United States Department of the Interior
Bureau of Land Management

Battle Mountain Field Office
Battle Mountain, Nevada

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Pipeline/South Pipeline Pit Expansion Project

Final Supplemental Environmental Impact Statement

NVN-067575(01-1A)
NV063-EIS01-70

COOPERATING AGENCY:
Nevada Department of Wildlife

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 the 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.

EIS NUMBER: NV063-EIS01-70
PLAN OF OPERATIONS NUMBER: NVN067575(01-1A)
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PIPELINE/SOUTH PIPELINE
PIT EXPANSION PROJECT
FINAL SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT

Lead Agency:	U.S. Department of Interior Bureau of Land Management Battle Mountain Field Office
Cooperating Agency:	Nevada Department of Wildlife
Project Location:	Lander County, Nevada
SEIS Number:	NV063-EIS01-70
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ABSTRACT

Cortez Gold Mines proposes to extend gold mining operations at the Pipeline/South Pipeline Mine within the Gold Acres Mining District in Lander County, approximately 30 miles southeast of Battle Mountain, Nevada. The Pipeline/South Pipeline Pit Expansion Project (Proposed Action) would modify the existing Plan of Operations and include an expansion of the existing open pit in stages, the expansion of the existing waste rock disposal sites, the increase in height of the heap leach pads, and waste rock dumps, as well as the sequential backfilling of a majority of the open pit and development of a new waste rock dump. The Proposed Action would occur within the previously approved surface disturbance footprint, all of which is public land administered by the Bureau of Land Management. Mining operations are expected to occur seven days a week, 24 hours a day, for up to an additional seven years. This Final Supplemental Environmental Impact Statement analyzes the environmental effects of the Pipeline/South Pipeline Pit Expansion Project, the No Action Alternative, and the Complete Backfill Alternative.

Responsible Official for the SEIS:	Gerald M. Smith Field Manager Battle Mountain Field Office

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PIPELINE/SOUTH PIPELINE
PIT EXPANSION PROJECT
FINAL SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT

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ACRONYMS AND ABBREVIATIONS

Reader Note: Refer to the list below for abbreviations or acronyms that may be used in this document.

ABA	Acid-base accounting
AGP	Acid-generating potential
amsl	Above mean sea level
ANFO	Ammonium nitrate/fuel oil mixture
ANP	Acid-neutralization potential
ARD	Acid rock drainage
AUM	Animal unit months
BAPC	Bureau of Air Pollution Control
BEA	Bureau of Economic Analysis
BLM	Bureau of Land Management
BMPs	Best Management Practices
BMRR	Bureau of Mining Regulation and Reclamation
BMWS	Battle Mountain Water and Sewer
BPIP	Building Profile Input Program
BSAF	Biota sediment accumulation factor
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CESA	Cumulative Effects Study Area
CFB	Continuous fluid bed
CFR	Code of Federal Regulations
CGM	Cortez Gold Mines, Inc.
CIL	Carbon-in-leach
CO	Carbon monoxide
COPC	Chemical of potential concern
Corps.	U.S. Army Corps of Engineers
CVAQMA	Crescent Valley Air Quality Management Area
CWA	Clean Water Act
dBA	Decibels (A-weighted)
dB	Decibels
(º)	Degrees
DEM	Digital Elevation Model
DOE	Department of Energy
DOI	Department of Interior
DWS	Drinking Water Standards
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMA	Environmental Management Associates, Inc.
EPA	Environmental Protection Agency
ERA	Ecological Risk Assessment
ESA	Endangered Species Act

F	Fahrenheit
FLPMA	Federal Land Policy and Management Act
FND	Fennemore-Neller-Davis
FIRE	Finance insurance and real estate
FY	Fiscal year
gpd	Gallons per day
gpm	Gallons per minute
GPS	Global Positioning System
H	Horizontal
HAP	Hazardous air pollutant
HDPE	High density polyethylene
HQ	Hazard Quotient
ISCST3	Industrial Source Complex - Short Term
I-80	Interstate 80
JBR	JBR Environmental Consultants, Inc.
JVA	Joint Venture Area
KOP	Key observation point
LOAEL	Lowest Observed Adverse Effect Levels
MCL	Maximum contaminant level
mgd	Million gallons per day
mg/l	Milligrams per liter
mg/kg	Milligrams per kilogram
MMPA	Mining and Mineral Policy Act of 1970
MOU	Memorandum of Understanding
mph	Miles per hour
MSHA	Mine Safety and Health Administration
MTBE	Methyl tert-butyl ether
MWMP	Meteoric water mobility procedure
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NCV	Net carbonate value
NDEP	Nevada Division of Environmental Protection
NDETR	Nevada Department of Employment, Training and Rehabilitation
NDF	Nevada Division of Forestry
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
ng/l	Nanograms per liter
NSAAQS	Nevada State ambient air quality standards
NNP	Net neutralizing potential (ANP-AGP)
NNRPDP	Northeastern Nevada Regional Professional Development Program
NOI	Notice of Intent
NOAEL	No Observed Adverse Effect Level
NO_2	Nitrogen dioxide
NPDES	National Pollution Discharge Elimination System
NRS	Nevada Revised Statutes
NSPS	New source performance standards
NSO	Nevada State Office of the Bureau of Land Management

O_3	Ozone
OBE	Operating basis earthquake
OHV	Off-highway vehicle
PCPI	Per capita personal income
Pb	Lead
pH	Potential of hydrogen
$PM_{2.5}$	Particulate matter less than 2.5 micrometers in aerodynamic diameter
PM_{10}	Particulate matter less than 10 micrometers in aerodynamic diameter
Plan	Plan of Operations
PRISM	Precipitation-Elevation Regressions on Independent Slopes Model
Project	Pipeline/South Pipeline Pit Expansion Project
PSD	Prevention of significant deterioration
PRIME	Plume Rise Mode Enhancement
RFFA	Reasonably Foreseeable Future Actions
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right-of-way
RPS	Rangeland Program Summary
SAG	Semi-autogenous grinding
SAHL	South Area Heap Leach (defined as the Pipeline/South Pipeline Heap Leach Facility in the South Pipeline Project Final Environmental Impact Statement)
SARA	Superfund Amendment and Reauthorization Act of 1986
SCRAM	Support Center for Regulatory Air Modeling
SDWA	Safe Drinking Water Act
SEIS	Supplemental Environmental Impact Statement
SIP	State Implementation Plan
SLERA	Screening level ecological risk assessment
SO_2	Sulfur dioxide
SPCC	Spill Prevention Control and Countermeasure Plan
SPU	Spring Creek Utilities
SR	State Route
SRK	Steffen, Robertson and Kirsten (U.S.), Inc.
TCPU	Transportation, communications, and public utilities
TDS	Total dissolved solids
tpd	Tons per day
TPH	Total petroleum hydrocarbons
tpy	Tons per year
TRV	Toxicity reference values
UBC	Uniform Building Code
UNR	University of Nevada, Reno
USC	United States Code
USGS	United States Geological Survey
V	Vertical
VMRP	Voluntary Mercury Reduction Program
VOC	Volatile organic compounds
VRM	Visual Resources Management
WAD	Weak acid dissociable

WMC	Water Management Consultants, Inc.

Document Abbreviations

South Pipeline Final EIS	South Pipeline Project Final Environmental Impact Statement (BLM 2000a)
Pipeline Final EIS	Cortez Pipeline Gold Deposit Final EIS (BLM 1996a)
Pipeline Infiltration EA	Pipeline Infiltration Environmental Assessment (BLM 1999)
Gravel Pit EA	Pipeline Gravel Pit Project Environmental Assessment (BLM 1996b)
Gravel Pit Expansion	Gravel Pit Expansion (CGM 2001b)
HCCUEP	Horse Canyon/Cortez Unified Exploration Project (BLM 2000b)

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EXECUTIVE SUMMARY

Purpose of this Document

Cortez Joint Venture dba Cortez Gold Mines (CGM) has proposed the Pipeline/South Pipeline Pit Expansion (Project) as a modification to the existing Plan of Operations (Plan) for the Pipeline/South Pipeline Project (Proposed Action). Specifics of the Project are outlined in a Modified Plan filed by CGM on January 16, 2001 (revised April 2004; CGM 2001a).

This Final Supplemental Environmental Impact Statement (SEIS) has been prepared by the U.S.D.I. Bureau of Land Management (BLM), the Lead Agency with respect to compliance with the National Environmental Policy Act (NEPA) and its implementing regulations, and with Cooperating Agency, Nevada Department of Wildlife (NDOW). The purpose of the document is to analyze the environmental effects of the Proposed Action, which consists of the proposal by CGM to develop the Pipeline/South Pipeline open pit expansion.

The purpose of the SEIS is to inform decision-makers in all federal agencies required to approve authorizing actions, as well as the public, of the anticipated significant environmental effects of the Proposed Action, the possible ways to mitigate the significant effects of the Proposed Action, and reasonable alternatives, which could feasibly reduce the significant environmental impacts of the Proposed Action to below the level of significance. The information in an EIS does not control an agency's discretion on a project.

The Final SEIS has been prepared in a single volume. All technical documents used to support this SEIS are available for review during normal business hours at the BLM's Battle Mountain Field Office in Battle Mountain, Nevada.

Proposed Action

The Proposed Action (CGM's Pipeline/South Pipeline Pit Expansion Project [Project]) is to develop the additional mineral resources identified at the Pipeline/South Pipeline ore deposit and construct associated facilities to continue to extract gold from the mined ore within the Project Area (CGM 2001a). The Proposed Action would occur within the approved 7,676 acres of surface disturbance. CGM plans to conduct certain activities at the approved Cortez Facilities without substantial modification to those facilities.

The Proposed Action would extend the operational life of CGM's mining and processing activities, as well as the employment of 450-500 individuals, for up to an additional seven years. Some of this timeframe would run coincident with the time frame outlined in the South Pipeline Project Final EIS. The actual schedule could be different if reserves are increased or if economic conditions change. The milling facility could also be utilized beyond the Pipeline Mine life if ore from other CGM or another mine owner's property or properties were transported to the facility for processing.

The principal actions associated with the Proposed Action would consist of the following: a) expand the South Pipeline open pit to the east, southeast, and southwest; b) increase the depth of the Pipeline/South Pipeline open pit; c) use resulting waste rock as backfill into portions of the Pipeline/South Pipeline open pit; d) increase the levels of the approved South Area Heap Leach pad from a height of 250 feet to 300 feet above ground surface; e) increase the approved waste rock dump height from 250 feet to 300 feet above ground surface; f) increase the height of the approved

Area 28 Integrated Heap Leach/Tailings facility up to a maximum of 350 feet above ground surface; g) construct an additional waste rock dump (above original grade) on the backfilled portion of the open pit; h) construct the 125-acre Gap waste rock dump; I) increase the approved mining rate from an average 150,000 tons per day (tpd) with a maximum of 250,000 tpd to an average of 350,000 tpd with a maximum of 500,000 tpd; j) translocate waste rock within the Pipeline/South Pipeline open pit, including portions of the expanded open pit; k) conduct certain activities at the approved Cortez facility; l) close the existing Gold Acres heap leach facility, transfer any solutions to the existing Pipeline mill process circuit, move the ore on the pad to the SAHL for further processing, and dismantle the leach pad, ponds, and other structural components; m) install ground water extraction wells (ground water extraction from the existing and planned wells would not exceed the approved annualized average rate of 34,500 gallons per minute [gpm]); and n) continue management of mine dewatering as outlined in the Pipeline Infiltration Environmental Assessment (EA) and South Pipeline EIS. All of these activities comprise the Proposed Action to be analyzed in the SEIS. The Proposed Action would utilize the same mining methods as are used to mine the Pipeline/South Pipeline deposit. See Section 2.2 as well as the Cortez Pipeline Gold Deposit (Pipeline) Final EIS (BLM 1996a; pages 2-10 to 2-11) and South Pipeline Final EIS (BLM 2000a; pages 3-7 to 3-10). The use and occupancy of these facilities would be in compliance with 43 Code of Federal Regulations (CFR) 3715, which regulates the storage of equipment and supplies, occupancy of structures, and structures on public land that restrict public access.

