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Office of Environmental Management – Grand Junction

MOAB UTAH UMTRA Project

Moab UMTRA Project Annual Site Environmental Report for Calendar Year 2013

September 2014

U.S. Department of Energy

Office of Environmental Management

Prepared by the Remedial Action Contractor under DOE contract number DE-DT0002936
for the U.S. Department of Energy Office of Environmental Management, Grand Junction, Colorado.

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Revision 0

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Acronyms and Abbreviations

ACM	asbestos-containing material
ALARA	as low as reasonably achievable
ASER	Annual Site Environmental Report
BLM	Bureau of Land Management
BMPA	best management practice area
BO	Biological Opinion
CA	Contamination Area
CFR	Code of Federal Regulations
DCS	derived concentration standard
DOE	U.S. Department of Energy
DOE O	DOE Order
DOT	Department of Transportation
EMS	Environmental Management System
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FWS	U.S. Fish and Wildlife Service
FY	fiscal year
IA	interim action
lb	pounds
MEI	maximally exposed individual
mrem/yr	millirems per year
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NRC	U.S. Nuclear Regulatory Commission
PCB	polychlorinated biphenyl
pCi/L	picocuries per liter
QA	quality assurance
RCRA	Resource Conservation and Recovery Act
ROD	record of decision
RRM	residual radioactive material
SR-279	State Route 279
TSCA	Toxic Substances Control Act
UAC	Utah Administrative Code
UDOT	Utah Department of Transportation
UMTRA	Uranium Mill Tailings Remedial Action
UMTRCA	Uranium Mill Tailings Radiation Control Act
UPDES	Utah Pollutant Discharge Elimination System
US-191	U.S. Highway 191
USACE	U.S. Army Corps of Engineers
USC	United States Code

Executive Summary

This Annual Site Environmental Report (ASER) presents information pertaining to environmental activities conducted for the U.S. Department of Energy (DOE) under the Moab Uranium Mill Tailings Remedial Action (UMTRA) Project during 2013. This report includes Moab UMTRA Project activities conducted at either the Moab site located near Moab, Utah, or the Crescent Junction, Utah, disposal site, located approximately 30 miles north of the Moab site.

The purpose of the ASER is to summarize major site programs, environmental performance measures, and the status of the Environmental Management System (EMS). The ASER is a key component of DOE efforts to keep the public informed of environmental conditions at DOE sites. Consequently, this report summarizes results of monitoring data and compliance information for 2013. Although several DOE orders cited in this ASER have since been replaced or modified, this document was prepared pursuant to the orders that were contractually applicable during 2013. This report was prepared in accordance with the requirements of DOE Order (O) 231.1B, "Environment, Safety, and Health Reporting," DOE O 458.1, Change 3, "Radiation Protection of the Public and the Environment," and supplemental guidance from DOE Headquarters.

Major site activities in 2013 included the excavation and shipment of residual radioactive material (RRM) from the Moab site, operation of the interim action (IA) ground water remediation system at the Moab site, and disposal of RRM at the Crescent Junction site. Other activities included revegetation and maintenance of site vegetation, site management, security, maintenance, waste management, pollution prevention, and environmental compliance monitoring.

Major Site Activities for 2013

- Shipping and disposal of more than 723,800 tons of RRM was performed; the total to date through December 2013 was more than 6.45 million tons shipped.
- Approximately 15.1 million gallons of contaminated ground water were extracted, and about 39,750 pounds (lb) of ammonia and 310 lb of uranium were eliminated through evaporation on the tailings pile. Approximately 9.4 million gallons of freshwater were injected in wells along the Colorado River to further reduce the contaminant impacts on the river, and approximately 18.1 million gallons of freshwater were diverted into an adjacent side channel that developed into a suitable habitat to further reduce contamination impacts to the river.
- Operations were conducted without a recordable injury, an environmental notice of violation, or an unplanned environmental release.

Environmental Radiological Protection Program

The Moab Project monitors emissions and effluents to meet environmental compliance requirements and determines actions to protect the environment. The environmental air-monitoring network consists of on-site, off-site, and background sampling locations. DOE's environmental air-monitoring strategy targets concentrations of radon, exposure levels to direct gamma radiation, and airborne radioparticulates. More than 300 radon and direct gamma samples and more than 700 radioparticulate samples were collected and analyzed in 2013.

There were no unplanned radiological releases, and doses to the public and maximally exposed individuals (MEIs) were below DOE standards.

EMS

DOE established a series of orders directing each DOE site to implement sound stewardship practices that protect natural and cultural resources. These orders require the implementation of an EMS, a Sustainability Plan, radiation protection of the public, and radioactive waste management. The Moab Project's EMS is a structured process for reducing the environmental consequences of Project activities to maximize beneficial use of finite resources and to minimize wastes. DOE's EMS integrates key elements into the core functions of the contractors' Integrated Safety Management System to ensure continuous EMS improvement.

Compliance with State and Federal Regulations

The Moab Project must operate in compliance with various federal environmental statutes, some of which are enforced at the state level through permits. Table ES-1 summarizes principle regulatory requirements and the status of implementation of each one for the Moab Project.

Table ES-1. Principle Regulatory Requirements and Status for the Moab Project

Federal or State Requirement*	What it Covers	Implementation Status
Clean Air Act	Requirements for facility air quality and air emissions.	The Project is in full compliance with air permits and reporting requirements. The Clean Air Act is enforced at the state level through fugitive dust control permits that have been obtained for Moab and Crescent Junction.
Clean Water Act	Requirements for water quality and discharges.	The Clean Water Act is enforced by the state through Storm Water Permits (renewed in 2013) and by USACE through Section 404 Permits. The Project sites are designated non-discharging facilities and are in compliance with state storm water and dredge-and-fill (Section 404) permits.
UMTRCA	Title I of UMTRCA requires DOE to establish a remedial action program and authorizes DOE to stabilize, dispose of, and control RRM, including contaminated ground water, in accordance with cleanup standards, which were promulgated in 40 CFR 192.	DOE has excavated and disposed of approximately 40 percent of the total RRM in compliance with 40 CFR 192. Also, approximately 203.7 million gallons of contaminated ground water have been extracted and eliminated through evaporation.
U.S. DOT Special Permit	Authorizes the transportation in commerce of uranium mill tailings and debris with low levels of radiation.	The Project is in compliance with the Special Permit.
EMS	Continuous set of processes and practices undertaken to enable the Project to achieve environmental missions and goals.	The Project is in compliance with its EMS.
Emergency Planning and Community Right-to-Know Act	Public's right to know about chemicals released into the community.	The Project had no reportable leaks, spills, or other releases of chemicals into the environment. Chemical inventory reports were submitted to the state and the Moab Fire Department Chief.

Table ES-1. Principle Regulatory Requirements and Status for the Moab Project (continued)

Federal or State Requirement*	What it Covers	Implementation Status
Endangered Species Act and Migratory Bird Treaty Act	Protection of rare species of plants and animals and their habitat.	The Project reviewed work activities for potential impacts on threatened or endangered species and protected migratory birds. Fish habitat was protected by interception and dilution of contaminated ground water.
NEPA	Project evaluation of environmental impacts.	A Supplement Analysis was prepared by the Project and the FEIS remains adequate.
Hazardous Waste	RRM is covered under UMTRCA and used oil, batteries, fluorescent bulbs, and ballasts under state regulations.	No hazardous waste was generated in 2013, used oil was recycled, and fluorescent bulbs and batteries were treated as universal waste.
National Historic Preservation Act	Project evaluation of impacts and mitigation to historic sites.	No additional impacts or mitigation were noted in 2013. Per the memoranda of agreements, annual reports were submitted to the BLM, Utah DOT, and state of Utah.

BLM = Bureau of Land Management; CFR = Code of Federal Regulations; DOT = Department of Transportation; FEIS = Final Environmental Impact Statement; NEPA = National Environmental Policy Act; UMTRCA = Uranium Mill Tailings Radiation Control Act; USACE = U.S. Army Corps of Engineers
*RRM is exempt from the Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulations; no RCRA, TSCA , or CERCLA wastes have been created from current operations.

Document Distribution

This document may be viewed in its entirety on the DOE Moab UMTRA Project website at www.gjem.energy.gov/moab and in the public reading room in the Grand County Library in Moab. Hard copies may be obtained by contacting Mr. Donald Metzler, Moab Federal Project Director, at (970) 257-2115 or at the address below.

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Comments or questions regarding this document may also be directed to the Moab Project at (800) 637-4575. Members of the public who wish to comment on this document or who have questions are encouraged to contact DOE at the above phone number or by email at moabcomments@gjem.doe.gov.

1.0 Introduction

1.1 Project Mission

The mission of the Moab Project is to relocate mill tailings and other contaminated materials, known as RRM, from a former uranium ore-processing facility (millsite) and from off-site properties known as vicinity properties in Moab, Utah, to an engineered disposal cell constructed near Crescent Junction, Utah (see Figure 1). The materials are being transported primarily by rail. The scope also includes active remediation of ground water at the millsite (Moab site). The Project is managed by the DOE Office of Environmental Management, located in Grand Junction, Colorado.

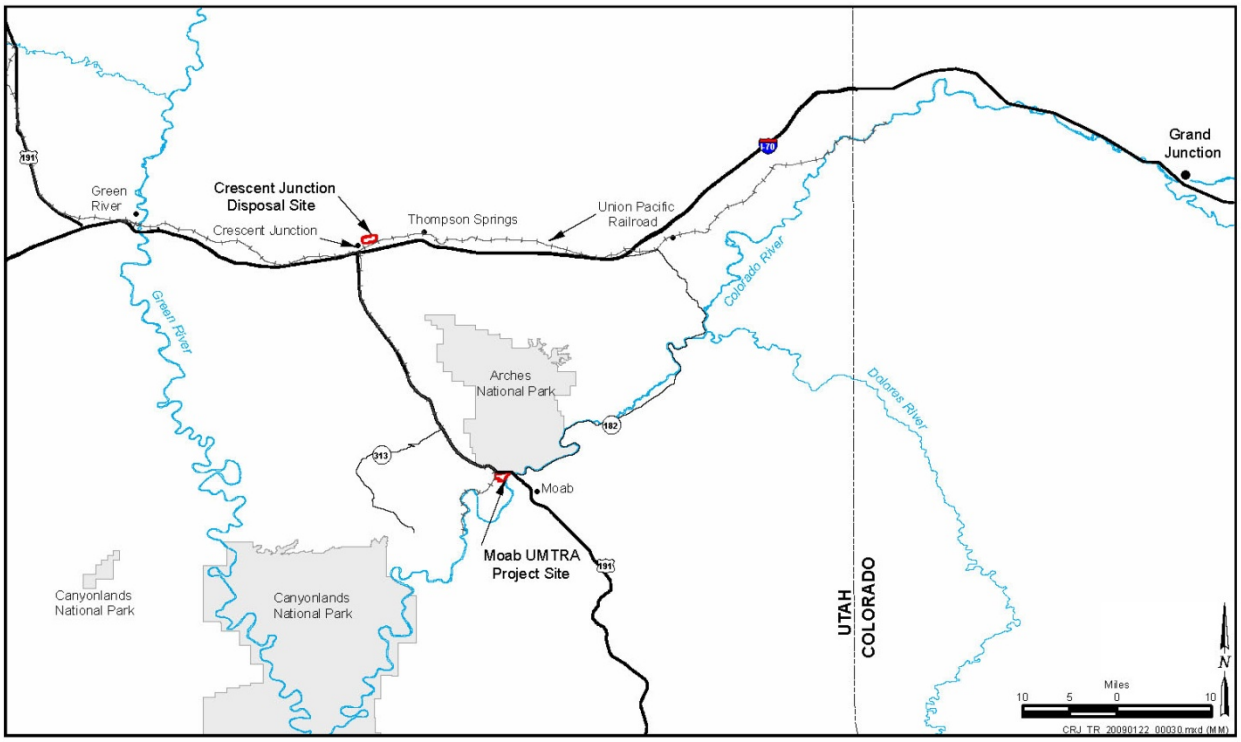

Figure 1. Location of Moab and Crescent Junction Sites

1.2 Site Locations

The Moab site is located about 3 miles northwest of Moab in Grand County, Utah, and lies on the western bank of the Colorado River at the confluence with the Moab Wash. The 480-acre site is bordered on the north and southwest by sandstone cliffs. The Colorado River forms the eastern boundary of the site. U.S. Highway 191 (US-191) parallels the northern site boundary, and State Route (SR)-279 transects the western portion of the property. The Union Pacific Railroad traverses a small section of the site west and uphill of SR-279, then enters a tunnel; the track terminates several miles southwest of the site. Arches National Park has a common property boundary with the Moab site on the northern side of US-191, and the park entrance is located less than 1 mile northwest of the site. Figure 2 shows Moab site features, including the site boundary, structures, tailings pile, roads, and rail line.

