



**United States Department of the Interior  
Bureau of Land Management**



**Battle Mountain Field Office  
Battle Mountain, Nevada**

**July 2007**

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**Cortez Hills Expansion Project  
Draft Environmental Impact Statement  
Volume I**

**NVN-067575  
NV063-EIS06-011**



Photo Courtesy of the Eureka Sentinel Museum

**COOPERATING AGENCY:**  
**Nevada Department of Wildlife**

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## ***BLM Mission Statement***

*The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all times.*

*Management is based upon the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wildlife, wilderness, air and scenic, scientific, and cultural values.*

**BLM/BM/ES-07/007+1793**

*Cover: Photo of historic Cortez townsite looking northeast toward the site of the proposed Cortez Hills Expansion Project.  
Printed with permission of Eureka Sentinel Museum, Eureka, Nevada.*

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**DRAFT  
ENVIRONMENTAL IMPACT STATEMENT  
CORTEZ HILLS EXPANSION PROJECT**

**Lead Agency:** U.S. Department of the Interior  
Bureau of Land Management  
Battle Mountain Field Office

**Cooperating Agencies:** Nevada Department of Wildlife

**Project Location:** Lander and Eureka counties, Nevada

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**ABSTRACT**

Cortez Gold Mines (CGM), on behalf of the Cortez Joint Venture, proposes to construct and operate the Cortez Hills Expansion Project (Proposed Action), which would include the development of new facilities and expansion of its existing open-pit gold mining and processing operations at the Cortez Gold Mines Operations Area in Crescent Valley, Nevada. The proposed Cortez Hills Expansion Project is located in north-central Nevada approximately 24 miles south of Beowawe in Lander and Eureka counties.

Existing CGM mining and processing facilities are located in three main areas in the Cortez Gold Mines Operations Area; these areas are referred to as the Pipeline Complex, Cortez Complex, and Gold Acres Complex. The Proposed Action would include development of new mining facilities in a new area, the proposed Cortez Hills Complex, including development of a new open pit, underground mining, three new waste rock facilities, new heap leach pad, and related roads and ancillary facilities. The Proposed Action also would include continued use of existing facilities in the Pipeline Complex, Cortez Complex, and Gold Acres Complex and expansion of existing facilities (pits and waste rock facilities) in the Pipeline Complex and Cortez Complex.

The Proposed Action would require new surface disturbance of approximately 6,792 acres, including 6,571 acres of public land administered by the Bureau of Land Management and 221 acres of private land owned by CGM. If approved, the anticipated mine life would be approximately 10 years, followed by an estimated 3 years for ongoing ore processing, site closure, and final reclamation.

This Environmental Impact Statement analyzes the environmental effects of the Proposed Action, three action alternatives, and the No Action Alternative.

**Responsible Official for EIS:** Gerald M. Smith  
Field Manager  
Battle Mountain Field Office

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**EXECUTIVE SUMMARY**

Cortez Gold Mines (CGM), on behalf of the Cortez Joint Venture, proposes to construct and operate the Cortez Hills Expansion Project (Proposed Action), which would include the development of new facilities and an expansion of its existing open-pit gold mining and processing operations at the Cortez Gold Mines Operations Area located in north-central Nevada, approximately 24 miles south of Beowawe in Lander County. Existing CGM mining and processing facilities are located in three main areas in the Cortez Gold Mines Operations Area; these areas are referred to as the Pipeline Complex, Cortez Complex, and Gold Acres Complex. The Proposed Action would include development of new mining facilities in a new area, the proposed Cortez Hills Complex; continued use of existing facilities in the Pipeline Complex, Cortez Complex, and Gold Acres Complex; and expansion of existing facilities (pits and waste rock facilities) in the Pipeline Complex and Cortez Complex.

CGM proposes to mine the ore bodies associated with the Cortez Hills Expansion Project concurrently with the existing Pipeline/South Pipeline ore bodies. The majority of the high grade ore mined under the Cortez Hills Expansion Project would be processed at the existing Pipeline and/or Cortez mills. A lesser quantity of refractory ore would be sold to an off site processing facility. The primary method of processing low grade ore would be heap leaching. The proposed project would include an expansion of two existing open pits (one expanded and one deepened) and the development of one new open pit, construction of two heap leach pads (one new and one expanded) and associated facilities, underground mining, expansion of two existing and construction of three new waste rock facilities, expansion of one existing mill, expansion of an existing tailings facility, construction of an overland conveyor, and the relocation of portions of two county roads and an electrical transmission line. In addition, the proposed project would utilize some of the existing primary facilities and ancillary support facilities.

The Proposed Action proposes the consolidation of CGM's three existing mine plans (Pipeline/South Pipeline Plan of Operations, Cortez Plan of Operations as amended for the Underground Exploration Project, and Gold Acres Plan of Operations) and modification of the plan boundaries for CGM's two existing exploration projects (Pipeline/South Pipeline/Gold Acres Exploration Project and Horse Canyon/Cortez Unified Exploration Project [HC/CUEP]) into a new mine plan of operations boundary that would be known as the Cortez Gold Mines Plan of Operation. The proposed consolidation of mine plans and boundary modifications would eliminate overlap between various plan boundaries and approved activities. The two existing exploration plans would remain in effect within their modified boundaries.

The Proposed Action would result in surface disturbance on a total of 6,792 acres, of which 6,571 acres are public lands administered by the Bureau of Land Management (BLM) and 221 acres are private land owned by CGM. If approved, the anticipated mine life would be approximately 10 years, followed by an estimated 3 years for ongoing ore processing, heap rinsing, site closure, and final reclamation.

**Geology and Minerals**

Direct impacts of the Proposed Action on geologic and mineral resources would include: 1) the generation and permanent disposal of approximately 1,577 million tons of waste rock, 53 million tons of tailings

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material, and 112 million tons of spent heap leach material; 2) the removal of approximately 5 million tons of refractory ore; and 3) the mining of proven and probable ore reserves of approximately 170 million tons of mill-grade and leachable ore (8 million ounces of gold).

The project would result in the disturbance and permanent alteration of the landscape of approximately 4,570 acres. This would include unreclaimed areas disturbed by open pits and reclaimed waste rock facilities, leach pads, and a tailings impoundment that permanently would alter the natural topographic and geomorphic features in the area.

Dewatering required for the Proposed Action would increase the areal extent and magnitude of drawdown and could increase dewatering-induced ground subsidence in Crescent Valley. Ground subsidence could result in the development of cracks at the surface (i.e., earth fissures). The predicted subsidence resulting from the Proposed Action dewatering operations indicates that the maximum subsidence would be less than 3 feet and would occur southeast of the existing Pipeline Pit. The area affected by 1 foot or greater subsidence is predicted to extend up to approximately 4 miles from the pit perimeter. This predicted subsidence is similar to the subsidence predicted to occur for future dewatering associated with currently permitted activities. Additional subsidence in Crescent Valley could expand the development of earth fissures; if undetected, earth fissures potentially could damage facilities, including solution-bearing facilities such as leach pads and process ponds. There are no new processing facilities (i.e., heap leach pads or tailings facilities) proposed within the predicted subsidence area. CGM's current monitoring and mitigation plan for ground subsidence and related earth fissure development for previously authorized activities also would be implemented for the proposed project to minimize potential impacts to facilities in southern Crescent Valley.

Surface and underground mining would be conducted using conventional drilling and blasting techniques. Blasting-induced ground vibration is not anticipated to result in significant impacts to bedrock exposures in the White Cliffs or Mount Tenabo.

The proposed underground workings would encounter mineralized and altered rock with poor rock quality. In the post-closure period, localized rock collapse would be likely to occur over the workings and result in the development of localized ground deformation/subsidence-type features within the boundaries of the proposed Cortez Hills Pit. The declines are expected to have localized long-term collapse but are unlikely to significantly impact surface features due to the strength and thickness of the overlying rock in relation to the dimensions of the underground openings.

A potential stability concern identified for the proposed Cortez Hills Pit is the presence of weak, highly sheared bedrock material associated with the Cortez Fault Zone that would be intersected by the pit wall in the eastern segments of the pit. Implementation of the proposed pit dewatering program, pit slope design criteria, and an integrated geotechnical monitoring system are expected to minimize the potential risk of large-scale bedrock failures during operations.

After the dewatering operations cease and the pit slopes are no longer actively depressurized, pore pressure would partially or fully recover. An increase in pore pressure in the east wall over time would have

the potential to contribute to the development of deep-seated failures in the weak bedrock materials associated with the Cortez Fault Zone. Potential seismic activity also could trigger slope instability. As a result, there would be a potential risk of failures to develop in the post-closure period that could extend outside of the pit boundary in the southern segment of the east wall of the proposed Cortez Hills Pit. Based on the mapped location of the Cortez Fault Zone and proposed pit boundary, a failure in the Cortez Fault Zone in this general location would have the potential to extend a maximum of a few hundred feet (i.e., less than 500 feet) outside of the pit boundary.

In the vicinity of the Cortez Hills Pit, the White Cliffs occur over 1,500 feet east of the eastern boundary of the Cortez Fault Zone. Because of the high strength properties of the quartzite and considerable distance between the White Cliffs and the pit margin and Cortez Fault Zone, potential slope failures that could develop in the post-mining period would not impact the White Cliffs.

### **Water Resources and Geochemistry**

Under the Proposed Action, the active dewatering period in the Cortez Gold Mines Operations Area would be extended several years, and the target dewatering elevation at the Cortez/Cortez Hills complexes would be lowered to allow for development of the proposed Cortez Hills Pit and development of the underground mine operation. Dewatering required for the Proposed Action would increase dewatering rates (compared to currently permitted operations) an estimated 700 gallons per minute (gpm) to 8,400 gpm (on an average annual basis) with the highest incremental rates occurring in the final years of the proposed operation after active dewatering ceases at the Pipeline Complex.

