

COVER SHEET

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- U.S. Nuclear Regulatory Commission
- U.S. Army Corps of Engineers
- State of Utah
- Ute Mountain Ute Tribe
- San Juan County
- Grand County
- City of Blanding
- Community of Bluff

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

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Abstract:

The purpose of the *Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah, Draft Environmental Impact Statement* is to provide information on the environmental impacts of the U.S. Department of Energy's (DOE's) proposal to (1) remediate approximately 11.9 million tons of contaminated materials located on the Moab site and approximately 39,700 tons located on nearby vicinity properties and (2) develop and implement a ground water compliance strategy for the Moab site using the framework of the *Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project* (DOE/EIS-0198, October 1996). The EIS will be used to inform the public of the information being used by DOE in decision-making for the remediation of the Moab site. The surface remediation alternatives analyzed in the draft EIS include on-site disposal of the contaminated materials and off-site disposal at one of three alternative locations in Utah using one or more transportation options: truck, rail, or slurry pipeline. This draft EIS evaluates the environmental consequences that may result from implementing the reasonable alternatives, including health impacts to the public, impacts to ground water and surface water, traffic impacts, and impacts to other resources. The draft EIS also analyzes a No Action alternative, under which DOE would not implement any surface or ground water remedial actions. DOE has not yet identified a preferred alternative; a preferred alternative will be identified in the final EIS after consideration of public comments, the information provided in this EIS, and other factors, including the costs of the alternative actions.

Public Comments:

Public hearings on the draft EIS will be held in January 2005. Oral and written comments are invited at these hearings. Commentors are also encouraged to send written comments until February 18, 2005, or email to moabcomments@gjo.doe.gov to the DOE Grand Junction address provided above. DOE will consider all public and agency comments submitted during the public comment period on the draft EIS in preparing the final EIS. Comments received after the close of the public comment period will be considered to the extent practicable.

**Remediation of the
Moab Uranium Mill Tailings,
Grand and San Juan Counties, Utah,
Draft Environmental Impact Statement**

November 2004

Volume I

**U.S. Department
of Energy**



**Office of
Environmental
Management**

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Appendices

Appendix A	Biological Assessment/Screening Level Risk Assessment/Biological Opinion
Appendix A1	Biological Assessment
Appendix A2	Screening Level Risk Assessment
Appendix A3	Biological Opinion (under development by USF&WS)
Appendix B	Assumed Disposal Cell Cover Conceptual Design and Construction
Appendix C	Slurry Pipeline Route Maps
Appendix D	Human Health
Appendix E	Evaluation of Disposal of Moab Tailings in Salt Caverns Within the Paradox Formation
Appendix F	Floodplain and Wetlands Assessment for Remedial Action at the Moab Site
Appendix G	White Mesa Mill Operations
Appendix H	Transportation Impact Analysis

End of current text

Acronyms

AASHTO	American Association of State Highway and Transportation Officials
AADT	annual average daily traffic
ACL	alternate concentration limit
ADT	average daily traffic
ANSI	American National Standards Institute
AWQC	ambient water quality criteria
BA	biological assessment
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	<i>Code of Federal Regulations</i>
cfs	cubic feet per second
cm/s	centimeters per second
dBA	A-weighted sound level (decibels)
dBV	velocity of decibels
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
ECDC	East Carbon Development Corporation
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESC	Electric Systems Consultants
ft	feet
ft ²	square feet
ft ³	cubic feet
FLPMA	Federal Land Policy and Management Act
FR	<i>Federal Register</i>
FY	fiscal year
g/m ²	grams per square meter
gpm	gallons per minute
HEW	U.S. Department of Health, Education, and Welfare
ISV	in situ vitrification
IUC	International Uranium (USA) Corporation
K _d	distribution coefficient
kVA	kilovolt-amperes
LCF	latent cancer fatality
L _{dn}	day-night sound level
L _{eq}	equivalent sound level
MBTA	Migratory Bird Treaty Act
MCL	maximum concentration limit
MEI	maximally exposed individual
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
µg/m ³	micrograms per cubic meter
µR/h	microrentgens per hour
mph	miles per hour
mrem/yr	millirem per year
mR/h	milliroentgens per hour

mV	millivolt
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Academy of Sciences
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
ORNL	Oak Ridge National Laboratory
PCBs	polychlorinated biphenyls
pCi/g	picocuries per gram
pCi/L	picocuries per liter
pCi/m ² -s	picocuries per square meter per second
PEIS	Programmatic Environmental Impact Statement (for the UMTRA Ground Water Project)
PM ₁₀	particles less than 10 micrometers in aerodynamic diameter
PMF	probable maximum flood
ppm	parts per million
PSD	prevention of significant deterioration
Qal	Quaternary alluvium
RAA	remedial action agreement
RAP	remedial action plan
RCRA	Resource Conservation and Recovery Act
R _d	distribution ratio
REA	radiological and engineering assessment
RIMS II	Regional Input-Output Modeling System II
RME	reasonable maximum exposure
rms	root mean square
ROD	Record of Decision
RRM	residual radioactive materials
SCADA	Supervisory Control and Data Acquisition
SITLA	School and Institutional Trust Lands Administration
SOWP	site observational work plan
SPA	specially planned area
TDS	total dissolved solids
TEEL	Temporary Emergency Exposure Limit
TSCA	Toxic Substances Control Act
UAC	Utah Administrative Code
UDEQ	Utah Department of Environmental Quality
UDOT	Utah Department of Transportation
UDWR	Utah Division of Wildlife Resources
UMTRA	Uranium Mill Tailings Remedial Action (Project)
UMTRCA	Uranium Mill Tailings Radiation Control Act
U.S.C.	<i>United States Code</i>
USFS	U.S. Forest Service
USF&WS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VPMIM	Vicinity Properties Management and Implementation Manual
yd ³	cubic yards

Measurements and Conversions

The following information is provided to assist the reader in understanding certain concepts in this document.

Units of Measurement

Most measurements in this report are presented in English units. Metric units are also used for measurements that are too small to be defined by English units or with data that were intended to be presented in metric units. Many metric measurements in this volume include prefixes that denote a multiplication factor that is applied to the base standard (for example, 1 centimeter = 0.01 meter). [Table MC-1](#) presents these metric prefixes. [Table MC-2](#) lists the mathematical values or formulas needed for conversion between metric and English units.

Table MC-1. Metric Prefixes

Prefix	Symbol	Multiplication Factor
deci	d	$0.1 = 10^{-1}$
centi	c	$0.01 = 10^{-2}$
milli	m	$0.001 = 10^{-3}$
micro	μ	$0.000\ 001 = 10^{-6}$
nano	n	$0.000\ 000\ 001 = 10^{-9}$
pico	p	$0.000\ 000\ 000\ 001 = 10^{-12}$

Table MC-2. Metric Conversion Chart

To Convert To Metric			To Convert From Metric		
If You Know	Multiply By	To Get	If You Know	Multiply By	To Get
Length					
inches	2.54	centimeters	centimeters	0.3937	inches
feet	0.3048	meters	meters	3.281	feet
miles	1.60934	kilometers	kilometers	0.6214	miles
Area					
square feet	0.092903	square meters	square meters	10.7639	square feet
square miles	2.58999	square kilometers	square kilometers	0.3861	square miles
Volume					
gallons	3.7854	liters	liters	0.26417	gallons
Temperature					
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths then add 32	Fahrenheit
Mass					
tons (U.S.)	0.907	metric tons	metric tons	1.10	tons (U.S.)

Rounding

Some numbers have been rounded; therefore, sums and products throughout the document may not be consistent. A number was rounded only after all calculations using that number had been made. Numbers that are actual measurements were not rounded.

Scientific Notation

Scientific notation is based on the use of positive and negative powers of 10. A number written in scientific notation is expressed as the product of a number between 1 and 10 and a positive or negative power of 10.

Examples: 5,000 would be written as 5×10^3 or 5E+3
0.005 would be written as 5×10^{-3} or 5E-3

Numbering Conventions

The following conventions were used for presenting numbers in the EIS text and tables:

- Numbers larger than 1 are expressed as whole numbers.
- Numbers between 10^{-1} and 10^{-2} are expressed in decimal form.

Examples: 5×10^{-1} is expressed as 0.5
 5×10^{-2} is expressed as 0.05

- Numbers smaller than 10^{-3} are expressed in scientific notation.

1.0 Introduction

This chapter introduces the U.S. Department of Energy's (DOE's) proposal to remediate residual radioactive materials (RRM) at the Moab Uranium Mill Tailings Radiation Control Act (UMTRCA) site and nearby properties (known as vicinity properties) located in and near the city of Moab, Utah. It summarizes the alternatives being considered and the types and categories of materials and other waste that would be managed under the alternatives. This chapter also introduces background information, including the regulatory basis for the action, contaminants of potential concern, history of the site, and goals and standards.