The mining that was approved under the Pipeline Project and the South Pipeline Project was, and is being, conducted by CGM in seven stages (Stages 1 through 7). Mining under the Proposed Action would continue to occur in Stages 8 through 12 (see Stage description in Section 2.2), which are described as follows: a) Stage 8: mine ore from the Pipeline/South Pipeline open pit; b) Stage 9: mine ore from the South Pipeline open pit; c) Stage 10: mine ore from the Crossroads open pit; d) Stage 11: mine ore from the Gap open pit and continue to mine ore from the Crossroads open pit; and e) Stage 12: mine ore from the Gap open pit to the extent of economic mineralization. The mining stages are outlined in the following sections and are assessed as distinct Project actions in order to determine the level of impacts related to each stage, since mining could be discontinued at the conclusion of any consecutive stage. Potential impacts of each stage are evaluated individually in this SEIS, with each stage incorporating the previous stages. Plan views and cross sections of these distinct stages of the Proposed Action have been prepared and are included in this SEIS. There is a potential for two or more stages to be mined concurrently.

An estimated 110 million tons of additional ore would be mined from the expanded open pit as part of the Proposed Action. A portion of the ore would be leached on existing heap leach pads. The remainder would be processed at the approved Pipeline mill and tailings facility, at the existing Cortez CFB roaster, CIL mill, and tailings facility, or shipped offsite to be processed at a third party ore processing facility. The waste-to-ore ratio is approximately 5.4:1, resulting in approximately 590 million tons of waste rock that would also be mined from the expanded open pit. The waste rock would be deposited on the approved/expanded Pipeline/South Pipeline waste rock dumps, and/or sequentially backfilled into the mined-out portions of open pits, and/or on a new dump planned on top of the completely backfilled Pipeline/South Pipeline portion of the open pit, and/or the new Gap waste rock dump.

The incorporation of backfilling into the planned activities under the South Pipeline Project was approved subject to further investigations, as a result of the analysis to address the potential impacts

to wildlife, particularly because of concentrations of methylmercury, identified in the South Pipeline Final EIS (BLM 2000a, Pages 4-135 to 4-137). The previous EIS (BLM 2000a) used one-half the detection limit for the methylmercury value in the modeling. The current analysis refines the assessment of methylmercury by using actual values from analogous pit lakes, as well as fully evaluating hydrochemistry issues, and are incorporated into the report titled Pit Lake Chemistry Assessment for the Pipeline/South Pipeline Pit Expansion Project (Geomega 2003b). The conclusion of the report is that the methylmercury levels in the pit lake under the Proposed Action are within the limits of the aquatic life water quality standards.

The approved pumping rate of an annualized average of up to 34,500 gpm would be sufficient to dewater the open pit under the Proposed Action, although the length of time for dewatering operations would be extended. An updated dewatering model has been completed for the Project. This Project would increase the time for dewatering by up to seven years and could ultimately result in one pit lake of up to 750 acres, or up to three smaller lakes. The actual size of the lake(s) would depend upon final open pit design based on the actual extent of mining (described in detail in Section 3.1.2), ongoing exploration activities and economic conditions, and the amount of waste rock hauled into mined-out areas.

Reclamation activities would be conducted in accordance with BLM surface management regulations 43 CFR 3809 and State of Nevada Administrative Code NAC 519A. The construction, maintenance, and reclamation phases of the Project have been designed to prevent unnecessary and undue degradation of the lands affected by CGM throughout the life of the Project. The objectives of the reclamation plan include minimizing or eliminating public safety hazards, stabilizing disturbed areas, and providing a post-mining surface condition that would be consistent with long-term land uses. The primary long-term land uses are expected to be wildlife habitat, livestock grazing, and potential future mining-related activity.

With the exception of portions of the Pipeline/South Pipeline open pit, which would be constructed in its final configuration, reclamation activities would consist of regrading, topsoiling, and revegetating disturbed areas. The draindown chemistry of the heap leach pad would be stabilized in accordance with applicable regulatory requirements in addition to regrading, topsoiling, and revegetation. Other reclamation would include removal of the pipes for transporting dewatering water and pregnant/barren solutions and installing safety features around the Pipeline/South Pipeline open pit.

Complete Backfill Alternative

The Complete Backfill Alternative would require all waste rock from Stages 8 through 12 (Section 3.1.2) to be placed in the mined-out expanded Pipeline/South Pipeline and Gap open pits. The Complete Backfill Alternative is significantly different from the Proposed Action in that it would require the re-handling and translocation of all of the mined waste rock. The elevation of the Pipeline/South Pipeline waste rock dump would temporarily increase and other temporary dump facilities would be constructed. At the end of mine life, waste rock from the dump facilities would be removed and placed back into the Pipeline/South Pipeline and Gap open pits. The backfill would be performed with the existing labor force and a pit lake would still form in the Crossroads open pit. Implementation of the Complete Backfill Alternative would result in no new surface area disturbance.

No Backfill Alternative

Under the No Backfill Alternative, the 590 million tons of waste rock that would be mined under the Proposed Action would need to be disposed of in the existing Pipeline/South Pipeline waste rock dump and on a new dump adjacent to the Gap open pit. The Gap dump, which would consist of both Pipeline/South Pipeline and/or Crossroads waste in addition to the Gap waste, would cover 500 acres at a height of 250 feet. In addition, the existing Pipeline/South Pipeline waste rock dump would require additional stacking to 500 feet in height to accommodate the additional waste. The Pipeline/South Pipeline waste rock dump footprint would also be extended across the entire permitted disturbance acreage, leaving no space for sideslope contouring and shaping. All other activities under the No Backfill Alternative would be the same as under the Proposed Action with the exception that one large pit lake would form in the Pipeline/South Pipeline/Crossroads open pit and a small lake would form in the Gap open pit.

No Action Alternative

In accordance with BLM guidelines (H-1790-1, Chapter V), the SEIS evaluates the No Action Alternative. The objective of the No Action Alternative is to describe the environmental consequences that would result if the Proposed Action were not implemented. The No Action Alternative forms the baseline from which the impacts of all other alternatives can be measured.

Selection of the No Action Alternative would generally be inconsistent with the BLM multiple use mission and policy of making public lands available for a variety of uses, provided these uses are conducted in an environmentally sound manner. The subject lands were not withdrawn for any special use, and were open unappropriated lands when unpatented mining claims were located.

Under the No Action Alternative, CGM would not expand operations on the Pipeline/South Pipeline ore body as currently defined, and one large pit lake would form at the end of mining in the Pipeline/South Pipeline open pit. CGM would continue operations at the Pipeline/South Pipeline Project, as previously approved. The No Action Alternative would result from the BLM disallowing the Pipeline/South Pipeline Pit Expansion Plan (CGM 2001a). The activities outlined in Chapter 2 of this SEIS describe the No Action Alternative. The area would remain available for future commercial gold processing or for other purposes, as approved by the BLM.

Alternatives Eliminated from Detailed Consideration

A number of alternatives were considered and eliminated from detailed consideration in the South Pipeline Final EIS (BLM 2000a, pages 3-32 through 3-35) and the Pipeline Final EIS (BLM 1996a, pages 2-41 through 2-47). They are incorporated by reference in this document.

Important Issues and Impact Conclusions

The environmental consequences of, mitigation measures for, and level of significance of the environmental consequences before and after mitigation for the Proposed Action and the alternatives are summarized in Table ES-1. Under the discussion of impacts for the Proposed Action in Table ES-1, unless otherwise specifically stated, the impacts are the same for all options included in the Proposed Action. Detailed discussions of the same topics are discussed in Chapter 4 of the SEIS.

BLM Preferred Alternative

Chapter V, Section B.2.b. of the BLM NEPA 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 which influence the decision or are required under another statutory authority."

Thus, the BLM has selected a Preferred Alternative based on the analysis in this Final SEIS, and this Preferred Alternative is the alternative that best fulfills the agency's statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors. The BLM has determined that the Preferred Alternative is the Proposed Action as outlined in Chapter 3, with the inclusion of the identified mitigation measures to the Proposed Action as specified in Chapter 4.

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Table ES-1: Summary of Potential Environmental Effects, Mitigation Measures, and Residual Impacts

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
		GEOLOGY AND MINERAL RESOURCES		
Issue:	Mineral Resources			
Impact:	**Impact 4.2.3.3.1-1:** Implementation of the Proposed Action would result in the production of approximately 6.5 million ounces of gold, negligible amounts of silver, and byproduct production of minor amounts of other metals.	**Impact 4.2.3.6.1-1:** Future mineral resource extraction would be restricted due to implementation of the No Action Alternative.	Similar to Proposed Action	Similar to Proposed Action
Level of Significance:	Potentially significant	Significant	Similar to Proposed Action	Similar to Proposed Action
Mitigation Measures:	None	None	Similar to Proposed Action	Similar to Proposed Action
Residual Impact:	None	None	Similar to Proposed Action	Similar to Proposed Action
Impact:	**Impact 4.2.3.3.1-2:** Future mineral resource extraction would be restricted due to placement of waste rock in the Pipeline/South Pipeline/Gap/Crossroads open pits.		Similar to Proposed Action	
Level of Significance:	Potentially significant		Similar to Proposed Action	
Mitigation Measures:	None		None	
Residual Impact:	None		None	
Issue:	Geologic Hazards			
Impact:	**Impact 4.2.3.3.2-1:** Minor slope failures would occur from seismic events in the Project Area.	Similar to Proposed Action	Similar to Proposed Action	Similar to Proposed Action
Level of Significance:	Less than significant	Similar to Proposed Action	Similar to Proposed Action	Similar to Proposed Action
Mitigation Measures:	None	Similar to Proposed Action	Similar to Proposed Action	Similar to Proposed Action
Residual Impact:	The potential residual impacts to geology and mineral resources from the Proposed Action are the same as those under the impacts discussion because no mitigation measures are either feasible or considered required.	Under the No Action Alternative, residual adverse impacts to mineral resources would occur because the identified mineral resource would not be developed.	The potential residual impacts to geology and mineral resources from the Complete Backfill Alternative are the same as those under the impacts discussion because no mitigation measures are either feasible or considered required.	Similar to Proposed Action
		WATER RESOURCES - WATER QUANTITY		
Issue:	Surface Water - Erosion, Sedimentation, and Flooding within Rerouted Drainages - Stages 11 and 12			
Impact:	**Impact 4.3.3.3.1-1:** Grading, earth moving, diversion of drainages, and placement of fill could accelerate erosion and sedimentation, and alter surface water flood runoff patterns during mining and post-closure.	**Impact 4.3.3.6-1:** Grading, earth moving, diversion of drainages, and placement of fill could accelerate erosion and sedimentation, and alter surface water flood runoff patterns during mining and post-closure.	**Impact 4.3.3.5-1:** Grading, earth moving, diversion of drainages, and placement of fill could accelerate erosion and sedimentation, and alter surface water flood runoff patterns during mining and post-closure.	**Impact 4.3.3.4-1:** Grading, earth moving, diversion of drainages, and placement of fill could accelerate erosion and sedimentation, and alter surface water flood runoff patterns during mining and post-closure.
Level of Significance:	Less than significant	Less than significant	Less than significant	Less than significant
Mitigation Measures:	None	None	None	None
Residual Impact:	None identified	None identified	None identified	None identified
Issue:	Surface Water - Effects of Drawdown on Streams and Springs - Stages 11 and 12			
Impact:	**Impact 4.3.3.3.1-2:** Mine dewatering is not expected to affect flows in streams. The drawdown under Stages 11 or 12 of the Proposed Action is modeled to be more than ten feet at four East Valley springs at ten years after the end of mining. In addition, two springs in the Toiyabe Catchment area are located close to the ten-foot drawdown contour and could potentially be impacted.	**Impact 4.3.3.6-2:** Mine dewatering is not expected to affect flows in any springs or streams. This section is included only for comparison to corresponding potential impacts listed in other sections and in the South Pipeline Final EIS (BLM 2000a).	**Impact 4.3.3.5-2:** Mine dewatering could potentially impact four springs which issue from the alluvial aquifer (in the East Valley Group). In addition, three bedrock-sourced springs in the Toiyabe Catchment area as well as an ephemeral stream (which flows over shallow bedrock) associated with water rights Nos. 41 and 42 are also located close enough to be of concern.	**Impact 4.3.3.4-2:** Mine dewatering could potentially impact four springs which issue from the alluvial aquifer (in the East Valley Group). In addition, four bedrock-sourced springs in the Toiyabe Catchment area as well as an ephemeral stream (which flows over shallow bedrock) associated with water rights Nos. 41 and 42 are also located close enough to be of concern.
Level of Significance:	The impacts are potentially significant at the six springs mentioned above, as predicted by more than ten feet of drawdown of the valley-fill aquifer in the ground water model. Although significant impacts are not predicted to occur in the other individual streams, springs, or spring groups, the uncertainty of predicting impacts to springs indicates a need for operational monitoring and contingent mitigation measures to be implemented if significant impacts occur. The uncertainty arises from the complex nature of ground water flow through fractured bedrock; the continued efficiency and ultimate locations of infiltration sites; and the assumptions used in the ground water model. If drawdown, reduced spring flows, or new ground water discharge areas are detected during mine operation, then mitigation measures would be implemented as described below.	By definition, there is no impact under the No Action Alternative.	If mitigation measures do not take place, the aforementioned four springs which issue from the alluvial aquifer in the East Valley Group may be impacted under the Complete Backfill Alternative. If such impact were to occur, the impact would be deemed potentially significant. In addition, if the flow were to substantially decrease in any of the three aforementioned bedrock-sourced springs in the Toiyabe Catchment or the nearby stream associated with water rights Nos. 41 and 42, the impact would be deemed potentially significant.	If mitigation measures do not take place, the aforementioned four springs which issue from the alluvial aquifer in the East Valley Group may be impacted under the No Backfill Alternative. If such impact were to occur, the impact would be deemed significant. In addition, if the flow were to substantially decrease in any of the four bedrock-sourced springs in the Toiyabe Catchment or the nearby stream associated with water right Nos. 41 and 42, the impact would be deemed potentially significant.

