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Office of Environmental Management – Grand Junction

MOAB UTAH
UMTRA Project

Moab UMTRA Project Annual Site Environmental Report for Calendar Year 2018

Revision 0

September 2019

U.S. Department of Energy

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Moab UMTRA Project
Annual Site Environmental Report for Calendar Year 2018

Revision 0

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Revision History

Revision	Date	Reason for Revision
0	September 2019	Initial issue.

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Figures

Tables

Acronyms and Abbreviations

AEA	Atomic Energy Act
ASER	Annual Site Environmental Report
bgs	below ground surface
bkgd	background
CA	Contamination Area
CAA	Clean Air Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DOE	U.S. Department of Energy
DOE O	DOE Order
DOT	Department of Transportation
EISA	Energy Independence and Security Act
EM	Environmental Management
EMS	Environmental Management System
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FFCA	Federal Facilities Compliance Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
ft	feet
IA	interim action
ISMS	Integrated Safety Management System
ISO	International Organization for Standardization
km	kilometers
lb	pounds
LL	Lessons Learned
MEI	maximally exposed individual
mg/L	milligrams per liter
MOA	memorandum of agreement
mrem	millirems
mSv	milisievert
MBTA	Migratory Bird Treaty Act
N	nitrogen
N/A	not analyzed
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
NS	not sampled
pCi/L	picocuries per liter
QA	Quality Assurance
RAC	Remedial Action Contractor
RCRA	Resource Conservation and Recovery Act

Acronyms and Abbreviations (continued)

REM	roentgen equivalent man
RRM	residual radioactive material
SDWA	Safe Drinking Water Act
SME	subject matter expert
Sv	sievert
TAC	Technical Assistance Contractor
TSCA	Toxic Substances Control Act
U	uranium
UAC	Utah Administrative Code
UDEQ	Utah Department of Environmental Quality
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
USC	United States Code
USACE	United States Army Corps of Engineers
yr	year

Executive Summary

The Annual Site Environmental Report (ASER) serves as the principal document for communicating environmental protection performance information to the public. It is also the primary mechanism for documenting compliance with U.S. Department of Energy's (DOE's) requirements for radiation protection of the public and environment at its sites.

This ASER presents information pertaining to environmental activities conducted on the DOE Moab Uranium Mill Tailings Remedial Action (UMTRA) Project during calendar year 2018. This report includes Project activities conducted at the Moab site located near Moab, Utah, or the Crescent Junction, Utah, disposal site, located approximately 30 miles north of the Moab site.

There are four major programs for the Project including: Environmental Compliance, Environmental Radiological Protection, Groundwater, and Quality Assurance (QA). Brief descriptions of these programs are provided below.

Environmental Compliance Program
The Project must operate in compliance with various federal environmental statutes, some of which are enforced at the state level through permits. During 2018, the Project remained in compliance with all regulations and permits, and there were no notices of violation. Section 2.0, Compliance Summary, addresses principle regulatory requirements and the status of implementation of each on the Project.

Environmental Radiological Protection Program
The Project monitors radiological emissions and effluents to ensure DOE activities are protective of the public and the environment. The environmental air monitoring network consists of on-site and off-site sampling locations. The Project monitors concentrations of radon and direct gamma radiation and selected airborne radioparticulates. Samples are collected quarterly at 36 locations.

Groundwater Program
The Groundwater Program at the Moab site is designed to limit ecological risk from contaminated groundwater discharging to the Colorado River. River protection is accomplished through a multifaceted approach. An interim action (IA) groundwater remediation system includes extraction of contaminant mass, primarily ammonia and uranium, near the uranium mill tailings pile and injection of fresh water closer to the river to protect suitable habitat areas for endangered fish species. Groundwater and surface water monitoring measures IA system performance. During 2018, operation and monitoring of the IA system continued.

QA Program
The Project ensures the quality of its environmental data through implementation of contractor QA Plans, which include validation of data collection and sample analysis.

Environmental Management System
DOE sites must use an Environmental Management System (EMS) as a platform to implement programs with objectives that contribute to sustainability goals.

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 minimize wastes. DOE's EMS integrates key elements into the core functions of the contractors' Integrated Safety Management System (ISMS) to ensure continuous improvement.

Key Activities in 2018

The Project shipped more than 468,000 tons of residual radioactive material (RRM) from the Moab site to the Crescent Junction disposal site during 2018. The cumulative total through 2018 was 9.4 million tons.

The Project purchased new equipment, including 51 shipping containers, six trailers, and four trucks.

Document Availability

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

U.S. Department of Energy
200 Grand Avenue, Suite 500
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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 *publicaffairs@gjemtac.doe.gov.*

1.0 Introduction

1.1 Site Locations

The Moab site is located about 3 miles northwest of Moab in Grand County, Utah (Figure 1). The 480-acre site is bordered on the north and west by sandstone cliffs. U.S. Highway 191 (US-191) parallels the northern site boundary, and State Route 279 transects the western portion of the property. Arches National Park has a common property boundary with the Moab site north of US-191. The Colorado River forms the eastern boundary. The Moab Wash, an ephemeral stream, runs northwest to southeast through the site and joins the Colorado River. The Scott M. Matheson Wetlands Preserve lies directly across the river from the site. Figure 2 shows Moab site features.

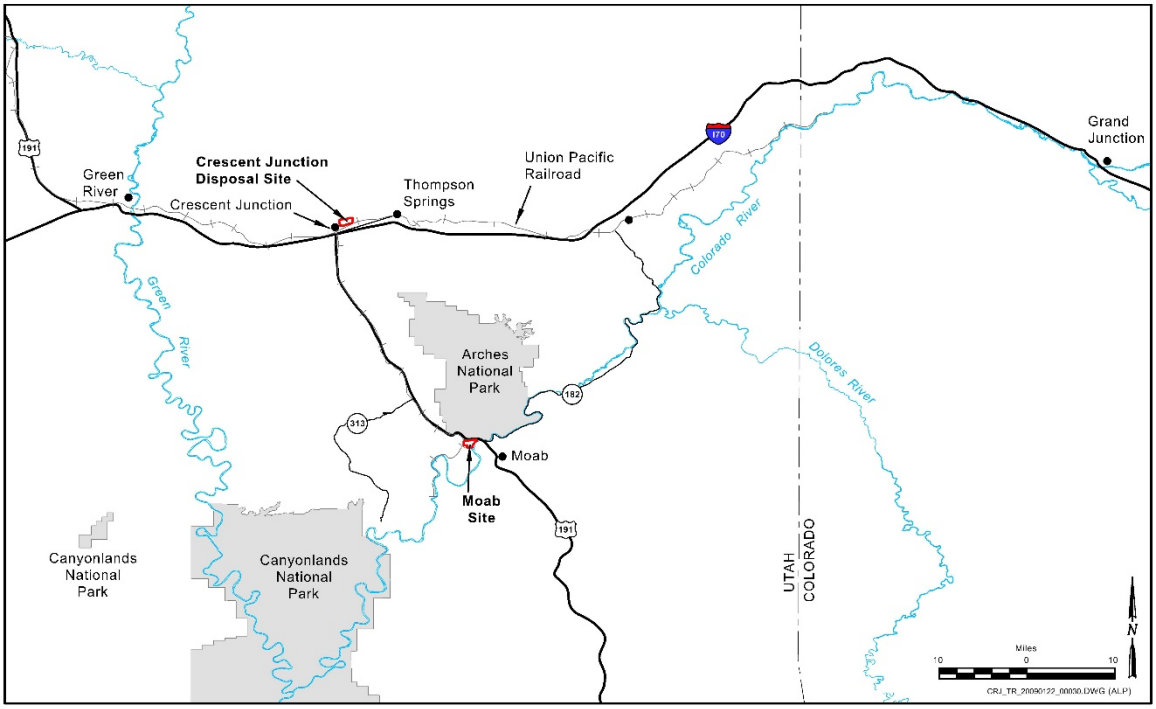

Figure 1. Location of Moab and Crescent Junction Sites

The Crescent Junction disposal site is also located in Grand County, northeast of the junction of Interstate 70 and US-191, approximately 30 miles north of the Moab site (Figure 1). 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 (beginning in 2009) near Crescent Junction for the disposal cell and surrounding support areas. Figure 3 shows Crescent Junction site features.