The incremental changes in groundwater levels attributable to the Proposed Action were evaluated by comparison to the model-simulated groundwater level changes for the currently permitted operations (No Action Alternative). The additional dewatering required for the Proposed Action is not predicted to substantially increase drawdown beneath the Shoshone Range west and northwest of the Pipeline Complex, or in the Crescent Valley area north, west, or south of the Pipeline Complex. However, the Proposed Action is predicted to result in an increase in drawdown (compared to the No Action Alternative) on the eastern side of Crescent Valley at the end of mining and in the region surrounding the proposed Cortez Hills Pit, including an area beneath the Cortez Mountains.

The Proposed Action is predicted to result in drawdown in the vicinity of Mill Creek, located in the Cortez Mountains approximately 2 miles northeast of the proposed Cortez Hills Pit. Potential perennial flows in Mill Creek could be interconnected to the regional bedrock groundwater system and therefore could be impacted. A reduction in groundwater levels in the vicinity of Mill Creek could reduce flows and possibly reduce the length of the perennial stream reach. Significant impacts to other streams in the study area are not anticipated.

There are 50 inventoried perennial springs located within the predicted mine-related groundwater drawdown area. A total of 22 of these inventoried springs occur within areas where surface flows could be affected by lowering of the groundwater surface. Potential impacts to these springs could range from reductions in flow to elimination of all flow. The actual impacts to individual seeps, springs, or stream reaches would depend

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on the source of groundwater that sustains the perennial flow (a perched or hydraulically isolated aquifer versus a regional groundwater system) and the actual extent of mine-induced drawdown that occurs in the area. Groundwater levels in the vicinity of springs located in the East Valley group are predicted to eventually recover in the post-mining period. However, 15 other springs occur within areas that are predicted to experience long-term drawdown impacts (greater than 100 years).

Excluding water rights owned or controlled by CGM, there are 11 water rights located within the predicted mine-induced drawdown area (i.e., the area where the groundwater levels are predicted to be lowered by 10 feet or more). This includes six surface water rights and five groundwater rights. Six of these are used for stock watering, four are used for mining and milling, and one is used for irrigation.

The water balance estimates indicate that the mine-induced drawdown is predicted to result in a decrease in evapotranspiration in Crescent Valley. The evapotranspiration rates are predicted to return to baseline conditions in the post-mining period. The quantity of groundwater that discharges to the Humboldt River, Pine Valley, and Grass Valley is not predicted to change significantly as a result of mine dewatering and water management activities.

Following the completion of mining and dewatering operations, groundwater elevations would rebound and eventually result in the development of pit lakes in both the Cortez Hills and Cortez pits. The proposed Cortez Hills Pit would recover rapidly from dewatering with more than 80 percent of the recovery occurring within 10 years of the end of dewatering. In addition, at 100 years post-mining, the Cortez Hills Pit is predicted to have groundwater outflow. The Cortez Pit lake is predicted to start to form at approximately 20 years after the end of dewatering due to the higher elevation of the pit floor. The Cortez Pit lake is expected to behave as a sink, with no throughflow to the groundwater system. The development of pit lakes in the southern and southwestern portions of the existing Pipeline Pit is predicted to be similar to the development described for the currently permitted activities.

The results of hydrochemical modeling of pit lake water quality were used to evaluate potential impacts to water quality associated with the Cortez Hills Pit lake, as well as any changes in water quality that could result from the Proposed Action with respect to development of two pit lakes (Gap and Crossroads) in the existing Pipeline Pit. The results of the predictive modeling indicate that the Cortez Hills Pit lake water quality would not exceed water quality standards and is expected to eventually discharge to the groundwater system downgradient of the pit at approximately 100 gpm.

The water quality of the Gap and Crossroads pit lakes is predicted to be essentially the same as previously analyzed in the Pipeline/South Pipeline Pit Expansion Project Final Supplemental Environmental Impact Statement (SEIS) (BLM 2004e). The Gap and Crossroads pit lakes had predicted water chemistries that slightly exceeded some water quality standards. However, these pit lakes are predicted to be terminal pit lakes and would serve as groundwater sinks. Based on the numerical modeling results, it is anticipated that both the Crossroads and Gap pit lakes would behave as sinks, with no through flow to the groundwater system.

The projected chemistry of the Cortez Pit lake was based on observation of the former Cortez Pit lake rather than hydrochemical modeling. Use of the observed pit lake water quality data was determined to be appropriate, because no new lithologies would be exposed in the ultimate pit surface, and no major changes would occur in pit morphology under the Proposed Action. The existing data indicate that the water quality in the Cortez Pit lake is not expected to exceed water quality standards or impact downgradient aquifers.

The potential impacts of waste rock seepage from the proposed Canyon, North, and South waste rock facilities and Cortez Waste Rock Facility expansion area were assessed by determining the potential locations and magnitude of waste rock seepage from the facilities; the travel time of water through the facilities; and travel time, composition, and flux of seepage that could reach underlying groundwater. The results indicate that maximum concentrations in the predicted seepage chemistry would exceed secondary standards for manganese and sulfate. However, since the average modeled concentrations were below the secondary standards and the volume of leachate is predicted to be low, impacts to groundwater from waste rock seepage are anticipated to be negligible.

Construction of the proposed Pipeline Waste Rock Facility expansion area would be similar to the previously approved construction for the existing facility. Based on previous studies of potential seepage formation in the approved waste rock facility (BLM 2004e), infiltration is unlikely to move below the upper 4 feet of the waste rock pile, effectively preventing the formation of seepage that could affect underlying groundwater resources.

Excess mine water would be discharged to the existing infiltration basins and serve as recharge for the basin fill aquifer in Crescent Valley. The Proposed Action is projected to result in an increase in the total volume to the infiltration basins by approximately 5 percent compared to the total historic infiltration activities and projected future infiltration activities that would occur under the currently permitted operations (No Action Alternative). This incremental increase in volume is not expected to substantially increase the volume of the groundwater mounds in Crescent Valley. The Proposed Action is not anticipated to cause the chemistry of water under the infiltration ponds to be different from what it would be under the currently permitted activities (No Action Alternative).

The proposed placement of these components would encroach on the cross-sectional area of flow for the 100-year flood event in Crescent Valley. As a result, flooding may occur outside the current delineated floodplain, which likely would result in erosion of soils and sediments on the south side of the current flood zone. Flood flow also would impinge on the relocated county road and the south toe of the Pipeline Waste Rock Facility expansion area and may damage these features. Stormwater diversion along the east wall of the Cortez Hills Pit could accelerate erosion and sedimentation in downstream drainages. Downstream of the project, flood damages and the threat to property and public safety would be minimal due to the sparseness of structures and improvements and the enclosed nature of the drainage system.

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### **Soils and Reclamation**

Approximately 6,792 acres of soil would be disturbed as a result of the proposed project development activities. Suitable topsoil material and suitable growth media from alluvial deposits in the proposed disturbance areas would be salvaged and stockpiled for subsequent use in reclamation.

The initial soil quality of reconstructed seedbeds and root zones on the approximately 5,793 acres that would be reclaimed would be less than that of the existing soil resources. Depending on soil amendments, these impacts are likely to persist for 10 years or more following reclamation. A permanent loss of soil productivity would occur on approximately 999 acres in association with development of the proposed Cortez Hills Pit and construction of the county road reroutes, which would not be reclaimed.

### **Vegetation Resources**

**General Vegetation Impacts.** Project development and operation would disturb or remove approximately 6,792 acres of vegetation, the majority of which (approximately 5,793 acres) subsequently would be reclaimed. The project-related activities would result in the conversion of tree- and shrub-dominated vegetation types to grass/forb-dominated vegetation types in the short term. Over the long term, shrubs and trees would become re-established and increase in abundance within the majority of disturbed areas as a result of reclamation and natural recolonization.

Approximately 1,612 acres of the total proposed disturbance would occur in areas currently occupied by piñon-juniper woodland that consist primarily of Utah juniper and singleleaf piñon trees; immature Utah juniper and singleleaf piñon trees occur at lower elevations within the project boundary. CGM has committed to evaluate the planting of singleleaf piñon seedlings in suitable areas within the proposed disturbance areas. In addition, the natural re-colonization of mine-related disturbance areas with Utah juniper and singleleaf piñon seedlings would occur over a period of decades, as it did following historic mining and tree harvesting from the 1880s to the 1920s. Therefore, the removal of trees from these woodland areas would impact these areas for approximately 75 to 100 years until mature Utah juniper and singleleaf piñon trees become re-established in the project area. Of the 1,612 acres of total disturbance in piñon-juniper woodland areas, approximately 817 acres of piñon-juniper woodland would be permanently lost with the development of the Cortez Hills Pit and county road reroutes.

Mine-related groundwater drawdown would not result in impacts to upland vegetation within the predicted 10-foot groundwater drawdown area. Piñon and juniper trees, as well as herbaceous plant species, have shallow to moderately deep root systems and predominantly rely on soil moisture from precipitation.

Approximately 0.7 acre of wetland/riparian vegetation would be removed or disturbed as a result of the proposed project. The removal of these unique plant communities by mine-related activities would be considered a significant impact. Mine-related groundwater-level changes potentially may affect perennial seeps and springs. Riparian and wetland vegetation associated with 22 known springs or seeps (approximately 3.5 acres) and one potential perennial stream reach (i.e., Mill Creek) that occur within the

projected 10-foot groundwater drawdown area likely would experience long-term adverse effects as a result of groundwater drawdown.

