2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Introduction

This chapter describes the proposed project (Proposed Action) as described by RMGC in the most recent POO Amendment (RMGC 2009). Descriptions of other alternatives, including the No Action Alternative, presented in this chapter are based on supporting information provided by RMGC and reviewed by the BLM. This chapter also includes a summary of other alternatives which were considered but eliminated from detailed analysis, and a comparative impact analysis summary of the proposed project alternatives (Section 2.10, Comparative Analysis of Alternatives). A description of past, present, and reasonably foreseeable future actions (RFFA) considered in the cumulative impact assessment is included in Section 2.9, Past, Present, and Reasonably Foreseeable Actions. The BLM's preferred alternative is identified in Section 2.11, BLM-preferred Alternative.

Existing facilities and disturbance associated with the Round Mountain Mine also are described in this chapter. Existing disturbances may not reflect the total authorized disturbance levels previously approved by the BLM for certain mine components as not all of the authorized facilities have been constructed to their final configurations. However, it is assumed that RMGC would complete mine development in 2011 for activities currently authorized by the BLM. Therefore, surface disturbance acreages provided in this chapter are the authorized disturbance levels, which are used as baseline conditions relative to the expansion and new development of facilities associated with the proposed project. Unless otherwise indicated, elevations in this EIS are presented in mine grid (74.18 feet greater than U.S. Geological Survey [USGS] elevation).

2.2 Background

2.2.1 Round Mountain Area

The Round Mountain Area has been the focus of mining operations since 1906. From 1906 to the early 1960s, placer gold was recovered using open-pit and placer mining methods. Underground hardrock mining also occurred during this time.

Later mining operations, which extended up to 1969, included the addition of a gravity separation plant. Exploration conducted from 1970 through 1976 identified a substantial hard rock gold deposit, and an open-pit mining and heap-leaching operation began in late 1976, with the first doré bar being cast in 1977. The construction of a mill at the Round Mountain Mine in 1997 allowed for the recovery of metals from non-oxidized ores. The production rate for 2005 averaged 259,000 tpd of total material moved, producing about 737,000 ounces of gold.

An old mining area, known as the Shale Pit, is located in the southeastern portion of the Round Mountain Area. This operation was likely active in the first half of the 20th Century and resulted in disturbance of approximately 142.7 acres. This area is currently inactive and would not be reclaimed by RMGC.

A chronological summary of POO amendments for the Round Mountain Mine is provided below.

- 1981 – Round Mountain Mine owner/operator, Copper Range Company, submitted a POO for 134.4 acres of proposed disturbance on public land administered by the BLM for employee housing and

recreation facilities, exploration drilling, and mine activities. Prior disturbance was approximately 700 acres.

- 1983 – The POO Amendment proposed a total of 596 acres of surface disturbance on public land administered by the BLM land for overburden disposal, leach pads, haul roads, housing, and mining activities.

- 1985 – Echo Bay Mines, Ltd. submitted a POO Amendment to the BLM for a total of 776 acres of proposed surface disturbance on public land administered by both the BLM and United States Forest Service (USFS) for expansion of overburden disposal and the pit. An Operating Plan was submitted separately to the USFS for approval of 115 acres.

- 1986 – The SVCO submitted a POO Amendment for an expansion of the existing open pit, construction of overburden piles, a heap leach facility, and an employee housing development, and upgrading of utilities and ancillary facilities. The total proposed surface disturbance was increased to approximately 1,218.5 acres on BLM and USFS lands (excluding patented land).

- 1987 – The SVCO submitted a POO Amendment for the expansion of the open-pit mine and overburden piles and construction of a leach pad, leach residue disposal area, processing plant, and ancillary facilities. The total proposed surface disturbance was increased to 2,034 acres on BLM and USFS lands (excluding patented land).

- 1988 – The SVCO submitted a POO Amendment for 400 acres of additional surface disturbance from deposition of overburden material on public land administered by the USFS. The total proposed surface disturbance on public lands administered by the BLM and USFS lands to that point was 2,434 acres.

- 1991 – POO Amendment was submitted for the proposed construction of a dedicated leach facility to treat run-of-mine (ROM) ore, and extension and reconfiguration of the south and north overburden rock piles. The approved plan resulted in a total of 826 acres of additional disturbance on public land administered by the BLM. The total revised proposed disturbance as a result of all approved amendments to the POO was 4,767 acres consisting of 3,659 acres on public land administered by the BLM, 515 acres on public land administered by the USFS, and 593 patented acres.

- 1995 – A POO Amendment was filed for a mill facility and associated tailings impoundment facility. Proposed facilities disturbed an additional 757 acres. An EIS was prepared, and the Final EIS was issued in February 1996.

- 1996 – A POO Amendment was filed for expansion of the North and South Waste Rock Dumps. Expansion of the North Waste Rock Dump necessitated moving a road to the Town of Round Mountain. A new road was constructed, and a ROW was issued to the Nye County Road Department.

- 1997 – A POO Amendment was filed for the West Dedicated Heap Leach Pad. Construction of the leach pad was completed in phases over an 8-year period.

- 2000 – A POO Amendment was filed for stacking of ore to 400 feet on the South and West Dedicated Heap Leach Pads.

- 2001 – A POO Amendment was filed for construction of Phase III of the West Dedicated Leach Pad.

- 2001 – A POO Amendment was filed for construction of Phases IV and V of the West Dedicated Leach Pad.
- 2005 – A POO Amendment was filed for construction and development of an underground decline within the open pit.
- 2005 – A POO Amendment was filed for an expansion of the open pit.
- 2006 – A POO Amendment was filed for an addition of a flotation circuit to the existing mill and conversion of part of the reusable pad to a dedicated leach pad.
- 2006 – A POO Amendment was filed for the proposed project.
- 2008 – A revised POO Amendment was filed for the proposed project.
- 2009 – A revised POO Amendment was filed for the proposed project.

2.2.2 Gold Hill Area

Mineralization at the Gold Hill Area was discovered about 1910, during the same time period as the discovery and initial development of the Round Mountain deposit (Kleinhampl and Ziony 1984). Most of the historic development and production at the Gold Hill Area occurred between 1930 and 1933 by a joint venture of the Tonopah Mining Company and Tonopah-Belmont Development Company. The venture also was historically known as the Gold Hill Development Company. During this time, the Gold Hill Shaft was sunk to approximately 500 feet below ground surface (bgs), and at least 6 levels were developed along the gold- and silver-bearing veins. The Gold Hill mining operation was forced to close under the Essential Materials Act during World War II. The mine never re-opened following the war.

Modern exploration efforts in the Gold Hill Area are documented from approximately 1974 to the present. Exploration work has consisted of geologic mapping, geochemical sampling, trenching, geophysical surveys, and drilling conducted by Copper Range Exploration Company, Noranda Exploration, Cordex Exploration, RMGC, Homestake Mining Company, BarGold Corporation, and Nevada Star Resources. Drilling exploration by RMGC in the Gold Hill Area began in July 2000.

The Gold Hill Area has been extensively disturbed by past mining and exploration activities. In the center of the Gold Hill Area is an abandoned mill site with mill tailings. The area is marked by numerous shallow excavations and a number of deeper mine workings. Deep excavations have been enclosed by fences. Many pre-existing dirt roads traverse the area.

2.3 No Action Alternative

The expansion of existing facilities and the development of new facilities that comprise the proposed project would not be constructed under the No Action Alternative. Under this alternative, RMGC would continue to recover gold and silver in the Round Mountain Area as currently authorized by the BLM and the State of Nevada for the existing Round Mountain Mine. Full-scale mining would end in 2011. Heap leaching and milling of stockpiled ores would continue for several years concurrent with the start of reclamation of the

Round Mountain Mine. **Figure 2.3-1** illustrates the mine components associated with the No Action Alternative, which includes all permitted facilities. **Table 2.3-1** presents the existing, incremental, and authorized disturbance for each mine component at the Round Mountain Mine as permitted by the BLM. **Table 2.3-2** presents the authorized disturbance associated with the No Action Alternative according to land ownership. Several mine components would actually decrease in area. For example, expansion of the open pit would consume 145.6 acres of the North and South Waste Rock Dumps. The loss in surface area would not affect the functionality of any mine component.

2.3.1 Surface Ownership

Table 2.3-3 presents the surface ownership in the existing project boundary and existing authorized disturbance. Surface ownership and the existing project boundary are illustrated on **Figure 2.3-2**.

2.3.2 Schedule and Work Force

Approximately 730 workers are directly employed by RMGC to operate the existing Round Mountain Mine, including 30 full time contractors. The operations work force payroll in 2007 was approximately $46,659,954. Under the No Action Alternative, open-pit mining operations are anticipated to continue through 2012 with on-going ore processing, decommissioning, and reclamation activities. Final decommissioning and reclamation would continue for approximately 2 additional years with a work force of approximately 30 on-site contractors. Management of residual drain down and monitoring activities would continue for up to 10 additional years with a workforce of up to 4 on-site contractors. Following the active management period, remote management of residual fluid drain down monitoring activities would continue for several decades with occasional visits by site contractors for maintenance and repair, and monitoring activities, as required.

2.3.3 Round Mountain Open Pit

Ore is mined at the Round Mountain Pit using electric or hydraulic shovels and front-end loaders, which load ore into 150-, 190-, and 240-ton-class haul trucks. Typical pit configurations include:

- Bench heights are approximately 35 feet;
- Bench face angles range between 67 and 72 degrees and vary with rock type and pit orientation;
- Bench widths range between 21 and 25 feet;
- Bench inter-ramp slope angles range from 41 to 50 degrees; and
- Haul roads have been designed for a maximum grade between 10 and 11 percent. Haul road widths are designed at 90 to 120 feet for 2-lane traffic.

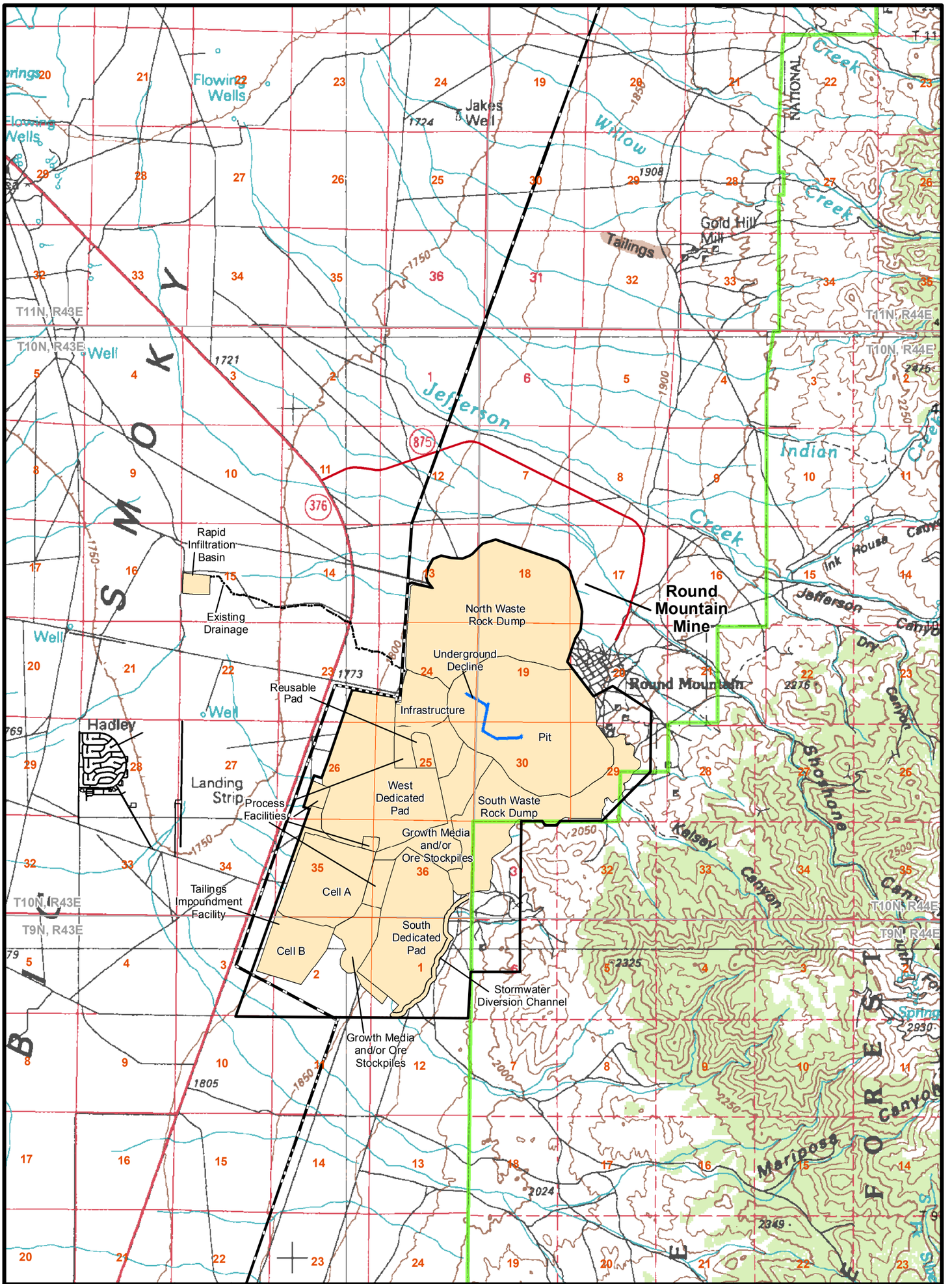


Figure 2.3-1
No Action Alternative

Round Mountain Expansion Project

05/12/2009

Table 2.3-1
Summary of Existing, Incremental, and Authorized Disturbance in the Round Mountain Area[1,2]

Component	Facility	Existing (acres)	Incremental[3] (acres)	Authorized (acres)
Open Pit	Open Pit	857.3	222.9	1,080.2
Subtotal		**857.3**	**222.9**	**1,080.2**
Waste Rock Dumps	North Waste Rock Dump	1,334.5	-115.7	1,218.8
	South Waste Rock Dump	648.8	-29.9	618.9
Subtotal		**1,983.3**	**-145.6**	**1,837.7**
Leach Pads	Reusable Pad	114.8	-71.5	43.3
	West Dedicated Pad	756.7	73.4	830.1
	South Dedicated Pad	627.3	0.0	627.3
Subtotal		**1,498.8**	**1.9**	**1,500.7**
Tailings Impoundment Facility	Tailings Impoundment Facility	450.1	227.1	677.2
Subtotal		**450.1**	**227.1**	**677.2**
Growth Media and/or Ore Stockpiles	Stockpile	290.6	-21.8	268.8
	Stockpile	151.4	-2.0	149.4
Subtotal		**442.0**	**-23.8**	**418.2**
Process Facilities	Processing Facility	172.7	-26.5	146.2
	Processing Facility	14.9	0.0	14.9
	Processing Facility	64.1	0.0	64.1
	Processing Facility	30.9	0.0	30.9
Subtotal		**282.6**	**-26.5**	**256.1**
Infrastructure	Infrastructure	188.7	-30.8	157.9
Subtotal		**188.7**	**-30.8**	**157.9**
Total		**5,702.8**	**225.2**	**5,928.0**

[1] Includes buffer areas around facilities that may not currently be disturbed.

[2] Negative acreages indicate mine components or facilities where the footprint of these facilities would decrease due to the development and surface disturbance of other mine components or facilities.

[3] Permitted activities that have not been implemented.

Source: RMGC 2009.

Table 2.3-2
Summary of Authorized Disturbance in the Round Mountain Area[1]

Component[2]	Authorized Disturbance (acres)		
	Public	Private	Total
Open Pit	171.0	909.2	1,080.2
Waste Rock Dumps	1,761.2	76.5	1,837.7
Process Facilities	255.6	0.5	256.1
Leach Pads	1,500.7	0.0	1,500.7
Tailings Impoundment Facility	677.2	0.0	677.2
Growth Media and/or Ore Stockpiles	416.5	1.7	418.2
Infrastructure	157.9	0.0	157.9
Total	**4,940.1**	**987.9**	**5,928.0**

[1] Does not include exploration activities since exploration was authorized under Notices of Intent and Exploration POO (NVN-075204).

[2] Includes buffer areas around facilities that may not currently be disturbed.

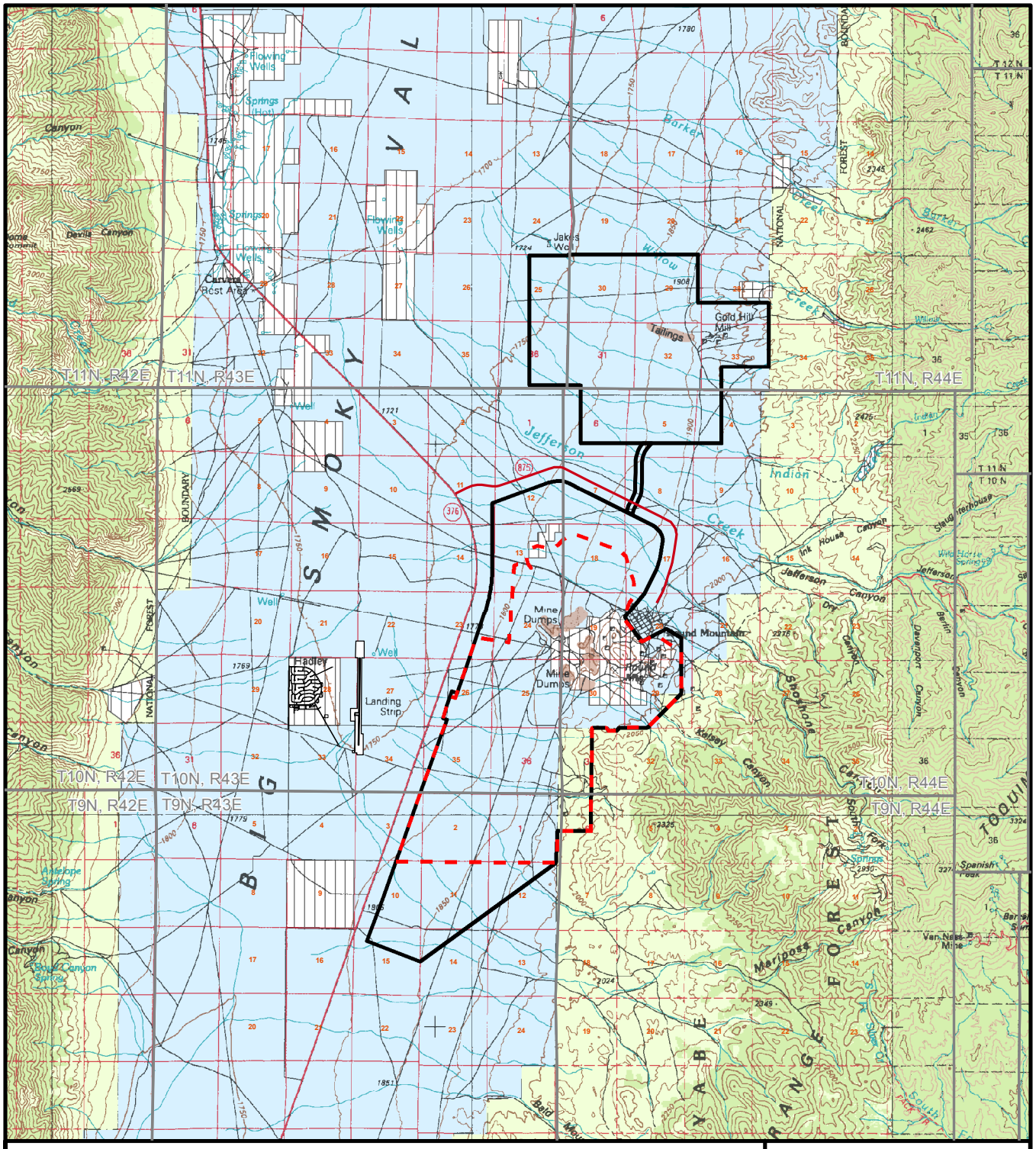
Source: RMGC 2009.

Table 2.3-3
Surface Ownership - Existing Project Boundary and Authorized Disturbance

	BLM (acres)	USFS (acres)	Private (acres)	Total (acres)
Existing Project Boundary	5,686.1	515.7	1,061.2	7,263.0
Authorized Disturbance	4,801.7	138.4	987.9	5,928.0

Source: RMGC 2009.

The authorized pit bottom elevation is approximately 5,065 feet mine grid elevation (i.e., approximately 4,991 feet above mean sea level [amsl]) and is approximately 739 to 749 feet below the pre-mining groundwater table (5,730 to 5,740 feet elevation amsl). As a result, a pit lake is anticipated to form in the long term after the cessation of dewatering activities and groundwater recharge. Detailed information regarding pit lake formation is provided in Section 4.3, Water Quality and Quantity (Surface and Ground) and Water Use.



Legend

- Proposed Project Boundary
- Existing Project Boundary
- No Action Boundary/Proposed Action Boundary Overlap Areas
- Bureau of Land Management
- U.S. Forest Service
- Private Land

Note: Topographic elevations provided in meters, USGS 1929 Vertical Datum.

Source: RMGC 2009.

N

0 0.5 1 2 Miles

Round Mountain Expansion Project

Figure 2.3-2

Surface Ownership

05/25/2009

2.3.3.1 Blasting and Ore Control

RMGC presently operates eight rotary blasthole drills. All drills use a 6.75-inch-diameter rotary bit; 4 of the 8 drills have high pressure systems that allow the bit down the hole (DTH) hammer drilling. Blasthole patterns are designed with a burden (between rows) and spacing (between holes) ranging from 14 to 30 feet. Blastholes are drilled to a depth of 40 feet with a bench height of 35 feet. Blasthole samples are collected and assayed to provide control for ore segregation. Based upon these assays and economics, blasted pit ore is processed at one of the following facilities:

- Dedicated leach pads;
- Crushing facility/reusable leach pads;
- Mill; or
- Gravity plant.

Blasting agents include ammonium nitrate and fuel oil (ANFO) and water resistant slurry (i.e., liquid, oxidizers, fuel plus a thickener) for wet holes. Blasting materials include 0.5- and 1-pound boosters, pyrotechnic detonator (non-electronic), electronic detonators, 18-grain detonating cord, noiseless trunk detonators (NTD), lead-in line and harness wire. Seismographs are used to monitor ground vibrations that are controlled by the timing configuration of the blast design.

2.3.3.2 Underground Exploration and Development

RMGC constructed an exploration and development decline within the open pit perimeter as authorized by the BLM (February 2005) as an amendment to the Round Mountain Mine POO (NVN-072662). The exploration decline portal is located within the south highwall of the open pit and was authorized for mining to a terminus elevation of approximately 4,685 feet. The decline ends about 400 feet beneath the west wall of the pit where gold-bearing zones were the target of drill exploration and underground sampling. Waste rock from the underground operation was sent to the North or South Waste Rock Dumps. Any ore-grade material that was encountered was sent to the appropriate processing facility for metallurgical evaluation and processing. Currently, the decline is not being actively advanced.

2.3.3.3 Dewatering

The existing Round Mountain Mine is currently dewatering from wells located within and outside of the pit and is authorized to dewater up to 6,200 gallons per minute (gpm). The pit dewatering water is pumped to temporary storage areas or directly to facilities and is utilized throughout the property for processing and dust control. Water exceeding the volumes required for these uses is discharged to a drainage, which conveys discharged water to a RIB. This RIB, which was authorized under NDEP Water Pollution Control Permit (WPCP) NEV91030, covers approximately 35.8 acres and is located in the Big Smoky Valley approximately 1.7 miles west of the existing Round Mountain Mine (**Figure 2.3-1**). The permit authorizes the annual average infiltration of 3,400 gpm. Pursuant to the discharge permit, RMGC conducts water monitoring for each dewatering well, which includes recording water volumes pumped and sampling for NDEP Profile I constituents on a quarterly basis. Water depth in the RIB is measured weekly.

2.3.3.4 Pit Support Facilities

Support facilities include the dispatch tower and radio repeater towers, power distribution system, dewatering system, stormwater ponds, and a maintenance storage area.

2.3.4 Waste Rock Dumps

The maximum height of the existing North Waste Rock Dump is 425 feet (approximately 6,475 feet elevation), and is designed to contain approximately 660 million tons (Mt) of waste rock above current permitted 2004 levels. The maximum height of the existing South Waste Rock Dump is 375 feet (approximately 6,800 feet elevation), and it contains approximately 270 Mt of waste rock.

Waste rock from the existing Round Mountain Pit is transported to the North and South Waste Rock Dumps. Waste rock dumps are constructed by end-dumping material in lifts of up to 75 feet in height to an overall average slope configuration of 2.5H:1.0V to 3.0H:1.0V (i.e., horizontal to vertical). The unreclaimed dump faces are at the angle of repose. The North Waste Rock Dump is developed to the north and west of the open pit area and the South Waste Rock Dump is developed south and east of the open pit as illustrated in **Figure 2.3-1**.

The existing waste rock dumps are built as terraced structures to facilitate recontouring and reclamation. Each terrace is designed with up to 75-foot lifts, where practical, with an offset for each lift to provide for overall final regrade lines. Some areas of the waste rock dumps have been regraded and reclaimed concurrent with ongoing operations. The final configuration of the waste rock dump is subject to change based on operational considerations during the life of the proposed project.

Waste rock is managed according to the existing Waste Rock Management Plan (RMGC 2009). This plan identifies potentially acid-generating (PAG) waste rock (designated waste) and describes appropriate handling and placement procedures for these materials. The Waste Rock Management Plan is summarized in Section 4.3, Water Quality and Quantity (Surface and Ground) and Water Use. **Table 2.3-4** presents a description of the design features of the existing waste rock dumps.

Table 2.3-4
Authorized Waste Rock Dump Design Parameters

Waste Rock Dump	Height (feet)	Crest Elevation (feet)	Authorized (Mt)	Footprint (acres)
South Waste Rock Dump	375	6,800	270	618.9
North Waste Rock Dump	425	6,475	660[1]	1,218.8

[1]Above currently permitted 2004 levels.

Source: RMGC 2009.

2.3.5 Ore Processing Operations

Four types of ore processing are used to beneficiate ore at the existing Round Mountain Mine depending upon the ore grade, oxidation state, and size distribution of gold:

- Heap leaching of uncrushed lower-grade ore on the dedicated pads;
- Crushing and heap leaching of higher-grade ores on the Reusable Pad, followed by leaching on the dedicated pads or milling;
- Gravity and flotation concentration of higher-grade sulfide ores followed by leaching of the concentrate in the mill; and
- Gravity processing of coarse gold-bearing ore in the Gravity Plant.

These processes produce high-grade precious metal (i.e., gold and silver); concentrates; and solutions containing precious metals dissolved by cyanide. The high-grade precious metal concentrates can be directly melted in the refinery furnace while the precious metal solutions require further processing. The locations of the various processing areas are shown in **Figure 2.3-1**.

2.3.5.1 Heap Leach Processing

The West Dedicated Pad has a maximum authorized height of 400 feet (crest elevation of approximately 6,430 feet) and contained approximately 331 Mt of ROM and Reusable Pad crushed ore as of the end of 2008. The South Dedicated Pad has a maximum authorized height of 400 feet (crest elevation of approximately 6,670 feet) and contained approximately 197 Mt of ROM and Reusable Pad crushed leach ore at the end of 2008. The Reusable Pad is approximately 35 feet in height, and contains approximately 3.1 Mt of mined leach ore. Under the No Action Alternative, ore would continue to be leached at average and maximum leach solution application rates of 0.0025 to 0.005 gpm per square foot until recovery has been completed.

Each pad is designed with a synthetic liner to prevent the loss of precious metal solution. The dedicated leach pads have a liner system of high density polyethylene (HDPE) overlying a secondary liner of compacted low permeability native material. The Reusable Pad has a 3-layer asphalt system consisting of an upper protective layer of 3.5 to 5 inches of asphalt concrete overlying a 0.25-inch asphalt-rubber membrane, overlying a 2- to 3.5-inch asphalt concrete layer over compacted native material. Leach pads at the Round Mountain Mine are authorized by the NDEP to be constructed, operated, and closed under WPCP NEV87052, issued by NDEP. **Table 2.3-5** summarizes the physical characteristics of the authorized heaps.

Table 2.3-5
Physical Characteristics of Authorized Heap Leach Pads

Heap Leach Pad Name	Height (feet)	Crest Elevation (feet)	Authorized Tonnage (Mt)	Footprint (acres)
West Dedicated Pad	400	6,430	440.0	830.1
South Dedicated Pad	400	6,670	286.0	627.3
Reusable Pad	35	NA	3.1	114.8[1]

[1] A portion of the Reusable Pad is authorized for conversion to dedicated pad space.

Source: RMGC 2009.

Dedicated Pad ROM Heap Leach Processing

In ROM leach pad operations, blasted ore is taken from the pit and is hauled directly to the leach pad, and partially leached ore is off-loaded from the Reusable Pads and hauled to the leach pads or mill. Daily ROM production varies significantly, but averaged 101,000 tpd in 2006. RMGC operates two dedicated leach pad systems that have been constructed in phases:

- The South Dedicated Pad has a total capacity of approximately 286 Mt and consists of 5 phases. Leaching commenced on the South Dedicated Pad system in 1993. Phased construction has occurred through the years. Phase 5 construction was completed in 2006; and

- The West Dedicated Pad has a total capacity of approximately 440 Mt. Loading of ore began in 1997. Phased construction has occurred through the years with Phase 5 construction completed in 2004. Phases 3, 4, and 5 are currently being loaded with ore. Under existing BLM authorizations, Phase 6 would be constructed in place of the southern portion of the Reusable Pad. Phase 6a is scheduled for construction in 2009.

Pad Construction. Dedicated Pad construction initially included the salvaging of soils containing plant matter for future use as growth media. The stripped surface was then scarified and moisture-conditioned as determined by the geotechnical design. In areas where fill was placed to bring the subgrade to the required grades and elevations, the fill was placed in lifts not to exceed 12 inches in compacted thickness. These areas were constructed with random fill material compacted to a minimum of 90 percent of the maximum dry density.

After preparing the subgrade and placing fill in the pad area, a secondary liner consisting of 12 inches of a compacted low permeability soil was placed over the pad area. The secondary liner was constructed to meet a maximum coefficient of permeability of $1x10^{-6}$ centimeters per second (cm/sec). The secondary liner was moisture conditioned and placed as directed by the geotechnical design. Low permeability soil was derived from selected mine waste material or other sources that met the specifications for low permeability.

A primary liner system of HDPE overlies the secondary liner. Prior to 2001, the thickness of the HDPE liner was 80 mil, which was used at the South Dedicated Pad - Phases 1 through 4 and the West Dedicated Pad - Phases 1 and 2. A 60-mil primary liner has been used for heap leach pad construction since 2001. The West Dedicated Pad - Phases 3 through 5 and the South Dedicated Pad - Phase 5 were constructed with 60-mil HDPE liner.

The overliner consists of a layer of crushed rock that allows solution migration and protects the HDPE geomembrane liner during initial placement of ore on the pad. The overliner material is placed directly over the HDPE geomembrane using placement methods that do not compromise the integrity of the geomembrane and solution collection system buried just above the HDPE liner at the base of the overliner. The solution collection system is comprised of a network of corrugated perforated polyethylene tubing (CPPT) of progressively larger diameters that transport the leach solution to a single collection point for each cell. Leak detection systems are constructed and directly linked with the ponds and solution systems.

Solution Management. Leach solution from each cell reports to a solution collection channel that conveys the solution by gravity to its solution collection sump. The collection sumps are constructed as a part of the solution collection channel. The solution collection channel and sumps are lined with HDPE geomembrane

underlain by a 12-inch-thick layer of low-permeability soil installed in the same manner as that of the leach pad. The solution channels are underlain by a process component monitoring system (PCMS) that is regularly monitored for leaks in the liner.

Solution from each cell is captured in the corresponding solution collection sump, and solution is conveyed to the process facilities via solid HDPE pipe or conveyed to the process ponds via the solution collection channel. Valves installed on the HDPE pipeline control flow into the pipeline.

At the location of the collection sump, the perforated CPPT pipe ties into a solid HDPE discharge pipe. This pipe discharges into a larger diameter sump, from which any collected fluids are pumped back into the solution collection channel.

Process ponds receive solutions from the leach pads. The process ponds were constructed in a similar manner as the leach pads with an additional geomembrane liner and leak detection/collection for ponds that contain process solution. Event ponds that only contain storm event solution for short duration are single-lined and do not require leak detection/collection.

Heap Operation. Heaps are typically constructed by end-dumping leach material from trucks in 50-foot lifts within individual slopes at the angle of repose. Each lift is set back approximately 55 feet from the edge of the lower lift to achieve the final average slope of 2.5H:1.0V. Basic heap design parameters are summarized in **Table 2.3-5**. The currently permitted ultimate height of the heap leach pads is 400 feet.

Before placement on the heap, supplemental lime to augment pH is added to the ore. Dry lime is added into loaded haul trucks. A lime-slaking system is also used to augment pH. After loading, the upper surface of the heap is ripped to enhance solution percolation. The leach solution generally contains approximately 0.5 pound of sodium cyanide per ton of solution and is applied at a nominal rate of up to 0.005 gpm per square foot to the pad by drip emitter tubing or other application devices. Solution percolates through the ore to the synthetic liner, flowing via lined collection channels to collection sumps, then piped to the lined solution ponds. Channels are netted and French drain systems are used to prevent wildlife from contacting leach solution. As each leach pad section or phase is loaded, leach solution distribution pipelines are placed across and down the sides of the ore heap.

Generally, a two-cycle leach process is used. Solutions from areas of the pad that have been under leach for longer periods of time have lower concentrations of precious metals and are called “lean” solutions and are collected separately from pregnant solutions. After returning the cyanide concentration to the desired level, these lean solutions are applied to leach pad areas with fresh ore to produce a higher-grade pregnant solution.

Pregnant solutions from the leach pads are routed to process ponds for temporary storage or directly to adsorption columns to recover the dissolved gold and silver onto activated carbon. After returning the cyanide concentration to the desired level, the resultant barren solution is recycled back to the heap leach pads to leach additional precious metals. Solution ponds are double-lined with HDPE liners and have leak collection and recovery systems between the liners. Ponds are designed and operated in compliance with NAC §445A.433 through .435 and Title 43 CFR, Subpart 3809.420. The design includes sufficient volume to accommodate; freeboard; the precipitation from a 100-year, 24-hour storm event; power outages; and snowmelt events. Process facility pond volumes are presented in **Table 2.3-6**.

Table 2.3-6
Process Facility Pond Volumes

Facility	Total Volume (million gallons)
South Adsorption, Desorption, and Reactivation (ADR) Ponds	
South Barren Pond - Pond #1	18.3
North Event Pond - Pond #2	0.9
South Event Pond - Pond #3	3.6
Evaporation Pond - Pond #4	3.4
Subtotal	**26.2**
South Dedicated Leach Pad Process Ponds	
Pregnant Pond - Pond #6	6.9
Lean Pond - Pond #7	6.4
Event Pond - Pond #5	9.8
Event Pond - Pond #8	6.4
Event Pond - Pond #9	9.8
Event Pond - Pond #10	12.1
Event Pond - Pond #36	12.8
Subtotal	**64.0**
Tailings Reclaim Ponds	
Tailings Event Pond - Pond #15	13.2
Tailings Reclaim Pond - Pond #16	7.3
Tailings Reclaim Pond - Pond #17	6.7
Tailings Reclaim Sediment Pond - Pond #18	3.9
Subtotal	**31.1**
West Dedicated Leach Pad Ponds	14.4
Feed Pond - Pond #11	14.4
Event Pond - Pond #12	9.7
Return Pond - Pond #13	14.8
Feed Pond - Pond #14	14.4
Event Pond - Pond #29	22.6
Event Pond - Pond #31	14.6
Subtotal	**90.5**
Total	**211.8**

Source: RMGC 2009.

Reusable Pad Crushed Ore Heap Leach Processing

An average of approximately 20,000 to 30,000 tpd of ore is crushed and conveyor-stacked on the Reusable Pad. After the ore is leached from 90 to 120 days, it is removed by front-end loaders and haul trucks so the

pad can be reused in a continuous cycle of loading, leaching, and off-loading through the pad sections. Off-loaded material is placed onto the dedicated pad system or sent to the mill for additional recovery.

Reusable Pad Crushing. A 3-stage crushing plant is used to reduce Reusable Pad ore to nominal -0.75 inch. The plant is also used to crush material for road maintenance, milling, construction projects, and blasthole stemming material. The crushing plant is authorized to operate 24 hours per day, 7 days per week, with the primary crusher authorized to process up to 4,000 tons per hour (tph) and other facilities authorized to process up to 2,200 tph.

Haul trucks dump directly into the apron feeder, which controls the rate of feed to the primary crusher. The product from the crusher is conveyed to an ore stockpile. Apron feeders under the ore stockpile feed the ore through screens and the fine fractions are removed as Reusable Pad product. The coarse size fractions are crushed in the two secondary crushers. The secondary crusher product is screened, with the fine fractions removed as Reusable Pad product. The coarse size fractions are crushed in tertiary crushers. An intermediate size from the first screens can be produced for use as heap leach overliner material. Two silos located above the conveying system add lime to the crushed ore as it is delivered to the Reusable Pad.

Reusable Pad Leaching. The Reusable Pad is configured in two parallel elongated ovals with the feed conveyor between the two sides. Each of the two parallel reusable leach pad sides is divided into sections, which are continuously loaded and unloaded in a cycle resulting in an average leach time of 90 to 120 days. Leach solution is applied in a two-step cycle. Barren solution from the West Dedicated carbon columns, with cyanide added to the desired concentration, is used to leach ore on sections of the Reusable Pad that have been under leach for some time. After returning the cyanide concentration to the desired level, the resultant lean solution is used to leach newly stacked ore producing pregnant solution. This pregnant solution is processed at a rate of approximately 6,000 to 7,000 gpm in adsorption columns to recover gold and silver onto carbon. Barren solution from the carbon adsorption columns is cycled to the West Dedicated Pad for application onto older sections. The total solution application rate (lean and barren) to the 2 Reusable Pad sides is approximately 10,000 to 11,000 gpm.

Upon completion of leaching of a given section of the leach pad, the ore is allowed to drain without applying solution. Following drain-down, ore is removed from the Reusable Pad using front-end loaders, placed into haul trucks, and trucked to the dedicated pads for additional leaching. Certain ores with both fine and coarse gold are occasionally processed on the Reusable Pad to dissolve the fine gold before processing it in the Mill to recover the coarse gold.

The use of rinsed spent ore for road maintenance, blasthole stemming, and construction is authorized under WPCP NEV87052. Prior to being off-loaded for use, reusable pad ore is rinsed for 1 to 5 days using fresh water applied at the same rate as the leaching solution and is allowed to drain for up to 3 days. RMGC has conducted several characterization/stabilization studies on the spent ore from the reusable heap leach pad that was rinsed for 2 to 6 days, offloaded and stockpiled on native alluvium in the North and South Leach Residue Dumps. The volume of water used to rinse this material averaged approximately 14 gallons per ton (gpt) of ore. In 1993, Hydro-Search, Inc. performed an extensive characterization and demonstration of the chemical stabilization of the off-load dumps in the report entitled “Hydrogeologic/Geochemical Conditions in the Vicinity of the Leach Residue Dumps, Round Mountain Gold Company, Round Mountain, Nevada” (Hydro-Search 1993). This study concluded that the spent ore contained within the North and South Leach Residue Dumps is stable according to NAC 445.24354, Sections 2 (a) and 3 (now NAC 445A.230, Sections 2(a) and 3 and that meteoric infiltration through the off-load dumps had not, and would not degrade the

waters of the State, which exist at depths ranging from 180 to 425 feet bgs. The attenuation potential and non-degradation of the vadose zone soils has also been demonstrated by detailed characterization studies including the McClelland Laboratories, Inc. (MLI) Report on Column Soils Attenuation Tests, Job No. 1937 (MLI 1994). The argument of non-degradation was accepted by the NDEP (1995) and can be extended to future rinsed ore material at Round Mountain that may be off-loaded and used for construction, maintenance, and blasting purposes. A recent geochemical study completed by Water Management Consultants (WMC) (2008) indicates that as mining progresses into the Round Mountain expansion area, changes in the tonnage of key lithotypes would result in a slight increase in the production of potentially acid-generating ore. However, the overall risk of increased acid production associated with this minor shift is low. As a result, RMGC anticipates that future heap ore would be similar to the ore material characterized by Hydro-Search (1993).

Carbon Adsorption

Conventional carbon adsorption techniques are used to recover precious metals from heap leach process solutions. The heap leach pads and carbon adsorption plants operate 24 hours per day, 7 days per week. Pregnant (i.e., gold- and silver-bearing) solution flows through a series of fluidized carbon adsorption tanks. Gold and silver cyanide complexes in solution are adsorbed onto the activated carbon as the solution flows through the carbon producing a barren solution. After returning the concentration of the cyanide solution to the desired level, the barren solution is recycled back to the leach pads to recover more precious metals.

As the gold loading increases on the carbon, it is advanced “counter-currently” or opposite to the flow of the solution. Reactivated barren carbon is fed into the last adsorption tank. Loaded carbon from the first adsorption tank is removed and is transferred to the ADR Plant for desorption. Material adsorbed at satellite carbon plants is transferred via a carbon truck to the ADR Plant for desorption and reactivation.

There are currently three carbon adsorption facilities at the existing Round Mountain Mine: two parallel column sets at the ADR Plant for the Reusable Pad, a single column set also at the ADR Plant for the West Dedicated Leach Pad, and a single column set for South Dedicated Pad. To balance solution flows, RMGC blends solution from each pad area.