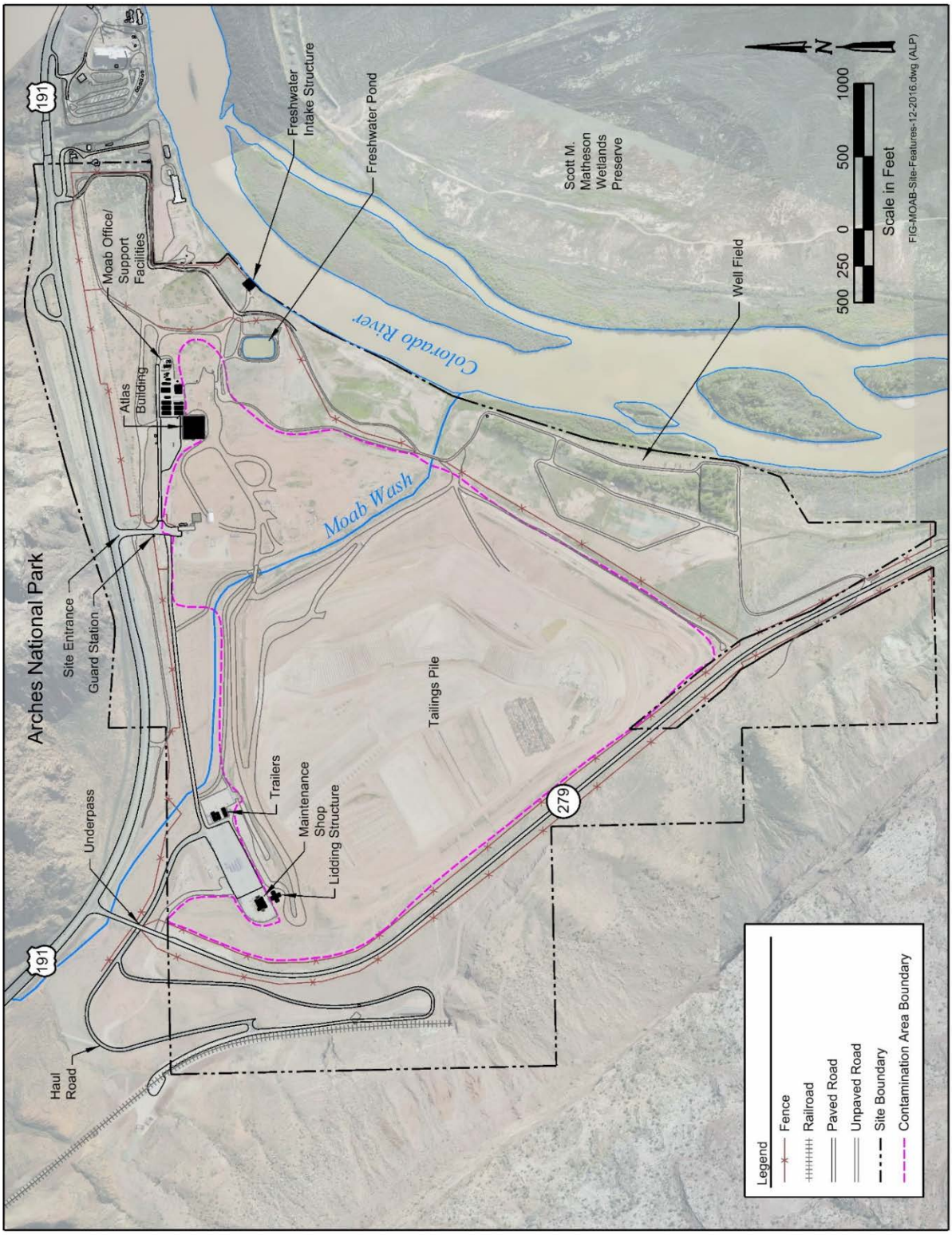

Figure 2. Moab Site Features

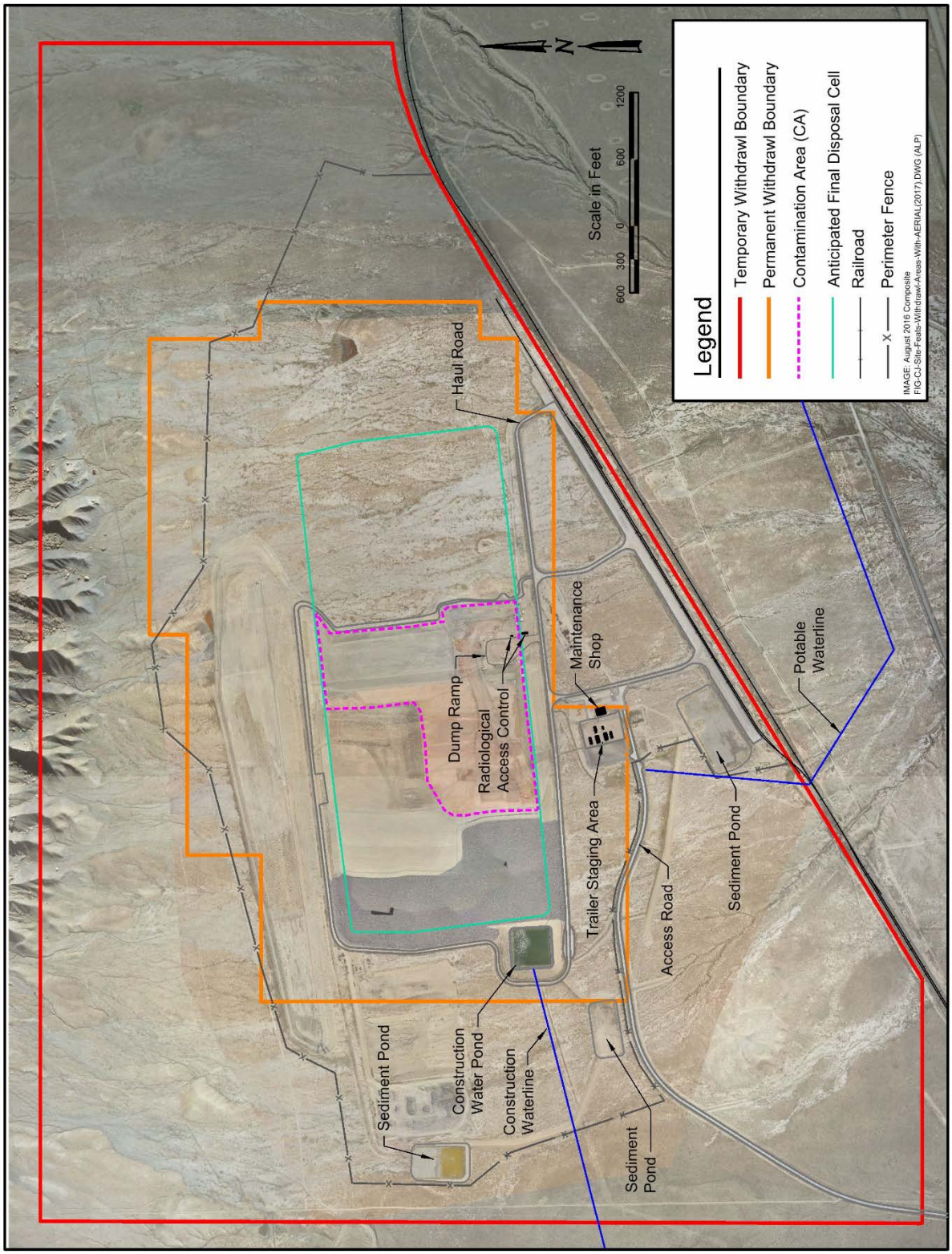

Figure 3. Crescent Junction Site Features

1.2 Site History

The Moab mill operated under various private owners from 1956 through 1984. The tailings created by the milling operations were pumped to an unlined impoundment in the western portion of the property. The tailings accumulated over time, forming a pile up to 90 feet thick. The eastern toe of the pile lies 750 feet from the Colorado River. When processing operations ceased, an estimated 16 million tons (12 million cubic yards) of RRM were present in the pile, which occupied about 130 acres at the site. An interim cover was placed on the pile in 1995.

Congress enacted the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Public Law 106-398), and in October 2001, ownership and cleanup responsibility for the Moab site were transferred to DOE. The Project is managed by the DOE Office of Environmental Management (EM) located in Grand Junction, Colorado (see Figure 1). 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).

In July 2005, DOE published the *Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah, Final Environmental Impact Statement* (FEIS) (DOE/EIS-0355). The FEIS presented the preferred remediation alternatives. In September 2005, DOE issued the *Record of Decision for the Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah* (6450-01-P), which detailed the selection of the preferred alternatives and basis for that decision. The first phase of the disposal cell was constructed in 2008; RRM shipments to the cell began in April 2009.

1.3 Project Mission

The mission of the Moab Project is to safely relocate uranium mill tailings and other process-related wastes, collectively known as RRM, from the former uranium ore-processing facility (millsite), and off-site contaminated properties known as vicinity properties in Moab, to an engineered disposal cell constructed near Crescent Junction. The RRM is primarily transported by rail. The mission also includes active remediation of contaminated groundwater at the Moab site.

1.4 Primary Operations and Project Activities

Primary operations and Project activities at the sites include:

- Excavating and conditioning RRM at the Moab site.
- Transporting RRM to the Crescent Junction site by rail.
- Excavating the Crescent Junction disposal cell.
- Placing and compacting RRM from the Moab site and vicinity properties in the cell.
- Placing interim and final cell cover layers.
- Operating an IA groundwater remediation system at the Moab site, including groundwater extraction and freshwater injection.
- Monitoring contaminants of concern in air, soil, groundwater, and surface water.
- Revegetating and maintaining vegetation in remediated areas.

1.5 Environmental Setting

Climate

The climate of the Moab and Crescent Junction sites is semi-arid. At the Moab site, the 2018 average annual temperature was approximately 58ºF. January was the coldest month, with low temperatures averaging 20ºF, and July was the warmest month, with high temperatures averaging 101ºF. The total rainfall was approximately 11 inches. At the Crescent Junction site, the average annual temperature was approximately 54ºF. January was the coldest month, with low temperatures averaging 17ºF, and July was the warmest month, with high temperatures averaging 100ºF. The total rainfall was approximately 13 inches.

Geology and Hydrology

The primary hydrogeologic unit present at the Moab site consists of unconsolidated alluvium on the valley floor flanked by consolidated sandstones and shale on the canyon walls. The Moab site is susceptible to flooding from the Colorado River during runoff of spring snowmelt in the Rocky Mountains and from thunderstorms in the drainage basin of the Moab Wash.

The Colorado River generally reaches a maximum flow between late May and early June. Groundwater underlying the site moves from north to south, discharging to the Colorado River.

The Crescent Junction site is on a gently south-sloping surface of unconsolidated alluvium underlain by consolidated Mancos Shale. The site lies at the base of the Book Cliffs to the north. Surface drainage flows to ephemeral washes located to the south of the site that ultimately drain to the Green River. Groundwater underlying the Crescent Junction site occurs intermittently in sand lenses in the alluvium and in fractures in the Mancos Shale.

1.6 Area Demographics

Moab is the Grand County government seat and the principal city of southeastern Utah, with a population of about 5,322 (2018 estimate, U.S. Census Bureau, *https://factfinder.census.gov*). In addition to Moab, the communities of Crescent Junction and Thompson Springs, also in Grand County, are affected by relocation of RRM to the Crescent Junction site.

The population of Grand County is about 9,764 (2018 estimate U.S. Census Bureau). 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.

2.0 Compliance Summary

UMTRCA required the promulgation of cleanup standards now codified by the U.S. Environmental Protection Agency (EPA) at Title 40 Code of Federal Regulation Part 192 (40 CFR 192), "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," and assigned the U.S. Nuclear Regulatory Commission to oversee the cleanup and issue licenses for the completed disposal cells.

RRM at the Moab site contains contaminants in concentrations that could be hazardous to the environment and public health and that exceed EPA standards. Remediation of the Moab site and disposal at the Crescent Junction site are conducted in compliance with these standards.

