DOE/EH-0209

Environmental Audit

Rifle, Gunnison and Grand Junction UMTRA Project Sites

U.S. Department of Energy

Office of Environmental Audit
Washington, DC 20585

August 1991

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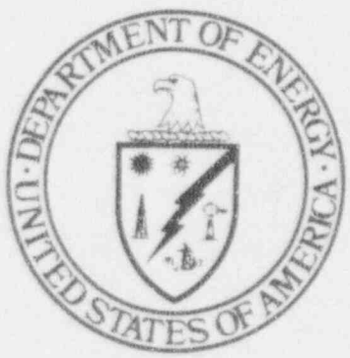

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PREFACE

Preface

U.S. Department of Energy
Environmental Audit
of the
Rifle, Gunnison, and Grand Junction
UMTRA Project Sites

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 emphasized and strengthened 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 multidisciplinary environmental audits at DOE's operating facilities. The initial audits in this program are designed to gather baseline information on environmental compliance and management at facilities that have not undergone a DOE Headquarters Environmental Survey or Tiger Team Assessment and are not expected to be scheduled for a Tiger Team Assessment through Fiscal Year 1992.

This document contains findings identified during the Environmental Audit of the UMTRA Project Sites at Grand Junction, Rifle, and Gunnison, Colorado. This Environmental Audit was conducted by the DOE's Office of Environmental Audit between June 10 and June 26, 1991.

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

The scope of this Environmental Audit was comprehensive, covering all areas of environmental activities and waste management operations, with the exception of the National Environmental Policy Act (NEPA), which is the responsibility of the DOE Headquarters Office of NEPA Oversight (EH-25). Compliance with Federal, state, and local regulations DOE Orders, and internal facility requirements was assessed, along with adherence to best management practices.

June 1991
Washington, D.C.

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EXECUTIVE SUMMARY

Executive Summary

This report documents the results of the comprehensive baseline Environmental Audit completed for the Uranium Mill Tailings Remedial Action (UMTRA) sites at Grand Junction, Rifle, and Gunnison, Colorado. Included in the Audit were the actual abandoned mill sites, associated transportation and disposal cell facilities, and representative examples of the more than 4,000 known vicinity properties (i.e., locations affected by mill tailings spread by the actions of wind, water, and people). The State-Owned Temporary Repository located in the same general area as the Climax Mill Site in Grand Junction was not covered in this Audit. Rather, the State Repository was included in the Audit of the Grand Junction Projects Office (GJPO) which was completed on June 12, 1991.

Sites investigated in the Audit include:

- Climax Mill Site
- Truck/Train Haul Route
- Cotter Transfer Station
- Cheney Disposal Cell
- Rifle Mill Sites (Old and New Rifle)
- Gunnison Mill Site
- Vicinity Properties
- Estes Gulch and Proposed Landfill Site No. 1 Disposal Cells

The UMTRA Environmental Audit was conducted from June 10 to June 26, 1991, by the U.S. Department of Energy's Office of Environmental Audit (EH-24) located within the Office of the Assistant Secretary for Environment, Safety & Health.

EH-24 carries out independent assessments of Department of Energy (DOE) facilities and activities as part of the Assistant Secretary's Environmental Audit Program. That program is designed to evaluate the status of DOE facilities/activities regarding compliance with laws, regulations, DOE Orders, formal written procedures, compliance agreements, and Best Management Practices (BMPs). This internal oversight function plays an important role in improving the compliance status of DOE operations. The Audit stresses the fact that it is the responsibility of line management to conduct operations in an environmentally sound and safe manner.

The UMTRA Audit was a comprehensive baseline audit which considered all environmental programs and the activities associated with ongoing and planned remediation at the UMTRA sites listed above. The only exception to this is that compliance with the National Environmental Policy Act (NEPA) was not considered during this investigation. Specifically included were the facilities and actions of the Albuquerque Operations Office (DOE-AL), the UMTRA Project Office, and the numerous contractors and subcontractors involved. The Audit Team looked at the following technical disciplines:

- Air
- Surface Water/Drinking Water
- Groundwater
- Soil/Sediment/Biota
- Waste Management
- Toxic and Chemical Materials
- Quality Assurance
- Radiation
- Inactive Waste Sites
- Environmental Management

The Audit Team completed its investigations through a series of activities in Grand Junction, Rifle, and Gunnison, Colorado as well as in Albuquerque, New Mexico. These included conducting interviews, reviewing documents, and conducting onsite field inspections. Interviews were held with DOE and contractor personnel knowledgeable in the remediation projects, along with appropriate State and local regulators. The results of previous audits and self-assessments were also considered during the preparation of this report.

Deficiencies noted during the Audit do not, in the opinion of the Team, represent conditions or actions significant enough to warrant cessation of operations. Many of the major findings identified by the Team involve, directly or indirectly, the logistical difficulties inherent in managing large projects in fairly remote locations with little or no onsite presence by the DOE. The "Key Findings" are summarized by DOE Oversight, Formality of Operations, Determination of Regulatory Compliance, Comprehensive Environmental Management and Protection Program and Quality Assurance Program.

Due to circumstances that could not be predicted at the time the Audit was scheduled, actual hauling of mill tailings and vicinity property materials was not occurring while the Audit Team was onsite in Colorado. As such, a comparison of written procedures to actual activities was not routinely possible. However, the Team was able to draw upon observations made during the pre-Audit site visit as well as video tapes and still photos of activities at the locations involved in the Audit. It should not be assumed that actual operations which were not viewed by the Team are in compliance with all requirements because specific findings were not developed. The development and full implementation of a comprehensive self-assessment program by DOE-AL, the UMTRA Project Office, and the contractors/subcontractors will ensure that all operations are evaluated. Although the preparation of individual self-assessment plans has been initiated, a coordinated, detailed, and formalized *program* does not currently exist. A particular emphasis of such a program should be the comparison of actual onsite activities to appropriate policies and procedures.

Environmental Audit

Rifle, Gunnison and Grand Junction UMTRA Project Sites

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1.0

INTRODUCTION

1.0 Introduction

The Environmental Audit covered in this report is a comprehensive baseline audit for the Uranium Mill Tailings Remedial Action (UMTRA) Project sites located in Grand Junction, Rifle, and Gunnison, Colorado. Additional UMTRA project sites are located in Lakeview, Oregon; Lowman, Idaho; Belfield and Bowman, North Dakota; Edgemont, South Dakota; Canonsburg, Pennsylvania; Salt Lake City, Green River, and Mexican Hat, Utah; Monument Valley and Tuba City, Arizona; Shiprock and Ambrosia Lake, New Mexico; Falls City, Texas; Riverton and Spook, Wyoming; and Naturita, Maybell, Slick Rock, and Durango, Colorado (Figure 1-1). These sites were not visited as part of this audit.

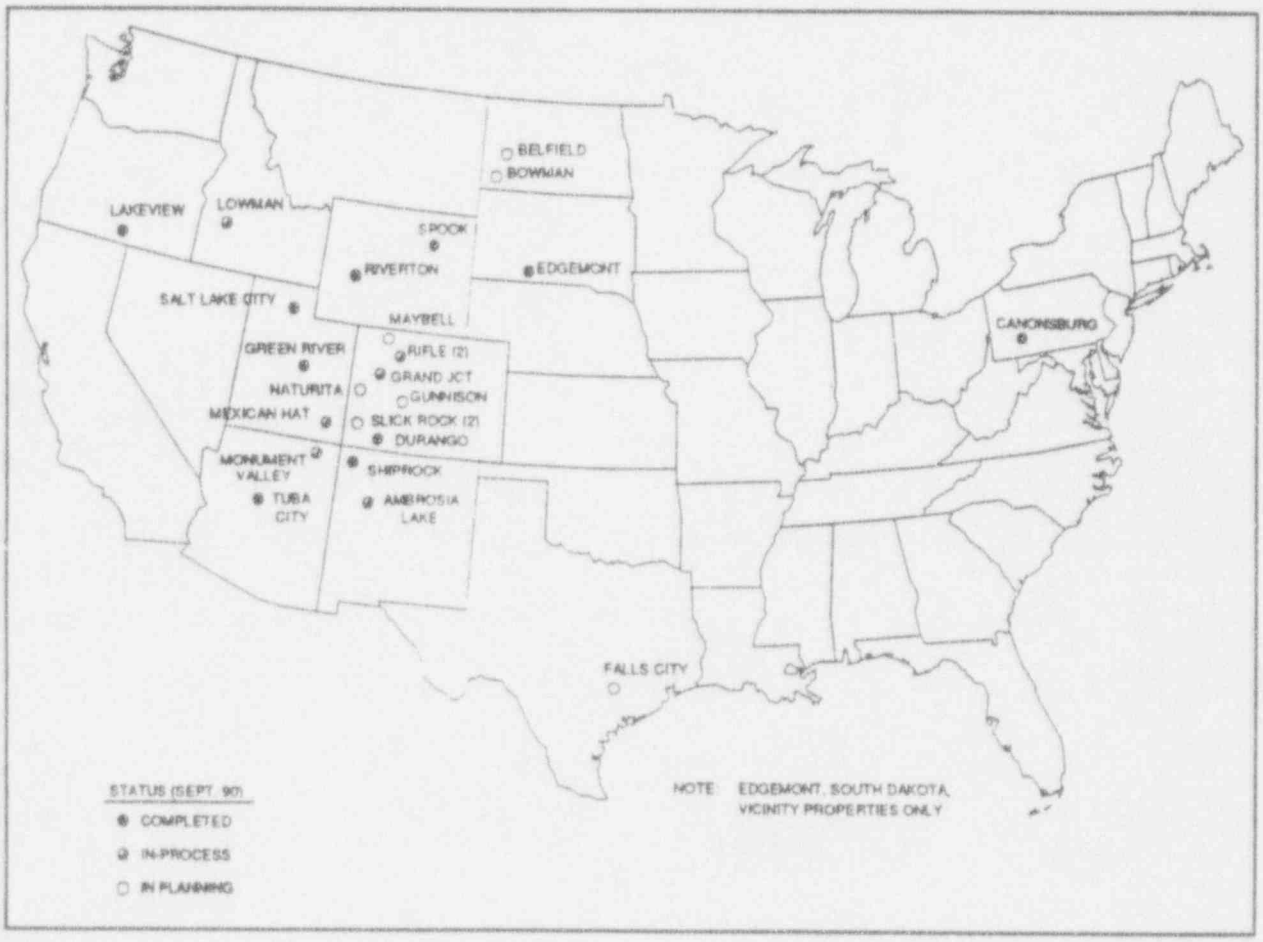

Figure 1-1. UMTRA Site Locations

In 1978, Congress passed the Uranium Mill Tailings Radiation Control Act (PL95-604) which authorized the Secretary of Energy to administer a program for the cleanup of 24 inactive uranium processing sites nationwide. The U.S. Department of Energy-Albuquerque Operations Office (DOE-AL) was assigned responsibility for carrying out the UMTRA Project. The UMTRA Project Office, headquartered in Albuquerque, New Mexico, was created and is managed under the Assistant Secretary for Environmental Restoration and Waste Management, Office of Environmental Restoration, Division of Offsite Remediation (EM-45). DOE-AL has a memorandum of understanding with U.S. Department of Energy-Idaho Operations Office

(DOE-ID), Grand Junction Project Office (DOE-GJPO) to manage portions of the UMTRA program, specifically the vicinity property remediation project in Grand Junction. A separate Environmental Audit was conducted at GJPO from May 29, 1991, through June 12, 1991, and the findings are presented in the Environmental Audit Report, Grand Junction Project Office, June 1991. Two findings relating to the UMTRA Project under the purview of GJPO, specifically issues associated with the State Owned Repository at the Grand Junction site, are presented in the GJPO Environmental Audit Report.

Contractors involved in the UMTRA project include: the Remedial Action Contractors (RAC), MK-Ferguson Co., Chem-Nuclear Geotech Inc.; the Technical Support Contractor (TSC), Jacobs Engineering Group, Inc.; and Oak Ridge National Laboratory (Figure 1-2).

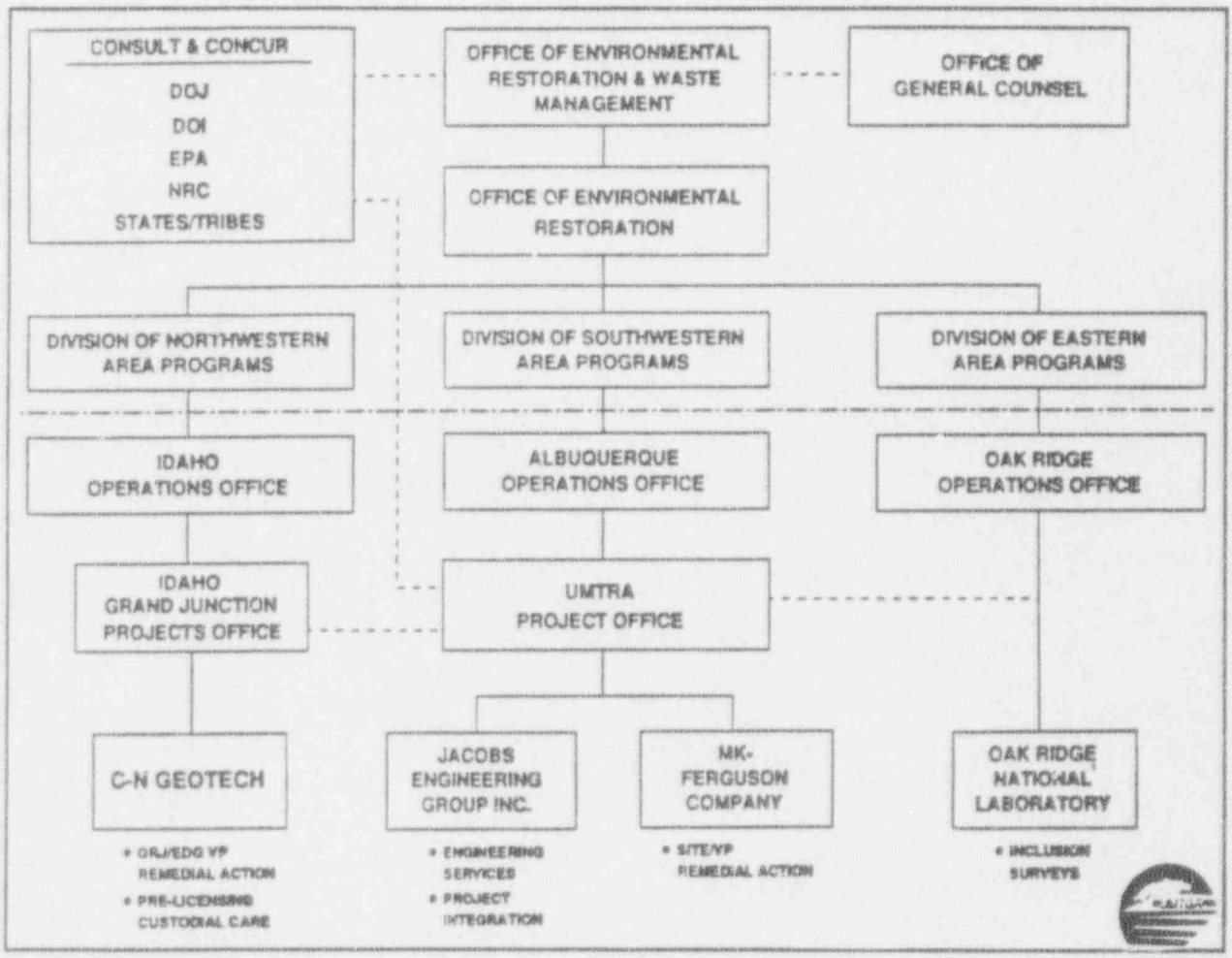

Figure 1-2. UMTRA Projects Participant Structure

Within the scope of this Environmental Audit, the RACs are responsible for design and construction activities, specifically, Chem-Nuclear Geotech Inc. is responsible for the Grand Junction Vicinity Property remediation program; MK-Ferguson Co. is responsible for remedial activities related to the Grand Junction site, and remedial activities at the Rifle and Gunnison sites and their associated vicinity properties. The TSC, Jacobs Engineering Group, Inc., is responsible for technical support to the UMTRA Project including preparing environmental documentation (NEPA), developing procedures for disposal of hazardous wastes, preparing

groundwater restoration and surface remedial action plans and other support activities. Oakridge National Laboratory is responsible for the initial inclusion/exclusion surveys at vicinity properties. Numerous sub-contractors also participate in the UMTRA Project.

Secretary of Energy Notice (SEN)-6D-91, "Departmental Organization and Management Arrangements," assigns the Office of Environment, Safety and Health (EH) to conduct independent internal oversight audits to ensure compliance with laws and sound management practices related to environmental protection. SEN-20-90, "Interaction with Internal and External Oversight Organizations," emphasizes the concept that the responsibility for ensuring environmentally sound activities starts with line management at the facility level and moves up through DOE line management. The goal of the Environmental Audit Program, as conducted by the Office of Environmental Audit (EH-24), is to provide a continuing program of internal, independent oversight of line management's environmental performance, in support of DOE's broader goal of achieving full compliance and excellence in the environmental area.

1.1 Purpose

The purpose of the Environmental Audit of the Rifle, Gunnison and Grand Junction UMTRA Project sites is to provide the Secretary of Energy with concise information on the following issues:

- Current compliance status with environmental regulations (with the exception of the National Environmental Policy Act (NEPA) requirements);
- Application of best management practices (BMPs);
- Adequacy of environmental management programs and organizational structure within the UMTRA Project Office;
- Identification of causal factors associated with each deficiency to determine root causes; and
- Determination of DOE vulnerabilities and liabilities associated with compliance status, environmental conditions and management practices.

This information will assist DOE in determining the patterns and trends in environmental compliance and best management practices and will provide UMTRA Project management with information to identify root causes and to determine necessary corrective actions.

1.2 Scope

The scope of the UMTRA Environmental Audit was comprehensive, covering all environmental media, Federal and state regulations and requirements, best management practices, and DOE Orders. The environmental disciplines addressed in the Audit include: surface water/drinking water; groundwater; soils, sediment and biota; waste management; toxic and chemical materials; air; radiation; quality assurance; and inactive waste sites and releases. In addition, the Audit included a review of the effectiveness of the environmental management program. Because auditing NEPA activities is the responsibility of the U.S. Department of Energy Headquarters (DOE-HQ), Office of NEPA Oversight (EH-25), this is not addressed here.

1.3 Approach

The UMTRA Environmental Audit was conducted in accordance with the draft *DOE Environmental Audit Guidance Manual* (June 1990) and followed accepted audit techniques. The Environmental Audit was conducted by a team of professionals managed by a Team Leader and Assistant Team Leader from the Office of Environmental Audit (EH-24) with technical contractor support personnel. The names, responsibilities, affiliation, and biographical sketches of the team members are provided in Appendix A.

The UMTRA Environmental Audit included three phases: planning, onsite activities, and reporting. During the planning phase, a memorandum was sent to the UMTRA Project Manager announcing the Audit and requesting information about the site. A pre-Audit site visit was conducted from April 30 to May 2, 1991. Information gathered in response to the information request memorandum and the pre-Audit site visit formed the basis for the Environmental Audit Team's Audit Plan (Appendix B). As more information was obtained and additional areas of interest were identified, the onsite agenda was modified. The final daily Environmental Audit agenda is contained in Appendix C.

Onsite activities for the UMTRA Project Environmental Audit took place from June 10 to 26, 1991. Onsite activities included document review, interviews with UMTRA and contractor personnel, and personnel from Federal and state agencies, reviews of previous audits and self-assessments, and inspections of the operations at Rifle, Gunnison and Grand Junction. The team held daily debriefs which were open to UMTRA Project Office, contractor and regulatory personnel. The Colorado Department of Health was actively involved in the audit process. The lists of site documents reviewed and interviews conducted are provided in Appendices D and E, respectively. In addition, DOE Headquarters personnel were also interviewed. Using these sources of information, the team developed the findings as discussed in the following sections.

Each concern identified by the Environmental Audit Team has been categorized as either a compliance finding (CF) or a best management practice finding (BMPF). Compliance findings are conditions that, in the judgement of the Environmental Audit Team, may not satisfy environmental regulations, DOE Orders (including internal DOE memoranda), internal environmental site policies and operation standards. Best management practice findings are derived from regulatory agency guidance, accepted industry practice, best professional judgement, and draft DOE Orders. Within these categories, the findings are prefaced by a statement of the Performance Objective. The performance objectives specify the standards that were not being met. The findings are not arranged in order of relative significance.

Site operations and management were also reviewed for noteworthy practices which are activities or programs that, in the Audit Team's opinion, have general application to other DOE facilities and warrant documentation for information transfer. The presence or absence of noteworthy practices should not be viewed as a measure of performance.

The intent of the Environmental Audit is to go beyond the identification of individual findings and to identify causal factors. Causal Factors can be defined as the factors contributing to the observed environmental deficiencies. The causal factors are further evaluated by the facility to determine the root cause and to design a comprehensive corrective action to rectify each individual finding and overall deficiencies.

1.4 Description of Facilities

The UMTRA Project includes 24 inactive Uranium Mill Processing sites in 10 states. The principal hazard associated with the tailings results from the production of radon, a radioactive decay product of radium contained in the pile. Radon, a radioactive gas, can diffuse through the pile and be released into the atmosphere where it and its radioactive decay products may be inhaled by humans. The remedial action at the site is generally to stabilize the tailings in place or to relocate the tailings pile to an offsite disposal cell.

The Environmental Audit covered by this report includes representative UMTRA Project sites located in the state of Colorado. These sites are listed in the following paragraphs.

1.4.1 Grand Junction

The Grand Junction site, also known as the Climax Mill Site, is located on 114 acres adjacent to the south side of the city of Grand Junction, Mesa County, Colorado, and adjacent to the north side of the Colorado River (Figure 1-3). Currently, the Climax Mill Site consists of access control/office trailers, the tailings area, the sugar beet factory/mill building, truck decontamination area, train loading area, wastewater treatment plant, two wastewater retention basins, several above ground storage tanks, outside storage shed, drum storage area, asbestos storage vans, and a water tank. The state of Colorado presently owns a portion of the site, the State Owned Repository, which is utilized for temporary storage of material generated from the remedial action project at the vicinity properties in the Grand Junction area.

More than 4,000 vicinity properties have been identified in the Grand Junction area. Vicinity properties (VP) are homes, businesses or commercial properties, public buildings, and vacant land which may have been contaminated by the use of tailings as a building material or as fill material before the hazards associated with this material were known. The use of tailings for these purposes is no longer allowed. VPs may also have been contaminated by tailings distributed by wind or water. Currently, the Grand Junction Vicinity Property Program is actively conducting remediation and hauling residual radioactive material (RRM) to the State Owned Repository.

It is estimated that 5.5 million cubic yards of RRM are associated with the Grand Junction site. The active remediation project at the Climax Mill Site began in April 1990, and consisted of site preparation activities. The activities included the construction of: the Cheney Disposal Cell, the dedicated haul road, the Cotter train/truck transfer site, the dedicated rail line at the Climax site and the onsite wastewater treatment plant. The Cotter Transfer Station consists of: access control/office trailers, the train/truck transfer area, and decontamination facilities. The Cheney Disposal Cell consists of: access control/office trailers, the 54-acre disposal cell, backfill stockpiles, a vehicle maintenance facility, above ground storage tanks for oil and waste oil, a drum storage area, a truck decontamination facility, water tanks, and two wastewater retention ponds.

The active excavation, transportation and disposal of RRM began on March 11, 1991. The tailings are excavated from the Climax Mill Site, transported via train to the Cotter Transfer Station and trucked to the Cheney Disposal Cell for ultimate disposal. Approximately 10,000 cubic yards of RRM can be transported per day. In conjunction with the startup of the active remediation of the Climax Mill Site, DOE requested an exemption from the U.S. Department

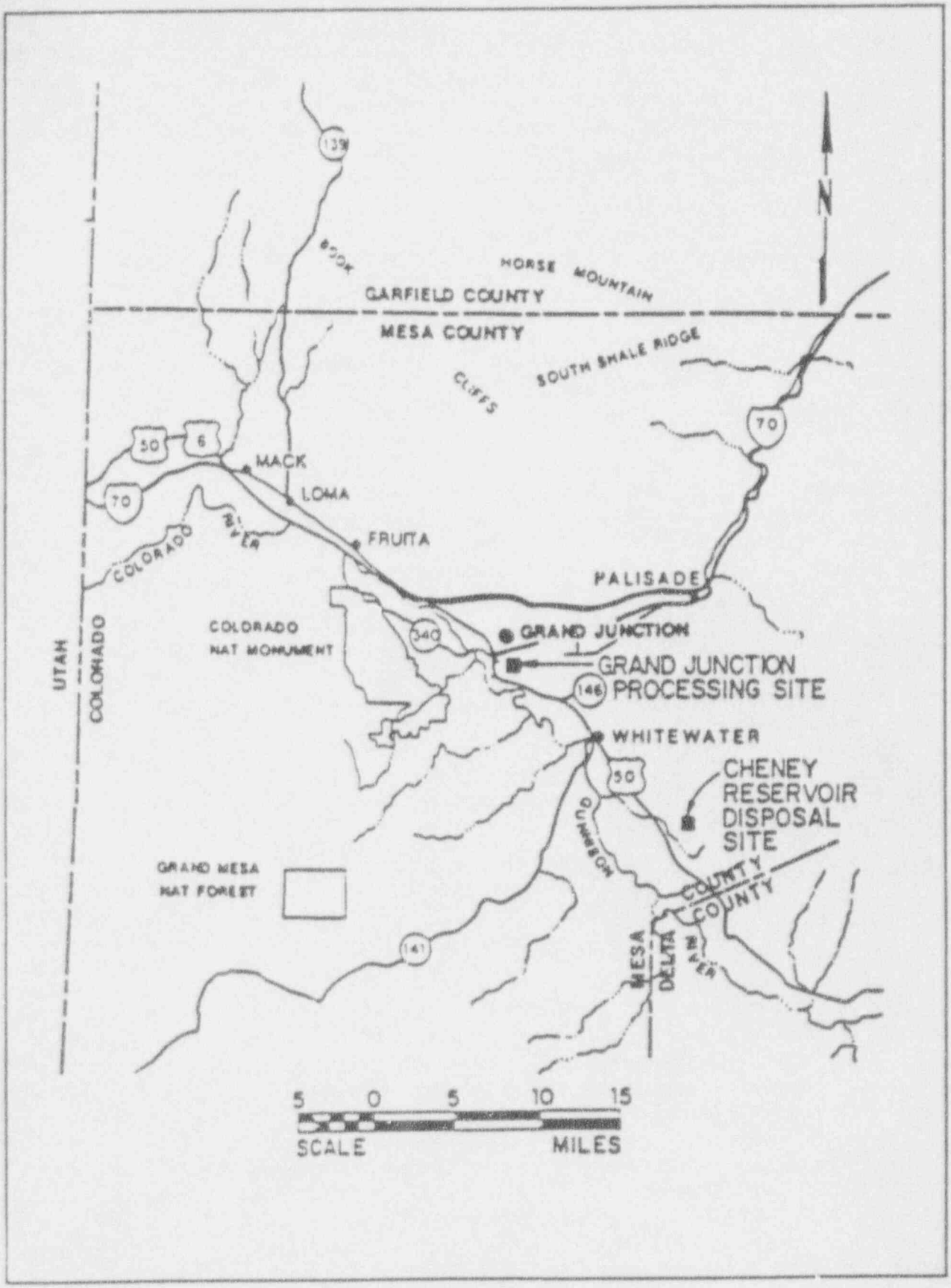

Figure 1-3. Site Location Map, Grand Junction Site, Colorado

of Transportation (DOT) to allow for the transportation of mill tailings in excess of 2,000 pCi/gram total activity on April 30, 1991. The exemption request was published in the *Federal Register* on May 9, 1991, and the comment period closed on June 10, 1991. DOT exemption No. E-10594 was granted on June 21, 1991, with specific conditions relating to the Grand Junction sites.

A spill on the haul road between the Cotter Transfer Station and the Cheney Disposal Cell occurred on May 6, 1991, which prompted a DOE-HQ (EM-50) review of the spill incident. As a result of this review, the project was requested to take the following actions:

- Assure shipment of all materials under current procedures be limited to those with specific activity (including radon daughter products) of less than 2,000 pCi/gram.
- Prepare to revise transportation procedures to comply with the provisions of the in-process exemption.
- Modify procedures and requirements, where necessary, to assure the material haulers have $5 million liability insurance.
- Complete the proper notifications regarding the May 6, 1991, spill incident to the National Emergency Response Center.
- Upgrade the occurrence report ALO-UMTR-UMTRA-1991-1001 from "off-normal" to "unusual occurrence."

The Grand Junction project was shut down on May 28, 1991. As an interim measure pending ruling on the DOT exemption request, the UMTRA Project Office requested authority from EM-1 pursuant to AL Order AL 1120, "Organization, Authorities and Functions," Chapter IV, Section 16A, Distribution of Functions within the Environmental Protection Division (EPD), May 14, 1991, to re-start the remedial activities to only haul materials with specific activity less than 2,000 pCi/gram. EM-1 authorized the re-start of the Grand Junction UMTRA Project on June 17, 1991. Based on the dates of the project shut down, all inspections conducted as part of this Environmental Audit at Grand Junction, including the Climax Mill Site, the Cotter Transfer Station and the Cheney Disposal Cell, did not include inspection of active remedial operations. However, the observations made by the Audit Team during the pre-Audit site visit and while reviewing video tapes of typical operations were considered.

1.4.2 Gunnison

The Gunnison Site is a 60.5-acre site located adjacent to the city of Gunnison in Gunnison County, Colorado, on a drainage divide between the Gunnison River and Tomichi Creek (Figure 1-4). Currently, the Gunnison Site consists of the tailings pile, a steel mill building, an administration building, a steel water tower, an active irrigation ditch, and miscellaneous debris piles. Ten vicinity properties are also associated with the site. It is estimated that 833,300 cubic yards of RRM are associated with the Gunnison Site.

A plume of uranium contaminated groundwater was identified to the southwest of the mill site in the area of the Dos Rios Subdivision in July 1990. Bottled water is currently being supplied to area residents. DOE is negotiating with the Town of Gunnison and Gunnison County to develop an alternate public water supply. Vicinity property remediation and onsite demolition

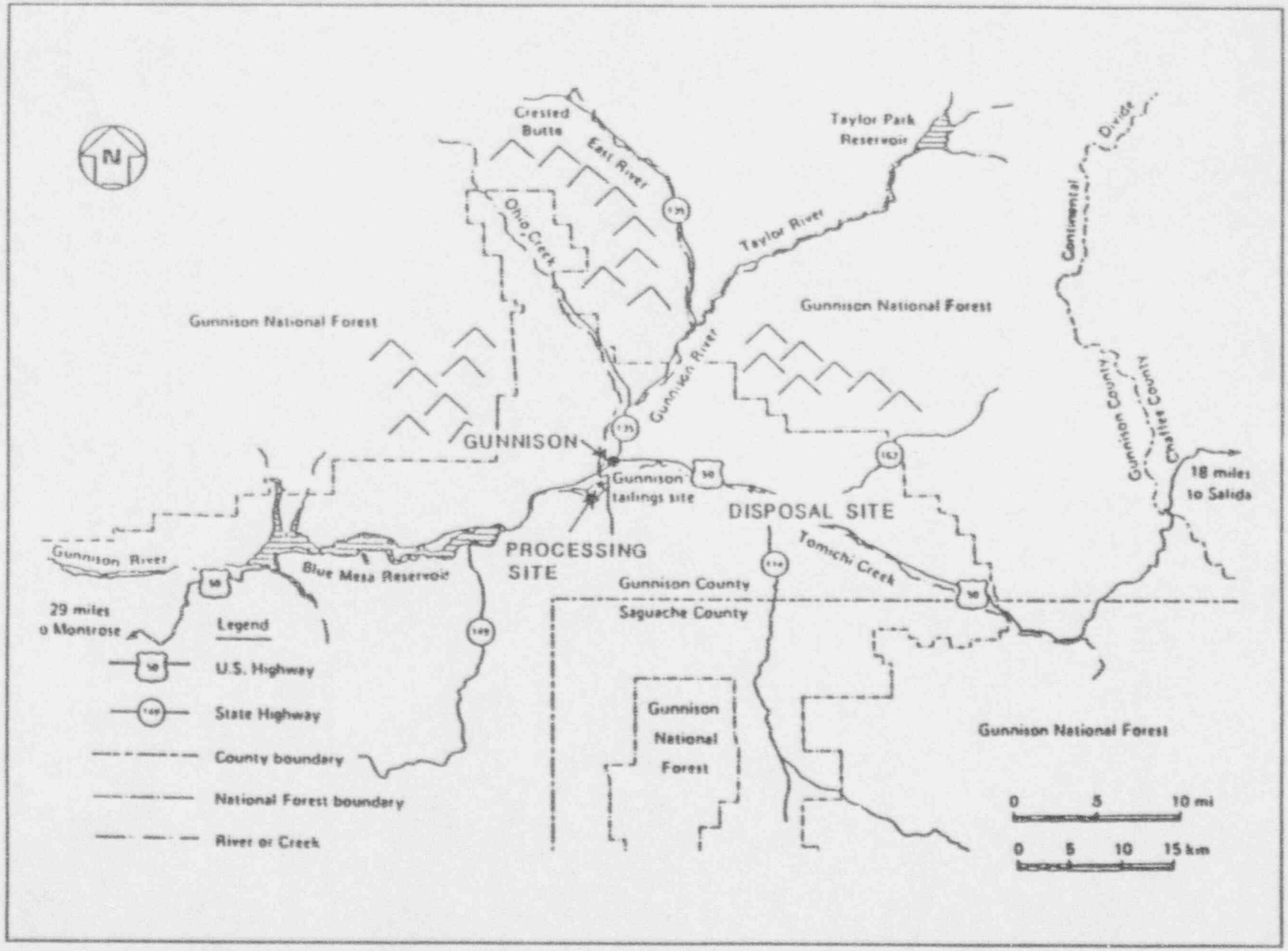

Figure 1-4. Location Map, Gunnison Site, Colorado

activities are scheduled for Fiscal Year 1991. The excavation, transportation and disposal of mill tailings to an offsite disposal location is scheduled for Fiscal Year 1992.

1.4.3 Rifle

The Rifle Site consists of two distinct areas, the 22-acre Old Rifle Site and the 142-acre New Rifle Site, both adjacent to the city of Rifle in Garfield County, Colorado, and the Colorado River (Figure 1-5). Currently, the New Rifle Site consists of the tailings pile, demolition debris from the Phase I demolition of the mill buildings, an asbestos storage area, a wastewater retention basin, and access control/office trailers. Currently, the Old Rifle Site consists of a tailings pile which likely covers demolition debris from the former mill structures. Approximetely 102 vicinity properties are also associated with the site. It is estimated that 4.0 million cubic yards of RRM are associated with the Rifle Sites.

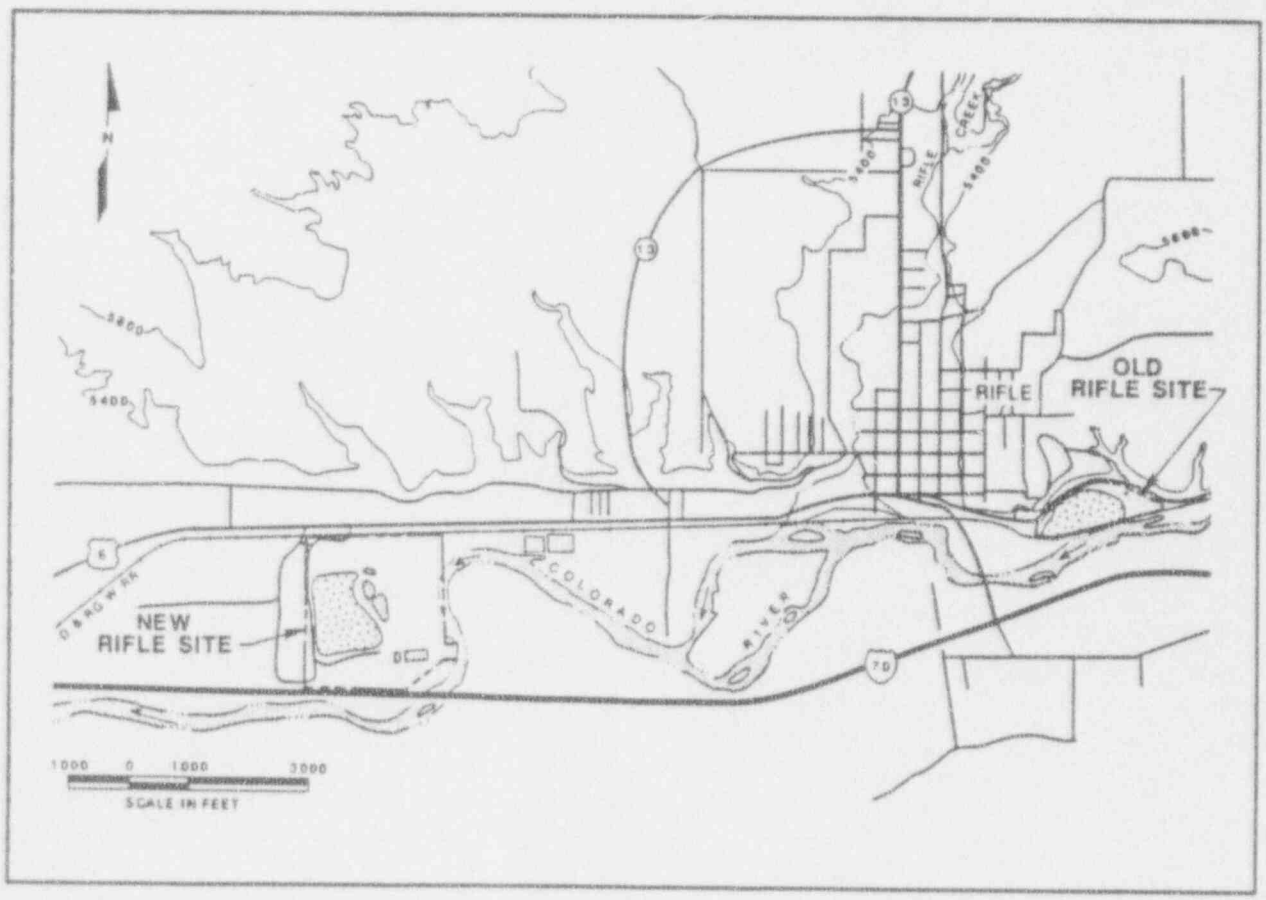

Figure 1-5. Old and New Rifle Sites

Onsite demolition activities (Phase I) have been completed. Vicinity property remediation is ongoing in Rifle and the RRM is hauled to the New Rifle Site for temporary storage. The excavation, transportation, and disposal of mill tailings to an offsite disposal location in Estes Gulch is scheduled for Fiscal Year 1992.

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2.0

SUMMARY OF ENVIRONMENTAL AUDIT FINDINGS, KEY FINDINGS AND CAUSAL FACTORS

2.0 Summary of Environmental Audit Findings, Key Findings, and Causal Factors

This section presents a summary of the findings by technical discipline, a discussion of overall key findings, and evaluation of the apparent causal factors. The findings are organized by discipline and categorized as either compliance findings (CF) or best management practice findings (BMPF). Each finding is assigned an alpha numeric code based on the specific technical discipline involved (e.g., IWS/CF-1 is the first compliance finding in the Inactive Waste Sites discipline). References within the discussion of each finding may include interviews, documents, and other findings. A list of documents reviewed is provided in Appendix D. A list of interviews conducted is provided in Appendix E and is organized by discipline in numerical order (e.g., I-EM-7 is the seventh interview conducted by the Environmental Management expert).

2.1 Findings Summary

The Environmental Audit Team identified 48 findings (see Figure 2-1) in the Environmental Audit of the Rifle, Gunnison and Grand Junction UMTRA Project sites. None of these findings reflect situations that present an immediate danger to public health and the environment.

It should be recognized that the total number of findings identified by this audit process does not directly relate to the significance of the problems which exist at facilities. It is inappropriate to compare the performance of the UMTRA Project to other Environmental Audits solely based on the number of findings. In addition, the sequencing of technical disciplines and the numbering of findings do not reflect a prioritization of concerns or anticipated corrective actions.

The scope and depth of the information collection process is not intended to be so exhaustive as to identify every compliance problem with the UMTRA Project, but rather to compile a representative sampling of information to develop a broad understanding and awareness of the compliance issues which exist at this time, the range of issues and causes.

The UMTRA Audit was somewhat unusual because the sole mission of the UMTRA Program is environmental restoration. In addition, the timing of particular events, specifically, the remediation operations that would normally be occurring at the Grand Junction project sites and the Rifle sites were "on hold" during the audit inspections. This was due to a DOE Headquarters decision regarding compliance with DOT regulations. As such, Audit Team members did not all have the opportunity to actually observe such activities as the hauling of mill tailings and the decontamination of vehicles. Therefore, some of the findings discussed in this report are based on the observations of a sub-set of the Team that visited the sites during the pre-Audit site visit. Additionally, all Team members viewed various video tapes covering typical operations at the sites being audited. Remediation activities at the Gunnison Site have not begun.

The Comprehensive Baseline Environmental Audit at the UMTRA Project sites in Grand Junction, Rifle, and Gunnison, Colorado, identified 48 findings divided between 32 Compliance Findings and 16 BMPFs. Compliance Findings involve activities or conditions which, in the judgement of the Environmental Audit Team, may not satisfy Federal, state, or

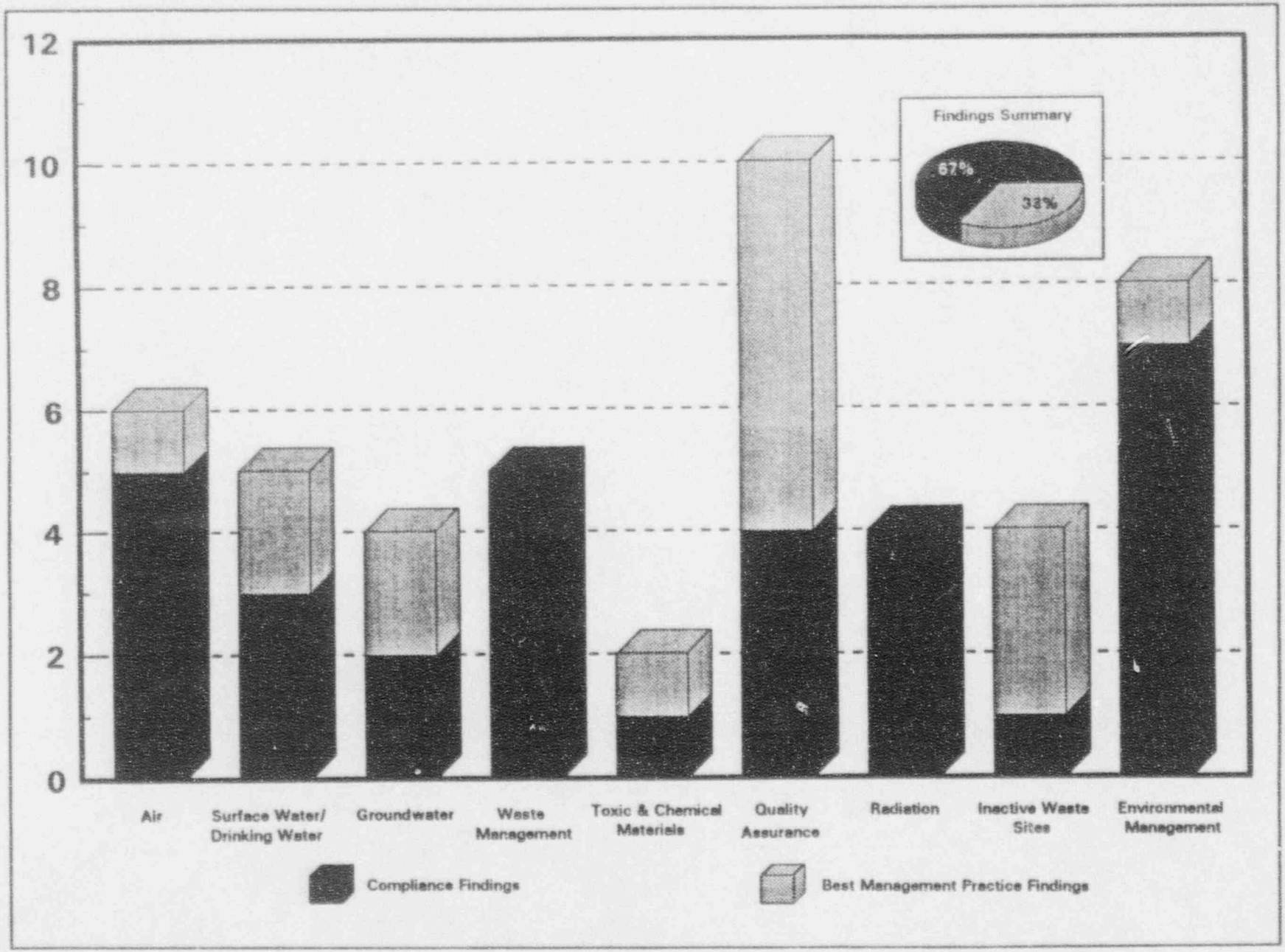

Figure 2-1. Summary of Findings by Medium or Discipline

local environmental regulations, or Department of Energy and Albuquerque Orders. BMPFs are derived from regulatory agency guidance, DOE Orders, accepted industry practices, and professional judgement. In some findings in this report, best management practices are identified within the discussion of a Compliance Finding and not listed separately.

The third type of issue that is evaluated in the audit process is Noteworthy Practices. They involve environmental practices which, in the judgement of the team, will have general application to other DOE-facilities/operations. No Noteworthy Practices were identified by the Audit Team. However, the lack of Noteworthy Practices is not an indication of a deficiency.

The titles of the findings are presented in Table 2-1 by medium or discipline, as appropriate. The findings are cross-referenced in the discussion when further explanation and clarification of issues is helpful.

2.1.1 Air

The major non-radiological source of air pollutants at the UMTRA Project sites is particulates or dust. Five compliance findings and one BMP finding were identified. The compliance findings related to lack of the permit number imprinted on air pollution equipment; exceedance of noise limits at the Climax Mill Site; permit violations with regard to dust control at the Climax Mill Site and the Cheney Disposal Site and; locations of Total Suspended Particulate (TSP) monitors. The BMP finding related to a noise minimization plan at the Climax Mill Site.

2.1.2 Toxic and Chemical Materials

Small quantities of toxic or chemical materials are present at the UMTRA Project sites. One compliance finding was identified regarding implementation of the Spill Prevention, Control and Countermeasures (SPCC) plan at Grand Junction. One BMP finding addressed the inconsistent distribution of Material Safety Data Sheets.

2.1.3 Waste Management

Hazardous wastes typically generated at UMTRA Project sites consist of oils, oil filters and spent paints. Five compliance findings were identified. The findings address labelling of hazardous wastes; disposal of UMTRA tailings from the Lowman Idaho Site at the New Rifle Site; waste characterization and generator status at the Grand Junction sites; waste management procedures for Residual Radioactive Material (RRM) and; procedures for characterization and management of hazardous waste at Vicinity Property sites.

2.1.4 Surface Water/Drinking Water

Surface water runoff is a concern at UMTRA Project sites because of the potential for off-site radiological contamination. Three compliance findings and two BMP findings were identified. Compliance findings relate to surface water runoff collection at the Climax Mill Site; discharge of fill materials into a wetland area along the Cheney Haul Road; and presence of a 10,000 gallon fuel oil tank at the Cheney Disposal Site. The BMP findings relate to applications of petroleum/oil based materials to the Cheney Haul Road for dust suppression and the surface water runoff collection at the New Rifle Site.

