

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

July 2005

Volume I  
Chapters 1-11

U.S. Department  
of Energy



Office of  
Environmental  
Management

# COVER SHEET

**Lead Agency:** U.S. Department of Energy

**Cooperating Agencies:**

- National Park Service
- U.S. Nuclear Regulatory Commission
- U.S. Fish and Wildlife Service
- U.S. Environmental Protection Agency
- San Juan County
- City of Blanding
- Bureau of Land Management
- U.S. Army Corps of Engineers
- State of Utah
- Ute Mountain Ute Tribe
- Grand County
- Community of Bluff

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

**Contact:**

*For further information about this Environmental Impact Statement, contact:*

Don Metzler  
Moab Federal Project Director  
U.S. Department of Energy  
2597 B ¾ Road  
Grand Junction, CO 81503  
(800) 637-4575, or fax to (970) 248-7636

*For general information on the Department of Energy's process for implementing the National Environmental Policy Act, contact:*

Carol Borgstrom  
Office of NEPA Policy and Compliance (EH-42)  
U.S. Department of Energy  
1000 Independence Avenue, SW  
Washington, DC 20585  
(202) 586-4600, or leave message at (800) 472-2756

**Abstract:**

*The Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah, Final Environmental Impact Statement* provides 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 Environmental Impact Statement (EIS) informs the public of the information used by DOE in decision-making for the remediation of the Moab site. The surface remediation alternatives analyzed in the 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 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 EIS also analyzes a No Action alternative, under which DOE would not implement any surface or ground water remedial actions. DOE's preferred alternatives are off-site disposal of the mill tailings at Crescent Junction, Utah, using rail transportation, and implementation of active ground water remediation at the Moab site.

**Public Comments:**

In preparing this final EIS, DOE considered comments received from the public and from agencies during scoping meetings, during public hearings on the draft EIS, and during a 90-day public comment period on the draft EIS that began November 12, 2004, and ended February 18, 2005. Public hearings on the draft EIS were held at four locations in Utah in January 2005.

---

\* Substantive changes made to the text of the EIS between draft and final have been marked with sidebars in the margins.

# Contents

	<u>Page</u>
<b>Volume I</b>	
Acronyms.....	xxv
Measurements and Conversions .....	xxvii
<b>1.0 Introduction.....</b>	<b>1-1</b>
1.1 Regulatory Requirements.....	1-1
1.2 Background.....	1-2
1.2.1 History of the Site.....	1-2
1.2.2 Current Status of the Site.....	1-5
1.3 Purpose and Need for Agency Action .....	1-6
1.4 Alternatives.....	1-7
1.4.1 On-Site Disposal Alternative.....	1-7
1.4.2 Off-Site Disposal Alternative.....	1-7
1.4.3 Ground Water Remediation.....	1-9
1.4.4 No Action Alternative.....	1-10
1.4.5 Preferred Alternative.....	1-11
1.4.5.1 Off-Site Disposal.....	1-11
1.4.5.2 Active Ground Water Remediation.....	1-12
1.4.6 DOE Decision-Making.....	1-13
1.5 Public and Agency Involvement.....	1-14
1.5.1 Scoping.....	1-14
1.5.2 Issues/Concerns Raised During Scoping.....	1-15
1.5.3 Public and Agency Review of the Draft Environmental Impact Statement— Process and Results.....	1-23
1.5.3.1 Overview of Review Process.....	1-23
1.5.3.2 Major Issues Raised in Comment Documents.....	1-24
1.5.4 Major Revisions to the EIS.....	1-31
1.6 Cooperating Agencies.....	1-32
1.7 EIS Contents.....	1-33
1.8 References.....	1-34
<b>2.0 Description of Proposed Alternative Actions.....</b>	<b>2-1</b>
2.1 On-Site Disposal Alternative.....	2-4
2.1.1 Construction and Operations at the Moab Site.....	2-6
2.1.1.1 Site Preparation, Infrastructure Enhancement, and Controls.....	2-6
2.1.1.2 Contaminated Material Remediation Operations.....	2-11
2.1.1.3 Disposal Cell Recontouring, Stabilization, and Capping.....	2-12
2.1.1.4 Site Reclamation.....	2-14
2.1.2 Characterization and Remediation of Vicinity Properties.....	2-14
2.1.2.1 Survey and Characterization.....	2-16
2.1.2.2 Remediation.....	2-17
2.1.2.3 Residual Radioactive Materials Combined with Other Hazardous Components.....	2-18
2.1.2.4 Applicable Regulations.....	2-18
2.1.3 Construction and Activities at Borrow Areas.....	2-19
2.1.3.1 Borrow Material Standards and Requirements.....	2-21
2.1.3.2 Borrow Material Excavation and Transport Operations.....	2-22

2.1.4	Monitoring and Maintenance .....	2-24
2.1.5	Resource Requirements .....	2-24
2.1.5.1	Labor .....	2-25
2.1.5.2	Equipment .....	2-25
2.1.5.3	Land Disturbance .....	2-26
2.1.5.4	Fuel .....	2-26
2.1.5.5	Water .....	2-27
2.1.5.6	Solid Waste Disposal .....	2-27
2.1.5.7	Sanitary Waste Disposal .....	2-27
2.1.5.8	Electric Power .....	2-27
2.2	Off-Site Disposal Alternative .....	2-27
2.2.1	Construction and Operations at the Moab Site .....	2-30
2.2.1.1	Site Preparation, Infrastructure Enhancement, and Controls .....	2-33
2.2.1.2	Excavation and Preparation of Tailings for Transportation .....	2-34
2.2.1.3	Moab Site Closure .....	2-35
2.2.2	Characterization and Remediation of Vicinity Properties .....	2-36
2.2.3	Construction and Operations at Borrow Areas .....	2-36
2.2.4	Transportation of Tailings Pile and Other Contaminated Material .....	2-37
2.2.4.1	Truck Transportation .....	2-38
2.2.4.2	Rail Transportation .....	2-49
2.2.4.3	Slurry Pipeline Transportation .....	2-56
2.2.5	Construction and Operations at the Off-Site Disposal Locations .....	2-66
2.2.5.1	Reference Disposal Cell .....	2-67
2.2.5.2	White Mesa Mill Disposal Cell .....	2-78
2.2.6	Monitoring and Maintenance .....	2-83
2.2.7	Resource Requirements .....	2-83
2.2.7.1	Labor .....	2-83
2.2.7.2	Equipment .....	2-85
2.2.7.3	Land Disturbance .....	2-87
2.2.7.4	Fuel .....	2-87
2.2.7.5	Water .....	2-87
2.2.7.6	Solid Waste Disposal .....	2-89
2.2.7.7	Sanitary Waste Disposal .....	2-89
2.2.7.8	Electric Power .....	2-90
2.3	Ground Water at the Moab Site .....	2-90
2.3.1	Background .....	2-90
2.3.1.1	EPA Ground Water Standards .....	2-91
2.3.1.2	Contaminants of Potential Concern .....	2-92
2.3.1.3	Compliance Strategy Selection Process .....	2-94
2.3.1.4	Initial and Interim Actions Related to the Proposed Action .....	2-97
2.3.2	Proposed Ground Water Action .....	2-98
2.3.2.1	Ground Water Remediation Options .....	2-98
2.3.2.2	Implementation of Ground Water Remediation .....	2-102
2.3.2.3	Construction and Operational Requirements .....	2-102
2.3.2.4	Active Remediation Operations .....	2-106
2.3.3	Uncertainties .....	2-108
2.4	No Action Alternative .....	2-110
2.5	Alternatives Considered But Not Analyzed .....	2-111

2.5.1	On-Site Alternatives.....	2-111
2.5.1.1	Solidification.....	2-111
2.5.1.2	Soil Washing.....	2-112
2.5.1.3	Vitrification.....	2-113
2.5.1.4	On-Site Relocation.....	2-114
2.5.1.5	Removal of Top of the Pile.....	2-114
2.5.2	Off-Site Alternatives.....	2-114
2.5.2.1	Off-Site Surface Locations .....	2-114
2.5.2.2	Disposal in Mined Salt Caverns.....	2-116
2.6	Description and Comparison of Alternatives and Environmental Consequences .....	2-118
2.6.1	Impacts Affecting the Moab Site and Vicinity Properties, Transportation Corridors, and Off-Site Disposal Locations.....	2-118
2.6.2	Impacts Affecting Potential Borrow Areas.....	2-164
2.6.3	Consequences of Uncertainty .....	2-165
2.6.4	Responsible Opposing Views .....	2-176
2.6.4.1	Responsible Opposing Views on River Migration .....	2-176
2.6.4.2	Responsible Opposing Views on Contaminant Flow Under the River.....	2-179
2.6.4.3	Responsible Opposing Views on the Appropriate Compliance Standard.....	2-182
2.7	Other Decision-Making Factors.....	2-184
2.7.1	Areas of Controversy .....	2-184
2.7.2	National Academy of Sciences Review .....	2-185
2.7.3	Costs.....	2-187
2.7.3.1	On-Site Versus Off-Site Disposal Alternative Comparison .....	2-189
2.7.3.2	Off-Site Transportation Options Comparison.....	2-189
2.7.3.3	Off-Site Disposal Cell Locations Comparison .....	2-189
2.8	References.....	2-189
<b>3.0</b>	<b>Affected Environment .....</b>	<b>3-1</b>
3.1	Moab Site.....	3-1
3.1.1	Geology.....	3-2
3.1.1.1	Stratigraphy.....	3-2
3.1.1.2	Structure.....	3-6
3.1.1.3	Geologic Resources .....	3-6
3.1.1.4	Geologic Hazards.....	3-7
3.1.2	Soils.....	3-8
3.1.3	Description of Contaminated Materials at the Moab Site.....	3-9
3.1.3.1	Millsite Contamination .....	3-9
3.1.4	Air Quality .....	3-11
3.1.4.1	Conformity Review.....	3-13
3.1.5	Climate and Meteorology .....	3-14
3.1.6	Ground Water.....	3-17
3.1.6.1	Hydrostratigraphy .....	3-17
3.1.6.2	Ground Water Occurrence .....	3-17
3.1.6.3	Ground Water Quality.....	3-21
3.1.6.4	Ground Water Use .....	3-26
3.1.7	Surface Water.....	3-28
3.1.7.1	Surface Water Resources .....	3-28
3.1.7.2	Surface Water Quality.....	3-29

