



Denison Mines (USA) Corp.

Sunday Mines

**Environmental Assessment
CO-800-2007-104EA**

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Bureau of Land Management
Dolores Public Lands Office
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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION.....	1
1.1 Project Background.....	1
1.2 Report Organization.....	2
2.0 PROPOSED ACTION.....	3
2.1 Topaz Mine Expansion	4
2.2 Vent Holes (Topaz Mine Expansion and Sunday Mine Complex).....	6
2.3 Exploration Drilling.....	6
3.0 NO ACTION ALTERNATIVE	7
4.0 ALTERNATIVES CONSIDERED	8
5.0 PURPOSE AND NEED FOR THE ACTION	8
5.1 Purpose and Need	8
5.2 Decision to be Made	9
6.0 PLAN CONFORMANCE REVIEW.....	9
7.0 CONFORMANCE WITH STATUTES OR OTHER REGULATIONS.....	9
8.0 ENVIRONMENTAL IMPACTS.....	12
8.1 Elements Not Present.....	14
8.1.1 Farmlands, Prime and Unique.....	14
8.1.2 Floodplains.....	14
8.1.3 Wetlands and Riparian Zones	14
8.1.4 Wild and Scenic Rivers.....	15
8.1.5 Wilderness/Wilderness Study Area (WSA).....	15
8.1.6 Woodland/Forestry	15
8.1.7 Fuels/Fire Management	16
8.1.8 Wild Horses and Burros.....	16
8.1.9 Wilderness Characteristics.....	16
8.2 Elements Present But Not Affected	16
8.2.1 Areas of Critical Environmental Concern.....	17
8.2.2 Environmental Justice.....	17

8.2.3	Native American Religious Concerns.....	18
8.2.4	Threatened, Endangered, and Sensitive Species.....	19
8.2.5	Migratory Birds.....	20
8.2.6	Wastes.....	21
8.2.7	Ground Water.....	21
8.2.8	Surface Water.....	27
8.2.9	Rangeland Health Standards and Guidelines.....	29
8.2.10	Vegetation.....	30
8.2.11	Livestock Grazing.....	30
8.2.12	Wildlife (Other than TE&S).....	31
8.2.13	Recreation.....	32
8.2.14	Soils/Watershed.....	33
8.2.15	Visual Resources.....	34
8.2.16	Lands/Access.....	35
8.2.17	Transportation.....	36
8.3	Present and Affected Elements.....	40
8.3.1	Critical Elements.....	40
8.3.2	Non-Critical Elements.....	52
9.0	CUMULATIVE IMPACTS.....	62
9.1	Past, Present, and Reasonably Foreseeable Future Actions.....	62
9.2	Air Quality.....	64
9.3	Cultural Resources and Paleontology.....	64
9.4	Invasive Non-Native Species.....	65
9.5	Geology and Minerals.....	65
9.6	Socioeconomics.....	65
9.7	Transportation.....	65
9.8	Public Health and Safety.....	66
10.0	RESIDUAL IMPACTS.....	66
10.1	Irreversible Commitments.....	67
10.2	Irretrievable Commitments.....	67
11.0	PERSONS AND AGENCIES CONSULTED.....	67
12.0	REFERENCES.....	69

TABLES

<u>Table</u>	<u>Page</u>
Table 1: Existing and Proposed Surface Disturbance.....	4
Table 2: Summary of Required Permits and Approvals	11
Table 3: Critical and Non-Critical Elements	13
Table 4: Projected Maximum Air Emissions (Tons per Year)	42
Table 5: PM10 Dispersion Modeling Results (micrograms per cubic meter of air).....	45
Table 6: Persons and Agencies Consulted.....	67

FIGURES

Figure

1	Project Location Map
2	Sunday Mines Map
3	Underground Mine Workings
4	Proposed Surface Facility Map
5	Exploration Drilling Density Map

APPENDICES

Appendix

A	Operational Measures
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1.0 INTRODUCTION

This Environmental Assessment (EA) has been prepared for the Plan of Operation (POO) (Tetra Tech 2008) for expanding existing operations at the Topaz Mine and adding vent holes and exploration drilling at the Sunday Mines (Proposed Action). This EA meets the requirements of the National Environmental Policy Act of 1969 (NEPA) for amended resource baselines and clearances for the project.

The Topaz Mine POO is referenced throughout this EA. This POO is available for review at the San Juan Public Lands Center and Dolores Public Lands Office.

The following sections discuss the project background and report organization.

1.1 PROJECT BACKGROUND

The Sunday Mines are underground uranium and vanadium mines located in Big Gypsum Valley southwest of the town of Naturita, in San Miguel County, Colorado. The Sunday Mines consist of five operating mines: the Topaz, Sunday, West Sunday, Carnation, and St. Jude Mines. Specifically, the Mines are located in Sections 10, 11, 13 through 15, and 22 through 26, Township 44 North, Range 18 West, New Mexico Principal Meridian, San Miguel County, Colorado (see Figure 1).

The Sunday Mines are located on U.S. Department of the Interior (DOI) Bureau of Land Management (BLM) land. Denison Mines (USA) Corp. (the Operator) currently holds claim rights and permitting responsibility for the Sunday Mines. Currently, the Sunday, St. Jude, and Carnation Mines (collectively referred to as the Sunday Mine Complex) fall under one POO, BLM Case No. COC 53227. The West Sunday Mine falls under a second POO, BLM Case No. COC 52049.

The Operator submitted the Topaz Mine POO (BLM Amendment Case No. COC 07-1A to COC 53227) to incorporate the expansion of the Topaz Mine and other included activities with the existing POOs for the Sunday, St. Jude, Carnation and West Sunday Mines. The Topaz Mine POO is on file at the San Juan Public Lands Center and the Dolores Public land Office.

The Sunday Mines were historically owned and operated by separate entities. As a result, the Operator currently holds the following five reclamation bonds with the Colorado Division of Reclamation Mining and Safety (DRMS) and the BLM for the Sunday Mines:

- Topaz Mine (M-1980-055HR)
- Sunday Mine (M-1977-285)
- West Sunday Mine (M-1981-021)
- St. Jude Mine (M-1978-039HR)
- Carnation Mine (M-1977-416)

Historical maps of the area show the Sunday Mines were in existence in the 1950s. They were permitted with DRMS after 1978, as required. Figure 2 shows the existing Sunday Mines and roadway features. Existing features at the Sunday Mines include adits to the underground workings at all mines, roads, waste rock areas, offices, maintenance shops, designated parking areas, buried water tanks, drill water tank, 1,000-gallon diesel fuel tank, topsoil stockpiles, electric power line and electrical switch gear, air compressor and receiver tank, mobile storage boxes, septic tank, and diversion channels and culvert.

Certain roads shown on Figure 2 have existed since before 1981. In 1981, BLM regulations for surface management of mineral development, authorized under the 1872 Mining Law (43 CFR 3809), were promulgated. The roads that were in place before 1981 have remained unreclaimed from previous historical operations because they were in place before 43 CFR 3809 was promulgated. Since 1981, all exploration or development activities of locatable minerals on lands administered by the BLM are subject to these regulations, including reclamation.

The Sunday Mines are located within a sequence of sedimentary rocks, including sandstone, conglomerate, siltstone and shale units. The sandstone rock unit hosting the ore body from which production at the mines occurs is the Salt Wash Member of the Morrison Formation. Accordingly, the mines have been developed among this common mineralized system, with some interconnected underground workings (see Figure 3). The proposed expansion of the Topaz Mine, additional vent holes, and exploration drilling described in the POO would follow this common mineralized system.

Operations at the Sunday Mines include underground mining operations, waste rock placement, temporary ore storage, transportation of ore to the White Mesa Mill, water supply and use, chemical storage, dust control, and light equipment maintenance. These operations, as performed at the Topaz Mine, are further described in detail in the POO and this EA. Currently, approximately 54 people are employed at the Sunday Mines.

1.2 REPORT ORGANIZATION

Besides this introduction, this report consists of the following sections:

- Section 2.0, Proposed Action
- Section 3.0, No Action Alternative
- Section 4.0, Alternatives Considered
- Section 5.0, Purpose and Need for the Action
- Section 6.0, Plan Conformance Review
- Section 7.0, Conformance with Statutes or Other Regulations
- Section 8.0, Environmental Impacts
- Section 9.0, Cumulative Impacts
- Section 10.0, Residual Impacts
- Section 11.0, Persons and Agencies Contacted
- Section 12.0, References

Tables appear embedded in text or on the page after the text that first refers to the table. Figures are included after the References section. Appendix A lists the Operator's operational measures. The following documents are related to the EA and are available for review at the BLM San Juan Public Lands Center and the Dolores Public Lands Office:

- POO
- Air Attachments (applications and permits)
- Cultural Resources Reports
- Stormwater Discharge Permit Certification
- Biological Reports
- Denison Bat Policy Letter
- San Miguel County Septic System Permit
- General Purpose Water Well Permit Application
- BLM Range Allotment Map
- Locations and Descriptions of the Soil Mapping Units
- Key Observation Points and Visual Resources Photographic Log

2.0 PROPOSED ACTION

The Topaz Mine POO is considered to be the Proposed Action and meets the need of the Operator's proposal.

Proposed activities at the Sunday Mines, as described in the POO, consist of the following:

Topaz Mine (Expansion)

- Rehabilitating existing mine workings
- Extending underground declines
- Expansion of the waste rock area (WRA) at the mine portal an additional 200 feet north
- Re-establishing mine ventilation through the addition of three (3) new vent holes over the next 5 years

Sunday Mine Complex (Vent Holes)

- Establishing mine ventilation through the addition of four (4) new vent holes over the next 5 years

Exploration Drilling

- Exploration drilling within the Sunday Mines claim areas

Figure 4 shows the expanded WRA and facilities at the Topaz Mine portal. Figure 5 shows the area and drilling density of proposed exploration drilling. The Operator processes ore from all five of the Sunday Mines at its licensed and active uranium mill

near Blanding, Utah. No ore processing activities would occur at any of the five Sunday Mines.

Table 1 summarizes the existing and proposed areas of disturbance at the Sunday Mines, which are described in detail in the Topaz Mine POO.

Table 1: Existing and Proposed Surface Disturbance

Description	Proposed Disturbance Area (acres) ⁽¹⁾		
	Existing Area	Expanded Area	Proposed Total Area
Topaz Mine	8.30	4.55	12.85
Sunday Mine Complex ⁽²⁾	57.09	3.30	60.39
West Sunday Mine	12.11	0.0	12.11
Total	77.5	7.85	85.35
Exploration Drilling ⁽³⁾		10	10

Notes:

- (1) All surface disturbances, including surface facilities, vent holes, and access roads
- (2) The Sunday Mine Complex permit area includes the Sunday, St. Jude, and Carnation Mines.
- (3) Exploration drilling would occur at the Sunday Mines in conjunction with mining activities, and drill sites and access roads would be concurrently reclaimed after drilling activities. Exploration disturbance may result in total maximum disturbance (pads and roads) of up to 10 acres at any given time.

Each proposed activity is discussed in further detail below.

2.1 TOPAZ MINE EXPANSION

The Topaz Mine would be developed to ultimately support a maximum ore production rate of about 5,000 to 6,000 tons per month. Current production from all Sunday Mines, including the Topaz Mine, is approximately 5,000 to 6,000 tons per month. Ore production at the Topaz Mine is expected to take place at various rates over a period of approximately 20 years. The Operator estimates that a maximum of 72,000 tons of ore would be produced annually from the Topaz Mine. The Operator estimates that a maximum of 142,000 tons of ore may be mined per year from the remaining four mines (Sunday, West Sunday, St. Jude, and Carnation). The POO previously released for public review stated a production rate of 120,000 tons per year. The POO has been changed to reflect the correct production rate of 142,000 tons per year for the 4 mines.

An ore stockpile density of 130 pounds per cubic foot (lbs/ft³) was assumed to convert tonnage to cubic yards. Based on previous mining in the Sunday Mine Complex, the Operator assumes an average waste-to-ore ratio of 1:2 for mine production. The Operator expects the waste-to-ore ratio to be higher during development of the decline and laterals (up to 1:1) and expects this ratio to decrease during later production, resulting in the generation of less waste rock.

Expansion of the existing WRA and related facilities is required at the Topaz Mine portal area to support the expanded Topaz Mine operations. Figure 4 shows the expanded WRA and related facilities. These proposed related facilities include the following:

- Proposed topsoil stockpile area
- Ore stockpile area (OSA)
- Catchment
- Modified drainage channels
- Modified/relocated berms
- Mine access roads
- Solid waste container/roll-off container

These facilities are discussed in detail in Section 4 of the Topaz Mine POO.

As described in Section 4.4.2 of the POO and shown in Figure 4, additional surface disturbance at the mine portal resulting from the Topaz Mine expansion would be associated with the expanded WRA footprint (including proposed topsoil stockpile area, catchment, and berms) and modified storm water drainage channels. The OSA, solid waste container, buildings, electrical hookups, and other existing support facilities would be located on the WRA, as shown in Figure 4. Additional surface disturbance from the Topaz Mine expansion would be associated with additional vent holes to accommodate the expanded operations and access roads to these vent holes (see discussion of vent holes, below).

Section 4 of the POO also includes a discussion of committed practices, which include, among other described operational practices:

- Control of air emissions (e.g., dust control)
- Stormwater management and erosion and sediment control
- Oil spill prevention and containment
- Growth media salvage and storage
- Weed monitoring and control

BLM met with the Operator to discuss these operational practices to minimize effects from mining operations at the Sunday Mines. The Operator incorporated all of BLM's recommended actions as described in this EA.

Following completion of mining activities, reclamation of the Topaz Mine would be conducted in accordance with the Colorado Mined Land Reclamation Act and the BLM land use laws as dictated by 43 CFR 3809. Reclamation is discussed in detail in Section 5 of the POO. As described in Section 5 of the POO, the Operator would complete concurrent reclamation as directed by 43 CFR 3809 at all five of the Sunday Mines whenever possible and practical. The Operator's approved reclamation plan addresses, among other items:

- Post mining land use and reclamation goals
- Post mining contours and topography
- Reclamation of waste rock area
- Road reclamation
- Disposition of buildings and ancillary facilities
- Reclamation of underground mine (closure of vent holes and portals)
- Exploration drill hole plugging

As previously stated, there would be no processing activities on site; all the ore would be transported to the White Mesa Mill near Blanding, Utah. Based on the estimated maximum of 72,000 tons of ore mined per year from the Topaz Mine, and using 22-ton haul trucks, the Operator's haul contractor would make approximately 12 trips to the mill each day from the Topaz Mine, assuming a 5-day work week. Based on the estimated maximum of 214,000 tons of ore mined per year from the five Sunday Mines, and using 22-ton haul trucks, the Operator's haul contractor would make a maximum of 34 round trips to the mill each day from the five Sunday Mines, assuming a 5-day work week. The Operator estimates an average of 22 to 26 trucks per day and that hauling would generally occur during off peak hours (early morning and late evening) Monday through Friday with an occasional Saturday.

2.2 VENT HOLES (TOPAZ MINE EXPANSION AND SUNDAY MINE COMPLEX)

The exact locations of the vent holes cannot be specified at this time because the locations must be sited to intersect the mine workings in areas where ventilation is required. The location of mine workings would be dependant on the results of the proposed exploration drilling. Although the vent hole locations cannot be specified at this time, the final vent hole locations would fall within the areas in which resource surveys were conducted under this EA. As described in Section 4.4.2 of the approved POO, pads for the three vent holes and associated access roads required for the expanded Topaz Mine operations would account for 2.05 of the proposed 4.5 acres of additional surface disturbance associated with the expanded Topaz Mine. Additional surface disturbance for the other four vent holes and associated access roads required for operations at the Sunday Mine Complex would total 3.3 acres.

2.3 EXPLORATION DRILLING

In any given year, surface exploration drilling may not be required to support mining activities at the Sunday Mines, and in other years as many as 60 surface exploration holes would be drilled. The number of holes drilled in a year would be based on drilling campaign results. The Operator would have no more than 60 exploration sites unreclaimed at any given time. The total disturbed acreage associated with an exploration hole and its access road depends on the location of the individual hole. The Operator anticipates that, at most, up to 10 acres of surface disturbance would be present or undergoing reclamation at any given time.

Exploration drilling within the Sunday Mines claim areas would take place concurrently with mine operations. Exploration would be conducted in areas of low, medium, and high drilling density, depending on local ore occurrences. Figure 5 shows the expected drilling density in areas proposed for exploration drilling. Drilling in low-density areas would likely be conducted at 500-foot centers, but could be conducted with centers as close as 200 feet apart. In areas where encouraging geology is encountered (likely medium-density areas), drilling would be conducted at less than 200-feet, but greater than 100-foot centers. Where ore grade mineralization is encountered (likely high-density areas), drill holes would be placed at 100-foot centers on average and, in some cases, using drill holes placed as close as 25 feet apart.

Existing roads would be used wherever possible during exploration drilling. Portions of existing roads, drill sites, and other areas requiring earthwork to accommodate drilling operations would be considered disturbed areas. Reclamation would occur after a drilling campaign, and it is anticipated that all disturbance created by exploration drilling in a given year would be reclaimed within that same year. Reclamation of exploration drilling surface disturbance would be considered complete when earthwork and other surface stabilization measures (e.g., vegetation establishment) meet BLM standards. Successful revegetation would be dependent on weather conditions, with successful revegetation typically taking a minimum of 3 years or sometimes longer to complete. Annual reports would be completed and submitted to the BLM documenting the locations and acreage of existing disturbances, completed earthwork, and completed reseeding and reclamation activities.

All exploration would be conducted under a state-wide prospecting bond compliant with the Colorado Mined Land Reclamation Act and BLM bonding requirements at Title 43 of the CFR, Part 3800. The Operator has posted a statewide bond with the DRMS and BLM to cover any proposed drilling activity.

Exploration activities are driven by the market price for uranium, which has fluctuated throughout the last 20 years. The duration of exploration activities is unknown because it depends on the supply and demand for uranium. However, the Operator would evaluate exploration drilling activities with the BLM in annual reports and every 5 years.

3.0 NO ACTION ALTERNATIVE

A No Action Alternative is evaluated in order to provide a benchmark that would enable the decision-maker to compare the magnitude of environmental effects of different alternatives to existing management conditions. Consideration of the No Action Alternative is required by 40 CFR 1502.14(d). Although the BLM cannot deny the development of a claim, individual actions can be denied to prevent unnecessary and undue degradation.

Under the No Action Alternative, the Proposed Action would not occur. A decision for the No Action Alternative would mean that rehabilitation of existing mine workings, extension of underground declines, expansion of the WRA, establishment of vent holes for worker health and safety, and exploration drilling would not occur at the Sunday

Mines. Current mining operations at all the Sunday Mines would continue under two previously approved POOs, BLM case numbers COC 53227 and COC 52049. These operations would continue until such time as additional vent holes would be required for worker health and safety. As described in the approved POO, the Operator has reclamation permits and has posted reclamation bonds with the BLM and DRMS for all the Sunday Mines. Following cessation of mining operations, all the Sunday Mines would be reclaimed as discussed in the approved POO.