ADR Facilities

The ADR Plant processes gold-bearing solution at an average rate of approximately 6,000 to 7,000 gpm on the Reusable Pad return system and 7,000 to 8,000 gpm on the West Dedicated return system. Under the No Action Alternative, the ADR Plant would continue to operate for the processing of gold-bearing solution from the heap leach circuit. An average of approximately 1,950 gpm (3,150 acre-feet per year [ac-ft/yr]) of make-up water is added at the ADR Plant, Reusable Pad, and West Dedicated Pad to compensate for water loss due to evaporation and wetting of ore on the leach pads. Loaded carbon from the Reusable Pad, South Dedicated Pad, and West Dedicated Pad adsorption columns and the Mill leach circuit are processed at the ADR facility to remove the loaded precious metals.

Dissolved precious metals are recovered from cyanide solutions by conventional ADR carbon processing techniques. Precious metals dissolved in the cyanidation circuits are adsorbed onto activated carbon at each facility. This loaded carbon is then processed in the ADR Plant. Precious metals are stripped from the loaded carbon by pumping solution through the carbon in a pressurized vessel. As the solution contacts the carbon, gold, and silver are desorbed and recovered into solution. The resulting concentrated pregnant

solution is forwarded to electrowinning cells where gold and silver are recovered and dried prior to smelting in an electric induction furnace. The hot molten precious metal is poured into molds to cast bars of approximately 60 to 70 pounds. These doré bars typically contain from 50 to 65 percent gold, with the remainder being silver. The bars are shipped to an off-site refinery for final processing.

Following pressure stripping, carbon is rinsed with softened water, washed with nitric acid solution at a pH of 1.5 to 2, neutralized with caustic, rinsed, and thermally regenerated in a rotary kiln. The reactivated carbon is recycled back to the adsorption tanks in the various areas to recover additional precious metal values.

2.3.5.2 Milling Operations

Milling operations began in late 1997 and would continue under the No Action Alternative. The Mill is used to reduce the size of higher grade ore for more effective processing. The currently authorized mill circuit consists of a gyratory crusher, a semi-autogenous grinding (SAG) mill, vibrating screens, a pebble crusher, spiral concentrators, cleaning tables, flotation concentrators, thickeners, a regrind mill, carbon-in-leach (CIL) agitated leaching tanks, reagent handling, a cyanide neutralization circuit, and associated equipment. The average production rate is approximately 11,000 tpd. The Mill is authorized to operate 24 hours per day, 7 days per week.

Ore Crushing

The ROM ore is fed to the gyratory crusher using front-end loaders and haul trucks. The mill crushing facility reduces ROM ore to less than 6 inches, after which the ore is moved to the grinding mill. A variable speed apron feeder delivers the crushed ore to the crushed ore stockpile via conveyor belt and radial stacker. Variable speed apron feeders located under the stockpile feed crushed ore at a controlled rate to the SAG mill via a conveyor.

Water is added to the ore as it enters the SAG mill where gold and pyrite minerals are liberated from the host rock. The mill discharges slurry onto the primary screen where the coarse 2- by 0.5-inch “pebbles” are removed. These pebbles are conveyed to a small cone crusher for crushing to -0.5 inch and returned to the SAG mill feed belt for further grinding.

A series of screens (i.e., primary, secondary, and tertiary) are used to separate the larger sized material to be returned to the mill for additional grinding in the SAG mill. The primary screen undersize is pumped to the secondary screens where the larger sized material is returned to the mill for further grinding. The secondary screen undersize is pumped to the tertiary screens where the larger sized material is recycled back to the SAG mill. The tertiary screen underflow feeds the spiral concentrators, which utilize gravity separation.

Concentration Processing

Gold and gold-bearing minerals liberated in the SAG mill circuit are recovered by gravity and flotation concentration. The concentration steps significantly reduce the amount of material requiring cyanide leaching to about 3 or 4 percent of the total mill feed. The gravity concentrate is processed to remove the coarse free-gold before combining with the flotation concentrate. The combined concentrate is fed to the regrind mill to further liberate precious metals for subsequent cyanide leaching. Concentrator tailings are sent to a tailing thickener to recover water for reuse in the mill. The thickened slurry is pumped from the thickener underflow to the tailings impoundment facility for disposal.

Gravity Concentration

Gravity concentration devices use turbulent water to separate gold and heavy minerals, such as pyrite, from lighter waste rock. For example, gold and pyrite 'gravitate' to the center of a spiral concentrator while fine waste materials are spun to the outside. The coarse gold and gold-bearing pyrite liberated by the SAG mill circuit are recovered by a gravity circuit consisting of three stages of spiral concentrators.

Free gold is separated from the spiral concentrate by two stages of shaking tables. Table concentrate is further cleaned in a gold wheel to a product suitable for the refinery furnace. The gold-bearing pyrite tailings from the shaker tables and the gold wheel are sent to the regrind circuit along with a middling spiral concentrate for fine grinding before cyanide leaching.

Flotation Concentration

The flotation circuit recovers the fine gold and pyrite not recoverable by the spiral concentrators. The equipment for the flotation circuit is located in an attached building on the west side of the mill facility. The flotation circuit consists of an agitated conditioning tank, flotation machines, process sumps and pumps, and flotation reagent mixing and handling equipment.

Gravity tailings from the rougher spirals flow to the conditioning tank where collector and frother reagents are added. The conditioned gravity tailings are then fed to the flotation machines where compressed air is injected into the slurry mixture. The precious metal and sulfide minerals are collected by the air bubbles and separated into a concentrate. This flotation concentrate is mixed with the gravity pyrite concentrate for processing in the existing mill equipment to recover the precious metals. The flotation tailings are sent to the existing mill thickening tank and then piped as a slurry to the tailings impoundment facility.

Concentrate Grinding, Leaching, and Adsorption

Concentrate from the gravity and flotation circuits is reground in a vertical stirred mill. Further size reduction exposes the precious metals for subsequent cyanide leaching. The mill discharge is sized using cyclones. The coarse material is returned to the regrind mill for further grinding. The excess water in the cyclone overflow is removed in a concentrate thickener.

Thickener underflow is leached in three stages of agitated tanks with cyanide to extract the gold and silver. Activated carbon in the agitated leach circuit adsorbs the precious metals as they are dissolved from the leach slurry. Reactivated barren carbon is fed into the final tank. As the gold loading increases on the carbon, it is advanced counter-currently to the flow of the leach slurry. Slurry from the first tank is screened to remove the loaded carbon, which is sent to the ADR Plant for recovery of the precious metals and regeneration of the activated carbon. A cyanide destruction circuit using copper sulfate and ammonium bisulfite is utilized to ensure that the weak acid dissociable (WAD) cyanide concentration in the final tailings slurry is safe for wildlife.

2.3.5.3 Tailings Impoundment Facilities

Under the No Action Alternative, the currently authorized tailings impoundment facilities include Cells A and B. Cell A covers approximately 450.1 acres and contains approximately 33.5 Mt of tailings. Cell A would be

constructed to a maximum height of approximately 215 feet (6,090 feet elevation). Cell B has not been constructed to date, but is permitted to cover approximately 227.1 acres, contain approximately 31 Mt of tailings, and be constructed to a maximum elevation of 6,090 feet.

After cyanide neutralization, the leach circuit tailing combines with the thickened concentrator circuit tailings. The combined tailing slurry has a solids concentration of approximately 50 to 55 percent by weight and is pumped to the tailings impoundment facility. The tailings impoundment facility is equipped with a peripheral tailing line that rests inside the embankment crest. Tailings slurry is spigotted from the peripheral line controlling deposition within the impoundment. The tailings material consolidates in the impoundment. Excess water drains from the bottom of the lined impoundment into a series of reclaim ponds.

The tailings embankment for Cell A was constructed utilizing pit waste rock, which has been characterized as non-acid generating (NAG). Waste rock has been placed at a slope angle of 1.4H:1.0V by end-dumping from haul trucks in 20- to 30-foot lifts.

The tailings impoundment facility has a synthetic HDPE liner with a sub-grade secondary liner composed of 12 inches of compacted low permeability material. The tailings impoundment facility was constructed with a drain system to reduce the hydraulic head on the synthetic liner. A series of perforated pipes encased in gravel was positioned across the top of the synthetic liner at specified intervals. These pipes drain to a collection pond below the tailings dam, where the reclaimed water is pumped back to the mill circuit.

2.3.5.4 Gravity Plant

Under the No Action Alternative, the Gravity Plant would continue to operate seasonally and be used until ore, suited for use in the Gravity Plant, has been sorted and processed. The Gravity Plant uses placer equipment to recover coarse free gold encountered within the ore body. Gravity feed is stockpiled and then processed; production rates are typically about 100 tpd of ore. Tailing products generated by the gravity separation equipment are reprocessed in the mill as they may contain economically beneficial amounts of precious metals.

The processes used in the Gravity Plant are strictly mechanical; no process chemicals other than flocculant are used. The process involves size reduction of the ore material and a mechanical separation of gold and silver from rock based on the differences in densities between gold and the host rock. Tailings from this process are then re-processed in the mill, and the process water is recycled back into the process. Gold and silver product is melted in the refinery furnace.

2.3.6 Exploration

2.3.6.1 Round Mountain Area

Drill exploration activities have been conducted in the Round Mountain Area under POO NVN-072662. This POO allows for up to 9 acres of unreclaimed surface disturbance and 12 open drill holes at any time during the life of the mining operations. Reclamation and revegetation of past drill pads and roads, and plugging of drill holes allows for subsequent drill exploration with a maximum of 9 unreclaimed acres and 12 open drill holes. Drill exploration activities are permitted inside and within 1 mile of the currently authorized project boundary.

2.3.6.2 Gold Hill Area

Drill exploration activities have been conducted in the Gold Hill Area under Exploration POO (NVN-075204) and two exploration notices (NVN-077007 [North Gold Hill] and NVN-077083 [South Gold Hill]). This POO allows for up to 500 drill holes and 50 acres of surface disturbance. The two exploration notices were authorized by the BLM for a specific set of drill sites and drill roads. Current disturbance in the Gold Hill POO area includes approximately 308 drill holes and 28 acres of disturbance. In the North Gold Hill proposed project area, surface disturbance includes approximately 2 acres of disturbance. In the South Gold Hill project area, surface disturbance includes 4.9 acres of disturbance.

2.3.7 Ancillary Facilities

Under the No Action Alternative, the following ancillary structures, facilities, and systems would continue to be used for the remainder of the operation. RMGC maintains ancillary facilities to support the mining and processing operations.

2.3.7.1 Offices and Other Buildings

A number of office buildings and warehouses support the mining and processing operations. These buildings include the administration building, information technology building, clinic, daycare, mine offices, maintenance, electrical, safety, mine rescue area, core sheds, contractor offices, security building and main gate, assay laboratory, and shops. Parking areas are provided at these facilities.

2.3.7.2 Growth Media Stockpiles

Growth media is stockpiled for subsequent use in reclamation. These stockpiles are located in various areas in the Round Mountain Area as illustrated on **Figure 2.3-1**.

2.3.7.3 Ore Stockpiles

Ore is stockpiled for subsequent processing. These stockpiles are located in various areas in the Round Mountain Area as illustrated on **Figure 2.3-1**.

2.3.7.4 Bioremediation Facilities

Two bioremediation facilities are located in the Round Mountain Area and are authorized by NDEP General Permit GNV041995 to bioremediate petroleum-contaminated soil and floor sweep materials. One facility accepts primarily wash bay sludge, which is placed on a clay-lined pad. The second facility accepts petroleum-contaminated solids from other areas of the operations. The pad consists of two cells. One cell has a clay liner, and the second cell is lined with a composite liner system composed of a synthetic primary liner underlain with a compacted low-permeability clay liner.

Bioremediation is a process whereby naturally occurring soil bacteria utilize petroleum contaminants as food, resulting in the destruction of the petroleum products and the formation of water and carbon dioxide (CO_2) as metabolic wastes. Bioremediation is an actively managed process, which incorporates soil mixing, maintaining soil moisture, and the occasional application of a dry fertilizer that is high in nitrogen and

phosphorous. These actions encourage and maintain the growth of bacteria in the soil. The bioremediation cells are lined facilities that are designed to ensure environmental protection.

2.3.7.5 Landfills

Two active waivered Class III landfills are located within the North Waste Rock Dump. The first landfill area accepts typical industrial- and municipal-type solid wastes such as paper, wood, and construction materials. Other wastes such as punctured aerosol cans and drained oil filters also are acceptable. The second landfill permit provides for disposal of tires. Additional waivered Class III landfill cells are authorized for the South Waste Rock Dump area and may be constructed in the future.

2.3.7.6 Access and Haul Roads

The Round Mountain Area is served by a connecting road from State Route (SR) 376. This paved access road occurs on 4.5 acres of land within the existing project boundary. The most recent inventory of haul roads in the Round Mountain Area totals 133.8 acres.

2.3.7.7 Fencing and Security

The existing security system would continue to be implemented under the No Action Alternative. Existing fences would be maintained to prevent access by wildlife and livestock and to provide for public safety. The Round Mountain Area is bounded by approximately 87,400 linear feet of perimeter barbed-wire fencing. Within the existing operation, approximately 41,000 feet of chain-link fencing is used for security and other fencing requirements.

2.3.7.8 Hazardous Materials and Solid Waste Disposal

RMGC is classified as a large quantity generator of hazardous waste for purposes of the Resource Conservation and Recovery Act (RCRA). The primary hazardous waste stream is generated at the assay laboratory as cupels, crucibles, and slag. These wastes are stored on site prior to shipment in approved containers located in storage facilities that comply with RCRA regulations. Hazardous waste is transported in U.S. Department of Transportation (USDOT)-approved containers to permitted hazardous waste treatment, storage, and disposal facilities. RMGC uses on-site waivered Class III landfills to dispose of non-hazardous solid waste. Detailed information regarding chemical use, storage, and transportation is provided in Section 2.4.3.8, Ancillary and Support Facilities.

2.3.7.9 Spill Prevention and Emergency Response

RMGC's Spill Response Contingency Plan has been and would continue to be used to prevent spills and respond to any emergencies related to spills in the study area.

2.3.7.10 Fire Protection

Fire protection is a high priority of the operation at all times. Employees are trained on the fire protection program as part of job training. Specific fire protection measures covered in training include:

- Operations personnel are on duty 24 hours per day and provide the initial response to fires;

- All mobile equipment is equipped with fire control equipment including fire extinguishers;
- Water trucks equipped with water monitors and hose reels are maintained for fire protection needs;
- The administration building, clinic, daycare, mine offices, core sheds, security building, assay laboratory, shops, warehouses, and process buildings currently are equipped with a fire water system including a fire water pond and hydrants at appropriate locations;
- Adequate firefighting equipment (i.e. shovel, pulaski, extinguisher[s]), and/or an ample water supply should be kept at the mine site(s);
- Fire hydrants, hoses, and emergency supplies are located around the mine;
- RMGC's Loss Control Manager, or his designee, serves as the Fire Control Coordinator;
- RMGC's Fire Control Coordinator would coordinate with the Round Mountain Volunteer Fire Department in the event of a fire; and
- Report wildland fires immediately to the BLM Central Nevada Interagency Dispatch Center at (775) 623-3444;
- Vehicle catalytic converters should be inspected often and cleaned of all brush and grass debris;
- When conducting welding operations, they should be conducted in an area free from or mostly free from vegetation. An ample water supply and shovel should be on hand to extinguish any fires created from the sparks; and
- Extra personnel should be at the welding site to watch out for fires created by welding sparks.

2.3.7.11 Stormwater Diversions, Ponds, and Controls

RMGC's stormwater management practices employ a variety of stormwater control features. These features are monitored and maintained as necessary to ensure proper operation. Stormwater controls utilized include:

- A stormwater diversion channel has been constructed east of the South Dedicated Heap Leach Pad to divert runoff away from that facility and direct any flow to a natural (unnamed) drainage down-gradient from the heap. The location of that channel and its proximity to the South Heap Leach Pad are illustrated on Figure 2.3-1.
- Eight unlined stormwater collection ponds. The purpose of these ponds is to collect surface runoff and allow that water to primarily evaporate into the atmosphere, and secondarily infiltrate to near-surface soils. The number and location of stormwater collection ponds varies to meet stormwater management needs.

Sediment basins and traps have been installed at various locations in the Round Mountain Area as part of the stormwater control program. There are no identified waters of the United States (U.S.) (as defined by

40 CFR 230.3) in or downgradient of the existing operations therefore, RMGC is not subject to stormwater permitting through NDEP.

2.3.7.12 Dewatering and Water Disposal

Section 2.3.3.3, Dewatering, provides details regarding dewatering of the pit and water disposal.

2.3.7.13 Water Supply Wells

Potable water for the existing facilities at Round Mountain would continue to be obtained from three existing production wells. The existing Round Mountain Mine would continue to use an average of approximately 6 million gallons of potable water per year.

2.3.7.14 Electric Power

Electric power for operations would continue to be provided by NVEnergy via the existing 230-kV overhead power transmission line transecting the Big Smoky Valley. A substation at the mine entrance transforms the power to 24.9-kV, the voltage transmitted throughout the operation via overhead transmission lines. Diesel generators are in place to provide emergency power to critical facilities throughout the site.

2.3.8 Mitigation Measures

Mitigation measures for the No Action Alternative were described in the 1996 Final EIS for the Round Mountain Mill and Tailings Facility and ROD (BLM 1996).

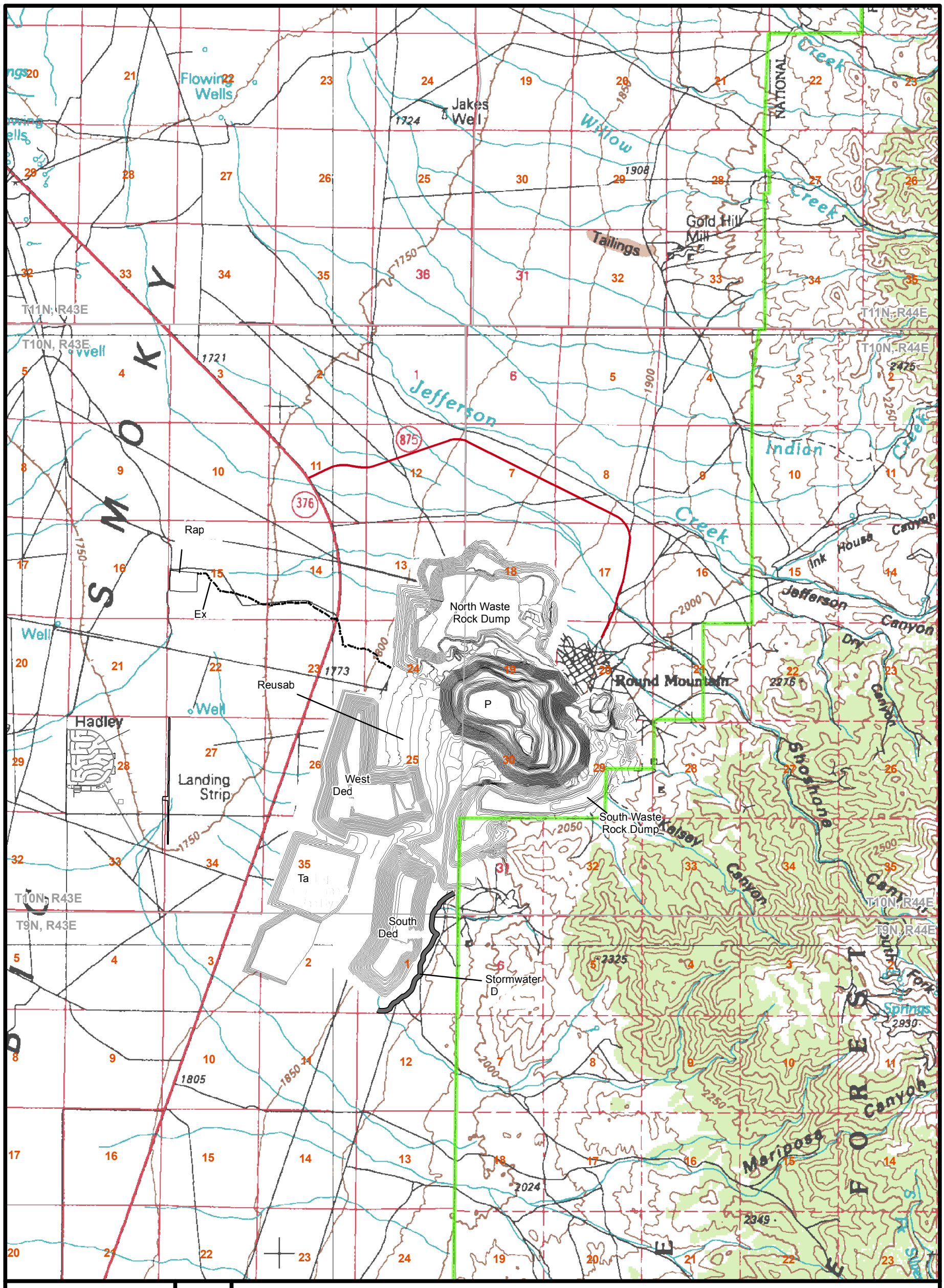
2.3.9 Mine Closure and Reclamation

Once available ore has been mined from the open pit and the gold and silver has been recovered from the heaps, the existing facilities would be closed and reclaimed in accordance with the currently approved reclamation plan, current permits, and applicable Federal and state closure and reclamation requirements. Closure and reclamation of the study area are discussed in detail in the Round Mountain Mill and Tailings Facility Final EIS and ROD (BLM 1996). The total disturbance area subject to reclamation would be approximately 5,928 acres. Reclamation of facilities associated with the No Action Alternative would be similar to those described in Section 2.6, Reclamation, for the Proposed Action and action alternatives. The post-mining reclamation topography for the No Action Alternative is presented in **Figure 2.3-3**.

As discussed in Section 2.3.3, Open Pit, a pit lake would form in the long term as a result of groundwater recharge after the cessation of pit dewatering. The environmental effects of the Round Mountain Pit lake, in the No Action Alternative, are presented in Chapter 4.0.

2.4 Proposed Action

RMGC is planning to expand the existing operations in the Round Mountain Area and to develop the Gold Hill Area. The areas of planned expansion and development are illustrated in **Figure 2.4-1** and summarized in **Table 2.4-1**. **Table 2.4-2** summarizes proposed surface disturbance by land ownership.



Legend

Post Reclamation Contours (25-foot Intervals)

National Forest Boundary

N

0 1 2 Miles

Note: Topographic elevations provided in meters, USGS 1929 Vertical Datum.
Source: RMGC 2009.

Round Mountain Expansion Project

Figure 2.3-3
No Action Alternative
Post-mining
Reclamation Topography

04/29/2009

West Waste Rock Dump
Intramine Area
North Waste Rock Dump
Gold Hill Area
Infrastructure
Pit
RIBs and Water Production Wells
Growth Media and/or Ore Stockpiles
Stormwater Diversion Channel
Process Facility
Heap Leach Pad
Transportation/ Utility Corridor
North Dedicated Pad
Rapid Infiltration Basin
North Waste Rock Dump
Round Mountain Area
Existing Drainage
Underground Decline
Reusable Pad
Process Facilities
West Dedicated Pad
South Waste Rock Dump
Cell A
South Dedicated Pad
Cell B
Tailings Impoundment Facility
Cell C
Cell D
Flowing Wells
Jakes Well
Hadley
Landing Strip
T11N, R43E
T10N, R43E
T9N, R43E
T11N, R44E
T10N, R44E
T9N, R44E

Legend

- Proposed Project Boundary
- Proposed New Disturbance
- Currently Authorized Disturbance
- Proposed NVEnergy 230-kV Power Lines
- Proposed 24.9-kV Power Lines
- Proposed Exploration Drill Sites
- Proposed Exploration Drill Roads
- NVEnergy 230-kV Power Line
- NVEnergy 24.9-kV Power Line
- National Forest Boundary

Note: Topographic elevations provided in meters, USGS 1929 Vertical Datum.
Source: RMGC 2009.

N

0 1 2 Miles

Round Mountain Expansion Project

Figure 2.4-1

Proposed Action and Gold Hill Processing Alternative

04/30/2009

Table 2.4-1
Proposed Action - Proposed Surface Disturbance

Component	Facility	Round Mountain Area (acres)			Gold Hill Area (acres)	
		Total Acreage of Proposed Disturbance	Proposed Facility Overlap With Previously Permitted Disturbance[1]	New Proposed Disturbance[2]	New Proposed Disturbance[2]	Total New Disturbance (acres)
Open Pit	Open Pit	1,289.4	1,160.3	129.1	221.6	350.7
Subtotal		**1,289.4**	**1,160.3**	**129.1**	**221.6**	**350.7**
Waste Rock Dumps	North Waste Rock Dump	1,918.7	1,051.6	867.1	51.6	918.7
	South Waste Rock Dump	570.7	570.7	0.0	NA	0.0
	West Waste Rock Dump	NA	NA	NA	500.6	500.6
Subtotal		**2,489.4**	**1,622.3**	**867.1**	**552.2**	**1,419.3**
Leach Pads	Reusable Pad	51.2	51.2	0.0	NA	0.0
	North Dedicated Pad	537.5	137.2	400.3	NA	400.3
	West Dedicated Pad	868.0	868.0	0.0	NA	0.0
	South Dedicated Pad	627.3	627.3	0.0	NA	0.0
	GH Leach Pad	NA	NA	NA	299.8	299.8
Subtotal		**2,084.0**	**1683.7**	**400.3**	**299.8**	**700.1**
Tailings Impoundment Facility	Tailings Impoundment Facility	1,607.4	721.6	885.8	NA	885.8
Subtotal		**1,607.4**	**721.6**	**885.8**	**NA**	**885.8**
Growth Media and Ore Stockpiles	Stockpiles	476.9	234.1	242.8	93.2	336.0
Subtotal		**476.9**	**234.1**	**242.8**	**93.2**	**336.0**
Process Facilities	Processing Facilities	438.7	325.9	112.8	35.1	147.9
Subtotal		**438.7**	**325.9**	**112.8**	**35.1**	**147.9**
Infrastructure[3]	Infrastructure	558.2	180.1	378.1	195.7	573.8
Subtotal		**558.2**	**180.1**	**378.1**	**195.7**	**573.8**
Intramine Area[4]	Intramine Area	NA	NA	NA	204.6	204.6
Subtotal		**NA**	**NA**	**NA**	**204.6**	**204.6**
Transportation/ Utility Corridor[5]	Transportation/ Utility Corridor	NA	NA	NA	66.2	66.2
Subtotal		**NA**	**NA**	**NA**	**66.2**	**66.2**
Exploration[6]	Exploration	0.5	NA	0.5	13.5	14.0
Subtotal		**0.5**	**NA**	**0.5**	**13.5**	**14.0**
Total		**8,944.5**	**5,928.0**	**3,016.5**	**1,681.9**	**4,698.4**

[1] These acres have been previously disturbed by permitted mine development.
[2] Acres of exploration disturbance includes exploration activities that do not occur within previously permitted facilities or facilities that would be permitted under the Proposed Action, as exploration activities that occur within the previously authorized disturbance area or Proposed Action disturbance area either has, or would be, subsumed by the development of facilities.
[3] Infrastructure includes the following: RIBs, stormwater controls, secondary roads, haul roads, stockpiles, borrow pits, landfills, fresh water lines, wells, etc.
[4] The intramine area would include roads, laydown yards, and other support facilities within the Gold Hill Area.
[5] The acres for the Transportation/Utility Corridor were calculated from the Round Mountain Area boundary to the Gold Hill Area boundary. The acres of connecting internal haul roads within the Round Mountain and Gold Hill areas are included under infrastructure.
[6] Acres of exploration disturbance includes exploration activities that do not occur within previously permitted facilities or facilities that would be permitted under the Proposed Action, as exploration activities that occur within those areas either have been, or would be, subsumed by the development of facilities.
Source: RMGC 2009.

Table 2.4-2
Proposed Surface Disturbance[1]

Component	Round Mountain Area			Gold Hill Area			Total		
	Public[2]	Private	Total	Public[2]	Private	Total	Public[2]	Private	Total
Open Pits	67.0	62.1	129.1	221.6	0.0	221.6	288.6	62.1	350.7
Waste Rock Dumps	833.7	33.4	867.1	552.2	0.0	552.2	1,385.9	33.4	1,419.3
Leach Pads	378.7	21.6	400.3	299.8	0.0	299.8	678.5	21.6	700.1
Tailings Impoundment Facility	885.8	0.0	885.8	0.0	0.0	0.0	885.8	0.0	885.8
Growth Media and Ore Stockpiles	242.8	0.0	242.8	93.2	0.0	93.2	336.0	0.0	336.0
Process Facilities[3]	112.8	0.0	112.8	35.1	0.0	35.1	147.9	0.0	147.9
Infrastructure[4]	378.1	0.0	378.1	195.7	0.0	195.7	573.8	0.0	573.8
Intramine Area	0.0	0.0	0.0	204.6	0.0	204.6	204.6	0.0	204.6
Transportation/ Utility Corridor	0.0	0.0	0.0	66.2	0.0	66.2	66.2	0.0	66.2
Exploration	0.5	0.0	0.5	13.5	0.0	13.5	14.0	0.0	14.0
Total	**2,899.4**	**117.1**	**3,016.5**	**1,681.9**	**0.0**	**1,681.9**	**4,581.3**	**117.1**	**4,698.4**

[1] Areas presented include the listed component as well as associated roads. Acreages include areas of new surface disturbance.

[2] BLM-administered.

[3] Process facilities include crushing facilities.

[4] Infrastructure includes the following: RIBs, stormwater controls, secondary roads, haul roads, stockpiles, borrow pits, landfills, fresh water lines, wells, etc.

Source: RMGC 2009.

Descriptions of the components are provided in the following sections. For permitting purposes, the disturbance includes sufficient area to accommodate projected disturbance related to the existing operations and the proposed expansions as well as potential variations resulting from design modifications, such as engineering adjustments to the open-pit perimeter, haul/access road realignments, and growth media stockpiles. **Table 2.4-3** presents a summary of previously authorized and proposed disturbance for the proposed expansion and development.

Expansion in the Round Mountain Area would include:

- Increasing the existing Round Mountain Project Boundary Area from 7,263 to 10,385 acres, an incremental increase of 3,122 acres;

- Expanding the permitted Round Mountain Pit by about 209 acres to a total of approximately 1,289 acres and deepening the Round Mountain Pit by about 455 feet to approximately 4,610 feet in elevation;

- Expanding the dewatering operations for the open pit;

Table 2.4-3
Summary of Authorized and Proposed New Disturbance Within the Proposed Project Area

Component	Authorized Disturbance (acres)			Proposed New Disturbance (acres)			Total (acres)		
	Public	Private	Total	Public	Private	Total	Public	Private	Total
Open Pits	171.0	909.2	1,080.2	288.6	62.1	350.7	459.6	971.3	1,430.9
Waste Rock Dumps	1,761.2	76.5	1,837.7	1,385.9	33.4	1,419.3	3,147.1	109.9	3257.0
Leach Pads	1,500.7	0.0	1,500.7	678.5	21.6	700.1	2,179.2	21.6	2,200.8
Tailings Impoundment Facility	677.2	0.0	677.2	885.8	0.0	885.8	1,563.0	0.0	1,563.0
Growth Media and Ore Stockpiles	416.5	1.7	418.2	336.0	0.0	336.0	752.5	1.7	754.2
Process Facilities	255.6	0.5	256.1	147.9	0.0	147.9	403.5	0.5	404.0
Infrastructure	157.9	0.0	157.9	573.8	0.0	573.8	731.7	0.0	731.7
Intramine Area	NA	NA	NA	204.6	0.0	204.6	204.6	0.0	204.6
Transportation/ Utility Corridor	NA	NA	NA	66.2	0.0	66.2	66.2	0.0	66.2
Exploration	NA	NA	NA	14.0	0.0	14.0	14.0	0.0	14.0
Total	**4,940.1**	**987.9**	**5,928.0**	**4,581.3**	**117.1**	**4,698.4**	**9,521.4**	**1,105.0**	**10,626.4**

Source: RMGC 2009.

- Conducting underground mining operations;
- Expanding the North Waste Rock Dump by about 700 acres to a total of approximately 1,919 acres;
- Adding a North Dedicated Leach Facility with a footprint of about 538 acres, as well as process ponds and carbon adsorption plant;
- Expanding the Reusable Pad by about 8 acres to a total of approximately 51 acres;
- Expanding the West Dedicated Pad by about 38 acres and adding associated process ponds;
- Expanding the milling and flotation circuits to increase the processing rate from 11,000 tpd to approximately 22,000 tpd;
- Increasing tailings disposal capacity by adding cells with combined footprint of approximately 886 acres and associated reclaim ponds;
- Expanding the process facility areas by about 62 acres;
- Moving the primary and secondary crushing facilities;
- Expanding growth media and ore stockpile areas;
- Adding lime silos and/or lime slakers;
- Expanding the stormwater controls and diversions; and
- Conducting exploration for additional gold ore.

Expansion in the Gold Hill Area would include:

- Delineating a Project Boundary Area of approximately 4,928 acres;
- Constructing a 1.1-mile-long, 500-foot-wide (66.2 acres) Transportation/Utility Corridor connecting with the haul roads internal to the Round Mountain and Gold Hill areas;
- Excavating an open pit approximately 222 acres in size, which would include a 200-foot-wide buffer zone for potential variations resulting from design modifications, such as engineering adjustments to the open-pit perimeter and haul/access road realignments;
- Constructing 2 waste rock dumps for a total of approximately 552 acres;
- Constructing and operating a heap leach facility with an approximate footprint of 400 acres, as well as associated lined solution ponds, collection and conveyance pipes, lined ditches, pumps, reagent storage, and associated controls;
- Constructing and operating a Merrill-Crowe precious metals precipitation plant, retort, and refinery;

- Developing internal haul roads and secondary roads;
- Installing dewatering wells and associated piping systems;
- Installing production water wells;
- Constructing RIBs for the infiltration of water from dewatering of the Gold Hill Pit;
- Constructing ancillary facilities including but not limited to: intramine area, stormwater controls, and diversion ditches; lime silos and a lime slaker; lined water storage pond; fuel storage; landfill; septic systems; and other support facilities; and
- Conducting exploration for additional gold ore.

Proven and probable reserves of approximately 3.2 million ounces of gold and 7 million ounces of silver occur within the proposed project area. The proposed project would extend the active mine life by approximately 13 years. Ore processing would continue for several years after mining operations cease, followed by reclamation, site closure activities, and post-closure monitoring. Reclamation monitoring would be conducted for each reclaimed area until vegetative stability has been demonstrated. Summaries of the conceptual mining, processing, and reclamation timelines are shown in **Figure 2.4-2**. These timelines are approximations based on current conditions; however, operational considerations may affect actual timelines.

2.4.1 Surface Ownership

Figure 2.3-2 illustrates the land status in the proposed project area. A total of 15,379.2 acres occurs within the proposed Round Mountain Area, Gold Hill Area, and Transportation/Utility Corridor. Surface ownership within the proposed project area includes:

- BLM lands – 13,743.9 acres;
- USFS lands – 515.7 acres; and
- Private lands – 1,119.6 acres.

2.4.2 Schedule and Work Force

The proposed mining operations are scheduled to begin in 2009 pending authorization of required permits and approvals. Mine operations would be conducted on a 7-day-per-week basis for 365 days per year for both the Round Mountain and Gold Hill areas. Shifts are based upon a 12-hour workday, and include 2 shifts per day on a rotating schedule. Four crews would be required to provide the necessary worker coverage. Mining operations are projected to continue through 2022.

Depending on the price of gold and other considerations, the Gold Hill Area may be developed concurrently with mining at the Round Mountain Mine, or development may occur as mining in the Round Mountain Area approaches completion. The operational life of the Gold Hill Area is estimated to be approximately 12 years.

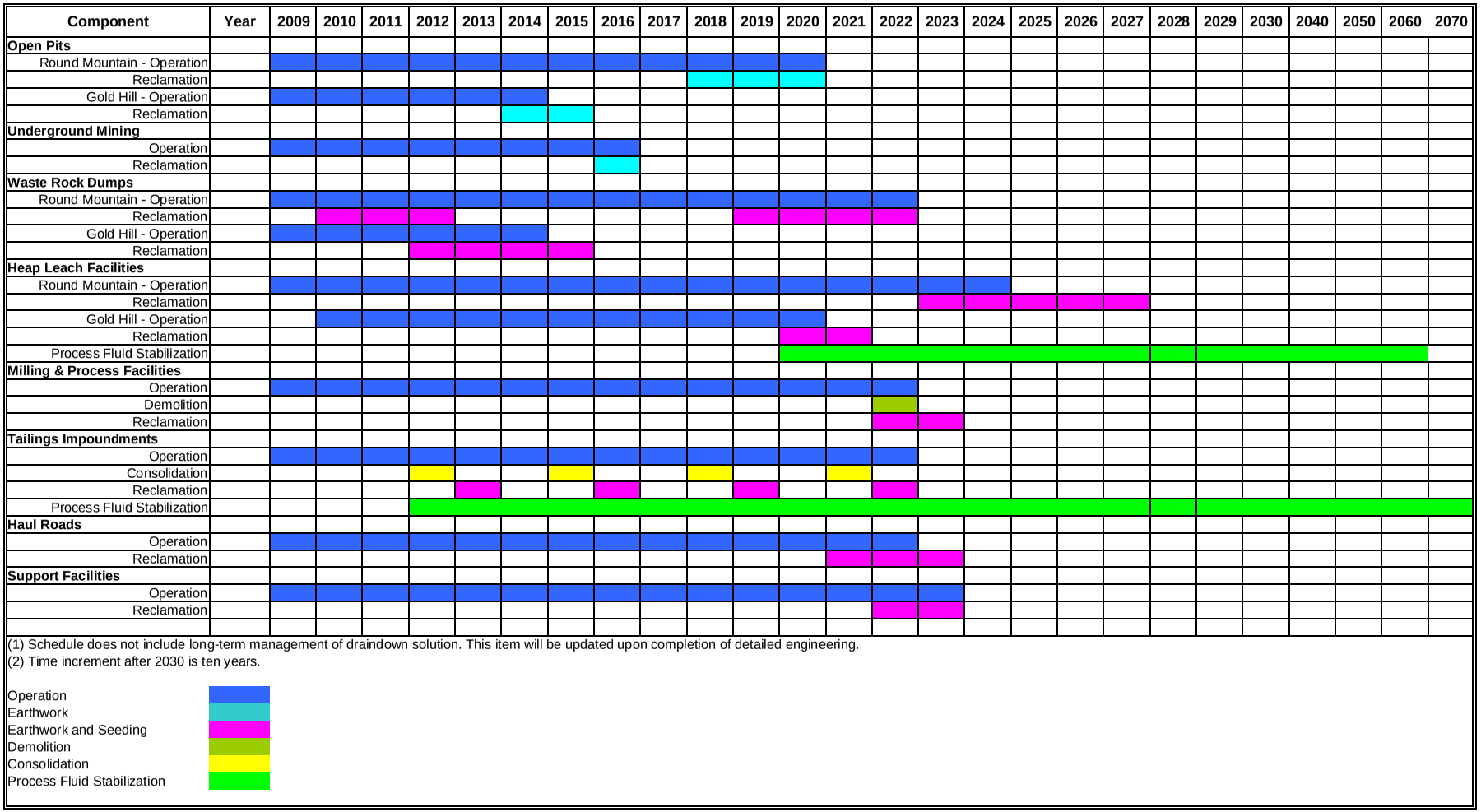


Figure 2.4-2 Conceptual Reclamation Schedule

Simultaneous Development – Work Force. A construction work force of approximately 300 contract workers would be employed: 200 at Round Mountain for relocation of crushers and construction of the mill, leach pads, tailings impoundment facilities, and infrastructure; and 100 at Gold Hill for construction of processing facilities and infrastructure. An additional 110 direct employees would be hired for development and implementation of underground operations. Existing employees would continue working at the Round Mountain operations through the construction phase, which would be completed by the end of 2011 or earlier. At completion of construction, the 300 contract construction workers would be replaced by approximately 100 permanent operations employees for the Gold Hill Operations (depending on skill sets of the workers, some of the "construction" workers may transition to operations). The existing total employment level of approximately 730 workers would grow to a maximum of 1,140 during construction, would range between 760 and 940 through completion of surface mining in 2016, when it would begin a gradual decline to approximately 340 for continued processing of ore and reclamation activities through 2017. Total employment would decline to approximately 40 to 80 workers from 2018 through 2021 as closure and final reclamation activities are completed. It is expected that the proposed project would terminate at the end of 2021.

Sequential Development – Work Force. A construction work force of approximately 200 would be contracted for approximately 12 to 24 months, beginning in 2010, to relocate the crushers and construct leach pads, mill, tailings impoundment facilities, and associated infrastructure at Round Mountain. At the same time, or perhaps slightly sooner, approximately 110 employees would be hired for underground mining operations. Subsequently, in about 2014, approximately 100 construction workers would be contracted to construct Gold Hill processing facilities and infrastructure. No additional surface mine operations employees would be hired under the sequential development scenario. Since Gold Hill would not begin operations until Round Mountain operations were scaling down, operations workers would be shifted from Round Mountain to the Gold Hill operation. Under this scenario, the maximum employment would be 1,040 during the construction period at Round Mountain, followed by 6 years ranging from 800 to 940 during operations at Round Mountain. Construction at Gold Hill would temporarily raise the total to 940, but it would decrease to 800 the following year and would gradually decline to 140 in 2019 when mining would be completed at Gold Hill. Total employment would range from 40 to 90 workers for closure and final reclamation activities from 2020 through 2023.