DOE is proposing to clean up surface contamination and develop and implement a ground water compliance strategy to address contamination that resulted from historical uranium-ore processing at the Moab uranium mill tailings site (Moab site), Grand County, Utah. Pursuant to the National Environmental Policy Act (NEPA), 42 *United States Code* (U.S.C.) §§ 4321 et seq., DOE prepared this draft environmental impact statement (EIS) to assess the potential environmental impacts of remediating the Moab site and vicinity properties (properties where uranium mill tailings were used as construction or fill material before the hazard associated with this material was known). As described in more detail in this and subsequent chapters, DOE analyzed the potential environmental impacts of both on-site and off-site remediation and disposal alternatives involving both surface materials and ground water contamination. DOE also analyzed the No Action alternative as required by NEPA implementing regulations promulgated by the Council on Environmental Quality (Title 40 *Code of Federal Regulations* [CFR] Part 1502.14[d]).¹

1.1 Regulatory Requirements

In 1978, Congress passed UMTRCA, 42 U.S.C. §§ 7901 et seq., in response to public concern regarding potential health hazards of long-term exposure to radiation from uranium mill tailings. Title I of UMTRCA requires DOE to establish a remedial action program and authorizes DOE to stabilize, dispose of, and control uranium mill tailings and other contaminated material at 24 uranium-ore processing sites and associated vicinity properties. UMTRCA also directed the U.S. Environmental Protection Agency (EPA) to promulgate cleanup standards (now codified at 40 CFR 192, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings") and assigned the U.S. Nuclear Regulatory Commission (NRC) to oversee the cleanup and license the completed disposal cells. Chapter 7.0 contains additional information regarding UMTRCA requirements.

In October 2000, the Floyd D. Spence National Defense Authorization Act (Floyd D. Spence Act) for fiscal year (FY) 2001 (Public Law 106-398) amended UMTRCA Title I (which expired in 1998 for all other sites except for ground water remediation and long-term radon management), giving DOE responsibility for remediation of the Moab site. That act also mandates that the Moab site be remediated in accordance with UMTRCA Title I "subject to the availability of appropriations for this purpose" and requires that DOE prepare a remediation plan to evaluate the costs, benefits, and risks associated with various remediation alternatives. The act further stipulates that the draft plan be presented to the National Academy of Sciences (NAS) for

¹In this EIS, "contaminant" or "contamination" refers to RRM, unless specified otherwise. RRM is defined by UMTRCA and the implementing regulations in 40 CFR 192 as (1) waste that DOE determines to be radioactive in the form of tailings resulting from the processing of ores for the extraction of uranium and other valuable constituents of the ores and (2) other wastes that DOE determines to be radioactive at a processing site which relate to such processing, including any residual stock of unprocessed ores or low-grade materials. Contaminated materials include soils, tailings, facility components, buildings or building materials, equipment, and other wastes. Contaminated ground water is ground water in the uppermost aquifer contaminated with RRM.

review. NAS is directed to provide “technical advice, assistance, and recommendations” for remediation of the Moab site. Under the act, the Secretary of Energy is required to consider NAS comments before making a final recommendation on the selected remedy. If the Secretary prepares a remediation plan that is not consistent with NAS recommendations, the Secretary must submit a report to Congress explaining the reasons for deviating from those recommendations.

DOE’s *Preliminary Plan for Remediation* (DOE 2001) for the Moab site was completed in October 2001 and forwarded to NAS. After reviewing the draft plan, NAS provided a list of recommendations on June 11, 2002, for DOE to consider during its assessment of remediation alternatives for the Moab site. DOE has addressed the NAS recommendations in its internal scoping for this EIS and in this draft EIS and supporting documents. Section 2.7.2 summarizes the NAS comments and provides a cross reference to sections of the EIS that address the issues raised by NAS. As published in the Notice of Intent, the final EIS will take the place of a final plan for remediation for the purpose of supporting decision-making for remediation of the Moab site.

1.2 Background

As shown on [Figure 1–1](#), the Moab site lies approximately 30 miles south of Interstate 70 (I-70) on U.S. Highway 191 (US-191) in Grand County, Utah. The 439-acre site is located about 3 miles northwest of the city of Moab ([Figure 1–2](#)) on the west bank of the Colorado River at the confluence with Moab Wash. The site is bordered on the north and southwest by steep sandstone cliffs. The Colorado River forms the eastern boundary of the site. US-191 parallels the northern site boundary, and State Road 279 (SR-279) transects the west and southwest portion of the property. The Union Pacific Railroad traverses a small section of the site just west of SR-279, then enters a tunnel and emerges about 1.5 miles to the southwest. Arches National Park has a common property boundary with the Moab site on the north side of US-191, and the park entrance is located less than 1 mile northwest of the site. Canyonlands National Park is located about 12 miles to the southwest.

1.2.1 History of the Site

The Moab site is the site of a former uranium-ore processing facility that was owned and operated by the Uranium Reduction Company and later the Atlas Minerals Corporation (Atlas) under a license issued by NRC. The mill ceased operations in 1984 and has been dismantled except for one building that DOE currently uses for maintenance and storage space. During its years of operation, the facility accumulated approximately 10.5 million tons of uranium mill tailings that are present on the site as a 130-acre tailings pile. Uranium mill tailings are naturally radioactive residue from the processing of uranium ore. Although the milling process recovered about 95 percent of the uranium, the residues, or tailings, contain several naturally occurring radioactive elements, including uranium, thorium, radium, polonium, and radon. The unreclaimed tailings at the Moab site contain contaminants at levels above the EPA standards in 40 CFR 192.

Decommissioning of the mill began in 1988, and an interim cover was placed on the tailings pile between 1989 and 1995. In 1996, Atlas submitted a reclamation plan and an application to NRC for an amendment to its existing NRC license (No. SUA-917) to allow for reclamation of the site. Under the license amendment, Atlas was required to reclaim the tailings impoundment in accordance with the October 1996 submittal to NRC titled *Final Reclamation Plan, Atlas Corporation Uranium Mill and Tailings Disposal Area* (Smith 1996).