**Special Status Species.** Habitat evaluations and surveys were conducted for special status plants in 2000 and 2005 within the southeastern portion of the study area. Habitat evaluations and field surveys also were conducted within portions of the study area (i.e., proposed Pipeline Waste Rock Facility expansion area, conveyor corridor, and County Road [CR] 222 and CR 225 reroutes) for Eastwood's milkweed and Elko rockcress in 2007. Special status species were not observed within the study area during these surveys. As a result, no significant impacts are anticipated to occur as a result of mine development and operation, assuming no known occurrences are identified in response to a recent request to the Nevada Natural Heritage Program for occurrence information for the areas surveyed in 2007. Special status plant species identified as potentially occurring in the area would not be affected by mine-related groundwater drawdown, since potential habitat for these species includes upland areas that rely on precipitation for adequate soil moisture.

**Ethnobotanical Plant Species.** No impacts to *Lomatium dissectum* are anticipated as a result of the proposed project.

**Invasive and Non-native Species.** Implementation of CGM's weed control program in conjunction with the reclamation plan substantially would reduce the potential for noxious weed establishment in the proposed disturbance areas. However, minor populations of weedy annual species (e.g., halogeton, cheatgrass) may become established in localized areas for short periods of time. A decrease or cessation of flow in ephemeral creeks or drainages within the projected 10-foot groundwater drawdown area may reduce the likelihood of establishment of some invasive and non-native species in the long term. However, there would be a potential for invasion of species that prefer drier habitats.

**Woodland Products.** The Proposed Action would result in the long-term loss of productivity on approximately 1,612 acres of piñon-juniper woodlands. Of the 1,612 acres of total disturbance in piñon-juniper woodland areas, approximately 817 acres of piñon-juniper woodland would be permanently lost with the development of the proposed Cortez Hills Pit and relocation of county roads.

All of the 1,612 acres of woodland that would be removed under the Proposed Action would occur on BLM-administered land. BLM-administered lands in the project boundary are open for the collection of dead wood for firewood and the harvesting of pine nuts from live trees. To help off-set the loss of these resources in the proposed disturbance areas, CGM has committed to clearing piñon and juniper trees in advance of mine development in a manner that would allow utilization of the resources to the extent possible. In addition, funding for the value of the removed firewood would be provided by CGM as a contribution to off-site BLM or Nevada Department of Wildlife (NDOW) revegetation.

The long-term change in vegetation and loss of woodland product productivity would not result in significant impacts to woodland products since the Proposed Action is located in an area where abundant piñon-juniper woodlands exist on public lands. As discussed above under general vegetation, approximately

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75 to 100 years would be required for mature piñon and juniper trees to re-establish in mine-related disturbance areas.

Piñon and juniper trees would not be affected by mine-related groundwater drawdown since these trees rely on precipitation for adequate soil moisture.

### **Wildlife Resources/Terrestrial Wildlife**

**Wildlife Habitat.** Direct impacts to wildlife habitat would result in the long-term reduction of approximately 5,793 acres of habitat, and permanent loss of approximately 999 acres of habitat from the development of the Cortez Hills Pit and construction of county road reroutes. The North Gap Pit expansion and deepening of the Cortez Pit would have negligible effects on wildlife since the mining activity would occur in previously disturbed habitat that has little to no value for wildlife. Development of a post-mining pit lake (in the Cortez Hills Pit), where the water quality is projected to be within Nevada stock water standards, potentially would result in an increase in habitat for waterfowl and aquatic species.

**Big Game.** Direct impacts to big game species would result in the long-term reduction of approximately 645 acres of mule deer range and approximately 4,110 acres of pronghorn range. The development of the Cortez Hills Pit would result in the permanent loss of approximately 380 acres of mule deer range. The Cortez Hills Pit and county road reroutes would result in the permanent loss of approximately 21 acres of pronghorn range. No important seasonal habitats or movement corridors would be directly impacted from the Proposed Action.

**Small Game.** Direct impacts to small game species would include the temporary reduction of approximately 5,793 acres of potentially suitable habitat, until vegetation is re-established, and the permanent loss of approximately 999 acres of potential habitat. Potential effects to small game species from mine development are expected to be low.

**Impacts to Breeding Birds.** Direct impacts to bird species as a result of the proposed project would include the long-term reduction of approximately 5,793 acres, and permanent loss of approximately 999 acres, of potentially suitable breeding, roosting, and foraging habitat. Potential direct impacts to breeding birds (i.e., loss of nests, eggs, or young) 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.

**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. There would be an increased potential for wildlife/vehicle collisions. The potential would be further increased if truck haulage of ore to the Pipeline Complex for processing is used in place of the cross-valley conveyor or development of the Cortez Heap Leach Facility.

**Cyanide Effects.** Fences, wildlife exclusion devices (e.g., netting, pond covers, or floating “bird balls”), and piping would be installed to prevent access of wildlife to cyanide solutions. In addition, weak acid dissociable

cyanide concentrations in the tailings facility would be maintained at non-lethal levels. As a result, the potential for impacts to wildlife resources from cyanide ingestion would be low.

**Potential for 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 habitat; however, the probability of a spill into aquatic habitats along the transportation corridor would be low.

**Potential Impacts to Wildlife Associated with Pit Lake Water Quality.** Projected pit water quality modeling results for the proposed Gap, Crossroads, and Cortez Hills pit lakes and examination of water quality data from the historic Cortez Pit lake indicate that the water quality of the pit lakes is expected to be reasonably similar to background groundwater quality. In addition, a screening-level ecological risk assessment was conducted to evaluate potential impacts to wildlife and fish species as a result of exposure to pit lake water (Geomega 2007b). The predicted pit lake water quality was evaluated in relation to U.S. Environmental Protection Agency criteria and Nevada standards for aquatic life, as well as the no observed adverse effect level benchmarks for drinking water consumption (Sample et al. 1996) for representative species. These evaluations indicated that the predicted pit lake water quality would not pose unacceptable risks to wildlife or fish species.

**Potential Impacts to Wildlife Associated with Dewatering Activities.** Dewatering activities would result in groundwater drawdown potentially affecting 22 seeps or springs and 1 potential perennial stream within the modeled 10-foot groundwater drawdown contour. It is anticipated that associated riparian/wetland habitat also could be affected by water level change. Due to the limited amount of wetland/riparian habitat in the project vicinity, this habitat loss would result in a significant impact to wildlife species.

### **Special Status Wildlife Species**

**Bats.** Direct impacts would include long-term reduction of approximately 5,218 acres, and the permanent loss of approximately 939 acres of foraging habitat. The potential disturbance of a mine working that occurs within 500 feet of CR 222 could affect maternity roosts, nursery colonies, or hibernacula. This impact would be considered adverse to the local bat population, if present.

**Pygmy Rabbit.** Direct impacts would result in the long-term reduction of approximately 7 acres, and permanent loss of approximately 5 acres of potential sagebrush habitat for this species associated with the Canyon Waste Rock Facility and CR 222. This impact would be considered low to moderate, depending on the relative habitat quality. Project construction likely would result in the direct mortalities of individual rabbits, if present. The loss of individual pygmy rabbits would not result in population-level effects.

**Northern Goshawk.** No direct or indirect impacts to the northern goshawk would be anticipated as a result of project construction or operation due to the lack of breeding and foraging habitat within the project boundary.

**Bald Eagle.** No impacts to wintering or migrating bald eagles would be expected from the proposed project. Although suitable nesting and foraging habitat occurs along the Humboldt River and surrounding foothills,

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the potential for roosting and foraging activities in upland habitats located within the proposed disturbance area likely would be sporadic. Direct impacts would include the long-term reduction of approximately 4,698 acres of potential foraging habitat, until reclamation has been completed and prey species have been re-established, and the permanent loss of approximately 182 acres of shrubland habitat. However, overall impacts to this species from the development of the pit lake would be dependent on the use of the pit lake by prey species (e.g., waterfowl and fish). It is anticipated that the development of the pit lake would attract prey species that otherwise would not occur in the study area.

**Golden Eagle.** Although no nests have been identified within the project boundary, a nest site has been documented in the project vicinity. Potential impacts to breeding eagles as a result of mine-related activities would be minimized through the implementation of CGM's committed environmental protection measures. Direct impacts would include the long-term reduction of approximately 4,698 acres of potential foraging habitat, until reclamation has been completed and prey populations have been re-established, and the permanent loss of approximately 182 acres of potential foraging habitat associated with development of the Cortez Hills Pit and construction of county road reroutes. However, overall impacts to this species from the development of the pit lake would be dependent on the use of the pit lake by prey species. It is anticipated that the development of the pit lake may support a greater number and diversity of terrestrial prey species for the golden eagle that otherwise would not occur in the pit lake area. Indirect impacts associated with mine-related noise and human presence currently occurs at the site and would continue under the Proposed Action. Based on implementation of CGM's committed environmental protection measures, the lack of existing nest sites within the project boundary, and the existing level of activity in the project area, potential impacts to this species as a result of the proposed project would be considered low.

**Ferruginous Hawk.** Although no nests have been identified within the project boundary, ferruginous hawk nests have been documented in the project vicinity. Potential impacts to breeding hawks as a result of mine-related activities would be minimized through the implementation of CGM's committed environmental protection measures. Direct impacts would include the long-term reduction of approximately 4,698 acres of potential foraging habitat, until reclamation has been completed and prey populations have been re-established, and the permanent loss of approximately 182 acres of potential foraging habitat associated with development of the Cortez Hills Pit and construction of county road reroutes. However, this impact would be considered negligible based on the overall availability of suitable foraging habitat in the vicinity. Indirect impacts would continue to result from mine-related noise and human presence. Based on implementation of CGM's committed environmental protection measures, the lack of existing nest sites within the project vicinity, and the existing level of activity in the project area, potential impacts to this species as a result of the proposed project would be considered low.