3.1.7.3 Site-Related Surface Water Contamination .....	3-30
3.1.7.4 Surface Water Use .....	3-31
3.1.7.5 Surface Water Quality Criteria .....	3-35
3.1.8 Floodplains.....	3-35
3.1.9 Wetlands .....	3-36
3.1.10 Aquatic Ecology.....	3-38
3.1.10.1 Aquatic Species Listed in the Endangered Species Act.....	3-39
3.1.10.2 Environmental Tolerances .....	3-44
3.1.11 Terrestrial Ecology.....	3-44
3.1.11.1 Terrestrial Vegetation and Wildlife .....	3-44
3.1.11.2 Threatened and Endangered Species .....	3-45
3.1.11.3 Other Special Status Species.....	3-49
3.1.12 Land Use .....	3-53
3.1.13 Cultural Resources .....	3-55
3.1.13.1 Cultural History of Southeastern Utah.....	3-55
3.1.13.2 Cultural Resource Inventories of Potentially Affected Areas.....	3-56
3.1.13.3 Section 106 Consultation Process .....	3-57
3.1.13.4 Moab Site Inventory Results.....	3-58
3.1.14 Noise and Vibration .....	3-58
3.1.15 Visual Resources.....	3-60
3.1.16 Infrastructure.....	3-62
3.1.16.1 Waste Management.....	3-62
3.1.16.2 Electrical Power Supplies .....	3-62
3.1.16.3 Water.....	3-63
3.1.17 Transportation.....	3-63
3.1.17.1 Vehicular Traffic.....	3-63
3.1.17.2 Rail Transport .....	3-67
3.1.18 Socioeconomics .....	3-67
3.1.18.1 Population, Workforce, and Job Base.....	3-68
3.1.18.2 Housing and Income Characteristics .....	3-69
3.1.18.3 Commercial Business and Farm-Based Enterprise.....	3-70
3.1.19 Human Health .....	3-71
3.1.19.1 Natural Radiation Environment .....	3-72
3.1.19.2 Current Risk to Members of the Public .....	3-72
3.1.19.3 Existing Occupational Risks.....	3-74
3.1.20 Environmental Justice.....	3-75
3.2 Klondike Flats Site.....	3-76
3.2.1 Geology.....	3-79
3.2.1.1 Stratigraphy.....	3-79
3.2.1.2 Structure.....	3-79
3.2.1.3 Geologic Resources .....	3-81
3.2.1.4 Geologic Hazards.....	3-81
3.2.2 Soils.....	3-81
3.2.3 Climate and Meteorology .....	3-82
3.2.4 Ground Water.....	3-82
3.2.4.1 Hydrostratigraphy .....	3-82
3.2.4.2 Ground Water Occurrence .....	3-86
3.2.4.3 Ground Water Quality.....	3-86
3.2.4.4 Ground Water Use .....	3-88

3.2.5	Surface Water.....	3-89
3.2.5.1	Surface Water Resources .....	3-89
3.2.5.2	Surface Water Quality.....	3-89
3.2.5.3	Water Quality Standards .....	3-89
3.2.6	Floodplains.....	3-89
3.2.7	Wetlands .....	3-89
3.2.8	Terrestrial Ecology.....	3-89
3.2.8.1	Terrestrial Vegetation and Wildlife .....	3-90
3.2.8.2	Threatened and Endangered Species .....	3-90
3.2.8.3	Other Special Status Species.....	3-93
3.2.9	Land Use .....	3-97
3.2.10	Cultural Resources .....	3-97
3.2.11	Noise and Vibration .....	3-98
3.2.12	Visual Resources.....	3-98
3.2.13	Infrastructure.....	3-99
3.2.14	Transportation .....	3-99
3.2.15	Socioeconomics .....	3-100
3.2.16	Human Health .....	3-100
3.2.16.1	Background Radon/Natural Radiation.....	3-100
3.2.17	Environmental Justice.....	3-101
3.2.18	Pipeline Corridor.....	3-101
3.2.18.1	Geology.....	3-101
3.2.18.2	Soils.....	3-101
3.2.18.3	Ground Water.....	3-104
3.2.18.4	Surface Water.....	3-105
3.2.18.5	Floodplains and Wetlands.....	3-105
3.2.18.6	Terrestrial Ecology.....	3-106
3.2.18.7	Land Use .....	3-107
3.2.18.8	Cultural Resources .....	3-107
3.2.18.9	Visual Resources.....	3-108
3.3	Crescent Junction Site.....	3-108
3.3.1	Geology.....	3-109
3.3.1.1	Stratigraphy.....	3-109
3.3.1.2	Structure.....	3-109
3.3.1.3	Geologic Resources .....	3-110
3.3.1.4	Geologic Hazards.....	3-110
3.3.2	Soils.....	3-111
3.3.3	Air Quality .....	3-113
3.3.3.1	Ambient Air Quality .....	3-113
3.3.3.2	Visibility .....	3-113
3.3.4	Climate and Meteorology .....	3-113
3.3.5	Ground Water.....	3-114
3.3.5.1	Hydrostratigraphy .....	3-114
3.3.5.2	Ground Water Occurrence .....	3-114
3.3.5.3	Ground Water Quality.....	3-114
3.3.5.4	Ground Water Use .....	3-115
3.3.6	Surface Water.....	3-115
3.3.6.1	Surface Water Resources .....	3-115
3.3.6.2	Surface Water Quality.....	3-115

3.3.6.3	Relevant Water Quality Standards.....	3-115
3.3.7	Floodplains.....	3-115
3.3.8	Wetlands .....	3-115
3.3.9	Terrestrial Ecology.....	3-116
3.3.9.1	Terrestrial Vegetation and Wildlife .....	3-116
3.3.9.2	Species Listed Under the Endangered Species Act .....	3-116
3.3.9.3	Other Special Status Species.....	3-118
3.3.10	Land Use .....	3-122
3.3.11	Cultural Resources .....	3-122
3.3.12	Noise and Vibration .....	3-123
3.3.13	Visual Resources.....	3-123
3.3.14	Infrastructure.....	3-123
3.3.15	Transportation.....	3-124
3.3.16	Socioeconomics .....	3-124
3.3.17	Human Health.....	3-125
3.3.17.1	Background Radon and Natural Radiation .....	3-125
3.3.18	Environmental Justice.....	3-125
3.3.19	Pipeline Corridor.....	3-129
3.3.19.1	Geology.....	3-129
3.3.19.2	Soils.....	3-129
3.3.19.3	Ground Water.....	3-129
3.3.19.4	Surface Water.....	3-129
3.3.19.5	Floodplains and Wetlands.....	3-130
3.3.19.6	Terrestrial Ecology.....	3-130
3.3.19.7	Land Use .....	3-131
3.3.19.8	Cultural Resources .....	3-131
3.3.19.9	Visual Resources.....	3-132
3.4	White Mesa Mill Site.....	3-132
3.4.1	Geology.....	3-133
3.4.1.1	Stratigraphy.....	3-133
3.4.1.2	Structure.....	3-133
3.4.1.3	Geologic Resources .....	3-133
3.4.1.4	Geologic Hazards.....	3-134
3.4.2	Soils.....	3-135
3.4.3	Air Quality .....	3-135
3.4.3.1	Ambient Quality.....	3-135
3.4.3.2	Visibility .....	3-139
3.4.4	Climate and Meteorology .....	3-139
3.4.5	Ground Water.....	3-140
3.4.5.1	Hydrostratigraphy .....	3-140
3.4.5.2	Ground Water Occurrence .....	3-140
3.4.5.3	Ground Water Quality.....	3-141
3.4.5.4	Ground Water Use .....	3-142
3.4.6	Surface Water.....	3-143
3.4.6.1	Surface Water Resources .....	3-143
3.4.6.2	Surface Water Quality.....	3-144
3.4.6.3	Relevant Water Quality Standards.....	3-146
3.4.7	Floodplains.....	3-146
3.4.8	Wetlands .....	3-146