RRM, specifically defined in 40 CFR 192.01, "Definitions," is waste that DOE determines is radioactive and related to the milling process. RRM requiring cleanup at the Moab site includes uranium mill tailings, contaminated soil, debris from dismantling the mill buildings and associated structures, equipment, remnants of processing ponds, disposal trenches, and other wastes.

2.1 Compliance Status

The Project is committed to protecting the environment while conducting its mission. It operated without any notices of environmental violations during 2018. Table 1 summarizes federal and state environmental regulations and their implementation status on the Project.

2.2 Other Major Environmental Issues and Actions

DOE uses external and internal assessments, surveillances, and management assessments to evaluate environmental compliance and implement corrective actions. The Project QA organization performed and/or coordinated assessments in 2018 to verify system descriptions and compliance with procedures and regulations.

Adapting to Climate Change

The Project actively controls the water level in the Moab freshwater pond and the Crescent Junction construction water pond, reducing the Project's vulnerability during drought conditions. Waste storage areas have been designed in a conservative manner to better withstand beyond-design-basis storms.

Due to the comparatively short-term completion date for the Project, no additional climate change adaptation efforts are currently planned; however, the Project's environmental control plans are annually reviewed and revised as needed based upon changing weather conditions. Drought response activities were added to the December 2018 revision of the *Moab UMTRA Project Flood and Drought Mitigation Plan* (DOE-EM/GJ1640).

2.3 Continuous Release Reporting

Not applicable to the Project.

2.4 Unplanned Releases

No unplanned radiological or non-radiological releases occurred in 2018.

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

Federal or State Requirement	What it Covers	2018 Implementation Status
Environmental Restoration and Waste Management		
RCRA, FFCA	RCRA governs the generation, storage, handling, and disposal of hazardous wastes. In 1992, RCRA was amended by the FFCA, which required DOE to take a number of actions to manage mixed waste handled at its facilities.	All waste generated within the Moab site 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. During 2018, no RCRA wastes were generated outside the CA. The Project maintains a Very Small Quantity Generator status.
NEPA	NEPA requires federal agencies to follow a prescribed process to anticipate impacts on the environment of proposed major federal actions and alternatives. DOE codified its implementation of NEPA in 10 CFR 1021, "National Environmental Policy Act Implementing Procedures."	NEPA reviews have been conducted periodically to ensure proposed Project activities are within the original bounds of the FEIS. During 2018, site operations were conducted in accordance with NEPA.
TSCA	TSCA was enacted to regulate the manufacturing and distribution of certain chemical substances and/or mixtures. TSCA specifically addresses the importation, use, and disposal of asbestos, polychlorinated biphenyls, radon, and lead-based paint.	All waste generated within the Moab site CA is considered RRM, the cleanup and management of which is regulated by UMTRCA, not TSCA; however, waste generated outside the CA is considered non-RRM and, therefore, can be regulated by TSCA. During 2018, no TSCA wastes were generated outside the CA.
FIFRA	FIFRA governs the distribution, sale, and use of pesticides. This Act categorizes pesticides as either restricted or general use.	During 2018, general use pesticides were applied at the Moab and Crescent Junction sites.
Radiation Protection		
UMTRCA, Floyd D. Spence Act	Title I of UMTRCA requires DOE to establish a remedial action program and authorizes DOE to stabilize, dispose of, and control RRM, including contaminated groundwater, in accordance with cleanup standards promulgated in 40 CFR 192. UMTRCA is the primary law governing site cleanup and disposal for the Project.	During 2018, the Project excavated and disposed of RRM and remediated contaminated groundwater in compliance with 40 CFR 192.

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

Federal or State Requirement	What it Covers	Implementation Status
Radiation Protection (*continued*)		
DOE O 458.1 Admin Chg 3, "Radiation Protection of the Public and the Environment"	DOE O 458.1 is the key DOE order for public radiation protection. The order establishes requirements for DOE operations to protect members of the public and the environment from undue risk from radiation.	During 2018, the Project monitored radiological emissions and effluents. Project activities did not result in any dose to the public that exceeded the limits in DOE O 458.1.
DOE O 435.1, "Radioactive Waste Management"	This order was implemented to ensure all DOE radioactive waste is managed in a manner that protects workers, public health and safety, and the environment.	During 2018, the Project managed RRM in compliance with DOE O 435.1.
AEA	The AEA requires the management, processing, and utilization of radioactive materials in a manner that protects public health and the environment.	UMTRCA amended the AEA and authorized the EPA to establish health and environmental standards for the disposal of uranium mill waste.
Air Quality and Protection		
CAA	CAA establishes the requirements for facility air quality and air emissions.	The CAA is enforced at the state level through fugitive dust control plans prepared for the sites.
UAC R307-205-8,"Emission Standards; Fugitive Emissions and Fugitive Dust; Tailings Piles and Ponds"	This state administrative code establishes minimum work practices and emission standards for sources of fugitive emissions and fugitive dust.	During 2018, EPA Method 9-certified individuals diligently monitored fugitive dust emissions and implemented controls outlined in the site fugitive dust control plans.
40 CFR 61, NESHAP	The CAA establishes emission standards for hazardous air pollutants associated with various industrial processes codified as NESHAP.	The Project is not required to report under the NESHAP program as there are no NESHAP-regulated air emissions associated with the Project sites.
Water Quality and Protection		
33 USC 1251, CWA/NPDES	Under the CWA, the NPDES 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 U.S. surface waters. The federal discharge requirements are implemented by UPDES, an equivalent state system.	As required by UPDES Storm Water General Permits (see Table 2), DOE prepared and continues to implement site storm water pollution prevention plans. The NOI was renewed for 2018 by UDEQ. During 2018, no discharges were noted under UPDES.

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

Federal or State Requirement	What it Covers	Implementation Status
Water Quality and Protection (*continued*)		
Storm Water Management and EISA	Under Section 438 of EISA, federal agencies have requirements to reduce storm water runoff from federal development projects to protect water resources.	During 2018, the Project conducted biweekly inspections to ensure storm water controls were intact and storm water runoff was managed according to the plans.
42 USC 300f, SDWA	The SDWA establishes minimum drinking water standards and monitoring requirements.	The provisions of the SDWA are not directly relevant to the Project sites because neither groundwater 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. During 2018, a Temporary Change Application was received from the Utah Department of Natural Resources, Division of Water Rights (see Table 2).
Other Environmental Statutes		
U.S. DOT Special Permit	Authorizes the transportation in commerce of non-DOT-specification bulk packages containing RRM from the Moab site and vicinity properties to the Crescent Junction disposal cell.	During 2018, the Project remained in compliance with the Special Permit.
DOE O 231.1B Admin Chg 1, “Environmental, Safety and Health Reporting”	DOE O 231.1B requires timely collection, reporting, analysis, and dissemination of data on environmental issues that could adversely affect the health, safety, and security of the public or workers, the environment, DOE operations, or DOE credibility.	This ASER summarizes Project environmental activities and protection performance during 2018.
NHPA	MOAs are in place among DOE, the Utah State Historic Preservation Office, the Utah DOT, and the Bureau of Land Management for protection of cultural and historic resources at the Project sites.	In 2018, an annual cultural resource inventory was performed at the Crescent Junction site for Native American art sites. An annual report was prepared and submitted in accordance with the applicable MOA, documenting that no additional impacts or mitigation were noted. The conditions of the Moab site MOA have been previously met.

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

Federal or State Requirement	What it Covers	Implementation Status
Other Environmental Statutes (*continued*)		
ESA	The ESA prohibits activities that would jeopardize the continued existence of an endangered or threatened species or cause adverse modification to a critical habitat.	The Project reviewed work activities for potential impacts on threatened or endangered species. The Biological Opinion anticipates three age-0 Colorado pikeminnow, one age-0 humpback chub, one age-0 razorback sucker, and one age-0 bonytail chumcould be taken annually through the completion of remediation. No known take occurred in 2018. Critical fish habitat was protected by interception of contaminated groundwater and injection of fresh water in wells near the Colorado River.
E.O. 13751, "Safeguarding the Nation from the Impacts of Invasive Species"	E.O. 13751 calls on federal agencies to prevent the introduction, establishment, and spread of invasive species and to eradicate and control populations of invasive species that are established.	Invasive weeds are controlled with bio-based herbicides and mechanical methods. Section 3.2 summarizes the Project's invasive weed control efforts.
MBTA	The MBTA implements various treaties and conventions among the U.S. and several other countries for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds, their body parts, nests, or eggs is unlawful.	During 2018, no endangered, threatened, or candidate species were noted on the Project sites.
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 resource protection laws, regulations, and DOE requirements.	The Project developed an annual Site Sustainability Plan and has implemented an EMS that has been incorporated in contractors' ISMS to promote sound stewardship practices and to ensure compliance with this order.
42 USC 11001, EPCRA	EPCRA requires facilities with large quantities of hazardous or toxic chemicals, including petroleum products, to prepare emergency plans and report their inventories to EPA, the state, and local emergency planning groups.	The Project operated in accordance with emergency planning and reporting requirements and submitted Tier II Emergency and Hazardous Chemical Inventory Reports for 2018.

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

Federal or State Requirement	What it Covers	Implementation Status
Other Environmental Statutes (*continued*)		
EO 11988, "Floodplain Management"	DOE's implementing regulations in 10 CFR 1022, "Compliance with Floodplain and Wetland Environmental Review Requirements," identify the requirements of EO 11988 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 2018 were limited to irrigation and weed control.
EO 11990, "Protection of Wetlands"	10 CFR 1022 implements the requirements of EO 11990 for actions that may affect wetlands.	Project activities performed in 2018 that could enhance jurisdictional wetlands included storm water controls, revegetation, and erosion control. A 404 permit is pending closure based on success criteria concerning revegetation.

2.5 Summary of Permits

Table 2 shows the permits that were active for the Project during 2018.

