

Office of Environmental Management – Grand Junction



Moab UMTRA Project
Moab Site Fugitive Dust Control Plan

Revision 0

February 2013



U.S. Department
of Energy

Office of Environmental Management

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Review and Approval



Edward B. Baker
RAC Environmental Compliance Manager

January 29, 2013
Date

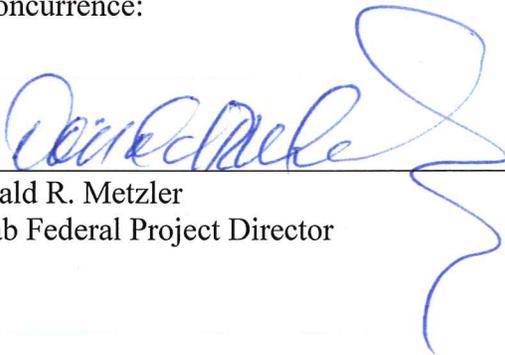


Jeff C. Biagini
RAC Project Manager

1-29-2013

Date

In concurrence:



Donald R. Metzler
Moab Federal Project Director

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Date

Revision History

Revision No.	Date	Reason/Basis for Revision
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Acronyms and Abbreviations

BMP	best management practice
BMPA	best management practice area
C°	degrees Centigrade
cm	centimeters
DOE	U.S. Department of Energy
DOE O	DOE Order
F°	degrees Fahrenheit
R	UAC rule
UAC	Utah Administrative Code
UMTRA	Uranium Mill Tailings Remedial Action
URC	Uranium Reduction Company
USC	United States Code

1.0 Introduction

The State of Utah Division of Air Quality rules for the control of fugitive dust and emissions require that all sources with activities or equipment that have the potential to produce fugitive or airborne dust must prepare and implement a Fugitive Dust Control Plan. Accordingly, this Fugitive Dust Control Plan has been prepared to address the control of fugitive and airborne dust emissions from the U.S. Department of Energy (DOE) Uranium Mill Tailings Remedial Action (UMTRA) Project site located in the city of Moab in Grand County, Utah. Specifically, this Plan complies with the state of Utah rules for controlling fugitive dust emissions as specified in the Utah Administrative Code (UAC) Rule (R)307-205, “Nonattainment and Maintenance Areas for PM10: Emission Standards.”

This Plan addresses UMTRA activities and operations conducted by DOE and contractors at the Moab site. There is a separate plan for the Crescent Junction site, the *Crescent Junction Project Site Fugitive Dust Control Plan* (DOE-EM/GJ1235-2006). The primary objective of this Plan is to describe the strategy for controlling, to the greatest extent practicable, fugitive or airborne dust emissions at the Moab site. This is accomplished by identifying specific sources and activities at the Moab site that have the highest potential to produce or generate fugitive or airborne dust emissions. This Plan describes the engineering controls necessary to minimize and control dust emissions from those sources and activities.