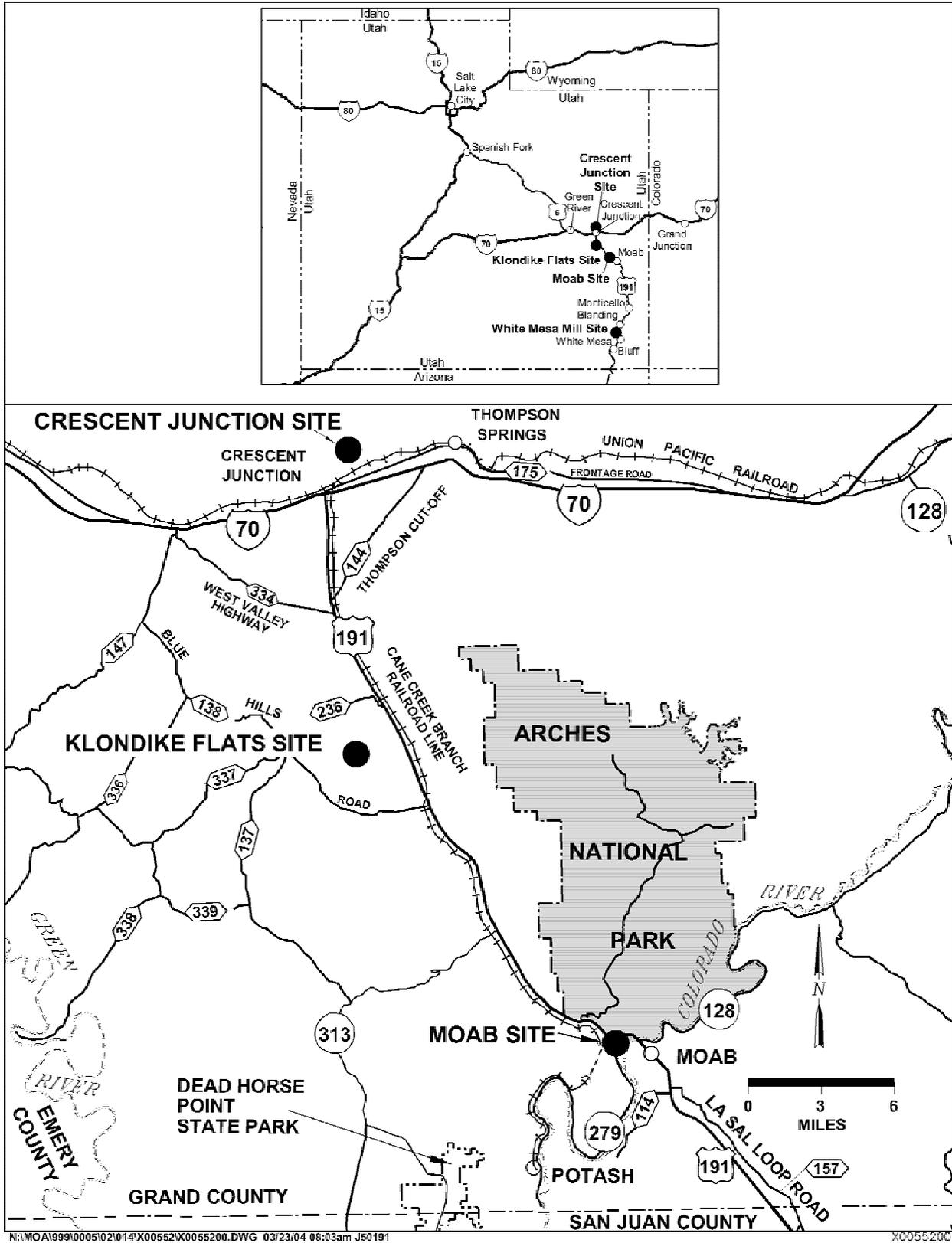


Figure 1-1. Location of the Moab Site in Grand County, Utah

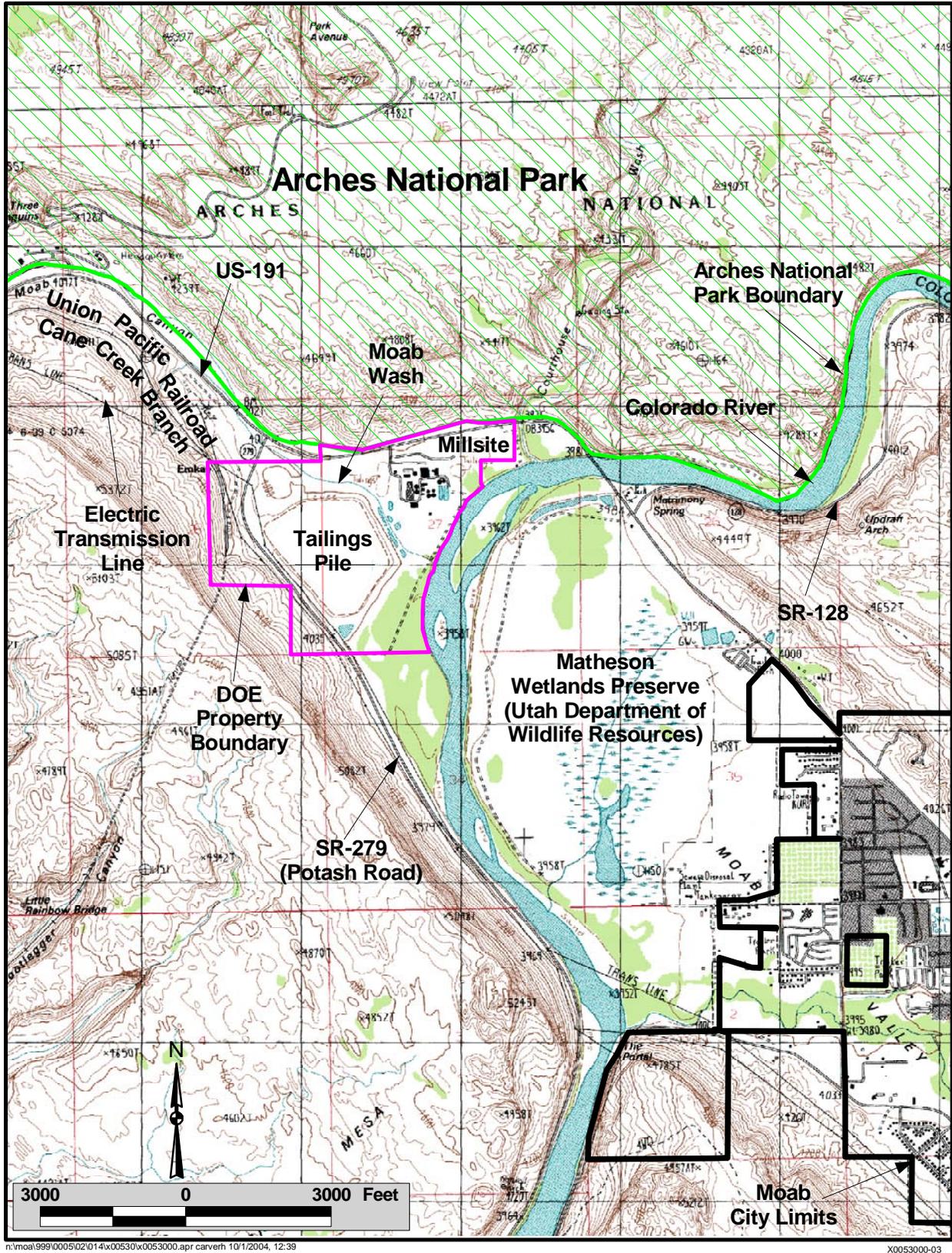


Figure 1-2. Location of the Moab Site in Relation to the City of Moab

The amendment to the NRC license also required preparation of an EIS to assess potential impacts from the 1996 reclamation plan. However, Atlas filed for bankruptcy in September 1998, prior to completing the EIS. In March 1999, a trust was created to fund future reclamation and site closure. Atlas was released from all future liability with respect to the uranium mill facilities and tailings impoundment at the Moab site. The bankruptcy court appointed NRC and the Utah Department of Environmental Quality (UDEQ) beneficiaries of the Atlas bankruptcy trust. Later, the beneficiaries selected PricewaterhouseCoopers to serve as trustee.

In 1999, NRC completed the *Final Environmental Impact Statement Related to Reclamation of the Uranium Mill Tailings at the Atlas Site, Moab, Utah* (NRC 1999), which proposed stabilizing the tailings pile in place. The final EIS received numerous comments both in favor of and opposed to the proposed action. However, the EIS did not address ground water compliance or remediation of vicinity properties. NRC documented U.S. Fish and Wildlife Service (USF&WS) concerns regarding the effects of contaminants reaching the Colorado River; specifically, the effects on four endangered fish species and critical habitat (in 1998, USF&WS had concluded in a Final Biological Opinion that continued leaching of existing concentrations of ammonia and other constituents into the Colorado River would jeopardize the razorback sucker and Colorado pikeminnow [USF&WS 1998]).

To minimize potential adverse effects to human health and the environment in the short term, former site operators, custodians, and DOE instituted environmental controls and interim actions at the Moab site. Controls have included storm water management, dust suppression, pile dewatering activities, and placement of an interim cover on the tailings to prevent movement of contaminated windblown materials from the pile. Interim actions have included restricting site access, monitoring ground water and surface water, and managing and disposing of legacy chemicals to minimize the potential for releases to the environment. A pilot-scale ground water extraction system was implemented in summer 2003, which continues to reduce the mass of ground water contaminants discharging to the Colorado River and thereby reduce ammonia and uranium concentrations discharging to the river.

Federal and state regulatory agencies have expressed concerns about the effects of disposing of contaminated materials at the site and the effects of contaminated ground water entering the Colorado River. Stakeholders, including local and state governments, environmental interest groups, and downstream users of Colorado River water, have also expressed concerns.

1.2.2 Current Status of the Site

The tailings are located in a 130-acre unlined tailings impoundment (pile) that occupies much of the western portion of the site. The tailings pile averages 94 feet (ft) above the Colorado River floodplain (4,076 ft above mean sea level) and is about 750 ft from the Colorado River. The pile was constructed with five terraces and consists of an outer compact embankment of coarse tailings, an inner impoundment of both coarse and fine tailings, and an interim cover of soils taken from the site outside the pile area. Debris from dismantling the mill buildings and associated structures was placed in an area at the south end of the pile and covered with contaminated soils and fill. Radiation surveys indicate that some soils outside the pile also contain radioactive contaminants at concentrations above the EPA standards in 40 CFR 192.

Besides tailings and contaminated soils, other contaminated materials requiring cleanup include ponds used during ore-processing activities, disposal trenches, and other locations used for waste management during mill operations. DOE estimates the contaminated material at the Moab site and vicinity properties has a total mass of approximately 11.9 million tons and a volume of approximately 8.9 million cubic yards (yd³). Evidence indicates that historical building materials may contain asbestos.

Ground water in the shallow alluvium at the site was also contaminated by milling operations. The Colorado River adjacent to the site has been negatively affected by site-related contamination, mostly because of ground water discharge. Concentrations of several site contaminants in ground water at the Moab site are above appropriate standards or benchmarks for aquatic organisms and may be affecting fish species protected under the Endangered Species Act. A biological assessment (BA), which evaluates the effects of these contaminants and the proposed actions on protected species, and a thorough screening of contaminants are provided in Appendixes A1 and A2, respectively. Through the screening process, five contaminants of potential concern have been identified: ammonia, copper, manganese, sulfate, and uranium. However, ammonia is the key contaminant driving the proposed ground water action because of its high concentrations in the tailings seepage and ground water and its toxicity to aquatic organisms (EPA 1999).

In addition to the contaminated material at the Moab site, approximately 39,700 tons of contaminated materials are estimated to have been used as construction material or fill at homes, businesses, public buildings, and vacant lots in and near Moab (see Section 2.1.2). As a result, these vicinity properties have elevated levels of radiation. On the basis of past surveys that identified 130 potential sites, and for purposes of analysis in this EIS, DOE has assumed that 98 vicinity properties would need to be remediated. However, additional characterization would be necessary to identify the current number and locations of vicinity properties. In accordance with the requirements of UMTRCA, DOE is obligated to remediate those properties where contaminant concentrations exceed the limits in 40 CFR 192, along with the Moab site.