**Swainson's Hawk.** No direct impacts to nesting Swainson's hawks would be anticipated from project construction due to the lack of breeding habitat within the project boundary. As a result, it is anticipated that potential impacts to this species would be limited to migrating and foraging individuals. Direct impacts would include the long-term reduction of approximately 4,698 acres of potential foraging habitat (e.g., shrubland habitats), until reclamation has been completed and prey populations have been re-established, and the permanent loss of approximately 182 acres of shrubland habitat associated with development of the Cortez Hills Pit and county road reroutes. These impacts would be considered negligible based on the overall

availability of suitable foraging habitat in the vicinity. Indirect impacts would continue to result from mine-related noise and human presence.

**Prairie Falcon.** Although no nests have been identified within the project boundary, potential nesting habitat occurs within the project boundary. Potential impacts to breeding falcons as a result of mine-related activities would be minimized through the implementation of CGM's committed environmental protection measures. Direct impacts to migrating and foraging falcons would include the long-term reduction of approximately 4,698 acres of potential foraging habitat, until reclamation has been completed and prey populations have been re-established, and the permanent loss of approximately 182 acres of habitat associated with development of the Cortez Hills Pit and county road reroutes. However, overall impacts to this species from the development of the pit lake would be dependent on the use of the pit lake by prey species. It is anticipated that the development of the pit lake would attract prey species (e.g., waterfowl) that otherwise would not occur in the study area. Indirect impacts would continue to result from mine-related noise and human presence. Based on the implementation of the committed environmental protection measures, the lack of existing nest sites within the project boundary, and the existing level of activity at the mine site, potential impacts to this species as a result of the proposed project would be considered low.

**Greater Sage Grouse.** No impacts to breeding greater sage-grouse would be anticipated from project activities. Although greater sage-grouse potentially could nest in upland habitats within the project boundary, it is anticipated that brooding activity would be low, due to the limited availability of surface water and riparian vegetation in the study area. Direct impacts to the greater sage-grouse would include the long-term reduction of approximately 3,087 acres of habitat, until reclamation has been completed and vegetation is re-established. Permanent impacts would result from the loss of approximately 139 acres of habitat in association with the development of the Cortez Hills Pit and county road reroutes. This impact would be considered negligible based on the overall availability of suitable wintering habitat in the vicinity of the project.

**Mountain Quail.** No impacts to breeding quail would be anticipated from mine-related activities. Direct impacts would include the long-term reduction of approximately 5,793 acres of habitat and the permanent loss of approximately 999 acres of habitat in association with the development of the Cortez Hills Pit and county road reroutes. This impact would be considered negligible based on the overall availability of suitable wintering habitat in the vicinity of the project.

**Short-eared Owl.** No impacts to breeding short-eared owls would be anticipated from mine-related activities. Direct impacts would result from the long-term reduction of approximately 4,698 acres of potential foraging habitat and the permanent loss of approximately 182 acres of potential foraging habitat in association with the development of the Cortez Hills Pit and county road reroutes. These impacts would be considered negligible based on the overall availability of suitable wintering habitat in the vicinity of the project. Indirect impacts would continue to result from mine-related noise and human presence.

**Long-eared Owl.** Although long-eared owl nest sites have been identified in the project vicinity, potential impacts to breeding owls as a result of mine-related activities would be minimized through the implementation of CGM's committed environmental protection measures. Direct impacts to this species

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would result from the long-term reduction of approximately 795 acres of potential nesting and foraging habitat, until mature habitat is re-established (approximately 75 to 100 years), and the permanent loss of approximately 817 acres of piñon-juniper habitat in association with the development of the Cortez Hills Pit and county road reroutes. Indirect impacts would continue to result from construction-related noise and human presence. Based on implementation of CGM's committed environmental protection measures and the existing level of activity at the mine site, potential impacts to this species as a result of the proposed mine expansion would be considered low.

**Burrowing Owl.** Although a burrowing owl nest site was identified in the project vicinity, potential impacts to breeding owls as a result of mine-related activities would be minimized through the implementation of CGM's committed environmental protection measures. Direct impacts to this species would include the short-term reduction of approximately 4,698 acres of potential grassland and shrubland breeding and foraging habitat, until reclamation has been completed and vegetation has been re-established and the permanent loss of approximately 182 acres of suitable habitat. Indirect impacts would continue to result from mine-related noise and human presence. Based on implementation of CGM's committed environmental protection measures and the existing level of activity at the mine site, potential impacts to this species as a result of the proposed project would be considered low.

**Pinyon Jay.** Although pinon jay could nest within the project vicinity, potential impacts as a result of mine-related activities would be minimized through the implementation of CGM's committed environmental protection measures. Direct impacts to this species would result from the long-term reduction of approximately 795 acres of piñon-juniper habitat, until mature habitat is re-established in project disturbance areas (approximately 75 to 100 years), and the permanent loss of approximately 817 acres of piñon-juniper habitat in association with the development of the Cortez Hills Pit and county road reroutes. Indirect impacts would continue to result from mine-related noise and human presence. Based on the implementation of CGM's committed environmental protection measures, the overall availability of piñon-juniper habitat in the vicinity of the project, and the existing level of activity at the mine site, potential impacts to this species as a result of the proposed project would be considered low.

**Loggerhead Shrike.** Although the loggerhead shrike could nest within the project vicinity, potential impacts as a result of mine-related activities would be minimized through the implementation of CGM's committed environmental protection measures. Direct impacts to this species would include the long-term reduction of approximately 5,793 acres of potential breeding and foraging habitat, until reclamation has been completed and vegetation has re-established, and the permanent loss of approximately 999 acres of breeding and foraging habitat in association with the development of the Cortez Hills Pit. Indirect impacts would continue to result from mine-related noise and human presence. These impacts would be considered negligible based on implementation of CGM's committed environmental protection measures, the overall availability of suitable habitat in the vicinity of the project, and the existing level of activity at the mine site.

**Vesper Sparrow.** Although the vesper sparrow could nest within the project vicinity, potential impacts as a result of mine-related activities would be minimized through the implementation of CGM's committed environmental protection measures. Direct impacts to this species would include the long-term reduction of approximately 3,087 acres of potential sagebrush breeding and foraging habitat, until reclamation has been

completed and vegetation has been re-established, and the permanent loss of approximately 139 acres of potential foraging habitat (shrubland) in association with the development of the Cortez Hills Pit and county road reroutes. Indirect impacts would continue to result from mine-related noise and human presence. These impacts would be considered negligible based on implementation of CGM's committed environmental protection measures and the overall availability of suitable breeding and foraging habitat in the vicinity of the project.

**Juniper Titmouse.** No impacts to breeding juniper titmouse would be anticipated from mine-related activities. Direct impacts to this species would result from the long-term reduction of approximately 795 acres of potential piñon-juniper foraging habitat, until mature habitat is re-established in project disturbance areas (approximately 75 to 100 years), and the permanent loss of approximately 817 acres of potential foraging habitat in association with the development of the Cortez Hills Pit and county road reroutes. Indirect impacts would continue to result from mine-related noise and human presence. These impacts would be considered negligible based on the overall availability of suitable wintering habitat in the vicinity of the project.

### **Fisheries Resources**

**Fisheries.** Perennial stream and spring/pond habitat in the project vicinity is limited to the upper portion of Copper Canyon and the northern portion of the Toiyabe Range. Since no project-related surface disturbance would occur within these drainages, impacts to aquatic habitat or fish species (if present) in these drainages are not anticipated. Project-related surface disturbance would occur in approximately 10 intermittent channel segments; however, these areas do not provide fisheries habitat on a consistent basis.

Based on groundwater modeling results, mine-related groundwater drawdown potentially could reduce surface flows or water levels in Mill Canyon, a potential perennial stream located in the Cortez Mountains. This potential perennial stream contains sufficient depth to support fish species; however, no fish were collected in recent surveys (JBR 2007a).

**Special Status Species/Invertebrates.** Although potential springsnail habitat was identified in three springs in the Horse Canyon area, mine dewatering is not expected to affect springs in this area. Habitat in springs or seeps in Fourmile Canyon, which is the only drainage in the study area with a documented occurrence of springsnails, would not be affected by proposed mine-related surface disturbance or mine-related groundwater drawdown. Mill Canyon, a potential perennial stream that could be affected by mine-related groundwater drawdown, is not known to contain springs and seeps. Twenty-two seeps/springs in the vicinity of the Cortez Hills Complex could be affected by mine-related groundwater drawdown. Springsnails were not present in any of these seeps or springs.

### **Range Resources**

The construction of perimeter fences around proposed mine and processing facilities would exclude rangeland from livestock grazing during the life of the project, resulting in the loss of a total of 142 AUMs

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within the Carico Lake Allotment and 36 AUMs within the South Buckhorn Allotment for a total reduction of 178 AUMs on BLM-administered lands. This is based on a stocking rate of approximately 54 acres per AUM for the Cortez Joint Venture Use Area of the Carico Lake Allotment and 11 acres per AUM within the South Buckhorn Allotment. The Grass Valley Allotment would not be affected since proposed project facilities would not be located in this allotment. Privately-owned rangeland also would be excluded from livestock grazing with the construction of the perimeter fences; however, AUMs associated with these areas would not affect the active grazing preference for the Carico Lake Allotment.

