

Volume 5 of 5

TABLE OF CONTENTS - General

VOLUME 1 of 5: Adjudication Files

Form 1	Application for In Situ Permit to Mine
Form 3	License to Mine Application
Form 8	Surface Owner Consent Form
Appendix A	Surface and Mineral Rights within the Lost Creek Permit Area
Appendix B	Surface and Mineral Rights Adjacent to the Lost Creek Permit Area
Appendix C	Tabulation of Lands
Appendix E	Right of Ways
Table ADJ-1	List of Regulatory Requirements

VOLUME 2 of 5: Appendix D (D1 to D5)

D1	Land Use
D2	Brief History
D3	Archaeological and Paleontological Resources (separate volume – requesting WDEQ confidentiality)
D4	Meteorology, Climatology, and Air Quality
D5	Geology

VOLUME 3a of 5: Appendix D (D6)

D6	Hydrology (through Attachment D6-2b)
----	--------------------------------------

VOLUME 3b of 5: Appendix D (D6)

D6	Hydrology (through Attachments D6-3 and D6-4)
----	---

VOLUME 4 of 5: Appendix D (D7 to D11)

D7	Soils
D8	Vegetation
D9	Wildlife
D10	Background Radiological Characteristics
D11	Wetlands

VOLUME 5 of 5: Operations Plan and Reclamation Plan

Operations Plan (OP)
Groundwater Quality Restoration and Surface Reclamation (RP)

TABLE OF CONTENTS - Detailed

VOLUME 1 of 5: Adjudication Files

Form 1	Application for In Situ Permit to Mine
Form 3	License to Mine Application
Form 8	Surface Owner Consent Form
Appendix A	Surface and Mineral Rights within the Lost Creek Permit Area
Appendix B	Surface and Mineral Rights Adjacent to the Lost Creek Permit Area
Appendix C	Tabulation of Lands
Appendix E	Right of Ways
Table ADJ-1	List of Regulatory Requirements

VOLUME 2 of 5: Appendix D (D1 to D5)

D1	Land Use	D1-1
D1.1	Rangeland and Grazing	D1-1
D1.2	Wildlife Habitat and Hunting.....	D1-2
D1.3	Recreation and Special Use Areas	D1-2
D1.4	Minerals and Energy	D1-2
D1.5	Transportation and Infrastructure	D1-3
D1.6	Population Distribution.....	D1-3
D2	Brief History.....	D2-1
D3	Archaeological and Paleontological Resources	D3-1
	(separate volume – requesting WDEQ confidentiality)	
D4	Meteorology, Climatology, and Air Quality.....	D4-1
D4.1	Meteorology and Climatology	D4-1
D4.1.1	Temperature	D4-2
D4.1.2	Precipitation	D4-2
D4.1.3	Humidity	D4-2
D4.1.4	Wind.....	D4-3
D4.1.5	Evaporation.....	D4-3
D4.1.6	Severe Weather	D4-3
D4.1.7	Local Air Flow Patterns and Characteristics	D4-4
D4.2	Air Quality	D4-4
D4.2.1	Background Conditions	D4-4
D4.2.2	Air Quality Construction Permit.....	D4-6

TABLE OF CONTENTS – Detailed (continued)

VOLUME 2 of 5: Appendix D (D1 to D5) continued

D5	Geology.....	D5-1
D5.1	Regional Geology	D5-1
D5.1.1	Stratigraphy.....	D5-1
D5.1.2	Structure.....	D5-2
D5.2	Site Geology.....	D5-2
D5.2.1	Stratigraphy.....	D5-3
D5.2.2	Structure.....	D5-4
D5.2.3	Ore Mineralogy and Geochemistry.....	D5-4
D5.2.4	Subsurface Exploration Activities	D5-6
D5.2.4.1	Uranium Exploration	D5-6
D5.2.4.2	Other Mineral Exploration.....	D5-8
D5.3	Seismology.....	D5-8
D5.3.1	Historic Seismicity.....	D5-8
D5.3.1.1	Town of Bairoil Area.....	D5-8
D5.3.1.2	City of Rawlins Area	D5-9
D5.3.1.3	City of Rock Springs Area.....	D5-10
D5.3.1.4	City of Lander Area	D5-10
D5.3.1.5	City of Casper Area	D5-11
D5.3.2	Uniform Building Code	D5-12
D5.3.3	Deterministic Analysis of Active Fault Systems	D5-12
D5.3.4	Maximum Tectonic Province Earthquake “Floating Earthquake” Seismogenic Source	D5-13
D5.3.5	Short-Term Probabilistic Seismic Hazard Analysis	D5-14

VOLUME 3a of 5: Appendix D (D6)