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
Mitigation Measures:	**Mitigation Measure 4.3.3.3.1-2a**: Monitoring of flows at streams and the 68 springs in the southern portion of Crescent Valley would be performed as dewatering progresses to assess whether the active infiltration areas are adequate to prevent potential impacts. Monitoring locations and monitoring frequency are summarized in the Pipeline Final EIS, Appendix D (BLM 1996a). Model simulations have indicated the ability to limit the extent of drawdown in the Crescent Valley alluvial aquifer through spatial variation of infiltration site locations and recharge volumes. Over time, the actual effectiveness of infiltration for recharging the alluvial aquifer as simulated will depend, in part, on the local hydraulic characteristics of the intervening soil sequences between the individual infiltration site and the aquifer area targeted for recharge. If monitoring shows that significant impacts are not mitigated by management of infiltration, then additional mitigation measures (including supplementing affected flows with mine water, installing wells at spring locations, or replacing affected water rights) would be implemented as described in the Integrated Monitoring Plan (WMC 1995b). **Mitigation Measure 4.3.3.3.1-2b**: It is possible that some impacts to springs may only occur after the end of mining, when the operational measures described above may not be available. In order to re-evaluate predictions for post-mining delayed impacts of drawdown, the ground water flow model would be updated during the final year of dewatering using actual field data for pumping rates, infiltration rates and locations, consumptive use, and observed drawdown. Streams and springs that are indicated to be significantly affected would be mitigated by one or more of the following measures, subject to approval of the BLM and NDWR: • Installation of a well and pump at affected spring locations to restore the historical yield of the spring. • Posting of an additional bond to provide for potentially affected water supplies in the future.	**Mitigation Measure 4.3.3.6-2a:** No mitigation is expected to be required. However, monitoring of flows at streams and the 68 springs in the Project Area shall be performed as dewatering progresses, and if necessary, mitigation shall be performed as described under Mitigation Measure 4.3.3.3.1-2a. **Mitigation Measure 4.3.3.6-2b:** No new impact is predicted under the No Action Alternative. However, it is possible that some impacts to springs may only occur after the end of mining, when the operational measures described under Mitigation Measure 4.3.3.3.1-2a may not be available. If such impacts were to occur, mitigation shall be performed as described under Mitigation Measure 4.3.3.3.1-2b.	**Mitigation Measure 4.3.3.5-2a:** Mitigation may be required for the four springs in the East Valley Group. Monitoring of flows at streams and the 68 springs in the Project Area shall be performed as dewatering progresses, and if necessary, mitigation would be performed as described under Mitigation Measure 4.3.3.3.1-2a. **Mitigation Measure 4.3.3.5-2b:** Under the Complete Backfill Alternative it is possible that some impacts to springs or streams may only occur after the end of mining, when the operational measures described under Mitigation Measure 4.3.3.3.1-2a may not be available. If such impacts were to occur, mitigation shall be performed as described under Mitigation Measure 4.3.3.3.1-2b.	**Mitigation Measure 4.3.3.4-2a:** Mitigation may be required for the four springs in the East Valley Group. Monitoring of flows at streams and the 68 springs in the Project Area shall be performed as dewatering progresses, and, if necessary, mitigation would be performed as described under Mitigation Measure 4.3.3.3.1-2a. **Mitigation Measure 4.3.3.4-2b:** Under the No Backfill Alternative it is possible that some impacts to springs or streams may only occur after the end of mining when the operational measures described under Mitigation Measure 4.3.3.3.1-2a may not be available. If such impacts were to occur, mitigation shall be performed as described under Mitigation Measure 4.3.3.3.1-2b.
Residual Impact:	None identified	None identified	None identified	None identified
Issue:	Surface Water - Erosion, Sedimentation, and Flooding Within Rerouted Drainages - Stage 8			
Impact:	**Impact 4.3.3.3.2-1:** Grading, earth moving, diversion of drainages, and placement of fill could accelerate erosion and sedimentation, and alter surface water flood runoff patterns during mining and post-closure.			
Level of Significance:	Less than significant			
Mitigation Measures:	None			
Residual Impact:	None identified			
Issue:	Surface Water - Effects of Drawdown on Streams and Springs - Stage 8			
Impact:	**Impact 4.3.3.3.2-2:** Mine dewatering is not expected to affect flows in any springs or streams under Stage 8 of the Proposed Action.			
Level of Significance:	No impact is expected under Stage 8 of the Proposed Action. However, if the flow of the springs or streams substantially decreases due to dewatering activities, the impact would be deemed potentially significant.			
Mitigation Measures:	**Mitigation Measure 4.3.3.3.2-2a:** No mitigation is expected to be required. However, monitoring of flows at streams and the 68 springs in the southern portion of Crescent Valley would be performed as dewatering progresses, and, if necessary, mitigation would be performed as described under Mitigation Measure 4.3.3.3.1-2a. **Mitigation Measure 4.3.3.3.2-2b:** No mitigation is expected to be required because no impact is predicted under Stage 8 of the Proposed Action. However, it is possible that some impacts to springs may only occur after the end of mining, when the operational measures described under Mitigation Measure 4.3.3.3.1-2a may not be available. If such impacts were to occur, mitigation would be performed as described under Mitigation Measure 4.3.3.3.1-2b.			
Residual Impact:	None identified			
Issue:	Surface Water - Erosion, Sedimentation, and Flooding Within Rerouted Drainages - Stage 9			
Impact:	**Impact 4.3.3.3.3-1:** Grading, earth moving, diversion of drainages, and placement of fill could accelerate erosion and sedimentation, and alter surface water flood runoff patterns during mining and post-closure.			
Level of Significance:	Less than significant			
Mitigation Measures:	None			
Residual Impact:	None identified			
Issue:	Surface Water - Effects of Drawdown on Streams and Springs - Stage 9			
Impact:	Impact 4.3.3.3.3-2: Mine dewatering is not expected to affect flows in any springs or streams under Stage 9 of the Proposed Action. Therefore, no impact is expected.			
Level of Significance:	No impact is expected under Stage 9 of the Proposed Action. However, if the flow of the springs or streams is substantially decreased due to dewatering activities, the impact would be deemed potentially significant.			

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
Mitigation Measures:	**Mitigation Measure 4.3.3.3.3-2a:** No mitigation is expected to be required. However, monitoring of flows at streams and the 68 springs in the Project Area would be performed as dewatering progresses. If necessary, mitigation would be performed as described under Mitigation Measure 4.3.3.3.1-2a. **Mitigation Measure 4.3.3.3.3-2b:** No mitigation is expected to be required because no impact is predicted under Stage 9 of the Proposed Action. However, it is possible that some impacts to springs or streams may only occur after the end of mining when the operational measures described under Mitigation Measure 4.3.3.3.1-2a may not be available. If such impacts were to occur, mitigation would be performed as described under Mitigation Measure 4.3.3.3.1-2b.			
Residual Impact:	None identified			
Issue:	Surface Water - Erosion, Sedimentation, and Flooding Within Rerouted Drainages - Stage 10			
Impact:	**Impact 4.3.3.3.4-1:** Grading, earth moving, diversion of drainages, and placement of fill could accelerate erosion and sedimentation, and alter surface water flood runoff patterns during mining and post-closure.			
Level of Significance:	Less than significant			
Mitigation Measures:	None			
Residual Impact:	None identified			
Issue:	Surface Water - Effects of Drawdown on Streams and Springs - Stage 10			
Impact:	**Impact 4.3.3.3.4-2:** Mine dewatering could potentially impact three springs which issue from the alluvial aquifer (in the East Valley Group). In addition, three bedrock-sourced springs in the Toiyabe Catchment area as well as an ephemeral stream (which flows over shallow bedrock) associated with water rights 41 and 42 are located close enough to be of concern.			
Level of Significance:	If mitigation measures do not take place, the aforementioned three springs which issue from the alluvial aquifer in the East Valley Group may be impacted under Stage 10 of the Proposed Action.Such impact would be deemed significant. In addition, if either any of the three aforementioned bedrock-sourced springs in the Toiyabe Catchment or the nearby stream associated with water right Nos. 41 and 42 substantially decreased in flow, the impact would be deemed potentially significant.			
Mitigation Measures:	**Mitigation Measure 4.3.3.3.4-2a:** Mitigation may be required for the three springs in the East Valley Group. Monitoring of flows at streams and the 68 springs in the southern portion of Crescent Valley shall be performed as dewatering progresses, and if necessary, mitigation shall be performed as described under Mitigation Measure 4.3.3.3.1-2a. **Mitigation Measure 4.3.3.3.4-2b:** Under Stage 10 of the Proposed Action, it is possible that some impacts to springs or streams may only occur after the end of mining when the operational measures described under Mitigation Measure 4.3.3.3.1-2a may not be available. If such impacts were to occur, mitigation shall be performed as described under Mitigation Measure 4.3.3.3.1-2b.			
Residual Impact:	None identified			
Issue:	Ground Water - Consumptive Losses - Stages 11 and 12			
Impact:	**Impact 4.3.3.3.1-3:** Consumptive use of water by evaporation during mining and delivery of water to the Dean Ranch for irrigation would support a beneficial use and would not be expected to adversely impact water resources; CGM would have adequate water rights to cover the consumptive use. Evaporation of 1,023 (Stage 12) to 1,043 (Stage 11) acre-feet per year from the post-mining pit lake would continue into the foreseeable future after the mine has closed, a decrease compared to the No Action Alternative. Hence, there is a positive impact compared to the No Action Alternative.	**Impact 4.3.3.6-3:** Consumptive use of water by evaporation during mining and delivery of water to the Dean Ranch for irrigation would support a beneficial use and would not be expected to adversely impact water resources; CGM would have adequate water rights to cover the consumptive use. Evaporation of 1,304 acre-feet per year from the post-mining pit lake would continue into the foreseeable future after the mine has closed. This is 281 acre-feet per year greater than Stage 12 of the Proposed Action.	**Impact 4.3.3.5-3:** Consumptive use of water by evaporation during mining and delivery of water to the Dean Ranch for irrigation would support a beneficial use and would not be expected to adversely impact water resources; CGM would have adequate water rights to cover the consumptive use. Evaporation of 911 acre-feet per year from the post-mining pit lake would continue into the foreseeable future after the mine has closed. This is 112 acre-feet per year less than Stage 12 of the Proposed Action, and 393 acre-feet per year less than the No Action Alternative. Hence, there is a positive impact compared to the No Action Alternative.	**Impact 4.3.3.4-3:** Consumptive use of water by evaporation during mining and delivery of water to the Dean Ranch for irrigation would support a beneficial use and would not be expected to adversely impact water resources; CGM would have adequate water rights to cover the consumptive use. Evaporation of 2,537 acre-feet per year from the post-mining pit lake would continue into the foreseeable future after the mine has closed. This is 1,514 acre-feet per year more than Stage 12 of the Proposed Action, and 1,233 acre-feet per year more than the No Action Alternative.
Level of Significance:	There is a positive impact compared to the No Action Alternative.	Impacts during the active mine life are less than significant. After mining ceases, direct impacts of evaporation do not result in significant impacts; however, the long-term consumptive use of water resources that do not contribute to beneficial use is considered a significant impact.	Impacts during the active mine life are less than significant. After mining ceases, direct impacts of evaporation do not result in significant impacts; however, the long-term consumptive use of water resources that do not contribute to beneficial use is considered a significant impact for which no mitigation measures appear to be feasible. Again, under the Complete Backfill Alternative there will be a positive impact compared to the No Action Alternative.	Impacts during the active mine life are less than significant. After mining ceases, direct impacts of evaporation do not result in significant impacts; however, the long-term consumptive use of water resources that do not contribute to beneficial use is considered a significant impact for which no mitigation measures appear to be feasible.
Mitigation Measures:		None	None	None
Residual Impact:	None identified	None identified	None identified	None identified