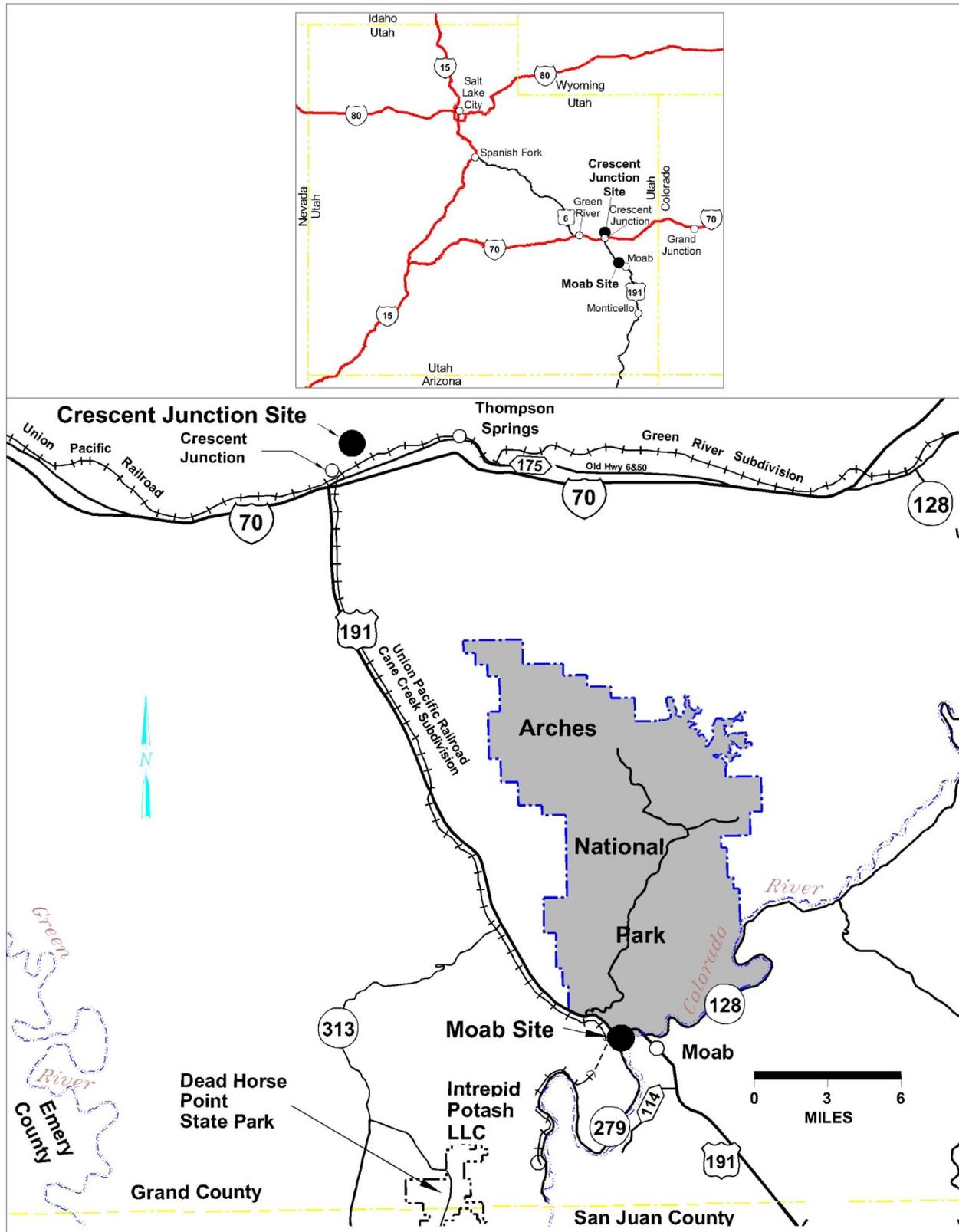
1.1 Site Location

The Moab site is a former uranium ore-processing facility located approximately 3 miles northwest of Moab (Figure 1). The Moab site is irregularly shaped; a uranium mill tailings pile occupies much of the western portion of the site. The Moab site is bordered on the north and southwest by steep sandstone cliffs. The Colorado River forms the southeastern boundary of the site. U.S. Highway 191 parallels the northern site boundary, and State Highway 279 parallels the southwestern boundary. Arches National Park is located adjacent to the northern site boundary, and Canyonlands National Park is located approximately 12 miles to the southwest.

The Union Pacific Railroad traverses a small section of the site just west of Highway 279, then enters a tunnel and emerges several miles to the southwest. The Moab Wash runs in a southeasterly direction through the center of the site where it joins with the Colorado River. The wash is an ephemeral stream that flows only after precipitation or during snowmelt. The entire site covers approximately 480 acres, of which 130 acres are covered by the tailings pile. Figure 2 shows the major features of the Moab site.

1.2 Site History

Originally, the property and facility were owned by the Uranium Reduction Company (URC) and were regulated by the Atomic Energy Commission, the predecessor agency to DOE. In 1956, URC began operation of the Moab mill. In 1962, the Atlas Minerals Corporation acquired URC and operated the mill until operations ceased in 1984. Between 1956 and 1984, uranium mill tailings were disposed of on site in an unlined impoundment.



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Figure 1. Regional Location of Moab UMTRA Site