Table 2. Active Permits for the Moab Project

Permits	Issuing Agency	No. of Permits
UPDES Storm Water General Permits: Moab UTR359185 Crescent Junction UTR359187	State of Utah, Department of Environmental Quality, Division of Water Quality	2
Temporary Change Applications to change points of diversion to support groundwater 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, and gates	State of Utah, U.S. DOT	8
Special Permit SP-14283 for DOE to transport RRM and party status for the RAC	U.S. DOT	1
Scientific Research and Collecting Permit ARCH-2018-SCI-0003	National Park Service	1
Asbestos Landfill Permit	State of Utah, Department of Environmental Quality, Division of Air Quality	1
Conditional Use Permit	Grand County Council	1
404 Permit to construct and maintain pump station on the Green River SPK-2007-632	U.S. Army Corps of Engineers	1

3.0 Environmental Management System

The framework of the Project's EMS is based on the "Plan-Do-Check-Act" cycle of the International Organization for Standardization (ISO) Standard 14001:2015, "Environmental Management Systems," to ensure continuous improvement. The Project's EMS is addressed in the first three core functions of ISMS: define the scope of work, analyze the hazards, and develop and implement hazard controls. Once implemented, programs must be assessed and any problems corrected to improve the effectiveness of the management system and to improve environmental, safety, and health performance.

The EMS implementing programs, processes, and procedures define how the DOE, as implemented by the Technical Assistance Contractor (TAC) and Remedial Action Contractor (RAC), integrates environmental management controls into work activities, and oversees implementation of EMS within EM federal and contractor activities. The EMS dictates environmental and sustainability values for ensuring protection to the environment, worker, and public health, consistent with the requirements of ISO 14001:2015 and DOE Order 436.1, "Departmental Sustainability."

The main objectives of the EMS are as follows:

- Implement, maintain, and continually improve the EMS.
- Execute conformance to ISO 14001:2015.
- Establish roles and responsibilities for key management and EMS positions.
- Implement a standardized method to incorporate environmental concerns into the Moab UMTRA Project utilizing the ISO 14001:2015 EMS as a guide.
- Identify and comply with all applicable environmental laws, regulations, and other requirements.
- Support and implement the Moab UMTRA Project Environmental Policy.
- Adhere to the DOE's ISMS with all work-related safety and compliance controls.

These objectives apply to everyone working on behalf of DOE. All employees and subcontractors are expected to comply with environmental requirements dictated in the EMS and report environmental concerns to management. Managers promote environmental stewardship, site-wide sustainability practices, and take prompt action to address concerns.

The 2018 EMS goals included greenhouse gas reduction and increased clean and renewable energy, water use efficiency and management, fleet management, sustainable acquisition, pollution prevention, electronic stewardship, and climate change resilience.

The electrical exterior lighting was updated at the Crescent Junction site from high-pressure sodium wall packs to LED wall packs with 30-year life spans. These wall packs will contribute to more efficient lighting sources, longevity, and a cost savings of approximately $36.14 per wall pack annually.

The Revegetation team utilized subject matter experts (SMEs) to help identify the most suitable vegetation for site characteristics and to develop a plan for an overall reduction in irrigation for both short- and long-term maintenance and irrigation needs. Staff identified several revegetated areas that no longer required irrigation and removed them from the watering schedule, which notably reduced non-potable water use.

Low-capacity water trucks were replaced with a more efficient, higher-capacity water wagon. The water wagon requires fewer water applications and has a wider area of influence per application.

Composted tree trimmings from on-site pruning/thinning activities were used to create a soil amendment for revegetation areas to promote moisture retention.

In 2018, two Project EMS conformance reviews were performed; one internal and one independent. They provided evidence that operations and EMS processes are in conformance with the requirements of DOE O 436.1 and ISO 14001:2015. The reviews encompassed all facets of the environment affected by work conducted on behalf of the Project.

There were no non-conformances identified during the independent conformance review, and the EMS received a positive recommendation for conformance to the standard.

As part of its planning process, the Project uses an environmental aspects checklist to consider environmental and human health impacts (adverse or beneficial) of potential new activities. The Project determines the likelihood of an environmental aspect that could occur and the consequences if it does. The Project also determines if the environmental aspect is significant, aspects that have or could have a significant impact on the environment, the Project, or the Project's mission. In 2018, the Project considered environmental aspects of new activities, but none were determined significant.

In 2018, the EMS improved aspects in the following areas:

- Reduced risk to the facility by meeting compliance obligations.
- Increased fiscal efficiency through on-site composting operations, reuse/recycling of materials.
- Greater recognition of environmental issues by presenting monthly compliance/environmental topics to project employees.
- Empowerment of individuals to contribute to improving the organization's environmental footprint through the Project Environmental Policy, engagement with internal stakeholders, and team meetings to discuss Project environmental issues.
- Improved community relations through presentations at county meetings, communication with the Grand County UMTRA Liaison, joining the local Canyon Country Ecological Working Group, presenting to youth at the Western Colorado Children's Water Festival, and providing feedback on the Colorado River Management Plan.

In 2018, the EMS had an impact on environmental issues including:

- Improved overall compliance management through on-site visits and open communication with regulatory officials.
- Improved personnel health and safety through compliance training, by incorporating environmental hazards and controls into the Integrated Work Planning process, spill prevention controls, and complying with Hazardous Communication protocol.
- Followed best management practices for all storm water controls.

- Improved air and water quality through analytical sampling, data validation, and analysis.
- Minimized waste through recycling and compositing.
- Minimized water use through the use of native, drought-resistant plants for revegetation activities.
- Improved fuel economy through ride-sharing between Project locations.

3.1 Environmental Operating Experience and Performance Measurement

Environmental operating experience and performance measurement is an integral component of an EMS. Environmental operating experience and sharing of lessons learned (LL) are consistent with the purpose and objectives of DOE O 210.2A, "DOE Corporate Operating Experience Program." LL are derived from work activities, assessments, and events, both positive and negative, which can be used to enhance or improve all aspects of operations. When lessons are learned at DOE sites, they are documented and shared so others can learn from them. The DOE LL database is reviewed weekly and applicable LL are distributed to managers for incorporation in work planning.

Environmental performance is monitored, evaluated, and measured through contractor QA plans and contractor assurance systems. They establish comprehensive and integrated oversight processes to ensure work performance meets applicable requirements for environment, safety, and sustainability. In addition, any opportunities to meet EM and/or Project goals utilizing green and sustainable remediation are evaluated in part based upon a balance of environment, social, and economic factors for a holistic approach.

To implement a comprehensive EMS for the Project in accordance with DOE O 436.1, the EMS provides requirements and responsibilities for managing and achieving sustainability goals. The Project's sustainability goals, performance status, and planned actions toward meeting the goals are updated annually.

3.2 Accomplishments and Recognition

Revegetation efforts have recently focused on drought-tolerant, native plant species. The Project plants vegetation to promote a diverse and healthy ecosystem. Revegetation personnel worked with a local SME to determine which plant species were best suited for site conditions.

The Moab site has several invasive species prevalent throughout the southwestern United States. Due to the large amount of soils that have been disturbed by remediation activity, many undesirable flora species have spread.

Invasive species and noxious weeds include: salt cedar (*Tamerix aphylla*), cheatgrass (*Bromus tectorum*), Russian thistle (*Kali tragus*), kochia (*Kochia scoparia*), Canada thistle (*Cirsum avense*), diffuse knapweed (*Centaurea diffusa*), field bindweed (*Convolvulus arvensis*), Russian olive (*Elaeagnus angustifolia*), yellow toadflax (*Linaria vulgaris*), and leafy spruge (*Euphorbia esula*).

Most of these species thrive in soils that are high saline and thin in organics. The Revegetation team worked to control noxious weeds with bio-herbicide and mowing. When possible, noxious weeds are eliminated before they drop seeds, which mitigates their prevalence.

4.0 Environmental Radiological Protection Program and Dose Assessment

4.1 Radiological Discharges and Doses

This section presents results of the calculated radiation dose to the public from Project operations in 2018. Compliance with DOE O 458.1 may be demonstrated by calculating the dose to the maximally exposed individual (MEI), the representative person or group from the public likely to receive the most radiation dose based on exposure pathways and parameters.

The Project establishes an MEI for each site. The maximum dose the public receives is calculated based on MEI data. The DOE public dose limit is 100 millirems/year (mrem/yr) above background received through all the pathways, such as inhalation, ingestion, and direct radiation. A summary of the public radiation dose applicable to both the Moab and Crescent Junction sites compared to the DOE public dose limit is shown in Table 3.

The estimated collective dose is the sum of doses to all members of the public within the defined distance established in Table 3. To calculate the estimated collective dose, the maximum annual dose to MEIs was multiplied by the population within 50 miles from the sites and divided by 1,000.

Because the Moab Project includes the Moab and Crescent Junction sites, which both have a calculated dose to the MEI, the average of the two sites was used to represent the overall Project dose to the public. The MEI dose for both sites is presented in quarterly air monitoring reports found on the Project website *(https://www.gjem.energy.gov/).*

The estimated background radiation population dose is the amount of radiation occurring naturally in an area. To calculate the estimated background radiation population dose, the average gamma radiation background at both sites was multiplied by the population and divided by 1,000.

Table 3. Moab Project 2018 Public Radiation Dose

Pathway	Maximum Annual Dose to MEIs in mrem (mSv)	% of DOE 100 mrem/yr Limit	Estimated Collective (Population) Dose in person-rem (Sv)	Population Within 50 miles (~80 km)	Estimated Bkgd Radiation Population Dose in person-rem
Air	23.7 (0.237)	23.7	384 (3.84)	~16,600	1,448
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	23.7 (0.237)	23.7	384 (3.84)	~16,600	1,448

Note: Calculations are divided by 1,000 to convert the units from rem to mrem and Sv to mSv.
The air pathway includes inhalation and direct gamma radiation.

4.2 Clearance of Property Containing RRM

Remediation of Moab site contaminated soils (off-pile areas) not associated with the tailings pile and of vicinity properties is part of the Project scope to reduce potential health and environmental risks from historical uranium ore processing at the site. In 2018, DOE did not perform any off-pile or vicinity property remediation.

4.3 Radiation Protection of Biota

DOE O 458.1 requires protection of biota from adverse effects due to radiation and radioactive material released from DOE operations. Biota are aquatic animals and terrestrial plants and animals that may be found at the Moab and Crescent Junction sites.

