CHAPTER 2
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

INTRODUCTION

This chapter describes Newmont's previous activities in the Emigrant Project area, Newmont's Proposed Action to develop the Emigrant Project, reasonable alternatives to the Proposed Action, alternatives eliminated from further analysis, and the agency's preferred alternative. The proposal to develop ore reserves at Emigrant is referred to as the Emigrant Project (Project) or the Proposed Action in this document.

Alternatives considered in the Draft EIS are based on issues identified by BLM and comments received during the public scoping process. Alternatives analyzed are intended to reduce or minimize potential impacts associated with the Proposed Action.

The Emigrant Project is located on the eastern slopes of the Piñon Range in the Dixie Creek Basin, and includes Sections 25, 26, 34, 35, and 36, Township 32 North, Range 53 East and Sections 1, 2, 3, 4, 11, and 12, Township 31 North, Range 53 East, Mount Diablo Baseline and Meridian. Surface and mineral ownership are shown on **Figure 2-1**.

The Emigrant deposit is a large, shallow, low-grade, oxide ore body exposed along the side of a hill. Geologic investigations have identified mineralization extending 12,000 feet along a north-south trend, and 3,000 feet east of the Emigrant Fault. The deposit extends from the bottom to the top of the hill, which would facilitate mining in phases up the hillside and allow waste rock to be placed into previously mined-out portions of the pit.

One small intermittent drainage flows through the proposed mine pit area. A new engineered stream channel for this drainage would be constructed during the first two phases of mining to form a permanent stream channel through the mine pit area.

CURRENT ACTIVITY

Exploration activities at the Emigrant Project area were authorized under the Decision Letter for the Emigrant Springs Exploration Plan of Operations (BLS-1 N16-93-001P) issued in December 1994. Exploration activities included road construction, drill pad construction, drilling, trenching, and rock sampling.

In February 2004 (revised May 2004), Newmont submitted a Plan of Operations for the Emigrant Project, which was analyzed in a Draft EIS that was published and released for public comment in March 2005. At the time the 2005 Draft EIS was issued for public review, additional waste rock characterization, including humidity cell testing, was being conducted by Newmont to provide data to augment previous test results. Specifically, the geochemical testing was designed to evaluate potential for acid mine drainage formation and metal contaminant release from waste rock that would be produced during mining. Results of this testing are included in the *Geology and Minerals* section of Chapter 3.

With development of the additional geochemistry data, BLM decided to re-issue a Draft EIS that incorporates the data and updates the Plan of Operation for the Emigrant Project. Information regarding BLM's action for the Draft EIS is included in Chapter 1.

PROPOSED ACTION

The Proposed Action referred to throughout this Draft EIS is Newmont's 2007 Plan of Operations for the Emigrant Project. The Plan of Operations for the Project (Newmont 2007a) submitted to the BLM and evaluated in this Draft EIS includes descriptions of the following components:

- Life-of-Mine Schedule
- Permit Boundary
- Geologic Evaluations
- Mine Development
- Mining Operations
- Engineered Stream Channel
- Waste Rock Management
- Heap Leach Facility
- Process Ponds
- Surface Water and Sediment Controls
- Haul and Access Roads
- Ancillary Facilities
- Wildlife Protection Measures
- Resource Monitoring
- Solid and Hazardous Waste
- Human Health and Safety
- Employment
- Reclamation
- Monitoring/Evaluation of Reclamation

LIFE-OF-MINE SCHEDULE

Under current operating plans and projections, Newmont anticipates the Project would have an operational life of 10 years of mining and 14 years of active leaching. Reclamation, closure, and monitoring activities could extend up to 30 years. The proposed schedule for the Emigrant Project is shown in **Table 2-1**.

TABLE 2-1
Proposed Emigrant Mine Schedule

Activity	Estimated Time-Frame
Permitting	1 Year
Construction	1 Year
○ Phase I leach Pad	1 Year
○ Diversion Channel	3 Years
Mining & In-Pit Backfill	10 Years
○ Phase I	1 Year
○ Phase II - III	2 Years
○ Phase IV – V	2 Years
○ Phase VI	1 Year
○ Phase VII	2 Years
○ Phase VIII	2 Years
Heap Leaching	14 Years
Construction (Phase II Pad) (continued heap leaching)	12 Years
Construction (Phase III Pad) (continued heap leaching)	10 Years
Phased Capping of Heap	3 Years
Solution Evaporation	7 Years
Closure Monitoring	30 Years

Source: Newmont 2007a.

SEE FIGURE 2-1 SURFACE AND MINERAL OWNERSHIP

PERMIT BOUNDARY

The proposed permit boundary would encompass 3,883 acres, of which 2,761 acres are public (including 880 acres of split estate) and 1,122 acres are private. The proposed mine disturbance boundary (within the permit boundary) shown on **Figure 2-2** includes buffer zones around proposed surface disturbances. Total area of proposed surface disturbance within the mine permit boundary would be approximately 1,418 acres, which includes 1,170 acres of public land (including 442 acres of split estate) and 248 acres of private land. Approximately 22 acres in the existing Rain Mine complex located 3 miles west of the Emigrant Project site would be used to support the Emigrant Project. Acreage associated with the Rain Mine is permitted under a separate authorization. Proposed disturbance areas and mine components are shown on **Figure 2-2** and summarized in **Table 2-2.**

A standard BLM fence would be constructed around the permit boundary to prevent livestock from entering active mine areas. The northern extension of the fence would be advanced to coincide with mining operations to allow continued livestock grazing as long as possible in each area. Once the mine is fully developed, the fence would enclose the entire permit area and remain in place until reclamation is complete.

GEOLOGIC EVALUATIONS

Newmont proposes to continue geologic evaluations (exploration) within the Project area under the previously approved Emigrant Springs Exploration Project Plan of Operations (N-071065). Geologic evaluation activities would include exploration and development drilling, geochemical sampling, excavation of test pits, trenching, and application of various geophysical methods.

TABLE 2-2
Proposed Surface Disturbance Areas
Emigrant Mine Project

Disturbance Areas	Proposed Disturbance (Acres)		
	Public	Private	Total
Mine Pits	615	0	615
Non-PAG Waste Rock Disposal Facility	26	52	78
Heap Leach and Processing Facility	214	130	344
Haul/Access Roads[1]	37	0	37
Ancillary Facilities[2]	278	66	344
Total	**1,170[3]**	**248**	**1,418**

Source: Newmont 2007a.
[1] Does not include 13.6 acres of public access road.
[2] Includes buildings, storage yards, growth medium stockpiles, barrow sources, and buffer zones.
[3] Includes 442 acres of split estate (public surface, private mineral).

Surface disturbance created by drilling operations would consist of constructing roads, drill pads, and sumps. A surface disturbance of 50 acres would occur with exploration activities. These activities were reviewed under the Environmental Assessment, Finding of No Significant Impact (April 9, 2003), and Decision Record issued for Modification of the Emigrant Springs Exploration Plan of Operations No. BLM/EK/PL-2003/018.

MINE DEVELOPMENT

Prior to commencing mining and ore processing operations, various construction and development activities would occur sequentially or in some cases concurrently. These activities are described below and discussed in respective sections of this chapter. Mine development would include the following construction activities:

- Access roads into the Project area from the Rain Mine;
- Phase I of the heap leach facility;
- Surface and storm water controls (ponds and ditches);
- Ancillary facilities (*e.g.*, operations office, maintenance shop, plant facilities, powder magazines, prill silo, water fill station, and septic leach field);
- Perimeter fence;
- Upgrade and reroute electrical service from Rain Mine; and
- Relocate water supply line.

Where possible, land clearing and surface disturbance would be timed to prevent destruction of active bird nests or disturbance of young birds during the avian breeding season (May 1 to July 15, annually) to comply with the Migratory Bird Treaty Act. If surface disturbing activities are unavoidable, Newmont would have a qualified biologist survey areas proposed for immediate disturbance to identify active nests. If active nests are located, or if other evidence of nesting is observed (mating pairs, territorial defense, carrying nesting material, transporting of food), the area would be avoided to prevent destruction or disturbance of nests until the birds are no longer present.

Avian surveys would be conducted only during the breeding season and immediately prior to Newmont's activities that would result in disturbance. After such surveys are performed, and disturbance created (*i.e.*, road construction and drill pad development), Newmont would not disturb additional land during the avian breeding season without first conducting another avian survey. After July 15, new land clearing activities would continue, and no further avian surveys would be conducted until the following year, in compliance with Migratory Bird Treaty Act (Newmont 2007a).

MINING OPERATIONS

Newmont proposes to mine 92 million (M) tons (t) of ore and 83 Mt of waste rock from the Emigrant ore deposit (**Figure 2-2**). Low-grade run-of-mine oxide ore would be placed on a heap leach facility constructed south of the open pit mine. Lime would be added to the ore prior to placement on the heap leach facility to maintain the proper pH of the ore for leaching (Newmont 2007a).