2.4.3 Round Mountain Area

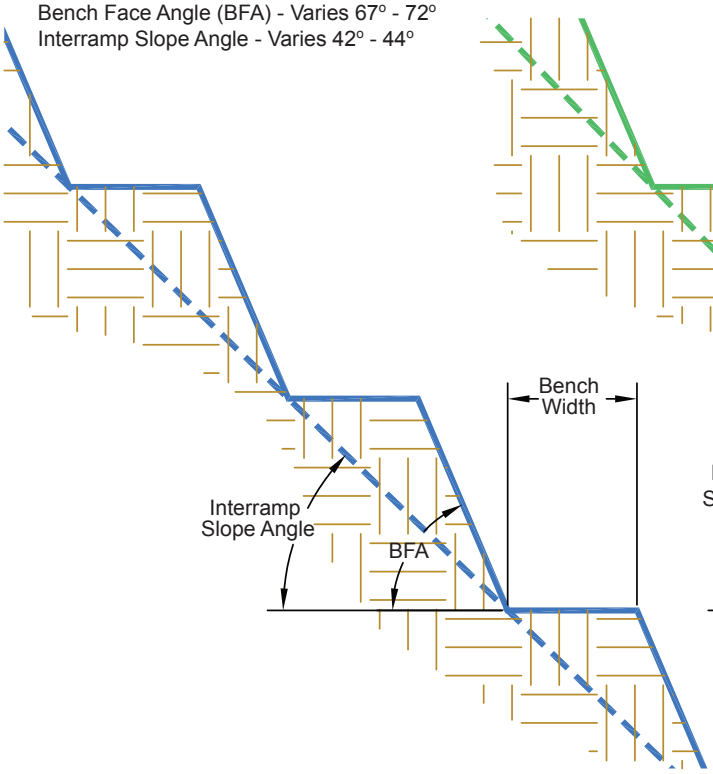
2.4.3.1 Open Pit

The proposed open-pit design, construction/expansion, and operation in the Round Mountain Area would be similar to the current operations, as described in Section 2.3.3, Open Pit. **Figure 2.4-3** illustrates a typical pit cross-section, and **Figure 2.4-4** illustrates a detailed cross-section of the pit expansion areas. Pit design parameters would be similar to those described for the No Action Alternative in Section 2.3.3, Open Pit, with the following additional specifications:

- Side slopes – 35 to 50 degrees;
- Pit bottom elevation – 4,610 feet;
- Approximate dimensions – 9,000 feet by 5,800 feet;
- Approximate depth – 1,600 feet; and
- Footprint – approximately 1,289 acres.

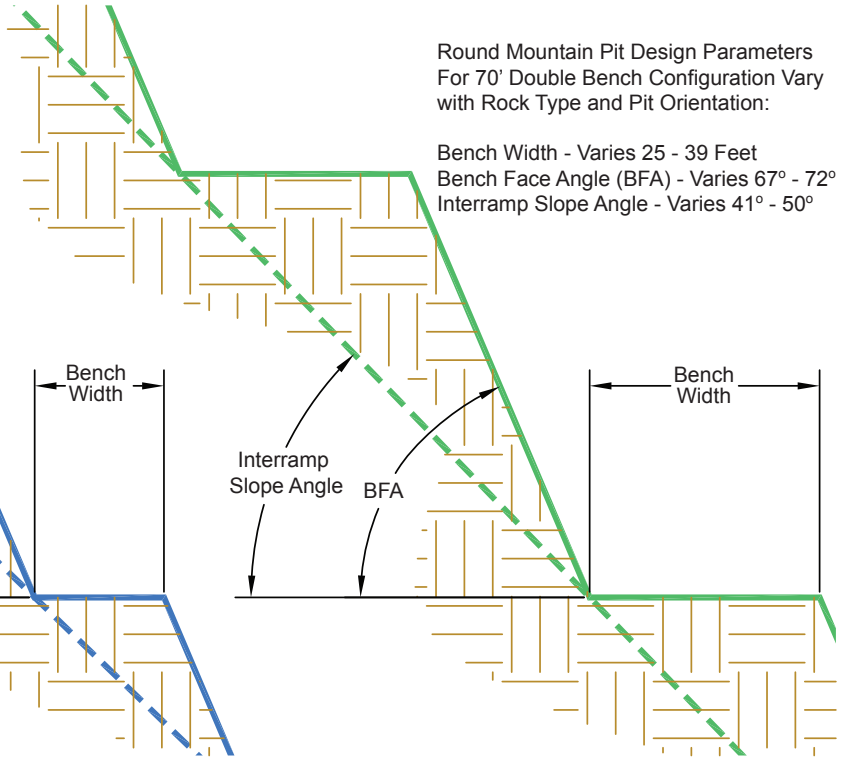
Round Mountain Pit Design Parameters
For 35' Single Bench Configuration Vary
with Rock Type and Pit Orientation:

Bench Width - Varies 21 - 25 Feet
Bench Face Angle (BFA) - Varies 67° - 72°
Interramp Slope Angle - Varies 42° - 44°



Round Mountain Pit Design Parameters
For 70' Double Bench Configuration Vary
with Rock Type and Pit Orientation:

Bench Width - Varies 25 - 39 Feet
Bench Face Angle (BFA) - Varies 67° - 72°
Interramp Slope Angle - Varies 41° - 50°



Legend

Pit Wall

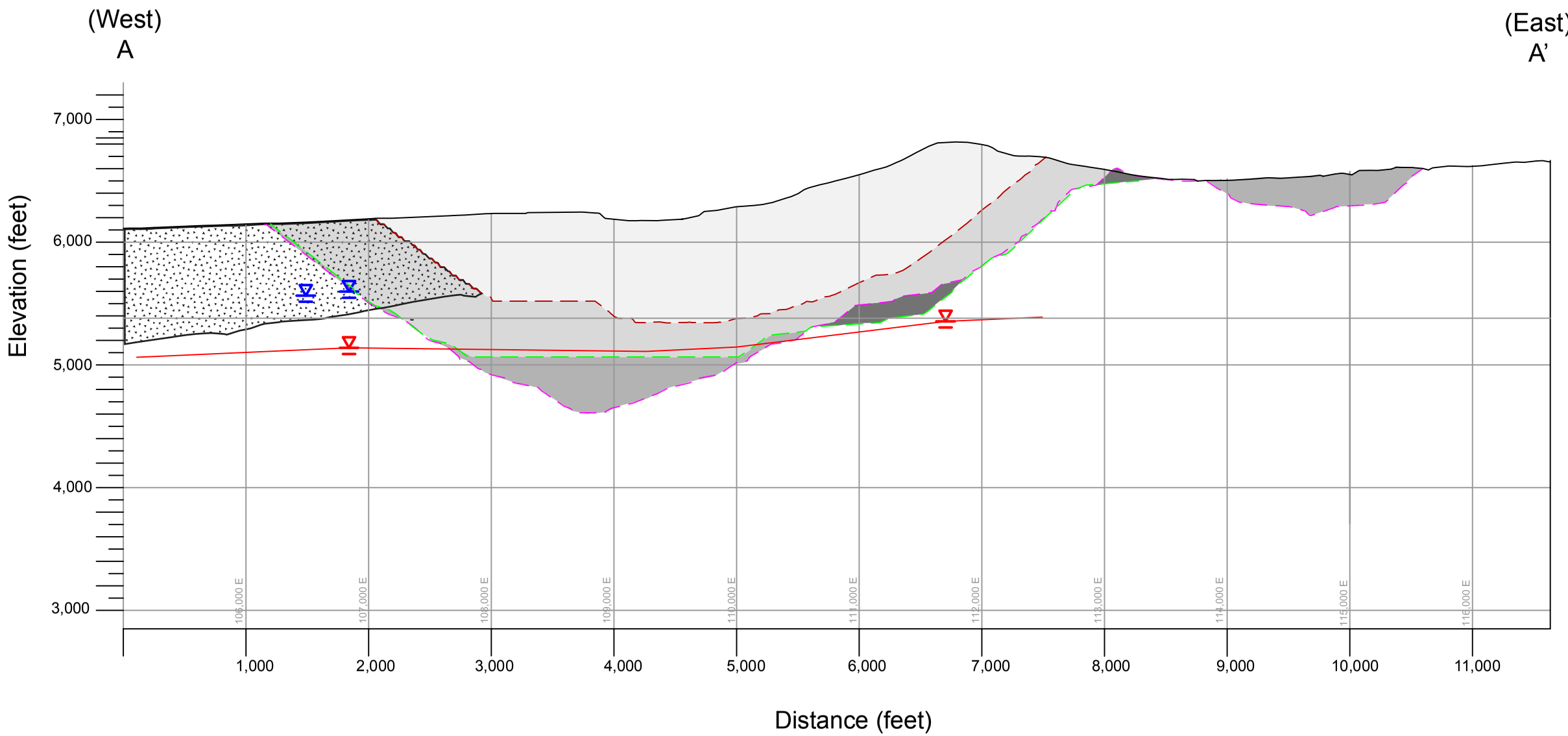
Source: RMGC 2009.

04/11/09

Round Mountain Expansion Project

Figure 2.4-3

Typical Pit Cross-section of Slope Angles and Bench Configuration



Legend

- 2005 End-of-Year Pit Configuration
- Currently Permitted Pit Configuration
- Proposed Pit Configuration
- Overlap of Currently Permitted and Proposed Pit Configurations
- Alluvium
- Bedrock
- Alluvial Water Level
- Bedrock Water Level

Note: See **Figure 3.3-18** for location of cross-section. Topographic and water elevations provided in feet, USGS 1929 Vertical Datum plus 74.18 feet.
Source: WMC 2008.

Round Mountain Expansion Project

Figure 2.4-4

Round Mountain
Pit Cross-section

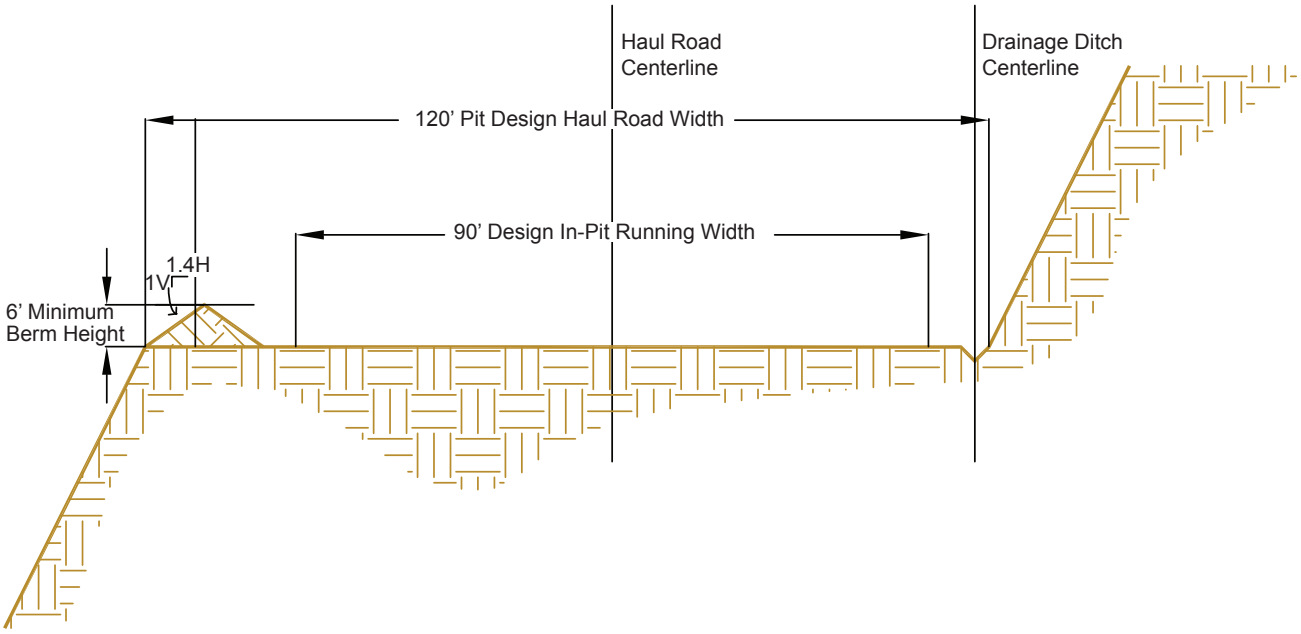
04/12/09

RMGC currently operates, and would continue to operate, the Round Mountain Pit as a conventional open-pit mine. During peak mining years, the anticipated mining equipment for simultaneous operation of Round Mountain and Gold Hill would likely include the following equipment shown in **Table 2.4-4**. RMGC may substitute a different make of equipment that would be in a similar class as those presented in **Table 2.4-4**. Mining would be conducted on both single and double bench configurations. Bench face angles and bench width would vary with rock type and pit orientation. RMGC would continue with regular pit slope stability reviews based on changes in slope conditions. Haul roads would be designed for a maximum grade between 10 and 11 percent with widths designed at 90 to 140 feet for 2-lane traffic. **Figure 2.4-5** presents a typical in-pit haul road cross-section, and **Figure 2.4-6** presents a typical out-of-pit haul road cross-section.

Table 2.4-4
Projected Surface Operations Mobile Equipment

Equipment	Number
Caterpillar 785, 150-ton haul trucks	12
Caterpillar 789, 190-ton haul trucks	14
Caterpillar 793, 240-ton haul trucks	18
P&H 2300 XPA 28-cubic-yard (cu-yd) shovels	3
Caterpillar 5230 shovel	1
Komatsu WA1200 26-cu-yd loader	2
Caterpillar 992 G loaders	4
Caterpillar 992 C	2
Caterpillar 992 D loader	1
Ingersoll-Rand DM50 ELP blasthole drills	4
DM-50-E rotary blasthole drill	2
Ingersoll- Rand DML rotary blasthole drill	1
Caterpillar D10 dozers	5
Caterpillar D11 R dozers	3
Caterpillar 16 G graders	3
Caterpillar 16 H grader	2
Caterpillar 245 excavator	1
Caterpillar 690 D wheeled dozer	1
Caterpillar 834 B wheeled dozers	2
Caterpillar 854 G wheeled dozers	3
Caterpillar 631 E scraper	1
Caterpillar 777 B water truck	1
Caterpillar 631 E water truck	1
Caterpillar 785 B water trucks	3
Caterpillar 777 B lowboy	1
Air track drill	1

Source: RMGC 2009.



Legend

Bedrock

Notes: H = Horizontal.
V = Vertical.

Source: RMGC 2009.

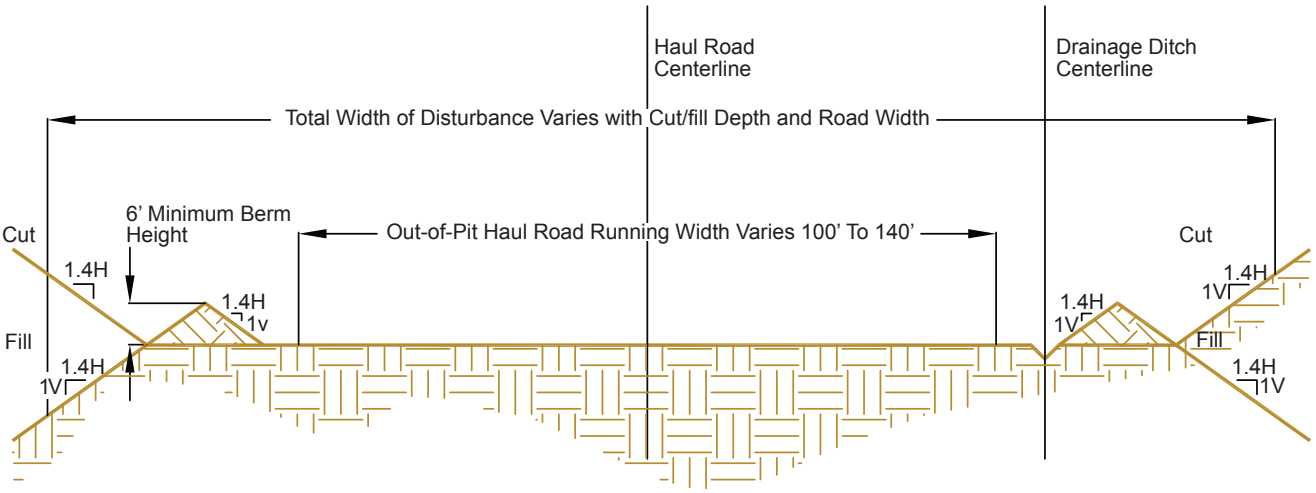
5' 25'
0 10'
Feet

Round Mountain Expansion Project

Figure 2.4-5

Typical In-Pit Haul Road Cross-section

04/29/09



Legend

Bedrock

Notes: H = Horizontal.
V = Vertical.
Source: RMGC 2009.

5' 25'
0 10'
Feet

Round Mountain Expansion Project

Figure 2.4-6

Typical Out-of-Pit Haul Road Cross-section

04/20/09

Pit side slopes would be controlled by several parameters that include the geometry of the ore body, geologic and geotechnical characteristics of the host rock, equipment constraints, and safe operating practices. Ongoing geotechnical and slope movement monitoring studies would be used to evaluate the safety of open-pit slopes.

Blasting practices currently in use at the existing Round Mountain Mine would likely continue. Depending upon conditions, blasthole patterns would be drilled on centers that range from 14 to 30 feet. Explosive blasting agents currently used at the existing Round Mountain Mine would be used in proposed mining operations associated with the proposed expansion. Blasting materials would include ANFO, cartridge blasting agents, cartridge explosives, downlines, detonating cord, boosters, and lead-in line.

As the open pits at Round Mountain develop and expand, the final determination of explosive types and use may be modified based on the characteristics of the rock encountered. All explosives would be stored and used in accordance with Mine Safety and Health Administration (MSHA) and Bureau of ATF regulations.

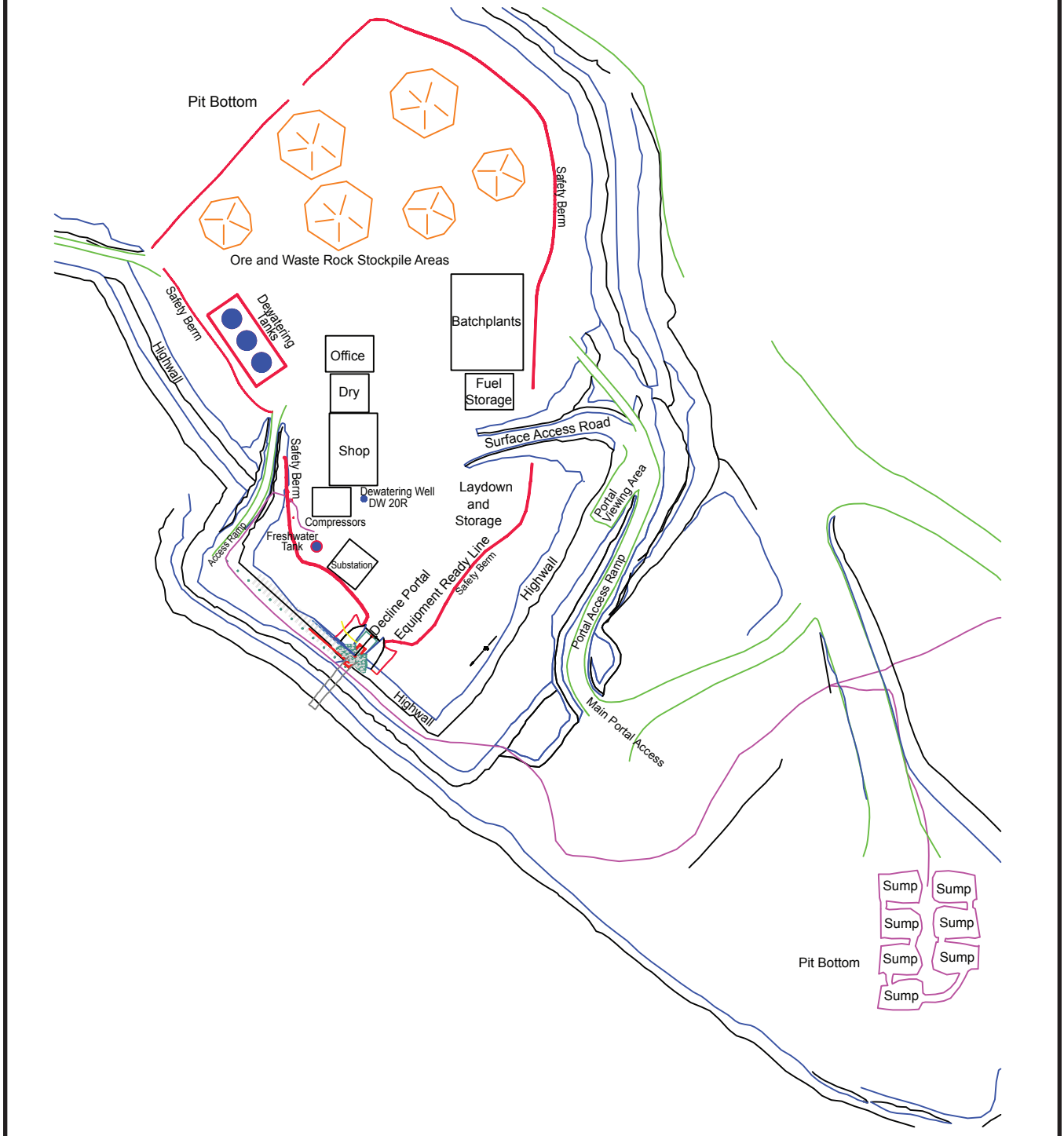
A pit lake would form following the completion of mining activities. Section 4.3, Water Quality and Quantity (Ground and Surface) and Water Use, provides detailed information regarding pit lake formation and water chemistry.

2.4.3.2 Underground Mining Operations

As illustrated in **Figure 2.4-1**, proposed underground mining operations would be located within the Round Mountain Pit area. The proposed underground facilities would consist of portals from lower pit benches into the pit highwalls, declines, underground drifts for drill platforms and/or ore access, stopes, and ventilation and/or escape raises from underground workings to the surface. As illustrated in **Figure 2.4-7**, the proposed surface facilities located in the pit bottom to support underground operations would include: dewatering facilities, an office building, a change house for miners, a shop, air compressors, an electrical substation, a freshwater tank, an equipment ready line, a laydown and storage area, a fuel storage facility, a cement rockfill batch plant with associated silos, and a shotcrete batch plant with associated silos.

The proposed operating schedule would be up to 7 days per week, 24 hours per day. Proposed underground production would be up to 2,000 tpd. The proposed production schedule is summarized in **Figure 2.4-2**.

Openings to the surface would include the existing portal (1,500 feet bgs) for the exploration decline (15 feet wide and 17 feet high) and a second portal (15 feet wide and 16 feet high) that would be developed in the west pit wall. A ventilation and escape raise (i.e., inclined mine working) would also be constructed, which would consist of an 8-foot-diameter circular opening in the west wall of the open pit. The raise would connect the underground workings with the surface. Portals would be located within the lower benches of the pit wall. The portal areas would be stabilized with engineered structures, such as wire mesh and safety benches, to provide safety measures from rock rolling off pit walls. The portals would be cased in either concrete or metal structures, such as steel sets with lagging, which would be extended from the high wall by approximately 30 feet to create a safety cover for personnel and equipment entering or exiting the mine. The casing structures would include designed space for utility lines, ventilation fans, and ventilation ductwork, as necessary.



Round Mountain Expansion Project

Figure 2.4-7

Underground Mine Conceptual Surface Facilities

N

0' 100' 200' 500' Feet

Source: RMGC 2009.

04/11/09

Mining methods would include sublevel stoping (also called longhole open stoping) as well as drift-and-fill. Other mining methods may be employed as ore zone configurations and safety constraints dictate. General layouts of the proposed mining methods are illustrated in **Figures 2.4-8** and **2.4-9**.

Sublevel Stoping

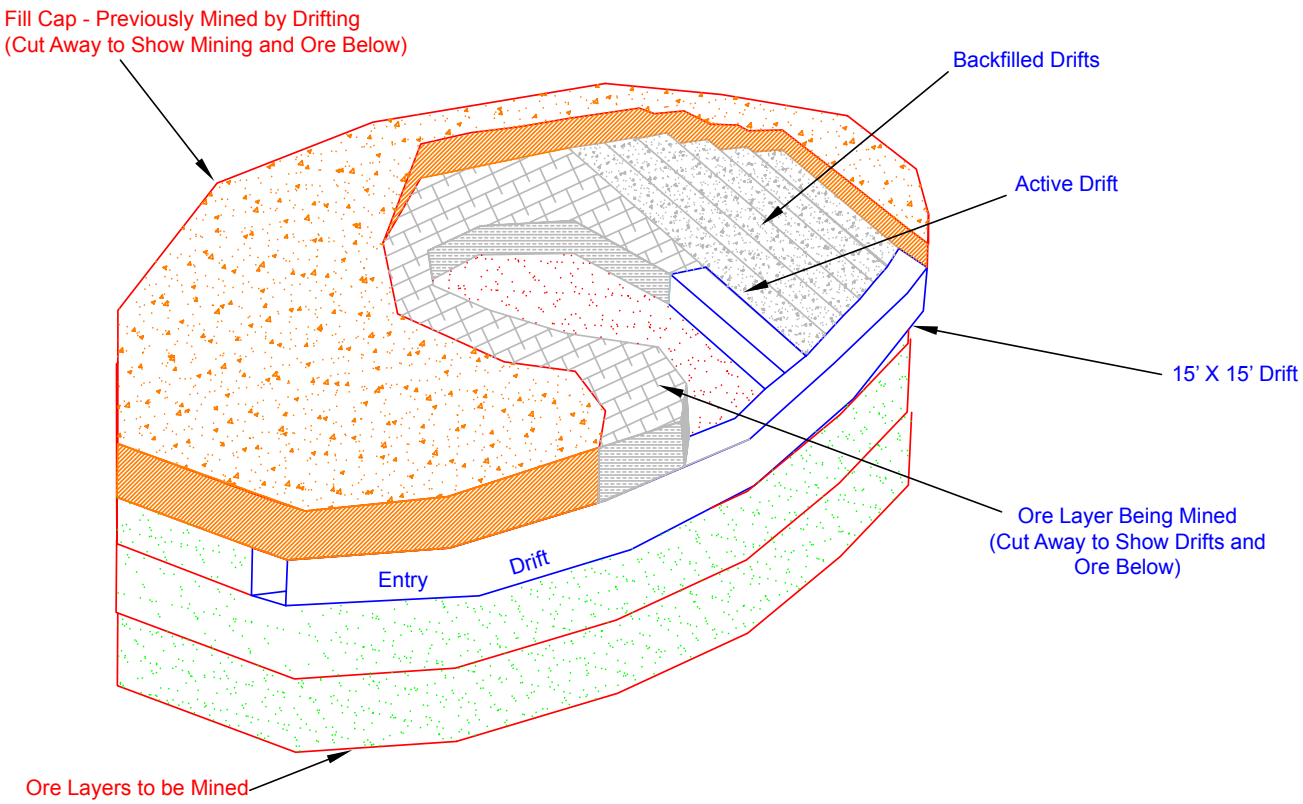
Sublevel stoping is used for mining large ore bodies that also have sufficient height, length, and ground conditions that allow large openings to exist without caving. Sublevel stoping utilizes 2 underground excavations termed sublevel drifts, which are typically 14 feet wide and 14 feet high and are separated vertically by 20 to 45 feet or more of ore. A vertical opening called a 'slot raise' is created between the sublevels and widened to the full width of the stope (i.e., slot). This is accomplished using specialized drilling that is typically completed from the upper level down to or alongside the lower level. However, this process can be reversed if conditions warrant. After drilling has been completed, blasting is completed between the levels and the ore is loaded.

Once the slot has been opened, holes are drilled in rows and are loaded with explosives. One or more rows are then blasted into the open slot. The broken rock is then removed by loaders from the lower drift. Special low profile loaders are used to remove the broken rock. Remote-controlled loaders are often used to ensure worker safety. When the drift is void of broken rock, additional rows are blasted and loaded, and the process is repeated until the stope is completely mined. Sublevel stoping is considered a bulk mining method since blastholes are used to break relatively large amounts (i.e., thousands of tons) of ore in a single blast. After a sublevel stope is mined, it is usually filled with backfill consisting of either waste rock or "cemented rock fill" (CRF) that supports the walls and prevents caving.

Drift-and-Fill Mining

Drift-and-fill mining is used where ore bodies are relatively thin, irregular, or where conditions are poor and large openings cannot be created. This method is more flexible and selective than sublevel stoping or other mining methods. Drift-and-fill mining is accomplished by creating a drift through the ore body and subsequently backfilling with CRF. A second drift can then be driven alongside the CRF and subsequently backfilled. The CRF provides structural support for adjacent drifts and worker safety. Subsequent levels would be developed above or below the first. If conditions allow, mining and filling would be completed on one level with subsequent mining and filling occurring beneath the backfilled drift.

Decline and drift dimensions would be designed to accommodate mining equipment (as listed in **Table 2.4-4**), piping, ventilation ducting, and safety considerations. The decline would extend approximately 200 to 600 feet below the end of the existing decline, which is approximately 1,500 feet below the existing pit rim. Ore headings would be approximately 15 feet wide by 15 feet high; however, dimensions may vary as determined by geotechnical and safety constraints. Ore drifts and minor secondary access openings would be reduced to 14 feet wide by 14 feet high. Proposed stope dimensions are estimated to be approximately 25 feet wide by 65 feet high by 80 feet long, but actual dimensions would vary based on ore zone geometry and geotechnical and safety constraints.



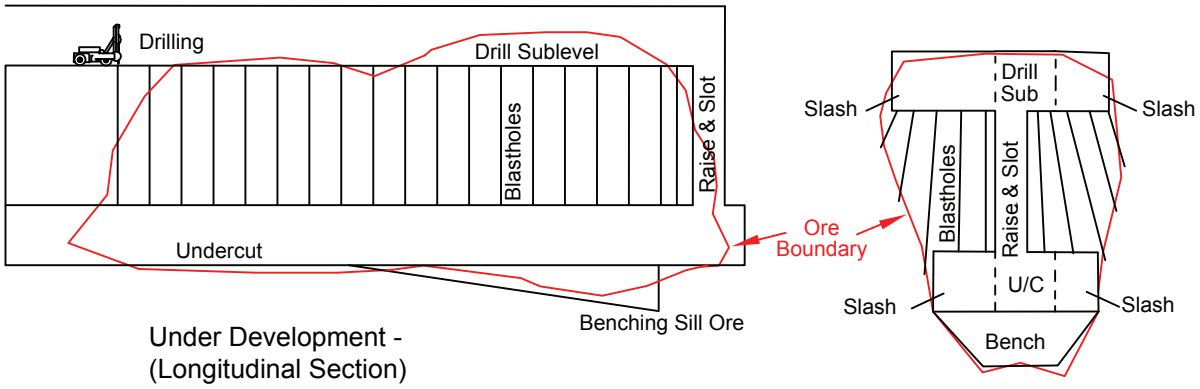
Round Mountain Expansion Project

Figure 2.4-8

Underground Mine - Drift and Fill Mining

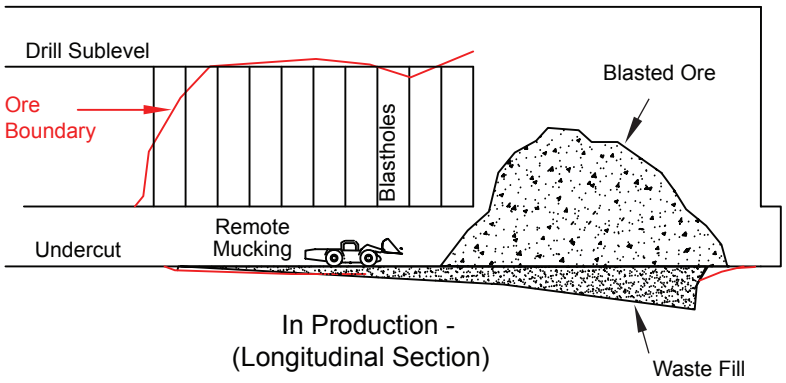
Source: RMGC 2009.

04/11/09



Under Development -
(Longitudinal Section)

(Cross-section)



In Production -
(Longitudinal Section)

Round Mountain Expansion Project

Figure 2.4-9

Underground Mine - Sublevel Stoping

Source: RMGC 2009.

04/11/09

The decline and drifts would be advanced by drilling blastholes using underground jumbo drills. The holes would be loaded with a mix of ammonium nitrate and fuel oil or other blasting agents as deemed appropriate. After blasting, the shot rock would be excavated using load-haul-dump (LHD) machines and/or underground haul trucks. Once the workings are at sufficient depths, one or more explosive day storage areas would be established.

Waste rock generated by underground mining would either be stored near the portal entrance for use in cemented backfill or taken to one of the rock disposal areas associated with the pit. Waste rock would be handled according to the existing Waste Rock Management Plan. Cemented backfill would use waste rock generated by either the underground or surface operations, and if necessary, crushed in existing crushing facilities.

Up to three ventilation and/or escape raises would be constructed to connect the underground workings with the surface. The raises would be located outside the proposed pit footprint. The specific locations of vent raises would be determined based upon orebody location and characteristics. Typically, raises would be constructed from a surface drill pad using a raise-boring machine that enlarges a small-diameter pilot drill hole to a large borehole from the bottom up. Cuttings and drill fluids from the underground workings would be removed with pumps and LHDs.

Ground control during construction of the declines, drifts, drill stations, and mining areas may consist of rock bolts, chain link fencing, shotcrete, steel sets, a combination of these support mechanisms, or other appropriate ground control methods deemed necessary for worker safety. The mining methods and/or ground control would require the use of CRF. A silo would be located within the batch plant footprint area to provide cement or flyash that would be mixed with waste rock to create CRF. Amounts of cement and/or flyash that may be needed would be dependent upon the nature of the waste rock that would be used as cemented backfill and the amount of backfill required.

Up to 60 miners and 50 maintenance and support personnel would be employed in the underground operation. Underground equipment, including pumps, ventilation fans, and electrical load centers, would be used to develop the declines and ventilation raises as well as to mine the ore deposit. Equipment would be installed underground or would be stored on the equipment-ready line located outside the portal as shown in **Figure 2.4-7**. A list of the proposed underground equipment during peak mining is shown in **Table 2.4-5**.

RMGC would provide an electric power line to the underground facilities. The power line would be constructed within the existing haul road corridors. A surface substation would be installed in the pit bottom to service both the surface and underground facilities associated with the underground operation.

Diesel fuel would be stored in a lined containment facility. Up to 10,000 gallons of diesel fuel would be stored in the fuel storage area illustrated in **Figure 2.4-7**. Storage would be provided for other oils and lubricants for routine maintenance.

Ore removed from underground operations would be stockpiled prior to being hauled to the heap or mill facilities. Ore stockpile storage locations are illustrated in **Figure 2.4-7**. Select waste rock from surface operations also may be stockpiled near the portal for use as backfill, if needed.

Table 2.4-5
List of Proposed Mobile Underground Equipment

Unit	Quantity
Jumbo drills	5
Load-haul-dump units (3- to 6-yard class)	9
Underground haul trucks (15- to 20-ton class)	3
Underground haul trucks (30-ton class)	6
Bolter	3
Scissorlift or lift trucks	5
Shotcrete spray truck	3
Shotcrete mixer truck	3
Explosives truck	2
Maintenance truck	2
Service tractors and mancarriers	6
Electric underground core drill	1
Production/RC drill	3
Handheld drills (jack-legs and stopers)	8
Underground grader	1
Pumps (main, booster, secondary, submersible)	26
Ventilation fans (main and secondary)	12
Electrical load centers	5
Surface loader (CAT 966 class)	2
Compressors (1,000 to 2,000 cubic feet per minute [cfm] class)	3

Source: RMGC 2009.

Water would be delivered to the water storage tank via the existing pit dewatering system or the underground dewatering and settling system. The water storage tank would have a holding capacity up to 30,000 gallons. Water would be piped from the water tank into the underground workings. Service water piped into the mine would be used for drilling, dust control, pump gland seal water, and for general cleanup purposes.

Water and suspended solids generated during mining development and production would be pumped from underground sumps to a series of lined basins and a transfer pumping station. The lined basins would be constructed to facilitate sediment removal (**Figure 2.4-7**). Water would be pumped to the pit dewatering pipeline, and removed sediment would be taken to a designated disposal area.

2.4.3.3 Ore and Waste Rock Management

Ore and waste rock management would be the same as described in Section 2.3.4, Waste Rock Dumps, and Section 2.3.5, Ore Processing Operations. Material mined from the Round Mountain Pit would be classified as: 1) ore, 2) waste, or 3) designated waste.

During mining operations, blasthole samples would be collected and assayed to provide ore control for ore and waste segregation. The resulting information would be used to assign material types to the blocks representing the active benches. Each block would be assigned a destination code based on classification of the material (ore, waste, or designated waste). Following assay and ore/waste designation, visual identification of designated waste would be made by site geologists and compared to the mine block model. Waste blocks from the mine model that contain designated waste lithotypes would be identified on the ore control maps and would be distinguished by ore control stakes in the pit. The tonnage of this material would be tracked by RMGC's geologists and the dispatch mine production reporting system.

Waste rock would be delivered directly to the waste rock dumps. Waste rock storage at the Round Mountain Area would be managed in accordance with the currently authorized Waste Rock Management Plan. RMGC would continue to conduct geochemical evaluations of the waste rock in accordance with this plan and applicable water pollution control permit requirements. The geochemical characterization program would provide representative information from Meteoric Water Mobility Procedure (MWMP) testing and Acid-Base Accounting (ABA) tests to evaluate the potential for acid generation and mobilization of dissolved constituents. RMGC would use these data to update the Waste Rock Management Plan, as necessary.

The waste rock lithologies with the potential to generate acid would be tracked in the mine plan. The information would be used to determine the placement of materials within the waste rock dumps in accordance with the Waste Rock Management Plan.

ROM (i.e., low grade) ore would be delivered to the dedicated pad. During waste rock placement in the waste rock dumps, lithotypes identified as designated waste are blended with other waste lithotypes and placed according to the following guidelines:

- Placed on a minimum 20-foot-thick base composed of benign waste material;
- Placed at an average of 24 feet from any final (regraded) dump face; and
- Placed to accommodate a future cover of benign waste material with a minimum thickness of 20 feet.

Reusable Pad ore would be crushed and placed on reusable leach pads. Following the initial leach cycle, the partially leached ore from the Reusable Pad would be transferred to a dedicated pad or mill. Gold particle size distribution and the oxidation state of high-grade ore determine the processing method. High-grade, coarse gold-bearing ore is either:

- Sent to the Reusable Pad for leaching followed by milling;
- Sent directly to the gravity plant with tails reporting to the mill; or
- Sent directly to the mill or mill stockpile.

2.4.3.4 Waste Rock Dumps

RMGC currently operates two waste rock dumps in the Round Mountain Area, the South Waste Rock Dump and North Waste Rock Dump. Under the Proposed Action, RMGC plans to expand the North Waste Rock Dump, as illustrated in **Figure 2.4-1**. Construction and expansion of the North Waste Rock Dump would continue using current practices as described in Section 2.3.4, Waste Rock Dumps. Typical waste rock dump design would include a height of 500 feet with a crest elevation of 6,550 feet. The proposed waste rock dumps would cover 2,489.4 acres and would result in an increased capacity of approximately 992 Mt of waste rock material. Additional design details are discussed in the following sections.

The expanded waste rock dump would be constructed by end-dumping waste material from haul trucks. The waste rock dump would be developed at overall slopes of 2.5H:1.0V to 3.0H:1.0V, and slopes would be reclaimed to an average final slope not steeper than 2.5H:1.0V. **Figure 2.4-1** illustrates the locations of the existing and proposed waste rock dumps for the Round Mountain Area, and general waste rock dump cross sections are illustrated in **Figure 2.4-10**. Based on the low precipitation rate in the study area (5 to 7 inches annually), the coarse nature of materials placed in the facilities, and the final design slopes, minimal erosion and sediment loss is anticipated from the waste rock dump. The following practices would be adopted during the waste rock dump construction in order to maintain dump integrity and stability:

- The first lift would be constructed such that a layer of coarse, free-draining material would rest on the native soils; and

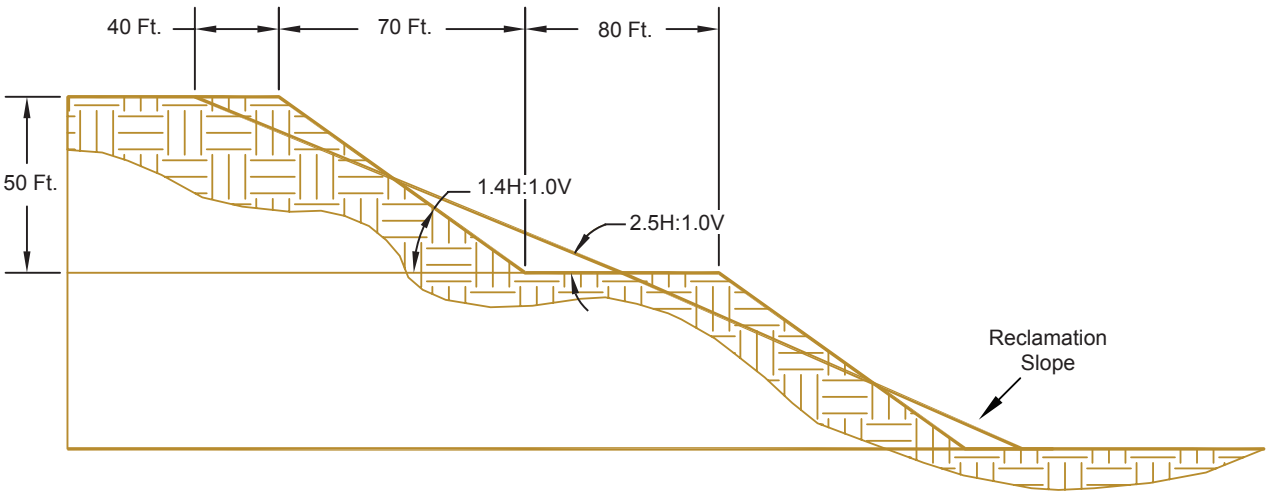
- During placement of waste and after completion, the top would be sloped to shed water to the outside of the facility in order to minimize potential to impound water.

The waste rock dumps would be built as terraced structures to facilitate recontouring and reclamation. Each terrace would be designed with lifts up to 75 feet high, where practical, with an offset for each lift to provide for overall final regrade lines. The final configuration of the waste rock dump is subject to change based on operational considerations during the life of the proposed project. Low-grade ore material may be stockpiled in selected sections of proposed or existing waste rock dumps.

