Daneros Mine
San Juan County, Utah

Plan of Operations Modification
UTU-74631
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Monticello Field Office
365 North Main Street
Monticello, Utah 84535

Submitted By: **Energy Fuels Resources (USA) Inc.**
225 Union Blvd., Suite 600
Lakewood, Colorado 80228

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Acronyms

ABA	acid based accounting
ALARA	As low as reasonable achievable
amsl	above mean sea level
AO	Air Approval Order
ARD	acid rock drainage
APE	Area of Potential Effect
BLM	U.S. Bureau of Land Management
BMP	Best Management Practice
CFM	cubic feet per minute
CFR	Code of Federal Regulations
CR	County Road
CWA	Clean Water Act
cy	cubic yards
Energy Fuels	Energy Fuels Resources (USA) Inc.
DOT	U.S. Department of Transportation
DRA	Development Rock Area
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
H:V	Horizontal to Vertical
IO	Isolated Occurrence
kVA	kilovolt-ampere
kW	Kilowatt
LOS	Level of Service
MBTA	Migratory Bird Treaty Act
mrem	Millirem
mrem/hr	millirem per hour
mrem/yr	millirem per year
MSHA	Mine Safety and Health Administration
mSv	millisieverts
NAD	North American Datum
NCRP	National Council on Radiation Protection and Measurements
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NRC	Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
OSHA	Occupational Safety and Health Administration
pCi/g	picocuries per gram
PLS	pounds live seed
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention Control and Countermeasures
SWCA	SWCA Environmental Consultants
SWPPP	Storm Water Pollution Prevention
TI	Transport Index
UAC	Utah Administrative Code

UDAQ	Utah Division of Air Quality
UDEQ	Utah Department of Environmental Quality
UDOGM	Utah Division of Oil, Gas, and Mining
UDOT	Utah Department of Transportation
UDWR	Utah Division of Water Rights
UL	Underwriter Laboratories Inc.
USGS	United States Geological Survey
USHPO	Utah State Historic Preservation Office
UPAF	Utah Partners in Flight
UTM	Universal Transverse Mercator
vph	vehicles per hour
WL	Working Level
WLM	Working Level Month

Section 1 Introduction

1.1 Purpose

This modification to the Daneros Mine Plan of Operations (Modification) addresses proposed surface disturbance on federal lands administered by the U.S. Bureau of Land Management (BLM). The purpose of this Modification is to facilitate:

- Modifications to surface facilities at the Daneros Mine (Daneros Portal Area, Bullseye Portal Area, and the South Portal Area)
- Construction of additional vent holes and associated access roads to support future mining

These proposed surface disturbing activities are incident to locatable mining activities, and are located on federal lands administered by the BLM. Therefore, BLM approval of a Plan of Operations as set forth at 43 Code of Federal Regulations (CFR) 3809 is required before Energy Fuels Resources (USA) Inc. (Energy Fuels) can commence the proposed activities.

1.2 Background

The existing Daneros Mine (UTU-74631) is located in Bullseye Canyon, in the central portion of the Colorado Plateau in southeastern Utah. The project is located approximately 4.8 miles southwest of Fry Canyon, Utah, in western San Juan County off Highway 95. The mine is accessed from Highway 95 utilizing approximately 14 miles of existing San Juan County roads, the Radium King Road county road (CR) B258 and CR D0029, as shown in Figure 1-1.

The Daneros Mine is an underground uranium mine that is operated by Energy Fuels. The mining claims and other project assets are held by Energy Fuels' affiliate EFR White Canyon Corp. Energy Fuels Inc. acquired Denison Mines Corp.'s U.S. assets on June 29, 2012 including Denison Mines (USA) Corp. and Utah Energy Corporation. Subsequently, Denison Mines (USA) Corp. was renamed Energy Fuels Resources (USA) Inc. and Utah Energy Corporation was renamed EFR White Canyon Corp. Company officers and contact information are provided in Attachment A.

Uranium mining has occurred in Bullseye Canyon and the surrounding areas since the 1950's, with intervening periods of decreased or increased mining activity in relation to changing economic conditions. The proposed Daneros Mine disturbance area includes portions of several historical uranium mining operations including the Bullseye, Spook, Lark (formerly Cove), and Royal (formerly Mineral Channel) mines. A previous Daneros Plan of Operations (Plan) was submitted in 2009 and approved in June 2011. The Plan provided for the following:

- Production of up to 100,000 tons of uranium ore during a seven-year period of operation.
- Transportation of ore by truck on existing county and state roads to the White Mesa Mill, near Blanding, Utah.
- Construction and/or rehabilitation of two declines into the uranium ore body for purposes of ore haulage, mine ventilation and a secondary escape route.
- Construction of two 7-foot diameter mine ventilation boreholes.
- Drilling of 22 development drill holes to further delineate the ore body.
- Installation of a water supply well to support surface and underground activities.
- Construction and operation of surface facilities, which include a mine yard/portal area, office/shop area, ore stockpile area, development rock area (DRA), and two topsoil stockpile areas.

The 2009 plan provides for a total of 4.5 acres of surface disturbance, the majority of which (3.5 acres) occurs within areas of pre-existing mining disturbance.

Mining activities conducted in accordance with previously approved plans of operations include:

- Mine operation and development
- Production of ore and development rock (i.e. waste rock)
- Extension of underground workings (with installation of additional vents)
- Construction of surface facilities

During operations, ore is loaded into trucks for transport to off-site mineral processing facilities, and development rock, generated as part of the underground mining activities, is placed in DRAs located on the surface. No on site physical or chemical processing occurs at the mine; accordingly, no tailings or processing chemicals are generated or stored on site. Ore produced at the mine is shipped to the White Mesa Mill, located near Blanding, Utah for processing.

This Modification includes components necessary to support additional mine development and mine operation beyond 2012. This Modification is designed to facilitate mineral development activities for a minimum of five and up to approximately 20 years of continued production, depending on market conditions and other factors.

1.3 Planned Mine Development

The proposed surface disturbing activities described in this Modification are based on existing exploration data and projected extensions to uranium mineralization. Projected extensions are forward-looking and subject to change based on geological findings and market conditions. Surface disturbances associated with the planned mine development will be increased by 41.8 acres resulting in a cumulative surface disturbance of 46.3 acres. Without further exploration drilling and mining, Energy Fuels can only predict mining activity for the next five years; however, 500,000 tons of ore production and associated surface disturbance is proposed in this plan over the next 20 years. This approach was adopted so that the maximum potential impacts of future mining could be addressed by the BLM in its National Environmental Policy Act (NEPA) review of the project. The proposed surface disturbing activities are described in Section 3.

Uranium deposits at the Daneros Mine are found in localized stratigraphic horizons that underlie mesas and rough terrain. As a result, the specific locations of future development such as mine vent holes are difficult to determine in advance, and their ultimate placement will rely on geological conditions determined primarily from underground exploration and development. Therefore, planned locations for vent holes are described generally to allow flexibility in future placement of these facilities; however, it is reasonably foreseeable that several of the historic portals will be used for ventilation in the future. This approach is necessary to maintain adequate flexibility to support the future requirements of the mining operations.

1.4 Prevention of Unnecessary or Undue Degradation

Protection of the environment is a major component of the BLM regulations for locatable mining operations, which are set forth at 43 CFR 3809. BLM regulations address requirements for protection of the environment in terms of prevention of "unnecessary or undue degradation" which is set forth at 43 CFR 3802.0-5(l).

Energy Fuels' existing and proposed activities are authorized by the General Mining Law of 1872, comply with applicable environmental laws and regulations, and employ current procedures, methods and standards for mining and environmental protection. Unnecessary or undue degradation is defined in 43 CFR 3809.0 5(l) as follows:

> *"…impacts greater than those that will normally be expected from an activity being accomplished in compliance with current standards and regulations and based on sound practices, including use of the best reasonably available technology".*

BLM also sets forth the requirements to prevent unnecessary or undue degradation (43 CFR §3809.415):

> *…You prevent unnecessary or undue degradation while conducting operations on public lands by — (a) Complying with § 3809.420, as applicable; the terms and conditions of your notice or approved plan of operations; and other Federal and State laws related to environmental protection and protection of cultural resources …*

In accordance with 43 CFR 3809.420, this Modification provides the required information to demonstrate that the proposed operations will not result in unnecessary and undue degradation of public lands.

1.5 Organization of the Plan

This Modification is organized to meet the general purpose described in Section 1 and to provide information required for plans of operations for locatable minerals set forth at 43 CFR Part 3809. The Modification contains the following sections:

- Section 1 Introduction
- Section 2 Operator Information
- Section 3 Proposed Modifications to the Daneros Mine Plan of Operations
- Section 4 Reclamation Plan
- Section 5 Monitoring Plan
- Section 6 Interim Management Plan
- Section 7 Reclamation Cost Estimate
- Section 8 Operational and Baseline Environmental Information
- Section 9 Period of Use/Occupancy for Surface Facilities
- Section 10 References

Sections 2 through 7 provide information required by 43 CFR 3809.401(b) and 43 CFR 3809.401(d). Section 8 provides operational and baseline environmental information in accordance with 43 CRF 3809.401(c).

Section 2 Operator Information

In accordance with 43 CFR 3809.401(b)(1), this section presents information about the operator of the Daneros Mine, the location and legal description of BLM lands affected and proposed to be affected by the mining activities, and information regarding mining claims. A list of other local, state, and federal permits required for mine operations is also provided.

2.1 Daneros Mine Operator Information

The Daneros Mine is operated by Energy Fuels and the project claims and other assets are held by EFR White Canyon Corp. Attachment A provides detailed mine operator information. Energy Fuels will notify the BLM of any change in operator in writing within 30 days of such a change.

2.2 Location and Legal Description

The Daneros Mine is generally located at Universal Transverse Mercator (UTM) coordinates 571,084 meters east and 4,161,286 meters north (North American Datum) [NAD] 83), Zone 12. The mine is situated in the valley along the western edge of the Wingate Mesa, southwest of Fry Canyon, Utah, in western San Juan County as shown in Figure 1-1. The Daneros Mine (Daneros, Bullseye, and South portal areas) is located in portions of the S ½ of Sec. 6, T37S, R16E and in a portion of the NE ¼ Sec. 18; T37S, R16E, Salt Lake Meridian, San Juan County, Utah.

2.3 Surface Ownership within Area of Operations and Mining Claim Information

Currently, Energy Fuels holds or controls 141 unpatented lode claims at the Daneros Mine as shown in Attachment B – Daneros Mine Unpatented Mining Claims Located in San Juan County, Utah. The BLM serial numbers for these claims are also provided in the attachment. Figure 2-1 shows the location of these unpatented mining claims.

The surface facilities of the Daneros Mine are located exclusively on federal lands administered by the BLM, as shown in Figure 2-2.

2.4 Other Federal, State, or Local Authorizations

The following table provides a list of permits or approvals that the Daneros Mine has applied for or that have been issued. Attachment J contains copies of approval letters.

Table 2-1 Daneros Mine List of Permits or Approvals

Permit/Number	**Agency**
Plan of Operations for Daneros Mine (UT–090-07-43)	BLM (Approved for existing operations)
Decision Record, Finding of No Significant Impact and Environmental Assessment for Daneros Mine (UT-090-07-43)	BLM (Approved for existing operations)
Small Mine Permit/Mine and Reclamation Plan – Daneros (S/037/0121)	Utah Division of Oil, Gas and Mining (UDOGM) (currently approved for existing operations)
Large Mine Permit/Mine and Reclamation Plan – Daneros Mine (M/037/0126)	UDOGM (Application submitted for mine expansion)
Approval for Construction under 40 CFR Part 61 Subparts A and B (DAQC-611-12, Site ID 14509) Radon NESHAPs)	Utah Division of Air Quality (Approved)
Approval Order for a New Underground Uranium Mine San Juan County (Project No. N144920002)	Utah Division of Air Quality (Approved July 8, 2014)
Stormwater Pollution Prevention Plan and Permit (UTR 260661)	Utah Division of Water Quality (Permit Approved; Plan Modification enclosed as Attachment G)
Spill Prevention Control and Countermeasure (SPCC) Plan	Plan Modification enclosed as Attachment I
Stream Alteration Permit (Application No. 15-99-01SA) for Daneros Portal Area	Utah Division of Water Quality (Under review)
Stream Alteration Permit for Bullseye Portal Area	Utah Division of Water Quality (In Application Preparation Process)
Test Well# 0999001M00 at Daneros Portal Area	Utah Division of Water Rights (Approved)
Application to Appropriate Water Number 09-2315 (A78359)	Utah Division of Water Rights (Approved)
Potable Water System	Utah Division of Drinking Water (Will be applied for prior to installation of system)
Access Permit	San Juan County Public Works Department (Will be applied for prior to any new access needs)
Building Permit	San Juan County Community Development and Planning Department (Will be applied for prior to any building construction)

Permit/Number	**Agency**
Septic System Permit	Southeast Utah Public Health Department (Will be applied for prior to installation of system)
Pesticide Application Licensing	Utah Department of Agriculture (Approved)
Mine Safety and Health Administration (MSHA) Mine Registration	U.S. Department of Labor (Will be applied for prior to reopening the mine)
MSHA Training Plan, Escape and Evacuation Plan, and Ventilation Plan	U.S. Department of Labor (Will be applied for prior to reopening the mine)

Section 3 Proposed Modifications to Daneros Plan of Operations

This proposed Modification supports future development at the Daneros Mine in accordance with Energy Fuels' rights under the General Mining Law as amended. This section describes the proposed surface disturbing activities as required by 43 CFR 3809.401 and 43 CFR 3809.432:

- Modifications to surface facilities at the Daneros Mine (Daneros, Bullseye, and the South portal areas)
- Construction of additional vent holes and associated access roads to support future mining

3.1 Pre-Mining Disturbances

Pre-mining surface disturbances at the Daneros Mine are mostly associated with historic mining operations. These historic disturbances include former haul roads, DRAs, abandoned mine adits, and wooden support structures.

Limited visible pre-mining disturbance exists within the disturbed boundary at the Daneros Portal Area as a result of existing mining operations. Figure 3-1a shows the extent of the current mining operations at the Daneros Portal Area. No apparent pre-mining disturbances exist within the expanded disturbed boundary (i.e., the area between the blue dashed line and red solid line).

Pre-mining disturbances associated with historic mining operations are more apparent within the proposed area of surface disturbance at the Bullseye and South portal areas. Figure 3-1b shows two areas with historic surface disturbance in the Bullseye Portal Area. The first is associated with former mine facilities and operations located immediately adjacent to the former Bullseye Portal, and the second is associated with development rock disposal activities from the former mine.

The South Portal Area also has historic surface disturbances that are likely associated with previous mining operations. Figure 3-1c shows the location of these pre-mining disturbances.

All pre-mining disturbance areas within the proposed boundary of surface disturbance for this Modification will be reclaimed in accordance with the Reclamation Plan (see Section 4). However, soil is not available for salvage from within these pre-mining disturbance areas.

3.2 Modifications to Surface Facilities

The proposed modifications to existing surface facilities include the following at the Daneros Mine (Daneros, Bullseye, and South portal areas):

- Rehabilitation of the existing Bullseye Portal Area.
- Construction of the South Portal Area.
- Expansion of the DRA at the Daneros Portal Area.
- Construction of DRAs at the Bullseye and South portal areas.
- Construction of ore stockpile areas at the Bullseye and South portal areas.
- Construction of topsoil and inert material stockpile areas.
- Installation of drainage control structures.
- Installation of mine infrastructure systems.
- Installation of an office/shop complex at the South Portal Area.
- Installation of up to 8 additional vent holes.

Operations and maintenance of these facilities will occur throughout the life of the project (approximately 20 years). The facilities will be constructed in a phased manner with mine operations resuming at the Daneros Portal Area and construction starting at the Bullseye Portal Area. As mining continues, the South Portal Area will be developed while much of the disturbance at the Daneros Portal and Bullseye Portal areas will be reclaimed including the DRAs. Proposed reclamation bonding has been based on phased development as discussed in Section 7 and Attachment K.

Figures 3-2a, 3-2b, and 3-2c show the proposed modifications to surface facilities at the Daneros, Bullseye, and South Portal areas, respectively. The proposed modifications in each of the three areas of the mine are discussed in more detail below.

3.2.1 Rehabilitation of Bullseye Portal Area

The Bullseye Portal is located approximately 1,000 feet southwest of the existing Daneros Mine Portal Area, and consists of a wood portal structure at the entrance to the underground mine. The Bullseye Portal is historic and has the potential to provide access into the Daneros Mine underground workings. This area contains historic surface disturbance, mining debris and ore-bearing material. Energy Fuels proposes to clean the existing portal of debris with existing ore and solid waste segregated into respective secure temporary storage areas. The wood portal structure may be initially improved but will eventually be replaced with a permanent portal structure consistent with modern mining practices. The existing Bullseye Portal will be re-opened as a ventilation and haulage portal into the existing mine workings. In addition, the portal location could provide access to ore reserves to the northwest.

The Bullseye Portal Area is accessed by the existing road, CR D0029. An upgraded access roadway to the portal will be constructed. The site will be re-graded to minimize surface water run-on and will be sloped to provide for drainage into a storm water detention pond to manage future surface water run-off. Site re-grading will include the construction of berms, ditches and silt fences to minimize potential future impacts to offsite undisturbed areas. Temporary sediment ponds will capture all water impacting the surface facility area from a 100-year/24-hour storm event. The sediment ponds will be inspected/maintained routinely and immediately following major storm events to ensure that stormwater controls are functioning as designed.

3.2.2 Construction of South Portal

The South Portal will be located along CR B258, approximately 1 mile south of the Daneros Portal Area. The Spook Portal, just north of the South Portal Area is an existing decline that accesses old mine workings that date primarily from the mid-1950s-60s. Given the relatively old age of the Spook mine workings, Energy Fuels will construct new portals and declines at the South Portal Area. No surface disturbance is planned in the vicinity of the Spook Portal, as shown on Figure 3-2c. Energy Fuels will construct two new portals right next to each other, sometimes referred to as twin declines, with one new portal used for primary access and ore haulage and the other portal used for ventilation. The portal structures will be constructed consistent with modern mining practices and MSHA regulations. They will be used for ventilation of, and haulage from, the existing Daneros underground mine workings to the north. In addition, this access will provide entry into historical workings in the area and reserves and potential resources to the north of the portal.