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
Issue:	Ground Water -Pit Dewatering - Impacts to Water Rights - Stages 11 and 12			
Impact:	**Impact 4.3.3.3.1-4:** Except for those controlled by CGM, no active water rights are located within the modeled ten-foot drawdown area of the valley-fill aquifer other than those already predicted (No Action Alternative) to be significantly affected.	**Impact 4.3.3.6-4:** No active water rights are located within the predicted area of the modeled ten-foot drawdown of the valley-fill aquifer. However, there are four inactive water wells.	**Impact 4.3.3.5-4:** Drawdown under the Complete Backfill Alternative was predicted to exceed ten feet for 12 water rights, four of which are inactive wells (Nos. 1, 2, 9, and 10), and eight of which are controlled by the applicant (Nos. 4, 36, 38, 39, 40, 41, 42, and 45).	**Impact 4.3.3.4-4:** Drawdown under the No Backfill Alternative was predicted to exceed ten feet for 16 water rights, five of which are inactive wells (Nos. 1, 2, 8, 9, and 10), and ten of which are controlled by the applicant (Nos. 4, 5, 6, 36, 38, 39, 40, 41, 42, and 45). Only one active well not controlled by the applicant appears to have the potential to be impacted (No. 3 Filippini).
Level of Significance:	Impacts to the inactive wells are not considered significant until such time as the water rights holder chooses to utilize his rights, at which time impacts would be considered potentially significant. Impacts to well No. 4 and the four water rights for springs numbered 36, 38, 39, and 40 are not considered significant because they are controlled by CGM. Any potential impacts would become less than significant after implementation of the following mitigation measures:	Impacts to the inactive wells are not considered significant until such time as the water rights holder chooses to utilize his rights, at which time they would be considered potentially significant. The impacts would become less than significant after implementation of the mitigation measures described below.	Potential impacts to water rights (Nos. 4, 36, 38, 39, 40, 41, 42 and 45) are not deemed significant because they are controlled by the applicant. Impacts to the inactive wells are not considered significant until such time as the water rights holder chooses to utilize his rights, at which time they would be considered potentially significant. The impacts would become less than significant after implementation of the mitigation measures described below.	Impacts to water rights Nos. 4, 5, 6, 36, 38, 39, 40, 41, 42, and 45 are not deemed significant because they are controlled by the applicant. Impacts to the inactive wells are not considered significant until such time as the water rights holder chooses to utilize his rights, at which time they would be considered potentially significant. The impact to water rights No. 3 (Filippini) is potentially significant. The impacts would become less than significant after implementation of the mitigation measures described below.
Mitigation Measures:	**Mitigation Measure 4.3.3.3.1-4a:** As part of the comprehensive monitoring program, CGM would be responsible for monitoring ground water rights, surface water rights, and ground water levels between the mine and water supply wells. Adverse impacts to water wells and water rights would be mitigated as required by the NDWR. Mitigation of impacts to wells could include lowering the pump, deepening an existing well, drilling a new well for water supply wells, or providing a replacement water supply of equivalent yield and general water quality. Mitigation for surface water rights could require providing a replacement water supply of equivalent yield and general water quality. **Mitigation Measure 4.3.3.3.1-4b:** The operational measures described above may not be available for significant impacts to wells when such impacts are not predicted to occur until after the end of mining. In order to re-evaluate predictions for post-mining delayed impacts of drawdown, the ground water flow model would be updated during the final year of dewatering using actual field data for pumping rates, infiltration rates and locations, consumptive use, and observed drawdown. Active water rights not controlled by CGM that are indicated to be significantly affected would then be mitigated by one or more of the following measures, subject to approval of the BLM and NDWR: • Replacement or purchase of the affected water right by the applicant. • Installation of a deeper well and pump at affected locations to restore the historical yield of the well. • Posting of an additional bond to provide for potential future impacts to potentially affected water supplies.	**Mitigation Measure 4.3.3.6-4a:** As part of the comprehensive monitoring program, CGM would be responsible for monitoring ground water rights, surface water rights, and ground water levels between the mine and water supply wells. Adverse impacts to water wells and water rights shall be mitigated as required by the NDWR. Mitigation of impacts to wells could include lowering the pump, deepening an existing well, drilling a new well for water supply wells, or providing a replacement water supply of equivalent yield and general water quality. Mitigation for surface water rights could require providing a replacement water supply of equivalent yield and general water quality. **Mitigation Measure 4.3.3.6-4b:** The operational measures described above may not be available for significant impacts to wells when such impacts are not predicted to occur until after the end of mining. In order to re-evaluate predictions for post-mining delayed impacts of drawdown, the ground water flow model shall be updated during the final year of dewatering using actual field data for pumping rates, infiltration rates and locations, consumptive use, and observed drawdown. Wells with active water rights that are indicated to be significantly affected shall then be mitigated by one or more of the following measures, subject to approval of the BLM and NDWR: • Replacement or purchase of the affected water right by the applicant. • Installation of a deeper well and pump at affected locations to restore the historical yield of the well. • Posting of an additional bond to provide for potential future impacts to potentially affected water supplies.	**Mitigation Measure 4.3.3.5-4a:** As part of the comprehensive monitoring program, CGM shall be responsible for monitoring ground water rights, surface water rights, and ground water levels between the mine and water supply wells. Adverse impacts to water wells and water rights would be mitigated as required by the NDWR. Mitigation of impacts to wells could include lowering the pump, deepening an existing well, drilling a new well for water supply wells, or providing a replacement water supply of equivalent yield and general water quality. Mitigation for surface water rights could require providing a replacement water supply of equivalent yield and general water quality. **Mitigation Measure 4.3.3.5-4b:** The operational measures described above may not be available for any significant impacts to wells when such impacts do not occur until after the end of mining. In order to re-evaluate predictions for post-mining delayed impacts of drawdown, the ground water flow model shall be updated during the final year of dewatering using actual field data for pumping rates, infiltration rates and locations, consumptive use, and observed drawdown. Active water rights not owned by the applicant that are indicated to be significantly affected shall then be mitigated by one or more of the following measures, subject to approval of the BLM and NDWR: • Replacement or purchase of the affected water right by the applicant. • Installation of a deeper well and pump at affected locations to restore the historical yield of the well. • Posting of an additional bond to provide for potential future impacts to potentially affected water supplies.	**Mitigation Measure 4.3.3.4-4a:** As part of the comprehensive monitoring program, CGM would be responsible for monitoring ground water rights, surface water rights, and ground water levels between the mine and water supply wells. Adverse impacts to water wells and water rights would be mitigated as required by the NDWR. Mitigation of impacts to wells could include lowering the pump, deepening an existing well, drilling a new well for water supply wells, or providing a replacement water supply of equivalent yield and general water quality. Mitigation for surface water rights could require providing a replacement water supply of equivalent yield and general water quality. **Mitigation Measure 4.3.3.4-4b:** The operational measures described above may not be available for any significant impacts to wells when such impacts do not occur until after the end of mining. In order to re-evaluate predictions for post-mining delayed impacts of drawdown, the ground water flow model shall be updated during the final year of dewatering using actual field data for pumping rates, infiltration rates and locations, consumptive use, and observed drawdown. Active water rights not owned by the applicant that are indicated to be significantly affected shall then be mitigated by one or more of the following measures, subject to approval of the BLM and NDWR: • Replacement or purchase of the affected water right by the applicant. • Installation of a deeper well and pump at affected locations to restore the historical yield of the well. • Posting of an additional bond to provide for potential future impacts to potentially affected water supplies.
Residual Impact:	None identified	None identified	None identified	None identified
Issue:	Ground Water -Pit Dewatering - Ground Water Flow to Humboldt River - Stages 11 and 12			
Impact:	**Impact 4.3.3.3.1-5:** Modeling of ground water flow from Crescent Valley to the Humboldt River indicates no impact compared to the No Action Alternative, and only a very slight reduction (nine acre-feet per year) compared to pre-mining conditions.	**Impact 4.3.3.6-5:** Modeling indicates that a very slight reduction of ground water flow (nine acre-feet per year) from Crescent Valley to the Humboldt River would occur (compared to pre-mining conditions).	**Impact 4.3.3.5-5:** Modeling of ground water flow from Crescent Valley to the Humboldt River indicates no impact compared to the No Action Alternative and only a very slight reduction of ground water flow (nine acre-feet per year) compared to pre-mining conditions.	**Impact 4.3.3.4-5:** Modeling indicates that a very slight reduction of ground water flow (nine acre-feet per year) from Crescent Valley to the Humboldt River would occur.
Level of Significance:	Less than significant	Less than significant	Less than significant	Less than significant
Mitigation Measures:	None	None	None	None
Residual Impact:	None identified	None identified	None identified	None identified