Project activities in the tailings pile at the Moab site are not conducive to fauna migratory patterns nor do they promote habitat formation. Moab RRM contains low levels of radioactivity, and the chemical composition (salt and pH) of the tailings pile materials limits vegetative growth. There are similar conditions at the Crescent Junction site.

The estimated radiological dose to biota from RRM at the Project sites is generally indistinguishable from naturally occurring radioactive material found in the surrounding environment. Therefore, the Project does not currently monitor the effects of radiological doses to biota and has no plan to monitor these effects.

4.4 Unplanned Radiological Releases

No unplanned radiological releases occurred in 2018.

4.5 Environmental Radiological Monitoring

Before tailings removal and disposal operations began, DOE initiated environmental air monitoring at and near the Moab and Crescent Junction sites. This was performed to collect baseline data and assess the potential for radiation dose to members of the public that could result from site operations. The Project's current air monitoring network measures radon, direct gamma radiation, and airborne radioparticulate matter at on-site and off-site locations.

Moab monitoring locations are shown in Figures 4 and 5. Crescent Junction locations are shown in Figure 6. In August 2018, the air particulate sampling equipment was removed from location 0121 due to construction activities at the City of Moab waste water treatment facility.

In addition, radon and gamma radiation detectors were removed from this location during the fourth quarter by unauthorized personnel. An on-site location (0114) was added at the beginning of the fourth quarter 2018 in the well field. Due to limited data, results associated with these locations are not provided in this report.

Environmental air monitoring results are used to demonstrate compliance with DOE O 458.1, which states DOE radiological activities must be conducted in a manner that does not cause an annual total effective dose, including gamma radiation and radioparticulates, to the public to exceed 100 mrem above background.

DOE O 458.1 also specifies releases of radioactive material to the atmosphere from DOE activities shall not exceed an annual average concentration of 3 picocuries per liter (pCi/L) of radon or its decay products (excluding background) at the site boundary.

Background monitoring locations sufficiently removed from the sites were established to ensure air quality is not influenced by airborne contaminants associated with Project operations. Data from stations 0117 and 0123 collected between 2003 and 2008 were used to establish an average background radon concentration in the Moab area of 0.7 pCi/L and a background direct gamma radiation effective dose of 82 mrem/yr.

Data collected from monitoring stations in the Crescent Junction area from 2006 to 2009, before tailings shipments began, were used to establish a background radon concentration of 0.9 pCi/L and a background direct gamma radiation effective dose of 92.5 mrem/yr. The effective background dose from inhalation of radioparticulates was not determined for either site and was assumed to be zero.

Environmental air monitoring data are published in quarterly reports that are posted on the DOE Project website at *www.gjem.energy.gov/* and are available in the Moab public reading room. End-of-year monitoring results for 2018 for the Moab site are shown in Table 4 and for Crescent Junction in Table 5.

4.5.1 Radon

DOE O 458.1 established a limit of 3.0 pCi/L above background for radon concentrations at the DOE property boundary. During 2018, radon was measured at 36 locations (21 on site, 13 off site, and two MEIs) using alpha-sensitive detectors (e.g., radon cups). Radon cups were exposed for a period of approximately three months. After collection, the radon cups were sent to an off-site laboratory for analysis. As shown in Tables 4 and 5, no annual average concentration exceeded the 3.0 pCi/L plus background annual limit at either site at the end of 2018, including the MEI locations.

4.5.2 Direct Gamma Radiation

As uranium decays, several of the decay products emit gamma radiation. RRM at the Moab site is a source of direct gamma radiation. During 2018, direct gamma radiation was also measured at the same 36 locations (21 on site, 13 off site, and two MEIs) using thermoluminescent dosimeters exposed for approximately three months.

On collection, the dosimeters were sent to an off-site laboratory for analysis. These results (Tables 4 and 5) represent the gamma dose an individual would receive from occupying a location for an entire year. As expected, the highest results were associated with locations closest to the tailings pile.

The gamma dose is combined with the air radioparticulate dose to calculate the total effective dose (Section 4.5.4). There are only 13 locations where the air radioparticulate data are collected compared to the 36 locations where gamma doses are measured. Even without adding the radioparticulate dose, it is evident based on the results provided in Table 4 that some of the Moab locations (in particular on-site locations 0109, 0110, and 0112) would exceed the total effective dose limit without adding the dose associated with the radioparticulates. However, the public does not consistently occupy any of these locations, and the MEI is below the annual limit at both sites.