D6	Hydrology	D6-1
D6.1	Surface Water.....	D6-1
D6.1.1	Drainage Characteristics	D6-1
D6.1.2	Surface Water Use	D6-3
D6.1.3	Surface Water Quality.....	D6-3
D6.2	Groundwater Occurrence.....	D6-5
D6.2.1	Regional Hydrogeology	D6-5
D6.2.1.1	Lewis Shale.....	D6-7
D6.2.1.2	Fox Hills Formation.....	D6-7
D6.2.1.3	Lance Formation	D6-7
D6.2.1.4	Fort Union Formation	D6-8
D6.2.1.5	Battle Spring Formation- Wasatch Formation.....	D6-8
D6.2.1.6	Undifferentiated Tertiary and Quaternary Sediments... D6-9	
D6.2.2.2	Potentiometric Surface, Groundwater Flow Direction and Hydraulic Gradient.....	D6-13

TABLE OF CONTENTS – Detailed (continued)

VOLUME 3a of 5: Appendix D (D6) continued

D6.2.2	Site Hydrogeology	D6-10
D6.2.2.1	Hydrostratigraphic Units.....	D6-10
D6.2.2.3	Aquifer Properties.....	D6-15
D6.3	Groundwater Use	D6-20
D6.4	Groundwater Quality	D6-22
D6.4.1	Regional Groundwater Quality	D6-22
D6.4.2	Site Groundwater Quality	D6-25
D6.4.2.1	Groundwater Monitoring Network and Parameters....	D6-25
D6.4.2.2	Groundwater Quality Sampling Results	D6-26
D6.5	Hydrologic Conceptual Model.....	D6-31
D6.5.1	Regional Groundwater Conceptual Model	D6-31
D6.5.2	Site Groundwater Conceptual Model.....	D6-32
D6.5.2.1	Hydrostratigraphic Units.....	D6-32
D6.5.2.2	Potentiometric Surface and Hydraulic Gradients	D6-33
D6.5.2.3	Aquifer Properties.....	D6-35
D6.5.2.4	Water Quality.....	D6-35
D6.5.2.5	Summary	D6-36

VOLUME 4 of 5: Appendix D (D7 to D11)

D7	Soils.....	D7-1
D7.1	Introduction.....	D7-1
D7.2	Methods.....	D7-1
D7.2.1	Review of Existing Literature.....	D7-1
D7.2.2	Soil Survey.....	D7-2
D7.2.3	Field Sampling.....	D7-3
D7.2.4	Laboratory Analysis.....	D7-3
D7.3	Results and Discussion	D7-3
D7.3.1	General characteristics.....	D7-3
D7.3.2	Soil Mapping Unit Interpretation.....	D7-4
D7.4	Topsoil Suitability.....	D7-5
D7.5	Topsoil Protection.....	D7-5
D7.6	Geotechnical Investigations.....	D7-5
D7.7	Historical Surface Disturbances.....	D7-6
D8	Vegetation.....	D8-1
D8.1	Introduction.....	D8-1
D8.2	Description of the Study Area.....	D8-1
D8.3	Methods.....	D8-2
D8.3.1	Vegetation Type Identification and Mapping.....	D8-2
D8.3.2	Species Composition.....	D8-2
D8.3.3	Sampling Design.....	D8-3

TABLE OF CONTENTS – Detailed (continued)

VOLUME 4 of 5: Appendix D (D7 to D11) continued

D8.3.4	Sampling Times	D8-3
D8.3.5	Collection and Analysis of Vegetation Cover Data.....	D8-3
D8.3.6	Collection and Analysis of Tree and Shrub Density Data	D8-4
D8.3.7	Cropland and Prime Farmland Description	D8-4
D8.3.8	Plant Species of Special Concern	D8-4
D8.4	Results.....	D8-5
D8.4.1	Description of Vegetation Types	D8-5
D8.4.1.1	Upland Big Sagebrush Shrubland Type.....	D8-5
D8.4.1.2	Lowland Big Sagebrush Shrubland Type	D8-6
D8.4.2	Sample Site Locations.....	D8-8
D8.4.3	Weeds, Selenium Indicators, Endangered or Threatened Species	D8-8
D8.4.4	Species Composition.....	D8-8
D8.4.5	Sample Adequacy	D8-9
D8.5	Discussion	D8-9
D8.6	Conclusions.....	D8-10
D9	Wildlife	D9-1
D9.1	Habitat Description and Wildlife Species.....	D9-2
D9.2	Methods.....	D9-3
D9.2.1	File and Data Searches.....	D9-3
D9.2.2	Field Surveys	D9-3
D9.3	Results.....	D9-4
D9.3.1	Big Game	D9-4
D9.3.2	Upland Game Birds.....	D9-5
D9.3.3	Raptors	D9-6
D9.3.4	Waterfowl and Shorebirds	D9-7
D9.3.5	Passerine and Breeding Birds	D9-7
D9.3.6	Migratory Birds of High Federal Interest	D9-8
D9.3.7	Other Mammals	D9-9
D9.3.8	T&E and State-Listed Species of Concern	D9-9
D9.3.9	Reptiles and Amphibians	D9-10
D9.3.10	Fish and Aquatic Life.....	D9-11
D10	Background Radiological Characteristics.....	D10-1
D10.1	Background Gamma Radiation Survey and Soils Sampling	D10-1
D10.1.1	Methods.....	D10-2
D10.1.1.1	Gamma Surveys and Mapping.....	D10-2
D10.1.1.2	Cross-Calibration between NaI Detectors and the HPIC.....	D10-4
D10.1.1.3	Soil Sampling and Gamma Correlation Grids	D10-5
D10.1.2	Data Quality Assurance and Quality Control	D10-6