The proposed open pit would disturb approximately 615 acres of public land. Mining would progress in phases, beginning at the lower elevation near the southern end of the pit. A non-PAG waste rock disposal facility would be constructed during the first phases of mine development. The non-PAG waste rock disposal facility would disturb approximately 78 acres, extend about 190 feet above existing topography, and would have a capacity of approximately 12 Mt. Waste rock from subsequent phases would be placed as backfilled overburden in mined-out portions of the pit.

PAG waste rock encountered during mining would be segregated and placed on limestone benches in mined-out portions of the pit against exposed limestone highwalls and encapsulated with a minimum of 10 feet of neutralizing waste rock as described in the *Encapsulation Cell* section of this chapter. Based on the current mine plan, approximately 5 percent (4 Mt) of the total waste rock to be excavated (83 Mt) would be managed as PAG waste rock.

SEE FIGURE 2-2 PROPOSED MINE AREA

Ore and waste rock would be drilled and blasted in sequential benches to facilitate loading and hauling. Blasted ore and waste rock would be loaded into end-dump haul trucks using shovels and front-end loaders. Benches would be established at approximately 20-ft vertical intervals with bench widths varying to include safety berms and haul roads. Haul trucks would move within the pit using roads on the surface of benches with ramps extending between two or more benches.

Drill cuttings would be collected during blast-hole drilling and analyzed to determine gold content and metallurgical and waste rock characteristics. Blasted rock material would be loaded into haul trucks for transportation to the non-PAG waste rock disposal facility, heap leach facility, or placed as backfill into mined-out portions of the pit.

Phase I Mining

Mining would begin at the topographically lower south end of the deposit above the existing streambed elevation and extend eastward. The next sequence would involve mining down to the streambed and constructing an engineered stream channel to the east of the existing streambed. Flow would continue in the existing channel until this section of the engineered stream channel is completed (**Figure 2-3**). Once the new engineered stream channel is established, flow would be diverted into the channel, which would allow mining to progress below the level of the original streambed. Non-PAG waste rock generated during this phase of mine development would be placed in the non-PAG waste rock disposal facility. PAG waste rock would be segregated and placed in a designated encapsulation cell and managed as described in the *Encapsulation Cell* section of this chapter.

Phase II Mining

This phase of mine development would be similar to Phase I, but would occur in the northwestern or upper section of the drainage. Excavation would progress eastward above the existing elevation of the streambed allowing flow to remain in the existing channel. A portion of waste rock generated during this phase would be placed in the non-PAG waste rock disposal facility, with the remainder used as backfill in mined-out portions of the Phase I pit sequence. PAG waste rock generated during Phase II would be placed in an encapsulation cell and managed in the same fashion as described in the *Encapsulation Cell* section of this chapter.

Upon completion of the engineered stream channel, surface flow would be redirected into the channel and mining below the streambed elevation would occur. The permanent engineered stream channel would be completed at the end of the Phase II mining sequence. The new engineered stream channel would be constructed at the same grade as the original streambed (4%) and would be located primarily in Devils Gate limestone. Detailed information on construction and design of the engineered stream channel is discussed in the *Engineered Stream Channel* section of this chapter.

Phase III Through Phase VIII Mining

Once Phase I and Phase II mining are completed and the permanent engineered stream channel is established, mining would proceed from the lower elevations of the deposit toward the higher elevations. Phase III through Phase VIII mining sequences are depicted on **Figures 2-3, 2-4,** and **2-5**.

During mining of the Phase III pit, PAG waste rock may be exposed in the western highwall. Non-PAG neutralizing waste rock from Phase IV mining would be used to completely backfill the Phase III pit. PAG rock exposed in the

Phase III highwall would be backfilled at a 3H:1V (horizontal to vertical) slope angle. Selective handling and placement of PAG waste rock generated during Phase III through Phase VIII would be managed as described in the *Encapsulation Cell* section of this chapter.

Engineered Stream Channel

The intermittent stream that extends through the southern portion of the proposed mine pit would be permanently diverted (**Figure 2-2**). Phased construction of the new engineered stream channel is described in the *Mining Operations* section of this chapter. The engineered stream channel would be relocated along a pit bench at or near the bottom of the drainage and would require reconstruction as a result of mining operations.

To control and limit flow of alluvial groundwater into backfilled mine pits adjacent to the engineered stream channel, a slurry cutoff wall would be installed in the natural channel above the inlet to the engineered stream channel (**Figure 2-6**). Alluvial groundwater encountering the cutoff wall would pool on the upstream side of the cutoff wall. Once the pool fills to a level commensurate with the inlet to the engineered stream channel, water would flow into the channel.

The engineered stream channel would be lined with a geosynthetic clay liner and follow a constructed meandering pathway along the pit bench to replicate the natural drainage course. The channel design would incorporate step-pools, native riparian grasses (graminoides), shrubs, and rock weirs to create a drainage that appears and functions as a natural channel providing both aquatic and riparian habitat (**Photos 1** and **2**). This design is intended to restore the natural form and function of the stream channel. Final design of the engineered stream channel would be contingent upon BLM review and approval. Post closure reclamation of the sediment pond and slurry cutoff wall would include revegetation to establish riparian habitat as shown on **Figure 2-7**.

The pit bench upon which the diversion would be constructed would be about 50 feet wide and slope at a continuous grade of approximately 4 percent from the upgradient channel transition area to a point where the channel is returned to its natural course. The upgradient channel transition would be constructed on a 0.5 percent grade from the upstream transition between the natural drainage channel and the engineered stream channel. The engineered stream channel would be approximately 5,000 feet long. Flow from the engineered stream channel would be directed into the existing natural drainage at the southeastern edge of the pit.

Debris and large sediment catch basins would be constructed at the base of the pit highwall along the east side of the engineered stream channel to collect surface water run-off and rock debris dislodged upslope during mining. A levee with 3.0H/1.0V slopes would be constructed along the western edge of the engineered stream channel to provide protection during periods of high flow. Sediment control structures would be constructed behind the levee to capture and retain sediment. Both the catch basins and sediment control structures would be accessible with equipment and maintained on an as needed basis. A typical cross-section and features of the engineered stream channel are shown on **Figure 2-6**.

SEE FIGURE 2-3 MINE DEVELOPMENT PHASES 1-III

SEE FIGURE 2-4 MINE DEVELOPMENT PHASES IV - VI

SEE FIGURE 2-5 MINE DEVELOPMENT PHASES VII - VIII

SEE FIGURE 2-6 ENGINEERED STREAM CHANNEL DETAILS

SEE FIGURE 2-7 TYPICAL ENCAPSULATION CELL

Photo No. 1: Relocation of tributary to Bell Creek northwest of Carlin, Nevada, illustrates conceptual design for construction of engineered stream channel in the Emigrant drainage. Relocated channel includes sinuous meandering channel cobble bed, rock weirs, and riparian vegetation including willows, sedges, and rushes.

Photo No. 2: Relocated Bell Creek tributary has perennial flow in some stretches resulting in growth and establishment of wetland riparian vegetation supporting terrestrial and aquatic wildlife species.

The new engineered stream channel would be constructed to accommodate a 500-year storm event (3.9 inches). Culverts with reinforced concrete or non-PAG rip-rap headwalls would be installed where haul roads cross the channel. Culverts would be capable of conveying 100-year peak flow and installed in a manner to allow passage of aquatic life within engineering constraints. Flow in excess of culvert capacity would pass over the roadway. Non-PAG rip-rap would be incorporated into the diversion and at the discharge point to reduce potential coarse sediment effects. Applicable Clean Water Act (Section 404) permits would be obtained from the U.S. Army Corps of Engineers.

WASTE ROCK MANAGEMENT

In order to characterize the potential to generate acid and/or mobilize metals, various static and kinetic tests were performed on the primary rock types at the Emigrant Mine. Initial static testing was performed by Newmont in 2002, and due to the uncertainty of unoxidized rock to generate acid, Newmont performed supplemental testing in 2005 and 2006. Testing included static tests [Acid-Base Accounting; Peroxide Acid Generation (Net Acid Generating); and Meteoric Water Mobility Procedure], and kinetic tests (Humidity Cell and Biological Acid Production Potential tests). Paste pH measurements were also taken on samples undergoing humidity cell testing. A summary of test results is contained in *NCV and Paste pH Emigrant Project Waste Rock Characterization and a Proposed Method for Field Identification* (Newmont 2008a) on file at the BLM Elko District Office.