The South Portal Area will be accessed by an existing San Juan County Road (CR B258). An upgraded access roadway to the portal will be constructed.

3.2.3 Construction of Development Rock Areas

To accommodate continued mineral production, the existing DRA at the Daneros Portal Area will be expanded to the north, and two new DRAs at the Bullseye Portal Area and one new DRA at the South Portal Area will be constructed. Figures 3-2a, 3-2b, and 3-2c show the proposed location of each of these DRAs. Based on an average development rock-to-ore ratio of 1.5:1 for mine production, the typical annual development rock production rate will be 21,400 cy/year.

The DRAs will contain rock, which must be mined to reach the ore, but which does not contain sufficient mineralization to warrant mineral processing. DRAs will contain materials that are potentially deleterious or acid-forming.

Daneros Portal Area

It is proposed that this facility be constructed by placing development rock on the existing DRA, then continuing to the north up to the base of the proposed

diversion channel, as shown on Figure 3-2a. The DRA will be initially constructed at an angle of repose slope ranging from approximately 30 to 35 degrees. This approach will facilitate efficient production during mining, and provide for placement of approximately 22,000 cubic yards (cy) of additional development rock material at the Daneros DRA #1.

Bullseye Portal Area

At the Bullseye Portal Area, the proposed DRAs will be constructed in a series of lifts with an overall slope angle of 3 horizontal to 1 vertical (3H:1V). This will facilitate future reclamation of these facilities. A total of 26,000 cy of storage capacity is proposed at the Bullseye DRA #2 and 12,000 cy of capacity is proposed a the Bullseye DRA #3. Development rock will be hauled from the Bullseye Portal across CR D0029 to the DRAs, which are approximately 300 ft away. A portion of the haul distance, approximately 200 ft, is along CR D0029.

South Portal Area

At the South Portal Area, a single large DRA, DRA #4, will be constructed using a series of lifts similar to the techniques proposed above for the Bullseye DRAs. A total capacity of 210,000 cy is proposed for the South Portal Area DRA. Development rock will be hauled from the South Portal approximately 300 feet west to the DRA.

The proposed DRA modifications at DRAs 1 through 4 will provide storage for estimated future development rock production of up to 270,000 cy. Table 3-1 provides a summary of the estimated storage capacity at each proposed DRA. The table also shows planned storage capacity for topsoil stockpiles, ore stockpiles and low grade ore stockpiles.

Table 3-1 Summary of Development Rock and Stockpile Storage Capacity

	Proposed Approximate Portal Area Storage Capacity (cy)			
Stockpile	**Daneros**	**Bullseye**	**South**	**Total**
Ore	1,500	1,500	1,500	4,500
Low Grade Ore Per Year			3,000	3,000
Low Grade Ore Total			30,000	30,000
Development Rock	22,000*	38,000	210,000	270,000
Inert Material		8,000**	27,500***	35,500
Topsoil	4,000*	6,500	17,000***	27,500
Total	27,500	54,000	309,500	391,000

* Additional Storage.

** Inert material at the Bullseye Portal Area will be excavated and stockpiled prior to placement of development rock.

*** Excess inert material and topsoil salvaged at the South Portal can be used, where needed, to reclaim the other development rock piles.

During reclamation, all angle of repose slopes will be reduced to a final reclamation slope of 3H:1V or less steep as discussed in Section 4. The full extent of each of the proposed DRA footprints will be utilized upon completion of reclamation activities when the slopes are reduced to the finished grade.

3.2.4 Delineation of Ore Stockpile Areas

Based on an estimated 500,000 tons over 20 years, the total annual ore production is estimated at approximately 25,000 tons/year. This equates to an annual ore volume of approximately 14,250 cy/year (with the assumption of an ore stockpile density of 130 pounds per cubic foot to convert tonnage to cubic yards). No mineral processing is conducted at the Daneros Mine, and therefore, ore is only present in temporary stockpiles. Ore is typically transported from the underground workings via low-profile, end-dump haul trucks and dumped into temporary ore stockpiles. These stockpiles are located as reasonably close as possible to the portal entrances. Stockpiled ore is then loaded into over-the-road carriers for transport to the White Mesa Mill in Blanding, Utah.

Ore stockpiles will contain materials that are potentially deleterious or acid-forming. Additional information regarding environmental characteristics of ore and low grade ore is presented in Attachment D.

Daneros Portal Area

An ore stockpile area at the Daneros Portal Area was previously approved to hold 1,500 cy. The following provides a brief description of the proposed ore stockpile areas at the Bullseye and South portal areas.

Bullseye Portal Area

The proposed ore stockpile area at the Bullseye Portal Area is located between the portal entrance and the roadway east of the DRAs as shown on Figure 3-2b. The maximum amount of ore stored at this location at any given time is expected to be 1,500 cy.

South Portal Area

The proposed ore stockpile area at the South Portal Area is located approximately 200 feet southeast of the portal along CR B258 as shown on Figure 3-2c. Within this large ore pad, ore and low-grade ore will be separated. The maximum amount of ore stored at the South Portal area at any given time is expected to be 1,500 cy. The low-grade ore stockpile is designed to provide for storage of up to 30,000 cy. The need for low-grade ore storage and volume of material will be dependent on mining operations and uranium market prices therefore the low-grade storage area is not shown separately on the figures.

3.2.5 Creation of Topsoil Stockpile Areas

As much soil material as is practical (i.e., approximately 0 to 51 inches at the Bullseye Portal Area and approximately 0 to 38 inches at the South Portal Area) will be salvaged and stockpiled within the disturbed boundary of each portal site. Most soil removal will be performed using a tracked dozer, although a front-end loader and/or motor grader may also be used. Haulage equipment will not be allowed to cross the stockpiles so that compaction of stockpiled soil is minimized. The topsoil storage locations are designed to be outside of drainage areas to minimize erosion. The topsoil stockpiles will be contoured, ripped, and broadcast seeded in the late fall with the BLM and UDOGM approved seed mix. Seeding efforts will continue until vegetation is established.

Daneros Portal Area

Topsoil from the expanded DRA will be removed and stockpiled at both the proposed Daneros topsoil stockpile area northeast of the proposed DRA#1 and at the proposed Bullseye topsoil stockpile area, if additional storage is required. The existing topsoil stockpile area at the Daneros Portal Area is currently storing topsoil and has a previously approved design capacity of approximately 1,200 cy. The proposed new topsoil stockpile area has a capacity of approximately 4,000 cy. The location of these areas is shown on Figure 3-2a.

Bullseye Portal Area

Topsoil salvaged from the disturbed areas as a result of construction of the DRAs, ore stockpile areas, and the mine yard at the Bullseye Portal Area will be stored at the proposed topsoil stockpile area in the south portion of the disturbed area boundary as shown on Figure 3-2b. The total capacity of the topsoil stockpile at the Bullseye Portal Area is approximately 6,500 cy.

South Portal Area

Topsoil salvaged from the disturbed areas as a result of construction of the DRA, ore stockpile area, and mine yard at the South Portal Area will be stored at the proposed topsoil stockpile area, south of the DRA as shown on Figure 3-2c. The total capacity of the topsoil stockpile at the South Portal Area is approximately 17,000 cy.

Vent Holes and Access Roads

Topsoil will be salvaged during construction of the access roads to the ventilation holes and the ventilation hole pad areas. This soil will be windrowed along the sides of the access roads and along one or two sides of each pad area. Assuming salvage of an average of 6 inches of topsoil and 1.5 acres of surface disturbance per vent hole site (i.e., 0.25 acre per pad area and 1.25 acre per access road), approximately 1,200 cy of topsoil will be stored in windrows along the side of a typical access road and vent pad. A total of 8 additional vent holes are proposed and approximately 1,200 cy of topsoil are stored near the existing vent holes, which will result in approximately 10,800 cy total salvaged topsoil for the vent holes.

3.2.6 Creation of Inert Material Stockpile Areas

Analysis of development rock produced from the ore zone indicates that it has the potential to generate acid. In order to reclaim the DRAs and reduce the risk of acid drainage, Energy Fuels will stockpile inert material. "Inert material" is defined herein as development rock and soils generated from the geologic units above the Shinarump ore zone. The inert material will be used during reclamation as additional cover material, applied evenly over the graded DRAs, prior to applying topsoil. Inert materials will consist of development rock and soils produced from non-ore-bearing soil and rock units overlying the Shinarump Member, which are excavated during construction of surface facilities, ventilation shafts, mine declines, or other mine activities. Approximately 35,500 cy of inert materials will be stockpiled at the Bullseye and South Portal areas for use during mine reclamation. The inert material stockpiles will be scarified and broadcast seeded in the late fall with the BLM and UDOGM approved seed mix.

Stockpiling of inert materials at the Daneros Portal Area is not proposed due to space limitations. At the Bullseye Portal Area, the bulk of the inert material will be excavated from the areas to be used for development rock and toposoil stockpiles. Some may be placed directly on the Daneros DRA during concurrent reclamation, the remainder will be placed in a stockpile just east of DRA #3 as shown on Figure 3-2b. At the South Portal area, inert material will be excavated from the area to be used for DRA #4 and the two new declines and stockpiled just across the road as shown on Figure 3-2c.

3.2.7 Installation of Drainage Control Structures

Energy Fuels proposes to install drainage control structures around and within the proposed disturbance areas. The purpose of the drainage control structures is to manage stormwater and mitigate potential effects of erosion on water quality. Drainage control structures will include diversion channels, berms, sediment ponds and other drainage structures designed to manage stormwater in accordance with requirements of the federal Clean Water Act (CWA) and other laws.

An existing report titled *Hydrology and Hydraulics Narrative for Utah Energy Corporation Daneros Mine* (Shephard-Wesnitzer, Inc. 2008) evaluated existing drainage characteristics of the watersheds adjacent to the mine for the purpose of designing a diversion channel for the existing DRA, to affirm the safe low-water crossing design, and to verify that runoff from the design storm event will flow at a safe freeboard distance below the mine portal and existing DRA. The 100-year/6-hour storm event was used to analyze the hydraulic characteristics of the wash relative to the proposed mine facilities.

A second report titled *Drainage Report for Daneros Mine, San Juan County, Utah* (CDM Smith 2013a) evaluated drainage around the proposed disturbance areas to ensure that a 100-year/24-hour storm event from off-site is transported around the

mine's surface facilities and drainage from within the site from the same storm event will be captured in temporary sedimentation basins (See Attachment C). The scope of the report covers aspects of storm water collection, conveyance, and retention design necessary to comply with BLM requirements for the mine site including Title 43 Code of Federal Regulations Section 3809 (43 CFR §3809.401(2)(iii)), and the Utah Division of Oil, Gas, and Mining requirements including Utah Administrative Code Title R647 Natural Resources; Oil, Gas and Mining; Non-Coal, and Utah Code Title 40 Chapter 08 Utah Mined Land Reclamation Act.

Daneros Portal Area

The drainage control design for the Daneros Portal Area includes one diversion channel, one diversion berm, and a sedimentation pond. The diversion channels are designed to convey peak flows from the design storm event around the disturbance area associated with the Daneros Portal Area. The berms and sedimentation pond are designed to contain the water generated within the disturbance areas during the design storm event. This will mitigate the potential for suspended solids (eroded from within the disturbance area) to discharge from site.

Bullseye Portal Area

At the Bullseye portal Area, three diversion channels are proposed. Two channels are designed to route offsite surface water run-on from the drainage basins north of the DRAs to the existing drainage channel, and a third channel is designed to route offsite surface water run-on from the drainage basin east of the portal and mine yard to the existing drainage channel. Three-60" diameter culverts are designed for each of the two proposed crossings along the major existing drainage. A stream alteration permit will be obtained with the Utah Division of Water Quality prior to culvert installation. Berms around the two disturbance areas are designed to contain the water generated within the disturbance areas during the design storm event.

South Portal Area

Two upstream diversion channels are designed to route offsite surface water run-off around the proposed disturbance areas and from the drainage basin to the north into the existing drainage channels. Storm water runoff from the northwest disturbance area (i.e. DRA #4) will be captured by an earthen berm to the west and routed through a culvert under the road to a storm water pond south west of the Inert Material Storage Area. Storm water runoff from the eastern side of DRA #4 will be captured by Collection Channel 1 and routed through a culvert under the road and under Diversion Channel 2 where it will flow into the Portal Area Sediment Pond. Storm water runoff from the portal area will be contained by berms and flow into that same sediment pond. Storm water runoff from within the south central and southwest disturbance area (i.e., buildings, topsoil storage area, laydown yard and inert material storage) will be captured by earthen berms and drained into temporary sediment ponds at the east and west edges of this

disturbance area. Storm water runoff from within the ore stockpile area located in the southeast corner of the site will be captured and retained by perimeter earthen berms.

3.2.8 Installation of Mine Infrastructure Systems

It is Energy Fuels' goal to provide an integrated mine infrastructure system which will be primarily located at the Daneros Portal Area. The satellite mining locations at the Bullseye and South portal areas will also require mine infrastructure to support future mining activities. The quantities and types of equipment at each location are subject to change depending on market conditions and other factors.

Daneros Portal Area

The main surface infrastructure will be located at the Daneros Portal Area. This installation will include two synchronized diesel-powered Caterpillar Prime 455 kilowatt (kW), 568.7 kilovolt-ampere (kVA) generators that will allow for the expansion of the underground power system in a cost-effective manner.

An emergency generator (140 kW) will be stored onsite to provide power where needed (e.g., vent hole construction, back-up power, etc.). It is assumed that this generator will be in operation 24 hours a day; however, for only 42 days out of the year.

Two 975 cubic feet per minute (CFM) electric air compressors will be utilized and installed underground so that the surface footprint does not need to be further expanded. Compressed air is used underground to power jack-leg rock drills and other mining equipment.

Two 6,000 gallon above-ground self-contained fuel tanks will be installed to provide diesel storage for the generators and the underground equipment. These tanks will be double walled, designed for storage of petroleum products, and constructed in accordance with Underwriter Laboratories Inc. (UL) standards for above ground storage tanks. The tanks will be leak tested prior to installation and will be maintained and monitored in accordance with the mine SPCC Plan.

The existing SPCC Plan has been modified to incorporate the new fuel storage tanks. Because the proposed above-ground storage tanks are double walled with monitoring ports, additional secondary containment is not required under federal regulations. However, Energy Fuels plans to install these tanks on concrete pads with concrete containment walls designed to contain the maximum capacity of the largest tank, as discussed in the revised SPCC Plan (see Attachment I).

Bullseye Portal Area

The Bullseye Portal Area will use similar equipment as the Daneros Portal Area. It will have one diesel-powered Caterpillar 455 kW generator, one 975 CFM electric air compressor, and one 6,000 gallon above ground fuel tank. In addition, two 5,000-gallon water tanks will be installed at the site.

This satellite installation will be temporary in nature. Once underground development has advanced to connect the Daneros underground workings to the historical workings, the Bullseye surface installations can be decommissioned since power, water and compressed air can be supplied by the installations at the Daneros and South portal areas. Most of the equipment will be moved to the South Portal Area and the majority of the disturbed area including the DRAs will be reclaimed at that time. The Bullseye Portal will remain open to provide ventilation and an emergency escapeway.

South Portal Area

Mining infrastructure from the temporary satellite installation at the Bullseye Portal Area will be relocated to the South Portal Area upon connection to the Daneros underground workings. The South Portal Area will ultimately have two diesel-powered Caterpillar 455 kW generators (one relocated from the Bullseye Portal Area), one 975 CFM electric air compressor, and eventually two 6,000-gallon above-ground fuel tanks. Two 5,000-gallon water tanks and one 5,000-gallon brine water tank will also be installed at the site.

A variety of underground and surface equipment will be utilized during production at the Daneros Mine. Tables 3-2 through 3-4 provide summaries of the expected equipment. The raise-bore equipment will only be on site during installation of new vent holes. The quantities and types of equipment are subject to change depending on market conditions, equipment availability, mining conditions and other factors.

Table 3-2 Underground Equipment

	Daneros Mine (Quantity)	
Description	**Current**	**Future**
Diesel Loaders, 2 – 3.5 cy capacity	4	6
Diesel Trucks, 2 - 10 ton capacity	7	10
Development Drills, Jumbos	0	2
Production Drills, Jacklegs	24	35
Diesel Mantrips and Utility Vehicles	5	9
Water Truck	1	1
Skid Steer	1	2
Exploration Long Hole/Short Hole Machine	2	2

Table 3-3 Surface Equipment

Description	Daneros Mine (Quantity)	
	Current	Future
Front-End Loader	2	2
Tracked Dozer	0	1
Dump Truck, 10 ton	0	1
Highway Haul Trucks, 25 [(a)]	10-15	10-15
Water Truck	1	1
Motor Grader	1	1
Tanker Truck (water)	1	1
Generator, 230 kW	1	0
Generator, 140 kW	1	1
Generator, 455 kW	0	4
Emergency Generator, 255 kW	0	1
Portable Compressor, 375H	2	3
Pick-up Trucks, 3/4-ton (4-wheel drive)[(b)]	7	10
Water Tanks	1	6
Propane Tanks	2	4

Notes

a. *Highway haul trucks are provided by a Contractor*
b. *Up to 10 pick-up trucks and passenger vans or buses will be used for employee and contractor transportation to and from the site; only 4 such vehicles will be used onsite at a time.*

Table 3-4 Raise Bore Equipment (Vent Hole Installation)

Description	Daneros Mine (Quantity)
Raise Bore machine	1
Caisson Machine	1
Skid Steer Loader	1
4 WD Pickup Trucks	3
Concrete Trucks	1
Drill Rig	1
Dozer	1

3.2.9 Installation of Office/Shop Complex (South Portal Area)

The South Portal access is required to provide safe entry into historical workings in the area and access reserves and potential resources to the north of its surface location. The South Portal Area will be not constructed until after underground development advances further to the south, but it will ultimately become a primary entry point into the Daneros Mine workings. An office/shop complex, ore stockpile pads, a large DRA, and other facilities will be constructed at this location. Infrastructure will include:

- Mine offices and dry (changing and shower facility)
- Maintenance shop and warehouse
- Designated parking areas and storage yard
- Water well (including water systems)
- Non-potable water holding tank
- Portable sanitation facilities
- Septic system (including leach field)

The location and orientation of the office/shop complex is shown in Figure 3-2c. The proposed size and orientation of the surface facilities may change slightly during construction; however, these surface facilities will remain within the proposed disturbed area.