1.3 Purpose and Need for Agency Action

The Moab site and vicinity properties near Moab, for which DOE has been given responsibility, contain contaminated materials in concentrations that exceed 40 CFR 192 concentration limits and present a current and long-term potential source of risk to human health and the environment. DOE needs to take action to remediate the Moab site in accordance with UMTRCA Title I to fulfill its responsibilities under Public Law 106-398. Accordingly, DOE, with the assistance of its cooperating agencies (see Section 1.6), prepared this EIS to analyze the existing risks and compare and analyze reasonable alternatives available to control, reduce, or eliminate risks to the extent practicable. This EIS will be used to inform decision makers and the public prior to deciding upon a final course of action or taking any action that may represent an irreversible commitment of resources.

1.4 Alternatives

DOE is proposing (1) to remediate approximately 11.9 million tons of contaminated materials located on the Moab site and approximately 39,700 tons located on vicinity properties and (2) to develop a ground water compliance strategy for the Moab site using the framework of the *Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial*

Action Ground Water Project (PEIS) (DOE 1996). The range of reasonable surface remediation alternatives includes both on-site and off-site disposal of the contaminated materials.

For both the on-site and off-site disposal alternatives, DOE must demonstrate that the combination of engineered controls (e.g., disposal cell cover and liner systems), institutional controls, and custodial care performed as part of the long-term surveillance and maintenance activities required under UMTRCA would ensure long-term protection of public health and the environment. DOE has not identified a preferred alternative in this draft EIS; a preferred alternative will be developed in the final EIS after consideration of public comments, the information provided in this EIS, and other factors relevant to the decision, such as costs. During the preparation of the draft EIS, some of the cooperating agencies identified in Section 1.6 have expressed their preferences among the alternatives analyzed in this EIS, and these preferences are identified in Section 2.7.1.

Institutional Controls are used to limit or eliminate access to, or uses of, land, facilities, and other real and personal property to prevent inadvertent human and environmental exposure to residual contamination and other hazards. These controls maintain the safety and security of human health and the environment and of the site itself. Institutional controls may include legal controls such as zoning restrictions and deed annotations and physical barriers such as fences and markers. Also included are methods to preserve information and data and to inform current and future generations of the hazards and risks.

DOE Policy 454.1 (DOE 2003)

1.4.1 On-Site Disposal Alternative

The on-site disposal alternative would involve placing contaminated site materials and materials from vicinity properties on the existing tailings pile and stabilizing and capping the tailings pile in place. DOE would design the cap to meet EPA standards in 40 CFR 192 for longevity and radon releases, using DOE's experience with disposal cell covers at other uranium mill tailings disposal sites. Final design and construction would meet the requirements of disposal cells under all applicable EPA and NRC standards. Flood protection would be constructed along the base of the pile, and cover materials for radon attenuation and erosion protection would be brought to the site from suitable borrow areas.

Following completion of the on-site disposal cell, the area outside the cell would be recontoured, reclaimed, and revegetated. The disposal cell would be enclosed and protected by a security chain-link fence around its perimeter to discourage access.

Remediation of contaminated materials on the site and at vicinity properties is estimated to take 7 to 10 years to complete and to cost approximately \$166 million. This cost and time estimate does not include the long-term operations and maintenance associated with ground water remediation (see Section 1.4.3). Section 4.1.14 and Table 4-8 provide a detailed characterization of the estimated costs of each alternative and transportation mode.

1.4.2 Off-Site Disposal Alternative

For this alternative, DOE would remove contaminated materials from the Moab site and transport them to another location for disposal. Approximately 11.9 million tons of contaminated material would be removed from the site. This total consists of the estimated 10.5-million-ton tailings pile; an estimated 600,000 tons of soil that was placed on top of the pile; 566,000 tons of subpile soil (assumed to be 2 feet thick); 234,000 tons of off-pile contaminated site soil; and

39,700 tons of vicinity property material that would be brought to the Moab site before shipment to an off-site location.

DOE has identified three sites in Utah as alternative off-site disposal sites: Klondike Flats site, near Moab; Crescent Junction site, near the town of Crescent Junction and 30 miles east of Green River; and the White Mesa Mill site south of Blanding and north of the town of White Mesa (see Figure 1–1 inset). The Klondike Flats and Crescent Junction sites are location alternatives where new disposal cells could be constructed; the White Mesa Mill site is an existing facility that could receive the contaminated materials.

Klondike Flats—Klondike Flats is a low-lying plateau about 18 miles northwest of the Moab site, just northwest of the Canyonlands Field Airport and south-southeast of the Grand County landfill. The Klondike Flats site consists of undeveloped lands administered by the Bureau of Land Management (BLM) and the State of Utah School and Institutional Trust Lands Administration (SITLA).

Crescent Junction—The Crescent Junction site is approximately 30 miles northwest of the Moab site and 30 miles east of Green River, just northeast of Crescent Junction. The site also consists of undeveloped land administered by BLM and interspersed with lands owned by the State of Utah.

White Mesa Mill—The White Mesa Mill site is approximately 85 miles south of the Moab site, 4 miles from the community of White Mesa and the Ute Mountain Ute Reservation and 6 miles from the city of Blanding in San Juan County, Utah. This commercial mill is owned by the International Uranium (USA) Corporation (IUC) and disposes of uranium-bearing materials on site in lined ponds. It has been in operation since 1980. Although the facility has an NRC-issued license to receive, process, and permanently dispose of uranium-bearing material, it would need a license amendment from the State of Utah before it could accept material from the Moab site. (Effective August 16, 2004, NRC transferred to Utah the responsibility for licensing, inspection, enforcement, and rule-making activities for uranium and thorium-milling operations, mill tailings, and other wastes). Also, expansion of the existing facility would likely be necessary. The mill has the potential to process materials from the Moab site to extract valuable constituents and then dispose of the residues on the site or to dispose of the material without processing. At this time, IUC has indicated that it may process water used for slurry transport (one of the potential transportation modes) but would not reprocess tailings.

Under the off-site disposal alternative, three transportation modes are evaluated: truck, rail, and slurry pipeline for some or all of the off-site disposal locations.

Truck Transport— Trucks would use US-191 as the primary transportation route for hauling contaminated materials to the selected disposal site. Trucks would be used exclusively for hauling borrow materials to the selected disposal site. Construction of highway entrance and exit facilities could be required to safely accommodate the high volume of traffic currently using this highway.

Rail Transport—An existing rail line (Cane Creek Branch) runs from the Moab site north along US-191 and connects with the main east-west Union Pacific Railroad line near I-70. The Klondike Flats and Crescent Junction sites could be served with this rail line with upgrades and

additional rail sidings. There is no rail access from the Moab site to the White Mesa Mill site. Construction of a rail line from the Moab site to White Mesa Mill was not analyzed because of technical difficulties, potential impacts, and high cost.

Slurry Pipeline—This transportation mode would require the construction of a new pipeline from the Moab site to the selected disposal site and a water line to recycle the slurry water back to Moab for reuse in the pipeline.

As with the on-site disposal alternative, an off-site disposal cell would be enclosed and protected by a security chain-link fence around its perimeter to discourage access. Potential for future use outside the security fence would be evaluated after completion of remedial actions. Once the tailings were removed, the Moab site would be reclaimed by recontouring and revegetating. Future use of the site would be evaluated after completion of remedial action.

The off-site disposal of contaminated materials, including those from vicinity properties, is estimated to take up to 8 years to complete and to cost \$329 million to \$393 million for the closest site (Klondike Flats) and \$418 million to \$464 million for the farthest site (White Mesa Mill), depending upon the transportation mode selected. These cost and time estimates do not include the long-term operations and maintenance associated with ground water remediation (see Section 1.4.3). Section 4.1.14 and Table 4–8 provide a detailed characterization of the estimated costs of each alternative and transportation mode.

1.4.3 Ground Water Remediation

As part of its UMTRCA responsibilities, DOE established a Uranium Mill Tailings Remedial Action (UMTRA) Ground Water Project, and prepared the UMTRA Ground Water PEIS (DOE 1996) and a Record of Decision (ROD) (62 *Federal Register* [FR] 22913 [1997]). The PEIS described and the ROD adopted a ground water remediation framework that takes into consideration human health and environmental risk, stakeholder input, and cost. In applying the framework, DOE assesses ground water compliance in a step-by-step approach, beginning with consideration of a no-remediation strategy and proceeding, if necessary, to consideration of passive strategies, such as natural flushing with compliance monitoring and institutional controls, and finally to consideration of more complex, active ground water remediation methods or a combination of strategies (such as pump and treat), if needed.

Ground Water Compliance Strategies

Supplemental Standards are essentially a narrative exemption from remediating ground water to prescriptive numeric standards (background concentrations, maximum concentration limits [MCLs], or alternate concentration limits [ACLs]), if one or more of the eight criteria in 40 CFR 192.21 are met. At the Moab site, the applicable criterion is limited-use ground water, (40 CFR 192.21[g]), which means that ground water has naturally occurring total dissolved solids (TDS) concentrations greater than 10,000 milligrams per liter (mg/L), and widespread TDS contamination is not related to past milling activities at the site. The PEIS (DOE 1996) also discusses supplemental standards within the context of “no ground water remediation.” However, guidance in 40 CFR 192.22 directs that where the designation of limited-use ground water applies, remediation shall “assure, at a minimum, protection of human health and the environment.”