Non-PAG Waste Rock Disposal Facility

Development of the Emigrant Project would require construction of a non-PAG waste rock disposal facility to be located in portions of Sections 1 and 2, Township 31 North, Range 53 East. A portion of the non-PAG waste rock generated during the first three phases of mining would be placed in the non-PAG waste rock disposal facility. Subsequent waste rock generated during Phases IV through VIII would be placed as backfill within mined-out portions of the pit. The non-PAG waste rock disposal facility would be engineered for stability and designed, where practicable, with boundaries to blend with surrounding topography. The proposed non-PAG waste rock disposal facility would disturb approximately 78 acres (26 public and 52 private acres) and have a capacity of approximately 12 Mt. Remaining waste rock would be used for in-pit backfill.

Non-PAG waste rock would be placed by end-dumping down an advancing face in successive horizontal lifts of 20 to 60 feet, depending on topography. Approximate dimensions of the waste rock disposal facility are 2,750 feet long north to south, and 1,650 feet wide east to west. The waste rock disposal facility would be constructed to an overall height of 190 feet above ground surface with an operating slope of 1.4H:1.0V, and reclaimed at an overall average slope of 3.0H:1.0V.

Based on regional seismicity, a magnitude 7.0 earthquake on the Richter scale was used for design of the waste rock disposal facility. Since epicenters are not closely associated with identified faults in this region, the epicenter of a maximum credible earthquake could occur anywhere within the area (Ryall 1977). Consistent with standard and accepted design practices, the value of 0.13 gravity (g) is taken as two-thirds of the maximum horizontal ground acceleration of 0.2g expected to occur as a result of the design seismic event of 7.0 on the Richter scale. Newmont has designed the waste rock disposal facility with a horizontal coefficient of acceleration of 0.13g used to simulate earthquake loading for a pseudostatic case (Newmont 2007a).

Waste Rock Handling

Newmont would sample, test, and classify waste rock in accordance with NDEP Waste Rock and Overburden Evaluation Guidelines (NDEP 1994). Acid generating potential of mined waste rock would be determined in accordance with BLM acid rock drainage policy for activities authorized under 43 CFR 3802/3809 (BLM 1996). Classification is by net acid generation potential according to Acid-base Accounting (ABA) procedures and the Net Carbonate Value (NCV) system. Visual sulfide classification of waste rock is conducted by Newmont geologists from in-pit samples or blast-hole drill cuttings. The visual classification scheme is verified through laboratory analysis of blast-hole cuttings.

A summary of the classification procedure includes the following steps:

- Establish PAG identification from core logs and analyses from exploration holes (NCV [ASTM E1915-05]; Biological Acid Production Potential [Newmot 2004a]; X-ray diffraction/X-ray florescence; kinetic [ASTM D5744-96]; and Meteoric Water Mobility Procedure test work [Appendix B of Information Bulletin No. NV-96-97]).

- Computer modeling of known PAG zones to locate areas of concern.

- Blast-hole analyses, including NCV determination, visual geology and field hydrochloric acid neutralizing test.

- Engineers/geologists establish polygons for mining and special handling of PAG waste rock to encapsulation cells.

- Tracking PAG handling through Newmont's dispatch system.

- Monitoring PAG cells to ensure compliance with respective guidelines.

- Compliance sampling, analyses, and reporting. Compliance samples are collected for every 200 ktons of waste rock. A composite sample is sent to an independent state certified laboratory for analyses (Newmont 2003).

Approximately 83 Mt of waste rock would be mined from proposed mine pit areas. Of this total, about 5 percent (4 Mt) is projected to be PAG (carbon sulfur rock type). The remainder of waste rock would be either net neutralizing (oxide carbonate) or oxide siliceous, which is inert, slightly basic, or basic. During the first phases of mining (Phases I through III), 12 Mt (14% of total waste rock) of non-PAG oxide waste rock would be placed in the non-PAG waste rock disposal facility located south of the pit area. Most waste rock (86%) generated at Emigrant would be placed as backfill in mined-out portions of the pit. Pit floors are composed predominantly of Devils Gate limestone. Waste rock produced during each proposed mining phase is shown in **Table 2-3**.

Encapsulation Cell

Encapsulation cells would be constructed in the following manner:

- PAG waste rock would be placed on Devils Gate limestone in mined-out portions of the pit.

- PAG waste rock would be encapsulated with a minimum 10-ft thick layer of non-PAG acid-neutralizing waste rock.

- The surface of the PAG cell and backfill surface material would be sloped to eliminate pooling and minimize infiltration of meteoric water.

TABLE 2-3
Proposed Waste Rock Production and Classification
Emigrant Mine Project

Mining Phase	Total Waste Rock (tons)	Non-Potentially Acid Generating Waste Rock (tons)	Potentially Acid Generating Waste Rock (tons)	Potentially Acid Generating Waste Rock as % of Total
1	10,082,637	9,885,366	197,271	0.24
2	3,920,835	2,917,463	1,003,372	1.2
3	4,937,138	4,846,050	91,088	0.1
4	21,748,659	21,188,549	560,110	0.68
5	4,584,876	4,060,863	524,013	0.64
6	15,557,583	14,248,075	1,309,508	1.6
7	12,022,729	11,854,152	168,577	0.20
8	9,578,032	9,429,909	148,123	0.18
Total	**82,432,489**	**78,430,427**	**4,002,062**	**4.9**

Note: NCV = Net Carbonate Value (%CO_2). Revised NCV criteria for classification of potentially acid generating rock are [NCV < 0% CO_2] or [NCV > 0% CO_2 and Paste pH <6].
Source: Newmont 2008a.

The ratio of non-PAG to PAG waste rock averages greater than 30:1 across all phases of mining. Based on current mine design, adequate quantities of non-PAG waste rock would be available for use in construction of the 10-ft thick encapsulation layer. Encapsulation cells are designed to minimize exposure of PAG waste rock to atmospheric oxygen and water from precipitation and snowmelt. Typical placement and encapsulation of PAG material is shown on **Figure 2-8** (Newmont 2007a).

HEAP LEACH FACILITY

Ore produced at the Emigrant Mine would be processed using run-of-mine oxide heap leach techniques. Lime would be added to the ore at the lime silo as it is transported to the heap leach facility. Coarse lime (minimum 1/8-inch diameter) would be added to the ore in order to maintain a consistent pH level of the cyanide solution used in the heap leach facility. The proposed location of the lime silo is shown on **Figure 2-2**.

The zero discharge heap leach facility would be constructed in three phases (**Figure 2-5**) on approximately 344 acres (214 acres public land and 130 acres private land) in portions of Sections 1 and 12, Township 31 North, Range 53 East (**Figure 2-2**). The ultimate leach pad would be approximately 2,800 feet wide and 5,000 feet long, and designed to contain 92 Mt of ore. Loaded to its ultimate configuration, the maximum height would be approximately 300 feet above ground surface. Temporary surface water control ditches would be constructed around each of the three successive phases of heap leach pad development. The heap leach pad would be developed in six construction stages: 1) remove and stockpile growth media; 2) blend and compact remaining subsoil and selected borrow materials to attain a low-permeability (12 inches of 1×10^{-6} centimeters per second [cm/sec]) subgrade; 3) install an 80-mil (0.080-inch) double-textured, high density polyethylene (HDPE) liner; 4) place 12 inches of

SEE FIGURE 2-8 PROPOSED LEACH PAD AND PROECESS LINER SYSTEMS

fine-grained (100 percent passing a #4 sieve) gravel material over the liner as a protective layer; 5) place an 18-inch thick coarse rock layer over the lateral collector and header pipes to enhance drainage through the pad and minimize hydraulic head on the liner system; and 6) place ore in successive lifts on the prepared base and liner (Newmont 2005a). A cross-section of the leach pad liner system proposed for the Emigrant Project heap leach facility is shown on **Figure 2-9**. Final design would require NDEP approval.

A leak detection system would be installed under areas of concentrated flow such as solution collection headers, to monitor potential seepage through the liner system. Perforated pipe would be installed in 80-mil HDPE-lined trenches cut into subgrade material beneath key areas in the leach pad liner system (**Figure 2-9**). The leak detection system piping would flow to a collection sump which would be monitored by site personnel (Newmont 2005a).

Three types of material would be used during construction of the heap leach facility: 1) prepared subgrade; 2) protective layer; and 3) drainage layer. Borrow sources (**Figure 2-2**) would be developed to provide material for construction. Borrow areas are described in detail later in this chapter. During construction of the heap leach facility, fine-grained material would be excavated and hauled for use as the over-liner protective layer placed on the synthetic liner (construction stage 4 above).

Solution exiting the leach pad drainage system would pass through a launder box designed to direct flow of pregnant solution to the process ponds or directly to the processing plant. Solution would be conveyed from the launder to its destination via HDPE piping installed in HDPE-lined conveyance channels. Channels would be designed to contain maximum potential flow volume, plus the flow resulting from a 100-year, 24-hour storm event, plus the maximum capacity of the piping, and serve as secondary containment in case of a release.