3.3 Construction of Vent Holes and Access Roads

Adequate ventilation is required for underground mining activities. Worker health and safety at the Daneros Mine depends on the installation of vent holes, which are vertical shafts that provide for either inflow or discharge of air. A total of 8 vent holes are proposed within the future development area shown in Figure 3-3. This area of future development is based on professional judgment, past operations, and estimated ore trends. Installation and maintenance of access roads to the vent holes is also required. In addition, existing roads will be rehabilitated and used, to the extent practicable, for access to vents. The total disturbed area associated with the installation of the vent holes and construction of the access roads will result in an estimated surface disturbance of 12 acres. This estimate is based on an average surface disturbance of ¼ acre per vent hole and 1 ¼ acre for associated access roads (1.5 acres per vent hole).

The specific location of individual vent holes and access roads within the area of future development, shown on Figure 3-3, cannot be determined at this time. The placement of these vent holes is uncertain and dependent on the specific location and geometry of ore delineated underground; however, it is reasonably foreseeable that the former Jim Butts Portal will be used for ventilation. Therefore, Energy Fuels has provided general locations of these activities for review and approval by BLM. Energy Fuels proposes that the specific locations for these facilities and the location of associated access roads be subject to BLM review prior to construction. If approved, Energy Fuels proposes that this requirement be included in the BLM Decision Notice as a Condition of Approval. Installation of these facilities is required to support extraction of uranium ore from the Daneros Mine, and will be conducted in accordance and compliance with applicable federal and state rules and regulations.

Installation of a vent hole requires that an access road be constructed to the site if existing road access is not present. A small-diameter pilot hole is then drilled from the surface into the mine workings. A large six to ten foot cutting head is then connected to the drill steel within the mine and used to upream the hole from the mine to the surface. The resulting cuttings that collect below in the mine workings are mucked out and hauled to the surface where they are placed in an inert stockpile for later use during reclamation.

During each drilling operation, there will typically be a 1,000 gallon portable diesel tank, one to two 55-gallon drums of hydraulic oil, and several 5 gallon cans of motor oil present at the raise bore machine. These petroleum products will be stored with adequate secondary containment using Best Management Practices (BMPs). In the event of an inadvertent leak of petroleum products during drilling activities, the BLM will be contacted, and containment and clean-up activities will be conducted. Any necessary mitigation activities such as excavation of affected soil will be conducted in accordance with state and federal requirements.

The proposed vent holes are expected to be six to ten feet in diameter. The surface disturbance associated with the proposed vent holes will be minimal (approximately ¼ acre per vent hole). Metal diffusers will be installed above the proposed opening for vents where the fan is placed on the surface. Diffusers are used to maximize flow and ventilation system efficiency. The diffusers will be approximately four to five feet tall and screened on top to prevent entry. Fans are generally placed on the surface to improve mine ventilation and avoid noisy underground conditions to meet MSHA requirements for workers; however, in some cases, fans can be placed underground in areas where workers will not be continuously working. A figure of a typical vent hole layout (with photograph of a typical diffuser) is included as Figure 3-4. Electrical lines to power the vent fans will all be placed underground. In some instances where underground power is initially unavailable, the emergency generator may be placed on the surface next to the fan until electrical line power is established.

Individual vent holes may be reclaimed prior to final reclamation of the Daneros Mine if they are no longer needed for ventilation. This could occur where an area is mined out and sealed off from the main workings. However, concurrent reclamation will only be performed if these activities do not jeopardize worker health and safety (i.e., adequate ventilation and emergency escapeways have to remain in place until the mine is closed). Reclamation of vent holes will be performed as described in Section 4.

Surface disturbance associated with the access roads to vent holes is estimated to be approximately 1 ¼ acre based on historical operations and topography and terrain at the Daneros Mine Site. Surface disturbance caused by installation of access roads will be reclaimed as described in Section 4.

3.4 Surface Disturbance

The previously permitted disturbed acreage of 4.5 acres will be increased by 41.8 acres to 46.3 acres. Table 3-5 provides a summary of the previously approved and proposed surface disturbance area. The pre-mining disturbance area is also provided for reference purposes.

As shown in Table 3-5, 8.9 additional acres at the Daneros Portal and Bullseye Portal areas will be disturbed upon resumption of mining operations. The remaining 32.9 acres of proposed surface disturbance will occur at the South Portal Area and in the installation of future vent holes. The South Portal Area will not be developed until later mine expansion while the vent holes will be installed incrementally over the proposed 20-year mine life.

Table 3-5 Surface Disturbance Area Summary

Portal Area	Previously Permitted Disturbance Acreage	Proposed Modification Acreage (Existing Disturbance)[2]	Total Proposed Disturbance
Daneros	4.5[1]	0.8	5.3
Bullseye	0.0	8.1 (0.7)	8.1
South	0.0	20.9 (4.9)	20.9
Vent Holes and Access Roads[1]	0.0[1]	12.0[1]	12.0
Total Acreage	4.5	41.8 (5.6)	46.3

[1] Typical disturbance from vent shafts includes 0.25 acres per vent shaft and approximately 1.25 acres per vent shaft for access roads. The acreage for 2 existing vents was included in the Daneros Portal Previously Permitted Disturbance Acreage.
[2] Existing disturbance is due to historic mining activities in the area.

3.5 Water Management Plans

The water management plan for the Daneros Mine consists of measures to be taken to avoid disturbance of existing natural drainage channels, minimize sedimentation, minimize erosion, and protect surface water and groundwater systems.

The Storm Water Pollution Prevention Plan (SWPPP) has been updated for the Daneros Mine in conformance with the UDEQ requirements under the Utah Water Pollution Control Act, Title 19, Chapter 5, Utah Code Annotated 1953, as amended. The SWPPP (see Attachment G) establishes BMPs such as sediment and erosion controls, inspections, and maintenance schedules to mitigate migration of sediments by surface water runoff.

Areas of potential erosion include the topsoil stockpiles, the ore stockpiles, and the DRAs. As discussed in more detail in the Drainage Report (see Attachment C), diversion channels will be constructed upstream of the disturbed areas to route off-site runoff around these facilities. Runoff within the disturbed areas will be contained within berms and/or routed to temporary sediment ponds. The topsoil stockpiles will be temporarily seeded using the BLM and UDOGM approved seed mix during the first fall planting season after the soil is stockpiled. Seeding may be done in combination with other stabilization measures (i.e., mulching, berming).

3.6 Rock Characterization and Handling Plans

Mine rock was characterized initially by the BLM (BLM 2011). Further characterization studies were completed in 2012 to support planned National Environmental Policy Act analysis for this proposed Modification. The purpose of the rock characterization study was to determine if the rock contains acid generating or deleterious materials, and to support development of an effective rock handling plan to meet performance standards set forth at 43 CFR 3809.420. This section describes the rock characteristics and the proposed handling plans.

3.6.1 Rock Characteristics

Evaluation of rock characteristics included review and assessment of existing data plus additional characterization to better assess the geochemical characteristics of ore and development rock mine at the Daneros Mine.

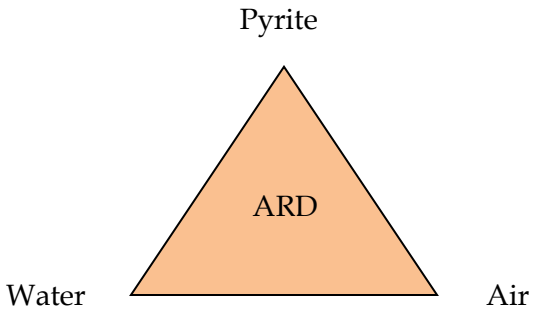
Review of previous data

The ore deposits of the Daneros Mine are hosted by an approximately ten-foot thick unit of interbedded sandstone and conglomerate of the Shinarump Member of the Chinle Formation. The Shinarump Member is underlain by the Moenkopi Formation and is overlain by a thick sequence of sedimentary rocks of the Chinle Formation, Wingate Sandstone and Kayenta Formations of the Glen Canyon Group. The ore occurs within sandstone and conglomerate units of the Shinarump Member in association with fossilized wood and other organic debris. Uranium minerals and pyrite occur as replacement minerals within fossilized wood and other organic matter, and as disseminations spatially associated with organic matter (Thaden et al. 1964).

Mining of uranium ore at the Daneros Mine occurs entirely within the Shinarump Member, and commonly the top of the underlying Moenkopi Formation is kept in the sill (floor) of the drifts (i.e. tunnels). The stability of the overlying sandstone and siltstone units of the Chinle Formation is poor, and the back (roof) of the tunnels seldom intersects the sandstone and siltstone units unless necessary. Therefore, the ore and most development rock is mined from the Shinarump Member. Most future mining in accordance with this proposed Modification will occur within the Shinarump Member. Based on geochemical testing of the various rock units, the Shinarump Member is the only rock unit within the mine that contains elevated concentrations of uranium, pyrite, or other sulfide minerals.

Rock units overlying the Shinarump Member will be mined during construction of ventilation shafts and the decline tunnel at the proposed South Portal. The Shinarump is overlain by approximately 600 feet of non-ore-bearing siltstone, sandstone, shale, and limestone of the Chinle Formation; approximately 400 feet of sandstone of the Wingate Formation; and approximately 40 feet of sandstone of the Kayenta Formation. These overlying units are not ore-bearing (Thaden et al, 1964), and are not expected to exhibit acid generating or deleterious characteristics.

Because the mineralized portions of the Shinarump Member contain sulfide minerals including pyrite, samples of this lithology were analyzed for the potential to generate acid by the BLM (BLM 2011). Re-examination of this data shows that 5 of the 8 samples are classified as acid generating based on the acid based accounting (ABA) data. This data suggests that mineralized portions of the Shinarump Member will have the propensity to generate acid rock drainage (ARD) if other required components of the ARD triangle are present. The ARD triangle is shown below.



The ARD triangle shows diagrammatically the components that must be present for ARD to occur. The first component is pyrite or other acid-generating sulfide minerals, which produce acidity when exposed to air and water. The second component is air, or more accurately oxygen, which supports oxidation of pyrite or other acid-generating sulfide minerals. The final component is sufficient water to cause deep percolation through a rock pile and generation of leachate in quantities that could affect surface water or groundwater quality.

Results of Additional Rock Characterization

The geochemical characteristics of the Daneros Mine rock are evaluated in *Daneros Mine Rock Geochemistry Investigation* (CDM Smith 2013b), which is included as Attachment D. This investigation focused on assessing mine rock produced from the Shinarump Member of the Chinle Formation, because this unit hosts all uranium and associated pyrite mineralization at the Daneros Mine. The results of this investigation are summarized as follows:

- Uranium mineralization at Daneros is hosted by sandstones and conglomerates of the Shinarump Member of the Chinle Formation, and uranium mineralization is spatially associated with accumulations of fossilized wood and pyrite mineralization.
- The potential for development rock produced from the Shinarump Member to generate acid varies, but overall, the average characteristics of Shinarump Member development rock indicate that it does have potential to generate acid. Seven of the 10 samples collected from the underground mine and all of the multi-increment samples of Shinarump Member development rock exhibited negative net neutralization potential based on acid base accounting analyses.
- The acid potential of the Shinarump Member development rock varies over short distances within the underground mine. Therefore, segregation of acid generating and non-acid generating development rock from the Shinarump Member during mining is likely to be difficult.
- Both Shinarump Member development rock and ore have potential to generate deleterious leachate if sufficient water is present to cause percolation through the rock piles. Ore has potential to generate leachate containing antimony, arsenic, nitrate, thallium and uranium, and development rock has potential to generate leachate containing arsenic, nitrate and uranium.
- The Shinarump Member development rock and ore both have the potential to cause direct contact risks related to arsenic to BLM campers and BLM workers.
- Ore has potential to cause direct contact risks to wildlife/livestock from copper, lead and zinc, and development rock has potential to cause direct contact risks to wildlife/livestock from copper.

The geochemical characterization data collected to support the previous Daneros Mine Environmental Assessment (BLM 2011) were re-evaluated and are discussed in *Daneros Mine Rock Geochemistry Investigation* (CDM Smith 2013b) (Attachment D). The acid base accounting data collected to support the Daneros Mine Environmental Assessment were misinterpreted in the 2011 environmental assessment. Therefore, the conclusions presented above and described in more detail in Attachment D are different from the conclusions of the previous environmental assessment.

Additional monitoring of rock geochemical characteristics is required as a condition of approval for the existing BLM Plan of Operations, which addresses the Daneros portal area. Monitoring data collected in accordance with this approved Plan of Operations will be provided to the state of Utah on an annual basis.

Geochemical Characteristics of other Rock and Soil Units

Development of the Daneros Mine will affect several other rock units during construction of ventilation shafts and declines extending from the surface to the underground mine. These rock units were not sampled during the geochemical investigation, because they are not ore-bearing and are well-described by existing US Geological Survey data (Thaden et al 1964 and Thaden et al 2008). Rock units that will be intersected during construction of vent shafts and declines include the Chinle Formation, the Wingate Sandstone and the Kayenta Formations of the Glen Canyon Group. The Chinle Formation is composed of interbedded clastic and chemical sedimentary rocks including shale, siltstone, sandstone and limestone. The Wingate Sandstone is composed of fine grained sandstone, and the Kayenta Formation is composed of sandstone with thin lenses of conglomerate and siltstone. Unconsolidated deposits of colluvium formed from these rock units also may be excavated during development of mine surface facilitates. These rock units are composed of minerals such as quartz, feldspar, various clays, and calcite, which do not generate acid. In addition, rocks containing calcite or other carbonate minerals will provide significant neutralization potential. Therefore, the rock units that will be excavated during construction of vent shafts, declines and surface facilitates are not deleterious or acid forming. In contrast, these rock units provide a valuable source of construction materials to use during mine reclamation as part of a management strategy designed to address potential risks associated with acid-forming or deleterious materials produced during mining of the Shinarump Member of the Chinle Formation.

Development of the Daneros Mine will also affect soils, which will be excavated and placed into temporary stockpiles during mine development. After mining is complete, these soils will be redistributed over mining-disturbed areas to support revegetation. Soils at the Daneros mine were sampled and analyzed at the Colorado State University Soil, Water and Plant Testing Laboratory (laboratory data are provided in Attachment F). The soil samples exhibited neutral to slightly alkaline soil paste pH ranging from 6.8 to 8.4 standard units (su), with 80 percent of the samples exhibiting soil paste pH of over 8 su. The soil samples were also analyzed for acid base accounting, and all soil samples exhibited excess neutralization potential with net neutralization potential values ranging from 13.6 to 81.6 tons per kiloton calcium carbonate equivalent. These data show that the soils are not deleterious or acid-forming.

Potential for DRAs to Produce Leachate

The potential for the DRAs to produce leachate was examined using unsaturated flow modeling with the program UNSAT-H (Fayer 2000), which is a model that evaluates the processes of precipitation, infiltration, evaporation and percolation based on site-specific soil characteristics and climate data compiled from Blanding, Utah. The UNSAT-H model was chosen for this evaluation because it simulates both downward movement of water into the DRAs and upward movement of water from the DRAs caused by evaporation. Consideration of upward unsaturated flow is critical for accurate simulation of percolation through mine

rock piles in semiarid and arid environments (Swanson et al. 2000). This assessment is described in detail in Attachment H.

The UNSAT-H evaluation used data developed from site-specific samples of development rock, inert material produced during vent hole installation, and site soil, which were collected at the Daneros Mine in May 2012. These samples were analyzed at Advanced Terra Testing in Lakewood, Colorado for grain size, permeability, soil-water characteristics, and other parameters to support the UNSAT-H modeling. Climate data including daily temperature, wind speed, wind direction, precipitation and relative humidity were compiled from a weather station located near the mine at Blanding, Utah (Station UT USC00420738), which is the closest National Oceanic and Atmospheric Administration cooperating weather station to the Daneros Mine. The elevation of the Blanding station is 6,040 ft, whereas the elevation at the Daneros Mine ranges from approximately 5,600 to 5,700 ft. The Blanding station is located approximately 39 miles east of the Daneros Mine. Climate data were downloaded from the National Climatic Data Center database. Precipitation at Blanding is low and averages only 13 inches per year based on a record extending from 1906 to 2012. In contrast, potential evaporation is approximately 75 inches per year. The UNSAT-H model uses these site-specific data to simulate infiltration of precipitation through the surface of the DRA, storage of water within the cover layers and the rock pile, evaporation of the stored water, and deep percolation that could produce leachate.

The UNSAT-H modeling considered three potential reclamation cover profiles composed of soil and inert material, which ranged in thickness from 18 to 36 inches. The remainder of the modeled profile was development rock with an overall thickness of 9.8 feet. The water predicted to percolate to the base of the 9.8 foot profile was assumed to represent potential leachate production. This is a conservative assumption, because most areas of the reclaimed DRAs will be significantly thicker than 9.8 feet.

The UNSAT-H simulations predict that leachate production under all three potential reclamation cover profiles will be negligible, with estimated percolation beyond 9.8 feet of approximately 0.0004 inches (0.001 centimeters) per year. The thickness of the reclamation cover profile did not significantly affect the estimated percolation rates, indicating that a cover thickness of greater than 18 inches is not necessary to limit leachate generation. The model shows that water will infiltrate into the reclamation cover profile during precipitation events, however this water will subsequently be removed by evaporation. Transpiration of water by plants in the vegetative cover will also remove water from the reclamation cover profile, but transpiration was not specifically modeled in the UNSAT-H simulations. The modeling results are supported by anecdotal observations at the Daneros Mine, which also indicate that leachate is not produced by the existing Daneros DRA.

Based on consideration of the arid climate at the Daneros Mine, unsaturated flow modeling results, and anecdotal observations at the mine, precipitation is not expected to be sufficient to cause deep percolation through rock piles or generation

of leachate. Periodic precipitation events are expected to wet the upper layer of the piles to depths ranging from inches to several ft. This moisture is expected to be removed from the piles through upward movement caused by evaporation and/or transpiration, which limits downward flow beyond several feet and deep percolation of water through the DRAs. Although this process will prevent ARD and production of deleterious leachate, it could cause effects to surface soil resources and reduce reclamation success. This issue is addressed in the rock management plan.