No Remediation means that no ground water remediation is necessary because ground water concentrations meet acceptable standards. No remediation under the PEIS is not the same as No Action under NEPA, because actions such as site characterization would be required to demonstrate that no remediation is warranted.

Natural Flushing means allowing the natural ground water movement and geochemical processes to decrease contaminant concentrations.

Active Remediation means the use of active ground water remediation methods such as gradient manipulation, ground water extraction and treatment, or in situ ground water treatment to restore ground water quality to acceptable levels.

On the basis of this methodology and site-specific modeling, DOE's proposed action for ground water at the Moab site would involve the application of ground water supplemental standards and implementation of an active remediation system to intercept and control discharge of contaminated ground water to the Colorado River. Because of its naturally high salt content, the uppermost aquifer at the Moab site does not represent a potential source of drinking water. However, discharge of contaminated ground water has resulted in elevated concentrations of ammonia and other site-related constituents in a portion of the Colorado River near the Moab site. These concentrations pose no risk to humans, but ammonia concentrations exceed ammonia levels considered to be protective of aquatic life. Therefore, the cleanup objective of the proposed ground water action is to protect the environment, particularly endangered species of fish, which are known to use that portion of the river. Active remediation would be necessary to meet this goal.

The active remediation system would extract and treat ground water while natural processes act on the ground water system to decrease contaminant concentrations to the long-term protective goals. Active remediation would cease after long-term goals were achieved. Conceptually, the same system would be installed and operated at the Moab site regardless of whether the on-site or off-site disposal alternative was implemented. An extraction well system developed as an interim ground water remedial action in 2003 could become a part of the extraction system envisioned under the proposed ground water action.

Section 2.3.1.3 provides additional background on the ground water compliance strategy selection process and more specific cleanup objectives for the ground water. Uncertainties affecting the ability of the proposed ground water remediation to meet specific cleanup objectives are discussed in Section 2.3.3. Section 2.3.2.3 provides further details regarding construction and operation of the proposed ground water action.

It would cost approximately \$10.75 million to design and construct a ground water remediation system under either the on-site or off-site disposal alternative and approximately \$906,000 annually to operate and maintain it. Construction would be completed in 2009, or approximately 5 years after issuance of a ROD. The system would operate for 75 to 80 years. The cost and schedule for designing and constructing a ground water remediation system under an off-site disposal alternative would be the same as for the on-site disposal alternative. Section 4.1.14 and Table 4-8 provide a detailed characterization of the estimated costs of each alternative and transportation mode.

1.4.4 No Action Alternative

This alternative is analyzed to provide a basis for comparison to the action alternatives and is required by NEPA regulations (40 CFR 1502.14[d]).

Under the No Action alternative, DOE would not remediate contaminated materials either on the site or at vicinity properties. The existing tailings pile would not be covered and managed in accordance with UMTRCA standards. No short-term or long-term site controls or activities to protect human health and the environment would be continued or implemented. Public access to the site is assumed to be unrestricted. All site activities, including operation and maintenance, would cease.

Initial and interim ground water actions would not be continued or implemented. The No Action alternative would include stopping all ongoing and planned activities designed to protect endangered species and control discharge of contaminated ground water to the Colorado River. No further media sampling or characterization of the site would take place.

A compliance strategy for contaminated ground water beneath the site would not be developed in accordance with UMTRCA standards. No institutional controls would be implemented to restrict use of ground water, and no long-term stewardship and maintenance would take place. Because no activities would be budgeted or scheduled at the site, no further initial, interim, or remedial action costs would be incurred. DOE recognizes that this scenario would be highly unlikely; however, it has been included as part of the EIS analyses to provide a basis for comparison to the action alternatives in the EIS. Section 4.1.14 and Table 4–8 provide a detailed characterization of the estimated costs of each alternative and transportation mode.

1.4.5 DOE Decision-Making

At the time of issuance of this draft EIS, DOE has not determined a preferred alternative for remediation of the Moab site. DOE intends to consider the results of analyses provided in this draft EIS, the relative costs of the alternatives, and other factors, such as public and agency comments on this draft EIS, in determining its preferred alternative for remediation of the Moab site and vicinity properties. DOE's preferred alternative will be based on these considerations and will be identified in the final EIS.

DOE is planning on a tiered decision-making process based on this EIS. It is anticipated that in the ROD that will be issued after the publication of the final EIS, DOE will determine whether it will propose to Congress and seek specific funds (1) to consolidate the mill tailings and other contaminated materials on site and close the site with an NRC-approved cap or (2) to move the pile (including contaminated material from vicinity properties) to an off-site location for final capping and disposal. If the selected remedy is off-site disposal of contaminated material, DOE would identify the specific off-site location and the transportation mode that would be used to move the contamination to that location. As a part of its decision, DOE would also identify a strategy for remediation of the contaminated ground water under the Moab site but would defer selection of the specific remediation technologies until after a decision regarding the remediation of the Moab site.

Upon completion of this EIS and the ROD, DOE would develop a remedial action plan (RAP) for remediation of contaminated materials. The RAP would provide the detailed engineering reclamation design and incorporate a ground water compliance strategy and corrective actions. NRC would need to approve the RAP; no additional NEPA analysis or documentation would be required for that approval.

DOE possesses sufficient information for an understanding of the potential environmental impacts of each alternative. With respect to off-site disposal sites, however, additional site-specific testing and evaluation may be required to provide data relevant to final design, although additional NEPA documentation is not expected. For example, final selection of a disposal cell location within the large areas assessed at the Klondike Flats or Crescent Junction sites would require more detailed study of geology, hydrology, engineering logistics, and other environmental factors. These evaluations could involve intrusive investigation of surface and subsurface conditions and could include site-specific cultural or archaeological surveys and other

sampling. Similarly, a final selection of the soil borrow areas would require confirmatory sampling of borrow material characteristics and could also entail other site-specific environmental sampling. Should DOE select a pipeline for its transportation mode for off-site disposal, final alignment of a pipeline within the corridors assessed in this EIS would also require further route-specific characterization.

Decisions on future uses of the Moab site and a slurry pipeline (should it be selected) will not be a part of DOE's near-term decisions. For a determination on the future uses of the Moab site, a final decision on surface and subsurface remediation must be made and implemented and its success evaluated before the feasibility of future uses can be reasonably evaluated. Similarly, future uses of a slurry pipeline for water transportation would be predicated first on a decision to use a slurry pipeline and a determination, after tailings shipment was completed, that a radiological release of the pipeline for such a use would be acceptable. DOE has determined that these decisions are several years in the future and are, therefore, too speculative at this time to allow for meaningful assessment in this EIS. DOE would conduct NEPA reviews for these future decisions at the appropriate time.

In accordance with the implementing regulations for NEPA (40 CFR 1502.9[c][1]) and 10 CFR 1021.314), DOE would reassess the adequacy of this EIS to support future decisions on a case-by-case basis and complete a Supplement Analysis if warranted. Because several of these future decisions would involve actions on land currently administered by BLM, a cooperating agency in the preparation of this EIS, DOE would work closely with BLM to ensure that any future NEPA documentation would meet the needs of both agencies.

1.5 Public and Agency Involvement

DOE's NEPA process includes multiple opportunities for public involvement in agency decision-making. The public scoping process allows members of the public to suggest alternatives and issues to be analyzed in the EIS. Following issuance of the draft EIS, DOE will provide a 90-day public comment period during which members of the public are encouraged to submit comments regarding the EIS. Public hearings on the draft EIS will be held during the public comment period.

1.5.1 Scoping

In a Notice of Intent published in the *Federal Register* on December 20, 2002 (67 FR 77969), DOE sought public input on the scope of the EIS. The public scoping process, conducted in winter of 2003, was an opportunity for the public to assist DOE in determining the alternatives and issues for analysis. As part of this process, DOE held six public scoping meetings to facilitate dialogue between DOE and the public and to provide an opportunity for individuals to provide written or oral statements, ask questions, and discuss concerns regarding the EIS with DOE officials.

DOE received 175 public scoping comment documents in the form of letters, electronic mail (e-mail) messages, facsimiles, and oral statements. Copies of the scoping presentations, scoping comments, and other project documents are available on the Internet at <http://gj.em.doe.gov/moab/>. In addition, copies of written comments and transcripts of oral comments are available at the following locations:

Grand County Library
25 South 100 East
Moab, UT 84532
Phone (435) 259-5421
Hours: 9–9, Mon–Fri

White Mesa Ute
Administrative Building
(off US-191)
White Mesa, UT 84511
Phone (435) 678-3397
Hours: 12–7, Mon–Thurs; 2–6, Fri

Blanding Branch Library
25 West 300 South
Blanding, UT 84511
Phone (435) 678-2355
Hours: 8–4:30, Mon–Fri

U.S. Department of Energy
Technical Library
2597 B $\frac{3}{4}$ Road
Grand Junction, CO 81503
Phone (970) 248-6089
Hours: 8–4, Mon–Fri

Public participation during the scoping period is summarized below:

- Oral comments at six public meetings (251 people signed the attendance sheets).
 - Green River, January 21, 2003 (12 people)
 - Moab, January 22, 2003 (49 people)
 - Blanding, January 23, 2003 (60 people)
 - Blanding meeting with the members of the Navajo Nation, January 23, 2003 (32 people)
 - White Mesa, January 23, 2003 (50 people)
 - East Carbon, Utah, January 28, 2003 (48 people)
- Written comments (letters, postcards, e-mail) received from 175 individuals, groups, and state, local, and tribal agencies.
- Oral comments (by telephone) received from 50 individuals, groups, and state, local, and tribal agencies.