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Environmental Audit Team Findings

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QA/CF-3	Quality Assurance Plans	3-57
QA/CF-4	Control of Environmental Protection Program Documents	3-59
QA/BMPF-1	Vicinity Property Exclusion Criteria	3-61
QA/BMPF-2	Completeness and Consistency of Program Procedures or Implementation of Procedures	3-63
QA/BMPF-3	QA/QC Program for Radon	3-66
QA/BMPF-4	Annual Site Environmental Report	3-69
QA/BMPF-5	Interlaboratory Performance Evaluation Program	3-70
QA/BMPF-6	Quality Assurance and Data Verification Guidelines for Environmental Monitoring Programs	3-71

Table 2-1.
Environmental Audit Team Findings (continued)

Finding Number	Title of Finding	Page
Radiation		
RAD/CF-1	Controlling Environmental Pollution	3-75
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RAD/CF-3	Monitoring of Emissions for Reporting Doses to the Public	3-78
RAD/CF-4	Radioactive Materials Transportation and Notification Requirements	3-79
Inactive Waste Sites		
IWS/CF-1	Policy and Implementation Procedures under UMTRCA to Ensure Compliance with DOE Orders	3-86
IWS/BMPF-1	CERCLA Remedial Action Decisions	3-89
IWS/BMPF-2	Statements of Principle for Dealing with Hazardous or Commingled Wastes	3-91
IWS/BMPF-3	Procedures for Demolition of Mill Structures	3-94
Environmental Management		
EM/CF-1	Priority of Environment, Safety, and Health Matters	3-100
EM/CF-2	General Environmental Protection Program	3-101
EM/CF-3	Self-Assessment Program	3-104
EM/CF-4	Organizational Structure	3-105
EM/CF-5	Regulatory Compliance	3-107
EM/CF-6	Environmental Protection Provision in Contracts	3-109
EM/CF-7	Office of Environment, Safety, and Health Organizational Responsibilities	3-110
EM/BMPF-1	Data Sharing with Cooperating Agencies	3-112

2.1.5 Inactive Waste Sites

Potential CERCLA liabilities at UMTRA sites have not been evaluated by the UMTRA Project Office. One compliance finding and three best management practice findings were identified. The compliance finding addressed policy and implementation procedures under UMTRA to ensure compliance with DOE Orders and limit future liabilities under CERCLA. The three BMPFs addressed policy and procedures to maintain continuing reviews of ongoing remedial activities at non-UMTRA sites; potential liabilities associated with the Statements of Principle for dealing with hazardous and commingled wastes; and demolition procedures utilized at the New Rifle Site.

2.1.6 Quality Assurance

A general lack of Quality Assurance/Quality Control procedures was noted throughout the UMTRA Project. Four compliance findings and six best management practice findings were identified. The compliance findings related to QA/QC practices for sampling and analysis activities; UMTRA Project Quality Assurance Program Plans and contractor Quality Assurance Program Plans; and document control systems for environmental protection documents. BMPFs addressed Vicinity Properties (VP) exclusion criteria; the completeness and consistency of inclusion/exclusion procedures; and a QA/QC Program to determine that the structures on exclusion properties are below the limits for radon daughter concentrations (RDCs); reporting of the laboratory cross-check program in the Annual Environmental Monitoring Report; participation of all laboratories in an interlaboratory performance evaluation program; and QA data verification guidelines for the UMTRA Project Office's environmental monitoring efforts.

2.1.7 Environmental Management

Generally, the UMTRA Project Office has not provided adequate support to ES&H activities. Seven compliance findings and one BMP finding were identified. The compliance findings represent a general trend of non-compliance with DOE Orders and SEN directives with respect to integrating environmental awareness into the UMTRA Project. The compliance findings relate to environmental staff resources to carry out ES&H oversight; identification of responsibilities for ES&H and QA for line management; the formal self-assessment program for the UMTRA Project Office and contractors; organizational structure; regulatory compliance; and environmental protection provisions in contracts. The BMP finding relates to formalizing data sharing procedures with the state of Colorado.

2.1.8 Groundwater

Phase II of UMTRCA implementation considers groundwater remediation and restoration. However, limited groundwater characterizations have taken place at the Rifle, Gunnison and Grand Junction mill sites. Two compliance findings and two BMP findings were identified. The compliance findings related to monitoring well permits, security at the well heads and well decommissioning procedures and the evaluation of the slurry wall construction at the Climax Mill Site with respect to the impact on the area's groundwater. The two BMP findings addressed effluent monitoring at disposal cell sites and groundwater monitoring well sampling procedures.

2.1.9 Radiation

The uranium mill tailings present at the UMTRA Project sites are classified as RRM. The principal health hazard associated with the mill tailings is release of radon gas. Four compliance findings were identified and concern the monitoring of emissions to determine dose assessments to the public; adherence to formal procedures during the excavation, loading and decontamination operations at the Climax Mill Site; the 1990 Environmental Monitoring Report; and implementation of radioactive materials transportation and notification requirements.

2.2 Key Findings

Key findings are selected from the UMTRA Audit Findings. These are findings or groups of findings which, in the judgement of the Audit Team, are integral to understanding the nature, and the scope of environmental issues at UMTRA sites. The key findings the Audit Team identified are:

DOE Oversight: A lack of DOE UMTRA Project Office oversight contributes to a large percentage of the findings identified by the Audit Team. The majority of the UMTRA Program is the responsibility of the Albuquerque Operations Office (DOE-AL), but a portion of the UMTRA Program (i.e., Grand Junction vicinity properties) is managed by the Grand Junction Project Office (GJPO) under the Idaho Operations Office (ID). The UMTRA Program also involves numerous contractors and subcontractors who work in several widely separated and remote locations.

The remediation efforts under the program are being managed as any typical construction project in which the main concerns are adherence to a schedule and staying under budget. The lack of ongoing oversight on the part of AL in general, and the UMTRA Project Office and GJPO in particular, represents a delegation of both authority and responsibility to the contractors. Individual findings related to this key finding include EM/CF-2, EM/CF-3, EM/CF-4, EM/CF-5, and IWS/CF-1.

Formality of Operations: An overall tendency toward informality of operations is a common thread woven through many of the findings. This informality is seen at all levels of the project and is reflected in the lack of formal procedures and policy implementation guidance. It is evident that the RAC is a qualified construction management contractor however, it is also apparent that they receive little formal direction or guidance on environmental protection requirements. The radioactive and non-radioactive hazards involved in this remediation project are much lower than is often encountered at other DOE facilities. However, the risks are nonetheless real and also of greater potential severity than a standard construction project. In addition, the risks and, perhaps even more importantly, the perceived risks envisioned by some members of the public need to be dealt with on a more formal basis. Preparation and implementation of formal written procedures are critical to achieving environmental "excellence." Related findings include A/CF-3, A/BMPF-1, GW/BMPF-1, WM/CF-5, TCM/BMPF-1, QA/CF-1,2,3,4, QA/BMPF-1,2,4,6, RAD/CF-1,2,4, IWS/CF-1, IWS/BMPF-2, and EM/CF-6.

Determination of Regulatory Compliance: The UMTRA Project Office identified that an "operating envelope" of environmental regulations, DOE Orders and SEN directives has not been defined for the UMTRA Program. The lack of this "operating envelope" contributed to many findings within this Audit. Specifically, the UMTRA Project Office has not fully evaluated the impact of environmental regulations and DOE directives on the program and has not determined the potential liabilities associated with other environmental laws and regulations besides UMTRCA. Findings associated with this key finding are IWS/CF-1, IWS/BMPF-2, EM/CF-5, RAD/CF-4 and WM/CF-1,2,3,4,5.

Comprehensive Environmental Management and Protection Program: The UMTRA Project Office does not have an integrated and complete environmental management and protection program covering all activities and participants in the remediation efforts. Numerous individual pieces that would make up such a program already exist, however, a comprehensive program for the project as a whole is not in place. DOE-AL, the UMTRA Project Office, GJPO, and the myriad of contractors and subcontractors each have developed some components necessary to assemble such a program. However, some items are redundant, others are incomplete or inadequate, and still others do not exist. The result is a shotgun approach to environmental management and protection; some items are hit once, others numerous times, and some not at all. This is reflected in that comprehensive environmental protection plans required by DOE Order 5400.1 have not been developed. Findings associated with this key finding are GW/CF-2, RAD/CF-1, IWS/BMPF-1, and EM/CF-1,2,3.

Quality Assurance Program: In the environmental QA area there is a general lack of oversight of the prime contractor's Quality Assurance Program Plans. Consequently, QA is applied in an inconsistent manner within UMTRA environmental protection programs. The lack of an adequate Quality Assurance Program may lead to actual or perceived discrepancies related to environmental compliance and monitoring. This key finding focuses on environmental protection program QA and includes a number of individual findings related to development and implementation of procedures, document control and distribution, environmental monitoring practices and procedures, periodic review and update requirements and data reporting (QA/CF-1,2,3,4, QA/BMPF-1,2,3,4,5,6, GW/BMPF-1, and EM/CF-5).

2.3 Causal Factor Summaries

In an effort to understand why a finding occurred, a systematic approach was initiated to perform a "probable root cause" analysis. This analysis is a two-step process which first identifies causal factors and then identifies the root cause which is the most basic, fundamental cause, which if corrected will prevent recurrence.

The cause(s) and rationale(s) in support of the causal factors are identified by the Environmental Audit Team in the discussion of each finding. The majority of these apparent causal factors are judgement calls by the Team members. The UMTRA Project Office should make the final detailed casual factor analysis to correct all causal factors which have contributed to the finding and perform the root cause analysis. Although the identified causal factors for a particular finding may be incomplete, it is still the UMTRA Projects Office's responsibility to address *all* causal factors in the Corrective Action Plan.

The Environmental Audit identified 12 apparent causal factors which contributed to the occurrence of the findings (see Table 2-2). The three factors that appear most frequently are policy, policy implementation and procedures. An additional causal factor that particularly affects the UMTRA Program is resources. Each of these causal factors is discussed below. Definitions of the causal factors typically used in the audit process are presented in Appendix F.

Policy Implementation is the causal factor that appears most frequently (44 percent of the findings) and was evident in every discipline within the Audit. In many cases, the UMTRA Project Office has not fully evaluated the impact of environmental regulations and DOE Orders related to environmental protection on the UMTRA Program. In addition, various permit conditions were not met at specific sites.

Procedures is a causal factor in 33 percent of the findings and is noted in all but the Surface Water discipline. Failure to have procedures in place and the disregard for certain procedures reflects a lack of environmental protection awareness within the UMTRA Program.

Policy is a causal factor in 25 percent of the findings and was evident in all but the Toxic and Chemical Materials discipline. Inadequate policy was of particular concern with respect to full characterization of UMTRA Project sites and the ability to identify potential liabilities associated with other environmental regulations besides UMTRCA.

Resources is a causal factor in 8 percent of the findings and was unique to the Environmental Management discipline. However, the lack of "human" resources within the UMTRA Project Office impacts most findings contained within the Audit.

Chapter 3 presents the 48 compliance and best management practice findings, by discipline, identified during the Environmental Audit, and discusses in greater detail the causal factors that appeared to contribute to the findings.

TABLE 2-2
SUMMARY OF APPARENT CAUSAL FACTORS IDENTIFIED BY AUDIT FINDING

FINDING NUMBER	APPARENT CAUSAL FACTORS													
	Policy	Policy Implementation	Procedures	Personnel	Resources	Training	Change	Risk	Appraisals/Audits/Reviews	Design	Human Factors	Barriers and Controls	Supervision	QA/QC
Air														
A/CF-1		✓												
A/CF-2		✓		✓										
A/CF-3		✓	✓											
A/CF-4		✓												
A/CF-5		✓												
A/BMPF-1	✓		✓											
Surface Water/Drinking Water														
SW/CF-1		✓								✓			✓	
SW/CF-2		✓						✓				✓		
SW/CF-3		✓						✓						
SW/BMPF-1	✓							✓						
SW/BMFP-2		✓						✓		✓				
Groundwater														
GW/CF-1		✓												

TABLE 2-2
SUMMARY OF APPARENT CAUSAL FACTORS IDENTIFIED BY AUDIT FINDING

FINDING NUMBER	APPARENT CAUSAL FACTORS														
	Policy	Policy Implementation	Procedures	Personnel	Resources	Training	Change	Risk	Appraisals/Audits/Reviews	Design	Human Factors	Barriers and Controls	Supervision	QA/QC
GW/CF-2										✓				
GW/BMPF-1	✓		✓											
GW/BMPF-2										✓				
Waste Management														
WM/CF-1						✓								
WM/CF-2						✓		✓			✓			
WM/CF-3	✓													
WM/CF-4		✓											✓	
WM/CF-5			✓										✓	
Toxic And Chemical Materials														
TCM/CF-1		✓				✓						✓		
TCM/BMPF-1		✓	✓											
Quality Assurance														
QA/CF-1			✓			✓								
QA/CF-2		✓												

TABLE 2-2
SUMMARY OF APPARENT CAUSAL FACTORS IDENTIFIED BY AUDIT FINDING

FINDING NUMBER	APPARENT CAUSAL FACTORS													
	Policy	Policy Implementation	Procedures	Personnel	Resources	Training	Change	Risk	Appraisals/Audits/Reviews	Design	Human Factors	Barriers and Controls	Supervision	QA/QC
QA/CF-3		✓	✓						✓					
QA/CF-4			✓											
QA/BMPF-1			✓											
QA/BMPF-2			✓											
QA/BMPF-3	✓													
QA/BMPF-4			✓											
QA/BMPF-5	✓													
QA/BMPF-6		✓	✓											
Radiation														
RAD/CF-1			✓					✓						
RAD/CF-2		✓	✓											
RAD/CF-3									✓					
RAD/CF-4	✓													
Inactive Waste Sites														
IWS/CF-1	✓	✓												

TABLE 2-2
SUMMARY OF APPARENT CAUSAL FACTORS IDENTIFIED BY AUDIT FINDING

FINDING NUMBER	APPARENT CAUSAL FACTORS													
	Policy	Policy Implementation	Procedures	Personnel	Resources	Training	Change	Risk	Appraisals/Audits/Reviews	Design	Human Factors	Barriers and Controls	Supervision	QA/QC
IWS/BMPF-1	✓													
IWS/BMPF-2	✓		✓											
IWS/BMPF-3	✓													
Environmental Management														
EM/CF-1		✓										✓		
EM/CF-2		✓			✓									
EM-CF-3					✓							✓		
EM/CF-4												✓		
EM/CF-5					✓	✓								
EM/CF-6			✓											
EM/CF-7		✓							✓					
EM/BMPF-1	✓				✓									
TOTALS	12	21	16	1	4	5	0	6	5	4	1	5	3	0

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3.0

ENVIRONMENTAL AUDIT FINDINGS

3.0 Environmental Audit Findings

3.1 Air

3.1.1 Overview

The purpose of the air portion of the UMTRA Environmental Audit was to ascertain the current operations of the UMTRA Project practices with regard to: (1) regulations promulgated under the Clean Air Act; (2) the Mesa County Department of Health Regulations; (3) Colorado State regulations on air pollution control; (4) DOE Orders, (5) RAC internal procedures; and (6) best management practices (BMPs) associated with air pollution control. In addition, noise was included as a subcategory of the air portion of the Environmental Audit. The purpose of the noise portion of the audit was to evaluate the current operations of the UMTRA Project with regard to: (1) the Mesa County Planning Division regulations; (2) DOE Orders; and (3) best management practices (BMPs). Table 3-1 lists applicable noise and air regulations, requirements, guidelines, and the DOE Orders used in this evaluation.

Air pollution control and permitting at the Grand Junction, Rifle, and Gunnison Mill Sites is regulated by the Colorado Department of Health—Air Pollution Control Division (CDH-APCD) with onsite inspections conducted by the respective County Department of Health personnel. The sites are all in regions that are in attainment for all air criteria. Noise pollution control and permitting at the sites is regulated by: (1) local ordinances, and (2) DOE Orders.

The general approach to the air and noise audit included the following activities: (1) an inspection of the various sites; (2) interviews with the RAC, Colorado Department of Health, Mesa Department of Health, and Mesa County Department of Planning personnel; and (3) a review of site documents and files.

Total suspended particulates (TSPs) are the non-radioactive, air emissions of greatest importance at these sites. The Climax Mill Site and the Cheney Disposal Site produce the greatest amount of TSP, due to the activities associated with the movement of tailings. The Rifle and Gunnison Sites have minimal particulate emissions at the present time, due to the absence of remedial action activity. TSP emissions at the Climax Mill Site and at the Cheney Disposal Site result primarily from the moving, loading, and unloading of the uranium mill tailings and associated support activities.

The noise produced at the Climax Mill Site is the noise issue of greatest importance. Local regulations limit the noise levels from the Climax Mill Site and there have been complaints about noise from that site from local residents. Noise is not an issue at the other sites due to lack of nearby residences and/or lack of site activity.

The air and noise portion of the Environmental Audit identified five compliance findings and one best management practice finding. The compliance findings relate to air pollution emission permit requirements. The best management practice finding relates to the development of a noise minimization plan.

Table 3-1.
List of Air Regulations,
Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
40 CFR 50, Parts 50-88	Clean Air Act Implementing Regulations	EPA
DOE Order 5400.1	General Environmental Protection Program	DOE
DOE Order 6430.1A	General Design Criteria	DOE
Emission Permits	Air Emission Permits 88ME247F, 91ME097, 88ME250	Colorado Department of Health
Colorado Air Quality Control Commission Regulations No. 1-10	Air Pollution Regulations	State of Colorado
EPA-600/4-77-027a	Quality Assurance Handbook for Air Pollution Measurement Systems	EPA
	Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II - Ambient Air Specific Methods	EPA
	Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV - Meteorological Measurements	EPA
Mesa County Conditional Use Permit (CUP)		Mesa County Commission

3.1.2 Findings

A/CF-1: **Air Emission Permit Requirements for Wastewater Treatment Facility**

Performance Objective: Colorado Department of Health (CDH) Air Emission Permit (No. 91ME097) for the wastewater treatment facility requires that the permit number be "clearly marked on the subject equipment for ease of identification."

Finding: The permit number was not marked anywhere on the subject equipment at the wastewater treatment facility at the Climax Mill Site.

Discussion: UMTRA operations at the Climax Mill Site require a CDH air permit for the emission of ammonia from the wastewater treatment facility. An Air Pollution Emissions Notice was submitted for operation of the facility and an initial permit was approved on April 9, 1991. The RAC has recently submitted the Notice of Startup for the wastewater treatment facility, and has since commenced testing of the facility. The permit number must be displayed on the equipment in conjunction with the submittal of the Notice of Startup and the commencement of operations at the facility. The other conditions of the permit do not pertain at this time, since the facility is not in a complete operational mode and no ammonia is being emitted from the stack.

This finding was not identified in the RAC Environmental, Safety and Health Compliance Assessment Report.

The apparent causal factor is that there is not adequate policy implementation to ensure air emission permit requirements are met.

A/CF-2: **Noise Monitoring**

Performance Objective: The Mesa County Conditional Use Permit (CUP) for UMTRA operations at the Climax Mill Site requires that:

> "Noise monitors shall be placed on the north periphery of the site and on the south bluff line of the Colorado River, known as Orchard Mesa. Readings shall be taken bi-weekly and a quarterly report submitted to the Board of County Commissioners. The ambient noise level at the rim of the Orchard Mesa bluff shall not exceed the following noise limits:
>
> - 65 dB(A) averaged over any one (1) hour.
> - 75 dB(A) averaged over any fifteen (15) minute period.
>
> "During the hours before 7:00 a.m. and after 8:00 p.m., noise levels shall not exceed 65 dB(A) at the bluff on Orchard Mesa as referenced in paragraph 1 above. Work during these hours shall not include operations that include noise impacts above the 65 dB(A) level to residents of Orchard Mesa."

Finding: The required noise level limits required by the CUP for the quiet hours at Orchard Mesa are being exceeded and were not adequately reported in the quarterly report.

Discussion: Noise monitors are operated at three locations at the Climax Mill Site: one at Orchard Mesa Bluff, one at 9th Street and Kimball Avenue (Access Control), and one at the east side of the load-out facility. The monitoring site at 9th and Kimball is the one used to fulfill the CUP requirement of monitoring at the north periphery.

The quarterly noise monitoring report for May 1991, which was sent to the Mesa County Commissioners, presents noise levels for both day-time and night-time operations at all three of the noise monitoring sites. In the report, representative night-time data are presented as averaged over either 15 minutes or an hour, but not as instantaneous noise levels. Since the night-time limits in the CUP state that the 65 dB(A) shall not be exceeded at any time, the hourly and 15 minutes averages do not pertain to the noise limits required by the permit. Furthermore, a review of the noise monitoring data from Orchard Mesa bluff, indicate that unreported instantaneous noise levels exceed the 65 dB(A) limit.

This finding was not identified in any of the formal self-assessments. The RAC has contracted with a noise monitoring expert to take independent, third-party noise monitoring of the site and to provide information on improving the RAC noise monitoring procedure.

An apparent causal factor contributing to this finding is that there is not an adequate policy implementation to ensure CUP requirements are met. Another apparent causal factor is the lack of expertise in monitoring and abatement of noise by all levels of RAC personnel.

A/CF-3: **Air Emission Permit Requirements at Climax Mill Site**

Performance Objective: Colorado Department of Health Air Emission Permit (No. 88ME250) for the activities at the Climax Mill Site requires that the following conditions be met in order to reduce fugitive dust emissions:

- Tailings piles, excavation areas, and stockpiles will be watered to maintain a surface moisture content of 6 percent or greater. Water shall be available at all times.
- Water sprays shall be used to control emissions during loading and off loading of materials to a surface moisture content of 6 percent or greater.
- Vehicle speed on unpaved surfaces shall be limited to 30 mph. Speed limit signs shall be posted at appropriate locations.
- Unpaved haul roads shall be watered to maintain surface moisture content of 5 percent or greater.
- Work onsite shall be halted when wind speeds continuously exceed 40 mph.

Although permit 88 ME250 has never been officially finalized, the State Air Pollution Control Division considers this permit active regardless of official finalization. In addition, while not a condition of the permit, calibration of the meteorological station should be conducted semi-annually, pursuant to DOE guidance *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance* of January 1991, (DOE/EH-0173T) Section 4.6 in order to ensure proper operation, and reflect quality assurance standards in ANSI/ASME NQA-1, as required by AL Order 5700.6B, Revision II, *Quality Assurance*.

Finding: The conditions of the Air Emissions Permit at the Climax Mill Site are not being met due to the lack of water spray application during the loading of materials on the trains and the absence of speed limit signs. Calibration of meteorological monitoring equipment should occur on a semi-annual basis. This is not occurring at the Climax Mill Site nor is it included in the protocol for the planned tower at the New Rifle Site.

Discussion: No water spraying during the loading of materials into the rail cars at the Climax Mill Site was observed in an audio/visual presentation made of the operations that took place on March 11, 1991, which was presented at the UMTRA Project Overview on June 17, 1991. During the loading of materials, dust emission was evident. The video was shown as an indication of typical operations since tailings hauling was shut down during the audit inspections.

There are no speed limit signs at the Climax Mill Site. While the site terrain is not conducive to high speed travel, the requirement for speed limit signs was put in the permit with the site in mind.

While not a violation of the permit, there is a lack of a written fugitive dust control plan that is sufficient to meet the requirements of the air emission permit. The sampling of soil moisture content appears to be done periodically, (i.e., as needed.) Best management procedures would dictate that soil moisture samples be collected in a way that results in an

unbiased mapping of the moisture content at various areas of the site so that watering can be done "as needed."

The RAC personnel interviewed (I-A-10) did have knowledge of the requirements of water spraying during loading and unloading of materials when needed. The belief was that the moisture content of the loads had always been high enough that dust emission was not a problem.

Written procedure regarding the calibration of the meteorological tower at the Climax Mill Site (Section No. 14 of "TSP Monitoring Protocol for Grand Junction, Colorado May 1990") indicates that a quarterly calibration will be done. This quarterly calibration is actually a system check, which is done by the RAC, and is not intended to conform with the standards in ANSI/ASME NQA-1. The supplier of the meteorological tower can be called in by the RAC to calibrate the tower in a manner that conforms with the standards in ANSI/ASME NAQ-1. The RAC has no written procedure for the frequency on this type of calibration. The meteorological tower was last calibrated by the supplier in November 1990. Pursuant to Section 4.6 of DOE/EH-0173T, a semi-annual calibration of the meteorological tower is not required, but should be made. The total suspended particulate (TSP) monitoring protocol for the New Rifle Site, indicates a bi-annual calibration of the meteorological tower will be done. This tower should also be calibrated on a semi-annual basis.

This finding was not identified in any of the formal self-assessments.

An apparent causal factor contributing to this finding is that there is no adequate policy implementation to ensure that the air emission permit requirements are met. Another apparent causal factor contributing to this finding is that adequate procedures do not exist to ensure sufficient calibration of the meteorological towers.

A/CF-4: **Air Emission Permit Requirements at Cheney Disposal Site**

Performance Objective: Colorado Department of Health (CDH) Air Emission Permit (No. 88ME247F) for the activities at the Cheney Disposal Site requires that the following conditions be met in order to reduce fugitive dust emissions:

- Tailings piles, excavation areas, and stockpiles will be watered to maintain a surface moisture content of 5 percent or greater. Water shall be available at all times.
- Disturbed areas left inactive for 6 months and longer shall be treated with chemical stabilizers and reseeded and mulched.
- Water sprays shall be used to control emissions during loading and off loading of materials to a surface moisture content of 5 percent or greater.
- Unpaved haul roads shall be watered to maintain surface moisture content of 5 percent or greater.
- Work onsite shall be halted when wind speeds exceed 40 mph continuously.

Although Permit 88 ME247F has never been officially finalized, the State Air Pollution Control Division considers this permit active regardless of official finalization. While not required by the CDH permit No. 88ME247F, a program to obtain and maintain representative meteorological data should exist in order to show compliance with the permit.

Finding: The conditions of the Air Emissions Permit are not being met, due to water spray not being applied during the unloading of materials at the Cheney Disposal Site. There is also a lack of both a fugitive dust control plan and an effective meteorological monitoring program.

Discussion: No water spraying during the unloading of materials at the Cheney Disposal Site was observed in an audio/visual presentation made of the UMTRA operations that took place on March 11, 1991 (which was presented at the UMTRA Project Overview on June 17, 1991). The emission of fugitive dust was evident in the unloading process. The video tape was shown as an indication of typical operations since tailings hauling was shut down during the audit inspections.

While not a violation of the permit, there is a lack of a written fugitive dust control plan that is sufficient to meet the requirements of the air emission permit. The sampling of soil moisture content appears to be done periodically (i.e., "as needed"). Best management procedures would dictate that soil moisture samples be collected in a way that gives an unbiased mapping of the moisture content at various areas of the site so that watering can be done "as needed."

The only meteorological monitoring that takes place at the Cheney Disposal Site is the use of a hand-held anemometer used "as needed," which does not constitute an effective meteorological monitoring program. Best management practices would require the implementation of a meteorological monitoring program to provide the data required to confirm

compliance with the 40 mph wind condition in the permit. The hand-held amemometer does not provide the required data.

The RAC personnel that were interviewed (I-A-10) did have knowledge of the requirements of water spraying during loading and unloading of materials when needed. The belief was that the moisture content of the loads had always been high enough that dust emission was not a problem.

This finding was not identified in any of the formal self-assessments.

The apparent causal factor contributing to this finding is that there is not adequate policy implementation to ensure that the air emission permit requirements are met.

A/CF-5: **Requirements for Total Suspended Particulate Monitoring**

Performance Objective: Colorado Department of Health (CDH) Air Emission Permit (No. 88ME250) requires that a monitoring program be conducted to determine compliance with ambient air quality standards for particulate matter and to determine the need for a more stringent fugitive particulate emission control plan. 40 CFR Part 58, App. E, Section 5.2, requirements for the "Spacing from Obstructions" for the monitoring of "Particulate Matter," states that a sampler must be located away from obstacles such as buildings, so that the distance between obstacles and the sampler is at least twice the height that the obstacle protrudes above the sampler. Furthermore, agreements with the CDH Air Pollution Control Division require that the siting of the Total Suspended Particulate (TSP) monitor near the access control will be located on top of the access control trailer at a height of 12-15 feet above the ground. In addition, it is a good management practice to periodically bring blank filters to the site and go through the process of installing them and immediately removing them, followed by analysis by the laboratory to quantify errors due to handling.

Finding: The Climax Mill Site's location of the TSP monitor at access control is not in compliance with the with the "Spacing from Obstructions" requirement, nor is it in compliance with the agreed upon location with the CDH. Furthermore, no filter blanks are currently being employed at the ambient air sampling stations for TSP.

Discussion: Three TSP monitoring stations in place at the Climax Mill Site are operated once every 3 days. A large construction vehicle was left parked at a distance that is in violation of the "Spacing from Obstructions" requirements and the CDH requirement, and remained parked for the duration of the audit. The CDH agreement also considers the security of the TSP monitors, but the TSP monitor at access control was not locked and could be tampered with by anyone that was in the access control parking lot.

Furthermore, good management practice would dictate the use of blank filter handling and analysis in the TSP monitoring protocol. The TSP protocol for the Climax Mill Site does not include the periodic use of blank filter handling and analysis, nor is it the practice to use blank filter handling and analysis.

This finding was not identified in the RAC Environmental, Safety and Health Compliance Assessment Report.

The apparent causal factor for this finding is the lack of policy implementation with respect to permit requirements.

A/BMPF-1: **Noise Minimization Plan**

Performance objective: Best management practices require that noise levels be accurately measured and that a noise minimization plan be developed that takes into consideration all uses of areas surrounding an operation.

DOE Order 6430.1A, *General Design Criteria*, Chapter 0150, Section 4.5, requires that precautionary measures be implemented to mitigate the impact of noise pollution on adjacent activities when the impacts are significant.

Finding: A noise minimization plan that considers the residents who live in close proximity to the Climax Mill Site and precautionary measures to mitigate the impact of noise pollution on adjacent residences has not been developed.

Discussion: Placement of one of the noise monitors between trailers near access control at the Climax Mill Site calls into doubt the representative nature of the resultant noise readings. The nearby trailers may shield the monitor from actual maximum readings and give site personnel a false indication of reasonable noise levels at the residences near 9th Street and Kimball Avenue. One of the trailers that is probably shielding the noise dosimeter had just been put into place a week prior to the Environmental Audit. The personnel interviewed (I-A-10) did acknowledge the poor siting of the noise monitoring location at the access control, due to the recent placement of this trailer.

The trailers might also shield the dosimeter from the noise that would be created in the parking lot of access control. The close proximity of the parking lot to the houses at 9th and Kimball would indicate that activities in the parking lot could contribute to the noise levels at those houses. One of the reasons that the noise monitors were not sited between the parking lot and the houses was because the RAC thought (I-A-6, I-A-10) that parking lot noise would unfairly bias the noise level. While the Mesa County Conditional Use Permit (CUP) has no noise level requirement for the 9th and Kimball location, the CUP requirement of monitoring for noise is for the noise produced from the UMTRA operations, which would include those activities in the parking lot.

Specifically, best management procedures would dictate the use of a noise minimization plan in areas that are sensitive to the impact of UMTRA operations. The problematic location for noise complaints is at the 9th and Kimball area. Efforts by the RAC to minimize noise at the 9th and Kimball area apparently are not effective, since complaints are still being made. A written procedure does not exist, yet there appear to be many ideas from the RAC and CDH (I-A-5, I-A-6, and I-A-10) on how to reduce the noise; however, no effective measures have been implemented.

This finding was not identified in any of the formal self-assessments.

An apparent causal factor contributing to this finding is that the CUP is an inadequate policy, since it does not specify noise limitations at any site other than the Orchard Mesa bluff. Lack of written procedures, on the part of the RAC, to implement a noise minimization plan is also an apparent causal factor.

3.2 Soil/Sediment/Biota

3.2.1 Overview

The purpose of the soil/sediment/biota portion of the Environmental Audit was to evaluate the status of soil, sediment, and biota monitoring associated with UMTRA activities at Grand Junction, Rifle, and Gunnison. The evaluation was based on compliance with DOE Orders, CERCLA requirements (DOE Order 5400.4) and internal UMTRA guidance as incorporated in the Technical Approach Document Rev. II, December 1989 (UMT117), for the identification of potential contamination of soil/sediment media. The biota portion of this section evaluated compliance with the requirements for biota toxicity testing contained in Colorado Wastewater Discharge Permit System (CDPS) water discharge permits and the ecosystem revegetation requirements as per U.S. Army Corps of Engineers Section 404 permits for the sites. The biota section does not specifically evaluate impacts to threatened and/or endangered species since this issue has been addressed in various environmental impact statements and assessments for UMTRA properties. Table 3-2 lists applicable regulations, requirements, guidelines and DOE Orders used in this evaluation.

The general approach to the soil/sediment/biota assessment included review of written guidance documents and environmental monitoring data as well as observation of potential contamination sources, pathways, and containment devices.

There are no formal Federal or state guidelines which regulate and/or issue permits for soil/sediment quality issues. The concentrations of target compounds in these media can provide a reliable indication of overall environmental quality and evidence for the migration of environmental contamination in an area. Soil/sediment can act as "sinks," accumulating contaminants transported via water or air pathways. Depending upon the future physical/chemical conditions of the media, it can be possible for soils/sediments to release contamination back into other portions of environmental systems.

Soil/sediment media sample data on the concentrations of chemicals associated with the mills tailings piles have been utilized to characterize site conditions in several UMTRA remedial action studies (e.g., the *Remedial Action Plan for Rifle, CO*, UMT092).

In general, the concentration of radionuclides has been used as the primary qualitative assessment of soil contamination. The concentrations of elements such as thorium, uranium, and radium isotopes in soils/sediments have been measured at the mill tailings sites, proposed disposal areas, and offsite areas. All soil/sediment data reviewed by the Audit Team described conditions prior to remedial activities at the UMTRA sites. There were little or no data being collected from soil/sediment media during active remediation operations at the sites. There were no data from any site concerning sediment quality in the Colorado River.

There are no findings that specifically address the soil/sediment resources at the UMTRA sites. However, there are two findings under other sections of the Audit which relate to the lack of data from these media. Finding IWS/CF-1 concerns the inadequate characterization of UMTRA sites and offsite areas in regard to non-radiologic, potentially hazardous parameters. Finding EM/CF-2 concerns the inaction in development of criteria for ongoing environmental monitoring and surveillance at UMTRA sites and offsite areas which may be affected by activities at the sites.

Table 3-2
List of Soil/Sediment/Biota
Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
40 CFR Part 300	National Oil and Hazardous Substances Pollution Contingency Plan	EPA
DOE 5400.1	General Environmental Protection Program	DOE
DOE 5400.4	Comprehensive Environmental Response, Compensation, and Liability Act Requirements	DOE
DOE/EH-0173T	DOE Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance	DOE

At this time, there are no findings relating to biotic resources assessment at UMTRA sites. Future discharges of wastewater from the wastewater treatment facility at the Grand Junction site (and later, at the Rifle and Gunnison sites) will require the RAC to perform specific biotic toxicity analyses according to the terms of CDPS permits. Once the wetland mitigation activities are completed at the Climax Mill Site, periodic assessments of the re-establishment of vegetation and the function of wetland ecosystems will be required under the terms of the Corps Section 404 permit.

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3.3 Surface Water/Drinking Water

3.3.1 Overview

The purpose of the surface water portion of this Environmental Audit was to evaluate compliance with Federal, State of Colorado, and local water pollution control requirements established in conformance with the Clean Water Act (CWA), and with drinking water requirements codified under the Safe Drinking Water Act (SDWA). This Audit also reviewed compliance with state and local requirements for floodplain management and the use of water rights appropriations. In addition, the Audit evaluated compliance with DOE Orders and water pollution control practices with respect to industry-accepted best management practices (BMPs). The Audit included a review of active permits between UMTRA contractors and regulatory agencies. Permits in effect at the time of the Audit included Colorado Wastewater Discharge Permit (CDPS) CO-0042391 (Cheney Disposal Site) and CO-0042536 (Climax Mill Site) issued by the Colorado Department of Health (CDH); Ground Water Discharge Permit 017 (Climax Mill Site) for discharge of pre-treated industrial wastewater to the City of Grand Junction Sanitary District; and Section 404 Permit 9978 (Cheney Haul Road and Climax Mill Site) issued by the U.S. Army Corps of Engineers (Corps) for the discharge of fill materials into wetland areas. Table 3-3 lists applicable regulations, requirements, guidelines and DOE Orders used in this evaluation.

The surface water portion of this audit focused on compliance with the active permits covering operations at the Grand Junction Sites. The Rifle and Gunnison Sites are in early stages of project action and permits covering water discharges, floodplains, water rights and wetlands are not final.

The general approach to the surface water assessment included inspection of wastewater sources and conveyance systems such as ditches and retention basins; inspection of wastewater treatment facilities including outfall locations; review of active permits covering water discharge and wetland mitigation; interviews with UMTRA Project personnel including RAC and TSC contractors; interviews with regulators from the CDH and Colorado Department of Highways who were active in the UMTRA permit process; and a review of pertinent internal documents relevant to surface water pollution control. At the time of the Audit, no wastewater discharge had occurred at any of the UMTRA sites. Thus, compliance with the discharge limitations and sampling/testing protocol contained in the various wastewater permits could not be determined. The RAC was in compliance with the periodic data reporting requirements for all Colorado Wastewaters Discharge Permit System (CDPS) permits. Compliance with the CWA requirements for the above-ground bulk storage of petroleum products and the preparation of site Spill Prevention Control and Countermeasures (SPCC) plans is addressed in the Toxic and Chemical Materials Section of the Audit Report.

Overall compliance with local floodplain and water rights requirements was good. The water rights appeared to ensure an adequate water source for operations at the Grand Junction and Rifle Sites. At present, appropriation of water rights which would ensure a sufficient quantity of water for the proposed operations at the Gunnison Site have not been secured. At Gunnison, a small irrigation channel which bisected the site had recently been dredged to maintain flow in the channel. The determination of water rights ownership and future channel maintenance at Gunnison are issues which will have to be resolved prior to the initiation of remedial action.

Table 3-3
List of Surface Water
Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
Clean Water Act 40 CFR Part 112	Oil Pollution Prevention	EPA
Clean Water Act, 40 CFR Parts 122, 123, 125	National Pollutant Discharge Elimination System (NPDES)	EPA
Clean Water Act, 40 CFR Parts 122, 123, 124	NPDES Stormwater Requirements	EPA
Safe Drinking Water Act, 40 CFR Parts 141—143	National Primary and Secondary Drinking Water Regulations	EPA
Code of Colorado Regulations (CCR) Title 5, Chapter 1002, Article 2	Colorado Discharge Permit System Regulations CDPS Permits CO-0042536, CO-0042391	CDH
DOE Order 5400.1	General Environmental Protection Program	DOE
DOE Order 6430.1A	General Design Criteria	DOE
	City of Grand Junction/Mesa County Industrial Pretreatment Program	
Clean Water Act, 33 U.S.C. 1344	Section 404 Wetlands Dredge/Fill Requirements Permit 9978	U.S. Army Corps
	UMTRAP - Subcontracts Documents Final Design for Construction Bid Schedule, Specifications. GRJ-PH-11, December 1988	UMTRA
	Technical Approach Document Revision II, DOE/AL 050425.0002 December 1989	UMTRA

UMTRA sites were not a source of public drinking water according to SDWA criteria. At UMTRA sites reviewed in this Audit, potable water was supplied as bottled water from an outside vendor (field sites) or via hookup with municipal water supplies (office location at Gunnison and Grand Junction). Non-potable water sources for personal washing and decontamination were clearly designated at field locations. Personal sanitary wastes at field sites were handled through chemical toilet systems maintained by a RAC subcontractor. Site office areas at Rifle and Grand Junction dispose of sanitary waste via septic systems.

In general, efforts to comply with requirements for surface water discharge at the Grand Junction sites were good. Most permits were obtained prior to the initiation of actions which could affect water quality, however the updating of permits to reflect changes in project design or site conditions was not always done in a timely manner. In these instances, unpermitted actions by the RAC did not appear to result in any significant adverse environmental impact. Overall, relations between the UMTRA Project Office, CDH and Corps were good and the regulators felt that the UMTRA Project Office had been responsive to the requirements for environmental protection.

The surface water audit identified three compliance findings and two best management practice findings. The compliance findings concerned waste waster and stormwater permit conditions and discharge of fill materials into wetlands area. The best management practice finding concerns surface water runoff at the New Rifle tailings pile and the Cheney Haul Road.

3.3.2 Findings

SW/CF-1: Implementation of Terms of the Colorado Water Discharge Permit

Performance Objective: Colorado Department of Health wastewater discharge permit (CDPS-CO-0042391) specifies a diesel fuel storage tank of less than 5,000 gallons at the Cheney Site.

Finding: A 10,000 gallon above ground diesel fuel storage tank installed at the Cheney Site is not consistent with the terms of the water discharge permit (CDPS-CO-0042391) which specifies a diesel fuel storage tank of less than 5,000 gallons at the Cheney Site.

Discussion: The Clean Water Act (CWA), and requirements of the National Pollutant Discharge Elimination System (NPDES) program, regulate the discharge of waste into waters of the United States. The Colorado Department of Health (CDH) acting through the Colorado Wastewater Discharge Permit System (CDPS) has the authority to implement the NPDES permit program for point-source wastewater discharges within the State. On January 29, 1991, the CDH issued CDPS permit CO-0042391 to the RAC to discharge wastewater from two points at the Cheney Disposal Site. The permit specifies the conditions for discharge including the allowed quantitative flow rate, specific standards on the chemical and biological characteristics of the discharge, monitoring schedules, sampling criteria, and data reporting requirements to assure permit compliance. Under Section IV of the Summary of Rationale, Facility Descriptions, the background information states that "the subcontractor may store diesel fuel for equipment in an above-ground storage tank with a capacity of less than 5,000 gallons" (UMT252). Audit team inspection of the Cheney Site on June 14, 1991, indicated that a 10,000 gallon above ground diesel fuel tank was installed at the Cheney Site. The installation of this fuel storage tank is not consistent with the terms under which CO-0042391 was granted to the RAC. In addition, there were three 6,000 gallon oil storage tanks and one 6,000 gallon waste oil tank also in place at Cheney. These tanks are not specifically indicated in the facility description, which is part of the text of the permit and consequently are not included in the waste water discharge permit.

This finding was not addressed in any of the formal self-assessments.

The causal factors for this finding include failure to properly implement policies to comply with a regulatory permit, improper design of the fuel storage system, and lack of supervision to assure consistent application with the terms of the permit.

SW/CF-2: Discharge of Fill Materials in Wetland Areas

Performance Objective: Disposition of fill materials into designated wetland areas is regulated by the U.S. Army Corps of Engineers (Corps) in conjunction with the U.S. Environmental Protection Agency. Section 404 of the Clean Water Act (33 U.S.C. 1344) requires that a Corps permit be obtained prior to the placement of fill materials into wetland areas.

Finding: Fill materials were discharged into wetland areas along the haul road between the Cotter Transfer Site and the Cheney Disposal Site in excess of the amount of wetland disturbance acreage permitted under the existing Corps 404 Permit.

Discussion: Remedial actions at the Climax Mill Site were planned to result in the disturbance of up to 8 acres of wetlands along the Colorado River. On December 20, 1988, the Corps issued Section 404, Permit No. 9978, to the RAC allowing for 8 acres of wetland mitigation at the processing site (UMT265). In response to a planned 3 acres of additional wetland disturbance along the proposed haul road between Cotter and Cheney, on February 9, 1990, the Corps amended Permit No. 9978 to include a total of 11 acres of wetland mitigation (UMT263). The expiration date for the permit remained December 31, 1991, with the subcontractor required to apply for a permit extension at least 1 month before that date. Construction of the haul road was completed in the late fall of 1990. To date, no construction has been done in wetlands at the Climax Mill Site.

According to RAC personnel (I-SW-16) and as documented in the *Environmental Analysis of a Proposed Haul Road Between Whitewater, Colorado, and the Cheney Disposal Site for the Grand Junction Tailings, January 1990* (UMT068), a total of 12 wetland acres, as delineated by the RAC, were to be affected by construction of the haul road. The wetland acreage thus affected would require up to 20 acres of mitigated wetlands to be permitted under the Section 404 permit for the Grand Junction Site. However, construction work was completed (resulting in the subsequent filling of wetlands), without sufficient consultation and approval from the Corps covering the full 12 acres of wetlands along the haul road. The actions of the RAC were thus not consistent with the terms of Section 404, Permit No. 9978, in effect at the time of construction.

An Audit Team review of the written documents and conversations with relevant RAC and Corps personnel indicate confusion as to the terms of the permit and the actual amount of wetlands affected by construction of the haul road. According to the RAC (I-SW-16), the Corps recognized only 3 acres of designated wetlands along the haul road route and thus, proceeded with construction once the permit was amended to include a total wetland mitigation of 11 acres. However, an internal communication between RAC contractors dated January 4, 1990 (UTM274), indicates that the RAC should seek a modification of the permit to include a total of 12 acres of affected wetlands along the proposed haul road. There is no indication that this recommendation was acted upon by the RAC. The Corps maintains (I-SW-20) that the RAC has not submitted a detailed delineation outlining the boundaries and characteristics of the entire 12 acres of wetlands in the affected area. According to the Corps, if the RAC had delineated and considered 12 acres of wetlands present along the haul road, the actual total of wetland acres requiring mitigation in the permit should have been amended to 20 acres. To date, this has not been done by the RAC.

Overall, the Corps has been pleased with the work of the RAC regarding plans to provide wetland mitigation for the UMTRA Site in Grand Junction. Given the general climate of

cooperation between the Corps and the UMTRA Project Office, the resolution of this after-the-fact permitting issue should not be a significant problem.

This finding was not addressed in any of the formal self-assessments.

The causal factors for this finding include a failure to implement policy in the upgrade of regulatory permits and an inadequate assessment of risk associated with the proposed action.

SW/CF-3: **Collection of Surface Water**

Performance Objective: An effective system to collect surface water runoff and prevent ponding of potentially contaminated water is required at the Climax Mill Site according to requirements issued by the Colorado Department of Health (CDH) under the applicable Colorado Wastewater Discharge Permit System (CDPS) permit (CO-0042536).

Finding: The design of the surface water drainage/collection system at the Climax Mill Site is not adequate to collect surface water runoff and site SOPs designed to remove excess water are not adequate to meet CDH requirements.

Discussion: Under the terms of CDPS permit CO-0042536, the CDH conducts routine inspections of environmental conditions at the Climax Mill Site. The permit lists a series of best management practice (BMP) requirements which should be followed in order to minimize the potential risk of offsite migration of contaminants due to surface water runoff or via point-source discharge (UMT038). On January 24, 1991, the CDH issued a series of recommendations to the RAC based upon the CDH inspection of January 1991 (UMT253). A concern of the state was the potential for groundwater contamination from infiltration of ponded surface water at the site. The CDH cited several BMPs that require all site drainage ditches be graded to allow water runoff to flow to the retention basin and that remaining ponded water be pumped to the retention basin. In addition, the CDH required that action be taken to prevent the outflow of contaminated runoff from the tailings pile and State Repository through the open stormwater drainage channel (Ditch A) which bisects the UMTRA Site. The RAC was required to submit plans to the CDH responding to the noted concerns by March 31, 1991.