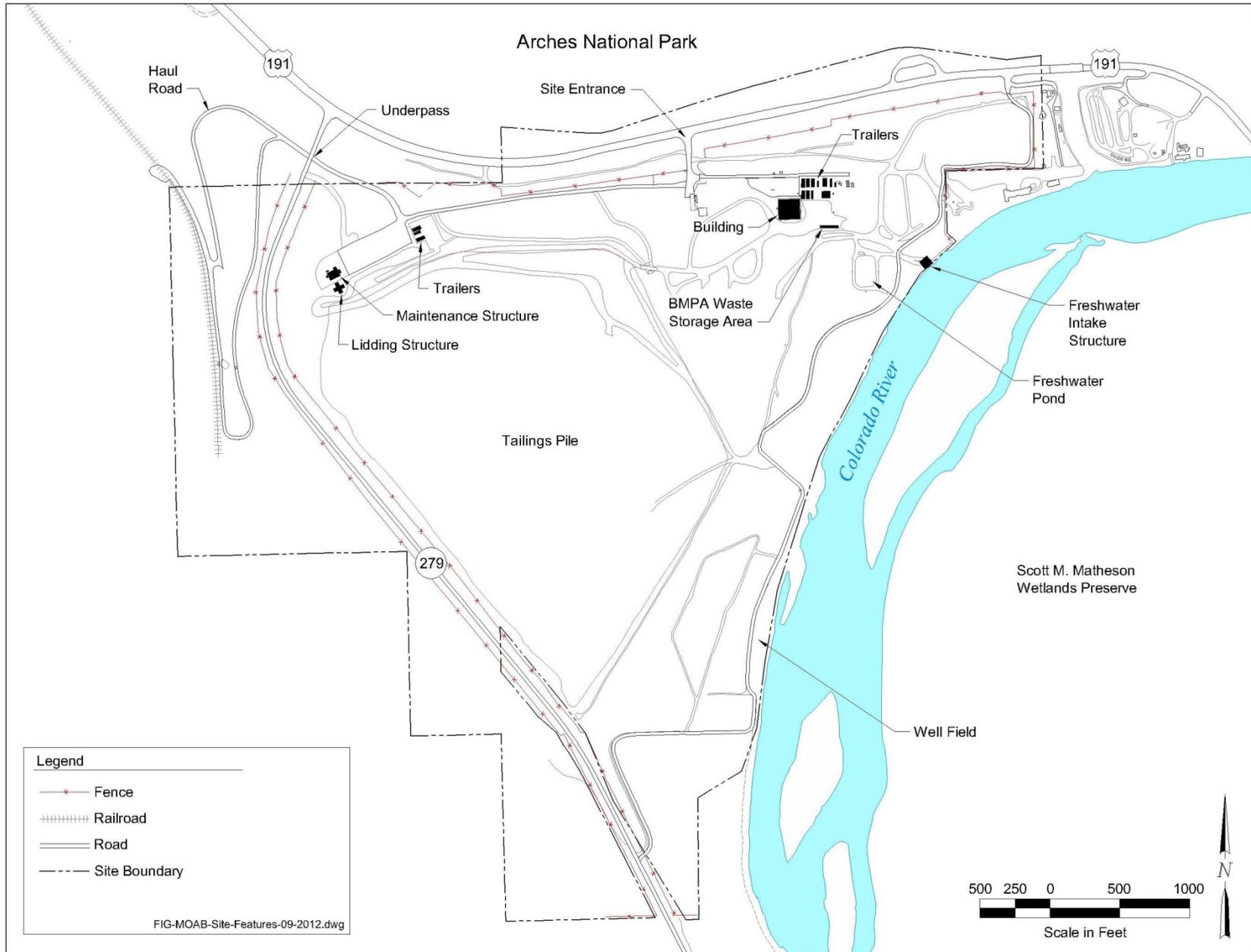


Figure 2. Moab UMTRA Site Features Map

Decommissioning of the mill began in 1988; between 1989 and 1995, an interim cover was placed on the impoundment. In 1996, Atlas proposed to reclaim the tailings pile for permanent disposal in its current location. However, Atlas declared bankruptcy in 1998, and subsequently, the U.S. Nuclear Regulatory Commission appointed Pricewaterhouse Coopers as the trustee of the Moab reclamation trust and licensee for the site.

Ownership and responsibility of the Moab site was effectively transferred from Pricewaterhouse Coopers to DOE by passage of the “Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001” (Public Law 106-398). This act further designates that the Moab site undergo remediation in accordance with Title I of the Uranium Mill Tailings Radiation Control Act of 1978, codified at Title 42 United States Code Section 7912 (42 USC 7912). DOE took possession of the Moab site on October 24, 2001. The original *Moab UMTRA Project Fugitive Dust Control Plan* (GJO-2002-301-TAR) was prepared by the previous contractor and was issued in March 2002.

1.3 Climatology

The climate of the Moab region is semi-arid. Average annual temperature is approximately 14 degrees Celsius (°C) (57 degrees Fahrenheit [°F]). January is the coldest month, averaging -1°C (30°F), and July is the warmest month, averaging 28°C (82°F). Extreme temperatures have ranged from -28°C (-18°F) in January 1963 to 44°C (111°F), which has occurred more than once (in July 1953 and on earlier occasions). Temperatures of 32°C (90°F) or higher occur about 100 days per year, with approximately 80 percent of those occurring during June, July, and August. Temperatures below freezing 0°C (32°F) occur on the average of 123 days of the year, with approximately 80 percent of those occurring during November through February. The effects of high temperature on human comfort are moderated by the low relative humidity, which is often less than 50 percent during the daytime hours.

Average annual precipitation at Moab is 20 centimeters (cm) (8 inches), distributed approximately equally among the seasons with slight peaks during the spring and fall. Potential evapotranspiration (approximately 127 cm [50 inches] per year) greatly exceeds annual precipitation. Mean pan evaporation (approximately 140 cm [55 inches] per year) and lake evaporation (approximately 97 cm [38 inches] per year) also greatly exceed the total annual precipitation. Low humidity in the region limits fog occurrences with visibility of less than half a kilometer (0.3 miles) to fewer than 10 days per year. Thunderstorms occur approximately 40 days per year. Hail occurs approximately 3 days per year. Prevailing winds in the Moab region are from the southwest. Cold air drainage at the Moab site can occur from the northwest under very stable conditions.

1.4 Regulatory Requirements

This Fugitive Dust Control Plan is prepared in response to State of Utah Division of Air Quality regulations for the control of fugitive dust, as found in UAC R307-205 (Fugitive Dust Rule). Dust control plans are required to minimize on-site fugitive dust from various pits, yards, and storage areas. Utah’s “Nonattainment and Maintenance Areas for PM10: Emission Standards; Fugitive Emissions and Fugitive Dust” (UAC R307-309) also addresses storage and handling of aggregate materials, construction/demolition activities, mining activities, and tailings piles and ponds.

The portion of the Fugitive Dust Rule that specifically applies to the Moab site is found at UAC R307-205-8, “Emission Standards; Fugitive Emissions and Fugitive Dust; Tailings Piles and Ponds,” and requires that “... any person owning or operating an existing tailings operation where fugitive dust results from grading, excavating, depositing, natural erosion, or other causes in association with such operation shall take steps to minimize fugitive dust from such activities.”