Most (approximately 5,793 acres on BLM-administered land) of the proposed surface disturbance within the study area would be reclaimed. Successful reclamation of disturbed areas on BLM-administered lands would increase plant cover and provide an adequate amount of forage to recover 107 of the 178 AUMs lost during project development and operation. In addition, 52 AUMs would be recovered with the removal of perimeter fences after successful reclamation. Therefore, 159 of the 178 AUMs would be recovered after successful reclamation is achieved and perimeter fences have been removed. Livestock grazing may be resumed after re-established vegetation is capable of supporting grazing (i.e., approximately 3 to 5 growing seasons after final revegetation).

No direct disturbance to water-related range improvements would occur as a result of the proposed project development. However, impacts to three water-related range improvements (i.e., improved springs and wells) in the Carico Lake Allotment that fall within the predicted mine-related 10-foot groundwater drawdown area may occur as a result of proposed mine dewatering operations.

### **Paleontology**

No impacts to scientifically significant or critical fossil resources are anticipated as a result of ground-disturbing activities associated with the Proposed Action.

### **Cultural Resources**

Historic properties (i.e., those properties eligible for, or listed on, the National Register of Historic Places) exist within the area of potential effects (APE). Based on a programmatic agreement (PA) between the BLM Battle Mountain and Elko field offices, Nevada State Historic Preservation Officer (SHPO), and Cortez Joint Venture, specific safeguards are in place to avoid or mitigate potential effects to these resources. Direct effects to NRHP-eligible properties, including surface or subsurface disturbance during project construction or operations, could occur, as well as visual effects to NRHP-eligible properties located within and adjacent to the project area. A historic properties treatment plan will specify BLM- and SHPO-approved mitigation procedures for each NRHP-eligible property potentially affected by the proposed project. Consultation is ongoing between the BLM and area Indian tribes to develop mitigation measures to address potential effects to NRHP-eligible properties of importance to the tribes. Based on the PA, the results of consultation, and implementation of the treatment plan, the proposed project is not anticipated to have adverse effects on historic properties.

**Native American Traditional Values**

Direct and indirect effects to Native American traditional values would occur as a result of the Proposed Action. These would include visual effects on views from Mount Tenabo and the White Cliffs, which were determined eligible for the NRHP as a Property of Cultural and Religious Importance (PCRI), as well as effects related to pine nut harvesting areas and spiritual and religious use of the project area.

Native American consultation regarding potential effects and possible mitigation is ongoing between the BLM Battle Mountain Field Office and tribal consultants designated by the Te-Moak Tribe of Western Shoshone Indians. No surface disturbance would occur within or immediately adjacent to the boundary of the PCRI prior to completion of consultation required by law, and, as appropriate, implementation of a mitigation plan to address effects to that resource. A mitigation plan would be reviewed and approved by the BLM and Nevada SHPO, with the advice of the Te-Moak tribal council, prior to implementation. The Te-Moak Tribe and other area tribes would be asked to participate as a concurring party in the development of this plan in accordance with federal mandates and the PA. Pending the results of consultation and implementation of the mitigation plan, the project is not anticipated to have adverse effects on the PCRI

**Air Quality**

Modeling results for the proposed project indicate the maximum concentrations of particulate matter with an aerodynamic diameter of 10 microns or less, nitrogen dioxide, carbon monoxide, and sulfur dioxide would not exceed Nevada or National Ambient Air Quality Standards. There would no impacts to Prevention of Significant Deterioration Class I areas as a result of the proposed project.

Particulate mercury is present naturally in the soils, overburden, and ore at the mine; therefore, it would be present as a small fraction of all particulate emissions produced during the various mine processes. Material handling; primary, secondary, and tertiary crushing; conveying; and stacking are potential emission sources of particulate mercury. Controls would be applied to each of the processes to reduce overall particulate emissions. Mercury emissions from fugitive dust at the mine were estimated using an emission factor of 4.70 E-05 tons per ton of PM<sub>10</sub> emissions (BLM 1996a). The estimated annual total emission of mercury would be 1,424 pounds (Enviroscientists 2006). It is anticipated that CGM's installation of Nevada MACT mercury control would minimize mercury emissions associated with the proposed project.

The combined hazardous air pollutant (HAP) emissions would be less than the major source limit of 25 tons per year; therefore, the Proposed Action would not constitute a major HAP source.

**Land Use and Access**

**Land Use.** The Proposed Action would commit approximately 6,792 acres of public and private land to mining uses for the life of the Proposed Action. During operations, activities such as grazing, wildlife habitat and dispersed recreation would be restricted until reclamation activities have been completed. Current public use of the area for these uses is very light, limited mainly to some grazing and a modest amount of dispersed recreation use, including visits to the remnants of the historic Cortez townsite and the Cortez

## **EXECUTIVE SUMMARY**

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cemetery. Since 2001, the Western Shoshone Defense Project has hosted an annual spring gathering at a location within the project area. The Proposed Action would not preclude these uses.

The project would be consistent with applicable land use plans. Post-reclamation land use of most of the disturbance area would be returned to open space, grazing, dispersed recreation, and wildlife habitat. These uses would be consistent with local and BLM land use plans and guidelines. The Cortez Hills Pit would remain unreclaimed, resulting in a permanent change from current uses.

**Access.** Traffic on State Route 306 would increase somewhat, but the Level of Service would remain at an “A” level and the highway would continue to operate at well below capacity throughout the life of the project. Access through the area on CR 222 and CR 225 would be lengthened due to relocation of portions of both roadways, but related travel time increases would be minor. Access to public lands outside the project area would not be impaired.

### **Recreation and Wilderness**

There would be a minor reduction in land available for dispersed recreation due to the project; however, there is ample supply of alternative public land available for dispersed recreation activities in the vicinity. There also would be a minor increase in demand for recreation facilities and resources from the project-related population increase. Access to the old Cortez townsite would be maintained throughout the life of the project. Some visitors to the townsite may feel the experience is degraded by the proximity to the mining activities, however. No adverse effects to designated wilderness or wilderness study areas have been identified.

### **Social and Economic Values**

Temporary increases in local construction jobs and longer-term increases in mining sector employment in Elko, Eureka, and Lander counties would occur as a result of the proposed project. The Proposed Action would employ approximately 300 construction workers plus 150 operations workers for expansion of the underground operations during the initial 18 months of the project. The underground workers would continue for the life of the project and would be joined by 200 operations workers for surface operations. Resulting population growth would range from an estimated 349 people in the first 1.5 years to a peak of 419, including from 58 to 89 school-aged children. These numbers would not exceed the 5 percent significance threshold for the entire study area, although, if current residency patterns continue for CGM workers, Crescent Valley/Beowawe would experience growth of from 7.5 to 8.9 percent. The project would generate an operations payroll of approximately \$45.9 million annually. Housing and public facilities and services in the study area are believed to be adequate to accommodate project-related population growth, with the possible exception of Crescent Valley/Beowawe. There may be localized pressure on individual schools, some of which have enrollments in excess of stated capacity, although the school systems as a whole appear to have sufficient unused capacity to accommodate the new students. Because no major public service shortfalls have been identified, most of the public revenue generated by the proposed project is expected to be a direct benefit to the communities. Overall, the social and economic effects of the proposed project would be beneficial to study area communities.

**Environmental Justice**

The potential project-related effects would not be expected to disproportionately affect minority or low-income populations. However, another facet of the environmental justice analysis requires consideration of impacts that may affect a cultural, historical, or protected resource of value to an Indian tribe or a minority population, even when the population is not concentrated in the vicinity. Results of the analysis indicate that direct and indirect effects to tribal resources of cultural and religious importance may occur during construction and operation of the proposed project. See “Native American Traditional Values” in this executive summary for an expanded discussion of these impacts.

**Visual Resources**

The Proposed Action would result in a substantial expansion of the existing CGM mining and processing operations in Crescent Valley. Most prominently, the Canyon Waste Rock Facility and the Cortez Hills Pit on the lower slopes of Mount Tenabo and the Cortez Mountains would be visible from Crescent Valley for several miles north of the project site. After completion of reclamation activities, visual effects of the waste rock facilities would be substantially reduced due to CGM’s commitment to vary their topography to mimic natural landforms to the degree possible. The long-term visual impact in Visual Resource Management Class IV areas would be moderate to low.

**Noise**

Noise levels substantially higher than ambient background noise levels would be generated in close proximity to the main noise-generating activity centers of the project project; however, there are no sensitive receptors close enough to experience significant adverse noise effects. Mine-related noise is projected to be below 50 decibels on the A-weighted scale at all five of the identified sensitive receptors. Blasting noise would be higher, but would be experienced as a brief, somewhat muted clap and roll of thunder preceded by a warning whistle or siren. Blasting noise, too, is projected to be below the significance threshold.

**Hazardous Materials and Solid Waste**

The Proposed Action would require the transport, handling, storage, use, and disposal of materials classified as hazardous under various regulatory frameworks. All hazardous materials would be shipped to and from the site in accordance with applicable U.S. Department of Transportation (USDOT) hazardous materials regulations. All shipping containers and vehicles would be USDOT-approved for the specific materials.

Transportation hazard analysis indicates that there would be a low probability of an accident involving the release of hazardous materials during the life of the Proposed Action with the potential for 0.28 to 0.36 releases per accident during the life of the project. The number of fuel releases that potentially would occur over the life of the project is projected to be less than 0.01.

## **EXECUTIVE SUMMARY**

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Operations would be conducted in accordance with the existing Hazardous Materials Spill and Emergency Response Plan, which would ensure that impacts from potential spills would be minimized and the spilled materials contained and removed.