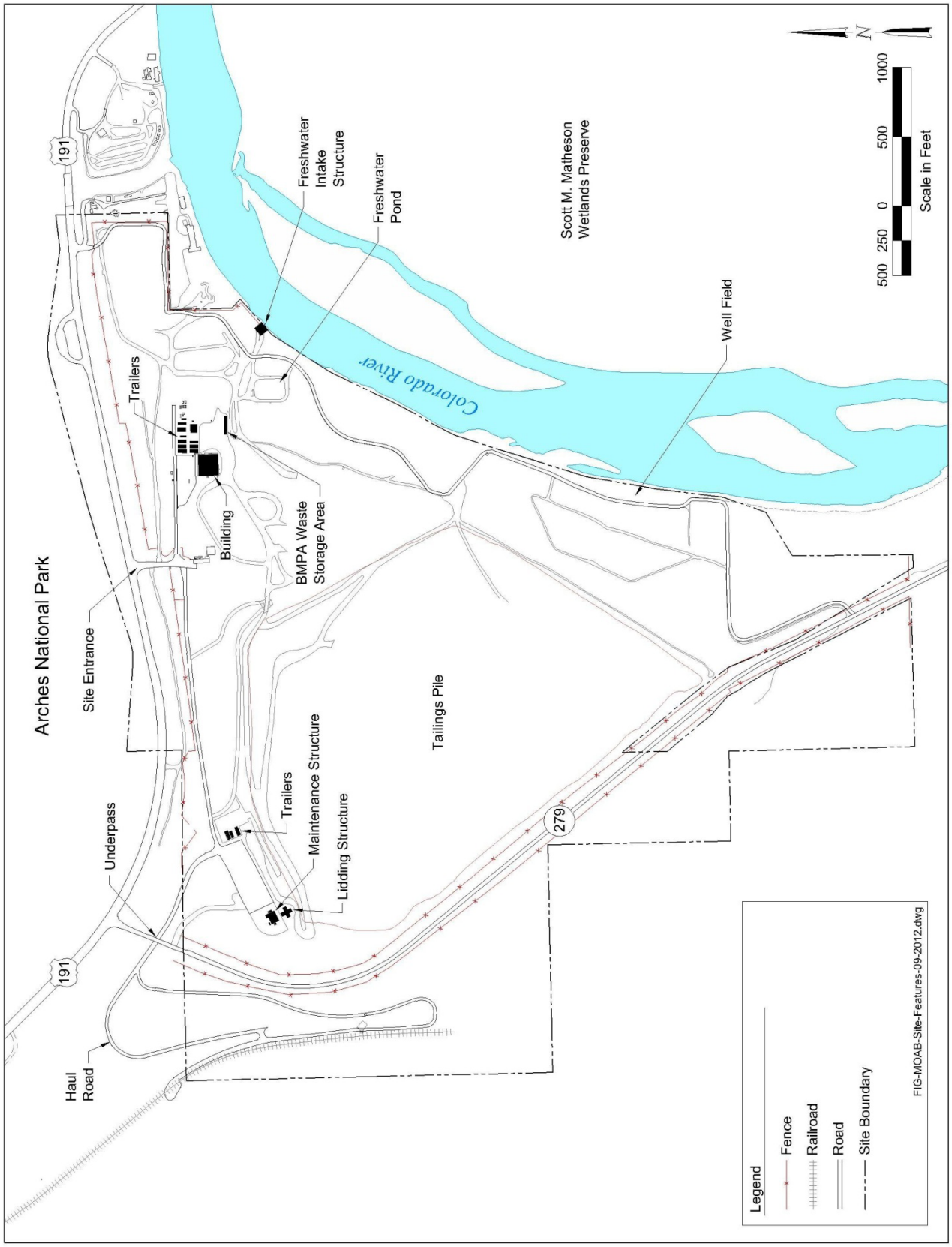

Figure 2. Moab Site Features

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The Crescent Junction site is located northeast of the junction of Interstate 70 and US-191, approximately 30 miles north of the Moab site, and it is the location for disposal of the Moab site RRM. Through a series of temporary withdrawals of public domain land and a permanent land transfer by the Department of the Interior, DOE currently owns 500 acres of land and has another 936 acres in a 20-year withdrawal near Crescent Junction for the disposal cell and surrounding support area. The locations of the Moab and Crescent Junction sites are shown in Figure 1.

1.3 Area Demographics

Moab is the Grand County government seat and the principal city of southeastern Utah. The population of Moab is about 5,100. In addition to Moab, the communities of Crescent Junction and Thompson Springs, which are also in Grand County, are affected by the relocation of RRM to the Crescent Junction site for permanent disposal. The population of Grand County is about 9,350. Grand County's major economic base is tourism. Southeastern Utah has the nation's largest concentration of national and state parks, monuments, and recreation areas. Leisure and hospitality industries account for about 35 percent of Grand County's employment, government accounts for 20 percent, and trade, transportation, and utilities account for almost 20 percent.

1.4 Environmental Setting

The Moab mill operated under various private owners from 1956 through 1984. The milling operations created process-related wastes and tailings, a radioactive, sand-like material, collectively known as RRM. The tailings were pumped to an unlined impoundment in the western portion of the property that accumulated over time, forming a pile more than 80 feet thick. When the processing operations ceased, an estimated 16 million tons (12 million cubic yards) of RRM was present in the pile, which occupies about 130 acres at the site. An interim cover was placed on the tailings pile in 1995. The southern toe of the pile lies 750 feet from the Colorado River.

Although the milling process recovered about 95 percent of the uranium, the tailings contain several naturally occurring radioactive elements, including uranium, thorium, radium, polonium, and radon. The tailings at the Moab site contain contaminants in concentrations that could be hazardous to the environment and public health and could exceed the U.S. Environmental Protection Agency (EPA) standards in Title 40 Code of Federal Regulations Part 192 (40 CFR 192), "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings."

With the enactment of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Public Law 106-398), ownership and cleanup responsibility for the site were transferred to DOE. The legislation stipulated that the Moab site undergo remediation as a Title I site under Title 42 United States Code Section 7901 (42 USC 7901), the Uranium Mill Tailings Radiation Control Act (UMTRCA). The site is regulated by the U.S. Nuclear Regulatory Commission (NRC).

To minimize potential adverse effects to human health and the environment, DOE instituted environmental and administrative controls at the Moab site. Controls have included pile dewatering system, storm-water management, dust suppression, site access restrictions, and legacy chemicals management.

In addition, DOE implemented an IA ground water remediation system to protect potential suitable habitat areas in the Colorado River adjacent to the site and to remove contaminant mass, mostly ammonia and uranium, from the ground water system.

DOE developed an environmental impact statement to fulfill the National Environmental Policy Act (NEPA) (42 USC 4321) requirement of considering the full range of reasonable alternatives and associated environmental effects of significant federal actions. In July 2005, DOE published the *Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah, Final Environmental Impact Statement* (DOE/EIS-0355) (FEIS) that presents the preferred alternatives of active ground water remediation at the Moab site and off-site disposal of the RRM at the Crescent Junction disposal site using predominantly rail transportation. The preferred alternatives included cleanup and reclamation of the former millsite property and vicinity properties.

DOE issued the *Record of Decision for the Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah* (ROD) (6450-01-P) in September 2005. The ROD detailed the selection of the preferred alternatives and the basis for that decision. In February 2008, the ROD was amended to allow more truck transport. In 2013, DOE published the *Moab UMTRA Project Supplement Analysis for the Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah, Final Environmental Impact Statement* (DOE/EIS-0355 SA-1) to document that no significant changes have occurred since publication of the FEIS and it remains adequate.

1.5 Primary Operations and Project Activities

Primary operations and Project activities include:

- Excavating and conditioning RRM at the Moab site.
- Transporting RRM to Crescent Junction by rail.
- Excavating disposal cell.
- Placing and compacting material from the Moab site and vicinity properties in the cell.
- Placing interim and final cell cover layers.
- Operating an IA ground water system at the Moab site, including ground water extraction and freshwater injection.
- Monitoring radioactive and non-radioactive materials in air, soil, ground water, and surface water.
- Maintaining site, including revegetation.
- Maintaining site security and access control.

2.0 Compliance Summary

2.1 Compliance Status

The Project is committed to protecting the environment while conducting its mission of removal of RRM and its placement in the disposal cell. The Moab and Crescent Junction sites operated during 2013 without any notices of environmental violations.

2.1.1 Environmental Restoration and Waste Management

Project environmental restoration and waste-management statutes and regulations are discussed below.

DOE O 231.1B, "Environmental, Safety, and Health Reporting"

DOE O 231.1B requires the timely collection and reporting of information on environmental issues that could adversely affect the health and safety of the public and the environment. Specifically, the order requires the Project to publish an ASER with the following objectives.

- Characterize site environmental management performance, including effluent releases and environmental monitoring.
- Estimate radiological releases to the public.
- Confirm compliance with environmental standards and requirements.
- Highlight significant programs and efforts, including environmental performance indicators and/or programs.

The Project was in compliance with all federal and state regulatory requirements and complied with DOE O 231.1B by collecting environmental data and reporting results in quarterly reports. Monitoring results indicated Project impacts were limited to the DOE properties, and the public was not exposed to radiation above public dose limits. There were no effluent releases in 2013.

Superfund Amendments and Reauthorization Act and Executive Order 12856

The Superfund Amendments and Reauthorization Act, an amendment to the Comprehensive Environmental Response, Compensation, and Liability Act (42 USC 9601), the Emergency Planning and Community Right-to-Know Act of 1986 (42 USC 11000), and Executive Order (EO) 12856, "Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements," established requirements for industry and the government to provide the public with information about the hazardous and toxic chemicals in their communities and to have emergency planning and notifications in place to protect the public in the event of a release of extremely hazardous substances.

DOE reviews the chemical inventories and activities at the Moab and Crescent Junction sites annually to determine if any relevant reporting is required. During 2013, diesel, used oil, and propane were stored at the Moab and Crescent Junction sites in amounts exceeding the 10,000-pound threshold level identified in 40 CFR 370.10, "Who must comply with the hazardous chemical reporting requirements of this part?" Tier II Emergency and Hazardous Chemical Inventory reports were submitted as required to the Utah State Emergency Response Commission, the Moab Emergency Planning Committee, and the Moab Fire Department Chief.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) (42 USC 6901), established in 1976 and subsequently amended several times, is the nation's primary law governing the proper management of non-hazardous and hazardous solid waste from the point of generation to final disposal.

All waste generated within the Moab site's Contamination Area (CA) is considered RRM, the cleanup and management of which is regulated by UMTRCA, not RCRA; however, waste generated outside the CA is considered non-RRM and, therefore, can be regulated by RCRA.

No RCRA wastes were generated in 2013; however, the Project does maintain a small quantity generator permit, as shown in Table 1.

Table 1. Permits/Agreements Active in 2013 for the Moab Project

Permits/Agreements	Issuing Agency	No. of Permits
UPDES Storm Water Discharge Permit for Moab (permit number UTR359185)	State of Utah, Department of Environmental Quality, Division of Water Quality	1
UPDES Storm Water Discharge Permit for Crescent Junction (permit number UTR359187)	State of Utah, Department of Environmental Quality, Division of Water Quality	1
Streambank Alteration Permits for the Colorado and Green River intake structures and for structures and well field to support the IA ground water remediation system	State of Utah, Department of Natural Resources, Division of Water Rights	5
Temporary Change Application to change points of diversion to support ground water actions and a non-use application to extract water from the Colorado River	State of Utah, Department of Natural Resources, Division of Water Rights	2
Highway rights-of-way and encroachment permits for roads, pipelines, gates	State of Utah, U.S. DOT	8
Special Permit SP-14283 for DOE to transport RRM and party status for the Remedial Action Contractor	U.S. DOT	1
Hazardous Materials Certificate of Registration	U.S. DOT	1
Small Quantity Generator UTD980717607	EPA	1
Fugitive Dust Control Permits: Moab DAQC-626-2002 Crescent Junction DAQC-1110-2006	State of Utah, Department of Environmental Quality	2
404 Nationwide General Permits for Green River pump station, water pipelines, Moab Wash, and off-pile area	USACE	4

DOT = Department of Transportation; USACE = U.S. Army Corps of Engineers

NEPA

Remedial actions performed pursuant to UMTRCA are considered major federal actions subject to the requirements of NEPA. The Council on Environmental Quality regulations to implement NEPA are codified in 40 CFR 1500, "Purpose, Policy, and Mandate." These regulations require each federal agency to develop its own implementing procedures (i.e., 40 CFR 1507.3, "Council on Environmental Quality, Agency Procedures"). DOE-related NEPA regulations are established in 10 CFR 1021, "National Environmental Policy Act Implementing Procedures."