According to available site records, the RAC presented the CDH with an acceptable response to the Ditch A issue and received an extension until August 1, 1991, for the completion of improvements to the ditch (UMT250). There is no indication that the RAC responded to the CDH BMP requirements. During the site visit of June 11, 1991, the Audit Team noted that not all ditches at the site had been graded to allow for gravity flow of runoff to the retention basin. In several locations, water runoff from the tailings pile was ponded in the drainage ditches and low areas within the site. There was no effort underway to remove the water. According to site officials, it was the responsibility of the RAC subcontractor to pump ponded water to the retention basin (I-SW-2). The SOPs for site dewatering are given in Part 3, Dewatering and Drainage of the MK-Ferguson Subcontract Documents, (GRJ-PH-11) December 1988 (UMT245). The procedures in GRJ-PH-11 are inadequate to meet the BMP requirements set forth by the CDH. In particular, there are no provisions in the SOPs to assure timely removal of ponded water at the site and there are no criteria specifying the surface water conditions which would require the contractor to initiate surface water collection.

This finding was not identified in any of the formal self-assessments.

The causal factors for this finding include a failure to implement policies that would provide an effective response to identified concerns of independent agency inspections; a failure to assess the risk associated with the noted site conditions; and inadequate design of barriers and controls at the site.

SW/BMPF-1: **Surface Water Runoff from Transfer Facility and Haul Road**

Performance Objective: It is a best management practice to assess the potential environmental impacts from chemicals applied to roads or other surface areas.

Finding: Petroleum-based sealants and/or dust suppressants have been applied along the haul road between the Cheney and Cotter facilities and also at the truck-train transfer area of the Cotter Transfer Station without documentation of the potential environmental impacts to offsite areas which may result from overland runoff of the chemicals.

Discussion: The gravel based haul road constructed between the Cotter Transfer Station and the Cheney Disposal Site and the gravel surface along the railroad truck-train transfer area of Cotter were completed in the fall of 1990. In June 1991, a fresh coating of petroleum-based asphalt and/or oil materials were applied by a RAC subcontractor to the haul road and transfer area. Site documents indicate that the application of similar materials was previously done between September and November 1990 (UMT255). Several of the materials used for the road surfacing are slightly toxic according to information contained in the Material Safety Data Sheets (MSDSs) for the various materials(UMT255). At least two emulsified asphaltic compounds were water soluble and the MSDS stated, "Precipitation on uncured emulsified asphalt may result in product being carried with runoff water into storm sewer or other bodies of water" (Corbitco, Inc. MSDS for Emulsified Asphalt Mastic Compound, January 16, 1989). At least one surface-applied compound, Asphalt Medium Curing (CAS No. 8052-42-4) from Sinclair, was combustible and the MSDS stated that "runoff may create fire or explosion hazard in sewers." The RAC did not have SOPs available which described the requirements for the environmentally safe application of surfacing compounds. In addition, there was no discussion nor assessment of the potential environmental hazards associated with the application of petroleum-based road surfacing products in the RAC document *Environmental Analysis of the Proposed Haul Road Between Whitewater, Colorado and the Cheney Disposal Site for the Grand Junction Tailings, January 1990* (UMT068).

The potential impacts from stormwater runoff associated with construction projects of greater than five acres is currently regulated under the new U. S. EPA NPDES Stormwater Guidelines (40 CFR Parts 122—124) as promulgated on November 16, 1990. According to concurrent regulations adopted by the CDH, permitted water dischargers in the State of Colorado are required to submit permits describing stormwater discharges by either November 1991 or May 1992 (exact date yet to be determined by CDH). Prior to the submission, the RAC may be required to undertake analysis of the potential environmental impacts of surface runoff from the haul road and transfer facility. In communications between the Audit Team and the CDH (I-SW-21) about the possible runoff of materials applied to the haul road, the CDH expressed concern about the potential for environmental contamination to offsite areas, especially since the haul road crosses a number of streams and stormwater drainage routes in Mesa County. According to the CDH, it is possible that the effects of runoff from the haul road may require consideration under the terms of the existing CDPS (CO-0042391) permit for the Cheney Facility.

This finding was not addressed in any of the formal self-assessments.

The causal factors for this finding include a failure to assess the environmental risk associated with the construction of the haul road and a failure to develop policy guidance in the application of chemicals.

SW/BMPF-2: **Containment for Surface Runoff**

Performance Objective: According to guidelines in the *Request for Interim NEPA Action, Uranium Mill Tailings Remedial Action at Rifle, CO USDOE/AL June 21, 1988* (UMT273), DOE has an "obligation to prevent further pollution of the Colorado River by its actions or lack of actions. Failure to remedicte site conditions which could lead to additional pollution of the Colorado River or local groundwater may result in noncompliance with applicable regulations, and could result in a public health hazard." It is a best management practice to provide an engineered system to prevent the infiltration of surface water runoff into groundwater of the Colorado River watershed.

Finding: The installed surface water runoff collection system at New Rifle is designed to collect runoff from only three of the four sides of the tailings pile. There is no effective collection along the east side of the mill tailings pile.

Discussion: Engineered systems designed to prevent the outflow of contaminated surface water runoff are an important factor in environmental protection at UMTRA mill tailings sites. According to the guidelines outlined in Section 11.3.2 of UMTRA Technical Approach Document, Revision II, December 1989 and in Section 4.4.4 of the Remedial Action Plan for the Rifle Site (UMTRA-DOE/AL-050506, February, 1990) surface runoff waters from contaminated areas will be collected in a retention basin system where the waste waters can be either "evaporated or treated as necessary" and discharged from the site. At the time of the audit, the lined runoff collection and water retention system around the mill tailings pile at New Rifle was not designed to collect runoff from the entire east side of the tailings pile. Runoff from the large (approximately 400 foot long by 25 foot high) slope drains to a flat evaporative basin of several acres where the water percolates into the ground. Given the relatively shallow water table aquifer in this area and the proximity of the area to the Colorado River, it is probable that contaminated surface water would migrate via groundwater flow into the river. The potential allowance of such offsite contaminant migration is not consistent with the DOE "obligation to prevent further pollution . . ." (cited above) or with the protocol effected for the collection and treatment of contaminated runoff at the New Rifle Site.

This finding was not addressed in any of the formal self-assessments.

The causal factors for this finding include a failure to implement consistent policies for environmental protection, an inadequate assessment of risk associated with allowing contaminated waters into the Colorado River watershed, and improper design in the construction of the runoff collection system.

3.4 Groundwater

3.4.1 Overview

The groundwater portion of the Environmental Audit of the Grand Junction, Gunnison, and Rifle UMTRA sites involved a review of the Federal and state regulations and DOE Orders regarding the characterization and protection of groundwater beneath and adjacent to the facilities. This review was coordinated with those of the inactive waste sites and surface water specialists. The assessment included tours of each mill processing site, the Cheney and proposed Landfill Site No. 1 disposal cells, observation of groundwater monitoring well sampling, review of site documents, and interviews with DOE, Colorado Department of Health (CDH), RAC, and TSC personnel. Compliance with groundwater requirements was evaluated on the basis of applicable statutes, Orders, regulations, and guidelines listed in Table 3-4.

Preliminary groundwater characterizations of each site and disposal cell (approved and proposed) have been completed as part of Environmental Assessment and Remedial Action Plan (RAP) activities. A generic Groundwater Protection Management and Groundwater Monitoring Program required by DOE 5400.1, *General Environmental Protection Program*, has been developed to serve for all 24 UMTRA sites. Based on Subpart B (Phase II) of the UMTRCA amendments of 1988, the UMTRA Project Office has elected to postpone complete hydrogeologic characterization and groundwater restoration (if required) of these three sites until the mill tailings pile stabilization projects are completed.

These sites are briefly discussed in paragraphs 3.4.1.1 through 3.4.1.3.

3.4.1.1 Grand Junction

The city of Grand Junction and the Climax Mill Site are located on the floodplain and low-lying alluvial terraces immediately north of the Colorado River. The mill site is underlain by a relatively thin layer of recent to Quaternary alluvium and a thick sequence of Cretaceous and older sedimentary units. The alluvium is comprised of mixed gravel, sand, and silt layers ranging in thickness from 7 to 21 feet based on data from borings (UMT078).

The Mancos Shale and Dakota Sandstone underlie the alluvium. The Mancos is a relatively impermeable unit comprised of shale with some interbedded sand layers. Underlying the Mancos is the Dakota Sandstone which consists of bedded sandstone, conglomeratic sandstone, shale, and some coal (UMT078).

Groundwater is found beneath the sites in each of these units. The alluvium is the uppermost aquifer and generally has poor water quality so the water is not utilized. The Mancos Shale is saturated beneath the site, but is relatively impermeable and serves as an aquitard. The Dakota Sandstone/Burro Canyon aquifer system has been ranked last in importance as a usable water source in the area (UMT078).

Groundwater beneath the site predominately flows westerly to southwestward depending on the level of the Colorado River. The Colorado River is believed to be the discharge point for alluvial groundwater (UMT078).

Table 3-4
List of Groundwater
Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE 5400.1	General Environmental Protection Program	DOE
DOE 5400.4	Comprehensive Environmental Response, Compensation, and Liability Act Requirements	DOE
DOE 6430.1A	General Design Criteria	DOE
CRS Title 6 1007-3	Colorado Hazardous Waste Regulations	CDH
CRS §37-91-101, *et seq.*	Water Well Construction and Pump Installation Contractor Laws	DNR
40 CFR Part 192 Subpart A	Standards for Remedial Actions at Inactive Uranium Mill Processing Sites	EPA
40 CFR Part 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	EPA
OSWER Directive 9950.1	RCRA Groundwater Monitoring Technical Enforcement Guidance Document (TEGD)	EPA
OWSER Directive 9950.2	RCRA Comprehensive Groundwater Monitoring Evaluation Document	EPA
OSWER Directive 9950.3	Operation and Maintenance Inspection Guide (RCRA) Groundwater Monitoring Systems	EPA
OSWER Directive 9355.0-14	Compendium of Field Methods	EPA
OSWER Directive 9502.00-6D	RCRA Facility Investigation (RFI) Guidance Document	EPA

Background water quality for the alluvium is generally poor with brackish water found in wells except those in close proximity to the Colorado River. The Dakota Sandstone contains brackish to saline water as well (UMT078).

Mill site operations have resulted in groundwater contamination beneath the tailings pile which has migrated offsite. Gross alpha and radium radioactive contaminants, present in concentrations above the Maximum Contaminant Levels (MCLs) and inorganic contaminants above the MCLs (e.g., arsenic, barium, cadmium, chromium, molybdenum, selenium, and dissolved uranium) have been identified in groundwater as much as 2,500 feet downgradient of the site. Restoration of the contaminated groundwater will be addressed as part of Subpart B of UMTRA (UMT078).

The Climax Mill Site is currently undergoing tailings pile excavation and relocation. As a result, no sampling of the onsite monitoring wells is being performed. No sampling was conducted in 1990 due to pre-excavation site activities. The offsite wells are scheduled to be sampled on a semi-annual basis (I-GW-23).

The Cheney Disposal Cell is situated approximately 23 miles southeast of the mill site. Underlying the cell is alluvium and a sedimentary sequence starting with the Mancos Shale. The Mancos is believed to be 700-750 feet thick. The cell design calls for the mill tailings to be placed on unweathered Mancos Shale and covered with a radon barrier and appropriate erosion controls (UMT078).

Groundwater has been identified in paleochannels and rebound fractures in the upper surface of the Mancos Shale. Aquifer testing has shown that the volume of water produced from these features is limited. The footprint of the disposal cell has been located away from all identified paleochannels. Groundwater in the underlying confined Dakota Sandstone aquifer has been classified as Class III quality (UMT078).

The water resource protection strategy developed for the Cheney Disposal Cell relies on geologic isolation and chemical attenuation to mitigate any leachate/effluent from the compacted mill tailings. No groundwater monitoring wells or soil lysimeters are planned to be installed at the Cheney Site (UMT078).

3.4.1.2 Gunnison

The Gunnison mill processing site is located on the floodplain and terraces of the Gunnison River and Tomichi Creek. The site is underlain by recent to Quaternary alluvium deposited by these water bodies. The alluvial deposits are composed of poorly graded clay to boulder-sized material of unknown thickness. A boring completed 200 feet southwest of the site encountered shale bedrock at a depth of 130 feet below the ground surface (UMT087).

The alluvium comprises the uppermost aquifer beneath the site. Groundwater levels fluctuate in response to changing water levels in the Gunnison River and Tomichi Creek. The river, creek, and an irrigation ditch which crosses the site are believed to recharge the alluvium aquifer. Typically, the depth to groundwater beneath the site is 5 feet. Groundwater in the alluvium flows to the southwest and is believed to discharge into the Gunnison River and Tomichi Creek approximately 2 miles southwest of the site (UMT087).

The average horizontal hydraulic conductivity and average linear groundwater velocity of the alluvial aquifer have been determined to be 9×10^{-2} centimeters per second (cm/sec) and 1,460 feet per year (ft/yr), respectively (UMT078).

Background groundwater quality has been found to exceed net gross alpha and uranium MCLs in areas. Groundwater in the area is also known to contain elevated levels of manganese. Groundwater in onsite and downgradient wells as much as 3,000 feet offsite exceeded the MCLs for arsenic, barium, cadmium, net gross alpha, mercury, molybdenum, nitrate, radium^{226}, radium^{228}, selenium, and uranium (UMT078). The state believes that the exeedance for gross alpha may be the result of sampling error.

There are 510 domestic wells registered within a 2-mile radius of the site (UMT078). Many, if not all, of these wells are screened in the alluvial aquifer. Residents of the Dos Rios Subdivision, located approximately 2,500 feet downgradient of the mill site, have been provided DOE-supplied bottled water due to radioactive contamination detected in their domestic well water systems (I-GW-5).

The monitoring and domestic wells on and around the Gunnison mill site area are currently being sampled on a quarterly basis (I-GW-19).

The proposed disposal cell, Landfill Site No. 1, is located approximately 13 miles southwest of the mill site on a topographic saddle separating two hills at an elevation of approximately 7,800 feet. The disposal cell is underlain by recent to Quaternary alluvium and colluvium, Tertiary sands, gravels, volcaniclastic mudflows (lahars) and ash fall tuffs, the Jurassic Morrison claystone and Junction Creek sandstone, and Precambrian metasedimentary and metamorphic rock (UMT078).

Groundwater in the proposed disposal cell area is found as perched layers in the volcaniclastic lahar and in the Tertiary gravels. The Tertiary gravels are considered to comprise the regional aquifer. The Tertiary gravels are recharged by upflow from elevated areas to the south of the cell site. At the cell location, groundwater flow bifurcates at the saddle, flowing to the northwest along the topographic trend of Chance Gulch and to the northeast-east along East Long Gulch (UMT078). The water resource protection strategy for Landfill Site No. 1 calls for the installation of point of compliance wells screened in the Tertiary gravels at the downgradient edge of the cell boundary on both limbs of the bifurcation point (I-GW-8).

3.4.1.3 Old and New Rifle

Both the Old and New Rifle Sites are underlain by Recent to Quaternary alluvium deposited by the Colorado River and the Tertiary Wastch Formation sand and claystones. The thickness of the alluvium varies and pinches out at the Old Rifle Site. The groundwater flow in both the alluvium and Wasatch is to the west roughly parallel to the flow of the Colorado River (UTM092).

The hydraulic conductivity and groundwater velocity measured at the Old Rifle Site are roughly three times greater than those measured at New Rifle. However, the groundwater velocity measured in the Wasatch Formation at the New Rifle Site is ten times greater than at Old Rifle (UMT078).

Background groundwater quality in the alluvium at both sites has concentrations of molybdenum, selenium, uranium, and gross alpha activity that exceed the MCLs. Background groundwater quality at the New Rifle Site also exceeds the MCLs for radium^{226} and radium^{228} (UMT078). However, since the New Rifle Site is located downgradient of Old Rifle, it is difficult to discern if the radium levels are naturally occurring or the result of contamination from Old Rifle. Groundwater contamination has been identified in the underlying Wasatch Formation to a depth of 90 feet below the ground surface and up to 3,500 feet downgradient of the New Rifle Site (UMT078).

The monitoring wells on and around the Old and New Rifle Sites are currently sampled on an annual basis (I-GW-22).

The Estes Gulch disposal cell is located approximately 4 miles north of the Old and New Rifle Sites. The cell is underlain by the Wasatch Formation which comprises the uppermost aquifer. Groundwater is encountered at a depth of 160 feet. The average hydraulic conductivity and linear velocity of groundwater in the Wasatch is very low, 2×10^{-7} cm/sec and 0.1 ft/yr, respectively.

Groundwater quality in the Wasatch has been classified as Class III due to high total dissolved solids, concentrations of barium, cadmium, lead, molybdenum, and selenium exceeding the MCLs, and the low yield of the formation. The water resources protection strategy for the Estes Gulch disposal site involves geologic isolation and attenuation. No groundwater monitoring wells or soil lysimeters are planned to be installed at the disposal cell site.

The groundwater portion of the Environmental Audit identified three compliance findings and one best management practice finding. The compliance findings relate to the lack of monitoring well permits, inadequate security at well heads, and decommissioning procedures; the incomplete evaluation of a slurry wall; and inadequate groundwater sampling procedures. The best management practice finding addresses the need for effluent monitoring at disposal sites.

3.4.2 Findings

GW/CF-1: Monitoring Well Permits, Security, and Decommissioning Procedures

Performance Objective: State of Colorado regulations CRS Section 37-91-102 require that all monitoring wells be permitted and decommissioned or abandoned following established protocols. DOE Order 5400.1, *General Environmental Protection Program*, Chapter IV, Section 9, states that all groundwater monitoring programs will be conducted in accordance with applicable regulations. The Resource Conservation and Recovery Act (RCRA) Groundwater Monitoring Technical Enforcement Guidance Document (TEGD) contains guidelines for well security and decommissioning procedures.

Finding: As many as 173 monitoring wells associated with the Grand Junction, Gunnison, and Rifle mill processing sites may not have the appropriate well permits filed with the State of Colorado according to a data base currently being developed. In addition, best management practice dictates that improvements can be made to the existing well security and decommissioning procedures.

Discussion: The actual number of wells witnout permits is not known at this time as the TSC "inherited" all wells completed by other contractors prior to the establishment of UMTRA. In response to a TSC Action Memorandum (UMT119) issued by the UMTRA Project Office a data base was developed to identify and inventory all groundwater monitoring wells associated with the 24 UMTRA sites. The action memorandum specifically addressed well identification, well head security, cataloging of any lock numbers, and wells requiring upgrading. The TSC requested (I-GW-26) that the data base be expanded to include items such as well permit status, well construction details, planned future use of the well, and ownership. This data base is currently being generated by the TSC (I-GW-26). Once completed and the future use of the well has been determined, the TSC plans to submit permit applications for any well that will be retained for future use that is currently out of compliance.

As many as 115 monitoring wells at the Grand Junction, Gunnison, and Rifle Sites are not secured with locking well covers (I-GW-26). As discussed above, the TSC is developing a data base to identify all unsecured wells. Current plans include the retro-fitting of locking well covers on monitoring wells that will not be decommissioned (I-GW-26).

Final approved well decommissioning procedures are not available. The copy of the RAC procedures given to the Audit Team contained numerous handwritten comments and was labelled "For Information Only." The RAC has decommissioned wells on mill processing sites and has submitted the appropriate permits to the State of Colorado and the TSC for their data base (I-GW-26). A generic TSC decommissioning procedure was issued on June 17, 1991.

The portions of this finding relating to monitoring well permits and well security were identified in the TSC Preliminary Draft Self-Assessment. The portion of the finding relating to well decommissioning procedures was not identified in any of the formal self-assessments.

The apparent causal factor is the lack of policy implementation to ensure compliance with existing state regulations, regarding monitoring well decommissioning procedures.

GW/CF-2: **Construction of Slurry Wall at Climax Mill Site**

Performance Objective: DOE Order 6430.1A, *General Design Criteria*, Section 0214-2, requires that a groundwater investigation including characterization of subsurface soils and groundwater quality be completed prior to the initiation of any dewatering activity.

Finding: A slurry wall has been proposed at the Climax Mill Site to dewater the tailings for ease of excavation. The full impact of the proposed slurry wall on the groundwater flow regime, and the compatibility of slurry wall construction materials with groundwater quality, have not been evaluated.

Discussion: A slurry wall is being constructed at the Climax Mill Site to facilitate the excavation of mill tailings. The TSC has reviewed the construction details for the slurry wall as part of their 60 percent design value engineering summary and recommendation report, and did not have any technical concerns with the wall installation (UMT271). However, this review was based predominately on cost-benefit factors. The Audit Team has not identified any studies performed to evaluate the possible effects of the slurry wall on the future groundwater restoration efforts (if any) or any evaluation of the integrity of the slurry wall with respect to groundwater quality.

If a soil/bentonite slurry wall is proposed, sulfate concentrations have been documented to cause significant deterioration of slurry wall impermeability (UMT119, Sec. 3.4.4). Sulfate contamination that is often associated with mill tailing sites has not been addressed.

Installation of the wall could severely limit the options for groundwater remediation under Subpart B of UMTRA. The zone of capture of any extraction wells or trenches could be limited in effectiveness by the slurry wall. The flow of any contaminated groundwater resulting from the surrounding upgradient industrial area could be altered by the installation of the slurry wall. Modeling of the anticipated impact to the site hydrology has not been undertaken.

This finding was not identified in any of the formal self-assessments.

The apparent causal factor is the inadequate design of the slurry wall with respect to consideration of its impact on the groundwater flow regime.

GW/BMPF-1: Groundwater Monitoring Well Sampling Procedures

Performance Objective: The Resource Conservation and Recovery Act (RCRA) Groundwater Monitoring Technical Enforcement Guidance Document, Section 4.2.3, states that well development and purge water be containerized if it is, or has the potential to be, hazardous, and provides additional guidelines for groundwater monitoring.

Finding: Current UMTRA groundwater sampling procedures (UMT120) involve the discharge of development or purge water from monitoring wells to the ground surface around the well head. Sampling procedures do not reflect RCRA Groundwater Monitoring Technical Enforcement Guidance Document guidelines.

Discussion: No radiological screening is conducted during the sampling procedure to determine if development/purge water contains radioactive constituents. Since no radiological screening is performed, the potential exists for exposure to sampling personnel and release of contaminants to the environment. A Quality Improvement Team (QIT) has been formed by the TSC to evaluate the monitoring well sampling procedures. The QIT report is scheduled for completion in June 1991. The Audit Team did not review the QIT report because it was not finished at the time of the audit. In addition, sampling procedures do not incorporate the following TEGD guidelines:

- measurement of total depth of well for more accurate calculation of well casing volume and amount of sediment present in the well;
- measurement of turbidity as turbid samples can influence analytical results;
- incorporation of trip, field, regeant, and equipment blanks in order to provide better laboratory quality assurance/quality control; and
- use of chain of custody records for each individual shipment of samples.

This finding was not identified in the TSC Preliminary Draft Self-Assessment.

The apparent causal factor is that policy and procedures have not been updated to reflect current guidelines.

GW/BMPF-2: **Disposal Cell Effluent Monitoring**

Performance Objective: DOE Order 5400.1, *General Environmental Protection Program*, Chapter IV, requires the measuring and monitoring effluents from all DOE Operations to: (1) verify compliance with regulations and Orders; (2) determine compliance with commitments made in Environmental Impact Statements and other official documents; (3) evaluate effectiveness of effluent treatment and control; (4) identify potential environmental problems and evaluate the need for remedial actions; (5) support permit revisions; and (6) detect characterization and report unplanned releases.

Finding: Current disposal cell designs do not allow for the direct monitoring of leachate/effluent from the cell.

Discussion: Current disposal cell designs do not allow for, or incorporate monitoring systems for any leachate/effluent generated at the base or sides of the cell. Developed water resources protection strategies at the Cheney Site and Estes Gulch disposal cells do not propose any groundwater or leachate/effluent monitoring. Plans for Landfill Site No. 1 for Gunnison propose to have groundwater monitoring wells installed as a point of compliance but do not include leachate monitoring. The UMTRA Project Office and the TSC have presented valid arguments for the geologic isolation, chemical attenuation, and poor groundwater quality conditions (class III) for each of the accepted and proposed disposal cell locations. The Nuclear Regulatory Commission has concurred with these strategies presented for the Cheney cell. However, the Nuclear Regulatory Commission may require installation of leachate/effluent monitoring system prior to final licensing of the disposal site.

This finding was identified in the TSC Preliminary Draft Self-Assessment. The TSC dismissed the finding as they determined any seepage from the disposal cells would not be considered an effluent under the Clean Water Act.

The apparent causal factor is the design of the disposal cells was not prepared in accordance with all applicable DOE Orders.

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3.5 Waste Management

3.5.1 Overview

The purpose of the waste management assessment at UMTRA sites was to evaluate the waste generation and management activities for compliance with Federal, state, and local regulations, DOE Orders, and best management practices. This UMTRA Site assessment included visits to facilities and inspections of UMTRA operations at Grand Junction, Rifle, and Gunnison Sites and discussions with officials from the UMTRA Project Office in Albuquerque, New Mexico. Table 3-5 lists applicable regulations and guidelines used to evaluate the waste management discipline.

The general approach to the waste management assessment included: (1) inspection of facilities and operations associated with waste generation, identification, accumulation, storage, treatment, recycling, and disposal; (2) interviews with personnel responsible for environmental compliance, waste generation, and waste management operations; and (3) review of relevant waste management documentation and correspondence, including, waste characterization, data manifests, operating logs, training records, permits, permit applications, policies, orders, procedures, plans, and self-assessments. The information collected from these activities was evaluated with respect to applicable Federal and state regulations and DOE Orders, as well as current industry best management practices.

The Colorado Department of Health (CDH) has primacy for RCRA and exercises this authority whenever appropriate in the management of solid and hazardous wastes. Generally, the CDH hazardous waste regulations are the same as EPA hazardous waste regulations. However, the Colorado program also identifies a category of "mixed waste" for materials containing both radiologic and hazardous constitutes. CDH's program relating to mixed waste is broader in scope that the Federal RCRA program which does not designate such a category of waste.

Section 101(7) of the Uranium Mill Tailings Radiation Control Act (UMTRCA) 42 U.S.C. 7911(7) defines residual radioactive material (RRM) as radioactive tailings resulting from uranium milling operations and other wastes that relate to ore processing activities that also have been identified as being radioactive. RRM, therefore may contain both radiological and non-radiological hazards. Their disposal must be in accordance with UMTRCA-Title I regulations. In certain instances, hazardous wastes that are not a result of uranium milling operations may also be encountered at processing sites and vicinity property sites. These hazardous wastes must be disposed of in an environmentally acceptable manner, in accordance with appropriate environmental regulations. The UMTRA Project Office is developing Statements of Principle regarding wastes encountered at processing sites and vicinity properties which fall outside the explicit mandates of UMTRCA. The chapter of this Audit dealing with Inactive Waste Sites discusses these Statements of Principle in greater detail.

The Grand Junction, Rifle, and Gunnison, Colorado sites each contain uranium mill tailings piles that were generated as a result of the extraction of uranium and other valuable constituents from ore. These mill tailings are characterized as RRM. Other RRM present at these sites includes wastes related to processing activities, such as, equipment, piping, tools, mill buildings, and other structures, and unprocessed ores. In addition to radiological hazards, RRM may also contain hazardous chemical constituents, including heavy metals from ores, process acids or bases, and organic compounds introduced during ore processing activities.

Table 3-5
List of Waste Management Regulations,
Requirements, and 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
CCR, Title 6, Chapter 10007, Article 3	Hazardous Waste Management Regulations	CDH
40 CFR Parts 260-268, 271	Hazardous Waste Management Regulations	EPA
Resolution Number 90-017	Conditional Use Permit	Garfield County Colorado

RRM identified at mill sites will be disposed of together with mill tailings at the designated repository for those tailings, provided that introduction of RRM to the disposal cell does not diminish the overall performance of the cell with respect to compliance with applicable standards promulgated by EPA in 40 CFR Part 192, Subpart A. Where such problems are anticipated, RRM may undergo appropriate pretreatment prior to delivery to the disposal cell.

Vicinity Property (VP) sites were typically created by the transport of uranium tailings offsite for use typically as fill or in construction. VPs were also created when tailings were spread offsite by wind and/or water. The VP site RRM will be disposed of in the same cell as the tailings retrieved from those properties. At the Grand Junction Site, the RRM pile is being excavated, containerized, and transported, to the Cheney Disposal Site. The VP Grand Junction site wastes, temporarily stored in the State Owned Repository will also be disposed of in the same cell.

The combined truck and rail transportation to Cheney for disposal must pass through the Cotter Transfer Station. This transportation system generates hazardous wastes from vehicle and equipment maintenance. Similar vehicle and equipment maintenance activities will generate hazardous wastes at Rifle and Gunnison, when RRM disposal commences at those sites. A well planned waste minimization program would significantly reduce the quantities of hazardous waste generated from these maintenance activities.

There are numerous RRM piles at the New Rifle Site that are the result of recent demolition of the mill buildings and facilities. These wastes are awaiting disposal in the yet to-be-constructed Estes Gulch disposal cell. A waste characterization program was performed by the RAC who also accepted the designation as hazardous waste generator (including obtaining an EPA generator identification number) to ensure the proper management of hazardous wastes identified on the site which did not fit the categorical definition of RRM. The RRM demolition debris was segregated into discrete piles. In addition hazardous wastes recovered during demolition are stored at the New Rifle Site. These wastes include radioactive asbestos waste (as both loose insulation recovered from pipes that has been bagged and wall panels containing transite cement) and 31 overpacks of radioactive tailings. Transport of tailings and other RRM awaits DOE funding.

The Gunnison Site has a tailings pile and associated RRM likely co-buried with the tailings. Disposal is anticipated to be at the nearby Landfill Site No. 1, however, this decision has not been finalized. The process buildings and equipment remain standing on site to be demolished prior to disposal. Two underground storage tanks for refined petroleum products also await remediation. Considerable trash has been dumped on the Gunnison Site, subsequent to mill site abandonment. This trash will need to be characterized and disposed of in a safe and environmentally acceptable manner.

The municipal solid waste generated at all of the sites assessed is disposed of by commercial disposal firms.

The five compliance findings for this assessment addressed noncompliance for hazardous waste determination and management; disposal of radioactive wastes; waste characterization and generator status; waste management procedures at UMTRA sites; and waste management procedures at vicinity properties. Additionally, a noncompliance finding for waste minimization plans at all of the UMTRA sites was identified as WM/CF-2.

3.5.2 Findings

WM/CF-1: **Hazardous Waste Determination and Management**

Performance Objective: CCR 262.11 Part and 40 CFR Part 262.11 require the generator to determine if a solid waste is a hazardous waste. If the waste is determined to be hazardous, it must be managed in accordance with CCR Parts 262-268 and 40 CFR Parts 262-268.

Finding: Labelling indicates that wastes have been determined to be hazardous wastes by the generator under CCR Part 262.11 and 40 CFR Part 262.11. These wastes are being managed in a manner that is inconsistent with this labelling determination by the generator.

Discussion: Eleven steel 55 gallon drums of asbestos abatement debris from the yellow cake building at the New Rifle Site have been labeled as "radioactive," "asbestos," and "hazardous waste." Site personnel are aware that waste characterization of these drums had shown no hazardous waste characteristics (I-WM-24).

Thirty-one polyethylene 85-gallon overpacks of uranium mill tailings at the New Rifle Site have been labeled as "radioactive" and "hazardous waste." Waste characterization of these overpacks had shown the selenium concentration to exceed the EPA toxicity characteristic limit for hazardous waste determination.

However, these wastes are classified as Residual Radioactive Materials (RMM) and direction has been provided by the State of Colorado. Hazardous Materials Division which specifically allows disposal of this material into the UMTRA disposal cell at Estes Gulch.

These wastes have been determined to be residual radioactive material. However, by labeling them as hazardous wastes it could be interpreted that they are subject to management under CCR Parts 262-268 and 40 CFR Parts 262-268. If it is determined that these wastes are regulated as hazardous waste, then CCR Parts 262-268 and 40 CFR Parts 262-268 would apply. CCR Parts 262-268 and 40 CFR Parts 262-268 allow the accumulation of hazardous waste onsite for 90 days or less without a permit or having interim status.

The drums and overpacks at Rifle with hazardous waste labels have exceeded the 90 day accumulation limit under CCR Part 262.34 and 40 CFR Part 262.34.

A generator that accumulates hazardous waste for more than 90 days becomes the operator of a storage facility and is subject to the requirements of CCR Parts 264-265, 40 CFR Parts 264-265, and the permit requirements of 40 CFR Part 270 unless granted an extension to the 90 day period.

CCR Part 268.50 and 40 CFR Part 268.50 prohibit the storage of hazardous wastes restricted from land disposal except justifiable quantities in marked and dated containers solely for the purpose to facilitate proper recovery, treatment, or disposal. For the first storage year, the regulatory agency bears the burden of proof in an enforcement action. After 1 storage year, the facility bears the burden of proof and must demonstrate that the waste is being stored solely for the stated purpose.

Although the site was aware of this issue, this finding was not addressed in any of the formal self-assessments.

The apparent causal factor is lack of training regarding proper hazardous waste labelling.

WM/CF-2: **Disposal of Radioactive Wastes**

Performance Objective: The Garfield County Conditional Use Permit, Resolution No. 90-017, prohibits the disposal of wastes not generated in the immediate Rifle vicinity at the Estes Gulch Disposal Site.

Finding: UMTRA wastes generated outside the immediate Rifle vicinity have been placed on the New Rifle tailings pile in violation of the Garfield County Conditional Use Permit.

Discussion: During the pre-Audit site visit to the New Rifle Site on May 1, 1991, approximately eleven 5-gallon pails clearly labeled as containing radioactively contaminated soil were located immediately inside the access control gate. The RAC stated the buckets contained a total of approximately 1 cubic yard of tailings from the Lowman, Idaho UMTRA Site that had been analyzed at a Denver laboratory (I-WM-1). It was also acknowledged by the RAC that disposal of the contaminated material would be in violation of the existing Conditional Use Permit.

On June 14, 1991, the RAC stated (I-WM-26) the buckets in question had been emptied onto the New Rifle Processing Site and, after decontamination, the empty pails had been stored outside the controlled area. Team members located the empty buckets. A representative of the CDH (I-WM-27) stated the disposal of radioactive material from outside the immediate Rifle area at the Estes Gulch Cell is a violation of the Garfield County Conditional Use Permit.

This finding was not addressed in any of the formal self-assessments.

The apparent causal factor is a lack of training of line and supervisory personnel in the need to adhere to the requirements of the Conditional Use Permit, human factors (i.e., disregarding the strict interpretation of the Conditional Use Permit), and the risk associated with this action.

WM/CF-3: **Waste Characterization and Generator Status**

Performance Objective: DOE Order 5400.3, *Hazardous and Radioactive Mixed Waste Program*, requires that hazardous and mixed wastes be managed in compliance with the statutory requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA) and the Atomic Energy Act, respectively.

Finding: Waste is generated from maintenance operations at the Cotter Transfer Site and the Cheney Disposal Site. These wastes have not been characterized or quantified sufficiently under CCR Parts 261-262 and 40 CFR Parts 261-262 to determine generator and compliance status of the operations as required by DOE Order 5400.3.

Discussion: The Cotter Transfer Site generates used oil filters, fuel filters, air filters, and rags from vehicle maintenance. The site may qualify as a small quantity generator under 40 CFR Part 262.44 (i.e., between 100 and 1,000 kg hazardous waste per calendar month). Since the Cotter Site is in a startup phase, the actual waste generation quantities need to be determined.

The Cheney Disposal Site generates used oil filters, fuel filters, hydraulic oil filters, air filters, and rags from vehicle and equipment maintenance. The Cheney Site may qualify as a conditionally exempt small quantity generator under 40 CFR Part 261.5 (i.e., no more than 100 kg hazardous waste per calendar month). Since the Cheney Site is in a startup phase, the actual waste generation quantities need to be determined.

The wastes generated at Cotter and Cheney may be hazardous waste, radioactive waste, commingled waste, or non-hazardous waste. However, they have not been characterized sufficiently to make the applicable waste determination. Once the waste determination has been made and quantified, the Cotter and Cheney Sites can be managed under the appropriate generator compliance status.

This finding was not addressed in any of the formal self-assessments.

The apparent causal factor is a lack of policy to characterize waste that is generated onsite and the subsequent regulatory implications.

WM/CF-4: **Waste Management Procedures at UMTRA Sites**

Performance Objective: Uranium Mill Tailings Radiation Control Act (UMTRCA) requires the DOE to use technology in performing remedial action to assure the safe and environmentally sound stabilization of residual radioactive material (RRM). DOE Order 5400.3, *Hazardous and Radioactive Mixed Waste Program*, requires DOE to manage mixed, radioactive, and hazardous wastes according to the requirements of Subtitle C of the Resource conservation and Recovery Act (RCRA).

Finding: The UMTRA Project does not adequately characterize wastes, use waste manifest procedures (where applicable), demonstrate fiscal responsibility, or manage potentially incompatible RRM wastes to assure compliance with UMTRCA, and DOE Order 5400.3.

Discussion: There are numerous situations where UMTRA waste management could be improved. UMTRA wastes, including the mill tailings, are not uniformly characterized to determine the chemical and physical property hazards, which must be known to assure the safe and environmentally sound stabilization of RRM under UMTRCA.

As UMTRA wastes are excavated, containerized, transported, and disposed, the hazard characteristics play an important role in responsible waste management. DOE Order 5400.3 expects that incompatible wastes will be managed in a manner that will avoid and minimize environmental and safety hazards and that worker exposure to these hazards will be minimized through engineering and management controls.

There are several other issues that relate to best management practices. RACs do not use waste manifests and acceptable pre-transportation requirements for offsite disposal of RRM. RACs have not demonstrated financial responsibility for accidents arising from Treatment, Storage and Disposal (TSD) facility operations. Such deficiencies do not constitute a safe and environmentally sound RRM waste management system.

This finding was not addressed in the UMTRA Draft Preliminary Self-Assessment. However, in response to a recent transportation incident involving UMTRA wastes, the UMTRA Project has prepared the inclusion of additional waste management controls to address the best management practice issues discussed above.

The apparent causal factor is supervision that is not adequate to ensure implementation of laws and policies.

WM/CF-5: **Waste Management Procedures at Vicinity Property Sites**

Performance Objective: The Uranium Mill Tailings Radiation Control Act (UMTRCA) requires DOE to use appropriate technology in performing remedial actions to assure the safe and environmentally sound stabilization of residual radioactive material (RRM). UMTRCA further requires the DOE to protect public health, safety, and the environment from radiological and non-radiological hazards associated with the processing, possession, transfer and disposal of byproduct material at processing and disposal sites.

DOE Order 5400.3, *Hazardous and Radioactive Mixed Waste Program*, requires DOE to manage departmental mixed radioactive and hazardous wastes according to Subtitle C of the Resource Conservation and Recovery Act (RCRA).

Finding: The vicinity property (VP) remediation program is proceeding without finalizing procedures for proper site characterization and the safe and environmentally sound management of hazardous waste encountered at VP sites as required under UMTRCA and DOE Ordar 5400.3.

Discussion: The UMTRA Project Office has determined that it is both necessary and appropriate to establish procedures for the proper characterization and management of hazardous waste that may be commingled with uranium mill tailings at VP sites in order to satisfy UMTRCA and DOE Order 5400.3. A statement of principle and guidelines regarding commingled waste management is under development.

When finalized, this statement of principle will provide the necessary direction for the development of those procedures. The UMTRA Project Office is proceeding with the VP remediation program without the finalization of procedures to deal with safety hazards and hazardous waste environmental concerns. The protection of workers and the public from such safety hazards needs to be adequately addressed both prior to and during site remediation. The discovery of hazardous waste on the VP sites can cause the site to be identified as contaminated, thereby requiring stabilization or other treatment during the site cleanup activity. Significant liabilities can be incurred by responsible parties for such site cleanup.

Although the site was aware of the issue, this finding was not addressed in any of the formal self-assessments.

This apparent causal factor is a lack of supervisory control over the completion and implementation of appropriate written procedures.

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3.6 Toxic and Chemical Materials

3.6.1 Overview

The toxic and chemical materials portion of the Environmental Audit evaluated the status of the UMTRA Project Sites at Grand Junction, Rifle, and Gunnison with regard to regulations (see Table 3-6). Included are the Toxic Substances Control Act (TSCA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and DOE Orders, as well as best management practices. The management and control of PCBs, chlorofluorocarbons, pesticides, petroleum and petroleum products, asbestos, and bulk chemicals were assessed.

The Grand Junction, Rifle, and Gunnison Mill Sites are in different stages of remediation. Phase I, demolition work, at the Gunnison Site is scheduled for fiscal year 1992. Asbestos and various known and unknown chemicals have been found in the old buildings. No chemicals or pesticides are stored on site.

Rifle consists of two sites: Old and New Rifle. Structures containing asbestos at New Rifle have been demolished. The asbestos was bagged according to Occupational Safety and Health Act (OSHA) standards and placed in four trailers in a waste storage area. Non-friable asbestos siding and pipes are also stored there along with other wastes. Pesticides are not applied at either Old or New Rifle. Two PCB transformers at Old Rifle and three PCB transformers at New Rifle remain on the property. Documentation exists that these are owned by the Public Utility Service Company. At the present time no chemicals or pesticides are stored at these sites.

The UMTRA operations at Grand Junction involve three sites: Climax Mill Site, Cotter Transfer Station, and Cheney Disposal Site. Bulk quantities of chemicals are stored at the Climax Mill Site in 55 gallon drums and an above ground, 6,000-gallon storage tank. Both the Cotter Transfer Station and the Cheney Disposal Site have petroleum stored in above ground tanks. Sizes of the tanks range from 500 gallons (Cotter) to 10,000 gallons (Cheney). Chemicals and petroleum products such as lubricating oils and hydraulic fluids are stored both in 55 gallon drums and in above ground storage tanks (4,000 to 6,000 gallons) both at Cheney and Cotter. These tanks are located in the maintenance areas and at the decontamination pad. The Climax Mill Site water treatment plant stores several 55 gallon drums of acids. Two transformers located at the Climax Mill Site are owned by the Public Utility Service Company. No pesticides are stored at this site.

The toxic and chemical materials audit identified one compliance finding and one best management practice finding. The compliance finding concerned the implementation of the RAC's Spill Prevention Control and Countermeasures (SPCC) plan at the Cheney Site. The BMP finding involved the distribution and posting of Material Safety Data Sheets at all Grand Junction Sites.

Table 3-6
List of Toxic and Chemical Materials
Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
40 CFR Part 761	PCB Regulations	EPA
40 CFR Part 165	Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Regulations	EPA
40 CFR Part 112	Oil Pollution Prevention	EPA
29 CFR Part 1910	Occupational Health and Safety Act (OSHA) Regulations	OSHA
DOE 5400.1	General Environmental Protection Program	DOE
DOE 5480.4	Environmental Protection, Safety and Health Standards	DOE
MK-Ferguson	Guidelines for the Preparation of a Spill Prevention Control and Countermeasures (SPCC) Plan	MK-Ferguson

3.6.2 Findings

TCM/CF-1: Storage of Hazardous Chemicals

Performance Objective: Sites that store hazardous chemicals should have effective measures to prevent the release of chemical contaminants to the environment. The RAC has developed a Spill Prevention Control and Countermeasures (SPCC) plan for the Grand Junction sites in order to ensure that "all chemicals used in large quantities at the site are stored and managed to prevent catastrophic releases to the environment." Storage of chemicals should be consistent with the SPCC plan.

Finding: The storage of hazardous chemicals at the Climax Mill Site and Cheney Disposal Site was not consistent with requirements of the SPCC plan developed by the RAC. The SPCC plan itself was not consistent with the terms of RAC guidelines for preparations of SPCC plans.

Discussion: Basic guidelines for the preparation of SPCC plans are given in 40 CFR 112. The RAC *Guidelines for the Preparation of a Spill Prevention, Control and Countermeasures Plan*, (undated), incorporates the criteria for the containment of petroleum products as outlined in 40 CFR 112. In addition, the RAC guidance document extends the SPCC plan to cover the "prevention control and cleanup of any hazardous material stored at an UMTRA site."

As developed, the approved SPCC plan does not adequately follow the criteria outlined in the RAC *Guidelines for the Preparation of a SPCC Plan*. The "Guidelines" require that the SPCC "must include a prediction of the direction of the rate of flow, and total quantity and type of hazardous material owned or managed (by the RAC) which could be discharged. . . ." The SPCC plan does not predict the direction or rate of flow in the event of a spill at either site. The inclusion of site maps in the SPCC plan without an adequate explanation of the topographic features is not a sufficient response to this requirement.

In addition, the Audit Team found the actual conditions of spill containment and control at the sites were not consistent with the requirements set forth in the SPCC plan. Examples of the failure to adequately implement the SPCC plan include:

- Some aboveground storage tanks (ASTs) were not properly labeled. Several large AST's at Cheney had been painted, obscuring the content labels of the tanks. Appropriate signs such as "Flammable" and "No Smoking" were not seen on all tanks or around all sides of the storage area.

- Two empty ASTs at Cheney and three empty severely corroded drums at the processing mill remained onsite. According to the SPCC plan, empty tanks and drums shall be returned to the suppliers.

- Records of storage tank inspections were not maintained at the RAC site office as stated in the plan.

- A corroded 5 gallon container of the product NALCO was found on a concrete pad at the Grand Junction decontamination pad. The contents had started to leak onto the concrete.

- One 55 gallon drum of 10 percent Sodium Hypochlorite Solution was found in a wet area of the water filtration plant violating the label on the container which read "Keep in cool, dry area. . . ."

- The valve connection on the 6,000 gallon tank of CPB-12 appeared defective and product material was leaking onto the ground.

- The 6,000 gallon tank labeled CPB-12 was mislabeled. The tank actually contained a 1:10 mixture of CPB-12 and water.

- Inspections should include the structure, above ground pipes, drip pans, tank supports, foundations and tank seams (for the deterioration and leaks). There was no indication that such inspections were conducted. Oil was present in several drip pans. A tank at the Cheney Site had signs of oil at the seams.

This finding was not identified in the RAC Environmental, Safety and Health Compliance Assessment Report.

The causal factors for this finding appear to be inadequate policy implementation in following RAC internal guidelines; and lack of training and supervision by appropriate management in overseeing employees.

TCM/BMPF-1: **Chemical Hazards Communication**

Performance Objective: The RAC's *Industrial Hygiene Procedures*, Section 14.0, "Hazard Communication" program require that Material Safety Data Sheets (MSDSs) be "readily available to all employees in their work area for review."

Finding: The distribution and posting of MSDSs at the UMTRA sites in and near Grand Junction are done in an inconsistent and incomplete manner.

Discussion: Examples of inadequate access to MSDSs include

- Climax Mill Site - MSDSs not available in MSDS binder for surfactant, CPB-12.
- Cheney Maintenance Area - MSDSs not available in binder for Molytex EP-2, ethylene glycol and Releez.

These chemicals were identified in the MSDS listing, however the sheets were not available in the binder onsite. In one instance, the audit team was told (I-TCM-2) that the MSDS sheet was available at the RAC main office located approximately 4-5 blocks away from the site.

MSDSs are intended to provide important data about the particular physical, health and environmental hazards associated with a specific product or chemical compound. To comply with the U.S. Occupational Safety and Health Administration (OSHA), the RAC "Hazard Communication" program describes how MSDS shall be made available to employees in their work area.