Prior to constructing the North Waste Rock Dump to the final proposed configuration, the footprint would be utilized for haul roads to connect the Round Mountain Area to the Transportation/Utility Corridor and subsequently the Gold Hill Area. The actual configuration of the haul roads would vary with the mining sequence and as the waste rock dump expansion is constructed. As mining progresses, road segments would become incorporated into the waste rock dump and would be modified as necessary for material haulage efficiency.

2.4.3.5 Ore Processing Operations

Processing operations in the Round Mountain Area consist of heap leach facilities with carbon columns and ADR, and a mill facility, gravity plant, and refinery. These facilities are described in Section 2.3.5, Ore Processing Operations.



Legend

Waste Rock

Notes: H = Horizontal.
V = Vertical.
1. Lift height - varies from 25 to 75 feet (commonly 50 feet).
2. As-built bench width - 55 feet.
3. Interramp slope - 2.5H:1.0V.

Source: RMGC 2009.

Round Mountain Expansion Project

Figure 2.4-10

Typical Waste Rock Dump Cross-section with Reclamation Slope

04/27/09

In 2006, the State of Nevada promulgated Nevada Mercury Control Program (NMCP) rule (NAC 445B.3611, et seq.). The rule requires that thermal emissions units at precious metals mining operations obtain a permit from the state and, ultimately, install Nevada Maximum Achievable Control Technology (NVMACT) on each thermal emission unit that has the potential to emit mercury above a de minimis level. The rule also contains a provision providing for an early reduction credit (ERC) for operations that installed presumptive NVMACT prior to February 2008. RMGC installed deep bed, sulfur-impregnated carbon beds on both of its regulated thermal emission units and qualified for the credit. These controls would be maintained and operated in accordance with the NMCP.

Crushing and Grinding

Existing primary and secondary crushing facilities would be moved to a new location as illustrated in **Figure 2.4-1**. Crushing facilities would be similar to those described for the existing facilities (Section 2.3.5.1, Heap Leach Processing). The existing Mill Primary Crusher would remain operational.

Heap Leach Facilities

RMGC plans to construct and operate the North Dedicated Heap Leach Facility and the expansion of the West and South Dedicated Pad Heap Leach Facilities. **Figure 2.4-1** illustrates the location of the existing and proposed heap leach facilities.

The dedicated heap leach facilities would be designed to contain leach material and solution in accordance with NAC 445A.432 and 43 CFR 3809.420. The dedicated leach pads would be constructed in phases with a composite liner system that has been successfully utilized at the existing Round Mountain Mine since 1992. Section 2.3.5.1, Heap Leach Processing – Pad Construction, provides a description of the liner and operating systems. A typical heap cross-section is illustrated in **Figure 2.4-11**. Basic proposed heap design parameters are summarized in **Table 2.4-6**.

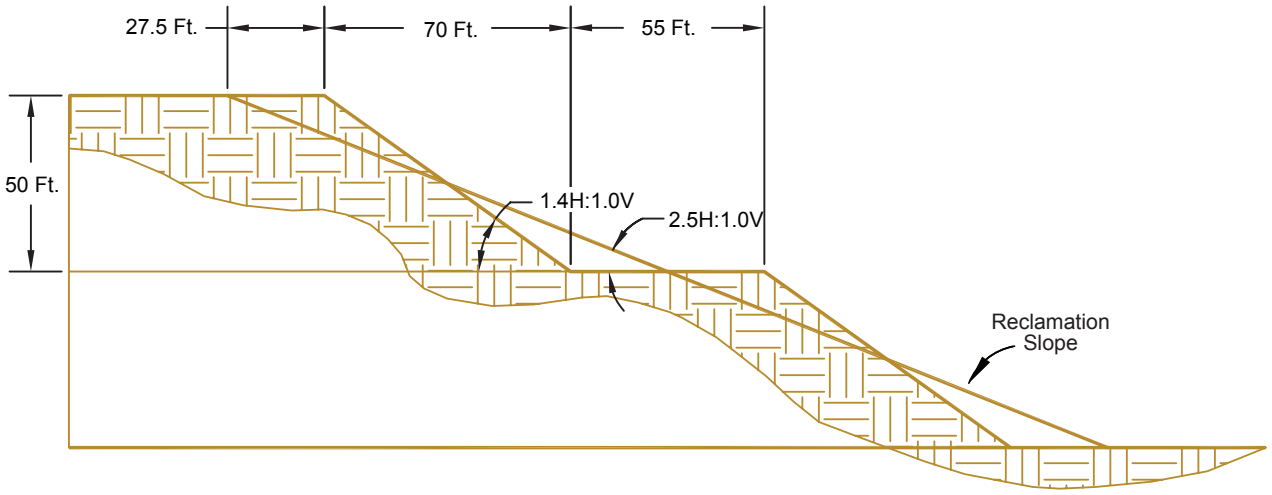
Table 2.4-6
Proposed Round Mountain Heap Design Parameters Summary

Leach Pad	Heap Height (feet)	Crest Elevation (feet)	Approximate Tons[1] (Mt)	Surface Disturbance (acres)
West Dedicated Pad	450	6,550	467.9	868.0
North Dedicated Pad	450	6,425	250.8	537.5
South Dedicated Pad	450	6,595	279.2	627.3
Reusable Pad	35	N/A	N/A	51.2

[1] Tonnage would vary based on rock density.

Source: RMGC 2009.

The authorized Reusable Pad would be expanded to the north in an area that is currently authorized and used for processing facilities (i.e., conveyors for crushed ore). In the short term, the expansion area, shown on **Figure 2.4-1**, would continue to be used for processing facilities (i.e., conveyors for crushed ore). Prior to expanding the Reusable Pad, RMGC would provide the BLM and NDEP with a revised Reusable Pad and conveyor configuration and revised design report. The Reusable Pad expansion would be constructed in accordance with NAC 445A and operated in accordance with WPCP NEV87052 issued by NDEP.



Legend

Leach Ore

Notes: H = Horizontal.
V = Vertical.
1. Lift height - 50 feet.
2. Bench width - 55 feet.
3. Interramp slope - 2.5H:1V.

Source: RMGC 2009.

Round Mountain Expansion Project

Figures 2.4-11

Typical Heap Leach Pad Cross-section with Reclamation Slope

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Process solution ponds would be double-lined with 60-mil HDPE liners and would have leak collection and recovery systems between the liners. Ponds would be designed and operated under NAC 445A.433 through 445A.435 and 43 CFR 3809.420. The design includes freeboard, the 24-hour drain down, and snowmelt events.

Process ponds containing cyanide solution that could be toxic to wildlife and/or domestic animals would be fenced and/or covered to prevent access as per appropriate Industrial Artificial Pond Permits issued by the NDOW. Floating plastic balls would continue to be used in existing and proposed process ponds, and netting would be used over process solution collection channels. In addition, as used for recently developed process solution collection channels, French drains would be installed for proposed process solution collection channels to protect wildlife and domestic animals.

Secondary containment would be constructed around tanks and recovery circuits adequate to prevent the release of process solution to the environment in the event of primary containment failure. Detailed design and quality assurance specifications would be supplied when available.

Heap leach facilities would be provided with berms or ditches to prevent stormwater run-on from entering the facilities. In addition, culverts and diversion ditches may be placed in and around the facilities as necessary for further stormwater control. Stormwater falling directly on the heap would be contained within the heap leach facility by use of berms and diversion ditches. Stormwater runoff would be conveyed to collection ponds with the use of culverts, diversion ditches, and piping, where necessary.

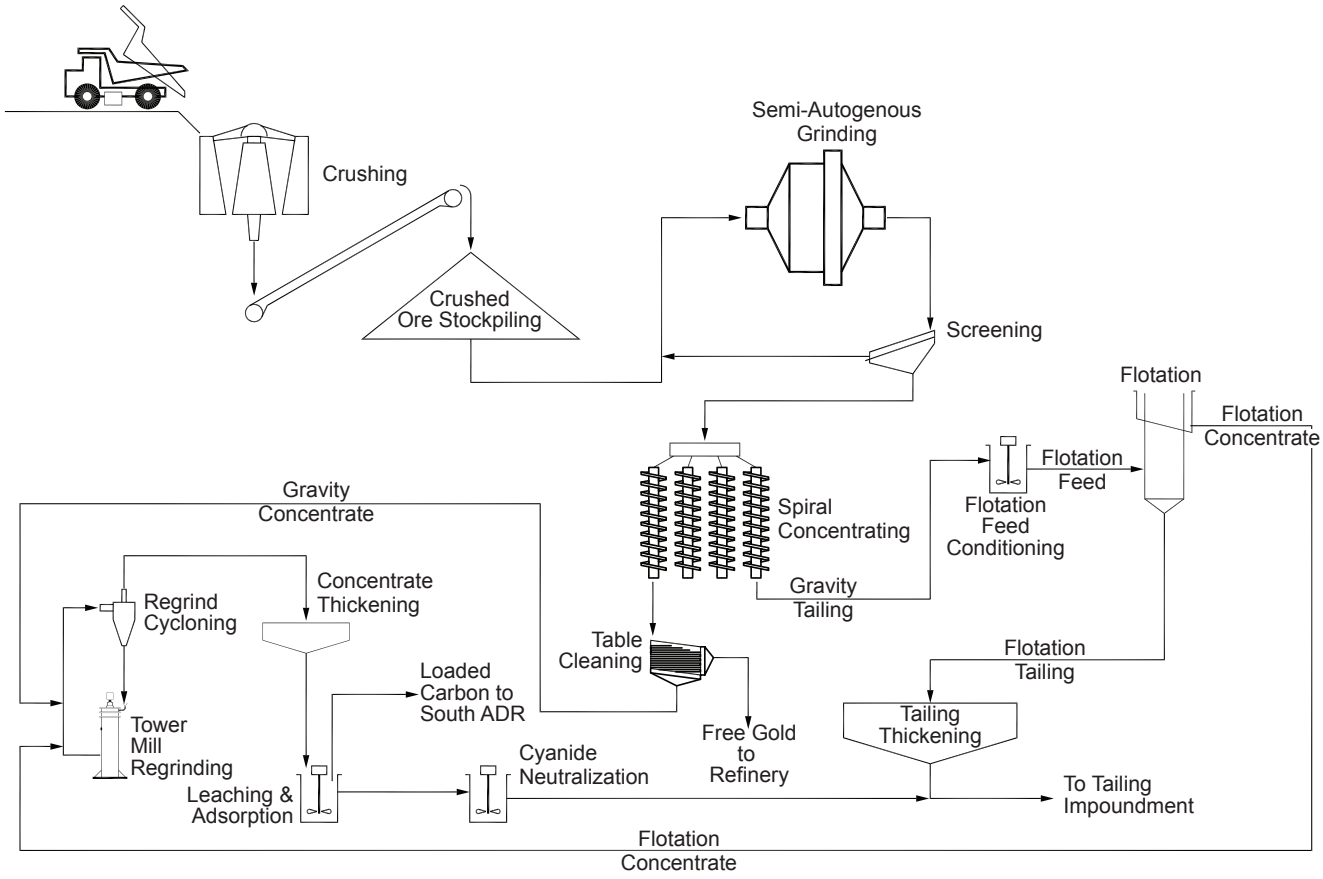
Milling and Flotation Circuit Facility

The existing milling facilities are described in detail in Section 2.3.5.2, Milling Operations. **Figure 2.4-12** illustrates the mill flow with flotation circuit facility. These facilities would be duplicated as part of the proposed project to expand the Round Mountain milling capacity to 22,000 tpd. The second mill would be built to the north of the existing mill. The new mill would include the same facilities as the existing mill including the grinding, gravity, flotation, and leach facilities.

An expanded process facilities area is proposed between the South Dedicated Leach Pad and the proposed tailings impoundment facility expansion as shown in **Figure 2.4-1**. This area would be utilized for toll-milling, for tailings processing, or to expand the on-site processing capacity. A combination of milling and processing facilities may be constructed within this area and could include, but not be limited to: gravity concentration, carbon-in-leach, flotation, an ADR plant, or a Merrill-Crowe plant. Milling and processing facilities constructed within this area are expected to be similar to the existing milling and processing facilities described in Section 2.3.5, Ore Processing Operations and Section 2.4.4.5, Ore Processing Operations. Final determination of what facilities would be constructed in this area would be dependent upon economics. Design details would be submitted to BLM and NDEP for approval prior to construction.

Tailings Impoundment Facility

The mill leach circuit and flotation circuit tailing streams would be combined and sent to the tailings impoundment facility. The amount of solids that report to the tailings impoundment facility would be up to 22,000 tpd. The current flow rate to the existing tailings impoundment facility is approximately 11,000 tpd. A



Round Mountain Expansion Project

Figure 2.4-12

Existing Mill Flow Sheet with Flotation

Source: RMGC 2009.

04/12/09

cyanide destruction circuit using copper sulfate and ammonium bisulfite would be utilized to ensure that the WAD cyanide concentration in the final tailings slurry is safe for wildlife.

The tailings expansion would include the addition of up to three cells, one of which is currently authorized, adjacent to the southern perimeter of the existing impoundment. Each cell would occupy approximately 360 acres and be constructed to an approximate height of 215 feet. The cells would be constructed sequentially from north to south.

The design of the cells would be consistent with the design of the existing tailings impoundment facility described in Section 2.3.5.3, Tailings Impoundment Facility, or the cells would be constructed as conventional tailings impoundment facilities depending on changes in material characteristics as mining progresses. The tailings impoundment facilities would be designed and operated in accordance with NAC 445A. A perimeter earthen embankment would form the starter impoundment. A filter layer would be placed between the embankment and the tailings, and the tailings area would drain through the filter and embankment into a lined collection channel that drains to the existing lined ponds. **Figure 2.4-13** presents a typical dam cross-section.

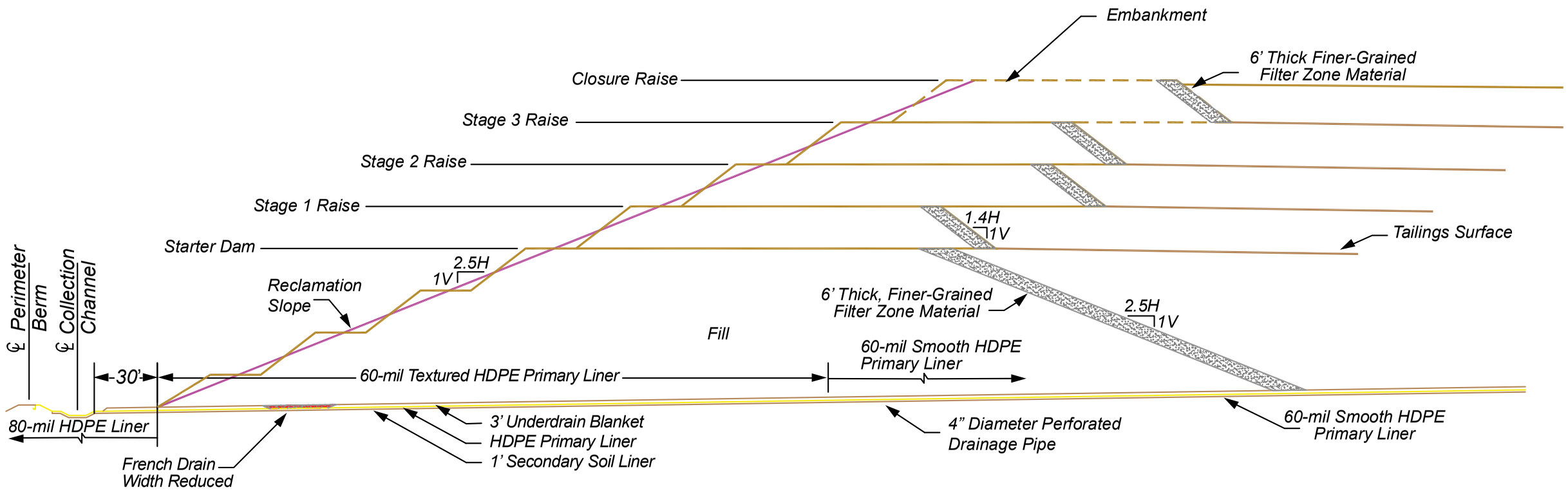
The existing lined ponds consist of a sediment pond, two reclaim solution ponds, and an event pond. An additional lined sediment pond would be constructed adjacent to the first expansion cell to supplement the sediment and solution storage volume of the existing ponds.

Each new tailings cell would store approximately 45 Mt of tailings and provide approximately 4.5 years of operational capacity. The cells would be operated as managed thin layer deposition facilities to maximize tailings density and drainage of the supernatant. Deposition of tailings would occur from multiple spigot points around the cell perimeter. Pump and pipeline facilities would be used to recycle water from the supernatant pool and external lined ponds. Pipelines that exit lined containment would be sleeved for secondary containment purposes and aligned on a positive grade that allows drainage into lined containment.

Cell construction would be phased. Initial construction of each cell is likely to involve completion of sufficient capacity for 2 years of production with subsequent phases completed approximately on an annual basis. Scheduled mine waste material may be utilized to create the phased embankment raises to allow more continuous construction and a beneficial use for the waste rock. Such waste rock would be selectively chosen for suitability based on geochemical and geotechnical characteristics. Upstream embankment construction methods are envisioned for the phased raising of the perimeter embankment.

The existing lined solution collection channel would be extended to the south along the west perimeter of the proposed cells to continue to serve as the primary solution management facility throughout the life of the expansions. The channel would connect the existing ponds with the proposed sediment pond located at the northwest corner of expansion Cell B. The channel would extend from this proposed sediment pond along the west toe of the downgradient perimeter embankment of all three proposed tailings cells. The details of the proposed channel segment would be consistent with that of the existing channel segment.

The existing up-gradient stormwater diversion channel would be extended southward in a phased manner to bypass the area occupied by each cell as they are constructed. The details of the diversion channel would be consistent with the existing diversion channel segment.



Notes: H = Horizontal.
V = Vertical.
1. Total height varies from 120 to 200 feet.
2. Individual lift heights vary from 20 to 30 feet.
3. Number of raises will vary.

Source: RMGC 2009.

Round Mountain Expansion Project

Figure 2.4-13

Typical Tailings Dam Cross-section with Reclamation Slope

2.4.3.6 Access and Haul Roads

RMGC would construct haul roads as part of the proposed activities. These haul roads would connect the Round Mountain Pit with the leach facilities, waste rock dumps, crushers, and ancillary facilities. **Figure 2.4-5** presents a typical in-pit haul road cross section, and **Figure 2.4-6** presents a typical out-of-pit road cross-section. The haul roads would be about 90 to 140 feet in width to accommodate 2-way traffic. Secondary roads would be about 20 feet wide to accommodate smaller service vehicles and pickups. Typical haulage road construction would include cut/fill construction utilizing earthmoving equipment maintained by RMGC. The berm heights would be at least one-half the wheel height of the largest vehicle that would use the roads. Haul roads to the Transportation/Utility Corridor to access the Gold Hill Area would be managed as to optimize haulage efficiency based on ground conditions and reduce fuel consumption and fugitive dust. Haul and secondary roads would be maintained on a regular basis. Water and/or magnesium chloride or similar dust suppressant would be used to control fugitive dust.

Stormwater and erosion control features would be developed as necessary utilizing BMPs. Culverts would be installed as necessary to allow stormwater and natural drainages to flow. Sediment control devices would be located where necessary according to field conditions.

2.4.3.7 Ancillary and Support Facilities

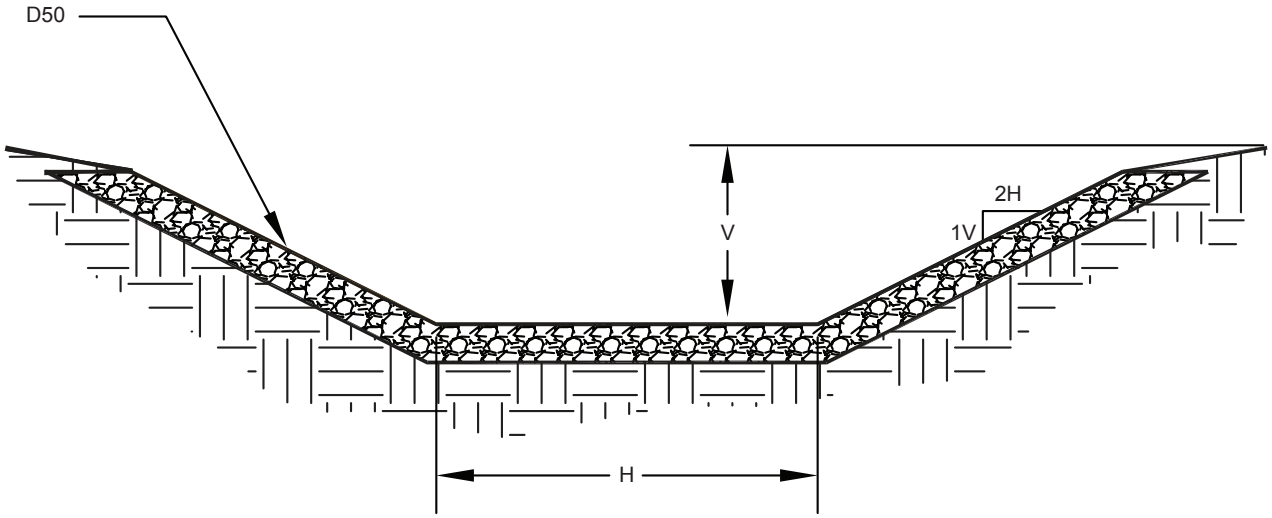
Stormwater Controls and Diversions

Stormwater run-on would be diverted around the proposed process facilities and returned to natural drainages, where practical. In those limited cases where topography (i.e., ridges) prevents the construction of ditches that would return flow to natural drainages, stormwater run-on may be impounded or temporarily pumped and diverted. The run-on diversions would be designed to accommodate the 100-year, 24-hour storm event for process facilities where needed. Stormwater runoff would be collected in ponds and then evaporated or used in process or mining activities, where practical. **Figure 2.4-14** illustrates a typical diversion cross-section.

Dewatering and Water Disposal

In the Round Mountain Mine, pit dewatering would be achieved using dewatering wells. The pit dewatering water would be pumped to temporary storage areas and would be utilized throughout the property for processing and dust control. Water exceeding the volumes required for these uses would be discharged to the existing RIB system.

The existing Round Mountain Mine is currently dewatering from wells located within and outside of the pit and is authorized to dewater up to 6,200 gpm. The combined surface and underground dewatering rate would be approximately 7,525 gpm. RMGC is currently authorized by NDEP Permit to Discharge NEV91030 to discharge excess water to a RIB system located in the valley west of the mine site. The permit authorizes infiltration of up to 3,400 gpm on an average annual basis. Accounting for process uses in heap leach, mill, and dust control, RMGC anticipates that this level of infiltration would be adequate through the projected life of the mine.



Legend

Rip Rap

Native Material

Notes: H = Horizontal.
V = Vertical.
1. D50 to be sized for channel slope and calculated velocity.
2. Actual dimensions would be sized to accommodate calculated drainage basin.

Source: RMGC 2009.

Round Mountain Expansion Project

Figure 2.4-14

Typical Cross-section of Stormwater Diversion Channel

04/12/09

Water Supply

No new water supply wells would be required for the proposed project. Water for the proposed project would be provided by the existing production wells and additional dewatering wells.

Growth Media Stockpile Areas

Suitable growth media would be salvaged and stockpiled during the expansion of the existing pit, waste rock dump, new leach pads, and tailings impoundment facility. Following stripping, soil would be stockpiled adjacent to the proposed disturbance areas. Diversion channels and/or berms would be constructed around the stockpiles as needed to prevent erosion from overland runoff.

Electric Power

Power would continue to be supplied via the existing NVEnergy 230-kV power line. Approximately 15,000 feet of the 230-kV power line would be realigned to accommodate the North Leach Pad and approximately 15,500 feet would be realigned to accommodate Tailings Cells C and D as illustrated on **Figure 2.4-1**. A 24.9-kV, 7,200-foot-long spur line would be constructed from the existing substation to the North Leach Pad process facilities. A 24.9–kV, 20,000-foot-long power line would be constructed and appended to an existing power line in the Round Mountain Area to service the Gold Hill Area. The power line would be constructed, owned, and maintained by RMGC. No new substations are planned, but a new transformer would be installed near the North Leach Pad process facilities. Power lines would be extended from the existing power grid to the proposed expansion areas associated with the North Heap Leach Pad and Tailings Impoundment.

Yards

New yards would be established for the West and North Leach facilities and the mill expansion.

Security and Fencing

A 4-strand barbed wire range fence, with a smooth bottom strand (a minimum of 18 inches above the ground), would be installed in areas where the proposed project perimeter would be expanded. In accordance with NDOW specifications, an 8-foot-high chain-link fence would be constructed around process ponds to minimize exposure of wildlife to process solutions.

To protect public safety, RMGC maintains strict security measures to prevent unauthorized access to the Round Mountain Mine by the public. Visitors are required to check in at the security building located at the main gate. Security measures would remain in place until operations have been completed and safety hazards have been removed or mitigated.

Chemical Use, Storage, and Transportation

The existing fueling and bulk chemical storage facilities in the Round Mountain Area would continue to be used as previously authorized. Additional chemical storage associated with expanded process facilities would be constructed with primary and secondary containment that would prevent the release of chemicals to the environment in the event of primary containment failure. Secondary containment would be designed

to contain 110 percent of the capacity of the largest tank. Detailed design and quality assurance specifications would be supplied in applications for the appropriate permits.

Reagents required for the proposed project would be the same as those currently in use, including: lime; sodium cyanide; sodium hydroxide; ammonium nitrate (for explosives); calcium hypochlorite (for cyanide neutralization); activated carbon; refining flux (including sodium borate, silica, sodium nitrate, fluorspar, and sodium carbonate); flotation reagent (frother and collector) and anti-scalant. Transportation of chemicals would continue to be handled by properly licensed carriers in properly placarded vehicles. **Table 2.4-7** presents a summary of the products presently in use and which would continue to be used in the Round Mountain Area.

Table 2.4-7
Summary of Bulk Products Used in the Round Mountain Area[1]

Reagent	Storage Volume	Annual Usage	Storage Method/Locations	Reportable Quantities (40 CFR 302.4)
Sodium cyanide (NaCN) solution	15,064 gallons	3,578,800 gallons	Existing storage and 4 new tanks	10 pounds cyanide (CN)
Lime	820 tons	96,000 tons	Existing storage and 2 new silos	-
Anti-scalant	28,500 gallons	62,100 gallons	Existing storage and 4 new tanks	-
Ammonium bisulfite	468,000 pounds	600,000 pounds	Double existing capacity	5,000 pounds
Copper sulfate	12,000 pounds	45,000 pounds	Double existing capacity	10 pounds
Nitric acid	5,300 gallons	50,000 gallons	Existing storage	1,000 pounds
Sodium hydroxide	7,500 gallons	525,000 gallons	Existing storage	1,000 pounds
Ammonium nitrate	1,500,000 pounds	15,844,000 pounds	Existing storage	-
Ammonium nitrate emulsion	300,000 pounds	45,000 pounds	Existing storage	-
Flotation reagents	12,000 gallons	86,000 gallons	Existing storage	-
Diesel	412,000 gallons	10,650,000 gallons	Existing storage	-
Unleaded gasoline	15,000 gallons	150,000 gallons	Existing storage	-
Antifreeze	17,000 gallons	28,000 gallons	Existing storage	5,000 pounds
Lube oils	102,000 gallons	190,000 gallons	Existing storage	-
Propane	132,000 gallons	105,180,000 gallons	Existing storage and 4 new tanks	-

[1] The list of bulk products is not all inclusive and additional products may be used in the Round Mountain Area.
Source: RMGC 2009.

All liquid reagents including sodium cyanide, antiscalant, sodium hydroxide, and nitric acid would be trucked to the site and stored in existing specially designed and constructed containers located within existing

concrete and concrete-bermed areas. These bermed areas were designed to contain 110 percent of the capacity of the storage tank or tanks in series within the berm. With the exception of the acid storage area, bermed storage areas were designed to drain into the process solution pond. Solid reagents such as pebble lime, cement, flocculent, and caustic soda beads would be hauled to the site and stored in existing flow bins or silos specifically designed for these materials. Lime storage also would be provided by new lime silos that would be located alongside the haul roads near the leach pads. All reagents would be stored in a manner that would reduce the possibility of intermixing and uncontrolled chemical reactions. Reagent storage and cleanup procedures are presented in the mine's existing Spill Response Contingency Plan. The use and storage of key bulk products are summarized in **Table 2.4-7**.

Fuel (i.e., gasoline, diesel fuel, and propane), antifreeze, petroleum oils, and solvents would be delivered to the mine in tanker trucks for transfer to existing and proposed additional storage tanks. As a BMP, RMGC currently provides secondary containment for 110 percent of the capacity of the largest tank in the event of a spill or tank rupture. RMGC's existing Spill Response Contingency Plan would be implemented in the event of a spill or release of petroleum products.

Explosive materials that would be transported to the site include blasting agents and initiation devices. Blasting agents would be composed primarily of ammonium nitrate. The ammonium nitrate would be stored in appropriate storage containers separate from the explosive magazine. Blasting initiation devices would be stored in the existing prefabricated magazines in conformance with the ATF, MSHA, and applicable state and local regulations.

Hazardous and Solid Waste Management

RMGC is classified as a large quantity generator of hazardous waste for purposes of RCRA. The primary sources of hazardous waste are cupels, crucibles, and slag generated at the Assay Laboratory. These wastes are stored on site prior to shipment in approved containers located in storage facilities that comply with RCRA regulations. Hazardous waste is transported in USDOT-approved containers to permitted hazardous waste treatment, storage, and disposal facilities.

RMGC would continue to operate the existing on-site waivered Class III landfills to dispose of non-hazardous solid waste. A waivered Class III landfill permit would be obtained from the NDEP Bureau of Waste Management for new landfills.

Petroleum-contaminated wash water from equipment washing activities would continue to be collected in existing concrete sumps that drain the reinforced concrete floor of the existing wash facility. An oil skimmer and/or oil/water separator would continue to be utilized as an oil/water separator. Water recovered from the skimmer would continue to be: 1) recycled for wash water, dust control, or process water; 2) allowed to evaporate; or 3) disposed of in accordance with all appropriate Federal and state regulations. Wastes containing oil (i.e., sump separation and oil absorbents) would be disposed of in accordance with all appropriate Federal and state regulations. Round Mountain currently generates about 210,000 gallons of used motor oil per year. Used oil not utilized for ANFO blasting agents would be shipped off-site for reuse, recycling, or disposal in accordance with applicable state and Federal regulations.

The existing laboratory facility is equipped to perform daily analyses of pit and process samples, screen analyses, and environmental analyses for solids and liquids. Laboratory wastes would continue to be

collected and either recycled in the process circuit, neutralized, or disposed of off-site in an approved depository in accordance with all appropriate Federal and state regulations.

Petroleum-contaminated Soil Management

RMGC is currently preparing a Petroleum-contaminated Soils Management Plan in accordance with recent NDEP final guidance. In the interim, the existing authorized facilities would continue to be used. After authorization, petroleum-contaminated soils would be managed in accordance with the plan. RMGC also may elect to transport petroleum-contaminated soils off-site to an approved disposal facility.

2.4.3.8 Exploration

Exploration activities would include building drill roads, constructing drill sites, and drilling exploration holes similar to existing authorized activities. Proposed activities within the Round Mountain Area would include approximately 0.55 mile of new drill roads (approximately 12 feet wide) and about 422 drill sites (approximately 40 feet wide and 60 feet long) for total exploration disturbance of about 24 acres.

The majority of the proposed exploration disturbance would be located within the footprints of other existing or proposed facilities, such as the pit, waste rock dumps, leach pads, and tailings impoundment facilities. Exploration disturbance located outside of other existing or proposed facilities would include the development of 8 drill sites for new surface disturbance of approximately 0.5 acre as shown in **Table 2.4-1**. It is anticipated that no new roads would be developed to access these 8 new drill sites.

The exploration program would consist of drilling exploration holes using a truck or track-mounted drill. Exploration drill holes would average up to 1,000 feet deep, with a maximum depth of 1,500 feet. Drill holes would generally be vertical; however, in areas where initial drilling indicates the need for additional geotechnical or metallurgical information, angle holes may be drilled.

Water and non-toxic drilling fluids would be utilized as necessary during drilling. Water would be obtained from the Round Mountain Area. Sediment traps (sumps) would be constructed at each drill site to collect drill cuttings and to manage drill hole water. The sediment traps would be constructed within the 40-foot-wide by 60-foot-long drill site disturbance area associated with each drill site.

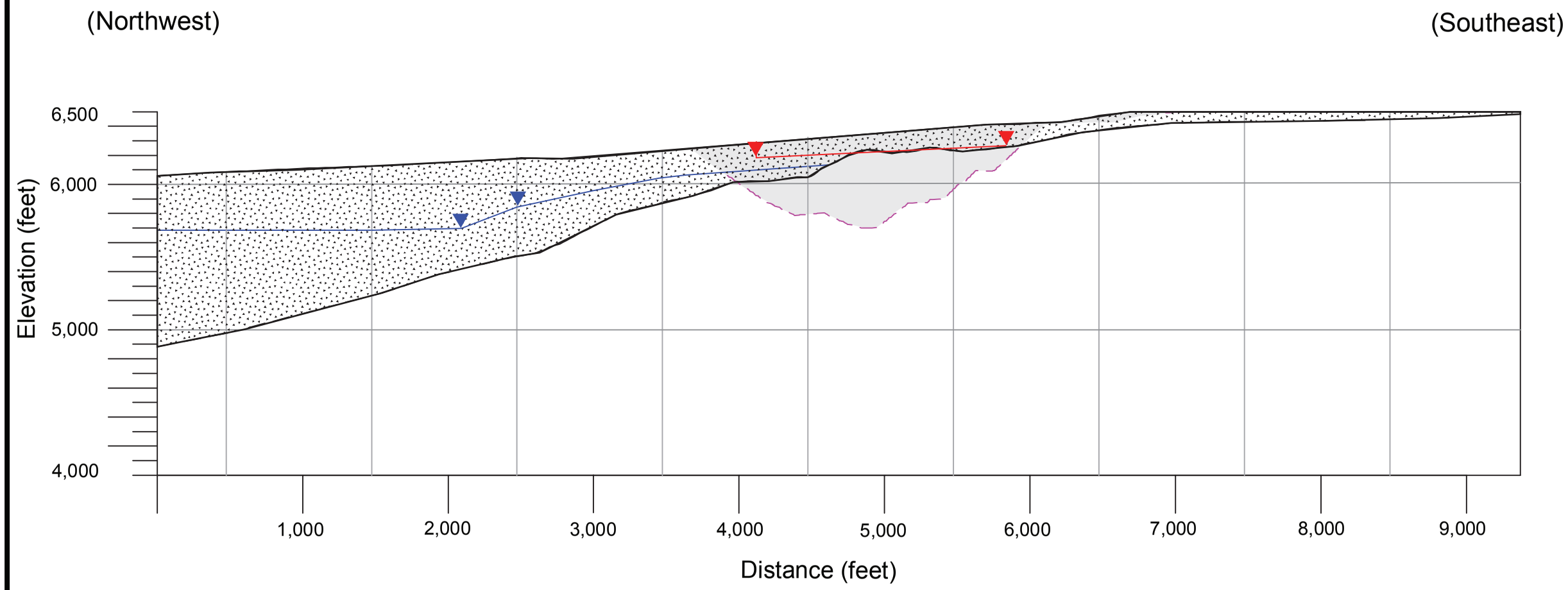
Standard drill rig crews generally would consist of a drill operator and one or two additional workers.

2.4.4 Gold Hill Area

2.4.4.1 Open Pit

The proposed open-pit design, construction, and operation in the Gold Hill Area would be similar to the existing operations at the Round Mountain Mine, as detailed below. **Figure 2.4-15** presents a cross-section of the Gold Hill Pit. Pit design parameters would include:

- Side slopes – 40 to 50 degrees;
- Pit bottom elevation – 5,675 feet;
- Approximate dimensions – 3,500 feet by 5,100 feet;



Legend

- Proposed Pit Configuration
- Alluvium
- Bedrock
- Alluvial Water Level
- Bedrock Water Level

cross-section.

Note: See Figure 2.3-23 for location of

Topographic and water elevations

Vertical Datum plus 74.18 feet.

Source: RMGC 2009.

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Figure 2.4-15

Gold Hill Pit
Cross-section

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- Approximate depth – 900 feet; and
- Footprint – approximately 222 acres.

RGMC would operate the Gold Hill Pit as a conventional open-pit mine. The mining would be conducted on 35-foot benches and supported by the same type of equipment fleet that is presently used at the existing Round Mountain Mine. Mining would be conducted on both single and double bench configurations. Bench face angles and bench width would vary with rock type and pit orientation. RMGC would continue with regular pit slope stability reviews based on changes in slope conditions. Haul roads would be designed for a maximum grade between 10 and 11 percent with widths designed at 90 to 140 feet for 2-lane traffic. **Figure 2.4-5** presents a typical in-pit haul road cross-section, and **Figure 2.4-6** presents a typical out-of-pit haul road cross-section.

The Gold Hill Pit design criteria would include bench face angles of approximately 63 degrees, haul roads 90 to 140 feet wide, a 12.5-foot catch bench, and 35-foot benches. Operation of the pit would be similar to that of the Round Mountain Pit as described in Section 2.4.3.1, Open Pit. Mining would utilize electric or hydraulic shovels and front-end loaders paired with 150-, 190-, and 240-ton class haul trucks.

Operational open-pit slope configurations for the pit would be controlled by several parameters that include the geometry of the ore body, geologic and geotechnical characteristics of the host rock, equipment constraints, and safe operating practices. Geotechnical and slope movement monitoring studies would be used to evaluate the safety of open-pit slopes. Blasting practices would be the same as described for the Round Mountain Mine.

A pit lake would form following the completion of mining activities. Section 4.3, Water Quality and Quantity (Surface and Ground) and Water Use, provides detailed information regarding pit lake formation.

2.4.4.2 Ore and Waste Management

Blasthole samples from the Gold Hill Pit would be collected and assayed to provide control for ore and waste segregation. As with the Round Mountain operations, material mined from the Gold Hill Pit would be classified as 1) ore, 2) waste, or 3) designated waste. Waste material would be transported via truck directly to the West and North Waste Rock Dumps for disposal. Based upon the results of the assays, the ore would be segregated and transported either to the dedicated ROM heap leach pad adjacent to the Gold Hill Pit or hauled to the Round Mountain Area for crushing, followed by leaching or milling.

The management of the designated waste at Gold Hill would be similar to the management of designated waste at the Round Mountain Mine, where potentially reactive waste rock is encapsulated within the interior of the dumps and non-designated waste from the pit is placed in the final waste rock dump surfaces. The Gold Hill Area has been incorporated into the Waste Rock Management Plan.

2.4.4.3 Waste Rock Dumps

RMGC proposes two waste rock dumps at the Gold Hill Area: the West and North Waste Rock Dumps. Low-grade material may be stockpiled in selected sections of proposed or existing waste rock dumps. The anticipated capacity, height, and crest elevation for each waste rock dump is provided in **Table 2.4-8**.

Table 2.4-8
Proposed Gold Hill Waste Rock Dump Design Parameters Summary

Gold Hill Waste Rock Dumps	Height (feet)	Crest Elevation (feet)	Capacity (Mt)	Footprint (acres)
West Waste Rock Dump	200	6,175	135	500.6
North Waste Rock Dump	175	6,500	9	51.6

Source: RMGC 2009.

2.4.4.4 Waste Rock Management

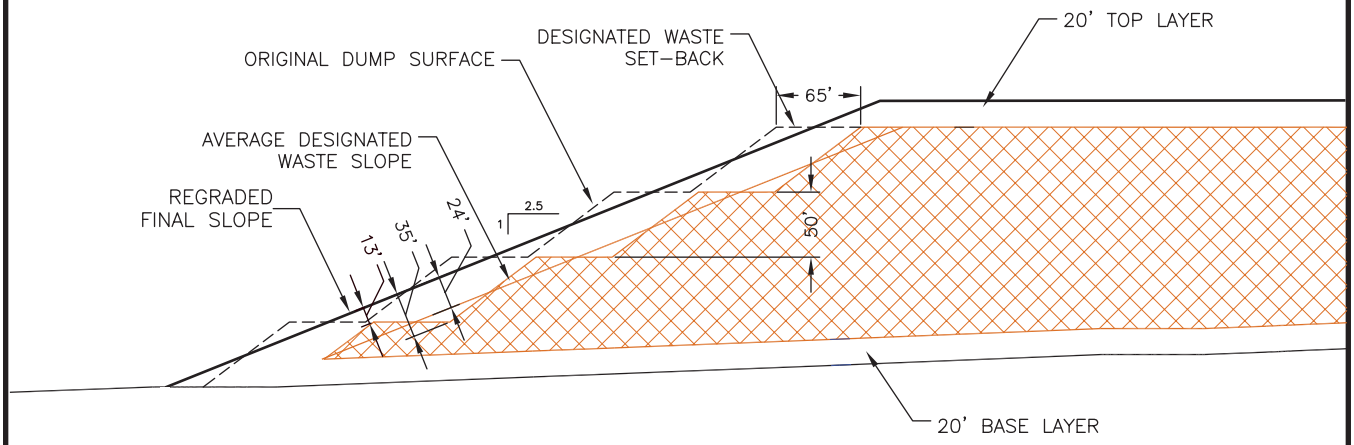
The two waste rock dumps required to handle the waste rock expected to be generated by the proposed Gold Hill Mine would be designed in a manner similar to the existing waste rock dumps at the Round Mountain Mine (see Section 2.3.4, Waste Rock Dumps). The designated waste rock (PAG waste rock) would be encapsulated within the waste rock dumps by a cover of non-designated material that is 20-feet in thickness and a base of non-designated material that is also 20-feet in thickness. The outer slopes of the waste rock dumps would have an average of 24 feet of non-designated cover over the designated waste rock. Approximately 70 Mt of designated waste rock would be encapsulated by 42 Mt of alluvial material (SRK 2009a). **Figure 2.4-16** illustrates a general cross-section view of waste rock dumps at Gold Hill and the placement of PAG material and cover material within the waste rock dumps.