This site-specific Fugitive Dust Control Plan was submitted to the DOE Office of Environmental Management for approval and is updated and revised as necessary to reflect dust controls that correspond to current and ongoing site activities and operations.

1.5 Environmental Air Monitoring

In addition to the implementation of physical dust controls, DOE has developed and implemented an Environmental Air Monitoring Program for the Moab site. This Program consists of sampling airborne particulates, radon, and direct gamma radiation at various locations along the site perimeter and at various off-site locations.

Background monitoring locations have also been established to provide ambient air quality data. The background or ambient air quality data is compared to air quality data collected from the on-site monitoring locations for the purposes of determining compliance with various DOE Orders (Os), and federal and state air regulations.

As part of DOE’s environmental air monitoring and fugitive dust control strategy, two meteorological monitoring stations have been established at the Moab site. Wind speed and direction data collected from this monitoring station is used to determine when site-specific action levels have been exceeded and specific dust controls (e.g., the application of dust suppression techniques) must be initiated.

In addition, personnel certified in reading opacity measurements in the state of Utah are also consulted to determine when active dust control measures should be initiated and when specific dust generating activities (i.e., excavating, hauling, grading) should be discontinued.

In addition to complying with the State of Utah Fugitive Dust Rule, this Fugitive Dust Plan is consistent with the intent of complying with various DOE Os. DOE O 436.1, “Departmental Sustainability,” specifies that effluent monitoring and environmental surveillance must be conducted to determine the effect of DOE activities on “...on-site and off-site environmental and natural resources,” and to “...verify compliance with applicable federal, state, and local effluent regulations and DOE Orders.”

Similarly, DOE O 458.1, “Radiation Protection of the Public and the Environment,” requires DOE to control and monitor radiological exposures from its facilities and activities. Radioactive effects have been limited to within one-quarter mile of the site, and no public health regulations or guidelines have been exceeded.

The physical form of the radioactive contaminants (i.e., uranium mill tailings) located at the Moab site is best described as a fine-grained, sand-like material, which is highly susceptible to wind erosion.

Consequently, one of DOE's major objectives at the Moab site is to control and contain the off-site transportation of radiological contaminants resulting from the erosive forces of wind and storm water.

This Fugitive Dust Control Plan outlines DOE's strategy for controlling airborne dust emissions and minimizing/controlling the off-site transportation of mill tailings resulting from wind erosion.

2.0 Site and Source Information

2.1 Site Ownership and Physical Location

As required by the Utah Division of Air Quality, site-specific source information is provided below.

Name of Operation

Moab UMTRA Project site, formerly known as the Atlas Uranium Mill.

Owner/Operator Information

U.S. Department of Energy, Grand Junction Office, 200 Grand Avenue, Suite 500, Grand Junction, Colorado 81501. DOE Contact: Don Metzler (970) 257-2115.
Moab On-site Contact: Art Murphy (435) 719-2845.

Physical Address of Operations

2021 N. Highway 191, Moab, Utah 84532.

Longitude/Latitude of Operation

Latitude: 38 degrees, 36 minutes, 17.53329 seconds North
Longitude: 109 degrees, 35 minutes, 23.47893 seconds West
Elevation: 3977.624 feet above mean sea level

2.2 Source Information

Types of Material Processed or Disturbed

The materials of concern with respect to fugitive dust emissions at the Moab site are residual uranium mill tailings and unstable soils and sand.

The majority of the mill tailings are contained within an on-site tailings pile, the footprint of which covers approximately 130 acres. An interim cover of the tailings pile remains on the eastern and southern side slopes. The materials on the surface of the tailings pile consist of poorly consolidated soils and are, therefore, considered a "high-potential" source of fugitive dust emissions at the Moab site. Similarly, remediated (disturbed) areas (i.e., the eastern and the southeastern off-pile areas) are in the early stages of revegetation, and vegetative cover is limited. Soils are poorly consolidated and are considered major sources of fugitive dust emissions at the Moab site.

Combined, the tailings pile and the remediated off-pile areas comprise approximately 40 percent of the total land surface of the Moab site. The remainder of site is not considered a significant source of fugitive dust emissions due to: 1) the low level of past disturbances in these areas; 2) the low levels and quantity of contaminated soils identified within these areas; 3) the low levels of anticipated activity occurring in these areas; and 4) a greater percentage of vegetative cover present within these areas.

Source areas identified as “moderate-potential” consist of areas that have been disturbed and partially revegetated in the past (approximately 20 percent of the total site area); however, soils and surface sediments in these areas are typically better consolidated and are stabilized by varying degrees of vegetative cover. If these areas prove to be a source of fugitive dust emissions in the future, appropriate control measures will be implemented.

Most of the “low-potential” areas are found along the site perimeter and consist of steep, rocky terrain (i.e., sandstone slopes and cliffs) in the west and wetland/river bottom areas along the southern and eastern margins of the site boundary. Typically, there is little to no activity occurring in these areas, nor have these areas been disturbed by past milling activities. The low-potential areas comprise approximately 40 percent of the total site area. Consequently, DOE does not anticipate that these areas to be a significant source of dust emissions from the facility, and no controls are planned for these areas.