One of the most important functions of an MSDS is to provide data on information regarding the cleanup and containment of the chemical in the event of an inadvertent release. It is imperative that access to the information contained in an MSDS be available in a timely manner at the location when an emergency involving a potentially hazardous chemical may occur. Given the isolated locations of the Cotter and Cheney facilities, it is a best management practice to have an appropriate MSDS at each site where a potentially hazardous chemical is stored. Furthermore, the MSDS should be kept in a location readily accessible to the persons requiring the information contained on the sheet. It may be appropriate to place MSDS distribution in a formal records control program.

This finding was identified in the RAC Environmental, Safety and Health Compliance Assessment Report.

The causal factors for this finding is policy implementation; procedures for maintaining MSDSs onsite have not been followed or enforced.

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3.7 Quality Assurance

3.7.1 Overview

The purpose of the quality assurance (QA) portion of the Environmental Audit was to evaluate QA for the UMTRA Project environmental protection programs. Quality assurance activities of both the UMTRA Project Office and contractors were reviewed for compliance with regulatory agency requirements and permits, DOE Orders, project requirements, and AL Orders, and for adherence to best management practices (see Table 3-7).

The general approach to the QA assessment for the environmental protection programs for the UMTRA Project included interviews with both UMTRA Project Office and contractor staff responsible for assuring quality of the programs (e.g., UMTRA Project Office and contractor management personnel, quality assurance coordinators, field samplers, and laboratory analysts). The assessment also included reviews of documents (such as DOE Orders, AI Orders, QA plans, QA program plans, and sampling and analysis methods and procedures) audits of groundwater sampling activities and reviews of facilities and procedures at the RAC Grand Junction field support laboratory, the Geotech Analytical Laboratory and the TSC Hydrology Laboratory. In addition, the Vicinity Property portion of the UMTRA Project was reviewed for consistency in contractor/subcontractor activities that assure quality.

The assessment of QA for the UMTRA Project environmental protection programs was coordinated with the other UMTRA Environmental Audit Team specialists and the Grand Junction Project Office Environmental Audit Team specialists to ensure that all potential QA issues were identified, reviewed, and addressed.

Environmental monitoring sampling activities for the UMTRA Project are conducted by the prime contractors. For example, air sampling is conducted by the RAC, groundwater sampling by the TSC, soil sampling by both the RAC and TSC, and wastewater discharge sampling by the RAC.

In general, most of the environmental sample analyses are conducted by qualified subcontractor analytical laboratories although the RAC's field support laboratory does some soil analysis for selected parameters.

Several of the subcontractor analytical laboratories participate in the U.S. EPA's Environmental Monitoring Systems Laboratory - Las Vegas Radiation Intercomparison Study. In addition, several of the laboratories performing water analyses are certified by the Colorado Department of Health (CDH) for drinking water analysis.

The prime contractors' QA oversight of subcontractor analytical support to the UMTRA Project is excellent. The prime contractors conduct preliminary onsite facilities audits prior to contract award, followed by periodic audits. Their audits are well defined in that audit checklists are available, and qualified technical audit team members complete the technical area assessments. UMTRA Project Office audits of environmental sampling and analysis laboratory activities have not been undertaken.

The Audit Team determined that QA oversight of the prime contractors' quality assurance program plans (QAPPs) is lacking and the manner in which QA is applied in the UMTRA environmental protection programs is inconsistent. Although the UMTRA Project Quality

Table 3-7
List of Quality Assurance
Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE Order 5700.6B	Quality Assurance	DOE
DOE Order 5400.1	General Environmental Protection Program	DOE
QAMS-005	Interim Guidelines and Specification for Preparing Quality Assurance Project Plans	EPA
SW-846	Test Methods for Evaluating Solid Waste—Physical/Chemical Methods	EPA
AL Order 5700.6B, Revision II	General Operations Quality Assurance	AL
EPA/530-SW-90-021	Report on Minimization Criteria to Assure Data Quality	EPA
40 CFR Part 136	Guidelines Establishing Test Procedures for the Analysis of Pollutants	EPA
40 CFR Part 141	National Primary Drinking Water Regulations	EPA
NQA-1-1983	American National Standards Institute/ American Society of Mechanical Engineers Standard	ANSI/ASME
EPA-330/9-78-001-R	National Enforcement Investigations Center Policies and Procedures	EPA

Assurance Plan (QAP) has been concurred with by the Nuclear Regulatory Commission and the prescriptive requirements on the UMTRA Project Office are explicit in the QAP,implementation of the overall QAP to the UMTRA environmental protection programs has not been achieved. An explanation for this may be that the QAP's requirements for each element do not appear to be required by the prime contractors. In fact, the QAP requirements for the prime contractors are only that they will or have implemented the respective QAP element in their QA programs not that they incorporate the specific requirements as prescribed to the UMTRA Project Office into their QAPPs. This approach affords the opportunity for inconsistencies in the overall quality assurance and QA guidance for the project's environmental protection programs; even though the UMTRA Project Office reviews and approves the contractors' QAPPs.

A total of four compliance findings and six best management practice findings were identified in the QA area. The compliance findings address the following areas: general quality assurance practices, compliance of the UMTRA Project Office's QAP and contractors' QAPPs with DOE and AL quality assurance directives, quality assurance plans for environmental protection programs, and document control for environmental protection program documents and procedures. The best management practice findings address the following areas: Vicinity Property exclusion criteria completeness and the consistency of Project procedures, the QA/Quality Control program for radon testing in structures excluded from remediation under the UMTRA Project, the lack of a laboratory QA program summary in the annual site environmental report, interlaboratory performance evaluation program for radiological analysis laboratories, and quality assurance and data verification guidelines for the UMTRA Project's environmental monitoring program.

3.7.2 Findings

QA/CF-1: General Quality Assurance Practices

Performance Objective: Quality assurance/quality control (QA/QC) procedures and practices resulting in scientifically valid and defensible environmental analysis data should be implemented consistent with DOE Order 5400.1, *General Environmental Protection Program*, and EPA guidelines including SW-846, 40 CFR Part 136, Chapter 1 (7-1-90 Edition), and 40 CFR Part 141.

Finding: The QA/QC practices in some of the UMTRA Project environmental sampling and analysis activities are not sufficient to document the validity of the analytical data.

Discussion: Deficiencies in the QA/QC practices observed in at least one of the UMTRA Project sampling and analysis activities include, but are not limited to the following:

- Alteration of previous entries in notebooks being maintained for the UMTRA Project at the Oak Ridge National Laboratory Grand Junction facilities were initialed but not dated by the person making the alteration (I-QA-11).

- Alterations of previous entries in notebooks being maintained for the UMTRA Project at the UMTRA Technical Support Contractor laboratory were neither initialed nor dated by the person making the changes (I-QA-17).

- Not all samples from UMTRA Project Vicinity Property sampling received by the Geotech analytical laboratory for analysis had "chain-of-custody" documentation (I-QA-8).

- Shipping containers for groundwater samples being shipped to a commercial laboratory for analysis did not have custody seals (I-QA-7).

- Field QA/QC samples such as equipment rinsates, acid blanks, and field duplicates were not collected or prepared for groundwater monitoring (I-QA-7).

- "Chain-of-custody" procedures are not used for soil samples collected from the Climax Mill Site for environmental analysis (I-QA-4).

- Sampling containers for groundwater sampling stored at the UMTRA Technical Support Contractor Laboratory are delivered with custody seals on the shipping boxes. After some bottles are removed from the shipping boxes for use, the boxes are not resealed to protect the integrity of the remaining bottles (I-QA-17).

- "Chain-of-custody" procedures are not used for the total suspended particulate (TSP) filters collected at the Climax Mill Site for analysis at a commercial laboratory (I-A-10).

- Drinking water samples collected for the Gunnison Bottled Water Program, specifically those collected for the determination of metals such as: As, Se, Sc, and Hg are not preserved with acid (UMT152).

This finding was not identified in any of the formal self-assessments.

The probable causal factors for this finding appear to be inadequate procedures and training. Procedures for "chain-of-custody" and field QA/QC samples have not been developed for the Project. Training in appropriate notebook and records maintenance has been inadequate.

QA/CF-2: **Quality Assurance Directive**

Performance Objective: DOE Order 5700.6B, *Quality Assurance*, was written to provide DOE policy, set forth requirements, and assign responsibilities for establishing, implementing, and maintaining plans and actions to assure quality achievement in DOE programs and cancels DOE Order 5700.6A, *Quality Assurance*. The DOE Order references ANSI/ASME NQA-1-1983, *Quality Assurance Program Requirements for Nuclear Facilities* as the applicable national consensus standard. AL Order 5700.6B, Revision II, *General Operations Quality Assurance*, was written to provide the Albuquerque Operations Office (AL) policy, establish requirements, and assign responsibilities and authorities for quality assurance for AL activities in accordance with DOE Order 5700.6B *Quality Assurance*, and cancels AL Order 5700.6B, Revision I, *Non-Weapons Quality Assurance*. The AL Order states "It is the policy of AL to require that quality assurance plans shall be developed through the judicious and selective application of appropriate requirements of National Consensus Standard ANSI/ASME NQA-1."

Finding: The UMTRA Project Quality Assurance Plan (QAP) and contractor Quality Assurance Program Plans (QAPPs) do not reflect current DOE and AL quality assurance (QA) directives.

Discussion: The UMTRA Project QAP, UMTRA-DOE/AL 185, Revision 3, March 1990 (UMT155), identifies DOE Order 5700.6A and AL Order 5700.6B, Revision I, as the applicable quality assurance directives. The Nuclear Regulatory Commission in its transmittal letter of March 15, 1990 (UMT163), on concurrence to the UMTRA QAP Revision 3 noted the reference to ANSI/ASME NQA-1-1979 with 1981 Addendum. Their response as quoted in the letter was "We wish to suggest, however, that the reference section of the QAP include the latest version of ANSI/ASME NQA-1." Use and reference of canceled Orders in current requirements documents is not consistent with DOE and AL QA expectations.

Although this issue appears to have been known by the site, the finding was not identified in any of the formal self-assessments.

The probable causal factor is policy implementation. The UMTRA Project Office apparently assessed this issue when the QAP was revised but elected not to revise the QAP requirements because of contractual concerns.

QA/CF-3: **Quality Assurance Plans**

Performance Objective: DOE Order 5700.6B, *Quality Assurance*, establishes DOE policy on quality assurance (QA). Section 9d of the Order states: "Quality assurance activities shall be implemented by DOE organizations and contractors using written procedures and instruction appropriate to the activities to be performed."

AL Order 5700.6B, Revision II, states that contractor organizations shall "develop, implement, and maintain Quality Assurance Programs that comply with this Order." Management of those organizations implementing the quality assurance program, or portions thereof, shall regularly assess the adequacy of that part of the program for which they are responsible and shall assure its effective implementation.

The UMTRA Project Quality Assurance Plan (QAP), UMTRA-DOE/AL 185, Revision 3, states that "Quality Assurance Program Plans (QAPPs) will be developed, reviewed, and approved by the prime contractors. The QAPPs shall be submitted to the DOE/UMTRA-PO for review and approval prior to implementation."

Finding: Approved QAPPs are not available for all UMTRA prime contractors. Some of the QAPPs do not comply with DOE and AL Orders.

Discussion: Laboratory QAPs are not available for the Remedial Action Contractor's field support laboratory providing environmental analytical data to the Project (I-QA-4), and the Technical Support Contractor's Hydrology Laboratory which performs special studies for the Project (I-QA-17).

The RAC's QAPP (UMT175) has been developed using the basic requirements of NQA-1 as required by the AL Order. Selected elements of NQA-1 are indicated as "not applicable to the project at this time." The AL Order requires that elements "shall be evaluated for inclusion in quality program plans as applicable. The rationale for non-inclusion shall be documented." The UMTRA Project Office (I-QA-14) has no records documenting the rationale for non-inclusion. In addition, the non-inclusion of Criteria 6, "Document Control" (UMT149) in the RAC's UMTRA Project QAPP makes it difficult to determine which version of the Project Procedures Manual has been approved for the UMTRA Project.

The TSC *Quality Assurance Manual for Quality Assurance and Inspection Services in Support of the Uranium Mill Tailing Remedial Action Program*, January 22, 1986, (UMT166) has not been revised to reflect the most recent UMTRA QAP.

The UMTRA Project Office (I-QA-14) has no documented record of review and approval of the QAPPs for the UMTRA Project for either Geotech, Inc. or Oak Ridge National Laboratory. Both are prime contractors selected by DOE-AL to perform assistance, or provide services on the UMTRA Project.

Documented QAPs that are current and comply with DOE Orders and UMTRA requirements are necessary to support environmental protection program activities for the Project.

This finding was identified in the TSC Preliminary Draft Self-Assessment. It was not identified in the Environmental, Safety and Health Compliance Report prepared by the RAC or the Draft UMTRA Draft Preliminary Self-Assessment.

The probable causal factors contributing to this finding appear to be inadequate policy implementation, lack of procedures and lack of formal appraisals and/or reviews.

QA/CF-4: **Control of Environmental Protection Program Documents**

Performance Objective: AL Order 5700.6B, Revision II, *General Operations Quality Assurance*, as part of the Basic Requirements states "The preparation, issue, and change of documents that specify quality requirements or prescribe activities affecting quality shall be controlled to ensure that correct documents are being employed. Such documents, including changes thereto, shall be reviewed for adequacy and approved for release by authorized personnel."

In addressing the adequacy of the UMTRA Project's documents, DOE Order 5400.1, *General Environmental Protection Program*, establishes DOE environmental protection policy. The DOE Order states: "It is DOE's policy that efforts to meet environmental obligations be carried out consistently across all operations and among all field organizations and programs." In addition, Heads of Field Organizations shall: "Ensure all operations under their authority comply with applicable environmental protection laws and regulations, and directives."

The UMTRA Project Quality Assurance Plan (QAP), Section 6.0, Document Control, states "The responsibility for document control is established and maintained by the DOE/UMTRA-PO. Each UMTRA Project Prime contractor develops and implements procedures that assure UMTRA project documents are prepared, revised, reviewed, approved, and issued in a prescribed and controlled manner."

Section 6.5.6 of the UMTRA QAP entitled "Controlled Documents" states that for UMTRA Project Office documents, "Controlled document recipients are responsible for acknowledging the receipt of each document, assuring that the latest authorized documents are in use, and marking, destroying, and returning obsolete or suspended documents."

Finding: The document control systems implemented by the UMTRA Project Office and prime contractors do not ensure compliance with the DOE Order, AL Order, and the UMTRA QAP for environmental protection documents.

Discussion: The UMTRA Project Office (I-QA-14) has no formal mechanism that ensures that all UMTRA Project environmental protection documents receive document numbers. The UMTRA Project Office (I-QA-14) has no formal system to ensure that documents that affect the quality of environmental protection activities are controlled according to Section 6.2.6 of the UMTRA QAP.

The TSC does not have a system that ensures document control of all UMTRA Project environmental protection documents (I-QA-16). In addition, some of the TSC have instituted mechanisms whereby controlled documents and procedures are distributed to the various levels of management responsible for UMTRA environmental protection activities but controlled documents and procedures are not formally distributed to personnel performing the task.

The RAC (I-QA-2) has a document control system that addresses all of the UMTRA QAP "controlled documents" provisions. Here again, the RAC has instituted mechanisms whereby controlled documents are distributed to the various levels of management responsible for UMTRA environmental protection activities but controlled documents are not formally distributed to personnel performing the task.

The Draft DOE Order 5700.6C, *Quality Assurance*, states in the "Quality Assurance Program Implementation Guide" under Criterion 4-Documents and Records that "controlled documents are to be distributed to and used by personnel performing work. "Issuance of controlled documents and/or procedures for quality-related activities in UMTRA environmental protection programs to personnal performing the task will help to ensure that current versions of procedures and other prescriptive documents are being employed.

The UMTRA Project Office (I-QA-19) and prime contractors (I-QA-2, I-QA-14, and I-QA-21) do not have formal protocols to ensure that operating procedures and documents are reviewed to ensure compliance with DOE's environmental protection requirements. Lack of a formal environmental protection review can result in UMTRA Program procedures and documents not meeting applicable Federal, state, and local environmental protection requirements.

This finding was not identified in any c: the formal self-assessments.

The probable causal factor for this finding appears to be that formal protocols have not been developed to implement existing procedures.

QA/BMPF-1: **Vicinity Property Exclusion Criteria**

Performance Objective: The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978, Section 2.(a), as amended, states "The Congress finds that uranium mill tailings located at active and inactive mill operations may pose a potential and significant radiation health hazard to the public, and that the protection of the public health, safety, and welfare and the regulation of interstate commerce require that every reasonable effort be made to provide for the stabilization, disposal, and control in a safe and environmentally sound manner of such tailings in order to prevent or minimize radon diffusion into the environment and to prevent or minimize other environmental hazards from such tailings." In order to meet the requirements of this law, it is essential that all properties identified as potentially containing uranium mill tailings be properly evaluated for inclusion in or exclusion from the Uranium Mill Tailing Remedial Action Project (UMTRAP).

Finding: False exclusion recommendations may be made due to contaminant levels that are close to the limits set by EPA (borderline properties), team leader actions and/or inaccurate background determinations.

Discussion: A draft report of false exclusion recommendations performed by the Radiological Survey Activities (RASA) Program of Oak Ridge National Laboratory (ORNL) (UMT100), evaluated the possibility of false exclusion recommendations from the UMTRA Project of properties potentially containing uranium mill tailings. The report investigated two possible reasons for false exclusion recommendation (1) "contamination levels close to the limits set by the EPA for inclusion (a "borderline" property)," and (2) "the team leader responsible for a property's radiological survey." The investigators reviewed 70 "biased" properties, properties with a good potential to be a false exclusion recommendation. Of the 70 "biased" properties, 16 percent were determined to be false exclusion recommendations. Reasons for false exclusion recommendations were determined to be changes in procedures (since the survey was conducted), errors in team leader judgement, contamination associated with concrete structures, potential spillovers, combinable multiple deposits and insufficient sampling. The authors estimated the "unbiased" false exclusion recommendations rate to be less than 6 percent. Discussion with ORNL (I-RAD-19), revealed that the acceptable false exclusion recommendations rate is 0 percent. Based on the 6,000 exclusion recommendations this could result in a false exclusion recommendations number between the "unbiased" value (6 percent or 360 properties) and the "biased" value (16 percent or 960 properties).

A RAC documentation report (UMT267) for a completed vicinity property was reviewed. That report included the "Results of Inclusion Survey at Location RF00006." In this report the Inclusion Survey Contractor (ISC) estimated the background, "Based on measurements taken in the uncontaminated portions of the property," to be 23 +/- 7 μR/hr. The report, three sentences later, states, "It is probable that windblown tailings are scattered over the entire property." This report raises a concern about the adequacy of the inclusion/exclusion recommendations surveys. The first component of the concern is that the ISC determined background on a property that it considered to be potentially contaminated. The second component of the concern is that the RAC Radiological and Engineering Assessment (REA) survey estimated the background to be 14 μR/hr and determined the range of gamma readings to be from 15 to 21 μR/hr. The highest RAC gamma reading is lower that the background determined by the ISC. The concern of inadequate surveys does not apply to this particular property, as it was an inclusion recommendations property, but rather to other properties that

may have been false exclusion recommendations based on similar potential surveying errors.

The ISC was aware of the possibility of false exclusion recommendations and evaluated the potential frequency in their false exclusion survey.

The probable causal factors contributing to this finding appear to be inadequate procedures as there is a possibility that background surveys were taken on a contaminated property and further reviews concluded that false exclusion recommendations were made.

QA/BMPF-2: **Completeness and Consistency of Program Procedures or Implementation of Procedures**

Performance Objective: Best management practice dictates that procedures or implementation of procedures used in a program be consistent and without errors or omissions.

Finding: The RACs and Inclusion Survey Contractor (ISC) procedures are inconsistent and contain errors or omissions.

Discussion: Inconsistencies were noted in procedures or implementation of procedures used by the RACs and the ISC. These inconsistencies include, but are not limited to:

(1) RAC-1 uses grab samples to determine Radon Daughter Concentrations (RDCs) for verification surveys of remediated properties. RAC-2 procedures allow for use of grab samples but stated (I-RAD-12) that they do not perform grab samples for verification surveys due to difficulties in meeting the pre-sampling requirements for grab samples.

(2) The RACs use the same criteria for investigation of anomalies on concrete (background plus 30 percent) as they use on bare ground. The ISC performs core boring for any anomaly over concrete. There is a concern about using the same criteria on concrete that is used on bare ground. Four inches of concrete will reduce the gamma radiation from radium by about 50 percent. Use of the same criteria on concrete as on bare ground would mean that the gamma exposure rate would have to be twice the value under concrete as it is under bare ground before further investigation would be performed.

(3) The completion reports prepared by the RACs do not report data in a consistent manner. The reports completed by RAC-2 contained all information necessary to evaluate the included data. The reports completed by RAC-1 reported count rates without a conversion factor to evaluate what the count rates mean, they do not report whether dose rates include or are above background, survey reports are not completely filled out and explanations are not included where they may be required (count rates are increasing with depth in a bore hole but readings are taken only to a 24 inch depth with no explanation noted for why no deeper readings were obtained).

(4) RAC-2 tests for RDCs with the installed vent system inactive while RAC-1 tests for RDCs with the installed vent system activated. Efforts should be made to meet the RDC limits with the vents inactive as homeowners are likely to inactivate the system to save on heating costs.

(5) There is a requirement that an Independent Verification Contractor (IVC) perform physical verifications on 10 percent of RAC-2's completed properties, but no such requirement for RAC-1.

The following errors, omissions, or concerns were observed during a cursory review of RAC-1's Health Physics Procedures (UMT109):

(1) Step 3.8.4.2 of RAC-004 contains the requirements for release for restricted use of vehicles from controlled areas. The procedure requires only a spot check swipe survey of the tires and the floorboards of the vehicle. The undercarriage of the vehicle, a high probability area to contain contamination, is not examined. There is no documentation to validate not performing undercarriage surveys.

(2) Steps 3.8.1 and 3.8.4.3 of RAC-004 reference steps 3.7.3 and 3.7.2, respectively. There are no steps 3.7.2 and 3.7.3 in RAC-004.

(3) Step 3.2.2 of RAC-012 states, "In the event of a high daily reading (a 2 pCi/l 24-hr. avg. increase over the previous 24-hr. avg.) in a boundary or offsite RGM, the site Health Physics Manager shall be immediately notified." This step contains only an absolute value with no requirement to review trending. A 2 pCi/l increase may not occur over a 24-hr period but a 5.7 pCi/l increase could occur over a 72-hr period (1.9 pCi/l per 24-hr period) with no report to the Health Physics Manager required.

(4) Step 3.4.3 of RAC-012 references RAC-017. There is no RAC-017.

(5) Step 4.3.6.1 of RAC-016 for determination of average working level (WL) for background states, "Three or four properties that have *never* been involved in the UMTRA Project shall be used as local background habitable structures." Partly because a structure has never been involved in UMTRA it does not necessarily represent a background structure.

(6) Step 9.1 of RAC-025 contains an equation for determination of flux measurements. The equation is missing a parenthesis at the end.

(7) The Radiological Survey and Assessment (UMT267) lists the background radiation exposure as 10 μR/hr, while the Radiological and Engineering Assessment (UMT267) lists the background radiation exposure as 14 μR/hr.

(8) There is no requirement in RAC-1 procedures that meets directive No. E11 of the Vicinity Property Management Implementation Manual (VPMIM) (UMT110) which states, "For excavation control [using the Opposed Crystal System], the EPA standards are to be interpreted as 5 pCi/g total for surface and 15 pCi/g total subsurface, regardless of the distance from a structure; background adjustments are not to be made."

The following errors, omissions, or concerns were observed during a cursory review of RAC-2 Field Assessments Procedures Manual (UMT101):

(1) Step 2.4.3.1 contains requirements for determination of background for a property. One part of this section states, "If the delta-gamma measurement *at this location* is less than 2.5 pCi/g, the scintillometer reading is considered to be a representative *background value for the surface covered area.* Another

part of the step states, "An area is considered to be representative of a noncontaminated area if the soil sample, as analyzed by Opposed Crystal System (OCS), indicates a true concentration of less than 5.0 pCi/g. *If this is the case, the scintillometer reading at this location is considered to be a representative background value."* Both parts of this section are invalid. Background for a particular area should be determined and verified only in uncontaminated areas. The requirements listed could allow material above the EPA limits to remain in place due to use of an artificially high background value.

Also, RACs need to address problems with the Colorado Department of Health concerns about procedures used.

The RACs were aware of some inconsistencies, errors, and omissions in program procedures. The Project has established Process Quality Management Teams to evaluate the differences in procedures and procedure implementation between the RACs in areas such as application of supplemental standards, excavation control, and verification. The Project has also established a team to conduct a comprehensive review of the Vicinity Properties Management and Implementation Manual and the RACs implementing procedures to assure consistent implementation of Project policy on all vicinity properties. Results of these efforts are too preliminary to be evaluated by the Audit Team.

The apparent causal factor contributing to this finding is procedural inadequacies.

QA/BMPF-3: QA/QC Program for Radon

Performance Objective: The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978, Section 2.(a), as amended states, "The Congress finds that uranium mill tailings located at active and inactive mill operations may pose a potential and significant radiation health hazard to the public, and that the protection of the public health, safety, and welfare and the regulation of interstate commerce require that every reasonable effort be made to provide for the stabilization, disposal, and control in a safe and environmentally sound manner of such tailings in order to prevent or minimize radon diffusion into the environment and to prevent or minimize other environmental hazards from such tailings." The EPA Standards for Remedial Actions at Inactive Uranium Processing Sites (UMT099) section III.C states, "The purpose of this standard is to limit the risk from inhalation of radon decay products in houses built on land contaminated with tailings, and to limit gamma radiation exposure of people using contaminated land." 40 CFR Part 192.12(b)(1) states, "The objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL. In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL."

Finding: There is no quality assurance/quality control (QA/QC) program in place to verify that structures on properties excluded from remediation under the UMTRA Program are below the limits for radon daughter concentrations (RDCs).

Discussion: UMTRCA was predicated on reducing the potential health effects due to exposure to RDCs. Included in the EPA Standards for Remedial Actions at Inactive Uranium Processing Sites (UMT099) are:

(1) Section I states, "that every reasonable effort should be made to minimize radon diffusion into the environment. . . ."

(2) Section I states, "Cleanup is the operation which places the tailings in a condition that will minimize the potential health consequences of tailings that have been dispersed from tailings piles by natural forces or removed by man and used elsewhere in buildings or land."

(3) Section I states, ". . . stabilize and control . . . tailings in a safe and environmentally sound manner and to minimize or eliminate radiation hazards to the public."

(4) Section II.A states, "Uranium mill tailings can affect man through four principal environmental pathways: Diffusion of radon-222, the decay product of radium-226, from tailings into indoor air . . . The exposures involved may be large for persons who have tailings in or around their houses, or who live very close to tailings piles."

(5) Section II.A states, "From our analysis we conclude:

(a) "Lung cancer caused by the short-lived decay products of radon is the dominant radiation hazard from tailings. Effects of gamma radiation, of long-lived radon decay products, and of airborne tailings from the piles

are generally much less significant although high gamma radiation doses may sometimes occur.

(b) "Individuals who have tailings in or around their houses often have large exposures to indoor radon and hence high risks of lung cancer. . . ."

(6) Section II B.2 states, "The objective of cleanup of tailings from buildings is to reduce elevated indoor levels of radon decay products and gamma radiation."

(7) Section III.C states, "The purpose of this standard is to limit the risk from inhalation of radon decay products in houses built on land contaminated with tailings, and to limit gamma radiation exposure of people using contaminated land."

Included in the Final Environmental Impact Statement for Remedial Action Standards for Inactive Uranium Processing Sites (40 CFR Part 192) (UMT111) are:

(1) Chapter 4, relating to health risks from uranium tailings states, "However, the major threat comes from breathing air containing radon decay products with short half-lives—polonium-218, for example—and exposing the lungs and other internal organs to the alpha radiation these decay products emit."

(2) Section 4.3.1 states, "The greatest hazard from tailings removed from piles and used in construction is their potential to increase levels of radon decay products in buildings. The concentration of radon decay products in a building will depend mainly on the amount of radium in the tailings that are in, under, or adjacent to it."

(3) Section 5 states, "Our goal is to reduce the health effects from tailings by isolating them from the biosphere."

(4) Section 8.3.1(3) states, "Radon emission is usually the principal hazard from uranium mill tailings."

The principal hazard associated with uranium mill tailings is the dose to the lungs from inhalation of radon decay products and the purpose of the UMTRA Program is the removal of the tailings to reduce that health hazard. Currently, exclusion recommendations are based on gamma scintillometer readings. If the gamma scintillometer readings do not exceed background plus 20 percent, the property is excluded from the UMTRA Program with no radon daughter concentration (RDC) measurements made in the structure. Therefore, an exclusion is determined without evidence of meeting the most important limit, the RDC limit, imposed by 40 CFR Part 192. Data are available to indicate that false exclusions have been made (UMT100) and that high (above limits) RDC measurements have been obtained in structures that have been remediated and verified (other than RDCs) (UMT105). Best management practice suggests that a QA/QC program be initiated to investigate the RDCs in homes that have been excluded from remediation based solely on gamma scintillometer readings. This QA/QC program would serve the purpose of verifying whether the present survey requirements are adequate and aid in determining if formerly excluded properties need to be revisited. The audit team understands the difficulties associated with this QA/QC program and the high natural background radon levels in areas associated with the UMTRA Program

but feels such a program is necessary to validate the exclusion decision for properties which could otherwise need remediation.

The site was aware of the potential for false exclusions.

The apparent causal factor contributing to this finding is inadequate policy.

QA/BMPF-4: **Annual Site Environmental Report**

Performance Objective: DOE Order 5400.1, *General Environmental Protection Program*, Chapter II, Section 4., requires an Annual Site Environmental Report "to present summary environmental data so as to characterize site environmental management performance, confirm compliance with environmental standards and requirements, and highlight significant programs and efforts." Attachment II-1 of the Order presents the suggested format and content of the report, which includes a section on quality assurance. "A quality assurance section should summarize the measures taken to ensure the quality of data. A summary of results from participation in interlaboratory cross-check programs should be included, listing site results and expected results."

Finding: The UMTRA Project Annual Environmental Monitoring Report Calendar Year, 1990 does not include a summary of results from participation in interlaboratory cross-check programs for the laboratories contracted to perform environmental radiological and non-radiological analyses.

Discussion: The suggested conduct and format for the annual site environmental report (UMT157, UMT158) includes a recommendation that the results from participation in interlaboratory cross-check programs be incorporated in the report. Incorporation of a summary of interlaboratory cross-check program results for the laboratories supplying environmental radiological and non-radiological analytical data for the UMTRA Project provides credibility to the sample analysis data supplied by these laboratories.

This finding was not identified in any of the formal self-assessments.

The apparent causal factor for this finding is that formal procedures have not been developed to implement existing guidelines. Current DOE Order guidelines suggest that interlaboratory cross-check program results be incorporated into the Annual Environmental Monitoring Report.

QA/BMPF-5: **Interlaboratory Performance Evaluation Programs**

Performance Objective: Good management practice requires that contractor and subcontractor laboratories that conduct analytical work in support of UMTRA environmental radiological monitoring programs participate in an interlaboratory performance evaluation program.

Finding: Not all of the contractor and subcontractor laboratories are participating in an interlaboratory performance evaluation program.

Discussion: The RAC field support laboratory which provides environmental radiological monitoring data for the UMTRA Program is not currently participating in an interlaboratory performance evaluation program (I-QA-2). Of the subcontractor laboratories used by the RAC for radiological analyses, Barringer Laboratories, Inc., participates in an interlaboratory radiological analyses performance evaluation program (UMT165). Barringer is also used by the TSC (I-QA-16). One of the other TSC subcontractor laboratories, Core Laboratories-Casper, participates in a radiological performance evaluation program (I-QA-17). Participation in interlaboratory performance evaluation programs can provide a mechanism to monitor and improve environmental analytical laboratory data. In addition, DOE Order 5400.1, *General Environmental Protection Program*, Chapter IV, Section 10, establishes the Quality Assurance and Data Validation requirements for environmental monitoring. (Note: Requirements on this chapter shall be implemented no later than November 8, 1991.) Part C of Section 10 will require "all DOE and contractor laboratories that conduct analytical work in support of DOE environmental radiological monitoring program for radioactive materials to participate in the DOE interlaboratory quality assurance program coordinated by the DOE Environmental Measurements Laboratory."

This finding was not identified in any of the formal self-assessments.

The apparent causal factor for this finding is that no policy exists as a formal UMTRA specific requirement.

QA/BMPF-6: **Quality Assurance and Data Verification Guidelines for Environmental Monitoring Programs**

Performance Objective: DOE Order 5400.1(IV), *General Environmental Protection Programs —Environmental Monitoring Requirements*, states in Chapter IV, Section 10, "a quality assurance program consistent with DOE Order 5700.6B be established covering each element of environmental monitoring and surveillance program commensurate with its nature and complexity."

Finding: Quality assurance (QA) and data verification guidelines for UMTRA's environmental monitoring program are not available.

Discussion: Documented and approved QA guidelines are not available for UMTRA's environmental monitoring program activities. As a result aspects of quality assurance/quality control (QA/QC) for project sampling, and analysis that provide a basis for ascertaining sample integrity, analytical method acceptability, and data validity have not been instituted. The QA program should include, but is not limited to the following:

- organizational responsibility;
- program design;
- sampling procedures;
- laboratory procedures;
- sampling quality control;
- laboratory quality control;
- human factor;
- recordkeeping;
- chain-of-custody procedures;
- audits;
- performance reporting;
- independent data verification; and
- training.

Operating without a QA plan can result in the use and reporting of analytical data of questionable validity. The use of such data to support management decisions can result in the ineffective expenditures of funds and resources and in improper waste handling and disposal.

This finding was not identified in the UMTRA Draft Preliminary Self-Assessment.

The apparent causal factors for this finding are lack of policy implementation and lack of formal procedures to implement existing policy.

3.8 Radiation

3.8.1 Overview

The purpose of the radiation portion of the UMTRA Environmental Audit was to evaluate the Program's compliance with DOE Orders, Federal and state regulations and conformance with referenced guidelines and commonly accepted and best management practices. Radiation issues were evaluated against the guidelines, regulations, and DOE Orders listed in Table 3-8.

The general approach to the radiation portion of the Environmental Audit included: review, of radiological monitoring procedures and program documents; inspection of sites and monitoring stations; and interviews with personnel responsible for the radiation program. Site inspections included the Grand Junction Mill Site, truck/train haul loading area, Cotter Transfer Station, Cheney Disposal Cell, the Old and New Rifle Mill Sites, and the Gunnison Mill Site.

Airborne emissions from the UMTRA Sites are emissions from the tailing piles at the process sites or from the transfer of tailings from the process site to the disposal site. Monitoring stations at the mill sites include quarterly track etch and hourly radon gas monitors (RGMs); a continuous air sampler (RAS-1) for collection of particulate material; a thermoluminescent dosimeter (TLD) to provide measurement of exposure to gamma radiation. The thorium-230 annual average concentration is listed for each monitoring station; however, the total curies released or annual population exposures are not calculated.

The radiation portion of the Environmental Audit identified four compliance findings. The findings relate to control of environmental pollution, annual environmental report requirements, monitoring of emissions for reporting doses to the public, and radioactive materials transportation and reporting requirements.

Table 3-8
List of Radiation Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE Order 5400.1	General Environmental Protection Program	DOE
DOE Order 5400.5	Radiation Protection of the Public and the Environment	DOE
DOE/EH-0173T	Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance	DOE
DOE Order 5480.1	Prevention, Control, and Abatement on Environmental Pollution	DOE
DOE Order 5480.4	Environmental Protection, Safety and Health Protection Standards	DOE
DOE Order 5500.3	Reactor and Nonreactor Nuclear Facility Emergency Planning Preparedness and Response Program for DOE Operations	DOE
40 CFR Part 61 Subpart H	National Emission Standards for Emissions of Radionuclides Other than Radon from DOE Facilities	EPA
40 CFR Part 61 Subpart T	National Emissions Standards for Radon Emissions from the Disposal of Uranium Mill Tailings	EPA
40 CFR Part 192	Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings	EPA
49 CFR Part 173	Shipper—General Requirements for Shipments and Packages	DOT

3.8.2 Findings

RAD/CF-1: Controlling Environmental Pollution

Performance Objective: The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978, as Amended, Section (a) states, "The Congress finds that uranium mill tailings located at active and inactive mill operations may pose a potential and significant radiation health hazard to the public, and that the protection of the public health, safety, and welfare and the regulation of interstate commerce require that every reasonable effort be made to provide for the stabilization, disposal, and control in a safe and environmentally sound manner of such tailings in order to prevent or minimize radon diffusion into the environment and to prevent or minimize other environmental hazards from such tailings."

AL 5480.1, Chapter XII, "Prevention, Control and Abatement on Environmental Pollution" establishes internal AL supplemental procedures and guidance to assist in implementing DOE Order 5480.1, Chapter XII, issued December 18, 1980, for purposes of controlling sources of environmental pollution and assuring compliance with environmental protection statutes. Chapter II requires that ALO Contractors shall: (3) Control the use, storage, and handling of potential pollutants to avoid or to minimize the possibility of their accidental release and resultant damage to the environment. This includes appropriate preventive measures to entrap spills or unplanned releases and emergency plans and procedures containing, diverting, or otherwise dealing with accidental pollution; and (4) Control radioactive discharges to the environment to as low as reasonably achievable (ALARA) levels in accordance with Chapter XI of DOE Order 5480.1 and with policies and guidance of the National Council of Radiation Protection and the Environmental Protection Agency or referred to in Section 1-12 (g) of Executive Order 12088.

Finding: Operational practices regarding hauling of tailings and truck/container decontamination do not adhere to formalized procedures that would minimize the potential spread of mill tailings, leachate, or ponded surface water being placed in the containers.

Discussion: In order to meet the above cited laws and Orders, various procedures and practices have been created for the UMTRA Project. These are detailed in procedure manuals (UMT287, 295, 296, 297, 298, 299 and 300). In addition, when there are changes or additional needs, specific memoranda are issued (UMT154). These memoranda include site-specific procedures such as fixed sampling locations (the haul train loading area), the specific five percent truck/container smear locations, and specific decontamination levels to meet or exceed. Thus, the site Health Physics personnel are provided procedures and appear, based on interviews, to be aware of these procedures. However, some procedures are not provided such as a procedure describing the 5 percent random selection process and all contractor and subcontractor personnel do not necessarily follow the site procedures. Continual failure to follow specified procedures defeats the intent of the procedures, which is to minimize the spread of tailings. Specifically, this was noted at the Grand Junction Site, Decontamination Pad between the Process Site and the Haul Train Loading Facility. The operator log book (UMT153) indicates numerous examples of overheight loads, and potentially contaminated containers leaving the area because of subjective decisions. There are nearly 40 log book notations between March 18, 1991 and May 24, 1991 concerning container latch problems.

It is apparent in the log entries, that there are numerous examples of how subjective decisions rather than formalized procedures are the driving force behind operations at the decontamination pad. Notations indicate an informality of operations and subjectivity based on, in the opinion of the Audit Team, maintaining a schedule rather than doing everything possible to ensure protection of the environment. In addition, Health Physics personnel guidance is not always followed.

Adherence to written procedures would likely result in operational delays; but this would also minimize the spread of contamination and, thus, comply with DOE ALARA requirements. It is necessary that decisions on "how clean is clean enough," be based on established environmental protocols.

This finding was not identified in any of the formal self-assessments.

The apparent causal factors are failure to implement and adhere to formalized procedures and a lack of full understanding of the potential risks involved with specific operations.

RAD/CF-2: Annual Environmental Monitoring Reports

Performance Objective: DOE Order 5400.1, *General Environmental Protection Program*, Chapter II, requires the preparation of Annual Site Environmental Reports. Attachment II-1 outlines the content and format to be used when describing environmental radiological monitoring program information in the report.

Finding: The 1990 Annual Environmental Monitoring Report, which includes the Grand Junction and Rifle Sites, does not summarize effluent data for all radionuclides, report potential dose to the public, or use required reporting units.

Discussion: The 1990 Annual Environmental Monitoring Report summarizes radioactive effluent data for thorium, although the total number of curies released is not reported. The Order specifies that all nuclides of concern should be included in the environmental monitoring effort. However, other radionuclides in the uranium-238 and/or the thorium-232 decay chains are not included in the report. There is no indication that these other radionuclides were analyzed or considered as part of the annual environmental monitoring effort.

The Order also requires that the annual dose to the public be assessed and calculated. The report only states that the concentration at a sampling station is below the guideline set forth in DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, and does not include the actual value. The dose that the public would receive and the risk associated with that dose is not calculated.

The Order designates units for reporting radiological data and specifically designates that concentrations of radioactivity in air be reported using μCi/ml. In addition, if thorium and/or uranium are reported the unit pg/ml must also be included. The Annual Report lists only μCi/ml.

Although the site was aware of this finding it was not identified in any of the formal self-assessments.

The probable causal factors contributing to this finding are a lack of formal procedures and implementation of the policy regarding annual environmental reports.

RAD/CF-3: **Monitoring of Emissions for Reporting Doses to the Public**

Performance Objective: 40 CFR Part 61, Subpart H, lists the "National Emission Standards for Emissions of Radionulides Other than Radon for Departme:t of Energy Facilities." 40 CFR Part 61.94 contains the compliance and reporting requirements for the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) and states, "Compliance with this standard shall be determined by calculating the highest effective dose equivalent to any member of the public at any offsite point where there is a residence, school, business or office. The owners of operations of each facility shall submit an annual report to both EPA headquarters and the appropriate regional office by June 30 which includes the results of the monitoring as recorded in DOE's Effluent Information System and the dose calculations required by [40 CFR] 61.93.(a)] for the previous year." 40 CFR Part 61.90 "Designation of facilities" exempts from the requirements of Subpart H disposal facilities subject to 40 CFR Part 192.

DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, Chapter II.1, requires compliance with the 40 CFR Part 61. DOE Order 5400.5, Chapter II.6. states "Compliance with the dose limits of this Order shall be demonstrated by documentation of an appropriate combination of measurements and calculations to evaluate potential dose and the results of the evaluations."

Finding: Monitoring of emissions for determining doses to the public has not been performed in accordance with 40 CFR Part 61 and DOE Order 5400.5.

Discussion: The "1990 Annual Environmental Monitoring Report," states that the UMTRA Project is programmatically exempt from the DOE Monitoring requirement of Subpart H. However, the exemption in Subpart H applies to disposal at facilities subject to 40 CFR Part 192; UMTRA remedial action activities and operations at the mill processing sites are not specifically exempted. There is no formal documentation in the UMTRA Project Office files to indicate that operations at the mill processing sites are exempt. The UMTRA Project Office has asked EPA for an interpretation of the applicability of Subpart H to the UMTRA Project (UMT169). The UMTRA Project Office has indicated to EPA that it is their understanding that the requirement does not apply to the UMTRA Project and that they will go forth with this interpretation unless told otherwise. However, a final determination from EPA has not been received. A lack of response on the part of EPA is not adequate determination of concurrence.

Although the site was aware of this finding it was not identified in any of the formal self-assessments.

The probable causal factor contributing to this finding is inadequate followup on the EPA review of the UMTRA Project Office exemption determination.

RAD/CF-4 **Radioactive Materials Transportation and Notification Requirements**

Performance Objective: The requirements identified in 49 CFR Part 173 for shipment of radioactive materials over public highways include a threshold limit of 2,000 pCi/g above which special restrictions apply. DOE-HQ interprets 49 CFR Part 173.403(y) to require the inclusion of radiological activities from all radionuclides (not solely Radium-226) in the determining whether the threshold standard has been exceeded.

DOE and AL Orders 5484.1, *Environmental Protection, Safety, and Health Protection Information Reporting Requirements*, notes that procedures must be established to ensure proper notification (internally and to Federal, state, regional, and local agencies) of occurrences involving DOE and DOE contractor operations.

Finding: Measurements of radiological activities associated with transportation of mill tailings from the Climax Mill Site to the Cheney Disposal Site were not made in a manner consistent with the recently obtained DOE-HQ interpretations of 49 CFR Part 173. Comparisons of measured activity of any individual truckload with the 2,000 pCi/g standard were based solely on Radium-226 concentrations as derived from measurement results.

Discussion: Remediation of the Climax Mill Site includes the removal of uranium mill tailings and other residual radioactive material (RRM) and transportation to the Cheney Disposal Site along the train/truck haul route. Truck transportation occurs over a haul road connecting the Cotter Transfer Station and the Cheney Disposal Site. The UMTRA Project Office has considered this road to be private, however, points of public access to this road are not controlled. DOE-HQ and DOT have not concurred with this classification (UMT306)and consider the haul road public.

The UMTRA Project Environmental, Health, and Safety Plan Section 2.3 (c) specifies that RACs and subcontractors shall ensure that required information is recorded and reported as required by DOE and AL Order 5484.1 (UMT131). A site specific emergency action plan (UMT227) for the Grand Junction site outlines internal emergency response procedures and requires that investigation reports be submitted to the Site Manager as required by DOE Order 5484.X (note that the emergency action plan is undated and DOE order 5484.X was finalized to DOE Order 5484.1 on February 24, 1981).

On May 6, 1991, a truck overturned on the haul road. This transportation incident prompted a regulatory review, by DOE-HQ specifically, the Office of Transportation Management, (EM-50) and the Southwestern Area Program Division (EM-45), of transportation activities conducted under all UMTRA projects. This regulatory review (UMT304) determined that the UMTRA Project Office and the RAC improperly interpreted 49 CFR Part 173.403(y) by considering it to apply only to the contribution of radiological activity by Radium-226. Consequently, compliance with the threshold standard of 2,000 pCi/g was incorrectly established and requirements in 49 CFR Part 173 Subpart I were therefore deemed not applicable. The UMTRA Project Office had not sought concurrence from DOE-HQ or the DOT on whether their interpretation of 49 CFR Part 173 was correct prior to the initiation of transportation activities at the Climax Mill Site (or other UMTRA project sites). Based on DOE-HQ's regulatory review, all transportation activities within the UMTRA Project were shut down on May 28, 1991, including the activities associated with the transportation of mill tailings from the Climax Mill Site. In addition, the regulatory review stated that the reporting of the

truck incident was deficient and that occurrence report ALO-UMTR-1991-001 be upgraded from an off-normal report to an unusual occurrence report (UOR).

At the UMTRA Project Office's request, the Division of Quality Verification and Transportation Safety (EM-321) on April 30, 1991 formally requested from DOT "that a DOT Exemption be issued such that bulk shipments of mill tailings from specific sites will be exempt from the shipping paper, packaging, labeling, and placarding requirements of Parts 172 and 173 of Title 49, Code of Federal Regulations (49 CFR) (UMT306)." The exemption was requested for RRM having specific activities averaging from 40 to 8,000 pCi/g total activity, with the potential for "pockets" of higher activities up to 50,000 pCi/g. DOT exemption No. E-10594 was granted, with conditions, on June 21, 1991. The conditions included transportation by closed venicles, information requirements relating to the hazards associated with the tailings and emergency planning requirements.

This finding was not addressed in any formal self-assessments. Of course, the UMTRA Project Office and its contractors were aware of the transportation incident and the events that transpired in the aftermath.

The apparent casual factors for this finding is that policy determinations were made by the UMTRA Project Office in the absence of formal DOE-HQ or Department of Transportation concurrence.