Loading the heap facility would progress from the lower southeast end of the facility to the northwest in phases. Loading of Phases 1, 2, and 3 (ultimate loading) is shown on **Figure 2-5.** Ore would be placed on the heap leach pad in lifts ranging from 15 to 60 feet depending on topography and processing needs. Benches approximately 30 feet wide would separate each lift. The surface of each lift would be ripped to facilitate percolation of process solutions. A weak barren cyanide solution (barren of metals) would be applied to the surface using drip tubes or sprinklers.

The cyanide solution would migrate through the ore; dissolve the gold and silver contained in the ore, and drain to a central collection point at the base of the ore pile. Leach solution containing dissolved gold and silver would then be pumped from the collection point to a series of carbon columns, where the gold and silver would be adsorbed onto the carbon (Carbon-in-Column recovery system). Process solution would then be recycled back to the leach pad for reuse. About once a week, loaded carbon (carbon containing metal) would be transported to Newmont's Gold Quarry processing facility (about 7 miles north of Carlin) for treatment.

Solution flow rates would be designed for 9,000 gallons per minute (gal/min) to allow for surge capacity, but would operate at 7,000 gal/min. Makeup water required for the heap leach facility would average about 200 gal/min (approximately 100 million gal/year for about 14 years) with most losses attributable to evaporation and moisture retention of the ore. Makeup water requirements would be reduced in subsequent years. Makeup water would be supplied from existing groundwater wells located in the Dixie Creek Valley, currently used to supply water to the Rain Mine.

PROCESS PONDS

Three process ponds including two operational ponds measuring approximately 325 by 350 feet, each with a capacity of 10 million gallons, and a storm water (event) pond approximately 410 by 700 feet with a capacity of 30 million gallons, would be constructed approximately 800 feet southeast of the heap leach facility (**Figures 2-2**). The ponds would be designed with side-slopes of 2.5H:1.0V and depths ranging from 20 to 25 feet. Pond liner systems would be constructed in the following manner from bottom to top: 12 inches of prepared subgrade; secondary 80-mil HDPE geomembrane; leak detection system consisting of a geonet; and a primary 80-mil HDPE geomembrane.

The geonet layer between the geomembrane layers would allow for collection of fluids that may seep through the primary geomembrane. A cross-section showing construction of the ponds is on **Figure 2-9**. The ponds would be connected by spillways such that flow would be contained within the two operational ponds before spilling to the storm water pond.

The heap leach facility and processing ponds would be fenced to preclude access by wildlife in accordance with NRS 502.390 (Newmont 2005a). Process ponds containing chemicals in solution at concentrations lethal to wildlife (*e.g.*, barren and pregnant solution ponds) would be covered or contained to preclude access by birds and bats for as long as the pond contains solution. NDOW representatives would periodically check on the status of the protective measures. Newmont has obtained an Industrial Artificial Pond permit from NDOW in accordance with NRS 501.181, 502.390, and NAC 502.

SURFACE WATER AND SEDIMENT CONTROLS

Surface water run-off would be controlled within the mine site by construction of diversion ditches, berms, and sediment and water retention structures. Surface water control ditches would be constructed as necessary around the heap leach facility and non-PAG waste rock disposal facility to control storm water run-on to these sites. Surface water control ditches and sediment retention ponds would be designed and constructed in accordance with Best Management Practices (BMPs) as outlined in the Handbook of Best Management Practices (Nevada State Conservation Commission 1994) and a Storm Water Pollution Prevention Plan (Newmont 2005a). Sediment ponds and diversion ditches would be sized to contain a 100-year, 24-hour precipitation event of 2.8 inches. Locations of sediment control ponds are shown on **Figure 2-2**.

Sediment control structures would be constructed as needed in response to advancing mine operations. Specific sediment control structures would include:

- Permanent and temporary surface water diversion channels around the heap leach pad to direct water flow away from the facility into natural drainage channels down stream.
    - Diversion channels around the east side of the leach pad would parallel the county road right-of-way.
    - A diversion channel along the west side of the heap leach pad to divert water run-off from the haul road away from the pad and into natural drainages downstream of the process ponds.

SEE FIGURE 2-9 POST CLOSURE SEDIMENT POND AND SLURRY CUTTOFF WALL CROSS SECTION

A large sediment/debris catch basin at the toe of the high wall adjacent to the engineered stream channel with additional check structures within the channel proper (see discussion under *Engineered Stream Channel* in this chapter).

- Long-term control of soil movement from the heap leach pad would be accomplished by establishing vegetation on the slopes. Short-term control would use BMPs such as dozer tracking and sediment filter barriers at the toe of the fill slopes.
- Run-off from the non-PAG waste rock disposal facility would be directed toward Borrow Area #1 and into sediment collection basins where topography permits. Sediment filters would also be used at the toe of the non-PAG waste rock disposal facility.

Newmont has obtained a storm water discharge permit from NDEP which includes design criteria, monitoring program, and a Storm Water Pollution Prevention Plan (Newmont 2005a). Storm water would be controlled using BMPs as defined by Nevada State Conservation Commission (1994). These BMPs address material handling procedures that minimize exposure of materials to storm water; define spill prevention and response measures; identify sediment and erosion control measures; and describe physical storm water controls.

Pursuant to NAC 445A.429, diversion channels, sediment basins, and other surface water control structures would be constructed upgradient of surface facilities to control storm water run-on. Ditches would divert uncontaminated run-on water into natural drainages down gradient from disturbed areas. Diversion structures and sediment basins are designed to convey flows from a 100-year, 24-hour storm event. These structures would be maintained until closure of the Project is complete and BLM and NDEP are satisfied as to the stability of the reclaimed landscape.

Berms and ditches would be constructed as appropriate to preclude meteoric water from flowing into mine pits, or onto the non-PAG waste rock disposal facility. Sediment control structures would include silt traps and fences using certified weed free straw, hay bales, or geotextile fabric, and sediment ponds. Sediment ponds would be constructed at the upstream and downstream end of the engineered stream channel to capture sediment released from mining and related disturbances. Sediment ponds would be removed once vegetation has stabilized on reclaimed areas.

Sediment control measures would be implemented, as necessary to reduce soil movement within the site and to minimize off-site effects. These structures would be monitored following major precipitation events; maintained on a regular basis; and designed to allow access for maintenance throughout the life of the Project. Soil collected in these structures would be periodically removed and placed in the soil stockpile or on reclaimed areas.

HAUL AND ACCESS ROADS

Development and operation of the Emigrant Project would require approximately 37 acres of disturbance on public land for construction of haul, access, and service roads (**Figure 2-2**). Proposed haul roads would be 100 to 120 feet wide (running width) to safely accommodate haul truck traffic with a maximum gradient of 10 percent. Haul roads would be maintained on a continuous basis to ensure safe, efficient haulage operations and to minimize fugitive dust emissions in accordance with the NDEP Bureau of Air Pollution Control Class II Air Quality Operating Permit, No. AP1041-2085. Haul roads would be constructed using non-PAG in-situ or oxide waste rock as necessary, for construction or routine maintenance. Access and service roads would be constructed to an average width of 70 feet using in-situ materials and non-PAG waste rock similar to haul roads. Berms (approximately 5 to 6 feet in height) would be constructed along each side of access and haul roads. Breaks in the berms would be constructed to allow wildlife passage through the area. The service road from the Rain Mine shop complex to the Emigrant Mine is shown on **Figure 2-2**. An existing county road right-of-way would be relocated around the heap leach facility.

ANCILLARY FACILITIES

Ancillary facilities would be constructed at the Emigrant Mine including: operations office, septic leach field, truck ready-line and equipment fueling facility, electrical substation, lime silo, prill silo, explosive magazine, water fill stations for water trucks, and growth media stockpiles. The operations office and septic leach field would be located south of the heap leach pad next to the processing plant (**Figure 2-2**). Equipment and vehicle maintenance would be performed at existing shops located at the Rain Mine.

Equipment Fueling Facility

The equipment fueling facility and ready line would be constructed near the prill silo and consist of above ground storage tanks with a total capacity of approximately 30,000 gallons of diesel fuel. A lined spill containment basin would be constructed around bulk storage tanks to contain 110 percent of the volume of the largest tank.

Spill Prevention and Response

In accordance with Newmont's Spill Prevention, Control, and Countermeasure (SPCC) Plan (Newmont 1997), all maintenance facilities would be equipped with spill response materials. Earth moving equipment would be available from the mining operation for constructing dikes. Above-ground tanks and associated piping would be visually inspected for leaks on a daily basis. Bulk storage tanks would be constructed with secondary containment to accommodate 110 percent of volume of the largest tank.