Length/Duration of Construction Project

The DOE’s Project timeline is controlled by funding from congressional appropriations; therefore, the duration of the Project is a rough estimate. Approximately 16 million tons of uranium mill tailings and surface contaminated soils were at the Moab site when ownership transferred to DOE, with approximately two-thirds of the material currently remaining. DOE’s responsibility for monitoring and controlling fugitive dust emissions from this site range in duration from approximately 10 to 15 years,

Description of Processes/Site Activities

Currently, the activities occurring at the Moab site include:

1. Primary activities at the Moab site are excavation and conditioning of uranium mill tailings and other contaminated materials for transport to the Crescent Junction, Utah, disposal site. The material is loaded into containers, a metal lid is attached to seal the container, and containers are shipped to Crescent Junction primarily by rail.
2. Site support (e.g., project management, business operations, radiological access control).
3. Operation of a ground water treatment system, including ground water extraction, freshwater injection, and operation of an evaporation pond.
4. Monitoring of radioactive and non-radioactive materials in air, soil, ground water, and surface water.
5. Site stabilization (i.e., revegetation and irrigation of disturbed areas).
6. Implementation of fugitive dust and storm water controls.
7. Site security (e.g., fence installation/repair, postings, barricades).

3.0 Description of Fugitive Dust Emission Activities

A description of the on-site activities that may contribute to or generate fugitive dust emissions at the Moab site are discussed below.

Site Monitoring and Ground Water Remediation

DOE currently performs various types of environmental monitoring and ground water remediation activities at the Moab site. These activities include: vegetation; surface and ground water monitoring; radon and direct gamma radiation monitoring; environmental air/particulate monitoring; and meteorological monitoring.

Ground water remediation is a major environmental activity to clean up ground water and protect critical river habitat. Most of these types of activities are non-intrusive and result in little to no fugitive dust emissions. Vehicles used to transport personnel and equipment from one location to another may produce minimal generation of fugitive dust.

Excavation, Conditioning, and Shipping Actions

DOE is engaged in various remedial efforts to move the tailings material from the Moab site to the Crescent Junction site. Moab activities involve excavation, conditioning the tailings, and loading material into containers. Lids are installed on the containers and are shipped by rail to the Crescent Junction disposal site. Activities associated with these actions necessitate the use of heavy equipment for excavation and conditioning purposes. These actions have the potential to generate high levels of fugitive dust emissions.

Maintenance of Fugitive Dust and Storm Water Runoff Controls

DOE recognizes that mill tailings and residual contaminated soils are especially vulnerable to wind and storm runoff. In an effort to contain these contaminants and prevent their migration off site, maintenance of fugitive dust and storm water runoff controls is a priority for DOE. Maintenance of berms, sediment retention basins, barrow ditches, culverts, and application of dust suppressant materials continue; however, fugitive emissions as a result of these activities are minimal.

Waste Management Activities

DOE has developed the *Moab UMTRA Project Waste Management Plan* (DOE-EM/G1633), the *Moab UMTRA Project Spill Prevention Control and Countermeasure Plan*, (DOE-EM/GJRAC1477), and the *Moab UMTRA Project Universal Management Waste Plan* (DOE-EM/GJRAC1920) for control of wastes and petroleum products during operations at the site. A Best Management Practice Area (BMPA) was constructed at the Moab site. The BMPA is a bermed temporary storage facility that was constructed with a polyethylene liner. Waste and petroleum materials are temporarily stored at this location until a permanent disposal or storage option has been defined. Operation of this facility involves the use of heavy equipment. These activities produce low fugitive dust emissions.

Revegetation Activities

Disturbed areas from remediation or construction activities are contoured, seeded, and revegetated as soon as possible. This effort requires the use of heavy equipment; however, the duration is relatively short-term and does not result in significant fugitive dust emissions.

4.0 Description of On-site Fugitive Dust Emission Controls

The fugitive dust emission controls used at the Moab site for each of the potential source areas are discussed below. All sources of fugitive dust emissions at the Moab site are related to site activities and conditions. The routine operation of heavy equipment is not considered a significant source of emissions at this site.

4.1 High-potential Source Areas

Certain portions of the Moab site are considered significant sources of fugitive dust emissions and require more active controls than other areas. These areas are characterized by: loose, poorly consolidated sediments; poor vegetative cover; high levels of previous disturbance; high levels of future/anticipated activity or disturbance; or areas with significant residual radioactive contamination remaining.

Because both the native soils and uranium mill tailings possess a sand-like texture, these materials can easily become airborne given sufficient climatic conditions (e.g., low soil moisture content, sufficient wind speeds). Consequently, DOE has designated these areas as having the highest priority in their dust control strategy. Cumulatively, these high-potential areas comprise approximately 40 percent of the total site surface area. The specific high-potential source areas and the planned dust controls implemented for each of these areas are summarized Table 1.