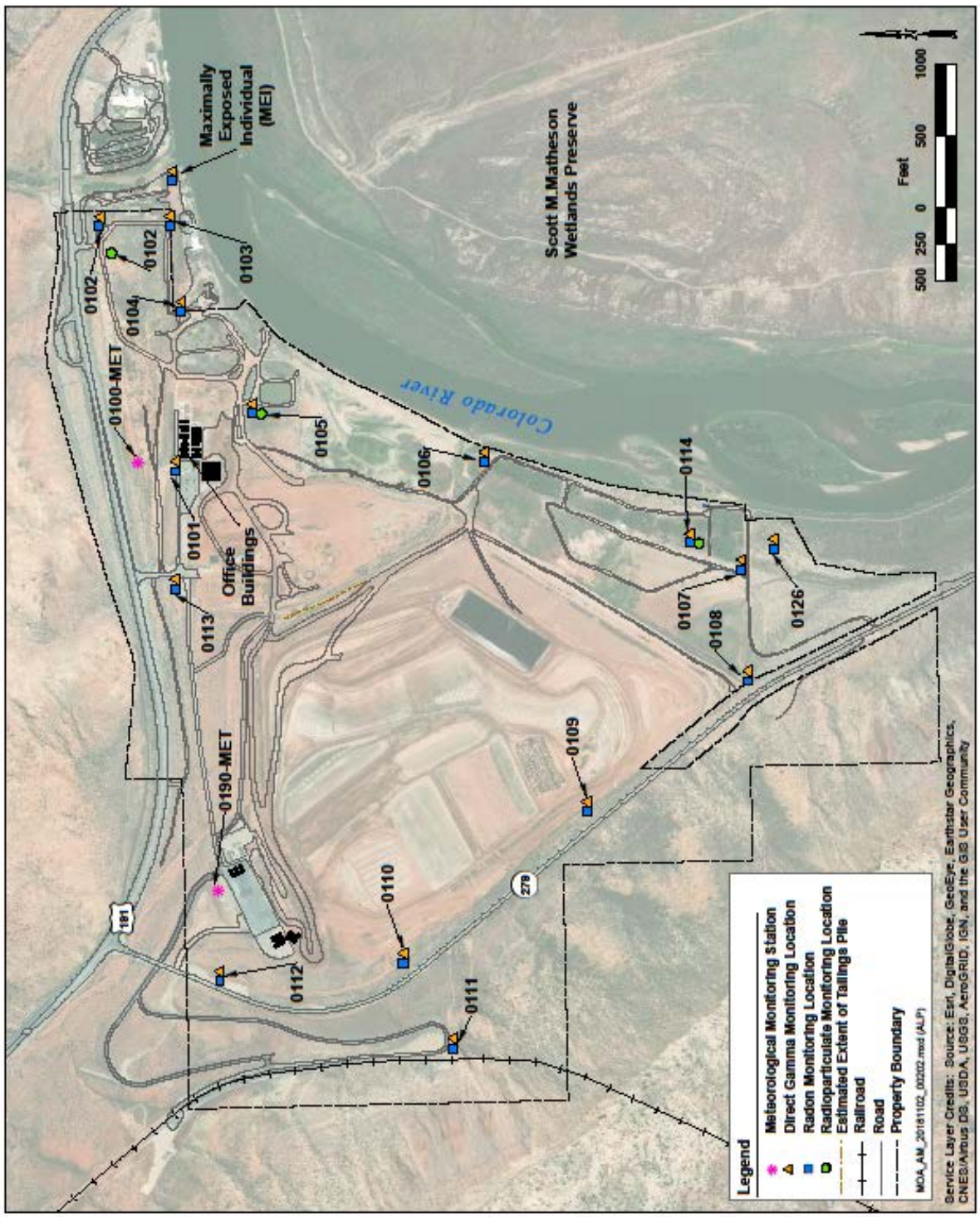

Figure 4. Moab On-site and MEI Environmental Air Monitoring Locations

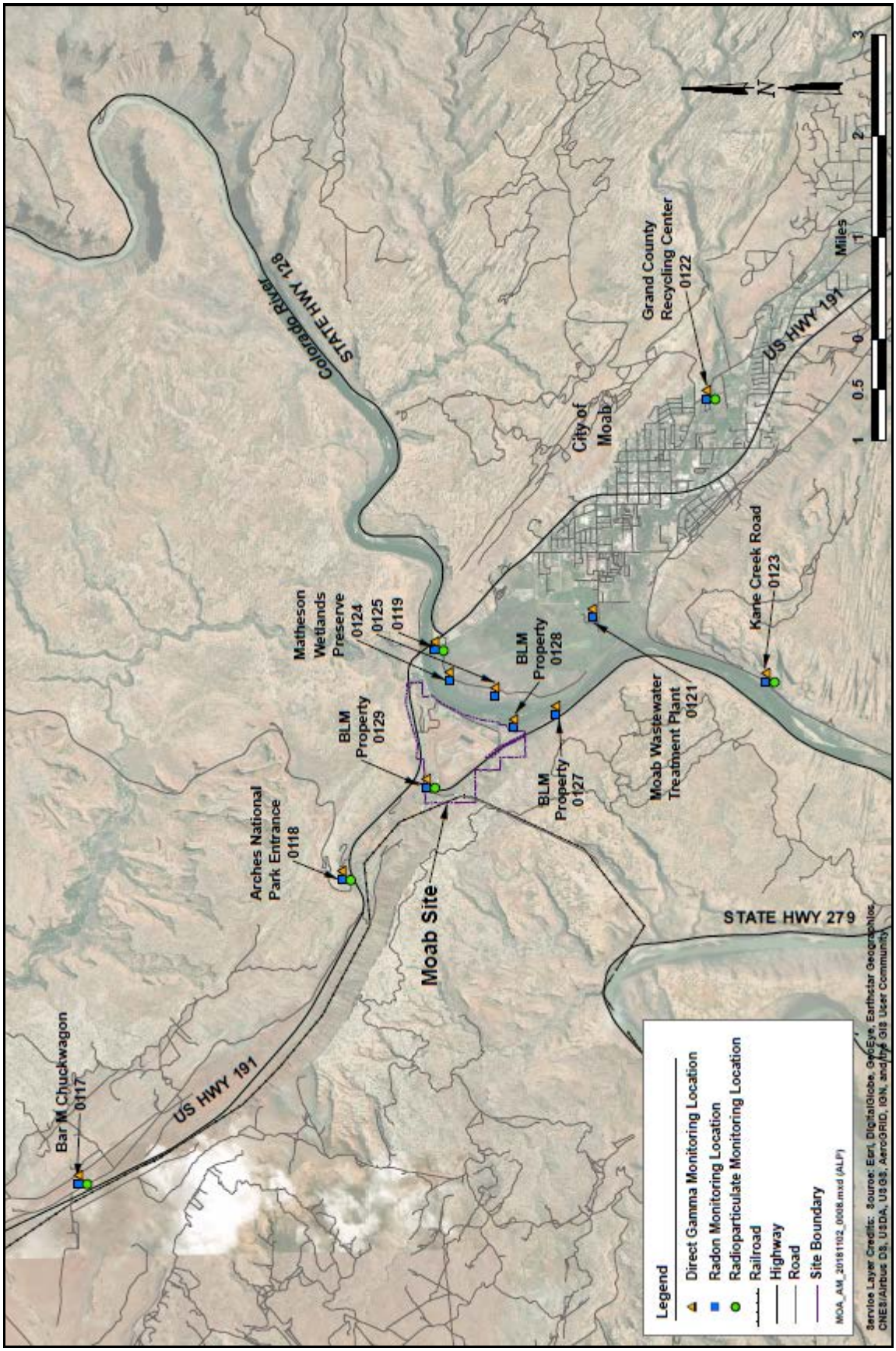

Figure 5. Moab Off-site Environmental Air Monitoring Locations

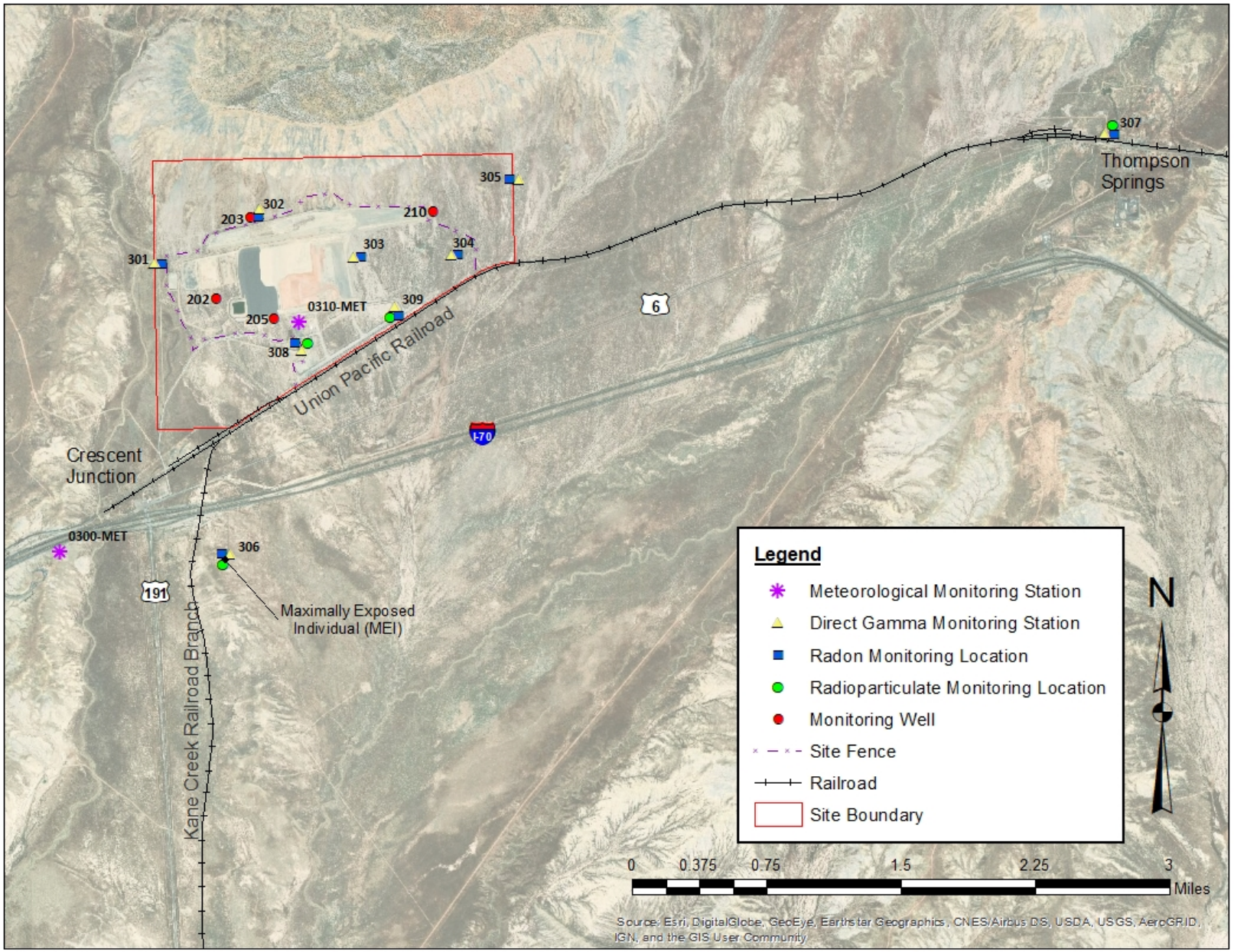

Figure 6. Crescent Junction Site Environmental Air Monitoring Locations

Table 4. Environmental Air Monitoring Data at the end of 2018 for the Moab Site

Station Number	Annual Average Radon Concentration (pCi/L)	Annual Direct Gamma Radiation Effective Dose (mrem/yr)	Annual Radioparticulate Effective Dose (mrem/yr)
On-site Locations			
0101	2.7	172.1	N/A
0102	1.5	99.1	4.17
0103	1.6	102.3	N/A
0104	2.2	114.4	N/A
0105	2.5	106.1	5.90
0106	3.2	141.6	N/A
0107	3.0	120.7	N/A
0108	3.6	176.9	N/A
0109	1.8	466.3	N/A
0110	1.5	414.2	N/A
0111	0.7	150.6	N/A
0112	2.1	199.9	N/A
0113	3.2	173.7	N/A
0126	2.5	117.5	N/A
Off-site Locations			
0117	0.5	105.5	2.92
0118	0.8	99.6	3.60
0119	0.9	100.3	3.42
0122	0.4	83.6	3.39
0123	0.4	89	2.93
0124	1.2	106.3	N/A
0125	1.4	114.3	N/A
0127	1.0	107.8	N/A
0128	2.3	107.4	N/A
0129	1.9	129.4	9.13
MEI[1]	1.4	105.7	4.17[1]

[1]MEI location obtained using closest monitoring station 0102.

Table 5. Environmental Monitoring Data at the end of 2018 for the Crescent Junction Site

Station Number	Annual Average Radon Concentration (pCi/L)	Annual Direct Gamma Radiation Effective Dose (mrem/yr)	Annual Radioparticulate Effective Dose (mrem/yr)
On-site Locations			
0301	0.6	110.6	N/A
0302	0.6	108.3	N/A
0303	0.9	129.6	N/A
0304	0.7	107.6	N/A
0305	0.6	110.3	N/A
0308	2.7	113.1	4.70
0309	1.2	111.9	4.71
Off-site Locations			
0306[1]	0.6	103.0	3.30
0307	0.5	114.3	3.68

[1]MEI location

4.5.3 Radioparticulates

Although the milling process recovered about 95 percent of the uranium, the RRM contains several other naturally occurring radioactive elements. In 2018, air samplers measured radioparticulates at 13 locations (four on site, seven off site, and two MEIs).

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, polonium-210, and actinium-227. It was possible to calculate the protactinium-231 concentration based on the actinium-127 results.

4.5.4 Total Effective Dose

The annual total effective dose at the end of 2018 to the Moab MEI was 27.8 mrem and 13.8 mrem for the Crescent Junction MEI. These values are below the annual limit. These values were calculated by subtracting the background dose of 82 mrem from the Moab MEI gamma radiation dose and the background dose of 92.5 mrem from the Crescent Junction MEI, and then adding the respective radioparticulate doses.

5.0 Environmental Non-radiological Program Information

5.1 Non-radiological Environmental Monitoring

The Project manages storm water at the sites through controls specified in site-specific storm water pollution prevention plans (see Table 1).

Air opacity is monitored at the sites by Project personnel certified to EPA Method 9. When opacity exceeds 20 percent, dust-generating activities stop, and dust control is initiated to minimize fugitive dust.

DOE operates two meteorological monitoring stations at the Moab site and two at or near the Crescent Junction site (see Figures 4 and 6, respectively). These stations enable DOE to monitor site-specific climatic conditions and events and provide a valuable resource for assessing impacts resulting from any unplanned release of airborne contamination.

Meteorological parameters monitored include air temperature, relative humidity, solar radiation, wind speed, wind direction, and precipitation. An extended drought in 2018 impacted the freshwater intake structure. A secondary pump had to be placed to obtain fresh water for site operations. Other than the drought, no abnormal weather events impacted the site.

5.2 Fire Protection Management and Planning

No unplanned wildland fires occurred at the sites in 2018. Dead vegetation, weeds, and windblown materials are cleared near buildings and equipment to minimize fire hazards. Weed control and limited removal of dead vegetation are performed in other areas of the sites.

5.3 Recreational Hunting and Fishing

There is no recreational hunting or fishing allowed on the Project sites.

6.0 Groundwater Protection Program

The groundwater beneath the Moab site was contaminated by former uranium milling operations. The site groundwater meets the criteria of limited-use groundwater due to the natural salt content; therefore, it is not a current or potential source of drinking water. Ammonia and uranium are the primary contaminants of concern.