Newmont personnel would be instructed in operation and maintenance of equipment to prevent discharge of oil. Spill response training would be provided through the Environmental Compliance Awareness Program outlined in Newmont's Emergency Response Plan (Newmont 2006). Supervisors would schedule and conduct spill prevention briefings for appropriate personnel to include a review of the SPCC Plan, spills, malfunctioning components, and precautionary measures. Emergency response procedures and clean-up would be conducted in accordance with Newmont's Emergency Response Plan (Newmont 2006a).

Growth Media Stockpiles

Prior to commencing mining activities, growth media would be salvaged and stockpiled for future use in reclaiming disturbed areas. Proposed growth media stockpile areas for material salvaged from Phase I of the heap leach facility, non-PAG waste rock disposal facility, and initial pit development are shown on **Figure 2-2**. Growth media salvaged during construction of Phases II and III of the heap leach facility would be stockpiled in the north end of Borrow Area #1 (GM #3 on **Figure 2-2**). The following estimates of growth media volumes are for the initial development stage only, and do not include additional growth media available for reclamation that would be salvaged during phased development of the heap leach facility and borrow areas.

Growth media stockpile #1 (GM#1) would contain approximately 318,000 cubic yards (yd^3) of material stripped from Phase I construction of the heap leach facility. Growth media stockpile #2 (GM#2) would contain approximately 50,000 yd^3 of material salvaged from Borrow Area #1 (BA#1). Growth media stockpile #3 (GM#3) would contain material salvaged from the base of the non-PAG waste rock disposal facility (approximately 186,000 yd^3) and Phases II and III of the heap leach facility (approximately 414,000 yd^3). Growth media stockpile #4 (GM#4) would contain approximately 10,000 yd^3 of material stripped from the initial mine pit during Phases I and II. In addition, several small stockpiles would be created adjacent to the new haul road during construction of the road.

Borrow Areas

Three borrow areas would be developed to provide material for construction of the heap leach facility and growth media for use in reclamation. Locations of borrow sources are shown on **Figure 2-2**.

Borrow Area #1 (BA#1) would be located adjacent to the non-PAG waste rock disposal facility and would disturb approximately 83 acres of public land. This source would provide approximately 1.3 million yd^3 of borrow material. Borrow Area #2 (BA#2) is an existing source and would be expanded to produce approximately 475,000 yd^3 within an existing surface disturbance of 16 acres (13 private and 3 public acres). An existing road would be widened and used to access and transport material from Borrow Area #2.

Approximately 165,000 yd^3 of material would be excavated from within the proposed disturbance boundary of the heap leach facility for use as a protective layer over the synthetic liner during construction of the heap leach facility.

Growth media would be salvaged and stockpiled from Borrow Areas #1 and #2 for use in reclamation. Final slopes would be regraded to an overall average of 3.0H:1.0V, and final stage pit floors that are not backfilled would be shaped and graded with growth media to facilitate drainage and prevent ponding.

Energy

Electrical energy would be provided by accessing an existing 25-kilovolt (kV) line that currently services the Rain Mine. An existing line supplying power to water wells in Dixie Valley would be rerouted around the heap leach facility. A new 3000-kV electrical substation would be constructed near the southeast corner of the heap leach facility. An additional 1000-kV substation would be constructed near the ready line.

Water Supply Wells and Water Use

Two water supply wells were installed by Newmont in 1988 along Dixie Creek to provide water for the Rain Mine. Well logs indicate that the production wells (RPW-1 and RPW-2) were completed to depths ranging from 700 to 860 feet below ground surface and collectively produce up to 1,500 gal/min. Water from these production wells is transported 6 miles to the Rain Mine by a 12-inch diameter buried pipeline within right-of-way (N-47282) issued by BLM to Newmont. The right-of-way also includes an overhead powerline and access road.

Water use at the Rain Mine would continue for about 5 years at an expected rate of 2 to 3 million gal/year, which has been the pumping volume for the Rain Mine since 2005 (Newmont 2008b). The proposed volume to be pumped from the Dixie Creek Valley production wells for the Emigrant Project would total about 130 million gal/year (105 million gal/year as make-up water for the heap leach facility and 25 million gal/year for dust suppression, equipment wash bay, potable, and sanitary use). The combined pumping volumes for the Emigrant Mine and

Rain Mine, therefore, would be approximately 133 million gal/year, but usage would decrease after 5 years as the Rain Mine is decommissioned.

WILDLIFE PROTECTION MEASURES

Fencing

The heap leach facility and process ponds would be fenced to preclude access by terrestrial animals. The fence would be 8 feet high, the bottom 4 feet of which would be composed of woven or mesh wire with not greater than 2-inch mesh on the bottom 2 feet and a maximum of 8-inch mesh on the top. The bottom would be placed tight to the ground level to prevent animals from gaining access under the fence. The remainder of the fence above the woven or mesh wire would be smooth or barbed wire with a spacing of 10, 12, and 14 inches beginning from the top of the woven or mesh wire. If cyclone or chain-link fence is used, the only applicable conditions would be the 8-foot height and tight-to-ground requirement.

Covering/Containment

Bird balls or netting would be placed on or over process ponds containing chemicals in solution at concentrations lethal to wildlife (e.g., barren and pregnant solution ponds) to preclude access by birds and bats for as long as the ponds contain solution. NDOW representatives would periodically check on the status of the protective measures.

RESOURCE MONITORING

Air Quality

Emissions from the lime silo would be monitored in accordance with requirements imposed by an NDEP Air Quality Operating Permit. Fugitive emissions would be controlled using BMPs as defined by the Nevada State Conservation Commission (1994). Dust emissions would be controlled through use of water, approved chemical binders or wetting agents, dust collection devices, water sprays, and revegetation of disturbed areas concurrent with operations.

Water Resources

Water resources in the Project area would be monitored within the Dixie Creek hydrographic basin as part of Newmont's Plan of Operations (Newmont 2007a). The monitoring program would be developed in conjunction with NDEP to address groundwater, springs/seeps, and streams/rivers. The purpose of water monitoring is to establish baseline data and report changing conditions as mining and ore processing operations are conducted in the area. Three groundwater monitoring wells have been installed to date on the Project site. One is located down-gradient of the waste rock storage facility, and two others, a shallow alluvial well and deeper bedrock well, have been installed down-gradient of the proposed heap leach facility. These wells would be sampled quarterly and results reported to NDEP and BLM in accordance with State Water Pollution Control Permit requirements.

Other monitoring wells may be required by the State prior to issuing a mine permit. Location of additional monitoring wells would be approved by NDEP and BLM and incorporated into Newmont's Water Monitoring Program. Water quality, groundwater levels, and surface water flow would be measured as required at designated monitoring wells, springs and seeps, and surface water stations. Monitoring reports would be prepared by Newmont to summarize water resource monitoring data collected in accordance with State Water Pollution Control Permit requirements.

Cultural Resources

Cultural resource inventories have been completed for the Emigrant Project area. Three cultural resource sites were mitigated due to proposed disturbance by various mine facilities. No sites eligible for listing on the National Register of Historic Places would be affected. New sites that may be discovered during proposed surface disturbing activities or by future cultural inventories would either be avoided or mitigated by Newmont in accordance with Section 106 of the National Historic Preservation Act (see Chapter 3 - *Cultural Resources*).

Paleontological Resources

Paleontological resources have not been identified within the Emigrant Project area. In the event vertebrate fossils are discovered within the Project area during mining operations, Newmont would notify the BLM Authorized Officer. Actions that could occur after notification include cessation of mining activities in the area of discovery; verification and preliminary inspection of the discovery; and development/ implementation of plans to avoid or recover the fossils.

Wildlife

Newmont has obtained an Industrial Artificial Pond permit from NDOW in accordance with NRS 501.181, 502.390, and NAC 502. Measures would be implemented to prevent wildlife mortality occurring as a result of contact with the heap leach facility and associated process ponds. Newmont would inspect these facilities daily and maintain a record of wildlife mortalities associated with them. Reports would be submitted to NDOW on forms provided by the agency.

SOLID AND HAZARDOUS WASTE

Solid Waste

All non-hazardous solid waste generated at the Emigrant Mine would be disposed in an NDEP approved Class III waivered landfill established at the mine site or in an existing landfill at the Rain Mine. Typical solid waste generated at the Emigrant Project would include paper, plastic packaging, and household type refuse.

Hazardous Waste

Hazardous waste is defined as any solid waste that meets criteria in 40 CFR 261.10 through 261.35. Under the Resource Conservation and Recovery Act (RCRA), solid waste from the "extraction, beneficiation, and processing of ores and minerals" are excluded from hazardous wastes designation as a result of the Beville Exclusion (40 CFR 261.4(b)(7). The Emigrant Mine would operate as a Conditionally Exempt Small Quantity Generator of hazardous waste as defined by RCRA because the facility would generate less than 220 pounds (100 kilograms) per month of RCRA-regulated hazardous waste (40 CFR Part 260-270) under EPA Identification No. NVD 982-486-300. Hazardous wastes would be stored in covered 55-gallon drums and periodically transported to an approved treatment, storage, and disposal facility. When practicable, wastes would be sent to recycling facilities. All hazardous wastes would be stored, packaged, and manifested in compliance with applicable federal and state regulations.