4.2 Moderate-potential Source Areas

Other portions of the Moab site are considered moderate sources of fugitive dust emissions and require a less aggressive approach to dust control. These areas are characterized by: more stable soil conditions; a greater percentage of vegetative cover; lesser quantities of radiologically contaminated materials; and moderate levels of activity. These areas are found mostly in the eastern, southeastern, and southern portions of the Moab site. Cumulatively, these moderate-potential areas comprise approximately 30 percent of the total site surface area. A summary of the anticipated dust control measures used in these areas is found in Table 1.

4.3 Low-potential Source Areas

Approximately 30 percent of the site is considered a low-potential source for fugitive dust emissions. These areas include: the river bottom and wetland areas along the eastern and southern site boundaries; the sandstone cliffs and rocky slopes along the southern and western site boundaries; and the Highway 191 and 279 corridors. These areas are designated as low-potential sources of fugitive dust emissions because: there is very little surface disturbance in these areas; some areas contain dense vegetative cover; these areas are relatively uncontaminated; and there is little to no activity occurring in these areas. No dust controls are planned for these areas.

4.4 Standards, Action Levels, and Response Actions

Table 2 outlines the applicable regulatory standards and best management practices (BMPs) relative to controlling fugitive dust emissions at the Moab site and the appropriate response actions implemented once it is determined that standards or actions levels have been exceeded.

Table 1. Summary of Fugitive Dust Controls for the Moab Site

Fugitive Dust Source		Dust Controls							
		Water Truck	Sprinkler Irrigation	Vegetative Cover	Surfactant	Magnesium/ Calcium Chloride	Gravel	Asphalt	No Controls
High-potential Areas	Tailings Pile (Top)	X	X			X			
	Tailings Pile (Side Slopes)	X		X		X			
	Northeast Support Area	X		X				X	
	Northwest Haul Road/Railroad Area	X		X	X			X	
	Site Roads	X				X	X	X	
Moderate-potential Areas	East, Southeast, Southern Portions of Moab Site	X	X	X					
	Moab Wash Corridor	X	X	X					X
Low-potential Areas	River Bottom/Wetland Areas (South/East)								X
	Sandstone Slopes/Cliffs (East/South)								X
	Highway 191 and 279 Corridors (East and North)			X				X	X

Table 2. Fugitive Dust Standards, Action Levels, and Response Actions

Standard/ Site-specific Action Level	Method of Determination	Response Action
Opacity Cannot Exceed 20%	Visual Observation by State of Utah Certified Opacity Reader	Initiate Immediate Dust Control Measures as Outlined in Table 1. Cease All Dust Generating Activities.
Sustained Wind Speeds Exceeding 20 Miles Per Hour	Real-time Meteorological Monitoring	Monitor Visible Emissions; Cease All Dust Generating Activities if Necessary to Maintain 20 Percent or Less Opacity. If Needed, Initiate Immediate Dust Control Measures as Outlined In Table 1.
Cannot Exceed Public Exposure Standards (DOE Orders 458.1 and 5400.5 Chapter III*)	Analysis of Filters Collected by Continuous Air Samplers	Re-assess Dust Control Plan and Controls.

*DOE O 5400.5, Chapter III, "Radiation Protection of the Public and the Environment, Derived Concentration Guidelines for Air and Water"

An air particulate monitoring network at the Moab site has been implemented in accordance with DOE O 458.1 Admin. Change 3, "Radiation Protection of the Public and the Environment." In accordance with the *Moab UMTRA Project Environmental Air Monitoring Sampling and Analysis Plan* (DOE-EM/GJRAC1434), air quality monitoring data are routinely collected and reviewed to ensure compliance with DOE Os and applicable federal and state air quality regulations. Air particulate sample locations are shown on Figures 3 and 4.

4.5 BMPs

The BMPs described below are followed to help minimize and control dust emissions at the Moab site to the most practical extent possible.

Roads

All on-site traffic is restricted to specifically designated roads. The haul road and queue access/loadout were asphalted to reduce dust. Off-road travel is only authorized on a case-by-case basis (e.g., access to a remote monitoring well). Traffic speed is restricted to an appropriate level on all designated roads. All designated roads are considered high-potential dust source areas and, as such, are a priority for dust controls.

Hours of Operation

This Fugitive Dust Control Plan is in effect during all hours of operation at the Moab site. During non-business hours, there are no activities generating dust. However, as a BMP, if high winds are evident based on site weather stations, site personnel should evaluate vulnerable areas and implement controls as appropriate to minimize off-hours emissions.