Unpatented mining claims on BLM lands grant the right to the claim holder to occupy a reasonable amount of surface for the extraction of minerals. The Federal Land Policy and Management Act (FLPMA) defines BLM's mission as one of multiple-use and identifies mineral development, wildlife, recreation, rights-of-way, and livestock grazing as principal or primary uses of public lands. Selection of the No Action Alternative is generally contrary to the BLM's statutory requirements.

4.0 ALTERNATIVES CONSIDERED

The EA for the Topaz Mine POO focuses on only two alternatives: the Proposed Action and the No Action Alternative. The No Action Alternative is considered and analyzed to provide a baseline for comparison of impacts from the Proposed Action.

Generally, alternatives need not be analyzed if they do not meet the underlying need for the Operator's proposal, resolve conflicts, mitigate impacts, or create impacts greater than the Proposed Action. The Proposed Action as identified in the Topaz Mine POO meets the need of the proposal. The Topaz Mine POO outlines operational measures to resolve conflicts and eliminate or reduce potential impacts. BLM's role is to regulate the development of the proposed mining activities. Within this framework, there are no reasonable alternatives that would allow for the extraction of uranium ore in lieu of mine development.

5.0 PURPOSE AND NEED FOR THE ACTION

5.1 PURPOSE AND NEED

The Proposed Action is the extraction of uranium ore from the BLM unpatented mining claims in accordance and in compliance with applicable BLM regulations (Federal Mining Law at 43 CFR, Subpart 3809, "Surface Management") and DRMS rules and regulations. The BLM is considering this proposed project to allow for the development and production of uranium ore in accordance with the BLM multiple-use mandate and the goals and objectives of the Energy Policy Act of 2005 (Public Law 109-58).

The BLM is responsible for administering mineral rights access on certain federal lands as authorized by the General Mining Law of 1872. Under the law, qualified prospectors are entitled to reasonable access to mineral deposits on public domain lands which have not been withdrawn from mineral entry.

The purpose of BLM is to implement the Federal Land Policy Management Act (FLPMA). FLPMA directs that BLM manage public lands on the basis of multiple use (Title 43 of the *United States Code* [U.S.C.], Section 1701[a] [7]). Minerals are identified as one of the principal uses of public lands in Section 103 of FLPMA (43 U.S.C., Section 1702[c]). The need is to ensure that mining operations are conducted in a manner that would not result in undue or unnecessary degradation.

5.2 DECISION TO BE MADE

BLM would determine under what terms and conditions the Proposed Action may be conducted to ensure that unnecessary or undue degradation would not occur.

6.0 PLAN CONFORMANCE REVIEW

The Proposed Action is subject to and has been reviewed by the BLM for conformance with the following area RMP (43 CFR 1610.5, BLM 1617.3):

- Plan:** “San Juan/San Miguel Planning Area Resource Management Plan, U. S. Department of the Interior”
- Date Final:** September 1985
- Page:** The Record of Decision for the RMP states on page 17: “BLM actively encourages and facilitates the development by private industry of public land mineral resources so that national and local needs are satisfied and economically and environmentally sound exploration, extraction, and reclamation practices are provided.”

The Proposed Action would fulfill the objective and intent of the RMP that public land mineral resources be developed in an environmentally sound manner. Therefore, the Proposed Action is in conformance with the RMP.

7.0 CONFORMANCE WITH STATUTES OR OTHER REGULATIONS

This EA has been prepared under the authority of NEPA and federal regulations at 40 CFR, Parts 1500 through 1508. The Proposed Action is consistent with federal, state, and local laws and regulations. The Proposed Action also is consistent with BLM’s Colorado Rangeland Health Standards and Guidelines and does not affect any tribal lands held in trust for the tribes by the federal government.

More than three dozen federal environmental laws and regulations apply to all aspects of mining. In addition, each state has laws and regulations that mining companies must follow. The following laws and regulations are most relevant to the Proposed Action:

- **Surface Resources Act at 43 CFR, Subpart 3715** – regulates residency or seasonal occupancy of mining claims by mining claimants, and requires

occupancy to be authorized by the proper BLM field office through a notice or POO

- **Federal Mining Regulation at 43 CFR, Subpart 3809, Surface Management** – requires proper permits and authorizations for mineral exploration mining and for reclamation actions on public lands administered by the BLM
- **National Environmental Policy Act** – requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of Proposed Actions and reasonable alternatives to those actions
- **Colorado Mined Land Reclamation Act** – requires mine permitting, reclamation plans, assessment of impacts through designated mining operations evaluation, and bonding requirements
- **Federal Land Policy and Management Act** – requires the prevention of undue and unnecessary degradation of federal lands
- **Clean Air Act** – authorizes the U.S. Environmental Protection Agency (EPA) to set air quality standards and limits on air emissions from sources such as factories and mills
- **Federal Water Pollution Control Act (Clean Water Act)** – directs standards to be set for surface water quality and for controlling discharges to surface water
- **Solid Waste Disposal Act** – regulates the generation, storage, and disposal of hazardous waste and management of solid non-hazardous waste
- **Comprehensive Environmental Response, Compensation, and Liability Act** – requires owners/operators to report releases of hazardous substances to the environment and to inventory chemicals handled
- **Toxic Substances Control Act** – requires regulation of chemicals that present risk to human health or the environment
- **Endangered Species Act** – mandates protection for plants and animals that are listed as threatened or endangered
- **Migratory Bird Treaty Act** –protects migratory bird species

Other laws that impact mining include the following:

- Rivers and Harbors Act
- Mining Law of 1872
- National Historic Preservation Act
- Law Authorizing Treasury’s Bureau of Alcohol, Tobacco and Firearms to Regulate Sale, Transport and Storage of Explosives
- Federal Mine Safety and Health Act

Table 2 below lists known federal, state, and local approvals and permits required for the Proposed Action identified by type and entity. All required permits and approvals have been or would be issued in the Operator’s name.

Table 2: Summary of Required Permits and Approvals

Permit or Approval	Entity
Air Quality Emissions Permits (07SM1140 and 07SM1141F)	Colorado Department of Public Health and Environment (CDPHE) Division of Air Quality
Well Permit (66209-F)	Office of the State Engineer, Colorado Division of Water Resources
Hard Rock/Metal Mining Regular Operation (112) Reclamation Permit (M-1980-055HR) – Topaz Mine	Colorado DRMS
Hard Rock/Metal Mining Regular Operation (112) Reclamation Permit Amendment (M-1977-285) – Sunday Mine	Colorado DRMS
Hard Rock/Metal Mining Regular Operation (112) Reclamation Permit Amendment (M-1981-021) – West Sunday Mine	Colorado DRMS
Hard Rock/Metal Mining Limited Impact Operation (110) Reclamation Permit Amendment (M-1978-039 HR) – St. Jude Mine	Colorado DRMS
Hard Rock/Metal Mining Limited Impact Operation (110) Reclamation Permit Amendment (M-1977-416) – Carnation Mine	Colorado DRMS
National Emissions Standards for Hazardous Air Pollutants, Title V	EPA
Colorado Discharge Permit System (CDPS) General Permit, Stormwater Discharge (COR 040223)	CDPHE Water Quality Control Division
Septic System Permit 97024S	San Miguel County Department of Building and Health
San Miguel County Special Use Permit 1997-18, Updated Resolution 2007-34	San Miguel County (currently being amended)
San Miguel County Road Use Permit for County Road 20R	San Miguel County (currently being amended)
POO/Decision Record	BLM

8.0 ENVIRONMENTAL IMPACTS

The affected environment of the Proposed Action and No Action Alternative was considered and analyzed by an interdisciplinary team of BLM resource specialists. Table 3, below, summarizes the critical and non-critical elements and the conclusions of the resource specialists regarding which elements of concern are (1) not present in the project area, (2) present but not affected by the Proposed Action to a degree that requires detailed analysis and (3) present and affected. “Critical Elements of the Human Environment” (critical elements) are subject to requirements specified by statute, regulation, or executive order, and must be considered in all EAs.

The San Juan Public Lands Center (SJPLC), Dolores Public Lands Office (DPLO), and the Authorized Officer have made determinations regarding the status of each element. DPLO and SJPLC resource specialists and the Authorized Officer have reviewed the information in this document and concur with the findings summarized in Table 3 and described in the following sections. Section 8.1 briefly discusses the elements listed in Table 3 as “Not Present.” Section 8.2 discusses the critical elements listed as “Present but Not Affected” and Section 8.3 discusses elements listed as “Present and Affected.”

Table 3: Critical and Non-Critical Elements

Element	Not Present	Present but Not Affected	Present and Affected
Critical Elements			
Air Quality			X
Areas of Critical Environmental Concern (ACEC)		X	
Environmental Justice		X	
Cultural Resources			X
Farmlands, Prime and Unique	X		
Floodplains	X		
Invasive Non-Native Species			X
Native American Religious Concerns		X	
Threatened, Endangered, and Sensitive Species (TE&S)		X	
Migratory Birds		X	
Wastes		X	
Surface and Ground Water		X	
Wetlands and Riparian Zones	X		
Wild and Scenic Rivers	X		
Wilderness/Wilderness Study Area (WSA)	X		
Non-Critical Elements			
Rangeland Health Standards and Guidelines		X	
Livestock Grazing		X	
Woodland/Forestry	X		
Vegetation		X	
Wildlife (Other than TE&S)		X	
Recreation		X	
Soils/Watershed		X	
Visual Resources		X	
Geology, Mineral Resources, and Energy Production			X
Paleontology			X
Lands/Access		X	
Fuels/Fire Management	X		
Socioeconomics			X
Wild Horses and Burros	X		
Wilderness Characteristics	X		
Transportation		X	
Public Health and Safety			X

8.1 ELEMENTS NOT PRESENT

Elements that BLM resource specialists found to not be present in the project area are discussed briefly below. For the Proposed Action, those elements include:

- Farmlands, Prime and Unique
- Floodplains
- Wetlands and Riparian Zones
- Wild and Scenic Rivers
- Wilderness/Wilderness Study Area
- Woodland/Forestry
- Fuels/Fire Management
- Wild Horses and Burros
- Wilderness Characteristics

8.1.1 Farmlands, Prime and Unique

According to the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) internet site, the area of the Sunday Mines does not qualify as prime or unique farmland (NRCS 2007b).

8.1.2 Floodplains

Flood hazard or risk to human safety within the project area is not likely. Floodplains in the vicinity of the Sunday Mines are associated with Gypsum Creek, Nicholas Wash, and the Dolores River. The closest floodplain to the proposed area of surface disturbances is associated with Gypsum Creek and is located about 0.4 mile northeast of the north end of the Topaz Mine portal access road. The elevation of the floodplain is at least 200 feet lower than the portal, vent holes, and exploration holes.

Stormwater runoff at the project area would be managed in conformance with CDPHE stormwater requirements (Tetra Tech 2007a; CDM 2008; and URS 2007) and controlled using diversion channels, berms, and a catchment basin. Mine facilities would be protected from flooding using engineered structures and drainage systems. The elevation of the vent holes and exploration holes is higher than the floodplain, and they would be protected using BLM-recommended BMPs for mining and exploration activities (Tetra Tech 2007a). Considering these mitigation measures, floodplains would not be impacted by the Proposed Action.

8.1.3 Wetlands and Riparian Zones

No springs, wetlands, or riparian areas were observed within areas surveyed in May 2007 (see Attached Biological Reports). Two ephemeral ponds in the project area contained water, but no riparian or wetland features were observed. Channels within the Topaz Mine permit area contain water only during short, intense storms typical in the region. Based on the absence of water bodies and hydrophytic vegetation, no potential wetlands or riparian areas were identified within the project area.

8.1.4 Wild and Scenic Rivers

No BLM-designated Wild and Scenic Rivers are located in the project area. The closest Wild and Scenic River is the Rio Chama River, which is about 250 miles southeast of the Topaz Mine site below El Vado Lake in northern New Mexico. Other Wild and Scenic Rivers in the region include the Rio Grande River located about 350 miles southeast, the Cache La Poudre River located about 400 miles northeast, and the Verde River located about 430 miles southwest of the project area. The “San Juan Public Lands Draft Land Management Plan” (BLM 2007) proposes portions of the Dolores River as a Wild and Scenic River. The section of the river closest to the Topaz Mine, the 12 mile Summit Canyon section, is proposed to have a ‘recreation’ designation. This section of river is approximately 2 miles from the Topaz Mine at the closest point if measured directly, and about 2.5 miles measured along the Big Gypsum Valley stream. Immediately upstream of the Summit Canyon section of the river is a section of river designated as ‘scenic’. Downstream of the Summit Canyon section is the 7.6 mile Coyote Wash section which has been proposed for a ‘wild’ designation. This section is four miles from the project at the closest point.

Based on the distance of mining operations to the nearest designated or proposed Wild and Scenic River, no such rivers would be affected by the Proposed Action.

8.1.5 Wilderness/Wilderness Study Area (WSA)

The area of the Sunday Mines surface facilities, vent holes, and exploration drilling (specifically Big Gypsum Valley and Big Gypsum Ridge) is not currently designated as a Wilderness Area or WSA by BLM, and there are no known proposals to change their status. The closest wilderness areas to the Topaz Mine are the Lizard Head Wilderness Area of Colorado, located 66 miles to the east – southeast; Mt. Sneffels Wilderness Area, located 70 miles east; and the Dark Canyon Wilderness area of Utah, located 70 miles east. Wilderness/Wilderness Study Areas would not be affected by the Proposed Action.

8.1.6 Woodland/Forestry

The project area contains 15 to 16 percent vegetation cover. Vegetation surveys within the Sunday Mines area identify two distinct vegetative compositions within the project area: steep hillsides and valley floors. The valley floor vegetation composition does not contain woodland areas. The steep hillsides contain 16 percent vegetation cover, of which 10 percent was identified as Pinyon-Juniper Woodlands. The Pinyon-Juniper Woodlands areas are the only areas considered as woodland/forestry areas (Tetra Tech 2007b).

Only a small percent of the project area is considered a woodlands area, and this area is limited to steep hillsides where disturbances are not expected to occur. Further, the Operator would avoid the removal of trees as a standard practice wherever possible. Most roads are existing, so tree removal would be minimal for road construction purposes. Based on survey findings, the location of the woodlands area, and the

Operator's standard practices, the Proposed Action would not impact merchantable timber.

8.1.7 Fuels/Fire Management

As discussed under Woodland/Forestry, above, the project area contains 15 to 16 percent vegetation cover. Vegetation surveys within the Sunday Mines area identify two distinct vegetative compositions within the project area: steep hillsides and valley floors. The valley floor vegetation composition does not contain woodland areas. The steep hillsides contain 16 percent vegetation cover, of which 10 percent was identified as Pinyon-Juniper Woodlands. (Tetra Tech 2007b).

The project area is not currently used for firewood collection or other forest-related product production. Based on the nature of the proposed activities, the Proposed Action would not affect the risk of wildfire.

8.1.8 Wild Horses and Burros

Based on conversations with BLM personnel, the project area is not within an active wild horse or burro area.

8.1.9 Wilderness Characteristics

No lands inventoried or evaluated by BLM possess wilderness characteristics in the Sunday Mines area.

8.2 ELEMENTS PRESENT BUT NOT AFFECTED

Elements present, but not affected are discussed in this section. For the Proposed Action, those elements include:

- Areas of Critical Environmental Concern
- Environmental Justice
- Native American Religious Concerns
- Threatened, Endangered, and Sensitive Species
- Migratory Birds
- Wastes (waste rock and solid waste)
- Ground Water
- Surface Water
- Rangeland Health Standards and Guidelines
- Vegetation
- Livestock grazing
- Wildlife (Other than TE&S)
- Recreation
- [Soils / Watershed](#)
- Visual Resources
- Lands/Access
- Transportation

The Operator has submitted a POO that contains design criteria and best management practices (BMP) (operational measures) to protect resources. These operational measures are adequate to eliminate or reduce impacts to a negligible level that does not require detailed analysis for elements identified as present but not affected. These operational

measures are discussed under the affected environment for each respective element and are also summarized in Appendix A, Operational Measures.

8.2.1 Areas of Critical Environmental Concern

Affected Environment: Currently, no lands designated as ACECs are located within or adjacent to the project area. Big Gypsum Valley is proposed as an ACEC in the San Juan Public Lands Draft Land Management Plan” (BLM 2007a). However, the proposed Big Gypsum Valley ACEC is located adjacent to the project area in Sections 10, 11, and 13. Important values of the Big Gypsum Valley ACEC include occurrences of two plants: Gypsum Valley cat-eye and the lichen *Lecanora gypsicola*, both of which are critically imperiled at the State (S1) and Global (G1) levels. In addition, Neally’s needle grass is present, a Globally Secure (G5) but Critically Imperiled in Colorado (S1) species. The area also contains sensitive and easily damaged gypsiferous soils that support these and other plants and a diverse cryptobiotic soil community.

Environmental Consequences of Proposed Action: The proposed ACEC is located on the northeastern side of Big Gypsum Valley, and the Sunday Mines are located on the southwestern side of the valley. Surveys in the project area revealed no occurrence of the critical plant species. Therefore, the Proposed Action would not affect the proposed Big Gypsum Valley ACEC.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. As with the Proposed Action, there would be no affect on ACECs under the No Action Alternative.

Mitigating Measures: BMPs have been incorporated into the Proposed Action to minimize potential impacts. No mitigating measures are required.

8.2.2 Environmental Justice

Affected Environment: Two criteria are evaluated to determine if environmental justice effects are present: 1) the presence of minority and/or low-income populations in a potentially affected community and 2) if any environmental effects fall disproportionately on these minority and/or low income populations and/or tribal resources. The Sunday Mines are located on the western side of San Miguel County, which is considered an economically depressed area (Belt 2008). Minorities in San Miguel County make up 6.4 percent of the population, and in Dolores County they make up 4.7 percent of the population (U.S. Census Bureau 2007).

The nearest town to the Sunday Mines is Naturita, which is about 18 miles from the Sunday Mines. Current mine employees include Native Americans (3), Hispanic (1) and Caucasian (approximately 50).

Environmental Consequences of Proposed Action: Given the location of the Sunday Mines in relation to the nearest population center, the Proposed Action would not affect any population centers. Considering employment demographics, the Proposed Action

would not result in a disproportionately high and adverse human health or environmental impact on minority populations, low-income populations or Indian Tribes.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. As with the Proposed Action, there would be no effect on Environmental Justice under the No Action Alternative.

Mitigating Measures: BMPs have been incorporated into the Proposed Action to minimize potential impacts. No mitigating measures are required.

8.2.3 Native American Religious Concerns

Affected Environment: The Sunday Mines are located on public lands administered by the BLM. The Ute Mountain Indian Reservation and Mesa Verde National Park are located about 56 miles south of the Sunday mines. These areas would not be impacted by the Proposed Action because the mining operations would not use the Ute Mountain Indian Reservation or Mesa Verde National Park roads, nor interfere with reservation or park lands.

The Class III inventories completed to date within the project area do not document any Traditional Cultural Properties or sacred sites specific to Native American Tribes. However, past consultations with the Ute Tribes have revealed the presence of culturally sensitive types of sites in the Disappointment Valley and Gypsum Valley regions. Specific sites of cultural concern to the Ute Tribes that lie in the region and, therefore, may lie within the un-inventoried portions of the project area that have not been documented to date may include ancestral burial sites, shrines, rock art sites, trails and trail markers, wickiups, and peeled trees.