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
Issue:	Ground Water - Potential Impacts Due to Subsidence - Stages 11 and 12			
Impact:	**Impact 4.3.3.3.1-6:** A small change in aquifer characteristics is expected to result from compaction of the aquifer materials. Ground subsidence of up to approximately one foot would occur up to six miles east of the open pit. Subsidence of up to two feet is expected to occur up to four miles southeast of the open pit. The subsidence would result primarily from a permanent reduction in porosity in the finer grained sediments (clays and silty clays), which are not the primary water-bearing materials in the alluvial aquifer.	**Impact 4.3.3.6-6:** A small change in aquifer characteristics is expected to result from compaction of the aquifer materials. Ground subsidence of up to approximately one foot would occur up to approximately two miles east of the open pit, and up to approximately four miles south of the open pit. The subsidence would result primarily from a permanent reduction in porosity in the finer grained sediments (clays and silty clays), which are not the primary water-bearing materials in the alluvial aquifer.	**Impact 4.3.3.5-6:** A small change in aquifer characteristics is expected to result from compaction of the aquifer materials. The compaction would result primarily from a permanent reduction in porosity in the finer grained sediments (clays and silty clays), which are not the primary water-bearing materials in the alluvial aquifer.	**Impact 4.3.3.4-6:** A small change in aquifer characteristics is expected to result from compaction of the aquifer materials. The compaction would result primarily from a permanent reduction in porosity in the finer grained sediments (clays and silty clays), which are not the primary water-bearing materials in the alluvial aquifer.
Level of Significance:	The potential for the aquifer to transmit or store water is not expected to be significantly affected. The incremental impact and the cumulative impact are considered less than significant.	The potential for the aquifer to transmit or store water is not expected to be affected. The incremental impact and the cumulative impact are considered less than significant	The potential for the aquifer to transmit or store water is not expected to be measurably affected. The incremental impact and the cumulative impact are considered less than significant.	The potential for the aquifer to transmit or store water is not expected to be measurably affected. The incremental impact and the cumulative impact are considered less than significant.
Mitigation Measures:	None	None	None	None
Residual Impact:	None identified	None identified	None identified	None identified
Issue:	Ground Water - Potential For Significant Land Surface Alterations - Stages 11 and 12			
Impact:	**Impact 4.3.3.3.1-7a**: Differential subsidence could result in the development of fissures. Capture of surface runoff by the fissures may form erosional fissure gullies, which represent a safety risk to wildlife, livestock, and people.	**Impact 4.3.3.6-7a:** Differential subsidence could result in the development of fissures. Capture of surface runoff by the fissures may form erosional fissure gullies, which represent a safety risk to wildlife, livestock, and people.	**Impact 4.3.3.5-7a:** Differential subsidence could result in the development of fissures. Capture of surface runoff by the fissures may form erosional fissure gullies, which represent a safety risk to wildlife, livestock, and people.	**Impact 4.3.3.4-7a:** Differential subsidence could result in the development of fissures. Capture of surface runoff by the fissures may form erosional fissure gullies, which represent a safety risk to wildlife, livestock, and people.
Level of Significance:	The impact would be significant if fissure gullies were to form.	The impact would be significant if fissure gullies were to form.	The impact would be significant if fissure gullies were to form.	The impact would be significant if fissures gullies were to form.
Mitigation Measures:	A monitoring program as described in Section 2.3.2.2.10 (CGM 2004) shall be implemented to specifically watch for fissure development. If fissure gullies form, they shall be filled in with clean, coarse-grained alluvium within a reasonable amount of time. The intent of using coarse-grained (permeable) backfill is to provide a rapid means of dissipation for any surface water entering the fissure. While the mine is in operation, the necessary earth moving equipment shall be readily available and shall be used to fill any fissures within two weeks of the date that such a fissure gully is observed. After reclamation has reached the stage where earth moving equipment is no longer on site, fissure gullies shall be filled within one month of the date when any such fissure gullies are observed.	A monitoring program as described in Amec (2003) shall be implemented to specifically watch for fissure gully development. If fissure gullies form, they shall be filled in with clean, coarse-grained alluvium within a reasonable amount of time. The intent of using coarse-grained (permeable) backfill is to provide a rapid means of dissipation for any surface water entering the fissure. While the mine is in operation, the necessary earth moving equipment shall be readily available and shall be used to fill any fissures within two weeks of the date that such a fissure gully is observed. After reclamation has reached the stage where earth moving equipment is no longer on site, fissures shall be filled within one month of the date when any such fissure gullies are observed.	A monitoring program as described in Amec (2003) shall be implemented to specifically watch for fissure gully development. If fissure gullies form, they shall be filled in with clean, coarse-grained alluvium within a reasonable amount of time. The intent of using coarse-grained (permeable) backfill is to provide a rapid means of dissipation for any surface water entering the fissure. While the mine is in operation, the necessary earth moving equipment shall be readily available and shall be used to fill any fissures within two weeks of the date that such a fissure gully is observed. After reclamation has reached the stage where earth moving equipment is no longer on site, fissures shall be filled within one month of the date when any such fissure gullies are observed.	A monitoring program as described in Amec (2003) shall be implemented to specifically watch for fissure gully development. If fissure gullies form, they shall be filled in with clean, coarse-grained alluvium within a reasonable amount of time. The intent of using coarse-grained (permeable) backfill is to provide a rapid means of dissipation for any surface water entering the fissure. While the mine is in operation, the necessary earth moving equipment shall be readily available and shall be used to fill any fissures within two weeks of the date that such a fissure gully is observed. After reclamation has reached the stage where earth moving equipment is no longer on site, fissures shall be filled within one month of the date when any such fissure gullies are observed.
Residual Impact:	None identified	None identified	None identified	None identified
Impact:	**Impact 4.3.3.3.1-7b:** Differential subsidence could result in deep fissures which could allow degradation of waters of the state by causing a release of process components to the aquifer. Fissures forming in the immediate vicinity of heap leach facilities (e.g., pads, solution ponds, or the plant) or chemical/hydrocarbon storage facilities could result in damage and a consequent release to the environment. Fissures could provide a preferential flow path for the migrating solutions.	**Impact 4.3.3.6-7b:** Differential subsidence could result in deep fissures which could allow degradation of waters of the state by causing a release of mining process components, chemicals, or hydrocarbons directly to the aquifer. Fissures forming in the immediate vicinity of heap leach facilities (e.g., pads, solution ponds, or the plant) or chemical/hydrocarbon storage facilities could result in damage anda consequent release to the environment. Such a release of process components or other materials could potentially reach the aquifer through openings along the subsidence-induced fissuring.	**Impact 4.3.3.5-7b:** Differential subsidence could result in deep fissures which could allow degradation of waters of the state by causing a release of mining process components, chemicals, or hydrocarbons directly to the aquifer. Fissures forming in the immediate vicinity of heap leach facilities (e.g., pads, solution ponds, or the plant) or chemical/hydrocarbon storage facilities could result in damage and a consequent release to the environment. Such a release of process components or other materials could potentially reach the aquifer through openings along the subsidence-induced fissuring.	**Impact 4.3.3.4-7b:** Differential subsidence could result in deep fissures which could allow degradation of waters of the state by causing a release of mining process components, chemicals, or hydrocarbons directly to the aquifer. Fissures forming in the immediate vicinity of heap leach facilities (e.g., pads, solution ponds, or the plant) or chemical/hydrocarbon storage facilities could result in damage and a consequent release to the environment. Such a release of process components or other materials could potentially migrate directly to the aquifer through subsidence-induced fissures.
Level of Significance:	The impact would be significant if fissure gullies were to form immediately adjacent to, or beneath engineered Project components that manage process solutions.	The impact would be significant if fissure gullies were to form immediately adjacent to, or beneath engineered Project components that manage process solutions.	The impact would be significant if fissure gullies were to form immediately adjacent to, or beneath engineered Project components that manage process solutions.	The impact would be significant if fissure gullies were to form immediately adjacent to, or beneath engineered Project components that manage process solutions.
Mitigation Measures:	CGM shall continue to implement the fissure monitoring program and shall incorporate language in to the existing $1,250,000 long-term trust fund that will include any long-term mitigation of post-closure fissure development.	Mitigation of the impact is same as the mitigation measures described for Impact 4.3.3.3.1-7b.	Mitigation of the impact is same as the mitigation measures described for Impact 4.3.3.3.1-7b.	Mitigation of the impact is the same as the mitigation measures described for Impact 4.3.3.3.1-7b.
Residual Impact:	None identified	None identified	None identified	None identified
Issue:	Ground Water - Consumptive Losses - Stage 8			
Impact:	**Impact 4.3.3.3.2-3:** Consumptive use of water by evaporation during mining and delivery of water to the Dean Ranch for irrigation would support a beneficial use, and would not be expected to adversely impact water resources; CGM would have adequate water rights to cover the consumptive use. Evaporation of 1,087 acre-feet per year from the post-mining pit lake would continue into the foreseeable future after the mine has closed. This amount is 64 acre-feet per year greater than Stage 12 of the Proposed Action, and approximately 217 acre-feet per year less than the No Action Alternative. Hence, there is a positive impact compared to the No Action Alternative.			
Level of Significance:	Impacts during the active mine life are less than significant. While post-mining evaporation does not result in significant impacts, long-term consumptive use of water resources that do not contribute to beneficial use is considered a significant impact for which no mitigation measures appear to be feasible. However, there is a positive impact compared to the No Action Alternative.			

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
Mitigation Measures:	None			
Residual Impact:	None identified			
Issue:	Ground Water - Impacts to Water Rights - Stage 8			
Impact:	**Impact 4.3.3.3.2-4:** No non-CGM active water rights are located within the predicted area of the modeled ten-foot drawdown of the valley-fill aquifer. However, there are four inactive water wells and a water right (No. 4) owned by the applicant. Effects are generally similar to the No Action Alternative.			
Level of Significance:	Impacts to the inactive wells are not considered significant until such time as the water rights holder chooses to utilize his rights, at which time they would be considered potentially significant. The impacts would become less than significant after implementation of the mitigation measures described below.			
Mitigation Measures:	**Mitigation Measure 4.3.3.3.2-4a:** As part of the comprehensive monitoring program, CGM would be responsible for monitoring ground water rights, surface water rights, and ground water levels between the mine and water supply wells. Adverse impacts to water wells and water rights would be mitigated as required by the NDWR. Mitigation of impacts to wells could include lowering the pump, deepening an existing well, drilling a new well for water supply wells, or providing a replacement water supply of equivalent yield and general water quality. Mitigation for surface water rights could require providing a replacement water supply of equivalent yield and general water quality. **Mitigation Measure 4.3.3.3.2-4b:** The operational measures described above may not be available for mitigation of post-mining significant impacts to wells. In order to re-evaluate predictions for post-mining delayed impacts of drawdown, the ground water flow model would be updated during the final year of dewatering using actual field data for pumping rates, infiltration rates and locations, consumptive use, and observed drawdown. Active water rights not owned by the applicant that are indicated to be significantly affected would then be mitigated by one or more of the following measures, subject to approval of the BLM and NDWR: • Replacement or purchase of the affected water right by the applicant. • Installation of a deeper well and pump at affected locations to restore the historical yield of the well. • Posting of an additional bond to provide for potential future impacts to potentially affected water supplies.			
Residual Impact:	None identified			
Issue:	Ground Water Flow to Humboldt River - Stage 8			
Impact:	**Impact 4.3.3.3.2-5:** Modeling of ground water flow from Crescent Valley to the Humboldt River indicates that there will be a very slight reduction of ground water flow (nine acre-feet per year compared to pre-mining, or one acre-foot per year compared to the No Action Alternative).			
Level of Significance:	Less than significant			
Mitigation Measures:	None			
Residual Impact:	None identified			
Issue:	Ground Water - Potential Impacts Due to Subsidence - Stage 8			
Impact:	**Impact 4.3.3.3.2-6:** A small change in aquifer characteristics is expected to result from compaction of the aquifer materials. Ground subsidence of up to approximately one foot would occur up to 3.5 miles southeast of the open pit, and up to approximately four miles south of the open pit (Figure 4.3.29). A subsidence of two feet would extend as far as two miles south of the open pit. The subsidence would result primarily from a permanent reduction in porosity in the finer grained sediments (clays and silty clays), which are not the primary water-bearing materials in the alluvial aquifer.			
Level of Significance:	The potential for the aquifer to transmit or store water is not expected to be significantly affected. The incremental impact and the cumulative impact are considered less than significant .			
Mitigation Measures:	None			
Residual Impact:	None identified			
Impact:	**Impact 4.3.3.3.2-7a:** Differential subsidence could result in the development of fissures. Capture of surface runoff by the fissures may form erosional fissure gullies, which represent a safety risk to wildlife, livestock and people.			
Level of Significance:	The impact would be significant if fissure gullies were to form.			
Mitigation Measures:	A monitoring program as described in Section 2.3.2.2.10 (CGM 2004) shall be implemented to specifically watch for fissure gully development. If fissure gullies form, they shall be filled in with clean, coarse-grained alluvium within a reasonable amount of time. The intent of using coarse-grained (permeable) backfill is to provide a rapid means of dissipation for any surface water entering the fissure. While the mine is in operation, the necessary earth moving equipment shall be readily available and shall be used to fill any fissure gullies within two weeks of the date that such a fissure gully is observed. After reclamation has reached the stage where earth moving equipment is no longer on site, fissure gullies shall be filled within one month of the date when any such fissure gullies are observed.			
Residual Impact:	None identified			