TABLE OF CONTENTS – Detailed (continued)

VOLUME 4 of 5: Appendix D (D7 to D11) continued

D10.1.3	Results.....	D10-7
D10.1.3.1	Baseline Gamma Survey.....	D10-7
D10.1.3.2	Baseline Soil Sampling.....	D10-8
D10.1.3.3	HPIC / NaI Cross-Calibration.....	D10-8
D10.1.3.4	Three-Foot HPIC Equivalent Gamma Exposure Rate Mapping.....	D10-9
D10.1.3.5	Soil Ra-226 Concentration Mapping.....	D10-10
D11	Wetlands.....	D11-1
D11.1	Introduction.....	D11-1
D11.2	Methods.....	D11-1
D11.3	Results and Discussion.....	D11-2

VOLUME 5 of 5: Operations Plan and Reclamation Plan

Operations Plan (OP).....	OP-1
OP 1.0 Overview of Proposed Operation.....	OP-1
OP 1.1 Site Facilities Layout.....	OP-2
OP 1.2 Ore Deposits.....	OP-3
OP 2.0 Project Development, Maintenance, and Monitoring.....	OP-4
OP 2.1 Project Schedule.....	OP-4
OP 2.2 Additional Regulatory Requirements.....	OP-6
OP 2.3 Land Use.....	OP-7
OP 2.4 Cultural Resources Mitigation Program.....	OP-7
OP 2.5 Topsoil Management.....	OP-8
OP 2.5.1 Short-Term Topsoil Protection.....	OP-9
OP 2.5.2 Long-Term Topsoil Protection.....	OP-9
OP 2.6 Roads.....	OP-10
OP 2.7 Vegetation Protection and Weed Control.....	OP-11
OP 2.8 Wildlife Protection and Monitoring.....	OP-12
OP 2.8.1 Wildlife Protection Measures.....	OP-12
OP 2.8.1.1 Activity Restrictions.....	OP-12
OP 2.8.1.2 Road Use.....	OP-12
OP 2.8.1.3 Fencing and Screening.....	OP-13
OP 2.8.1.4 Transmission Line.....	OP-13
OP 2.8.1.5 Human Disturbance.....	OP-13
OP 2.8.1.6 Wildlife Enhancements.....	OP-13
OP 2.8.2 Wildlife Monitoring.....	OP-14
OP 2.8.2.1 Raptors.....	OP-14
OP 2.8.2.2 Sage Grouse.....	OP-15

TABLE OF CONTENTS – Detailed (continued)

VOLUME 5 of 5: Operations Plan and Reclamation Plan continued

OP 2.9	Prevention and Remediation of Accidental Releases	OP-15
OP 2.9.1	Pipelines, Fittings, Valves, and Tanks.....	OP-16
OP 2.9.2	Wells	OP-16
OP 2.9.3	Buildings.....	OP-16
OP 2.9.4	Storage Ponds	OP-16
OP 2.9.5	Fuel Storage Areas.....	OP-18
OP 2.10	Air Monitoring	OP-18
OP 2.11	Groundwater Monitoring	OP-18
OP 2.11.1	On-Site Wells.....	OP-18
OP 2.11.2	Off-Site Wells.....	OP-19
OP 3.0	Mine Unit Processes, Instrumentation, and Control	OP-19
OP 3.1	Mine Unit Chemistry	OP-19
OP 3.2	Mine Unit Design.....	OP-20
OP 3.2.1	Injection and Production Well Patterns	OP-22
OP 3.2.2	Monitor Well Locations.....	OP-22
OP 3.2.2.1	Perimeter Monitor Wells.....	OP-23
OP 3.2.2.2	Observation Wells.....	OP-23
OP 3.2.2.3	Production Zone Monitor Wells	OP-24
OP 3.2.2.4	Overlying and Underlying Monitor Wells.....	OP-24
OP 3.3	Well Completion.....	OP-25
OP 3.4	Well Integrity Testing.....	OP-26
OP 3.5	Mine Unit Piping and Instrumentation	OP-27
OP 3.6	Mine Unit Control.....	OP-27
OP 3.6.1	Header House Control	OP-28
OP 3.6.2	Pattern Control.....	OP-29
OP 3.6.3	Projected Water Balance and Water Level Changes	OP-30
OP 3.6.3.1	Water Balance.....	OP-30
OP 3.6.3.2	Mine Unit Interference.....	OP-31
OP 3.6.3.3	Cumulative Drawdown	OP-31
OP 3.6.4	Excursion Monitoring and Control.....	OP-33
OP 3.6.4.1	Mine Unit Baseline Water Quality and Upper Control Limits.....	OP-33
OP 3.6.4.2	Excursion Detection.....	OP-34
OP 3.6.4.3	Excursion Verification and Corrective Action.....	OP-34
OP 3.6.4.4	Ability to Control an Excursion.....	OP-35
OP 4.0	Plant Processes, Instrumentation, and Control	OP-36
OP 4.1	Ion Exchange (Resin-Loading) Circuit.....	OP-36
OP 4.2	Elution Circuit.....	OP-37
OP 4.3	Precipitation/Filtration Circuit	OP-37
OP 4.4	Major Process Equipment and Instrumentation.....	OP-38