1.5.2 Issues/Concerns Raised During Scoping

DOE has considered all the comments received during the public scoping process and has addressed the issues and concerns raised to the fullest extent possible in this EIS. The following is a summary of the scoping comments received. The reader is referred to [Table 1–1](#) following this summary for the specific locations within the EIS where issues relevant to the scope of the EIS have been addressed.

1. DOE Decision-Making Process

Commenters stated that DOE’s decision regarding the uranium mill tailings pile in Moab should be based on science and sound and impartial evidence, not emotion. Other commenters wondered what decision would be made on the basis of this EIS and whether a subsequent NEPA document would be prepared if an off-site location were selected. Some commenters questioned the value of public comments and asked how DOE would use the public comments received. Commenters also encouraged DOE to evaluate long-term effects and solutions. One commenter asked if a cleanup contract had already been signed.

2. Public Scoping Process

Commenters stated that there were problems with the scoping process, including lack of notice, lack of information, problems with the website and the toll-free telephone line,

absence of a court reporter to transcribe comments, and absence of translators for meetings attended by members of the Ute Mountain Ute Tribe and the Navajo Nation. Commenters asked for additional reading rooms in White Mesa, Green River, Blanding, and East Carbon and asked that additional information be made available in the reading rooms and on the website (for example, regulations cited, the White Mesa Mill proposal, and NAS comments). Commenters also asked that the public scoping period be extended beyond February 14, 2003, and that DOE work with Tribal Councils. The Ute Mountain Ute Tribe requested that another informational meeting be held in White Mesa, Utah.

3. *Cooperating Agencies*

Commenters stated that Grand County and other affected local communities should be asked to be cooperating agencies. EPA, Grand County, and San Juan County also indicated interest in or asked to be cooperating agencies. One commenter disagreed with the Navajo Nation's decision not to be a cooperating agency, and another commenter asked for a list of cooperating agencies and contacts.

4. *Moab Site/On-Site Disposal Alternative*

- a. Commenters stated that materials other than mill tailings (barrels, acid, and debris) may have been put on the tailings pile and that DOE needed to discuss the presence of such materials in the EIS. Some commenters stated that existing studies were not acceptable, that monitoring information should be made available, and that DOE should make a concerted effort to locate historical information about wells and quicksand. Commenters stated that the interim cover was not effective.
- b. The No Action and on-site disposal alternatives were criticized for being contrary to the requirements of the Floyd D. Spence Act and opposed because of potential impacts to the Colorado River and its users and because of the site's proximity to Arches National Park.
- c. Commenters stated that the pile should remain in place because Moab had the benefits of the mill and should bear the burdens and because moving the pile would only cause additional environmental damage elsewhere.

5. *Klondike Flats and Crescent Junction Sites/Alternatives*

- a. The Klondike Flats site was opposed because of its current use by mountain bikers. Other commenters stated that the Klondike Flats site might be used for other waste types, in addition to the uranium mill tailings.
- b. Other commenters supported the use of the Klondike Flats site or the Crescent Junction site because these sites involved the shortest travel distance, were not near population areas, could provide jobs, or did not involve surface or ground water problems. Commenters also noted the proposed Williams Company's Crescent Junction Terminal project and its potential proximity to the Crescent Junction site.

6. *East Carbon Development Corporation Site/Alternative*

- a. Commenters asked whether allowing the East Carbon Development Corporation (ECDC), an existing solid waste disposal facility in Carbon County, Utah, to dispose of the uranium mill tailings would open up the facility to the storage or disposal of other types of nuclear material or other hazardous wastes. Commenters noted that ECDC was accepted by the community for solid, nonhazardous waste disposal and presented several

signed agreements between ECDC and its predecessors and the City of East Carbon documenting ECDC's plans to accept only nonhazardous waste.

- b. The ECDC site was opposed primarily because of its proximity to people, potential adverse impacts to air and water quality, effect on property values, travel distance and associated traffic and dust impacts, and the contractual commitment to prohibit disposal of hazardous or radioactive materials at the site.
- c. After scoping, ECDC formally requested that DOE remove its site from further consideration for Moab mill tailings (see Section 2.5.2.1).

7. *White Mesa Mill Site/Alternative*

- a. Commenters stated that there was not enough information about the site, including how IUC would manage or handle the uranium mill tailings. This issue was not addressed in the EIS prepared by NRC for the White Mesa Mill (NRC 1979), which some commenters said did not accurately address the operations of the mill and overlooked the Ute Reservation and the community of White Mesa. Commenters identified potential impacts from current mill operations with alternative feed materials that have not been addressed. Commenters wanted a determination of the feasibility of remilling Moab tailings at White Mesa Mill and assurances that White Mesa Mill would bear the costs of remilling and paying DOE a percentage as required by UMTRCA Title I (Section 108 [b]). Commenters stated that because it was a Canadian company, IUC does not care about the local community; others complained that they could smell the chemicals used at the White Mesa Mill when the wind blew, that the ponds at the site were supposed to be capped but were not, that the cells leak, and that the fencing around the ponds was not adequate. Commenters stated that the cumulative effects of the mill operations and a uranium mill tailings pile should be addressed in the EIS. Commenters also asked that an epidemiological study be done for the White Mesa Mill.
- b. The White Mesa Mill site was opposed primarily because of its potential impact to the Native American communities (Navajo and Ute Reservations) located near the site. Other reasons were potential adverse impacts to air and water quality, potential contamination of the San Juan River, potential impacts to tourism, and the absence of railroad access to the site.
- c. Some commenters supporting the use of the White Mesa Mill site stated that any potential human health impacts could be adequately managed.
- d. With respect to the White Mesa Mill site, some commenters stated that people were being asked to choose between, or balance risks to, jobs and human health.
- e. Other commenters supported the use of the White Mesa Mill site because of its current use as a uranium mill, with mill tailings already on the site, and because it would provide jobs in the area.

8. *Cost of Alternatives/Funding*

Commenters asked what each of the alternatives would cost and whether DOE had or could obtain the funds for cleanup of the Moab site. One commenter stated that the cost of moving the Moab tailings pile could be more than \$2 billion. Another commenter stated that the cost and duration of ground water cleanup would not be the same whether the tailings pile were left in place or moved, contrary to DOE's assertion. Other commenters noted the cost differential between constructing a railroad or railroad spur and a slurry pipeline for access to particular sites. Some commenters were concerned that the owner of a privately owned

disposal site could go bankrupt and leave the problem for the Federal Government to clean up. Commenters also stated that the costs of legal action should be included in any cost estimate. One commenter asked if the construction contract would be a fixed-price contract.

9. *Other Alternatives*

Several alternatives were suggested:

- Move the pile back from the river and place in a lined bed.
- Use the Lisbon Copper Mine in San Juan County, Utah.
- Make a golf course out of the tailings pile.
- Move the tailings to old mines in the La Sal area.
- Move the tailings to an unpopulated site under DOE's control (not privately owned).
- Move the tailings to the former uranium mill tailings site near Green River, Utah.
- Move the tailings to Envirocare in Clive, Utah.
- Move the tailings to the already contaminated testing ground in Utah.
- Use the Grand County landfill.
- Allow Grand County to own and/or direct operations of the cleanup area.
- Consider in situ stabilization, perhaps using new chemical techniques for stabilization.
- Reroute the section of the Colorado River away from the Moab site.
- Use contaminated water for the slurry.

10. *NRC Involvement*

Commenters asked about the extent of NRC involvement with the Moab site. Commenters also stated that NRC's failure to regulate the site adequately has led to current problems there. With respect to the White Mesa Mill site, commenters stated that NRC was uncooperative and had not considered all the impacts of or alternatives to the White Mesa Mill site when it licensed that facility.

11. *Extent and Impact of Contamination in the Colorado River*

Commenters questioned the source and extent of contamination, including ammonia, in the Colorado River and on sandbars in the river. Commenters also questioned the impact of existing contamination on endangered species. Other commenters stated that there were 3 million downstream users, including Lake Havasu, Lake Powell, and Lake Mead. One commenter asked if any studies had been conducted regarding other wastes along the Colorado River downstream from Moab. Another commenter stated a concern that the Colorado River could migrate in the future. Commenters stated that the potential for catastrophic floods because of ice damming on the Colorado River should be addressed in the EIS.