The BLM DPLO initiated a formal tribal consultation with the Southern Ute Tribe, the Ute Mountain Ute Tribe, and the Uinta-Ouray Ute Tribe regarding the Topaz Mine POO. No comments were received.

Environmental Consequences of Proposed Action: Based on the location of the Sunday Mines, results of completed inventories, and consultation, the Proposed Action would have no effect on Native American Religious Concerns.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. As with the Proposed Action, there would be no effect on Native American Religious Concerns under the No Action Alternative.

Mitigating Measures: BMPs have been incorporated into the Proposed Action to minimize potential impacts. No mitigating measures are required.

8.2.4 Threatened, Endangered, and Sensitive Species

Affected Environment: A literature search was conducted to identify federally listed threatened, endangered, or candidate plant and wildlife species as well as sensitive species and state sensitive species that could potentially be present in the project area. The literature search included the “Colorado BLM State Director’s Sensitive Species List (Animals and Plants)” (BLM 2000), the U.S. Fish and Wildlife Service’s (USFWS) threatened and endangered species list for San Miguel County (USFWS 2007), and the Colorado Division of Wildlife’s (CDOW) “Threatened and Endangered List” (CDOW 2007a). The following summarizes the results of the literature survey:

Federal or Colorado Listed as Threatened or Endangered or Candidate for Listing		
Bald eagle	Bonytail	Humpback chub
Mexican spotted owl	Colorado pikeminnow	Razorback sucker
BLM Sensitive		
Ferruginous hawk	Fringed myotis	Northern leopard frog
Gunnison sage-grouse	Yuma myotis	Naturita milkvetch
Townsend’s big-eared bat	Big free-tailed bat	Jones Blue star
Spotted bat	Midget faded rattlesnake	Aromatic Indian Breadroot
Allen’s big-eared bat	Canyon treefrog	San Rafael Milkvetch

Field surveys of wildlife and plants identified in the literature search were conducted in May 2007. All proposed areas of disturbance were surveyed for the presence of federally listed threatened, endangered, or candidate plant species as well as for sensitive species, state sensitive species, and state rare plants as identified above. No federally listed or BLM special status plant species were observed in the project area. No evidence of any federal or Colorado State threatened, endangered, or candidate wildlife species was observed in the project area. Additionally, no BLM sensitive species were observed.

A raptor survey was conducted during the May 2007 wildlife survey, and no occupied raptor nests were located within the survey area. The surveys did not attempt to identify individual bat species or occupied roost locations in any inactive mine workings of the Topaz Mine because of safety issues related to the inactive mine workings. Although mine workings that have remained inactive for a long period of time may become habitat for bats, no evidence of bats (i.e., guano) has been found nor have any bats been encountered to date since mine rehabilitation began in areas of the underground mine workings in 2007.

As an operational measure, the Operator would provide information regarding the locations of any proposed and future disturbances (such as from exploration drilling when locations are determined) to the BLM for additional surveys and identification of possible threatened, endangered, sensitive, or rare plants. The Operator’s policy on bats is addressed in an April 9, 2007, letter to BLM.

Environmental Consequences of Proposed Action: Based on the literature search, findings of the site surveys, and the Operator’s operational measures, the Proposed Action would have no effect on threatened, endangered, and sensitive species.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. As with the Proposed Action, there would be no effect on threatened, endangered, and sensitive species under the No Action Alternative.

Mitigating Measures: If any bats are observed in the mine workings, the Operator would cease all activities in the area and report the finding to the BLM. The Operator would follow any recommendations made by BLM personnel. These recommendations may include cessation of activities in the mine workings supporting the bat habitat until the breeding season is over.

8.2.5 Migratory Birds

Affected Environment: Based upon habitat classifications for Colorado Partners in Flight (PIF), the project area lies within Physiographic Region 87: the Colorado Plateau. Areas within that Region that contain both piñon-juniper and semi-desert shrubland habitat that support a diversity of avian species, including migratory birds, in upland communities in the western U.S. Consequently, the proposed project area could support migratory bird species that are protected under the Migratory Bird Treaty Act (MBTA). Colorado PIF priority species potentially occurring within these two habitat types include black-chinned hummingbird (*Archilochus alexandri*), black-throated gray warbler (*Dendroica nigrescens*), Cassin's kingbird (*Tyrannus vociferans*), gray flycatcher (*Empidonax wrightii*), gray vireo (*Vireo vicinior*), horned lark (*Eremophila alpestris*), juniper titmouse (*Baeolophus ridgwayi*), pinyon jay (*Gymnorhinus cyanocephalus*), and Scott's oriole (*Icterus parisorum*) (PIF website updated 2008).

USFWS maintains a Birds of Conservation Concern (BCC) list. These are non-game migratory avian species that the USFWS has targeted as conservation priorities, but are not currently federally listed as threatened or endangered. BCC species with potential to occur in the proposed project area are golden eagle, black-throated gray warbler, American peregrine falcon, gray vireo, pinyon jay, and Virginia's warblers (*Vermivora virginiae*). One other BCC species associated with piñon-juniper woodlands, yet unlikely to be located within the proposed project area, is Lewis' woodpecker (*Melanerpes lewis*). Lewis' woodpeckers utilize piñon-juniper habitats only when they border riparian areas or when they are interspersed with taller ponderosa pines that are more suitable as nest trees. None of the PIF or BCC species were identified in the project area (BIO-Logic 2007a and BIO-Logic 2007b).

Environmental Consequences of Proposed Action: None of the PIF or BCC species were identified in the project area (BIO-Logic 2007a and BIO-Logic 2007b). The Proposed Action therefore would not adversely affect migratory birds.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. Effects to migratory birds under the No Action Alternative would be negligible, similar to those under the Proposed Action.

Mitigating Measures: BMPs have been incorporated into the Proposed Action to minimize potential impacts. No mitigating measures are required.

8.2.6 Wastes

Affected Environment: Non-mining related solid wastes (including, but not limited to, tires, hoses, and plastic sheeting) would be stored in a roll-off container for off-site disposal. A mine contractor would empty the container and dispose of the contents on a regular basis. Solid waste would be properly disposed of in accordance with state and local regulations.

Small volumes of waste oil, crank case oil, antifreeze, and non-chlorinated solvents would be stored in the maintenance shop or in locked storage containers. Waste products of these chemicals collected as a result of routine vehicle and equipment maintenance would be stored in steel drums in the maintenance shop or within a plastic- and earthen-lined bermed area and would be picked up on a periodic basis by a mine contractor for disposal or recycling. These materials would be handled and disposed of in accordance with federal, state, and local regulations. All other solid wastes (including, but not limited to, tires, hoses, and plastic sheeting) would be properly disposed of in accordance with state and local regulations.

A permitted septic system is located west of the Topaz Mine maintenance shop. The septic system is not currently in use. However, it may be used in the future during mining operations. Sanitary waste disposal service is currently provided to the Topaz Mine by portable toilets that are serviced by a contractor.

Environmental Consequences of Proposed Action: Based on the Operator's commitments to proper disposal of non-mining solid waste, it is not anticipated that the Proposed Action would result in adverse environmental effects.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. The Operator would continue to dispose of non-mining waste as described above. As with the Proposed Action, it is not anticipated that disposal of non-mining solid waste under the No Action Alternative would result in adverse environmental effects.

Mitigating Measures: BMPs have been incorporated into the Proposed Action to minimize potential impacts. No mitigating measures are required.

8.2.7 Ground Water

Affected Environment:

Groundwater Regime

Aquifers in the Paradox Basin typically behave as unconfined aquifers where the formations outcrop at the surface. Confined conditions exist further in the basins.

Recharge is typically from precipitation through surface outcrops along the edge of valleys and infiltration along river channels (Topper, et al. 2003). Typically, groundwater flows from the outcrop towards the direction of major streams (Robson and Banta 1995).

Water quality can be quite variable, depending on the type of rock in which it is stored, the degree it is recharged from surface waters, and its residence time within that rock. In large aquifers, water quality typically decreases with depth in the basins.

The general area is dominated by the Morrison Formation. Members of the Morrison Formation that are present locally are the Brushy Basin and the Salt Wash. The Brushy Basin mainly consists of relatively impermeable siltstone, mudstone. It is recognized as a confining unit due to its low permeabilities and poor ability to transmit water. Locally, channel sandstones may occur (BLM 2008). These sandstones may contain perched aquifers (discontinuous saturated lenses) which are not connected laterally or vertically.

The Salt Wash Member consists primarily of interbedded sandstones, siltstones, and mudstones. The sandstones were originally deposited as fluvial sands and channel splays in a meandering river environment. The meandering sands coalesced to form three major sequences of sand bodies which occur through most of the formation. The sands are separated vertically by siltstones and mudstones. These sandstones commonly serve as aquifers. Topper, et al. (2003) describe hydrologic characteristics of the Salt Wash as yielding some water and typically suitable for stock and domestic use.

The Salt Wash is underlain by the Summerville Formation. This formation consists primarily of shale that is several hundreds of feet thick. This formation is also considered to be a confining unit (Robson and Branta 1995).

The Salt Wash is a primary host for uranium deposits in the Uravan Belt. During early burial and diagenesis, oxidized groundwater carried uranium and vanadium as the water flowed through the Salt Wash and Brushy Basin units. The uranium and vanadium precipitated where groundwater encountered reducing conditions in the rocks. The grade of uranium typically runs from 0.16 to 0.25 percent. Groundwater associated with the Salt Wash typically has elevated concentrations of radionuclides, total dissolved solids (TDS), and sulfate (DOE 2007). A study of water quality in similar uranium deposits in the Salt Wash (the Whirlwind and Packrat Mines) showed that levels of Ra-226, uranium, arsenic, and selenium were relatively higher than the source water (BLM 2008).

No groundwater quality information is available specific to the Sunday Mines because no groundwater wells are located at the Sunday Mines. A U.S. Geological Survey (USGS) study of the Dolores River Basin indicates that water quality in the Salt Wash Member of the Morrison Formation ranges from 517 to 13,900 parts per million (ppm) of TDS, with an average concentration of 4,150 ppm (Weir 1983). The Salt Wash Member generally does not contain high concentrations of sulfides, and therefore would not be expected to generate acid leachate when exposed to surface conditions and weathering. It is expected that water quality would demonstrate relatively higher levels of radionuclides, TDS, and sulfate (DOE 2007).

Recharge to the Salt Wash in the area of the Sunday Mines may be from a relatively small exposure of the Salt Wash at the northwestern base of Gypsum Ridge. The Brushy Creek may contain perched aquifers that could also serve as a source. Groundwater is interpreted to flow southwest toward the center of the basin in Disappointment Valley.

The Sunday Mines underground mine workings are developed through the Brushy Basin and into the Salt Wash where the uranium and vanadium deposits occur. Mining occurs in the Top Rim Sandstone (one of the three pervasive sandstones of the Salt Wash Formation). Historically, little to no water has been encountered in the Sunday Mines. Groundwater has also been reported to be present in a historic portion of the existing workings at the Sunday Mine. Current conditions in this portion of the Sunday Mine have not been assessed because this area of the mine is not currently accessible due to lack of ventilation and hazardous ground conditions.

Groundwater is currently encountered in active underground workings at the West Sunday and Topaz mines at a depth of approximately 700 feet below ground surface. Currently, approximately 0.3 gallons per minute of groundwater is pumped from the base of the West Sunday Mine to a temporary storage sump located within the mine. In the Topaz Mine, a local area of wet rock was encountered. There was no flow from the rock. The low rate of groundwater pumping from the base of the West Sunday Mine is indicative of generally low permeability within the rock units hosting the Sunday Mines.

The hydrogeologic framework in the area of the underground mine workings is based on US Geological Survey data (Cater 1955). The Salt Wash Formation is underlain by the Summerville Shale which serves as a confining layer. The Top Rim Sandstone is underlain by a siltstone and may represent a smaller aquifer within the Salt Wash Formation. The water table is interpreted to be parallel to topography in areas beyond the known observation points. A groundwater divide is interpreted to be coincident with the valley faults between Gypsum Ridge and Big Gypsum Valley.

The primary ore-bearing zones at the Topaz Mine occur in prominent sandstone units of the Salt Wash Member of the Morrison Formation where uranium and vanadium are concentrated in organic-rich regions. The Salt Wash Member comprises most of the ore and waste rock that is mined. Mining first started in this area in the 1930s. Background water is expected to be typical of the Salt Wash Formation (relatively high in radionuclides, TDS, and sulfate). Areas of enriched uranium would result in higher levels. Studies from the Whirlwind and Packrat Mines indicate that water quality can be high in uranium, Ra-226, arsenic, and selenium.

The primary source of water that may infiltrate the WRA would be from precipitation. In the area of the Sunday Mines, the average precipitation rate is 13 inches per year (Topper, et al. 2003). Some precipitation occurs in the form of snow. Most precipitation occurs during intense rain storms which occur during the late spring and early fall. In addition, intense rain events tend to result in high runoff and low infiltration into the ground. The average evaporation rate for this area is between 50 and 80 inches/year (Robson and Banta 1995). Stormwater runoff at the project area would be managed in

conformance with CDPHE stormwater requirements ([Tetra Tech 2007a](#); [CDM 2008](#); and [URS 2007](#)) and controlled using diversion channels, berms, and a catchment basin.

It is not expected that any leachate that might develop from the WRA would affect the groundwater in the Top Rim Sandstone. The Topaz WRA is underlain by the Brushy Basin Formation which is considered to be relatively impermeable.

Final reclamation would include features that would minimize infiltration of surface waters into the WRA or entering the portal. A diversion ditch would remain permanently in place, after reclamation is completed. The waste rock storage area would be covered with available topsoil or similar material and planted with a stable mix of grasses and forbs well suited to this location. The WRA would be recontoured in a manner that would minimize erosion. Vegetation would utilize much of the direct precipitation and surface water runoff that occurs on the reclaimed WRA.

Additional Studies

The Operator, in compliance with the Colorado Division of Reclamation, Mining, and Safety (DRMS) and BLM, is completing a mine rock characterization plan. The purpose of this plan is to evaluate waste rock and ore from the Sunday Mines for the potential formation of toxic materials or acid mine drainage. These studies will be conducted for existing permitted operations as well as for the Proposed Action.

Waste Rock Areas

Samples of background soils will be collected to assist in interpretation of total metals data collected from the WRAs. Nine background soil samples would be collected in areas upslope and upwind from the existing mine facilities and analyzed for total metals to estimate background metal concentrations.

Three trenches would be excavated to expose the interior of each of the Sunday, St. Jude, West Sunday, and Topaz WRAs. A composite sample would be collected from each trench. Samples would not be collected from the Carnation Mine. The WRA at the Carnation Mine has been generally reclaimed and vegetation is currently established in these areas. In lieu of sample collection, visual observation of the waste rock would be conducted to confirm that the material is similar to the waste rock from the other Sunday Mines, and the data collected from the other Sunday Mines WRAs would be used to characterize the Carnation Mine WRAs. Two representative composite samples of ore from the Sunday Mines would also be collected.

Samples would be submitted for laboratory analysis of Acid Base Accounting (ABA) and Meteoric Water Mobility Procedure (MWMP). Total metals analysis would also be conducted to measure the concentrations of metals or metalloids in the waste rock and ore. A subset of these samples would also be analyzed for soil-water characteristic curves and other geotechnical parameters that would be used to evaluate the volume of seepage that may occur at the WRAs, as described further below.

ABA data would be used to estimate the potential for mine rock to generate acid over time. Results of the ABA would be used along with evaluation of mineralogical data in order to classify the potential for acid rock drainage from the WRAs.

The MWMP analyses would be performed to evaluate if the mine rock may potentially leach toxic materials when in contact with precipitation (rainfall/snowmelt). Consistent with recommendations provided by the DRMS, the leachate collected from the MWMP would be analyzed for constituents listed under the Colorado Department of Public Health and Environment (CDPHE) Regulations 31 (surface water) and 41 (groundwater) in addition to hardness, conductivity, dissolved oxygen, and oxidation reduction potential. The MWMP is an aggressive test which would conservatively predict leachate quality.

Native surface soils and subsurface soil/rock located near each of the WRAs and from rock of the Brushy Basin Formation would be sampled. Geochemical sorption potential analysis would be performed on the native soil samples for each particular constituent that is selected based on results of the MWMP analyses. The results of this analysis would be used to characterize the potential for leachate from the WRAs to concentrate in the soils.

If the results of the analyses of mine rock show that constituent concentrations in any seepage from the WRAs may exceed the applicable surface or groundwater standards, the Operator would perform an evaluation of the fate and transport of the constituents to determine the likelihood of leachate to affect surface or ground water quality.

Underground Mines

As with many mines in the region, the primary ore-bearing zones at the Topaz Mine occur in the Salt Wash Member where uranium and vanadium were concentrated in organic-rich zones. It is expected that water quality in the Salt Wash would be naturally elevated in radionuclides and associated minerals. Exposure of groundwater to oxidizing conditions in the mines may affect these concentrations.

The effect of current underground mining operations on groundwater quality would be evaluated by monitoring any observed changes in groundwater quality between upgradient and downgradient wells. Two wells would be installed up-gradient from current underground workings to evaluate ambient groundwater quality, and three wells would be installed down-gradient from the underground workings. The monitoring wells would be installed in subhorizontal underground boreholes.

The down-gradient monitoring wells would consist of three varying-depth boreholes drilled adjacent to each other, at deep, middle, and shallow depths (i.e., 25 feet, 50 feet, and 100 feet from the mine workings). The intent of installing varying-depth boreholes is to evaluate the persistence of changes to oxidation-reduction potential and dissolved concentrations of naturally occurring trace elements. Groundwater samples would additionally be analyzed for Tritium in order to provide information regarding the degree of connection between surface water and groundwater.

Hydrologic Studies

The Operator would implement a plan to more fully evaluate ground water conditions in the area of the Sunday Mines. Pumping and drawdown records in the West Sunday Mine would be analyzed to estimate the hydraulic conductivity of the Top Rim Sandstone.

Data from the current mining operations and existing published data would be used to develop more detail in the current hydrogeologic model. Information would be used to interpret the hydrologic characteristics of the Top Rim sandstone unit and potential connections to surface waters, estimate the rate and direction of groundwater flow, and identify areas of relatively different oxidation-reduction potential.

Additional information on the geology and groundwater in the area would be collected over the course of the exploration drilling program proposed by the Operator. This additional information would be used to refine the conceptual hydrologic model to further evaluate potential effects to groundwater from mining activities.

Control of Underground Seepage

If groundwater seeps into the underground mine workings, the Operator would route the water to sumps within the mine. All groundwater encountered would stay below ground and not be brought to the surface. Operational measures, such as wall grouting, would be implemented to control seepage into the mine workings, as needed.

Based on historical operations at the Sunday Mines, large amounts of water have not been encountered during mining operations. Groundwater has been reported to be present in a historic portion of the existing workings at the Sunday Mine, which are currently inaccessible. The volume cannot be accessed at this time. In the event that large volumes of water are encountered and could not feasibly be routed to sumps within the mine workings, the Operator would implement appropriate water handling measures such as pumping, treating, and surface discharge of this water under applicable state and federal regulations.