TABLE OF CONTENTS – Detailed (continued)

VOLUME 5 of 5: Operations Plan and Reclamation Plan continued

OP 5.0	Effluent Control Systems.....	OP-38
OP 5.1	Gaseous Emissions and Airborne Particulates.....	OP-39
OP 5.1.1	Non-Radioactive Emissions and Particulates	OP-39
OP 5.1.2	Radioactive Emissions.....	OP-40
OP 5.2	Liquid Wastes	OP-40
OP 5.2.1	Liquid Non-11(e)(2) Byproduct Materials	OP-41
OP 5.2.1.1	“Native” Groundwater Recovered during Well Development, Sample Collection, and Pump Testing.....	OP-41
OP 5.2.1.2	Storm Water Runoff.....	OP-41
OP 5.2.1.3	Waste Petroleum Products and Chemicals	OP-41
OP 5.2.1.4	Domestic Liquid Waste	OP-42
OP 5.2.2	Sources of Liquid 11(e)(2) Byproduct Material	OP-42
OP 5.2.2.1	Liquid Process Waste.....	OP-43
OP 5.2.2.2	“Affected” Groundwater Generated during Well Development and Sample Collection.....	OP-44
OP 5.2.2.3	Groundwater Generated during Aquifer Restoration.....	OP-45
OP 5.2.3	Disposal of Liquid 11(e)(2) Byproduct Materials	OP-45
OP 5.2.3.1	Storage Ponds.....	OP-45
OP 5.2.3.2	UIC Class I Wells	OP-46
OP 5.3	Solid Wastes.....	OP-46
OP 5.3.1	Solid Non-11(e)(2) Byproduct Materials.....	OP-46
OP 5.3.2	Solid 11(e)(2) Byproduct Materials.....	OP-47
Groundwater Quality Restoration and Surface Reclamation (RP)		RP-1
RP 1.0	Completion of Production Operations	RP-2
RP 2.0	Plans and Schedule for Groundwater Quality Restoration	RP-3
RP 2.1	Conditions in the Mineralized Zone Before and After Operations.....	RP-3
RP 2.2	Restoration Requirements.....	RP-4
RP 2.3	Groundwater Restoration Methods.....	RP-5
RP 2.3.1	Groundwater Sweep.....	RP-6
RP 2.3.2	Groundwater Treatment	RP-7
RP 2.3.3	Recirculation	RP-8
RP 2.4	Stabilization Phase	RP-9
RP 2.5	Reporting.....	RP-9
RP 3.0	Mine Unit Reclamation.....	RP-10
RP 3.1	Well Abandonment	RP-10
RP 3.2	Facility and Road Reclamation.....	RP-11

TABLE OF CONTENTS – Detailed (continued)

VOLUME 5 of 5: Operations Plan and Reclamation Plan continued

RP 4.0 Reclamation and Decommissioning of Processing and Support
Facilities..... RP-12

RP 4.1 Removal and Disposal of Equipment and Structures RP-13

RP 4.2 Waste Storage, Treatment, and Disposal Facilities RP-14

RP 4.3 Buried Piping and Engineering Control Structures RP-14

RP 4.4 Roads..... RP-14

RP 4.5 Soil Replacement and Revegetation RP-15

 RP 4.5.1 Post-Operational Land Use RP-15

 RP 4.5.2 Surface Preparation..... RP-15

 RP 4.5.3 Soil Replacement RP-16

 RP 4.5.4 Seed Mix, Reseeding Methods, and Fencing RP-16

 RP 4.5.5 Revegetation Success Criteria..... RP-17

RP 5.0 Financial Assurance RP-17

TABLE OF CONTENTS – Detailed (continued)

FIGURES

VOLUME 1 of 5: Adjudication Files – No Figures

VOLUME 2 of 5: Appendix D (D1 to D5)

D1 Land Use

Figure D1-1a General Location of the Permit Area

Figure D1-1b Aerial Photo of the Permit Area

Figure D1-2 Land Ownership

Figure D1-3 BLM Grazing Allotments

Figure D1-4 Nuclear Fuel Cycle Facilities and Mines within 50 Miles

Figure D1-5 Regional Transportation Network

Figure D1-6 Significant Population Centers within 50 Miles

D3 Archaeological and Paleontological Resources

(separate volume – requesting WDEQ confidentiality)