Mine Rock Radiological Characteristics

Baseline gamma surveys were conducted at existing and proposed facilities at the Daneros, Bullseye and South portal areas. Gamma radiation is ubiquitous in the environment and results from both space radiation and terrestrial radiation caused by radioactive decay of radionuclides such as uranium, potassium and thorium that occur naturally as trace constituents in soil and rock. Gamma radiation levels associated with ore and development rock are higher than background, because of the relatively higher concentration of radium in these materials. Radium is a decay product of uranium and is typically found in equilibrium with uranium in its native state.

The Daneros Portal Area was surveyed for gamma radiation during active operations in 2012. The Bullseye and South portal areas, which contain historic development rock areas, were also surveyed. These surveys were conducted by Energy Fuels personnel knowledgeable in use of radiological measurement equipment. The survey used a calibrated Ludlum Model 19 MicroR radiation survey meter. The survey was completed using a grid sampling approach. At each of the grid sampling locations, a gamma reading was gathered at the waist level and then on contact with the soil. In addition, four background survey locations were monitored. Active ore stockpiles at the Daneros Mine were not surveyed as part of this investigation, because the ore is only present in the stockpiles for a short period of time prior to haulage to the White Mesa Mill.

The gamma survey data show that rock with anomalous gamma radiation is present at both the Bullseye and South portal areas, in addition to the active areas at the Daneros Portal Area. Gamma survey data for the Daneros and Bullseye portal areas and the South Portal area are shown in Figures 3-5 and 3-6, respectively, and additional information is presented in Attachment E. Background gamma radiation in the Daneros Mine area is approximately 5 microroentgen (μR/hr). Areas containing development rock from historic or recent mining activities, exhibit higher gamma activity with values of up to 370 μR/hr present in localized areas. Historic development rock present in the South Portal Area from previous operations exhibit gamma radiation values of approximately 50 to 100 μR/hr.

3.6.2 Rock Management Plan

The proposed rock management plan is designed to address potential adverse effects of deleterious or acid-forming material. The rock management plan addresses Shinarump Member development rock, development rock generated from non-mineralized units overlying the Shinarump Member, ore, and low grade ore. The rock management plan includes the following components:

- To the extent practicable, development rock generated from the Shinarump Member will be placed into mined out voids within the underground mine, and will not be hauled to the surface.

- Development rock piles at the Daneros, Bullseye and South portal areas will be constructed in a vertically zoned design. Development rock generated from the Shinarump Member will be placed in the lower zone of the piles. These potentially acid-forming or deleterious materials will then be covered with an upper zone composed of inert materials prior to reclamation. The upper zone is designed to serve as a buffer to prevent upwards migration of products of sulfide mineral oxidation into the soil layer during evaporation and/or transpiration.

- Ore will be managed within discrete stockpiles, and will be hauled to the White Mesa Mill for mineral processing on a daily to weekly basis.

- Low-grade ore (ore-bearing rock that could be economical to process in the future) will be managed in the proposed stockpile areas. If this rock has not been processed by the end of the mine life, it will be hauled back underground during reclamation.

Inert materials will consist of development rock produced from non-ore-bearing rock units overlying the Shinarump Member, which are excavated during construction of ventilation shafts, mine declines, or other mine activities. Approximately 35,500 cy of inert materials are planned to be stockpiled at the Bullseye and South portal areas for use during mine reclamation. Stockpiling of inert materials at the Daneros Portal Area is not necessary, because placement of inert materials on the Daneros Portal Area DRA will be conducted prior to reclamation of the Bullseye and South portal areas, which provides for direct haulage and placement of inert materials at the Daneros Portal Area DRA. In the event that acid-forming or deleterious materials are excavated from rock units other than the Shinarump Member, these materials will be managed as acid-forming or deleterious materials. Additional information regarding reclamation is presented in Section 4.

3.7 Quality Assurance Plans

Quality assurance will be conducted during construction of the facilities at the Daneros Mine. This will include monitoring the extent of proposed ore stockpile areas and DRAs to facilitate construction and maintenance of drainage controls and allow for future reclamation in accordance with the approved reclamation plan.

3.8 Spill Prevention Plans

In accordance with 40 CFR Part 112, the existing SPCC plan has been updated for the Daneros Mine and will be implemented to prevent and mitigate damage to the environment from oil spills. The plan, which is presented in Attachment I, covers each of the three portal sites and provides measures and procedures for: predicting and controlling spills, preventive maintenance, transfer operations, personnel training, spill response, spill reporting, and periodic review and update of the plan.

3.9 Schedule of Mining and Operations

Typically, the Daneros Mine operates two 10 hour shift four days per week with light maintenance on an occasional Friday. Depending on market conditions and production rates, it is possible that these facilities could run on two or three shifts that operate from five to seven days a week. Potential extended periods of non-operation are discussed in Section 6.

3.10 Mine Access Roads and Utility Services

3.10.1 Access Roads

Access to the mine is via a year-round county maintained road, CR B258, and a lesser county-maintained road in Bullseye Canyon, CR D0029. CR B258 and CR D0029 are both designated routes in the BLM Monticello Field Office Travel Plan. Route CR D0029 passes the existing Daneros DRA and ore stockpile area and continues past the mine portal area, providing access onto Wingate Mesa. A locked gate has been installed just south of the Bullseye Portal Area to prevent public access to the mine area during operations. Access is still provided to local ranchers, BLM personnel, and others that periodically need access to the mesa. For public safety purposes, access on CR D0029 will continue to be restricted for the duration of mine operations. Safety signs and a gate have been placed on route CR D0029 at the entrance to the mine to restrict access for authorized mine personnel only. Public access will be restored once mining operations are completed.

County Road D0029 is currently truncated at the Daneros site, so that route, in its current condition, does not provide access to the existing and future vent hole locations. As shown on Figure 3-7, County Road D5319 bypasses the mine and connects with the existing vent holes. It will also be used to access future vent hole locations. The road is generally in good condition and will periodically be maintained when necessary using a grader during the 20-year mine life.

3.10.2 Electrical and Water Utilities

An existing generator is located at the Daneros Portal Area to provide power to the mine. Additional generators will be installed at each of the three portal areas as discussed in detail in Section 3.2.7. An electrical power line will be needed at the South Portal Area to convey power from the generators to the mine portal entrance (See Figure 3-2c). This line is planned to be buried in conduit to provide for vehicle access in the area. Power will then be conveyed within the underground mine to provide power to the underground vent fans.

Water is necessary to support the mining operation for general uses in surface facilities and for drilling and dust suppression in the underground mine. The surface facilities utilize water for washing equipment and other general uses. Water is necessary in the underground workings to drill and to control dust during drilling, mining and haulage activities.

A water well is located at the Daneros Portal Area in the Office/Shop Yard next to the pressure holding tank supplying non-potable water to the site. This well draws water from approximately 1,660 feet below the ground surface and about 1,300 feet below the primary mine workings. Water from the Cutler White Rim Aquifer is pumped into certified pressure vessels and provides the approximately 5,000 gallons per day needed for the site.

An additional water well will be developed at the South Portal Area to support similar activities in the future. Details regarding depth to groundwater and pumping rate at the South Portal Area are unknown at this time.

Drinking water is provided by bottled-water systems at the mine. In the event that mine employment increases to 25 or more employees, a potable water system will be installed for bathrooms and showers, as required by state law. This system could be supplied by the new well at the South Portal Area or by a cistern that is periodically filled with potable water obtained from an off-site source and trucked to the mine.

Section 4 Reclamation Plan

The following sections describe Energy Fuels' plan to reclaim disturbed areas and surface facilities in accordance with UDOGM and BLM regulations. This section conforms to the standards in 43 CFR Part 3809.420.

4.1 Drill and Vent Holes

Drill holes and vent shafts will be abandoned in accordance with UAC Rule R647-4-108. Holes that encounter groundwater will be plugged by placing a 50-foot cement plug immediately above and below the aquifer(s) or filling the hole from the bottom up with a high-grade bentonite/slurry mixture in accordance with UAC Rule R647-4-108.

Vent shaft abandonment will be generally similar to drill holes but some of the details depend on if the vent was only surface cased and grouted, cased and grouted due to dry but incompetent material, or cased and grouted due to intercept with a perched aquifer.

For all vent shafts, the vent surface casing will be removed to 5.5 feet below the ground surface, and placed inside the vent shaft. Approximately 3 inches of surface soil around the vent will also be placed within the vent shaft. Foam will be inserted into the vent opening as a plug. Above the foam, an 18-inch thick reinforced concrete cap will be placed over and beyond the diameter of the vent to a width of 4 feet. The remaining depth to surface grade will be filled with soil and graded to drain away from the vent.

4.1.1 Surface Cased Vent Shaft

If the geologic formations below a vent shaft are competent, dry and do not require support during mining, the vent shaft may only be cased for the top 20 feet. Reclamation of these vent shafts will include backfilling with inert material from the mine workings to the base of the foam plug. The backfill material will create the bottom form for the foam placement.

4.1.2 Fully Cased Vent Shaft

The two vent shafts already installed at the Daneros mine are fully cased because the geologic formations are not sufficiently competent to remain stable over the life of the mine and could create a safety hazard for miners underground. Geologic conditions at future vent shaft locations are expected to be similar. Reclamation of these fully cased vent shafts will not include full backfill. The rest of the reclamation will follow the abandonment measures discussed above.

4.1.3 Fully Cased and Grouted Vent Shafts

If, during vent shaft development, perched groundwater is encountered, the vent shaft will be fully cased and grouted to 50 feet above and below the water bearing zone. During closure of this type of vent shaft, the shaft will be backfilled to 50 feet below the water-bearing zone with inert material. A low-permeability seal will be

placed continuously to 50 feet above the water-bearing zone. The remainder of the shaft will be backfilled to the bottom of the foam plug. The backfill will be used as the base of the foam plug. The foam plug, concrete cap and soil cover will be installed as described above.

Additional details regarding planned vent shaft reclamation are provided in Figures 4-1, 4-2, and 4-3.

Stockpiled topsoil from the vent shaft areas will be used during reclamation. Disturbed areas will be ripped to alleviate soil compaction and broadcast seeded in the late fall using the BLM and UDOGM approved seed mix.

4.2 Regrading and Reshaping

The following subsections present Energy Fuels' proposed plans for regrading and reshaping of disturbed areas.

4.2.1 Road Reclamation

Temporary roads will be used to provide access to mine facilities and vent holes. Typically, these roads will be developed by pushing aside the top layer of soil into a windrow along the edge of the roadway. Upon reclamation, the windrows along these roads will be pushed back across the roadway and the road will be ripped and seeded with the BLM and UDOGM approved seed mix. The other temporary access roads will be reclaimed by:

- Re-grading any cuts and fills to re-establish approximate original ground contours and drainages
- Ripping the roads to a minimum depth of 18 inches to alleviate soil compaction (if depth to bedrock allows)
- Placing six inches of loose topsoil (as available) in locations where topsoil was removed (if applicable). Ideally, temporary access roads will have windrows of native soil that can be pushed back across the road
- Seeding the soil with the BLM and UDOGM approved seed mix(es)

Interim reclamation will be performed on any areas of road disturbance that are created during road construction that are not needed for regular use or maintenance. This includes cut banks and slopes, drainage ditches, berms and other features adjacent to the roadway. These areas will be stabilized with erosion control measures where appropriate and seeded.

Culverts installed along County Road D0029 that runs through Bullseye Canyon near the Daneros Portal will remain in place after mine reclamation is complete as requested by San Juan County. The county will accept maintenance responsibility for these culverts after mine reclamation is complete and reclamation liability has

been released by BLM and the state of Utah (Lynn Laws, San Juan County Roads Superintendent, written communication, September, 2013).

4.2.2 Slope Stability and Reclamation

The slopes created by mining activities will be regraded to achieve reclaimed slopes of 3H:1V or less steep, with the exception of the mine portals which will be graded to 2H:1V slopes. Compacted areas will be ripped on contour to a depth of 12 inches (in accordance with UAC Rule R647-4-110.5 (b)). Topsoil will be placed over the regraded slopes and scarified on contour and seeded with the BLM and UDOGM approved seed mix(es). BMPs, such as silt fence, straw waddles, or hay bales will be installed during reclamation to mitigate erosion until vegetation has been established.

4.2.3 Mine Portals

The mine portals will be sealed by pushing development rock 30 ft into each opening and then back filling additional material against the opening to create a 2H:1V slope. Material from the DRAs in the Daneros, South and Bullseye portal areas will be used for backfill within each of the portals. Inert material will be used to create the 2H:1V slopes. Topsoil will be placed over the final slope and seeded with the BLM and UDOGM approved seed mix upon reclamation.

4.2.4 Drainages

Most drainage channels at the Daneros mine will be reclaimed. Selected drainage channels at the Daneros Portal Area and Bullseye Portal Area will remain in place following closure of the mine sites to minimize the amount of runoff flowing down the slopes of the reclaimed DRAs and the across the mine sites. These drainage channels have been designed as permanent facilities to handle the 100-year, 24-hour storm event. Figures 4-1a, 4-1b, and 4-1c show the drainage channels that will remain post-reclamation at each portal area. Additional information regarding these drainage channels is provided in the *Drainage Report for Daneros Mine* (CDM 2012a).

4.2.5 Development Rock Areas

In-place reclamation of DRAs will include reduction of slopes, re-contouring, scarification of the surface to alleviate soil compaction, placement of inert rock and topsoil, and revegetation. Figures 4-4a, 4-4b, and 4-4c provide cross sections of the existing and reclaimed DRAs at the Daneros, Bullseye, and South portal areas. The top of the DRAs will be re-contoured to create natural appearing surfaces. The angle of repose slopes will be graded to achieve slopes of 3H:1V or less steep.

After re-contouring is complete, compacted areas of the DRA's will be scarified with suitable equipment. Inert material consisting of non-acid generating rock from development of vent holes and declines and subsoils will be placed over the regraded surface. Topsoil will then be placed as the final cover material. An average of 18 inches of loose inert material and topsoil will be placed over the

regraded DRAs. The ratio of soil to inert material will be dependent of material availability, but the depth of topsoil will be maximized to the extent practicable. The approximate volume of material available for respreading is provided in Table 3-1. The DRAs will be seeded with the UDOGM and BLM approved seed mix(es).

Energy Fuels will monitor the revegetation success and take any necessary measures to promote establishment of a self-sustaining vegetative cover until reclamation is established that meets the performance standards. BMPs will be installed to mitigate erosion until vegetation has successfully been established. Reclamation performance standards are addressed below in Section 4.9.

4.3 Final Deposition of Stockpiled Ore Materials

Any remaining ore stockpiles will be shipped to the mill for processing if market conditions are favorable. If low-grade ore has not been sent to the mill by the end of the mine life, it will be hauled back underground during reclamation.

Because the ore stockpiles contain relatively high levels of uranium and radionuclides, the ore stockpiles will be placed underground within the mined out areas if they are not shipped to the mill. Based on experience at other sites, the compacted soil immediately below the ore stockpile areas is expected to have radioactivity levels above background. These soils will be surveyed for radiation and any material with elevated radiation levels will be excavated and placed in the mine. Afterwards, the ore stockpile areas will be regraded, ripped, covered with soil, and seeded as shown on the Reclamation Map (Figures 4-4a through 4-4c).

4.4 Wildlife Habitat Rehabilitation

Land uses prior to proposed mine disturbance included uranium mining, recreation, livestock grazing, and wildlife habitat. The post-mining land will be returned to recreation and wildlife land uses on a natural landscape. Seed mix(es) have been designed to reflect the species composition observed within the project area and surrounding landscape, as well as those not observed, but typically associated with the landscape, soil type, elevation, and precipitation of the resource management area.

4.5 Topsoil Handling

Topsoil analyses indicate that the topsoil at the site is suitable for revegetation (see Attachment F). Compacted areas will be ripped on the contour to a minimum depth of 12 inches prior to placement of topsoil and growth media. Stockpiled topsoil will be placed as the final cover to the greatest extent practicable. This work will be accomplished using a dozer, front-end loader, and either scrapers or trucks.

Based on the availability of soil and inert material, the reclamation plan calls for the placement of 18 inches of inert rock and topsoil over the DRAs and 6 inches of topsoil over the other portions of the mine's reclaimed surface area. The ratio of topsoil to inert rock on the DRAs will vary according to the location and material

availability, but topsoil and subsoil material will be given preference over inert rock cover.

Following the placement of topsoil, the surface will be roughened by scarifying the soil. Care will be taken on the DRAs to limit scarification to the topsoil and not penetrate the underlying inert and potentially acid-generating development rock. A roughened soil surface exhibits lower soil loss potential, increased moisture retention, cooler surface soil temperatures, and greater seed germination.

4.6 Revegetation

The following sections describe Energy Fuels' procedures to reestablish vegetation and achieve a minimum of 70 percent of the pre-mining vegetative ground cover after reclamation activities.

4.6.1 Soil Material Replacement

Compacted areas will be ripped to a minimum depth of 12 inches prior to the placement of topsoil over the regraded site. Stockpiled topsoil will be placed loosely over the regraded DRAs and other areas of the site. This will be accomplished using a dozer, front-end loader, and trucks. An average of six inches of topsoil will be placed over the regraded mine site except for the DRAs, which will be covered with an average of 18 inches of loose inert material and topsoil. The depth of topsoil on the DRAs will be maximized based on available stockpiled soil volumes. Following the placement of topsoil, the surface will be will be scarified prior to or during seeding to aid in water infiltration and retention of precipitation. A roughened soil surface exhibits lower soil loss potential, increased moisture retention, cooler surface soil temperatures, and greater seed germination. Slopes of 3H:1V or less will be scarified on the contour of the reestablished post-mine topography using a tracked dozer.

4.6.2 Seed Bed Preparation

To minimize surface compaction and timeliness of the initial seeding efforts in late fall, broadcast seeding will be conducted concurrent with surface scarification. Where the regraded surface allows and the post-mine topography is determined to not be too steep, a tracked-dozer with rippers and broadcast seeder (or equivalent method) will be used to seed along (parallel to) the re-contoured surface. Care will be taken to limit the depth of scarification to the upper topsoil layer.

4.6.3 Seed Mixture

The following broadcast seed mix and rate, which was recommended by the Utah Division of Oil, Gas and Mining, is proposed for revegetation of the Daneros Mine. All seed will be certified or source-identified seed.