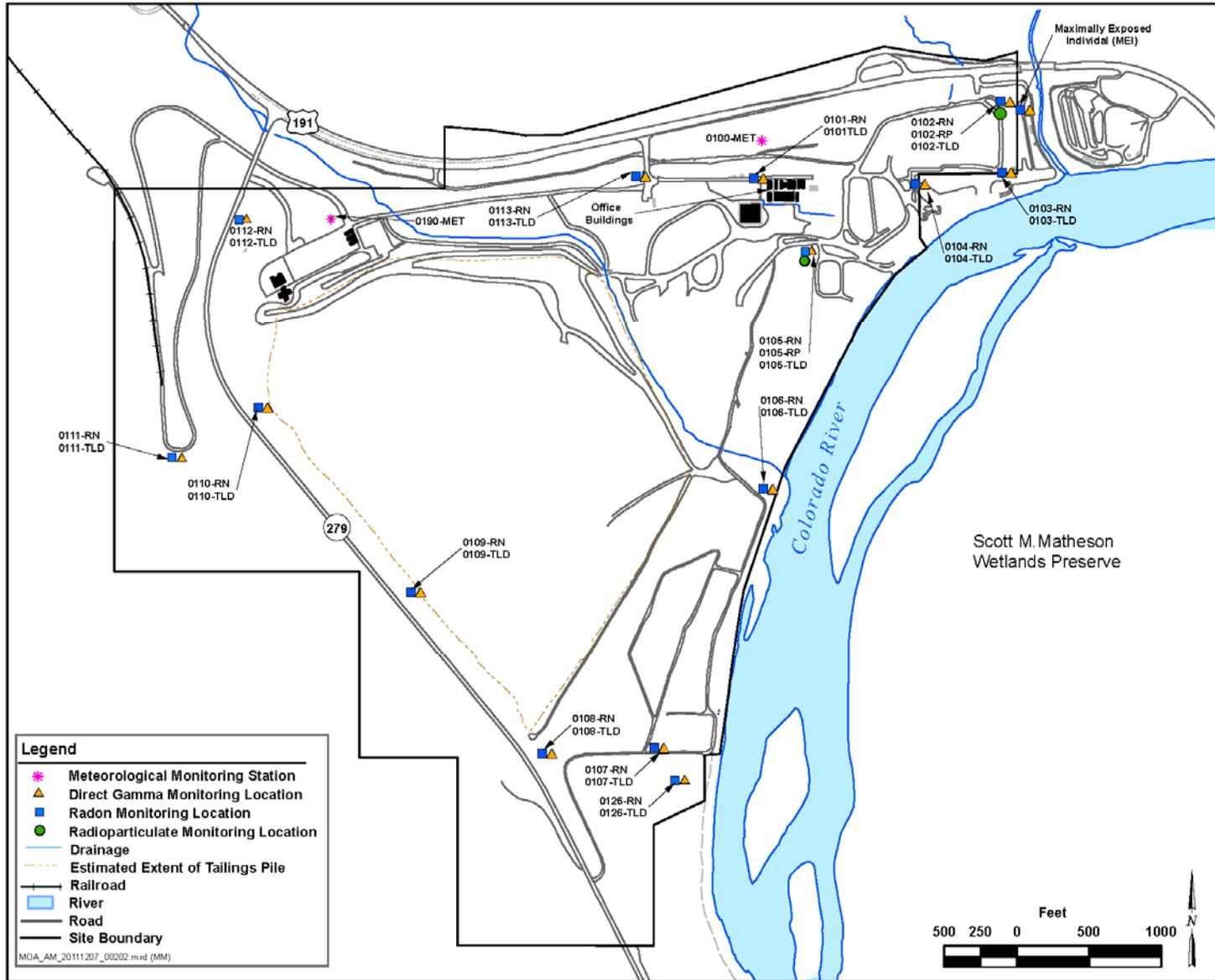


Figure 3. Moab On-site Monitoring Locations

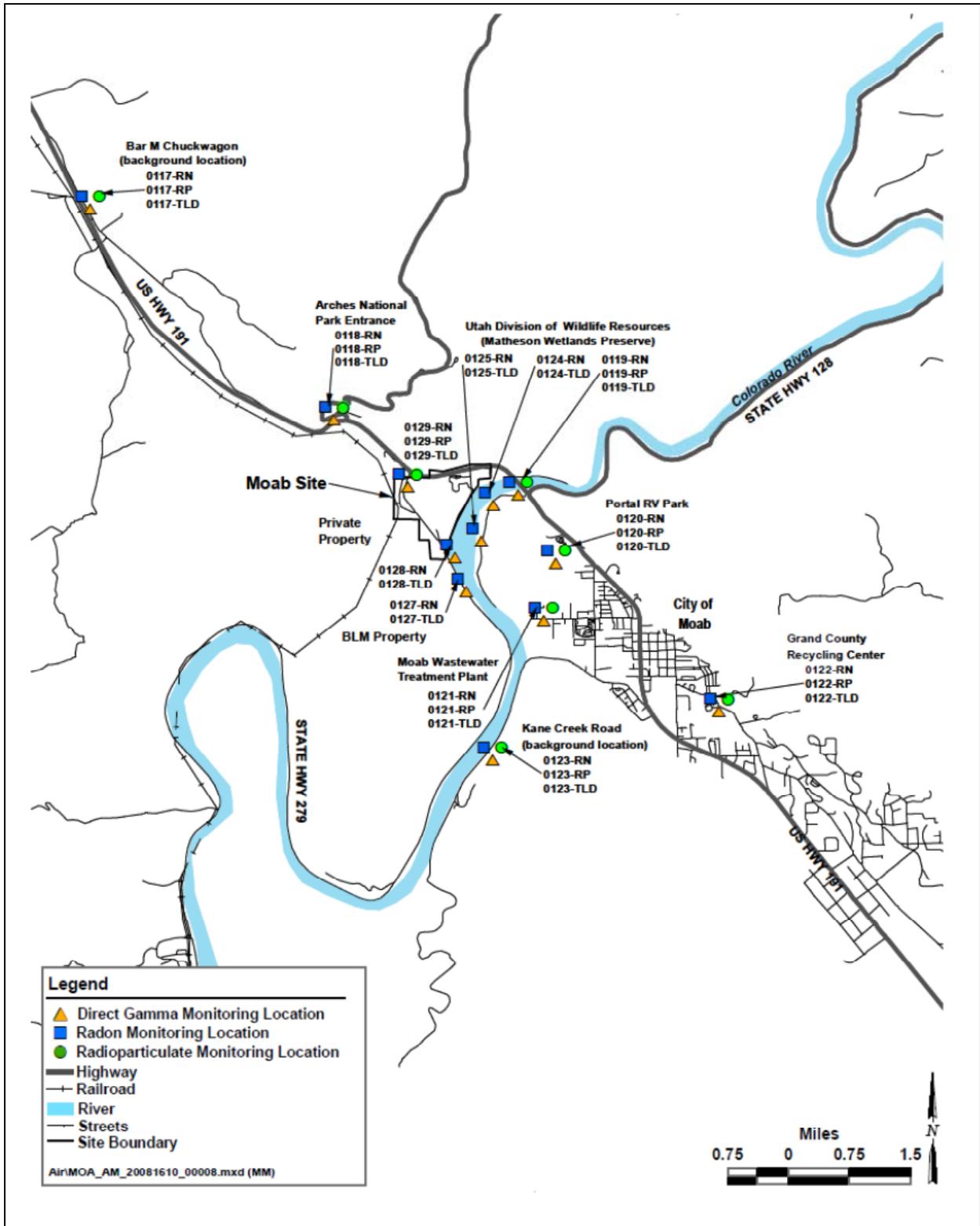


Figure 4. Moab Off-site Monitoring Locations

Use of Chemical Suppressants

Water has been successfully used as the main dust control agent. Use of various chemical dust suppressants (e.g., surfactants, salt-based soil conditioners) is an option and applied in accordance with the recommended end-uses for those products. Site personnel shall not exceed the manufacturer recommended application rates. Material Safety Data Sheets for all dust suppressant materials used at the Moab site shall be reviewed and approved by the Environmental Services organization. Before application, site personnel shall determine and evaluate if the use of the dust suppressant could interfere with other site monitoring activities or cause other harm to the environment (e.g., runoff into critical habitat for threatened or endangered fish).

5.0 Description of Off-site Fugitive Dust Emission Controls

To minimize the potential for off-site releases or emissions, the controls described below are also implemented.

Decontamination

Before leaving the Moab site, containers or any piece of heavy equipment are thoroughly washed and decontaminated at a decontamination pad. This practice minimizes the potential for any off-site tracking of sediment or contaminants.

Cover Loads

Any off-site containers or trucks hauling material are covered with a hard lid or tarped to minimize the loss of materials in transit/off site. All loads are inspected to ensure they are properly covered before departure.

Spill Response

In the event of an off-site spill or release of contaminated material, the spilled material is immediately contained and cleaned up. Emergency spill response actions are outlined in the *Moab UMTRA Project Emergency/Incident Response Plan* (DOE-EM/GJ1520).