D4 Meteorology, Climatology, and Air Quality

Figure D4-1 Meteorological Stations within 50 Miles of the Permit Area

Figure D4-2 Monthly Total Precipitation in the Project Region

Figure D4-3a to m Wind Speed and Wind Direction at the Lost Soldier Meteorological Station

Figure D4-4 Tornado Statistics by County

Figure D4-5 Air Particulate Sampling Locations

Figure D4-6 Passive Radiological Sampling Locations

D5 Geology

Figure D5-1 Regional Geologic Map

Figure D5-2a Geologic Cross Section Schematic of the Permit Area

Figure D5-2b General Stratigraphy of the Upper Battle Spring Formation

Figure D5-3 Historical Seismic Activities in Wyoming

Figure D5-4 UBC Seismic Zones

Figure D5-5 Active Fault Systems in the Vicinity of the Permit Area

Figure D5-6 500-Year Probabilistic Acceleration Map of Wyoming

VOLUME 3a of 5: Appendix D (D6)

D6 Hydrology

Figure D6-1 Surface Drainage Map for the Lost Creek Permit Area

Figure D6-2 Longitudinal Profile along Battle Spring Draw from the Northern Boundary

Figure D6-3a Photo of Crooked Well Reservoir Taken During Spring Snowmelt Runoff Looking West

TABLE OF CONTENTS – Detailed (continued)

FIGURES (continued)

VOLUME 3a of 5: Appendix D (D6) continued

- Figure D6-3b Surface Water Permits within Three Miles of the Permit Area
- Figure D6-4 Storm Water Sampler Installed to Collect a One-Liter Sample of Snowmelt or Storm Surface Runoff.
- Figure D6-5 Locations of Storm Water and Spring Snowmelt Samplers
- Figure D6-6 Potentiometric Surface, Wasatch/Battle Spring Aquifers, Great Divide Basin
- Figure D6-7 Regional Hydrostratigraphic Units of Interest, Great Divide Basin
- Figure D6-8 Potentiometric Surface, Tertiary Aquifer System, Great Divide Basin
- Figure D6-9 Location Map, Lost Creek Monitor Wells
- Figure D6-10 Site Hydrostratigraphic Units, Lost Creek Project
- Figure D6-11a Potentiometric Surface, HJ Production Zone, November 2007
- Figure D6-11b Potentiometric Surface, Overlying Aquifer (LFG), November 2007
- Figure D6-11c Potentiometric Surface, Underlying Aquifer (UKM), November 2007
- Figure D6-11d Potentiometric Surface, HJ Production Zone, August 1982 and October 2006
- Figure D6-12 Location of Well Groups Used to Evaluate Vertical Hydraulic Gradients
- Figure D6-13 Location of Pump Tests Conducted in 1982 and 2006
- Figure D6-14a Location of LC19M Pump Test and Monitoring Wells, 2007
- Figure D6-14b Location of LC16M Test Wells, 2007
- Figure D6-15 Drawdown in the HJ Aquifer at the End of the LC19M Pumping Test
- Figure D6-16 Drawdown in the HJ Aquifer Near the End of the LC16M Pump Test
- Figure D6-17 Spatial Distribution of Aquifer Transmissivity
- Figure D6-18 BLM Wells near the Lost Creek Permit Area
- Figure D6-19 BLM Battle Spring Draw Well No. 4451
- Figure D6-20 BLM Boundary Well No. 4775
- Figure D6-21 BLM Battle Spring Well No. 4777
- Figure D6-22 BLM East Eagle Nest Draw Well
- Figure D6-23 Location of Historic Site Monitor Wells

TABLE OF CONTENTS – Detailed (continued)

FIGURES (continued)

VOLUME 3a of 5: Appendix D (D6) continued

- Figure D6-24 Location of Site Baseline Monitor Wells
- Figure D6-25a Distribution of TDS, August 1982
- Figure D6-25b Distribution of Radium-226, August 1982
- Figure D6-25c Distribution of Uranium, August 1982
- Figure D6-26a Distribution of Average TDS, September 2006 to May 2007
- Figure D6-26b Distribution of Average Sulfate, September 2006 to May 2007
- Figure D6-27a Piper Diagram – Average Water Quality at Individual Monitor Wells
- Figure D6-27b Piper Diagram – Average Water Quality in Aquifers of Interest
- Figure D6-28a Distribution of Average Uranium, September 2006 to May 2007
- Figure D6-28b Distribution of Average Radium 226+228, September 2006 to May 2007

VOLUME 4 of 5: Appendix D (D7 to D11)

D7 Soils

- Figure D7-1 Typical Soil Pit
- Figure D7-2 Soil Sampling Locations
- Figure D7-3 Existing Road Disturbance
- Figure D7-4 Typical Two-Track Road within Lost Creek Permit Area

D8 Vegetation

- Figure D8-1 Vegetation Map
- Figure D8-2 Upland Big Sagebrush Shrubland
- Figure D8-3 Lowland Big Sagebrush Shrubland
- Figure D8-4 Intergraded Upland and Lowland Big Sagebrush Shrubland