Environmental Consequences: BMPs have been incorporated into the Proposed Action to minimize potential impacts.

Groundwater may be affected by leaching constituents from the material located on the WRAs, or encountered in the underground mines.

The Topaz WRA is expected to produce little to no leachates due to low potential for infiltration, and stormwater prevention and final reclamation measures. If leachate were to occur, it is not expected to affect any surface waters. The closest aquifer below the WRA is the Top Rim Sandstone. The Brushy Basin Member, which underlies the WRAs, is relatively impermeable and would prevent that aquifer from being affected.

Leachate might flow through a layer of alluvium material and on the surface of the Brushy Basin, towards the center of the valley. The volume of leachate would be expected to be very small. It would mix with other meteoric waters as it moved through the alluvium towards the center of the valley. The quality of water in the alluvium typically decreases towards the valley center as residence time increases. Mine rock characterization studies would confirm if there is a potential for leachate that exceeds water quality standards to occur.

The Operator has committed to controlling seeps in the mine by collecting water in sumps and by grouting mine walls where necessary. If large volumes of groundwater are encountered in the underground mine that cannot be controlled, it will be discharged on the surface. Any discharge of ground water to the surface would be done under applicable state and federal regulations and in a manner to maintain or improve water quality of any other surface or ground waters.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. The Operator would still perform the groundwater evaluations and geochemical characterization of mine rock and implement the requirements for environmental protection measures set forth under the DRMS regulations. As with the Proposed Action, it is not anticipated that groundwater would be adversely affected under the No Action Alternative.

Mitigating Measures: In the event that mine rock characterization tests indicate there is a potential for leachate that exceeds background water quality to develop, piezometers and/or monitoring wells would be installed below the toe of the WRA to monitor any groundwater quality.

In the event that it is shown that groundwater quality is being affected by the WRA, the waste rock material would be managed in such a manner to reduce water from entering the WRA and/or containing any leachate from exiting the material. Examples of mitigations include capillary barriers or other covers to prevent or minimize water infiltration, liners under the WRA to prevent fluids from entering the groundwater system, and treatment to improve leachate quality to a degree that it would not affect groundwater.

8.2.8 Surface Water

Affected Environment: Colorado is one of the seven states through which the Colorado River runs, and these states have formed the Colorado River Basin Salinity Control Forum. Colorado, as a member of the forum, is participating in the multi-state, basin-wide approach for salinity management in the Colorado River.

The CDPHE Water Quality Control Commission has established standards for the Colorado River Basin (“Colorado River Salinity Standards,” Commission Regulation No. 39). As authorized by the Colorado Water Quality Control Act, Sections 25-8-101 et seq., *Colorado Revised Statutes (C.R.S.)*, as amended, the commission and the Colorado Water Quality Control Division implement the standard in compliance with Section 208

(area wide water quality management planning) and Section 402 (National Pollutant Discharge Elimination System [NPDES]) of the Clean Water Act. Specifically, under the Colorado Pollutant Discharge Elimination System (CPDES) permitting program, permits for industrial discharges are written in conformance with Colorado River Basin Salinity Control Forum policies for controlling salinity in the Colorado River.

The Topaz Mine is located approximately 2 miles away from the nearest perennial surface water body (Dolores River). Two natural ephemeral drainages run from the south to the north of the east and west sides of the Topaz Mine surface facilities area. In the past 20 years, no discharge of sediment or waste rock material has been observed from the Sunday Mines.

Water quality protection is currently and would continue to be provided through the engineered stormwater drainage facilities and implementation of a Stormwater Management Plan (SWMP) required under the Operator's CDPS stormwater discharge permit. Features at the Topaz Mine include a surface water diversion ditch, located to the south and upgradient of the WRA. Additionally, an earthen berm and catchment basin would be maintained along the toe of the expanded WRA. Another berm would be located at the top of the WRA to prevent surface water from running off of the surface facilities over the WRA. The catchment basin along the toe of the WRA would be designed to contain the discharge from a 100-year, 24-hour storm event. An emergency overflow spillway would discharge flow from storms that are greater than 100-year, 24-hour storm events to the ephemeral channel to the west of the catchment basin.

Drainage controls to minimize erosion for the existing road system (culverts, waterbars, and ditches) would be maintained as needed using current BLM BMPs (see POO Attachment E) for road stabilization. New roads would be designed and would incorporate BLM BMPs. Earthen berms, straw bale barriers, and vegetation buffers would be used to control sediment along new roads. Runoff from the WRA, ore stockpile area, and topsoil stockpile would be captured by earthen berms located at the crest and toe of the WRA.

A Spill Prevention, Control, and Countermeasure (SPCC) Plan prepared in accordance with 40 CFR Part 112 - Oil Pollution Prevention would also be implemented. The SPCC Plan addresses the oil spill prevention requirements set forth under the aforementioned regulation. These include, among others:

- Spill prevention and control measures
- Spill response procedures
- Spill notification procedures
- Recordkeeping
- Plan review and amendment

Example spill prevention and control measures include:

- Secondary containment for oil/fuel storage
- Tank inspection and testing

- Tank loading/unloading
- Personnel training

Final reclamation would include features that would minimize erosion. A diversion ditch/berm would remain permanently in place, after reclamation of the WRA is completed. The WRA would be covered with available topsoil or similar material and planted with a stable mix of grasses and forbs, approved by the BLM. The WRA would be recontoured in a manner that would minimize erosion. Vegetation would utilize much of the direct precipitation and surface water runoff that occurs on the reclaimed WRA.

Environmental Consequences of Proposed Action: Erosion would be controlled by implementation of the Storm Water Management Plan, BMPs, and final reclamation measures. Spills would be minimized by the Spill Prevention, Control, and Countermeasure Plan. It is not expected that surface water quality would be affected by mining operations.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. The Operator would continue to operate under a CDPS stormwater permit and SPCC Plan. The Operator would still be committed to implement the requirements for environmental protection measures set forth under the DRMS and BLM regulations. As with the Proposed Action, it is not anticipated that surface waters would be adversely affected under the No Action Alternative.

Mitigating Measures: BMPs have been incorporated into the Proposed Action to minimize potential impacts. No mitigating measures are required.

8.2.9 Rangeland Health Standards and Guidelines

Affected Environment: Vegetation surveys were conducted for the Proposed Action on May 14 through 17, 2007. Previous vegetation surveys conducted in the Sunday Mine Complex area identified two distinct vegetative compositions for steep hillsides and valley floors. This pattern of vegetative composition is similar throughout all of the Sunday Mines. Based on the field survey, no recent grazing activities have occurred in the project area because only weathered animal droppings were observed (see attached Biological Reports). Nonetheless, grazing would not be restricted while any mining is ongoing.

A weed management plan has been prepared for the mine site to control invasive species. The plan includes requirements that any earth-moving heavy equipment, not including haul trucks, be power-washed in a nearby town before entering and after leaving the site. The plan also includes annual pesticide spraying for noxious/invasive plants in the spring and possibly the fall.

Environmental Consequences of Proposed Action: Based on the findings of the site surveys already conducted and the Operator's current and continued implementation of a

Weed Management Plan, Rangeland Health Standards and Guidelines would not be adversely affected under the No Action Alternative.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. As with the Proposed Action, the No Action Alternative would not adversely affect Rangeland Health Standards and Guidelines.

Mitigating Measures: BMPs have been incorporated into the Proposed Action to minimize potential impacts. No mitigating measures required.

8.2.10 Vegetation

Affected Environment: Vegetation surveys were conducted for the Proposed Action on May 14 through 17, 2007. Vegetation in the project area consists of open pinyon-juniper woodlands. The understory varies slightly across the survey area, but commonly understory plants include sagebrush, antelope bitterbrush, ephedra, Douglas rabbitbrush, broom snakeweed, fourwing saltbrush, mountain mahogany, skunkbush, galleta, Indan rice grass, blue gamma, needle and thread grass, scarlet globemallow, desert princessplume, winged buckwheat, Lesquerella spp., Aster spp., and a variety of other forbs (BIO-Logic 2007a and BIO-Logic 2007b). Previous vegetation surveys conducted in the Sunday Mine Complex area identified two distinct vegetative compositions for steep hillsides and valley floors. This pattern of vegetative composition is similar throughout all of the Sunday Mines.

Environmental Consequences of Proposed Action: The Proposed Action would result in an additional 17.85 acres of disturbed land. The project area contains 15 to 16 percent vegetation cover. Reclamation of the site would be conducted in accordance with the approved reclamation plan included in the Topaz Mine POO. Therefore the impacts to vegetation as a result of the Proposed Action would be negligible.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. As with the Proposed Action, the No Action Alternative would not adversely affect vegetation.

Mitigating Measures: BMPs have been incorporated into the Proposed Action to minimize potential impacts. No mitigating measures required.

8.2.11 Livestock Grazing

Affected Environment: Livestock grazing was surveyed in May 2007. No evidence of current-year livestock grazing was observed in the survey area. However, weathered animal droppings were observed. The Sunday Mines overlie three BLM grazing allotments. They are: Gypsum Valleys with a size of 41,187 acres, Disappointment Creek with a size of 34,232 acres, and RCA with a size of 17,255 acres. Together these allotments provide over 90,000 acres of rangeland.

Environmental Consequences of Proposed Action: Vehicular use in the project area would increase as a result of the Proposed Actions, but vehicular speed in the area is naturally controlled by the terrain (e.g., less than 25 mph) and by speed limits on County Road 20R (20 to 35 mph), minimizing the chances of collisions with livestock.

Livestock would be permitted to graze the mining area but would be prevented from accessing the mine surface facilities and waste rock areas. Currently, the number of acres affected by the surface disturbance at the Sunday Mines is 77.5 acres. The Proposed Action would add an additional 17.85 acres of surface disturbance, including 10 acres of unreclaimed exploration disturbance at any given time, making the cumulative area of impact 95.35 acres. The maximum surface disturbance would affect less than one tenth of one percent of grazing allotments in the area and, therefore, impacts to grazing under the Proposed Action would be negligible.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. No additional surface disturbance would occur. Effects to livestock grazing under the No Action Alternative would be negligible, similar to those under the Proposed Action.

Mitigating Measures: In the event of an accident with livestock associated with mining operations, the Operator would compensate the livestock owner.

8.2.12 Wildlife (Other than TE&S)

Affected Environment: A survey of the project area was conducted in May 2007 for springs, wetlands, and riparian areas. No springs or riparian wetlands were found. Two ponds contained water, but no riparian or wetland features were observed. Therefore, there is insufficient habitat for fish.

The Operator contacted the CDOW on March 9, 2007, to solicit comments regarding the Proposed Action. CDOW responded on May 7, 2007, and discussed potential impacts the mine could have on local plant and wildlife populations. This area is located within critical winter range for mule deer and elk (CDOW 2007b).

Elk and mule deer spend the winter months foraging for food. No rutting, breeding, or birthing activities take place. Critical habitat in the winter would therefore consist of areas that contain a sustainable source of food. The CDOW website states that the bark and twigs of trees may contribute up to half of the winter diet of elk, which consists of conifers, cedar, aspen, willow, woody shrubs, and occasionally lichen. They also favor wooded areas and sheltered valleys for protection from the wind and snow. Existing rangeland grass and forb cover is minimal, and bare and rocky ground dominates the mine site. The Proposed Action is largely limited to treeless areas, and minimal grass is present.

CDOW also stated that about 10 different bat species inhabit the area around the mines, one of which, the Townsend Big-Eared Bat, is considered a species of special concern

(CDOW 2007b). Inactive mine sites commonly serve as winter roost sites or breeding areas for bats.

Environmental Consequences of Proposed Action: CDOW suggested seasonal cessation of mining activities to minimize any possible impact on mule deer and elk populations resulting from vehicular accidents with individual animals (CDOW 2007b). Vehicular speed in the area is naturally controlled by the terrain and by posted speed limits on County Road 20R (20 to 35 mph), minimizing the chances of collision with animals. Vehicular travel to maintenance sites in the winter would be limited to the occasional travel in small all-terrain vehicles (ATV). In addition, operational hour limitations on driving outside of the existing portal areas would limit the likelihood of vehicular accidents. Most maintenance activities that require access to areas outside the mine portals would occur in the summer months, and access to area outside the portals is limited during winter months because of the weather and road conditions. The likelihood of elk or mule deer being present at the site of proposed activities during the winter is minimal because of the lack of an adequate food supply and cover. Motorized vehicles traveling to the site for maintenance would only take place occasionally. Based on these factors, and the fact that the mine is underground, and therefore most activities are underground, the likelihood of maintenance activities negatively impacting mule deer or elk is unlikely, and there would be no seasonal restrictions applied.

Based on the literature search, findings of the site surveys already conducted, and the Operator's operational measures, it is not anticipated that wildlife would be adversely affected to by the Proposed Action.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. Effects to wildlife under the No Action Alternative would be negligible, similar to those under the Proposed Action.

Mitigating Measures: If any bats are observed in the mine workings, the Operator would cease all activities in the area and report the finding to the BLM. The Operator would follow any BLM recommendations.

8.2.13 Recreation

Affected Environment: Typical recreation activities in the areas around the Sunday Mines include hunting, driving, ATV use, biking, and boating on the Dolores River. No designated recreation areas are located in the vicinity of the Sunday Mines.

Environmental Consequences of Proposed Action: Mining operations would not interrupt recreation activities on BLM land outside of the active mining areas and would not affect access to BLM land. There are no plans to restrict vehicular traffic access on County Road 20R. The project area and mine activities are minimally visible from County Road 20R.

Mining activities would not affect recreation activities. Signs would be posted advising the public of any mining activity and any road construction activity. Cones and gates

would be used when necessary to limit access or divert traffic at mine surface facilities. Aside from surface facility areas, no public land access would be restricted by mining activities.

Based on these factors, mining activities would not affect recreation use patterns in the area.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. Effects to recreation under the No Action Alternative would be negligible, similar to those under the Proposed Action.

Mitigating Measures: BMPs have been incorporated into the Proposed Action to minimize potential impacts. No mitigation measures are required.

8.2.14 Soils/Watershed

Affected Environment: The NRCS soil survey of the project area was reviewed (NRCS 2007a). Ten broad mapping units were identified within the permit area boundaries. The surface disturbances under the Proposed Action would occur in two of the mapping units: the Bodot dry-Ustic Torriorthents complex and Mivida fine sandy loam.

Environmental Consequences of Proposed Action: Soils erosion potential may increase in disturbed areas. Areas of potential soils erosion include the topsoil stockpile, the ore stockpile, new and existing roads, and the expanded WRA slope of the Topaz Mine expansion. Topsoil would be removed within the proposed disturbance areas and stockpiled. The topsoil stockpile would be seeded during the first fall planting season with a BLM approved seed mix to control erosion of the topsoil. The topsoil would be put back in place in accordance with the approved reclamation plan included in the Topaz Mine POO. Once reclamation is successfully completed, soils would be stabilized.

Runoff from the WRA, ore stockpile area, and topsoil stockpile would be captured by earthen berms located at the crest and toe of the WRA. The existing drainage controls for the existing road system (culverts, waterbars, and ditches) would be maintained as needed using current BLM BMPs for road stabilization. New roads would be designed and would incorporate the BLM BMPs. Water bars, earthen berms, straw bale barriers, and vegetation buffers would be used to control sediment runoff along new roads. Erosion impacts would be minimized by installing the sediment control measures discussed in Section 8.2.7, Surface Water.

Based on the findings of the soil survey already conducted, and the Operator's commitments to erosion control and temporary seeding of topsoil stockpiles, the Proposed Action would not result in adverse environmental effects to soils and watersheds.

Environmental Consequences of No Action Alternative: Current mining operations and measures to control erosion would continue under the No Action Alternative. Effects

to soils under the No Action Alternative would be negligible, similar to those under the Proposed Action.

Mitigating Measures: BMPs have been incorporated into the Proposed Action to minimize potential impacts. No mitigation measures are required.

8.2.15 Visual Resources

Affected Environment: The project area is located approximately 3 miles due north of State Highway 141 and a half mile from County Road 20R. The mine site is approximately 6 miles from the southern edge of the Dolores River Wilderness Study Area, and about 5 miles southeast of the Dolores River Big Gypsum boat launch site. The mines are located on the north facing steep slope that forms the south edge of the Big Gypsum Valley.

The area is rated an A, High Scenic Quality per BLM Manual H-8410 - 1. This is primarily due to the proximity of the Dolores River and the WSA and the dramatic and colorful redrock escarpment that forms the north edge of the Big Gypsum Valley. The Visual Sensitivity of the area is Medium to Low. Recreation use in the area is low and seasonal with hunters, Dolores River boaters and occasional bicyclists and hikers visiting the area, depending on the season. Most viewers would be traveling on a road or trail. While use is low, some users have an expectation of high scenic quality. The combination of the Scenic Quality and Visual Sensitivity gives this area a Visual Resource Inventory Class III.

Mine disturbance is visibly prevalent in the area and attracts the attention of the viewer on County Road 20R. Visible elements include mine buildings and facilities which contrast in color and texture with the landscapes natural colors and shapes, and the light grey colored mine waste rock piles that also contrast substantially with the surrounding dark browns, greens and reds of the natural landscape. The uniform texture and shapes of the waste piles also contrast substantially with the overall rough texture of the landscape features. However, the vast scale of the landscape and the dramatic redrock cliffs to the north tend to shift the viewers attention away from the mining activity. Because of these geographic factors, the current size and features of the mines, overall dramatic scale and natural landscape features of the Valley and viewer position, speed of travel, and duration of view, the area currently rates a Visual Resource Class III – the existing character of the landscape is partially retained. The level of change to the characteristic landscape is moderate. Management activities attract attention but do not dominate the view of the casual observer.

Each mine site, viewed from a stationary position on the County Road 20R currently rates a Visual Resource Class IV – management activities have created a major modification of the natural character of the landscape. The level of change to the natural landscape is high. Management activities dominate the view and are the major focus of viewer attention.

Part of the definition of a Visual Resource Class IV is: every attempt has been made to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements. Some features of the existing mine condition do not meet this definition. These include the color and location of some mine buildings (blue) and the locations of some utility poles, which are sky lined.

This area is governed by the 1985 San Juan/San Miguel Planning Area Resource Management Plan. This area is within Emphasis Area A, Livestock Management. Page 26 states, "Establish site specific visual quality objectives and design guidelines for landscape development projects during activity planning."

Environmental Consequences of Proposed Action: Key observation points (KOPs) were established to evaluate the effect of the Proposed Action. KOPs include two stationary locations on County Road 20R, as well as a linear KOP that consists of a 3 mile stretch of County Road 20R, one KOP at the Dolores River in Big Gypsum Valley at River Mile 59.5, and one KOP within the WSA in T45N, R18W, and Section 17. The project area is not visible from the Dolores River or from the WSA KOP. The project is not visible from State Highway 141. The project is visible from numerous places along the County Road 20R in the foreground and in middleground.