Table 4-1 Seed Mixture

Common Name (Pounds Live Seed [PLS])	Species Name	Rate lbs/ac
Western wheatgrass	Elymus smithii	1
Blue Grama	Bouteloua gracilis	1
Indian ricegrass	Oryzopsis hymenoides	2
Galleta	Hilaria jamesii	1
Palmer penstemon	Penstemon palmerii	0.5
Scarlet globemallow	Sphaeralcea coccinea	0.5
Black sagebrush	Artemisia nova	0.1
Mormon Tea	Ephedra viridis or torreyana	2
Shadscale	Atriplex confertifolia	1
4-wing saltbush	Atriplex canescens	2
Stansbury Cliffrose	Purshia stansburiana	1
Rubber Rabbitbrush	Chrysothamnus nauseosus	0.2
	Total Seed	13.3 lbs/ac

* Rate is recommended for broadcast seeding, pounds of pure live seed per acre (PLS).

4.6.4 Seeding Method

Seeding of all species will be achieved with a broadcast applicator in late fall. This will allow for the advantage of a natural cold scarification of the seeds as well as sufficient moisture at the onset of germination. A flex or drag harrow, or similar method, will be used to lightly cover the seed with topsoil after broadcasting in all reclaimed areas that are accessible by mobile equipment. Hand rakes will be used to cover seed with 1/8 to 1/4-inch of soil in small or steep areas where equipment access is limited.

4.6.5 Fertilization

No fertilizers are proposed to be used in the re-seeded areas. In areas where soils historically have exhibited nutrient limitations, and reclaimed soils continue to be low in plant-available nutrient content; the use of fertilizers has resulted in the proliferation of invasive species populations. Stockpiled soil will be tested again prior to reclamation, and the potential need for fertilizer or other soil amendments will be reevaluated at that time.

4.6.6 Irrigation

Irrigation will not be employed at the site. Energy Fuels will rely on precipitation for growth of vegetation in the reseeded areas. Growth of new vegetation will be monitored and additional actions including reseeding or weed control will be taken if adequate growth has not occurred after two growing seasons.

4.6.7 Other Revegetation Procedures

In conjunction with the reclamation activities described above, erosion control measures such as silt fence, straw wattles, and riprap will be installed in critical areas to minimize erosion. Straw mulch may also be applied in selected areas if recommended by the agencies.

Energy Fuels will mark areas where noxious weeds are found on the reclaimed areas and either spray or remove the weeds by hand. Weed identification and removal efforts will be documented and reported to the BLM and UDOGM.

4.7 Isolation and Control of Acid-Forming, Toxic, or Deleterious Materials

Data regarding environmental characteristics of development rock and the rock management plan designed to isolate and control potentially deleterious materials were described previously in Section 3.6. The data show that potentially deleterious materials may be produced during mining of the Shinarump Member, the host unit for uranium mineralization. The rock management plan described in Section 3.6 is designed to manage development rock in a manner that will support reclamation and meet environmental performance standards of 43 CFR 3809.420.

A focus of this management plan is construction of zoned DRAs designed to protect surface soil resources and facilitate establishment of a diverse and self-sustaining vegetative cover. Construction of the zoned backfill at the Daneros and Bullseye portals will occur concurrently with mining, because the capacity of the DRAs will be reached within several years after approval of this Modification. The lower zone of the DRAs will contain rock from the Shinarump Member, which may contain pyrite and trace concentrations of other metals and radionuclides. Once the capacity of a DRA is reached, the rock piles will be re-graded to a 3H:1V slope and rock mined from the overlying non-mineralized sedimentary rocks, or other stockpiled inert material will be placed, forming the upper zone of the DRAs. Stockpiled soil will then be placed over the upper zone, and will be revegetated as described in Section 4.6.

No federal or State of Utah radiological standards exist for reclamation of the DRAs at uranium mine sites. The Nuclear Regulatory Commission (NRC) has specifically excluded natural ores from regulation under the Atomic Energy Act (Section 6.2 of the Atomic Energy Act (42 U.S.C. 2092), and as set forth in 10 CFR 40.13(b)). However, despite the absence of federal or state standards, Energy Fuels proposes to voluntarily reclaim the DRAs to a standard dose of 100 millirem/year (mrem/yr) or less above background to a person camping on or near a DRA for 14 days for its mines in Utah. This standard falls within the radiation protection concept of As Low As is Reasonably Achievable (ALARA). The 100 mrem standard is supported technically by recommendations from the National Council on Radiation Protection and Measurements (NCRP). In addition, the standard is consistent with the numerical public dose protection standard set by the NRC for uranium milling facilities as set forth in 10 CFR Part 20.1301, Subpart D.

The proposed inert material/soil cover on the development rock areas is expected to provide for compliance with this proposed reclamation standard at the Daneros Mine. A post-reclamation gamma survey and assessment of compliance with the voluntary reclamation standard will be conducted after mining and reclamation are complete. This rock management plan will mitigate adverse effects that could be caused by the Daneros Mine development rock piles and provide for reclamation success after mining is completed.

If a radiological regulatory standard for reclamation of uranium mines is implemented by DOGM prior to final reclamation of the Daneros mines, Energy Fuels will work with DOGM to evaluate if it can be applied to future Daneros reclamation efforts without excessive cost or major changes to our reclamation plans.

4.8 Removal or Stabilization of Buildings, Structures, and Support Facilities

No mine surface facilities will be left after reclamation of the Daneros Mine. Trailers will be hauled to another facility, sold, or hauled to a landfill for disposal. Prefabricated buildings will be disassembled and reassembled at another facility, sold, or disposed of at an off-site landfill.

Solid waste meeting the definition of "inert waste" under UAC Rule R315-301-2 (e.g., concrete, blocks, brick, incidental rebar, and glass) will be broken up and buried on site. Concrete foundations and pads will be broken, using a hydraulic excavator with a concrete breaker (or equivalent) to dimensions of five feet or less. The broken concrete will be buried/covered with a minimum of three feet of soil or development rock, or alternately, it may be hauled to and disposed of within the mine underground workings prior to closing the portals.

4.9 Post-Closure Management

After reclamation is completed, post-closure monitoring and maintenance is anticipated to take 3 to 5 years. Success and progress of revegetation efforts are dependent on seasonal growth patterns, precipitation, and weather patterns. Additional erosion control measures and seeding may be required during the post-closure period to meet BLM and UDOGM reclamation standards. Revegetation success will be measured in accordance with UAC Rule R647-4-111 such that revegetation has achieved 70 percent of the pre-mining vegetative ground cover. In addition, the vegetation must survive three growing seasons following the last seeding. Revegetation will also be considered accomplished if the BLM and UDOGM determine that the site is stable and revegetation work has been satisfactorily completed within practical limits. This provision of the rules is especially applicable to mine sites such as the Daneros Mine where historic mining activities have decreased the amount of salvageable topsoil. A vegetation survey was conducted for the purpose of establishing pre-mining vegetative ground cover as discussed in Section 8.4 and detailed in Attachment F.

In accordance with UAC Rule R647-4-113, Energy Fuels will maintain a surety bond for reclamation until the BLM and UDOGM concur that reclamation is complete. Energy Fuels will notify the agencies to conduct an inspection upon completion of reclamation activities. A partial release of surety may be requested in the event that substantial phases or segments of reclamation such as demolition, backfilling, regrading, and/or vegetation establishment has been successfully performed and the residual amount of retained surety is determined adequate to verify completion of reclamation. Annual assessments of reclamation progress and annual reporting will be conducted to inform BLM and UDOGM of reclamation progress.

Section 5 Monitoring Plan

The following sections discuss Energy Fuels' proposed plan for monitoring the environmental effects of proposed operations at the Daneros Mine. This section conforms to 43 CFR Part 3809.401, Section (b)(4).

5.1 Surface Water and Sediment Monitoring

Erosion control for the site will be conducted in accordance with this Plan of Operations and the SWPPP presented in Attachment G. Qualified personnel will inspect the stationary equipment and mine areas on a monthly basis, at a minimum, during active mine operations for compliance with the plans and specifications. Stormwater inspections will be performed biannually during periods of temporary closure.

The monthly inspections may be done at any time during the month and preferentially following a precipitation event when drainage or sedimentation problems are generally more noticeable. Inspections are not required when adverse weather conditions, such as snow, make the site inaccessible; however, this information will be documented in the SWPPP. Biannual inspections are typically performed in late spring and fall.

All material handling areas will be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control systems and devices will be inspected to determine if they are working properly. Appropriate actions will be taken in response to inspections. Records of inspections will be maintained with the SWPPP.

In addition to inspections, follow-up maintenance will occur and be adequately documented in the inspection checklist. Follow-up maintenance includes maintaining equipment, and repairing BMPs that have been damaged by mining or construction activities, stormwater runoff, and or wind erosion. Maintenance may require replacement or addition of BMPs in areas where high erosion or sedimentation is occurring.

A copy of the SWPPP, which includes a spill and leak reporting form and log, and an example inspection form, is kept on site during active operations for use by Energy Fuels personnel.

Acid-forming or deleterious materials are unlikely to affect surface water, because these facilities will be managed in accordance with the drainage plan (Attachment C) and SWPPP (Attachment G). The drainage plans are design to contain all surface water runoff from the areas containing acid-forming or deleterious materials in sediment detention ponds for all storm events up to the design storm event (the 24-hour 100 year storm). Although an episodic storm water discharge from areas of the mine containing acid-forming or deleterious materials is possible during storm events that exceed the design storm, very large volumes of storm water from other unaffected areas would be present during these events. This

water would dilute any potential discharge from the detention ponds effectively mitigating adverse effects to surface water quality. In addition, no perennial or intermittent surface water bodies are present in vicinity of the Daneros mine, and any discharge that occurred during these infrequent, very large storm events would be discharged into ephemeral drainages, which do not contain aquatic ecological receptors that could be adversely affected.

5.2 Fuel Storage Area Monitoring

In accordance with 40 CFR Part 112, an existing SPCC plan has been updated for the Daneros Mine to prevent and mitigate damage to the environment from potential oil spills. This plan is included as Attachment I.

Energy Fuels will perform regular external visual inspections for any oil spilled outside the tank, especially at seams, joints, and piping. Monthly and annual inspections of the facilities will be conducted in accordance with the requirements of the SPCC plan. Precipitation that accumulates within the diked areas is visually inspected for oil sheen, and, if none is present, the water is allowed to evaporate or the water is removed. When the mine is on standby, fuels and other petroleum products will be removed from the site thereby eliminating the need for monthly inspections.

All logs and documentation of fuel unloading procedures are maintained by the person responsible for spill prevention. These records, as well as records of all inspections, will be kept with the SPCC plan and maintained for at least 3 years from the time of inspection.

5.3 Wildlife Monitoring

Energy Fuels has designed the operation to minimize the effects to wildlife to the extent practicable including bats, migratory birds, and bighorn sheep. Energy Fuels will maintain records of on-site and transportation-related wildlife mortality and will provide this information to BLM upon request. Biological surveys for the areas of future disturbance, including future vent hole development areas that are not yet disturbed will be performed prior to construction when specific areas of future disturbance are identified.

5.4 Noxious Weed Monitoring

A weed management plan was developed to prevent and control the spread of noxious weeds and invasive plants during and following construction, operations and reclamation (Attachment P). Energy Fuels and its contractors will be responsible for carrying out the methods described in this plan.

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. Implementation of preventive measures to control the spread of noxious weeds and invasive plants is the most cost-effective management approach.

The following preventive measures have been implemented and will be continued to prevent the spread of noxious/invasive plants during construction and future operations and maintenance activities:

- Prior to construction, Energy Fuels and its contractors will be trained on methods for cleaning equipment, identification of problem plant species in the project area, and procedures to follow when an invasive or noxious weed is located. To assist in identification, construction personnel will be supplied with a list and pictures of noxious and invasive species that may exist within the project area.

- Prior to any construction disturbance, all known noxious weed populations will be flagged so that they may be avoided.

- Equipment, materials, and vehicles will be stored at specified work areas or construction yards. All personal vehicles, sanitary facilities, and staging areas will 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 will be seeded following completion of activities to reduce the potential for the establishment and spread of noxious weeds and invasive plants. Seeding should occur as soon as possible following the disturbance activities and during the optimal seasonal time period. Only state/BLM-approved mixtures of certified "weed-free" seed will be used. All other introduced materials used for the mining activities, such as straw and fill, will also be certified weed-free.

- Should problematic weed infestation areas occur on site, Energy Fuels will confer with the BLM and the County regarding the appropriate control measures to be implemented.

5.5 Air Quality Monitoring

The existing operations at the Daneros Mine have been conducted under a small source exemption with the UDEQ, Air Quality Division (UDAQ). A new air quality permit was approved in 2014 for the proposed mine expansion (Attachment J). The new Approval Order (AO) contains special provisions that describe approved equipment, requirements and limitations that must be attained.

The approved equipment includes the four proposed main generators (two at the Daneros Portal Area, one at the Bullseye Portal Area, and one at the South Portal Area). The generator at the Bullseye Portal Area will be moved to the South Portal Area during the later stages of mine development, increasing the number of generators at the South Portal Area to two. Other site surface equipment will include an emergency generator, air compressors, front end loaders, a dozer, a dump truck, highway haul trucks rated at 25 tons capacity, a water truck, a motor grader, and a tanker truck.

The production and operating hour limits of the air quality permit established by UDAQ include:

- Up to 72,000 tons of ore produced per rolling 12-month period for the mine
- Four (4) 455 kW diesel-fired electric generators, two at the Daneros Portal Area, one at the Bullseye Portal Area and one at the South Portal Area. The generator at Bullseye portal area will eventually be moved to the South Portal Area. Once installed, the four generators will operate 24 hours a day/7 days a week with an operating time of approximately 8,760 hours per rolling 12-month period.
- One 140 kW diesel-fired electric emergency generator (24 hours a day/~42 days of the year) with operating time of approximately 1,000 hours per rolling 12-month period.
- Four 6,000 gallon above-ground self-contained diesel storage tanks. Two located at the Daneros Portal Area, one at the Bullseye Portal Area, and one at the South Portal Area. The storage tank at the Bullseye Portal Area will eventually be moved to the South Portal Area.

Visible emissions from the following emission points will not be allowed to exceed the following values:

- Haul roads – 15 percent opacity
- Operational areas – 15 percent opacity
- Diesel engines – 20 percent opacity
- All other points – 20 percent opacity
- Visible fugitive dust emissions from haul-road traffic and mobile equipment in operational areas shall not exceed 15 percent opacity at any point.

The requirements and limitations will also include haul road speed limits and fuel oil requirements. Approved fugitive dust control methods are discussed in Attachment O.

In addition, the proposed increase in ore production requires Energy Fuels to obtain approval from UDAQ for radon emissions from the mine ventilation system. The requirements for radon emissions are outlined in 40 CFR Part 61: Radon from Underground Uranium Mines, which is part of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) program. Approval for radon emissions was granted in an approval for construction letter dated May 23, 2012 (see Attachment J).

Radon emissions from the mine exhaust vents are monitored and controlled in accordance with standards implemented by UDAQ and promulgated by the U.S. Environmental Protection Agency's (EPA's) NESHAP program. The air volume of the mine exhausts and the measured radon concentrations within the exhausts are utilized by Energy Fuels to derive an annual radon emission rate estimate. The annualized emission rate data, the physical parameters of the mine exhaust, and the location of the nearest resident are entered into EPA's computer model (Comply-R) or an equivalent EPA approved model. The model output is compared against the 10 mrem/yr incremental dose limit for the general public (i.e., the nearest residents) to determine if the mine is in compliance or whether there is a need for further radon control. Although the 10 mrem/yr standard is very low (typical annual radiation doses received from natural background sources for people living in this part of Utah are in excess of 400 mrem/yr), exceedance of the standard is very unlikely given the mine's remote location and the lack of nearby residents.

5.6 Radiation Monitoring

The working environment, including mine safety and radiation exposure of site personnel, is regulated by the Mine Safety and Health Administration (MSHA), which inspects the mine on a regular basis. Energy Fuels is required by MSHA to monitor and control particulate and radiation exposure to workers at the mines. This program involves monitoring and control of dust, radon daughters and gamma radiation within the working areas of the mine. In addition, Energy Fuels maintains a health and safety plan for mine workers that includes ear protection, respirator policies, an evacuation plan, fire drills, stench evacuation tests, and 40-hour MSHA training.

The proposed inert material/soil cover on the development rock piles described in Section 3.6.2 is expected to provide for compliance with the proposed reclamation standard at the Daneros Mine. A post-reclamation gamma survey and assessment of compliance with the voluntary reclamation standard will be conducted after mining and reclamation are complete. This data and assessment will be provided to BLM.

Section 6 Interim Management Plan

This section conforms to the requirements of 43 CFR Part 3809.401, Section (b) (5). Mineral commodity markets tend to be cyclical, that is, prices rise and fall substantially over periods of years. In the uranium market for example, high prices in the late 1970s gave way to very low prices in the early 1990s, with spot prices falling below the cost of production for most mines. In 1996 spot prices recovered to the point that many mines could produce profitably, though prices soon declined again and only started to recover strongly late in 2003.

Given market conditions, temporary closure may occur, as it has in the past, due to the unpredictable market. In the past, these market fluctuations have led to temporary closure and the re-opening of uranium mines in the U.S. In some instances uranium mines were reclaimed prior to the exhaustion of recoverable resources. Interim management of the mines protects BLM lands from undue degradation during periods of non-operation.

In the event that market conditions or other circumstances require a temporary closure of mine operations, Energy Fuels will provide notice to the BLM in accordance with the requirements of 43 CFR Part 3802.4.7. During non-operating periods, Energy Fuels will maintain the buildings, drainage structures, roads, and other surface facilities in a safe and environmentally acceptable condition. Underground openings, gates, and buildings will be locked (or otherwise blocked) to discourage unauthorized access when mine personnel are not present.

To prevent unnecessary or undue degradation during temporary closure, the following Interim Management Plan will be followed by Energy Fuels.

6.1 Measures to Stabilize Excavations and Workings

The following measures will be used to stabilize excavations and workings.

6.1.1 Mine Portals and Vent Holes

Mine portals will be gated and locked, or blocked with development rock, during periods of temporary closure.

Vent holes will have metal diffusers (if fans are on the surface) and metal grates (on all vents) to prevent access to them. These diffusers and grates will remain in place during periods of non-operation. Energy Fuels may also weld a cover over each vent during extended closure periods. The Daneros Mine is a series of interconnected underground mines; therefore, no trenches or pits will be excavated during mining operations, and stabilization is not required.