3.4.9	Terrestrial Ecology.....	3-146
3.4.9.1	Terrestrial Vegetation and Wildlife .....	3-146
3.4.9.2	Threatened and Endangered Species .....	3-149
3.4.9.3	Other Special Status Species.....	3-150
3.4.10	Land Use .....	3-153
3.4.11	Cultural Resources .....	3-155
3.4.12	Noise and Vibration .....	3-157
3.4.13	Visual Resources.....	3-159
3.4.14	Infrastructure.....	3-160
3.4.14.1	Waste Management.....	3-160
3.4.14.2	Electric Power Supplies .....	3-160
3.4.14.3	Water Supplies .....	3-160
3.4.15	Transportation.....	3-160
3.4.16	Socioeconomics .....	3-160
3.4.16.1	Demography of the Area.....	3-160
3.4.16.2	Socioeconomic Profiles .....	3-163
3.4.17	Human Health .....	3-163
3.4.18	Environmental Justice.....	3-164
3.4.19	Pipeline Corridor.....	3-164
3.4.19.1	Geology.....	3-164
3.4.19.2	Soils.....	3-167
3.4.19.3	Ground Water.....	3-167
3.4.19.4	Surface Water.....	3-168
3.4.19.5	Floodplains and Wetlands.....	3-169
3.4.19.6	Terrestrial Ecology.....	3-169
3.4.19.7	Land Use .....	3-175
3.4.19.8	Cultural Resources .....	3-175
3.4.19.9	Visual Resources.....	3-176
3.5	Borrow Areas .....	3-177
3.5.1	Crescent Junction Borrow Area .....	3-179
3.5.2	Floy Wash Borrow Area .....	3-180
3.5.3	Courthouse Syncline Borrow Area .....	3-181
3.5.4	Klondike Flats Borrow Area.....	3-183
3.5.5	Tenmile Borrow Area .....	3-183
3.5.6	Blue Hills Road Borrow Area.....	3-185
3.5.7	LeGrand Johnson Borrow Area .....	3-187
3.5.8	Papoose Quarry Borrow Area.....	3-187
3.5.9	Blanding Borrow Area.....	3-187
3.5.10	White Mesa Mill Borrow Area .....	3-188
3.6	References.....	3-189
<b>4.0</b>	<b>Environmental Consequences.....</b>	<b>4-1</b>
4.1	On-Site Disposal (Moab Site).....	4-2
4.1.1	Geology and Soils.....	4-2
4.1.1.1	Construction and Operations Impacts at the Moab Site.....	4-2
4.1.1.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-3
4.1.1.3	Impacts from All Sources .....	4-3
4.1.2	Air Quality .....	4-4
4.1.2.1	Construction and Operations Impacts at the Moab Site.....	4-4

4.1.2.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-5
4.1.2.3	Construction and Operations Impacts Related to Transportation .....	4-5
4.1.2.4	Monitoring and Maintenance Impacts .....	4-5
4.1.2.5	Impacts from All Sources .....	4-5
4.1.3	Ground Water.....	4-5
4.1.3.1	Construction and Operations Impacts at the Moab Site.....	4-6
4.1.3.2	Impacts from All Sources .....	4-11
4.1.4	Surface Water.....	4-11
4.1.4.1	Construction and Operations Impacts at the Moab Site.....	4-12
4.1.4.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-13
4.1.4.3	Impacts from All Sources .....	4-13
4.1.5	Floodplains and Wetlands.....	4-13
4.1.5.1	Construction and Operations Impacts at the Moab Site.....	4-14
4.1.5.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-14
4.1.5.3	Construction and Operations Impacts Related to Transportation .....	4-14
4.1.5.4	Impacts from All Sources .....	4-15
4.1.6	Aquatic Ecology.....	4-15
4.1.6.1	Construction and Operations Impacts at the Moab Site.....	4-15
4.1.6.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-19
4.1.7	Terrestrial Ecology.....	4-20
4.1.7.1	Construction and Operations Impact at the Moab Site.....	4-20
4.1.7.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-23
4.1.7.3	Construction and Operations Impacts Related to Transportation .....	4-23
4.1.7.4	Monitoring and Maintenance Impacts .....	4-25
4.1.7.5	Impacts from All Sources .....	4-25
4.1.8	Land Use .....	4-25
4.1.8.1	Construction and Operations Impacts at the Moab Site.....	4-25
4.1.8.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-26
4.1.8.3	Construction and Operations Impacts Related to Transportation .....	4-26
4.1.8.4	Monitoring and Maintenance Impacts .....	4-26
4.1.8.5	Impacts from All Sources .....	4-26
4.1.9	Cultural Resources .....	4-26
4.1.9.1	Construction and Operations Impacts at the Moab Site.....	4-26
4.1.9.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-27
4.1.9.3	Construction and Operations Impacts Related to Transportation .....	4-27
4.1.9.4	Monitoring and Maintenance Impacts .....	4-27
4.1.9.5	Impacts from All Sources .....	4-27
4.1.10	Noise and Vibration .....	4-28
4.1.10.1	Construction and Operations Impacts at the Moab Site.....	4-28
4.1.10.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-29
4.1.10.3	Construction and Operations Impacts Related to Transportation .....	4-29

4.1.10.4	Monitoring and Maintenance Impacts .....	4-30
4.1.10.5	Impacts from All Sources .....	4-31
4.1.11	Visual Resources.....	4-31
4.1.11.1	Construction and Operations Impacts at the Moab Site.....	4-31
4.1.11.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-35
4.1.11.3	Construction and Operations Impacts Related to Transportation ...	4-35
4.1.11.4	Monitoring and Maintenance Impacts .....	4-35
4.1.11.5	Impacts from All Sources .....	4-36
4.1.12	Infrastructure.....	4-36
4.1.12.1	Construction and Operations Impacts at the Moab Site.....	4-36
4.1.12.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-37
4.1.12.3	Construction and Operations Impacts Related to Transportation ...	4-38
4.1.12.4	Monitoring and Maintenance Impacts .....	4-38
4.1.12.5	Impacts from All Sources .....	4-38
4.1.13	Solid Waste Management .....	4-38
4.1.13.1	Construction and Operations Impacts at the Moab Site.....	4-38
4.1.13.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-39
4.1.13.3	Construction and Operations Impacts Related to Transportation ...	4-39
4.1.13.4	Monitoring and Maintenance Impacts .....	4-39
4.1.13.5	Impacts from All Sources .....	4-39
4.1.14	Socioeconomics .....	4-39
4.1.15	Human Health.....	4-43
4.1.15.1	Construction and Operations Impacts at the Moab Site.....	4-43
4.1.15.2	Impacts from Characterization and Remediation of Vicinity Properties .....	4-44
4.1.15.3	Construction and Operations Impacts Related to Transportation ...	4-45
4.1.15.4	Monitoring and Maintenance Impacts .....	4-46
4.1.15.5	Impacts from All Sources .....	4-47
4.1.16	Traffic .....	4-50
4.1.17	Disposal Cell Failure from Natural Phenomena .....	4-51
4.1.18	Environmental Justice.....	4-58
4.2	Off-Site Disposal (Klondike Flats Site).....	4-59
4.2.1.	Geology and Soils.....	4-59
4.2.1.1	Construction and Operations Impacts at the Moab Site.....	4-59
4.2.1.2	Construction and Operations Impacts at the Klondike Flats Site ...	4-60
4.2.1.3	Construction and Operations Impacts Associated With Transportation .....	4-60
4.2.1.4	Impacts from All Sources .....	4-60
4.2.2	Air Quality .....	4-61
4.2.2.1	Construction and Operations Impacts at the Moab Site.....	4-61
4.2.2.2	Construction and Operations Impacts at the Klondike Flats Site ...	4-61
4.2.2.3	Construction and Operations Impacts Related to Transportation ...	4-62
4.2.2.4	Impacts from All Sources .....	4-62
4.2.3	Ground Water.....	4-62
4.2.3.1	Construction and Operations Impacts at the Moab Site.....	4-62
4.2.3.2	Construction and Operations Impacts at the Klondike Flats Site ...	4-64