Storage, containment, transportation, and handling of hazardous waste would be in accordance with CGM's existing Solid and Hazardous Waste Management Plan. All hazardous waste generated at the mine would be disposed of in accordance with applicable federal and state regulations. Non-hazardous solid waste would be disposed of in a Class III waived landfill located on private land in Grass Valley or in the existing on site landfills. All hazardous substances would be handled in accordance with applicable Mine Safety and Health Administration or Occupational Safety and Health Administration regulations (Titles 30 and 29 of the Code of Federal Regulations). The potential for a major release occurring at the site during the life of the proposed project is considered to be low.

### **BLM-preferred Alternative**

Chapter V, Section B.2.b. of the BLM's National Environmental Policy Act Handbook directs that "the Manager responsible for preparing the EIS should select the BLM's preferred alternative. ... For externally initiated proposals, ... the BLM selects its preferred alternative unless another law prohibits such an expression. ... The selection of the preferred alternative should be based on the environmental analysis as well as consideration of other factors that influence the decision or are required under another statutory authority."

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 outlined in Chapter 2.0 with mitigation measures specified in Chapter 3.0 of this EIS.

**ACRONYMS AND ABBREVIATIONS**

AAQS	ambient air quality standards
ACHP	Advisory Council on Historic Preservation
AIRFA	American Indian Religious Freedom Act
AFH	amorphous ferric hydroxide
AGFD	Arizona Game and Fish Department
AMEC	AMEC Earth and Environmental, Inc.
amsl	above mean sea level
AOU	American Ornithologists Union
APCR	Air Pollution Control Region
APE	Area of Potential Effects
APLIC	Avian Power Line Interaction Committee
ARPA	Archaeological Resources Protection Act
AUM	animal unit month
BAPC	Bureau of Air Pollution Control
BEA	Bureau of Economic Analysis
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practices
BMRR	Bureau of Mining Regulation and Reclamation
°C	degrees Celsius
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CCD	Census County Division
CDP	Census Designated Place
CELCCD	Cooperative Extension and Lander County Conservation District
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	cumulative effects study area
CFB	circulating fluid bed
CFR	Code of Federal Regulations
CGM	Cortez Gold Mines
CIC	carbon-in-column
CIL	carbon-in-leach
CIP	carbon-in-pulp
CO	carbon monoxide
CR	County Road
CWA	Clean Water Act
dBA	decibels, A-weighted
DVWD	Diamond Valley Weed District
EA	environmental assessment
EHS	extremely hazardous substances
EIS	environmental impact statement
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
ERA	ecological risk assessment

## ACRONYMS AND ABBREVIATIONS

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ESA	Endangered Species Act
ET	evapotranspiration
°F	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FLPMA	Federal Land Policy and Management Act
FR	Federal Register
GAP	Gap Analysis Program
GIS	geographic information system
gpm	gallons per minute
H	horizontal
HAP	hazardous air pollutant
HC/CUEP	Horse Canyon/Cortez Unified Exploration Project
HDPE	high density polyethylene
HQ	Hazard quotient
HSA	hydrologic study area
I	Interstate
ICC	Indian Claims Commission
IRA	Indian Reorganization Act of 1934
km	kilometer
KOP	key observation point
kV	kilovolt
L <sub>90</sub>	Noise level exceeded 90 percent of time
LHD	load-haul-dump
L <sub>max</sub>	maximum noise level
LOAEL	lowest observed adverse effects level
LOS	level of service
µg	micrograms
µg/g	micrograms per gram
µg/L	micrograms per liter
µg/m <sup>3</sup>	micrograms per cubic meter
µm	micrometers
µmhos/cm	micromhos per centimeter
MACT	Maximum Achievable Control Technology
MCL	maximum concentration level
mg/L	milligrams per liter
mg/m <sup>3</sup>	milligrams per cubic meter
MMPA	Mining and Mineral Policy Act
MOU	memorandum of understanding
mph	miles per hour
MSDS	material safety data sheet
MSHA	Mine Safety and Health Administration
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code

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## ACRONYMS AND ABBREVIATIONS

NAGPRA	Native American Graves Protection and Repatriation Act
NDA	Nevada Department of Agriculture
NDEP	Nevada Division of Environmental Protection
NDETR	Nevada Department of Employment, Training, and Rehabilitation
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NGO	non-governmental organization
NHPA	National Historic Preservation Act
NMCP	Nevada Mercury Control Program
NNHP	National Natural Heritage Program
NNP	net neutralization potential (acid neutralization potential/acid generation potential)
NO <sub>2</sub>	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NO <sub>x</sub>	oxides of nitrogen
NOAEL	no observed adverse effects level
NPA	National Programmatic Agreement
NPDES	National Pollutant Discharge Elimination System
NPIF	Nevada Partners in Flight
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
NSPS	New Source Performance Standards
O <sub>3</sub>	ozone
OHV	off-highway vehicle
OSHA	Occupational Safety and Health Administration
PA	programmatic agreement
PCRI	properties of cultural and religious importance
PM	particulate matter
PM <sub>2.5</sub>	particulate matter with an aerodynamic diameter of 2.5 microns or less
PM <sub>10</sub>	particulate matter with an aerodynamic diameter of 10 microns or less
PMUs	population management units
ppm	parts per million
PRIME	Plume Rise Model Enhancement
PSD	Prevention of Significant Deterioration
PTE	potential to emit
RCRA	Resource Conservation and Recovery Act
RFFA	reasonably foreseeable future action
RMP	Resource Management Plan
ROD	record of decision
ROW	right-of-way
RPS	range program summary

## **ACRONYMS AND ABBREVIATIONS**

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RUSLE	Revised Universal Soil Loss Equation
RV	recreational vehicle
SAG	semi-autogenous grinding
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SEIS	supplemental environmental impact statement
SFHA	special flood hazard area
SH	State Highway
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO <sub>2</sub>	sulfur dioxide
SOC	species of concern
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
SR	State Route
SWANCC	Solid Waste Agency of Northern Cook County
TDS	total dissolved solids
tpd	tons per day
tpy	tons per year
TPQ	threshold planning quantity
TRB	Transportation Research Board
TRV	toxicity reference value
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDOT	U.S. Department of Transportation
USGS	U.S. Geological Survey
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
V	vertical
VMRP	Voluntary Mercury Reduction Program
VOCs	volatile organic compounds
VRM	Visual Resource Management
WAD	weak acid dissociable
WSA	wilderness study area
WSDP	Western Shoshone Defense Project

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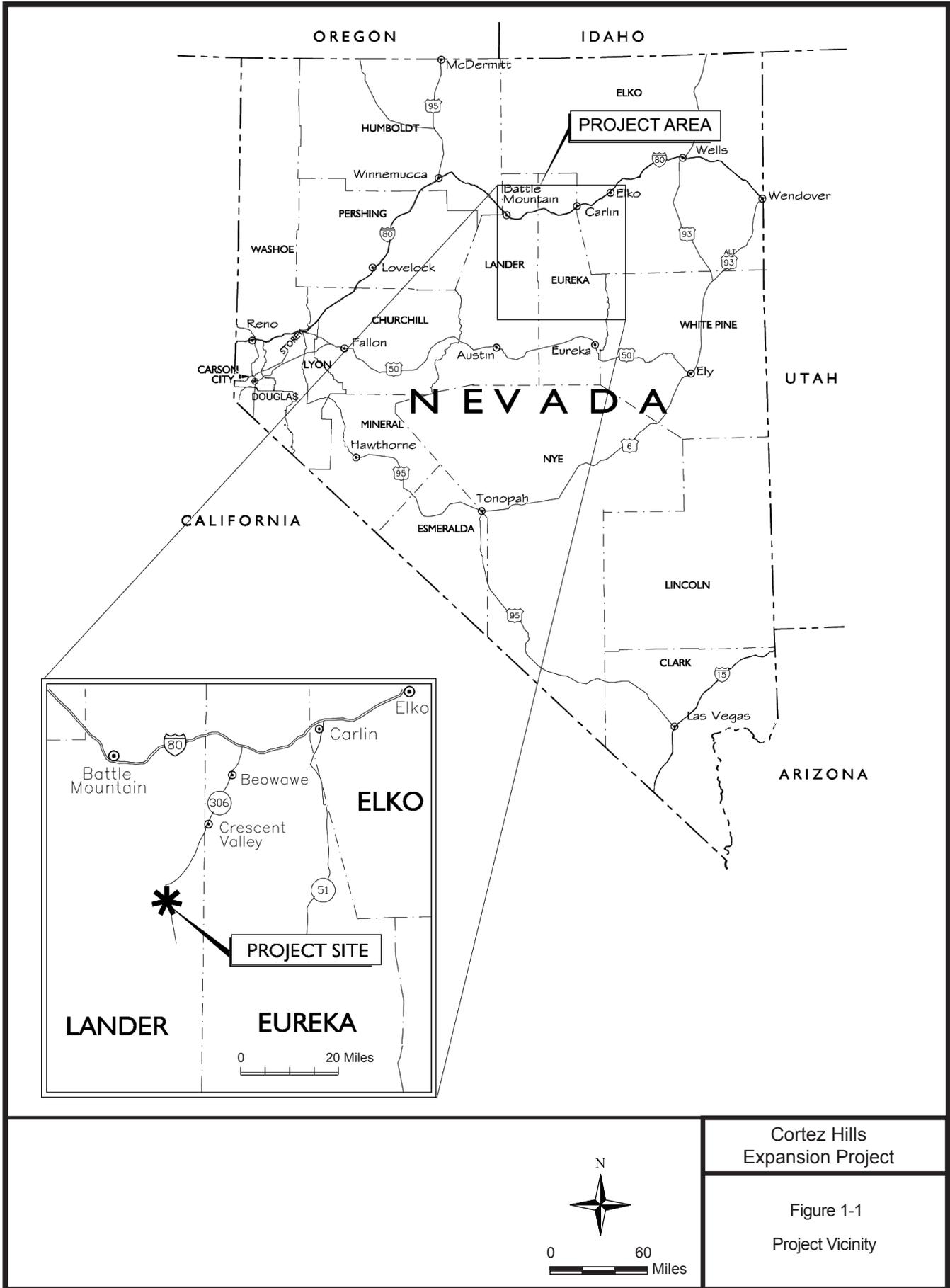
## **1.0 INTRODUCTION**