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
Impact:	**Impact 4.3.3.3.2-7b:** Differential subsidence could result in deep fissures which could allow degradation of waters of the state by causing a release from process components. Fissures forming in the immediate vicinity of heap leach facilities (e.g., pads, solution ponds, or the plant) or chemical/hydrocarbon storage facilities could result in damage and a consequent release to the environment. Fissures could provide a preferential flow path for the migrating solutions.			
Level of Significance:	The impact would be significant if fissure gullies were to form immediately adjacent to, or beneath engineered Project components that manage process solutions.			
Mitigation Measures:	Mitigation of the impact is the same as the mitigation measures described for Impact 4.3.3.3.1-7b.			
Residual Impact:	None identified			
Issue:	Ground Water - Consumptive Losses - Stage 9			
Impact:	**Impact 4.3.3.3.3-3:** Consumptive use of water by evaporation during mining and delivery of water to the Dean Ranch for irrigation would support a beneficial use and would not be expected to adversely impact water resources; CGM would have adequate water rights to cover the consumptive use. Evaporation of 1,256 acre-feet per year from the post-mining pit lake would continue into the foreseeable future after the mine has closed. This amount is 233 acre-feet per year greater than Stage 12 of the Proposed Action, and 48 acre-feet per year less than the No Action Alternative. Hence, there is a slightly positive impact compared to the No Action Alternative.			
Level of Significance:	Impacts during the active mine life are less than significant. While post-mining evaporation does not result in significant impacts, long-term consumptive use of water resources that do not contribute to beneficial use is considered a significant impact for which no mitigation measures appear to be feasible. However, there is a positive impact compared to the No Action Alternative.			
Mitigation Measures:	None			
Residual Impact:	None identified			
Issue:	Ground Water -Pit Dewatering - Impacts to Water Right - Stage 9			
Impact:	**Impact 4.3.3.3.3-4:** No active non-CGM water rights are located within the predicted area of the modeled ten-foot drawdown of the valley-fill aquifer. However, there are four inactive water wells.			
Level of Significance:	Impacts to the inactive wells are not considered significant until such time as the water rights holder chooses to utilize his rights, at which time the impacts would be considered potentially significant. The impacts would become less than significant after implementation of the mitigation measures described below. Potential impacts to water rights owned by the applicant are not deemed significant.			
Mitigation Measures:	**Mitigation Measure 4.3.3.3.3-4a:** As part of the comprehensive monitoring program, CGM shall be responsible for monitoring ground water rights, surface water rights, and ground water levels between the mine and water supply wells. Adverse impacts to water wells and water rights shall be mitigated as required by the NDWR. Mitigation of impacts to wells could include lowering the pump, deepening an existing well, drilling a new well for water supply wells, or providing a replacement water supply of equivalent yield and general water quality. Mitigation of surface water rights could require providing a replacement water supply of equivalent yield and general water quality. **Mitigation Measure 4.3.3.3.3-4b:** The operational measures described above may not be available for mitigation of post-mining significant impacts to wells. In order to re-evaluate predictions for post-mining delayed impacts of drawdown, the ground water flow model shall be updated during the final year of dewatering using actual field data for pumping rates, infiltration rates and locations, consumptive use, and observed drawdown. Active water rights not owned by the applicant that are indicated to be significantly affected shall then be mitigated by one or more of the following measures, subject to approval of the BLM and NDWR: • Replacement or purchase of the affected water right by the applicant. • Installation of a deeper well and pump at affected locations to restore the historical yield of the well. • Posting of an additional bond to provide for potential future impacts to potentially affected water supplies.			
Residual Impact:	None identified			
Issue:	Ground Water -Pit Dewatering - Ground Water Flow to Humboldt River - Stage 9			
Impact:	**Impact 4.3.3.3.3-5:** Modeling of ground water flow from Crescent Valley to the Humboldt River indicates that a very slight reduction of ground water flow (nine acre-feet per year) would occur compared to pre-mining conditions. The estimated difference between Stage 9 and the No Action Alternative is one acre-foot per year.			
Level of Significance:	Less than significant			
Mitigation Measures:	None			
Residual Impact:	None identified			

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
Issue:	Ground Water - Subsidence -Potential for Changes to Aquifer Productivity - Stage 9			
Impact:	**Impact 4.3.3.3.3-6:** A small change in aquifer characteristics is expected to result from compaction of the aquifer materials. Ground subsidence of up to approximately one foot would occur up to four miles southeast of the open pit, and up to approximately four miles south of the open pit (Figure 4.3.32). A subsidence of two feet would extend as far as two miles south of the open pit. The subsidence would result primarily from a permanent reduction in porosity in the finer grained sediments (clays and silty clays), which are not the primary water-bearing materials in the alluvial aquifer.			
Level of Significance:	The potential for the aquifer to transmit or store water is not expected to be significantly affected. The incremental impact and the cumulative impact are considered less than significant.			
Mitigation Measures:	None			
Residual Impact:	None identified			
Issue:	Ground Water - Subsidence -Potential For Significant Land Surface Alterations - Stage 9			
Impact:	**Impact 4.3.3.3.3.-7a:** Differential subsidence could result in the development of fissures. Capture of surface runoff by the fissures may form erosional fissure gullies, which represent a safety risk to wildlife, livestock and people.			
Level of Significance:	The impact would be significant if fissure gullies were to form.			
Mitigation Measures:	A monitoring program as described in Section 2.3.2.2.10 (CGM 2004) shall be implemented to specifically watch for fissure gully development. If fissure gullies form, they shall be filled in with clean, coarse-grained alluvium within a reasonable amount of time. The intent of using coarse-grained (permeable) backfill is to provide a rapid means of dissipation for any surface water entering the fissure. While the mine is in operation, the necessary earth moving equipment shall be readily available and shall be used to fill any fissure gullies within two weeks of the date that such a fissure gully is observed. After reclamation has reached the stage where earth moving equipment is no longer on site, fissure gullies shall be filled within one month of the date when any such fissure gullies are observed.			
Residual Impact:	None identified			
Impact:	**Impact 4.3.3.3.3-7b:** Differential subsidence could result in deep fissures which could allow degradation of waters of the state by causing a release from mining process components directly to the aquifer. Fissures forming in the immediate vicinity of heap leach facilities (e.g., pads, solution ponds, or the plant) or chemical/hydrocarbon storage facilities could result in damage and a consequent release to the environment. Such a release of process components or other materials could potentially reach the aquifer through openings along the subsidence-induced fissuring.			
Level of Significance:	The impact would be significant if fissure gullies were to form immediately adjacent to, or beneath engineered Project components that manage process solutions.			
Mitigation Measures:	Mitigation of the impact is the same as the mitigation measures described for Impact 4.3.3.3.1-7b.			
Residual Impact:	None identified			
Issue:	Ground Water - Consumptive Losses - Stage 10			
Impact:	**Impact 4.3.3.3.4-3:** Consumptive use of water by evaporation during mining and delivery of water to the Dean Ranch for irrigation would support a beneficial use and would not be expected to adversely impact water resources; CGM would have adequate water rights to cover the consumptive use. Evaporation of 1,185 acre-feet per year from the two post-mining pit lakes would continue into the foreseeable future after the mine has closed. This amount is 162 acre-feet per year greater than Stage 12 of the Proposed Action, and 119 acre-feet per year less than the No Action Alternative.			
Level of Significance:	Impacts during the active mine life are less than significant. Post-mining evaporation does not result in significant impacts; however, long-term consumptive use of water resources that do not contribute to beneficial use is considered to be a significant impact for which no mitigation measures appear to be feasible.			
Mitigation Measures:	None			
Residual Impact:	None identified			
Issue:	Ground Water - Pit Dewatering - Impacts to Water Rights - Stage 10			
Impact:	**Impact 4.3.3.3.4-4:** Drawdown under the No Backfill Alternative was predicted to exceed ten feet for 16 water rights, five of which are inactive wells (Nos. 1, 2, 8, 9, and 10), and ten of which are controlled by the applicant (Nos. 4, 5, 6, 36, 38, 39, 40, 41, 42, and 45). Only one active well not controlled by the applicant appears to have the potential to be impacted (No. 3 Filippini).			
Level of Significance:	Impacts to water rights Nos. 4, 5, 6, 36, 38, 39, 40, 41, 42, and 45 are not deemed significant because they are controlled by the applicant. Impacts to the inactive wells are not considered significant until such time as the water rights holder chooses to utilize his rights, at which time they would be considered potentially significant. The impact to water rights No. 3 (Filippini) is potentially significant. The impacts would become less than significant after implementation of the mitigation measures described below.			

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
Mitigation Measures:	**Mitigation Measure 4.3.3.3.4-4a:** As part of the comprehensive monitoring program, CGM shall be responsible for monitoring ground water rights, surface water rights, and ground water levels between the mine and water supply wells. Adverse impacts to water wells and water rights would be mitigated as required by the NDRW. Mitigation of impacts to wells could include lowering the pump, deepening an existing well, drilling a new well for water supply wells, or providing a replacement water supply of equivalent yield and general water quality. Mitigation of surface water rights could require providing a replacement water supply of equivalent yield and general water quality. **Mitigation Measure 4.3.3.3.4-4b:** The operational measures described above may not be available for mitigation of post-mining significant impacts to wells. In order to re-evaluate predictions for post-mining delayed impacts of drawdown, the ground water flow model shall be updated during the final year of dewatering using actual field data for pumping rates, infiltration rates and locations, consumptive use, and observed drawdown. Active water rights not owned by the applicant that are indicated to be significantly affected shall then be mitigated by one or more of the following measures, subject to approval of the BLM and NDWR: • Replacement or purchase of the affected water right by the applicant. • Installation of a deeper well and pump at affected locations to restore the historical yield of the well. • Posting of an additional bond to provide for potential future impacts to potentially affected water supplies.			
Residual Impact:	None identified			
Issue:	Ground Water - Pit Dewatering - Ground Water Flow to Humboldt River - Stage 10			
Impact:	**Impact 4.3.3.3.4-5:** Ground water flow modeling indicates that a very slight reduction of ground water flow (nine acre-feet per year) from Crescent Valley to the Humboldt River would occur.			
Level of Significance:	Less than significant			
Mitigation Measures:	None			
Residual Impact:	None identified			
Issue:	Ground Water - Subsidence - Potential Changes to Aquifer Productivity - Stage 10			
Impact:	**Impact 4.3.3.3.4-6:** A small change in aquifer characteristics is expected to result from compaction of the aquifer materials. The compaction would result primarily from a permanent reduction in porosity in the finer grained sediments (clays and silty clays), which are not the primary water-bearing materials in the alluvial aquifer.			
Level of Significance:	The potential for the aquifer to transmit or store water is not expected to be affected. The incremental impact and the cumulative impact are considered less than significant.			
Mitigation Measures:	None			
Residual Impact:	None identified			
Issue:	Ground Water - Subsidence - Potential for Significant Land Surface Alterations - Stage 10			
Impact:	**Impact 4.3.3.3.4-7a:** Differential subsidence could result in the development of fissures. Capture of surface runoff by the fissures may form erosional fissure gullies, which represent a safety risk to wildlife, livestock and people.			
Level of Significance:	The impact would be significant if fissure gullies were to form.			
Mitigation Measures:	A monitoring program as described in Section 2.3.2.2.10 (CGM 2004) shall be implemented to specifically watch for fissure gully development. If fissure gullies form, they shall be filled in with clean, coarse-grained alluvium within a reasonable amount of time. The intent of using coarse-grained (permeable) backfill is to provide a rapid means of dissipation for any surface water entering the fissure. While the mine is in operation, the necessary earth moving equipment shall be readily available and shall be used to fill any fissures within two weeks of the date that such a fissure gully is observed. After reclamation has reached the stage where earth moving equipment is no longer on site, fissures shall be filled within one month of the date when any such fissure gullies are observed.			
Residual Impact:	None identified			
Impact:	**Impact 4.3.3.3.4-7b:** Differential subsidence could result in deep fissures which could allow degradation of waters of the state by causing a release from mining process components. Fissures forming in the immediate vicinity of heap leach facilities (e.g., pads, solution ponds, or the plant) or chemical/hydrocarbon storage facilities could result in damage and a consequent release to the environment. Fissures could provide a preferential flow path for the migrating solutions.			
Level of Significance:	The impact would be significant if fissure gullies were to form immediately adjacent to, or beneath engineered Project components that manage process solutions.			
Mitigation Measures:	Mitigation of the impact is the same as the mitigation measures described for Impact 4.3.3.3.1-7b.			
Residual Impact:	None identified			