4.2.3.3	Construction and Operations Impacts Related to Transportation	4-65
4.2.3.4	Impacts from All Sources	4-65
4.2.4	Surface Water	4-65
4.2.4.1	Construction and Operations Impacts at the Moab Site	4-65
4.2.5	Floodplains/Wetlands	4-66
4.2.5.1	Construction and Operations Impacts at the Moab Site	4-66
4.2.5.2	Construction and Operations Impacts Related to Transportation	4-66
4.2.5.3	Impacts from All Sources	4-66
4.2.6	Aquatic Ecology	4-67
4.2.6.1	Construction and Operations Impacts at the Moab Site	4-67
4.2.6.2	Construction and Operations Impacts Related to Transportation	4-67
4.2.6.3	Impacts from All Sources	4-67
4.2.7	Terrestrial Ecology	4-67
4.2.7.1	Construction and Operations Impacts at the Klondike Flats Site	4-67
4.2.7.2	Impacts of Transportation	4-69
4.2.7.3	Monitoring and Maintenance Impacts	4-71
4.2.7.4	Impacts from All Sources	4-71
4.2.8	Land Use	4-72
4.2.8.1	Construction and Operations Impacts at the Moab Site	4-72
4.2.8.2	Construction and Operations Impacts at the Klondike Flats Site	4-72
4.2.8.3	Construction and Operations Impacts Related to Transportation	4-73
4.2.8.4	Monitoring and Maintenance Impacts	4-74
4.2.8.5	Impacts from All Sources	4-74
4.2.9	Cultural Resources	4-74
4.2.9.1	Construction and Operations Impacts at the Moab Site	4-74
4.2.9.2	Construction and Operations Impacts at the Klondike Flats Site	4-74
4.2.9.3	Construction and Operations Impacts Related to Transportation	4-75
4.2.9.4	Monitoring and Maintenance Impacts	4-75
4.2.9.5	Impacts from All Sources	4-75
4.2.10	Noise and Vibration	4-76
4.2.10.1	Construction and Operations Impacts at the Moab Site	4-76
4.2.10.2	Construction and Operations Impacts at the Klondike Flats Site	4-76
4.2.10.3	Construction and Operations Impacts Related to Transportation	4-77
4.2.10.4	Monitoring and Maintenance Impacts	4-78
4.2.10.5	Impacts from All Sources	4-78
4.2.11	Visual Resources	4-78
4.2.11.1	Construction and Operations Impacts at the Moab Site	4-78
4.2.11.2	Construction and Operations Impacts at the Klondike Flats Site	4-79
4.2.11.3	Construction and Operations Impacts Related to Transportation	4-82
4.2.11.4	Monitoring and Maintenance Impacts	4-84
4.2.11.5	Impacts from All Sources	4-84
4.2.12	Infrastructure	4-85
4.2.12.1	Construction and Operations Impacts at the Moab Site	4-85
4.2.12.2	Construction and Operations Impacts at the Klondike Flats Site	4-86
4.2.12.3	Construction and Operations Impacts Related to Transportation	4-87
4.2.12.4	Monitoring and Maintenance Impacts	4-88
4.2.12.5	Impacts from All Sources	4-88
4.2.13	Solid Waste Management	4-88
4.2.13.1	Construction and Operations Impacts at the Klondike Flats Site	4-88

4.2.13.2	Construction and Operations Impacts Related to Transportation	4-88
4.2.13.3	Monitoring and Maintenance Impacts	4-89
4.2.13.4	Impacts from All Sources	4-89
4.2.14	Socioeconomics	4-89
4.2.15	Human Health	4-90
4.2.15.1	Construction and Operations Impacts at the Moab Site and Klondike Flats Site	4-90
4.2.15.2	Construction and Operations Impacts Related to Transportation	4-93
4.2.15.3	Monitoring and Maintenance Impacts	4-95
4.2.15.4	Impacts from All Sources	4-95
4.2.16	Traffic	4-96
4.2.17	Disposal Cell Failure from Natural Phenomena	4-99
4.2.18	Environmental Justice	4-99
4.3	Off-Site Disposal (Crescent Junction Site)	4-99
4.3.1	Geology and Soils	4-100
4.3.2	Air Quality	4-100
4.3.3	Ground Water	4-100
4.3.3.1	Construction and Operations Impacts at the Crescent Junction Site	4-100
4.3.3.2	Construction and Operations Impacts Related to Transportation	4-101
4.3.3.3	Impacts from All Sources	4-101
4.3.4	Surface Water	4-101
4.3.5	Floodplains/Wetlands	4-101
4.3.5.1	Construction and Operations Impacts at the Crescent Junction Site	4-101
4.3.5.2	Construction and Operations Impacts Related to Transportation	4-102
4.3.5.3	Impacts from All Sources	4-102
4.3.6	Aquatic Ecology	4-102
4.3.7	Terrestrial Ecology	4-102
4.3.7.1	Construction and Operations Impacts at the Crescent Junction Site	4-102
4.3.7.2	Impacts of Transportation	4-104
4.3.7.3	Monitoring and Maintenance Impacts	4-106
4.3.7.4	Impacts from All Sources	4-106
4.3.8	Land Use	4-106
4.3.8.1	Construction and Operations Impacts at the Crescent Junction Site	4-106
4.3.8.2	Construction and Operations Impacts Related to Transportation	4-107
4.3.8.3	Monitoring and Maintenance Impacts	4-107
4.3.8.4	Impacts from All Sources	4-107
4.3.9	Cultural Resources	4-107
4.3.9.1	Construction and Operations at the Moab Site	4-107
4.3.9.2	Construction and Operations Impacts at the Crescent Junction Site	4-107
4.3.9.3	Construction and Operations Impacts Related to Transportation	4-108
4.3.9.4	Monitoring and Maintenance Impacts	4-108
4.3.9.5	Impacts from All Sources	4-108
4.3.10	Noise and Vibration	4-109
4.3.10.1	Construction and Operations Impacts at the Moab Site	4-109

4.3.10.2	Construction and Operations Impacts at the Crescent Junction Site.....	4-109
4.3.10.3	Construction and Operations Impacts Related to Transportation ..	4-110
4.3.10.4	Monitoring and Maintenance Impacts .....	4-110
4.3.10.5	Impacts from All Sources .....	4-110
4.3.11	Visual Resources.....	4-110
4.3.11.1	Construction and Operations at the Crescent Junction Site .....	4-111
4.3.11.2	Construction and Operations Impacts Related to Transportation ..	4-114
4.3.11.3	Impacts from All Sources .....	4-116
4.3.12	Infrastructure.....	4-116
4.3.12.1	Construction and Operations Impacts at the Moab Site.....	4-117
4.3.12.2	Construction and Operations Impacts at the Crescent Junction Site.....	4-117
4.3.12.3	Construction and Operations Impacts Related to Transportation ..	4-117
4.3.12.4	Monitoring and Maintenance Impacts .....	4-117
4.3.12.5	Impacts from All Sources .....	4-117
4.3.13	Solid Waste Management .....	4-118
4.3.14	Socioeconomics .....	4-118
4.3.15	Human Health .....	4-119
4.3.15.1	Construction and Operations at the Moab Site and the Crescent Junction Site.....	4-119
4.3.15.2	Construction and Operations Impacts Relating to Transportation ..	4-121
4.3.15.3	Monitoring and Maintenance Impacts .....	4-123
4.3.15.4	Impacts from All Sources .....	4-123
4.3.16	Traffic .....	4-125
4.3.17	Disposal Cell Failure from Natural Phenomena .....	4-125
4.3.18	Environmental Justice.....	4-125
4.4	Off-Site Disposal (White Mesa Mill Site) .....	4-126
4.4.1	Geology and Soils .....	4-126
4.4.1.1	Construction and Operations Impacts at the Moab Site.....	4-126
4.4.1.2	Construction and Operations Impacts at the White Mesa Mill Site .....	4-126
4.4.1.3	Construction of Operations Impacts Related To Transportation ..	4-127
4.4.1.4	Impacts from All Sources .....	4-127
4.4.2	Air Quality .....	4-127
4.4.3	Ground Water.....	4-128
4.4.3.1	Construction and Operations Impacts at the White Mesa Mill Site .....	4-128
4.4.3.2	Construction and Operations Impacts Related to Transportation ..	4-129
4.4.4	Surface Water.....	4-129
4.4.4.1	Construction and Operations Impacts at the White Mesa Mill Site .....	4-129
4.4.4.2	Construction and Operations Impacts Related to Transportation ..	4-130
4.4.5	Floodplains/Wetlands .....	4-130
4.4.5.1	Construction and Operations Impacts at the Moab Site.....	4-130
4.4.5.2	Construction and Operations Impacts at the White Mesa Mill Site .....	4-130
4.4.5.3	Construction and Operations Impacts Related to Transportation ..	4-130
4.4.5.4	Impacts from All Sources .....	4-130

4.4.6	Aquatic Ecology.....	4-131
4.4.6.1	Construction and Operations Impacts at the Moab Site.....	4-131
4.4.6.2	Construction and Operations Impacts at the White Mesa Mill Site .....	4-131
4.4.6.3	Construction and Operations Impacts Related to Transportation ..	4-131
4.4.6.4	Impacts from All Sources .....	4-131
4.4.7	Terrestrial Ecology.....	4-132
4.4.7.1	Construction and Operations Impacts at the Moab Site.....	4-132
4.4.7.2	Construction and Operations Impacts at the White Mesa Mill Site .....	4-132
4.4.7.3	Impacts of Transportation.....	4-133
4.4.7.4	Monitoring and Maintenance Impacts .....	4-135
4.4.7.5	Impacts from All Sources .....	4-135
4.4.8	Land Use .....	4-136
4.4.8.1	Construction and Operations Impacts at the Moab Site.....	4-136
4.4.8.2	Construction and Operations Impacts at the White Mesa Mill Site .....	4-136
4.4.8.3	Construction and Operations Impacts Related to Transportation ..	4-136
4.4.8.4	Monitoring and Maintenance Impacts .....	4-137
4.4.8.5	Impacts from All Sources .....	4-137
4.4.9	Cultural Resources .....	4-137
4.4.9.1	Construction and Operations Impacts at the Moab Site.....	4-137
4.4.9.2	Construction and Operations at the White Mesa Mill Site .....	4-137
4.4.9.3	Construction and Operations Impacts Related to Transportation ..	4-138
4.4.9.4	Monitoring and Maintenance Impacts .....	4-139
4.4.9.5	Impacts from All Sources .....	4-139
4.4.10	Noise and Vibration .....	4-139
4.4.10.1	Construction and Operations Impacts at the Moab Site.....	4-140
4.4.10.2	Construction and Operations Impacts at the White Mesa Mill Site .....	4-140
4.4.10.3	Construction and Operations Impacts Related to Transportation ..	4-140
4.4.10.4	Monitoring and Maintenance Impacts .....	4-141
4.4.10.5	Impacts from All Sources .....	4-141
4.4.11	Visual Resources.....	4-141
4.4.11.1	Construction and Operations Impacts at the Moab Site.....	4-142
4.4.11.2	Construction and Operations at the White Mesa Mill Site .....	4-142
4.4.11.3	Construction and Operations Impacts Related to Transportation ..	4-142
4.4.11.4	Monitoring and Maintenance Impacts .....	4-146
4.4.11.5	Impacts from All Sources .....	4-146
4.4.12	Infrastructure.....	4-146
4.4.12.1	Construction and Operations Impacts at the Moab Site.....	4-146
4.4.12.2	Construction and Operations Impacts at the White Mesa Mill Site .....	4-147
4.4.12.3	Construction and Operations Impacts Related to Transportation ..	4-148
4.4.12.4	Monitoring and Maintenance Impacts .....	4-148
4.4.12.5	Impacts from All Sources .....	4-148
4.4.13	Solid Waste Management .....	4-148
4.4.14	Socioeconomics .....	4-148