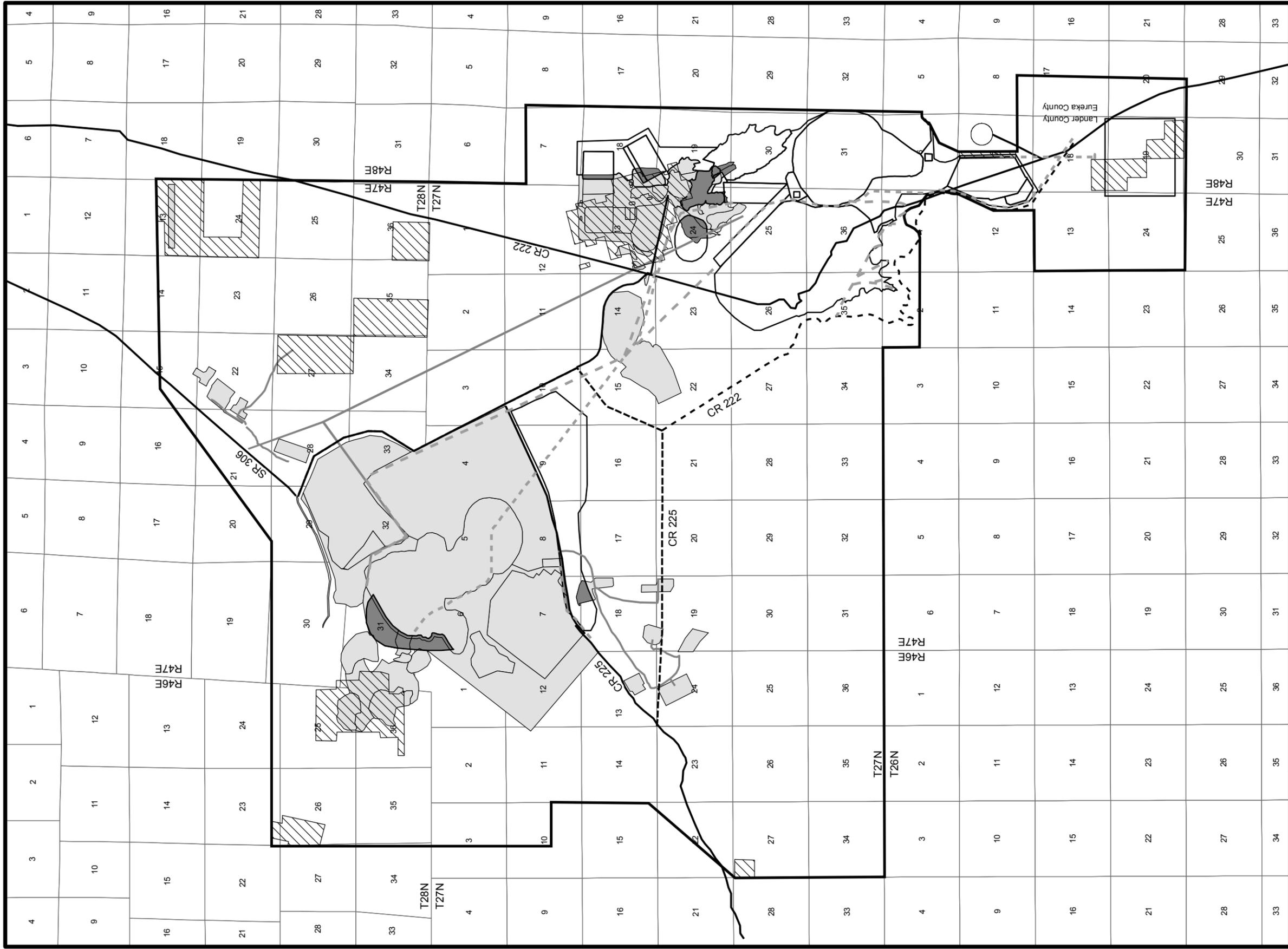
Cortez Gold Mines (CGM), on behalf of the Cortez Joint Venture, proposes to construct and operate the Cortez Hills Expansion Project, which would include the development of new facilities and expansion of its existing open-pit gold mining and processing operations located in north-central Nevada approximately 24 miles south of Beowawe in Lander County (**Figure 1-1**). The Cortez Joint Venture is composed of Barrick Cortez Inc. (a wholly owned subsidiary of Barrick Gold Corporation) and Kennecott Exploration (Australia) Ltd. On August 29, 2005, CGM submitted an Amendment to the Pipeline/South Pipeline Plan of Operations for the Cortez Hills Expansion Project to the Bureau of Land Management (BLM) Battle Mountain Field Office in compliance with 43 Code of Federal Regulations (CFR) 3809 and 3715; revised plans were submitted in June and November 2006.

The proposed Cortez Hills Expansion Project would be located within Township 27 North (T27N), Range 48 East (R48E); T27N, R47E; T27N, R46E; T26N, R47E; T26N, R48E; T28N, R46E; and T28N, R47E in Lander County. There are no proposed facilities in Eureka County; however, the project boundary would extend on to BLM administered lands in Eureka County to accommodate a portion of the proposed Cortez Hills Pit buffer zone and ancillary facilities. The majority of the proposed 6,792 acres of new surface disturbance would be located on public lands administered by the BLM Battle Mountain Field Office. Private lands owned by CGM also would be associated with the project. Surface ownership in the project area is presented in **Figure 1-2**.

CGM proposes to mine the ore bodies associated with the Cortez Hills Expansion Project concurrently with the existing Pipeline/South Pipeline ore bodies. The majority of the high grade ore mined under the Cortez Hills Expansion Project would be processed at the existing Pipeline and/or Cortez mills; the primary method of processing low grade ore would be heap leaching. A lesser quantity of refractory ore would be sold to an off site processing facility. The proposed project would include an expansion of two existing open pits (one expanded and one deepened) and the development of one new open pit, development of underground mining operations, the construction of two new heap leach pads and associated processing facilities, the expansion of two existing and construction of three new waste rock disposal areas, expansion of one existing mill, expansion of an existing tailings facility, construction of an overland conveyor with associated crusher and stockpile, and the relocation of portions of two county roads and a transmission line. In addition, the proposed project would utilize some of the existing primary facilities and ancillary support facilities. If approved, the anticipated mine life would be approximately 10 years, followed by an estimated 3 years for ongoing ore processing, chemical stabilization of heaps, site closure, and final reclamation.

In addition to incorporation of the proposed project, the plan amendment also proposes consolidation of CGM's three existing mine plans (Pipeline/South Pipeline Plan of Operations [NVN-067575], Cortez Plan of Operations [NVN-67261] as amended for the Underground Exploration Project, and Gold Acres Plan of Operations [NVN-67174]) into a new mine plan of operations boundary that would be known as the Cortez Gold Mines Plan of Operations. The proposed consolidation of mine plans and boundary modifications would eliminate overlap between various plan boundaries and approved activities. The plan boundaries for CGM's two existing exploration plans (Pipeline/South Pipeline/Gold Acres Exploration Project [NVN-67575]





**Figure 1-2**  
Surface Ownership

**Cortez Hills Expansion Project**

**Legend**

- Project Boundary
- Existing Facilities
- Existing and Proposed Facilities Overlap
- Proposed Facilities
- Private Land
- Existing and Approved Roads
- Proposed Road Reroutes
- Existing Linear Features
- Proposed Linear Features

Source: BLM 2007.

and Horse Canyon/Cortez Unified Exploration Project [HC/CUEP] [NVN-66621]) also would be modified to eliminate the overlap of the exploration plan boundaries with the proposed new mine plan of operations boundary. The two existing exploration plans still would be in effect within their modified boundaries. Prior plans of operations, environmental analysis documents, and approvals for previous CGM development and exploration activities in the vicinity of the proposed Cortez Hills Expansion Project are summarized in **Table A-1** in Appendix A of this Environmental Impact Statement (EIS).

The proposed mining activities located on public and private lands are subject to review and approval by the BLM pursuant to the Federal Land Policy and Management Act of 1976 (FLPMA) as amended, and the BLM's surface management regulations (43 CFR Subpart 3809). The BLM's review and approval of a mine plan of operations under the surface management regulations constitute a federal action that is subject to the National Environmental Policy Act of 1969 (NEPA). The BLM has determined that the project constitutes a major federal action and has determined that an EIS must be prepared to fulfill NEPA requirements. A Notice of Intent to prepare an EIS was published in the Federal Register (FR) on December 2, 2005 (FR Volume 70, Number 231). Public scoping meetings for the EIS were held in Crescent Valley and Battle Mountain, Nevada, on December 19 and 20, 2005, respectively. The comments received during the scoping process were considered in developing this EIS.