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
		WATER RESOURCES - WATER QUALITY		
Issue:	Potential Water Quality Degradation Due to Waste Rock Seepage			
Impact:	Impact 4.4.3.3.1: There is a net positive impact compared to the No Action Alternative.	**Impact 4.4.3.6.1:** The potential would be low for impacts to surface water and ground water quality due to drainage from waste rock piles under the No Action Alternative.	**Impact 4.4.3.4.1:** The potential would be low for impacts to surface water and ground water quality due to drainage from waste rock piles under the Complete Backfill Alternative. A slight positive impact would be expected compared to the No Action Alternative.	**Impact 4.4.3.5.1:** The potential would be low for impacts to surface water and ground water quality due to drainage from waste rock piles under the No Backfill Alternative.
Level of Significance:	The impact is positive compared to the No Action Alternative.	Less than significant	Less than significant	Less than significant
Mitigation Measures:	None	None	None	None
Residual Impact:	None	None	None	None
Issue:	Potential Impacts Due to Pit Lake Water Quality			
Impact:	**Impact 4.4.3.3.2:** Compared to the No Action Alternative, there would be less concentration by evaporation; therefore, Stage 12 of the Proposed Action would generally yield a positive impact. The predicted open pit water quality would initially be good, with acidic mine waters not predicted to develop. With time, evapoconcentration is predicted to increase constituent concentrations, eventually exceeding primary drinking water standards for some constituents. As evaporation concentrates open pit waters over time, the quality would generally resemble that of natural lakes in closed basins in an arid climate. Migration of relatively small volumes of open pit water into the adjacent bedrock aquifers may occur; however, very slow ground water flow rates and existing water quality in the Crescent Valley suggest that downgradient migration of very small volumes of open pit water would not result in significant changes in water quality.	**Impact 4.4.3.6.2:** There would be a slight potential for impacts to surface water or ground water quality due to seepage from the post-mine pit lake that would form under the No Action Alternative. The predicted open pit water quality would initially be good under the No Action Alternative. The development of acidic mine waters is not expected. With time, evapoconcentration is predicted to increase constituent concentrations, eventually exceeding some primary drinking water standards in the distant future. As evaporation concentrates open pit waters over time, the quality would generally resemble that of natural closed basin lakes in an arid climate. Seepage from the open pit lake into ground water is not predicted for the No Action Alternative.	**Impact 4.4.3.4.2:** The predicted open pit water quality would initially be good under the Complete Backfill Alternative. The development of acidic mine waters is not predicted. With time, evapoconcentration is predicted to increase constituent concentrations, eventually exceeding some primary drinking water standards in the distant future. As evaporation concentrates open pit waters over time, the quality would generally resemble that of natural closed basin lakes in an arid climate. Potential migration of open pit waters into the adjacent aquifers would not occur until hydraulic steady-state is reached, beyond 100 years after the end of mining. There would be no potential for impacts to surface water and low potential for impacts to ground water quality due to seepage from the post-mine pit lakes that would form under the Complete Backfill Alternative. Water quality would be slightly better than that predicted for the other alternatives. Hence, there is a positive impact compared to the No Action Alternative.	**Impact 4.4.3.5.2:** There would be no potential for impacts to surface water or ground water quality due to seepage from the post-mine pit lake that would form under the No Backfill Alternative. The predicted open pit water quality would initially be good under the No Backfill Alternative. Development of acidic mine waters is not predicted. With time, evapoconcentration is predicted to increase constituent concentrations, immediately exceeding the future (2006) Nevada primary drinking water standard for arsenic and eventually exceeding the standard for fluoride. As evaporation concentrates open pit waters over time, the quality would generally resemble that of natural closed basin lakes in an arid climate. Under the No Backfill Alternative, no seepage is expected from the pit lake into the ground water.
Level of Significance:	The significance of open pit water quality impacts is time dependent. Over the normal time frame of post-closure monitoring and maintenance (30 years), impacts are less than significant. The Proposed Action provides for operational evaluation of pit lake water quality and monitoring of ground water quality in the vicinity of the open pit. To document water quality, samples of pit lake water and ground water samples in monitoring wells surrounding the proposed pit lake would be collected and analyzed at least quarterly for the following NDEP Profile 1 parameters: 36 metals, total suspended solids, and turbidity.	As discussed for the Proposed Action, the significance of open pit water quality impacts is time dependent. Over the normal time frame of post-closure monitoring and maintenance (30 years), impacts are less than significant. Since potential exceedances relate strictly to secondary fluoride and TDS standards, impacts at 100 years are also less than significant. Long-term impacts are considered to be potentially significant because solute concentrations would continue to increase under the influence of evapoconcentration, although increasing uncertainty of predictions extended far into the future makes longer term predictions more qualitative. No mitigation measures appear to be feasible for potential long-term impacts; however, a long-term trust fund has been established by CGM and the BLM (BLM 1996a, Section 2.2.8). This fund would be used at the BLM's discretion for long-term monitoring, and to provide for a program of corrective action using the best available technology should such action be indicated.	As discussed for the Proposed Action, the significance of open pit water quality impacts is time dependent. Over the normal time frame of post-closure monitoring and maintenance (30 years), impacts are less than significant. Potential exceedances of drinking water standards relate mainly to fluoride and future (2006) arsenic standards; these exceedences are significantly less than for the No Action Alternative. Long-term impacts are considered to be potentially significant because solute concentrations would continue to increase under the influence of evapoconcentration, although increasing uncertainty of predictions extended far into the future makes longer term predictions more qualitative. No mitigation measures appear to be feasible for potential long-term impacts; however, a long-term trust fund has been established by CGM and the BLM (BLM 1996a, Section 2.2.8). This fund will be used at the BLM's discretion for long-term monitoring, and to provide for a program of corrective action using the best available technology should such action be indicated.	As discussed under Stage 12 of the Proposed Action, the significance of open pit water quality impacts is time dependent. Over the normal time frame of post-closure monitoring and maintenance (30 years), impacts are less than significant. Long-term impacts are considered to be potentially significant because solute concentrations would continue to increase under the influence of evapoconcentration, although increasing uncertainty of predictions extended far into the future makes longer term predictions more qualitative. No mitigation measures appear to be feasible for potential long-term impacts; however, a long-term trust fund has been established by CGM and the BLM (BLM 1996a, Section 2.2.8, page 2-39). This fund will be used at the BLM's discretion for long-term monitoring, and to provide for a program of corrective action using the best available technology should such action be indicated.
Mitigation Measures:	None	None	None	None
Residual Impact:	**Pit Lake Water Quality:** Initial water quality of the pit lake would be good, meeting Nevada drinking water standards except for arsenic. Within approximately 100 years, evapoconcentration is predicted to result in exceedances of primary standards for fluoride and arsenic (but less than under the No Action Alternative) as well as some other elements in the distant future. At 100 years post-mining, the TDS of the pit lake is predicted to be as high as 947 mg/l, but this is less than the predicted TDS under the No Action Alternative. In the distant future, open pit water quality could approach that of natural saline lakes, but the very low predicted rates of communication with ground water indicate that such changes would exist only in the immediate vicinity of the open pit.	**Pit Lake Water Quality:** Initial water quality of the pit lake would be good, meeting Nevada drinking water standards. Within approximately 100 years, evapoconcentration is predicted to result in exceedances of the primary water quality standard for fluoride, with primary standards for some other elements potentially exceeded in the distant future. At 100 years post-mining, the TDS of the pit lake is predicted to be approximately 1,119 mg/l. In the distant future, open pit water quality would approach that of natural saline lakes, but no changes in water quality outside of the open pit are expected to result.	**Pit Lake Water Quality:** Initial water quality of the pit lake would be good, meeting Nevada drinking water standards except for arsenic. Within approximately 100 years, evapoconcentration is predicted to result in exceedances of some drinking water quality standards, with primary standards exceeded for some elements in the distant future. At 100 years post-mining, the TDS of the pit lake is predicted to be approximately 826 mg/l, whereas the predicted TDS under the No Action Alternative is 1,119 mg/l. In the distant future, open pit water quality would approach that of natural saline lakes, but the very low predicted rates of communication with ground water indicate that such changes would exist only in the immediate vicinity of the proposed mine pit.	**Pit Lake Water Quality:** Initial water quality of the pit lake would be good, meeting Nevada drinking water standards except for the future (2006) standard for arsenic. Within approximately 100 years, evapoconcentration is predicted to result in exceedances of Nevada drinking water standards for fluoride, with primary standards exceeded for some elements in the distant future. At 100 years post-mining, the TDS of the pit lake is predicted to be approximately 935 mg/l, whereas under the No Action Alternative the TDS is expected to be 1,119 mg/l. In the distant future, pit water quality would approach that of natural saline lakes, but no changes in water quality outside of the open pit would result.