Infiltration modeling by SRK (2009a) has indicated that the 20-foot alluvial cover proposed for the Gold Hill waste rock dumps should be sufficient to prevent infiltration of precipitation under the most probable range of precipitation events. However, this infiltration model has not been field-tested for adequate calibration. Therefore, a field infiltration test of the proposed alluvial cover for the Gold Hill waste rock dumps would be conducted to determine sufficient cover depth to prevent precipitation from contacting designated (PAG) waste rock in the interior of the Gold Hill waste rock dumps. A field pilot test of infiltration into the proposed alluvial cover for the waste rock dumps would be conducted over a period of 5 years prior to the end of mining. This field pilot test is described in Section 4.3.1.2, Gold Hill Area.

2.4.4.5 Ore Processing Operations

The majority of Gold Hill ore would be processed on-site using a newly constructed Dedicated Heap Leach Pad and an onsite precious metal recovery circuit. Depending upon grade and metallurgical characteristics, some ore may be hauled to the Round Mountain Area for processing. To recover the precious metal from the Gold Hill Dedicated Leach Pad, conventional cyanide leaching followed by Merrill-Crowe zinc precipitation processing would be utilized. **Figure 2.4-17** illustrates the Gold Hill Heap Leach and Merrill Crowe zinc precipitation flow diagram.

The State of Nevada has recently adopted rules requiring the control of mercury emissions (Section 2.4.3.6, Ore Processing Operations). Since Gold Hill ores have higher mercury content than Round Mountain ores, the control of mercury for the proposed project would include a retort, air emission controls and possibly the use of mercury inhibiting chemicals, as required by the NMCP (NAC 445B.3611, et seq). The necessary controls would be installed in the Gold Hill process plant and refinery. Mercury recovered from the process



Legend

Designated Waste Rock

Non-designated Waste Rock and Alluvium

Source: SRK 2009a.

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Figure 2.4-16

Gold Hill
Waste Rock Dumps
Schematic Cross-section
Showing Encapsulation
of Designated Waste

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would be collected and managed as product. Based on metallurgical testing, the Gold Hill Area is expected to produce more than 1 ounce of mercury, as a product, for each ounce of gold produced. Transportation of product mercury would occur in accordance with applicable regulations.

Heap Leach Facilities

Blasted, uncrushed oxide and sulfide ore (i.e., greater than 0.25 percent sulfur) from the open pit would be hauled by truck to the heap leach pad. Sulfide designation includes ore that has been partially oxidized but still contains sulfides. Enough oxidation has occurred in this ore to make gold recovery acceptable. In addition, unoxidized higher grade sulfide ore can be leached at lower recoveries because of this higher gold content. As each leach pad cell is loaded, leach solution pipelines would be placed across and down the sides of the heap. A dilute solution of sodium cyanide would be applied to the ore using drip emitters at a nominal rate up to 0.005 gpm per square foot. Depending on the nature of the ore, leach solution would contain approximately 100 to 300 parts per million (ppm) of dissolved sodium cyanide per ton of solution at an appropriate pH. To maintain the proper pH, lime would be added to the ore. Supplemental lime to augment pH may be added via a milk-of-lime slaking and distribution system.

Gold, silver, and mercury would form cyanide complexes that dissolve into the leach solution as it percolates through the heap. The resulting pregnant solution would flow downgradient along the pad liner and gather in solution collection ditches located along the leach pad edges. Pregnant solution from the leach pad would be routed via a piping system directly to the process plant or to a process pond for temporary storage. Total solution application rate to all leach pad phases would be approximately 8,000 to 10,000 gpm.

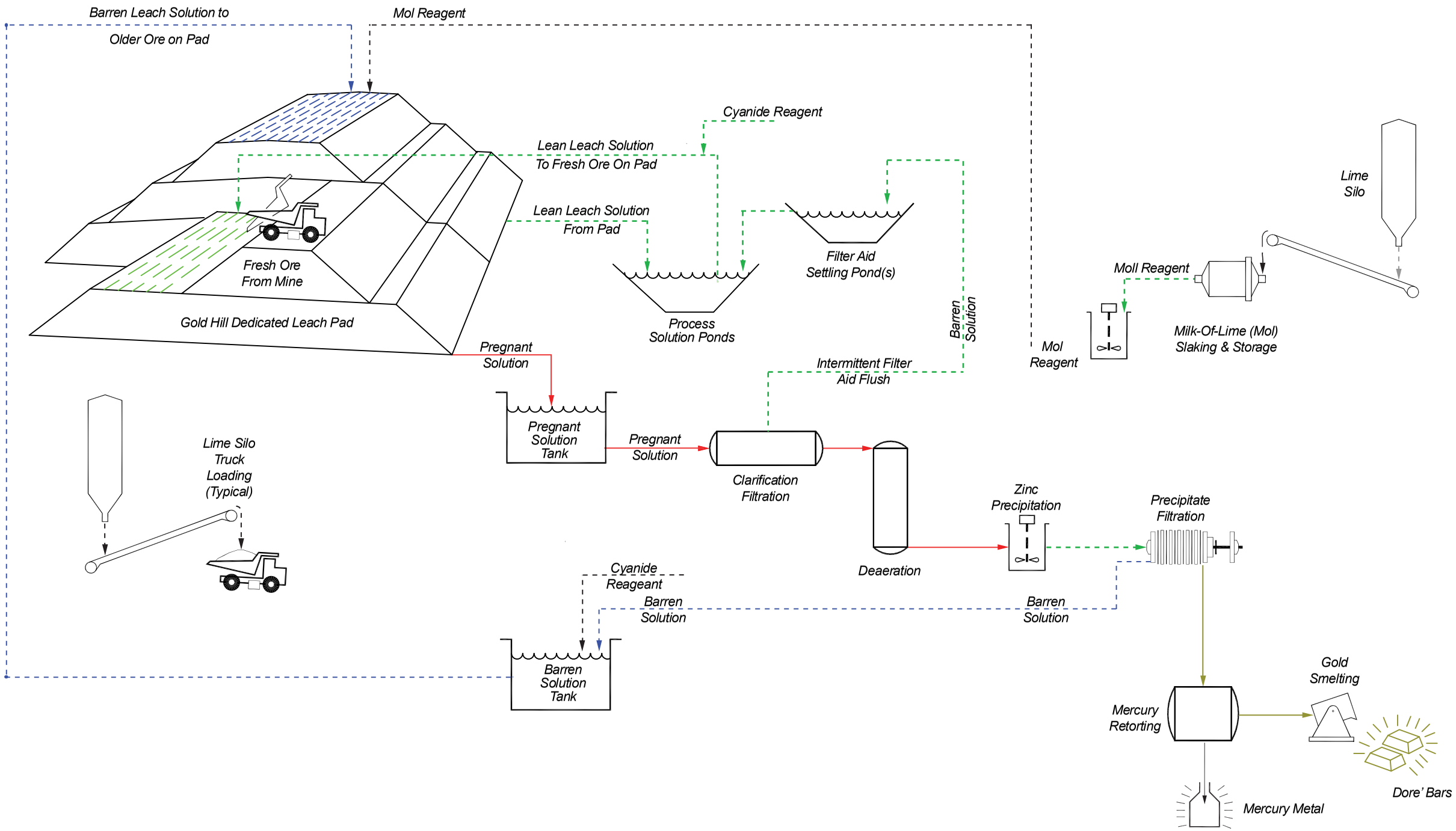
The Gold Hill heap and pond designs, solution collection system, leak detection/collection system, and operating parameters would be similar to the Round Mountain heaps, as described in Section 2.3.5, Ore Processing Operations. The lime silos and lime slaker would be located adjacent to the leach pad.

Secondary containment would be constructed around tanks and recovery circuits adequate to prevent the release of process solution to the environment in the event of primary containment failure. Detailed design and quality assurance specifications would be supplied when available.

The leach pad would cover approximately 300 acres and the crest would be at approximately 6,325 feet in elevation. The proposed heap height would be 200 feet. The heap would have the capacity to contain approximately 48 Mt. Process and event ponds for each phase would be sized to accommodate freeboard; the 24-hour drain down; power outages; snowmelt events; and the precipitation from the local 100-year, 24-hour storm event, in addition to the maximum process solution inventory.

Merrill-Crowe Precipitation Processing

For conventional Merrill-Crowe zinc precipitation processing, the pregnant solution would be pumped through clarification filters to remove suspended solids that would interfere in the precipitation process. Filtered solids and associated filter aid (i.e., diatomaceous earth and/or cellulose) would periodically be flushed from the filtration units into a lined settling pond. Solids would settle to the bottom, and the clear solution would be recycled back to the process for recovery of the contained precious metals. Prior to precipitation, the clarified pregnant solution would be de-aerated to remove oxygen. Zinc metal powder and lead nitrate would then be added to the de-aerated solution to precipitate the dissolved metals. The precipitate would then be filtered from the barren solution to form a filter cake. After returning the cyanide



Legend

- Pregnant solution
- Lean solution
- Barren solution
- Metal
- Reagent

Source: RMGC 2009.

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Figure 2.4-17

Gold Hill Leach and Merrill-Crowe Processing

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concentration to the desired level, the barren solution would be recycled back to the leach pads. The precipitate filter cake would be retorted to remove mercury. The retort product would then be smelted into doré in an onsite refinery. Mercury inhibitor reagents may be added to limit the dissolution of mercury. The Merrill-Crowe plant would include a mercury retort and air emission control equipment to control mercury emissions in compliance with Nevada regulations. Air emission controls for the two thermal units (i.e., retort and furnace) with the potential to emit mercury would be proposed in RMGC's application for the Nevada Mercury Operating Permit to Construct. Technologies typically used on these types of emission units include carbon filters, in some cases with particulate removal as a pre-conditioner. After review of the application, the Director of NDEP would make a determination of NVMACT for each emission unit.

2.4.4.6 Internal Haul Roads and Secondary Roads

Haul roads would connect the Gold Hill Pit with the leach facilities, waste rock dumps, crushers, and ancillary facilities. **Figure 2.4-5** presents a typical in-pit haul road cross section, and **Figure 2.4-6** presents a typical out-of-pit road cross-section. Construction and maintenance of the haul roads and secondary roads would be the same as described in Section 2.4.3.6, Access and Haul Roads.

2.4.4.7 Transportation/Utility Corridor

The Gold Hill Area would be accessed through a non-public connector road from the north end of the Round Mountain Area. A 1.1-mile-long, 500-foot-wide Transportation/Utility Corridor would be developed between the Round Mountain and Gold Hill areas, which would include a 146-foot-wide haul road, an overhead 24.9-kV power line, a 12-foot-wide access road for the power line, and an underground water pipeline. A typical cross-section of the Transportation/Utility Corridor is illustrated in **Figure 2.4-18**. The total surface disturbance within the Transportation/Utility Corridor would be approximately 27 acres.

The proposed width of the Transportation/Utility Corridor would allow the flexibility to develop the optimal alignment for the proposed transportation route. The corridor width also would provide for an adequate distance between the transportation/haul road and proposed utilities for worker safety. The proposed water pipeline would convey water from groundwater sources, including water from dewatering wells and water management reservoirs.

The haul road and power line access road would be constructed and maintained in the same fashion as the haul roads and secondary roads described in the previous section. The corridor would be fenced with an NDOW-approved 4-strand range fence, which would include 3 barbed strands and a smooth bottom strand (a minimum of 18 inches above the ground) to allow for wildlife movement across the corridor. Between County Road (CR) 875 and the proposed Gold Hill project boundary, 2 box-culvert underpasses would be provided for wildlife and cattle passage under the haul road. However, site conditions would be evaluated on a case-by-case basis. Culverts would be constructed along the transportation/haulage road at drainage crossings, including Jefferson Creek, and would be designed to meet Nye County standards. Corrugated pipe culverts would be used in drainages. Fill material for the construction of the transportation/haulage road would be obtained from the Round Mountain and Gold Hill areas and would consist of non-designated waste rock material.

The transportation/haul road would intersect CR 875. To control traffic, RMGC would install crossing gates similar to those used for railroad crossings at both the haul road and CR 875. The gates would remain open to traffic on CR 875 except when mine traffic approaches the intersection. The gates would be electrically

interlocked to ensure that only one set (i.e., either for the haul road or for CR 875) could be open at one time. Approaching mine traffic would activate the gates using an electronic device. A backup power source would be established in case of an electrical outage. All mine traffic would be required to stop before proceeding through the intersection.

2.4.4.8 Intramine Area

RMGC would develop an intramine area between the proposed components, such as pits, waste rock dumps, and heap leach pads. The intramine area would be used for roads, laydown yards, and other support facilities. Undisturbed "islands" of vegetation would remain between these haul road segments. As mining progresses, road segments would be incorporated into the waste rock dumps, heap leach pads, and pits and would be modified for material haulage efficiency. **Figure 2.4-6** shows conceptual haul road configurations within the proposed intramine area.

2.4.4.9 Ancillary and Support Facilities

Stormwater Controls and Diversions

Stormwater controls and diversions would be constructed in a similar manner to the stormwater controls and diversions described for the Round Mountain Area in Section 2.4.3.7, Ancillary and Support Facilities.

Dewatering and Water Management

Dewatering of the Gold Hill Pit would be required to facilitate safe and efficient mining operations. Preliminary hydrogeologic investigations indicate that the dewatering rate would be up to approximately 1,600 gpm.

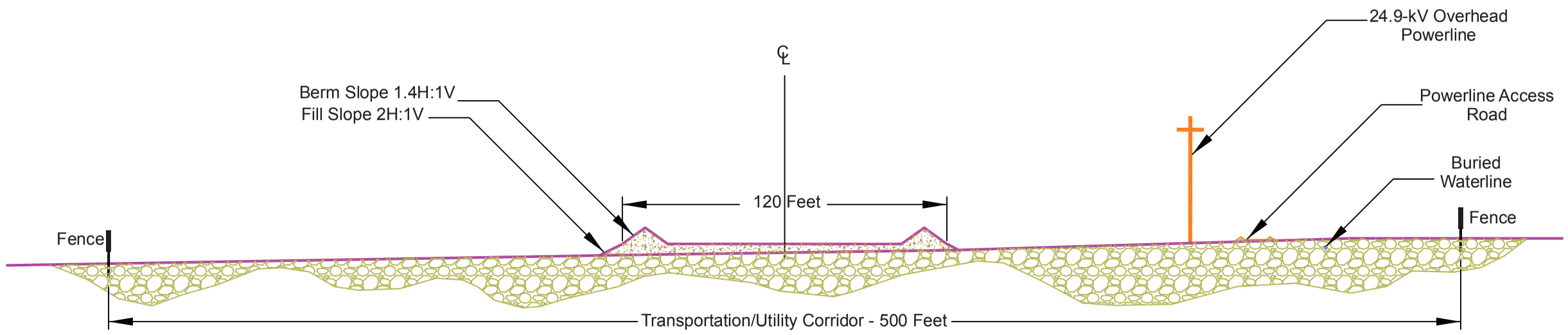
Pit dewatering would be achieved using dewatering wells. Water would be pumped from the dewatering wells to temporary storage areas that would be used for ore processing and dust control. Excess water exceeding the volumes required for these uses would be discharged to one or more RIBs.

The site water balance indicated that up to about 500 gpm of excess water may be produced by the mine dewatering system. The need for discharge is expected to decrease during the later stages of the proposed Gold Hill operation.

Up to three RIBs may be needed for water infiltration from dewatering activities at the Gold Hill Pit. Each RIB would be appropriately sized and would infiltrate approximately 500 gpm of water. RMGC would prepare detailed engineering designs and quality assurance plans for RIBs at the time of permitting.

Water Supply

Production wells are planned to ensure adequate water supply for consumption, ore processing, and dust control needs. RMGC would construct up to three production wells to supply fresh water to the Gold Hill facilities. Pit dewatering also would be an integral part of the water supply. An aboveground pipeline would transfer the water to either the upper or lower storage tank or the water storage pond.



Legend

Fill

Alluvium

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Figure 2.4-18

Typical Cross-section of Transportation/Utility Corridor

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Growth Media Stockpile Areas

Growth media salvage and storage would be the same as for the Round Mountain Area, which is described in Section 2.4.3.8, Ancillary and Support Facilities.

Electric Power

Gold Hill facilities would be serviced by a new 24.9-kV spur line that would be appended to an existing power line on the northern rim of the Round Mountain Pit to the Gold Hill Area. The power line, which would be approximately 20,000 feet in length, would parallel the proposed haul road between the Round Mountain and Gold Hill areas as illustrated in **Figure 2.4-1**. The spur line would have "T pole" construction, which would connect to a substation and then would be distributed to different facilities in the Gold Hill Area. The power line would be constructed, owned, and maintained by RMGC.

Yards

New yards would be established for the process facility and the maintenance area.

Security and Fencing

A NDOW approved 4-strand range fence, with 3-barbed strands and a smooth bottom strand (a minimum of 18 inches above the ground), would be constructed around the perimeter of the Gold Hill Area. The fence would be gated to prevent access by unauthorized personnel. In accordance with NDOW specifications, an 8-foot-high chain-link fence would be constructed around process ponds to minimize exposure of wildlife to process solutions.

Chemical Use, Storage, and Transportation

Fuel and bulk chemical storage areas would be constructed in the Gold Hill Area. Chemical storage associated with expansion facilities would be constructed with primary containment and secondary containment adequate to prevent the release of chemicals to the environment in the event of primary containment failure.

The fuel facility would consist of diesel and unleaded gasoline storage tanks and fuel island. The facility would be located between the equipment ready line and access/haul road.

Chemical reagent storage would be located within the proposed process areas. Reagents required for the proposed project would include: quick lime, sodium cyanide, sodium hydroxide, ammonium nitrate (for explosives), zinc metal, lead nitrate, calcium hypochlorite (for cyanide neutralization), mercury inhibitor, activated carbon, refining flux (including sodium borate, silica, sodium nitrate, and sodium carbonate) and anti-scalant. Transportation of chemicals would be handled by properly licensed carriers in properly placarded vehicles. **Table 2.4-9** presents a summary of the products that would be used at the Gold Hill Area.

Reagent transportation and storage for the Gold Hill Area would be the same as for the Round Mountain Area, which is discussed in Section 2.4.3.7, Ancillary and Support Facilities.

Table 2.4-9
Summary of Bulk Products Used at the Gold Hill Area[1]

Reagent	Storage Volume	Annual Usage	Storage Method/Locations	Reportable Quantities (40 CFR 302.4)
NaCN solution	150,000 gallons	900,000 gallons	Tanks at process facility	10 pounds of CN
Lime	210 tons	54,750 tons	Silos	-
Anti-scalant	8,000 gallons	18,250 gallons	Tanks at process facility	-
Mercury inhibitor	8,000 gallons	10,950 gallons	Tanks at process facility	-
Zinc metal	44,000 pounds	360,000 pounds	Process plant	1,000 pounds
Lead nitrate	7,500 pounds	90,000 pounds	Process plant	10 pounds
Diatomaceous earth/cellulose	44,000 pounds	270,000 pounds	Process plant	-
Ammonium nitrate	400,000 pounds	54,000,000 pounds	Silos	-
Ammonium nitrate Emulsion	360,000 pounds	300,000 pounds	Tank at explosives storage area	-
Diesel	100,000 gallons	5,184,000 gallons	Tank in fuel storage area	-
Unleaded gasoline	5,000 gallons	180,000 gallons	Tank in fuel storage area	-
Antifreeze	200 gallons	12,600 gallons	Tote bins in maintenance area	5,000 pounds
Propane	1,000 pounds	6,000 pounds	Cylinders	-

[1] The list of bulk products is not all inclusive and additional products may be used in the Gold Hill Area.

Source: RMGC 2009.

Hazardous and Solid Waste Management

A waivered Class III landfill would be permitted and constructed within the proposed West Waste Rock Dump area. The construction and operation of the landfill would be similar to the existing landfill in the Round Mountain Area. Landfill cells would be constructed in the waste rock and would be raised in conjunction with the West Waste Rock Dump. Solid waste would be placed in an onsite waivered Class III industrial landfill in accordance with NAC 444.731 through 444.737. A training program would be implemented to inform employees of their responsibilities in proper waste disposal procedures, which would include but would not be limited to:

- Separate disposal of hazardous materials, liquid wastes, and petroleum products from solid wastes; and
- Management of used containers that stored reagents or petroleum products.

Petroleum-contaminated Soil Management

RMGC would prepare a Petroleum-contaminated Soils Management Plan prior to operation of the landfill. RMGC also may elect to transport petroleum-contaminated soils off-site to an approved disposal facility.

2.4.5 Exploration

Exploration activities would be similar to those discussed for the Round Mountain Area (see Section 4.3.8, Exploration), except that the proposed activities within the Gold Hill Area would include approximately 8.8 miles of new drill roads (approximately 12 feet wide) and about 101 drill sites (approximately 40 feet wide and 60 feet long) for total exploration disturbance of about 18.4 acres.

Exploration disturbance located outside of the proposed facilities would include the development of approximately 81 drill sites and about 6.3 miles of new drill roads for a surface disturbance of approximately 13.5 acres, as shown in **Table 2.4-1**.

2.5 RMGC's Environmental Protection Measures

During construction and operation of the proposed project, RMGC would implement these environmental protection measures to mitigate potential impacts to air, land, water, wildlife, cultural resources, and human resources to prevent undue or unnecessary degradation of the environment as part of the proposed project's standard operating procedures. Pre-development planning, pollution prevention measures, and pollution control measures and equipment would be used to reduce potential project-generated environmental impacts. These measures are discussed in the following sections.

2.5.1 Geology and Minerals

- Geotechnical monitoring, consisting of geologic structure mapping, groundwater monitoring, and slope stability analyses, would be conducted during active mining to assist in optimizing the final pit designs. Slope movement monitoring also would continue to be conducted to evaluate the safety of the open pit high walls. In addition, operational procedures for controlling blasting and bench scaling would facilitate the mining of stable pit walls.

2.5.2 Water Resources

- The existing Round Mountain Monitoring Plan would be updated to include the expansion of the Round Mountain Pit and development of the Gold Hill Pit, which were submitted to the BLM and NDEP as part of the POO. Groundwater monitoring would be conducted to ensure compliance with permit criteria and provide for early identification of potential impacts.

- All monitoring, production, and dewatering wells would be properly abandoned in accordance with Nevada regulatory requirements to prevent contamination of groundwater resources.

- Although there are no waters of the U.S. downstream of the study area, BMPs would be used to limit erosion and reduce sediment in precipitation runoff from project facilities and disturbed areas during construction, operations, and initial stages of reclamation. BMPs may include, but are not limited to, diversion and routing of stormwater using accepted engineering practices, such as diversion ditches, and the placement of erosion control devices such as sediment traps, and rock and gravel cover.

- Process components would be designed, constructed, and operated in accordance with NDEP regulations. The proposed heap leach pads and tailings impoundment facilities would be designed for zero discharge and would have a composite liner system in accordance with NDEP design criteria. The

waste rock dumps would be evaluated for their potential to generate acid and/or mobilize deleterious constituents or sediment and would be monitored routinely.

- A field scale pilot test for potential infiltration of precipitation through the proposed alluvial cover for the two Gold Hill Waste Rock dumps would be conducted. This pilot test would consist of an area of alluvium at least 10 feet in thickness and of sufficient surface area to capture a representative sample of precipitation for the Gold Hill Area over a period of at least 5 years. Eight volumetric moisture probes would be installed in the alluvial test plot at depths of 2 feet, 4 feet, 6 feet, and 8 feet at 2 locations on the alluvial test plot sufficiently far apart to allow for a representative sampling of the alluvial test plot. The probes would be sampled on a regular basis and the data would be provided to the BLM and NDEP on an annual basis. At the end of the 5-year testing period, the data obtained from the probes would be used to calibrate an infiltration model and the model would then be run to evaluate potential infiltration of precipitation for expected average and reasonably expected maximum precipitation conditions. The results of the infiltration modeling would be used to adjust the final cover design for the Gold Hill waste rock dumps.

- On a semi-annual basis, RMGC would monitor wells, springs or seeps for water level and flow within the maximum 10-foot groundwater drawdown isopleth created by pit dewatering at the Round Mountain and Gold Hill Areas. Ink House and Healy springs, close to the 10-foot isopleth would also be monitored on a semi-annual basis. A decline in the water table attributable to groundwater drawdown caused by mine dewatering and adversely affecting water wells or springs/seeps would be mitigated by RMGC in accordance with guidelines established by the BLM and/or the Nevada Division of Water Resources (NDWR). Possible mitigation measures would include, but not be limited to, improving an existing well, installing a new well, improving or enhancing an existing spring or seep, or providing a replacement water supply for an impacted spring or seep. Access to springs and wells on private land would be subject to the permission of the landowner. Johnson springs 1 and 2 would not be monitored due to denial to access by the landowner (Johnson 2009).

2.5.3 Cultural Resources

Class III cultural resource surveys have been performed over the entire study area. Avoidance is the BLM-preferred treatment for preventing effects to unevaluated sites or sites eligible for inclusion on the National Register of Historic Places [NRHP]).

- If avoidance is not possible or is inadequate to prevent adverse effects to a site evaluated as eligible to the NRHP, data recovery or appropriate mitigation would be undertaken in accordance with the "Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation," 48 CFR 44716 (September 29, 1983), as amended or replaced. If an unevaluated site cannot be avoided, additional information would be gathered and the site would be evaluated by a qualified archaeologist. If the site does not meet eligibility criteria as defined by the BLM and Nevada State Historic Preservation Office (SHPO), no further cultural work would be performed. If the site meets eligibility criteria, appropriate mitigation would be implemented in accordance with a BLM and SHPO-approved Treatment Plan.

- RMGC would provide reasonable advance notice of any near-surface excavation work within the Transportation/Utility Corridor area to Western Shoshone representatives and provide an opportunity for Western Shoshone monitors to be present to observe such excavations.

- If previously undocumented cultural resources are discovered during construction of the mine facilities, construction would be halted in the area of the discovery, and the BLM Authorized Officer would be contacted to evaluate the find. If the site is evaluated as eligible for inclusion on the NRHP, impacts would be mitigated through a data recovery program or appropriate mitigation measures developed by the BLM in consultation with the Nevada SHPO.

2.5.4 Hazardous Materials and Solid Waste

- Hazardous materials would be transported, stored, and used in accordance with Federal, state, and local regulations. Employees would be trained in the proper transportation, use, and disposal of hazardous materials.

- Releases of hazardous materials would be contained, mitigated, and reported in accordance with RMGC's Spill Response Plan. Prevention, containment, and cleanup measures in the Spill Response Plan would minimize the potential for related impacts to soils, vegetation, wildlife, and water resources.

- RMGC would construct, operate, and close the waivered Industrial Class III landfill(s) in accordance with NAC 444.731 through 444.737. Employee training would continue to include appropriate landfill disposal practices such as the allowable wastes that can be placed in the landfill, management of used filters, oily rags, fluorescent light bulbs, aerosol cans, and other regulated substances. Signs would be installed at the landfill sites reminding employees of appropriate disposal practices.

2.5.5 Air Quality

- Appropriate air quality permits would be obtained from the NDEP, Bureau of Air Pollution Control (BAPC) for the new project facilities and land disturbance. As per BAPC regulations, the proposed project air quality operating permit must be authorized by the BAPC prior to component construction.

- Committed air quality practices would include dust control for mine unit operations as described by the BAPC required Dust Control Plan. In general, the Dust Control Plan would provide for water application of haul roads and other disturbed areas; chemical dust suppressant application (i.e., magnesium chloride) where appropriate; and other dust control measures per accepted and reasonable industry practice.

- Fugitive emissions in the process area would be controlled at the crusher and conveyor drop points by using water sprays where necessary. Appropriate emission control equipment would be installed and operated in accordance with the construction and operating air permits.

- Where required, pollution control devices installed by equipment manufacturers would control combustion emissions.

- Thermal processing units with the potential to emit mercury at levels above de minimis levels would be permitted by the NDEP. Emissions from these units would be subject to the NVMACT evaluation process as required by the NMCP. Pollution control equipment would be installed, operated, and maintained in good working order to minimize emissions. The use of mercury suppressant chemicals in the Gold Hill leach circuit would be investigated.

2.5.6 Visual Resources

- During operations, the margins of the waste rock dumps would be constructed to provide for variable topography during final regrading, thereby providing a more natural post-mining landscape.

- Following the completion of mining, structures and buildings would be dismantled and removed from the site or placed in landfills unless otherwise prescribed by the BLM.

- Concurrent reclamation would be implemented to the extent practical.

2.5.7 Soils and Watershed

- Suitable growth media would be salvaged up to a depth of 12 inches and stockpiled for use in reclamation (Table 3.13-1) during the development of the mine open pits, construction of the waste rock dumps, and during construction of the new leach pads and tailings impoundment facilities.

- Following stripping, growth media would be stockpiled adjacent to the proposed disturbance areas. Growth media stockpiles would be located such that they would not be disturbed by mining operations. Diversion channels and/or berms would be constructed around the stockpiles as needed to prevent erosion from overland runoff. BMPs such as silt fences or staked straw bales would be used as necessary to contain sediment liberated from direct precipitation.

- Stockpile conditions would be monitored following significant precipitation events. As stated in Section 2.6, Reclamation, RMGC may use a reclamation seed mix to stabilize these stockpiles in the short term.

- If fine-textured alluvium materials (e.g., clays, silts) are used for growth media, their use would be limited to slopes less than 20 percent and they would be covered with clean gravel mulch to a 0.5- to 1-inch depth.

- Roads, including paved or bladed roads and two-track roads, would be reclaimed at the completion of project uses unless the BLM specifies otherwise. Roads would be reclaimed by the following procedures:

  - Culverts would be removed, open drainage pathways would be restored and stabilized, and stream banks would be recontoured to the approximate original contour and revegetated;

  - The road prism would be restored to the approximate original land contour, where practicable;

  - Road surfaces would be recontoured or ripped along the entire disturbed length to the depth of compaction with a tool that has at least three to four shanks. For two-track roads, the middle shanks may be removed and only the tracks ripped. Blacktop that is fragmented and ripped into the subsoil would be covered with growth media to a minimum depth of 12 inches;

  - The entire road length would be revegetated;

  - The Transportation/Utility Corridor would be recontoured and revegetated. Culverts would remain in place for access and drainage.

  - Gates and BLM-approved closure signage would be left in place until adequate restoration/ revegetation/closure occurs to permit safe public access; and

- Any area that receives repeated heavy traffic would be ripped to the depth of compaction by ripping with a tool that has at least three to four shanks. This would help prepare the seedbed, encourage infiltration, and help to prevent accelerated runoff and erosion.

- Roads temporarily left open for monitoring would be gated and signed where public access may be of concern. At the completion of their use, all such roads would be obliterated and their locations reclaimed by the methods listed above, unless otherwise prescribed by the BLM.

- Building foundations that are fragmented and remain on the site would be covered with growth media to a depth of 12 inches prior to reseeding.

- RMGC would develop and provide the BLM with a formal protocol that further specifies guidelines for selection and approval of dump surfaces and heap leach pads eligible to be revegetated without application of growth media.

- Sludge remaining in ponds would be tested by the MWMP and the Toxicity Characteristic Leaching Procedure for 8 Metals (TCLP 8) to determine the potential to degrade surface water or groundwater. If tests determine that there is a potential to re-mobilize adverse constituents, the sludge material would be transferred to an authorized disposal facility.

- Water used for rinsing process piping, valves, or equipment would be managed on lined containment.

- Unless otherwise specified by BLM, embankments built for runoff and sediment retention would be breached and the channel area stabilized.

2.5.8 Erosion and Sediment Control

- Although there are no waters of the U.S. located downstream of the study area, BMPs would be used to limit erosion and reduce sediment in precipitation runoff from project facilities and disturbed areas during construction, operations, and initial stages of reclamation. BMPs may include, but are not limited to, diversion and routing of stormwater using accepted engineering practices, such as diversion ditches, and the placement of erosion control devices such as sediment traps, and rock and gravel cover.

- Concurrent reclamation would be maximized to the extent practical to accelerate revegetation of disturbed areas. Sediment and erosion control measures would be inspected periodically, and repairs performed as needed.

2.5.9 Vegetation and Invasive and Non-native Species

- Revegetation of disturbance areas would be conducted as soon as practical to reduce the potential for wind and water erosion, minimize impacts to soils and vegetation, help prevent the spread of invasive

and non-native species in disturbance areas, and facilitate post-mining land uses. Following construction activities, areas such as cut and fill embankments and growth media stockpiles would be seeded where appropriate. Concurrent reclamation would be conducted to the extent practical to accelerate revegetation of disturbance areas. Sediment and erosion control measures and revegetated areas would be inspected periodically to ensure long-term erosion control and successful reclamation.

- Any seed mixes and mulches used for reclamation would be certified weed-free.

- In accordance with its Noxious Weed Control Plan, RMGC would continue to monitor for the occurrence of noxious weeds, and if noxious weeds are found, weed control practices would be implemented to ensure that revegetation is successful with the proposed seed mixture.

2.5.10 Wildlife Resources

- Operators would be trained to monitor the mining and process areas for the presence of larger wildlife such as deer and pronghorn as well as avian and other terrestrial wildlife. Mortality information would be collected in accordance with the NDOW Industrial Artificial Pond Permit. RMGC would continue to operate in accordance with established wildlife protection polices that would prohibit feeding or harassment of wildlife.

- As part of the existing monitoring plan for wildlife, the top of the heap leach pad would be monitored daily for any substantial pooling of cyanide solutions and wildlife mortalities would be reported in accordance with the NDOW Industrial Artificial Pond Permit.

- Eight-foot-high chain-link fencing would be installed around the process ponds, and netting, pond covers, or floating “bird balls,” as appropriate, would be installed over ditches and ponds that would contain leach solutions, to minimize potential impacts to avian and terrestrial wildlife. In addition, the drip emitters would be buried where practical and the heaps would be scarified to minimize ponding and pooling of process solutions.

- The Round Mountain and Gold Hill project boundaries and Transportation/Utility Corridor would be fenced with 4-strand range fence; bottom strand would be smooth (a minimum of 18 inches above the ground), with the other 3 strands barbed. Pronghorn antelope crossing signs and vehicle speed limit signs would be placed along the Transportation/Utility Corridor. Between CR 875 and the proposed Gold Hill project boundary, 2 box-culvert underpasses would be constructed to provide for wildlife passage under the haul road.

- RMGC would monitor deer and pronghorn use along the Transportation/Utility Corridor. All big game mortalities would be reported to NDOW. Based on monitoring and mortality data and development of annual reports, RMGC would work with NDOW to determine if additional mitigation measures are necessary.

- To minimize potential impacts to wildlife species, WAD cyanide concentrations in the tailings impoundment facilities would be maintained at non-lethal levels through the continued operation of the existing cyanide detoxification system, which adds copper sulfate and ammonium bisulfite to the tailings slurry.

- Standard, raptor-friendly designs as outlined in Suggested Practice for Raptor Protection on Power Lines (Avian Power Line Interaction Committee [APLIC] 2006, 1996; APLIC and U.S. Fish and Wildlife Service [USFWS] 2005) would be incorporated into the design of new electrical distribution lines to prevent electrocution of raptor species attempting to perch on the power poles and lines. These measures may include, but would not be limited to, a 60-inch separation between conductors and/or grounded hardware in eagle-use areas and recommended use of insulating or cover up materials and other applicable measures for perch management, depending on line configuration, pole type, and biological risk factors (APLIC 2006, 1996).

- If construction activities occur within suitable habitat during the raptor nesting season (March 1 through July 31), a raptor survey, including, but not limited to, hawks, eagles, and burrowing owls, would be conducted by a qualified biologist, and appropriate mitigation measures, such as buffer zones around occupied nests, would be developed and implemented, as needed.

- To protect nesting birds, removal of migratory bird habitat on currently undisturbed lands in the study area would be avoided to the extent possible between March 1 and July 31. Should removal of habitat be required during this period, RMGC would employ a qualified biologist to conduct breeding bird surveys and implement appropriate mitigation, such as buffer zones around occupied nests, as needed.

- To minimize vehicle collisions between mine traffic and wildlife species along the Transportation/Utility Corridor, RMGC would install speed limit signs and would set speed limits at 35 mile per hour (mph) for haul trucks and 45 mph for small vehicles.

To protect bat species that may be present within and near the study area, RMGC has committed to several measures that would minimize impacts to bat species. The following measures would be implemented to protect bat species within the study area:

Gold Hill Area

- Develop gate designs to mitigate for the loss of bat habitat.
  - In coordination with the BLM, USFS, and NDOW; RMGC would protect five mine workings by installing bat gates. Selected bat roosts in Jefferson Canyon would be protected by constructing bat gates over mine working portals of abandoned underground mine workings.

- Develop a schedule to complete gating activities.
  - The bat gates in Jefferson Canyon would be constructed at the same time or just prior to exclusion of bats from Gold Hill.
  - The BLM and NDOW would work with the USFS to initiate an appropriate level of resource studies and public scoping in order for the USFS to prepare a separate decision authorizing the construction of the bat gates.

- Construct bat gates at identified mitigation sites.
  - RMGC would hire an outside contractor experienced in bat gate design, construction, and installation for work performance.
- Exclude bats from the Gold Hill Mine workings.
  - RMGC would hire a contractor experienced in bat exclusions and would coordinate with NDOW during the exclusion process.
  - The best time to implement exclusions and portal closures is during late summer or early fall after cessation of maternity activities and prior to the onset of hibernation.
  - One-inch mesh material (e.g., chicken wire, polypropylene, or similar material) would be installed over mine openings to allow bat egress while effectively discouraging their return.
  - Immediately following final confirmation by NDOW of bat exclusion, permanent closure of mine openings would be implemented.
- Bat monitoring at mitigated mine workings.
  - After bat gate installation, RMGC would conduct 3 years of post-mitigation monitoring of the bat-gated mine workings to determine the degree of use by bat species known to use both the historic Gold Hill and Jefferson Canyon mine habitats.
  - External monitoring (visual and/or acoustic methodologies) would need to be sufficient to account for nightly annual variation, such that several nights of data collection within the maternity season for each year at each site would be required, in coordination with NDOW.
  - Post-mitigation monitoring would be conducted by a qualified wildlife biologist.

<u>Round Mountain Area</u>

- RMGC would conduct acoustic surveys at mine workings deemed to have suitable bat habitat, in coordination with NDOW.
- Based on the results of the acoustic survey, additional off-site mitigation may be necessary to compensate for the loss of bat habitat.
- Exclude bats from the Round Mountain Area mine workings, if applicable.
  - RMGC would hire a contractor experienced in bat exclusions and would coordinate with NDOW during the exclusion process.
  - The best time to implement exclusions and portal closures is during late summer or early fall after cessation of maternity activities and prior to the onset of hibernation.

- One-inch mesh material (e.g., chicken wire, polypropylene or similar material) would be installed over mine openings to allow bat egress while effectively discouraging their return.

- Immediately following final confirmation by NDOW of bat exclusion, permanent closure of mine openings would be implemented.

2.5.11 Access and Land Use

- Post-mining safety barriers (e.g., berms, fencing, or other appropriate barriers) would be installed peripherally to the ultimate perimeters of the pits after mining has been completed.

- Public access on CR 875 would be maintained during construction and operation of the Transportation/Utility Corridor.

2.5.12 Protection of Survey Monuments

- RMGC would protect all survey monuments, witness corners, reference monuments, bearing trees, and line trees against destruction, obliteration, or damage. Public land survey system monuments would be protected and preserved in accordance with Nevada BLM Instructional Memorandum (IM) No. NV-2007-003. If, in the course of operations, any monuments, corners, or accessories are destroyed, RMGC would coordinate with the BLM.

- Registered monuments that would be covered or destroyed in the normal course of events by the implementation of the approved POO would be replaced by RMGC at the completion of operations, using global positioning system (GPS) technology.

2.6 Reclamation

Reclamation of disturbed areas resulting from mine development and expansion activities would be completed in accordance with BLM and NDEP regulations. The BLM is responsible for preventing unnecessary or undue degradation of BLM-administered public lands that may result from operations authorized by existing mining laws (43 CFR 3809). In addition, the State of Nevada requires that a reclamation plan be developed for any new mining projects and for expansions of existing operations (Nevada Revised Statute [NRS] 519A).

Detailed information regarding the reclamation of the proposed project components has been provided in the following sections. The plans and associated cost estimates are periodically updated in coordination with the BLM and NDEP. However, the reclamation methods provided in the following sections are consistent with the methods that have been previously approved by the BLM and NDEP.

Proposed disturbance areas are summarized in **Table 2.4-1**. The areas proposed for disturbance can be divided into the following categories: open pits, waste rock dumps, heap leach facilities, tailings impoundment facilities, growth media and ore stockpiles, haul roads, support facilities, and mine facilities. RMGC anticipates that, with the exception of open pits, each of these components would be reclaimed and revegetated. Reclamation of disturbed areas would be the same for the Round Mountain and Gold Hill areas; therefore, discussion of reclamation methods for both areas is combined in the following sections.

RMGC's long-term goals for reclamation of post-mining disturbance are to:

- Ensure public safety;
- Stabilize the site;
- Establish a productive vegetative community based on the applicable land use plan and designated post-mining land uses;
- Establish wildlife habitat, domestic grazing, dispersed recreation; and
- Allow for future mineral exploration and/or mining activity.

RMGC's short-term goals at both the Round Mountain and Gold Hill areas are to:

- Stabilize the disturbed areas to a safe condition;
- Perform concurrent reclamation; and
- Protect both disturbed and adjacent areas from unnecessary or undue degradation.