Hazardous Materials

Quantities Greater Than Reportable Quantities

The term "hazardous materials" is defined in 49 CFR 172.101. Hazardous substances are defined in 40 CFR 302.4 and the Superfund Amendments and Reauthorization Act Title III. Hazardous materials and hazardous substances that would be transported, stored, or used in quantities greater than the Threshold Planning Quantity designated by Title III for emergency planning are summarized in **Table 2-4**.

Hazardous materials are transported to the Rochester Mine via Highway 278 south of Carlin, then approximately 10 miles south on the Rain Mine road to the Rain Mine, and then via mine access roads to the site. U.S. Department of Transportation (USDOT) regulated transporters would be used for shipment. U.S. Department of Transportation approved containers would be used for on-site storage (Newmont 2007a), and spill containment structures would be provided. Hazardous materials would be stored in designated areas on private and public land.

Quantities Less Than Reportable Quantities

Small quantities of hazardous materials less than the Threshold Planning Quantity not included in **Table 2-4** would also be managed at the Emigrant Project. These include vehicle and equipment maintenance products, office products, paint, and batteries.

TABLE 2-4
Hazardous Materials Management
Emigrant Mine Project

Substance	Area Used/Stored	Rate of Use (per year)	Quantity Stored On-site	Storage Method	Waste Management
Diesel Fuel	Mine/truck shop	5,300,000 gal.	35,000 gal.	Bulk tank	No waste
Hydraulic Fluid	Mine/truck shop	-	5,000 gal.	Bulk tank totes, drums	Recycled
Motor Oil	Mine/truck shop	-	5,000 gal.	Bulk tank totes, drums	Recycled
Antifreeze	Mine/truck shop	-	5,000 gal.	Bulk tank totes, drums	Recycled
Explosives	Prill Silo	8,000,000 lbs.	370,000 lbs.	Silo	No waste
	Explosive (powder) magazine	50 tons	2,500 lbs.	Magazine	No waste
Gasoline	Mine/truck shop	-	5,000 gal.	Bulk tank	No waste
Propane	Mine/surface	-	5,000 gal.	Bulk tank	No waste
Grease	Mine/truck shop	-	1,000 gal	Totes, drums	Recycled
Cyanide	Leach Pad	8,200,000 lbs.	7,000 gal	Bulk tank	No waste
Lime	Heap Leach Facility/Lime silo	26,000 tons	250 tons	Silo	No waste

gal = gallons; lbs. = pounds
Source: Newmont 2007a.

Emergency Response

All tanks and containment vessels are positioned on a containment surface designed to route any spilled material to lined collection areas. In addition, all hazardous material storage tanks have secondary containment sufficient to hold at least 110 percent of the volume of the largest tank in the containment area.

Newmont would implement an Emergency Contingency Hazardous Waste Plan (Newmont 2007b) and an Emergency Response Plan (Newmont 2006a) to address accidental spills or releases of hazardous materials to minimize health risk and environmental effects. The plans include procedures for evacuating personnel, maintaining safety, cleanup and neutralization activities, emergency contacts, internal and external notifications to regulatory authorities, and incident documentation. Proper implementation of the Emergency Contingency Hazardous Waste Plan and Emergency Response Plan is expected to minimize the potential for impacts associated with potential releases of hazardous materials.

Toxic Release Inventory

Under Emergency Planning and Community Right-To-Know Act Section 313 guidance, Newmont would be required to report the amount of toxic release inventory chemicals that would be placed in disposal facilities as a "release amount." Waste rock is exempt from reporting under the Toxic Release Inventory regulations.

HUMAN HEALTH AND SAFETY

Human health and safety at the Emigrant Project would be regulated under the federal Mine Safety and Health Act of 1977, which sets mandatory safety and health standards for metal mines, including open pit mines. The purpose of these health and safety standards is the protection of life, promotion of health and safety, and prevention of accidents. Mine Safety and Health Act regulations are codified under 30 CFR Subchapter N, Part 56. Employees at the Emigrant Project would be required by Newmont to receive training as outlined in **Table 2-5**.

Noise

Noise levels are quantified using units of decibels (dB). Humans typically have reduced hearing sensitivity at low frequencies compared with their response at high frequencies. The "A-weighting" of noise levels, or A-weighted decibels (dBA), closely correlates to the frequency response of normal human hearing (250 to 4,000 hertz). By using A-weighted noise levels in an environmental study, a person's response to noise can typically be assessed. Because decibels are logarithmic values, the combined noise level of two 50 dBA noise sources would be 53 dBA, not 100 dBA.

Many different A-weighted metrics can be used to describe and quantify noise levels. The equivalent noise levels, L_{eq}, during a certain time period uses a single number to describe the constantly fluctuating instantaneous ambient noise levels at a receptor location during a period of time, and accounts for all noises and quiet periods that occur during that time period.

Noise levels at the Emigrant Project would vary during construction, mining, and reclamation activities. No residences, campgrounds, or recreation facilities are located within a 5-mile radius of the Project area. Noise sources within a 5-mile radius include the Rain Mine heap-leach processing and reclamation activities, wind-generated noise through grass and trees, flowing water in creeks, wildlife, aircraft flying overhead, and vehicles traveling on roads.

TABLE 2-5
Emigrant Project Health and Safety Training Programs

Course	Personnel	Frequency	Duration	Instruction
New-hire Training	All new hires exposed to mine hazards	Once	24 hours	Employee rights Supervisor responsibilities Self-rescue Respiratory devices Transportation controls Communication systems Escape and emergency evacuation Ground control hazards Occupational health hazards Electrical hazards First aid Explosives Toxic materials
Task Training	Employees assigned to new work tasks	Before new assignments	Variable	Task-specific health and safety procedures Supervised practice in assigned work tasks in nonproductive duty
Refresher Training	All employees who received new-hire training	Yearly	8 hours	Required health and safety standards Transportation controls Communication systems Escape ways, emergency evacuations Fire warning Ground control hazards First aid Electrical hazards Accident prevention Explosives Respirator devices
Hazard Training	All employees exposed to mine hazards	Once	Variable	Hazard recognition and avoidance Emergency evacuation procedures Health standards Safety rules Respiratory devices

Equipment proposed for use during construction, mining, and/or reclamation activities would include drill rigs, down-hole blasting, end-dump trucks, front-end loaders, shovels, and other standard construction and earthmoving equipment. Each individual piece of construction and earthmoving equipment can typically generate intermittent noise levels up to 90 dBA at a distance of 50 feet from the equipment (USDOT 1995). However, equipment noise can vary considerably depending on age, condition, manufacturer, use, and changing distance from the equipment to receptor location. **Table 2-6** indicates the estimated noise levels per activity at varying distances from the source(s).

Short-term noise levels during construction and reclamation activities would meet EPA L_{dn} levels of L_{dn} 55 dBA at 0.25 mile from the Project area (**Table 2-6**). Long-term noise levels during mining operations, including work at the open pit, waste rock disposal, and heap leaching facilities, would meet the EPA L_{dn} level of 55 dBA at approximately 0.6 mile beyond the Project area.

TABLE 2-6
Estimated Noise Levels at Various Distances from Source(s)
Emigrant Mine Project

Activity	Equipment / Noise Source(s)	Noise Level at Receiver		
		¼ mile	½ mile	1 mile
Construction — Heap leaching facility Diversion channel Haul and access roads Ancillary facilities	Three pieces of earth moving equipment operating simultaneously, such as end-dump trucks, bulldozers, scrapers, front-end loaders, or graders.	L_{dn} 55 dBA	L_{dn} 49 dBA	L_{dn} 46 dBA
Operations- Open pit mine Waste rock disposal Heap leaching facility	Sixteen pieces of earth moving equipment operating simultaneously, including end-dump trucks, front-end loaders, or shovels	L_{dn} 62 dBA	L_{dn} 56 dBA	L_{dn} 50 dBA
Operations — Open pit mine	Blasting – 10 charges of 375 lb explosives detonated simultaneously.	120 dBA (peak)	114 dBA (peak)	108 dBA[1] (peak)
Reclamation — All areas	Three pieces of earth moving equipment operating simultaneously, e.g., end-dump trucks, bulldozers, scrapers, front-end loaders, or graders,	L_{dn} 55 dBA	L_{dn} 49 dBA	L_{dn} 46 dBA

[1] Blast noise potentially audible for several miles; L_{dn} = day-night average noise level – a single number descriptor that represents the constantly varying sound level during a continuous 24-hour period. dBA = A-weighted decibels.
Source: USDOT 1995; Greene and Greene 1997.