6.0 References

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

UAC R307-305 (Utah Administrative Code), "Nonattainment and Maintenance Areas for PM10: Emission Standards."

UAC R307-309 (Utah Administrative Code), "Nonattainment and Maintenance Areas for PM10: Emission Standards; Fugitive Emissions and Fugitive Dust."

42 USC 7912 (United States Code), "The Uranium Mill Tailings Radiation Control Act of 1978," (Public Law 95-604).

DOE (U.S. Department of Energy), *Crescent Junction Project Site Fugitive Dust Control Plan* (DOE-EM/GJ1235-2006), July 2006.

DOE (U.S. Department of Energy), *Moab UMTRA Project Emergency/Incident Response Plan* (DOE-EM/GJ1520), September 2012.

DOE (U.S. Department of Energy), *Moab UMTRA Project Environmental Air Monitoring Sampling and Analysis Plan* (DOE-EM/GJRAC1434), June 2012.

DOE (U.S. Department of Energy), *Moab UMTRA Project Fugitive Dust Control Plan* (GJO-2002-301-TAR), March 2002.

DOE (U.S. Department of Energy), *Moab UMTRA Project Spill Prevention Control and Countermeasure Plan*, (DOE-EM/GJRAC1477), January 2013.

DOE (U.S. Department of Energy), *Moab UMTRA Project Universal Management Waste Plan* (DOE-EM/GJRAC1920), July 2010.

DOE (U.S. Department of Energy), *Moab UMTRA Project Waste Management Plan* (DOE-EM/G1633), July 2008.

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

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

DOE O 5400.5 (U.S. Department of Energy), Chapter III, “Radiation Protection of the Public and the Environment; Derived Concentration Guidelines for Air and Water.”

The “Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001” (Public Law 106-398).