4.4.15	Human Health .....	4-149
4.4.15.1	Construction and Operations at the Moab Site and the White Mesa Mill Site.....	4-149
4.4.15.2	Construction and Operations Impacts Relating to Transportation.....	4-151
4.4.15.3	Monitoring and Maintenance .....	4-153
4.4.15.4	Impacts from All Sources .....	4-153
4.4.16	Traffic .....	4-155
4.4.17	Disposal Cell Failure from Natural Phenomena .....	4-156
4.4.18	Environmental Justice .....	4-156
4.5	Borrow Areas .....	4-157
4.6	No Action Alternative.....	4-165
4.6.1	Geology and Soils .....	4-165
4.6.2	Air Quality .....	4-165
4.6.3	Ground Water.....	4-165
4.6.4	Surface Water.....	4-166
4.6.5	Floodplain/Wetlands .....	4-168
4.6.6	Aquatic Ecology.....	4-168
4.6.7	Terrestrial Ecology.....	4-168
4.6.8	Land Use .....	4-169
4.6.9	Cultural Resources .....	4-169
4.6.10	Noise and Vibration .....	4-169
4.6.11	Visual Resources.....	4-170
4.6.12	Infrastructure.....	4-170
4.6.13	Solid Waste Management .....	4-170
4.6.14	Socioeconomics .....	4-170
4.6.15	Human Health .....	4-171
4.6.16	Traffic .....	4-174
4.6.17	Tailings Pile Failure from Natural Phenomena .....	4-174
4.6.18	Environmental Justice.....	4-174
4.7	Mitigation Measures .....	4-174
4.7.1	Geology and Soils .....	4-175
4.7.2	Air Quality .....	4-176
4.7.3	Surface Water.....	4-176
4.7.4	Floodplains and Wetlands.....	4-176
4.7.5	Aquatic Ecology.....	4-177
4.7.6	Terrestrial Ecology.....	4-177
4.7.7	Cultural Resources .....	4-177
4.7.8	Noise and Vibration .....	4-179
4.7.9	Visual Resources.....	4-179
4.7.10	Infrastructure.....	4-179
4.7.11	Traffic .....	4-179
4.7.12	Health and Safety.....	4-180
4.8	References.....	4-180
<b>5.0</b>	<b>Cumulative Impacts.....</b>	<b>5-1</b>
5.1	Seasonal Tourism.....	5-1
5.2	Widening of US-191 .....	5-2
5.3	Williams Petroleum Products Pipeline Project.....	5-2
5.4	Ongoing Operations at White Mesa Mill.....	5-4
5.5	References.....	5-5



<b>6.0 Unavoidable Impacts, Short-Term Uses and Long Term Productivity, and Irreversible or Irretrievable Commitment of Resources .....</b>	<b>6-1</b>
6.1 Unavoidable Adverse Impacts .....	6-1
6.2 Relationship Between Local Short-Term Uses of the Environment and Long-Term Productivity.....	6-2
6.3 Irreversible or Irretrievable Commitment of Resources .....	6-2
<b>7.0 Regulatory Requirements .....</b>	<b>7-1</b>
7.1 Federal Regulatory Requirements.....	7-1
7.1.1 National Environmental Policy Act, 42 United States Code (U.S.C.) §§ 4321 et seq. ....	7-1
7.1.2 Uranium Mill Tailings Radiation Control Act, 42 U.S.C. §§ 7901 et seq., as amended.....	7-1
7.1.3 Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Public Law No. 106-398) .....	7-3
7.1.4 Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.).....	7-3
7.1.5 Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.).....	7-3
7.1.6 Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703 et seq.) .....	7-3
7.1.7 Clean Water Act, 33 U.S.C. §§ 1251 et seq.....	7-4
7.1.8 Rivers and Harbors Act of 1899, Section 10, 33 U.S.C. 403.....	7-4
7.1.9 Floodplain Management and Protection of Wetlands, 10 CFR 1022 .....	7-4
7.1.10 Safe Drinking Water Act, 42 U.S.C. 300f et seq. ....	7-4
7.1.11 Clean Air Act, 42 U.S.C. §§ 7401 et seq., as amended .....	7-5
7.1.12 Archaeological Resources Protection Act, 16 U.S.C. §§ 470aa et seq., and National Historic Preservation Act, 16 U.S.C. §§ 470 et seq. ....	7-5
7.1.13 Antiquities Act, 16 U.S.C. 431 et seq.....	7-5
7.1.14 Federal Land Policy and Management Act, 43 U.S.C. 1701 et seq.....	7-5
7.1.15 Noise Control Act of 1972, 42 U.S.C. 4901 et seq., as amended .....	7-6
7.1.16 Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901 et seq., as amended.....	7-6
7.1.17 Hazardous Materials Transportation Act, 49 U.S.C 1801 et seq. ....	7-6
7.1.18 Toxic Substances Control Act, 7 U.S.C. 136 et seq. ....	7-6
7.1.19 Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994) .....	7-6
7.2 Native American Regulatory Requirements .....	7-7
7.2.1 American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996) .....	7-7
7.2.2 Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001) .....	7-7
7.2.3 Executive Order 13007, Indian Sacred Sites .....	7-7
7.2.4 Executive Order 13175, Consultation and Coordination with Indian Tribal Governments .....	7-7
7.3 State Regulatory Requirements.....	7-8
7.3.1 Clean Water Act Implementing Regulations .....	7-8
7.3.2 State Water Appropriations.....	7-8
7.3.3 Clean Air Act Implementing Regulations.....	7-8
7.3.4 Radioactive Materials Licensing.....	7-8
7.4 References.....	7-8
<b>8.0 List of Preparers and Disclosure Statements .....</b>	<b>8-1</b>
<b>9.0 List of Agencies, Organizations, and Individuals Receiving Copies of the EIS .....</b>	<b>9-1</b>

**10.0 Glossary** ..... 10-1

**11.0 Index**..... 11-1

## Tables

Table MC-1. Metric Prefixes ..... xxvii

Table MC-2. Metric Conversion Chart ..... xxvii

Table 1-1. Locations in the EIS That Address Public Scoping Comments.....1-22

Table 1-2. Number of Comment Documents Received .....1-23

Table 2-1. Borrow Materials and Potential Source Locations .....2-19

Table 2-2. Summary Logistics for Borrow Material Transportation .....2-23

Table 2-3. Borrow Material Transportation Segments and Distances .....2-24

Table 2-4. Average Annual Labor Requirements—On-Site Disposal Alternative .....2-25

Table 2-5. Average Annual Equipment Requirements—On-Site Disposal Alternative .....2-25

Table 2-6. Estimated Area of Disturbed Land at Borrow Areas .....2-26

Table 2-7. Summary Logistics for Borrow Material Transport .....2-37

Table 2-8. Source Material Quantities .....2-38

Table 2-9. Summary Logistics for Truck Transportation from the Moab Site to Three  
Alternative Off-Site Disposal Locations.....2-38

Table 2-10. Summary Logistics for Rail Transportation from the Moab Site to  
Two Alternative Off-Site Disposal Cell Sites.....2-49

Table 2-11. Summary of Pipeline Corridor Characteristics .....2-62

Table 2-12. Slurry Pipeline System Parameters .....2-63

Table 2-13. Mainline Slurry Pump Characteristics .....2-64

Table 2-14. Mainline Recycle Water Pump System Characteristics.....2-65

Table 2-15. Facility Land Use Requirements (Footprints).....2-65

Table 2-16. Average Annual Labor Requirements—Truck Transportation .....2-85

Table 2-17. Average Annual Labor Requirements—Rail Transportation .....2-85

Table 2-18. Average Annual Labor Requirements—Slurry Pipeline Transportation.....2-85

Table 2-19. Average Annual Equipment Requirements—Truck Transportation Mode .....2-86

Table 2-20. Average Annual Equipment Requirements—Rail Transportation Mode .....2-86

Table 2-21. Average Annual Equipment Requirements—Slurry Pipeline  
Transportation Mode.....2-87

Table 2-22. Estimated Maximum Acres of Disturbed Land for the Off-Site Disposal  
Alternatives .....2-88

Table 2-23. Estimated Annual Fuel Consumption for the Off-Site Disposal Alternatives .....2-88