In December 1996, DOE issued the *Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project* (DOE/EIS-0198) that analyzed the potential impacts of implementing alternatives for ground water compliance at UMTRCA Title 1 processing sites. The applicable standards are determined on a site-specific basis. The ROD for ground water published in 1997 implemented a framework to select the appropriate compliance strategies for ground water remediation at Title I sites. The framework satisfies the requirements of the Floyd D. Spence Act in the selection of a ground water compliance strategy for the Moab site.

In 2005, DOE issued the final ROD for the Moab site described in Section 1.4. In 2013, a Supplement Analysis was performed, and the FEIS was determined to be adequate without additional NEPA action, and site operations were conducted in accordance with DOE and Council on Environmental Quality NEPA regulations.

Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) (15 USC 2601) was enacted in 1976 to regulate the manufacturing and distribution of certain chemical substances. TSCA provides EPA with authority to require testing of any chemical substances entering the environment and to regulate their production, sale, and management as a waste, where necessary. TSCA specifically addresses the use and management of asbestos and polychlorinated biphenyls (PCBs).

Historical records indicate various types of asbestos-containing material (ACM) including pipes, insulation, siding, roofing, and floor tiles from the former millsite structures were disposed of in an ACM landfill in the Moab tailings pile. PCB-contaminated materials, such as discarded electrical transformers, may also have been disposed of in the tailings pile. ACM is suspected to be present in the remaining on-site millsite building and utilities, and PCB wastes may be present in fluorescent light ballasts in the millsite building.

Any ACM, mercury, or PCBs that remain within the site's CA are considered RRM and are, therefore, subject to UMTRCA regulation, not TSCA regulation. During 2013, no ACM, mercury, or PCBs required management at the Moab site. No ACM, mercury, or PCBs exist at the Crescent Junction site; therefore, no management of these materials is necessary.

Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act (7 USC 136) governs the use, storage, registration, and disposal of pesticides. This act categorizes pesticides as either restricted use or general use.

EPA may classify a pesticide as restricted use if it is determined that substantial adverse affects to the applicator or environment may occur without additional regulatory restrictions, or unreasonable harm to humans or the environment may occur, even if the pesticide is used as directed by the label instructions. Restricted-use pesticides must be used or applied only by a certified private or commercial applicator or under the direct supervision of a certified applicator. A certified applicator was utilized to apply general-use herbicides and insecticides at the Moab and Crescent Junction sites in 2013 to control noxious weeds.

2.1.2 Radiation Protection

DOE O 458.1 is the key DOE order regarding radiation protection for the Project. The purpose of DOE O 458.1 is to establish standards and requirements for DOE operations with respect to protection of members of the public and the environment from undue risk from radiation. Radiation protection for workers is covered in 10 CFR 835, Occupational Radiation Protection." The primary federal law governing site cleanup and disposal for the Moab Project is UMTRCA.

UMTRCA

In 1978, Congress passed UMTRCA in response to public concern regarding potential health hazards of long-term exposure to radiation from RRM. Title I of UMTRCA requires DOE to establish a remedial action program and authorizes DOE to stabilize, dispose of, and control RRM at 24 uranium ore-processing sites and associated vicinity properties. Vicinity properties are locations where RRM was used as construction material or fill before the hazards associated with this material were known. UMTRCA also required the promulgation of cleanup standards (now codified at 40 CFR 192 by EPA) and assigned the NRC to oversee the cleanup and issue licenses for the completed disposal cells. Remediation of the Moab site and disposal at the Crescent Junction site are conducted in compliance with these standards.

RRM, specifically defined at 40 CFR 192.01(a), is waste that DOE determines to be radioactive and related to the milling process. Although the milling process recovered about 95 percent of the uranium, the RRM contains several naturally occurring radioactive elements, including uranium, thorium, radium, and polonium. RRM at the Moab site contains contaminants in concentrations that could be hazardous to the environment and public health and that exceed the EPA standards.

RRM generally refers to uranium mill tailings, but may also consist of contaminated soil, debris, equipment, and other wastes. Other contaminated materials requiring cleanup at the Moab site include debris from dismantling of the mill buildings and associated structures, remnants of ponds used during ore-processing activities, disposal trenches, other locations used during mill operations, and buried septic tanks assumed to be contaminated. Contaminated ground water beneath the Moab site is also considered RRM. For the purposes of this document, contaminant or contamination refers to RRM unless otherwise specified. During 2013, the Project remediated RRM in the form of mill tailings, contaminated soil, and contaminated ground water.

DOE manages RRM that is combined with hazardous or toxic components in a manner that is protective of human health and the environment as a best management practice. For example, certain legacy chemicals and industrial products that were stored at the Moab site were considered RRM and were managed in a safe manner that protected site workers and the environment.

Floyd D. Spence Act

The Moab site was originally subject to Title II of UMTRCA, because it was an active uranium-processing site when the legislation was passed, and it was regulated under an NRC license. The Floyd D. Spence Act amended UMTRCA to include the Moab site as a designated processing site for remediation under Title I. This legislation specified that the NRC license for the radioactive materials at the Moab site be terminated and the title and responsibility for cleanup be transferred to the Secretary of Energy.

2.1.3 Air Quality and Protection

The applicability of 42 USC 7401, the Clean Air Act, to Project air quality and protection is discussed below. The Environmental Air Monitoring Program for the Project and results of data collected in 2013 are further discussed in Section 4.0.

National Emission Standards for Hazardous Air Pollutants
Regulatory requirements associated with the Clean Air Act establish emission standards for hazardous air pollutants associated with various industrial processes codified at 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants" (NESHAP). The Project is not required to report under the NESHAP program as there are no NESHAP-regulated air emissions associated with the Moab and Crescent Junction sites.

Fugitive Dust Control Plans
The state of Utah has primacy for the Clean Air Act regarding control of fugitive or airborne dust, and the Project has prepared fugitive dust control plans for the Moab and Crescent Junction sites. The state of Utah issued fugitive dust control permits for both sites.

Most of the surface area consists of exposed, unprotected soils and sand at the Moab and Crescent Junction sites. Vegetation at the Moab and Crescent Junction sites is relatively sparse and offers little protection or stabilization to the site's disturbed and natural soils. Consequently, controlling windblown sand, soil, and dust is a recognized concern. In Utah, federal Clean Air Act requirements are implemented by an equivalent set of state regulations. To comply with Utah Administrative Code (UAC) R307-309-6, "Fugitive Dust Control," DOE prepared the *Moab UMTRA Project Moab Site Fugitive Dust Control Plan* (DOE-EM/GJRAC2072) and the *Moab UMTRA Project Crescent Junction Site Fugitive Dust Control Plan* (DOE-EM/GJ1235).

During 2013, DOE diligently monitored fugitive dust emissions and implemented the controls outlined in the fugitive dust control plans to the greatest extent practicable. In 2013, DOE applied more than 21 million gallons of water to the RRM at Moab and Crescent Junction and unpaved haul and access roads in an effort to stabilize areas susceptible to wind erosion. In addition, DOE restricted travel in off-road areas of the sites and limited vehicular speed to minimize the generation of fugitive dust. DOE also continued seeding and mulching disturbed areas to establish vegetative cover to control fugitive dust.

2.1.4 Water Quality and Protection
Project efforts regarding water quality and protection are discussed below.

Clean Water Act/National Pollutant Discharge Elimination System
Under 33 USC 1251, the Clean Water Act, the National Pollutant Discharge Elimination System, was designed to regulate and control pollutants from industrial wastewater and storm-water discharges, both of which can have negative impacts on the quality of surface waters of the United States. The federal discharge requirements are implemented by an equivalent state system known as the Utah Pollutant Discharge Elimination System (UPDES).

As required by the Clean Water Act, the Project obtained UPDES Storm Water General Permits for Storm Water Discharges Associated with Construction Activity at the Moab and Crescent Junction sites (see Table 1). As required by the permits, DOE prepared and implemented the *Moab UMTRA Project Moab Site Storm Water Pollution Prevention Plan* (DOE-EM/GJRAC1475) and the *Moab UMTRA Project Crescent Junction Disposal Site Storm Water Pollution Prevention Plan* (DOE-EM/GJ1238).

These plans outline the engineering controls and best management practices that DOE has implemented to control and minimize storm-water discharges from the sites. Copies of the plan and the storm-water discharge permit are maintained at each respective site. To ensure continued compliance with the plans, DOE conducts at least two storm-water inspections per month and documents the inspection results on a site-specific checklist. No discharges were noted under UPDES during 2013.

There are no sewer effluent discharge points associated with Moab or Crescent Junction site operations. DOE installed on-site sewer storage (pumped as needed) and leach-field systems at Moab and Crescent Junction and constructed a domestic waterline to the Crescent Junction site. Bottled water is provided for Moab and Crescent Junction on-site drinking water needs. Municipal water is trucked to the Moab site for other domestic requirements.

Safe Drinking Water Act

The provisions of 42 USC 300f, the Safe Drinking Water Act, are not directly relevant to the Moab or Crescent Junction sites, because neither ground water nor surface water at or near the sites is used as a public drinking water supply. DOE did not engage in any activities that affected drinking water supply sources. Remediation wells are designated as a temporary withdrawal point; therefore, a Temporary Change Application was received from the State of Utah Department of Natural Resources, Division of Water Rights (see Table 1).

2.1.5 Other Environmental Statutes

The applicability of various environmental statutes to the Project is discussed below.

Endangered Species Act

The Endangered Species Act (16 USC 1531) requires federal agencies to consult with the U.S. Fish and Wildlife Service (FWS) before conducting any ground-disturbing activities that may impact protected species (threatened or endangered) or their habitat. The FEIS included a Biological Assessment and a Biological Opinion (BO) written by FWS. DOE strives to meet the required habitat-protective measures stated in the BO.

DOE monitors Moab site-related impacts on fish and, as necessary, samples biota in accordance with the *Moab UMTRA Project Surface Water/Ground Water Sampling and Analysis Plan* (DOE-EM/GJTAC1830). There are four endangered fish species present in the Colorado River: Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub. Pikeminnow and razorback sucker are found near the Moab site, but 2013 side channel monitoring did not detect impacts to fish.

There is one endangered avian species, the southwestern willow flycatcher, that may inhabit tamarisk areas on or near the Moab site. There are no endangered species near the Crescent Junction site.

National Historic Preservation Act

Memoranda of agreement are in place among DOE, the Utah State Historic Preservation Office, the Utah Department of Transportation (UDOT), and the Bureau of Land Management (BLM) for protection of cultural and historic resources at the Project sites.

In 2013, an annual cultural resource inventory was performed at the Crescent Junction site for Native American art sites in accordance with the applicable memorandum of agreement. Annual reports for Moab and Crescent Junction sites were submitted to BLM, UDOT, and the state of Utah as required by the memoranda of agreement documenting that no additional impacts or mitigation were noted in 2013.

Migratory Bird Treaty Act

To ensure compliance with 16 USC 703, the Migratory Bird Treaty Act, the presence of migratory birds was evaluated in the Biological Assessment. The BO concurred that the potential migratory bird species that may inhabit the Moab and Crescent Junction sites included the bald eagle (threatened), the southwestern willow flycatcher (endangered), and the yellow-billed cuckoo (candidate species). The bald eagle was removed from the threatened list. No endangered, threatened, or candidate species were noted on the Moab or Crescent Junction sites in 2013.

At the Crescent Junction site, the burrowing owl, a Utah sensitive species, was identified as potentially present; however, none were observed in 2013. A large number of prairie-dog burrows are present; these burrows are associated with burrowing owl habitat. Hawks are known to hunt in the Crescent Junction site area; however, no nests are known to be present.

Floodplain Management

DOE's implementing regulations in 10 CFR 1022, "Compliance with Floodplain and Wetland Environmental Review Requirements," identify the requirements of EO 11988, "Floodplain Management," for actions that may affect floodplains. Portions of the Moab site fall within the 100-year floodplain of the Colorado River.

Activities conducted in the floodplain during 2013 were limited to revegetation; these activities included planting and seeding of desirable native species, irrigation to promote vegetation, and weed control. Minor erosion-control actions were taken in 2013 to prevent transportation of sediment to the river.

Protection of Wetlands

DOE regulation 10 CFR 1022 implements the requirements of EO 11990, "Protection of Wetlands," for actions that may affect wetlands. Jurisdictional wetlands were delineated at the Moab site in 2004 and verified by the U.S. Army Corps of Engineers (USACE) in 2005.

Project activities performed in 2013 with the potential to affect jurisdictional wetlands included storm-water controls, revegetation, and erosion control. There was no adverse impact to the jurisdictional wetlands from these activities.

All of these activities were authorized under the USACE 404 permitting program or by the state of Utah's Streambank Alteration Permit Program (see Table 1) through a cooperative agreement with USACE.