6.1.2 Gates and Signage

The signage and gates will remain in place and will be maintained by Energy Fuels.

6.2 Measures to Isolate or Control Toxic or Deleterious Materials

Appropriate measures will be taken to control toxic or deleterious materials in the event of short-term temporary closure of mining operations. These measures are commensurate with potential environmental risks associated with these materials. No mineral processing is conducted at the Daneros Mine. Therefore, neither mineral processing chemicals nor waste generated by mineral processing are present at the mine.

The environmental characteristics of mine rock were evaluated and a rock management plan is described in Section 3.6 to address potential acid forming or deleterious materials. Generation of ARD is not expected due to the arid climate and the large excess of evaporation over precipitation in the project area. Stormwater control structures associated with the DRAs will be maintained during periods of temporary closure to mitigate potential erosion of development rock.

Stockpiled ore contains elevated concentrations of uranium, copper, and other trace metals. Stockpiled ore will be removed from the mine or placed back into the mine prior to periods of temporary closure. Stockpiled low-grade ore will remain in the proposed low grade stockpile at the South Portal Area.

6.3 Noxious Weeds

Energy Fuels will continue to manage noxious weeds at the mine site during any periods of temporary closure. If spotted knapweed or any other noxious weed infestations are found at the Daneros Mine, the BLM will be notified and additional weed control measures will be implemented.

6.4 Provisions for the Storage or Removal of Equipment, Supplies, and Structures

Equipment and supplies at the mine will be placed into locked storage boxes and within the locked and gated mine workings. No equipment and supplies will remain outside of mine buildings or outside of the workings. The locks and buildings will be monitored periodically and repaired in the event of damage due to vandalism or other causes.

6.5 Measures to Maintain the Project Area in a Safe and Clean Condition

Signage for speed limits and access limitations will remain in place at the mine sites and will be maintained. When temporary closure occurs at the mine, all equipment will either be removed from the site or placed inside locked buildings. Topsoil stockpiles will be seeded if not already stabilized and measures will be taken to ensure that the DRAs are stable and stormwater controls are functioning. In addition, earthen berms will be repaired prior to cessation and maintained as needed during the closure period. The mine offices and dry will be locked and maintained.

6.6 Plans for Monitoring Site Conditions during Periods of Non-Operation

This section meets the requirements of 43 CFR Part 3809.401(b) (4) to establish a proposed plan for monitoring at the Daneros Mine during periods of non-operation. The mine facilities and surface structures such as buildings, portals, vent holes, roads, sediment controls structures, and fencing will, at a minimum, be monitored on a bi-annual basis during periods of temporary closure. Maintenance of facilities and stabilization structures and controls will occur at the mine site following monitoring activities and will be reported to the BLM. In addition, permits will be maintained and permit conditions will continue to be adhered to during temporary closure including environmental monitoring programs.

6.7 Schedule of Temporary Closure

The Daneros Mine was placed in temporary closure in October 2012 due to depressed uranium prices. The mine will be reopened once the price increases sufficiently to allow for profitable operations. The BLM was notified of the temporary closure in accordance with requirements of 43 CFR Part 3802.4.7.

Section 7 Reclamation Cost Estimate

This section conforms to 43 CFR Part 3809.401, Section (d).

7.1 Existing Reclamation Surety for Daneros Mine

A reclamation surety provided to UDOGM and BLM for previously approved existing facilities totals $81,120 as presented below in Table 7-1.

Table 7-1 Existing Reclamation Surety Summary

Mine	Current Date of Bond	Current Bond Amount	Agency on Bond
Daneros Mine	5/20/2009	$81,120.00	UDOGM/BLM

7.2 Proposed Reclamation Surety for Daneros Mine

The reclamation cost estimate has been revised for the proposed mine expansion in Attachment K, which includes the incremental reclamation costs for the Daneros, Bullseye, and South Portal Areas. The revised reclamation surety was estimated based on following activities:

- Equipment mobilization
- Supervision during reclamation
- Safety gates, berms, barriers, signs, etc.
- General site clean-up and removal of trash and debris
- Removal/disposal of deleterious or hazardous materials
- Cleanup and removal of structures
- Demolition, removal or burial of facilities/structures, regrading/ripping of facilities areas
- Backfilling, grading and contouring
- Regrading, ripping of DRA tops and slopes
- Regrading/ripping stockpiles and other compacted areas such as access roads
- Backfilling of ventilation shafts
- Drainage reconstruction
- Soil material redistribution and stabilization
- Revegetation (preparation, seeding, etc.)

The proposed modifications to the Daneros reclamation cost estimate are summarized in the table below and are provided in detail in Attachment K.

7.3 Incremental Bonding

Current disturbance at the Daneros Mine is limited to the Daneros Portal Area and expansion of this area will occur when the mine is restarted. Work at the Bullseye Portal Area and South Portal Area will occur later on a phased basis. Construction of ventilation shafts to support the underground mine will also occur on a phased basis. The timing of these phases is dependent on uranium prices and other economic considerations. Therefore, Energy Fuels proposes that these mine areas and vent holes be bonded on an incremental basis and that submittal of reclamation bonds for individual phases be required prior to commencement of these activities. Energy Fuels proposes that this requirement be included as a Condition of Approval for this Modification.

Energy Fuels requests the following condition of approval to address incremental bonding for future mine areas and ventilation shaft installation:

> *Prior to initiation of surface disturbance of additional areas at the Daneros Portal Area and new areas at the Bullseye Portal Area, the South Portal Area, and proposed ventilation shafts in accordance with the Daneros Mine Plan of Operations, Energy Fuels shall submit a reclamation bond for the proposed activities to the Utah Division of Oil, Gas and Mining that complies with requirements of 43 CFR Part 3809.401, Section (d) and is approved in advance by the BLM and UDOGM.*

The ability to use incremental bonding to address the very forward-looking plans for future surface disturbance provides UDGOM and the BLM with adequate bonding prior to any new surface disturbance while limiting Energy Fuels' bonding costs to existing surface disturbances and new disturbances that will occur in the immediate future. As discussed in Attachment K, Energy Fuels proposes to maintain the existing bond in place until the restart of mining operations. At that time, an incremental bond will be posted with UDOGM for the proposed additional disturbance in three phases:

- Phase 1 consists of expanding the Development Rock Area (DRA) at the existing Daneros Portal area. The existing disturbance at the Daneros Portal includes the mine buildings, tanks, stationary equipment, an ore pad, the existing DRA, and 2 ventilation shafts with associated access roads.

- Phase 2 consists of the items covered in Phase 1 plus the Bullseye Portal area and 3 additional ventilation shafts and associated access roads. The Bullseye Portal area will include tanks, stationary equipment, 2 DRAs, an inert material storage area, an ore pad, topsoil stockpiles, and drainage and sediment control features.

- Phase 3 consists of the items addressed in Phase 2 plus the South Portal Area and the remaining 5 proposed ventilation shafts and associated access roads. The South Portal area includes mine buildings, tanks, stationary equipment, a DRA, an inert material storage area, ore stockpile pad, topsoil stockpile, and associated drainage and sediment control features.

Table 7-2 summarizes the proposed additions to the Daneros mine surety based on Phase 1.

Table 7-2 Proposed Additions to Daneros Mine Surety

Direct and Indirect Costs With Escalation Factor of 1.2% for 3 Years	
Phase 1	$102,000

Although not included in the reclamation estimate provided in Attachment K, Energy Fuels will also request bonding credit for reclamation completed at the Daneros and Bullseye Portal areas, either as part of the third incremental bond, or as a separate request once this work is completed.

Section 8 Operational and Baseline Environmental Information

Operational and baseline environmental information is presented in the following sections in accordance with 43 CFR 3809.401.

8.1 Air Quality

Airborne emissions at the Daneros Mine are controlled and monitored under the requirements of two regulatory Agencies, UDAQ and MSHA. Fugitive emissions, including airborne particulates, are regulated by permits issued by UDAQ. A new air quality permit was approved in 2014 by UDAQ for the proposed mine expansion. This AO establishes controls for air emissions associated with the Daneros Mine including generators, vehicle travel on unpaved roads, ore and rock storage and handling, and other fugitive emissions. The permit limits fugitive dust from truck haulage and loading operations to 15 percent visual opacity. Airborne particulates are controlled by enforcing speed limits and spraying the haul roads with a magnesium chloride solution and/or water. In addition, topsoil stockpiles and areas that will not be used for significant periods of time will be seeded to minimize erosion. A copy of the approved AO is included as Attachment J and the associated Air Emissions Inventory (EI) is included as Attachment M.

Radon emissions from the mine exhaust vents are monitored and controlled in accordance with standards implemented under UDAQ and EPA's regulations. The air volume of the mine exhausts and the measured radon concentrations within the exhausts are utilized by Energy Fuels to derive an annual radon emission rate estimate. The annualized emission rate data, the physical parameters of the mine exhaust, and the location of the nearest resident are entered into EPA's computer model (Comply-R) or an equivalent, EPA approved model. The model output is compared against the 10 mrem/yr standard to determine compliance or the need for further radon control. The results are reported annually to UDAQ.

The underground working environment, including air quality and radiation exposure, is regulated by MSHA. MSHA inspects and regulates the overall safety of mining operations. Energy Fuels is required by MSHA to monitor and control particulate and radiation exposure to workers at the mines. This program involves monitoring and control of dust, radon daughters, and gamma radiation within the working areas of the mine. In addition, Energy Fuels maintains a health and safety plan for mine workers that includes ear protection, respirator policies, an evacuation plan, fire drills, stench evacuation tests, and 40 hour MSHA training.

8.2 Surface and Groundwater Resources

Information pertaining to hydrogeologic conditions at the Daneros Mine can be found in the 2011 Daneros Mine Project EA and various appendices including the Hydrology and Hydraulics Report (BLM 2011). Information presented in the 2011 EA has been included in whole or summarized in the following sections.

Additional information collected since 2011 has also been incorporated into the discussion, where appropriate.

8.2.1 Surface Water

The Daneros mine portals are located entirely on the southwest side of Wingate Mesa, towards the headwaters of the North Fork Red Canyon. From the Daneros Mine in Bullseye Canyon, down through the North Fork Red Canyon and Red Canyon, all of the drainages are ephemeral and meander for the 27 in-stream miles to the Bay. The South Portal Area drains directly to the North Fork Red Canyon and the in stream length is only slightly shorter. The drainages in the vicinity of the mine portals flow only during significant precipitation events.

No stream gauges exist and no historical record of flows exists for these tributaries (U.S. Geological Survey 2008). The final stretch of this drainage upstream of the Colorado River experiences intermittent flow below approximately 3,800 feet above mean sea level (amsl). No permanent springs or bodies of water are directly related to surface conditions within the mine site or the side canyon in which it resides. A nearby perennial spring, Bullseye Spring, is located at an elevation of 6,070 feet amsl, approximately 380 feet in elevation above the Daneros decline portals and DRA. Bullseye Spring is a small perched spring/seep with its source water percolating from the adjacent Wingate Mesa, which rises 800 feet above the spring. Discharges to the spring occur at a rate of approximately 0.18 gallon per minute (11 gallons per hour).

Surface water discharges from the Daneros Mine are permitted under an Industrial Stormwater permit (UTR 260661) for construction and mining activities as required by the Clean Water Act and associated state and federal water pollution control laws. A SWPPP for the Daneros Mine is in place at the mine, and stormwater pollution control facilities are in place and operating at the mine. A revised SWPPP that addresses stormwater controls and procedures for the expansion areas is included as Attachment G to this Plan of Operations.

8.2.2 Groundwater

The Daneros Mine is located within a sequence of Mesozoic sedimentary rocks containing dominantly clastic rocks including sandstone, siltstone, shale with local limey shale and limestone. The sedimentary sequence overlying the mine includes members of the Triassic Chinle Formation and the Wingate Standstone and Jurassic Kayenta Formations. The ore occurs within the Shinarump Member, which is the lowermost member of the Chinle Formation. The lower contact of the Shinarump Member is an unconformity, which is a former erosional surface at the top of the Moenkopi Formation. The Moenkopi is underlain by the Permian Cutler Formation and other Paleozoic sedimentary rocks (Thaden et al. 1964). A conceptual cross section of the geology is included as Figure 8-1 and Figure 2-2 shows the overall site topography and drainages.

Alluvial materials in the drainages in the Project Area are limited or absent, and groundwater flow is not associated with the drainages. Groundwater does occur in the geologic strata of the Wingate Mesa between the drainages, above the elevation of the proposed underground mining activities. Bullseye Spring and Bullseye Well both produce water from a shallow, perched aquifer in the Wingate Mesa. The Mesa rises about 800 feet above the Daneros Portal. Bullseye Spring is located about 0.27 mile east of the Daneros Portal at an elevation of 5900 feet, which is about 250 feet in elevation above the portal as shown on Figure 2-2. Bullseye Well is located about 0.40 mile southeast of the Daneros Portal. The elevation at the top of the well is about 6,100 feet and it is reported to be 200 feet deep thus making the bottom of the well about 310 feet above the potential mining zone. The perched water table that supplies the spring and well results from meteoric waters moving downward from the area of recharge on Wingate Mesa through unsaturated strata comprising permeable sandstones of the Kayenta and Wingate Sandstone Formations. A low-permeability layer in the Chinle Formation is believed to intercept the downward movement of water, causing water to accumulate on top of the low-permeability layer as a small, perched zone of saturation. Water in the perched water table moves laterally above the low-permeability layer until it discharges at the outcrop in Bullseye Canyon. Spring flow rates measured quarterly since July 2009 indicate the rate is less than 0.5 gallon per minute (gpm), and there is limited apparent seasonal variation. The well is still in periodic use by the rancher.

Very little development of groundwater resources has been completed in the area, particularly near the Daneros Mine. Lack of exploration of groundwater resources has resulted in the hydrogeologic system not being well understood and the degree of connectivity between the shallow perched and a deeper Cutler groundwater system is relatively unknown. The two aquifer systems are likely hydrologically separated because the Chinle and Moenkopi Formations have low transmissivity which limits vertical movement of groundwater (Howells 1990). A well at the Daneros Portal Area was constructed in 2009 and is 1,660 ft deep. The pump is located at a depth of 1,330 ft. The well is collared within the lower Chinle Formation. Based on the lithology in the collar area and the depth of the well intake, this well is likely screened within the lower Cutler beds (Halgaito Formation) of the Cutler Group at a point over 1,000 ft below the underground mine workings.

8.2.3 Existing and Future Uses of Groundwater

There has been little ground water development in Bullseye Canyon. As previously discussed in Section 3.10.2, a water well is located at the Daneros portal Area. According to the State of Utah Division of Water Rights, there are two pre-existing water rights in the canyon, Bullseye Spring and Bullseye Well. The spring and the well are used for livestock watering purposes. Water rights are in place for both the Bullseye Well (99-64) and Bullseye Spring (99-118). These water rights are owned

by Sandy and Gayle Johnson, local ranchers. As shown on Figure 8-1, the ore body is located approximately 300 feet below the Bullseye Spring. The Bullseye well was drilled and used as a source of water for past mining operations in the canyon. The spring and well are located east of, and roughly at or slightly below the elevation of the Daneros mine vent holes. The locations of the Daneros Portal Area well, the Bullseye well, and Bullseye Spring are shown on Figure 2-2.

The Daneros Portal Area water well, operated by Energy Fuels, is located near the Daneros Portal shown in Figure 2-2. Energy Fuels utilizes water from this well for dust control and underground mining operations. The well produces approximately 1 gallon per minute from the lower Cutler beds (Halgaito Formation) of the Cutler Group. This aquifer is also used for water supply at the Fry Canyon Lodge, which is the next closest well completed in the Cutler aquifer. It is located 14 miles from the Daneros Mine.

8.3 Soil Resources

The Daneros Mine is located along the western edge of Wingate Mesa. The topographic pattern of the general area is varied, consisting of defined ridges and deep, relatively incised valleys and canyons. Soil compositions found in the mine disturbed area include very stony sandy clay loam and extremely bouldery loam. The most prevalent soil type in the mine area is the Strych-Skos-Badland complex with Myton family-Skos-Rock outcrop association (Natural Resources Conservation Service [NRCS] 2011).

Figure 8-2 shows the extent of the various soil types that may be within the area of potential soil disturbance. These soil map units are based on landscape-scale similarities observed in parent material, general soil characteristics, elevation, precipitation, position within the landscape, and vegetation.

The Strych-Skos-Badland complex consists of three components, two of which are described here (Badland is not considered a major soil component).

The Strych component is found on slopes from 30 to 50 percent on structural benches. The parent material consists of alluvium derived from sandstone and shale and/or colluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well-drained and water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low as is the shrink-swell potential. This soil is not flooded or ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent and the calcium carbonate equivalent within 40 inches, typically, does not exceed 20 percent.

The Skos component is also found at slopes from 30 to 50 percent on structural benches. The parent material consists of colluvium derived from interbedded sandstone and shale and/or residuum weathered from interbedded sandstone and

shale. Depth to a root restrictive layer, bedrock, lithic, is 4 to 20 inches. The natural drainage class is well drained and water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low with a moderate shrink-swell potential; this soil is not flooded or ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent and the calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface.

The Myton family-Skos-Rock outcrop association also consists of three components, one of which is described below (rock outcrop is also not considered a major soil component and the Skos component was described above). The Myton family component is found on slopes from 50 to 70 percent on hill slopes and ledges. The parent material consists of colluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained and water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low as is the shrink-swell potential. This soil is not flooded or ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent and the calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

8.4 Vegetation Resources

There are six major vegetation communities that exist within the mine area: Colorado Plateau Piñon-Juniper Woodland; Colorado Plateau Piñon-Juniper Shrubland; Colorado Plateau Mixed Bedrock Canyon and Tableland; Colorado Plateau Blackbrush-Mormon Tea Shrubland; Inter-Mountain Basins Mixed Salt Desert Scrub; and Inter-Mountain Basins Big Sagebrush Shrubland. Descriptions and locations of vegetation cover types were derived from the United States Geologic Survey (USGS) Southwest Regional Gap Analysis Program (USGS 2004).