Measures to be taken to prevent unnecessary or undue degradation are derived from the general requirements established by 43 CFR 3809.420 surface management regulations; and NDEP mining, reclamation, water quality, and air quality regulations. Measures to be taken to prevent unnecessary or undue degradation at the proposed project are consistent with those described for the Round Mountain Mill and Tailings Facility Final EIS (BLM 1996) and updates to the reclamation plan prepared by RMGC. These measures would continue to be implemented during the design, construction, operation, and closure of both the Round Mountain and Gold Hill areas:

- All regulated components of each facility would be designed and constructed to meet or exceed design criteria of the following agencies:
-
  - BLM
  - NDEP
  - NDOW
  - NDWR

- Waste rock dumps would be evaluated for their potential to release pollutants and would be designed to prevent degradation of waters of the State. Stockpiles and waste material would be monitored routinely, or in accordance with the approved Waste Rock Management Plan for the Round Mountain Mine and Gold Hill Area (RMGC 2009);
- Heap leach and tailings impoundment facilities would be operated as zero discharge facilities and in accordance with fluid management, emergency response, and monitoring plans established by RMGC and NDEP permit conditions;

- Mineral exploration and development drill holes, monitoring and observation wells, and production dewatering wells subject to Nevada regulations would be properly abandoned to prevent potential contamination of water resources;

- Regulated wastes would be managed according to applicable Federal and state regulations;

- Surface disturbance would be minimized while optimizing the recovery of mineral resources;

- Fugitive dust emissions from disturbed and exposed surfaces would be controlled in accordance with NDEP regulations and permits;

- Surface water drainage control would be accomplished by diverting stormwater run-on, isolating facility runoff, and minimizing erosion;

- Where suitable as growth media, surface soils and some alluvial material in both the Round Mountain and Gold Hill pits would be managed as a growth media resource and removed, stockpiled, and applied during reclamation;

- A Reclamation Plan would be implemented that addresses earthwork and recontouring, revegetation and stabilization, removal of equipment and structures, disposal of wastes, and monitoring operations necessary to satisfactorily reclaim the proposed disturbance. This plan would be consistent with the stipulated post-mining land uses; and

- Where possible, RMGC would continue with the practice of concurrent reclamation.

Figure 2.4-2 presents a general proposed project schedule that addresses approximate operational time frames, closure, reclamation, and post-mining monitoring for both the Round Mountain and Gold Hill areas. The timelines presented herein are representative of expected activity and may be modified to meet future operational considerations. Mine site reclamation is scheduled following cessation of individual facility operation. The reclamation schedule and costs would be reviewed a minimum of every 3 years and updated as needed.

The RMGC Reclamation Plan for both the Round Mountain and Gold Hill areas:

- Minimizes soil loss from reclaimed sites through revegetation;

- Inhibits potential environmental degradation by stabilizing and revegetating site facilities; and

- Shapes the reclaimed facilities, including waste rock dumps, heap leach pads, roadways, and associated facilities to assist in long-term stability, vegetation establishment, and reduction of visual impacts. These practices would help create a safe, stable, productive post-mining environment and achieve the post-operational land use.

Wildlife habitat, livestock grazing, mineral exploration, and mining have been the primary uses of the area since the late 1800s. The proposed post-operational land use of the area would be similar to the pre-mine operational land use. Reclamation and revegetation would be conducted concurrently as individual facilities

and activities cease operation. Planned establishment of self-sustaining vegetation communities on reclaimed sites would reduce the erosion potential and improve forage production.

2.6.1 Concurrent Reclamation

RMGC would conduct concurrent reclamation of inactive dumps no longer required for operations. RMGC has initiated reclamation regrading and sloping on many facilities within the Round Mountain Area. Exploration roads, drill pads, sumps, and waste rock dumps are routinely reclaimed upon completion of activities. RMGC would continue concurrent reclamation activities as areas become available.

Reclaimed acreage is reported to NDEP on a regular basis. RMGC would coordinate concurrent reclamation and associated surety releases with the BLM and NDEP, as appropriate. Copies of the reclamation summary would be provided to the BLM.

RMGC has completed revegetation of selected areas on the waste rock dumps since the early 1990s. Results to date have demonstrated successful revegetation that meets the Nevada Guidelines for Successful Revegetation criteria for the reclamation permit. Waste rock dumps located on public land administered by the USFS have been released with concomitant bond reduction. **Figure 2.6-1** shows a reclaimed area along the South Waste Rock Dump in the Round Mountain Area. Successful revegetation techniques would continue to be used for the proposed facilities.

Baseline vegetation data were collected on a yearly basis for 5 consecutive years (1993 through 1997) at the existing Round Mountain Mine. Revegetation monitoring would be consistent with the approved RMGC Revegetation Plan, which also would be adopted for the Gold Hill Area.

RMGC would establish a minimum of 1 transect for every 50 acres of disturbance for measuring reclamation success on reclaimed sites in the Round Mountain and Gold Hill areas. Sampling methods utilized for the on-site transects would be identical to those used off-site or a similar accepted industry standard.

2.6.2 Growth Media Salvage and Reclamation Seed Mix

Where available, up to 12 inches of growth media would be salvaged from areas prior to project-related disturbance. This excludes the areas of the South and North Waste Rock Dumps in the Round Mountain Area that have poor quality growth media and were approved for construction with minimal or no growth media salvage.

Growth media that would be stripped and stockpiled is composed of a sandy/gravelly/alluvial soil material. The material is similar in texture to the alluvial overburden material, which is being removed from the pit and deposited in the waste rock dumps. Pit alluvium has been proven suitable and successful as a growth media for the establishment of vegetation and would continue to be used for the reclamation of project facilities as needed. There is a sufficient volume of alluvial overburden in the Round Mountain Pit to meet the additional need for growth media in reclamation. Not all pit alluvium at Gold Hill is suitable for growth media. RMGC would identify the locations of suitable and unsuitable alluvium and distinguishing characteristics between the two, in order to salvage suitable growth media.

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Figure 2.6-1

Example of Successful Reclamation in the Round Mountain Area

Source: RMGC 2009.

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Growth media would be stockpiled in a manner to facilitate re-handling by self-propelled scrapers or other equipment during reclamation. The growth media stockpiles may be seeded with the proposed reclamation seed mix listed in **Table 2.6-1** to reduce potential erosion prior to final reclamation of the mine site.

Table 2.6-1
Recommended Revegetation Seed Mixture

Common Name	Scientific Name	Seed Rate Pure Live Seed (PLS) (pounds/acre)
Crested wheatgrass	*Agropyron cristatum*	2.00
Bluebunch wheatgrass	*Agropyron spicatum*	0.80
Thickspike wheatgrass	*Agropyron dasystachyum*	0.80
Indian ricegrass	*Oryzopsis hymenoides*	1.60
Basin wildrye	*Elymus cinereus*	0.80
Wild buckwheat	*Eriogonum umbellatum*	0.04
Palmer penstemon	*Penstemon palmerii*	0.20
Basin sagebrush	*Artemesia tridentata*	0.10
Black sagebrush	*Artemesia nova*	0.10
Shadscale	*Atriplex confertifolia*	0.40
Fourwing saltbush	*Atriplex canescens*	1.60
Winterfat	*Ceratoides lanata*	0.40
	Total PLS (pounds/acre) Drill Seed	**8.84**

Source: RMGC 2009.

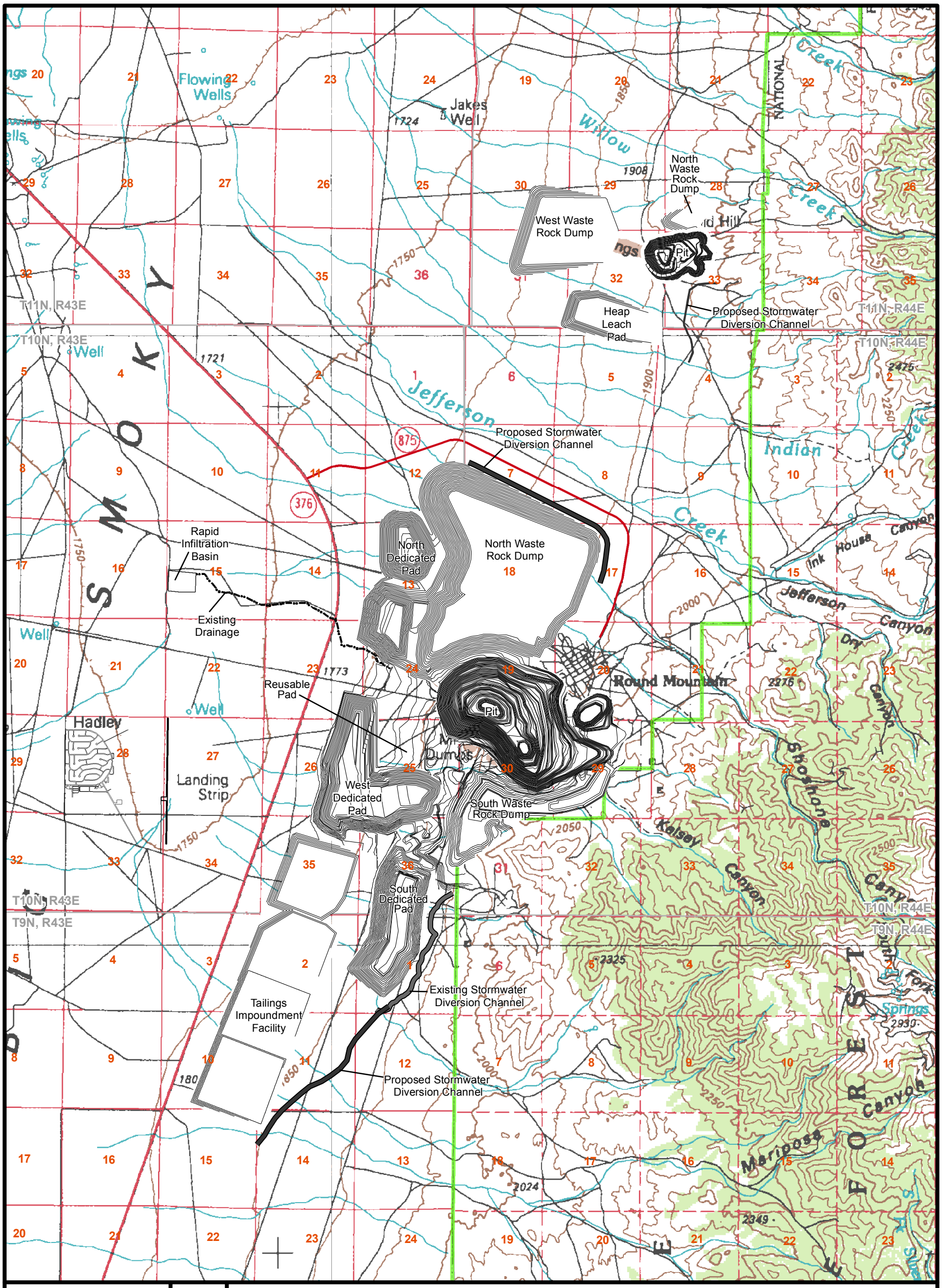
The revegetation standards for the proposed project would be based on the existing guidelines contained in the BLM/NDEP Standards for Successful Revegetation and the following revegetation standard approved by the BLM and NDEP. This standard was based on RMGC's on-going baseline vegetation sampling program and the results of revegetation test plots.

- Percent composition grasses: 7.09%-70%
- Percent composition forbs: 1.78%-5%
- Percent composition shrubs: 25%-91.13%
- Total percent cover: 16.67%

RMGC has completed revegetation of selected areas on the waste rock dumps since the early 1990s. Results to date have demonstrated successful revegetation that meets the criteria for the reclamation permit. Waste rock dumps located on public land administered by the USFS have been released with concomitant bond reduction. Successful revegetation techniques would continue to be used for the proposed facilities.

2.6.3 Grading and Stabilization

Figure 2.6-2 illustrates the post-mining reclamation topography for the Round Mountain and Gold Hill areas. During reclamation, the side slopes of waste rock dump and heap leach pad lifts would be regraded to



Note: Topographic elevations provided in meters, USGS 1929 Vertical Datum.
Source: RMGC 2009.

Round Mountain Expansion Project

Figure 2.6-2

Proposed Action and Gold Hill Processing Alternative Post-Mining Reclamation Topography

04/29/2009

achieve an average final slope not steeper than 2.5H:1.0V. The Reusable Pad is constructed in a single 35-foot angle-of-repose lift. During final operations, this lift would be removed from the reusable pad site and placed on a dedicated leach pad prior to final reclamation activities.

Regrading the Round Mountain dedicated leach pads to an average final slope not steeper than 2.5H:1.0V may require spent ore to be graded off the lined containment. The design of the Gold Hill heap leach pad allows the slopes to be regraded to an average final slope not steeper than 2.5H:1.0V without grading spent ore off of lined containment.

Solution ponds, no longer needed for containment of drain down fluids from the leach pads and tailings impoundments, would be reclaimed. Ponds would be reclaimed by folding in the pond liners to create an envelope. Pond areas would then be backfilled, covered with 12 inches of growth media, and regraded to establish free drainage and to blend with the adjacent topography. Concrete building foundations would be broken in-place to allow percolation of meteoric waters and buried under a minimum of 12 inches of common fill and growth media, graded to allow free drainage. Roadways would be ripped to relieve compaction and recontoured to the extent possible. As previously approved for the Round Mountain Pit, the open pits would not be backfilled and would remain in their final configuration. However, safety barriers would be put in place.

2.6.3.1 Open Pits

Pit slope angles are designed primarily to be operationally stable over the time period required to complete mining; however, some slope instability could occur over time following cessation of mining and as the pits fill with water. These failures would consist of bench-scale sloughing and some multiple bench failures, but would not significantly impact the overall configuration of the final pit. Mechanically altering the designed walls to obtain shallower slopes by mining would be economically infeasible, and blasting to flatten slopes could create unstable conditions, which would result in a potential long-term public safety hazard.

Current pit slope angles at the Round Mountain Pit are based primarily on mining experience and on-going pit slope monitoring. This process has resulted in the development of an operational inter-ramp slope angle of between 30 and 50 degrees depending upon rock type. The overall slope angles would range from 35 to 50 degrees at the proposed Round Mountain Pit and 40 to 50 degrees at the proposed Gold Hill Pit, depending on the exact location of haul roads.

2.6.3.2 Waste Rock Dumps

Round Mountain Area

The North and South Waste Rock dumps are constructed by placement of material in lifts of up to 75 feet in height to an overall average slope configuration of 2.5H:1.0V. The toe of each dump lift would be set back from the crest of the previous lift to achieve a final dump slope angle not steeper than 2.5H:1.0V (RMGC 2009).

Foundation conditions and slope geometry for the proposed expansion of the waste rock dumps at Round Mountain are consistent with the foundation conditions and geometry of the existing waste rock dumps. Further detailed stability analysis would likely confirm that the proposed facilities would likely have factors of

safety similar to the facilities that have been previously permitted, constructed, and operated at Round Mountain (RMGC 2009).

Erosion modeling for Round Mountain heaps and dumps at a final reclamation slope of 2.5H:1.0V has been performed by SRK (2001). The results indicate that "excessive erosion" as pursuant to NAC 519A.260, 275, and 315 would not occur on the proposed heaps and dumps (RMGC 2009).

Gold Hill Area

The Gold Hill waste rock dumps would be constructed in lifts up to 75 feet in height to an overall average slope configuration of 2.5H:1.0V. The toe of each dump lift would be set back from the crest of the previous lift to achieve a final dump slope angle not steeper than 2.5H:1.0V.

Based on slope stability studies conducted by Knight Piesold (2005), slopes associated with the proposed waste rock dumps, as designed, would be stable during operation and be able to withstand an earthquake with a magnitude of 6.5 occurring approximately 19 kilometers (km) from the site (RMGC 2009).

Erosion modeling for the Gold Hill heaps and dumps has been performed by SRK (2008a). The results indicate that "excessive erosion" as pursuant to NAC 519A.260, 275, and 315, would not occur for the Gold Hill heaps and dumps with a final reclamation slope of 2.5H:1.0V. Soil loss is predicted to be minimal once vegetation is established on the slopes.

2.6.3.3 Heap Leach Facilities

Round Mountain Area

Foundation conditions and slope geometry for the proposed heap leach pads at Round Mountain are consistent with the foundation conditions and geometry of the existing heap leach pads. The most recent slope stability analysis for heap leach pads at Round Mountain was for the West Dedicated Leach Pad at a 450-foot heap height (Knight Piesold 2006). Results of this analysis indicate the West Dedicated Leach Pad design is stable under static and earthquake loading conditions. A previous slope stability analysis was conducted for Phase 5 of the South Dedicated Pad (Knight Piesold 2005). Further detailed analysis would likely confirm the proposed facilities would have factors of safety similar to the facilities that have been previously permitted, constructed, and operated at the existing Round Mountain Mine.

Gold Hill Area

Based on slope stability studies conducted for the Gold Hill heap leach pad by Knight Piesold (2005), slopes associated with the proposed heap leach pad, as designed, would be stable during operation and be able to withstand an earthquake with a magnitude of 6.5 occurring approximately 19 km from the site.

2.6.3.4 Tailings Impoundment Facilities

The design for the existing Tailings Impoundment Facility in the Round Mountain Area was approved by the NDWR and NDEP BMRR as a modification to Water Pollution Control Permit Number NEV87052, with the appropriate stability analyses provided in the design reports.

The second approved cell and the two additional proposed cells would be consistent with the design of the existing tailings impoundment facility described in Section 2.3.5.3, Tailings Impoundment Facility, or the cells would be constructed as conventional tailings impoundment facilities depending on changes in material characteristics as mining progresses. A stability report would be prepared as part of the water pollution control permit application and submitted to BLM prior to construction. Foundation conditions and slope geometry for the proposed cells are consistent with the foundation conditions and geometry of the existing facility and further detailed analysis are expected to confirm the proposed cells would have factors of safety similar to the existing Tailings Impoundment Facility in the Round Mountain Area.

2.6.4 Surface and Seedbed Preparation

Following final grading, the waste rock dumps, heap leach pads, and tailings impoundment facilities would be inspected for slope stability, relief, topographic diversity, acceptable surface water drainage capabilities, and compaction, where appropriate. Prior to placement of growth media, and if conditions warrant, some surfaces may be ripped and scarified. Following placement of growth media, the final surface may be contour scarified to promote water retention, reduce erosion, and prepare the final seedbed.

Some of the final waste rock dump surfaces would consist of alluvium, which would be directly revegetated. Placement of a growth media cover would be limited to areas that contain coarse material that would require placement of growth media in order to reestablish vegetation. The remainder of the waste rock dump surfaces would be directly revegetated without the addition of growth media cover. These areas would be selected and approved on a case-by-case basis prior to revegetation.

RMGC may conduct nutrient analyses of the soil materials that would be utilized for growth media. RMGC does not currently anticipate that fertilizer would be required for establishing a permanent perennial cover.

2.6.5 Revegetation, Seeding, and Planting

Revegetation of the reclaimed sites within the Round Mountain and Gold Hill areas would be accomplished through a combination of seeding and pioneering of native vegetation. **Table 2.6-1** lists the proposed application rate for the various species that are included in the basic reclamation seed mix. The mix was developed by RMGC and approved by the BLM and NDEP based on site-specific conditions, including low annual precipitation and high soil pH. Baseline information gathered from off-site vegetation transects and established test plots also were considered during seed mix development. Rhizomatous grasses and bunchgrasses, shrubs, and forbs contained in the seed mix would provide species diversity that would stabilize the reclaimed facilities and assist in achieving the post-mining land use objectives.

The majority of species in the seed mix are native to Nevada and includes shrubs, forbs, and grasses. These species are drought and alkali tolerant and would provide palatable forage for livestock and wildlife. The basic seed mix also was selected for its ability to establish viable perennial plant communities on the reclaimed slopes, which would have soil texture ranging from coarse, well-drained materials to silty sands.

Upon approval from the BLM and NDEP, alternative seed mixes and application rates may be used for re-seeding in areas where the reclamation results do not meet the Nevada Standards for Successful Revegetation, or where site specific conditions or seed availability would warrant a variation from the basic seed mix.

The study area receives an average of 5 to 7 inches of precipitation per year. According to the BLM, the minimum acceptable seed application rate for successful revegetation is 25 live seeds per square foot. The proposed basic seed mix would be applied at an average drill seed rate of 40 live seeds per square foot or 8.84 pounds of PLS per acre. The proposed seed mix and application rate have been successful in revegetation efforts in the Round Mountain Area and likely would be successful for lands disturbed in the proposed mine expansion. The individual species in the mix and the application rate may be altered based on continued evaluation of seeded sites and seed availability. Potential alternate species to the reclamation mix may include any native species that inhabit the Big Smoky Valley and adjacent mountain terrain.

The majority of seeding would be accomplished by drill seeding during the fall or early spring planting season. Other methods may be utilized on selected areas. Annual variability in site conditions would determine the optimum seeding window (i.e., planting period).

2.6.6 Weed Control

In accordance with the Invasive Non-native Species and Noxious Weed Control Plan, RMGC would monitor the proposed project area for noxious weeds. According to the plan, if noxious weeds are found, weed control practices would be implemented to limit the growth and spread of noxious weeds and to ensure that revegetation is successful with the proposed seed mix. Weed control practices would be implemented in coordination with the BLM to limit the spread of noxious weeds and invasive species in the proposed disturbance areas.

2.6.7 Facility Reclamation

Figure 2.6-1 illustrates the proposed post-mining topography for the Round Mountain and Gold Hill areas. Reclamation details for specific facilities are discussed in the following sections.

2.6.7.1 Pit Reclamation and Security

RMGC has been granted an exemption from reclaiming the currently authorized Round Mountain Pit pursuant to NAC 519A.250 and has requested that the exemption be granted for the Round Mountain Pit expansion and the proposed Gold Hill Pit. **Figure 2.6-2** illustrates the proposed final configuration of the open pits. The reclamation objective is to restrict access to the pits and minimize surface water drainage to the pits.

Berms would be constructed around the pit perimeters to control access by people, livestock, and large wildlife species. The berms would be set back a minimum of 50 feet from the pit rims, and a greater distance in areas where geologic instability could potentially contribute to a berm failure. The berms would be a minimum of 10 feet high with angle of repose side slopes. During final layback development, mine rock would be deposited outside the pit rim to be used in constructing the final berms. The berms would be left in a rough, uneven configuration with boulder placement to deter attempts to traverse the berms. Several natural drainages intercept the eastern margin of the Gold Hill and Round Mountain pits. In these areas, the berms would be constructed of large boulders and coarse fill to allow the free flow of surface water through the berms and reduce the erosion potential. In addition, access roads to the open pit would be eliminated and reclaimed except when needed for post-reclamation monitoring.

2.6.7.2 Closure of Underground Operations

The existing exploration and development decline is located within the open pit perimeter of the Round Mountain Pit. The proposed underground mining operation would utilize and further develop the existing decline. Following the completion of pit and underground mining activity and cessation of pit dewatering, the underground openings would refill and the underground portal would be at the bottom of the Round Mountain pit lake. Flooding of the portal would occur within the active closure period; therefore no additional measures would be necessary to prevent unauthorized access by people and wildlife.

Support facilities near the portal would be removed prior to cessation of pit dewatering. No reclamation of these areas is required since they are within the footprint of the Round Mountain Pit.

2.6.7.3 Waste Rock Dumps

Regrading

Waste rock dumps would be constructed in lifts up to 75 feet in height to an average overall slope of 2.5H:1.0V. The toe of each dump lift would be set back from the crest of the previous lift to achieve a final dump slope angle not steeper than 2.5H:1.0V. **Figure 2.4-10** shows a typical cross-section of the waste rock dumps, which would be built in terraces to facilitate recontouring and reclamation.

During reclamation, the lifts would be regraded to a final average slope configuration not steeper than 2.5H:1.0V, which would reduce visual impacts and increase the revegetation potential of the final dump slopes. Compacted areas of the regraded surface would be ripped or scarified, as needed, to relieve compaction. As described in Section 2.6.3.2, Waste Rock Dumps, the regraded waste rock dumps would be stable based on slope stability studies, thus minimizing the potential for slope failure. Some areas of the waste rock dumps would be regraded and reclaimed concurrently with ongoing operations.

RMGC would plan and design the final placement of waste rock to create variable landforms on new and future waste rock dumps. The upper lifts of the waste rock would be placed to create an uneven skyline profile. Visual diversity would be added to new features during placement of the final waste rock. Long linear features would be avoided by selectively placing final materials to create uneven, complex sloping landforms. Slopes of the existing waste rock dumps would be varied in an effort to relieve rigid geometrical dimensions. Tops of waste rock dumps would be contoured with a gentle slope to provide for non-erosive runoff from the reclaimed feature. The final configuration of the waste rock dumps is subject to change based on operational considerations during the life of the project.

Application of Growth Media

The Waste Rock Management Plan calls for placement of potentially reactive waste rock (i.e., designated waste) within the interior of the dumps and preferential placement of alluvium on final waste rock dump surfaces for both the Round Mountain and Gold Hill operations. As a result, the final regraded dump surfaces would consist almost entirely of alluvium and other non-reactive waste rock and no additional cover would be required to prevent meteoric water from contacting potentially reactive waste.

Some of the final waste rock dump surfaces would consist of alluvium, which would be directly revegetated. Placement of a 10-inch growth media cover would be limited to areas that contain coarse material that

would require placement of growth media in order to reestablish vegetation. The remainder of the waste rock dump surfaces would be directly revegetated without the addition of growth media cover. These areas would be selected and approved on a case-by-case basis prior to revegetation. The final waste rock dump surfaces would likely be composed of gravelly materials, which would limit the erosion potential of in-situ waste rock and growth media.

Revegetation

Revegetation of the reclaimed waste rock dumps would be consistent with Section 2.6.5, Revegetation, Seeding, and Planting.

2.6.7.4 Heap Leach Facilities

Reclamation for heap leach facilities for both the Round Mountain and Gold Hill areas would be completed as described below.

Regrading

The spent heaps would be regraded to an average final slope configuration not steeper than 2.5H:1.0V as illustrated in **Figure 2.4-11**. This would effectively cover the heap leach solution collection ditches. Prior to regrading, a drain pipe would be installed in the solution collection ditches (if one is not already in place) and backfilled with gravel. The heaps would then be regraded over the backfilled solution collection ditches to the edge of the liner. Regarding the Round Mountain heap leach pad to the proposed configuration may require spent ore to be graded off the lined containment, provided MWMP chemistry for the final heap slopes is equal to or better than the reusable pad offload ore characterized by Hydro-Search (1993). Prior to regarding, confirmatory MWMP sampling and analysis would be conducted on the material to be graded off containment.

The geochemistry of the Gold Hill heap material is considerably different from the geochemistry of Round Mountain heap material. Gold Hill heap leach ore contains higher levels of metals and is PAG. Therefore, the design of the Gold Hill leach pad allows the slopes to be regraded to an average 2.5H:1.0V configuration without grading spent ore off of lined containment, thus maintaining a zero discharge condition after closure.

Tops of the leach pads would be constructed in a gently sloping configuration, which would facilitate non-erosive runoff from the reclaimed landform.

Application of Growth Media

Placement of a growth media cover would be limited to areas that contain coarse material that would require placement of growth media in order to reestablish vegetation. The remainder of the leach pad surfaces would be directly revegetated without the addition of growth media cover. These areas would be selected and approved on a case-by-case basis prior to revegetation.

Numerical infiltration modeling completed by SRK (2009a) has shown that the potential for infiltration through uncovered heap leach pad material is expected to be negligible and the only function of the final closure cover for the Round Mountain heap leach pads is to enhance the potential for vegetation establishment (SRK 2009b).

Because the geochemistry of the Gold Hill heap material has the potential to contain higher levels of metals and PAG, and alluvial cover is planned in order to reduce the potential for meteoric water to contact potentially reactive ore material and minimize the possibility of acid generation and metals mobility.

Revegetation

The regraded leach pads would be revegetated in accordance with Section 2.6.5, Revegetation, Seeding, and Planting.

Soil Stabilization

Soil erosion from the leach pads would be minimized by regrading the heaps to an average final slope not steeper than 2.5H:1.0V; contour scarifying the regraded and resoiled heaps when applicable and by revegetating the heaps as described in Section 2.6.5, Revegetation, Seeding, and Planting. Slope stability is discussed in Section 2.6.3.3, Heap Leach Facilities. Soil erosion was not considered a significant risk due to the low rainfall in the study area and the anticipated gravelly loam textures of the growth media to be applied. The Revised Universal Soil Loss Equation (RUSLE) model was used to estimate soil erosion rates for the heap leach pads and waste rock dumps. Results of the revised model indicated that using a slope of a 2.5H:1.0V in the Round Mountain Area yielded a soil loss estimate of 0.4 ton per acre per year (consistent with Round Mountain 1996 EIS findings) and confirmed that the gravelly loam textures and sparse rainfall overwhelm other equation factors of poor canopy cover and slope lengths in controlling erosive potential in the Round Mountain Area. In addition, silt fences may be utilized to limit soil erosion until vegetation can be established.

The RUSLE2 model was used to estimate soil erosion rates for the Gold Hill heap leach pads and waste rock dumps. Results of the model indicated that a reclaimed slope angle of 2.5H:1.0V and a slope length of about 563 feet yielded a soil loss values between 11 and 15 tons per acre per year. The results indicate that management, such as slope breaks, silt fences or vegetative barriers could be very effective in reducing soil loss. Soil loss is predicted to be minimal once vegetation is established on the slope.

Diverting Storm Flow

Flow is directed around the heap leach facilities by diversion ditches designed for a 100-year, 24-hour storm event as required by NAC 445A.433(1)(c). These ditches would remain in place following reclamation and closure of the heap leach facilities to ensure long-term stability. General drainage patterns of the post-mining landscape including diversion ditch locations are illustrated in **Figure 2.6-1**.

Cyanide Stabilization and Neutralization

Rinsing of the Round Mountain and Gold Hill heap leach pads with fresh water would provide no added benefit other than the reduction of cyanide which can be achieved simply by recirculation of remaining heap solution during residual gold recovery and fluid management during closure. This has been demonstrated by the Gold Acres heap rinsing case study (Bowell et al. 2009). The results of this study indicate that rinsing of the heap with fresh water could actually result in an increase in the release of constituents by changing the pH-redox conditions within the heap. Furthermore, rinsing would result in the consumption of a large

quantity of freshwater that would then need to be managed by evaporation. Consequently, fresh water rinsing of the Round Mountain and Gold Hill heap material is not proposed.

Treatment of Outflows, Residual Chemicals, or Fluids in the Heaps

A description of the management of residual heap solution during the closure and post closure period is provided in Section 2.6.7.6, Management of Residual Drain Down.

2.6.7.5 Tailings Impoundment Facility

RMGC would reclaim each tailings impoundment cell when the cell reaches the design capacity. No interim or concurrent reclamation of the tailings impoundment cells would be done during active deposition of tailings in each cell in order to protect the underdrain liner system and the outer berm liner. Reclamation of the tailings drain down collection ponds is discussed in Section 2.6.7.7, Solution Ponds and Collection Ditches.

Regrading

During final tailings deposition, the impoundment surface of each cell would be shaped through deposition to eliminate depressions and create drainage towards the south or southeast areas of the cell without compromising the dam's integrity. Upon completion of tailings deposition, remaining dam freeboard would be regraded or dozed into the impoundment area and the dam face would be recontoured to an average slope not steeper than 2.5H:1.0V. Dam material regraded onto the cell surface would be placed to maintain the drainage slope discussed above. **Figure 2.4-13** illustrates the final tailings impoundment configuration.

Application of Growth Media

Based on conceptual cover design developed for the tailings impoundments at Round Mountain, the fine grained nature of the tailings and the operational method of deposition would result in a well consolidated, low permeability ($<1\times10^{-6}$ cm/sec) mass of tailings solids (SRK 2008b). Consequently, infiltration through the tailings impoundment is expected to be negligible and a cover is not required from an infiltration perspective. However, a 12-inch-thick growth media cover would be placed on the impoundment surface to limit wind erosion and to allow establishment of vegetation.

Following regrading of the dam freeboard, a 12-inch growth media cover would be placed on the impoundment surfaces as well as the regraded dam face in preparation for reseeding. Construction of the tailings growth media cover is dependent on the trafficability of the tailings. The growth media cover would be placed progressively from the outer margin of each cell toward the center as the tailings material drains down, consolidates and becomes trafficable.

If the cover is placed soon after tailings deposition ceases, a traffic layer would be needed prior to cover placement. However, if placement of the cover is delayed sufficiently long that the tailings can drain down and consolidate then this layer would not be necessary.

The management of tailings drain down during the closure and post-closure period is discussed in detail in Section 2.6.7.6, Management of Residual Drain Down.

Revegetation

Revegetation activities would be the same as those described in Section 2.6.5, Revegetation, Seeding, and Planting.

2.6.7.6 Management of Residual Drain Down

Numerical simulations to estimate drain down rates of process fluids have been completed for the Round Mountain and Gold Hill heap leach pads (SRK 2008b) and the tailings impoundments (SRK 2008c). The numerical modeling predicts the drain down time for the Round Mountain heaps would take as much as 5 to 10 years. This can be attributed to the size of the heaps and the fact that the material is relatively fine-grained with moderate plasticity. In comparison to the Round Mountain heaps, the length of the drain down time for the Gold Hill heap is shorter due to the smaller size of the heap. Due to the fine-grained nature of the tailings material, the drain down rate for the tailings impoundment is predicted to be very slow and is significantly longer than that predicted for the heap leach pads.

Fluid management would include an active and passive phase. During the active phase, the initial high rate of drain down of process fluids would be re-circulated and evaporated through a forced spray evaporation system located on the heap leach pads, tailings impoundment surfaces and ponds. Heap solution may also be re-applied to the heap leach pad using the existing drip and/or sprinkler system. The purpose of the active phase would be to rapidly reduce solution inventory in the heap leach pad, tailings impoundment and associated ponds to allow transition to the passive management phase. In the passive phase, the remaining drain down from the heap leach pads and tailings impoundment would be evaporated and possibly evapotranspirated solely from the ponds. Because the drain down period for the tailings impoundment is significantly longer than that of the combined heap leach pads, the tailings impoundment drain down period defines the fluid management schedule.

Evaporation on the heap and tailings impoundment surfaces may extend for 2 to 5 years after closure starts. Until active evaporation on the facility surfaces ceases, growth media would not be placed on those portions of the facility surfaces that are being used for evaporation.

The active management period for the heap leach pad would overlap the active management period for the tailings impoundment and heap and tailings solutions would be managed by the same workforce. However, effluent from the heap leach pads and tailings drain down would be managed separately in order to avoid mixing solutions with differing chemistry. Accordingly, heap solution would only be evaporated on the heap leach pad and associated pond surfaces and tailings drain down solution would only be evaporated on the tailings impoundment and associated pond surfaces. During the passive phase, drain down from the heap leach pads and tailings impoundment would continue to be managed separately.

Management of drain down solution during the passive phase would include converting the associated ponds into evaporation cells (E cells), evapotranspiration cells (E-T cells), or a combination of both. These cells would be constructed by backfilling the ponds with alluvium and revegetating the surface with plants in the reclamation seed mix or plants adapted to wet conditions. Existing event ponds used in the passive management phase would be double lined with HDPE prior to being converted into E cells and/or E-T cells. If additional pond capacity is needed, more ponds may be constructed that would be designed to evaporate residual drain down flows. In-place closure is proposed for process ponds that are not used for the purposes of passive fluid management as described in Section 2.6.7.7, Solution Ponds and Collection Ditches.

Tailings drain down has the potential to contain elevated metals concentrations. As a result, long term drain down solution would be collected and managed through a zero discharge system. During passive management, the use of E-T cells would attenuate metals and metalloids in the drain down fluids by exposure to high ion-exchange capacity minerals in the alluvium.

Gold Hill heap drain down also has the potential to contain elevated metals concentrations. As a result, long-term drain down solution from the Gold Hill heap would be collected and managed through a zero discharge system. Long-term drain down solution from the Round Mountain heap leach pads would be collected and managed through E and E-T cells that may be designed with an overflow system to a subsurface infiltration basin. Drain down from the Round Mountain heap leach pads has the potential to contain aluminum and arsenic at concentrations above Nevada Maximum Contaminant Leval (MCL) values and antimony concentrations above the Nevada MCL (0.006 milligrams per liter [mg/L]) but below the reference value from NDEP Form 0190 for Profile I constituents (0.146 mg/L). Alluvium within the area has been shown to provide significant attenuation capacity for aluminum and arsenic (RMGC 2009) and use of alluvium in the construction of the E and E-T cells and infiltration systems would expose drain down solutions to the high ion exchange capacity of the alluvium which would attenuate aluminum and arsenic. Even though attenuation is not predicted for antimony, concentrations of antimony in the heap drain down would remain below the NDEP reference value.

2.6.7.7 Solution Ponds and Collection Ditches

Heap Leach Solution Ponds

Following closure of the individual heaps, ponds that are not used for the purposes of passive fluid management would be reclaimed. Remaining solutions would be removed by enhanced evaporation or transferred to other operating process components. Sludge left in the ponds would be tested by the MWMP and acid generation/neutralization procedures to determine if it has the potential to degrade surface water or groundwater. If the tests determine there is a potential to remobilize adverse constituents, the sludge material would be transferred to an operating facility or placed on the heaps. If the remobilization potential does not exist, the material and the liners would be left in place. The liners would be folded into the interior of the individual ponds to create an envelope that would shed water. The pond sites would then be backfilled, covered with 12 inches of growth media, and graded to promote free drainage. The reclaimed ponds would be revegetated according to Section 2.6.5, Revegetation, Seeding, and Planting.

Heap Leach Solution Collection Ditches

Regrading the heap leach pads to an average slope not steeper than 2.5H:1.0V would effectively cover the heap leach solution collection ditches. Prior to regrading, a drain pipe would be installed in the solution collection ditches (if one is not already in place) and backfilled with gravel. The heaps would then be regraded over the backfilled solution collection ditches to the edge of the liner. Regrading the Round Mountain dedicated leach pads to the proposed configuration may require spent ore to be graded off the lined containment. The design of the Gold Hill leach pad allows the slopes to be regraded to an average slope not steeper than 2.5H:1.0V configuration without grading spent ore off of lined containment, thus maintaining a zero discharge condition after closure.

Tailings Impoundment Facility Collection Ponds

Tailings impoundment drain down collection ponds that are not used for the purposes of passive fluid management would be reclaimed. The characterization test results of the sludge in the tailings impoundment facility collection ponds are expected to be similar to those of the tailings material. Remaining sludge would be buried in-place with the pond liners. The tailings collection ponds would be backfilled, covered with 12 inches of growth media, and graded to provide free drainage. Revegetation would be consistent with Section 2.6.5, Revegetation, Seeding, and Planting.

2.6.7.8 Haul and Secondary Roads

Project roads would be reclaimed unless the BLM requests that particular roads be left in place. Reclamation would consist of ripping to relieve compaction, recontouring, placing 12 inches of growth media if needed, reseeding the surface and monitoring the progress of revegetation. Revegetation of roads would be consistent with Section 2.6.5, Revegetation, Seeding, and Planting. Soil amendments may be applied to suitable growth media on an as-needed basis. Berms, side-cast material, and road drainage ditches would be reclaimed in this process. Blacktop road and parking surfaces would be ripped and buried in place prior to regrading. The relatively flat topography of the study area would minimize cut-and-fill road construction and facilitate reclamation. Road ditches would be filled and regraded to blend with the natural drainage patterns. Certain ramps within the open pit may be left; however, access roads to the pit would be reclaimed, and the pit would be bermed. Minor two-track or one-lane access corridors would be left as needed to conduct reclamation monitoring activities.

Where possible, drainages that were altered by the construction of the road system would be reconstructed to facilitate drainage to reduce the erosion potential due to precipitation runoff. Culverts would be removed unless the BLM requests that they be left in place. Water bars would not be used, as the road disturbance would be blended with the natural topography.

Upon completion of reclamation activities, RMGC would ensure that adequate public access is restored to BLM- and USFS-administered public lands. If additional access routes were needed, their use would be coordinated with the BLM and USFS.

2.6.7.9 Transportation/Utility Corridor

Reclamation of the Transportation/Utility Corridor would involve several components including the haul road and box culverts, 24.9-kV power line and access road, underground water pipeline, corridor boundary fence, and traffic control devices. The haul road and the power line access road would be reclaimed as described in Section 2.6.7.8, Haul and Secondary Roads. The power line and poles would be removed and the holes backfilled unless otherwise prescribed by the BLM. The traffic control devices and corridor boundary fence would be removed. The underground water pipeline would be plugged and left in place. Culverts would remain in place for drainage and access.

2.6.7.10 Dewatering Wells

The Reclamation Plan accounts for plugging and abandonment of wells utilized for monitoring, dewatering, geothermal production, and injection unless a post-mining use is approved by BLM. Wells would be plugged according to NRS 534.421 through NRS 534.428 after use.

Make-up and potable water for the Round Mountain Area is provided by the general mine-site wells located west of the Round Mountain Area in Smoky Valley. The Gold Hill wells would be located in the vicinity of the Gold Hill facilities. The water rights for these wells are owned by RMGC. If ownership of the water rights is not transferred, these wells would be plugged according to the standards set forth in NRS 534.421 through NRS 534.428. If BLM approves a post-mining use, some or all of these wells would remain open.

2.6.7.11 Stormwater Controls and Diversions

Sediment basins and traps have been or would be installed at various locations in the Round Mountain and Gold Hill areas as part of the stormwater control program. Waters of the U.S. have not and would not be affected by existing and proposed operations; therefore, RMGC is not subject to stormwater permitting through NDEP.

RMGC would utilize temporary sediment control practices, including berms, sediment traps, silt fencing, and hay/straw bale dikes as needed during reclamation and vegetation establishment. The reclaimed heaps would be comprised of spent ore and growth media, while the waste rock dumps would be composed of waste rock and growth media. Growth media utilized for the resoiling of the heaps and waste rock dumps is composed of a gravelly loam/alluvial material. The coarse texture of these soil materials, in combination with contour ripping/scarifying, and revegetation would minimize sediment loss from these reclaimed facilities (Section 2.6.7.4, Heap Leach Facilities). In addition, no water bodies are located downgradient of the study area that could be impacted by sediment deposition from the mine site. Surface water runoff and drainage would be conveyed to the natural drainages within and adjacent to the mine site.