Personal Protective Equipment

Personal protective equipment would be mandatory under Newmont policy for all activities based upon job risk assessment in accordance with MSHA regulations. At a minimum, all employees would be required to wear hard-hats and steel toed boots in designated work areas. Rubber gloves, rubber arm protectors, rain suit coveralls, face shields, splash goggles, safety belts and lanyards, dust respirators, hearing protectors, welding hoods and goggles, and high voltage insulated gloves would be available and required where appropriate. Safety showers would be provided at the processing plant.

EMPLOYMENT

The Emigrant Project would employ approximately 180 people. Most of the work force for the Project would come from existing mine-related work forces in the Carlin area.

The construction work force would be approximately 100 people during initial construction phases, decreasing to approximately five employees during final phases of construction. Construction and development are expected to require approximately 12 months.

RECLAMATION

Newmont submitted a Reclamation Plan for the Emigrant Mine site to both the BLM and NDEP in March 2007 (Newmont 2007a). Reclamation activities for the Emigrant Project are designed to achieve post-mining land uses consistent with the Elko District Office Resource Management Plan (BLM 1987). Reclamation is designed to return disturbed land to a level of productivity comparable to pre-mining levels associated with adjacent land. Post-mining land uses include wildlife habitat, livestock grazing, dispersed recreation, mineral exploration and development. Certain mine components (*e.g.*, last phase of the mine pit) may have restrictive post-mine land uses.

Short-term reclamation goals are to stabilize disturbed areas and protect adjacent undisturbed areas from unnecessary or undue degradation. Long-term reclamation goals include public safety, site stabilization, and establishment of productive vegetative consistent with post-mining land uses.

Reclamation activities would include regrading of the non-PAG waste rock disposal facility, backfilled portions of mined-out pit areas, borrow areas, and heap leach facility; removal of structures after cessation of operations; regrading disturbed areas (including roads); drainage control; well closure (*e.g.*, piezometers); removal and regrading of stockpile areas; replacement of salvaged soil; seeding and planting; and reclamation monitoring (Newmont 2007a).

Approximately 98 acres of the Phase VIII mining sequence would be partially backfilled. Reclamation would include grading backfill material to drain, placing growth media, and revegetation. A highwall would remain along the east and north portions of the pit offering habitat for bats and raptors.

The reclamation schedule would encompass the period between cessation of mining through post-reclamation monitoring. Reclamation would take place concurrent with operations where possible. Proposed post-reclamation topography for the Emigrant Project is shown on **Figure 2-10**. A Closure Plan meeting and State of Nevada requirements (NAC 445A.447) would be filed with NDEP 2 years prior to mine closure.

Soil Salvage

As proposed mine areas, borrow sources, haul and access roads, stockpile sites, heap leach pad, and waste rock disposal areas are developed, Newmont would recover available growth media for future use in reclaiming disturbed areas. After completion of Phase I and II mine operations, growth media would be salvaged from active mine areas and direct hauled for placement over backfilled and regraded portions of previously mined out phases of the pit where possible. Growth media would be salvaged and transported to stockpiles using scrapers, wheel dozers, track dozers, haul trucks, and loaders. Newmont would implement Best Management Practices to reduce soil loss from stockpiles by constructing run-off control berms, mulching, adding organic matter, interim seeding, or leaving slopes in roughened condition. Soil suitability and salvage depths of growth media are summarized in Chapter 3, *Soil Resources*.

Grading Disturbed Areas

Prior to replacing growth media, disturbed areas would be regraded to create a stable post-mining configuration, establish effective drainage to minimize erosion, and protect surface water resources. To the extent practicable, grading would blend disturbed areas with the surrounding terrain. Angular features, including tops and edges of waste rock disposal facilities, would be rounded.

SEE FIGURE 2-10 RECLAMATION COUNTOUR MAP

Prior to initiating the proposed reclamation vegetation plan, Newmont would evaluate growth media replacement depths. Soil replacement depths would vary according to location and soil type. The variety of replacement depths would provide different vegetation mosaics on reclaimed areas. Regraded surfaces would be ripped where necessary prior to placement of growth media. Ripping would reduce compaction and provide a uniform seed bed.

Revegetation

The goal of Newmont's revegetation program is to stabilize reclaimed areas, ensure public safety, and establish a productive vegetative community in accordance with the Elko District Office Resource Management Plan (BLM 1987) and designated post-mining land uses (Newmont 2007a). Plants proposed for use on the non-PAG waste rock disposal facility, backfilled mine pits, and borrow areas are shown in **Table 2-7**. Modifications to the seed list, application rates, cultivation methods, and techniques may change based on success of concurrent reclamation. Site-specific seed mixtures, amendments, and application rates would be developed through consultation with and approval by BLM, NDEP, and NDOW. Seedlings may be substituted for seeds. The seed mix selected would represent a Reclaimed Desired Plant Community and would be appropriate for each ecological site in the Project area. A perimeter fence along the permit boundary would remain in place until vegetation is established on reclaimed areas.

Criteria for bond release of revegetated areas would be in accordance with 43 CFR 3809.420 which requires, in part, "…establishment of a stable and long-lasting vegetative cover that is self-sustaining and, considering successional stages, will result in cover that is:

- Comparable in both diversity and density to pre-existing natural vegetation of the surrounding area; or
- Compatible with the approved BLM land use plan or activity."

Newmont would conduct annual weed surveys to direct weed control efforts. Monitoring weed infestations and weed control would continue until reclamation is complete and potential for weed invasion is minimized. Certified weed free straw bales would be used for sediment control.

Concurrent Reclamation

As various facilities reach the end of their period of use, Newmont would initiate reclamation activities concurrent with ongoing mining operations. As mining operations progress uphill (north), backfilled portions of the pit would be concurrently regraded, growth media placed, and seeded. In some areas, growth media would be temporarily stockpiled to allow adequate backfilling and regrading of mined-out portions of the pit prior to placement of growth media.

Waste Rock

The benched slopes associated with the non-PAG waste rock disposal facility would be regraded to an overall average slope of 3.0H:1.0V over the 190-ft height of the facility. Grading would be done to minimize erosion, facilitate reclamation activities (seeding, mulching), and provide a surface that would support vegetation. The top of the waste rock disposal facility would be ripped and graded to an overall 5 percent slope to promote runoff and eliminate ponding of precipitation and snowmelt (Newmont 2007a). The proposed closure plan for the non-PAG waste rock disposal facility is shown on **Figure 2-11.**

TABLE 2-7
Plant List for Emigrant Project

Common Name	Scientific Name
Grasses	
Bluebunch wheatgrass	*Agropyron spicatum*
Thickspike wheatgrass	*Agropyron dasystachyum*
Streambank wheatgrass	*Agropyron riparium*
Western wheatgrass	*Agropyron smithii*
Sandberg bluegrass	*Poa sandbergii*
Great Basin wildrye	*Elymus cinereus*
Barley	*Hordeum*
Annual ryegrass	*Lolium perenne multiflorum*
Indian ricegrass	*Oryzopsis hymenoides*
Webber's ricegrass	*Oryzopsis webberi*
Idaho fescue	*Festuca idahoensis*
Thurber needlegrass	*Stipa thurberiania*
Bottlebrush squirreltail	*Sytanion hystrix*
Crested wheatgrass	*Agropyron cristatum*
Sheep fescue	*Festuca ovina*
Slender wheatgrass	*Agropyron trachycaulum*
Canby's bluegrass	*Poa canbyi*
Sand dropseed	*Sporobolus cryptandrus*
Forbs	
Yellow sweet clover	*Melilotus officinalis*
Cicer milkvetch	*Astragalus cicer*
Northern sweetvetch	*Hedysarum boreale*
Buckwheat	*Eriogonum*
Common sainfoin	*Onobrychis viciiifolia*
White sweet clover	*Melilotus alba*
Alfalfa	*Medicago sativa*
Western Yarrow	*Achillea millefolium*
Blue flax	*Linum lewisii*
Gooseberry leaf globemallow	*Sphaeralcea grossulariifolia*
Small burnet	*Sanguisorba minor*
Scarlet globemallow	*Sphaeralcea coccinea*
Desert globemallow	*Sphaeralcea ambigua*
Arrowleaf balsamroot	*Balsamorhiza sagittata*
Palmer's penstemon	*Penstemon palmeri*
Shrubs	
Wyoming big sagebrush	*Artemisia tridentata var. tridentata, wyomingensis*
Antelope bitterbrush	*Purshia tridentata*
Serviceberry	*Amelanchier (alnifolia) utahensis*
Snowbrush	*Ceanothus spp.*
Winterfat	*Ceratoides lanata*
Chokecherry	*Prunus virginiana*
Black sagebrush	*Artemisia nova*
Shadscale	*Atriplex confertifolia*
Fourwing saltbush	*Atriplex canescens*
Prostrate kochia	*Kochia prostrata*
Rubber rabbitbrush	*Chrysothamnus nauseosus*
Mormon tea	*Ephedra (nevadensis) (viridis)*
Currant	*Ribes spp.*
Woods' rose	*Rosa woodsii*
Snowberry	*Symphoricarpos spp.*

Source: Newmont 2007a.