The primary visible effect of the Proposed Action would be the increased size and footprint-of the Topaz Mine WRA by approximately 2.5 acres. Under the Proposed Action, the Sunday Mines area would continue to have a Visual Resource Rating of IV. However, the overall experience of driving along County Road 20R meets a Visual Resource Rating of III. Upon mine closure, the Operator would reclaim each mine site to a VRM Class III designation by recontouring, planting and otherwise treating the area to achieve a natural appearance that blends with the surrounding natural features.

Environmental Consequences of No Action Alternative: The No Action Alternative would not expand the mine and, therefore, would have no additional affect on the Visual Resources of the area.

Mitigating Measures: Any new mine facilities would be painted a military olive color as recommended by the BLM to blend in with the environment.

8.2.16 Lands/Access

Affected Environment: Access to the Sunday Mines is from County Road 20R located south of the Sunday Mines. County Road 20R is accessed off of Colorado Highway 141, eight miles east of the Sunday Mines. The Operator currently has a San Miguel County Special Use Permit 1997-18, updated Resolution 2007-34, issued by San Miguel County for road access to the Sunday Mines. A maintenance bond (25-10-99) in the amount of \$25,000 also is in place with San Miguel County for the Operator's use of about 8 miles of County Road 20R. Maintenance of County Road 20R would be performed by the Operator in conjunction with San Miguel County. No additional right-of-way access or reclamation of the existing County Road 20R is required by San Miguel County. Public

lands in the project area also are accessible through unpaved, four-wheel-drive roads for recreational uses.

Environmental Consequences of Proposed Action: Mining operations would not affect access using County Road 20R. The Proposed Action would not affect public access and would not involve realty actions or affect any existing rights-of-way. The Operator would comply with any permit issued by the County, such as the Special Use Permit and the Road and Bridge Permit.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. Effects to Lands and Access of the area would be negligible, similar to those under the Proposed Action.

Mitigating Measures: BMPs have been incorporated into the Proposed Action to minimize potential impacts. No mitigating measures are required.

8.2.17 Transportation

Affected Environment: Mined ore from the Sunday Mines would be shipped to and processed at the White Mesa Mill near Blanding, Utah. An independent hauling contractor would transport the ore, and hauling would be performed under U.S. Department of Transportation (DOT) regulations found at CFR Title 49, Transportation, and in accordance with the Operator's "Transportation Policy for Shipments of Colorado Plateau Uranium Ores to the White Mesa Uranium Mill" (Denison Mines [USA] Corp. 2007).

The transportation route from the mines to the White Mesa Mill is east on County Road 20R about 8 miles, west and south on Colorado State Highway 141 through Egnar, west on State Highway 491 to Monticello, and south on State Highway 191 to Blanding, Utah. The San Miguel County Road Department states that there was an average of 35 vehicles per day on CR 20R from June 20 to July 23, 2007 (San Miguel County 2008). During that time, Operator had an average of 5 trucks per day on County Road 20R. It is likely that approximately 10 other ancillary vehicles per day were also traveling to the Operator's mines during this time period. All vehicle trips on CR 20R are round trips, thus the 5 trucks and 10 ancillary vehicles accounted for 30 of the 35 vehicles per day on CR20R during the Road Department's observation. According to statistics from the Colorado Department of Transportation, the average annual daily traffic (AADT) for 2008 on Highway 141 is projected to be between 588 to 650 vehicles, with 11.80 percent of those vehicles being trucks. On Highway 491 to the Utah border, the AADT is expected to be between 2,188 and 2,975 vehicles, with 25 to 30 percent of those vehicles being trucks (Colorado Department of Transportation 2008). Data from the Utah Department of Transportation show that Highway 491 from the Utah border to Highway 191 has an AADT of 2,295 to 2,460 vehicles, with 30 percent being trucks. Highway 191 south into Blanding, Utah, has an AADT of 2,465 to 4,490, and this number increases to 6,935 vehicles inside the town of Blanding. Along this portion of the highway, 30 to 39 percent of the vehicles are trucks (Utah Department of Transportation 2008).

The Operator estimates a maximum of 72,000 tons of ore per year may be mined from the Topaz Mine and a maximum of 214,000 tons of ore per year may be mined for all five Sunday Mines. The Operator is currently updating its Special Use Permit with San Miguel County. The Special Use Permit with San Miguel County is expected to permit the Operator to haul an average 26 trucks of ore per day with a maximum of 34 haul trucks in a 24-hour period based upon a 24-hour day beginning at 12:00 AM or (from 7:00 AM to 11:00 PM). Truck hauling would generally occur during off peak hours (early morning and late evening) Monday through Friday with an occasional Saturday. Additional traffic to the Topaz Mine may include miners, other staff, regulators, and vendors. Miners make up most of this additional traffic. Miners arrive at the mine site in van pools. The Operator estimates that the additional traffic is about 10 vehicles per day for all five Sunday Mines.

Traffic from the Sunday Mines would occur mainly on Monday through Friday, when it is likely that recreational traffic on this road and at other regional park and recreational areas would be lighter. Based on this information, the traffic data for the two least traveled and one most traveled stretch of road are summarized in the below:

	CR 20R	Highway 141	Highway 191
Maximum	95 percent	15 percent	1 percent
Average	94 percent	12 percent	0.7 percent

The Operator is responsible for ensuring that radiation levels from hauling operations fall within applicable DOT limits as specified in 49 CFR 173.427(a)(1). These requirements state that the external dose rate may not exceed a radiation level of 1,000 mrem/hr at 3 meters from the unshielded material. Based on the grade of the uranium ore from the Sunday Mines, the exposure rate would be less than 1 millirem per hour (mrem/hr) to recipients standing outside of the truck. As a result, the requirements at 49 CFR 173.427(a)(1) are expected to be satisfied.

Also, requirements at 49 CFR 173.427(a)(5) and 173.441(a) state that under conditions normally incident to transportation, the radiation level shall not exceed 200 mrem/hr at any point on the external surface of the package and the transport index shall not exceed 10. These requirements are also expected to be satisfied in all cases. The average reading in the occupied space of each truck cab is not expected to exceed the DOT limit of 2 mrem/hr as specified in 49 CFR 173.441(b)(4). In addition, the Operator would perform (and document for the record) spot gamma surveys on uranium ore shipments as appropriate in order to ensure that the regulatory standards are satisfied.

The Operator's transportation policy specifies that ore trucks must be covered at all times, with or without ore, except for loading and unloading using a tarpaulin or other suitable mechanism. With regard to accidents and other incidents involving the spillage of uranium ore, the policy states that the transportation contractor is responsible for handling the accident and that the contractor must have an Emergency Response Plan in case of emergency (Denison Mines [USA] Corp. 2007).

The following is a summary of guidelines for preparation of the Emergency Response Plan by the contractor in case of an emergency related to ore transportation:

Emergency Contact Information: The Plan should include emergency telephone numbers for the transportation contractor, the mine, the mill, and a third-party emergency response contractor, if applicable. Additionally, the Plan should include telephone numbers for the state patrol, local fire stations, local law enforcement, and emergency medical services. These telephone numbers should include all localities along the carrier's route to the mill. The plan should clearly spell out who is to be contacted depending on location and type of incident. It is recommended that the principal emergency responders named in each Plan be contacted to verify their capability of responding to an incident that might occur anywhere along the proposed haulage route(s). The driver should also be provided with a radio and/or mobile telephone suitable for the area traveled. Because of the relative remoteness of the mine sites, some communication units may not provide adequate coverage.

Scene Assessment: Prior to performing any action at an accident, the scene would need to be quickly evaluated for potential hazards including injuries, fires, fuel spills, downed power lines, traffic hazards, and proximity to streams or rivers. Identified hazards are to be avoided and, if possible, abated as soon as possible. It is recommended that the driver carry a copy of USDOT's current Emergency Response Guidebook and be trained in its use so that he/she can better identify potential hazards and the appropriate response procedures. Contacting the local fire station and/or sheriff's department is often the fastest method for gaining assistance when responding to identified hazards.

Succession of Authority: The driver, if capable, is responsible for the accident site and related area on public roads or highways until the arrival of the fire department or law enforcement personnel. Once the site has been secured and the preliminary investigation is complete, the assigned supervisor of the contracted Emergency Response Team shall be in charge of traffic control and cleanup activities. In addition, Denison radiation staff from the White Mesa Mill would respond and provide technical assistance during cleanup effort.

Traffic Control: Initially, reflective triangles, flares, and volunteer flaggers can be used to control traffic until emergency responders arrive. Professional traffic control measures would be needed for any subsequent clean-up actions.

Qualifications of Emergency Response Crews: General construction skills are needed plus experience in the use of radiological monitoring instruments. Emergency response crews should be located in close proximity to the ore haulage route. If a haulage route is relatively long, different crews may be needed to respond to different sections of the route.

Potential for Exposure: The uranium ore transported to the mill is low specific activity material ranging in uranium grade from 0.15 to 0.35 percent U₃O₈. Based on EPA and NRC health-based standards, a cleanup action of material having this low of uranium

content would not result in a worker becoming overexposed to radiation, even if the action extends over several work days.

Required Personal Protection Equipment (PPE): Due to the limited risk posed by the Low Specific Activity uranium ores being transported, worker protection can be limited to standard industrial clothing and safety protection consisting of work pants, sleeved work shirt, hard hats, safety glasses, and steel-toed safety shoes/boots.

Cleanup Procedures: Because of its potential to cause a fire or contaminate nearby water courses, containment and cleanup of any fuel spills is normally the first priority. Many of the fire departments carry adsorbents and booms to contain and clean up these types of spills. Spilled ore materials, depending on the size of the spill, can be cleaned up initially with a loader and completed with hand tools. If the spill is large, the ore should be transferred directly to another truck approved for uranium ore haulage. Smaller spills can be placed in barrels or other suitable containers. If it is windy, dust can be controlled with light water sprays; however, large volumes of water should not be used because this could result in runoff of water containing uranium and other contaminants. If the spill occurs near or within a stream or river, efforts should be made to limit the quantity of ore released to the water course. Because of its relatively low uranium content, however, no long-term environmental impacts would be expected if some of the material cannot be safely recovered.

Cleanup Verification: After visible spilled ore material has been removed, a scintillometer or gamma meter should be used to identify any “hot spots” of residual radiation on ground surfaces. These areas are determined by comparison to local background gamma measurements from an unaffected area near the accident scene. The hot spots can be marked using spray paint, chalk, or utility flags. After these hot spots are further cleaned, they should be rechecked with the instrument to verify that the area is at or near background radiation levels. This is normally readily achievable on hard surfaces such as concrete or asphalt. Some over-excavation of underlying soils may be necessary in gravel or grassy areas. If there is a concern regarding the cleanup levels achieved, soil samples can be taken of the contaminated area and a nearby uncontaminated area to establish background levels.

Disposal of Recovered Materials: Recovered materials that have been loaded for transport can be released by the assigned cleanup supervisor to be transported to the mill. Any materials contaminated with oil or fuel should be containerized and transported to a suitable holding area for later characterization and appropriate disposal.

Decontamination of Equipment and Tools: The contract Emergency Response Team should have specific procedures in place for decontaminating equipment and tools for “free release” of these items. These procedures generally include cleaning protocols, collecting swipe samples for analysis, and scanning for radiation levels.

Agency Notifications: Depending on the severity of the incident, one or more state and federal agencies may need to be notified. These notifications would be coordinated by Denison personnel and may include both verbal and written requirements. Notification

requirements, including contact information, should be included in the carrier's Plan. Depending on location, potential notifications may include but not be limited to:

1. Colorado Department of Public Health and Environment, Division of Emergency Management: (303) 756-4455
2. The Utah Department of Environmental Quality, 24-Hour Answering Service: (801) 536-4123
3. The U.S. Environmental Protection Agency, National Response Center: (800) 227-8914

Environmental Consequences of Proposed Action:

Based on the small estimated increase in traffic during operation and the measures to be carried out by the Operator described above, ore hauling activities are not expected to result in any appreciable effects to transportation in the area of the Sunday Mines or in potential exposure to workers and/or the public.

Environmental Consequences of No Action Alternative: Current mining operations and related ore haulage and measures described above would continue under the No Action Alternative. No additional ore haulage would occur under this alternative.

Mitigating Measures: BMPs have been incorporated into the Proposed Action to minimize potential impacts. No mitigation measures are required.

8.3 PRESENT AND AFFECTED ELEMENTS

Present and affected are discussed in this section. For the Proposed Action, those elements include:

Critical Elements

- Air Quality
- Cultural Resources
- Invasive Non-Native Species

Non-Critical Elements

- Geology and Minerals
- Paleontology
- Socioeconomics
- Public Health and Safety

8.3.1 Critical Elements

This section focuses on present and affected critical elements (see Table 3). Impacts are defined below.

- Long-term impacts are expected to remain for 5 or more years. Long-term impacts may result in alterations to the pre-project environment that may last for the lifetime of the proposed project and beyond.
- Short-term impacts are expected to last up to 5 years, although they may be disruptive and obvious. The environment generally reverts to pre-project conditions within 5 years.

Impacts are divided into the three levels summarized below.

- Moderate impacts cause a degree of change easy to detect but are not severe.
- Minimal impacts cannot be easily detected and cause little change in the existing environment.
- No impacts or negligible impacts do not result in changes to the existing environment.

Sections 8.3.1.1 through 8.3.1.3 analyze the affected environment and potential direct and indirect impacts of the Proposed Action and the No Action Alternative on Air Quality, Cultural Resources and Invasive Non-Native Species in the project area. Mitigating measures are also discussed, as applicable.

8.3.1.1 Air Quality

Affected Environment: The Sunday Mines are subject to the requirements set forth in CDPHE Air Quality Control Commission Regulation No. 3, “Stationary Source Permitting and Air Pollutant Emission Notice Requirements” (Regulation No. 3). The Operator has applied for and received final air permits for all Sunday Mines from the Colorado Department of Public Health and Environment (CDPHE) Air Pollution Control Division (APCD). All air permit-related documentation is available for review at the San Juan Public Lands Center and Dolores Public Lands Office.

The Sunday Mines would be a minor source of air pollution as defined by CDPHE. Sources of air emissions associated with the Sunday Mines include vent holes, vehicle travel on unpaved roads, ore and rock storage and handling, and other fugitive emissions. Most of the air emissions would be fugitive dust from day-to-day mining operations. The Operator would implement several measures as described herein to reduce possible impacts on air quality, including spraying the haul roads and the waste rock pile with water or a calcium chloride solution to reduce airborne particulates; seeding top soil stockpiles and areas that would not be used for long periods of time (greater than three years) to prevent wind erosion; and monitoring any radon emissions. Considering these measures, there would be a minimal impact to air quality during operations and reclamation.

The CDPHE air permit addresses common air pollutants called criteria pollutants, as well as hazardous air pollutants. Criteria pollutants include:

- Nitrogen dioxide (NO₂) – measured as nitrogen oxides (NO_x)
- Carbon monoxide (CO)
- Ozone (O₃) – a precursor to volatile organic compounds (VOCs)
- Particulate matter (PM)
 - Total suspended particulates (TSP)
 - PM with a diameter of 10 microns or less (PM₁₀)
- Sulfur dioxide (SO₂)
- Lead (Pb)

The EPA has also promulgated air quality standards for PM with a diameter of 2.5 microns or less (PM_{2.5}). PM_{2.5} can be emitted directly (primary PM_{2.5}) or formed in the atmosphere by reaction of other compounds (secondary PM_{2.5}). The majority of PM_{2.5} emitted from the Sunday Mines would be primary PM_{2.5} (i.e., dust) generated by material handling operations and vehicle traffic on unpaved roads. Based on EPA emission factors, PM_{2.5} from road dust is expected to be 10% of PM₁₀ from road dust (AP 42, Table 13.2.2-2) and PM_{2.5} from material handling is expected to be 15% of PM₁₀ from material handling and storage piles (AP 42, Chapters 13.2.4 and 13.2.5). An estimate of PM_{2.5} emissions from vent holes is not available at this time because the emission factors provided by CDPHE do not include PM_{2.5}. Therefore, total PM_{2.5} emissions from the Sunday Mines cannot be quantified at this time. Since a method to model PM_{2.5} has not been approved by the EPA at this time, modeling of PM_{2.5} is not yet required.

EPA has defined 188 hazardous air pollutants (HAPs). In addition to criteria air pollutants, the air permit addresses potential HAP emissions from the Sunday Mines. Table 4 summarizes the projected maximum air emissions from the Sunday Mines.

Table 4: Projected Maximum Air Emissions (Tons per Year)

Pollutant	Emissions (tons per year)
CO	10.2
NO _x	11.8
PM	51.5
PM ₁₀	27.2
VOC	1.6
SO ₂	0.5
Total HAPs	0.02

Source (Tetra Tech 2007c)

In 1979, the EPA designated radionuclides as a HAP, pursuant to section 112 of the Clean Air Act (CAA). In 1989, also pursuant to section 112 of the CAA, EPA promulgated National Emission Standards for Hazardous Air Pollutants (NESHAPs) to control radionuclide emissions from several source categories, including underground uranium mines. The Underground Uranium Mine NESHAP is codified in 40 Code of Federal Regulations (CFR) 61, Subpart B.

Underground uranium mines are ventilated to protect miners from exposure to substances such as radon (30 CFR Part 57). Ventilating to reduce miners' radon exposure may result in radon being emitted to ambient air. The Underground Uranium Mine NESHAP was promulgated to protect members of the public from these potential radon emissions. Mines subject to this regulation may not emit radon-222 (Rn-222) to the ambient air in excess of those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 millirem per year (mrem/yr).

Based on total and annual ore production rates, the Sunday Mines are subject to the Uranium Mine NESHAP. Under the federal regulations, the Operator monitors for RN-222 emissions from mine vent holes and submits an annual compliance report in conformance with the standards. Testing for Radon-222 emissions from the vent holes is completed by the Operator in accordance with 40 CFR 61, Appendix B, Method 115, Section 1 (“Radon-222 emissions from Underground Uranium Mine Vents”), specifically per Sections 1.1.1 (“Continuous Measurement”) and 1.2 (“Test Methods and Procedures”). Section 1.1.1 specifies that the radon-222 concentration shall be continuously measured at each mine vent whenever the mine ventilation system is operational. As provided in the Operator’s most recent annual compliance report for 2007, using the Environmental Protection Agency’s (EPA) Comply-R computer code, the dose equivalent generated by the model identified nearby receptors was 0.6 mrem/yr.

In addition to radon, it is also anticipated that public exposure to radioactive particulates from the mine vents would be negligible. MSHA regulates mine air quality conditions, and under the MSHA regulations, silicate particulate matter (dust) in underground mines is monitored weekly and must remain below a level protective of human health. Accordingly, the Operator implements dust suppression measures in the mine, such as watering, which limits dust emissions from the vent holes to a negligible amount.

CDPHE regulations (Regulation 1, Subpart III.D) require submission of a fugitive particulate emission control plan. In general, the regulations limit fugitive dust from mining activities to 20 percent opacity and no off-property transport. The off-property transport emission limitation guideline applies to on-site haul roads, but the nuisance guideline applies to off-site haul roads. An EPA-trained employee of the Operator would monitor opacity once every two weeks. Regulation No. 1 describes potential dust control measures for these sources, which include but may not be limited to:

- Watering or chemical stabilization of unpaved roads as often as necessary or as determined by the Operator and BLM and in conformance with San Miguel County regulations and permit conditions
- Restricting the speed of vehicles in and around the mining operation
- Restricting vehicular travel vehicles to established roads to the extent practical
- Covering loaded haul trucks
- Minimizing the area of disturbed land
- Revegetating disturbed surface areas

The following sections describe the sources of air emissions and planned mitigation operational measures that would be implemented to reduce air quality effects if necessary. The operational measures for each emission source are requirements identified in the air permit (Tetra Tech 2007c).