3.9 Inactive Waste Sites

3.9.1 Overview

The Inactive Waste Sites portion of the baseline Environmental Audit would normally evaluate the performance of the UMTRA Project Office in its efforts to identify, characterize, and remediate past releases of hazardous substances from facilities under its control and responsibility. The principal Federal legislation addressing such characterization and remediation activities is the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (as amended by Superfund Amendments and Reauthorizsation Act of 1986). Implementing regulations for CERCLA have been promulgated by the EPA under the National Contingency Plan (NCP)(40 CFR Part 300 *et seq.*). A list of laws, regulations, requirements and guidance documents appears in Table 3-9. It is important to note that items appearing in this table are the result of Audit Team interpretations and judgements and not necessarily affirmed by interpretative guidance on UMTRCA implementation issued by DOE.

No Uranium Mill Tailings Radiation Control Act (UMTRCA) specific interpretive guidance has been developed by DOE-HQ which identifies the possible or actual applicability of CERCLA requirements. (However, UMTRCA-specific language in DOE Order 5820.2A, Chapter IV, affirms the applicability of Resource Conservation and Recovery Act (RCRA) regulations and standards to the management of hazardous wastes and mixed wastes).

Section 101(22)(c) of CERCLA amended by SARA specifically excludes " . . . release of source, by product, or special nuclear material from any processing site designated under section 102(a)(1) or 302(a) of the Uranium Mill Tailings Radiation Control Act of 1978," but is otherwise silent on the potential applicability of CERCLA to the control of other hazardous substances that may be present at uranium mill sites or at vicinity properties (VPs).

While it is beyond the scope of this Audit to render legal opinions, it is the interpretation of the Audit Team that CERCLA requirements can be applied to wastes containing hazardous substances other than by-product materials or source special nuclear materials that have been released on UMTRA sites, including wastes generated by the RAC (e.g., certain non-petroleum vehicle and equipment maintenance wastes). Wastes resulting from remedial activities at UMTRA sites do not necessarily enjoy exclusion from the CERCLA definition of "release." (See the Waste Management Section of this Audit for additional discussions on the management of wastes generated by DOE contractors in the performance of site characterization or remediation activities.) Likewise, prior releases of non-radiological hazardous substances that may have occurred at mill sites and VPs may also be addressed under CERCLA.

Although the application of CERCLA authority and standards to remediation and redisposition of uranium mill tailings is preempted, nothing in the UMTRCA or CERCLA statutes would appear to prevent the coincident application of CERCLA to non-radiological wastes containing hazardous substances. The later application of CERCLA considerations to UMTRCA remediated sites after removal of UMTRCA related materials also appears possible. Precedent for the applicability of CERCLA authorities to the remediation of other inactive uranium milling sites has been established in ongoing Superfund actions at other uranium mill sites not specifically identified in UMTRCA, Title I.

Table 3-9
List of Inactive Waste Sites and Releases
Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
CERCLA/SARA	Section 103—Notices, Penalties	EPA
CERCLA/SARA	Section 120—Federal Facilities	EPA
20 CFR Part 1910	1910.120, Occupational Safety and Health Standards	OSHA
40 CFR Part 300	National Oil and Hazardous Substances Contingency Plan (NCP)	EPA
40 CFR Part 302	Designation, Reportable DOE-Headquarters Quantities and Notifications	EPA
40 CFR Part 264	RCRA Subpart F Corrective Action	EPA
40 CFR Part 355	Emergency Planning and Notification	EPA
40 CFR Part 370	Hazardous Chemical Reporting Community-Right-To-Know (SARA Title III)	EPA
40 CFR Part 372	Toxic Chemical Release Reporting	EPA
DOE Order 5400.1	General Environmental Management Program	DOE
DOE Order 5400.4	CERCLA Requirements	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
DOE Order 5820.2A	Radioactive Waste Management	DOE
OSWER Directive	Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA	EPA
OSWER Directive	Preliminary Assessment Guidance FY 1988	EPA
OSWER Directive 9345.1-02	Expanded Site Inspection Transitional Guidance for FY 1988	EPA

This Audit evaluated the actions of the UMTRA Project Office with respect to those CERCLA requirements that may apply to hazardous substances at UMTRA Project sites. The Environmental Audit also examined the potential for DOE's UMTRCA remedial actions to create future DOE repsonsibilities or obligations. In addition to CERCLA, the inactive waste sites audit evaluated the UMTRA Project Office's performance in relation to the Superfund Amendments and Reauthorization Act (SARA) (including SARA Title III, Sections 311, 312, and 313, the Community-Right-To-Know Act), the Resource Conservation and Recovery Act (RCRA), the Hazardous and Solid Waste Amendments (HSWA), the regulatory requirements of the National Contingency Plan (NCP) (40 CFR Part 300, *et seq.*), the regulatory requirements of appropriate Federal, state and local agencies, and the provisions and directives of DOE Orders and Executive Order 12580 (Superfund Implementation).

In developing its overall implementation strategy for UMTRCA mill site and VP remediations, the UMTRA Project Office has determined that its authority to undertake remedial actions under UMTRCA is limited to actions involving uranium mill tailings and other residual radioactive materials. However, the Project Office has adopted a very conservative definition of process-related wastes, thus ensuring that the greatest possible portion of wastes found at inactive mill sites would enjoy remediation under UMTRCA authority. The Project Office has also acted conservatively in declaring their remediation activities to meet the definition of a DOE "facility," thus requiring that Project Office activities maintain compliance with a number of DOE Orders, Secretary of Energy Notices, and guidance relating to the conduct of operation at DOE facilities.

Initial characterizations of mill site properties involved surveys by the TSC for the purpose of determining the extent of radiologic contamination. (Radiological surveys were also conducted on adjacent properties that may have received windblown contamination, but such adjacent properties were declared vicinity properties when radiological contamination was encountered.) The results of this radiological survey, together with engineering characterizations of the identified mill tailing piles served as the basis for the initial draft Remedial Action Plan (RAP) for the site. That draft RAP was subsequently submitted to the Nuclear Regulatory Commission for review and concurrence.

In order to ensure that planned remedial actions would proceed in a safe and environmentally sound manner, the processing site RAC subcontracted for more detailed assessments of mill properties (UMT083, UMT091). These site characterizations were performed in a manner generally consistent with preliminary site assessment guidance issued by EPA under the CERCLA program (OSWER Directives 9345.0-01, 9345.1-02, and 9355.3-01), although there is no indication that this coincidence is the result of a deliberate effort to utilize those CERCLA guidance documents. Detailed site characterizations have been completed for the Rifle and Grand Junction mill processing sites. No detailed site characterization has yet been performed on the Gunnison, mill processing site due to difficulties in obtaining access authority. [However, the RAC has completed a site inventory and preliminary health and safety evaluations (UMT2040).] These detailed site assessments explored historical records for the property, in some cases going back in time to periods predating uranium ore processing activities. The assessments also provided chemically specific descriptions of milling operations that took place on the property, establishing the chemical profiles of mill processing wastes and, by inference, a comprehensive list of hazardous substances that may have been released from the property. Sampling confirmed the presence of hazardous contaminants in some instances.

Results of detailed site characterization studies were then utilized by the RAC to develop more detailed remedial action plans, providing the information base for such critical elements of the RAP as the Health and Safety Plans. Although site characterization information is incorporated into the RAP development process, the RAC is nevertheless required to limit the scope of the RAP to remediation of uranium mill tailings and other RRM wastes present on the processing site. This is coincident with, and derives directly from, the Project Office's interpretation that its authority to remediate processing sites is limited to mill tailings and other RRM. This interpretation remains a point of fundamental disagreement between the Project Office and the Colorado Department of Health (CDH). CDH interprets the UMTRCA statute more broadly, believing that it obligates DOE to undertake remediation of the entire mill site, and not just the tailings and other RRM (UMT112, UMT113, I-IWS-5 and I-IWS-6).

Determining the legal correctness of either of these positions is beyond the scope of this Audit. However, it is important to note that implementation of remedial actions in accordance with the Project Office's interpretation of DOE's UMTRA obligations may result in the full extent of non-radiologic hazards at the site remaining uncharacterized and unremediated. At the completion of what the Project Office believes to be the UMTRCA-authorized remedial action, there will be no defensible basis for declaring the mill site clean of all environmental contamination.

As a result of early program experiences in mill site and VP remediations, and as supported by circumstantial information gathered during detailed site characterizations by the RAC's subcontractor, DOE has sufficient reason to believe that the processing sites as well as some VPs may contain wastes with significant non-radiologic hazardous character. In 1989, the Project Office attempted to ensure that future remediations proceed in a safe and environmentally sound manner and to guarantee consistent and equitable approaches to the assignments of responsibility for the management of non-UMTRA materials. It did so by developing Statements of Principle for the management of commingled wastes (RRM combined with hazardous constituents) discovered at VPs and hazardous (non-radiological) materials discovered at mill processing sites (I-IWS-17). These Statements of Principle are both currently in "Predecisional Draft" form (UMT205, UMT206). The Environmental Compliance Group, an ad hoc task force within the Project Office, has been responsible for their development, with input and review opportunities being extended to officials from CDH's UMTRA Program (UMT207, UMT298). The Project Office envisions that these Statements of Principle will exist as independent documents and has no intention of incorporating them into the existing Cooperative Agreement with the State of Colorado regarding UMTRCA remediations (I-IWS-18, I-IWS-19). It is important to note that the Statements of Principle would appear to have no basis in law since their formulation was not specifically directed by UMTRCA. It is nevertheless a responsible and prudent course of action by the UMTRA Project Office to finalize the Statements of Principle in order to guarantee consistent approaches to the disposition of commingled wastes and hazardous wastes encountered during or prior to remedial actions.

The Project Office has recently completed a draft self-assessment of the UMTRA Program and identified a number of areas of deficiency (UMT150). That self-assessment finding most closely aligned with Inactive Waste Sites concerns is titled "Lack of Defined Operating Envelope" and involves the failure of the Project Office to precisely and comprehensively define the regulatory envelope within which the UMTRA remedial actions must operate. Because the failure to identify a comprehensive array of applicable controls for remedial

actions under UMTRCA may result in significant future liabilities for DOE, this program deficiency is considered especially critical.

Due to delays in acquiring access to mill site properties for the purpose of site characterization, and other unanticipated logistical delays, the Project Office has determined that completion of the UMTRCA remediations by the deadline specified in the statute is in serious jeopardy (I-IWS-19). Consequently, a request has been forwarded to DOE/HQ to begin discussions with appropriate Congressional officials regarding the possible extension of the completion deadline. No other statutory relief is being sought and no statutory interpretations or clarifications have been requested.

Finally, in order to expedite the finalization of the Statements of Principle, the Project Office has recently approached the State of Colorado, requesting that one individual or agency be appointed to represent the entire array of regulatory authorities in the state that may have an interest in the content or application of the Statements of Principle (I-IWS-19). No concurrence with the Statements of Principle has been sought from EPA.

No compliance findings or best management practice findings have been identified with respect to SARA Title III reporting requirements. Clear documentation exists that Tier II reports of hazardous chemicals specified in SARA Title III chemicals have been delivered as required to state and local emergency planning agencies and local fire departments as required in the SARA statute (UMT256, UMT257).

In summary, the inactive waste sites portion of the audit has identified one compliance finding (CF) related to policy and procedures under UMTRA and three best management practice findings (BMPF) concerning CERCLA decisions, Statements of Principles and Procedures for demolition activities.

3.9.2 Findings

IWS/CF-1: Policy and Implementation Procedures under UMTRCA to Ensure Compliance with DOE Orders

Performance Objective: DOE Order 5820.2A, *Radioactive Waste Management*, requires that DOE programs for the management of radioactive and mixed wastes be protective of the health and safety of the public, DOE, contractor employees, and the environment. Chapter IV of DOE Order 5820.2a, Chapter IV, further specifies that waste containing Resource Conservation and Recovery Act (RCRA) hazardous waste substances or otherwise classified as mixed waste be managed in accordance with the requirements of RCRA regulations and that waste operations be managed in a manner consistent with the standards promulgated by EPA in 40 CFR Part 192.

DOE Order 5400.4, *Comprehensive Environmental Response, Compensation, and Liability Act Requirements*, requires that DOE installations fully comply with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the National Contingency Plan (NCP) (40 CFR Part 300 *et seq.*), and the RCRA regulations (40 CFR Parts 260-265) and guidance as they apply to facility activities.

Finding: Strategies for the remediation of inactive uranium mill sites and vicinity properties based on current interpretations of Uranium Mill Tailings Radiation Control Act (UMTRCA) authority may not result in the complete remediation of all hazardous substances at the designated sites. Procedures in place for assessing and characterizing the sites may not be reliable for identifying all situations of environmental contamination that require remediation. Procedures and policies under development for dealing with hazardous wastes that are present on those sites but believed to be outside DOE's UMTRCA remedial authority offer no guarantees of expeditious resolution of environmental problems created by those wastes and do not indemnify DOE from additional, future liabilities regarding those wastes.

Discussion: The UMTRA Project Office program for the remediation of inactive mill tailing sites and vicinity properties has been developed primarily through consideration of the directives contained in Title I of the UMTRCA. The UMTRA Project Office has asserted that the exclusion of source special nuclear and other by-product materials from the definition of "release" contained in section 101(22)(C) of CERCLA means that provisions of CERCLA and the NCP will not apply to remedial actions undertaken at those sites or that CERCLA cannot be coincidently applied to the non-radiological hazardous substance releases suspected of being present on the sites.

UMTRCA has further been interpreted to mean that UMTRA Project Office responsibilities with respect to remediation of inactive mill sites and vicinity properties extends only to the remediation of the uranium mill tailings and RRM present on those properties and that DOE is authorized to expend UMTRCA monies on remediation of only those materials.

Detailed site characterizations performed by the RAC have identified the potential for a variety of non-radiological hazardous substances to be released at the mill sites (UMT091, UMT083). In addition, past program experiences in the remediation of vicinity properties have also identified the possibility that non-radioactive hazardous substances other than the mill tailings may also be present.

In accordance with its interpretation of UMTRCA authority and in recognition of the potential for other non-radiological hazardous materials to be present at mill sites, the UMTRA Project Office has developed a strategy for site characterization and remediation that precludes DOE remediation of those hazardous substances that do not fit the definition of uranium mill tailings or other RRM. Initial site characterizations of mill sites for the purpose of designating areas eligible for UMTRCA remediation are based primarily on the presence of radioactive contamination. Subsequent and more detailed site characterizations are indeed capable of identifying other non-radiological hazardous substances present on the site, but such chemical characterization activities appear to be limited in areal extent to areas identified in previous site surveys as being radiologically contaminated.

Hazardous substances released in areas of the mill site that are not radiologically contaminated may not be identified under the current site characterization procedures. UMTRA Project Office officials have indicated that characterizations of probable or obvious areas of chemical contamination would occur under the discretionary application of their UMTRCA authority (I-IWS-14). For example, readily identified abandoned underground tanks and areas of obvious ground staining may be investigated for possible contamination (as is expected will be the case at the Gunnison Mill Site). However, current procedures do not guarantee that releases occurring in remote areas of the site will be fully characterized. Even if such areas of chemical contamination are confirmed, those areas would nevertheless not be eligible for UMTRCA remediation by the UMTRA Project Office if they were not considered to be related to ore processing activities or did not otherwise fit the definition of RRM.

It should be noted that there is no evidence to suggest that detailed site characterization studies performed at the Rifle and Grand Junction Mill Sites have failed to identify releases of hazardous substances. Both studies were well conceived, comprehensive in scope, and well executed. However, while historic reviews and the collection of anecdotal information appeared to be comprehensive, sampling activities were perfunctory and no non-intrusive subsurface investigation techniques were employed. [An intuitive argument can be made that since the main tailings piles were designated, albeit unauthorized, disposal areas during mill operations, all waste materials would have been placed in those piles. There is empirical evidence to support such a presumption. However, this presumption is not defensible with respect to unauthorized materials brought to the site, especially during periods of no access control. The presumption also does not address other industrial activities on the sites, prior to ore milling activities (as is the case for Grand Junction).] There was no indication in these reports that CERCLA guidance was utilized in developing the scope of work for those studies and no formal data quality objectives were established. While these site characterizations may have been adequate to support the preconceived UMTRA Project Office remediations under UMTRCA, they were not sufficient to evaluate the extent of other hazardous substance releases at UMTRA Project Sites.

The UMTRA Project Office has not formally evaluated its site assessment, site characterization, and remedial investigation/feasibility study procedures for their coincidence and compatibility with analogous procedures published by EPA under CERCLA and NCP authority. EPA guidance documents covering the characterization and cleanup of non-radioactive hazardous substances that may be present at UMTRCA sites include, but are not necessarily limited to: *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (OSWER Directive 9355.3-01), *Preliminary Assessment Guidance FY 1988* (OSWER Directive 9345.1-01), and *Expanded Site Inspection Transitional Guidance for FY 1988* (OSWER Directive 9345.1-02).

The current site characterization procedure is sufficient to identify those materials that the UMTRA Project Office believes it is obligated to remediate in accordance with UMTRCA. However, materials that may require management or remediation under CERCLA or other environmental statutes may not be fully identified. DOE Order 5820.2A obligates the UMTRA Project Office to ensure that any encountered hazardous wastes or mixed wastes will be managed in accordance with appropriate RCRA standards. DOE Order 5400.4 requires the UMTRA Project Office to ensure that CERCLA releases are dealt with in accordance with provisions of CERCLA and the NCP. Failure to identify all RCRA or CERCLA controlled materials during site characterization compromises DOE's ability to demonstrate compliance with DOE Orders 5820.2A and 5400.4, irrespective of whether the UMTRA Project Office is ultimately successful in getting previous private mill site owners or owners of vicinity properties to assume responsibility for the proper management of these materials. In fact, the comprehensive identification of materials controlled under RCRA and CERCLA is fundamental to the UMTRA Project Office's success in that regard.

It is also important to note that the failure to comprehensively identify RCRA and CERCLA controlled materials during site characterization may have short-term impacts on the planned UMTRCA remedial actions, particularly at mill sites. Failure to identify all hazardous substances present on the site, both radiologic and non-radiologic, precludes the RAC from developing a comprehensive health and safety plan. Such a plan is essential for conducting the remedial action in a manner fully protective of human health and the environment. Further, the presence of additional potential off-site sources of groundwater contamination that have not been fully characterized may preclude the UMTRA Project Office from successfully demonstrating compliance with applicable groundwater standards (40 CFR Part 192) (and thus full compliance with DOE Order 5820.2A) since the specific contaminants measured at the groundwater monitoring locations are likely to be indistinguishable with respect to source.

Finally, contamination present in soil and sediment which has migrated off the processing sites may significantly alter the anticipated remediation strategies for vicinity properties that are adjacent to those processing sites.

This deficiency was not identified in any of the formal self-assessments. However, the UMTRA Project Office self-assessments did acknowledge a failure to define the full extent of applicable requirements.

Apparent causal factors behind this finding include a lack of explicit interpretive guidance on policy implementation and inadequate policy development.

IWS/BMPF-1: CERCLA Remedial Action Decisions

Performance Objective: The UMTRA Project Office is required under the Uranium Mill Tailings Radiation Control Act (UMTRCA) to conduct remedial actions in a manner that is protective of human health and the environment, take reasonable steps to avail itself of all relevant information on which to base decisions on the selection of remedy, and ensure that remedial technologies being considered and applied at inactive mill sites under its control are appropriate and effective. Best management practice would result in ongoing reviews of similar remediation projects.

Finding: The UMTRA Project Office has no policy or procedure in place to maintain continuing reviews for consistency and applicability of the ongoing remedial activities at other uranium mill sites not designated in UMTRCA Title I.

Discussion: A number of mill sites and Vicinity Properties (VPs) not designated in UMTRCA Title I are currently listed on the National Priorities List (NPL) and are undergoing remediation under CERCLA authority. Two examples include: The Homestake Mining Co. Uranium Mill, Cibola County, New Mexico (NPL Rank 528), and the United Nuclear Corporation, Church Rock, New Mexico (NPL Rank 651). UMTRA Project Office officials believe that it is outside of their responsibility to ensure compatibility of their remedial activities with those ongoing at these two sites since those remediations are proceeding under CERCLA authority (I-IWS-19).

It is important to remember that the 24 inactive mill sites designated in UMTRCA Title I were unique from other mill sites only in the fact that substantially all of the uranium was produced for sale to the Federal Government. In other respects, UMTRCA Title I mill sites were similar in design and operation to other mill sites. (A number of different ore separation and beneficiation processes have been utilized at various mill sites and not all mill sites are identical. Further, some mill sites engaged in a broad variety of processes, as opposed to the UMTRCA mill sites which dealt almost exclusively with uranium ore processing.)

Reviews of decisions made under Superfund authority regarding the remediation of inactive uranium mill sites not designated under UMTRCA Title I can provide valuable insight into the environmental, regulatory, and liability issues associated with inactive mill site remediations. Site specific and ore-processing-design differences notwithstanding, there is reason to believe that these CERCLA remedial action decisions can provide insight and guidance as well as legal precedent for the execution of similar decisionmaking authority under UMTRCA. A review of the Records of Decisions for these two mill site remediations shows that EPA routinely reviews its decisions for consistency with the UMTRCA groundwater standards contained in 40 CFR Part 192, but has also developed other applicable or relevant and appropriate regulations (ARARs) for these site remediations (UMT209, UMT210).

Although CERCLA as amended by SARA provided exclusion of uranium mill tailings and other RRM from the definition of "release" contained in Section 101(22)(C), other hazardous wastes that have the potential for being present on the UMTRCA mill sites, do not enjoy the protection of the CERCLA exclusion if they have not been mixed with radioactive wastes to form RRMs. Remediation of these non-radiological hazardous wastes may proceed under the authority of a number of statutes, including CERCLA. It is therefore potentially important to remain informed of the decisions regarding the management and remediation of non-radiologic

wastes at these CERCLA sites in order to anticipate a similar application of CERCLA authorities to the UMTRCA designated sites.

The UMTRA Project Office and its contractors have not recognized this deficiency in their self-assessments. However, Project Office personnel acknowledge the potential benefits from such reviews. Also, Project Office and TSC personnel have reviewed the technical approaches employed in remediation at two other mill sites for their compatibility with UMTRCA projects.

Apparent causal factors behind this finding result from a failure by the UMTRA Project Office to comprehensively define its potential liabilities with respect to mill site remediation and a failure to recognize that policy and precedent established in other mill site remedial activities may be applicable, at least in principal, to UMTRCA Title I sites.

IWS/BMPF-2: **Statements of Principle for Dealing with Hazardous or Commingled Wastes**

Performance Objective: The Uranium Mill Tailings Radiation Control Act (UMTRCA) requires DOE to perform remediations of inactive mill sites and vicinity properties in a manner that is fully protective of human health and the environment. UMTRCA requires that the final disposal cell be capable of demonstrating compliance with EPA groundwater standards over the entire period of administrative controls specified in the Nuclear Regulatory Commission license. DOE is also obligated to complete all necessary remediations by a date certain as specified in the statute.

Finding: The Statements of Principle (UMT205, UMT206) which are currently under development to deal with remedial actions on hazardous wastes present at inactive mill sites and commingled wastes (residual radioactive material combined with hazardous constituents) encountered at vicinity properties may not provide sufficient protection to DOE against future liabilities. Notwithstanding additional liabilities, the remedies envisioned by these Statements of Principle promise to introduce significant delays in site remediation, thus jeopardizing DOE's ability to meet its statutory deadline.

Discussion: Early experiences in remediating vicinity properties and detailed site characterization studies performed at inactive mill sites have both established the potential for hazardous wastes to be present. The UMTRA Project Office has interpreted its authority to remediate the hazardous materials encountered at mill sites to be limited to instances where the hazardous waste substances have mixed with tailings to form Residual Radioactive Material (RRM) (I-IWS-16, IWS-18, and IWS-19).

At vicinity properties, because of the likelihood that hazardous wastes were not delivered to the property with the mill tailings and were instead the result of the actions of the property owner (or others), DOE presumes no obligation to remediate these hazardous materials using its UMTRCA authority.

Because the presence of hazardous materials at mill sites or vicinity properties may significantly impact DOE's remedial activities, the UMTRA Project Office has decided to address the proper disposition of these materials by developing separate Statements of Principle for hazardous materials at mill sites and vicinity properties. These Statements of Principle establish the protocols that DOE will follow in its attempts to get the previous private mill site owners and vicinity property owners to assume responsibility for dealing with such encountered materials.

In general, the Statements of Principle represent a sincere effort on the part of the UMTRA Project Office to confine its remedial activities and expenditures to its perceived limits of authority granted by UMTRCA. At the same time, these policy statements reaffirm the UMTRA Project Office's intention that remedial actions be performed safely and in an environmentally sound manner. However, in their present form, these policy statements are insufficient in scope and, in some instances, too unrealistic to offer adequate and reliable protection to DOE from additional environmental and statutory liabilities.

While it is not the purpose of this audit to provide an exhaustive analysis of the Statements of Principle, these few critical observations are offered in support of the above finding:

- The Statements of Principle have no force in law, since their formulation was not directed by UMTRCA. Officials from the CDH UMTRA Program have been given the opportunity to review and comment (UMT112, UMT113). However, their concurrence is not legally binding on the State and will not necessarily preclude the State's future exercise of its authority in ways contrary to the expectations of the Statements of Principle. The Statements of Principle are certainly not binding on EPA Region VIII in their exercise of RCRA oversight authority. [Under the terms of Colorado's Resource Conservation and Recovery Act (RCRA) authorization, Colorado has primacy to regulate hazardous wastes but EPA retains oversight RCRA enforcement authority over all aspects of Colorado's program except those provisions that are broader in scope and have no analog in the Federal RCRA program (I-IWS-5, IWS-14).] UMTRA Project Office officials have not to this point considered making the Statements of Principle binding amendments to the Cooperative Agreements required under UMTRCA between DOE and affected states (I-IWS-20, IWS-21). Finally, with respect to the enforceability of the Statements of Principle, DOE appears to have no legal authority to require the owners of vicinity properties or former private owners of mill sites to assume responsibility for proper management of commingled or hazardous wastes.

- The Statements of Principle appear to be too presumptive with respect to their anticipation of appropriate remedy for hazardous or commingled wastes. The Statements appear to adequately address scenarios where hazardous wastes (or hazardous materials in their original containers) are found in such a circumstance that they could be readily retrieved and isolated. In those instances, RCRA authorities would be the likely means of control. However, in those instances where hazardous substances are found to have been released to the environment (e.g., a subsurface plume of contamination that has no radiological components and is other otherwise not associated with ore processing activities) both RCRA (in the form of 3004(u) Corrective Action authority) or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedies are available and could be exercised by either or both the state and the EPA. In those instances where the foreign contamination is found to have a radiologic component but can otherwise not be associated with the ore processing activities (e.g., a commingling that has occurred at a vicinity property), both state hazardous mixed waste authority and Federal CERCLA/SARA authorities (or their state equivalents) could be applied. There are no provisions in the Statements of Principle addressing the coincident application of CERCLA authority to contaminant plumes on the affected properties.

- Regardless of the selected remedy for dealing with hazardous or commingled wastes, logistical nightmares can be expected. Most significant of these is the anticipated delay in securing any necessary RCRA permits for onsite treatment. The UMTRA Project Office correctly anticipates that radiologic components in the waste will likely preclude the offsite treatment of the wastes in commercial facilities (I-IWS-18, IWS-20). Depending on circumstantial factors, the UMTRA Project Office may not be able to complete its UMTRCA authorized remedial activities during onsite treatment of the hazardous or commingled wastes. (This will undoubtedly lead to increased UMTRCA remedial costs due both to

inflation and interim stabilization requirements, especially at mill sites.) The only relief from the expected delays in RCRA permit timetables would be in those instances where the situation is considered immediately dangerous to life and health and emergency permits can be issued. Finally, because the onsite treatment would occur on a property which is otherwise under the control of the DOE, the RCRA state permit authority may require the UMTRA Project Office to be a signatory to the permit or may otherwise impose restrictions on UMTRA Project Office activities on the site to prevent jeopardizing the safe operation of the treatment system. The ability of the UMTRA Project Office to meet its statutory deadline for completion of remediation of these sites is jeopardized in the best of cases.

- According to the Statements of Principle, fundamental to the successful resolution of hazardous waste and commingled waste issues is the owners' assumption of responsibility to properly manage these wastes. DOE has no way to reliably guarantee that this will happen. Furthermore, in some instances, past experience would suggest that it is unlikely that the owners will react according to the Statements of Principle. Because the Statements of Principle were developed to address waste management that the UMTRA Project Office believes is outside its UMTRCA authority, DOE's contingency position when owners are not cooperative is not readily apparent. Some consideration has been given to application of discretionary UMTRCA authority (with the same Federal/state cost share?), but this would be an intrinsically inconsistent position for DOE. Supplemental standards have also been considered, but their application, while possibly consistent with the UMTRCA statute and supporting regulations (40 CFR Part 192), may also introduce additional long-term monitoring liabilities on DOE.

The UMTRA Project Office has not acknowledged these potential deficiencies in any of their formal self-assessments, although incomplete interpretations of regulatory responsibilities have been noted.

Apparent causal factors behind this finding include insufficiently explicit guidance, and incompletely developed procedures. Failure to recognize potentially applicable regulations also contributes to inadequate policy and procedure development.

IWS/BMPF-3: **Procedures for Demolition of Mill Structures**

Performance Objective: The Uranium Mill Tailings Radiation Control Act (UMTRCA) requires DOE to conduct remedial actions at inactive mill sites that are sufficient in scope to address environmental contamination resulting from uranium mill tailings and other contaminated residual radioactive material.

Finding: Demolition procedures utilized at the Rifle Mill Site did not completely address all potential areas of release of hazardous or radiologic contaminants. As a consequence, future remedial activities at the site may not result in a successful demonstration that UMTRCA requirements have been met and that all other environmental liabilities have been characterized.

Discussion: The mill processing building and other ancillary structures at the inactive Rifle mill site have recently been demolished in preparation for the future remediation of the site. Demolition wastes have been characterized for radiological and non-radiological contamination and segregated onsite for eventual transfer to the permanent disposal cell being developed for wastes from this site and its vicinity properties. As part of the demolition of the processing area, the land surface was surveyed for radioactivity and found to be radioactively contaminated in amounts indicative of windblown contamination from nearby uranium tailings piles.

Demolition consisted of dismantlement of all above ground structures, including processing piping and utility lines within and associated with the mill building. Much of this piping was determined to be radioactively contaminated and also to be contaminated with asbestos-containing insulation materials. However, during the demolition, it was decided that some underground piping and utility lines known to exist in the milling area would not be removed, based on the results of radiation surveys conducted over the area which dismissed the likelihood that wholesale placement of uranium tailings had occurred. With respect to the buried utility lines that were abandoned in place, it was noted that experience gained during demolition suggested these lines would likely be contained in, or made up of transite, an asbestos-containing cement product (I-IWS-12, I-IWS-13).

The decision to abandon lines in place fails to recognize that the backfill around the utility lines may act as a conduit for subsurface movements of contaminants, often in defiance of natural subsurface flow directions. It is also important to note that surface gamma radiation surveys may not be capable of identifying radioactive contamination plumes at depths below grade where utility lines may be expected to exist. Given the discovery of asbestos on a large percentage of other piping within the mill area, the possible presence of asbestos-containing materials associated with abandoned buried utility lines cannot be readily dismissed.

There is no evidence that a formal decisionmaking framework is in place that takes all analytical and circumstantial information into account in their proper relative weights to support such abandonment decisions.

This finding was not been identified in any of the formal self-assessments.

The apparent causal factor supporting this finding is the lack of sufficiently developed decisionmaking guidance for the RAC, and a policy decision to confine characterization

activities in advance of remediation to those areas of the property which surveys have determined to be contaminated with radioactivity.

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3.10 Environmental Management

3.10.1 Overview

The purpose of the environmental management and organizational assessment portion of the Environmental Audit was to evaluate the effectiveness of the formal and informal management structure of the UMTRA Project. Of particular importance was determining if protocols exist to ensure that sound environmental management is conducted on the UMTRA Project. The approach looked at both formal structure as represented by organizational charts, program plans and other programmatic procedures and informal approaches as represented by "regularized ways of doing the job." Table 3-10 lists the DOE Orders, Secretary of Energy Notices, and regulations that define what organizational arrangements ought to be in place and what functional relationships should exist between organizations.

The ideals and goals established by Secretary Watkins in his 10-point Initiative and other characteristics of the "new culture" are of primary concern when considering environmental management issues. There was general consensus within the UMTRA Project personnel on the criteria defining the new culture. Specific to Secretary Watkins' 10-point plan were the following relevant initiatives: "Resetting of priorities to reflect environment, safety and health as more heavily weighted than production;" "Strengthening the environment, safety, and health technical capabilities of line managers within the DOE organizational structure;" and "Accelerating the cleanup of DOE facilities . . . ." Inherent in the new culture for DOE is the attitude of "do it right the first time" which requires managers and management policy to encourage positive attitudes toward environmental compliance, a sense of ownership and pride among workers and a strong commitment to excellence through oversight. While the new culture represents ideals toward which the Department and contractors are working, it must be realized that these cannot be reached without resources.

Within the context of the new culture and the regulatory environment, the environmental management of the UMTRA Project was assessed on the following points:

- organizational structure and functional reporting relationships;
- line responsibility and accountability;
- oversight activities;
- internal and external communication;
- management commitment and support for ES&H; and
- management guidance, training, and procedures.

The general approach to environmental management and organization assessment of the project included interviews with representatives of the Colorado Department of Health, UMTRA Project Office, Grand Junction Projects Office, Chem-Nuclear Geotech, MK-Ferguson, Jacobs Engineering, DOE-EH, DOE-EM, and DOE-Albuquerque Operations Office. Also included were examinations of various documents (including policies, procedures, and manuals), and interactions with other members of the Audit Team.

Table 3-10
List of Environmental Management
Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE Order 5000.3A	Occurrence Reporting and Processing of Operations Information	DOE
AL Order 5200	Manpower Management	DOE-AL
DOE Order 5400.1	General Environmental Protection Programs	DOE
DOE Order 5400.2A	Environmental Compliance Issued Coordination	DOE
DOE Order 5480.1B	Environment, Safety and Health Programs for Department of Energy Operations	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	Environmental, 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-6D-91	Departmental Organizational and Management Arrangements	DOE
SEN-7A-90	Policy of Line Management's Responsibility to Achieve Environmental Compliance	DOE
SEN-11-89	Setting the New Course	DOE
SEN-20-90	Interaction with Internal and External Oversight Organizations	DOE

1

IMAGE EVALUATION
TEST TARGET (MT-3)

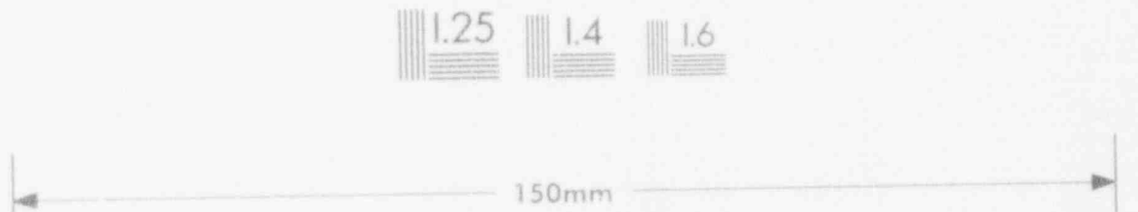

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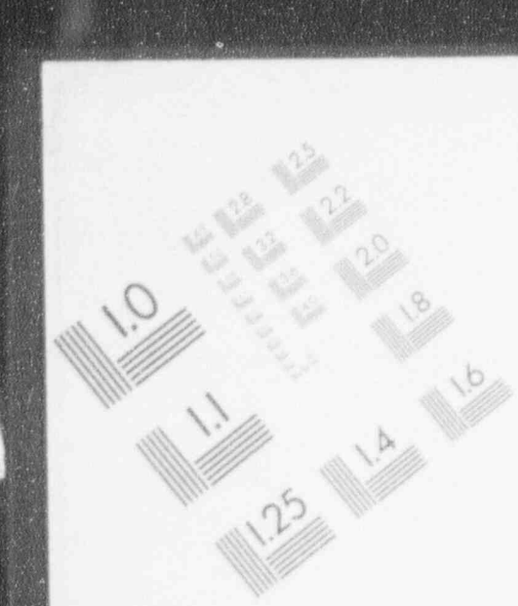
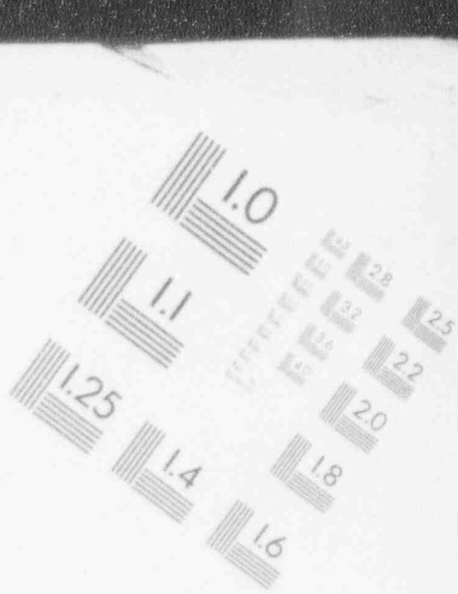
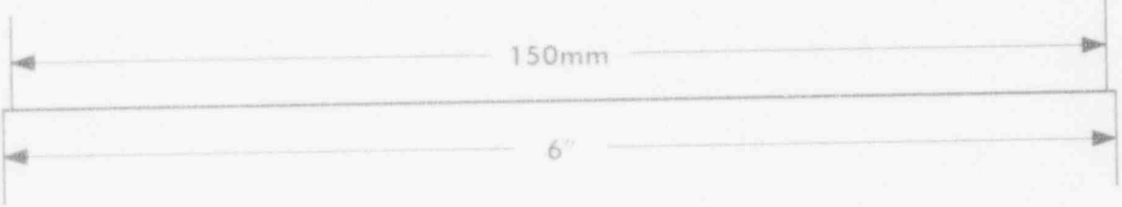
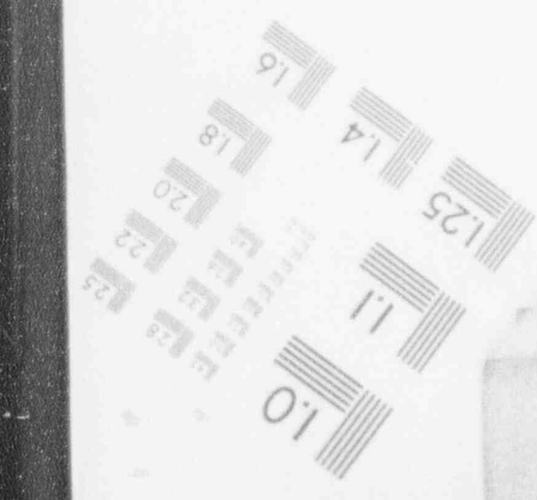
IMAGE EVALUATION
TEST TARGET (MT-3)







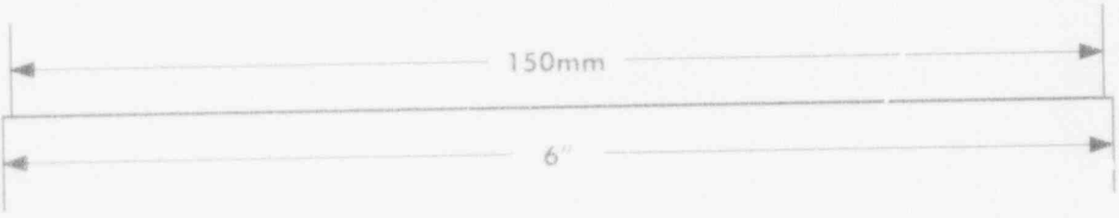


1

IMAGE EVALUATION TEST TARGET (MT-3)

1

IMAGE EVALUATION
TEST TARGET (MT-3)



The UMTRA Project has been operating for a number of years and has developed a reputation for making progress in effectively managing the remediation of uranium mill tailings sites. Dating back to the early days of the UMTRA Project, personnel were active in presenting papers and communicating with outsiders about the project. A number of key personnel have worked on the project for a number of years and maintain the institutional memory. On average, it appears that most staff have been on the project for 2 to 3 years. The UMTRA Project Office staff appear dedicated, sincere and overworked. Staff were open, forthright, and genuinely interested in the audit process producing constructive results. The RAC and the TSC were responsive to the Audit Team's requests and provided much insight into the management of the UMTRA Project.

Overall, it appears that the environmental management of the UMTRA Project can best be summarized by the concept (borrowed from the anthropologists) of culture lag (i.e., the delay in adjustment of social systems to changes occurring outside the immediate system). As new cultural elements are brought into an existing system, that system must adapt its beliefs, ideals, institutional/organizational arrangements and regular ways of doing things to fit the new cultural element. With the rapid cultural change brought on by Secretary Watkins, the UMTRA Project has been slow to adapt. This Audit was conducted approximately 2 years after Secretary Watkins' new culture was announced. This should have been ample time to make substantial progress in meeting the goals of the Department and develop comprehensive plans for meeting those goals. While some progress has been made recently in this area (such as the UMTRA Project Environment, Health & Safety Goal Statement published June 6, 1991), the project has not fully adapted to the new culture.

The management component of the Audit had seven compliance findings and one best management practice finding. Problems identified in these findings include: priority of environment, safety, and health matters; environmental management program; self-assessment program; data sharing with cooperating agencies; organizational structure; regulatory compliance; environmental protection provisions in contracts, and environment, safety, and health organizational responsibilities.

3.10.2 Findings

EM/CF-1: Priority of Environment, Safety, and Health Matters

Performance Objective: Secretary Watkins' 10-point Initiative indicates that environment, safety and health (ES&H) represent the number one priority for the Department of Energy. For a successful ES&H program, necessary resources must be obtained within each program area. The UMTRA Project Charter identifies the Project Manager as being responsible for preparing and maintaining "a Project Plan that describes schedule and resource requirements for the overall Project . . . ." (UMT130).

Additionally, SEN-6D-91 states "the lack of a coherent effort to recruit, train and develop within DOE the technical talent to run our complex operations is one of the Department's most serious problems."

Finding: Adequate staff resources have not been requested in the appropriate format to carry out adequate oversight of environment, safety, and health matters on the UMTRA Project.

Discussion: While the UMTRA Project Office is staffed by dedicated professionals, the site managers and the environmental, safety, and health personnel are spread too thin to effectively operate in all environmental areas and sites for which they are responsible. While the "new DOE culture" is clearly understood by those with management and environmental responsibilities, the regular approach in asking for new positions remains unchanged. Specifically, positions are requested within the context of known constraints on the Operations Office system. This understandably has had the effect of creating self-imposed constraints on the number of new positions requested for the UMTRA Project Office regardless of actual need. In addition, this has the effect of skewing the input data for the EM Five Year Plan by underestimating staffing needs for the project. General consensus among UMTRA Project staff and management, the TSC and the RAC is that the UMTRA Project Office is short of staff and, as a result, is not capable of providing the control, oversight and accountability necessary to adhere to the "new culture." It should be noted that the UMTRA Project Manager requested 24 additional staff in July of 1989 but has apparently not requested only 1-2 additional positions in subsequent years (UMT176).

The UMTRA Project Manager has been operating within the perceived constraints of the old system where prior knowledge of the limit on number of positions and interpersonal working relationships with superiors meant one did not ask for what one could not reasonably expect to receive. Informal feedback in the system meant revising the number of requested staff downward to meet expectations of the Operations Office. UMTRA staff are also largely unaware of the process that should be followed to request new positions and have that request passed on through the proper channels.

Although the site was aware of this issue, the finding was not identified in the UMTRA Draft Preliminary Self-Assessment.

The apparent causal factor is the existence of administrative barriers and controls in the past which discouraged managers from requesting additional staff. Additionally, lack of implementation of the policy outlined in SEN-6D-91 was also an apparent causal factor.

EM/CF-2: **General Environmental Protection Program**

Performance Objective: DOE Order 5400.1, *General Environmental Protection Program*, establishes the environmental protection program requirements, authorities, and responsibilities for DOE operations for assuring compliance with applicable Federal, state, and local environmental protection laws and regulations, Executive Orders, and internal Department policies. It also establishes requirements and guidance for (1) notification and followup of environmental occurrences and (2) periodic routine reporting of significant environmental protection program information. DOE operations are also required to develop and implement specific environmental protection program plans for each facility or group of facilities for which they are responsible, and environmental monitoring programs. Paragraph 9 of the Order states "Heads of Field Organizations shall issue and update, as required, a general environmental statement that reflects the statement of policy in this Order and contains broad environmental protection goals for all facilities and activities for which he or she is responsible; ensure that all operations under their authority comply with applicable environmental protection laws and regulations, and directives; prepare long range environmental protection plans in accordance with guidance issued by EH-1; and develop and implement programs that direct contractors to execute environmental protection compliance programs and policies, and provide for oversight, confirmation, and independent verification of those contractor programs."

DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*, Chapter I, Section A, states that effective implementation and control of operating activities is primarily achieved by establishing written standards in operations, periodically monitoring and assessing performance, and holding personnel accountable for their performance. Section B states that a high level of performance is accomplished by establishing operating standards, communicating these standards to the working level, and by providing sufficient resources to the Operations Department.

SEN-11-89 also states that "senior DOE field and headquarters officials will be expected to ensure that their contractors comply with operational, environmental, safety, health and security standards established by law, regulation or Departmental policy, while at the same time ensuring that they meet their production or research mission."

Finding: There is no comprehensive formalized Environmental Protection Program at the UMTRA Project Office sufficient to meet the requirements of the DOE Orders and the spirit of the new DOE culture.

Discussion: The lack of a comprehensive Environmental Protection Program has consequences for UMTRA Project Office staff who have line management responsibility and for the contractors doing the work. Contrary to often stated assertions that the UMTRA Project is an "environmental project," it is carried out as an engineering project where moving contaminated soil is a measurable form of production. Perhaps because the project has developed over several years (and prior to the new culture), there is a lack of a comprehensive formalized environmental program. This is reflected in the lack of adequate environmental guidance to contractors and the Grand Junction Project Office the lack of environmental training and the lack of environmental oversight.

The *UMTRA Project Environmental, Health, and Safety Plan*, (UMT-131), February 1989, has not been revised to reflect the DOE Order requirements and focuses mainly on health and

safety with only casual attention paid to some environmental parameters. The lack of attention to environment can be noted under headings such as 4.0—"Program Requirements," Subsection 4.1, "Organization and Staffing" where it states "The contractor having health and safety responsibilities at a site or associated vicinity properties shall have a qualified individual responsible for health and safety of the workers and public." Noticeably absent is the responsibility for environment. This omission is characteristic of most program documents.

In regard to training, the UMTRA Project Office has no environmental training document, and those used by the RAC focus almost exclusively on health and safety [as might be expected given the UMTRA Project Environmental Health, and Safety (EH&S) Plan]. Training documents related to environmental compliance by the TSC do not exist, although there is an *UMTRA Project Environmental Services Procedures Manual* (UMT-132).

Guidance from the UMTRA Project Office to contractors is lacking, especially in the area of environment. Numerous examples exist where guidance is either nonexistent, or not comprehensive. The UMTRA EH&S Plan is but one example. The Grand Junction Project Office (GJPO) does not receive guidance related to environment, safety and health on a regular basis nor do the contractors under GJPO. Contractors receive copies of DOE Orders with no guidance from the UMTRA Project Office and are left to interpret the Orders themselves.