Vegetation within the mine area is comprised mainly of piñon-juniper woodland and shrubland, at about 20 percent cover. The understory consists of patches of four-winged saltbrush (*Atriplex canescens)*, shadescale saltbrush (*Atriplex confertifolia*), cliffrose (*Purshia stansburiana)*, yellow rabbitbrush (*Chrysothamnus viscidiflorus*), rubber rabbitbrush *(Ericameria nauseosa)*, and mountain mahogany (*Cercocarpus montanus*) with sparse cacti, forbs, and graminoids.

8.4.1 Colorado Plateau Piñon-Juniper Woodland

This ecological system occurs in dry mountains and foothills of the Colorado Plateau region including the Western Slope of Colorado to the Wasatch Range, south to the Mogollon Rim and east into the northwestern corner of New Mexico. It is typically found at lower elevations ranging from 5,000 to 8,000 feet amsl. These woodlands occur on warm, dry sites on mountain slopes, mesas, plateaus, and ridges. Severe climatic events occurring during the growing season, such as frosts and drought, are thought to limit the distribution of piñon-juniper woodlands to

relatively narrow altitudinal belts on mountainsides. Soils supporting this system vary in texture ranging from stony, cobbly, gravelly sandy loams to clay loam or clay. Piñon pine *(Pinus edulis)* and/or Utah juniper *(Juniperus osteosperma)* dominate the tree canopy. In the southern portion of the Colorado Plateau in northern Arizona and northwestern New Mexico, one-seed juniper *(Juniperus monosperma)* and hybrids of juniper may dominate or codominate the tree canopy. Rocky Mountain juniper *(Juniperus scopulorum)* may codominate or replace Utah juniper at higher elevations. Understory layers are variable and may be dominated by shrubs, graminoids, or be absent. Associated species include greenleaf manzanita *(Arctostaphylos patula)*, big sagebrush *(Artemisia tridentate)*, littleleaf mountain mahogany *(Cercocarpus intricatus)*, mountain mahogany *(Cercocarpus montanus),* blackbrush *(Coleogyne ramosissima)*, stansbury cliffrose *(Purshia stansburiana)*, antelope bitterbrush *(Purshia tridentate),* Gambel oak *(Quercus gambelii)*, blue gramma *(Bouteloua gracilis)*, James' galleta *(Pleuraphis jamesii)*, or mutton grass *(Poa fendleriana)*. This system occurs at higher elevations than Great Basin Piñon-Juniper Woodland and Colorado Plateau shrubland systems where sympatric (SWCA 2008a).

8.4.2 Colorado Plateau Piñon-Juniper Shrubland

This ecological system is characteristic of the rocky mesa tops and slopes on the Colorado Plateau, but these stunted tree shrublands may extend further upslope along the low-elevation margins of taller piñon -juniper woodlands. Sites are drier than Colorado Plateau Piñon-Juniper Woodland. Substrates are shallow/rocky and shaley soils at lower elevations (4,000 to 6,500 feet amsl). Sparse examples of the system grade into Colorado Plateau Mixed Bedrock Canyon and Tableland. The vegetation is dominated by dwarfed (usually <10 feet tall) piñon pine and/or Utah juniper trees forming extensive tall shrublands in the region along low-elevation margins of piñon-juniper woodlands. Other shrubs, if present, may include black sagebrush *(Artemisia nova)*, Wyoming big sagebrush *(Artemisia tridentata ssp. wyomingensis)*, yellow rabbitbrush *(Chrysothamnus viscidiflorus)*, or blackbrush. Herbaceous layers are sparse to moderately dense and typically composed of xeric graminoids (SWCA 2008a).

8.4.3 Colorado Plateau Mixed Bedrock and Tableland

The distribution of this ecological system is centered on the Colorado Plateau where it is comprised of barren and sparsely vegetated landscapes (generally <10 percent plant cover) of steep cliff faces, narrow canyons, and open tablelands of predominantly sedimentary rocks, such as sandstone, shale, and limestone. Some eroding shale layers similar to Inter-Mountain Basins Shale Badland may be interbedded between the harder rocks. The vegetation is characterized by very open tree canopy or scattered trees and shrubs with a sparse herbaceous layer. Common species include piñon pine, ponderosa pine *(Pinus ponderosa)*, juniper spp., blackbrush, and other short-shrub and herbaceous species, utilizing moisture from cracks and pockets where soil accumulates (SWCA 2008a).

8.4.4 Colorado Plateau Blackbrush-Mormon-tea Shrubland

This ecological system occurs in the Colorado Plateau on benchlands, colluvial slopes, pediments or bajadas. Elevation ranges from 1,800 to 5,400 feet amsl. Substrates are shallow, typically calcareous, non-saline and gravelly or sandy soils over sandstone or limestone bedrock, caliche or limestone alluvium. It also occurs in deeper soils on sandy plains where it may have invaded desert grasslands. The vegetation is characterized by extensive open shrublands dominated by blackbrush often with Mormon tea *(Ephedra viridis)*, Torrey's jointfir *(Ephedra torreyana),* or Grayia spinosa (spiny hospage). Sandy portions may include sand sagebrush *(Artemisia filifolia)* as codominant. The herbaceous layer is sparse and composed of graminoids such as Indian ricegrass *(Achnatherum hymenoides)*, James' galleta, or sand dropseed *(Sporobolus cryptandrus)*.

8.4.5 Inter-Mountain Basins Mixed Salt Desert Scrub

This extensive ecological system includes open-canopied shrublands of typically saline basins, alluvial slopes and plains across the Intermountain western U.S. This type also extends in limited distribution into the southern Great Plains. Substrates are often saline and calcareous, medium- to fine-textured, alkaline soils, but include some coarser-textured soils. The vegetation is characterized by a typically open to moderately dense shrubland composed of one or more Atriplex species such as shadescale saltbush *(Atriplex confertifolia),* four-winged saltbush *(Atriplex canescens),* cattle saltbush *(Atriplex polycarpa)*, or spinescale saltbush *(Atriplex spinifera).* Other shrubs present to codominate may include Wyoming big sagebrush, yellow rabbitbrush, rubber rabbitbrush *(Ericameria nauseosa),* Nevada jointfir *(Ephedra nevadensis*), spiny hospage, winterfat *(Krascheninnikovia lanata)*, wolfberry (*Lycium spp.),* bud sagebrush (*Picrothamnus desertorum)*, or horsebrush (*Tetradymia spp*). Greasewood *(Sarcobatus vermiculatus)* is generally absent, but if present does not codominate. The herbaceous layer varies from sparse to moderately dense and is dominated by perennial graminoids such as Indian ricegrass, blue gramma, thickspike wheatgrass (*Elymus lanceolatus ssp. Lanceolatus*), western wheatgrass (*Pascopyrum smithii)*, James' galleta, big galleta (*Pleuraphis rigida)*, Sandberg bluegrass (*Poa secunda)*, or alkali sacaton (*Sporobolus airoides)*. Various forbs are also present (SWCA 2008a).

8.4.6 Inter-mountain Basins Big Sagebrush Shrubland

This ecological system occurs throughout much of the western U.S., typically in broad basins between mountain ranges, plains and foothills between 5,000 and 7,500 feet amsl. Soils are typically deep, well-drained and non-saline. These shrublands are dominated by basin big sagebrush *(Artemisia tridentata ssp. Tridentate)* and/or Wyoming big sagebrush. Scattered juniper spp., greasewood, and saltbush spp. may be present in some stands. Rubber rabbitbrush, yellow rabbitbrush, antelope bitterbrush, or mountain snowberry *(Symphoricarpos oreophilus)* may codominate disturbed stands. Perennial herbaceous components typically contribute less than 25 percent vegetative cover. Common graminoid species include Indian ricegrass, blue gramma, thickspike wheatgrass, Idaho fescue *(Festuca idahoensis)*, needle and thread *(Hesperostipa comata)*, basin wildrye *(Leymus*

cinereus), James' galleta, western wheatgrass, Sandberg bluegrass, or bluebunch wheatgrass *(Pseudoroegneria spicata)* (SWCA 2008a).

8.4.7 Wetlands

The Daneros Mine site lacks appreciable surface and/or sub-surface waters for the establishment and maintenance of wetlands/riparian zones. The Biological Survey Reports performed by SWCA (SWCA 2008a, SWCA 2013a) outlines common plant species at the site, which only includes upland plants and no riparian obligated species. Wetlands were not identified in the mine area; however, there are drainages adjacent to the proposed disturbed areas that will require protection through the construction and maintenance of stormwater and erosion control measures.

8.4.8 Vegetation Inventory

A vegetation inventory of the Bullseye Portal and South Portal areas was completed in 2013 (Westwater Engineering 2013). The *Vegetation Inventory, Energy Fuels Resources Daneros Mine – Bullseye and South Portals, San Juan County Utah*, is included within Attachment F. The purpose of this survey was to document any noxious weed infestations and to conduct quantitative vegetation analyses in accordance with current best practices. This survey identified 36 vegetative species including grasses, forbs and cacti with vegetative cover ranging from 4 to 30 percent in seven point-intercept method vegetation survey transects. The average vegetative cover within the seven transects was 16 percent. The project area is not heavily infested by noxious weeds and saltcedar (tamarisk) was the only species noted within the plant survey area (within 200 feet surrounding project features). Other invasive species noted in the area included Russian thistle, saltlover (halogeton), and cheatgrass. Table 8-1 displays the vegetative species identified in the Westwater Engineering (2013) inventory.

Table 8-1 Vegetative Species Identified in the Westwater Engineering (2013) Inventory

Common Name	Scientific Name	Common Name	Scientific Name
Alkali sacaton	*Sporobolus airoides*	Kingcup cactus	*Echinocereus troglachidiatus*
Arizona fescue	*Festuca arizonica*	Lemon scurfpea	*Psoralidium lanceolatum*
Aster	*Symphyotrichum* sp.	Milkvetch sp.	*Astragalus* sp.
Basin big sagebrush	*Artemisia tridentata tridentata*	Mormon tea	*Ephedra viridis*
Bastard toad flax	*Commandra umbellata*	Narrowleaf yucca	*Yucca angustissima*
Bottlebrush squirreltail	*Elymus elymoides*	Prickly pear cactus	*Opuntia* sp.
Broom snakeweed	*Gutierrezia sarothrae*	Purple threeawn	*Aristida purpurea*
Crispleaf buckwheat	*Eriogonum corymbosum*	Rose heath	*Chaetopappa ericoides*
Desert four o'clock	*Mirabilis multiflora*	Roundleaf buckwheat	*Eriogonum rotundifolium*
Derumpet	*Eriogonum inflatum*	Roundleaf buffaloberry	*Shepherdia rotundifolia*
Fourwing saltbush	*Atriplex canescens*	Rubber rabbitbrush	*Ericameria nauseosa*
Fremont's mahonia	*Mahonia fremontii*	Sand dropseed	*Sporobolus cryptandrus*
Galleta grass	*Pleuraphis jamesii*	Shadscale saltbush	*Atriplex confertifolia*
Gardner's saltbush	*Atriplex gardneri*	Small wirelettuce	*Stephanomeria exigua*
Golden princesplume	*Stanleya pinnata*	Stansbury cliffrose	*Purshia stansburiana*
Green molly	*Bassia americana*	Torrey's jointfir	*Ephedra torreyana*
Indian paintbrush	*Castilleja scabrida*	Upright prairie coneflower	*Ratibida columnifera*
Indian ricegrass	*Achnatherum hymenoides*	Utah Juniper	*Juniperus osteosperma*

Ten additional vegetative transects were evaluated by Energy Fuels personnel in 2012. These data are also included within Attachment F. During this survey, estimated vegetative cover within the Bullseye portal area ranged from 20 to 50 percent with an average of 30 percent based on four survey locations. Total vegetative cover within the South Portal area ranged from 0 to 60 percent with an average of 27 percent at the 6 survey locations.

8.5 Wildlife Resources

A biological survey was conducted by SWCA in 2008 and in 2009 within the Daneros Portal Area and at the two existing vent holes southeast of the portal. In 2011, Canyon Environmental conducted a similar survey within the Bullseye Portal Area, and in 2012 SWCA completed additional wildlife surveys in the Daneros Portal Area and the South Portal Area (SWCA 2013a).

The purpose of the surveys were to evaluate the potential effects of surface disturbance at the Daneros Mine on federally threatened or endangered species listed under the Endangered Species Act of 1973, as amended et seq., as well as species occurring on the Utah Sensitive Species List and BLM Special Management Species with the potential to occur in San Juan County Utah.

A summary of the findings are presented in the following sections. Additional information regarding wildlife is available in *Biological Survey Report, Daneros Project, San Juan County, Utah* (SWCA 2008a); *Survey Report, Utah Energy Corporation, Daneros Mine Project* (SWCA 2009); *Biological Survey Report for Daneros Mine, San Juan County, Utah* (Canyon Environmental 2011) and *Biological Survey Report*, Energy Fuels Resources (USA) Inc. (SWCA 2013a) which are included in Attachment L.

8.5.1 Threatened or Endangered Species

Research was conducted to identify threatened, endangered, and candidate species. The Federally Listed and Candidate Species that are known to *Occur* or *Have the Potential to Occur* in San Juan County, Utah are described in Table 8-2.

Table 8-2 Federally Listed and Candidate Species

Common Name	Scientific Name	Federal Status
Gunnison Sage Grouse	Centrocerus minimus	Threatened
Bonytail chub	Gila elegans	Endangered
California condor	Gymnogys californianus	Endangered
Humpback chub	Gila cypha	Endangered
Greenback Cutthroat Trout	Oncorhynchus clarki	Threatened
Mexican spotted owl	Strix occidnetalis lucida	Threatened
Razorback sucker	Xyrauchen texanus	Endangered
Southwestern willow flycatcher	Empidonax traillii extimus	Endangered
Western Yellow-billed cuckoo	Coccyzus americanus occidentailis	Threatened
Colorado pikeminnow	Ptychocheilus lucius	Endangered
Navajo sedge	Carex specuicola	Threatened

[1]*Experimental Population, Non-Essential*

The results from field investigations that evaluated habitat requirements for these species found that none of 11 federally listed and candidate species have the potential to occur in the Daneros Mine area (SWCA 2008a; SWCA2013).

8.5.2 BLM Sensitive Species

The BLM Monticello Field Office has identified three sensitive species in addition to raptors in general, which have potential to occur in San Juan County. The potential for these species to occur in the project area is shown in Table 8-3(SWCA 2013a).

Table 8-3 BLM Sensitive Species

Common Name	Scientific Name	Potential presence in area
Bighorn Sheep	Ovis canadensis	No
Silky Pocket Mouse	Perognathus flavus	No
Raptors	Multiple species	Yes
Cronquist's milkvetch	Astragalus cronquisti	No

The general area encompassing and surrounding the Daneros Mine is characterized by deeply incised canyons, mesas, and cliff faces, which provide suitable habitat for various raptors. The raptors are the only BLM sensitive species with potential to be present in the Daneros Mine area. Raptor surveys were completed in the Daneros Mine area in 2009, 2011, and 2012.

In 2009, SWCA conducted surveys for the presence of nesting raptors. The raptor survey focused on identifying the presence of nesting accipiters and/or buteos. Prior to field study, USGS topographic maps were reviewed to determine the location of potential forested and cliff habitat and points of access to the survey areas. No raptor nests were observed within the surveyed area, or within a 0.5 mile radius around it. No peregrine falcon nests were observed within the surveyed area or within a 1 mile radius. No individual raptor species were observed within the total survey area during the surveys (SWCA 2009).

In 2011, a general raptor survey was conducted for signs of any raptors in the area which included a 0.5 mile buffer area about the Bullseye Portal Area. Areas that were readily accessible within the buffer area were evaluated for potential and inventoried where accessible. Areas within the buffer that were not readily accessible were evaluated using binoculars and spotting scopes. No raptors or raptor nests were seen on the proposed Bullseye Portal Area. No nests were observed within the evaluated buffer area. Two red tailed hawks (Buteo Jamaicensis) were seen outside the project area foraging to the west. Direct impacts on raptors are unlikely due to lack of nesting sites in the proposed disturbance at the Bullseye Portal Area and immediately surrounding area, and the abundance of similar foraging habitat in the general vicinity (Canyon Environmental 2011a).

The South Portal Area was surveyed for raptors, their nests and other signs of raptor use in July and October 2012. These surveys included the Daneros Portal and South Portal areas and line of sight inspections of surrounding areas using binoculars. No raptors or indications of raptor use were identified in the area (SWCA 2012).

8.5.3 Bat Species

The project area is located within a region comprised of steep canyon walls and cliffs with numerous locations that could contain roosting sites for bat species. Although no bat activity was directly observed during the site assessments, which occurred over multiple days in June 2011 and also included dusk and early morning observance times, bat species may occur in the surrounding area. The following bat species are identified by the Utah State Division of Wildlife Resources, as sensitive species that occur in portions of San Juan County: Allen's big-eared bat (*Idionycteris phyllotis*), Big free-tailed bat (*Nyctinomops macrotis*), Fringed myotis (*Myotis thysanodes*), Spotted bat (*Euderma maculatum*), and Townsend's big-eared bat (*Corynorhinus townsendii*) (Canyon Environmental 2011a).

8.5.4 Migratory Birds

The Migratory Bird Treaty Act (MBTA) (16 USC 703–712), Executive Order 121186 for migratory bird protection, and the Bald and Golden Eagle Protection Act (16 USC 668–668d) establishes protections for migratory birds and their parts (e.g., eggs, nests, and feathers) from taking, hunting, capture, transport, sale, or purchase. Most species of birds are classified as migratory under the MBTA, except for upland game and introduced birds. Utah Partners in Flight (UPIF) has ranked those birds occurring in the Colorado Plateau physiographic region by priority of concern (Parish et al. 2002). The following bird species are considered priority due to habitat availability surrounding the proposed mine area. Three priority species are identified by UPAF for pinion-juniper habitat: grey vireo (*Vireo vicinoir*), black-throated gray warbler (*Dendroica nigrescens*), and ferruginous hawk (*Buteo regalis*). Two priority species are identified for shrub-steppe habitat: greater sage grouse (*Centrocercus urophasianus*) and sage sparrow (*Amphispiza belli*).

The potential exists for breeding birds protected by the MBTA and the BGEPA to occur within the project area. Energy Fuels will minimize potential impacts to migratory birds by limiting vegetation removal during the breeding season (March through August) and conducting nest surveys within five days prior to vegetation removal in the event that vegetation removal cannot be deferred to the non-breeding season. As discussed in Section 8.5.2 above, raptor surveys conducted in 2009, 2011, and 2012 did not did not identify any raptors or raptor nests in the project area.