The BLM is serving as the lead agency for preparing the EIS in compliance with NEPA, the Council on Environmental Quality (CEQ) NEPA implementing regulations (40 CFR 1500-1508), the BLM's NEPA handbook (H-1790-1), Nevada State Office Instruction Memorandum NV-90-435 on analysis of cumulative impacts and the Bureau-wide Guidelines for Assessing and Documenting Cumulative Impacts (April 1994), CEQ's 2005 Guidance on the Consideration of Past Actions in Cumulative Effects Analysis, and other applicable guidance. The Nevada Department of Wildlife (NDOW) is serving as a cooperating agency for preparation and review of the EIS. The EIS considers the quality of the natural environment based on the physical impacts to the public and private lands that may result from implementation of the proposed project.

This EIS describes the proposed mine expansion (Proposed Action) and project alternatives (including the No Action Alternative). It also describes the environmental consequences of implementing the Proposed Action or the alternatives.

### **1.1 Purpose and Need for the Action**

The purpose of the proposed Cortez Hills Expansion Project is to continue to profitably recover gold and silver reserves and resources from federal mining claims in the project area utilizing, to the extent practical, existing facilities at CGM's currently permitted operations for the various mining complexes within the Cortez Gold Mines Operations Area.

The project need is to meet the prevailing market demand for gold. The prevailing market demand is adjusted on a daily basis on commodity exchanges throughout the world. This adjustment results from buyers and sellers agreeing on a specific transaction price, which reflects the current supply and demand for the commodity and other factors.

## **1.0 INTRODUCTION**

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### **1.2 Relationship to BLM and Non-BLM Policies, Plans, and Programs**

#### **1.2.1 BLM Surface Management Authorizations and Plans**

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

In order to use public lands managed by the BLM's Battle Mountain Field Office, CGM must comply with the BLM Surface Management Regulations (43 CFR 3809) and other applicable statutes, including the Mining and Mineral Policy Act of 1970 (as amended) and FLPMA. As indicated in Section 1.1, the BLM must review CGM's plans for expanding and developing the Cortez Hills Expansion Project to ensure the following:

- Adequate provisions are included to prevent unnecessary or undue degradation of federal lands and to protect the non-mineral resources of the federal lands;
- Measures are included to provide for reclamation of disturbed areas; and
- Compliance with applicable state and federal laws is achieved.

#### **1.2.2 BLM Resource Management Plan**

The BLM has the responsibility and authority to manage the surface and subsurface resources on public lands located within the jurisdiction of the Battle Mountain Field Office, and it has designated lands within the project area as open for mineral exploration and development. In its Record of Decision (ROD) for the Shoshone-Eureka Resource Management Plan (RMP) (BLM 1986c), the BLM states in objectives 1.0 and 2.0 under Minerals that it will:

- "Make available and encourage development of mineral resources to meet national, regional, and local needs consistent with national objectives for an adequate supply of minerals," and
- "Assure that mineral exploration, development, and extraction are carried out in such a way as to minimize environmental and other resource damage and to provide, where legally possible, for the rehabilitation of lands."

The management decisions applicable to these objectives are as follows (BLM 1986c):

- Locatable minerals: "All public lands in the planning areas will be open for mining and prospecting unless withdrawn or restricted from mineral entry."
- Current mineral production areas: "Recognize these areas as having a highest and best use for mineral production and encourage mining and minimum environmental disturbance. Make thorough examinations of all sites proposed for other Bureau programs in these areas."

The proposed project is consistent with the Shoshone-Eureka RMP.

The proposed project also has been reviewed for conformance with the BLM's Minerals Management Prescription in the Elko RMP (BLM 1987). The proposed project is consistent with the prescriptions in this RMP.

### **1.2.3 BLM Cyanide Management Plan**

The BLM's national cyanide management policy requires that BLM state offices prepare a Cyanide Management Plan. The Nevada State Office of the BLM has prepared and administers the Nevada Cyanide Management Plan (BLM 1996g). The Nevada Cyanide Management Plan is applicable to all public lands administered by the BLM in Nevada and would be applicable to the proposed project's cyanide heap leaching activities, relevant precious metal recovery processes, and expanded tailings facility. The Nevada Cyanide Management Plan provides guidance on cyanide use in mining activities and lists the following objectives:

- Implement the BLM's national cyanide management policy;
- Ensure that mining operations using cyanide on BLM-managed lands follow Best Management Practices (BMPs) and do not cause unnecessary or undue degradation of the federal lands;
- Provide both the mine operator and the BLM technical staff with standards for development and evaluation of mining projects that use cyanide; and
- Use state standards, if established.

The Nevada Cyanide Management Plan is not intended to duplicate requirements of other federal or state agencies with responsibility for managing the use of cyanide in mining operations. Where standards are established for mining operations by the State of Nevada through the Nevada Division of Environmental Protection (NDEP), Bureau of Mining Regulation and Reclamation (BMRR), they shall apply when reviewing a Notice or a Plan. The BLM has reviewed the Plan of Operations for the proposed project to ensure that it is in conformance with the Nevada Cyanide Management Plan.

### **1.2.4 BLM Site Reclamation Standards**

The Mining and Mineral Policy Act of 1970 (MMPA) mandates that federal agencies ensure that closure and reclamation of mine operations be completed in an environmentally responsible manner. The MMPA states that the federal government should promote the "development of methods for the disposal, control, and reclamation of mineral waste products, and the reclamation of mined lands, so as to lessen any adverse impact of mineral extraction and processing upon the physical environment that may result from mining mineral activities."

## **1.0 INTRODUCTION**

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Relevant BLM policy and standards for reclamation are presented in the BLM Solid Minerals Reclamation Handbook (BLM Manual Handbook H-3042-1), which provides consistent reclamation guidelines for all solid non-coal mineral activities conducted under the authority of the BLM Minerals Regulations in Title 43 CFR Subpart 3809 (BLM 1992a). BLM's short-term reclamation standards and goals include stabilization of disturbed areas and protection of both disturbed and adjacent undisturbed areas from unnecessary or undue degradation. The BLM's long-term reclamation standards and goals include the establishment of a self-sustaining, safe, and stable condition providing productive post-mining use of the land, which conforms to the approved land use plan for the area. The BLM has reviewed the proposed Reclamation Plan for the Cortez Hills Expansion Project to ensure that the project would meet BLM's reclamation standards and goals.

### **1.2.5 Local Land Use Plans and Policies**

The Proposed Action is consistent with Section XI of the Lander County Policy Plan for Federally Administered Lands (Lander County 2005), which sets forth the policy to "promote the expansion of mining operations and areas." The Lander County Policy Plan for Federally Administered Lands also states that mine site reclamation standards should be consistent with the best possible post-mine use for each specific area, and that specific standards should be developed for each property.

The Eureka County Master Plan (Eureka County 1997) provides only general policy guidance and not site-specific control (Mears 2007). However, Eureka County, in cooperation with the Nevada Division of State Lands, has adopted a Policy for Public Lands within its jurisdiction (Eureka County 1985). The proposed project also is consistent with the policies in this plan, which include promoting expansion of mining operations/areas.

### **1.3 Authorizing Actions**

In addition to the EIS, implementing the Proposed Action would require authorizing actions from other federal, state, and local agencies with jurisdiction over certain aspects of the proposed project. **Table 1-1** lists the required permits or approvals that are already in place or would be obtained and the responsible regulatory agencies. CGM is responsible for amending existing permits and applying for and acquiring additional permits, as needed.

### **1.4 Organization of the Environmental Impact Statement**

This EIS follows the CEQ recommended organization (40 CFR 1502.10). Chapter 1.0 provides descriptions of the purpose and need for the action, the role of the BLM in the EIS process, and the required regulatory actions for the proposed project. Chapter 2.0 describes the Proposed Action and alternatives, including the No Action Alternative. Chapter 3.0 describes the affected environment and the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives; possible mitigation to reduce or minimize impacts; and any residual adverse effects following the implementation of mitigation. Chapter 4.0 summarizes public participation and the scoping process and the consultation and coordination undertaken to prepare the EIS. Chapter 5.0 presents the list of EIS preparers and reviewers. Chapter 6.0 presents the

list of references. Chapter 7.0 contains a glossary. Chapter 8.0 contains the index. Copies of supporting documents are on file at the BLM Battle Mountain Field Office in Battle Mountain, Nevada.

**Table 1-1  
Major Permits and Approvals**

<b>Permit/Approval</b>	<b>Granting Agency</b>
Environmental Impact Statement Plan of Operations Approval Right-of-Way Permits	U.S. Department of the Interior, BLM
Explosives Permit	U.S. Department of the Treasury, Bureau of Alcohol, Tobacco, and Firearms
Review of jurisdictional determinations for Clean Water Act Section 404 permitting	U.S. Army Corps of Engineers (USACE)
Surface Disturbance Permit Permit to Construct Permit to Operate	Nevada Department of Conservation and Natural Resources, NDEP, Bureau of Air Pollution Control
Water Pollution Control Permit Reclamation Permit	Nevada Department of Conservation and Natural Resources, NDEP, BMRR
Permit to Appropriate Water Permit for Dam Construction (Tailings and Fresh Water Reservoir)	Nevada Department of Conservation and Natural Resources, NDEP, Division of Water Resources
Industrial Artificial Pond Permit	NDOW
Approval to Operate a Sanitary Landfill	Nevada Department of Conservation and Natural Resources, NDEP, Bureau of Waste Management
General Discharge Permit (stormwater) General Permit to Operate and Discharge (large-capacity septic systems)	Nevada Department of Conservation and Natural Resources, NDEP, Bureau of Water Pollution Control
Permit to Operate	Nevada State Minerals Commission, Division of Minerals
Hazardous Materials Storage Permit	State of Nevada, Fire Marshal Division
Road Rerouting Applications Building Permits	Lander County