Several of the UMTRA Project EH&S documents were reviewed for compliance with DOE Orders. The *UMTRA Project Audit/Surveillance Program Plan*, April 1988, is outdated in that it does not reflect the DOE Order or the UMTRA Quality Assurance Plan requirements. The UMTRA Project Environmental Protection Implementation Plan, October 1990, was also reviewed. Several items of concern are noted. There is no indication that the plan has been approved by the appropriate Program Senior Official, with concurrence by EH-1. The plan document reviewed had no document control number. Section 6.1, "Quality Assurance Program," states "the RAC Quality Assurance Program is consistent with DOE 5700.B and covers the 11 elements described in DOE 5400.1." Review of the RAC Quality Assurance Program Plan (QAPP) for the above information resulted in the following observations: the RAC UMTRA Projection QAPP, MK-F-UMTRA-5, Revision 6, cites as reference DOE Order 5700.6A not DOE Order 5700.6B, and the RAC UMTRA Project QAPP does not appear to include the DOE Order 5400.1 Quality Assurance program elements such as field quality control, laboratory quality control, and chain-of-custody procedures.

The UMTRA Project has not developed formal Waste Minimization and Pollution Prevention Awareness Programs as required in DOE Order 5400.1. These programs were to have been completed no later than 12 months and 18 months respectively after the effective date of the Order, which was November 9, 1988. The Project has developed a general environmental statement, the UMTRA Project EH&S Goal Statement. While this statement appears to be in response to DOE Order 5400.1, it does not comply with the requirement in the order that the Pollution Prevention Awareness Program "shall be specifically identified in his or her environmental protection statement."

At present, all of the requirements contained in Chapter IV, Environmental Monitoring Requirements of DOE Order 5400.1 such as Environmental Monitoring Plans, Environmental Monitoring - General Requirements, Meteorological Monitoring Program, Radiological Monitoring, Non-Radiological Monitoring, Groundwater Monitoring and Quality Assurance and Data Verification do not need to be implemented until November 9, 1991, 36 months after

the effective date of the Order. The UMTRA Program Office will need to give these matters prompt attention to meet the deadline specified in the Order.

In light of these observations, it may be difficult for the UMTRA Project to demonstrate compliance with applicable Federal, state, and local environmental protection laws and regulations because the requirements of the Environmental Protection Program Order have not been implemented in a timely manner. Some of the items identified above were identified in the UMTRA Draft Preliminary Self-Assessment.

The apparent causal factor is a lack of implementation of a policy that is clearly delineated in DOE Orders and secondarily the lack of resources.

EM/CF-3: **Self-Assessment Program**

Performance Objective: Secretary Watkins sent a trends analysis based on the results of the first six Tiger Team Assessments to the Secretarial and Operations Office managers on January 26, 1990. Detailed guidance for self-assessment was transmitted to these same offices on July 31, 1990. This guidance included the following requirements: Self-assessment programs are required to include functional and management appraisals of contractors by DOE line management; the programs will involve all levels of line management, including DOE Headquarters; the programs will encompass specific operating procedures and planning requirements; the programs will include a formal lessons-learned program; and they will require that action plans that are developed to address deficiencies and also address root cause.

Finding: The UMTRA Project Office line management self-assessment program does not comply with the substantive requirements in the Environmental, Safety, and Health Self-Assessment Guidance.

Discussion: AL the process of establishing formal management policies and processes to assign responsibilities for the overall AL self-assessment program among contractors, area offices, project offices and AL. While the UMTRA Draft Preliminary Self-Assessment provided to the Audit Team was comprehensive, in-depth and forthright, no formal self-assessment program has been developed. The UMTRA Project Office is aware of this and has set into motion a process for developing a self-assessment program but must wait for AL guidance before finalization. It should be noted that portions of some elements of the self-assessment program exist within the Project Office such as a continuous audit program, a lessons learned program for active sites, and internal audits and surveillances.

As stated in the UMTRA self-assessment "a comprehensive, documented self-assessment program in full conformance with the Secretary's guidance does not exist."

The apparent causal factor contributing to this finding is the apparent lack of staff resources available to prepare and implement a formal self-assessment program. Additionally, the existence of an administrative barrier (in the form of the lack of AL guidance) is an apparent causal factor.

EM/CF-4: **Organizational Structure**

Performance Objective: The organizational structure should reflect the strong commitment of environmental excellence and DOE's environmental concerns as indicated in the Secretary's 10-point Initiative. In addition, the interface between the line organizations and staff should provide environmental support that is well defined and understood. DOE Order 5400.1, *General Environmental Protection Policy*, specifies the Program Senior Officials shall: "Provide clear and explicit delegations of authority and responsibilities for implementing DOE environmental protection programs." AL Order 5200 (Manpower Management) indicates that it is the responsibility of DOE-AL Officials to "Recommend to the Director, Organization and Personnel Division, organizational arrangements and position structure so that optimum utilization of personnel can be obtained." SEN-20-90 states that "the responsibility for managing Departmental activities in a safe and environmentally sound manner rests with line management—starting with line management at the contractor level and moving up through DOE line management." Therefore, it is DOE policy that line management be responsible for ensuring that operations under its jurisdiction comply with DOE Orders and Federal, state, and local regulations.

Finding: Overly complex organizational arrangements on the UMTRA Project distort line management responsibility and authority.

Discussion: The organizational split of the UMTRA Project between the Idaho Operations Office (ID) [which oversees the Grand Junction Project Office (GJPO)] and AL (which oversees the UMTRA Project Office) creates confusion, blurred lines of authority, inconsistencies in application of standards, and occasional conflict among the participants. Apparently, this organizational arrangement was the result of historical and political decisions based on the desire to provide the GJPO with increased work as their workload was declining.

The GJPO is responsible for work at the Grand Junction Vicinity Properties. Operating under ID, the GJPO takes its programmatic direction from the UMTRA Project Office. While in many ways working relationships have developed so that all parties interact in formal and informal ways (including regularly scheduled meetings), the structure of the program may cause the complexity of the arrangement to increase over time. Specifically, as the surface remediation at the mill sites is completed and the sites are licensed by the Nuclear Regulatory Commission, they will be transferred from the UMTRA Project Office to the GJPO for long term surveillance. In the case of nine mill sites currently completed, the UMTRA Project Office will be involved in groundwater remediation while the sites are under the auspices of the GJPO. This arrangement will mean that line management responsibilities of the GJPO go through ID, while UMTRA Project Office staff report through the AL on the same site. This problem has already lead to problems in regard to the project where ID requires respirators to be worn based on different criteria than those used by AL. In addition, GJPO contractors use different field procedures and reporting procedures than contractors working for the UMTRA Project Office (see Finding QA/BMPF-2). In Grand Junction, confusion has emerged about which contractors are in control of various parts of the site. Admittedly, some of these problems may disappear with increased guidance and oversight by the UMTRA Project Office, but the project has not moved to the stage where one organization would be responsible for long-term surface surveillance, while the other organization was responsible for groundwater restoration.

In a 1989 review, *Vicinity Property Programmatic Review* (UMT133), it was identified (Observation 1) that "Communication between CDH-GJ and DOE-GJPO, DOE-ID and UMTRA-Project Office could be improved. The CDH-GJ staff is not aware of the division of responsibilities between the different offices of the DOE . . . ." In another finding (Observation 6), it was indicated that one of the GJPO contractors had to report different work to GJPO and UMTRA-Project Office such that the " . . . double reporting mechanism causes frustration within staff because of different requirements from UMTRA Project Office and GJPO."

The UMTRA Project Office has been aware of these types of problems and an attempt has been made and continues to be made to more carefully specify the working arrangements between the two project offices for the pre- and post-licensing phases of the project (UMT134, UMT135). However, this finding was not identified in any formal self-assessment.

The apparent causal factor is a combination of administrative barriers and control. The decision to divide the UMTRA workload between AL and ID was apparently justified due to formally underutilized staff resources in GJPO. However, this further entrenched the complexity of the organizational structure.

EM/CF-5: Regulatory Compliance

Performance Objective: DOE Order 5400.1, *General Environmental Protection Program*, states the purpose of the order is "To establish environmental protection program requirements, authorities, and responsibilities for Department of Energy (DOE) operations for assuring compliance with applicable Federal, State and local environmental protection laws and regulations, Executive orders, and internal Department policies." The Order further states "it is DOE policy to conduct its operations in an environmentally safe and sound manner. . . . DOE expects its management and operating contractors to conduct their operations in an environmentally sound manner that limits the risks to the environment and protects the public health. DOE will actively oversee contractors' activities to assure compliance with this policy."

Finding: The regulatory environment applicable to the UMTRA Project is not clearly delineated by the UMTRA Project Office for its contractors. UMTRA contractors can not clearly define the regulatory environment, especially as it relates to DOE Orders and Secretary of Energy Notices.

Discussion: Almost everyone interviewed for the audit indicated confusion and frustration with the web of regulations that control or relate to the UMTRA Project. For legal support to be helpful it must be able to respond quickly and in a timely manner to meet the needs of the project; UMTRA Project Office staff indicated that legal support from DOE-AL was minimal or nonexistent and supplied too late to be of use. However, there were also indications that this situation is improving. Access to DOE Orders, uncertainty about whether one was working with the latest Orders, and lack of time for tracking the Orders were problems identified by UMTRA Project Office staff. Contractor staff indicated that Orders were sent indiscriminately to the contractor with no guidance as to the applicability to the UMTRA project. The RAC has had the primary responsibility to track regulations and permits. Permits are tracked in a data base system with regular updates provided to the site contractors. The RAC indicated that it was never sure whether it had the current Orders or even if it had a complete set at any one time. However, unknown to some staff at the RAC, their access to the Safety Performance Measurement System/Occurrence Reporting and Processing System allowed on-line access to DOE Orders and Secretarial Notices. The system also allows for the contractor to print copies of the orders while on-line.

The TSC, according to the Draft TSC Management Plan (UMT137), is responsible for tracking regulatory compliance and permitting. The TSC, however, seems to be relying on the RAC for this information, thus not providing a valuable oversight role in this area. Overall, it appears that much of the burden for guidance in this area has been shifted from the UMTRA Project Office to the RAC. The TSC Management Plan indicates that it is the responsibility of their National Environmental Policy Act (NEPA)/Regulatory Compliance Department for ". . . identification and compliance with any regulatory, licensing or permitting requirements related to DOE Orders, NRC, statutory requirements of NEPA, RCRA, CERCLA, the Clean Air and Water Acts (NPDES, etc.) and applicable state and local requirements."

However, it appears that the UMTRA Project Office is not providing guidance to the RAC nor overseeing the TSC in this area.

This finding was identified in the UMTRA Draft Preliminary Self-Assessment.

The apparent causal factor is a lack of resource and regulatory training in the UMTRA Project Office.

EM/CF-6: Environmental Protection Provisions in Contracts

Performance Objective: DOE Orders 5480.1B, *Environmental, Safety, and Health Programs for DOE Operations*, and DOE Order 5400.1, *General Environmental Protection Program*, establish DOE policy on environmental protection. DOE Order 5480.1B states: "It is Department policy to assure the protection of the environment and the health and safety of the public." In addition, this Order is explicit in stating that the "Heads of Field Organizations are responsible for assuring that all operations under their jurisdiction are carried out consistent with sound ES&H Orders. In carrying out this responsibility, the Heads of Field Organizations shall assure that applicable environment, safety, health, and quality assurance requirements are included in contracts." DOE Order 5400.1 more specifically defines environmental protection requirements than generally established in DOE Order 5480.1B and states: "It is DOE policy to conduct its operations in an environmentally safe and sound manner . . . While responsibility for good environmental management is a Department one, environmental protection practices will, if necessary, be carried out at all levels and locations where DOE activities are performed by its management and operating contractors; it is DOE policy that contractors will share the Department's commitment to good environmental management."

Finding: The UMTRA Project has no formal system to ensure incorporation of environmental protection provisions in its contracts.

Discussion: The DOE contract with the RAC provides the legal basis for ensuring that the RAC will meet its obligations, including protection of the environment. The current contract, originally signed in 1983, has not been modified to reflect the DOE's current emphasis on environmental compliance. Article XVII of the contract requires the contractor to

> " . . . take all reasonable precautions in the performance of the work under this contract to protect the health and assure the safety of employees and the public. The Contractor shall comply with all applicable federal, state, and local health and safety laws, regulations and requirements, including but not limited to, those established pursuant to the Occupational Safety and Health Act and with any additional safety and health standards and requirements . . . established by DOE."

The same article requires the contractor to submit a health and safety management program and implementation plan for approval by DOE. The article is silent on an environmental program and implementation plan.

This finding was identified in the UMTRA Draft Preliminary Self-Assessment.

The apparent causal factor for this finding appears to be that formal procedures have not been developed to implement existing policy.

EM/CF-7: **Office of Environment, Safety, and Health Organizational Responsibilities**

Performance Objective: DOE Order 5480.1B, *Environment, Safety, and Health Program for Department of Energy Operations*," states "It is Department policy to require line management to be responsible for effective Environment, Safety, and Health (ES&H) performance of their programs." The Order further states "Heads of Field Organizations are responsible for assuring that all operations under their jurisdiction are carried out consistent with sound ES&H practices and in accordance with the ES&H Orders." This Order also extends to the contractor level in that the Heads of Field Organizations are also required to "Execute programs and assure that contractors and their subcontractors execute programs and policies which utilize appropriate ES&H program elements, as identified in this and other Orders for siting, design, construction, operation, maintenance, modification, deactivation, decontamination, and decommissioning of DOE facilities and activities."

SEN-11-89 (Setting the New DOE Course) indicates the importance for line management responsibility and requires clear, documented identification of responsibilities for ES&H/QA performance of individuals. This requirement extends to the contractors.

Finding: Line management functions, authorities, and responsibilities regarding environmental protection have not been effectively defined. Position descriptions and/or duties do not adequately reflect the importance of ES&H required by the new culture.

Discussion: The UMTRA Project Office has not incorporated significant environmental, safety and health (ES&H) responsibilities in the position descriptions of site managers. Likewise, primary duties for contractor site managers only mention "environmental" in passing, if at all. While the lack of emphasis on ES&H as a line management responsibility in the position description does not preclude the practice of sound environmental management, performance criteria based on environmental compliance is necessary to encourage sound environmental practice.

Educational background, training, and experience of current employees indicates that familiarity with environmental compliance has not been a significant criteria for filling positions. While it is often claimed that UMTRA is "an environmental project," position descriptions, duties, and responsibilities indicate the project is viewed as an engineering project (that employs some Health Physicists).

Interviews with staff at all levels of the project indicated a reporting process for environmental problems that was different from person to person. While the line management process is generally followed within a particular organization, the described reporting procedure outside the organization (for instance from the RAC to the UMTRA Project Office) varied according to who was interviewed. Because the UMTRA Project Office is relatively small, and has open communication and established working relationships, information seems to find its way to the appropriate people. While organizational charts are available for all organizations, potential problems can emerge when ES&H line management responsibilities are not clearly defined. For example, UMTRA Site Managers are not clear on signature authority for their position and therefore may not know the bounds of their responsibility and authority.

The need to include ES&H in position descriptions was identified in the UMTRA Draft Preliminary Self-Assessment.

The apparent causal factors relate to the slow adoption of the new DOE policy on ES&H as the number one priority. Contributing causal factors include lack of appraisals or reviews in regard to implementation of this policy.

EM/BMPF-1: Data Sharing with Cooperating Agencies

Performance Objective: Secretary Watkins' 10-point Initiative establishes that DOE will cooperate fully with other agencies to ensure an open and credible posture with respect to the implied data sharing ideal in regard to epidemiologic data (recognizing that UMTRA data are not epidemiologic data). Also, the National Academy of Sciences in both a report entitled *Sharing Research Data* (UMT178), and in a report prepared at DOE's request, *Providing Access to Epidemiological Data* (UMT177), support data sharing especially when it may prove informative for public policy decision making. The National Academy of Sciences states this "view is especially relevant to scientific data gathered at public expense."

Finding: Clear guidance on the data access policy of the UMTRA Project Office has not been developed and provided to UMTRA project staff, contractors, subcontractors, and the Colorado Department of Health (CDH).

Discussion: Representatives of the CDH have expressed concern (I-EM-4) that requests for data and information are handled on an *ad hoc* basis. Sometimes data are supplied by contractors whereas other information is sent through the UMTRA Project Office. CDH has been directed to request all data through the UMTRA Project Office rather than directly from contractors. The CDH has asked to receive groundwater monitoring data prior to data validation and to receive those data on an automatic basis. This would alleviate the need for repetitive specific requests. Data sharing, especially with cooperating agencies, is clearly within the spirit and intent of the new culture at DOE. It seems reasonable to extend this to preliminary data as long as the data are well qualified and labelled as preliminary. Regardless of the stage of data at the time of release, a specific guidance letter/document on the process for requesting/releasing data needs to be developed. Such a document would specify what data are routinely available, at what stage they would be released, and what the release process would be. This document could also specify which data and reports would be sent automatically to CDH without going through formal request channels.

A communication problem between CDH and DOE was identified in a 1989 *Vicinity Property Programmatic Review* (UMT133). Specifically, it was stated that "Communication between CDH-GJ and DOE-GJPO, DOE-ID, and UMTRA Project Office could be improved." The specific recommendation was "Distribution of UMTRA Project documents relating to policy, procedures, division of responsibility, etc. to all major participants by DOE-GJPO is recommended." Related to another observation in the same review about the transfer of information to CDH, it was recommended that "Each contractor and CDH should appoint a technical liaison to distribute technical information to the other contractors and CDH through the UMTRA-PO." While CDH has expressed concern (I-EM-4) to the Audit Team about both access and the timeliness of data acquisition, the UMTRA Project Manager wrote the CDH in May 1991 indicating "commitment to working together as a team and maintaining open lines of communication at all levels of our respective staffs." It was then indicated "We do, however, prefer that all information requests be directed to this office (UMTRA Project Office rather than to our contractors." It seems this preference should be more clearly stated as an operating procedure with automatic data transfer mechanisms.

This finding was not identified in any of the formal self-assessments.

An apparent causal factor contributing to this finding is a lack of a formal policy on data transfer and lack of sufficient staff resources to deal with data sharing as a routine matter

rather than requiring formalized requests from cooperating agencies through the chain of command.

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APPENDICES

Appendix A

Biographical Sketches of the Environmental Audit Team

Appendix A:

Biographical Sketches of the Environmental Audit Team

NAME: Barry R. Clark

AREA OF RESP: Audit Team Leader

ASSOCIATION: U.S. Department of Energy

EXPERIENCE: 15 Years

- U.S. Department of Energy, Office of Environmental Audit

  — Environmental Protection Specialist. Principal responsibilities include leading multidisciplinary teams of professionals in performing Environmental Assessments and Audits. Tiger Team Training at Savannah River Operations Office. Worked with the Environmental Subteam for the Tiger Team Assessment at Sandia National Laboratories, Albuquerque, while training to be Team Leader.

- U. S. Department of the Interior, Minerals Management Service and U.S. Geological Survey

  — Marine Biologist/Fisheries Biologist/Supervisory Environmental Protection Specialist. Focus of responsibilities was completion of environmental monitoring and compliance inspections of offshore oil and gas operations. Areas of expertise include water quality, marine biology, endangered species, drilling effluents, oil spills, and compliance with the National Environmental Policy Act.

  — Environmental Consultant - Investigated the environmental effects of nuclear power plants on the aquatic environment of the Great Lakes. Major fields of research included commercial and recreational fisheries, benthos, and water quality. Specialized in completion of monitoring, research, and preparation of documentation for compliance with licensing requirements of the Nuclear Regulatory Commission.

EDUCATION: M.A., Biology/Aquatic Ecology, State University of New York, Buffalo, New York
B.A., Biology (Minor in Geology), State University of New York, Buffalo, New York

NAME: Christine S. Beling

AREA OF RESP: Assistant Audit Team Leader

ASSOCIATION: U. S. Department of Energy

EXPERIENCE: 7 Years

- U.S. Department of Energy, Office of Environmental Audit

  — Environmental Engineer under the direction of the Audit Team Leader/Environmental Subteam Leader. Provides guidance, direction, and assistance to a multidisciplinary group of professionals performing Environmental Audits and Tiger Team Assessments at DOE facilities. Participated in the environmental audit at the Southwestern Area Power Administration.

- Environmental Strategies

  — Environmental Engineer. Responsible for project management at an ongoing Superfund remedial investigation/feasibility study (RI/FS). Additionally, responsible for construction management, auditing, and environmental sampling at various sites.

- U. S. Environmental Protection Agency, Office of Solid Waste and Emergency Response

  — Environmental Engineer. Responsible for guidance development for remedial design/remedial action (RD/RA) activities conducted at Superfund sites by potentially responsible parties. Instructor of the corrective action order workshop regarding design and construction activities.

- U. S. Environmental Protection Agency, Region II, Office of Emergency and Remedial Response

  — Environmental Engineer. Responsible for all phases of RI/FS, remedial design, and remedial action at various Superfund sites.

EDUCATION: B.S., Chemical Engineering, Tufts University

NAME: Susan Barisas

AREA OF RESP: Technical Coordinator

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 15 Years

- Argonne National Laboratory

  - Participant in the Tiger Team Assessments of Savannah River Site and Lawrence Berkeley Laboratory and Environmental Audit of the Southwestern Area Power Administration. Provided technical assistance to the Department of Energy (DOE) in the development and execution of environmental survey and audit programs. Principal responsibilities include conducting environmental surveys at eight major DOE operating facilities, evaluating audit and appraisal procedures used by the DOE and private industry, and developing guidance manuals to be used by DOE facilities and field organizations.

  - Worked on various projects related to hazardous waste materials management. Responsibilities included developing hazardous waste and materials management plans, evaluating applicability of treatment and disposal options for synthetic fuels facilities, evaluating technologies for the treatment and disposal of PCB waste, and assessing the environmental impacts of different energy scenarios.

- Iowa Natural Resources Council

  - Developed task force reports on Water for Energy Production, Water for Commercial and Recreational Navigation, and Water quality for a State Comprehensive Water Plan. Aided in the development of a public participation program.

EDUCATION: M.S., Water Resources/Agricultural Engineering, Iowa State University
B.A., Biology, Grinnell College

NAME: David A. Dolak

AREA OF RESP: Toxic and Chemical Materials/Waste Management

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 10 Years

- Argonne National Laboratory

  — Environmental Consultant. Technical analyst and author of the New Production Reactor (NPR) Environmental Impact Statement (EIS). Assess the impacts that NPR generated hazardous and radioactive waste would have on waste management facilities at the Hanford Site, Idaho National Engineering Laboratory, and the Savannah River Site. Participated in the Tiger Team Assessment of Lawrence Berkeley Laboratory and environmental audit at the Southwestern Area Power Administration.

- Versar, Inc.

  — Prepared remedial investigation/feasibility studies for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) sites and prepared environmental permits to comply with the Clean Water Act, Clean Air Act, and RCRA regulations.

  — Performed environmental insurance audits at industrial facilities to assess the sites' potential for financial liability due to chemical contamination, CERCLA responsibility, noncompliance with RCRA, or violation of Superfund Amendments and Reauthorization Act (SARA) Title III reporting requirements. Assisted various clients in preparing documents for hazardous materials reporting under SARA Section 311, 312, 313, including database development for Form R submissions.

  — Lead investigator in the allocation of liability costs to 30 individual parties responsible for toxic contamination at a Superfund site. Project Manager for the assessment and removal of hazardous materials at a large abandoned industrial site near Cleveland, Ohio.

- United States Steel Corporation

  — Analytical Chemist. Diverse background in wet chemical methods and instrument analysis of environmental media.

EDUCATION: M.S., Environmental Science, Water Chemistry, Indiana University
B.S., Environmental Science, St. Joseph's College

NAME: David L. Duncan

AREA OF RESP: Radiation

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 27 Years

- Radiation Protection Consultant

  — Health Physicist. Provide assistance with Health Physics tasks such as audits, Offsite Emergency Response Plan Exercises for Accidents at nuclear power generation stations, and cleanup tasks at facilities such as the Feed Material Production Center, Fernauld, Ohio.

  — Instructor. Federal Emergency Management Agency, Emergency Management Institute, Emmitsburg, Maryland. Radiological Accident Assessment Courses - Plume Phase and Advanced.

- U.S. Environmental Protection Agency, U.S. Public Health Service

  — Commissioned Officer USPHS, 1962-1988. Permanent Detail to US EPA, January, 1971.

  — EPA, Region IX, Regional Radiation Representative, San Francisco.
  — EPA, Senior Staff Officer, ORP, Washington, D.C.
  — EPA, Chief, Natural Occurring Radiation, ORP, Las Vegas, Nevada.
  — EPA/USPHS, Project Officer, Uranium Tailings, 1970-1075.
  — USPHS, State Assignee, New Mexico EID, Radiation, Santa Fe.
  — USPHS, Weapons Detonation Officer, Sample Control Officer, Ground and Aerial Radiation Monitor, Nevada Test Site.

  — Environmental radiological, health physics career has focused on areas related to the protection of the public's health and safety from exposure to ionizing and non-assessment, and remedial action control programs; emergency response to incidents involving radioactivity materials; program administration; environmental sampling procedures including labelling, sample control date analysis, and reporting; sampling system research and development including indoor and outdoor radon, radon in water, ground surveys and airborne gamma monitoring for uranium mill tailings; and environmental monitoring for U.S. Nuclear Testing Program, Continental U.S. and Alaska.

EDUCATION: M.S., Radiology/Radiation Biology, Colorado State University, Ft. Collins, Colorado
B.S., Chemistry (Minor in Physics and Zoology), University of Denver, Denver, Colorado.

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 re-entry/recovery and ingestion pathway drills. Responsible for developing training programs for emergency response. Served on the Weldon Spring Remedial Action Project and the Grand Junction Project Office as the radiation specialist on DOE environmental audits.

- General Electric

  — Served as the site radiological controls auditor. Conducted comprehensive evaluations, audits and surveillance 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:

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

NAME: Ron Kolpa

AREA OF RESP: Inactive Waste Sites/Surface Water

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 17 Years

- Argonne National Laboratory

  — Staff Scientist, Environmental Research Division. Principal responsibilities include Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) preliminary assessments and site investigations for the U.S. Department of Energy, Department of Defense, Department of Commerce, and Army National Guard properties. He has also served as the project manager for property assessments required on Army properties as a result of the Base Closure and Realignment Act and as Team Leader for site characterizations of Army National Guard properties throughout the United States. He participated in the Tiger Team Assessment of Lawrence Berkeley Laboratory and the environmental audit of the Southwestern Area Power Administration. In addition, Mr. Kolpa chairs the Environmental Research Division's Environment, Safety, and Health Committee and serves as the Environmental Compliance Representative for the Environmental Research Division to Argonne National Laboratory.

- Iowa Department of Natural Resources

  — Prior environmental experience includes over 14 years as technical program specialist and Environmental Program Supervisor for regulatory programs in air, solid waste, and hazardous waste for the State of Iowa. Included during this period was a 2-year detail to the U. S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC, where his responsibilities included the development of Federal and state implementation strategies for hazardous waste programs developed under CERCLA and Resource Conservation and Recovery Act authorities.

EDUCATION: M.S., Inorganic Chemistry, Iowa State University
B.S., Chemistry, St. Procopius College

NAME: Peter C. Lindahl

AREA OF RESP: Environmental Management/Quality Assurance

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 18 Years

- Argonne National Laboratory

  — Group Leader. Principal responsibilities include supervision of environmental analysis group. Served as analytical laboratory project manager for the U.S. Department of Energy (DOE) Environmental Survey Program and currently serving as task manager for gas analysis for the DOE Waste Isolation Pilot Plant Pretest Waste Characterization Program. Also, participated in the DOE Tiger Team Assessments of Savannah River Site and Lawrence Berkeley Laboratory, and the environmental audit of the Southwestern Area Power Administration.

- Exxon Production Research Company

  — Senior Research Specialist. Responsible for supervision of inorganic analytical chemistry laboratory in support of coal, oil shale, and hydrothermal research projects and work in a research analytical chemistry laboratory to develop analysis methods for determining trace elements in coal.

- Perkin-Elmer Corporation

  — Senior Product Specialist. Responsible for atomic absorption spectrophotometry and analytical technical support.

EDUCATION: Ph.D., Analytical Chemistry, Southern Illinois University
M.A., Inorganic Chemistry, Southern Illinois University
B.A., Chemistry, Lake Forest College

NAME: Daniel M. Maloney

AREA OF RESP: Air

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 6 Years

- Argonne National Laboratory

  - Provides technical support for collection and analysis of field data for smoke dispersion studies in flat and complex terrain. Provide technical support to graduate assistants in the areas of data collection, data reduction, and computer model evaluation and development. Carried out environmental studies involving air pollutant dispersion and noise propagation, including the development of computer models to simulate those phenomena.

  - Coordinated and developed the algorithm to analyze the effects of toxic chemical vapor dispersion during transportation accident scenario for the 1990 U. S. Department of Transportation's (DOT) Emergency Response Guidebook (ERG). Acted as the liaison between the U. S. DOT and the Fire Chiefs' Association on coordinating key pieces of information for the 1990 ERG. Member of the 1993 ERG task force for model improvement. Publish and present technical papers.

- University of Illinois

  - Consultant in the Building Loads and System Thermodynamics (BLAST) Support Office providing nation-wide support for the BLAST, building energy analysis, computer program. Wrote technical articles for the office newsletter, and upgraded existing FORTRAN code to improve program accuracy and flexibility.

- Argonne National Laboratory

  - Performed fluid mechanics and heat transfer studies on thermal systems components, utilizing both analytical and experimental approaches. Coordinated the design and development of a large scale test facility to study the effects of particles in the pumping of fluids.

EDUCATION: M.S., Mechanical Engineering, University of Illinois at Urbana-Champaign
B.S., Mechanical Engineering, University of Illinois at Urbana-Champaign

NAME: Robert J. Stechmann, Jr.

AREA OF RESP: Groundwater

ASSOCIATION: Mittelhauser Corporation

EXPERIENCE: 9 Years

- Mittelhauser Corporation

  - Involved in the field program and data reduction for the hydrogeological assessment plans of three power plants for a major California utility. Coordinated well and piezometer installation, soil and groundwater sampling and analysis, tidal studies, aquifer pump tests, and waste characterization. For the same utility he has managed the field sampling program for an approved closure plan for three surface impoundments storing hazardous waste.

  - Managed large-scale bioremediation project involving petroleum hydrocarbon-impacted soils. Managed field drilling program and data analysis for the evaluation of site contamination and its remedial cleanup costs for a refinery site. Performed a sampling program to determine potential contamination from sump operations and underground gasoline storage tank facilities.

EDUCATION: B.A., Geological Science, University of California, Santa Barbara

NAME: Charles A. Wentz, Jr.

AREA OF RESP: Waste Management

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 29 Years

- Argonne National Laboratory
  - Waste management specialist for the Tiger Team Environmental Assessment at the DOE Savannah River Site. Hazardous material and hazardous waste specialist for U.S. Air Force ECAMP Environmental Assessments at George, Myrtle Beach, and Howard Air Force Bases.
  - Technical suppport for waste management to the DOE Rocky Flats site. Waste management support for U.S. Army and U.S. Navy waste minimization activities.
  - Research for hazardous waste, engineering systems, and technology transfer in the environmental and safety fields.
- University of North Dakota, Southern Illinois University
  - Taught hazardous waste management and safety engineering courses
- Ensco
  - President. Responsible for a hazardous waste and PCB incineration.
- Newpark Waste Treatment Systems
  - President. Responsible for cleanup of oil field wastes.
- Phillips Petroleum Company
  - Responsible for oil shale, oil field chemicals, budgets, Federal legislation, investor relations, plastics marketing, European joint ventures, and petrochemical research.

EDUCATION:
Ph.D., Chemical Engineering, Northwestern University
MBA., Southern Illinois University
M.S., Chemical Engineering, Missouri-Rolla
B.S., Chemical Engineering, Missouri-Rolla
Diploma, Sloan School for Senior Executives, MIT

OTHER: Author of two recent textbooks. Hazardous Waste Management, 1989. Occupational and Environmental Safety Engineering and Management, (Co-authored with H. R. Kavianian), 1990.

NAME: R. Gary Williams

AREA OF RESP: Environmental Management

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 14 Years

- Argonne National Laboratory

  - Responsibilities include directing staff of 16 social/environmental scientists, defining research direction, review technical adequacy of work and defining new areas of research. Scientific responsibilities include studying social aspects of human and natural resource interaction, analysis of social, demographic and economic impacts of various projects on the social system, and data base design and development related to epidemiology.

  - Responsibilities included management of projects related to environmental compliance. Research interest includes impact assessment, effects of population change and international development.

- Western Research Corporation

  - Responsibilities included: research design, research management and statistical analysis. Research areas: Social effects of rapid population growth brought on by natural resource development, transformation of rural communities, social impact assessment methodology, and population forecast modeling. Also part-time instructor, Department of Sociology, University of Wyoming, August 1981 to December 1981.

- Colorado State University

  - Responsibilities included studying turn-around migration and community change in the western United States and statistical analysis for a regional migration project. Areas of concentration: Rural and developmental sociology, research methods, theories of social change. Dissertation on domestic and international comparison of community integration and community satisfaction.

- University of Wyoming

  - Courses taught: Sociological Principles, Social Problems and Social Change. Research Associate, Center for Urban and Regional Analysis, Institute for Policy Research, University of Wyoming. Research area: Social consequences of rapid population growth brought on by energy development/industrialization and environmental impact research.

EDUCATION: Ph.D., Sociology, Colorado State University
M.Ed., Social Science Education, University of Georgia
Certificate, Afro-American Studies, University of Georgia
B.A., Sociology, University of Georgia

NAME: Mary C. Wozny

AREA OF RESP: Toxic and Chemical Materials

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 4 Years

- Argonne National Laboratory

  - Provides support in the design and implementation of management and oversight system for several programs. These include two National Science Foundation programs: Waste Minimization Treatment and Disposal Program and Preliminary Assessment/Site Investigation (PA/SI) Program. The National Science Foundation has contracted with ANL to conduct a waste minimization program for McMurdo Station, a U.S. base in Antarctica, and to investigate the extent of hazardous waste in the area. This contract extends to other bases in the coming years. Assists in the Department of Commerce, Economic Development Administration's Remedial Assessment at the Wisconsin Steel Works Site in Chicago and Liability Audit programs. Wisconsin Steel is an old steel mill partially owned by a federal agency with numerous environmental concerns. Provides technical assistance in the environmental audit program. Health and Safety Coordinator for the Wisconsin Steel Works and PA/SI programs.

  - Legislative tracker and regulatory analyst for RCRA, CERCLA, Clean Air Act, Clean Water Act, and other environmental laws and their impact on DOE facilities. Provided a monthly legislative report and individual bill analysis to the Department of Energy. Attended congressional hearings and interacted with committee members. Participated in the design of several computer projects for the DOE.

- University of Illinois

  - Research Assistant. Collected data for a pilot study concerning children's environmental safety that needed followup medical care at Health Maintenance Organizations. Reviewed and analyzed medical reports for entry into study.

  - Registered Nurse. Worked as a registered nurse in various capacities that included discharge planner and clinical supervisor for a home health agency. Interacted with medical personnel and families. Supervised nurses and aides. Trained incoming personnel. Participated and coordinated setting office policies and procedures. Interviewed prospective employees.

EDUCATION: M.P.H., Environmental and Occupational Health Science, University of Illinois at Chicago
B.S., Health Arts, College of St. Francis
R.N., Nursing, St. Mary of Nazareth

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Appendix B

Environmental Audit Plan

DOE F 1320.8
(8-89)

United States Government | Department of Energy

memorandum

DATE: MAY 30 1991

REPLY TO ATTN OF: EH-24

SUBJECT: Environmental Audit Plan and Tentative Daily Activity Schedule

TO: Mark L. Mathews, Project Manager, UMTRA Project Office

As agreed during our pre-audit site visit on April 29, 1991, attached for your information are the Environmental Audit Plan and tentative daily activity schedule for the environmental audit of the Uranium Mill Tailings Remedial Action (UMTRA) sites at Rifle, Grand Junction, and Gunnison, Colorado. Per your previous request to expand audit coverage to include three additional areas of operation, I have been in direct contact with Ms. Charlene Esparza-Baca of your staff. Specifically, you asked that the following be included in the UMTRA audit rather than the Grand Junction Project Office (GJPO) audit that began on May 28:

* Removal and transport of uranium mill tailings from the Grand Junction Climax Mill site to the Cheney disposal site;
* Remediation and transport of the Grand Junction vicinity property materials to the State Repository; and
* Transport of the Grand Junction vicinity property materials from the State Repository to the Cheney disposal site.

As explained to Ms. Esparza-Baca, operations related to the Climax Mill site and the disposal cell have been included in the UMTRA audit plan since it was placed on the audit schedule. Following your request and our pre-audit site visit, it was decided that any findings from the Grand Junction vicinity properties and related operations would also be included in the UMTRA audit report. However, as a logistical necessity brought about by staffing level and work load, site investigations at the Grand Junction vicinity properties will be completed concurrently with the GJPO audit. I am working closely with the GJPO audit Team Leader, Arlene Weiner, to ensure a smooth transition and have made arrangements for my Assistant Team Leader to arrive on-site prior to initiation of the UMTRA audit. Further, the technical specialist assigned exclusively to the GJPO vicinity properties will remain on-site during both audits to maintain continuity.

As you know, the UMTRA audit is scheduled to begin on June 10 in Grand Junction and the audit team will be in Albuquerque by June 17. It is unfortunate that you were unable to attend the briefing during the pre-audit site visit, but I am looking forward to talking with you about the UMTRA program during the audit. The attached daily agenda represents the best estimate of our anticipated schedule based on the information made available to date. As such, once the audit begins, some modification should be expected and the agenda will be updated daily, as warranted, to reflect any changes that result from interviews and other on-site activities.

Should you or your staff have further questions regarding this memorandum, the attached agenda and schedule, or the audit in general, please feel free to call me or my Assistant Team Leader, Christine Beling, at FTS 896-4419.

Barry R. Clark
Audit Team Leader

Attachments

cc: C. Esparza-Baca, UMTRA Project Office
S. Arp, UMTRA Project Office
D. Leske, Grand Junction Project Office
C. Beling, EH-24
A. Weiner, EH-24
S. Barisas, Argonne National Laboratory

Appendix B:

Plan for the DOE Environmental Audit

of the

Uranium Mill Tailings Remedial Action Project

Rifle, Gunnison and Grand Junction Sites, June 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 assessment/audit of the Uranium Mill Tailings Remedial Action Project-Rifle, Gunnison and Grand Junction sites (hereafter referred to as UMTRA) is to provide the Secretary with information on the current environmental regulatory compliance status and associated vulnerabilities, root causes for noncompliance, adequacy of environmental management programs, and response actions to address the identified problem areas.

The scope of the UMTRA Environmental Audit is comprehensive, covering all environmental media and 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, noise, quality assurance, and inactive waste sites. The audit also addresses the performance of environmental management functions.

The U.S. Department of Energy has responsibility for the UMTRA Project which is designed to clean up and control tailings from inactive uranium mills to eliminate potential environmental health hazards. The scope of the project includes the stabilization of twenty-four designated mill sites in 10 states and the clean up of an estimated 5,056 vicinity properties. This environmental assessment/audit will address three of these sites: Grand Junction, Rifle, and Gunnison. Although the investigation of the Grand Junction vicinity properties will occur during the Grand Junction Project Office Audit, any findings from the Grand Junction vicinity properties and related operations will appear in the UMTRA Audit Report. The UMTRA Audit will address all other uranium mill tailings remedial action activities at Grand Junction, as well as remedial action activities (including vicinity properties) at Rifle and Gunnison.

2.0 Environmental Audit Implementation

The Environmental Audit of UMTRA 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 Argonne National Laboratory. The names and responsibilities are listed below:

Barry Clark	DOE	Team Leader
Chris Beling	DOE	Assistant Team Leader
Susan Barisas	ANL	Technical Coordinator
Mary Wozny	ANL	Toxic and Chemical Materials
Ron Kolpa	ANL	Inactive Waste Sites and Releases
Dave Dolak	ANL	Surface Water/Drinking Water
Robert Stechman	Mittelhauser	Groundwater
Peter Lindahl	ANL	Quality Assurance
Dan Maloney	ANL	Air
Dave Duncan	ANL	Radiation
Al Wentz	ANL	Waste Management
Gary Williams	ANL	Environmental Management
Richard Lynch	META	Administrative Support
Helen Walters	META	Administrative Support

2.1 Pre-Audit Activities

Pre-Audit activities for the UMTRA 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 the UMTRA Project Office as a result of the information request memorandum.

A Pre-Audit Site visit was conducted on April 29-May 1, 1991 by the Team Leader and Assistant Team Leader, and the ANL Technical Coordinator and Quality Assurance Specialist. 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 UMTRA Project Office and contractor personnel.

This Environmental Audit Plan is based upon the information received by the Environmental Team as of May 24, 1991.

2.2 On-Site Activities and Reports

The on-site activities for the Environmental Audit will take place from June 10 to approximately June 26, 1991. On-site activities will include field inspections, file/record reviews, and interviews with site personnel and regulatory personnel. The preliminary schedule for the audit is shown in Table 2.1. The agenda will be modified as needed during the early part of the on-site audit. Any and all modifications to the agenda will be coordinated with the principle contacts from the UMTRA Project Office. The UMTRA Project Office is requested to identify, as soon as possible, any facility activities such as sampling, spill

response, or inspections which may occur during the audit so that team members may observe the operations.

A daily debriefing with site/facility personnel will be held each afternoon at which time team specialists will describe their activities and identify issues that may develop into findings.

A close-out briefing will be conducted at the conclusion of the on-site activities. Findings from the Environmental Audit will be presented. The date provided in the schedule for the close-out briefing is tentative and will be finalized during the audit. A draft report containing the findings will be provided to the UMTRA Project Office and to the Albuquerque Operations Office for their review and comment.

3.0 Air

The air-related portion of the UMTRA Environmental Audit will address 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 emission standards (new source performance standards or emission standards for hazardous air pollutants) have been established by the United States Environmental Protection Agency or by state or local agencies and contaminants considered by the State of Colorado to be toxic air pollutants. Adherence to the requirements of DOE Orders and Secretary of Energy Notices will also be evaluated.

3.1 Issue Identification

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 or maintenance 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) gasoline storage and dispensing facilities; 4) uses of organic solvents for parts cleaning or in painting activities; 5) emissions of substances considered to be toxic air pollutants in the State of Colorado. In addition, the air monitoring network will be evaluated, including monitoring equipment, the acquisition and processing of data, procedures applicable to data acquisition calibration, data validation, and data processing. Adherence to permit requirements for noise will also be evaluated.

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;
- Asbestos handling, removal, disposal procedures and environmental monitoring;
- Scope-of-work for any contracted asbestos removal projects;
- Environmental monitoring reports;
- Air monitoring program documentation;
- Meteorological monitoring program documentation;
- Documentation of any efforts to abate fugitive dust emission;
- MSDS on solvents/cleaners; and
- Reports on accidental releases of airborne substances.

4.0 Surface Water

4.1 Issue Identification

The focus of the surface water/drinking water portion of the UMTRA Environmental Audit will be on the release of contaminated or polluted wastewaters to the sanitary or storm sewers, or groundwater aquifers underlying the site. The assessment will review the potential for contamination of wastewaters by metals, organics, and radionuclides and review the present conditions of wastewater control, collection and treatment. Liquid waste treatment, collection and handling equipment will be examined and records of operation will be reviewed. The assessment will review the current National Pollutant Discharge Elimination System (NPDES) permits at the Rifle and Grand Junction Sites. Monthly/quarterly operation and monitoring reports for water discharge will be reviewed to assess compliance with NPDES permits. The audit will also include a review of any dredge and fill permits granted under Section 401 of the Clean Water Act and on-site inspection of any fill material placed in potential wetland areas. A review of special State of Colorado agreements regarding surface water runoff or discharge control measures will be undertaken.

The assessment will also review drinking water distribution systems at UMTRA sites to determine compliance with regulations under Safe Drinking Water Act (SDWA) for delivery of safe drinking water to employees and/or the public.

The assessment will include identification of discharges to surface waters, groundwater, or the sanitary sewer system, which may not be addressed in operating permits or other documents. Copies of standard operating procedures (SOPs), operating logbooks, and maintenance records will be reviewed with respect to water and wastewater discharge monitoring and treatment systems. Sampling and analytical practices will be observed to determine how closely SOPs are being followed. Interviews with managers and operators of monitoring equipment and treatment systems will be conducted in order to determine compliance with written procedures.

A walk-through of the UMTRA sites will be made to observe normal runoff containment practices and the activities for the treatment and disposal of wastewaters. Various discharge and monitoring points will be reviewed, and actual sampling and analytical procedures will be observed. Spill prevention provisions for fuels and hazardous material storage areas will be reviewed, along with UMTRA's procedures for reporting spills.

4.2 Records Required

Specific documents and files to be reviewed as part of the assessment include, but will not be limited to, the following:

- Recent analytical data on wastewater releases;
- Permits to operate water and wastewater facilities;
- Notices of Violations relating to wastewater releases;
- Wastewater treatment/discharge operator logbooks and monitoring reports;

- SOPs for wastewater collection, holding and transfer;
- Monitoring equipment maintenance and calibration records;
- Detailed drawings of sanitary and storm sewer systems;
- Records of drinking water quality;
- Procedures for collecting samples of drinking water and wastewater;
- Maintenance and inspection records for the drinking water system, including water tanks and cross connection/backflow prevention procedures;
- Spill Prevention, Control and Countermeasure (SPCC) plan and records inspection;
- Internal memos or correspondence relating to surface water/drinking water problems (e.g., backflow prevention measure);
- Agreements with the State of Colorado regarding wastewater discharge and/or surface water runoff prevention;
- NPDES permits for Rifle and Grand Junction sites; and
- Other records as determined on-site.

5.0 Groundwater

The groundwater assessment will involve the evaluation of previous studies of the site hydrogeology, determination of the status of ongoing studies and investigations, and review of plans for future investigations and/or remediations. The adequacy of existing monitoring and characterization efforts will be determined by comparison to existing state and federal regulations and/or DOE Orders. This effort will be coordinated with those by the waste management, inactive waste sites, and surface water specialists.

5.1 Issue Identification

The status of current investigations and plans for future corrective actions will be evaluated for the Grand Junction, Gunnison, and the two Rifle UMTRA sites. In addition to document review, visits will be made to areas of interest to observe field conditions, monitoring well construction and location, well purging and sampling techniques (if possible), and field QA/QC procedures. Discussions will be held with site personnel who have responsibilities for groundwater protection, remedial action, and monitoring well sampling. Procedures and permits for well abandonment will be reviewed. Applicable regulatory agencies will also be contacted as necessary.

The local and regional hydrogeologic conditions, existing monitoring well network, and any proposed remedial actions will be evaluated at the Grand Junction, Gunnison, and Rifle former mill sites as well as the disposal cells.

5.2 Records Required

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

- Site specific plan for Environmental Restoration and Waste Management;
- Groundwater Protection Management Plan documents or guidance;
- Groundwater Monitoring Plan including sampling procedures and analytical protocols;
- Recent (1989-1991) chemical analytical data for soil and groundwater samples;
- Well construction as-built diagrams and well/boring locations;
- Well abandonment procedures and permits;
- Current or historic groundwater discharge or well construction permits; and
- Any additional hydrogeologic or geologic investigation reports.

6.0 Waste Management

The environmental audit will address solid, hazardous, and radioactive residual material (RRM) wastes and the operation of regulated underground storage tanks. The audit will be carried out by reviewing and evaluating all activities that have generated wastes and the treatment, storage, recycling and disposal practices involved in the handling of the wastes.