12. *Human Health Impacts*

- a. Commenters were concerned about possible impacts of uranium mill tailings on human (and animal) health. Commenters stated that radioactive and chemical contamination could be spread through the air (dust blowing off the pile and off gases from evaporation ponds) and through surface and ground water pathways and that radioactive

contamination would be hazardous for a long time. Cancer was the primary health concern, although asthma was also noted. Some commenters stated that fears regarding the tailings material were exaggerated.

- b. Some commenters noted that everyone was affected regardless of where the mill tailings were left or sent.

13. Ground Water Impacts

Commenters stated that ground water was a critical issue and that complete studies needed to be conducted; one commenter stated that earlier wells to study ground water were not deep enough. Commenters questioned whether contamination from a mill tailings pile could seep into ground water that is used as a drinking water source, thus increasing the risk of cancer. Commenters also asked, regardless of its location, what would happen if the tailings pile leaked.

14. Water Quality, Availability, and Use

Commenters stated that Colorado River water quality would be improved if the tailings pile were moved and that future river migration could threaten the pile in its current location. Commenters also noted that moving the pile to an off-site location could adversely affect other water bodies such as the San Juan River, Recapture Reservoir, Icelander Creek, Price River, Green River, Navajo Sandstone aquifer, and springs, as well as lakes downstream of Moab on the Colorado River. Commenters stated that the pile should not be located near water sources in order to protect water quality and human health. With respect to a slurry pipeline, commenters asked where the water for the slurry would come from, noting that there were water shortages in the area and could be droughts in the future. Commenters also asked how water contaminated by the tailings would be disposed of. Some stated that use of water for slurry could adversely affect Native American economic development endeavors.

15. Transportation (including slurry pipeline)

- a. Commenters asked how many tons of tailings would be moved, what the time interval would be between trucks on the highways, who would drive them, and who would pay if there were an accident. Commenters also stated that truck traffic would be bad for existing roads. Commenters were concerned about the volume of truck traffic and the potential for traffic accidents and fatalities, in addition to dust. Commenters also wanted information regarding potential impacts of a loaded truck spilling on a highway. With respect to a slurry pipeline, commenters asked how such a system would operate, how much water would be required, where the water would come from, what the effect of the pipeline would be on natural and cultural resources, what the consequences would be if the pipeline carrying the uranium mill tailings slurry broke, and who would own or lease the pipeline. Commenters stated that the rail option would be the cheapest.
- b. Some commenters opposed the slurry pipeline method of transporting the tailings to any site because of cost, impracticality, impacts to natural and cultural resources, and water quality and quantity issues.
- c. Others supported using a slurry pipeline to avoid trucking and to minimize dust and because the pipeline could be used later to pump water to the area.

16. Socioeconomic Impacts (jobs and tourism)

Commenters stated that employment, tourism, and property values could all be affected, depending on the alternative disposal site selected.

17. Environmental Justice and Cultural Resource Considerations (impacts to Native American communities)

Many commenters noted the proximity of the White Mesa Mill site to Ute and Navajo tribal lands and stated that these Native American communities would be adversely affected by the selection of that site for the disposal of the Moab mill tailings pile and material from vicinity properties. Commenters stated that the land in that area was sacred to them and that they hunted animals and gathered herbs and willows, supporting subsistence living and medicinal uses, on the land that could become contaminated. Several commenters stated that the White Mesa Mill site was on a Ute sacred burial ground. Native American burial grounds were also said to be near the ECDC site.

18. Long-Term Surveillance and Maintenance

Commenters asked for information about long-term surveillance and maintenance activities at the sites, including whether such activities would occur at privately owned sites. Commenters asked how DOE could design a cell to last 200 to 1,000 years and whether DOE would own the land or enter into use agreements with landowners. Commenters also stated that the EIS should evaluate the potential for future human intrusion, long-term maintenance, and institutional management and controls.

19. Cumulative Effects

Commenters stated that reprocessing of uranium mill tailings and increased production at the White Mesa Mill site were reasonably foreseeable future actions that should be analyzed in the EIS. In addition, commenters stated that DOE should consider the cumulative effects of all the uranium mills and mill tailings sites in southeastern Utah. Commenters also stated that DOE should look at the cumulative effects of the disposal of the mill tailings at the White Mesa Mill site and the operations of the mill. Commenters noted that the Navajos are also affected by oil wells and electric power plants.

20. Other Issues To Be Addressed in the EIS

Commenters asked that the following issues be addressed in the EIS:

- Geologic conditions;
- Impacts to surface water (loss of surface flow, wetlands, riparian areas, and sedimentation in stream beds, seeps, and springs);
- Impacts to ground water (dewatering, process water wells, current water quality, and impacts of past and current activities);
- Impacts to cultural and historic sites, including impacts to cultural values because of the loss of pine nut gathering, and damage to springs, damage to native people's ability to use the area for cultural properties (includes nonconcrete items such as traditional cultural practices, ceremonies, and customs) or uses;
- Impacts to biological resources (native flora, threatened and endangered species, and potential for invasive species);
- Influence of tamarisk on ground water and river migration;

- Impacts to air quality (all sources of air pollution, release of dust and airborne contaminants into the atmosphere, and subsequent ground deposition);
- Noise impacts, including to visitors and employees of Arches National Park;
- Impacts to night sky (light pollution);
- Details regarding the design, construction, and operation of a slurry pipeline;
- Proposed closure and reclamation plans;
- Financial warranties and bonds;
- Short-term and long-term uses of lands and resources that could be affected by the proposed action and alternatives;
- Potential uses after pile removal, such as a restored wetland;
- A detailed economic analysis (impacts to local economy, and recreation);
- Demolition and restoration of the Moab site;
- Cleanup of areas of Arches National Park that were contaminated by windblown tailings;
- All applicable statutes, regulations, orders, policies, and guidance; and
- Homeland security.

Table 1–1 identifies specific locations in the EIS that address the scoping issues summarized in this section.

Table 1–1. Locations in the EIS That Address Public Scoping Comments

Comment	Location in Draft EIS Where Comment Is Addressed
1. DOE Decision-Making Process	Chapter 1.0, Section 1.4.5, “DOE Decision-Making”
2. Public Scoping Process	Chapter 1.0, Section 1.5, “Public and Agency Involvement”
3. Cooperating Agencies	Chapter 1.0, Section 1.6, “Cooperating Agencies”
4. Moab Site/On-Site Disposal Alternative	(a) Chapter 3.0, Section 3.1.3, “Description of Contaminated Materials at the Moab Site.” (b) Potential impacts of the on-site disposal alternative are discussed in Chapter 4.0, Section 4.1, “On-Site Disposal (Moab Site),” and DOE’s requirements under the Floyd D. Spence Act are described in Section 1.1, “Regulatory Requirements.” (c) Impacts of off-site disposal are discussed in Chapter 4.0, Sections 4.2, 4.3, and 4.4.
5. Klondike Flats and Crescent Junction Sites/Alternatives	The Klondike Flats site is described in Chapter 3, Section 3.2, “Klondike Flats Site,” and evaluated in Chapter 4.0, Section 4.2, “Off-Site Disposal (Klondike Flats Site).” The Crescent Junction site is described in Chapter 3, Section 3.3, “Crescent Junction Site,” and evaluated in Chapter 4.0, Section 4.3, “Off-Site Disposal (Crescent Junction Site).” The Williams Petroleum Pipeline Project is discussed in Chapter 5, Section 5.3.
6. ECDC Site/Alternative	Chapter 2.0, Section 2.5, “Alternatives Considered But Not Analyzed,” describes elimination of the ECDC from the proposed alternatives.
7. White Mesa Mill Site/Alternative	Chapter 4.0, Section 4.4, evaluates the White Mesa Mill site disposal alternative. Impacts to Native Americans are addressed in Section 4.4.18, “Environmental Justice”; other concerns are addressed in Sections 4.4.2, “Air Quality,” 4.4.4, “Surface Water,” and 4.4.15, “Human Health.”
8. Cost of Alternatives/Funding	Costs of the proposed alternatives are discussed in Chapter 2, Section 2.7.3, “Costs,” and Chapter 4.0, Sections 4.1.14, 4.2.14, 4.3.14, and 4.4.14, “Socioeconomics.”
9. Other Alternatives	Chapter 2.0, Section 2.5, “Alternatives Considered But Not Analyzed,” describes other alternatives.
10. NRC Involvement	NRC’s involvement in cleanup at the Moab site is described in Chapter 7.0, Section 7.1, “Federal Regulatory Requirements,” especially Section 7.1.2, which describes NRC’s role in UMTRCA.
11. Extent and Impact of Contamination in the Colorado River	Chapter 4.0, Section 4.1.4 describes short-term and long-term effects to the Colorado River that would result from the on-site disposal alternative, and Section 4.6.4 describes the effects of the No Action alternative.