Table 2-24. Estimated Annual Nonpotable Water Consumption.....2-88

Table 2-25. Potable Water Consumption Rates .....2-89

Table 2-26. Sanitary Waste Generated.....2-89

Table 2-27. Estimated Maximum Average Annual Electric Power Demand  
For the Off-Site Disposal Alternative .....2-90

Table 2-28. Summary of Compliance Strategy Selection Process .....2-96

Table 2-29. Estimated Equipment Requirements.....2-104

Table 2-30. Estimated Diesel Fuel Consumption for Evaporation Pond Construction.....2-106

Table 2-31. Schedule for Meeting Ground Water Target Remediation Goals.....2-108

Table 2-32. Summary and Comparison of Impacts.....2-138

Table 2-33. Consequences of Uncertainty .....2-166

Table 2–34.	Key NAS Recommendations for Assessing Remedial Action Alternatives for the Moab Site .....	2–187
Table 2–35.	Estimated Lifetime Cost of Analyzed Disposal Alternatives (in millions of dollars) .....	2–188
Table 3–1.	Properties of the Nakai Soil Type .....	3–9
Table 3–2.	Contaminated Material Quantities .....	3–10
Table 3–3.	Percent of Tailing Types in the Moab Impoundment .....	3–10
Table 3–4.	Air Quality Standards .....	3–11
Table 3–5.	Air Quality in the Moab Region .....	3–12
Table 3–6.	Estimated Annual Water Budget for the Moab Site .....	3–20
Table 3–7.	Standards for Inorganic Constituents in Ground Water at UMTRCA Project Sites .....	3–23
Table 3–8.	Summary of Surface Water Quality Criteria for Aquatic Species .....	3–36
Table 3–9.	Fish That May Occur in the Colorado River Near the Tailings Pile .....	3–39
Table 3–10.	Characteristics of the Potential Vegetation on the Nakai Soil Type .....	3–45
Table 3–11.	Federally Listed Terrestrial Threatened and Endangered Species Potentially Occurring at the Moab Site .....	3–46
Table 3–12.	Sensitive Plant Species That May Occur in the Vicinity of the Moab Site .....	3–50
Table 3–13.	State-Listed Wildlife Species That May Occur in the Vicinity of the Moab Site .....	3–51
Table 3–14.	Sensitive Bird Species Protected Under the Fish and Wildlife Conservation Act and Migratory Bird Treaty Act That May Occur Near the Moab Site .....	3–52
Table 3–15.	Annual Average Daily Traffic, Road Congestion, Truck Percent, and Highway Accidents for US 191 and I-70 in 2001 .....	3–64
Table 3–16.	Average Monthly Vehicle Traffic Near the North Boundary of Moab .....	3–66
Table 3–17.	Population and Labor Force Information for Grand and San Juan Counties, Utah .....	3–68
Table 3–18.	Housing and Income Information for Grand and San Juan Counties, Utah .....	3–69
Table 3–19.	Commercial and Farm-Based Enterprise in Grand and San Juan Counties .....	3–70
Table 3–20.	Annual Doses From Background Radiation Compared to Doses From Radon and Gamma Associated With Tailings at the Moab Site .....	3–74
Table 3–21.	2002 Annual Personnel Exposure Summary Report .....	3–75
Table 3–22.	Minority and Low-Income Populations in Grand and San Juan Counties .....	3–76
Table 3–23.	Soil Types and Properties at the Klondike Flats Site .....	3–83
Table 3–24.	Characteristics of Potential Vegetation on the Various Soil Types at the Klondike Flats Site .....	3–91
Table 3–25.	Federally Listed Threatened and Endangered Species Potentially Occurring in the Vicinity of the Klondike Flats Site .....	3–92
Table 3–26.	Sensitive Plant Species Potentially Occurring in the Klondike Flats Site Area ..	3–94
Table 3–27.	State-Listed Animal Species That May Occur in the Vicinity of the Klondike Flats Site .....	3–95
Table 3–28.	Sensitive Bird Species Protected Under the Fish and Wildlife Conservation Act and Migratory Bird Treaty Act That May Occur Near the Klondike Flats Site ..	3–96
Table 3–29.	United States and the Klondike Flats Site Natural Background Radiation Doses .....	3–100
Table 3–30.	Soil Types and Properties at the Crescent Junction Site .....	3–112
Table 3–31.	Vegetation Characteristics on the Various Soil Types at the Crescent Junction Site .....	3–117

Table 3–32.	Federally Listed Threatened or Endangered Species Potentially Occurring in the Vicinity of the Crescent Junction Site .....	3–117
Table 3–33.	Sensitive Plant Species Potentially Occurring in the Vicinity of the Crescent Junction Site.....	3–119
Table 3–34.	State-Listed Animal Species That May Occur In the Vicinity of the Crescent Junction Site.....	3–120
Table 3–35.	Sensitive Bird Species Protected Under the Fish and Wildlife Conservation Act and the Migratory Bird Treaty Act That May Occur Near the Crescent Junction Site.....	3–121
Table 3–36.	U.S. and the Crescent Junction Site Natural Background Radiation Doses .....	3–125
Table 3–37.	Soil Types and Properties at the White Mesa Mill Site .....	3–136
Table 3–38.	Federal Regional Priority Classifications Based on Ambient Air Quality .....	3–137
Table 3–39.	Air Emission Inventory for Key Criteria Emissions (tons per year) .....	3–139
Table 3–40.	Drainage Basins Near the White Mesa Mill Site .....	3–143
Table 3–41.	Monitoring Results for Surface Water Samples Collected from Cottonwood Creek and Westwater Creek near the White Mesa Mill Site .....	3–145
Table 3–42.	Vegetation Characteristics on the Various Soil Types at the White Mesa Site.....	3–147
Table 3–43.	Community Structure Parameters of the White Mesa Mill Site Plant Communities.....	3–147
Table 3–44.	Federally Listed Threatened or Endangered Species Potentially Occurring in the Vicinity of the White Mesa Mill Site.....	3–149
Table 3–45.	Sensitive Plant Species Potentially Occurring in the White Mesa Mill Site Vicinity .....	3–151
Table 3–46.	State-Listed Wildlife Species That May Occur In the Vicinity of the White Mesa Site.....	3–152
Table 3–47.	Sensitive Bird Species Protected Under the Fish and Wildlife Conservation Act and Migratory Bird Treaty Act That May Occur Near the White Mesa Mill Site .....	3–154
Table 3–48.	White Mesa Mill Site—Summary of Cultural Sites by Type .....	3–157
Table 3–49.	White Mesa Mill Site—Summary of Cultural Sites by Time Period .....	3–158
Table 3–50.	United States and the White Mesa Mill Site Natural Background Radiation Doses .....	3–163
Table 3–51.	Federally Listed Threatened and Endangered Species Potentially Occurring in the Vicinity of the Proposed Pipeline Corridor .....	3–170
Table 3–52.	Sensitive Plant Species Potentially Occurring in Vicinity of the Pipeline Corridor.....	3–172
Table 3–53.	State-Listed Animal Species That May Occur in the Vicinity of the Pipeline Corridor.....	3–173
Table 3–54.	Sensitive Bird Species Protected Under the Fish and Wildlife Conservation Act and Migratory Bird Treaty Act That May Occur Near the Pipeline Corridor.....	3–174
Table 3–55.	White Mesa Mill Pipeline—Summary of Eligible Cultural Sites by Type .....	3–176
Table 4–1.	Criteria Pollutant Concentrations from Emissions at the Moab Site .....	4–4
Table 4–2.	Assumptions for Liquid Drainage and Ammonia Concentrations From the Tailings Pile for the On-Site Disposal Alternative .....	4–7
Table 4–3.	Predicted Ammonia Concentrations in the Ground Water Adjacent to the Colorado River Resulting From the On-Site Disposal Alternative .....	4–9