2.1.6 DOE O 436.1, "Departmental Sustainability"

DOE O 436.1 requires all DOE sites to implement sound stewardship practices protective of the air, water, land, and other natural resources impacted by DOE operations; it also requires DOE sites to cost effectively meet or exceed compliance with applicable environmental, public health, and resources protection laws, regulations, and DOE requirements. The order further states each site is to implement an EMS. Section 3.0 provides details of the Moab Project EMS.

The Project provides annual reporting through its *Moab UMTRA Project Site Sustainability Plan* (DOE-EM/GJ1952) that identifies the mandated greenhouse gas-reduction targets and sustainability goals in compliance with DOE O 436.1.

2.2 Other Major Environmental Issues and Actions

DOE uses external and internal audits, surveillances, and management assessments to evaluate environmental compliance and to implement corrective actions. The Project Quality Assurance (QA) organization performed and/or coordinated internal and external assessments in 2013 to verify system descriptions and compliance with internal procedures. The Project prepared a Supplement Analysis for the FEIS, as discussed in Section 1.4. No major issues or actions were identified in 2013.

2.3 Continuous-release Reporting

Not applicable to the Project.

2.4 Unplanned Releases

No unplanned releases occurred in 2013.

2.5 Summary of Permits

Table 1 shows the permits and agreements that were active for the Project during 2013.

3.0 EMS

As with most federal agencies, DOE's EMS is based on the standard elements identified in International Organization for Standardization ISO 14001, "Environmental Management Systems." The EMS integrates these elements into the core functions of the contractors' Integrated Safety Management System, which follows the "Plan-Do-Check-Act" cycle to ensure continuous improvement.

The Project's EMS is a structured process for reducing the environmental consequences of Project activities to maximize beneficial use of finite resources and to minimize wastes. In an effort to implement a comprehensive EMS for the Project in accordance with DOE O 436.1, the Project issued the *Moab UMTRA Project Environmental Management System Manual* (DOE-EM/GJ1630).

3.1 Environmental Initiatives

3.1.1 Pollution Prevention

Pollution prevention is part of the waste-management strategy for the Project. Operations are evaluated to identify technically and economically feasible opportunities for source reduction, recycling, decontamination, or treatment. Disposal is the final solution after other options have been considered. Pollution prevention is also achieved through environmentally preferred purchasing.

Reuse and Recycling

In 2013, paper, plastic, aluminum cans, and used oil were collected from the Project sites and the Grand Junction office for recycling. Automotive and rechargeable batteries, toner cartridges, and power strips were also recycled. All of these recycled materials were non-radioactive. There was a 3-percent reduction in off-site, non-hazardous solid-waste disposal since fiscal year (FY) 2012 and a 48-percent reduction since FY2010.

Environmentally Preferable Purchasing

The preferred procurement process favors the acquisition of environmentally preferable products and services. This may entail purchasing materials with recycled content or materials or services that have a less adverse or even beneficial effect on the environment. The Project received the 2013 GreenBuy Gold Level Award by reaching the leadership goal for nine products in five different categories, achieving excellence in sustainable acquisition. The Project routinely adds language to contracts that specifies a preference for the use of recycled or otherwise recovered materials and removes language that prohibits the use of recycled materials.

In addition, the Project participates in the Blue Sky Renewable Energy Program by buying 10 percent renewable energy. As a result, the Remedial Action Contractor and the Project have received Blue Sky Champion Partner and EPA Green Power Partner designations.

Energy Efficiency

The Project's recently constructed facilities were designed to be energy efficient and to comply with the Secretary of Energy's energy initiatives for real property. The Moab and Crescent Junction sites receive power from overhead lines through the Rocky Mountain Power distribution system.

Source Reduction

Source reduction generally means any change in products, services, or actions that reduce, eliminate, or prevent the amount or toxicity of waste being generated. The Project sites achieve source reduction primarily by using work practices that minimize the amount of radioactive waste generated. The "as low as reasonably achievable" (ALARA) principle is emphasized to keep materials from becoming radioactively contaminated. Equipment and supplies, excess to other federal agencies, are procured whenever possible in place of purchasing new items. Due to these reuse efforts, a cost avoidance of approximately $150,000 was realized by the Project; this equipment and materials were potentially removed from the waste stream in FY2013.

3.2 Waste Management

During 2013, DOE conducted operations consistent with the *Moab UMTRA Project Waste Management Plan* (DOE-EM/GJ1633). Formal training in the requirements of this plan was provided to Project staff and subcontractors.

Wastewater volume reduction of as much as 18,000 gallons per year to the Moab on-site septic system will be realized following the purchase of four waterless urinals.

4.0 Environmental Radiological Protection Program and Dose Assessment

4.1 Radiological Discharges and Doses

This section presents the results of the calculated dose to Project employees, the public, and biota from Project operations in 2013 and reports whether the dose is below specified limits. The calculated public dose is received near the Project boundaries.

The DOE dose limit to a member of the public is 100 mrem/yr received through all pathways (i.e., all ways in which a person can be exposed to radiation, such as inhalation, ingestion, and direct radiation). Furthermore, doses to members of the public must be reduced to low levels consistent with a documented ALARA process and generally should not exceed one-quarter of the primary dose limit, or 25 mrem/yr. The dose received from airborne emissions of radionuclides is further restricted by the EPA effective dose equivalent of 10 mrem/yr. These doses are in addition to exposures from natural background, consumer products, and medical sources.

A summary of the public radiation dose, which is applicable to both the Moab and Crescent Junction sites, is shown in Table 2. The public and MEIs receive only a background dose based on Project monitoring results.

Table 2. Moab Project Public Radiation Dose for 2013

Pathway	Maximum Dose to MEIs in mrem (mSv)	% of DOE 100 mrem/yr Limit	Estimated Population Dose in person-rem	Population Within 80 km (~50 miles)	Estimated Bkgd Radiation Population Dose in person-rem
Air	12 (0.12)	12	less than 0.005	~10,300	less than 0.005
Water	N/A	N/A	N/A	N/A	N/A
Other Pathways	N/A	N/A	N/A	N/A	N/A
All Pathways	12 (0.12)	12	less than 0.005	~10,300	less than 0.005

Bkgd = background; km = kilometers; mSv = milliseivert; rem = roentgen equivalent man

4.2 Clearance of Property Containing RRM

To support remediation of the Moab site, DOE assessed Moab site soils not associated with the RRM pile (off-pile areas) for radiological contamination. Remediation of off-pile areas is part of DOE's cleanup strategy and one of the ongoing measures to address contamination resulting from historical uranium ore processing at the site to reduce potential health and environmental risks. In 2013, DOE did not clear any real or personal property that would create a potential contribution to the annual estimated public dose.

4.3 Radiation Protection of Biota

4.3.1 Dose Limits for Protection of Biota and Methods of Demonstrating Compliance

DOE O 458.1 requires the protection of populations of aquatic animals and terrestrial plants and animals in local ecosystems from adverse effects due to radiation and radioactive material released from DOE operations. The Moab RRM contains low levels of radioactivity, and the chemical composition (salt and pH) of the RRM limits vegetative growth. The level of Project activities near the RRM is not conducive for fauna migratory patterns, nor does it promote habitat formation in these areas. The estimated contribution to radiological dose to biota from the RRM at the Project sites is indistinguishable from the naturally occurring radioactive material found in the surrounding environment; therefore, the Project does not currently monitor the effects of radiological doses to biota. Biota monitoring for non-radiological effects is discussed in Section 2.1.5.

4.3.2 Evaluating Dose to Biota

Based on the radiological makeup of the RRM and the very low concentration of radionuclides, no future evaluations of dose to biota are planned.

4.4 Unplanned Radiological Releases

There were no unplanned radiological releases in 2013.

4.5 Environmental Radiological Monitoring

Radiological protection is in part gained through the Environmental Air Monitoring Program, which is described in the *Moab UMTRA Project Environmental Air Monitoring Sampling and Analysis Plan* (DOE-EM/GJRAC1434). This plan documents DOE's strategy for monitoring various airborne contaminants, including goals and objectives, and evaluates public radiological exposure. This section describes the Environmental Air Monitoring Program elements. Environmental air-monitoring data are compiled and published in quarterly reports. These reports compare monitoring data to exposure limits and standards and are posted on the DOE Project website at www.gjem.energy.gov/moab and in the public reading room.

Before the start of tailings removal and disposal operations, DOE initiated environmental air monitoring at the Moab and Crescent Junction sites to collect baseline data, assess the potential for radiation dose to members of the public that could result from site operations, and demonstrate compliance with applicable radon concentration standard established by DOE O 458.1.

Table 3. Summary of Parameters Measured at Environmental Air-monitoring Locations for the Moab and Crescent Junction Sites

Monitoring Station	Location	Parameter
Moab On-site Locations		
0101	Office area	Rn, G
0102	Perimeter	Rn, G, RP
0103	Perimeter	Rn, G
0104	Perimeter	Rn, G
0105	Perimeter	Rn, G, RP
0106	Perimeter	Rn, G
0107	Perimeter	Rn, G
0108	Perimeter	Rn, G
0109	Perimeter	Rn, G
0110	Perimeter	Rn, G
0111	Perimeter	Rn, G
0112	Perimeter	Rn, G
0113	Perimeter	Rn, G
0126	Perimeter	Rn, G
Moab Off-site Locations		
0117	Bar-M Chuckwagon (background location, ~5½ miles north of millsite)	Rn, G, RP
0118	Arches National Park entrance	Rn, G, RP
0119	Utah Division of Wildlife Resources (Matheson Wetlands Preserve)	Rn, G, RP
0120	Portal RV Park	Rn, G, RP
0121	Moab Wastewater Treatment Plant	Rn, G, RP
0122	Grand County Recycling Center	Rn, G, RP
0123	Kane Creek Road (background location, ~2¾ miles south of millsite)	Rn, G, RP
0124	Utah Division of Wildlife Resources (Matheson Wetlands Preserve)	Rn, G
0125	Utah Division of Wildlife Resources (Matheson Wetlands Preserve)	Rn, G
0127	BLM property (~¾-mile south of millsite)	Rn, G
0128	BLM property ($^1/_{10}$-mile south of millsite)	Rn, G
0129	BLM property (~200 yards northwest of millsite)	Rn, G, RP
MEI	Near northeastern property boundary	Rn, G
Crescent Junction Locations		
0305	Crescent Junction off-site location	Rn, G
0301, 0302, 0303, 0304	Crescent Junction on-site locations	Rn, G
MEI (0306)	Residence (~½-mile south of disposal cell)	Rn, G, RP
0307	Crescent Junction off-site location	Rn, G, RP
0308	Crescent Junction on-site location	Rn, G, RP
0309	Crescent Junction on-site location	Rn, G, RP