SEE FIGURE 2-11 PROPOSED CLOSURE PLAN – NON PAG WASTE ROCK DISPOSAL FACILITY

Waste rock would be regraded and ripped (to relieve compaction from mining equipment). Upon completion of grading, suitable growth medium would be redistributed over the non-PAG waste rock disposal facility to a depth of 6 inches to support vegetation, and seeded according to the reclamation plan (Newmont 2007a).

Backfill of open pits and management of PAG waste rock encountered during Phase I through VIII mining are described previously in this chapter. Portions of the remaining non-PAG waste rock generated during Phase I through VIII mining would be placed in previously mined out portions of the pit as mining progresses, allowing for concurrent reclamation. Backfill would be placed with bench heights varying from 15 to 100 feet and with an operational slope of 1.4H:1V. Backfill would be regraded and recontoured to achieve 3H:1V slopes. Six inches of growth media would be placed over the regraded backfill and revegetated with an approved seed mix.

The last portion of Phase VIII mining operations would not be completely backfilled. Approximately 80 percent of the pit surface area and 40 percent of the volume would be backfilled, graded and seeded, leaving a portion of the high wall exposed. Safety berms and signage would be constructed around the highwall perimeter. Approximately 2,000 linear feet of safety berm would be required around 10 percent of the open pit during closure.

Heap Leach Facility

When recovery of gold from the heap leach facility is no longer cost-effective, the addition of cyanide to the process solution would cease. Residual solution draining into the process pond would be pumped to evaporative sprays (snowmaker evaporators or atomizers) located on the leach pad or near the process ponds. Spray from the atomizers would be kept within the containment area of the ponds. The total volume of solution in the pad and pond system would be reduced by evaporation, until flow has diminished to a point that it can be treated passively.

As drain-down from the process circuit subsides, evapotranspiration cells would be constructed by modifying the process and/or storm water ponds. These modifications would consist of placing growth media in the pond area, and constructing a solution distribution network of slotted pipe, drip-tube, and gravel to distribute water throughout the pond area, either on the surface or within a few feet of the surface. Vegetation would be established on the surface of the evapotranspiration cells.

The heap leach facility would be recontoured to an overall average slope of 2.5V:1.0H and eliminate areas that could pond meteoric water. Growth media would be placed as a 2-ft thick evapotranspiration cover and seeded (Newmont 2005a). Regrading of spent ore to achieve an overall average 2.5H:1.0V slope would not result in spent ore being placed outside of the liner system of the leach pad. The evapotranspiration cover would be designed to limit infiltration into the reclaimed ore pile by storing water during the dormant season so that it is available for plant uptake during the growing season. This "store and release" cover, would minimize the amount of water contacting spent ore. A conceptual closure plan for the heap leach facility is shown on **Figure 2-12**.

Roads

Roads associated with the Project would be reclaimed concurrently with cessation of operations in each individual area. Roads remaining at the end of mining operations would be reclaimed when no longer needed for reclamation and access.

Haul roads associated with waste rock disposal areas would be reclaimed concurrently with closure of the respective disposal area. Haul roads not located on the waste rock disposal site would be reclaimed by regrading to provide proper drainage, ripping to reduce compaction, placement of 6-inches of growth media, seed-bed preparation, and seeding. Reclaimed roads would be regraded, to the extent practical, to reestablish original topography and drainage of the site and to control erosion. Culverts would be removed and natural drainage reestablished.

Exploration roads, drill pads, sumps, and trenches would be reclaimed in conjunction with ongoing operations. Exploration roads and drill pads would be bladed or shaped using a dozer or excavator. Soil material would form the roadbed or drill pad and during reclamation, the soil material would be recontoured or regraded onto the disturbed area to blend with surrounding topography. Trenches would be backfilled and regraded to conform to the surrounding topography and drainages reestablished.

Ancillary Facilities

At the end of Project life, the explosives magazine, ancillary buildings, water supply pipeline, shop and office complex, plant site, and other mine support structures with salvage value would be dismantled for salvage or used for other operations in the area. Concrete foundations would be broken up to the extent possible and buried a minimum of 5 feet below ground surface or left intact and buried beneath 10 feet of fill material. These sites would be reclaimed by regrading to provide proper drainage, ripping to reduce compaction, placement of 6-inches growth media, seedbed preparation, and seeding.

Unused explosives would be returned to the vendor or used at other mine sites in the area. Non-salvageable materials including scrap building materials and equipment would be buried onsite in the landfill or disposed offsite in accordance with federal and state regulations. Hazardous material would be recycled or disposed at approved landfills by licensed hazardous material transporters. The water pipeline would be reclaimed by plugging the pipe at both ends and allowing the pipe to remain buried. Storm water/sediment pond closure would include ripping and folding the liners, backfilling and regrading ponds, placement of 6-inches of growth media, and seeding.

Yard areas would be reclaimed by ripping compacted surfaces, regrading, placing 6 inches of growth media and seeding. Culverts and fencing would be removed.

MONITORING AND EVALUATION OF RECLAMATION

Newmont, in cooperation with BLM and NDEP, would evaluate the status of vegetative growth during three full growing seasons following completion of planting. Final bond release may be considered at that time. Interim progress of reclamation at the Emigrant Project area would be monitored as requested by the agencies. Water monitoring, as described in the *Resource Monitoring* section of this chapter, would also be used in evaluating reclamation success.

POST-CLOSURE MONITORING

Water Resources

Newmont would monitor groundwater quality for a minimum of 5 years after mine closure. Monitoring would be performed quarterly for NDEP Profile I reference constituents.

Surface water monitoring would continue until vegetation is established and/or until monitoring is determined by BLM and NDEP to no longer be necessary.

SEE FIGURE 2-12 PROPOSED CLOSURE PLAN – HEAP LEACH FACILITY

Vegetation

Reclamation goals for mining disturbances are to 1) stabilize the site; and 2) establish a productive vegetative community based on the designated post-mining land uses. The goal of revegetation would be to achieve as close to 100 percent of the perennial plant cover of selected comparison areas as possible. The comparison, or reference, areas would be selected from representative plant communities adjacent to the mine site, test plots or demonstration areas or, as appropriate, representative ecological or range site descriptions in conjunction with NDEP and BLM specialists. Newmont would monitor revegetation success for a minimum of 3 years after seeding until vegetation is established.

PROJECT ALTERNATIVES

The Proposed Action was determined to not have potentially adverse impacts requiring an alternative. Therefore, the only alternative considered in detail in this Draft EIS is the No Action alternative. Minor issues and potential impacts are addressed with specific mitigation measures in Chapter 3, *Affected Environment and Environmental Consequences*.

NO ACTION ALTERNATIVE

Under the No Action alternative, the Proposed Action would not be approved. Newmont would not be authorized to develop the defined ore reserves, construct ancillary mine facilities, construct a waste rock disposal facility or heap leach facility on public land. Potential impacts predicted to result from development of the Project would not occur.

ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

This section describes alternatives to the Proposed Action that were eliminated from further review in the Draft EIS. These alternatives were identified during the public scoping process or by BLM during review and analysis of the Proposed Action. These alternatives were considered technically infeasible, unreasonable, provided no environmental advantage over the Proposed Action, or would not meet the purpose and need for the Proposed Action. The rationale for dismissing these alternatives is provided.

USE EXISTING HEAP LEACH FACILITY AT RAIN MINE

This alternative would include all components of the Proposed Action, but would require Newmont to haul ore approximately 2.5 miles from the proposed Emigrant Mine to the existing heap leach facility at the Rain Mine. This alternative could eliminate the need to construct the proposed heap leach facility at the Emigrant Mine site.

RATIONALE FOR DISMISSAL

The existing heap leach facility at the Rain Mine encompasses approximately 40 acres and expansion of this facility to accommodate up to 92 million tons of ore from the Emigrant Project would require construction of an additional 320 acres of leach pad area. Expansion of the existing Rain Mine heap leach facility to accommodate proposed ore production from the Emigrant Mine would require extensive reconstruction of the existing heap leach pad. Such an expansion at the Rain Mine was determined to not have an advantage over the Proposed Action because the acres of disturbance associated with expansion of the Rain Mine leach facility would disturb an additional 320 acres, whereas the proposed heap leach pad at the Emigrant Project would disturb approximately 288 acres. Operation of the proposed leach facility at the Emigrant Project would also require less fuel because the haul distance for placement of ore on the leach pad is less.

AGENCY PREFERRED ALTERNATIVE

The BLM has identified the Proposed Action with mitigation as the preferred alternative.