Vent Holes

It is conservatively estimated that a maximum of 13.7 tons per year (tpy) of PM₁₀ could be emitted from the vent holes at the Sunday Mines, based on the coal emission factor provided by the CDPHE. This is the maximum permitted amount of PM₁₀ that may be emitted from the vent holes according to CDPHE. This emission estimate is expected to

be conservative because the emission factor is based on worker exposure to total coal dust and does not differentiate between total PM and PM₁₀. Further, dust generated from coal mining operations would be much greater than that in hard rock mining operations. PM₁₀ emissions through the vent holes occur from underground dust-generating activities such as drilling. To control these emissions, watering of underground operations would take place to reduce dust generation underground. The emissions calculated for these operations do not account for any dust control from underground watering. Dust emissions from vent holes must meet the 20 percent opacity limit specified above. In general, no fugitive dust is visible from these vent holes on account of the underground watering. Therefore, it is anticipated that emissions from vent holes would not exceed opacity limits.

Material Handling

Material handling transfer points at the Sunday Mines include truck loading/unloading, front-end loader loading/unloading, and ore transfer off-site. Particulate emissions would be generated as the material moves through the transfer point. Most of the material being handled on-site (waste rock and ore) includes large pieces of rock (up to approximately 6 inches in diameter). Therefore, material handling emissions of PM₁₀ would be relatively low (less than 2 tpy). The Operator would implement control measures as necessary, which would include covering haul truck beds with tarps for off-site transportation. Dust emissions from material handling must meet the 20 percent opacity limit specified above. Fugitive dust emissions from material handling operations are not anticipated to exceed opacity limits.

Storage Piles

Particulate matter may be emitted from ore, waste rock, and topsoil storage piles. The waste rock and ore that would be stored on-site would be large pieces of rock (up to approximately 6 inches in diameter). Therefore, storage pile emissions of PM₁₀ from these materials are negligible. The Operator would spray water or chemical suppressants as needed on the storage piles to reduce fugitive dust. Emissions from the topsoil storage piles would be controlled by vegetation that would be established on the piles. Dust emissions from storage piles must meet the 20 percent opacity limit specified above. Fugitive dust emissions from storage piles are not anticipated to exceed opacity limits.

Vehicle Traffic

Particulate emissions would be generated by truck and other vehicle traffic. The force of the wheels on the road surface causes pulverization of surface material when a vehicle travels on an unpaved road. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface.

Particulate emissions associated with vehicle traffic can be reduced by reducing the silt content of the road surface, paving the road, limiting vehicle speeds, or using control techniques such as water sprays to minimize dust formation. Potentially feasible control options for the Sunday Mines include wet suppression with water and/or chemical agents and/or limiting vehicle speeds. The Operator would control fugitive dust for the on-site roads by enforcing low speed limits (i.e., 20 to 25 mph for haul trucks on the county

road) and applying water, magnesium chloride, calcium chloride, or equivalent to the haul roads within the mine workings and portal area as needed to reduce fugitive dust. The frequency of chemical suppressant applications would depend on site-specific conditions such as precipitation, wind, road dust silt content, and traffic type and volume.

After leaving the mine site, haul trucks would transport mined ore to the White Mesa Mill located near Blanding, Utah. The haul route would include approximately eight miles along County Road 20, which is unpaved. Dust emissions from haul trucks along this portion of the haul route would be minimized by reducing truck speeds (i.e., 25 mph). The CDPHE nuisance guidelines apply to off-site haul traffic. If CDPHE determines that dust emissions generated from the haul trucks along off-site roads are causing a public nuisance, the Operator would be required to submit a revised control plan that would propose strategies to mitigate the nuisance dust along the road. The Operator would work in conjunction with San Miguel County to implement dust suppression measures, such as chemical suppressant application, on County Road 20. The frequency of chemical suppressant applications would depend on site-specific conditions such as precipitation, road dust silt content, and traffic type and volume.

CDPHE has determined that Sunday Mines would not cause or contribute to a violation of the ambient air quality standards (AAQS) based on the Operator’s proposed operation plan and the results from dispersion modeling studies. Dispersion modeling studies are computer simulations that estimate the downwind transport and dispersion of air emissions and estimate the resulting pollutant concentrations in air. Dispersion modeling results are compared with air quality standards to determine if a facility would cause a violation of any air quality standards. The Operator submitted a dispersion modeling analysis for PM₁₀ with its permit application for the Sunday Mines. The analysis was reviewed by CDPHE and used as the basis for issuing the permit. Table 5 shows the results of the dispersion modeling analysis, and compares these results to the applicable ambient air quality standards.

Table 5: PM₁₀ Dispersion Modeling Results (micrograms per cubic meter of air)

Pollutant	Averaging Time	Modeled Concentration⁽¹⁾	Colorado Air Quality Standard	National Air Quality Standard
PM ₁₀	24-Hour	102.7	150 ⁽²⁾	150 ⁽²⁾
	Annual	22.5	50	50

⁽¹⁾ Includes added background concentration

⁽²⁾ Not to be exceeded more than once per calendar year

The modeled concentrations shown above, which include background concentrations of particulate matter, are below both National and Colorado air quality standards.

Environmental Consequences of Proposed Action: As discussed above, it has been determined by the CDPHE that operations at the Sunday Mines would not cause or contribute to a violation of the ambient air quality standards (AAQS) based on the Operator’s proposed operation plan and the results from dispersion modeling studies.

The Operator would implement measures to reduce possible effects on air quality and to comply with its CDPHE air permit. Considering these compliance measures, there would be minimal effect to air quality during operations and reclamation.

Environmental Consequences of No Action Alternative: Current mining operations would continue under the No Action Alternative. These operations would continue under the CDPHE air permit and the Operator would continue to implement measures to reduce possible effects to air quality and comply with the CDPHE air permit. Effects to air quality, similar to those under the Proposed Action, would be negligible.

Mitigating Measures: No mitigation is required.

8.3.1.2 Cultural Resources

Affected Environment: Cultural resource studies in southwestern Colorado demonstrate about 10,000 to 12,000 years of human occupation and use. These findings are represented by prehistoric Paleo-Indian, Archaic, Basketmaker (BMII-BMIII), Fremont, Ancestral Puebloan (PI-PIV), protohistoric Ute and Navajo, and historic Native-American, Spanish and Euro-American culture traditions. General descriptions of these can be found in recent comprehensive archaeological context documents for this area (Reed and Metcalf 1999; Church and others 2007).

Specific to Disappointment Valley and the Operator's proposed project area as outlined in the Topaz Mines POO, all the culture traditions listed above have been found and documented with the exception of two. No Ancestral Puebloan III sites have been documented nor are there any proto-historic or historic Navajo sites documented. Most prehistoric sites consist of late Paleoindian, early to late Archaic, proto-historic and Ute activity areas and range from stone tool production areas, to substantial lithic resource surface quarries, to camps and seasonal habitations including rock shelters, wickiup sites and rock art. These sites represent a moderate to high site density for Southwestern Colorado and demonstrate a predominately hunting and gathering lifestyle. Documented prehistoric sites date from 6000 BC to 1600 AD. (Reed and Metcalf 1999; Church and others 2007).

Historic-period cultural resources that have been located in or near the project area include evidence of Ute, Spanish and Euro-American use in the form of exploration, hunting and gathering, camping, early livestock ranching, and prospecting and mining associated with the exploration and development of radium, vanadium and uranium mines. Types of historic sites include hunting camps, lithic scatters, resource procurement and processing areas, trails, wickiups, peeled trees, homesteads, livestock camps, mining camps, mines, brush structures such as corrals or game drives and rock or tree inscriptions and in some cases associated landscape components (Reed and Metcalf 1999; Church and others 2007).

The Area of Potential Effect (APE) is defined by the BLM for the purposes of analyzing potential cultural resource impacts. The APE for the Operator's operations includes low to high density drilling areas, mines, vent holes and all other facilities necessary to the

safe operation of the Sunday, West Sunday, St. Jude, Topaz and Carnation Mines and exploration areas necessary to define ore bodies over the next five years. The APE lies in the Disappointment and Gypsum Valleys Unit described in the BLM's Class I Cultural Resources Overview, San Juan Field Office, Southwestern Colorado. It describes the area inclusive as intermixed "Medium" and "High" Priority Zones for cultural resources (Collins, Grimm & Wise, 2006). This means that there are a moderate to high number of highly significant as defined by NHPA and sensitive cultural resources in the project area. The Class I document emphasizes that within the 257 recorded sites on public BLM lands within the Disappointment and Gypsum Valley Unit there are over 360 different components representing different cultural occupations. This means that many of the sites were occupied repeatedly, sometimes over thousands of years. Of these 257 sites, 45 of them are within the APE for the Topaz POO (Collins, Grimm, and Wise 2006). The Class I also emphasizes that for sites such as those within the APE, "vandalism and disturbance of stratified deposits are the primary potential impacts" (Collins, Grimm, and Wise 2006). In addition, as numerous studies have shown for moderate to high density areas in Southwestern Colorado, vandalism (collection, defacement, looting) is more likely to occur within ¼ mile of an uncontrolled public motorized vehicle access routes, especially 4WD-accessible routes into areas previously inaccessible by motorized vehicles (Collins, Grimm, and Wise 2006).

In the Sunday Mines APE there are currently 8.64 miles of improved access routes that would be utilized and/or maintained by the Operator to conduct uranium mining and exploration activities per their POO. In addition another 1-3 miles of temporary access roads would be constructed and/or utilized annually to complete the subsequent years of exploration drilling activity. As long as these access routes are in use by the Operator they are also available for uncontrolled public use and often provide links to dozens of miles of abandoned drill roads: 2-track routes attractive for motorized vehicles access to remote areas.

Of the approximately 1835 acres in the Sunday Mines APE, 796 acres has already been inventoried for cultural resources at a Class III, intensive level, are on steep mobile slopes or are so heavily disturbed by historically recent uranium mining activity that no traces of past human activity remain. Per the POO, a Class III cultural resource inventory would be conducted (about 1,040 acres) of the remainder of the analysis area including density drilling areas noted in Figure 6 of the POO. Of the 45 sites already documented within the previously-inventoried acreage, over half are considered eligible or potentially eligible to the National Register of Historic Places. Projected site densities in the remaining 1040 acres of the analysis area are likely to be similar, meaning that there may be about another 67 sites to be documented and considered.

The Operator has provided a Class III, intensive cultural resource survey of 84 acres. This inventory includes all areas proposed for surface disturbance in 2007 and beyond (1 waste-rock dump expansion, 30 drill holes and access roads and seven vent shafts and access roads). A total of 9 sites and 9 isolated finds were recorded. Five of the sites were evaluated as eligible to the National Register of Historic Places.

Environmental Consequences of Proposed Action Alternative: The BLM has determined that the development of uranium mineral resources including annual exploratory and development drilling by the Operator may have direct, indirect and cumulative effects upon scientifically important cultural resource properties eligible for inclusion in the National Register of Historic Places, and has consulted with the Colorado State Historic Preservation Office pursuant to Section VIII.C.(2).(b) of the State Protocol Agreement.

Effects on these resources in the entire APE cannot be fully determined at this time due to lack of inventory and evaluation data; and both parties have agreed to set forth procedures to be followed to collect that data in advance of surface-disturbing operations and to provide that data in a format acceptable to the BLM. The Topaz POO provides provisions for the completion of this data collection in 2008. The Colorado State Historic Preservation Office has agreed that this is the most appropriate approach and would anticipate an annual review of the project to be submitted by the BLM under Section 106 of the National Historic Preservation Act.

For the first year's operations, 30 exploratory drill holes, 1.3 miles of temporary access roads, 1 waste rock dump expansion (2.4 acres), and the possible construction of one or more of the seven vent sites with 1.2 miles of associated access roads are proposed.

The cultural resource inventory provided by the Operator for the first year's proposed operations revealed potential direct impacts to two National Register "eligible" sites from temporary access road construction and use by the Operator for the Sunday Mine drilling activity. In addition, there is potential for indirect impacts to scientifically important sites within a ¼ mile of motorized vehicle access routes including temporary drill roads and staging areas, maintained roads, vent sites and mine facilities. Impacts from uncontrolled public use of temporary drill roads and staging areas can be reduced by completing timely reclamation measures (within 1-2 weeks following completion of drilling activity). Impacts to scientifically important sites within a ¼ mile of more permanent facilities such as maintained project-area roads, vent holes and mine facilities that provide uncontrolled public access would need to be watched closely to prevent damage and monitored frequently for evidence of vandalism. If temporary drilling activity results in an overall increase in the amount of motorized vehicle access available for uncontrolled public use for longer than a 1-2 week period the threats to nearby cultural resources in those areas is significant increased.

Environmental Consequences of No Action Alternative: Under the No Action Alternative, there would be no additional impacts to cultural resources incremental to impacts that may have already occurred due to historical activities.

Mitigating Measures: Additional measures are necessary to prevent adverse environmental consequences to scientifically important cultural resources from proposed mining activity beyond those proposed in the Topaz POO. They are:

1. Access roads that are proposed to be utilized for the 1st year of drilling operations cross through two eligible cultural properties, (5SM5599 and

5SM5601). The BLM would require temporary protective fencing during drilling operations (including reclamation) to protect them from surface disturbance or inadvertent damage.

At 5SM5599, the existing bladed access road passes through the center of the site. Approximately 460 feet of fencing (e.g., silt fencing) would be temporarily placed on either side of the access road at the edge of the existing disturbed area that forms the two-track and to the north about 45' from where the road enters the east boundary of the site.

At 5SM5601, the existing bladed access road passes through the site. Approximately 525 feet of fencing (e.g., silt fencing) would be temporarily placed on either side of the access road at the edge of the existing disturbed area that forms the two-track road.

A BLM or BLM-permitted archaeologist familiar with the boundaries of these sites would direct the placement of the fencing which would be placed by hand. All fencing would be removed upon the completion of the exploration and associated reclamation activity.

2. Access routes constructed or utilized to complete annual drilling activity would be reclaimed as soon as possible following drilling (within 1-2 weeks is preferred). If agency monitoring reveals impacts to adjacent sites from vandalism, illegal collection or looting before reclamation is complete, additional reclamation measures may be necessary and these would be completed by the Operator in cooperation with the BLM.
3. If cultural resources are discovered during plan-related operations, all activities in the vicinity of the resource would cease immediately and the Operator would notify the BLM Authorized Officer. The BLM or a BLM-permitted archaeologist would inspect and evaluate the discovery as soon as possible if during drilling operations but at most within 5 days to determine its nature and extent and eligibility to the National Register of Historic Places. If the resource is determined "eligible", the BLM would determine appropriate avoidance and protection measures after consulting with the Operator. If avoidance is not possible, data recovery would be completed by the Operator according to Department of Interior policies and guidelines and the BLM Protocol with the Colorado State Historic Preservation Office.
4. Human remains and associated artifacts may be discovered during project development or during controlled archaeological test excavations. Discovery of such items would be handled in accordance with the provisions of the Native American Graves Protection and Repatriation Act. Pursuant to 43 CFR10.4(g), the BLM authorized officer must be notified, by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR10.4 (c) and (d), activities must stop in the vicinity of the

discovery and the discovery must be protected by the BLM and the Operator for 30 days or until the Operator is notified by the authorized officer. All reasonable measures would be taken to resolve any issues regarding affiliation and disposition of discovered remains within a 30 calendar day period beginning with the agency certification of initial notification.

5. The Operator is responsible for informing all persons associated with this project that they would be subject to prosecution for knowingly disturbing Native American Indian shrines, historic and prehistoric archaeology sites, vertebrate fossils, or for collecting artifacts of any kind, including historic items and/or arrowheads and pottery fragments from Federal lands.
6. BLM or BLM-permitted archaeologists would be required to be on site (within the Area of Interest/APE) semi-annually to monitor compliance with these conditions and to inspect the condition of cultural resource properties. Should the condition of cultural resources be found to be impacted or in a deteriorated state due to actions of the Operator, its employees, or its subcontractors, mitigation measures would be directed by the BLM and implemented to federal standards by the Operator and may involve excavation or intensive reclamation activity. If gross neglect or intent is involved, civil or criminal penalties may also apply.

8.3.1.3 Invasive Non-Native Species

Affected Environment: Two noxious weed surveys were completed at the Sunday Mines in May 2007. One survey was completed for the areas of proposed exploration drilling holes, and another survey was conducted for the areas of proposed vent holes and WRA expansion. The surveys were based on the Colorado Division of Agriculture (CDOA) “Colorado State Weed List” (CDOA 2007) and the Colorado State University Extension Service’s “San Miguel County Noxious Weeds List” (Colorado State University Extension Service 2007).

Both surveys found noxious weeds in relatively small patches. Noxious weeds identified included halogeton (*Halogeton glomeratus*), Russian knapweed (*Acroptilon repens*), and various species of tamarisk (*Tamarix spp.*). A 12-acre linear patch of Russian knapweed was found along the existing road that runs from the Sunday Mine to proposed exploration drilling hole areas. This patch of knapweed was not associated with proposed exploration drilling holes or new access roads.

Environmental Consequences of Proposed Action: The Proposed Action could disturb existing populations of noxious weeds. Russian knapweed and halogeton densities may increase within the short term at the Sunday Mines. Monitoring and treatment of these species after surface disturbance would reduce the densities of these species to below current levels. Weeds and invasive species are spread by a variety of means including humans (e.g. workers, hikers, and recreationalists, etc.), vehicles, construction equipment, construction and reclamation materials, livestock, and wildlife.

The Operator completed a weed management plan in June 2007 (included in the Topaz Mine POO) to control non-native invasive species. The weed management plan is compliant with San Miguel County “Noxious Weed Management Plan” (San Miguel County 2002) and the “Colorado Noxious Weed Act” (CDOA 2003). The plan requires, among other measures, the following:

- Prior to any construction disturbance, all known noxious weed populations would be flagged so that they may be avoided.
- Prior to entering the project area, vehicles and equipment would be cleaned by manual methods of all mud, dirt, and plant parts where there is potential to import weeds.
- Equipment, material, and vehicles would be stored at specified work areas or construction yards. All employee vehicles, sanitary facilities, and staging areas, would be confined to a limited number of specified weed-free locations to decrease chances of incidental disturbance and spread of noxious weeds and invasive plants.
- Disturbed areas would be promptly seeded following completion of activities to reduce the potential for the spread and establishment of noxious weeds and invasive plants.
- Only county/BLM-approved mixtures of certified “weed-free” seed would be used. All other introduced materials used for mining activities such as straw, fill, and gravel would also be certified weed-free.

Pesticides may be used to control noxious weeds. The Operator would obtain from the BLM an approved pesticide use proposal prior to application of any pesticides at the Sunday Mines. Pesticide application records would be submitted annually subsequent to pesticide applications.