Management of all solid waste streams from cradle to grave including RRM wastes, hazardous wastes, and non-hazardous wastes will be reviewed. The review will generally consist of several activities: 1) Facilities and operations associated with waste generation, identification, accumulation, storage, treatment, recycling, or disposal will be inspected; 2) Personnel involved in these activities will be interviewed; 3) Files including operating logs, inspection records, training records, etc. will be reviewed; 4) The potential for contamination of environmental media as defined by waste regulations will be assessed. Documents to be reviewed will include procedures, policies, guidance, and compliance related documents and correspondence.

Compliance of the non-hazardous, hazardous, and RRM waste management activities with State and Federal regulations, and DOE Orders will be evaluated. DOE Orders including 5400.1, 5400.3, 5820.2A, 5400.5 and 6430.1A will be used in evaluating the management of RRM. In addition to DOE Orders and environmental regulations, contractor procedures will also be used as audit criteria where appropriate.

Audit activities involving regulated underground storage tanks will include appropriate interviews, inspections, and document review.

6.1 Issue Identification

Issues of particular interest at Grand Junction, Rifle, and Gunnison will include the following:

- Waste characterization;
- Classification of RRM wastes;
- Manifesting of hazardous and RRM wastes for off-site shipment;
- Storage, handling, treatment, and disposal of hazardous and RRM wastes;
- Treatment of hazardous and RRM wastes;
- Storage of hazardous and RRM wastes in accumulation areas and longer term storage facilities;
- Land disposal restriction issues including storage of hazardous and RRM wastes;
- RCRA regulated 90-day and satellite waste accumulation areas;

- Physical status of hazardous and RRM waste treatment facilities (e.g., waste water treatment facilities, storage areas, etc.);
- Solid waste accumulation, collection, treatment, and disposal;
- Physical status of buildings and other facilities that may require disposal;
- Waste minimization plans for solid, hazardous, and RRM wastes;
- Resource recovery activities;
- Training of hazardous waste generators and hazardous waste facility employees; and
- Underground storage tanks (USTs) intended for regulated substances and the corrective actions for contaminated UST sites.

6.2 Records Required

Specific documents and files to be reviewed as part of the audit include, but will not be limited to, the following:

- Written policies and procedures relating to waste management activities including waste management plans, waste minimization plans, and other guidance documents;
- Waste generation and characterization documentation;
- Waste storage, treatment, and disposal records;
- Regulatory permits, permit applications, exclusions, or waivers related to waste management activities;
- Emergency spill response and cleanup procedures; and
- Environmental training records.

7.0 Toxic and Chemical Materials

The toxic and hazardous substances portion of the UMTRA Environmental audit will address the management and use of raw materials and chemical materials with reference to their handling, storage, and disposal. Primary emphasis will be given to the substances regulated by the Toxic Substances Control Act (TSCA) (for example, polychlorinated biphenyls (PCBs) and Chlorofluorocarbons), and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Any storage tanks used for chemicals and fuels, as well as drum storage and dispensing facilities, will also be included in the assessment. Information obtained will be evaluated to assess whether the 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.

7.1 Issue Identification

The management of electrical and hydraulic equipment which contains or has contained PCB or PCB-contaminated fluids will be reviewed during the audit. Records concerning PCBs will be reviewed including PCB annual reports, records of off-site shipments and disposal, spill reports, and procedures for PCB analysis, removal, and handling.

Toxic and hazardous materials (including oil) purchase and usage records will be viewed. Areas where these materials are stored and used will be visited and handling procedures evaluated.

Uses of pesticides (herbicides, insecticides, and rodenticide) to control weeds, for wood preservation, and rodent control will be reviewed. If activities are conducted by subcontractors oversight will be evaluated. Chemical, oil and/or fuel storage tanks will be inspected during this audit. The management and handling of these materials to prevent or minimize releases to the environment will be evaluated.

7.2 Records Required

Specific documents and files to be reviewed as part of the audit include, but will not be limited to, the following:

- Toxic substances labeling and tracking system;
- Procedures for procurement, handling, control, use and management of toxic substances;
- PCB handling, storage, and disposal procedures and documentation;
- Pesticide purchasing, training, handling, storage, disposal records, and environmental monitoring;
- Pesticide reports to regulatory agencies;

- Special procedures involving handling, storage, use, and disposal of chlorofluoroalkanes (freons) and chloro-organic solvents;
- Spill control and emergency preparedness plans for aboveground storage tanks;
- Audits or inspection reports pertaining to the toxic substances program; and
- Contracts/specifications associated with waste removal, transportation and disposal of toxic materials.

8.0 Quality Assurance

The Quality Assurance (QA) portion of the Environmental Audit will evaluate current sampling and analysis procedures performed at UMTRA sites by contractors or subcontractors. In addition, laboratories conducting analyses on the UMTRA sites environmental samples, will be audited to ensure that they are generating scientifically valid and defensible data. In addition to QA for environmental monitoring, the QA programs for all environmental functions will be reviewed.

8.1 Issue Identification

Specific issues that will be addressed include sampling and analysis procedures for environmental samples; contractor and subcontractor laboratory procedures; oversight of contractor and subcontractor laboratories; personnel training; and chain of custody procedures. In addition, the QA programs for environmental programs will be evaluated including documentation of past audits or assessments performed by UMTRA project or contractor personnel; follow-up activities; a determination of the effectiveness of the QA program; and a review of the extent of interaction between the UMTRA Project Office, Albuquerque Operations Office, and DOE Headquarters.

8.2 Records Required

Part of the audit 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 include, but will not be limited to, the following:

- QA plans for any supporting analytical laboratories;
- Environmental sampling, analysis, and sample disposal procedures used by contractors;
- QA audits by DOE contractors and subcontractors conducting environmental sampling and analysis;
- QA manuals and implementing procedures for any environmental surveillance programs;
- Summaries of results of QA sample analysis (conducted by UMTRA project contractors and subcontractors) of external performance evaluation sample;
- Procedures and QA requirements for acceptance of off-site sampling and analysis contractors and subcontractors; and
- Data validation procedures used for the UMTRA project.

9.0 Radiation

9.1 Issue Identification

The radiological portion of the environmental audit will involve review and observation of site-wide radioactive emissions and effluents, emission and effluent control and monitoring, and the associated impact on the public and the environment. This review will include atmospheric, liquid, and terrestrial pathways. The audit will also include direct radiation exposure issues, dose assessment methodologies, and quality assurance (QA) programs for radiation-related environmental monitoring. The audit will determine:

- Conformance with radiological standards and requirements in Federal, State, and local regulations, permits, agreements, orders, and consent decrees;
- Conformance with radiological standards and requirements in DOE Orders;
- Adequacy of UMTRA site radiological environmental/public protection programs, including planning, organization, resources, procedures, and documentation and training, to effectively and reliably implement/maintain the intent of standards contained in the previously mentioned documents;
- Relationships with regulatory agencies; and
- Conformance with and ability to adopt radiological "best" and "accepted" industry practices.

The assessment will be based on observations of programmatic processes, operations, emission control and monitoring, environmental monitoring, and environmental/public impact analyses. Procedures and/or documentation associated with these activities will be reviewed; discussions will be held with operational and supervisory personnel.

The radiological portion of the audit will be coordinated with the air, surface water, groundwater, inactive waste sites, and quality assurance technical disciplines.

9.2 Records Required

- Annual environmental monitoring reports;
- Radioactivity related ambient air quality information;
- Radioactivity data for all sampled media;
- Radiological quality assurance programs and procedures;
- Dose assessment methodologies, including assumptions, calculations, reporting;
- Description of radiation monitoring equipment, practices and procedures;
- Reports required by NESHAP Subpart H;
- Environmental Protection sample mention plan; and
- Decontamination and decommissioning information, plans, and data.

10.0 Inactive Waste Sites

10.1 Issue Identification

The objective of the Inactive Waste Site portion of the Environmental Audit is to determine whether planned or ongoing remedial activities at mine sites and at vicinity properties are fully in accordance with DOE Orders and with the provisions of the UMTRA (Public Law 95-604) and Federal regulations specified or directed therein. Federal regulations applicable to uranium mill tailings include those standards (addressing both radioactive and non-radioactive constituents) promulgated by the Environmental Protection Agency (EPA) and the Nuclear Regulatory Commission (NRC) in Titles 40 and 10 respectively of the Code of Federal Regulations.

Planned and ongoing mill tailing remedial activities will also be evaluated for compliance with the provisions of all cooperative agreements existing between the Department of Energy and the Colorado Department of Health. Remedial activities will also be evaluated for their compliance with other regulations (e.g., CERCLA, RCRA, and State of Colorado environmental regulations and standards), to the extent that those regulations and standards specifically apply to the remedial activity or related actions.

Finally, planned and ongoing remedial activities will be evaluated with respect to their consistency with appropriate best management practice to ensure that remediation is progressing in an environmentally sound manner, with a minimum of risk to public health and the environment.

10.2 Records Required

In addition to the records already provided to the audit team prior to the field visit, the following documents will need to be reviewed;

- Annual progress reports for ongoing remedial actions;
- Community Relations plans for each site undergoing remediation or for which remediation is planned;
- All correspondence with the Colorado Department of Health regarding the sites undergoing remediation, including all Notices of Violation (NOV's), Notice of Non-Compliance (NON) or Notices of Significant Non-Compliance (SNC), and copies of all inspection or evaluation reports received;
- Copies of all site characterization studies on which remedial action plans are based;
- Copies of operating licenses and/or permits for the Cheney disposal cell;

- SARA Title III documentation (as applicable), including:

  - spill notification documents
  - hazardous/extremely hazardous chemical inventories
  - Tier I/II Form submittals
  - Form R submittals

11.0 Environmental Management

The Environmental Management portion of the UMTRA Environmental Audit will include an assessment of the overall policies and procedures implemented to ensure conformance with Federal, state, and local statutes and regulations, DOE Orders, and Secretary of Energy Notices. The principal focus will be to assess if there is a sufficient management understanding and oversight of environmental protection programs, and an effective communication of these programs to managers and staff. Management practices will also be reviewed against commonly accepted best industry practices. Quality assurance oversight of the environmental compliance process is a critical element of environmental management and will also be evaluated as part of this audit.

11.1 Issue Identification

The general approach to the audit will include review of UMTRA's environmental protection program, policies, and procedures documentation and interviews with personnel, at the Albuquerque Project Office and mill tailings sites, who are responsible for implementation of environmental protection programs. The management audit will concentrate on the organizational and procedural arrangements by which all applicable regulations, DOE orders, Secretarial Notices and good management practices are implemented. Of particular interest will be determining if formal arrangements are in place to comply with the above and if these formal arrangements are part of the informal routine of the operation. Also of interest will be the interagency relationships that determine/oversee or facilitate compliance.

Specific areas of interest will be the effectiveness of management: (1) in meeting the intent of DOE environmental policies; (2) in translating the DOE policies into a useable implementation program; (3) in communicating the environmental protection program to the staff; and (4) in establishing a reasonable oversight program to ensure the staff, DOE consultants, and contractors are satisfying the program objectives.

11.2 Records Required

- Environmental Protection Implementation Programs;
- UMTRA Environmental Policies and internal documents;
- Environmental compliance Audit Reports;
- Internal documents relative to Audit findings;
- Long Range Environmental Plan;
- Self-Appraisal Reports, internal appraisals and corrective action plans;
- Standards for the preparation, review, approval, maintenance and control of environmental compliance procedures and documents;
- Position descriptions;
- Environmental compliance program training; and
- Other records as determined on site.

Appendix C

Environmental Audit Team
Schedule of Onsite Activities

Appendix C:

Environmental Audit Team
Schedule of Onsite Activities*

Colorado	Monday, 6/10	Tuesday, 6/11	Wednesday, 6/12	Thursday, 6/13	Friday, 6/14	Saturday, 6/15
Air	☞ Orientation ☞ Safety Training	☞ Site Visit GJ ☞ Inspect Monitoring Stations ☞ Review procedures/ data/laboratory facilities	☞ Site Visit RF ☞ Inspect Stations ☞ Review data/ procedures	☞ Interviews ☞ Review Procedures	☞ Site Visit Cheney ☞ Follow-up Reviews	☞ Write Findings ☞ Document Review
Radiation	☞ Orientation ☞ Safety Training	☞ Site Visit GJ ☞ Inspect Monitoring Stations ☞ Review procedures/ data/laboratory facilities	☞ Site Visit RF ☞ Inspect Stations ☞ Review data/ procedures	☞ Site Visit GU ☞ Inspect/Review	☞ Site Visit Cheney ☞ Follow-up Reviews	☞ Write Findings ☞ Document Review
Toxic Materials	☞ Orientation ☞ Safety Training	☞ Site Visit GJ ☞ Interview - hazardous materials program	☞ Site Visit RF	☞ Inspect/Review ☞ Site Visit Cheney Cotter	☞ Site Visit Cheney, Cotter ☞ Inspect/Review	☞ Write Findings ☞ Document Review
Surface Water	☞ Orientation ☞ Safety Training	☞ Inspect Surface Water Collection ☞ Review Monitoring data/procedures ☞ Review Dredge & Fill activities	☞ Site Visit RF ☞ Inspect Collection Systems ☞ Review Monitoring	☞ Site Visit GU ☞ Inspect/Review	☞ Site Visit Cheney, Cotter ☞ Inspect surface water collection wash stations	☞ Write Findings ☞ Document Review
Inactive Sites	☞ Orientation ☞ Safety Training	☞ Site Visit GJ ☞ Interviews-remedial action program	☞ Site Visit GU ☞ Interviews-site characterization, vicinity prop.	☞ Site Visit Cheney ☞ Follow-up Interviews	☞ Site Visit RF ☞ Interviews-site characterization, vicinity property	☞ Write Findings ☞ Document Review

* Grand Junction (GJ)
Rifle (RF)
Gunnison (GU)

Environmental Audit Team
Schedule of Onsite Activities (continued)

Colorado	Monday, 6/10	Tuesday, 6/11	Wednesday, 6/12	Thursday, 6/13	Friday, 6/14	Saturday, 6/15
Waste Management	☞ Orientation ☞ Safety Training	☞ Site Visit GJ ☞ Interview - commingled waste, waste mgmt. program	☞ Site Visit-GU ☞ Interviews-waste characterization, vicinity properties	☞ Cheney Site Visit ☞ Interviews-waste ☞ Document reviews	☞ Site Visit Cheney ☞ Follow-up Reviews	☞ Write Findings ☞ Document Review
Groundwater	☞ Orientation ☞ Safety Training	☞ Site Visit GJ ☞ Interviews Jacobs Eng. groundwater monitoring program	☞ Site Visit-GU	☞ Site Visit Cheney ☞ Interviews well abandonment ☞ Observe Sampling	☞ Site Visit RF ☞ Follow-up Reviews	☞ Write Findings ☞ Document Review
Quality Assurance	☞ Orientation ☞ Safety Training	☞ Interview State of Colorado DHS ☞ Interview UMTRA Proj. Mgr.-GJ	☞ Review air/rad lab facilities ☞ Interview MK Ferguson QA officer ☞ Interview MK-Ferguson GJ Site Engineer ☞ Interview UMTRA Technical Support Manager	☞ Observe Well Sampling ☞ Review UNC Laboratory Facilities	☞ Interview ORNL UMTRA Project Manager ☞ Interview UNC QA Manager ☞ Interview GJPO, UMTRA Project Manager	☞ Write Findings ☞ Document Review
Environmental Management	☞ Orientation ☞ Safety Training	☞ Interview State of Colorado ☞ Interview DOE Proj. Mgr./ESH personnel ☞ Interview DOE licensing personnel	☞ Interview Jacobs ESH Manager ☞ Interview MK ESH Manager	☞ Document Review	☞ Interviews - AL	☞ Write Findings ☞ Document Review

* Grand Junction (GJ)
Rifle (RF)
Gunnison (GU)

Environmental Audit Team
Schedule of Onsite Activities (continued)

Albuquerque	Monday, 6/17	Tuesday, 6/18	Wednesday, 6/19	Thursday, 6/20	Friday, 6/21*	Saturday, 6/22
Air	☞ Document Reviews ☞ Follow-up interviews—air, noise monitoring	☞ Write Findings ☞ Follow-up interviews	☞ Draft Findings to Project Office	☞ Draft Overview ☞ Factual Accuracy Review	☞ Revisions as required	☞ Revisions as required
Radiation	☞ Document Reviews ☞ Follow-up interviews ☞ Rad monitoring ☞ Dose assessment	☞ Write Findings ☞ Follow-up interviews	☞ Write Findings ☞ Follow-up interviews	☞ Write Findings	☞ Write Findings	☞ Draft Findings to Project Office
Toxic Materials	☞ Document Reviews ☞ Follow-up interviews	☞ Write Findings	☞ Draft Findings to Project Office ☞ Draft Overview	☞ Factual Accuracy Review ☞ Revisions as required	☞ Revisions as required	☞ Revisions as required
Surface Water	☞ Document Reviews ☞ Follow-up interviews ☞ NPDES, dredge and fill, sampling procedures ☞ SARA Tittle III Review	☞ Write Findings ☞ Follow-up interviews	☞ Write Findings ☞ Follow-up Interview	☞ Write Findings	☞ Draft Findings to Project Office ☞ Revisions as required	☞ Factual Accuracy Review ☞ Revisions as required

Environmental Audit Team
Schedule of Onsite Activities (continued)

Albuquerque	Monday, 6/17	Tuesday, 6/18	Wednesday, 6/19	Thursday, 6/20	Friday, 6/21	Saturday, 6/22
Inactive Sites	☞ Document Reviews ☞ Follow-up interviews with Project Officers	☞ Write Findings ☞ Follow-up interviews	☞ Write Findings ☞ Follow-up Interviews	☞ Write Findings	☞ Draft Overview ☞ Draft Findings to Project Office	☞ Factual Accuracy Review
Waste Management	☞ Document Reviews ☞ Follow-up interviews	☞ Write Findings	☞ Draft Findings to Project Office ☞ Draft Overview	☞ Factual Accuracy Review ☞ Revisions as required	☞ Revisions as required	☞ Revisions as required
Groundwater	☞ Document Reviews ☞ Follow-up interviews	☞ Write Findings ☞ Follow-up	☞ Write Findings	☞ Draft Findings to Project Office	☞ Factual Accuracy Review	☞ Revisions as required
Quality Assurance	☞ Document Reviews ☞ Write Findings ☞ Interview UMTRA QA Manager, JEG QA Manager	☞ Write Findings ☞ Review TSC Hydro Laboratory ☞ Interview MK-Ferguson ESN Manager ☞ Interview UMTRA ESN Manager, Rifle Site Manager	☞ Write Findings ☞ Interview Jacobs Engineering Manager Environmental Services	☞ Draft Findings to Project Office	☞ Factual Accuracy Review	☞ Revisions as required
Environmental Management	☞ Follow-up interviews with DOE Managers not in Colorado	☞ Follow-up interviews ☞ Write Findings	☞ Write Findings	☞ Draft Findings to Project Office	☞ Factual Accuracy Review	☞ Revisions as required

Environmental Audit Team
Schedule of Onsite Activities (continued)

Albuquerque	Monday, 6/24	Tuesday, 6/25	Wednesday, 6/26
Radiation	☞ Technical Accuracy Review		
Team Leaders/Coordinator/ Technical Specialists as needed	☞ Revisions as required	☞ Report to Printing ☞ Report Production ☞ Preparation for close-out	☞ Close-out

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Appendix D

List of Contacts and Interviews Conducted by the Environmental Audit Team

Appendix D:

List of Contacts and Interviews Conducted by the Environmental Audit Team

Ref. No.	Date	Auditor	Organization	Position	Topic
Air (A)					
I-A-1	6/11/91	D. Maloney	Chem Nuclear	HP Manager	Radiation
I-A-2	6/11/91	D. Maloney	Chem Nuclear	UMTRA Operations Manager	Radiation
I-A-3	6/11/91	D. Maloney	MK-Ferguson	Permit Specialist	Air
I-A-4	6/11/91	D. Maloney	MK-Ferguson	Site Engineer	Air
I-A-5	6/11/91	D. Maloney	Colorado Department of Health	On-Scene Coordinator	Air, Noise
I-A-6	6/12/91	D. Maloney	MK-Ferguson	Assist Construction S&H Manager	Air, Noise
I-A-7	6/12/91	D. Maloney	MK-Ferguson	Environmental Specialist	Air
I-A-8	6/12/91	D. Maloney	MK-Ferguson, Rifle	Site Engineer	Air
I-A-9	6/12/91	D. Maloney	Colorado Dept. of Health	Rifle Site Coodinator	Air, Noise
I-A-10	6/13/91	D. Maloney	MK-Ferguson	Site Environmental Specialist	Air, Noise
I-A-11	6/13/91	D. Maloney	MK-Ferguson	Quality Control Specialist	Air
I-A-12	6/13/91	D. Maloney	MK-Ferguson	Environmental Technician	Noise
I-A-13	6/13/91	D. Maloney	MK-Ferguson	Chaney Res. Site Specialist	Air
I-A-14	6/14/91	D. Maloney	DOE	Grand Junction Project Manger	Noise
I-A-15	6/17/91	D. Maloney	Mesa County Health Department	Air Quality Specialist	Air, Noise
I-A-16	6/17/91	D. Maloney	MK-Ferguson	Chemical Engineer	Air
I-A-17	6/18/91	D. Maloney	Mesa County Planning Department	Acting Assistant Director of Planning	Noise
I-A-18	6/19/91	D. Maloney	Met One Instruments	Product Manager	Air
I-A-19	6/19/91	D. Maloney	MK-Ferguson	Environmental Specialist	Air

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
Surface Water (SW)					
I-SW-1	6/11/91	D. Dolak	MK-Ferguson	Staff Engineer	Water Discharge and Wetlands Permits for Grand Junction
I-SW-2	6/11/91	D. Dolak	MK-Ferguson	Site Engineer	Water Drainage System and Permits Wetlands at Grand Junction
I-SW-3	6/11/91	D. Dolak	MK-Ferguson	Waste Water Operator	Operations of WWTF at Grand Junction
I-SW-4	6/12/19	D. Dolak	MK-Ferguson	Site Manager	Remedial Actions at Rifle Site
I-SW-5	6/12/91	D. Dolak	MK-Ferguson	Site Engineer	Surface Water Drainage and Permits at Old and New Rifle Sites
I-SW-6	6/12/91	D. Dolak	MK-Ferguson	Site Supervisor	Background History of Operation at Old Rifle Site
I-SW-7	6/12/91	D. Dolak	Colorado Dept. of Health	UMTRA Program Manager	Soil Permits from State of Colorado; Stormwater Culvert at Old Rifle
I-SW-8	6/13/91	D. Dolak	MK-Ferguson	Site Manager	Gunnison Site Activities
I-SW-9	6/13/91	D. Dolak	DOE	DOE Site Manager	Actions at Gunnison Site, Water Rights Issues and Dredging of Irrigation Canal
I-SW-10	6/14/91	D. Dolak	MK-Ferguson	Site Engineer	Surface Water Drainage at Cotter Transfer and Cheney Disposal Sites
I-SW-11	6/14/91	D. Dolak	Colorado Dept. of Health	Engineer; Hydrogeologist	Application of New EPA Stormwater Regulations to Colorado, Colorado Dept. of Health
I-SW-12	6/14/91	D. Dolak	TSC	Lawyer	UMTRA Language Applicability to Clean Water Act
I-SW-13	6/17/91	D. Dolak	Jacobs Engineering	Manager of Engineering	Floodplains and Water Discharge Permits for Grand Junction Sites
I-SW-14	6/17/91	D. Dolak	Colorado Dept. of Health	UMTRA Program Manager	Stormwater Culvert at Old Rifle
I-SW-15	6/17/91	D. Dolak	Colorado Dept. of Highways	Colorado Dept. of Highways Official	Colorado Department of Highways requirements for the Application of Road Surfacing Chemicals
I-SW-16	6/17/91	D. Dolak	Jacobs Engineering	Wetland Specialist	Wetland Permit Issues for Grand Junction Sites
I-SW-17	6/17/91	D. Dolak	MK-Ferguson	Principal Chemical Engineer	Water and Wetland Permits for Grand Junction Sites
I-SW-18	6/17/91	D. Dolak	MK-Ferguson	Environmental Scientist	Development of SPCC Plans for RAC

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
I-SW-19	6/17/91	D. Dolak	Colorado Dept. of Health	Industrial Wastewater Permitter	RAC Compliance with CDPS Permit Reporting Requirements
I-SW-20	6/18/91	D. Dolak	U.S. Army Corps of Engineers	Wetlands Permitter	Wetland Acreage Along the Cheney Haul Road and Applicability to RAC Permits
I-SW-21	6/18/91	D. Dolak	Colorado Dept. of Health	Industrial Wastewater Permitter	Colorado Stormwater Requirements and Applicability of Requirements to Cheney Haul Road
Groundwater (GW)					
I-GW-1	6/11/91	B. Stechmann	MK-Ferguson	Site Engineer	Grand Junction Climax Mill Site Tour
I-GW-2	6/11/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Geologist	Grand Junction Groundwater Characterization
I-GW-3	6/11/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Site Manager	Grand Junction Groundwater Characterization
I-GW-4	6/11/91	B. Stechmann	Colorado Dept. of Health (Grand Junction)	Vicinity Properties Manager	Grand Junction Vicinity Properties
I-GW-5	6/12/91	B. Stechmann	Colorado Dept. of Health (Denver)	Geologist	Gunnison, Rifle, and Grand Junction Groundwater Issues
I-GW-6	6/12/91	B. Stechmann	MK-Ferguson	Gunnison Site Manager	Gunnison Project Overview and Tour
I-GW-7	6/12/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Geologist	Gunnison Groundwater Characterization
I-GW-8	6/12/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Engineer	Gunnison Groundwater Characterization
I-GW-9	6/13/91	B. Stechmann, P. Lindahl	Jacobs-Weston-SH&B UMTRA Team	Geologist	UMTRA Groundwater Monitoring Well Procedures
I-GW-10	6/13/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Engineer	UMTRA Groundwater Monitoring Well Procedures
I-GW-11	6/13/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Technician	UMTRA Groundwater Monitoring Well Procedures
I-GW-12	6/13/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Technician	UMTRA Groundwater Monitoring Well Procedures

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
I-GW-13	6/13/91	B. Stechmann	MK-Ferguson	Cheney Site Superintendant	Toured Cotter Transfer Station and Cheney Disposal Cell
I-GW-14	6/14/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Geologist	Rifle Site Characterizations
I-GW-15	6/14/91	B. Stechmann	Colorado Dept. of Health (Grand Junction)	Rifle Site Manger	Rifle Site Characterizations
I-GW-16	6/14/91	B. Stechmann	MK-Ferguson	Rifle Site Manager	Rifle Site Characterizations and Future Site Operational Plans
I-GW-17	6/17/91	B. Stechmann	DOE Albuquerque	Hydrologist/NEPA/Geotech Manager	Groundwater Issues Associated with UMTRA Sites
I-GW-18	6/17/91	B. Stechmann	DOE Albuquerque	Site Manager	Groundwater Issues Associated with UMTRA Sites
I-GW-19	6/17/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Gunnison Site Hydrologist	Groundwater Issues Associated with UMTRA Sites
I-GW-20	6/17/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Gunnison Site Hydrologist	Groundwater Issues Associated with UMTRA Sites
I-GW-21	6/17/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Rifle Site Hydrologist	Groundwater Issues Associated with UMTRA Sites
I-GW-22	6/17/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Rifle Site Hydrologist	Groundwater Issues Associated with UMTRA Sites
I-GW-23	6/17/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Grand Junction Site Hydrologist	Groundwater Issues Associated with UMTRA Sites
I-GW-24	6/17/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Deputy Manager Hydrology	Groundwater Issues Associated with UMTRA Sites
I-GW-25	6/17/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Hydrology Manager	Groundwater Issues Associated with UMTRA Sites
I-GW-26	6/18/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Environmental Scientist/ Regulatory Specialist	Monitoring Well Permits at UMTRA Sites
I-GW-27	6/18/91	B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Data Base Administrator	Monitoring Well Data Base, Analytical Laboratory Interaction

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
Waste Management (WM)					
I-WM-1	5/1/91	B. Clerk	MK-Ferguson	UMTRA Project Director	Disposal of Out-of-State Radiation Contaminated Material
I-WM-2	6/11/91	A. Wentz	MK-Ferguson	Senior Environmental Specialist	Grand Junction Processing Site
I-WM-3	6/11/91	A. Wentz	MK-Ferguson	Site Environmental Specialist	Grand Junction Processing Site
I-WM-4	6/11/91	A. Wentz	DOE	Environmental and Safety Manager	Grand Junction Processing Site
I-WM-5	6/12/91	A. Wentz	MK-Ferguson	Construction ES&H Manager	Gunnison Processing and Disposal Sites
I-WM-6	6/12/91	A. Wentz	MK-Ferguson	Gunnison Site Manager	Gunnison Processing and Disposal Sites
I-WM-7	6/12/91	A. Wentz	Jacobs	Site Manager	Gunnison Processing and Disposal Sites
I-WM-8	6/12/91	A. Wentz	Colorado Dept. of Health	Site Manager	Gunnison Processing and Disposal Sites
I-WM-9	6/12/91	A. Wentz	DOE	Site Manager	Gunnison Processing and Disposal Sites
I-WM-10	6/12/91	A. Wentz	CNESI	Site Manager	Gunnison Processing and Disposal Sites
I-WM-11	6/12/91	A. Wentz	CNESI	Site Supervisor	Gunnison Processing and Disposal Sites
I-WM-12	6/12/91	A. Wentz	Jacobs	Site Geologist	Gunnison Processing and Disposal Sites
I-WM-13	6/12/91	A. Wentz	Gunnison County	Manager	Gunnison Processing and Disposal Sites
I-WM-14	6/13/91	A. Wentz	MK-Ferguson	Site Supervisor	Cheney Disposal Site
I-WM-15	6/13/91	A. Wentz	MK-Ferguson	Senior Environmental Specialist	Cheney Disposal Site, Cotter Transfer Site
I-WM-16	6/13/91	A. Wentz	MK-Ferguson	Environmental Technician	Cheney Disposal Site, Cotter Transfer Site
I-WM-17	6/13/91	A. Wentz	MK-Ferguson	Site Engineer	Cheney Disposal Site, Cotter Transfer Site
I-WM-18	6/13/91	A. Wentz	MK-Ferguson	Environmental Specialist	Cheney Disposal Site, Cotter Transfer Site
I-WM-19	6/13/91	A. Wentz	West Tran	Superintendent	Cotter Transfer Site
I-WM-20	6/14/91	A. Wentz	MK-Ferguson	Senior Environmental Specialist	Rifle Processing Sites
I-WM-21	6/14/91	A. Wentz	MK-Ferguson	Senior Environmental Specialist	Rifle Processing Sites
I-WM-22	6/14/91	A. Wentz	MK-Ferguson	Construction Superintendent	Rifle Processing Sites
I-WM-23	6/14/91	A. Wentz	MK-Ferguson	Site Engineer	Rifle Processing Sites

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
I-WM-24	6/14/91	A. Wentz	MK-Ferguson	Environmental Specialist	Rifle Processing Sites
I-WM-25	6/14/91	A. Wentz	MK-Ferguson	Health Physics Site Manager	Rifle Processing Sites
I-WM-26	6/14/91	B. Clark	MK-Ferguson	Rifle Site Manager	Disposal of Out-of-State Radioactive Contaminated Material
I-WM-27	6/14/91	B. Clark	Colorado Dept. of Health	UMTRA Rife Site Manager	Disposal of Out-of-State Radioactive Contaminated Material
I-WM-28	6/17/91	A. Wentz	Jacobs	Environmental Services Manager	UMTRA Waste Disposal
I-WM-29	6/17/91	A. Wentz	Jacobs	Regulatory Compliance Specialist	UMTRA Waste Disposal
Toxic Chemical Materials (TCM)					
I-TCM-1	6/11/91	M. Wozny	MK-Ferguson	Staff Environmental Specialist	Toxic Chemical Materials
I-TCM-2	6/11/91	M. Wozny	MK-Ferguson	Environmental Technician, Grand Junction	Toxic Chemical Materials
I-TCM-3	6/11/91	M. Wozny	DOE UMTRA	Environmental and Safety Manager	Toxic Chemical Materials
I-TCM-4	6/11/91	M. Wozny	ICC	Safety Engineer	Toxic Chemical Materials
I-TCM-5	6/11/91	M. Wozny	Westran	Project Manager	Toxic Chemical Materials
I-TCM-6	6/12/91	M. Wozny	MK-Ferguson	Environmental Specialist, Rifle	Toxic Chemical Materials
I-TCM-7	6/12/91	M. Wozny	MK-Fergueon	Staff Environmental Specialist	Toxic Chemical Materials
I-TCM-8	6/12/91	M. Wozny	MK-Ferguson	Rifle, Site Manager	Toxic Chemical Materials
I-TCM-9	6/12/91	M. Wozny	MK-Ferguson	Rifle Superintendent	Toxic Chemical Materials
I-TCM-10	6/13/91	M. Wozny	MK-Ferguson	Staff Environmental Specialist	Toxic Chemical Materials
I-TCM-11	6/13/91	M. Wozny	MK-Ferguson	Environmental Technician	Toxic Chemical Materials
I-TCM-12	6/13/19	M. Wozny	MK-Ferguson	Site Supervisor Cheney	Toxic Chemical Materials
I-TCM-13	6/14/19	M. Wozny	MK-Ferguson	Construction Health and Safety, UMTRA Sites	Toxic Chemical Materials
I-TCM-14	6/14/91	M. Wozny	MK-Ferguson	Environmental Technician, Cotter and Cheney	Toxic Chemical Materials

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
I-TCM-15	6/14/91	M. Wozny	Westran	Cotter, Site Foreman	Toxic Chemical Materials
I-TCM-16	6/15/19	M. Wozny	MK-Ferguson	Environmental Technician, Grand Junction	Toxic Chemical Materials
I-TCM-17	6/17/91	M. Wozny	MK-Ferguson	Staff Environmental Specialist	Toxic Chemical Materials
I-TCM-18	6/18/91	M. Wozny	Jacobs Engineering	Environmental, Health and Safety Manager	Toxic Chemical Materials
I-TCM-19	6/18/91	M. Wozny	MK-Ferguson	Environmental Technician, Grand Junction Site Engineer, Grand Junction	Toxic Chemical Materials
I-TCM-20	6/18/91	M. Wozny	Mesa County Fire Department	Emergency Services Coordinator	Toxic Chemical Materials
I-TCM-21	6/19/91	M. Wozny	Mesa County Fire Department	Emergency Services Coordinator	Toxic Chemical Materials
I-TCM-22	6/20/91	M. Wozny	MK-Ferguson	Environmental Technician Grand Junction	Toxic Chemical Materials
Quality Assurance (QA)					
I-QA-1	6/11/91	P. Lindahl	UMTRA	Site Manager, Grand Junction and Gunnison	Overview of Site Environmental Activities
I-QA-2	6/11/91	P. Lindahl	MK-Ferguson	Project Quality Manager	Project Quality Assurance Oversight or Subcontractors
I-QA-3	6/11/91	P. Lindahl, G. Williams	Colorado Dept. of Health Colorado Dept. of Health Colorado Dept. of Health	UMTRA Program Manager UMTRA Vicinity Property Manager, Grand Junction UMTRA Site Manager, Gunnison	Colorado Department of Health Perspective and Involvement in UMTRA Project
I-QA-4	6/12/91	P. Lindahl	Chem-Nuclear Environmental Services, Inc. (CNESI)	HP Manager, Grand Junction UMTRA Operations Manager	Laboratory Procedures
I-QA-5	6/12/91	P. Lindahl	MK-Ferguson	Site Engineer Grand Junction	Wastewater Discharge Permit and Procedures
I-QA-6	6/12/91	P. Lindahl	UMTRA	Technical Support Group Manager	Technical Support Group Activities and Responsibilities

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
I-QA-7	6/12/91	P. Lindahl, B. Stechmann	Jacobs-Weston-SH&B UMTRA Team	Geologist Engineer Technician Technician Geologist	UMTRA Groundwater Sampling Procedures
I-QA-8	6/13/91	P. Lindahl	Geotech	Analytical Laboratory Manager Senior Staff Scientist	Analytical Laboratory Operations and Sample Receiving
I-QA-9	6/14/19	P. Lindahl	ORNL	Pollutant Assessments Group Manager	Overview
I-QA-10	6/14/91	P. Lindahl	ORNL	UMTRA Project Manager	UMTRA Project Activities
I-QA-11	6/14/91	P. Lindahl	ORNL	Soil Coordinator	Sample Receiving and Preparation
I-QA-12	6/14/91	P. Lindahl	DOE-GJPO	UMTRA Vicinity Project Manager	GJPO Overview
I-QA-13	6/14/91	P. Lindahl	Geotech	UMTRA Program Manager	UMTRA QAPP and Activities
I-QA-14	6/17/19	P. Lindahl	UMTRA	Quality Assurance Manager	UMTRA Quality Assurance Activities and Overview
I-QA-15	6/17/91	P. Lindahl	MK-Ferguson	Staff Environmental Specialist	UMTRA Environmental Activities
I-QA-16	6/17/91	P. Lindahl	Jacobs Engineering Group	Senior Quality Assurance Specialist	Technical Support Contractor's Quality Assurance Overview and Activities
I-QA-17	6/18/91	P. Lindahl	Jacobs Engineering Group Jacobs Engineering Group R.F. Weston	Senior Quality Assurance Specialist Hydro Laboratory Manager Technician	Laboratory Quality Assurance Laboratory Operations, and Laboratory Procedures
I-QA-18	6/18/91	P. Lindahl	MK-Ferguson	Construction ESH Manager	Environmental Operations Overview and Quality Assurance Activities
I-QA-19	6/18/91	P. Lindahl	UMTRA	ESH Manager	Environmental Protection Activities and Oversight
I-QA-20	6/18/91	P. Lindahl	UMTRA	Site Manager, Rifle and Grand Junction Vicinity Properties	Environmental Protection Activities at Rifle and Grand Junction Vicinity Properties
I-QA-21	6/19/91	P. Lindahl	Jacobs-Weston-SH&B UMTRA Team	Environmental Services Manager	Technical Support Contractor Overview Activities

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
Radiation (RAD)					
Note: Contact/interview numbers 1-23 were conducted by Paul Jones, the rest were conducted by Dave Duncan.					
I-RAD-1	6/11/91	P. Jones	DOE/UMTRA Project Office	Vicinity Properties Project Site Manager	Vicinity Properties
I-RAD-2	6/11/91	P. Jones	DOE/UMTRA Project Office	Site Manager	Vicinity Properties
I-RAD-3	6/11/91	P. Jones	MK-Ferguson	Vicinity Properties Manager	Vicinity Properties
I-RAD-4	6/11/91	P. Jones	Colorado Dept. of Health	State Regulator	Vicinity Properties
I-RAD-5	6/11/91	P. Jones	Colorado Dept. of Health	UMTRA Manager	Vicinity Properties
I-RAD-6	6/11/91	P. Jones	Colorado Dept. of Health	UMTRA Gunnison Site Manager	Vicinity Properties
I-RAD-7	6/11/91	P. Jones	Colorado Dept. of Health	UMTRA Grand Junction Site Manager	Vicinity Properties
I-RAD-8	6/11/91	P. Jones	Colorado Dept. of Health	UMTRA Rifle Site Manager	Vicinity Properties
I-RAD-9	6/11/91	P. Jones	MK-Ferguson	Vicinity Properties Engineer	Vicinity Properties
I-RAD-10	6/12/91	P. Jones	DOE/UMTRA Project Office	Vicinity Properties Project Site Manager	Vicinity Properties
I-RAD-11	6/12/91	P. Jones	MK-Ferguson	Vicinity Properties Manager	Vicinity Properties
I-RAD-12	6/12/91	P. Jones	Geotech	Manager Field Assessments	Vicinity Properties Geotech Procedures
I-RAD-13	6/12/91	P. Jones	MK-Ferguson	Vicinity Properties Manager	Vicinity Properties MK-Ferguson Procedures
I-RAD-14	6/12/91	P. Jones	DOE/UMTRA Project Office	Vicinity Properties Project Site Manager	Vicinity Properties MK-Ferguson Procedures
I-RAD-15	6/12/91	P. Jones	MK-Ferguson	Site H.P. Manager	Vicinity Properties MK-Ferguson Procedures
I-RAD-16	6/12/91	P. Jones	MK-Ferguson	Environmental and Dosimetry Verification Manager	Vicinity Properties MK-Ferguson Procedures
I-RAD-17	6/12/91	P. Jones	MK-Ferguson	Health Physics and Environmental Manager	Vicinity Properties MK-Ferguson Procedures
I-RAD-18	6/12/91	P. Jones	ORNL	Pollution Assessment Group Leader	Vicinity Properties MK-Ferguson Procedures
I-RAD-19	6/14/91	P. Jones	Colorado Dept. of Health	State Regulator	Vicinity Properties

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
I-RAD-20	6/14/91	P. Jones	ORNL	Site Project Manager	Vicinity Properties
I-RAD-21	6/14/91	P. Jones	Geotech	Administrative Assistant	Vicinity Properties
I-RAD-22	6/17/91	P. Jones	Jacobs	Manager, Radiological Services	Vicinity Properties
I-RAD-23	6/17/91	P. Jones	MK-Ferguson	Health Physics and Environmental Manager	Vicinity Properties
I-RAD-24	6/11/91	D. Duncan	Chem Nuclear	Grand Junction HP Manager	Health Physics
I-RAD-25	6/11/91	D. Duncan	Chem Nuclear	Chem Nuclear Albuquerque	Health Physics
I-RAD-26	6/11/91	D. Duncan	Colorado Dept. of Health	Colorado Vincinity Properties Manager	Health Physics
I-RAD-27	6/12/91	D. Duncan	Chem Nuclear	Rifle HP Manager	Health Physics
I-RAD-28	6/12/91	D. Duncan	Chem Nuclear	Data Tech	Radon Data and Personnel Files
I-RAD-29	6/12/91	D. Duncan	Colorado Dept. of Health Rifle Representative	Colorado Department of Health Rifle Liaison	Health Physics Supplemental Standards
I-RAD-30	6/12/91	D. Duncan	Chem Nuclear	Rifle HP Supervisor	Health Physics
I-RAD-31	6/12/91	D. Duncan	Chem Nuclear	Rifle HP Tech	Health Physics
I-RAD-32	6/12/91	D. Duncan	Chem Nuclear	Rifle HP Tech	Health Physics
I-RAD-33	6/12/91	D. Duncan	Colorado Dept. of Health	Colorado Dept. of Health Vicinity Property Manager	Supplemental Standards
I-RAD-34	6/13/91	D. Duncan	Chem Nuclear	Grand Junction HP Supervisor	UMTRA HP Duties
I-RAD-35	6/13/91	D. Duncan	Chem Nuclear	Gunnison H.P. Supervisor	Gunnison UMTRA Project
I-RAD-36	6/13/91	D. Duncan	DOE	Gunnison H.P. Supervisor	Gunnison UMTRA Project
I-RAD-37	6/13/91	D. Duncan	MK-Ferguson	Gunnison and Mexican Hat Site Manager	Gunnison UMTRA Project
I-RAD-38	6/14/91	D. Duncan	Chem Nuclear	Grand Junction HP Manager	Process Site, Cotter (transfer point and the Cheney Disposal Cell)
I-RAD-39	6/14/91	D. Duncan	MK-Ferguson	MK-Ferguson Site Manager	Grand Junction Process Site, Cotter and Cheney
I-RAD-40	6/15/91	D. Duncan	Chem Nuclear	Grand Junction Chem Nuclear Supervisor	Grand Junction Process Site Operations

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
I-RAD-41	6/15/91	D. Duncan	Chem Nuclear	Rover Tech	Alpha Monitoring Instruments
I-RAD-42	6/18/91	D. Duncan	TSC Jacobs	EH&S Manager	Radiological Support to DOE and RAC's
I-RAD-43	6/18/91	D. Duncan	TSC Jacobs	Health Physicist	Radiological Support to DOE and RAC's
I-RAD-44	6/18/91	D. Duncan	TSC Jacobs	Health Physicist	Radiological Support to DOE and RAC's
I-RAD-45	6/18/91	D. Duncan	TSC Jacobs		Radiological Support to DOE and RAC's
I-RAD-46	6/18/91	D. Duncan	Chem Nuclear	Health Physic's Manager	Radiological Support to DOE and RAC's
I-RAD-47	6/18/91	D. Duncan	TSC Jacobs	Radiological Services Manager	Radiological Support to DOE and RAC's
I-RAD-48	6/18/91	D. Duncan	TSC Jacobs	EH&S Manager	Video of Loading and Hauling Grand Junction-Cheney
Inactive Waste Sites (IWS)					
I-IWS-1	6/11/91	R. Kolpa	Jacobs	Project Manager	TSC Responsibilities for Site Characterizations
I-IWS-2	6/11/91	R. Kolpa	Jacobs	NEPA Coordinator	TSC Responsibilities for NEPA Documentation and Site Characterizations
I-IWS-3	6/11/91	R. Kolpa	Jacobs	G.W. Specialist/Geologist	TSCs Site Characterizations Alternate Disposal Site Studies
I-IWS-4	6/11/91	R. Kolpa	Colorado Dept. of Health, UMTRA Program	Vicinity Property Manager	Vicinity Property Activities
I-IWS-5	6/11/91	R. Kolpa	Colorado Dept. of Health, UMTRA Program	Manager, UMTRA Program	Colorado Position on UMTRA Activities and DOE Responsibilities
I-IWS-6	6/12/91	R. Kolpa	Colorado Dept. of Health, UMTRA Program	Site Manager, Gunnison	Mill Site Remediation Groundwater Problems at Dos Rios Subdivision
I-IWS-7	6/12/91	R. Kolpa	MK-Ferguson	Health and Safety Manager	Mill Site Characterization Studies Gunnison Health and Safety Places at Sampling at Mill Sites
I-IWS-8	6/12/91	R. Kolpa	MK-Ferguson	Site Manager, Gunnison and Grand Junction	H.W. Disposal Site Characterization Procedures
I-IWS-9	6/13/91	R. Kolpa	MK-Ferguson	Site Manager, Grand Junction Mill Site	Grand Junction Site Tours Remedial Activities Sugar Beet Factory Information

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
I-IWS-10	6/13/91	R. Kolpa	Colorado Dept. of Health, UMTRA Program	Project Manager Grand Junction Mill Site and Vicinity Property's	Grand Junction Remedial Actions, Grand Junction Mill Site Wastewater Plant, Grand Junction State Repository Impacts Offsite From Grand Junction Flaws, Early Vicinity Property Remediation
I-IWS-11	6/14/91	R. Kolpa	Colorado Dept. of Health, UMTRA Program	Project Manager Rifle Mill Site and Vicinity Property's	Runoff to River at Mill Spill Procedures Identification of Vicinity Property's Methodology
I-IWS-12	6/17/91	R. Kolpa	UMTRA Project Office	Chairman, Environmental Compliance Group	Commingling Waste Issues (Group Meeting)
I-IWS-13	6/17/91	R. Kolpa	MK-Ferguson	Environmental Specialist	Mill Site Remediation Issues RCRA/CERCLA Issues
I-IWS-14	6/17/91	R. Kolpa	Jacobs	Environmental Attorney	Mill Site Remediation Issues RCRA/CERCLA Issues
I-IWS-15	6/17/91	R. Kolpa	DOE-AL UMTRA Project Office	Special Assistant	Environmental Compliance Group Activities, Statements of Principle Re. HW and Commingled Wastes
I-IWS-16	6/17/91	R. Kolpa	Jacobs	Regulatory Specialist	Applicable Regulations to UMTRA- •Needed UMTRCA Statute Changes •Statements of Principle •Early Vicinity Property Remediations
I-IWS-17	6/18/91	R. Kolpa	DOE-AL UMTRA Project Office	Project Manager, Rifle Mill and Grand Junction Vicinity Property's	Rifle Remediation, Grand Junction Vicinity Property Remediation, Grand Junction State Repository Pile Remediation
I-IWS-18	6/18/91	R. Kolpa	DOE-AL UMTRA Project Office	Environmental Safety, and Health Manager	Activities of Environmental Compliance Group, Statements of Principle Interpretive Guidance
I-IWS-19	6/18/91	R. Kolpa	DOE-AL UMTRA Project Office	UMTRA Project Director	Statements of Policy Intent of Authority and Responsibility, Superfund Remediation of Mill Sites, Other Money Sources for Remediation
Environmental Management (EM)					
I-EM-1	6/11/91	G. Williams	TSC, Westin	Manager, Environmental Services	Environmental Management
I-EM-2	6/11/91	G. Williams	TSC, Jacobs	Manager	Environmental Management
I-EM-3	6/11/91	G. Williams	MK-Ferguson	Community Affairs Coordinator	Public Involvements
I-EM-4	6/11/91	G. Williams	Colorado Dept. of Health	UMTRA Program Manager	State DOE Interaction