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
		AIR RESOURCES		
Issue:	PM_{10} Emissions			
Impact:	**Impact 4.5.3.3.1-1:** Fugitive dust (PM_{10}) would be generated by numerous processes as a result of the Proposed Action, including the re-suspension of road dust, wind erosion of exposed dirt surfaces, and activities related to the processing of ore materials. These activities are inherent to the mining process and would be ongoing throughout the life of the proposed action. The modeled PM_{10} concentrations show levels below the NSAAQS and NAAQS, even with the addition of the BAPC recommended background values.	No additional air quality impacts would occur.	Same as Proposed Action	Same as Proposed Action
Level of Significance:	Less than significant	Not applicable	Same as Proposed Action	Same as Proposed Action
Mitigation Measures:	None	None	Same as Proposed Action	Same as Proposed Action
Residual Impact:	Fugitive PM_{10} emissions from vehicular traffic, blasting, and material handling and processing operations.	None	Same as Proposed Action	Same as Proposed Action
Issue:	Combustion Emissions			
Impact:	**Impact 4.5.3.3.1-2:** Combustion emissions of CO, NO_2, SO_2 and VOC would be generated by numerous processes as a result of the Proposed Action, including combustion emissions from diesel engines, and burning propane, fuel oil, and/or coal in various process equipment. The modeled CO, NO_2, SO_2 and O_3 show levels below the NSAAQS and NAAQS.	No additional air quality impacts would occur.	Same as Proposed Action	Same as Proposed Action
Level of Significance:	Less than significant	Not applicable	Same as Proposed Action	Same as Proposed Action
Mitigation Measures:	None	None	Same as Proposed Action	Same as Proposed Action
Residual Impact:	Combustion emissions of PM_{10}, CO, NO_2, SO_2 and VOC generated by numerous processes as a result of the Proposed Action, including combustion emissions from diesel engines, and burning propane, fuel oil, and/or coal in various process equipment.	None	Same as Proposed Action	Same as Proposed Action
Issue:	Hazardous Air Pollutants			
Impact:	**Impact 4.5.3.3.1-3**: Mercury, cyanide, MTBE, propylene, toluene, and xylene would continue to be released by ore refining and processing and fuel combustion.			
Level of Significance:	This impact is considered less than significant.			
Mitigation Measures:	None			
Residual Impact:	**Combustion-related HAPs would continue to be emitted with diesel, gasoline, and propane usage.**			
		VISUAL RESOURCES		
Issue:	Visual Contrast and the Level of visibility of a facility, activity, or structure			
Impact:	**Impact 4.6.3.3.1-1:** The proposed mining activities would be visible from KOP #1, #2, and #3.	Under the No Action Alternative, additional disturbance and development as described in the Proposed Action would not occur within the Project Area. The visual environment would remain in its current state. CGM would be required to reclaim surface disturbances associated with its currently permitted operations.	Same as No Action	**Impact 4.6.3.5.1-1:** The proposed mining activities would be visible from KOP #1, #2, and #3.
Level of Significance:	This impact is considered less than significant and no mitigation measures are required, but the following mitigation measure would reduce the adverse effects of the impact.	Not applicable	Not applicable	This impact is considered less than significant and no mitigation measures are required, but the following mitigation measure would reduce the adverse effects of the impact.
Mitigation Measures:	**Mitigation Measure 4.6.3.3.1-1:** Minimizing disturbance is the most effective mitigation technique for reducing visual contrast. Where disturbance is proposed, repetition of the basic landscape elements (form line, color, and texture) would minimize visual change. Clearing of land for waste rock dumps and facility construction would create curvilinear boundaries instead of straight lines, thereby minimizing disturbance of the landscape. Grading would proceed in a manner that would minimize erosion and conform to the natural topography.	None	None	Mitigation Measure 4.6.3.5.1-1: Where disturbance is proposed, repetition of the basic landscape elements (form, line, color, and texture) would minimize visual change. Clearing of land for waste rock dumps and facility construction would create curvilinear boundaries instead of straight lines to minimize disturbance of the landscape. Grading would proceed in a manner that would minimize erosion and conform to the natural topography.
Residual Impact:	The Proposed Action would result in unavoidable but minimal additive physical change in the existing contour and character of the Project Area. The visible changes would be most apparent over the active life of the Project, but would diminish through completion of reclamation and revegetation activities conducted as part of the Proposed Action. The physical changes to the area would be permanent, but natural processes following final reclamation would continue to soften the line and form to match the surrounding landscape.	The additional proposed disturbance associated with the Proposed Action would not occur with the No Action Alternative. Visual resources impacts would be limited to on-going, permitted mining and exploration activities.	Same as No Action	The No Backfill Alternative would result in additive physical change in the existing contour and character of the Project area. The changes would be visibly most apparent over the active life of the Project, but would diminish through the completion of reclamation and revegetation activities. The physical changes to the area would be permanent, but would continue to lessen following the completion of final reclamation as natural processes continue to soften the line and form to match the surrounding landscape.

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
		AUDITORY RESOURCES		
Issue:	Noise Levels Associated with Construction and Mining Operations			
Impact:	**Impact 4.7.3.3.1-1:** The Proposed Action would extend and slightly increase the existing mining- and construction related noise impacts, excluding blasting, which would likely not exceed 55 dBA at the sensitive receptor sites.	The noise related impact under the No Action Alternative would be similar to that described for the Proposed Action, except that the duration of the impact would not be extended for seven additional years.	The noise related impact under the Complete Backfill Alternative would be similar to that described for the Proposed Action, except that the duration of the mining related noise would extend for two additional years.	Same as Proposed Action
Level of Significance:	Less than significant	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Mitigation Measures:	None	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Residual Impact:		The residual adverse effects on the environment from noise generated during ming activities associated with the No Action Alternative would be blasting related noise levels similar to existing levels, which would likely exceed 55 dBA at two of the three sensitive receptor sites.	The residual adverse effects on the environment from noise generated during mining activities associated with the Complete Backfill Alternative would be blasting related noise levels similar to existing levels, which would likely exceed 55 dBA at two of the three sensitive receptors.	Same as Proposed Action
Issue:	Noise Levels Associated with Blasting			
Impact:	**Impact 4.7.3.3.1-2:** Blasting associated with the Proposed Action would continue at a frequency of one blast a day. Estimated blasting related noise levels would be similar to existing levels, which would likely exceed 55 dBA at two of the three sensitive receptor sites. As the Proposed Action continues over time, the estimated blasting related noise level is expected to decrease as the overall depth of the pit increases.			
Level of Significance:	This impact is considered potentially significant. The following mitigation measure is provided to reduce the adverse effects of the impact; however, the impact would remain significant after implementation of the mitigation measure.			
Mitigation Measures:	Blasting shall occur on average once per day and be no longer than 15 seconds in duration per blast.			
Residual Impact:				
		SOCIOECONOMIC VALUES		
Issue:	Population Effects			
Impact:	**Impact 4.8.3.3-1:** Implementation of the Proposed Action would continue employment of CGM's existing work force for an additional seven years, thus maintaining population stability in the Study Area.		**Impact 4.8.3.6-1:** Implementation of the Complete Backfill Alternative would continue employment of CGM's existing work force for an additional seven years and a portion of the workforce for an eighth year, thus maintaining population stability in the Study Area.	Same as Proposed Action
Level of Significance:	Beneficial		Beneficial	Same as Proposed Action
Mitigation Measures:	None		None	Same as Proposed Action
Residual Impact:	None		None	Same as Proposed Action
Issue:	Employment Effects			
Impact:	**Impact 4.8.3.3-2:** Implementation of the Proposed Action may require employment of up to 50 short-term contractors or construction personnel during the life of the Project and would continue long-term employment for the existing CGM work force (450-500). It is expected that temporary and/or potential long-term employment positions could be accommodated by the Study Area population and no ingress of employees from outside of the Study Area would result. The Proposed Action would continue to employ current CGM employees for an additional seven years, resulting in continued current indirect employment, as well as direct and indirect spending in the Study Area and the state.	**Impact 4.8.3.4-1:** Impacts resulting from implementation of the No Action Alternative would be the elimination of up to seven additional years of payroll for 450-500 CGM employees, decreased revenues to local and state jurisdictions, and reduced wages spent in the Study Area.	**Impact 4.8.3.6-2:** Implementation of the Complete Backfill Alternative would continue long-term employment for the existing CGM work force (450-500) with an additional year for a portion of the current work force. The No Backfill Alternative would continue to employ current CGM employees for an additional eight years, resulting in continued indirect employment, as well as direct and indirect spending in the Study Area and the state.	Same as Proposed Action
Level of Significance:	Beneficial	Significant	Beneficial	Same as Proposed Action
Mitigation Measures:	None	None	None	Same as Proposed Action
Residual Impact:	None	The residual adverse impacts from implementation of the No Action Alternative stem from the loss of potential beneficial socioeconomic impacts associated with the Proposed Action.	None	Same as Proposed Action
Issue:	Housing Effects			
Impact:	**Impact 4.8.3.3.-3:** Implementation of the Proposed Action may increase demand for local rental housing. The demand can be accommodated with the existing housing supply.		Similar to Proposed Action	Same as Proposed Action
Level of Significance:	Beneficial		Similar to Proposed Action	Same as Proposed Action
Mitigation Measures:	None		None	Same as Proposed Action
Residual Impact:	None		None	Same as Proposed Action

	PROPOSED ACTION	NO ACTION	COMPLETE BACKFILL	NO BACKFILL
Issue:	Public Service Effects			
Impact:	**Impact 4.8.3.3-4:** Public service requirements as a result of implementing the Proposed Action would remain the same as current levels.		Implementation of the Complete Backfill Alternative would have the same impacts as the Proposed Action for seven years. In the eighth year, a decline in demand for services would occur; thus, no additional impact would be associated with the Complete Backfill Alternative.	Same as Proposed Action
Level of Significance:	Neither adverse nor beneficial		Same as Proposed Action	Same as Proposed Action
Mitigation Measures:	None		None	Same as Proposed Action
Residual Impact:	None		None	Same as Proposed Action
Issue:	Fiscal Effects			
Impact:	**Impact 4.8.3.3-5:** Implementation of the Proposed Action would result in continued and potentially increased revenues for the State of Nevada and Lander County.	**Impact 4.8.3.4-1:** Impacts resulting from implementation of the No Action Alternative would be the elimination of up to seven additional years of payroll for 450-500 CGM employees, decreased revenues to local and state jurisdictions, and reduced wages spent in the Study Area.	Same as Proposed Action	Same as Proposed Action
Level of Significance:	Beneficial	Significant	Same as Proposed Action	Same as Proposed Action
Mitigation Measures:	None	None	Same as Proposed Action	Same as Proposed Action
Residual Impact:	None	The residual adverse impacts from implementation of the No Action Alternative stem from the loss of potential beneficial socioeconomic impacts associated with the Proposed Action.	Same as Proposed Action	Same as Proposed Action
		WILDLIFE AND FISHERIES RESOURCES		
Issue:	Water Table Drawdown			
Impact:	**Impact 4.10.3.3-1:** Flows from these springs and stream are not expected to be impacted by pit dewatering for reasons stated in Sections 4.3.3.3 and 4.3.3.4. However, since more than ten feet of drawdown of the alluvial aquifer is predicted, the impacts to these springs and stream are considered to be potentially significant (Sections 4.3.3.3.1 through 4.3.3.3.4; Section 4.3.3.4.1). It follows that the impacts to these springs are potentially significant to wildlife resources since they may result in substantial disturbance to critical wildlife habitat. However, Mitigation Measure 4.3.3.3.1-2a establishes a monitoring program that is designed to detect reduced spring flows during mine operation and stipulates the development of methods of supplementing affected flows as described in the Integrated Monitoring Plan (WMC 1995b). In addition, Mitigation Measure 4.3.3.3.1-2b reduces the potential post-mining impacts to springs by restoring the historical yield of the springs (including the springs that feed the ephemeral stream).	Impacts to wildlife habitat under the No Action Alternative would be the same as those described and analyzed in the South Pipeline Final EIS (BLM 2000a; pages 4-133 through 4-138).	Same as Proposed Action	Impacts to wildlife habitat from the No Backfill Alternative are generally the same as those described for the Proposed Action (Section 4.10.3.3). The No Backfill Alternative has the potential to impact one additional spring in the Toiyabe Catchment area.
Level of Significance:	Therefore, potential impacts to wildlife habitat that is supported by spring flows would be below the level of significance.	Not applicable	Not applicable	Not applicable
Mitigation Measures:	None	None	None	None
Residual Impact:	No residual adverse impacts to wildlife resources would occur as a result of the Proposed Action.	No residual adverse impacts to wildlife resources would occur as a result of the No Backfill Alternative.	Same as the Proposed Action	No residual adverse impacts to wildlife resources would occur as a result of the No Backfill Alternative.
Issue:	Ecological Risk Assessment			
Impact:	Impact 4.10.3.3-2: The results of the SLERA demonstrate that potential impacts from pit lake chemistry for the Proposed Action are not expected to result in adverse ecological effects to wildlife populations or individual threatened or endangered species that may be attracted to the pit lake. The SLERA was conducted in a conservative manner, and the results of the SLERA are expected to overestimate rather than underestimate potential risks associated with the pit lake habitat.			
Level of Significance:	Potential impacts to wildlife from use of the pit lake habitat would be below the level of significance.			
Mitigation Measures:	None			
Residual Impact:	None			

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