Annual reports on the status of activities at the five Sunday Mines would be prepared for the BLM. The annual report would summarize the status of the noxious weed program and the status of pesticide usage at the five Sunday Mines. Annual reports would be submitted on the same schedule as the annual reports submitted to DRMS. In addition, the annual reports would include anticipated plans for the upcoming year.

The Operator would treat the specific areas of disturbance for noxious weeds at least 1 week before such disturbance in accordance with the weed management plan. The Operator would report in its annual report any new noxious weed infestations found and mitigation measures implemented.

Environmental Consequences of No Action Alternative: There would be no new disturbance under the No Action Alternative. However, populations of invasive and noxious weeds within the currently permitted Sunday Mines operations would continue to be treated.

Mitigating Measures: Mitigation measures include those as specified in the weed management plan.

8.3.2 Non-Critical Elements

Sections 8.3.2.1 through 8.3.2.4 analyze the affected environment and potential direct and indirect impacts of the Proposed Action and the No Action Alternative on Geology and Minerals, Paleontology, Socioeconomics, and Public Health and Safety in the project area. Mitigating measures are also discussed, as applicable.

8.3.2.1 *Geology and Minerals*

Affected Environment: The project area lies within the Colorado Plateau physiographic province and Big Gypsum Valley. The rock hosting the ore body is the Salt Wash Member of the Morrison Formation of late Jurassic age. Uranium production has occurred in the San Juan/San Miguel planning area since the early 1900s, with major production from the Salt Wash Member of the Morrison Formation (BLM 1985).

Environmental Consequences of Proposed Action: Waste rock and uranium ore would be extracted from ore seams in the underground mine workings, which vary in height and have an average seam thickness of approximately 4 to 5 feet. The area of existing development averages about 500 feet below the ground surface (bgs), with maximum depths of 800 feet bgs in the southern end of the Topaz Mine. The extraction of mineral resources constitutes an irreversible loss of these resources. However, this area of Colorado and nearby areas in Utah, northern New Mexico, and northern Arizona provide other opportunities for uranium ore production.

Environmental Consequences of No Action Alternative: The No Action Alternative would not impact geology or minerals. Under the No Action Alternative, no uranium mining would occur and the resource would remain in its current state.

Mitigating Measures: There are no mitigating measures required.

8.3.2.2 *Paleontology*

Affected Environment: To examine the potential for fossil resources within the project area for the Sunday Mines POO, the geologic formations present in the area were compared to the BLM's Potential Fossil Yield Classification (PFYC) system (BLM 2007c). Outcrops of the Entrada and Burro Canyon Members of the Morrison Formation, and the Mancos Shale Formation occur in the Analysis Area. The Entrada and Burro Canyon Members are both of a potential high yield for important vertebrate fossil remains, primarily dinosaurs. Paleontological inventories already completed in the project area have documented over a dozen localities of fossil bone and dinosaur tracks making this area a high level of concern for protection of these important resources. Dozens more localities may lie within the un-inventoried portions of the project area and are at risk from underground mining, surface disturbing operations and illegal excavation and collection, the risk of which increases with motorized vehicle access routes that bring collectors and looters to remote areas where they can more easily collect and dig undetected.

A paleontological inventory provided by the Operator for the first year's proposed operations revealed a moderate to high density of surface-exposed fossil resources including body fossils (skeletal material) and ichnofossils (tracks, trackways and other traces). This inventory verified initial expectations that this is an area of scientifically important and sensitive paleontological resources.

Measures to prevent adverse environmental consequences to scientifically important resources from proposed mining activity beyond those proposed in the Topaz Mine POO include:

1. If paleontological resources are discovered during plan-related operations, all activities in the vicinity of the resource would cease immediately and the Operator would notify the BLM Authorized Officer. The BLM or a BLM-permitted paleontologist would inspect and evaluate the resource as soon as possible if during drilling operations but within no longer than 5 days and appropriate measures to mitigate adverse effects to scientifically important paleontological resources would be determined by the authorized officer after consulting with the Operator. The Operator is responsible for the cost of any investigation necessary for the evaluation and for any mitigation measures. The Operator may not be required to suspend all operations if activities can avoid further impacts to a discovered site or be continued elsewhere, however, the discovery shall be brought to the attention of the authorized officer as soon as possible and protected from damage or looting.
2. The Operator is responsible for informing all persons associated with this project that they would be subject to prosecution for knowingly disturbing or collecting vertebrate fossils.
3. Should fossil resources be found during underground mining operations, reasonable efforts would be undertaken by the Operator to protect the fossil find or move it to a safe area for inspection, and notify the BLM Authorized Officer within 48 hours of discovery. The BLM would provide an assessment of the significance of the find within 10 days and may require additional reasonable measures to preserve it.
4. During construction activities on the surface (outside the mine passageways), if any paleontological resources are recorded within proposed disturbance areas during preliminary surveys and do not require avoidance, any construction activities disturbing the ground surface would be monitored for additional paleontological resources. During planning for the first year's operations, a fossil inventory revealed 6 vertebrate fossil sites near or within the boundaries of proposed mining activity. None of these were recommended by the BLM-permitted paleontologist for avoidance. However, it was noted that deposits may lie beneath the surface. Therefore, a BLM or BLM-permitted paleontologist would monitor any additional construction or road blading operations in the vicinity of the following resources to document and determine if additional fossil protection is needed: 5SM5718, 5SM5719, 5SM5721, 5SM5722, 5SM5724, and 5SM5725. If the monitor identifies additional material, it would be immediately evaluated by the BLM or BLM-permitted

paleontologist, and if found to be scientifically important, construction activity would cease and measure #1 (above) would be followed.

For outyear operations (years 2 and on), a BLM or BLM-permitted paleontologist may be required to monitor construction or maintenance operations as deemed appropriate by the BLM following their review of the Operator's annual or other proposals.

Environmental Consequences of Proposed Action Alternative: The BLM has determined that the development of uranium mineral resources including annual exploratory and development drilling by the Operator may have potential direct, indirect and cumulative effects upon scientifically important paleontological resources in Category 4 & 5 (the highest categories) of the BLM's Potential Fossil Yield Classification system. Resources within these formations are highly sensitive and have very important scientific value with museum-quality specimen potential.

Effects on these resources in the entire project area cannot be fully determined at this time due to lack of complete inventory and evaluation data; and both parties have agreed to set forth procedures to be followed to collect that data in advance of surface-disturbing operations and to provide that data in a format acceptable to the BLM. Contingency measures are also needed to provide direction in case discoveries made during mining operations, since the fossil containing matrix can be encountered during underground mining operations and under deeper soil deposits during surface-disturbing operations. The Paleontology section in the Topaz Mine POO describes the measures that the Operator proposes to complete collection of paleontological data for analysis in years subsequent to 2008 and to assist with protection of these resources in the project area.

A paleontological inventory provided by the Operator for the first year's proposed operations found numerous fossil sites and states that "The potential for impact to significant vertebrate fossil resources is obviously high in this area" (Uinta Paleontological Associates, Inc. 2007). Though no direct impacts were anticipated from the staked locations for vent holes, vent hole access roads, waste rock dump expansion area and the first year of exploratory drilling activity, several of the proposed construction sites and/or access routes are adjacent to or in the general vicinity of vertebrate fossils, including skeletal fossils and tracks, trackways and other traces. As such, there is a potential for indirect impacts (from inadvertent activity, collection and looting primarily) to scientifically important fossil resources adjacent to or in the general vicinity of these motorized vehicle access routes including temporary drill roads and staging areas, maintained roads, vent sites and mine facilities. Evidence of recent illegal excavation was noted at one locality within the investigation area, thereby providing evidence of this potential and a high level of interest. Inadvertent impacts and impacts from uncontrolled public use of temporary drill roads and staging areas can be reduced by completing timely reclamation measures (within 1-2 weeks following completion of drilling activity). Impacts to scientifically important sites close to more permanent facilities such as maintained project-area roads, vent holes and mine facilities that provide uncontrolled public access would need to be watched closely by the BLM to prevent damage and monitored frequently by the BLM for evidence of illegal collection or excavation. If mining activity results in an overall increase in the amount of motorized

vehicle access available for uncontrolled public use for longer than a 1-2 week period the threats to nearby paleontological in those areas is significantly increased.

Environmental Consequences of No Action Alternative: Under the No Action Alternative, there would be no additional impacts to paleontological resources incremental to impacts that may have already occurred due to historical activities.

Mitigating Measures: Mitigation measures as required include:

1. Access routes constructed or utilized to complete annual drilling activity would be reclaimed as soon as possible following drilling (within 1-2 weeks is preferred). If agency monitoring reveals impacts to adjacent fossil sites from illegal collection or looting before reclamation is complete, additional reclamation measures may be necessary and these would be completed by the Operator in cooperation with the BLM.
2. BLM or BLM-permitted paleontologist would be required to be on site (within the Area of Interest/APE) semi-annually to monitor compliance with these conditions and to inspect the condition of paleontological properties. Should the condition of the paleontological resources be found to be impacted or in a deteriorated state due to actions of the Operator, it's employees, or it's subcontractors, mitigation measures would be directed by the BLM and implemented to federal standards by the Operator and may involve excavation or intensive reclamation activity. If gross neglect or intent is involved, civil or criminal penalties may also apply.

8.3.2.3 Socioeconomics

Affected Environment: The Proposed Action is located in western San Miguel County southwest of the incorporated town of Naturita. San Miguel County is sparsely populated, with a population of 7,116 people and a density of 5.53 persons per square mile (U.S. Census Bureau 2007). Although the population of San Miguel County grew over the last few decades, forecasts indicate that population growth is slowing and will remain steady through 2020. The 2010 projected population is 8,693 (Hentschel and Walden 2006). According to U.S. Census Bureau survey data from 2004, from 2000 to 2003, the number of housing units increased 7.3 percent and the percent vacancy decreased from 42 to 41.1 percent. The high vacancy rate is mostly occurring in rural towns (U.S. Census Bureau 2004). About 10 percent of the county's residents live below the poverty level (U.S. Census Bureau 2004).

The County's economy historically has centered on mining and ranching, but over the last few decades, the economy has shifted to rely on construction, real estate, and tourism. The economy of western San Miguel County, which encompasses the project area, still relies on ranching, farming, and energy and minerals development (Hentschel and Walden 2006).

San Miguel County's August 2008 labor force consisted of 5,923 people, of which 5,726 are employed. The percent unemployment in San Miguel County in August 2008 was 3.3 percent (Colorado Department of Labor and Employment 2008). The median income was higher than the state average (U.S. Census Bureau 2004), but this statistic is most likely skewed due to the higher incomes represented by the residents of Telluride. The agriculture, forestry, fishing and hunting, and mining industry made up about 2.5 percent of the total San Miguel County workforce (U.S. Census Bureau 2004).

The workforce for the Topaz Mine project would come from the smaller communities of Dove Creek, Naturita, and Nucla around the project site in the far western portion of the county. These areas historically have supplied the workforce for uranium mining and milling activities. The workforce may need to come from as far as Cortez, Colorado. Cortez is located 80 miles south of the Sunday Mines and has a population of approximately 8,500 people. Other, larger cities in the region of the Sunday Mines, such as Grand Junction, are more than 150 miles away. These distances are not feasible for a daily commute to the Sunday Mines.

The towns of Naturita, Nucla, and Dove Creek have remained small (between 650 and 750 people per town) for the last several decades and are located in Montrose and Dolores Counties. The percent unemployment in Montrose and Dolores Counties are 4.8 percent and 7.5 percent, respectively (Colorado Department of Labor and Employment 2008). Population growth in the entire area is directly proportional to uranium mining activity. According to one long-time resident, Jim Fisher, who has lived in Dove Creek since 1969 and works for Denison Mines (USA) Corp., when the mines are operating, young people have jobs and stay in the surrounding towns. Otherwise, they leave to find work. He also verified that past mining operations have largely been the reason that infrastructure and housing were established in these towns. Roads, homes, and public facilities were constructed to support the influx of people working at the mines (Fisher 2008).

Beginning in 2004, Constellation Copper Corporation (located about 30 miles west of Dove Creek) invested \$9 million in wages and \$18 million in goods and services for a positive economic benefit in surrounding communities with supply-chain and vendor services. In early 2007, an executive decision was made to suspend the mine's copper production, and as a result, approximately 100 workers were laid off at the end of January 2008 (Constellation Copper Corporation 2008).

Oil and gas production in San Miguel County peaked in 2003 and 2004 and has been steadily declining. The oil and gas production in Dolores County was highest in 2000 and has also been steadily declining. Montrose County has had little to no oil and gas production (Colorado Oil and Gas Conservation Commission 2008). It is highly probable that past oil and gas activities had a positive effect by stimulating the economy early in this decade. Mesa County, located just north of Montrose County, has been producing more oil in the last 3 years than in earlier years. Allen Belt, Montrose County Commissioner, who represents the western section of the county (including the towns of Nucla and Naturita), stated that this production has boosted the economy in Nucla and Naturita (Belt 2008). Montezuma County, located just south of Dove Creek, has been

producing more oil and gas than any other county in the region for the last several years. Ernest Williams, Dolores County Commissioner, stated that the oil and gas industry in the area has had a very positive effect on Dove Creek's economy (Williams 2008).

Environmental Consequences of Proposed Action: Initial mine development requires approximately five miners and support personnel per mine. It is anticipated that once all five mines are in full production, about 100 people would collectively work at the five Sunday Mines (approximately 20 miners per mine). However, the workforce would be distributed at different mines, depending on the mine size, ore production, and general mining activities. In addition, three to five of the Operator's personnel are working at the mines in supervisory roles, as needed.

A separate trucking contractor transports ore from the mines to the Operator's White Mesa Mill located near Blanding, Utah. This activity adds about 5 to 10 workers to the overall operations. These workers are residents of local communities and purchase goods and services in their home areas. These workers are also local, state, and federal taxpayers. The Sunday Mines Complex also draws on several regional vendors to provide fuels, lubricants, mine supplies, equipment, repair parts, etc. The vendors and service providers are also taxpayers and contribute to highway and fuel taxes in the area.

Allen Belt, the Montrose County Commissioner, stated that this area of Colorado is considered economically depressed and that the creation of jobs from mining operations would positively impact the area's economy. He stated that the reason for the economic depression is that there are no jobs in the area except for mining-related jobs. In addition, he stressed that the labor force is small and that workers from Cortez would be needed. Mr. Belt also addressed the lack of new infrastructure in the towns of Nucla and Naturita and stated that the townspeople are expecting the mining companies to improve and maintain the roads and to supply more housing for the workers needed for the Sunday Mines (Belt 2008).

Ernest Williams, Dolores County Commissioner, stated that mining operations have a positive impact on the Dove Creek economy but does not know whether the population fluctuates with operations. He stated that the mines generally hire local people who are already established in the community. Mr. Williams also confirmed the opening of a bio-diesel plant in the area. The plant would only hire a "handful of people" but would have a positive impact on local farmers who participate in sunflower production for the project (Williams 2008).

Also, it is highly conceivable that workers associated with Constellation Copper Corporation's past operations would benefit from the jobs created by the Operator, especially because the nearest town to the copper mine, Monticello, Utah, only has a population of about 2,000 and would not be able to support a large demand for jobs.

Based on the information above, the Proposed Action would boost the local economy. Some infrastructure is in place from past mining operations and quite possibly from the oil and gas industry, the Lisbon Valley Copper Mine, and the U.S. Department of Energy reclamation project in Monticello. Mine construction would provide short-term

employment to area residents, and mine operations would provide long-term employment and contribute relatively high-paying jobs and a dependable long-term tax base to San Miguel County.

Environmental Consequences of No Action Alternative: Under the No Action Alternative, the activities associated with the Proposed Action would not occur. Additional revenue distributions to federal, state, and county governments also would not occur, nor would the local economy benefit from expenditures by the Operator, its contractors, and other employees.

Mitigating Measures: No mitigating measures are required.

8.3.2.4 Public Health and Safety

Affected Environment: Mining-related illnesses and injuries have steadily declined over the years because of stricter safety laws and improvements in mining machinery and practices. The potential for health impacts from modern uranium mining does not differ appreciably from those associated with other types of mining. The aspect of uranium mining that differentiates it from other mining is the potential for exposure to ionizing radiation from uranium ore and radon gas and its progeny.

As discussed in the Uranium Leasing Program Final Programmatic EA (DOE 2007), uranium mine sites comprise rocks and soils that contain naturally occurring radioactive material. Most of the natural radioactivity is derived from the uranium-238 and uranium-235 decay chains. One of the products in the uranium-238 decay chain is radium-226, which is the principal radionuclide of concern for characterizing the distribution of radioactivity in the environment.

The primary radioactive sources on uranium mine lands are mine-waste-rock piles, mine portals, ore-bearing outcrops and airborne particulates derived from these sources. Background concentrations of radium-226 in mine-waste-rock piles have been reported to average 23.7 pCi/g. In the underground mines, the primary radium-226 source is the ore-bearing Salt Wash Member (DOE 2007).

Nationwide, people are exposed to an average of about 300 mrem/yr of natural background radiation (NCRP 1987). The largest natural source is inhaled radioactivity, mostly from radon-222 and its radioactive decay products in homes and buildings, which accounts for about 200 mrem/yr. Additional natural sources include radioactive material in soils, radioactive material in the body, and cosmic rays from space filtered by the atmosphere. The actual radiation dose from natural background radiation varies with location. The total natural background radiation dose in the region around DOE's uranium lease tracts is about 440 mrem/yr (DOE 2007). These 38 lease tracts encompass 27,000 acres in southwest Colorado in Mesa, Montrose, and San Miguel Counties.

All mines are required to conduct operations in accordance with MSHA regulations. All miners receive mandatory 40-hour MSHA safety training and annual 8-hour refresher training. The Operator has daily safety meetings and each worker fills out a safety card each shift identifying any hazards noted in the individual's work area to be addressed by the Operator. Routine safety inspections are conducted to check the work area for such hazards as loose roofs, dangerous gases, and inadequate ventilation.

Water and, if necessary, surfactants would be used inside the mine workings to control dust from vehicular traffic, and all underground drilling activities use water so that dust from drilling is minimized. Split-set roof bolts would be installed at a specified spacing to prevent roof cave-ins, the biggest cause of mining injuries. Brattice builders would construct doors, walls, and partitions in tunnel passageways to force air into the work areas. Shift bosses would oversee all operations at the worksite.

Additional measures that would be taken at the Sunday Mines to protect worker health and safety include:

1. Radon within the mine is currently, and would continue to be, measured in accordance with regulations at 30 CFR, Part 57, to ensure worker safety and to control worker exposure to radon and its daughter products. As such, radon measurements would be used to adjust mine ventilation and the working environment as necessary to ensure that worker exposures do not exceed the annual dose limit for radon and to maintain exposures as low as is reasonably achievable. The threshold limits for airborne contaminants such as radon are adopted from the American Conference of Governmental Industrial Hygienists (ACGIH) and can be obtained at <http://www.acgih.org>.
2. Gamma surveys would be conducted in accordance with regulations at 30 CFR, Part 57 within the working areas of the mines in order to monitor the potential external radiation exposure of mine workers. These surveys would provide necessary information to determine (1) time and distance restrictions, if necessary, within particular areas of the mines and (2) the need for personal radiation detection monitoring. However, because of the expected low grade of the ore at the mines and associated limited gamma exposure, time and distance restrictions and personal monitoring are not anticipated.
3. General worker safety would be ensured through routine observation of worker behaviors and working areas within the mines and the presence of safety personnel to ensure that MSHA safety requirements are met. In addition, frequent and regularly scheduled safety meetings would be conducted to ensure a very high level of safety training and awareness by mine workers. Such training and indoctrination would be mandatory.
4. Surface disturbances and ore handling operations are routinely observed by mine personnel to determine the need for application of water or dust suppressants to control dust from surface and construction operations.