As required by NAC 445A.433, diversion ditches around existing and proposed heap leach facilities and tailings impoundment facilities would divert runon from the 100-year, 24-hour storm event into existing drainages.

2.6.7.12 Crushing and Processing Facilities

Buildings in the Round Mountain and Gold Hill areas would be demolished unless otherwise prescribed by the BLM. Buildings are generally constructed on a gently sloping alluvial fan or on waste rock dumps. Upon removal of equipment and structural facilities, concrete foundations would be broken up in place to allow for percolation of meteoric waters and buried under a minimum of 12 inches of common fill and growth media, graded to allow free drainage, and revegetated as described in Section 2.6.5, Revegetation, Seeding, and Planting. Large concrete crusher pedestals would be knocked down or shortened as much as possible prior to covering.

2.6.7.13 Ancillary Facilities

Non-hazardous or non-toxic materials such as scrap lumber or metal would be disposed of in State-approved waivered Class III landfills. The waivered Class III landfills approved for operations within the North Waste Rock Dump in the Round Mountain Area and the Gold Hill waivered Class III landfills would be covered by waste rock extracted from their respective open pits. The landfills would be covered by waste rock during the normal development of their associated waste rock dumps. Final reclamation of the landfills would be the same as described in Section 2.6.7.3, Waste Rock Dumps.

Reagents, petroleum products, solvents, and other hazardous or toxic materials would be disposed of according to Federal and state regulations.

Equipment including transformers, pumps, generators, etc. would be salvaged and utilized or disposed of in an appropriate manner. Power lines and power poles owned by RMGC and internal to the operations areas would be removed and salvaged or disposed of in the waivered Class III landfills. RMGC has verified that no polychlorinated biphenyls (PCB)-containing transformers are on site. RMGC has an ongoing program to ensure that PCB-containing transformers are not brought onto the site. No known asbestos is on the site.

Equipment that contained process solutions including pumps, piping, leach tanks, and carbon adsorption facilities would be cleaned and disposed of or reused in an appropriate manner. The equipment cleaning process would be determined by RMGC in accordance with applicable regulations.

Where accessible, pipes would be removed for reuse or taken to the landfill. Pipes not accessible would be capped/plugged in place and buried with a minimum of 2 feet of cover. Structural building materials would be recycled or hauled to the on-site landfills or to a permitted off-site landfill. The septic systems/leach fields would be closed according to state regulations.

2.6.7.14 Reclamation of Historic Disturbance

In the Gold Hill Area, RMGC has volunteered to excavate historic tailings of significant thickness in interpit areas where the proposed West Waste Rock Dump and Gold Hill Pit do not overlap the tailings. The excavated tailings would be sent to the Round Mountain process facilities for processing, placed on the Gold Hill Dedicated Pad or waste rock dump. Where only a thin layer of historic tailings exists, the tailings would be left in place because the benefit of removal would be less than the environmental impact of additional disturbance.

2.6.8 Surface Facilities or Roads not Subject to Reclamation

The following facilities would not be reclaimed:

- Round Mountain Pit;
- Gold Hill Pit;
- Shale Pit (disturbed land pre-dating RMGC); and
- Miscellaneous storm ponds and disturbances adjacent to the Round Mountain and Gold Hill open pits.

2.6.9 Post-reclamation Monitoring and Maintenance

Post-closure monitoring would consist of:

- Vegetation surveys coordinated with the BLM and NDEP;

- Routine maintenance of the pit berm and signs to ensure these facilities are in proper working order; and

- Required monitoring associated with current permits and approved closure plans.

Results from the vegetation surveys would determine the vegetation success rate of reclaimed sites. RMGC's vegetation monitoring obligation would cease and final reclamation surety would be released upon the achievement of the revegetation goals specified by the BLM and NDEP.

Revegetation monitoring would be conducted for a minimum of 3 years following implementation of revegetation activities or until revegetation success has been achieved. Revegetation monitoring would be based on seasonal growth patterns, precipitation, and weather conditions.

Springs and monitoring wells that are within the maximum 10-foot groundwater drawdown isopleth created by the dewatering of the Round Mountain and Gold Hill pits would be monitored during the post closure period. Flow measurements would be collected from all springs and water levels would be collected from all monitoring wells within the maximum 10-foot groundwater drawdown isopleth on a bi-annual basis for 30 years after the cessation of pit dewatering. Access to springs and wells on private land would be subject to the permission of the landowner. Johnson springs 1 and 2 would not be monitored due to denial of access by the landowner (Johnson 2009).

Drain down chemistry and flow rates from the heap leach pads and tailings impoundments, as well as select monitor wells, would continue to be monitored until the closure methods used for each facility have been demonstrated to be effective. This is expected to require a 10-year monitoring period following initiation of passive management for each heap leach pad and the tailings impoundment.

2.7 Alternatives to the Proposed Action

2.7.1 Gold Hill Area Processing Alternative

This alternative would include the processing of all ore mined from the Gold Hill Pit on the dedicated heap leach pad at Gold Hill. This would eliminate the haulage of up to 2 Mt of ore from Gold Hill to Round Mountain for processing but would result in a lower recovery rate and a loss of approximately 31,000 ounces of gold that would otherwise be recovered via ore processing in the Round Mountain Area. The configurations of mine components would be the same as the Proposed Action with minimal differences in heights of the heap leach pad and waste rock dumps (**Figure 2.4-1**). The total weight of ore and average number of loads (220 tons) per day associated with the haulage of Gold Hill ore to the Round Mountain Area that would not occur under this alternative are:

- Year 2011 – 0.05 Mt of ore based on an average of 1 load per day;
- Year 2012 – 0.19 Mt of ore based on an average of 3 loads per day;
- Year 2013 – 0.44 Mt of ore based on an average of 6 loads per day;
- Year 2014 – 0.34 Mt of ore based on an average of 4 loads per day;
- Year 2015 – 0.53 Mt of ore based on an average of 7 loads per day; and
- Year 2016 – 0.35 Mt of ore based on an average of 5 loads per day.

2.7.2 County Road Overpass Alternative

The Round Mountain and Gold Hill operations would be connected by a Transportation/Utility Corridor. Within the corridor, a 146-foot-wide haul road (120-foot-wide road with sideslopes), an overhead 24.9-kV power line and 12-foot-wide access road, and an underground water pipeline would be constructed. The

corridor would be fenced with an NDOW-approved four-strand range fence, which would include three barbed strands and a smooth bottom strand to allow for wildlife movement across the corridor.

This alternative would include the construction of a multi-plate overpass structure on CR 875, with the haul road crossing over the top of the overpass. Construction of the multi-plate structure would be accomplished by a contractor that specializes in the construction of these structures. The structure would be approximately 16 feet high with approximately 5 feet of cover over the structure and 30 feet wide at the actual crossing of CR 875. **Figures 2.7-1** and **2.7-2** illustrate overhead and oblique views of the overpass structure. In addition, **Figure 2.7-3** illustrates a cross-section of the overpass structure and utilities within the Transportation/Utility Corridor. The design of the overpass would be in compliance with Nye County Road Department specifications, or modified as required. It is estimated that construction of the overpass structure would be completed in approximately 21 days with a work force of 10 individuals. The foundation of the ramp would be constructed using fill material from the existing mining operation. Ramp construction would be accomplished using RMGC personnel and equipment.

As compared to the Proposed Action, overall effects from this alternative result in the disturbance of approximately 1.7 acres of additional disturbance, less fuel consumption by haul trucks (haul trucks would not be required to stop at the intersection), and greater public safety.

Under this alternative, mine configurations and post-mining reclamation topography would be the same as described for the Proposed Action.

2.8 Alternatives Considered but Eliminated from Detailed Analysis

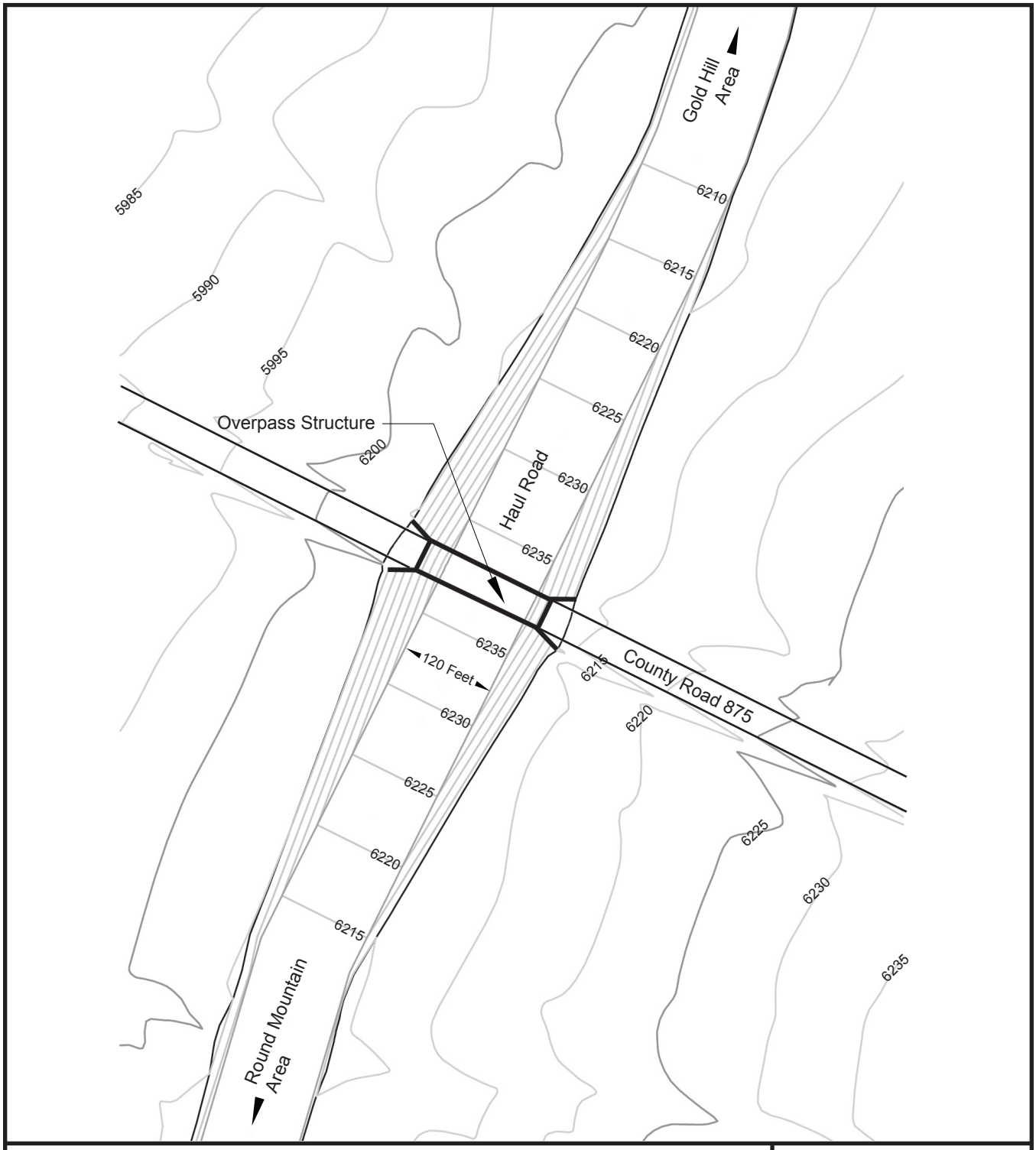
This section of the EIS describes the alternatives considered but eliminated from detailed analysis by the BLM, and the rationale for their elimination. The identified alternatives were considered relative to their means of addressing the identified purpose and need for the Proposed Action, their technological and economic feasibility, as well as their potential to reduce environmental impacts. No additional alternatives have been identified by the BLM as a result of the scoping process or project evaluation.

2.8.1 Increase Tailings Disposal Facility Height/Eliminate Cell D Tailings Dam Alternative

Under this alternative, increasing the height of the existing tailings impoundment facility (Cell A) and Cells B and C of the proposed tailings impoundment facility could potentially eliminate the need for Cell D of the proposed tailings impoundment facility. This alternative would reduce the surface disturbance in the Round Mountain Area by approximately 360 acres. Although detailed geotechnical evaluations have not been completed for Cells B and C for crest heights above those presented in the Proposed Action, it is anticipated that height increases necessary to eliminate a cell would not be geotechnically feasible.

2.8.2 Overland Conveyor System from Gold Hill to Round Mountain Alternative

Under this alternative, the potential construction and operation of an overland ore conveyor system from the Gold Hill Pit to the Round Mountain Area was evaluated. This alternative would eliminate the need for truck haulage of ore on the haul road within the Transportation/Utility Corridor between the Gold Hill and Round Mountain areas, and would reduce the surface disturbance in the Gold Hill Area by approximately 10.5 acres. However, this would not eliminate the need for the Transportation/Utility Corridor since the road would accommodate vehicular traffic and provide water and electricity from the Round Mountain to the Gold



Note: Topograhic elevations provided in feet, USGS 1929 Vertical Datum.

Round Mountain Expansion Project

Figure 2.7-1

County Road Overpass Alternative - Overhead View of the Overpass Structure

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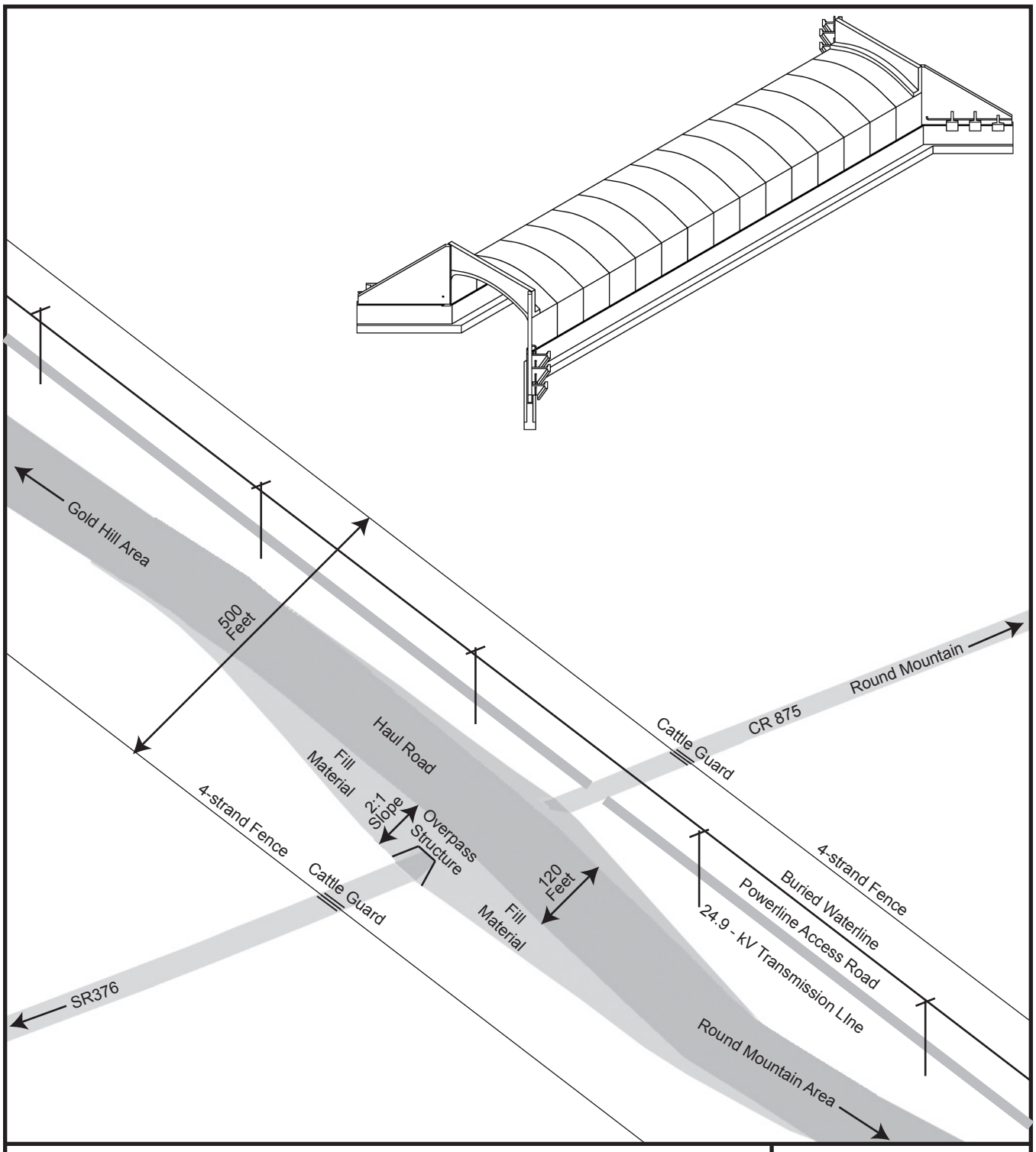

Round Mountain Expansion Project

Figure 2.7-2

County Road Overpass Alternative - Oblique Views of the Overpass Structure

Note: Topographic elevations provided in feet, USGS 1929 Vertical Datum.

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Hill Mine facilities. In addition, mining equipment and maintenance personnel would need to utilize the Transportation/Utility Corridor since all mining equipment in the Gold Hill Area would be maintained at facilities in the Round Mountain Area. An overland conveyor system would require the construction and operation of a crushing facility in the Gold Hill Area to reduce ore size to a fraction that would be suitable for placement and transport on an overland conveyor. The construction of the crushing facility and a 5.8-mile-long overland conveyor system would not be economically feasible, based on the proposed 7-year life of mining in the Gold Hill Area. Implementation of this alternative would reduce fuel consumption and air emissions from the reduction of haul truck traffic.

2.8.3 Transportation/Utility Corridor Alternative

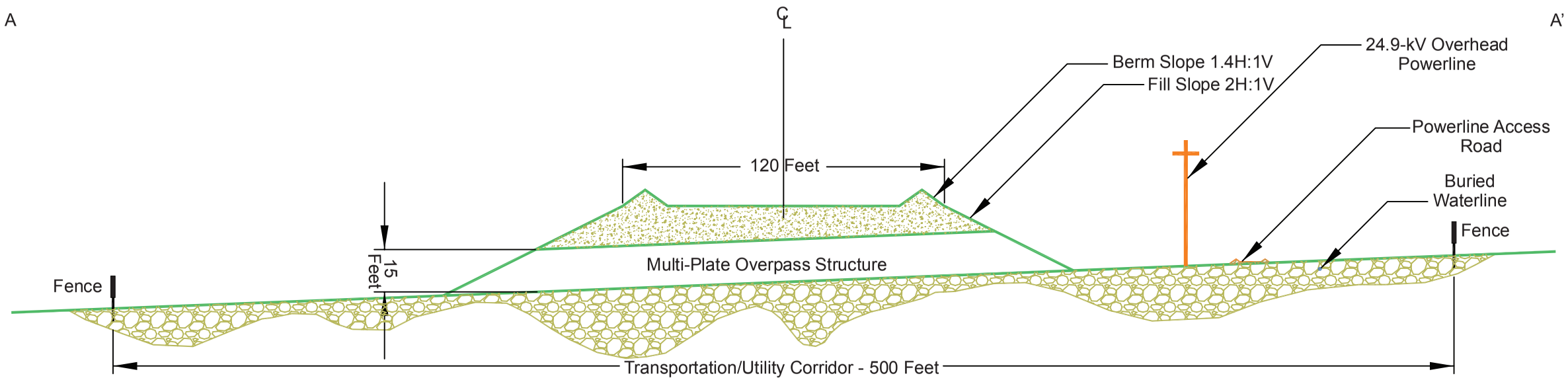
Alternative alignments were investigated for the Transportation/Utility Corridor between the Gold Hill and Round Mountain areas. The proposed alignment crosses CR 875, which connects the town of Round Mountain to SR 376. If another alignment could bypass CR 875, public safety concerns about the crossing could be eliminated. The only alternative alignment would exit the Round Mountain project boundary south of Round Mountain and then turn northward towards the Gold Hill Area.

The alternative alignment would avoid CR 875 but would cross recreational access roads to Shoshone, Dry, and Jefferson canyons. The topography along the alternative alignment includes hills around the town of Round Mountain and side slopes associated with an alluvial fan. Native American groups, who were consulted regarding the proposed project, have stated that the Transportation/Utility Corridor should be sited as far to the west as possible to avoid conflicts with cultural sites.

The alternative alignment for the Transportation/Utility Corridor was eliminated from further consideration because it would either close recreational access roads or require a grade crossing across the access roads to Shoshone, Dry, and Jefferson canyons. The proposed alignment would not affect access to these canyons. Considerably more earthwork would be needed to grade and level the haul road for the alternative alignment as compared to the proposed alignment. In addition, the alternative alignment would conflict with cultural resource sites, which would not be acceptable to the Native American tribes, families and individuals who have been actively involved with the BLM and RMGC in siting the proposed alignment.

2.8.4 Tailings Impoundment Facility Locations Alternative

Under this alternative, alternate locations for the tailings impoundment facilities were evaluated that could potentially reduce surface disturbance and impacts to visual resources. Under the Proposed Action, new tailings impoundment facilities (Cells B, C, and D) would be oriented in a line extending south from the existing tailings impoundment facility (Cell A). Due to the topographic relief within the proposed project area, potential alternative locations would cause greater surface disturbance and would be more difficult to construct and operate. For example, if Cells C and D were moved westward and northward to the west side of SR 376 and placed in a block with Cells A and B, the length of the tailings impoundment facilities could be reduced by 3.2 miles. However, cell placement west of SR 376 may interfere with aviation activities at the Smoky Valley Airport. In addition, cell placement west of SR 376 would either result in a significant reroute of SR 376, or the construction of cross-highway facilities (i.e., pipelines for tailings slurry and drain down solution). Impoundment cells west of the SR 376 also be more visually intrusive to Hadley and other residents in the Smoky Valley.



Legend

- Fill
- Alluvium

Round Mountain Expansion Project

Figure 2.7-3

County Road Overpass Alternative - Cross-section of the Overpass Structure

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If the southernmost cell of the tailings impoundment facility (Cell D) was moved eastward and northward and was placed adjacent to Cell C, impacts to visual resources would be reduced. However, since the growth media stockpile for the tailings impoundment facility is in this location, construction of a tailings impoundment cell in that area would result in greater surface disturbance. Drainage diversion around Cell D also would require more complex construction and extensive disturbance.

2.8.5 Ore Processing Options for ROM Ore at Gold Hill

Three ore processing options for ROM ore at Gold Hill were evaluated including:

- A Merrill-Crowe processing facility at Gold Hill;
- A Carbon-in-Column facility constructed at Gold Hill with the carbon processed in a modified Round Mountain ADR; and
- A Carbon-in-Column and ADR facility constructed at Gold Hill.

The Merrill-Crowe processing facility was selected to recover gold and silver from the Gold Hill Heap Leach Pad based primarily on the silver:gold ratio in the ore body. A higher silver to gold ratio requires a different type of ore processing, such as Merrill-Crowe processing, than the Carbon-in-Column method which is currently being used at Round Mountain. As a result, the Carbon-in-Column facility alternatives would not meet the Proposed Action's purpose and need. There is no environmental differences between the use of a Merrill-Crowe processing facility and a Carbon-in-Column facility.

2.8.6 Process All Gold Hill Ore at Round Mountain Alternative

Under this alternative, processing all Gold Hill ore at Round Mountain process facilities would eliminate the need for a heap leach pad and associated process facilities at Gold Hill. Although this alternative would reduce surface disturbance at Gold Hill by approximately 335 acres, an equivalent amount of disturbance would be needed in the Round Mountain Area for the construction of an additional leach pad and processing facilities (e.g., Merrill-Crowe processing facility). In addition, this alternative would greatly increase haulage costs from the Gold Hill Area by approximately $46.4 million, and increase traffic and fugitive dust, as compared to the Proposed Action. This alternative was eliminated from further consideration since it would fail to meet the Proposed Action's purpose and need, and would have additional environmental impacts.

2.8.7 Underground Operation at Gold Hill Alternative

Under this alternative, the Gold Hill Pit would be eliminated and ore would be mined exclusively by underground methods. This alternative would greatly reduce surface disturbance in the Gold Hill Area as compared to the Proposed Action. The Gold Hill orebody primarily consists of low-grade gold ore that cannot be economically recovered by underground mining. A lower cost open pit is the only means to economically mine at Gold Hill. Should higher grade reserves be identified in the Gold Hill Area, underground mining may be considered in the future.

2.8.8 Heap Leach Pad Locations Alternative

Under this alternative, several potential locations and configurations of heap leach pads in the Round Mountain and Gold Hill areas were evaluated. These locations included:

Round Mountain Area

- Northern expansion of the West Dedicated Heap Leach Pad;
- North Pad alternatives, which did not require relocation of the NVEnergy 230-kV power line; and
- Heap leach pad expansion, which would have joined the South and West Dedicated Heap Leach Pads.

Gold Hill Area

- Several locations and configurations were evaluated for the Heap Leach Pad in the Gold Hill Area. These locations were greater distances from the Gold Hill Pit than the proposed location of the Gold Hill Heap Leach Pad.

These sites were considered but excluded from detailed analysis. Some of the locations were not logistically possible given space constraints within the Round Mountain Area. Also, other locations did not offer any environmental advantage over the proposed placement of the North Dedicated Pad in the Round Mountain Area and the proposed Heap Leach Pad in the Gold Hill Area.

2.8.9 Construct Crushing Facility at Gold Hill Alternative

Under this alternative, the construction of a crushing facility or use of a contractor to crush ore in the Gold Hill Area was evaluated. The crushing of high grade oxide ore in the Gold Hill Area would increase recovery rates of the gold and silver from this ore. The high grade oxide ore would be most economically processed by either hauling the material to Round Mountain to be crushed and placed on the Reusable Leach Pad or being directly placed on the proposed Gold Hill Heap Leach Pad without being crushed. The crushing facility alternative was therefore, eliminated from detailed analysis since it would not be economically feasible and would not meet the Proposed Action's purpose and need.

2.8.10 Construct a Mill at Gold Hill and Process Sulfide Ores at Gold Hill Alternative

An economic evaluation was completed to evaluate the option of constructing a mill in the Gold Hill Area to process sulfide ore. Based on this study, it was determined that with the currently identified resource, a mill at Gold Hill is not economically feasible, and would not meet the Proposed Action's purpose and need.

2.8.11 Round Mountain Partial Pit Backfill Alternative

Under this alternative, the Round Mountain Pit would have two bottoms when fully developed. With proper planning and pit sequencing, the eastern pit bottom would be backfilled to an elevation of 4,995 feet. Although approximately 2.3 Mt of waste rock would be placed within the pit instead of being placed in the North Waste Rock Dump, surface disturbances would be the same as described for the Proposed Action. With the placement of waste rock in the pit and the subsequent formation of a pit lake, there would be potential to degrade waters of the State of Nevada as a result of ground water flow through the backfill. In

addition, the placement of backfill in the pit could preclude future mining opportunities and would offer no material environmental benefit.

2.8.12 Round Mountain Maximum Partial Pit Backfill Alternative

Under this alternative, approximately 871.2 Mt of waste rock would be placed in the pit bottom to an elevation of 6,030 feet, which would be higher than the pre-mining water level and below the pit rim (elevation range: 6,150 to 6,700 feet). Placement of waste rock in the pit would eliminate the formation of a pit lake, eliminate drawdown of groundwater in the long term, and reduce the size of the waste rock dump(s). Backfilling of the Round Mountain Pit would potentially create a flow-through pit, thus allowing any chemical changes to water quality due to potential leaching of metals from the pit backfill to impact downgradient water quality in the alluvial aquifer. In addition, this alternative would result in an additional $592 million in operating costs as compared to operating costs associated with the Proposed Action. These additional costs would be associated with additional roundtrip truck haulage of waste rock, increased fuel consumption and consumables (e.g., tires), the use of other heavy equipment, and increased labor costs. Two equipment spreads and approximately 37 years would be required to complete backfilling operations. These additional costs would render development of part or all of the ore body uneconomic. As a result, this alternative was eliminated based on economic and environmental considerations.

2.8.13 Gold Hill Complete Pit Backfill Alternative

Under this alternative, up to 144 Mt of waste rock would be returned to the pit. The waste rock would be higher than the pre-mining water, but below the pit rim. Placement of the waste rock would eliminate the formation of a pit lake, drawdown of groundwater in the long term, and the reclamation of the waste rock dumps. In this alternative all waste rock would be backfilled into the Gold Hill Pit. This would eliminate the proposed Gold Hill waste rock dumps, but would result in a flow-through pit for Gold Hill. The MWMP tests have shown that the designated waste rock at Gold Hill has the potential to leach sulfates and other metals. Consequently, creation of a flow through pit by the backfilling of the Gold Hill Pit would result in degradation of downgradient ground water quality. In addition, this alternative would result in an additional $76 million in operating costs as compared to operating costs associated with the Proposed Action. These additional costs would be associated with additional roundtrip truck haulage of waste rock, increased fuel consumption and consumables (e.g., tires), the use of other heavy equipment, and increased labor costs. One equipment spread and approximately 7 years would be required to complete backfilling operations. This alternative was eliminated from detailed analysis because it would render development of the Gold Hill Pit uneconomic. As a result, this alternative was eliminated based on economic and environmental considerations.

2.9 Past, Present, and Reasonably Foreseeable Future Actions

Cumulative impacts are those impacts on the environment that result from the incremental impact of the Proposed Action when added to the impacts of past, present, and RFFAs, regardless of what agency (Federal or non-Federal) or private entity undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time (40 CFR 1508.7). BLM IM NV-90-435 specifies that impacts first must be identified for the proposed project before cumulative impacts with interrelated projects can occur.

The BLM has identified past, present, and RFFAs with the potential to cause cumulative impacts in combination with the proposed project. These actions were identified primarily by geographic location and type of activity of the projects that are being considered in the analysis, as well as the type of resource potentially affected. A brief description of these actions is provided in this section. The area of concern for cumulative impacts would vary by resource. Impacts to certain resources would be restricted to the actual area of disturbance. Other resources, such as livestock grazing and wildlife, may be affected over a wide area, and cumulative impacts could involve more than surface disturbance. Resource specific cumulative impact areas were developed for each resource, as appropriate, and are discussed in Chapter 4.0, Environmental Consequences.

2.9.1 Past and Present Actions

Mining in the Big Smoky Valley and adjacent southern Toquima Range has historically included surface placer operations, exploration (drilling, trenching, sampling, and road construction), underground mining, and recent open pit mining. The surface disturbance associated with these mines includes underground mine workings, open pits, prospect pits, dredge deposits, waste rock dumps, heap-leach pads, tailing impoundments, and ore processing facilities, and other structures. Within the region, mining activity has been centered around five primary mineralized districts: Round Mountain, Manhattan, Gold Hill, Jefferson Canyon, and Barcelona (BLM 1996). Other actions that are considered in this EIS include farming, mining exploration, geothermal exploration, transportation and utility corridors, residential developments, and other county and government actions. The location and approximate extent of these mining districts and past, present, and RFFAs is shown in **Figure 2.9-1**. **Table 2.9-1** presents the acreages of existing disturbance for the mining districts and past, present, and RFFAs.

2.9.1.1 Mining-related Disturbance

The Round Mountain District

The Round Mountain District has been the focus of mining operations since 1906. Historic mining activities and gold and silver production in this district have been associated with placer operations, underground mining, and open-pit mining for gold. The Round Mountain Mine is the only active large-scale mining operation currently in production in the area. Total disturbance in the Round Mountain District is approximately 5,928 acres.

A history of the POO and associated expansions at the modern Round Mountain Mine from 1981 to 2006 is presented in Section 2.2, Background.

The Manhattan District

The Manhattan District encompasses an area of approximately 20 square miles. Most of the production has come from an east-west oriented belt approximately 0.6 mile wide and 6 miles long centered on the Town of Manhattan. The district's early production (1905 to 1947) came from numerous underground mines and surface placer operations. A large drag line dredge was in operation in Manhattan Gulch from 1938 to 1947.

Unreclaimed disturbance within the Manhattan Mining District is attributed to past or current underground, open pit, and placer mining and mill operations. There is also unreclaimed disturbance from past and

current mineral exploration including drill sites, roads, trenches, and prospect pits. Unreclaimed disturbance from mining and exploration activities in the Manhattan Mining District is approximately 528 acres.

Table 2.9-1
Surface Disturbance Associated with
Past, Present, and Reasonably Foreseeable Future Actions

Action	Past and Present Disturbance		Proposed Round Mountain Mine Expansion (acres)	RFFA Projected Disturbance (acres)
	Total Disturbance (acres)	Reclaimed Disturbance (acres)		
Mining Districts or Project Name				
Round Mountain Mine	5,928.0	0.0	3,032.7	0.0
Manhattan District	528.0	0.0	0.0	30.0
Barcelona District	20.0	0.0	0.0	0.0
Jefferson Canyon District	30.0	0.0	0.0	0.0
Gold Hill District	0.0	0.0	1,668.4	400.0
Northumberland Mine	500.0	180.0	0.0	
Midway Mine	8.0	0.0	0.0	15.0
Nevada Moly Project and Tonopah Copper Mine (Hall Mine)	2,553.0	2,174.0	0.0	500.0
Subtotal	**9,567.0**	**2,354.0**	**4,701.1**	**945.0**
Mining Exploration				
North Gold Hill (NVN-077007)	2.0	0.0	0.0	0.0
South Gold Hill (NVN-077083)	5.0	0.0	0.0	0.0
Gold Hill (NVN-075204) Plan of Operations	28.0	0.0	0.0	20.0
Round Mountain (NVN-072662) Plan Amendment	9.0	0.0	14.0	0.0
Subtotal	**44.0**	**0.0**	**14.0**	**20.0**
Geothermal Exploration				
Round Mountain Gold Corp. (NVN-046200)	5.0	0.0	0.0	0.0
Kenneth Berg (NVN-073967)	0.0	0.0	0.0	5.0
Lillian Darrough (NVN-074289)	0.0	0.0	0.0	5.0
Subtotal	**5**.0	**0.0**	**0.0**	**10.0**
Geothermal Power Plants				
Devils Canyon Geothermal Plant	0.0	0.0	0.0	9.0
Trail Canyon Geothermal Plant	0.0	0.0	0.0	9.0
Truckee Geothermal Plant	0.0	0.0	0.0	9.0
Subtotal	**0**.0	**0.0**	**0.0**	**27.0**

Table 2.9-1 (Continued)

Action	Past and Present Disturbance		Proposed Round Mountain Mine Expansion (acres)	RFFA Projected Disturbance (acres)
	Total Disturbance (acres)	Reclaimed Disturbance (acres)		
Utilities/Community				
Primary Roads (60 feet wide)	2,987.0	0.0	0.0	0.0
Secondary Roads (12 feet wide)	61.0	0.0	0.0	0.0
Power lines and communication ROW (12 feet wide)	131.0	0.0	0.0	0.0
Towns of Hadley, Carvers, and Round Mountain	270.0	0.0	0.0	0.0
Hadley Airport	10.0	0.0	0.0	0.0
Subtotal	**3,459.0**	**0.0**	**0.0**	**0.0**
Federal Land Withdrawal				
DLE 081370	318.5	0.0	0.0	0.0
DLE 081371	318.0	0.0	0.0	0.0
DLE 081372	303.0	0.0	0.0	0.0
Subtotal	**939.5**	**0.0**	**0.0**	**0.0**
Other Development and Actions				
BLM Community Gravel Pit	2.3	0.0	0.0	0.4
Nye County Landfill	40.0	0.0	0.0	0.0
Irrigated Agriculture	880.0	0.0	0.0	0.0
Subtotal	**922.3**	**0.0**	**0.0**	**0.4**
Total	**14,936.8**	**2,354.0**	**4,715.1**	**1,002.4**

The Gold Hill District

The Gold Hill District is a relatively small mining district that includes the historic Gold Hill Mine. Approximately 19,000 ounces of gold and 185,000 ounces of silver were produced. Unreclaimed surface disturbance from mining and exploration activities in the Gold Hill District is estimated at approximately 30 acres.

The Jefferson Canyon District

The Jefferson Canyon District is a historical mining area with mine ruins and an abandoned mining town. The district historically produced 1,000 ounces of gold and 300,000 ounces of silver. Exploration in the district has indicated that the district contains reserves of gold and antimony that could potentially be mined in the future. There are approximately 30 acres of unreclaimed exploration and old mine roads in the District.

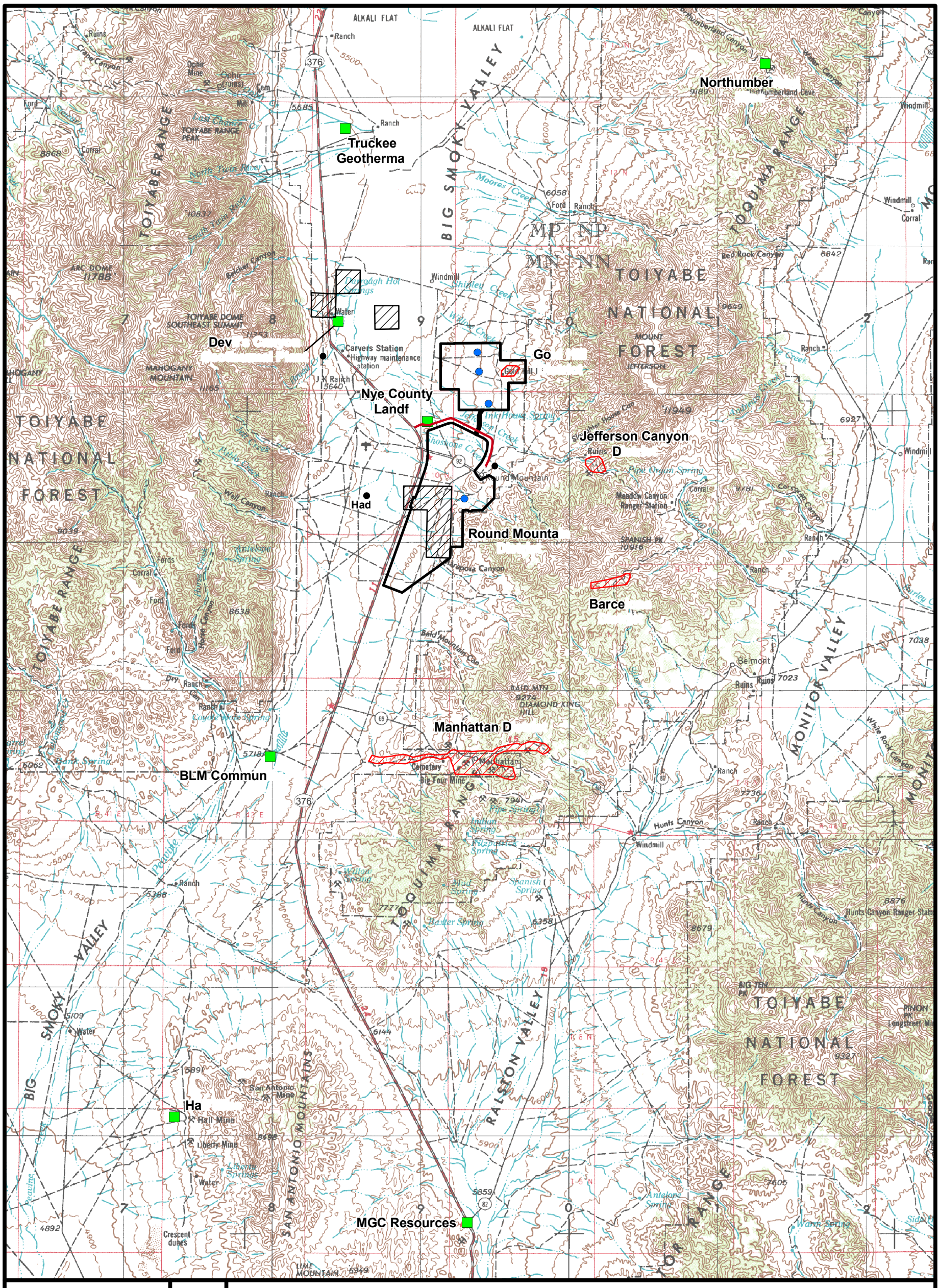

Figure 2.9-1
Past, Present and Reasonably Foreseeable Future Actions

Round Mountain Expansion Project

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The Barcelona District

The majority of surface disturbances in the Barcelona District resulted from the operation of the Van Ness and Flower Mines. These mines historically produced 1,000 flasks of mercury; other small mines in the district recorded small production of gold, silver, and lead (Mills et al. 1988). There are approximately 20 acres of unreclaimed exploration and old mine roads in the District.

2.9.1.2 Other Development and Actions

Other actions that would contribute to cumulative impacts within the Big Smoky Valley include a BLM community gravel pit located south of the Peavine Road in the southern portion of Big Smoky Valley. Surface disturbance at this gravel pit is approximately 2.3 acres. In addition, the Nye County Landfill is located immediately north of the Round Mountain Area. Permitted surface disturbance at the landfill is estimated at approximately 40 acres.

Permitted exploration activities in the Gold Hill District include a total of 50 acres of disturbance and a maximum of 500 drill holes under the Gold Hill Plan of Operations (NVN-075204), North Gold Hill (NVN-077007), and South Gold Hill (NVN-077083). Currently, approximately 28 acres have been disturbed and approximately 308 holes have been drilled.

Under the Round Mountain Plan Amendment (NVN-072662), exploration activities at the Round Mountain Mine include a maximum of 9 unreclaimed acres and 12 drill holes that have not been plugged within 60 days, at any 1 time.

Three geothermal leases also occur in Big Smoky Valley, including 1 lease that has been issued to RMGC for 2,559 acres and 2 individual leases from Kenneth W. Berg (NVN-073967) and Lillian Darrough (NVN-074289) for 846 acres. Although the total acreage would approximate 3,405 acres, it is expected that there would be fewer than 20 acres of total disturbance from these projects.