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
I-EM-5	6/11/91	G. Williams	MK-Ferguson	Project Director	Environmental Management
I-EM-6	6/11/91	G. Williams	MK-Ferguson	Operations Manager	Environmental Management
I-EM-7	6/12/91	G. Williams	UMTRA Project Office, DOE	Technical Support Group Leader	Environmental Management
I-EM-8	6/12/91	G. Williams	MK-Ferguson	Community Affairs Coordinator	Public Involvement
I-EM-9	6/12/91	G. Williams	DOE EH-25		NEPA Compliance
I-EM-10	6/12/91	G. Williams	UMTRA Project Office, DOE	Environmental and Safety Manager	Environmental Management
I-EM-11	6/12/91	G. Williams	Grand Junction Project Office, DOE	Project Engineer	Environmental Management
I-EM-12	6/12/91	G. Williams	Colorado Dept. of Health	Supervising Health Physicist	State/DOE Interaction
I-EM-13	6/12/91	G. Williams	Geotech	Manager UMTRA Project	Environmental Management
I-EM-14	6/14/91	G. Williams	MK-Ferguson	Project Director	Environmental Management
I-EM-15	6/14/91	G. Williams	MK-Ferguson	Construction Engineering Manager	Environmental Management
I-EM-16	6/14/91	G. Williams	MK-Ferguson	Project Contacts Manager	Environmental Management
I-EM-17	6/14/91	G. Williams	MK-Ferguson	Safety Supervisor	Incidence Reporting
I-EM-18	6/14/91	G. Williams	UMTRA Project Office, DOE	Engineering and Construction Group Leader	Environmental Management
I-EM-19	6/14/91	G. Williams	TSC, Weston	Technical Director	Environmental Management
I-EM-20	6/17/91	G. Williams	UMTRA Project Office, DOE	Project Manager	Environmental Management
I-EM-21	6/17/91	G. Williams	UMTRA Project Office, DOE	Site Manager	Environmental Management
I-EM-22	6/17/91	G. Williams	UMTRA Project Office, DOE	Site Manager	Environmental Management
I-EM-23	6/17/91	G. Williams	UMTRA Project Office, DOE	Administrative Officer	Environmental Management
I-EM-24	6/17/91	G. Williams	AL	Deputy Assistant Manager	Environmental Management
I-EM-25	6/18/91	G. Williams	UMTRA Project Office, DOE	Project Manager	Environmental Management
I-EM-26	6/18/91	G. Williams	UMTRA Project Office, DOE	Site Manager	Environmental Management
I-EM-27	6/18/91	G. Williams	UMTRA Project Office, DOE	Special Assistant	Environmental Management

List of Contacts and Interviews (continued)

Ref. No.	Date	Auditor	Organization	Position	Topic
I-EM-28	6/18/91	G. Williams	MK-Ferguson	Construction Safety and Health Manager	Environmental Management
I-EM-29	6/19/91	G. Williams	DOE-EM	ER Chief Regulatory Compliance	Environmental Management
I-EM-30	6/19/91	G. Williams	DOE-EM, EM-40	Deputy Associate Director, ER	Environmental Management

Appendix E

List of Site Documents Reviewed by the Audit Team

Appendix E:

List of Site Documents Reviewed by the Audit Team

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT001	Colorado Department of Health, Water Quality Control Division, Permit No. 0042391	Colorado Department of Health/M-K Ferguson Company	8/10/90
UMT002	Letter to M. Matthews Concerning Permits Requested for Environmental Audit	J. Oldham/M. Matthews	5/20/91
UMT003	Cooperative Agreement between the DOE and the State of Colorado, Agreement No. DE-FC04-81AL16257	DOE/State of Colorado	10/18/81
UMT004	Modification of Cooperative Agreement, Modification No. M001	DOE-AL/State of Colorado	9/21/82
UMT005	Modification of Cooperative Agreement, Modification No. M002	DOE-AL/State of Colorado	2/15/83
UMT006	Modification of Cooperative Agreement, Modification No. A003	DOE-AL/State of Colorado	5/11/83
UMT007	Modification of Cooperative Agreement, Modification No. A004	DOE-AL/State of Colorado	5/13/83
UMT008	Modification of Cooperative Agreement, Modification No. A005	DOE-AL/State of Colorado	8/2/83
UMT009	Modification of Cooperative Agreement, Modification No. A006	DOE-AL/State of Colorado	2/28/84
UMT010	Modification of Cooperative Agreement, Modification No. A007	DOE-AL/State of Colorado	11/13/84
UMT011	Modification of Cooperative Agreement, Modification No. A008	DOE-AL/State of Colorado	5/15/85
UMT012	Modification of Cooperative Agreement, Modification No. M009	DOE-AL/State of Colorado	7/26/85

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT013	Modification of Cooperative Agreement, Modification No. A010	DOE-AL/State of Colorado	5/1/86
UMT014	Modification of Cooperative Agreement, Modification No. A011	DOE-AL/State of Colorado	9/23/86
UMT015	Modification of Cooperative Agreement, Modification No. M012	DOE-AL/State of Colorado	1/28/87
UMT016	Modification of Cooperative Agreement, Modification No. A013	DOE-AL/State of Colorado	11/28/86
UMT017	Modification of Cooperative Agreement, Modification No. A014	DOE-AL/State of Colorado	5/20/87
UMT018	Modification of Cooperative Agreement, Modification No. A015	DOE-AL/State of Colorado	7/24/87
UMT019	Modification of Cooperative Agreement, Modification No. A016	DOE-AL/State of Colorado	9/24/87
UMT020	Modification of Cooperative Agreement, Modification No. A017	DOE-AL/State of Colorado	6/9/88
UMT021	Modification of Cooperative Agreement, Modification No. A018	DOE-AL/State of Colorado	3/17/89
UMT022	Modification of Cooperative Agreement, Modification No. A019	DOE-AL/State of Colorado	8/3/90
UMT023	Letter concerning Notification of Hazardous Waste Activity EPA I.D. Number COD007061567	J. Polniak/Hazardous Materials and Waste Division/J. Oldham	2/5/90
UMT024	Dredge and Fill Permit	U.S. Army Corps of Engineers/UMTRA Project - New Rifle	9/19/89
UMT025	Air Emission Permit 88ME247	Colorado Department of Health/Air Pollution Control Division/MK-Ferguson	10/9/90

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT026	Air Emission Permit 91ME097	Colorado Department of Health/Air Pollution Control Division/MK-Ferguson	4/9/91
UMT027	Air Emission Permit 88ME250	Colorado Department of Health/Air Pollution Control Division/MK-Ferguson	10/9/90
UMT028	Air Emission Permit 88GA190	Colorado Department of Health/Air Pollution Control Division/MK-Ferguson	1/18/89
UMT029	Section 8, Certificate of Designation for Establishment and Operation of a solid Waste Disposal Site	Garfield County Board of Health/UMTRA Project - Rifle	Undated
UMT030	Section 6, Colorado Pollutant Discharge System Permit (CPDS)	Colorado Department of Health/Water Quality Division/UMTRA Project - Rifle	8/6/90
UMT031	Volume II, Section I, Colorado Pollutant Discharge System Permit (CPDS)	Colorado Department of Health/Water Quality Division/UMTRA Project- Rifle	4/12/90
UMT032	Volume II, Section 4, Free Use Permit	Bureau of Land Management/UMTRA Project- Rifle	7/24/87
UMT033	Volume II, Section 9, Conditional Use Permit	Garfield County Commission/UMTRA Project- Rifle	10/23/90
UMT034	UMTRA Project - Rifle Highway 13 Truck Climbing Lane Air Quality Permit Requirement	State of Colorado/UMTRA Project	3/24/89
UMT035	Processing Site Final Permit. Letter to J. Oldham	J. Holm/Colorado Department of Health/J. Oldham	3/30/90
UMT036	Construction Dewatering Permit. Letter to J. Pepin	J. Pepin/D. Holmer	3/22/90
UMT037	Comments on Draft Discharge Permit. Letter to J. Holm	J. Oldham/J. Holm	2/2/90
UMT038	Authorization to Discharge under the Colorado Discharge Permit System, Permit No. CO-D042536	CO Department of Health/M-K Ferguson	3/4/90
UMT039	Amendment Permit Request. Letter to D. Holmer	J. Oldham/D. Holmer	11/30/90
UMT040	Amendment Permit Request. Letter to D. Holmer	J. Oldham/D. Holmer	12/12/90
UMT041	Amended Pages to Permit No. CO-0042536. Letter to J. Oldham	R. Shuckle/J. Oldham	1/4/91

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT042	Amendment Permit Request. Letter to D. Holmer	J. Oldham/D. Holmer	1/25/91
UMT043	Amendment Permit Request. Letter to D. Holmer	J. Oldham/J. Pepin	2/13/91
UMT044	CPDS/NPDES Facility Inspection, August 15, 1989 Report: IOC (October 24, 1989) to D. Holmer with report details	D. Watson/D. Holmer	1/24/91
UMT045	Annual Inspection of the Grand Junction Processing Site by the Colorado Department of Health. Letter to M. Matthews	J. Oldham/M. Matthews	2/22/91
UMT046	Letter to J. Oldham Concerning Improvements to Grand Junction Processing Site	M. Matthews/J. Oldham	3/7/91
UMT047	Ditch Drawings for Annual Inspection. Letter to D. Sanders	R. Cooney, J. Pepin/D. Sanders	2/8/91
UMT048	Supplemental Information Requested in 1991 Annual Inspection Report - Water Quality Data. Letter to D. Holmer	J. Oldham/D. Holmer	3/19/91
UMT049	Uranium Mill Tailings Remedial Action Program. Letter to D. Holmer	J. Oldham/D. Holmer	3/25/91
UMT050	DOE/Colorado Department of Health Grand Junction Vicinity Property Cost Management Team Report of Findings	DOE, Colorado Department of Health	9/24/90
UMT051	Grand Junction Vicinity Properties Risk Assessment. Letter to M. Matthews	J. Virgona/M. Matthews	7/18/90
UMT052	Response to the Grand Junction Vicinity Property Cost Management Team Report. Memorandum to M. Matthews	J. Virgona/M. Matthews	10/31/90
UMT053	Letter to H. Roitman Concerning Comments on the Cost Management Team Observations	M. Matthews/H. Roitman	2/7/91
UMT054	CDH Review and Response to GJPO Response of the Cost Management Team Report. Letter to M. Matthews	H. Roitman/M. Matthews	1/4/91
UMT055	UMTRA Project Water Treatment Experiences and Capabilities	MK-Environmental Services	7/89

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT056	CPDES Permit Application - Processing Site UMTRA Project - Grand Junction. Letter to R. Shuckle	J. Oldham/R. Shuckle	9/19/89
UMT057	CPDES Permit Application - Grand Junction Processing Site. Letter to R. Shuckle	J. Oldham/R. Shuckle	4/3/89
UMT058	Volume III, Section I, Colorado Discharge Permit System (CDPS)	Colorado Department of Health	Undated
UMT059	CPDES Permit Application UMTRA Project - Grand Junction Cheney Disposal Site. Letter to R. Shuckle	J. Oldham/R. Shuckle	4/3/89
UMT060	Air Pollution Permit - 88GA191	Colorado Department of Health/Air Pollution Control Division/MK-Ferguson	1/18/89
UMT061	Volume I, Section 1, Section 404 Dredge and Fill Permit (Permit No. 9978)	U.S Army Corps of Engineers/MK-Ferguson	Undated
UMT062	Volume VIII, Section I, Colorado Discharge Permit System (CDPS)	Colorado Department of Health/Water Quality Division/MK-Ferguson	Undated
UMT063	Surface Water Rights	Colorado Division of Water Resources/MK-Ferguson	11/8/88
UMT064	Underground Water Rights	Colorado Division of Water Resources/MK-Ferguson	11/8/88
UMT065	Floodplain Permit (F7-88)	Mesa County Engineering Department/MK-Ferguson	9/6/88
UMT066	Floodplain Development Permit (F2-90)	Mesa County Engineering Department/MK-Ferguson	2/20/90
UMT067	Floodplain Permit (13-90)	City of Grand Junction/MK-Ferguson	3/6/90
UMT068	Environmental Analyses of a Proposed Haul Road Between Whitewater, Colorado, and the Cheney Disposal Site for the Grand Junction Tailings	Jacobs Engineering Group	1/90
UMT069	Air Pollution Permit - 90GA252L	Colorado Department of Health/Air Pollution Control Division/MK-Ferguson	9/20/90
UMT070	Air Pollution Permit - 87ME350F	Colorado Department of Health/Air Pollution Control Division/MK-Ferguson	7/25/88

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT071	Air Pollution Permit - 87ME202D	Colorado Department of Health/Air Pollution Control Division/MK-Ferguson	9/28/90
UMT072	Air Pollution Permit - 90ME001L	Colorado Department of Health/Air Pollution Control Division/MK-Ferguson	2/20/90
UMT073	Air Pollution Permit - 89ME431L	Colorado Department of Health/Air Pollution Control Division/MK-Ferguson	1/26/90
UMT074	Air Pollution Permit - 89ME430L	Colorado Department of Health/Air Pollution Control Division/MK-Ferguson	1/26/90
UMT075	APENs and Support Documents for Air Emission Permits	MK-Ferguson/Colorado Department of Health/Air Pollution Control Division	Various Dates
UMT076	APENs and Support Documents for Air Emission Permits - Rifle	MK-Ferguson/Colorado Department of Health/Air Pollution Control Division	Various Dates
UMT077	Soil Moisture Content Determination Data	MK-Ferguson/Internal Document	3/19/91 - 5/28/91
UMT078	Remedial Action Plan and Site design for Stabilization of the Inactive Uranium Mill Tailings Site at Grand Junction, Colorado (Preliminary Final); Remedial Action Selection Report	UMTRA-DOE/AL 050505.0000	8/90
UMT079	Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Grand Junction, Colorado (Preliminary Final); Attachment 2: Geology Report	UMTRA-DOE/AL 500505.0000	8/90
UMT080	Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Sites at Grand Junction, Colorado (Preliminary Final); Attachment 3: Groundwater Hydrology Report	UMTRA-DOE/AL 050505.0000	8/90
UMT081	Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Grand Junction, Colorado (Preliminary Final); Attachment 4: Water Resources Protection Strategy	UMTRA-DOE/AL 050505.0000	6/90

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT082	Uranium Mill Tailings Remedial Action Project Response to Discarded Waste Samples Rifle, Colorado	MK-Ferguson	2/22/90
UMT083	Characterization of Chemical and Asbestos Wastes and Remedial Action Recommendations at the Grand Junction, Colorado UMTRA Site	Southwest Hazard Control, Inc.	6/14/89
UMT084	Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Sites at Rifle, Colorado; Volume I - Test; Appendices A, B, and C	UMTRA-DOE/AL 050506.0000	2/90
UMT085	Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Gunnison, Colorado (Draft); Remedial Action Selection Report	UMTRA-DOE/AL 050508.0000	6/90
UMT086	Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Gunnison, Colorado (Draft); Attachment 2, Geology Report	UMTRA	6/90
UMT087	Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Gunnison, CO (Draft); Attachment 3, Groundwater Hydrology Report	UMTRA-DOE/AL 050508.0000	6/90
UMT088	Health and Safety Audit Report, Rifle Processing Site	UMTRA	7/9-11/90
UMT089	Radiological Protection, Industrial Hygiene, and Occupational Safety for the Uranium Mill Tailings Remedial Action Project	UMTRA	8/1-5/88
UMT090	Rifle Health and Safety Audit Report		6/6-9/89
UMT091	Characterization of Chemical Wastes and Remedial Action Recommendations at the Rifle, Colorado UMTRA Sites	Southwest Hazard Control	3/10/89
UMT092	Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Sites at Rifle, Colorado; Final, VOR. II - Appendices D and E	UMTRA-DOE/AL 050506.0000	2/90
UMT093	UMTRA Project Corporate EH&S Assessment Corrective Measures Plan	John M. Isham, CIH, MK-Environmental Services, UMTRA	9/90

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT094	Geotech Vicinity Pruperty Documentation	Geotech	Undated
UMT095	MIT (Robley D. Evans) Comments Regarding Remedial Actions for Uranium Processing Sites (40 CFR 192). May 27,1981	Robley D. Evans	5/27/81
UMT096	UMTRA Project Remedial Action Contractor Health Physics Procedures	Chem-Nuclear Systems, Inc./MK-Ferguson	4/4/91
UMT097	Health Physics Monitoring Plan UMTRA Project	Chem-Nuclear Systems, Inc./MK-Ferguson	3/16/88
UMT098	RAC Vicinity Property Implementation Plan	MK-Ferguson	6/20/88
UMT099	EPA Standards for Remedial Actions at Inactive Uranium Processing Sites	Federal Register	1/5/83
UMT100	Work Performed as Part of the Radiological Survey Activities (RASA) Program of Oak Ridge National Laboratories (ORNL)	ORNL/UMTRA	Undated
UMT101	Field Assessments Procedures Manual	Chem-Nuclear/DOE	various dates
UMT102	Post-Construction RDC Failure	Herman R. Lucero	11/5/90
UMT103	Vicinity Property Programmatic Review	Noel Savignac, Paul Smith, and David Duncan	6/23/89
UMT104	Grand Junction UMTRA Site Spill Prevention Control and Countermeasures Plan	D.L. Crone/PEICC/MK-Ferguson	4/11/91
UMT105	SARA Title III - Update	J. G. Oldham/MK-Ferguson/Grand Junction Fire Department	4/17/91
UMT106	Procedure for Handling Waste Oil Grand Junction UMTRA Project	W.P. Grieb/ICC/MK-Ferguson	4/11/91
UMT107	Rifle Site Environmental Audit Manual	R. Withee/MK-Ferguson	4/90
UMT108	Grand Junction Environmental Audit Manual	J. Pepin/MK-Ferguson	4/90
UMT109	Health Physics Procedures	Chem-Nuclear Systems/MK-Ferguson	4/4/91

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT110	Vicinity Property Management Implementation Manual	UMTRA-DOE/AL	3/88
UMT111	Final Environmental Impact Statement for Inactive Uranium Processing Sites (40 CFR 192)	EPA	10/82
UMT112	Colorado Department of Health Comments on DOE Project Policy and Guidelines for Managing Hazardous Wastes at Designated Processing Sites	J. Deckler/CDH/M. Matthews	4/5/91
UMT113	Colorado Department of Health Comments on Commingled Waste Project Guidelines	J. Deckler/CDH/M. Matthews	5/20/91
UMT114	Inclusion Survey Activities (Procedure # TE-020)	ORNL	3/4/91
UMT115	1990 Annual Environmental Monitoring Report RAC for UMTRAP Volumes 1 and 2	MK-Ferguson and Chemical Nuclear System, Inc./ DOE Albuquerque Operations Office	Calendar Year 1990
UMT116	1989 Annual Environmental Monitoring Report RAC for UMTRAP Volumes 1 and 2	MK-Ferguson and Chemical Nuclear System, Inc./ DOE Albuquerque Operations Office	Calendar Year 1989
UMT117	Technical Approach Document Revision II	UMTRA-DOE/AL 050425.0002	12/89
UMT118	TSC Action Memorandum - Development of Monitoring Well Data Base	M. Matthews, DOE-AL/S. Hill, TSC	Undated
UMT119	Technical Framework for Groundwater Restoration	UMTRA-DOE/AL 400671	4/91
UMT120	Albuquerque Operations Manual Section 16: TAC Hydrological Standard Operating Procedures	Jacobs Engineering Group, Inc.	Various
UMT121	Albuquerque Operations Manual Section 17: Technical Standard Operating Procedures-Office	Jacobs Engineering Group, Inc.	Various
UMT122	Potential Groundwater Contamination at Grand Junction UMTRAP Vicinity Properties	UNC Geotech/DOE-GJPO	12/88
UMT123	Monitoring Well Inventory Summary Information Sheets for Rifle, Gunnison, and Grand Junction	Jacobs Engineering Group, Inc.	6/91

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT124	Groundwater Protection Management Program Plan for the DOE UMTRAP	DOE-AL	4/90
UMT125	Jacobs Engineering Group, Inc. Albuquerque Operations Limited Self-Assessment	M. Kearney/B. Glover	6/5/91
UMT126	MK-Ferguson Well Abandonment Procedures (Draft)	MK-Ferguson Company	Undated
UMT127	Jacobs Engineering Group, Inc. Well Abandonment Procedures	Jacobs Engineering Group, Inc.	6/17/91
UMT128	Preplanning Guidance Document for Groundwater Restoration	UMTRA-DOE/AL 400659.0000	6/91
UMT129	Regulatory Alternatives for Groundwater Compliance for the DOE UMTRAP Alternate Concentation Limits, Supplemental Standards, and Institutional Controls	UMTRA-DOE/AL 400659.0000	Undated
UMT130	Uranium Mill Tailings Remedial Action (UMTRA) Project Charter	DOE	4/86
UMT131	UMTRA Project Environmental, Health, and Safety Plan	DOE	2/89
UMT132	UMTRA Project Environmental Procedures Albuquerque Operations Manual Section II	Jacobs Engineering Group	11/88
UMT133	Vicinity Property Programatic Review	Noel Savignac, Paul Smith, and David Duncan	6/23/89
UMT134	Implementation Plan for the Integration of the Pre Licensing Custodial Care Programmatic Activities Between the Uranium Mill Tailings Remedial Action Project Office and Grand Junction Projects Office	Mark Matthews and Michael Tucker	4/11/89
UMT135	U.S. Department of Energy Long-Term Surveillance and Maintenance Program Implementation Plan for Site Transfer between the Urainium Mill Tailings Remedial Action and the Grand Junction Projects Office	Mark Matthews and Michael Tucker	4/11/89
UMT136	Letter to Mr. Jeffery Deckler, Colorado Department of Health	Mark Matthews/UMTRA Project Office	5/6/91

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT137	Draft TSC Management Plan	Not indicated	Undated
UMT138	Response to Tiger Team Comments (Groundwater)	DOE/AL/B. Stechmann	6/18/91
UMT139	High Volume Filters. Fax to John Isham	J. Bowden/CDS Labs/J. Isham	6/13/91
UMT140	UMTRA Project Permit Status Report	MK-Ferguson Document	3/7/91
UMT141	Procedures for Met. Tower Verification	Met. One Instruments/MK-Ferguson	Undated
UMT142	Engineer's Daily Activity Inspectors Report - Rifle	MK-Ferguson Internal Document	4/24/89
UMT143	UMTRAP Subcontractor's Documents. Final Design for Construction	MK-Ferguson-Rifle/DOE-AL	3/91
UMT144	Grand Junction Air Emission Permits and APENS. Transmittal Letters	MK-Ferguson Documentation	Various dates
UMT145	Rifle Air Emission Permits and APENS. Transmittal Letters	MK-Ferguson Documentation	Various dates
UMT146	UMTRA Project Environment, Health and Safety (EH&S) Goal Statement	M. Matthews/UMTRA	6/6/91
UMT147	UMTRA Project Audit/Surveillance Program Plan	UMTRA-DOE/AL 40326.0000	4/88
UMT148	UMTRA Project Environmental Protection Implementation Plan	B. Sellers, et.al/UMTRA-DOE/AL	2/9/90
UMT149	Document Control/Procedure	MK-Ferguson/Procedure No. 1.0, Revision 3	5/1/89
UMT150	UMTRA Project Office Draft Preliminary Self-Assessment	UMTRA Project Office	Undated
UMT151	Purchase Order-P.O. No. 3040-511-10192	J. Jones/MK-Ferguson/Air and Water Technologies	4/29/91
UMT152	Report-Water Analysis-P.O. No. 3050-511-10004	Barringer Laboratories Inc./MK-Ferguson	3/12/91
UMT153	Grand Junction Decontamination Pad Log Book	Various Authors	3/91-6/91
UMT154	Grand Junction Decon Pad Special Procedures	Various Authors	Various Dates

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT155	UMTRA Project Quality Assurance Plan	UMTRA-DOE/AL 185, Revision 3	3/90
UMT156	UMTRA Project Environmental Compliance Summary Calendar Year, 1990	Chem-Nuclear Environmental Services, Inc.	Undated
UMT157	UMTRA Project Annual Environmental Monitoring Report Calendar Year, 1990 - Volume I	Chem-Nuclear Environmental Services, Inc.	Undated
UMT158	UMTRA Project Annual Environmental Monitoring Report Calendar Year, 1990 - Volume II	Chem-Nuclear Environmental Services, Inc.	Undated
UMT159	Approval Signatures for Revised UMTRA QA Plan (QAP-X-91-HSRD-001). Letter	D. Halford/ORNL/M. Matthews	1/21/91
UMT160	Preparation and Revision of Standard Operating Procedures and Forms	D. Bibber/Jacobs Engineering Group, Inc.	6/19/91
UMT161	UMTRA Quality Assurance Plan Concurrence. Letter	P. Lohaus/NRC/M. Matthews	3/15/90
UMT162	Grand Junction Water Sampling. Memorandum	J. Fritts/Jacobs Engineering Group, Inc./Field Crew	6/11/91
UMT163	1990 Annual Site Environmental Report Guidance. Letter	M. Matthews/UMTRA Project Office/J. Oldham	2/15/91
UMT164	Final Guidance for the Preparation of Annual Site Environmental Report for Calendar Year 1990 Memorandum	K. Taimi/DOE-EH	1/31/91
UMT165	UMTRA Project Environmental Protection Implementation Plan	C. Esparza-Baca, et al/UMTRA	10/90
UMT166	Quality Assurance Manual	Jacobs Engineering Group, Inc.	1/22/86
UMT167	Instructions for Use of this Research and Technical Notebook	Martin Marietta Energy Systems	4/90
UMT168	Request Comments on Draft DOE. EPA NESHAPs MOU	Raymond Pelletier/DOE/Distribution	12/10/90
UMT169	Implementation of NESHAPs. Letter to U.S. EPA	M. Matthews/DOE-AL/Dr. Lemming - U.S. EPA	4/26/90
UMT170	Implementation of NESHAPs. Letter to U.S. EPA	M. Matthews/DOE-AL/Dr. Lemming - U.S. EPA	11/7/90

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT171	NESHAPs Radon Flux Measurements. Report to M. Matthews	J. Oldham/MK-Ferguson/M. Matthews - DOE-AL	10/24/90
UMT172	Implementation of NESHAPs. Letter to U.S. EPA	M. Matthews/DOE-AL/D. Howekamp - EPA	4/30/90
UMT173	Implementation of NESHAPs. Letter to J. Themelis	M. Matthews/DOE-AL/J. Themelis	8/30/90
UMT174	Implementation of NESHAPs. Letter to DOE-AL	D. Howekamp/U.S. EPA/B. Twining	8/7/90
UMT175	UMTRA Project Quality Assurance Plan	MK-Ferguson/MK-Ferguson-UMTRA-5, Rev. 6	1/2/91
UMT176	Additional Personnel Requirements at UMTRA?	Mark Matthews	7/14/89
UMT177	Providing Access to Epidemiologic Data	National Research Council/ National Academy of Sciences	1990
UMT178	Sharing Research Data	National Research Council/ National Academy of Sciences	1985
UMT179	Total Suspended Particulate Audited. Letter to J. Oldham	P. Donahue/CDH-APCD/J. Oldham	4/2/91
UMT180	Total Suspended Particulate Logbook for Grand Junction	C. Pettengill/MK-Ferguson	Continuous Log
UMT181	Total Suspended Particulate Sample Particulate Calculations	C. Pettengill/MK-Ferguson	Continuous Log
UMT182	Noise Data for Orchard Mesa Site	C. Pettengill/MK-Ferguson	Continuous Log
UMT183	Noise Quarterly Report	J. Jones/MK-Ferguson/Mesa County Commissioners	5/22/91
UMT184	Instructions for Model NL-15 Noise Data Logger	Quest Electronics	Undated
UMT185	Instructions for M-28 Noise Logging Dosimeter	Quest Electronics	Undated
UMT186	MK-Ferguson Meteorological Tower Field Report, Nov 9, 1990	Met One Instruments/MK-Ferguson	12/10/90
UMT187	Met. Tower Calibration. Letter to J. Oldham	N. Chick/CDH/J. Oldham	9/7/90

List of Site Documents Reviewed by the Audit Te: (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT188	Calibration Proposal for the MK-Ferguson Company Meteorological Monitoring Site Grand Junction, Colorado	Met One Instruments/MK-Ferguson	9/20/90
UMT189	APEN Permit No. 91ME097	CDH/MK-Ferguson	4/9/91
UMT190	Total Suspended Particulate Siting. Letter to N. Chick	J. Oldham/MK-Ferguson/N. Chick-CDH	11/17/88
UMT191	Total Suspended Particulate Siting. Letter to J. Plog	N. Chick/CDH/J. Oldham	12/1/88
UMT192	Total Suspended Particulate Siting. Letter to J. Oldham	N. Chick/CDH/J. Oldham	2/14/89
UMT193	Total Suspended Particulate Monitoring Requirements. Letter to J. Oldham	N. Chick/CDH/J. Oldham	3/1/89
UMT194	Total Suspended Particulate Siting. Letter to N. Chick	J. Oldham/MK-Ferguson/N. Chick-CDH	3/14/89
UMT195	Notice of Intent to Conduct	J. Plog/CDH/Public - J. Oldham	10/16/89
UMT196	UMTRA Total Suspended Particulate Protocol. Letter to J. Bowden	J. Isham/MK-Ferguson/J. Bowden - CDS	Undated
UMT197	Annual Met Tower Audits. Letter to J. Isham	C. Pettengill/MK-Ferguson/J. Isham MK-Ferguson	10/1/90
UMT198	Anemometer 840003/Documentation on Hand Held Anemometer	SPER Scientific	Undated
UMT199	Health Physics Monitoring Plan UMTRA Project Health Physics Monitoring Plan	ChemNuclear Systems/U.S. DOE-AL	3/16/88
UMT200	Total Suspended Particulate Quarterly Report for October-December, 1990	MK-Ferguson/CDH	2/7/91
UMT201	Total Suspended Particulate Protocol for Rifle, Colorado	MK-Ferguson	11/90
UMT202	Total Suspended Particulate Monitoring Protocol for Grand Junction, Colorado	MK-Ferguson	11/90
UMT203	Health Physics Monitoring Plan Grand Junction, Colorado	Chem-Nuclear/DOE	8/10/88
UMT204	Gunnison, CO UMTRA Project Materials, Health and Safety Survey and Inventory August 17, 1990	MK-Ferguson	8/17/90

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT205	Predecisional Draft Statement of Principle on Hazardous Waste Management at Designated Properties	UMTRA Project Office	2/27/90
UMT206	Predecisional Draft Statement of Principle on Commingled Waste Management at Vicinity Properties	UMTRA Project Office	5/24/91
UMT207	State Comments on Predecisional Draft on DOE Project Policy Statement and Implementing Guidelines for Managing HW at Designated Processing Sites	J. Deckler/CDH/M. Matthews	4/5/91
UMT208	Commingled Waste Project Guidelines Final Draft (Comments on)	J. Deckler/CDH/M. Matthews	5/20/91
UMT209	Data Base Printout ROD Data Base, U.S. EPA Abstract on Superfund ROD for United Nuclear Corporation Mill, Church Rock, NM		U.S. EPA/OSWER Superfund/ R. Kolpa 6/14/91
UMT210	Data Base Printout ROD Data Base/U.S. EPA RODs for United Nuclear Corporation Mill, Chruch Rock, NM and Homestake Mining CO., Cibola CO, NM	U.S. EPA/OSWER-Superfund/R. Kolpa	6/14/91
UMT211	Industrial Hygiene Procedures Section 14.0 - Hazard Communication	MK-Ferguson	Undated
UMT212	Guidelines for the Preparation of a Spill Prevention Control and Countermeasures (SPCC) Plan	MK-Ferguson	Undated
UMT213	1990 Environmental Compliance Summary	MK-Ferguson, Chem-Nuclear Environmental Services, Inc./DOE-AL	1990
UMT214	Semi-Annual Visual Tank Integrity Inspection	ICC	Various dates
UMT215	Grand Junction Site Trade Name/Manufacturer Cross Index (MSDS list)	MK-Ferguson	Undated
UMT216	Analysis Results (16 PCB Transformers)	W. Cooper/Environmentrics/ Southwest Hazard Control, Inc.	10/12/88

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT217	Analysis Results - PCB's in Oil (7 PCB Transformers)	W. Cooper/Environmentrics/ Southwest Hazard Control, Inc.	10/12/88
UMT218	Transformers at Old Rifle Site	L. Floyd/Southwest Hazard Control, Inc./L. Nielsons	11/14/88
UMT219	TAC Hazard Communication Plan	Jacobs Engineering	Undated
UMT220	MSDS for Water Samples	Jacobs Engineering	Undated
UMT221	MSDS Binder - Rifle	MK-Ferguson	Undated
UMT222	MSDS Binder - Grand Junction	MK-Ferguson	Undated
UMT223	MSDS Binder - Grand Junction	ICC	Undated
UMT224	MSDS Binder - Cotter	ICC/Western	Undated
UMT225	MSDS Binder - Cheney	MK-Ferguson	Undated
UMT226	MSDS Binder - Cheney	MK-Ferguson	Undated
UMT227	Site Specific Emergency Action Plan - Grand Junction	MK-Ferguson	Undated
UMT228	MSDS Data Sheets	ICC/Western	Undated
UMT229	Material Safety Data Sheet Listing - Rifle	MK-Ferguson	Undated
UMT230	Addendum to Subcontract RFL-88-03 Requisition	MK-Ferguson/John Innis/Dave Johnson Construction	8/30/89
UMT231	Requisition No. 7444-Wendon Order	MK-Ferguson/John Innis/Wen-Don Corp.	8/30/89
UMT232	Rifle Asbestos Abatement Inter Office Correspondence	MK-Ferguson/John Isham/W.A. Zebick	11/4/88
UMT233	Southwest Hazard Control of Storage - Disposal Area (Map)	Southwest Hazard Control/MK-Ferguson	10/11/88
UMT234	Rifle UMTRA Plans for Disposal of Asbestos, Selenium - Containing RRM and Acid Lines	P. Martinek/CDH/M. Matthews, DOE	7/13/90
UMT235	Asbestos Removal and Temporary Storage Area Final (New Rifle Sites)	C. Fields/Southwest Hazard Control/ CDH-Air Pollution Control	9/5/89
UMT236	Grand Junction Asbestos Disposal Plan (Letter)	M. Matthews/DOE-UMTRA/Martiner, CDH	11/19/90

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT237	Grand Junction Asbestos Disposal Plan	T. Manichesky/MK-Ferguson/J. Pepin	3/5/91
UMT238	Results of PCB Analysis	General Electric Co./Public Service Co. Lab.	10/12/88
UMT239	Subcontract Change Notice No. 14-2; Resampling of Transformer	R. Wegner/Nielsons, Inc./V. Logan, MK-Ferguson	4/24/89
UMT240	Lab Test Results for Transformer #T-13	J. Hixon/Nielson's Inc./W. Zebick, MK-Ferguson	5/25/90
UMT241	Revised Hazardous Waste Remediation Plan for Rifle and Grand Junction	MK-Ferguson/E. Bischoff, CDH	7/3/89
UMT242	Uniform Hazardous Waste Manifest (Doc. No. 637ND)	H. Hershey/Aptus/W. Zebick. MK-Ferguson	8/9/89
UMT243	DOE/UMTRA Project Department, Aptus Doc. No. 637ND	S. Sanders/Aptus/W. Zebick, MK-Ferguson	7/30/90
UMT244	Certification of Disposal of Aptus Doc. No. 37ND	B. Brosnan/Aptus/DOE/UMTRA Project Department	7/30/90
UMT245	UMTRAP GRJ-PH-11 Subcontracts Documents Final Design for Construction Bid Schedule, Specifications	MK-Ferguson Engineers	12/88
UMT246	Representative Water Discharge Reports for Permits CO-0042536, CO-0042391	John Pepin/MK-Ferguson	4/91-5/91
UMT247	Telecommunication Record Concerning Wetlands and Culvert at Grand Junction Processing Site	T. Myer/MK-Ferguson/Jacobsen, Army Corps	1/10/90
UMT248	Telecommunication Concerning Wetlands and Culvert at Grand Junction	MK-Ferguson/Jacobsen, Army Corps	1/12/90
UMT249	MSDS for M-binder	Chemical Manufacturer - Granite Seed	Undated
UMT250	Extention of Work on Drainage Ditch A, Grand Junction	D. Holmer/CDH/J. Oldham, MK Ferguson	4/25/91
UMT251	Annual Facility Inspection or Permit CO-0042391 Cheney Site	D. Holmer/CDH/J Pepin, MK Ferguson	1/22/91
UMT252	Final Permit and Attachments for Colorado Discharge Permit System CO-0042391 Cheney Site	R. Shukle/CDH/J. Oldham, MK Ferguson	1/29/91

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT253	Annual Industrial Facility Inspection CO-0042536 Grand Junction Processing Site	D. Holmer, W. Naugle/CDH/J. Pepin	1/24/91
UMT254	Revised BMPs for Cheney Site per CDH Inspection of 1/22/91	J. Oldham/MK-Ferguson/D. Holmer, CDH	3/29/91
UMT255	Selected MSDS for Materials Used on Cheney Haul Road	D. Jenson/United Companies of Mesa County/ D. Crone, ICC	5/17/91
UMT256	SARA Tier II Reporting Forms for 1989	J. Oldham/MK-Ferguson	2/26/90
UMT257	SARA Tier II Forms for 1990	J. Oldham/MK-Ferguson	2/22/91
UMT258	MSDS for CPB-12 Used at Rifle	Wen-Don Corporation	4/22/88
UMT259	Ground Water Discharge Permit #017, Grand Junction Processing Site	City of Grand Junction	5/29/91
UMT260	Ammonia Dissipator, and Wetland Permit Status; 4 Telecommunications February 14, 1991-February 21, 1991	J. Pepin/MK-Ferguson/R. Cooney	2/27/91
UMT261	Sizing Calculation for Retention Basin, New Rifle	MKE Document 5025-RFL-C-01-00253-00	5/5/87
UMT262	Processing Site Drainage During Construction	MKE Document 5025-GRJ-C-01-00484-01	4/22/87
UMT263	Letter Authorizing Expansion of Section 404 Permit #9978 to Include 11 Acres	A. Champ/Army Corps/J. Oldham, MK-Ferguson	2/9/90
UMT264	Increase in Wetlands Area for Section 404 Permit #9978	J. Oldham/MK-Ferguson/G. Mcnure, Army Corps	12/15/89
UMT265	Final Section 404 Wetlands Permit #9978 for Grand Junction Site	A. Champ/Army Corps/J. Oldham, MK-Ferguson	12/20/88
UMT266	Telecommunication Concerning Wetlands at Grand Junction Haul Road	C. Burt/Jacobs/J. Jacobson, Army Corps	2/14/91
UMT267	I.H. Monthly Summary, November 1988, Rifle CO	M. Doyon, MK-Ferguson/J. Isham, MK-Ferguson	12/29/88
UMT268	MK-Ferguson Vicinity Property Documentation	Geotech	Undated

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT269	Grand Junction UMTRAP Disposal of Selected Demolition Materials	J. Oldham/MK-Ferguson/M. Matthews	7/31/90
UMT270	Rifle UMTRAP Disposal of Various Demolition Materials	J. Oldham/MK-Ferguson/M. Matthews	4/5/90
UMT271	Grand Junction, Colorado 60% Design Valve Engineering Summary Recommendation	TSC/DOE-AL	10/22/87
UMT272	EPA Determination of Interim Action for the Rifle Site	C. Borgstorm/NEPA/J. Baublitz/U.S. DOE Re-20	7/21/88
UMT273	Request for Interim NEPA Action, Uranium Mill Tailings Remedial Action at Rifle, Colorado	U.S. DOE, UMTRA	6/21/88
UMT274	Letter Describing DOE Commitment to 12 Acres of Wetlands Along Haul Road	C. Burt/Jacobs/S. Hayes, MK-Ferguson	1/4/90
UMT275	Chem Nuclear: Grand Junction Instrument Check Out Log	Various Authors	Various Dates
UMT276	DOE - Time Log of Events	Various Authors	Various Dates
UMT277	Response to Environmental Audit Team Comments	RAC/MK-Ferguson/D. Duncan	6/18/91
UMT278	UMTRA Project Corporate EH&S Assessment Corrective Measures Plan	J. Isham/MK-Ferguson	9/90
UMT279	Radiological Surveillance of Remedial Action Activities at the Mexican Hat, Utah Processing Site	UMTRA-DOE/AL	3/27-30/89
UMT280	Uranium Mill Tailings Remedial Action Project Annual Environmental Monitoring Report	Chem-Nuclear/MK-Ferguson/DOE	1987
UMT281	Gunnison Radon Monitoring: Pre-Remedial-Action Summary	Jacobs Engineering Group	6/90
UMT282	Rifle Radon Monitoring: Pre-Remedial-Action Summary	Jacobs Engineering Group	9/88
UMT283	Grand Junction Radon Monitoring: Pre-Remedial-Action Summary	Jacobs Engineering Group	8/88
UMT284	Letter: Measurements Group Action Items Status	M. Mathews/DOE/AL/S. Hill	5/7/91

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT285	Report of Excavation Control and Verification QIT	M. Miller/Jacobs Engineering Group/D. Mann	6/11/91
UMT286	Plan for Implementing EPA Standards for UMTRA Sites	UMTRA-DOE/AL-153	1/84
UMT287	Technical Assistance Contractor Environmental, Health, and Safety Management Plan	Jacobs Engineering Group/AL	7/86
UMT288	Guidelines for Conducting Radiological Surveillance of Remedial Action Activities at UMTRA Processing Sites	UMTRA-DOE/AL	5/83
UMT289	UMTRA Project Radiological Surveillance Checklist	Jacobs Engineering Group	Undated
UMT290	UMTRA Project Environmental, Health, and Safety Audit Radiological Safety Checklist	Jacobs Engineering Group	Undated
UMT291	UMTRA Project - Employee Training Matrix	MK-Ferguson Company	Undated
UMT292	Health Physics Monitoring Plan, Rifle Colorado	Chem-Nuclear Systems/MK-Ferguson	5/10/88
UMT293	Radiological Surveillance of Remedial Action Activities at Rifle, Colorado, Processing Site and Vicinity Properties	Jacobs Engineering Group	6/6-8/89
UMT294	Final Radiological Surveillance Report at Rifle, Colorado, Processing Site and Vicinity Properties Remedial Action Activities	Jacobs Engineering Group	7/9-12/90
UMT295	Appendix B of the Health Physics Monitoring Plan UMTRA Project	Chem-Nuclear Systems/Morrison-Knudsen Co.	6/84
UMT296	UMTRA Project Remedial Action Contractor Health Physics Procedures	F. Petekla/Chem-Nuclear Systems/MK-Ferguson Company	4/91
UMT297	Health Physics Procedures Manual	M. Petelka/MK-Ferguson/DOE/AL	2/20/91
UMT298	Construction Environment, Safety and Health Management Program Uranium Mill Tailings Remedial Action Project Manual	M. Henderson/MK-Ferguson/DOE/AL	5/89
UMT299	Industrial Hygiene Manual	S. Sullivan/MK-Ferguson/UMTRA Project	3/18/91
UMT300	TAC Radiological Procedure Manual	Jacobs Engineering Group/DOE/AL	Undated

List of Site Documents Reviewed by the Audit Team (continued)

Doc. No.	Title/Description	Author/Organization/Recipient	Doc. Date
UMT301	Draft, Completion Report, Remedial Actions Contractor for the Uranium Mill Tailing Remedial Actions Project	MK-Ferguson/DOE/AL	5/90
UMT302	Standard Report (Chemical Inventory-Grand Junction)	Not indicated	4/11/91
UMT303	Standard Report (Chemical Inventory - Rifle)	Not indicated	4/11/91
UMT304	Memorandum: Regulatory Concerns with Uranium Mill Tailings Transportation	R. Whitfield/DOE Office of Environmental Restoration	5/24/91
UMT305	Letter: from M. Mathews to J. Oldam Re: Stop Work Order	M. Mathews/DOE/J. Oldham	5/29/91
UMT306	Letter: from J. Read to S. Hedgepeth Re: DOE Exemption	J. Read/DOE/S. Hedgepeth, DOT	4/30/91
UMT307	Point Paper, 49 CFR 173 Regulations	UMTRA Project Office/P. Whitfield	5/23/91

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Appendix F

Definitions of Causal Factors

Appendix F:

Definitions 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 of 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 a contributing factor in the finding. Evaluate if inadequacies in facilities and equipment were a contributing factor to the finding.

Training

Identify if adequate personnel training on implementing site policy, DOE 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 preventive maintenance, and/or lack of these controls, contributed to the finding.

Supervision

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

Appendix G

List of Acronyms and Abbreviations

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List of Acronyms and Abbreviations

AL*	Albuquerque Operations Office
ALARA	as low as reasonably possible
APEN	Air Pollution Emissions Notice
ASTs	aboveground storage tanks
BMP	best management practice
BMPF	Best Management Practice Finding
CDH	Colorado Department of Health
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	Compliance Finding
Corps	U.S. Army Corps of Engineers
CPDS	Colorado Wastewater Discharge Permit System
CUP	Conditional Use Permit
CWA	Clean Water Act
DOE*	U.S. Department of Energy
EH&S	Environment, Health, and Safety
EPA*	U.S. Environmental Protection Agency
EM	Environmental Management
GJPO	Grand Junction Project Office
GW	Groundwater
ID	Idaho Operations
ISC	Inclusion Survey Contractor
IWS	Inactive Waste Sites
MCLs	Maximum Containment Levels
MSDS	Material Safety Data Sheet
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NPL	National Priorities List
QA	quality assurance
QAP	Quality Assurance Plan
QAPP	Quality Assurance Program Plan
QC	quality control

* Indicates acronym is not defined or spelled out after the first usage in the body of the report.

RAC*	Remedial Action Contractor
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RDC	radon daughter concentration
RRM	residual radioactive material
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SEN	Secretary of Energy Notice
SOP*	standard operating procedure
SPCC	Spill Prevention Control and Countermeasures (Plan)
SW	Surface Water
TCM	Toxic and Chemical Materials
TSP	total suspended particulates
TSC*	Technical Support Contractor
UMTRA*	Uranium Mill Tailings Remedial Action
UMTRACA	Uranium Mill Tailings Radiation Control Act
UMTRAP	Uranium Mill Tailings Remedial Action Project
VP	vicinity property
WM	Waste Management