G = gamma; Rn = atmospheric radon; RP = radioparticulate

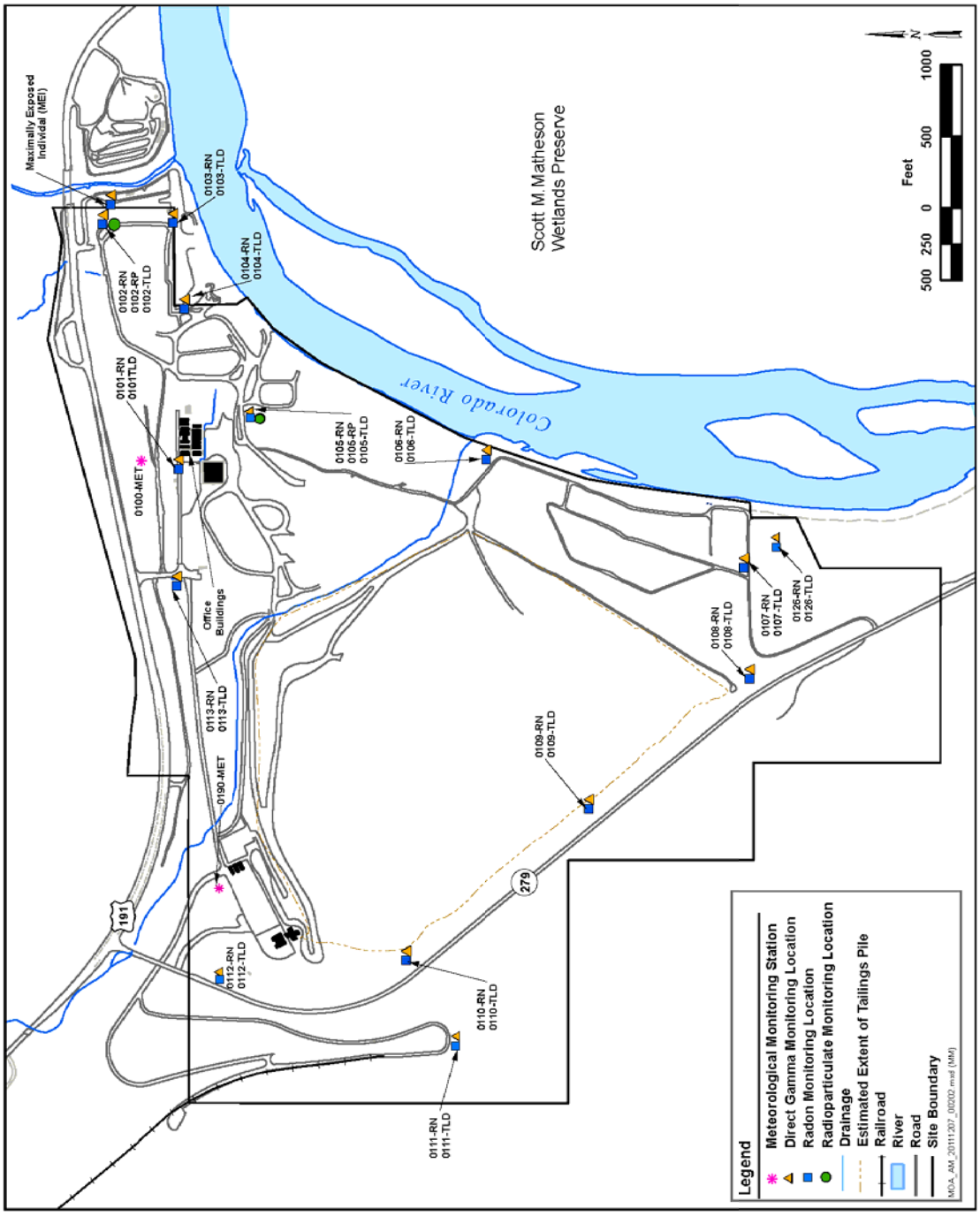

Figure 3. Moab On-site and MEI Environmental Air-monitoring Locations

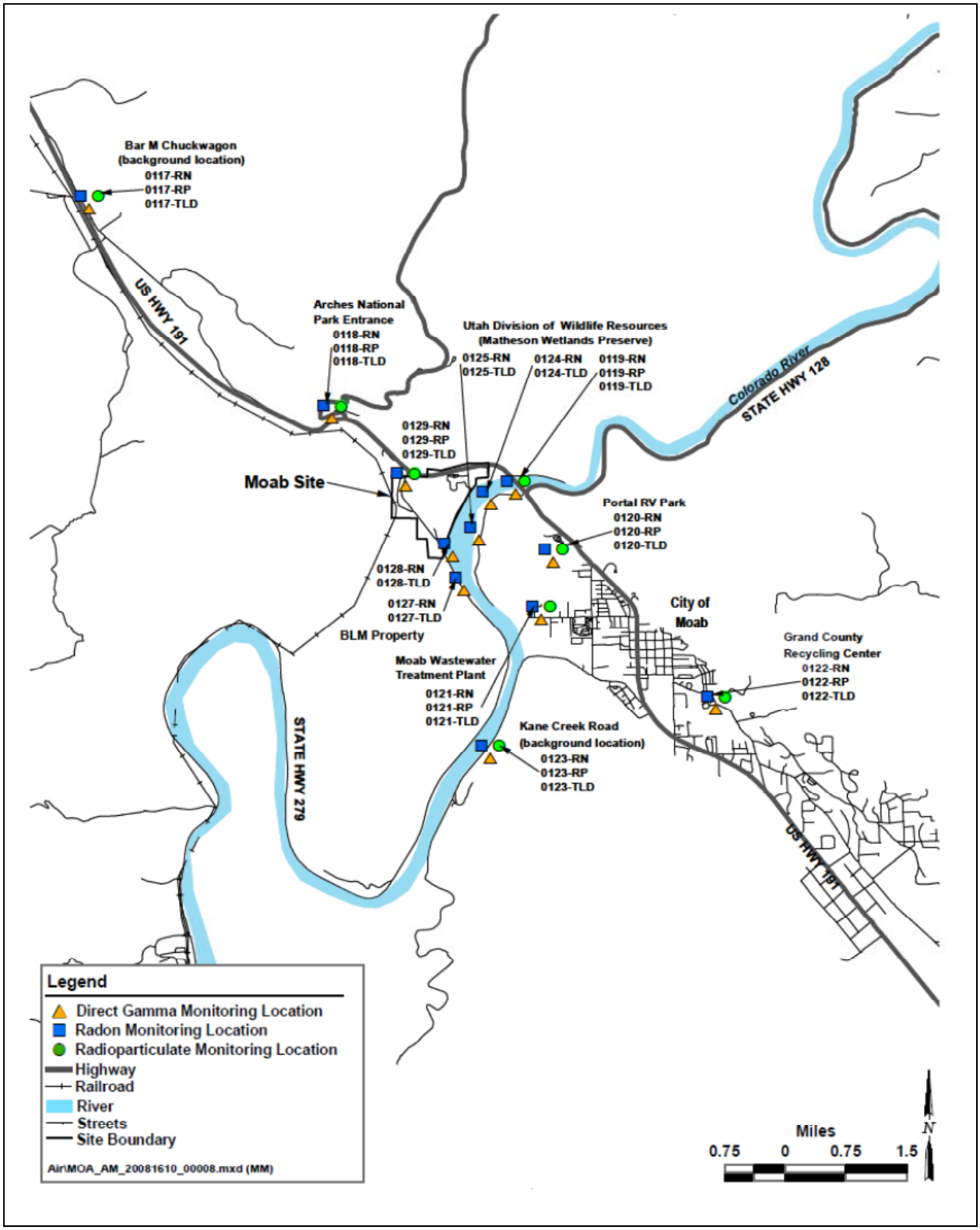

Figure 4. Moab Off-site Environmental Air-monitoring Locations

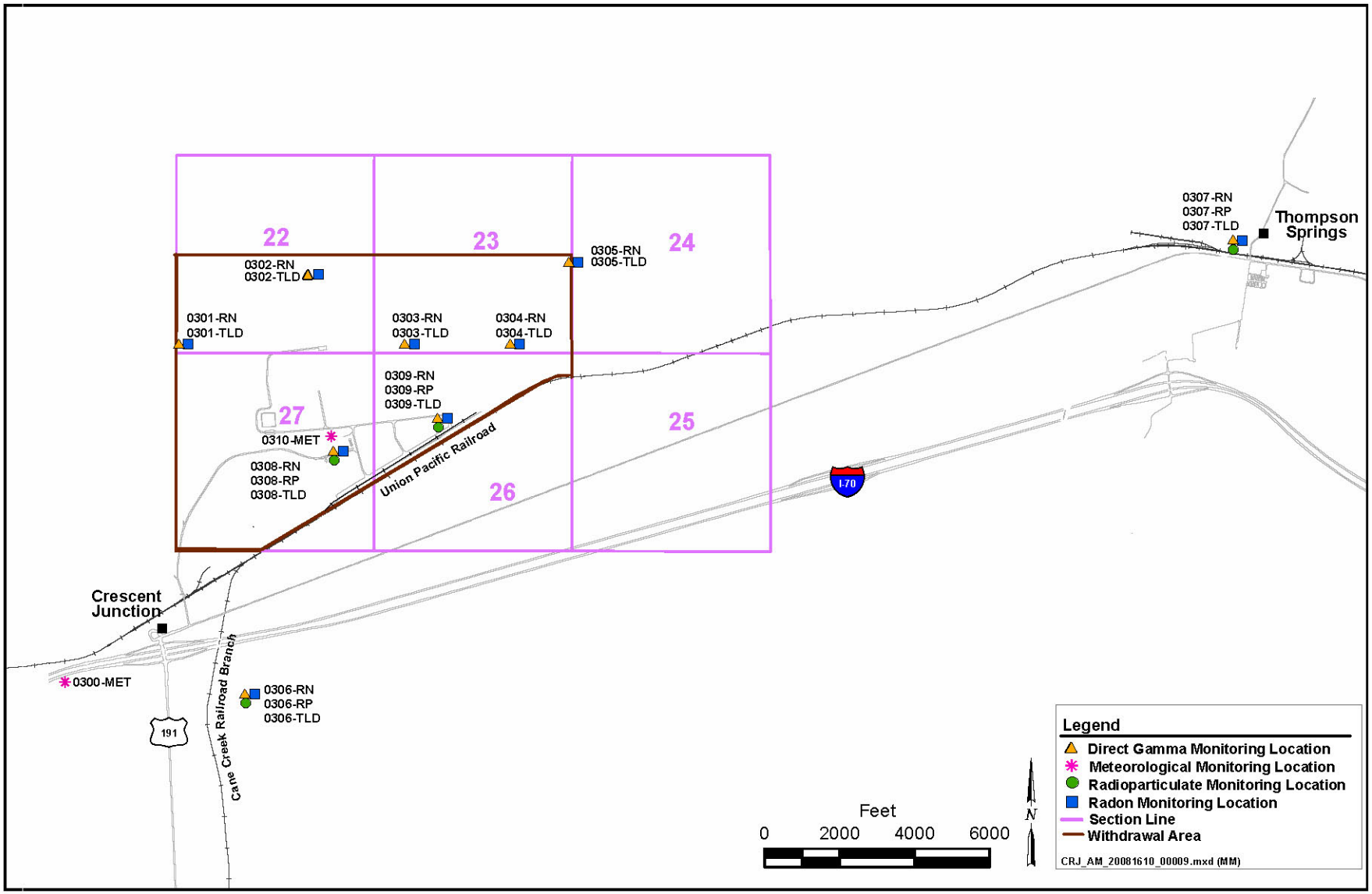

Figure 5. Crescent Junction Site Environmental Air-monitoring Locations

DOE established the air-monitoring network for the Project to measure atmospheric radon, airborne radioparticulate matter, and direct gamma radiation at various on-site, off-site, and background locations. The monitoring network was established after considering prevailing wind directions and the proximity of each site to the general population. Some off-site monitoring stations were located where emissions or releases of airborne contaminants would be detected before they reached the public. This location strategy enables DOE to quantify any public exposures that may be associated with Project activities. Table 3 summarizes the types of data collected at the various monitoring locations for Moab and Crescent Junction. Monitoring locations for Moab are shown in Figures 3 and 4 and for Crescent Junction in Figure 5.

Background monitoring locations have been established that are sufficiently removed from the Moab and Crescent Junction sites, so the air quality is not influenced by airborne contaminants associated with operations. Background monitoring locations provide baseline ambient air-quality conditions against which site-monitoring data may be compared before operation, which may impact background levels. MEI locations (see Figure 3 for the Moab site and Figure 5 for the Crescent Junction site) have special significance with respect to environmental monitoring. They represent the members of the public who would potentially receive the largest dose from all sources of radionuclide emissions combined and are considered the worst-case exposure scenario for a continuously occupied residential property. The MEI locations are the closest inhabited private property to each site.

4.5.1 Atmospheric Radon

During 2013, DOE continued to measure radon emissions at various locations on the millsite property boundary, around the Moab community, and at and around the Crescent Junction site. DOE O 458.1 provides radon standards for all DOE facilities, operations, and activities and offers a conservative goal with respect to controlling radon emissions at the Project sites while remediation of the RRM and its placement in the disposal cell are ongoing.

DOE O 458.1 established a standard for radon concentrations that is used at DOE's property boundary at each site and at off-site locations. The standard is less than 3.0 picocuries per liter (pCi/L) above the background concentration.

Based on data from 2003 through 2008, before excavation activities began, the background concentration of radon in the Moab area was established as 0.7 pCi/L; therefore, the standard at the Moab site is 3.7 pCi/L. Based on data from 2006 to 2009, the background concentration of radon in the Crescent Junction area was established as 0.9 pCi/L; therefore, the standard at the Crescent Junction site is 3.9 pCi/L. During 2013, atmospheric radon was measured at 36 locations (20 on site, 14 off site, and two MEIs) using alpha-sensitive detectors (e.g., radon cups).

Radon cups were exposed for a period of approximately 3 months. On collection, the radon cups were sent to an off-site laboratory for analysis. The actual duration of radon cup exposure was used to prorate the analytical data to determine the quarterly radon concentration for each location. Quarterly and annual radon concentrations for all 36 locations are shown in Table 4.

The curve shown represents the quarterly average of radon data from station locations 0104, 0105, 0106, 0107, 0108, and 0113. The radon standard and the trend at the MEI location are shown for comparison purposes.