The main objectives of the Groundwater Program are to reduce the ammonia and uranium contaminant mass and to protect young-of-year endangered fish species in suitable habitats of the Colorado River from site contaminants. The suitable habitat is protected through groundwater extraction near the tailings pile, freshwater injection along the riverbank, and surface water diversion directly to the habitat area.

Figures 7 and 8 show the ammonia and uranium plumes and surface water sampling locations at the Moab site, respectively. The ammonia concentration is highest at the toe of the tailings pile, and the uranium concentration is highest at the toe of the tailings pile and near the vicinity of the former uranium mill, just northeast of the pile.

Monitoring results show the extent of contaminant plumes has not significantly changed in the past five years. Groundwater flow is toward the southeast, discharging to the Colorado River.

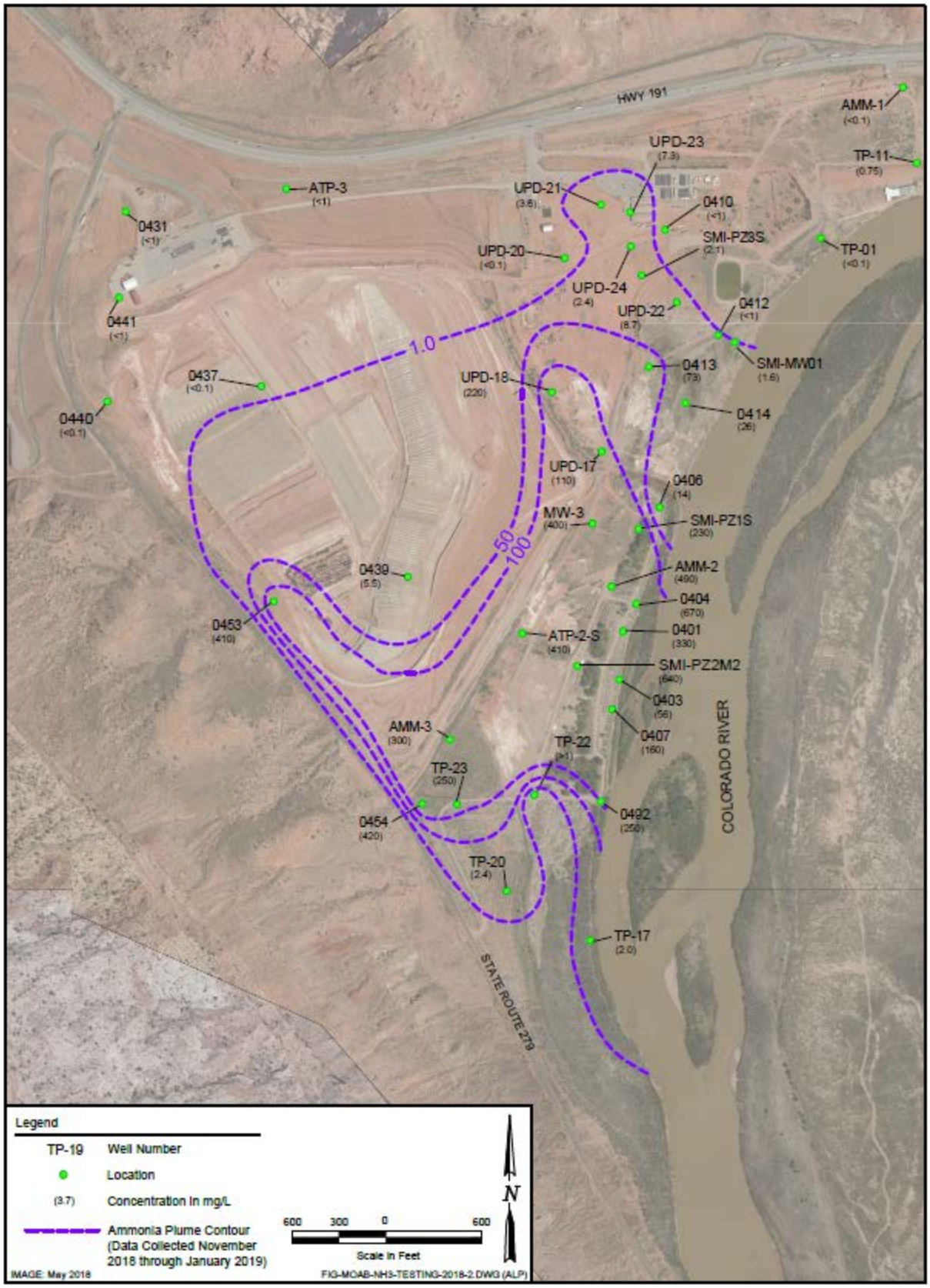

Figure 7. Ammonia Plume Contours and Select Sampling Locations

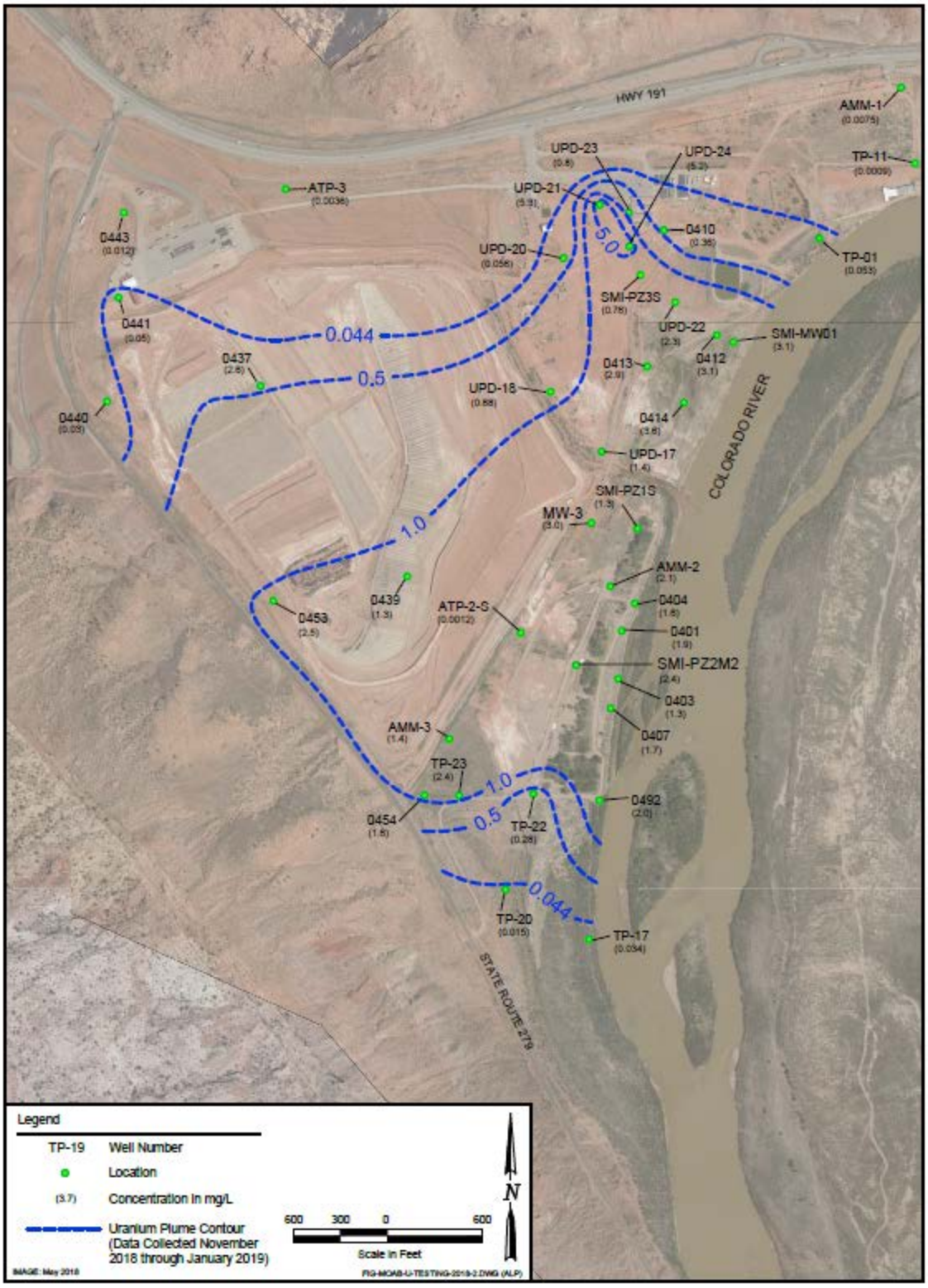

Figure 8. Uranium Plume Contours and Select Sampling Locations

6.1 Groundwater

In 2018, eight extraction wells and 10 injection wells were used to minimize contaminant discharge to the Colorado River. Extracted groundwater was pumped to a water storage tank located on the northeastern side of the tailings pile, where it was used as dust control inside the contamination area. Samples were collected from the extraction wells to assess IA performance, and site-wide sampling events were initiated in June and December to assess contaminant plumes. Groundwater samples were analyzed for ammonia and uranium. Data results from sampling events are available on the Project website *at www.gjem.energy.gov/* and in the Moab public reading room.

Table 6 shows the ammonia and uranium concentrations over the past five years at representative well location 0443, an observation well upgradient of the tailings pile, extraction well 0815, downgradient of the tailings pile, and 0403, an observation well near the riverbank. See Figure 7 for well locations.

Table 6. Representative Groundwater Well Sampling Results over Past Five Years

Year	Well 0443 (73 ft bgs)		Well 0815 (22 - 52 ft bgs)		Well 0403 (18 ft bgs)	
	Ammonia Total as N (mg/L)	U (mg/L)	Ammonia Total as N (mg/L)	U (mg/L)	Ammonia Total as N (mg/L)	U (mg/L)
2014	0.1*	0.01	350	3.1	37	0.36
2015	0.1*	0.01	190	3.3	34	0.20
2016	0.1*	0.01	250	3.7	73	0.37
2017	0.1*	0.01	190	3.0	67	0.35
2018	1.0*	0.01	95	3.2	100	0.93

*denotes the result was at or below detection limit

Well 0443 is not affected by contamination in the tailings pile and shows consistent ammonia and uranium results at the detection limit or representative of natural concentrations. Well 0815 has been affected by the tailings pile. Ammonia concentrations in this well have fluctuated over the past five years. The uranium concentrations in this well are substantially above the UMTRCA water quality standard of 0.044 milligrams per liter (mg/L).