Table 1–1 (continued). Locations in the EIS That Address Public Scoping Comments

Comment	Location in Draft EIS Where Comment Is Addressed
12. Human Health Impacts	Human health impacts are described in Chapter 4.0, Sections 4.1.15, 4.2.15, 4.3.15, and 4.4.15.
13. Ground Water Impacts	Ground water impacts are described in Chapter 4.0, Sections 4.1.3, 4.2.3, 4.3.3, and 4.4.3.
14. Water Quality, Availability, and Use	These resources are discussed in “Ground Water,” Chapter 3.0, Section 3.1.6, Chapter 4.0, Sections 4.1.3, 4.2.3, 4.3.3, 4.4.3, 4.6.3; and “Surface Water,” Chapter 3.0, Section 3.1.7, Chapter 4, Sections 4.1.4, 4.2.4, 4.3.4, 4.4.4, 4.6.4.
15. Transportation (including slurry pipeline)	Chapter 2.0, Section 2.2.4, “Transportation of Tailings Pile and Other Contaminated Material”; Chapter 3.0, Sections 3.1.17, 3.2.14, 3.3.15, 3.4.15, “Transportation”; Section 3.3.19, “Pipeline Corridor”; Chapter 4, Sections 4.1.16, 4.2.16, 4.3.16, 4.4.16, “Traffic.”
16. Socioeconomic Impacts (jobs and tourism)	Chapter 4.0, Sections 4.1.14, 4.2.14, 4.3.14, 4.4.14, “Socioeconomics,” and Chapter 5.0, Section 5.1, “Seasonal Tourism.”
17. Environmental Justice and Cultural Resource Considerations (impacts to Native American communities)	Environmental justice is discussed in Chapter 3.0, Sections 3.1.20, 3.2.17, 3.3.18, 3.4.18; and Chapter 4.0, Sections 4.1.18, 4.2.18, 4.3.18, 4.4.18, 4.6.18. Cultural resources are discussed in Chapter 3.0, Sections 3.1.13, 3.2.10, 3.3.11, 3.4.11; and Chapter 4.0, Sections 4.1.9, 4.2.9, 4.3.9, 4.4.9, 4.6.9.
18. Long-Term Surveillance and Maintenance	Institutional controls are described in Chapter 1.0, Section 1.4, “Alternatives.” Disposal cell material requirements are described in Chapter 2.0, Section 2.1.3.1, “Borrow Material Standards and Requirements.” Long-term management is described in Chapter 2.0, Sections 2.1.4 and 2.2.6, “Monitoring and Maintenance.”
19. Cumulative Effects	Chapter 5.0, “Cumulative Impacts.”
20. Other Issues To Be Addressed in the EIS	Except for “financial warranties and bonds” and “homeland security,” all issues listed in item 20 of this section appear under the same or similar section titles in Chapter 3.0, “Affected Environment” and Chapter 4.0, “Environmental Consequences.” The proposed alternatives are not associated with homeland security or financial warranties and bonds and are not discussed in this EIS.

1.6 Cooperating Agencies

NEPA implementing regulations state that a federal agency with jurisdiction by law over the proposed action or alternatives must be a cooperating agency, participating in the NEPA process as requested by the lead agency (40 CFR 1501.6). In addition, an [other] agency with special expertise with respect to any environmental issue to be addressed in the EIS should be a cooperating agency. DOE has entered into agreements with 12 federal, state, tribal, county, and local agencies to be cooperating agencies in the development and preparation of this EIS:

Federal

- Bureau of Land Management
- National Park Service
- U.S. Army Corps of Engineers (Corps of Engineers)
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Nuclear Regulatory Commission

State

- State of Utah

Tribal

- Ute Mountain Ute Tribe

County

- Grand County
- San Juan County

Local

- City of Blanding
- Community of Bluff

BLM and NPS are participating as cooperating agencies because lands managed by those agencies could be affected, directly or indirectly, by the on-site and off-site disposal alternatives under consideration. As the land steward of the proposed Klondike Flats and Crescent Junction disposal sites and many of the proposed borrow areas, BLM will use this EIS to support any needed land transfers or issue permits. USF&WS is responsible for protecting threatened and endangered species and is specifically participating in this EIS process through the review and acceptance of the BA (Appendix A1) and will be providing a Biological Opinion (Appendix A3). The Corps of Engineers has regulatory authority over proposed actions within floodplains and wetlands. The purpose and need for actions by these agencies is to ensure that the alternative selected is consistent with national and local land and resource management plans and goals, floodplain and wetland regulations, and the Endangered Species Act. This EIS is intended to meet the NEPA requirements of these federal agencies and of DOE.

UMTRCA authorized the NRC to be the federal regulatory oversight agency for UMTRCA Title I and II sites. Under this authority at Title I sites such as Moab, NRC provides technical and regulatory review of project documents, including remedial action plans, completion reports, long-term surveillance plans, and certification reports. Ultimately, the general license for Title I uranium mill tailings disposal sites will include the disposal site for uranium mill tailings from the Moab site and vicinity properties.

As specified in UMTRCA, EPA has established generally applicable standards for remediating and disposing of contaminated material from all uranium-ore processing sites. EPA's regulations in 40 CFR 192 establish the standards for protection of human health and the environment that form the basis for most of the impact analyses generated for this EIS.

In accordance with Section 274 of the Atomic Energy Act of 1954, as amended, NRC has recently authorized the State of Utah to regulate radioactive materials at UMTRCA Title II sites within Utah. White Mesa Mill is a Title II site now under State regulatory oversight that is being considered as an alternative off-site disposal site for contaminated materials from the Moab site. The State is also interested in ensuring that this EIS complements and satisfies environmental reporting requirements that would apply to the license amendment that would be needed should DOE select the White Mesa Mill site for off-site disposal.

The other cooperating agencies are agencies with expertise relevant to potential environmental, social, or economic impacts within their geographic regions. They provided information as requested and reviewed portions of the document as it was prepared.

1.7 EIS Contents

The remainder of this EIS consists of the following chapters and appendixes:

- *Chapter 2, Description of Proposed Alternative Actions:* This chapter describes the proposed alternatives analyzed in this EIS and those that were considered but are not analyzed in detail. It also presents summaries of the potential impacts associated with each proposed alternative and compares the potential impacts between the alternatives.
- *Chapter 3, Affected Environment:* This chapter describes the affected environment at the Moab site, at the proposed off-site disposal locations (Klondike Flats, Crescent Junction, and White Mesa Mill), at the borrow areas, and along the proposed pipeline corridors.
- *Chapter 4, Environmental Consequences:* This chapter describes the potential environmental impacts at the Moab site and off-site locations that could occur as the result of each proposed alternative. Potential environmental justice impacts associated with the proposed alternatives are also presented.
- *Chapter 5, Cumulative Impacts:* This chapter describes the cumulative impacts that would result from the proposed alternatives.
- *Chapter 6, Unavoidable Impacts, Short-Term Uses and Long-Term Productivity, and Irreversible and Irrecoverable Commitment of Resources:* This chapter describes some of the additional considerations that must be analyzed as part of the NEPA EIS process.
- *Chapter 7, Regulatory Requirements:* This chapter describes the key statutory and regulatory framework and requirements that are applicable to the proposed alternatives.
- *Chapter 8, List of Preparers and Disclosure Statements:* This chapter lists the individuals who prepared the EIS and their credentials. It also provides the certification by the contractors that assisted DOE in the preparation of this EIS that they have no financial or other interest in the outcome of the project as required by the Council on Environmental Quality (40 CFR 1506.5[c]) and DOE (10 CFR 1021).
- *Chapter 9, List of Agencies, Organizations, and Individuals Receiving Copies of the EIS:* This chapter lists federal, state, local, and tribal government agencies, various organizations, and members of the public who will receive copies of the draft EIS.
- *Chapter 10, Glossary:* This chapter defines many of the technical terms used in this EIS.
- *Chapter 11, Index:* This chapter provides an index of key terms used in this EIS.
- *Appendixes:* The appendixes provide additional information to support the EIS analyses.

1.8 References

10 CFR 1021. U.S. Department of Energy, “National Environmental Policy Act (NEPA) Implementing Procedures.”

40 CFR 1500–1508. Council on Environmental Quality, “Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.”

- 40 CFR 192. U.S. Environmental Protection Agency, “Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings.”
- 42 U.S.C § 4321 et seq., Congressional Declaration of Purpose, National Environmental Policy Act.
- 42 U.S.C § 7901 et seq., Congressional Findings and Purposes, Uranium Mill Tailings Radiation Control Act.
- 62 FR 22913. U.S. Department of Energy, “Uranium Mill Tailings Remedial Action (UMTRA) Ground Water Project,” *Federal Register*, Vol. 62, No. 81, April 28, 1997.
- 67 FR 77969. U.S. Department of Energy, “Notice of Intent to Prepare an Environmental Impact Statement and to Conduct Public Scoping Meetings, and Notice of Floodplain and Wetlands Involvement for Remediation of the Moab Uranium Mill Tailings Site in Grand County, UT,” *Federal Register*, Vol. 67, No. 245, December 20, 2002.
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- USF&WS (U.S. Fish and Wildlife Service), 1998. *Final Biological Opinion for the Proposed Reclamation of the Atlas Mill Tailings Site in Moab, Utah*, U.S. Fish and Wildlife Service, U.S. Department of the Interior, July 29.

End of current text