Table 4-4.	Number of Cultural Sites that Could Be Adversely Affected Under the On-Site Disposal Alternative.....	4-27
Table 4-5.	Noise Levels (dBA) Used for Noise Assessment .....	4-28
Table 4-6.	Noise Impacts (1-hour Leq) Around Transportation Routes for Borrow Material.....	4-30
Table 4-7.	Summary of Visual Resource Impacts Under the On-Site Disposal Alternative.....	4-36
Table 4-8.	Remediation Costs .....	4-41
Table 4-9.	Economic Impacts in the Two-County Socioeconomic Region of Influence.....	4-42
Table 4-10.	Worker Impacts for the On-Site Disposal Alternative (Moab Site) .....	4-44
Table 4-11.	Worker Impacts for the On-Site Disposal Alternative (Vicinity Properties).....	4-45
Table 4-12.	Transportation Impacts for the On-Site Disposal Alternative .....	4-46
Table 4-13.	Construction-Related Fatalities for the On-Site Disposal Alternative.....	4-47
Table 4-14.	Worker Impacts for the On-Site Disposal Alternative (Moab Site and Vicinity Properties).....	4-47
Table 4-15.	Future Potential Risks for the On-Site Disposal Alternative .....	4-49
Table 4-16.	Maximum Exposure Level of Contaminants Protective of Human Health and Ecological Resources .....	4-53
Table 4-17.	Calculated Concentrations of Dissolved Uranium and Ammonia (as N) in Colorado River Water Following a Catastrophic Failure at the Moab Site.....	4-55
Table 4-18.	Calculated Concentrations of Uranium and Radium-226 in Suspended Load in the Colorado River Following a Catastrophic Failure at the Moab Site.....	4-56
Table 4-19.	Comparison of Risk-Based Maximum Exposure Levels to Estimated Concentrations Following a Disposal Cell Failure .....	4-56
Table 4-20.	Summary of Short-Term Soil Impacts–Klondike Flats Off-Site Disposal Alternative.....	4-60
Table 4-21.	Criteria Pollutant Concentrations at the Moab Site .....	4-61
Table 4-22.	Criteria Pollutant Concentrations at the Klondike Flats Site .....	4-61
Table 4-23.	Assumptions for Liquid Drainage and Ammonia Concentrations From the Tailings Pile Under the Off Site Disposal Alternative.....	4-62
Table 4-24.	Number of Cultural Sites That Could Be Adversely Affected Under the Three Transportation Options .....	4-75
Table 4-25.	Summary of Visual Resource Impacts Under the Klondike Flats Off-Site Disposal Alternative.....	4-85
Table 4-26.	Economic Impacts in the Principal Two-County Socioeconomic Region of Influence Under the Klondike Flats Off-Site Disposal Alternative.....	4-90
Table 4-27.	Construction-Related Fatalities Under the Klondike Flats Off-Site Disposal Alternative.....	4-91
Table 4-28.	Worker Impacts Under the Klondike Flats Off-Site Disposal Alternative .....	4-92
Table 4-29.	Shipments Under the Klondike Flats Off-Site Disposal Alternative .....	4-93
Table 4-30.	Transportation Impacts Under the Klondike Flats Off-Site Disposal Alternative.....	4-94
Table 4-31.	Summary of Short-Term Soil Impacts–Crescent Junction Off-Site Disposal Alternative.....	4-100
Table 4-32.	Number of Cultural Sites that Could Be Adversely Affected Under the Three Transportation Options .....	4-109
Table 4-33.	Summary of Visual Resource Impacts Under the Crescent Junction Off-Site Disposal Alternative.....	4-116

Table 4–34.	Economic Impacts in the Principal Two-County Socioeconomic Region of Influence Under the Crescent Junction Off-Site Disposal Alternative.....	4–118
Table 4–35.	Construction-Related Fatalities Under the Crescent Junction Off-Site Disposal Alternative.....	4–119
Table 4–36.	Worker Impacts Under the Crescent Junction Off-Site Disposal Alternative ...	4–120
Table 4–37.	Shipments Under the Crescent Junction Off-Site Disposal Alternative .....	4–121
Table 4–38.	Transportation Impacts Under the Crescent Junction Off-Site Disposal Alternative.....	4–122
Table 4–39.	Summary of Impacts Related to Soil Disturbance–White Mesa Mill Site Off-Site Disposal Alternative .....	4–127
Table 4–40.	Criteria Pollutant Concentrations at the Moab Site .....	4–128
Table 4–41.	Criteria Pollutant Concentrations at the White Mesa Mill Site .....	4–128
Table 4–42.	Cultural Sites That May Be Adversely Affected by Disposal Cell Construction at the White Mesa Mill Site .....	4–138
Table 4–43.	Cultural Sites That Could Be Adversely Affected by Haul Road Construction at the White Mesa Mill Site .....	4–138
Table 4–44.	Number of Cultural Sites That Could Be Adversely Affected Under the Two White Mesa Mill Site Transportation Options .....	4–139
Table 4–45.	Noise Impacts Around Transportation Routes for the White Mesa Mill Off-Site Disposal Alternative .....	4–141
Table 4–46.	Summary of Visual Resource Impacts Under the White Mesa Mill Off-Site Disposal Alternative.....	4–146
Table 4–47.	Economic Impacts in the Two-County Socioeconomic Region of Influence Under the White Mesa Mill Off-Site Disposal Alternative .....	4–149
Table 4–48.	Construction-Related Fatalities for White Mesa Mill Disposal Alternative.....	4–150
Table 4–49.	Worker Impacts Under the White Mesa Mill Off-Site Disposal Alternative ...	4–150
Table 4–50.	Shipments Under the White Mesa Mill Off-Site Disposal Alternative .....	4–152
Table 4–51.	Transportation Impacts Under the White Mesa Mill Off-Site Disposal Alternative.....	4–152
Table 4–52.	Impacts at Anticipated Borrow Areas.....	4–159
Table 4–53.	Assumptions for Liquid Drainage from the Tailings Pile and Ammonia Concentrations for the No Action Alternative .....	4–166
Table 4–54.	Future Potential Risks Under the No Action Alternative .....	4–173

## **Figures**

Figure 1–1.	Location of the Moab Site in Grand County, Utah.....	1–3
Figure 1–2.	Location of the Moab Site in Relation to the City of Moab .....	1–4
Figure 2–1.	Schedule of Activities for On-Site and Off-Site Disposal—Summary .....	2–2
Figure 2–2.	Disposal Site Alternative Locations.....	2–3
Figure 2–3.	Moab Site Plan, On-Site Disposal Alternative .....	2–5
Figure 2–4.	On-Site Disposal Alternative Surface Remediation Activity Schedule.....	2–6
Figure 2–5.	Locations of Temporary Moab Site Construction Facilities, On-Site Disposal Alternative.....	2–10
Figure 2–6.	Typical Cross-Section of the Disposal Cell, On-Site Disposal Alternative.....	2–13
Figure 2–7.	Vicinity Property Inclusion Survey Area.....	2–15
Figure 2–8.	Borrow Areas .....	2–20

Figure 2–9.	Site Location Map.....	2–28
Figure 2–10.	Truck Haul Off-Site Disposal Alternative, Surface Remediation Activity Schedule.....	2–30
Figure 2–11.	Rail Haul Off-Site Disposal Alternative, Surface Remediation Activity Schedule.....	2–31
Figure 2–12.	Slurry Line Haul Off-Site Disposal Alternative, Surface Remediation Activity Schedule.....	2–31
Figure 2–13.	Locations of Temporary Moab Site Facilities, Processing (Drying) Areas, and Storm Control Features, Off-Site Disposal Alternative.....	2–32
Figure 2–14.	Truck and Rail Transportation Routes.....	2–39
Figure 2–15.	Slurry Pipeline Transportation Routes.....	2–40
Figure 2–16.	Reference Disposal Cell.....	2–42
Figure 2–17.	Moab Site Temporary Construction Facilities, Off-Site Disposal Alternative....	2–44
Figure 2–18.	Klondike Flats Site Truck Route Map.....	2–45
Figure 2–19.	Crescent Junction Site Truck Route Map.....	2–47
Figure 2–20.	White Mesa Mill Site Temporary Construction Facilities.....	2–48
Figure 2–21.	Moab Site Rail Transportation Infrastructure, Off-Site Disposal Alternative....	2–51
Figure 2–22.	Klondike Flats Site Railroad Transportation Mode.....	2–53
Figure 2–23.	Operational Rotary Dump Facility.....	2–54
Figure 2–24.	Crescent Junction Site Railroad Transportation Mode.....	2–55
Figure 2–25.	Klondike Flats Site Slurry Pipeline Transportation Mode.....	2–57
Figure 2–26.	Crescent Junction Site Slurry Pipeline Transportation Mode.....	2–58
Figure 2–27.	White Mesa Mill Site Slurry Pipeline Transportation Mode.....	2–59
Figure 2–28.	Locations of Proposed Slurry Pipeline Facilities at the Moab Site.....	2–60
Figure 2–29.	Slurry Preparation Plant Process Flow Diagram.....	2–63
Figure 2–30.	Filter Plant Process Flow Diagram.....	2–65
Figure 2–31.	Transportation Facilities Plan, Rail Transportation.....	2–68
Figure 2–32.	Disposal Cell Filling Sequence Profile.....	2–72
Figure 2–33.	Disposal Cell, Typical Section.....	2–74
Figure 2–34.	Reference Disposal Cell Cover Construction.....	2–75
Figure 2–35.	Reference Disposal Cell—Typical Cover Section.....	2–76
Figure 2–36.	White Mesa Mill Disposal Cell Plan.....	2–80
Figure 2–37.	White Mesa Mill Disposal Cell Cross-Section.....	2–81
Figure 2–38.	White Mesa Mill Wet Cell Liner Design.....	2–82
Figure 2–39.	White Mesa Mill Typical Reclamation Cover.....	2–84
Figure 2–40.	PEIS Compliance Strategy Selection Process.....	2–95
Figure 2–41.	Area of Proposed Active Ground Water Remediation.....	2–99
Figure 2–42.	Estimated Ground Water Remediation Schedule.....	2–103
Figure 2–43.	Predicted Maximum Ammonia Concentrations in Ground Water for Active Remediation.....	2–107
Figure 2–44.	Predicted Maximum Ammonia Concentrations in Ground Water for No Action.....	2–108
Figure 2–45.	Estimated Duration of Ground Water Remediation.....	2–119
Figure 2–46.	Annual Withdrawals of Colorado River Water.....	2–121
Figure 2–47.	Maximum Land Disturbance.....	2–122
Figure 2–48.	Maximum Number of Potentially Affected Cultural Resources.....	2–124
Figure 2–49.	Minimum Number of Potentially Affected Traditional Cultural Properties.....	2–124
Figure 2–50.	Power Requirements.....	2–127
Figure 2–51.	Total Fuel Consumption.....	2–127