D9 Wildlife

- Figure D9-1 Wildlife Habitat Map
- Figure D9-2 Pronghorn Range
- Figure D9-3 Mule Deer Range
- Figure D9-4 Elk Range
- Figure D9-5 Moose Range
- Figure D9-6 Sage Grouse Leks
- Figure D9-7 Raptor Nests
- Figure D9-8 Location of Pygmy Rabbit Burrows and Pellets

TABLE OF CONTENTS – Detailed (continued)

FIGURES (continued)

VOLUME 4 of 5: Appendix D (D7 to D11) continued

D10 Background Radiological Characteristics

Figure D10-1 Scanning System Equipment and Configuration

Figure D10-2 Correlation Grid Sampling Design

Figure D10-3 NaI-Based Gamma Survey Results

Figure D10-4 NaI Gamma Survey Results and HPIC Measurement Locations

Figure D10-5 OHV Re-Scan Results

Figure D10-6 Soil Sampling and Gamma Survey Results Overlay

Figure D10-7 Ra-226 Soil Concentration and Gamma Exposure Rate
Correlation

Figure D10-8 Ra-226 and Uranium Soil Concentration Correlation

Figure D10-9 Calibration Curves for HPIC versus NaI Detectors

Figure D10-10 Three-Foot NaI Detector Height Data

Figure D10-11 Three-Foot and 4.5-Foot NaI Detector Height Readings
Correlation

Figure D10-12 Calculated Three-Foot-HPIC-Equivalent Gamma Exposure
Rates

Figure D10-13 Kriged Estimates of the Three-Foot-HPIC-Equivalent Gamma
Exposure Rates

Figure D10-14 Regression Used to Predict Soil Ra-226 Concentrations

Figure D10-15 Estimated Soil Ra-226 Concentrations

D11 Wetlands

Figure D11-1 Potential Wetlands Delineated by the National Wetland
Inventory

Figure D11-2 Photo of Crooked Well Reservoir in the Spring of 2006

VOLUME 5 of 5: Operations Plan and Reclamation Plan

OP Operations Plan

Figure OP-1 Regional Map of the Permit Area

Figure OP-2a Site Layout

Figure OP-2b Lost Creek Ore Trend

Figure OP-2c Road Design Features

Figure OP-3 Typical ISR Operation

Figure OP-4a Lost Creek Project Development, Production, and Restoration
Schedule

Figure OP-4b Proposed Restoration Equipment Schedule

TABLE OF CONTENTS – Detailed (continued)

FIGURES (continued)

VOLUME 5 of 5: Operations Plan and Reclamation Plan continued

OP Operations Plan (continued)

Figure OP-5a Project Water Balance – Production Only

Figure OP-5b Project Water Balance – Production with Ground Water Sweep
(GWS)

Figure OP-5c Project Water Balance – Production with GWS and Reverse
Osmosis (RO)

Figure OP-5d Project Water Balance – Production with RO

Figure OP-5e Project Water Balance – GWS and RO, No Production

Figure OP-5f Project Water Balance – RO Only, No Production

Figure OP-6 Alkaline Uranium Leach Chemistry in the Aquifer

Figure OP-7a Solution Flow Patterns

Figure OP-7b Mine Unit Layout

Figure OP-7c Vegetation and Soil Impacts

Figure OP-8a Injection Well Construction

Figure OP-8b Production Well Construction

Figure OP-8c Monitor Well Construction

Figure OP-9a Well Completion Techniques

Figure OP-9b Restoration Well Completions

Figure OP-10a Ion Exchange Process Flow

Figure OP-10b Plant Process Flow

RP Groundwater Quality Restoration and Surface Reclamation

Figure RP-1 Lost Creek Project Development, Production, and Restoration
Schedule

Figure RP-2 Site Layout with Mining and Restoration Schedules

Figure RP-3 Proposed Bond Schedule

TABLE OF CONTENTS – Detailed (continued)

TABLES

VOLUME 1 of 5: Adjudication Files

ADJ Adjudication Files

Table ADJ-1 List of Regulatory Requirements

VOLUME 2 of 5: Appendix D (D1 to D5)

D1 Land Use

Table D1-1 Hunting Statistics for Hunt Areas that Include the Permit Area

Table D1-2 Population Data

D3 Archaeological and Paleontological Resources
(separate volume – requesting WDEQ confidentiality)

D4 Meteorology, Climatology, and Air Quality

Table D4-1 Comparison of Temperature Data

Table D4-2 Monthly Maximum and Minimum Humidity Measured at the Lost
Soldier Meteorological Station

Table D4-3 Monthly Pan Evaporation at the Pathfinder Dam

Table D4-4 Air Stability Data

Table D4-5 Primary and Secondary Limits for National Ambient Air Quality
Standards and the State of Wyoming

Table D4-6 Allowable Increments for Prevention of Significant Deterioration
of Air Quality