Well 0403 is near the Colorado River and shows the effects of IA activities for both ammonia and uranium. The concentrations at this well are fairly consistent over the five-year period but showed an increase in 2018. Table 7 summarizes the 2018 sampling efforts at the Moab Site. Table 8 shows the ranges of results for positive detection of the two most significant constituents, ammonia and uranium.

Table 7. 2018 Sample Collection/Analysis Summary

Surface Water Samples	
Number of Surface Water Locations	15
Number of Analyses Performed	58
Groundwater Samples	
Number of Locations	82
Number of Analyses Performed	306

Table 8. Sample Result Summary

Ranges of Results		
Analyte	**Minimum (mg/L)**	**Maximum (mg/L)**
Surface Water Samples		
Ammonia	0.1	1
Uranium	0.003	0.009
Groundwater Samples		
Ammonia	0.1	2,800
Uranium	0.0004	9.3

6.2 Surface Water

The Colorado River is the fundamental surface water feature. Ammonia is a concern because of its toxicity to aquatic life. The purpose of freshwater injection is to create a hydraulic barrier between the tailings pile and river side channels where suitable aquatic habitats can form. Injection occurred almost all year, for a total of about 5.6 million gallons of fresh water injected.

Fourteen surface water samples were collected on site, upriver, and downriver (see Figure 8) for laboratory analysis at near peak flow (June) and base flow (December) conditions in 2018. Another eight surface water samples were collected when a suitable habitat (Figure 8) developed. Table 9 shows the un-ionized ammonia concentration at each of these locations and the corresponding EPA acute and chronic criteria. Results from all of the sample locations were less than the EPA criteria.

Table 9. Ammonia Concentrations in Surface Water Samples Compared to EPA Criteria

Location	Date	Ammonia Total as N (mg/L)	EPA - Acute Total as N (mg/L)[1]	EPA - Chronic Total as N (mg/L)[2]
0201	6/11/18	<0.1	3.4	0.32
0201	12/12/18	<1.0	21	3.2
0218	6/11/18	<0.1	6.0	0.54
0218	12/12/18	<1.0	27	3.8
0226	6/11/18	<0.1	3.8	0.34
0226	12/12/18	<1.0	8.8	1.8
CR1	6/11/18	<0.1	7.3	0.63
CR1	12/12/18	<1.0	13	2.3
CR2	6/11/18	<0.1	7.3	0.59
CR2	12/12/18	<1.0	31	4.0
CR3	6/11/18	<0.1	3.4	0.32
CR3	12/12/18	<0.1	18	2.9
CR5	6/11/18	<0.1	3.8	0.34
CR5	12/12/18	<1.0	18	2.9
BW2-1	10/1/18	0.14	21	1.5

Table 9. Ammonia Concentrations in Surface Water Samples Compared to EPA Criteria (continued)

Location	Date	Ammonia Total as N (mg/L)	EPA - Acute Total as N (mg/L)[1]	EPA - Chronic Total as N (mg/L)[2]
BW2-2	10/1/18	<0.1	15	1.2
BW2-3	10/1/18	0.17	13	1.0
BW2-4	10/1/18	0.35	8.8	0.78
BW2-5	10/1/18	0.18	8.8	0.83
BW3-1	10/1/18	<0.1	7.3	0.76
BW3-2	10/1/18	<0.1	6.0	0.65
BW3-3	10/1/18	<0.1	6.0	0.65

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

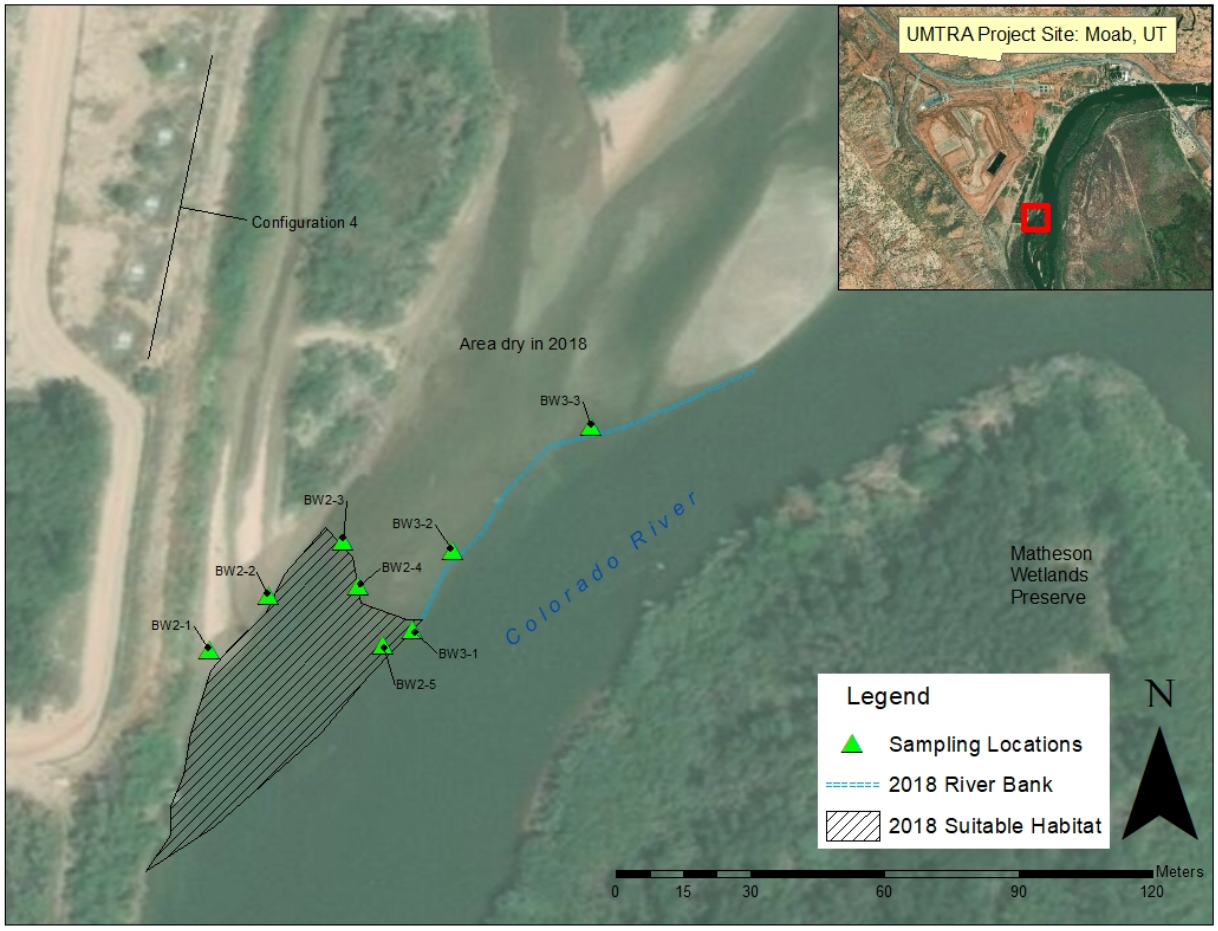

Figure 9. October 2018 Habitat Area Sampling Locations

7.0 Quality Assurance

The Project has a QA Program that provides a structured approach to apply QA principles to work performed on the Project. The quality measures embodied in this QA Program address the applicable requirements of the American Society of Mechanical Engineers Nuclear Quality Assurance-1 consensus standard, "Quality Assurance Requirements for Nuclear Facility Applications," Appendix A of DOE O 226.1B, "Implementation of Department of Energy Oversight Policy," 10 CFR 830, "Nuclear Safety Management," Subpart A, "Quality Assurance Requirements," DOE O 414.1D, "Quality Assurance," and EM-QA-001, "EM Quality Assurance Program."

The QA Program may also be used in conjunction with other consensus standards that provide acceptable methods for implementing QA requirements. The QA Program is implemented with contractor-specific plans and procedures that ensure environmental data collected are valid and traceable.

7.1 Laboratory Analysis

The Project ensures the flow-down of QA Program requirements and receipt of analytical data that meet Environmental Air Monitoring Program and Groundwater Program requirements by subcontracting analytical services to qualified laboratories.

The subcontracted laboratories are qualified under the DOE EM Consolidated Audit Program, the National Environmental Laboratory Accreditation Program, the 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

All documentation created as a result of compliance with this ASER is considered a Project record and 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 830A, (Code of Federal Regulations), "Nuclear Safety Management," "Quality Assurance Requirements,"

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.”

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

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

42 USC 11001 (United States Code), Emergency Planning and Community Right-to-Know Act.

DOE (U.S. Department of Energy), *Moab UMTRA Project Flood and Drought Mitigation Plan* (DOE-EM/GJ1640).

DOE (U.S. Department of Energy), *Moab UMTRA Project Records Management Manual* (DOE-EM/GJ1545).

DOE (U.S. Department of Energy) Order 210.2A, “DOE Corporate Operating Experience Program.”

DOE (U.S. Department of Energy) Order 231.1B Admin Chg 1, “Environment, Safety and Health Reporting.”

DOE (U.S. Department of Energy) Order 414.1D Chg 1, “Quality Assurance.”

DOE (U.S. Department of Energy) Order 435.1, “Radioactive Waste Management.”

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

DOE (U.S. Department of Energy) Order 458.1 Admin Chg 3, “Radiation Protection of the Public and the Environment.”

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

Executive Order 11988, “Floodplain Management.”

Executive Order 11990, “Protection of Wetlands.”

ISO (International Organization for Standardization) Standard 14001:2015, “Environmental Management Systems.”

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

UAC R307-205-8 (Utah Administrative Code), “Emission Standards; Fugitive Emissions and Fugitive Dust; Tailings Piles and Ponds.”

U.S. Census Bureau, *https://factfinder.census.gov.*