Figure 2–52. Daily Potable Water Consumption .....	2–128
Figure 2–53. Total Nonpotable Water Consumption .....	2–128
Figure 2–54. Sanitary Waste Generation .....	2–129
Figure 2–55. Annual Generation of RRM and Solid Waste.....	2–129
Figure 2–56. Annual Costs and Benefits.....	2–131
Figure 2–57. Generation of New Direct and Indirect Jobs.....	2–131
Figure 2–58. Latent Cancer Fatalities Among Workers.....	2–132
Figure 2–59. Public Latent Cancer Fatalities (Excluding Vicinity Property Exposure) .....	2–133
Figure 2–60. Public Latent Cancer Fatalities from Vicinity Property Exposure .....	2–133
Figure 2–61. Nonradiological Transportation Fatalities .....	2–135
Figure 2–62. Increase in Truck Traffic in Downtown Moab .....	2–135
Figure 2–63. Increase in Truck Traffic on US-191 .....	2–136
Figure 2–64. Increase in Moab Traffic from Commuters .....	2–136
Figure 2–65. Borrow Material Requirements.....	2–164
Figure 3–1. Physiographic and Structural Features in the Moab and Alternative Site Areas .....	3–3
Figure 3–2. Stratigraphic Column of Geologic Formations in the Moab Area.....	3–4
Figure 3–3. Geologic Structures in the Area from Moab Site to Crescent Junction Site.....	3–5
Figure 3–4. Prevailing Wind Direction at the Moab Site.....	3–15
Figure 3–5. Wind Velocity in the Moab Area.....	3–16
Figure 3–6. Water-Bearing Characteristics of Major Stratigraphic Units.....	3–18
Figure 3–7. Ground Water Elevation Contours on the Upper Freshwater Surface.....	3–19
Figure 3–8. Conceptual Model, Saltwater/Freshwater Interface.....	3–20
Figure 3–9. Cross-Sectional View of TDS Concentrations in Moab Wash and the Basin-Fill Aquifer Beginning at Moab Wash and Extending Southeast to the Colorado River.....	3–22
Figure 3–10. Uranium Concentrations Interpolated at the Ground Water Surface.....	3–25
Figure 3–11. Ammonia Concentrations Interpolated at the Ground Water Surface .....	3–25
Figure 3–12. Cross-Sectional View of Ammonia Concentrations Beneath the Tailings Pile...3–27	
Figure 3–13. Mapped Colorado River Features Near the Moab Site.....	3–32
Figure 3–14. Uranium Concentrations in Surface Water Samples Collected at the Moab Site .....	3–33
Figure 3–15. Ammonia Concentrations in Surface Water Samples Collected at the Moab Site .....	3–34
Figure 3–16. Colorado River Floodplain Area for the Moab Site.....	3–37
Figure 3–17. Locations of Preferred Habitat for Young-of-the-Year Aquatic Species When Backwaters Are Present .....	3–42
Figure 3–18. Land Use in the Moab to Crescent Junction Area .....	3–54
Figure 3–19. Comparison of A-Weighted Sound Pressure Levels Associated With Different Sources of Noise .....	3–59
Figure 3–20. View of the Moab Site Tailings Pile from Southbound US-191 .....	3–62
Figure 3–21. Transportation Routes and Selected Roads in the Moab to Crescent Junction Area .....	3–65
Figure 3–22. Population Within 50 Miles of the Moab Site .....	3–73
Figure 3–23. Minority Population Distribution Within a 50-Mile Radius of Moab, Utah .....	3–77
Figure 3–24. Household Income Distribution Within a 50-Mile Radius of Moab, Utah.....	3–78
Figure 3–25. Generalized Stratigraphic Column for the Klondike Flats and Crescent Junction Alternative Disposal Sites .....	3–80
Figure 3–26. Prevailing Wind Direction at Klondike Flats Site .....	3–84



Figure 3–27. Wind Speed at Klondike Flats Site .....	3–85
Figure 3–28. Location of Domestic Wells in the Klondike Flats Area.....	3–87
Figure 3–29. View Northeast of the Klondike Flats Site .....	3–99
Figure 3–30. Population Within 50 Miles of the Klondike Flats Site.....	3–102
Figure 3–31. Minority Population Distribution Within a 50-Mile Radius of the Klondike Flats Site.....	3–103
Figure 3–32. Household Income Distribution Within a 50-Mile Radius of the Klondike Flats Site.....	3–104
Figure 3–33. View of the Crescent Junction Site from the I-70 Scenic Overlook.....	3–124
Figure 3–34. Population Within 50 Miles of the Crescent Junction Site .....	3–126
Figure 3–35. Minority Population Distribution Within a 50-Mile Radius of Crescent Junction, Utah .....	3–127
Figure 3–36. Household Income Distribution Within a 50-Mile Radius of the Crescent Junction Site.....	3–128
Figure 3–37. Generalized Stratigraphic Column for the White Mesa Mill Site.....	3–134
Figure 3–38. Land Use in the Moab to White Mesa Mill Site Area .....	3–156
Figure 3–39. View of the White Mesa Mill Site from the Entrance Road on US-191 .....	3–159
Figure 3–40. Transportation Routes From Moab to the White Mesa Mill Site .....	3–161
Figure 3–41. Census Population Within 50 Miles of the White Mesa Mill Site.....	3–162
Figure 3–42. Minority Population Distribution Within a 50-mile Radius of the White Mesa Mill Site.....	3–165
Figure 3–43. Household Income Distribution Within a 50-Mile Radius of the White Mesa Mill Site.....	3–166
Figure 3–44. View North of Proposed Pipeline Crossing at Kane Springs Canyon (note existing pipeline corridor in rock outcrop) .....	3–178
Figure 3–45. View Southeast of Proposed Pipeline Crossing at Recapture Creek From US-191 .....	3–178
Figure 4–1. Predicted Maximum Ammonia Concentrations in Ground Water Adjacent to the Colorado River for the On-Site Disposal Alternative.....	4–9
Figure 4–2. Predicted Ammonia Concentrations in the Ground Water After 80 Years for the On-Site Disposal Alternative.....	4–10
Figure 4–3. Predicted Ammonia Concentrations in the Ground Water After 200 Years for the On-Site Disposal Alternative.....	4–10
Figure 4–4. Moab Site Visibility Analysis Map.....	4–32
Figure 4–5. Simulated View of the Moab Disposal Cell from the Southbound Lane of US-191 Immediately After Construction.....	4–34
Figure 4–6. Simulated View of the Moab Disposal Cell from the Southbound Lane of US-191 After Vegetation Is Established.....	4–35
Figure 4–7. Predicted Ammonia Concentrations in Ground Water Adjacent to the Colorado River Under the Off-Site Disposal Alternative.....	4–63
Figure 4–8. Predicted Ammonia Concentrations in Alluvial Ground Water After 75 Years Under the Off-Site Disposal Alternative.....	4–64
Figure 4–9. Simulated View of the Moab Site from Southbound Lane of US-191 After Tailings Pile Removal.....	4–79
Figure 4–10. Klondike Flats Site Visibility Analysis Map (Section 35 Location) .....	4–80
Figure 4–11. Klondike Flats Site Visibility Analysis Map (Section 25 Location) .....	4–81
Figure 4–12. View of 5-Year-Old Pipeline Corridor from US-191, Approximately 2 Miles South of Blue Hills Road Turnoff.....	4–84
Figure 4–13. Crescent Junction Site Visibility Analysis Map .....	4–112

Figure 4–14. Simulated View of the Crescent Junction Disposal Cell from the Westbound Lane of I-70 Immediately After Construction .....	4–113
Figure 4–15. Simulated View of the Crescent Junction Disposal Cell from the Westbound Lane of I-70 After Vegetation Was Established .....	4–113
Figure 4–16. Simulated View of the Crescent Junction Disposal Cell from the I-70 Scenic Overlook Immediately After Construction .....	4–115
Figure 4–17. Simulated View of the Crescent Junction Disposal Cell from the I-70 Scenic Overlook After Vegetation Was Established .....	4–115
Figure 4–18. White Mesa Mill Site Visibility Analysis Map.....	4–143
Figure 4–19. Simulated View of the Booster Pump Station in Lisbon Valley and Newly Constructed Pipeline from Northbound Lane of US-191 .....	4–145
Figure 4–20. Simulated View of the Reclaimed Booster Pump Station Area in Lisbon Valley from Northbound Lane of US-191 .....	4–145
Figure 4–21. Predicted Maximum Ammonia Concentrations in Ground Water Adjacent to the Colorado River Under the No Action Alternative .....	4–167
Figure 4–22. Predicted Ammonia Concentrations in the Ground Water After 75 Years Under the No Action Alternative .....	4–167

## **Appendices**

Appendix A	Biological Assessment/Screening Level Risk Assessment/Biological Opinion
Appendix A1	Biological Assessment
Appendix A2	Screening of Contaminants to Aquatic and Terrestrial Resources
Appendix A3	Biological Opinion
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 and Floodplain Statement of Findings for Remedial Action at the Moab Site
Appendix G	White Mesa Mill Operations
Appendix H	Transportation Impact Analysis