8.5.5 Bighorn Sheep

According to the biological assessment conducted by Canyon Environmental in June 2011, the Daneros Mine (Daneros and Bullseye Portal areas) falls on the edge of crucial habitat for desert bighorn sheep. This habitat is important for sheep year-round, but especially during the lambing and breeding seasons. The increase in human activity associated with the proposed mine operation may cause the sheep to abandon habitat in Bullseye Canyon and may disrupt normal movement patterns within the canyon.

SWCA conducted a ground observation survey for desert bighorn sheep in the project area on May 26, 2009 to look for signs or presence of lambing activity. No signs of desert bighorn sheep lambing activity were observed in the immediate project area. Furthermore, no signs of bighorn sheep activity (e.g., tracks or scat) were observed, nor were any individuals noted (SWCA 2009).

In 2011, Canyon Environmental found two very old pellet groups that may have been desert bighorn sheep or domestic sheep north of the proposed disturbance area. Old cow pies were found in the same area indicating some domestic use. Possible trails were found north of the proposed project as well; however, it was noted that direct impacts on the desert bighorn from this project are unlikely due to the lack of suitable habitat in the immediate proposed project area and the relatively small size of the disturbance (Canyon Environmental 2011a).

8.6 Cultural Resources

Cultural resources are sensitive, irreplaceable resources with potential public and scientific uses, and are an important and integral part of our national heritage. Cultural resources constitute "a definite location of human activity, occupation, or use identifiable through field inventories (i.e. surveys), historical documentation, or oral evidence" (BLM-M-8110).

Seven cultural resources inventories were conducted for the Daneros Mine project between 2008 and 2013. A total of 212 acres were inventoried covering the Area of Potential Effect (APE), including buffer areas around all project components and access roads.

No prehistoric sites were found. Six non-eligible and one eligible National Register of Historic Places (NRHP) historic sites were found in the APE. The BLM disagreed with the recommendation of the cultural resources contractor that the Spook Mine was not eligible for listing in the NRHP. The one eligible site is the remains of the historic Spook Mine dating from 1954 to the early 1960s. Provided that the site is avoided or a mitigation plan developed and implemented with the State Historic Preservation Office and the BLM, no historic properties would be affected by the proposed project. The Cultural Resource Inventory reports for the Daneros Mine project are on file with the BLM Monticello Field Office and the Utah State Historic Preservation Office and are summarized below.

In 2008, two cultural resource inventories were conducted for the Daneros Portal Area and associated vent hole locations. The first was conducted by SWCA in July 2008 and a second supplemental inventory was conducted by BLM on October 7, 2008. No Historic Properties (National Register of Historical Places eligible sites) were found. Consultations were also conducted with 15 tribal entities in order to identify any concerns related to traditional cultural properties or sacred sites. No specific sites or areas of concern to the tribes were identified as a result of these consultations (SWCA 2008b).

In 2011, a cultural resource inventory was conducted by Canyon Environmental on behalf of Utah Energy Corporation that included the surface disturbance area associated with the proposed Bullseye Portal Area. No historic properties were identified during the Class I File search and associated Class III cultural resource inventory within the Bullseye Portal Area (Canyon Environmental 2011b).

Additional cultural resource surveys were conducted in November 2011 and in April, July and October 2012 within the areas of proposed mine expansion. The combined inventory from these surveys resulted in the identification and documentation of six historic-age properties (more than 50 years old) and 13 isolated occurrences (IOs). Historic-age properties consist of two mine sites, three artifact scatters/sites, and one truck, located within the two southern survey areas. Twelve of the IOs were found in the southernmost survey area and consisted of two rock cairns of unknown temporal or cultural affiliation, and ten prehistoric IOs comprising primary, secondary, and tertiary chert flakes. One historic IO was documented in the northern portion of the inventory area. One of the two historic-age mine sites within this survey area is referred to as the Spook Mine. The BLM recommended that this mine be considered eligible for the NRHP under two main criteria which are Criteria C and D. The Criterion C eligibility is because the trestle and ore/waste rock bin embody distinctive characteristics of a type, period, or method of construction. The Criterion D eligibility is because it may be likely to yield information important to history because of the innovative artifacts and wooden structures that are present onsite. The BLM also found the site possibly eligible under Criterion A because the site may be associated with events that have made a significant contribution to the broad patterns of our history. The Spook Mine in the 1950s was operating during the height of the uranium boom and further research could reveal specific connections with significant events (BLM 2014). The Spook Mine will be avoided or a mitigation plan developed and implemented with the State Historic Preservation Office and the BLM (SWCA 2013b).

A cultural resources inventory was conducted in June 2013 and consisted of approximately 4200 ft (1280 m) of the CR(D)5319 road corridor on the slope forming the east side of Bullseye Canyon. The only cultural resources located included two rock cairns with associated pocket tobacco tins that are interpreted as exploratory mining, or prospecting claim markers. Both of these claim markers were noted on low ridge tops off the west side of the road. They were recorded as isolated occurrences of artifacts. They are both considered non-eligible in terms of their potential for nomination to the NRHP.

8.7 Paleontological Resources

Mine facilities and surface operations may disturb bedrock exposures. Surface facilities will be located mainly on old mine development rock material or Quaternary colluvial deposits which have little or no potential of containing paleontological resources. Impacts to surface fossils resulting from the proposed surface disturbance are anticipated to be negligible due to the surface characteristics (minimal exposed bedrock) of the project area.

A paleontological survey was conducted in July 2013 of the Daneros Mine Area Chinle outcrops. The report was provided to the BLM. The surveyor recommended that a paleontological monitor be on-site during excavation (leveling) operations of any Chinle Formation bedrock areas within the South Portal area, particularly in the northern and northwestern portions. An on-site paleontological monitor was also recommended during excavation operations in the western portion of the Bullseye Portal area. Energy Fuels will notify a BLM paleontologist prior to doing work in these areas and will request their oversight. If a BLM specialist cannot attend, arrangements will be made to have an agency approved monitor onsite. If any paleontological resources are discovered during surface-disturbing activities, work in that immediate vicinity will temporarily stop and a BLM specialist will be contacted.

Underground mine development and production operations will occur in the Monitor Butte and Shinarump Members of the Upper Triassic Chinle Formation. Vertebrate fossils are known to occur in these members, although occurrences are scarce. It is unlikely that vertebrate fossils will be encountered during mining; however, in the event of an unanticipated discovery, Energy Fuels will temporarily stop work in the immediate vicinity of the find and notify the BLM so that a BLM specialist can assess the situation and take appropriate action.

8.8 Socioeconomic Conditions

The population of San Juan County in 2010 (the most recent year for which data is available) was 14,746 people (U.S. Census Bureau 2011). The population increased by 333 people from 2000 to 2010. San Juan County's regional economy relies largely on education, health and social services (30.5 percent), arts, entertainment, recreation, accommodation, and food services (12.9 percent), retail trade (12.4 percent), and construction (10.1 percent). Agriculture, forestry, fishing and hunting, and mining are also conducted in the county (8.9 percent).

In 2010, San Juan County contained 3,371 owner-occupied housing units and 983 renter-occupied apartments, and the median household income in San Juan County was estimated at $36,209 in 2009 inflation-adjusted dollars. The 2011 cost of living index in San Juan County is low at 81.0 (U.S. Average is 100).

The nearest habitation to the mine is Fry Canyon; however, services and housing in Fry Canyon are limited to a general store and RV park. Blanding, Utah is located approximately 37 miles to the east.

The races in San Juan County are broken out as 54.7 percent American Indian, 41.9 percent white non-Hispanic, 5.3 percent Hispanic, 0.7 percent other races, and 1.9 percent with two or more races (total can be greater than 100 percent because Hispanics could be counted in other races).

In 2012, there were 14 employees at the Daneros Mine. The proposed future development plan for the Daneros Mine has the potential to employ up to 40 employees and extend the mine life to 20 years or more.

Resumption of mine operations will provide for employment of up to 40 miners and support personnel with the majority of the employees coming from the existing local work force. These will be relatively high paying jobs that will provide a direct positive impact on the local economy. Mine operations will also contribute to the San Juan County tax base through property taxes and sales and use receipts.

In addition, the mine sites will provide continued ancillary employment for the following:

- Energy Fuels' Tony M Mine offices near Ticaboo, Utah and Egnar, Colorado
- Contracted ore trucking companies
- Contracted road maintenance companies
- Processing support at the White Mesa Mill near Blanding, Utah
- Other technical services such as mechanics, electricians, etc.
- Mine equipment manufacture, sales, and delivery

8.9 Worker Health and Safety

Mining-related illnesses and injuries have steadily declined over the years because of stricter safety laws and improvements in mining machinery and practices. Although mine health and safety conditions have improved dramatically, worker health and safety at the Daneros Mine can be affected by multiple work hazards, such as ground falls, explosives handling, scaling activities, roof bolting, drilling, dust and other respiratory issues associated with inadequate ventilation, and equipment handling and maintenance.

Dust generated by drilling in mines can still place miners at risk of developing silicosis from rock dust. The Federal Coal Mine Health and Safety Act of 1969 regulates dust concentrations in mines, and respirable dust levels are closely monitored. Dust concentrations in mines have declined as a result. Underground miners have the option to have their lungs x-rayed when starting a job, with a mandatory follow-up x-ray 3 years later, in order to monitor any development of respiratory illness. Additional x-rays are given every 5 years, on a voluntary basis (MSHA 2012).

Worker health and safety can also be affected by exposure to ionizing radiation and radon gas and its progeny. 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. When radium-226 decays, it emits radon that can become concentrated in unventilated or poorly ventilated areas of the mine.

Radon and its daughter products exposed during mining operations are reduced to acceptable levels by ventilation to the outside, where atmospheric dispersion quickly reduces concentrations to well below the allowable levels for the general public established by UDAQ and EPA's NESHAP program.

The Operator will conduct monitoring and inspection programs responsive to the requirements of MSHA, as discussed below, to protect worker health and safety. For radon, the safety program at the mine calls for keeping all working areas ventilated to at or below 0.3 working levels (WL). A working level is any combination of the short-lived radon daughters in one liter of air that will result in ultimate emission of 1.3×10^5 million electron volts of potential alpha energy. This level is used as a precaution to ensure that a person working in the area will not receive greater than 4 Working Level Months (WLM) in a year, in accordance with regulatory standards. If radon levels rise above this level, additional ventilation will be implemented. If radon levels rise above 1.0 WL, respiratory protection will be required in the area. The only work that will be permitted in an area with radon levels above 1.0 WLs will be to install or improve ventilation, and additional ventilation will be used to reduce the radon level to 0.3 or below. Work in areas exhibiting radon at more than 10 WL will require the use of Self Contained Breathing Apparatus (SCBA).

Breathing zone samples will also be taken in accordance with approved MSHA protocols to (30 CFR 56.5002 and 57.5002) assess potential exposures to both radon and dust. Gamma surveys are also periodically conducted in the working areas of the mine to ensure protection of workers from external radiation from radium-226 and other gamma emitters. In addition to these environmental controls, the miners are equipped with half-face respirators with a 99 percent efficiency rating for protection against radon and particulates.

8.10 Transportation

Ore extracted from the Daneros Mine will be hauled to the White Mesa Mill near Blanding, Utah for processing. An independent contractor will transport the ore according to the U.S. Department of Transportation (DOT) regulations (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" (Attachment N).

The Daneros Mine proposes to employ up to 15 ore trucks per day traveling to and from the mine site, utilizing State Highway 95 and CR B258 and CR D0029. In addition to the 15 ore trucks, an additional 10 trips per day are anticipated for employee traffic and support vehicles (of the support vehicles, 4 would be used for operations within the mine), for a total of 50 vehicle trips per day (25 round trips).

The ore truck haul route is from the mine to the uranium mill south of Blanding via State Highways 95 and 191. Utah Department of Transportation's (UDOT) Traffic Volume Map for 2010 (UDOT 2010) lists a total of 420 vehicle trips per day for the segment of State Highway 95 between State Highway 261 and State Highway 191, and lists a total of 2,525 vehicle trips per day for that segment of State Highway 191 between State Highway 95 and the uranium mill south of Blanding.

State Highways 95 and 191 are each two-lane divided highways with minimum 12-foot lane widths along the proposed haul route corridor. Per Exhibit 12-15 of the Highway Capacity Manual (HCM 2000), a Class I highway with a Free Flow Speed of 60 mph in rolling terrain is capable of accommodating up to 130 vehicles per hour (vph) with a Level of Service (LOS) A condition (State Highway 95), and is capable of accommodating up to 290 vph with a LOS B (State Highway 191).

The mine is expected to employ up to 40 miners and support personnel. No on-site accommodations will be provided; employees will be housed at the Fry Canyon Lodge, 14 miles from the mine site, or in other local area communities.

Energy Fuels had 14 employees at the Daneros Mine during operations in 2012. For long term production at the mine site, Energy Fuels estimates a total of 20 to 40 employees at the mine. During 2012, the mine operated on two 10 hour shifts four days per week with light maintenance on an occasional Friday. Based on this information, it is likely that most traffic will occur Monday through Friday and an estimated 6 passenger vehicles will travel to the Daneros Mine (total) during two times of the day (e.g. accounting for two shifts).

It is the responsibility of Energy Fuels to ensure that the radiation levels associated with ore transportation fall within applicable limits. Based on the grade of the Daneros Mine uranium ore, the exposure rate will be less than 1 mrem/hr to recipients standing outside of the truck. As a result, the following requirements are expected to be satisfied in all cases:

- The requirements of 49 CFR 173.427(a)(1) that the external dose rate may not exceed a radiation level of 1,000 mrem/hr at 3 meters from the unshielded material and the requirements of 49 CFR 173.427(a)(5) and 173.441(a) that under conditions normally incident to transportation,

- The requirements of 49 CFR 173.427(a)(5) and 173.441(a) that under conditions normally incident to transportation:

  - The radiation level does not exceed 200 mrem/hr at any point on the external surface of the package

  - The transport index (TI) does not exceed 10. TI is a dimensionless number placed on the label of a package, to designate the degree of control to be exercised by the carrier during transportation. TI is determined by multiplying the maximum radiation level in millisieverts (mSv) per hour at 1 meter (3.3 feet) from the external surface of the package by 100 (equivalent to the maximum radiation level in mrem/hr at 1 meter (3.3 feet)

It is expected that the average reading in the occupied space of each truck cab will not exceed the DOT limit of 2 mrem/hr specified in 49 CFR 173.441(b)(4). In addition, Energy Fuels will perform and document spot gamma surveys on uranium ore shipments as appropriate in order to ensure that the regulatory standards are satisfied.

Energy Fuels' 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. Emergency response crews from the White Mesa Mill will also likely assist in any cleanup and confirmation sampling at a spill site.

8.11 Noise Emissions

The human ear experiences sound as pressure on the ear. The sound pressure level is expressed in decibels (dB). A value of 0 dB corresponds to the approximate threshold of human hearing. Environmental sounds are measured with the A-weighted scale of a sound level meter. The A scale simulates the frequency response of the human ear by giving more weight to the middle frequency sounds and less to the low and high frequency sounds. A-weighted sound levels are designated as dBA. Typical background sound levels for remote undeveloped areas are 25 dBA for nighttime average and 35 dBA for daytime average.

The sources of noise generated by the Daneros Mine include the aboveground ventilation fans, generators, and vehicle traffic and are typical of most construction sites (Attachment Q). In general, the backup alarms on the trucks generate the loudest noise during loading, unloading and hauling which are the same sound levels that are

generated when the existing mine is operational. Most noise will be concentrated at the three portal areas and will be generated by equipment operating above ground at those sites. The Bullseye and South portal areas will be located adjacent to existing county roads which are subject to occasional traffic noise. For example, actual measured noise level for a pickup truck passing slowly at 50 feet is 75 dBA. Aboveground ventilation fans dispersed throughout the project area will also be a source of noise. At Energy Fuels' La Sal Uranium Mine, ventilation fan noise levels were measured at 91.7 dBA at a distance of 10-feet away. At a half-mile, with attenuation, the noise level of a surface fan would be reduced to less than 50 dBA. The ventilation fans at the Daneros Mine are be similar to those used at the La Sal Mine.

San Juan County does not have a county-specific noise ordinance. There are no full or part time receptors (i.e., houses, schools, developed campgrounds, etc.) within 3 miles of the project area. If there were receptors within a half-mile, the noise generated by the mine operations would be within the typical sound limits established in noise regulations of other state and county regulatory authorities elsewhere in Utah and Colorado (Attachment Q). In addition, the mine is located in an area open to mineral development and, primarily recreational use, so signs are installed to notify the public about the presence of the mine.

Section 9 Period of Use/Occupancy for Surface Facilities

The Surface Resources Act of July 23, 1955, and associated regulations at 43 CFR 3715 authorize surface occupancy of unpatented mining claims for ''prospecting, mining, or processing operations and uses reasonably incident thereto''. Energy Fuels activities at the Daneros Mine are focused on prospecting and mining. Mineral processing is not conducted at the Daneros Mine. Energy Fuels also conducts activities that are reasonably incident to prospecting and mining such as operation of surface support facilities for underground mining operations.

Energy Fuels' existing occupancy of BLM land is in accordance with 43 CFR 3715.2 and meets the following requirements:

> *(a) Be reasonably incident;*
>
> *(b) Constitute substantially regular work;*
>
> *(c) Be reasonably calculated to lead to the extraction and beneficiation of minerals;*
>
> *(d) Involve observable on-the-ground activity that BLM may verify under §3715.7; and*
>
> *(e) Use appropriate equipment that is presently operable, subject to the need for reasonable assembly, maintenance, repair or fabrication of replacement parts.*

Surface occupancy in association with prospecting, mining and reasonably incident uses will continue for the life of the mine complex. The current life of the mine is estimated at 20 years; however, results of future exploration, market conditions, and other factors may extend the life of the mine. Depending on market conditions and production rates, mining initially started in 2009 and mining is expected to extend over an additional 20-year period starting in 2016 until the end of 2036.

Unnecessary or undue degradation of the public lands and resources will be prevented or avoided during use and occupancy. Use and occupancy conforms to the applicable Federal and State environmental standards and necessary local, state and federal permits will be obtained, as required under 43 CFR 3800. Permanent and temporary structures on public lands conform with applicable State and local building, fire, and electrical codes and occupational safety and health and mine safety standards.

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