Table 4. Summary of Atmospheric Radon and Gamma-monitoring Data for the Moab and Crescent Junction Sites for 2013

Station Number	1st Quarter 2013		2nd Quarter 2013		3rd Quarter 2013		4th Quarter 2013		2013 Annual	
	Radon pCi/L	Gamma mrem	Radon pCi/L	Gamma mrem	Radon pCi/L	Gamma mrem	Radon pCi/L	Gamma mrem	Avg Radon pCi/L	Gamma mrem
On-site Locations										
0101	2.0	41.2	1.6	40.8	0.9	41.2	2.4	45.8	1.73	169.0
0102	0.8	21.9	0.6	22.9	0.5	20.8	1.0	27.8	0.73	93.4
0103	1.1	19.7	0.6	19.7	0.6	19.1	1.3	23.0	0.90	81.5
0104	1.7	25.8	1.1	27.7	1.0	26.2	1.6	32.5	1.35	112.2
0105	2.7	22.4	1.2	23.5	1.0	22.0	1.8	27.9	1.68	95.8
0106	3.6	29.8	1.6	30.1	1.1	30.1	2.9	33.9	2.30	123.9
0107	3.1	27.6	2.0	25.3	1.3	27.4	2.4	29.9	2.20	110.2
0108	2.6	39.7	1.9	44.6	1.7	35.5	2.8	49.4	2.25	169.2
0109	1.9	135.4	1.5	152.8	2.1	162.5	1.8	153.4	1.83	604.1
0110	1.4	78.6	1.4	100.6	1.3	92.8	0.8	104.8	1.23	376.8
0111	1.1	38.1	0.8	40.8	0.8	42.9	0.9	44.6	0.90	166.4
0112	1.7	46.7	1.4	51.4	1.6	50.7	1.8	58.0	1.60	206.8
0113	2.7	34.6	1.6	41.0	1.2	38.1	2.9	37.2	2.10	150.9
0126	2.3	26.8	1.5	23.9	0.9	27.8	2.1	26.2	1.70	104.7
0301	0.3	23.2	1.0	22.7	0.6	23.1	0.8	23.2	0.68	92.2
0302	0.7	22.3	0.6	24.8	0.9	22.6	0.8	24.7	0.75	94.4
0303	0.8	26.8	0.4	22.3	0.5	27.7	1.3	23.6	0.75	100.4
0304	0.7	23.9	0.5	25.6	0.7	23.9	0.5	22.8	0.60	96.2
0308	2.1	24.1	0.9	26.9	1.1	24.0	1.9	26.2	1.5	101.2
0309	1.2	23.8	0.7	25.5	0.6	23.1	0.7	25.6	0.80	98.0
Off-site Locations										
0117	0.6	23.8	0.3	24.3	0.3	26.1	0.4	25.6	0.40	99.8
0118	0.8	21.5	0.3	21.1	0.4	23.6	0.4	25.0	0.48	91.2
0119	1.1	19.4	0.4	22.6	0.3	19.0	0.7	24.1	0.63	85.1
0120	0.7	19.2	0.3	20.2	0.4	20.4	0.4	25.1	0.45	84.9
0121	0.6	19.4	0.3	21.9	0.3	20.4	0.4	23.7	0.40	85.4
0122	0.8	17.9	0.3	21.4	0.3	18.5	0.3	25.2	0.43	83.0
0123	0.5	19.8	0.3	19.0	0.3	21.3	0.3	19.8	0.35	79.9
0124	1.4	25.0	0.5	24.1	0.5	26.3	1.0	26.8	0.85	102.2
0125	1.7	28.4	0.8	25.2	0.7	29.8	1.6	32.9	1.20	116.3
0127	1.0	22.7	0.3	24.7	0.4	24.1	0.9	27.4	0.65	98.9
0128	2.1	23.5	0.5	26.5	1.1	24.5	2.0	30.5	1.43	105.0
0129	1.4	29.1	0.9	28.6	1.2	29.1	1.7	29.8	1.30	116.6
MEI (Moab)	1.4	23.0	0.5	17.6	0.5	22.6	1.1	20.7	0.88	83.9
0305	1.0	23.0	0.4	29.3	0.5	22.8	0.5	28.7	0.60	103.8
MEI (CJ)	0.5	25.7	0.6	24.8	0.4	25.3	0.5	25.5	0.50	101.3
0307	0.7	22.7	0.4	25.3	0.3	23.2	0.4	24.8	0.45	96.0

CJ = Crescent Junction

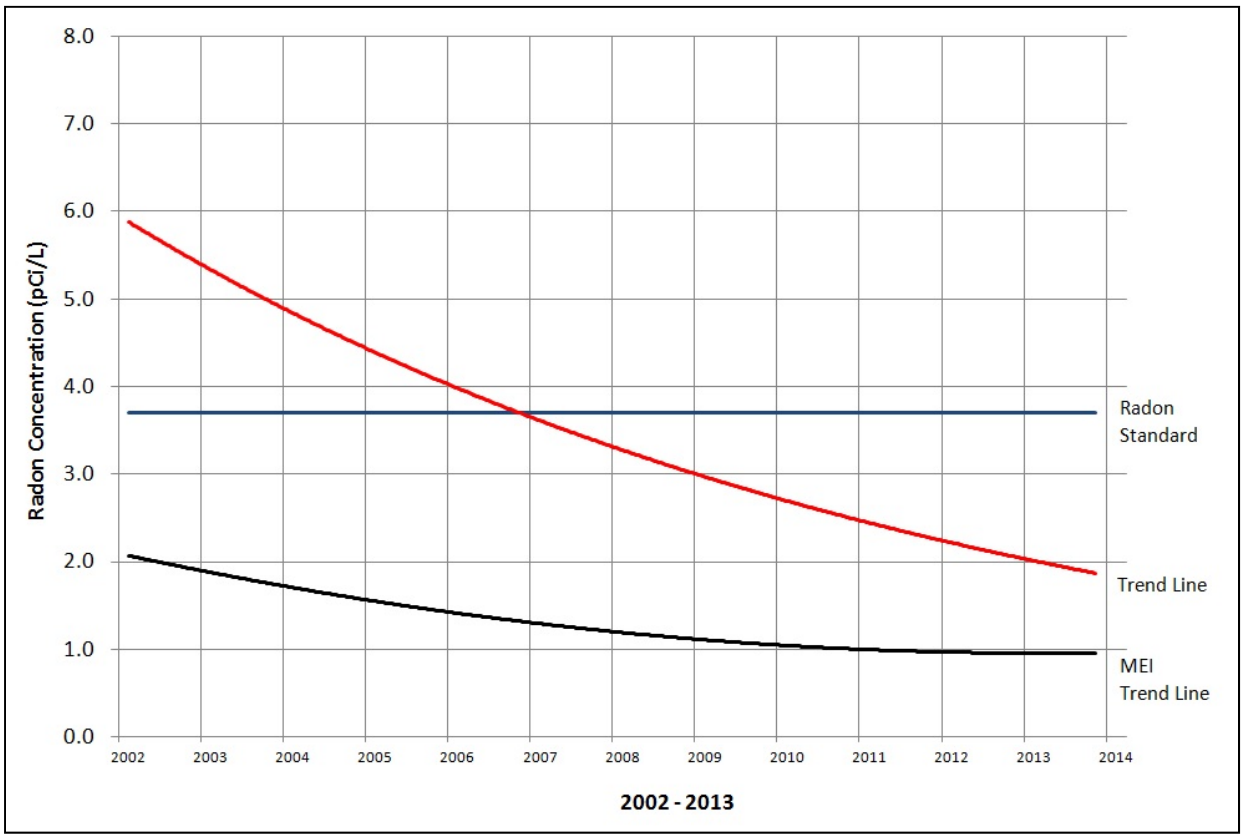

Figure 6. Long-term Radon Concentration Trend

There was no radon exceedance at the Crescent Junction site. The 2013 radon-monitoring data collected at the MEI locations were consistently below the 3.7 pCi/L and 3.9 pCi/L standards for Moab and Crescent Junction, respectively. Based on these data, radon emissions from the RRM are not affecting the public.

4.5.2 Direct Gamma Radiation

The RRM at the Moab site is a source of direct gamma radiation. As uranium decays, several of the decay products emit gamma radiation. Gamma radiation has sufficient energy to penetrate body tissues; therefore, protection from elevated exposure levels is of utmost importance to DOE. DOE public dose limits applicable to the Project are outlined in DOE O 458.1. DOE also complies with the state of Utah radiation-protection requirements codified at UAC R313-15-301, "Standards for Protection Against Radiation, Dose Limits for Individual Members of the Public." These regulations establish standards and requirements for DOE operations with respect to protection of members of the public and the environment from undue risk of radiation.
DOE O 458.1 establishes a public dose limit of 100 mrem/yr above naturally occurring gamma levels (background). DOE has determined that the background direct gamma radiation dose is approximately 81 mrem/yr in the Moab area and 92.5 mrem/yr in the Crescent Junction area.

These values were derived by averaging monitoring data collected at background-monitoring locations in each area; therefore, the DOE dose limit for direct gamma radiation at the site boundary (and at any off-site location) is approximately 181 mrem/yr at Moab and 192.5 mrem/yr at Crescent Junction.

During 2013, direct gamma radiation was measured at 36 locations (20 on site, 14 off site, and two MEIs) using thermoluminescent dosimeters that are exposed for a period of approximately 3 months. On collection, the dosimeters are sent to an off-site laboratory for analysis. The analytical data was prorated to a standard, 91-day quarter. Quarterly and annual total direct gamma radiation data results for all locations are shown in Table 4.

During 2013, direct gamma radiation measurements exceeded the DOE annual limit at three Moab on-site locations (0109, 0110, and 0112); this is not unexpected due to the large volume of RRM at the Moab site and its associated gamma activity. None of the off-site locations exceeded the annual limit; therefore, these on-site exceedances did not result in unacceptable public exposure. There were no exceedances at the Crescent Junction site.

The total gamma radiation dose at the MEI locations was 83.9 mrem/yr and 101.3 mrem/yr for the Moab and Crescent Junction sites, respectively; both doses were substantially below the limit for each site. Based on the levels of direct gamma radiation, these emissions are not affecting the general population in or near Moab or Crescent Junction.

4.5.3 Airborne Radioparticulates

Radioparticulate data collection is of particular interest to DOE because these data provide information relative to the dose the public may be receiving from the inhalation of radioactive particulate matter. In 2013, air samplers operated continuously at four on-site locations and 10 off-site locations at Moab and Crescent Junction, including the Crescent Junction MEI location. Air filters were collected weekly and submitted as a composite sample on a quarterly basis. The filters were then analyzed for specific radionuclides that are common constituents of RRM, including total uranium, thorium-230, radium-226, and polonium-210.

DOE O 458.1 provides guidance for the use of derived concentration standard (DCS) values for radioisotopes to determine acceptable exposure limits. A DCS represents the concentration from a specified radionuclide that would, if inhaled, cause a member of the public residing at the point of collection to receive a dose of 100 mrem/yr. Exposures above this limit are considered unacceptable. The DCS values for the radionuclides included in the Environmental Air Monitoring Program are shown in Table 5.

Table 5. Summary of DCSs for Inhaled Air Radionuclides Monitored at the Moab and Crescent Junction Sites for 2013

Radionuclide	DCS (µCi/mL)
Total Uranium	4.7E-13
Thorium-230	9.4E-14
Radium-226	4.0E-13
Polonium-210	8.7E-13

E = numerical value is to be multiplied by exponent (e.g., 1.8E-4 = 0.00018);
µCi/mL = microcuries per milliliter

Table 6. Summary of Radioparticulate Air-monitoring Data for the Moab and Crescent Junction Sites for 2013