Table D4-7 Reported Sources of Emissions near the Permit Area

Table D4-8 Reported Total Emissions near the Permit Area

Table D4-9 PM₁₀ Concentrations at Lost Creek

Table D4-10 Analytical Results for Passive Radon and Gamma Sampling

D5 Geology

Table D5-1 Permit Area Stratigraphy

Table D5-2 Abandonment Information for Historic Exploration Holes

VOLUME 3a of 5: Appendix D (D6)

D6 Hydrology

Table D6-1a Peak Flow Regression Equations

Table D6-1b Calculated Peak Flows for Battle Spring Draw

Table D6-2 Surface Water Permits within Three Miles of the Permit Area

Table D6-3 Historic Water Quality Results for Battle Spring from the
Sweetwater Mill Permit Application

TABLE OF CONTENTS – Detailed (continued)

TABLES (continued)

VOLUME 3 of 5: Appendix D (D6 to D11)

D6 Hydrology (continued)

Table D6-4 Water Quality Results for Seven Storm Water/Spring Snowmelt
Samples Collected on 17 April 2007

Table D6-5 Monitor Well Data

Table D6-6 Water Level Data

Table D6-7a Horizontal Hydraulic Gradients

Table D6-7b Vertical Hydraulic Gradients

Table D6-8 1982 and 2006 Pump Test Results

Table D6-9a 2007 LC19M Long Term Pump Test Monitor Wells

Table D6-9b 2007 LC16M Long Term Pump Test Monitor Wells

Table D6-10a 2007 LC19M Long Term Pump Test Results

Table D6-10b 2007 LC16M Long Term Pump Test Results

Table D6-11 Summary of Aquifer Characteristics

Table D6-12a Groundwater Permits within One-Half Mile of the Permit Area

Table D6-12b Groundwater Permits within Three Miles of the Permit Area

Table D6-13 Lost Creek Project Groundwater Permits

Table D6-14 Baseline Water Quality Monitoring Parameters

Table D6-15a Analytical Results of Baseline Monitoring

Table D6-15b State and Federal Ground Water Quality Criteria for Specified
Parameters

Table D6-16 Distribution of Samples Exceeding EPA MCL for Radium
226+228

VOLUME 4 of 5: Appendix D (D7 to D11)

D7 Soils

Table D7-1 Soil Mapping Units

Table D7-2 Soil Suitability Ranges

D8 Vegetation

Table D8-1 Areal Extent of the Vegetation Types

Table D8-2 Vegetation Sampling Locations and Site Information

Table D8-3 Cover Parameters of the Upland Big Sagebrush Shrubland

Table D8-4 Shrub, Semi-Shrub, and Cactus Densities of the Upland Big
Sagebrush Shrubland

Table D8-5 List of Vegetation Species Observed

TABLE OF CONTENTS – Detailed (continued)

TABLES (continued)

VOLUME 4 of 5: Appendix D (D7 to D11) continued

- Table D8-6 Cover Parameters of the Lowland Big Sagebrush Shrubland
- Table D8-7 Shrub, Semi-Shrub, and Cactus Densities of the Lowland Big Sagebrush Shrubland
- Table D8-8 Prohibited and Restricted Noxious Weeds
- Table D8-9 Evaluation of Sample Adequacy

D9 Wildlife

- Table D9-1 Wildlife Species Observed or Potentially Occurring in the Permit Area
- Table D9-2 Relative Abundance of Big Game Observations
- Table D9-3 Sage Grouse Lek Counts
- Table D9-4 Raptor Nest Locations
- Table D9-5 T&E Wildlife Species Potentially Occurring in the Permit Area
- Table D9-6 Wildlife Species of Special Concern

D10 Background Radiological Characteristics

- Table D10-1 Soil Sampling and Correlation Grid Results
- Table D10-2 Gamma Exposure Rate Differences from Two NaI Detector Heights

VOLUME 5 of 5: Operations Plan and Reclamation Plan

OP Operations Plan

- Table OP-1a Summary of Environmental & Operational Monitoring - During Plant Construction, Mine Unit Development, & Related Site Development Activities
- Table OP-1b Summary of Environmental & Operational Monitoring - During Operations
- Table OP-1c Summary of Environmental & Operational Monitoring - During Restoration/Reclamation/Decommissioning Activities & Evaluation of Activities' Effectiveness
- Table OP-2 Itemized Calculations on the Areas of the Expected Disturbance
- Table OP-3 Culvert Sizing
- Table OP-4 Potentially Disturbed Acreage by Vegetation Type
- Table OP-5 Surface Activity Timing Restrictions for Protection of Wildlife
- Table OP-6 Water Balance Summary
- Table OP-7 Water Balance – Calculation Details
- Table OP-8 Baseline Water Quality Monitoring Parameters

TABLE OF CONTENTS – Detailed (continued)

TABLES (continued)

VOLUME 5 of 5: Operations Plan and Reclamation Plan (continued)