Public access to the mine site would be precluded in order to eliminate public safety concerns. However, activities such as hiking, hunting, and camping could bring individuals to the area. These individuals could be exposed to radiation in the project area through inhalation of radon, inhalation and ingestion of radioactive particulates attached to dust, and external exposure to gamma radiation.

As discussed in the Uranium Leasing Program Final Programmatic EA (DOE 2007), the EPA evaluated exposures from radon emissions for individuals located near uranium mines and found that for underground uranium mines, radon concentrations for nearby individuals (within 0.33 to 33 miles) ranged from 2.0×10^{-6} to 0.0031 working levels. Assuming that an individual was continuously exposed at these concentrations, this is equivalent to a probability of a latent cancer fatality of 5.5×10^{-8} to 8.5×10^{-5} , or about 5 chances in 100 million to 8 chances in 100,000. Over 10 years, the probability of a latent cancer fatality would range from 5.5×10^{-7} to 8.5×10^{-4} , or about 5 chances in 10 million to 8 chances in 10,000. For perspective, an individual has a lifetime probability of dying of cancer from all sources of about 220,000 in 1 million, or a risk of lung cancer of 60,000 in 1 million. Radon ventilated from a mine quickly disperses. As discussed in Section 8.3.1.1, Air Quality, Mine ventilation systems would be monitored and modified as needed to ensure that releases of radon are in compliance with the requirements of EPA's NESHAP program and that potential exposure of the public would be maintained at a level as low as reasonably achievable.

As discussed in Section 8.3.1.1, Air Quality, dust and accordingly radioactive particulate emissions from mine vents would be controlled through dust suppression measures implemented in the underground mine workings in compliance with MSHA requirements. Fugitive dust emissions from the WSA and ore stockpile would be limited due to the larger size of these materials, and the Operator has committed to implementing dust suppression measures, such as watering, to meet dust emission (opacity) limits set forth in the Operator's air permit for the Sunday Mines operations.

As discussed in the Uranium Leasing Program Final Programmatic EA (DOE 2007), to assess exposures to members of the public on the lease tracks, an individual was assumed to camp on a mine-waste-rock pile for 24 hours a day over a 14-day period. The uranium concentration in waste-rock on the particular lease tract selected for assessment was about 0.040 percent U_3O_8 . This resulted in a radium-226 concentration of about 110 pCi/g in the waste rock, assuming that uranium is in equilibrium with its radioactive decay products. The radiation dose from camping on waste rock was estimated to be 49 mrem per year. The most significant exposure pathway was external exposure from gamma radiation emitted from the mine-waste-rock pile, which caused over 90 percent of the radiation dose. This radiation dose is equivalent to a probability of a latent cancer fatality of 2.9×10^{-5} , or about 3 chances in 100,000. As also discussed in the Programmatic EA (DOE 2007), after a mine site was reclaimed, the potential for exposing members of the public to radiation from waste rock would be reduced and the potential for radiation exposures after reclamation would be expected to be negligible.

No federal or state radiological standards currently exist for reclamation or post-closure of WRAs at uranium mine sites. However, numerical health and environmental

protection standards have been established for remedial actions at inactive uranium processing sites (abandoned uranium and thorium mill sites designated as “Title 1” sites under Section 1.2 [a][i] of the Uranium Mill Tailings Radiation Control Act). These standards are specified in 40 CFR, Section 192.12 and are presented below.

“Remedial actions shall be conducted so as to provide reasonable assurance that, as a result of residual radioactive materials from any designated processing site:

- (a) The concentration of radium-226 in land averaged over any area of 100 square meters shall not exceed the background level by more than:
 - (1) 5 picocuries per gram (pCi/g), averaged over the first 15 cm of soil below the surface, and
 - (2) 15 pCi/g, averaged over 15 cm thick layers of soil more than 15 cm below the surface.”

Although this standard was not designed specifically for the reclamation of uranium mine sites and does not technically apply to reclamation activities at the Sunday Mines, it is prudent mining practice to adopt a similar standard for the reclamation of the WRA at the Sunday Mines. Accordingly, the Operator would apply the standards summarized below to the WRA.

The concentration of radium-226 averaged over any area of 100 square meters of the reclaimed WRA shall not exceed the background level in the project area by more than the following:

- (1) 5 pCi/g averaged over the first 15 centimeters of material below the surface, and
- (2) 15 pCi/g averaged over the next 15-centimeter-thick layer of material below the surface.

The curie is a standard measure for the intensity of radioactivity contained in a sample of radioactive material. The basis for the curie is the radioactivity of one gram of radium. Radium decays at a rate of about 2.2 trillion disintegrations per minute. A picocurie is one trillionth of a curie and represents 2.2 disintegrations per minute.

The following shows the relative difference between the units and gives examples of where the amounts of radioactivity could typically be found:

- 1 Curie ————→ Nuclear medicine generator
- 1 Millicurie ————→ Amount used for a brain or liver scan
- 1 Microcurie ————→ Amount used in thyroid tests
- 1 Nanocurie ————→ Consumer Products
- 1 Picocurie ————→ Background environmental levels

US Army Corps of Engineers FUSRAP Fact Sheet – How Big is a Picocurie?

Environmental Consequences of Proposed Action: Worker health and safety at the Sunday Mines could be affected by multiple work hazards, such as ground fall, explosives handling, scaling activities, roof bolting, drilling, dust and other respiratory issues associated with inadequate ventilation, and equipment handling and maintenance. Worker health and safety would also be affected by exposure to ionizing radiation and radon. The safety of the workers within the mine and at the mine site would be ensured through monitoring and inspection programs responsive to the requirements of the MSHA that would be implemented by the Operator. Compliance with the MSHA requirements, as well as requirements set forth in the Operator's air permit, and implementation of the operational measures discussed above would also reduce effects to public health and safety to negligible levels.

Environmental Consequences of No Action Alternative: Under the No Action Alternative, current mining operations at all the Sunday Mines would continue until such time as additional vent holes would be required for worker health and safety. The Operator would continue to comply with MSHA and the Operator's air permit requirements and implement operational measures for protection of public health and safety.

Mitigating Measures: The Operator currently conducts and would continue to conduct routine safety inspections. If it is determined that safety standards are not met, mining operations would cease until conditions are made safe.

9.0 CUMULATIVE IMPACTS

Cumulative effects are determined by adding the incremental impacts of an action to the impacts generated from other past, present, and reasonably foreseeable future actions in the Area of Influence (AOI). The AOI can vary from project to project and from resource to resource within the same project, depending on the type of project and the resources affected. For this EA, the AOI is defined as a 50 kilometer (km) radius area around the Sunday Mines. This 50 km radius is being used because it is considered "near field" by the EPA and other agencies for air quality effects. The effects to other resources from the Proposed Action would not reasonably be expected to extend beyond this 50 km radius AOI.

9.1 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Past and existing activities that have impacted area resources include the following:

- Minerals development (mining and oil and gas)
- Livestock grazing activities
- Recreation activities, primarily hunting

Quantitative data does not exist for many historical disturbances related to minerals activities. Therefore, an accurate amount of acres of disturbance from past activities cannot be provided. Regarding reasonably foreseeable activities, we can predict more

would occur related to minerals exploration and development, but we are unable to estimate acreages at this time. Therefore, this cumulative effects analysis is being performed as a qualitative assessment.

Increases in grazing and recreational pressure are not foreseen. The existing grazing effects (reduction in vegetation height, trampling, soil compaction, etc.) and recreation effects (compaction from vehicles and dispersed camp sites) in the planning area would remain unchanged. Current effects on the land from grazing and recreational activities are within acceptable limits as determined by BLM specialists following the RMP (BLM 1985). Because most effects from recreation and grazing are minor compared to effects from mining activities, this discussion of cumulative impacts related to reasonably foreseeable activities focuses only on the effects of additional oil and gas development and uranium mining.

As a result of the current annual demand, uranium prices have increased sharply. Prices reached an all-time record in July 2007, and although prices have dropped to around \$60 per pound recently, they are expected to remain high enough to warrant further uranium exploration and development (Industrial Manufacturing News 2008; Ux Consulting Company, LLC 2008). As of May 2008, the San Juan Public Lands Center reported a total of 104.1 acres permitted for uranium exploration under 20 Notices of Intent (NOI) and two POOs (for current mining operations at the Sunday Mines) in San Miguel County (San Juan Public Lands Center 2008). It is reasonably expected that uranium mining may occur in these exploration areas if uranium prices remain at levels that make development economically feasible.

The 1991 Amendment to the San Juan RMP estimated that the area of short-term surface disturbance in the San Juan/San Miguel planning area for the next 20 years from oil and gas activities would be 1,430 acres. The 1991 Amendment also estimated 410 acres of long-term surface disturbance from oil and gas activities by 2011 after interim and final reclamation activities (BLM 1991). Based on data from the Colorado Oil and Gas Conservation Commission, the current surface disturbance from oil and gas activities is below the estimated surface disturbance acreages addressed in the EIS for the 1991 Amendment to the San Juan RMP.

Oil and gas exploration, production, and transport would result in additional surface disturbance. However, under a process similar to POO approval (the Application for Permit to Drill approval system), the use of BMPs and specific project criteria and advances in technology would help minimize these impacts.

Surface disturbance from the Proposed Action would combine with surface disturbances from other mining and oil and gas activities for a contribution to cumulative effects (e.g., removing vegetation resulting in habitat fragmentation, dust generation, spread of noxious weeds). Because the surface disturbance from the Proposed Action is small and is associated with an existing mine, the cumulative contribution caused by surface disturbance from the Proposed Action would be minor. It should also be noted that interim and final reclamation efforts, particularly for oil and gas activities, would offset

the total surface disturbance present at any given time from these activities. While some areas are being disturbed, others are being reclaimed.

Mining and oil and gas extraction activities have occurred in the past, and the direct and indirect effects of this project would combine with the direct and indirect effects of past, present, and reasonably foreseeable future projects to result in a cumulative effect to some resources. Resources that may experience a cumulative impact are air quality, cultural resources and paleontology, invasive non-native species, geology and minerals, socio-economics, transportation, and public health and safety. These are discussed in Sections 9.1 through 9.7, below

All other direct and indirect effects addressed in this EA would not contribute to a cumulative impact for the following reasons:

- The impacts to resources identified as present but not affected, such as wildlife, livestock grazing, and recreation, would be effectively eliminated or reduced to an unquantifiable amount by operational measures/design criteria and BMPs presented in the POO and this EA
- Many impacts are temporary and would only occur during the drilling periods. For example, surface disturbance for exploration drilling would be reclaimed on an annual basis

9.2 AIR QUALITY

The Sunday Mines would be a minor source of air pollution as defined by CDPHE. Sources of air emissions associated with the Sunday Mines include vent holes, vehicle travel on unpaved roads, ore and rock storage and handling, and other fugitive emissions. Most of the air emissions would be fugitive dust from day-to-day mining operations. As discussed in Section 8.3.1.1, all air emissions associated with the Sunday Mines, including the Proposed Action are permitted by a CDPHE air permit. It has been determined by the CDPHE that operations at the Sunday Mines would not cause or contribute to a violation of the ambient air quality standards (AAQS) for the reasons explained in Section 8.3.1.1.

No exceedance of AAQS from current activities in the AOI has been identified. It can be expected that future activities in the AOI would also not exceed AAQS, because such activities would be expected to go through the state CDPHE permitting process and adhere to state air quality regulations. Since the Proposed Activity and other permitted activities in the AOI would not individually exceed the AAQS, it can reasonably be expected that cumulative contributions from these activities would not cause or contribute to a violation of the AAQS.

9.3 CULTURAL RESOURCES AND PALEONTOLOGY

As discussed in Sections 8.3.1.2 and 8.3.2.2, the cultural and paleontological resources have not been totally inventoried. Due to uninventoried resources, the total direct and indirect impacts to these resources cannot be assessed at this time. However, for this

cumulative effects analysis, we are making the assumption that it can be reasonably expected that impacts to cultural and paleontological resources would be effectively eliminated or reduced to negligible levels by operational measures/design criteria presented in the POO and this EA. Therefore, it can reasonably be expected that the Proposed Action would not contribute towards a cumulative impact to cultural and paleontological resources within the AOI.

9.4 INVASIVE NON-NATIVE SPECIES

The Proposed Action would create surface disturbances that generally facilitate the spread of invasive non-native plant species (noxious weeds). However, operational measures and design criteria, such as monitoring and implementation of a weed management plan as discussed in the POO and this EA would reduce the spread and establishment of noxious weeds.

Future mining and oil and gas activities in the AOI would result in increased monitoring for and treatment of noxious weeds. This monitoring and treatment would be required under approved plans of operations for mining and surface use plans for oil and gas activities. Since the Proposed Activity and other permitted activities in the AOI would be required to manage and control the spread and establishment of noxious weeds, it can reasonably be expected that the spread and establishment of noxious weeds would be minimized within the AOI. Therefore, the cumulative impact contribution to the spread noxious weeds of the Proposed Action would be negligible.

9.5 GEOLOGY AND MINERALS

The Proposed Action would result in the permanent removal of mineral resources from the ground. This impact would combine with future minerals development activities within the AOI, such as mining and oil and gas development, resulting in the cumulative removal of mineral resources within the AOI.

9.6 SOCIOECONOMICS

The Proposed Action and other future minerals development activities are expected to increase employment opportunities. These activities would provide short- and long-term employment opportunities and contribute to the tax base for San Miguel County and possibly other counties. Employment and contributions to the tax base would continue so long as minerals extraction activities in the AOI continue.

9.7 TRANSPORTATION

The Proposed Action would result in some increase in traffic, primarily due to haul truck traffic along the ore hauling route. As described in Section 8.2.15, the Traffic would increase Monday through Friday with an occasional Saturday, when recreational traffic would be lighter. The Special Use Permit with San Miguel County is expected to permit the Operator to haul an average 26 trucks per day with a maximum of 34 haul trucks in a

24-hour period based upon a 24-hour day beginning at 12:00 AM) or (from 7:00 AM to 11:00 PM).

Other minerals development activities in the area of the Proposed Action would also result in increased traffic at various levels along the ore hauling route, depending on the locations of these activities and their scale. Although, any cumulative increase in traffic cannot be quantified, it is assumed that, similar to the Proposed Action, the other minerals development operations would be required to obtain permits and approvals from San Miguel County and comply with CDOT and UDOT regulations. Specifically regarding County roads, it is expected that the County would evaluate when road improvements are necessary to accommodate increased traffic resulting from future activities. Impacts from increased traffic would also be minimized through speed control, dust control, appropriate signage, employee training, and scheduling. Since traffic effects under the Proposed Action and other activities in the AOI would be mitigated by appropriate permitting, traffic regulations, and operational measures intended to reduce and/or eliminate these effects, it can reasonably be expected that cumulative traffic contributions from the Proposed Action and other minerals development activities would have a minor effect.

9.8 PUBLIC HEALTH AND SAFETY

The Sunday Mines are currently the only active uranium mines in the AOI. The radiological effects (i.e., radon and gamma radiation related to vent hole emissions and the expanded WRA) associated with the Proposed Action would increase only at the Sunday Mines because there are no other active uranium mines in the AOI. As discussed in Section 8.3.1.1, radon emissions from the proposed vent holes would be monitored and must comply with the NESHAP for radon at 40 CFR 61. The existing Topaz WRA would increase by only 2.5 acres under the Proposed Action.

As discussed in Section 8.3.1.1, the Operator would continue to conduct monitoring to comply with radon NESHAP for the existing and proposed vent holes. This monitoring would ensure that the cumulative radon emissions within the AOI would stay below the regulatory standard. The small expansion of the Topaz WRA would contribute towards a cumulative increase in surface area occupied by the waste rock area. For the reasons discussed in Section 8.3.2.4, waste rock is not considered to be a health concern. Therefore the expansion of the WRA would not contribute towards a radiological cumulative effect of concern on Public Health and Safety in the AOI.

Public Safety related to the increase in truck traffic from the Proposed Action is discussed in Section 9.7, above.

10.0 RESIDUAL IMPACTS

This section discusses impacts that would be permanent (irreversible commitments) and impacts that would remain as long as any mines remain in development and production (irretrievable commitments).

10.1 IRREVERSIBLE COMMITMENTS

Irreversible commitments generally cannot be reversed, such as the extinction of a species or the extraction of a mineral. If the Proposed Action is approved, uranium-vanadium ore would be extracted. Because the mineral resource would not regenerate, the extraction of uranium-vanadium ore is an irreversible commitment. No other irreversible commitments would occur under the Proposed Action.

10.2 IRRETRIEVABLE COMMITMENTS

Irretrievable commitments result in the loss of resources for a period of time. In other words, the resource is irretrievable as long as the action is undertaken. If the Proposed Action is approved, an additional 7.85 acres of surface disturbance associated with project facilities would occur. Additionally, up to 10 acres of disturbance may occur at any given time from exploration drilling. The additional surface disturbance would continue to be irretrievable for vegetation, wildlife habitat, and visual resources until mining activities cease and reclamation is finalized. After mining activities, the area would be reclaimed and restored to as close to its original state as possible. No other irretrievable commitments would occur under the Proposed Action.

11.0 PERSONS AND AGENCIES CONSULTED

Table 6 summarizes the persons and agencies consulted in the preparation and review of this EA.

Table 6: Persons and Agencies Consulted

Name	Office/Agency	Title
Eric La Price	Dolores Public Lands Office (DPLO)	Biological Scientist/NEPA Coordinator
Cara MacMillan	DPLO	Ecologist
Shauna Jensen	BLM DPLO	Hydrologist
Helen Mary Johnson	San Juan Public Lands Center (SJPLC), BLM	Geologist
Jamie Sellar-Baker	DPLO BLM	Associate Manager
Bob Oswald	DRMS	Review of DRMS permits and site inspections
Anthony Waldron	DRMS	Review of DRMS permits and site inspections
Mike Rozyki	San Miguel County	Review of San Miguel County Special Use Permit
Jim Boyd	San Miguel Basin Conservation District	Review of DRMS modification permits
Kristie Arrington	BLM SJPLC	Archeologist
Jennifer M. Burns	BLM SJPLC	Landscape Architect
Kelly Palmer	BLM SJPLC	Air Quality Specialist

Name	Office/Agency	Title
Kathy Nickell	BLM DPLO	Wildlife Biologist
Kay Zillich	BLM DPLO	Hydrologist
Jennifer Rowe	BLM DPLO	Rangeland Management Specialist
Penny Wu	BLM DPLO	Outdoor Recreation Planner

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FIGURES

APPENDIX A – Operational Measures