Three Desert Land Entries (DLE) located north of Carvers have been authorized by the BLM for irrigation and agricultural production. The three DLE's, N-081370, N-081371, and N-081372, total 940 acres.

Cumulative disturbance includes approximately 3,048 acres of surface disturbance from the development of primary and secondary roads, approximately 131 acres of disturbance from the construction and operation of power lines and communication ROWs, approximately 880 acres from the development of agricultural lands, and approximately 270 acres of disturbance from the development of residential communities (Hadley, Carvers, Round Mountain).

2.9.2 Reasonably Foreseeable Actions

In order to qualify as a RFFA for the cumulative impact analysis, a project must impact the same resources as the proposed mine expansion, must occur within the life of the Proposed Action (including reclamation), and must have a reasonable likelihood of going forward.

Gold Hill Pit (Phase II Development [Round Mountain Gold Corporation])

Drilling in the area immediately west of the proposed Gold Hill Pit has detected gold mineralization. If further drilling in the area confirms the presence of an adequate quantity of ore grade mineralization, it is reasonably foreseeable that RMGC could propose expanding the Gold Hill Pit.

If expanded to the west, the pit footprint could grow to as large as 400 acres. The known mineralization would indicate that the pit could be as deep as approximately 1,200 feet. Mining to that depth would require additional dewatering beyond what is currently proposed for the Gold Hill Pit.

It is likely that ore produced from an expanded pit could be accommodated by the Gold Hill Leach pad, as proposed, with the only change being an increase in height. It is also likely that some ore could be processed in the Round Mountain ore processing facilities. Waste rock from an expanded pit could be accommodated by the proposed West Waste Rock Dump, with an increase in height. Additionally, significant changes in facilities or disturbance area would not likely be needed. Expansion of the Gold Hill Pit would likely extend the life of the Gold Hill facilities but would not likely change the manpower requirements.

Northumberland Mine (Fronteer Development Group). The Northumberland mine area is located 18 miles northeast of the Gold Hill Area. Past open pit mining at Northumberland produced an estimated 237,000 troy ounces of gold and 485,000 troy ounces of silver. Drilling through 2008 by Fronteer has defined a large Carlin-type orebody with an indicated gold-equivalent resource of 2.44 million troy ounces (Fronteer Development Group 2009). Drilling would likely continue in order to further define and expand the mineral resource. An open pit mining operation at Northumberland may happen within the projected mine life of the Round Mountain Expansion Project.

Midway Mine (Midway Gold Corporation). Midway Gold Corporation is conducting a feasibility study for a small underground gold mine with associated mill facilities approximately 26 miles south of the southern boundary of the proposed project and 20 miles south of SR 377 near the intersection of SR 376 and the Belmont Road. Past exploration drilling activities at this site have resulted in the disturbance of approximately 8 acres.

Nevada Molybdenum Project and Tonopah Copper Mine (Hall Mine) (General Moly, Inc.). This site is located approximately 15 miles north of Tonopah and approximately 24 miles south southwest of the southern boundary of the proposed project. General Moly, Inc. has purchased the Hall property. Core and reverse circulation drilling in the old mine pit (molybdenum) and an area east of the pit has defined a resource of molybdenum mineralization that would likely encourage more drilling activities.

Geothermal Power Plants. Applications have been received for the Devils Canyon Geothermal Power Plant (N-073967) and the Trail Canyon Geothermal Power Plant (N-083962, N-077801). The Devils Canyon Geothermal Power Plant is located approximately 1 mile north of the town of Carvers and the Trail Canyon Geothermal Power Plant is located approximately 17 miles north of Carvers. These power plants would be developed on private and public lands. The power plants would disturb approximately 9 acres.

2.10 Comparative Analysis of Alternatives

Table 2.10-1 summarizes and compares the environmental impacts between the Proposed Action and the proposed project alternatives. Detailed descriptions of impacts are presented in Chapter 4.0, Environmental

Consequences. The summarized impacts assume the implementation of RMGCs environmental protection measures but the absence of potential mitigation measures. Implementation of the potential monitoring and mitigation measures identified in Chapter 4.0 potentially would further reduce impacts.

2.11 BLM-preferred Alternative

In accordance with NEPA, Federal agencies are required by the CEQ (40 CFR 1502.14) to identify their preferred alternative for a project in the Draft EIS, if a preference has been identified, and in the Final EIS prepared for the proposed project. The preferred alternative is not a final agency decision; rather, it is an indication of the agency's preference.

The BLM has selected a preferred alternative based on the analysis in this EIS; this preferred alternative is the alternative that best fulfills the agency's statutory mission and responsibilities, considering economic, environmental, technical, and other factors.

The BLM has determined that the preferred alternative is the Proposed Action as described in Section 2.4, Proposed Action, including the RMGC's environmental protection measures identified in Section 2.5, RMGC's Environmental Protection Measures, and resource-specific mitigation measures identified in Chapter 4.0 of this EIS.

Table 2.10-1
Comparison of the Proposed Action and Project Alternatives

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action Alternative
Geology and Minerals				
Material generation and disposal	Direct impacts would include the generation and permanent disposal of approximately 992 Mt of rock overburden and 998 Mt of processed ore in the Round Mountain Area, and up to 144 Mt of rock overburden (potentially 48 Mt of processed ore) in the Gold Hill Area.	Impacts would be the same as described for the Proposed Action except that up to 20 Mt of ore from Gold Hill would not be hauled to the Round Mountain Area for processing.	Impacts would be the same as the Proposed Action.	The associated waste rock, tailings, and spent heap leach material would not be generated. The existing Round Mountain Mine would continue to operate under existing authorizations.
Pit slope stability	The USGS ground motion hazard maps indicate that there is a low probability that ground motion due to movement on the East Smoky Valley Fault Zone presents a hazard in the study area. Geotechnical studies have suggested that the maximum expected peak ground acceleration in the proposed project area would be 13 percent of gravity. There are no identified geologic conditions that would be exacerbated by proposed project activities and result in geologic hazards. Geotechnical monitoring of the pits would be conducted in order to optimize pit design and monitor slope stability for the protection of mine workers. Pit walls, waste rock dumps, and heap leach pad slopes would be constructed to conform to regulatory standards to minimize instability.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	The existing Round Mountain Pit would continue to be developed operate under existing authorizations.
Geotechnical and seismic stability of waste rock and heap leach facilities	There are no stability concerns for tailings impoundment facilities, waste rock dumps, or leach pads at Round Mountain or Gold Hill related to the maximum expected peak ground acceleration (13 percent of gravity) from an earthquake. Waste rock dumps and heap leach pad slopes would be constructed to conform to regulatory standards to minimize instability, and would be able to withstand ground acceleration ranging from 30 to 40 percent of gravity, and 15 to 26 percent of gravity, respectively.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	No new waste rock, heap leach, or tailings facilities would be developed. The existing Round Mountain Mine would continue to operate under existing authorizations.
Future availability of mineral resources	No impacts have been identified.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Identified mineral resources associated with the Proposed Action would remain in place.
Water Quality and Quantity (Surface and Ground) and Water Use				
Groundwater Drawdown in the valley alluvium	Maximum groundwater drawdown in the valley alluvial aquifer of Northern Big Smoky Valley would be 10 to 20 feet west of the project area. Long-term drawdown due to evaporation from the pit lakes would be limited to the project boundaries.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.
Impacts to Springs	Maximum impact to springs would consist of 20 feet of drawdown at Johnson springs 1 and 2. Long-term impact to springs would consist of 10 to 20 feet of drawdown at Johnson Springs 1 and 2. Healy and Ink House springs may experience drawdown of 5 to 10 feet.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Healy Spring may experience maximum drawdown of 5 to 10 feet. Long-term drawdown at Healy Spring may be in the range of 5 to 10 feet.

Table 2.10-1 (Continued)

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action
Water Rights	The maximum extent of the 10-foot groundwater drawdown isopleth east of the proposed project area would include the private water rights held for Johnson springs 1 and 2. Healy and Ink House springs lie just outside the maximum extent of the 10-foot groundwater drawdown isopleth and may be affected by 5 to 10 feet of groundwater drawdown. The water rights for these springs may be affected.. No impact to water quality is expected.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Public water rights associated with Johnson springs 1 and 2, Healy Spring, and Ink House Spring would not be affected due to the absence of pit dewatering activities at Gold Hill.
Public Water Reserves	No PWR 107 water reserves, springs, or water holes that could potentially meet PWR criteria occur within the maximum extent of the 10-foot groundwater drawdown isopleth.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.
Groundwater loss to pit lakes and total project water consumption	Long-term groundwater loss to the expanded Round Mountain pit lake would be 764 gpm. Long-term groundwater loss to the Gold Hill pit lake would be 67 gpm. Total water consumption for the Proposed Action would be around 27,989 million gallons during the life of the project.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Long-term groundwater loss to the Round Mountain pit lake would be 853 gpm. Total water consumption by the currently permitted pit would be 13,308 million gallons during the life of the project.
Long-term evaporation loss of water	Long-term evaporation from pit lakes would be 954 gpm from the expanded Round Mountain Pit and 91 gpm from the Gold Hill Pit.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Long-term evaporation from the Round Mountain pit lake would be 1,010 gpm.
Cultural Resources	A total of 7 NRHP-eligible sites would be directly impacted. Treatment at two of these sites within the Gold Hill Area was conducted to mitigate potential adverse effects in 2004. However, both sites need to be re-evaluated for the adequacy of the previous mitigation relative to the Proposed Action. The remaining NRHP-eligible sites would be mitigated in accordance with the treatment plan.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Impacts to NRHP-sites would not occur. The existing Round Mountain Mine would continue under existing authorizations.
Native American Traditional Values	No direct effects to cultural resources are anticipated as a result of the Proposed Action. Indirect effects could illegal collecting of artifacts and inadvertent damage to areas of tribal concern due to increased numbers of people in the proposed project area.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Impacts to areas of cultural resources would not occur. The existing Round Mountain Mine would continue under existing authorizations.
Hazardous Materials and Solid Waste				
Transportation	There would be a low probability of an accident involving the release of hazardous materials during the life of the proposed project. The potential for releases of sodium hydroxide and sodium cyanide would be 0.02 and 0.27 releases per accident during the life of the proposed project, respectively. The number of fuel releases that potentially would occur is projected to be less than 0.07 releases per accident over the life of the proposed project.	There would be approximately 2,950,000 gallons of reduced fuel consumption (about 2.05 percent) than identified for the Proposed Action; therefore, the probability of a transportation-related spill would be lower.	Impacts would be the same as the Proposed Action.	The transportation of hazardous materials at the existing Round Mountain Mine would continue to operate under existing authorizations. No additional hazardous materials would be transported to the site.
Storage and use	Operations would be conducted in accordance with RMGC's Spill Response Plan, which would ensure that impacts from spills would be minimized and the spilled materials contained and removed.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Storage and use associated with the existing operations would continue. No additional hazardous materials would be stored or used on site.

Table 2.10-1 (Continued)

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action
Air Quality	Construction activities associated with mine development would cause an increase in fugitive and gaseous emissions in the local area. Mining activities would control fugitive dust in accordance with the Fugitive Dust Plan. The Proposed Action would cause fugitive HCN emissions from the Proposed Action. HCN emissions from the Proposed Action and existing mine activities would be below 10 tons per year (tpy). During the expected peak production year 2014, the proposed project would emit approximately 275,000 tpy of GHGs, or approximately 0.0034 percent of the national annual emissions. Thermal processing units with the potential to emit mercury at levels above de minimis levels would be permitted by Nevada Division of Environmental Protection (NDEP). Emissions from these units would be subject to the NVMACT evaluation process as required by the Nevada Mercury Control Program.	Impacts would be similar to the Proposed Action except that GHG emissions would be reduced by approximately 30,500 tons (about 2.05 percent) as a result of lower fuel consumption and fugitive emissions from fewer trips by haul trucks.	Impacts would be the same as the Proposed Action.	The existing Round Mountain Mine would continue to operate under current authorizations. Impacts would be limited to ongoing, approved mining, mineral processing, and reclamation activities.
Paleontological Resources	No impacts to paleontological resources would occur as a result of ground-disturbing activities.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.
Social and Economic Values				
Simultaneous Development Scenario	A construction work force of approximately 300 contract workers would be employed: 200 at Round Mountain; and 100 at Gold Hill. An additional 110 direct employees would be hired for development and implementation of underground operations. The existing total employment level of approximately 730 workers would grow to a maximum of 1,140 during construction, and would gradually decline to approximately 340 for continued processing of ore and reclamation activities. Total employment would decline to approximately 40 to 80 workers as closure and final reclamation activities are completed. In-migrating construction workers and their families would include approximately 280 persons. This increase represents a 10 percent increase over the 2007 population estimated at approximately 2,738 for the Round Mountain-Carvers-Big Smoky Valley communities in the study area most likely to be affected by project-related population. If Tonopah's population is added to the base, the construction-related population would represent a 5 percent increase over the 2007 population. The direct employment effect during the construction period would represent a 3.3 percent increase over total employment in Nye County (4th quarter 2007), and 2.1 percent of the county's total labor force. The total employment effect would be 4.4 percent of existing total employment and 2.8 percent of the county labor force. Direct payroll to new workers during the	Impacts would be similar as described for the Proposed Action except there would be a reduction in fuel consumption, which would reduce annual expenditures. Employment numbers would not differ appreciably from the Proposed Action.	Impacts would be similar as described for the Proposed Action except there would be a minor increase in construction cost associated with construction of the overpass, but it would not appreciably affect the impacts of the proposed project.	Economic opportunities associated with the Proposed Action would be foregone. Effects on the local housing market would be expected to be commensurate with the employment and population decline, particularly in the Northern Big Smoky Valley, where most mine employees live. Adverse affects on public facilities and services in the Round Mountain/Big Smoky Valley area would likely occur. Hadley, a subdivision of Round Mountain, would likely be dramatically reduced in size, which could adversely affect the resources of the service district and its ability to provide services. In addition, the demand for services also would decline dramatically. The greatest effect could be on the school district; a dramatic loss of school-aged children would result in enrollment declines and, perhaps, raise a question about the continued viability of maintaining school facilities in the area. In addition to wages, salaries, and purchases, the Round Mountain Mine annually pays taxes and fees to local and state agencies. Under this alternative, tx payments would decline over time to a small fraction of current levels with the ramp down of mining after 2012.

Table 2.10-1 (Continued)

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action
	construction period, not including the value of benefits, is projected to be approximately $27 million on an annual basis. The total new employment of 365 operations-related employees would represent a 2.9 percent increase over total employment in Nye County, and 1.9 percent of the county labor force. The estimated annual payroll for the proposed operation, not including benefits, would be approximately $14 million. It is estimated that capital expenditures for the proposed project would be approximately $168.2 million and there would be approximately $48.0 million worth of additional equipment purchased. Under this scenario, essentially all of these expenditures would occur in the approximate 1-year construction period. This would generate nearly $14.6 million in sales and use tax revenue for affected state funds and for Nye County. The proposed project would increase the school population to an estimated 48 students during the construction period and 55 students during project operations under this scenario. Round Mountain schools would see an enrollment increase of 10.8 percent during construction and 12.3 percent increase during operation. Tonopah schools would see enrollment increases of 0.9 percent during construction and 1.0 percent during operations. Demand for housing is estimated at 287 units during the construction period, 209 of which would be for contract construction workers – presumably short term, mostly transient housing - and 78 of which would be for underground mine workers and new indirect worker households – presumably more permanent. Upon completion of construction, the demand for short-term housing would diminish, but the need for more permanent housing would increase to an estimated 121 units. This level of demand would likely exceed the number of units available in the Round Mountain-Carvers-Big Smoky Valley area and would continue to strain the local housing market.			
Sequential Development Scenario	A construction work force of approximately 200 would be contracted for approximately 12 to 24 months at Round Mountain. At the same time, approximately 110 employees would be hired for underground mining operations. Subsequently, approximately 100 construction workers would be contracted to construct Gold Hill. Under this scenario, the maximum employment would be 1,040 during the construction period at Round Mountain, and 800 to 940 workers during operations at Round Mountain. Construction at Gold Hill would temporarily raise employment to 940, but would decrease to 800 the following year and would gradually decline until mining has been completed at Gold Hill. Total employment would range from 40 to 90 workers for closure and final reclamation. Under this scenario, there would be a 13 percent population	Same as described above for the simultaneous development scenario.	Same as described above for the simultaneous development scenario.	Same as described above for the simultaneous development scenario.

Table 2.10-1 (Continued)

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action
	increase over the Round Mountain-Carvers-Big Smoky Valley 2007 population, or a 6 percent increase over the combined local and Tonopah population. For the Round Mountain Area, the direct employment effect during the construction period would represent a 2.5 percent increase over total employment in Nye County (4th quarter 2007), and 1.6 percent of the county's total labor force. The total employment effect would be 3.4 percent of existing total employment and 2.2 percent of the county labor force. Direct payroll to new workers during the construction period, not including the value of benefits, is projected to be approximately $21 million on an annual basis. The total 191 operations-related new employment would represent a 1.5 percent increase of total employment and 1.0 percent of the labor force in Nye County. The estimated annual payroll for the proposed operation in the Round Mountain Area, not including benefits, would be approximately $7.3 million. For the Gold Hill Area, the direct employment effect during the construction period would represent a 0.8 percent increase over total employment in Nye County (4th quarter 2007), and 0.5 percent of the county's total labor force. The total employment effect would be 1.0 percent of existing total employment and 0.6 percent of the county labor force. Direct payroll to new workers during the construction period, including the value of benefits, is projected to be approximately $6.6 million on an annual basis. Under this scenario, capital expenditures of $134.8 million and equipment purchases of $44.9 million would take place during the construction year at Round Mountain, generating approximately $12.1 million in sales and use tax revenue at that time. Approximately 4 years later, during construction at Gold Hill, there would be additional capital expenditures of $33.5 million and equipment purchases of $3.1 million, generating sales and use tax revenues of approximately $2.5 million. There would be approximately 42 new students during the construction phase in the Round Mountain Area, an estimated 35 of whom would attend Round Mountain schools, increasing enrollment at Round Mountain schools by 9.5 percent. Project operations under this scenario would generate 28 new school-aged youth, increasing Round Mountain school enrollments by 6.3 percent. Project-related enrollment increases in Tonopah schools would be less than 1 percent under all time periods under this scenario. Demand for housing during the construction period is estimated at 213 units, of which 139 would be for contract construction workers and 74 would be for underground mine workers and new indirect worker households. Upon completion of construction, the demand for short-term housing would disappear, and the need for permanent housing would decline to an estimated 63 units. The majority, if not all, of this demand			

Table 2.10-1 (Continued)

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action
	would likely be accommodated by available units and/or vacant lots in the Round Mountain-Carvers-Big Smoky Valley area. During the construction phase in the Gold Hill Area, there would be a need for approximately 74 mostly short-term housing units. This need would likely strain in the local housing market.			
Recreation	The proposed project area would encompass the existing project boundary area of 7,263 acres plus an additional 8,116 acres, including 8,057 acres of BLM-administered land. Total new surface disturbance would be approximately 4,698 acres, of which approximately 4,581 acres (98 percent) would be on public land. The new disturbance would be in addition to the previously approved disturbance of 5,928 acres, which would be an approximate increase of 80 percent. There would be a permanent loss of approximately 351 acres of wildlife habitat and multiple use lands available for recreation associated with the development of the Gold Hill Pit and expansion of the Round Mountain Pit.	Impacts would be the same as the Proposed Action except that access to Jefferson and Shoshone canyons would be slightly less constricted due to a reduction of haul truck traffic across CR 875.	Impacts would be the same as the Proposed Action except that access to Jefferson and Shoshone canyons would be physically separated from haul road traffic by the county road overpass and there would be no traffic conflict to the canyons and National Forest lands.	Existing mine-related impacts to recreation associated with the existing operations would continue through mine close. No additional impacts would occur to recreational use of the area.
Wilderness	Direct effects to the Arc Dome Wilderness or Alta Toquima Wilderness would not occur from the proposed project. Indirect noise effects on the Alta Toquima Wilderness would occur that could degrade the sense of solitude for wilderness users. This effect would be most pronounced in the western reaches of the wilderness, which are infrequently used by the public because of difficult access. The Transportation/Utility Corridor may discourage access to the western side of the Alta Toquima Wilderness, but access on the county road to Round Mountain would remain open throughout the life of the proposed project so the effect would be very low. Overall, the effects of the proposed project on wilderness resources in the study area would be low.	Noise effects from ore processing would be somewhat higher than the Proposed Action, but noise emitted by traffic using the Transportation/Utility Corridor would be substantially reduced. There would be minimal difference in the overall effect. With less mine traffic using the Transportation/Utility Corridor, the minor deterrence to wilderness access would be reduced slightly.	Noise effects would be slightly higher than the Proposed Action due to haul trucks having to ascend a grade over the overpass. The Transportation/Utility Corridor would not be a major contributor to noise in the wilderness area. Access to the western side of the Alta Toquima Wilderness would not be impeded by the Transportation/Utility Corridor.	Existing mine-related impacts to recreation associated with the existing operations would continue through mine close. Following reclamation, most of the existing and authorized disturbed area would be returned to open lands.
Visual Resources	Development and expansion of the Round Mountain Area would minimally heighten visual contrast between existing, previously approved, mine-related facilities and the natural landscape character, and would not substantially increase the visual impact from the currently approved levels. The visual effect would be greatest on views from KOP #2 because the extension would be in the immediate foreground as motorists approach from the south. The east-west extent of the proposed project would not change noticeably for views from KOP #1. Views from KOP #1 would be moderately to strongly affected by the proposed project. Views from KOPs #3 through 7 would include the greatest north-south expansion of the proposed project. Prior to final reclamation and mitigation, the proposed project would not meet the Visual Resource Management Class IV management objectives.	Impacts would be the same as the Proposed Action.	The visual effect would be minimal from KOPs #1 and #8 and moderate from KOP #3. Effects would result from changes in form and color in the characteristic landscape.	The existing Round Mountain mining operations would result in the continuation of the existing visual environment during project operations, eventually culminating in reclamation and revegetation of the project facilities.

Table 2.10-1 (Continued)

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action
Soils and Watershed	Approximately 4,698 would be disturbed. The pit alluvium from the Round Mountain Area and suitable alluvium from the Gold Hill areas would be salvaged and stockpiled for subsequent reclamation. A permanent loss of soil productivity would occur on approximately 351 acres in association with development of the proposed pits, which would not be reclaimed. Hydric soils associated with riparian areas may be affected as a result of drawdown effects associated with pit dewatering activities.	Impacts would be the same as the Proposed Action.	The effects of this alternative on soils would be the same as described for the Proposed Action except there would be approximately 2 additional acres of disturbance associated with the construction of the overpass at the county road intersection. Runoff and erosion controls would be incorporated into the overall embankment and road configuration to assist in drainage stability. Watershed impacts would be the same as described for the Proposed Action.	The existing Round Mountain Mine would continue to operate under existing authorizations. Under this alternative, sufficient growth media resources have been salvaged during current mining activities, and reclamation progress has been approved under state and Federal guidelines.
Vegetation	Mine development and operation would disturb or remove a total of approximately 4,698 acres of native vegetation, the majority of which (approximately 4,348 acres) would be reclaimed. Areas of native vegetation within the Round Mountain and Gold Hill pits (approximately 344 acres) would not be reclaimed and would result in the permanent loss of vegetation. Approximately 0.05 acre of riparian vegetation associated with Jefferson Creek would be removed or disturbed as a result of surface disturbance from the Proposed Action. It is anticipated that mine-related groundwater drawdown would not result in direct impacts to upland vegetation within the 10-foot drawdown contour. Potential impacts to riparian vegetation could occur where gaining stream flow associated with Johnson springs 1 and 2, and Ink House and Healy springs, is reduced from groundwater drawdown.	Impacts would be the same as the Proposed Action.	Impact would be the same as described for the Proposed Action except there would be approximately 2 additional acres of disturbance associated with the construction of the overpass at the county road intersection.	The existing Round Mountain mining operations would continue under existing authorizations, which includes the additional incremental surface disturbance of approximately 225 acres of vegetation.
Noxious Weeds and Invasive Species	Implementation of RMGC's Reclamation Plan would reduce the potential for noxious weeds and invasive species to become introduced or spread within the study area. However, minor populations of weedy annual species (e.g., halogeton, cheatgrass) may become established in localized areas. If noxious weeds become established in project-related disturbance areas, a weed removal or spraying program would be implemented in accordance with State of Nevada and BLM regulations. Weed control practices would be implemented in coordination with the BLM Tonopah Field Office to minimize the potential for the introduction and spread of noxious weeds and invasive species within the study area.	Impacts would be the same as the Proposed Action.	Impact would be the same as described for the Proposed Action except there would be approximately 2 additional acres of disturbance associated with the construction of the overpass at the county road intersection.	The potential spread of noxious weeds and invasive species would be managed under existing authorizations. Ongoing reclamation and existing weed control measures would continue to be implemented to prevent the establishment of new populations and to control existing populations within the Round Mountain mine disturbance areas.

Table 2.10-1 (Continued)

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action
Range Management	Under the Proposed Action, perimeter fences would be erected along the proposed project area and Transportation/Utility Corridor. Perimeter fences would exclude livestock from an additional 6,577 acres of rangeland for the duration of the project. A temporary loss of 273 AUMs would occur during the 13-year life of the proposed project. A permanent loss of approximately 351 acres and 16 AUMs within the Smoky Allotment would occur as a result from the development of the Gold Hill Pit and expansion of the Round Mountain Pit. No direct impacts are anticipated for range improvements (e.g., cattle guards, fences) for the Proposed Action. Water management-related impacts to range resources, as a result of groundwater drawdown within the projected mine-related 10-foot groundwater drawdown contour, could include the reduction of groundwater levels for 2 water-related range improvements (i.e., the Upper Rogers Well and the Francisco Well) within the Smoky and Francisco allotments, respectively.	Impacts would be the same as the Proposed Action.	Impact would be the same as described for the Proposed Action except there would be approximately 2 additional acres of disturbance within the Smoky Allotment.	The existing mining operation associated with the Round Mountain Mine would continue under existing authorizations. Ongoing reclamation would minimize existing impacts to range resources in mine-related disturbance areas (with the exception of the portions of the existing pit that would not be backfilled), with resulting short-term impacts to grazing operations. Impacts to water-related range improvements would include possible reduced flows of Upper Rodgers Well and the Francisco well, as well as those impacts associated with ongoing permitted mining activities.
Wildlife and Fisheries Resources				
Wildlife habitat	The proposed project would result in the incremental long-term loss of approximately 4,346 acres and the permanent loss of 344 acres of native vegetation (i.e., salt-desert shrublands, sagebrush shrublands, pinyon-juniper woodlands, invasive annual grassland, and less than 1 acre of barren land and riparian habitat [approximately 0.05 acre]) from the development of the Gold Hill Pit and expansion of the Round Mountain Pit. Surface disturbance would result in habitat fragmentation and animal displacement until vegetation has been re-established.	Impacts would be the same as the Proposed Action.	Impact would be the same as described for the Proposed Action except there would be approximately 2 additional acres of habitat loss associated with the construction of the overpass at the county road intersection.	The existing Round Mountain mining operations would continue under existing authorizations, which includes the additional incremental disturbance of approximately 225 acres of potential wildlife habitat.
Game species	Direct impacts to mule deer would include the incremental long-term reduction of approximately 128 acres and the permanent loss of approximately 174 acres of mule deer winter range associated with the Gold Hill Pit. No important mule deer movement corridors or seasonal habitats would be directly impacted from project activities. Direct impacts to pronghorn would include the incremental long-term reduction of approximately 4,346 acres and the permanent reduction of approximately 344 acres of pronghorn range. No important pronghorn seasonal ranges would be directly impacted from project activities. Direct impacts to small game species (e.g., chukar, mourning dove, pygmy rabbit, and black-tailed rabbit) would include the incremental long-term reduction of approximately 4,346 acres and the permanent reduction of approximately 344 acres of potentially suitable habitat.	Impacts would be the same as the Proposed Action.	Impact would be the same as described for the Proposed Action except there would be approximately 2 additional acres of habitat loss for game species (including pronghorn range).	The existing Round Mountain mining operations would continue under existing authorizations, which includes the additional incremental disturbance of approximately 225 acres of habitat for game species, including pronghorn habitat.

Table 2.10-1 (Continued)

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action
Impacts to breeding birds	Direct impacts to bird species would include the incremental long-term loss of approximately 4,346 acres and the permanent reduction of approximately 344 acres of potentially suitable breeding, roosting, and foraging habitat. Potential direct impacts to breeding birds would be minimized through the clearing of vegetation outside of the breeding season, to the extent possible, and the implementation of breeding bird surveys and appropriate mitigation, as needed, in coordination with the BLM and NDOW.	Impacts would be the same as the Proposed Action.	Impact would be the same as described for the Proposed Action except there would be approximately 2 additional acres of habitat loss for breeding birds.	The existing Round Mountain mining operations would continue under existing authorizations, which includes the additional incremental disturbance of approximately 225 acres of potential breeding bird habitat.
Human presence and noise	Increased noise and human presence associated with mine development and operation is expected to result in negligible to low impacts to wildlife species. Although there would be an increased potential for wildlife/vehicle collisions along the Transportation/Utility Corridor, potential impacts would be minimized through the implementation of RMGC's environmental protection measures.	Impacts would be similar to the Proposed Action except that a reduction in mine traffic along the Transportation/Utility Corridor would reduce the potential for wildlife/vehicle collisions.	Impacts would be the same as the Proposed Action.	The existing Round Mountain mining operations would continue at current levels under existing authorizations until operations and reclamation have been completed, at which time these impacts would end.
Cyanide effects	Fences, wildlife exclusion devices (e.g., netting, pond covers, or floating "bird balls"), and piping would be installed to minimize access of wildlife to cyanide solutions. In addition, weak acid dissociable cyanide concentrations in the tailings impoundment facility would be maintained at non-lethal levels. As a result, the potential for impacts to wildlife resources from cyanide ingestion would be low.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	The existing Round Mountain mining operations would continue under existing approved authorizations.
Potential impacts associated with dewatering activities	It is anticipated that mine-related groundwater drawdown would not result in direct impacts to upland habitats within the 10-foot drawdown contour. Potential impacts to riparian habitat could occur where gaining stream flow associated with Johnson springs 1 and 2, and Ink House and Healy springs, is reduced from groundwater drawdown. However, impacts to regional wildlife populations from the reduction of surface water and riparian vegetation are expected to be low.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Potential impacts to wildlife habitat associated with existing approved water management operation would continue.
Potential impacts to wildlife associated with pit lake water quality	Exposure to higher trophic order receptors was evaluated in accordance with U.S. Environmental Protection Agency guidance based on predicted (modeled) pit lake water quality and applied conservative exposure assumptions and toxicity data (i.e., no observed adverse effect level (NOAEL)-based toxicity reference values [TRVs]) to develop risk estimates for representative species. The results indicated that it is unlikely that adverse effects would occur as a result of wildlife exposure (via direct contact and biota uptake) to the chemicals of concern (COC) in the proposed post-mining pit lakes.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	Potential impacts to wildlife habitat associated the development of the Round Mountain Pit would continue under existing approved authorizations.
Potential hazardous materials spill effects to wildlife	The potential for impacts to wildlife in the event of a hazardous materials spill would be highest if spilled material entered aquatic/riparian habitats. However, the probability of a spill event into aquatic/riparian habitats would be highly unlikely.	Impacts would be the same as the Proposed Action.	The probability of a release associated with transport of fuels and the potential for associated impacts to wildlife species would be less than the Proposed Action.	Hazardous materials used for ongoing processing and operations would continue to be transported to the existing operations.

Table 2.10-1 (Continued)

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action
Special Status Species				
Impact to bats	Direct impacts would include the incremental long-term reduction of 4,346 acres and the permanent loss of 344 acres of foraging habitat. Impacts to bat habitat would result from the loss of 15 mine shafts/adits within the Gold Hill Area and 12 mine shafts/adits within the Round Mountain Expansion Area. It is anticipated that an additional 4 shafts/adits would become unsuitable as potential bat habitat as a result of project-related activities in the Gold Hill Area and 2 shafts/adits in the Round Mountain Expansion Area. Direct impacts to bats would be avoided or minimized by excluding bats from these mine workings prior to the start of mining activities. Potential impacts to bat habitat as a result of mine-related activities would be minimized through the implementation of RMGC's committed environmental protection measures.	Impacts would be the same as the Proposed Action.	Impact would be the same as described for the Proposed Action except there would be approximately 2 additional acres of foraging habitat loss associated with the construction of the overpass at the county road intersection.	The existing Round Mountain mining operations would continue under existing authorizations, which includes the additional incremental disturbance of approximately 225 acres of potential foraging habitat.
Impacts to pygmy rabbit	The proposed project would result in the incremental long-term reduction of approximately 530 acres and the permanent reduction of 180 acres of potentially suitable sagebrush habitat would be considered low to moderate impact, considering the small amount of potential habitat located within the study area. The potential loss of individual pygmy rabbits during construction would not result in population-level effects.	Impacts would be the same as the Proposed Action.	Impact would be the same as described for the Proposed Action except there would be approximately 2 additional acres of habitat loss associated with the construction of the overpass at the county road intersection.	The existing Round Mountain mining operations would continue under existing authorizations, which includes the additional incremental disturbance of approximately 225 acres of potential habitat.
Desert bighorn sheep	The proposed project would result in the long-term disturbance of approximately 216 acres and the permanent loss of approximately 236 acres of desert bighorn sheep range associated with the Gold Hill Pit and expansion of the Round Mountain Pit. This anticipated loss of habitat would result in a small, incremental reduction in the amount of available habitat and is expected to have little impact on the existing desert bighorn sheep population that occurs in the project vicinity. No important desert bighorn sheep movement corridors or seasonal habitats would be directly impacted from project activities. Therefore, impacts to desert bighorn sheep populations are expected to be low.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	The existing Round Mountain mining operations would continue under existing authorizations, which includes the additional incremental disturbance of approximately 225 acres of potential habitat.
Impacts to sensitive bird species	Based on implementation of RMGC's environmental protection measures, no adverse effects to sensitive bird species would occur as a result of project development and operation. Indirect impacts associated with mine-related noise and human presence would continue under the proposed project in the Round Mountain Area. Development of the Gold Hill Area would result in an incremental increase in mine-related noise and human presence. Golden eagle – Direct impacts also would include the long-term reduction of approximately 4,346 acres and the permanent reduction of approximately 344 acres of potential foraging habitat. Potential impacts to this species as a result of the proposed project would be considered low. Short-eared owl – Same as discussed above for golden eagle.	Impacts would be the same as the Proposed Action.	Impact would be the same as described for the Proposed Action except there would be approximately 2 additional acres of habitat loss associated with the construction of the overpass at the county road intersection.	The existing Round Mountain mining operations would continue under existing authorizations, which includes the additional incremental disturbance of approximately 225 acres of potential foraging and nesting habitat.

Table 2.10-1 (Continued)

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action
	Burrowing owl – Direct impacts to this species would include the long-term reduction of approximately 4,346 acres and the permanent reduction of 344 acres of breeding and foraging habitat. Potential impacts to this species as a result of the proposed project would be considered low. Ferruginous hawk – Same as discussed above for golden eagle. Greater sage-grouse – No impacts to breeding greater sage-grouse would be anticipated from project activities. Potential direct impacts would include the incremental long-term reduction of 1,408 acres of occupied winter, spring, and brood-rearing habitat. The proposed project also would result in the permanent loss of 222 acres of occupied winter, spring, and brood-rearing habitat. This impact would be considered negligible based on RMGC's environmental protection measures, the overall availability of suitable habitat in the study area, and the distance of the proposed project area from the known lek site Prairie falcon – Same as discussed above for golden eagle. Peregrine falcon – Same as discussed above for golden eagle. Pinyon jay – Direct impacts to this species would result from the long-term reduction of approximately 530 acres and the permanent reduction of approximately 180 acres of potential foraging habitat. Potential impacts to this species as a result of the proposed project would be considered low. Loggerhead shrike – Direct impacts to this species would include the long-term reduction of approximately 4,346 acres and the permanent reduction of approximately 344 acres of breeding and foraging habitat. Impacts would be considered negligible. Sage thrasher – Direct impacts to this species would include the long-term reduction of approximately 530 acres and the permanent reduction of approximately 180 acres of breeding and foraging habitat. Impacts would be considered negligible Brewer's sparrow – Same as discussed above for sage thrasher.			
Eastwood's milkweed	No Eastwood's milkweed individuals were identified during species-specific surveys. Therefore, no impacts to Eastwood's milkweed are anticipated as a result of mine-related activities	Impacts would be the same as the Proposed Action.	Impact would be the same as described for the Proposed Action except there would be approximately 2 additional acres of potential habitat loss associated with the construction of the overpass at the county road intersection.	The existing Round Mountain mining operations would continue under existing authorizations, which includes the additional incremental disturbance of approximately 225 acres of potential habitat.

Table 2.10-1 (Continued)

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action
Sanicle Biscuitroot and Navada Dune Penstemon	No sanicle biscuitroot or Nevada dune penstemon were found during sensitive plant surveys. Therefore, impacts to sanicle biscuitroot and Nevada dune penstemon would not occur as a result of mine-related activities.	Impacts would be the same as the Proposed Action.	Impact would be the same as described for the Proposed Action except there would be approximately 2 additional acres of potential habitat loss associated with the construction of the overpass at the county road intersection.	The existing Round Mountain mining operations would continue under existing authorizations, which includes the additional incremental disturbance of approximately 225 acres of potential habitat.
Access and Land Use	The proposed project boundary would encompass the existing Round Mountain Mine Boundary of 7,263 acres plus an additional 8,116 acres associated with the proposed mine expansion. As currently planned, total new surface disturbance would be approximately 4,698 acres, of which approximately 4,581 acres (98 percent) would be on public land. The new disturbance would be in addition to the previously approved disturbance of 5,928 acres, which would be an approximate increase of 80 percent. The Transportation/Utility Corridor would result in a point of conflict between surface traffic on CR 875 and haul road traffic. Although standard traffic controls would be in place at the intersection, there would be an increase in risk of accidents at the intersection. Operation of the Transportation/Utility Corridor would be a constraint in accessing Toiyabe National Forest land. Although access to Jefferson and Shoshone canyons would remain open, some recreationists may be intimidated by the Transportation/Utility Corridor.	Access to Round Mountain and the Toiyabe National Forest would be slightly less constrained due to less traffic using the Transportation/Utility Corridor than the Proposed Action. There also would be a very minor reduction in heavy truck traffic on SR 376 because of reduced demand for fuel and other consumables as compared to the Proposed Action.	Impacts would be the same as the Proposed Action except that public traffic accessing the Round Mountain townsite and Jefferson and Shoshone canyons would be physically separated from traffic using the Transportation/Utility Corridor, which would prevent traffic conflicts or delays and constrain access. Also, there would be approximately 2 acres of additional disturbance associated with the construction of the overpass at the county road intersection.	The No Action Alternative would result in a continuation of existing access and land use conditions in the proposed project area for the duration of authorized mining activities.
Noise	Noise levels were calculated for 6 potential noise sensitive receptors. Projected noise levels at 4 of the 6 sensitive receptors would be below 50 dBA. The projected level at one receptor would be approximately 50.4 dBA. The highest level calculated would be 61.0 dBA at Round Mountain. Project-related noise levels at the nearest point in the Alta Toquima Wilderness was calculated at 47.9 dBA. Noise at the Mount Jefferson Trail, approximately 3 miles farther from the proposed project area, was calculated at 42.9 dBA. Blasting at either the Round Mountain Pit or the proposed Gold Hill Pit would be below 67 dBA at 5 of the 6 sensitive receptor locations. Noise at the Round Mountain townsite from blasting at the proposed Round Mountain Pit expansion was calculated at 82.5 dBA. Blasting noise was calculated at 60.4 dBA and 65.8 dBA at the wilderness boundary and 57.4 dBA and 59.9 dBA at Mount Jefferson Trail from the Round Mountain Pit and the proposed Gold Hill Pit, respectively. Brief blasting noise at these levels would be noticeable in the wilderness area and may be an annoyance to some people.	Impacts would be similar to the Proposed Action except that noise from the Transportation/Utility Corridor would be somewhat less due to less heavy traffic on the haul road as compared to the Proposed Action. This would mainly affect noise levels at Carvers and at the west ranch. Slightly higher noise levels may occur at the northeast residence because of greater activity at the proposed process facilities on the eastern side of the Gold Hill Pit.	The County Road Overpass Alternative would increase noise levels somewhat at Carvers and the west ranch. Haul trucks climbing the grade of the overpass would emit higher noise levels than trucks on a nearly flat grade and the noise would last somewhat longer for each truck because the climb would reduce their speed.	The No Action Alternative would result in a continuation of existing noise conditions in the study area for the duration of authorized mining activities.

Table 2.10-1 (Continued)

Resources	Proposed Action	Gold Hill Processing Alternative	County Road Overpass Alternative	No Action
Environmental Justice	The effects of the Proposed Action would not be expected to disproportionately affect any particular population. There is no indication of a meaningfully larger percentage of a minority population near the proposed project area. While there are likely households under the poverty threshold near the proposed project area, there also are many mine employees with above average household incomes. Environmental effects that may occur either in close proximity to the proposed project area, or at a greater distance, such as noise, visual, or air impacts, would affect the area's population equally, without regard to race, ethnicity, age or income level.	Impacts would be the same as the Proposed Action.	Impacts would be the same as the Proposed Action.	The No Action Alternative would result in a scaling down of mining from 2012 through approximately 2015 and complete closure of the Round Mountain Mine within a few years after that when all ore processing and reclamation activities have been completed. This would result in staged termination of essentially all 730 employees of the mine, ending the economic benefits currently provided by the mine. While the effects on household incomes would be substantial, they would be expected to affect people of all income levels more or less equivalently.