RP Groundwater Quality Restoration and Surface Reclamation

Table RP-1 Restoration Groundwater Quality Parameters

Table RP-2 Typical Specification Data for Removal of Ion Constituents

Table RP-3 Permanent Seed Mixture

Table RP-4 Reclamation/Restoration Bond Estimate

Table RP-5 Equipment and Tank List for Bond Estimate

TABLE OF CONTENTS – Detailed (continued)

PLATES

VOLUME 1 of 5: Adjudication Files

Appendix A Surface and Mineral Rights within the Lost Creek Permit Area

Plate A-1 Surface Owners of Record within Lost Creek Permit Area

Plate A-2 Uranium Mineral Owners of Record within Lost Creek Permit Area

Plate A-3 Oil and Gas Mineral Owners of Record within Lost Creek Permit Area

Appendix B Surface and Mineral Rights Adjacent to the Lost Creek Permit Area

Plate B-1 Surface Owners of Record within Half Mile Outside Permit Boundary

Plate B-2 Uranium Mineral Owners of Record within Half Mile Outside Permit Boundary

Plate B-3 Oil and Gas Mineral Owners of Record within Half Mile Outside Permit Boundary

Appendix C Tabulation of Lands

Plate C-1 Legal Land Description

Appendix E Right of Ways

Plate E-1 Location and Access

VOLUME 2 of 5: Appendix D (D1 to D5)

D5 Geology

Plate D5-1a Geologic Cross Section A-A'

Plate D5-1b Geologic Cross Section B-C

Plate D5-1c Geologic Cross Section C-D

Plate D5-1d Geologic Cross Section D-E

Plate D5-1e Geologic Cross Sections F-F'

Plate D5-1f Geologic Cross Sections G-G'

Plate D5-1g Geologic Cross Sections H-H'

Plate D5-2a Lost Creek Shale Isopach Map

Plate D5-2b HJ Sand Isopach Map

Plate D5-2c Sagebrush Shale Isopach Map

Plate D5-2d UKM Sand Isopach Map

TABLE OF CONTENTS – Detailed (continued)

PLATES (continued)

VOLUME 3a of 5: Appendix D (D6)

D6 Hydrology

Plate D6-1a Groundwater Permits within One-Half Mile of the Permit Area

Plate D6-1b Groundwater Permits within Three Miles of the Permit Area

VOLUME 4 of 5: Appendix D (D7 to D11)

D7 Soils

Plate D7-1 Soil Survey Mapping Units

VOLUME 5 of 5: Operations Plan and Reclamation Plan

OP Operations Plan

Plate OP-1 Plant Site Plan

TABLE OF CONTENTS – Detailed (continued)

ATTACHMENTS

VOLUME 1 of 5: Adjudication Files – No Attachments

VOLUME 2 of 5: Appendix D (D1 to D5)

- D3 Archaeological and Paleontological Resources
(separate volume – requesting WDEQ confidentiality)
- D5 Geology
 - Attachment D5-1 Typical Geophysical Logs
 - Attachment D5-2 Locations, Total Depths, and Completion Dates of
Historical Drill Holes
 - Attachment D5-3 Communication with WDEQ LQD related to Drill Hole
Abandonment

VOLUME 3a of 5: Appendix D (D6)

- D6 Hydrology
 - Attachment D6-1 Surface Water Quality Laboratory Results
 - Attachment D6-2a Evaluation of the LC19M Pump Test
 - Attachment D6-2b Evaluation of the LC16M Pump Test

VOLUME 3b of 5: Appendix D (D6)

- D6 Hydrology
 - Attachment D6-3 Well Completion Logs
 - Attachment D6-4 Groundwater Quality Laboratory Results

VOLUME 4 of 5: Appendix D (D7 to D11)

- D7 Soils
 - Attachment D7-1 Soil Survey Work Plan and Correspondence
 - Attachment D7-2 Field Notes/Soil Sample Point Photographs
 - Attachment D7-3 Laboratory Analysis
- D8 Vegetation
 - Attachment D8-1 Scope of Work
 - Attachment D8-2 Raw Data
 - Attachment D8-3 Sensitive Plant Probability

TABLE OF CONTENTS – Detailed (continued)

ATTACHMENTS (continued)

VOLUME 4 of 5: Appendix D (D7 to D11) continued

D9 Wildlife

Attachment D9-1 WGFD Wildlife Observations System Data

Attachment D9-2 Work Plan for Wildlife 2007

Attachment D9-3 BLM and WDEQ Correspondence

Attachment D9-4 MBHFI in Wyoming

D10 Background Radiological Characteristics

Attachment D10-1 Data Quality Assurance Documentation

Attachment D10-2 Data Quality Control Documentation

Attachment D10-3 Final Baseline Gamma Survey and Ra-226 Soil Maps

Attachment D10-4 HPIC-Adjusted Gamma Datasets

(Electronic Dataset Only)

VOLUME 5 of 5: Operations Plan and Reclamation Plan

OP Operations Plan

Attachment OP-1 UIC Class 1 Well Permit (to be provided)

Attachment OP-2 Specifications for Storage Ponds