Station Number	Isotope	1st Quarter 2013 (µCi/mL)	2nd Quarter 2013 (µCi/mL)	3rd Quarter 2013 (µCi/mL)	4th Quarter 2013 (µCi/mL)	Annual Average (µCi/mL)	Annual 2013 Dose mrem/yr
Moab On-site Locations							
0102-RP	Uranium	1.0E-16	1.6E-16	1.6E-16	1.5E-16	1.42E-16	1.28
	Thorium-230	8.7E-17	9.9E-17	1.6E-16	1.3E-16	1.20E-16	
	Radium-226	3.1E-17	3.7E-17	8.2E-17	3.5E-17	4.63E-17	
	Polonium-210	1.9E-14	4.2E-15	3.9E-15	1.2E-14	9.68E-15	
0105-RP	Uranium	1.6E-16	2.8E-16	2.4E-16	2.3E-16	2.28E-16	1.96
	Thorium-230	1.7E-16	2.8E-16	4.4E-16	4.0E-16	3.24E-16	
	Radium-226	1.4E-16	1.5E-16	2.0E-16	1.2E-16	4.67E-16	
	Polonium-210	2.1E-14	5.4E-15	4.7E-15	1.3E-14	1.09E-14	
Moab Off-site Locations							
0117-RP	Uranium	1.0E-16	1.7E-16	1.4E-16	2.3E-16	1.61E-16	1.09
	Thorium-230	5.4E-17	6.7E-17	9.1E-17	1.0E-16	7.92E-17	
	Radium-226	1.0E-17	6.5E-17	5.5E-17	3.7E-17	4.16E-17	
	Polonium-210	1.8E-14	3.8E-15	3.5E-15	1.0E-14	8.82E-15	
0118-RP	Uranium	1.0E-16	1.7E-16	1.4E-16	1.9E-16	1.50E-16	1.55
	Thorium-230	7.9E-17	2.4E-16	3.7E-16	1.7E-16	2.15E-16	
	Radium-226	4.1E-17	6.5E-17	1.3E-16	3.6E-17	6.81E-17	
	Polonium-210	2.0E-14	4.1E-15	4.4E-15	1.2E-14	1.00E-14	
0119-RP	Uranium	1.1E-16	1.6E-16	1.7E-16	1.4E-16	1.45E-16	1.19
	Thorium-230	7.9E-17	7.9E-17	3.7E-16	1.7E-16	1.74E-16	
	Radium-226	3.0E-17	4.8E-17	6.0E-17	7.2E-17	5.26E-17	
	Polonium-210	1.3E-14	3.6E-15	4.0E-15	8.9E-15	7.38E-15	
0120-RP	Uranium	1.1E-16	1.9E-16	1.3E-16	1.8E-16	1.53E-16	1.03
	Thorium-230	5.4E-17	8.6E-17	1.3E-16	8.8E-17	8.96E-17	
	Radium-226	3.3E-17	7.5E-17	6.5E-17	9.7E-17	6.76E-17	
	Polonium-210	1.5E-14	4.1E-15	3.6E-15	8.8E-15	7.88E-15	
0121-RP	Uranium	1.1E-16	1.6E-16	1.7E-16	1.6E-16	1.49E-16	1.19
	Thorium-230	1.2E-16	7.0E-17	1.7E-16	1.3E-16	1.23E-16	
	Radium-226	3.1E-17	1.1E-16	9.7E-17	2.5E-17	6.58E-17	
	Polonium-210	1.8E-14	3.9E-15	4.5E-15	8.4E-15	8.71E-15	
0122-RP	Uranium	1.1E-16	1.7E-16	1.1E-16	1.6E-16	1.39E-16	0.97
	Thorium-230	4.9E-17	6.0E-17	1.2E-16	5.9E-17	7.20E-17	
	Radium-226	3.5E-17	9.4E-17	9.0E-17	4.8E-17	6.68E-17	
	Polonium-210	1.3E-14	4.2E-15	2.9E-15	1.1E-14	7.74E-15	
0123-RP	Uranium	1.1E-16	1.4E-16	2.7E-16	1.6E-16	1.71E-16	1.04
	Thorium-230	6.8E-17	7.5E-17	1.4E-16	6.2E-17	8.61E-17	
	Radium-226	3.5E-17	2.8E-17	9.5E-17	4.9E-17	5.19E-17	
	Polonium-210	1.8E-14	3.7E-15	3.9E-15	7.0E-15	8.15E-15	
0129-RP	Uranium	1.4E-16	2.6E-16	2.8E-16	3.2E-16	2.50E-16	2.86
	Thorium-230	2.8E-16	7.8E-16	1.0E-15	9.5E-16	7.52E-16	
	Radium-226	9.5E-17	2.7E-16	2.1E-16	3.7E-16	2.35E-16	
	Polonium-210	1.7E-14	4.7E-15	4.7E-15	1.1E-14	9.45E-15	

Table 6. Summary of Radioparticulate Air-monitoring Data for the Moab and Crescent Junction Sites for 2013 (continued)

Station Number	Isotope	1st Quarter 2013 (µCi/mL)	2nd Quarter 2013 (µCi/mL)	3rd Quarter 2013 (µCi/mL)	4th Quarter 2013 (µCi/mL)	Annual Average (µCi/mL)	Annual 2013 Dose mrem/yr
Crescent Junction On-site Locations							
0308-RP	Uranium	1.0E-16	1.6E-16	1.7E-16	1.7E-16	1.5E-16	1.34
	Thorium-230	9.4E-17	1.3E-16	3.8E-16	2.4E-16	2.1E-16	
	Radium-226	6.7E-17	8.1E-17	1.6E-16	8.1E-17	9.7E-17	
	Polonium-210	1.3E-14	5.1E-15	4.5E-15	9.1E-15	7.9E-15	
0309-RP	Uranium	9.6E-17	1.6E-16	1.5E-16	1.8E-16	1.5E-16	1.55
	Thorium-230	6.7E-17	2.5E-16	3.4E-16	3.9E-16	2.6E-16	
	Radium-226	6.5E-17	6.1E-17	2.0E-16	9.0E-17	1.0E-16	
	Polonium-210	1.1E-14	4.2E-15	1.1E-14	9.1E-15	8.8E-15	
Crescent Junction Off-site Locations							
MEI (0306-RP)	Uranium	7.4E-17	1.1E-16	1.2E-16	1.4E-16	1.1E-16	0.89
	Thorium-230	5.4E-17	5.6E-17	1.1E-16	8.3E-17	7.6E-17	
	Radium-226	1.0E-17	1.9E-17	1.9E-17	3.4E-17	2.1E-17	
	Polonium-210	1.2E-14	3.8E-15	3.6E-15	8.3E-15	6.9E-15	
0307-RP	Uranium	6.1E-17	1.2E-16	1.2E-16	1.6E-16	1.1E-16	0.71
	Thorium-230	2.2E-17	3.7E-17	5.9E-17	6.3E-17	4.5E-17	
	Radium-226	4.7E-17	3.9E-17	5.1E-17	7.0E-17	5.2E-17	
	Polonium-210	7.9E-15	3.0E-15	4.4E-15	8.2E-15	5.9E-15	

µCi/mL = microcuries per milliliter
Uranium shown is total uranium.

The quarterly results and annual averages for airborne radioparticulate concentrations did not exceed the DCS values at any location for either site during 2013 (see Table 6). These data demonstrate that emissions of airborne radioparticulate matter were consistently two to four orders of magnitude below their respective DCS values and, therefore, do not exceed levels or concentrations that would result in an unacceptable public exposure. The radioparticulate results have consistently been below the DCSs since the DOE began its monitoring. DOE O 458.1 requires the radiological dose resulting from the total of the airborne emissions at each location to be less than less than 10 mrem/yr. Table 6 shows the annual dose at each location was lower than this airborne limit.

4.6 Best Management Practice Area

The best management practice area (BMPA) is a dedicated area within the CA at the Moab site designed to safely store and isolate waste materials, chemicals, equipment, or soil that require further characterization or for which a disposal strategy has not yet been selected. The area is located about 300 feet southeast of the office buildings (see Figure 3). It measures approximately 14 by 8 feet, is surrounded by a 2-foot-high earthen berm, and is lined with 30-millimeter plastic sheeting. Once adequate characterization data are obtained, and a disposal strategy is selected, wastes are removed from the BMPA. Once adequate characterization data are obtained, and a disposal strategy is selected, wastes are removed from the BMPA. No wastes were stored, added, or removed in 2013.

5.0 Environmental Non-radiological Program Information

5.1 Meteorological Monitoring

DOE operates two meteorological monitoring stations at the Moab site and two at or near the Crescent Junction site (see Figures 3 and 5, respectively). Meteorological monitoring is an important element in the design of environmental monitoring networks. Not only do these data enable DOE to monitor site-specific climatic conditions and events, they also provide a valuable resource for assessing impacts resulting from any unplanned release of airborne contamination. Meteorological parameters monitored at the Moab and Crescent Junction sites include air temperature, relative humidity, solar radiation, wind speed, wind direction, and precipitation.

Table 7 summarizes 2013 meteorological data for temperature, wind speed, and precipitation for the Moab site; these data are similar to the Crescent Junction site.

Table 7. Meteorological Data Summary for the Moab Site for 2013

Month	Temperature (ºF)		Wind Speed (mph)		Precipitation (inches)
	Max Temp	Min Temp	Avg	Peak Gust	
January	48.7	-3.5	2.1	36.2	0.67
February	57.9	20.5	2.7	32.3	0.30
March	77.0	23.5	3.6	33.9	0.04
April	87.0	29.4	4.0	38.0	0.69
May	94.3	37.9	4.7	38.0	0.40
June	109.8	49.7	4.4	46.4	0.00
July	105.5	61.6	4.5	54.2	0.85
August	102.1	57.2	3.4	47.2	0.84
September	101.5	39.7	3.9	36.8	1.95
October	86.5	34.1	3.5	41.9	0.99
November	67.6	25.0	2.7	44.9	1.20
December	52.3	1.9	2.0	23.9	0.57
Total Adjusted with Manual Gauge					**8.50**

6.0 Ground Water Protection Program

The ground water beneath the Moab site has been contaminated from former uranium milling operations. Ammonia and uranium are the primary contaminants of concern. The Colorado River is protected through ground water extraction near the tailings pile and freshwater injection along the riverbank. Additionally, when suitable habitat areas form, river water may be diverted into the side channels to reduce ammonia concentrations. Locations of select monitoring, extraction, and injection wells at the Moab site are shown in Figure 7. The locations where surface water sampling was conducted during 2013 are shown in Figure 8. Monitoring results show that the contaminant plumes of ammonia and uranium did not expand in 2013.

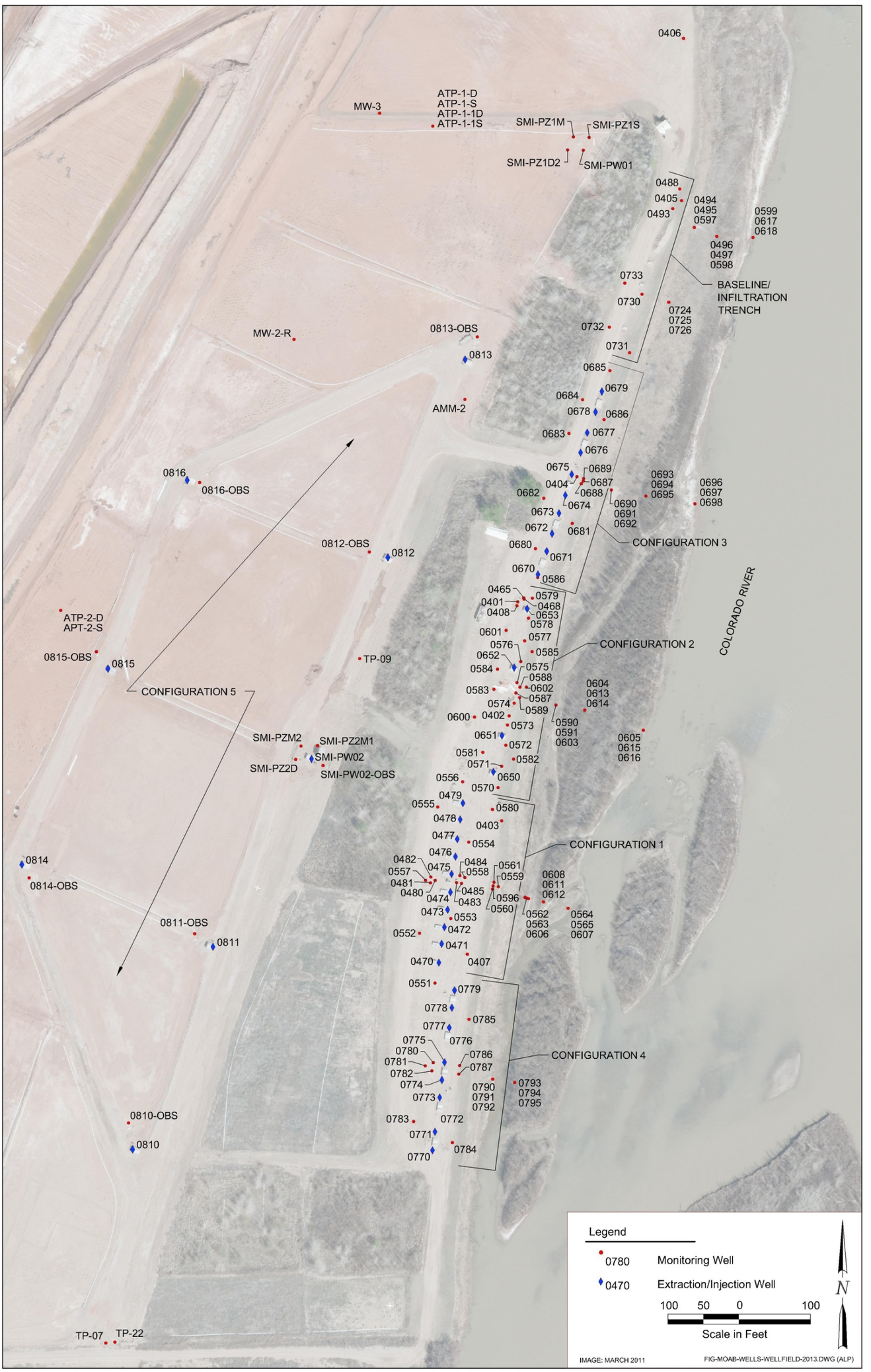

Figure 7. Locations of Select Monitoring, Extraction, and Injection Wells at the Moab Site

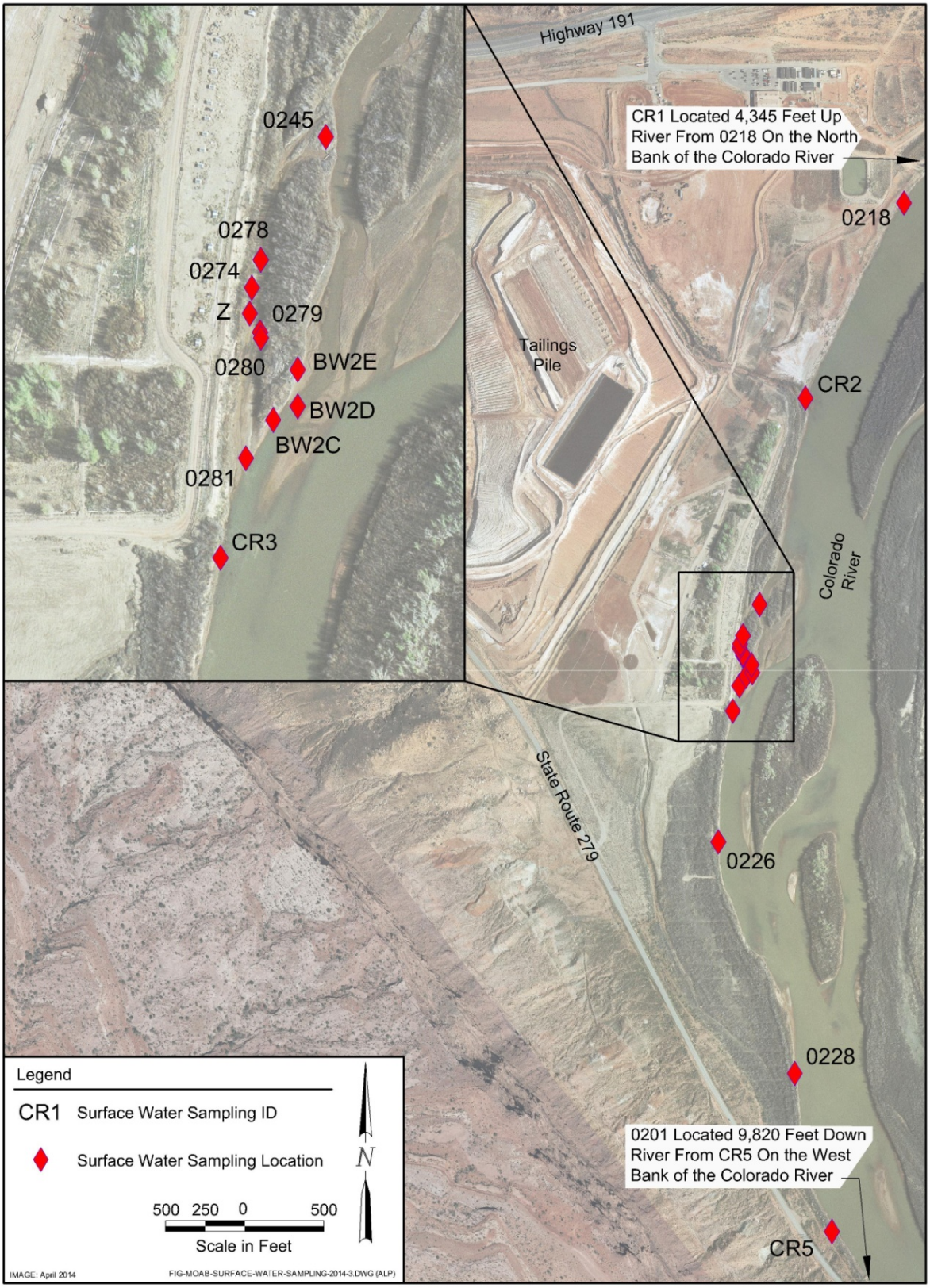

Figure 8. Surface Water Sampling Locations During 2013

6.1 Ground Water

Eight extraction wells and 10 injection wells were used to minimize contaminant discharge to the Colorado River in 2013. Samples were collected from these wells to assess performance of the IA. Site-wide sampling was conducted in May/June and November/December to assess contaminant distribution. Ground water samples were analyzed for the site-related contaminants ammonia and uranium. In addition, oxidation reduction potential, pH, specific conductance, temperature, and turbidity were measured in the field at all locations. Data results from sampling events are available on the Project website at www.gjem.energy.gov/moab and in the public reading room.

Approximately 15.1 million gallons of ground water were extracted in 2013, with more than 39,750 lb of ammonia and 310 lb of uranium removed. A total of about 203.7 million gallons had been extracted since initial implementation of the system through the end of 2013, including more than 796,300 lb of ammonia and nearly 3,970 lb of uranium. Approximately 9.4 million gallons of freshwater were injected in 2013. Injection occurred from February through August 2013 and again from mid-October through mid-December 2013. The purpose of injection is to create a hydrologic barrier between the RRM pile and the side channels in the river.

6.2 Surface Water

The Colorado River is the principle surface water feature and forms the eastern boundary of the Moab site. Ammonia is of concern because of its toxicity to aquatic life. To further reduce ammonia concentrations that may have migrated into a side channel that was a suitable habitat between late June and mid-September, approximately 18.1 million gallons of freshwater were diverted into this area. Surface water samples were collected for laboratory analysis at near peak-flow (late May) and base-flow (November) conditions in 2013. One additional surface water sampling event was completed at the end of September 2013. Samples were collected on site, upriver, and downriver (Figure 8).

All ammonia concentrations associated with the 26 surface water samples were below the EPA acute criteria. With the exception of four samples collected from locations 0278, 0279, 0280, and 0281, all samples were also below the chronic criteria (Table 8). Of the four chronic exceedances, the sample collected from location 0281 (which represents the largest difference of the four between the measured concentration and the criteria) exceeded the chronic criteria concentration by only 0.19 milligrams per liter.

A suitable habitat is characterized by fairly shallow, low-velocity, side channels that are closed off from the main channel on the upriver side that may develop between the peak spring runoff flows and the end of September. It should be noted that late August precipitation events increased the river flows to above average starting in early September; the above-average flows continued through the end of the month. The higher flows resulted in an upstream connection of the side channel to the main channel, and on September 30, the side channel was not considered a suitable habitat when the samples were collected.

Table 8. Surface Water Locations with Ammonia Concentrations Compared to EPA Acute and Chronic Criteria During 2013

Location	Date	Ammonia Total as N (mg/L)	EPA - Acute Total as N (mg/L)*	EPA - Chronic Total as N (mg/L)**
0218	5/30/13	<0.1	9.65	3.25
0226	5/30/13	<0.1	3.83	1.63
0274	5/30/13	<0.1	3.83	1.63
CR1	5/28/13	<0.1	17.5	4.06
CR2	5/30/13	<0.1	4.64	1.68
CR3	5/30/13	0.4	2.59	1.03
CR5	5/28/13	<0.1	5.62	1.94
0245	9/30/13	<0.1	13	1.0
0274	9/30/13	<0.1	11	0.79
0278	9/30/13	0.53	5.1	0.44
0279	9/30/13	0.85	8.8	0.83
0280	9/30/13	0.86	8.8	0.78
0281	9/30/13	0.87	8.8	0.68
BW2C	9/30/13	0.12	7.3	0.67
BW2D	9/30/13	<0.1	7.3	0.71
BW2E	9/30/13	<0.1	6.0	0.57
CR3	9/30/13	0.13	6.0	0.61
Z	9/30/13	0.88	13	1.0
0201	11/19/13	<0.1	31	4.0
0218	11/19/13	<0.1	11	2.1
0226	11/20/13	<0.1	4.9	1.1
0228	11/20/13	<0.1	4.1	0.95
CR1	11/19/13	<0.1	34	4.2
CR2	11/19/13	<0.1	8.8	1.8
CR3	11/20/13	<0.1	4.9	1.1
CR5	11/19/13	<0.1	15	2.6

*EPA Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater State (Effective April 2013), Table N.4., Temperature and pH-Dependent Values, Acute Concentration of Total Ammonia as N (mg/L)
**EPA Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater State (Effective April 2013),Table 6., Temperature and pH-Dependent Values, Chronic Concentration of Total Ammonia as N (mg/L)

7.0 QA

The Project has a QA Program that provides a structured approach for the application of QA principles to work performed on the Project and which is based on applicable DOE orders and other federal requirements. The QA Program is implemented with contractor-specific plans, which ensure environmental data collected are valid and traceable.

7.1 Laboratory Analysis

The Project ensures the receipt of analytical data that meet Environmental Air Monitoring Program and Ground Water Program requirements by subcontracting analytical services to qualified laboratories. The subcontract laboratories are qualified under the DOE Environmental Management Consolidated Audit Program, National Environmental Laboratory Accreditation Program, Utah Department of Health Environmental Laboratory Certification, and through participation in proficiency testing programs. The quality of the data received from the laboratories is evaluated through a formal data-validation process.

7.2 Records Management

Project records will be managed in accordance with the *Moab UMTRA Project Records Management Manual* (DOE-EM/GJ1545), which follows DOE orders, policies, and regulations for retention and maintenance of records.

8.0 References

10 CFR 835 (Code of Federal Regulations), "Occupational Radiation Protection."

10 CFR 1021 (Code of Federal Regulations), "National Environmental Policy Act Implementing Procedures."

10 CFR 1022 (Code of Federal Regulations), "Compliance with Floodplain and Wetland Environmental Review Requirements."

40 CFR 61 (Code of Federal Regulations), "National Emission Standards for Hazardous Air Pollutants."

40 CFR 192 (Code of Federal Regulations), "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings."

40 CFR 370.10 (Code of Federal Regulations), "What information must I provide and what format must I use?"

40 CFR 1500 (Code of Federal Regulations), "Purpose, Policy, and Mandate."

40 CFR 1507.3 (Code of Federal Regulations), "Council on Environmental Quality, Agency Procedures."

7 USC 136 (United States Code), Federal Insecticide, Fungicide, and Rodenticide Act.

15 USC 2601 (United States Code), Toxic Substances Control Act.

16 USC 703 (United States Code), Migratory Bird Treaty Act.

16 USC 1531 (United States Code), Endangered Species Act.

33 USC 1251 (United States Code), Clean Water Act.

42 USC 300f (United States Code), Safe Drinking Water Act.

42 USC 4321 (United States Code), National Environmental Policy Act.

42 USC 6901 (United States Code), Resource Conservation and Recovery Act.

42 USC 7401 (United States Code), Clean Air Act.

42 USC 7901 (United States Code), Uranium Mill Tailings Radiation Control Act.

42 USC 9601 (United States Code), Comprehensive Environmental Response, Compensation, and Liability Act.

42 USC 11000 (United States Code), Emergency Planning and Community Right-to-Know Act.

DOE (U.S. Department of Energy), *Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project* (DOE/EIS-0198).

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DOE (U.S. Department of Energy), *Moab UMTRA Project Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah, Final Environmental Impact Statement* (DOE/EIS-0355).

DOE (U.S. Department of Energy), *Moab UMTRA Project Site Sustainability Plan* (DOE-EM/GJ1952).

DOE (U.S. Department of Energy), *Moab UMTRA Project Supplement Analysis for the Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah, Final Environmental Impact Statement* (DOE/EIS-0355 SA-1).

DOE (U.S. Department of Energy), *Moab UMTRA Project Surface Water/Ground Water Sampling and Analysis Plan* (DOE-EM/GJTAC1830).

DOE (U.S. Department of Energy), *Moab UMTRA Project Waste Management Plan* (DOE-EM/GJ1633).

DOE (U.S. Department of Energy), *Record of Decision for the Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah* (6450-01-P).

DOE (U.S. Department of Energy) Order 231.1B, "Environment, Safety, and Health Reporting."

DOE (U.S. Department of Energy) Order 436.1, "Departmental Sustainability."

DOE (U.S. Department of Energy) Order 458.1, Change 3, "Radiation Protection of the Public and the Environment."

Executive Order 11990, "Protection of Wetlands."

Executive Order 11988, "Floodplain Management."

Executive Order 12856, "Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements."

ISO (International Organization for Standardization) Standard 14001, "Environmental Management Systems."

Public Law 106-398, Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001.

Public Law 111-5, American Recovery and Reinvestment Act of 2009.

UAC R307-309-6 (Utah Administrative Code), “Fugitive Dust Control.”

UAC R313-15-301 (Utah Administrative Code), “Standards for Protection Against Radiation, Dose Limits for Individual Members of the Public.”