BLM
Black Rock Field Office/Winnemucca, Nevada

DRAFT ENVIRONMENTAL IMPACT STATEMENT

DOI-BLM-NV-W030-2011-0001-EIS

Hycroft Mine Expansion Project

January 2012

U.S. Bureau of Land Management
Winnemucca District Office
Black Rock Field Office
5100 E. Winnemucca Blvd.
Winnemucca NV 89445-2921

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ABBREVIATIONS AND ACRONYMS

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

<	less than
≤	less than or equal to
>	greater than
°	degrees
µg/m^3	micrograms per cubic meters
AADT	annual average daily traffic
AAQS	Ambient Air Quality Standards
ABA	acid base accounting
ACE	U.S. Army Corps of Engineers
ADT	average daily traffic
afa	acre feet annually
AHPA	Archaeological and Historic Preservation Act of 1974
AIRFA	American Indian Religious Freedom Act of 1978
AML	Appropriate Management Levels
amsl	above mean sea level
ANFO	ammonium nitrate/fuel oil mixture
ANSI	American National Standards Institute
AP	Advanced Placement
APE	Area of Potential Effect
AQMA	Air Quality Management Area
ARD	acid rock drainage
ARPA	Archaeological Resource Protection Act of 1979
ASW	Applied Soil and Water Technologies
AUM	animal unit month
B&K	Bruel & Kjaer (microphones)
BAPC	Bureau of Air Pollution Control
BAQP	Bureau of Air Quality Planning
BATF	Bureau of Alcohol, Tobacco, Firearms, and Explosive
BBA	Brown Buntin Associates, Inc.
BCR	Bird Conservation Region
BEA	Bureau of Economic Analysis
bgs	below ground surface
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMPs	Best Management Practices
BMRR	Bureau of Mining Regulation and Reclamation
BRFO	Black Rock Field Office
BSA	Barkdull Spencer Agency
C	Celsius
CAB	Community Advisory Boards
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act

CESA	cumulative effects study area
CFR	Code of Federal Regulations
cm/sec	centimeters per second
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
$CO_2(e)$	carbon dioxide equivalent
dB	decibels
dBA	decibel with A weighting filter
DE	diatomaceous earth
DETR	Department of Employment, Training, and Rehabilitation
DMV	Department of Motor Vehicles
DOI	Department of the Interior
EIS	Environmental Impact Statement
EMS	Emergency Medical Services
ENM	Environmental Noise Model
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-To-Know Act
ESA	Endangered Species Act
ET	evapotranspiration
F	Fahrenheit
FCAA	Federal Clean Air Act
FCWA	Federal Clean Water Act
FHWA	Federal Highway Administration
FICON	Federal Interagency Committee on Noise
FLPMA	Federal Land Policy and Management Act
FMCSA	Federal Motor Carrier Safety Administration
ft/day	feet per day
FTA	Federal Transit Administration
GBBO	Great Basin Bird Observatory
GED	General Educational Development
GHG	greenhouse gas
GID	General Improvement District
GIS	Geographic Information System
gpd	gallons per day
gpm	gallons per minute
gpm/ft^2	gallons per minute per square foot
GPS	global positioning system
H:V	horizontal to vertical
H_2S	hydrogen sulfide
HAP	Hazardous Air Pollutants
HCRMP	Humboldt County Regional Master Plan
HCSD	Humboldt County School District
HCSO	Humboldt County Sheriff's Office
HCT	humidity cell test
HDA	Humboldt Development Authority

HDPE	high density polyethylene
HGH	Humboldt General Hospital
HMA	Herd Management Areas
HRDI	Hycroft Resources and Development, Inc.
HSWA	Hazardous and Solid Waste Amendments
Hz	hertz
I-80	Interstate 80
ICC	International Code Council
ICP	induced coupled plasma
ID	Interdisciplinary
IM	Instruction Memorandum
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPCC	Intergovernmental Panel on Climate Change
KMG	Kamma Mountains Group
KOP	key observation point
Ktons	kilotons
kV	kilovolt
KVA	kilovolt amperes
L_{50}	noise level median
LCRS	leak collection recovery system
L_{dn}	noise levels day/night
L_{eq}	noise level average
LFD	Lovelock Fire Department
L_{max}	noise level maximum
LMWD	Lovelock Meadows Water District
LPD	Lovelock Police Department
LR2000	Land and Mineral Legacy Rehost System
LRL	Lockwood Regional Landfill
MBTA	Migratory Bird Treaty Act
MDB&M	Mount Diablo Base & Meridian
MFP	Management Framework Plan
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
Mgal	million gallons
Mgd	million gallons per day
MMPA	Materials and Minerals Policy Act
MOU	Memorandum of Understanding
mph	miles per hour
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
mW/m^2	milliwatt per square meter
MWMP	Meteoric Water Mobility Procedure
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAD83	North American Datum 1983
NAG	net acid generation

NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NAIP	National Agricultural Imagery Program
NCA	National Conservation Area
NDE	Nevada Department of Education
NDEP	Nevada Division of Environmental Protection
NDOA	Nevada Department of Agriculture
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDSP	Nevada Division of State Parks
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NESHAP	National Emission Standard for Hazardous Air Pollutants
NHPA	National Historic Preservation Act of 1966
NHPD	Nevada Highway Patrol Division
NNHP	Nevada Natural Heritage Program
NNPS	Nevada Native Plant Society
NO_2	nitrogen dioxide
NOI	Notice of Intent
Non-PAG	non-potentially acid generating
NO_X	oxides of nitrogen
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
NSAAQS	Nevada State Ambient Air Quality Standards
NSHD	Nevada State Health Division
NSO	BLM Nevada State Office
NSPL	National System of Public Lands
NSPS	New Source Performance Standards
NVAAQS	Nevada Ambient Air Quality Standards
NVCRIS	Nevada Cultural Resources Information System
NV DOT	Nevada Department of Transportation
NVHC	Nevada Health Centers, Inc.
NWIS	National Water Information System
NWS	National Weather Service
O_3	ozone
OLSG	Old Lang Syne Group
opt	ounces per ton
OSHA	Occupational Safety and Health Administration
PASS	Personal Achievement School Success
PAG	potential acid generating
Pb	lead
PCMP	Pershing County Master Plan
PCPI	per capital personal income
PCRI	properties of cultural or religious importance
PCS	petroleum contaminated soils
PCSD	Pershing County School District

PCSO	Pershing County Sheriff's Office
PHREEQC	PH-REdox-EQuilibrium-Chemistry
Plan	Plan of Operations
PLS	pure live seed
PM_{10}	particulate matter with aerodynamic diameter less than 10 microns
$PM_{2.5}$	particulate matter with aerodynamic diameter less than 2.5 microns
PMU	population management unit
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PRIA	Public Rangelands Improvement Act of 1978
Project	Hycroft Mine Expansion Project
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
REMSA	Regional Emergency Medical Services Authority
RFFAs	reasonably foreseeable future actions
RMIS	Recreation Management Information System
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
RPC	Regional Planning Commission
RV	recreational vehicle
SARA	Superfund Amendments and Reauthorization Act
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SEA	Safe Explosives Act
SEM	scanning electron microscopy
SG	Sulphur Group
SHPO	State Historic Preservation Office
SLAMS	state and local air monitoring site
SO_2	sulfur dioxide
SR	State Route
SRA	State Recreation Area
SWPPP	Storm Water Pollution Prevention Plan
TCP	traditional cultural property
TDS	total dissolved solids
Title V	Federal Operating Permit Program
tpd	tons per day
tpy	tons per year
TRI	Toxics Release Inventory
TSCA	Toxic Substances Control Act
U.S.	United States
UBC	Uniform Building Code
USDC	United States Department of Commerce
UNR	University of Nevada Reno

UPRR	Union Pacific Railroad
USDA	United States Department of Agriculture
USDA-FS	United States Department of Agriculture- Forest Services
USDOT	United States Department of Transportation
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VFD	Volunteer Fire Department
VOC	volatile organic compounds
VRM	Visual Resource Management
WAD	weak acid dissolvable
WCDCD	Washoe County Department of Community Development
WCHD	Washoe County Health District
WCSD	Washoe County School District
WCSO	Washoe County Sheriff's Office
WEG	wind erodibility group
WPCP	Water Pollution Control Permit
WPD	Winnemucca Police Department
WRF	waste rock facility
WRFD	Winnemucca Rural Fire Department
WRMP	Waste Rock Management Plan
WWTF	Wastewater Treatment Facility
XRD	X-Ray diffraction

2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

Under the Proposed Action, HRDI proposes expanded mining and mineral exploration activities on public lands at the existing Hycroft Mine which would expand the Project boundary and create additional surface disturbance as summarized in Table 2.1-1 and shown in Figure 2.1.1.

Table 2.1-1: Summary of Project Surface Disturbance and Plan Boundary Acreage

	Disturbance (acres)			Plan Boundary (acres)		
	Public	**Private**	**Total**	**Public**	**Private**	**Total**
Authorized	1,368	1,695	3,063	7,051	1,807	8,858
Proposed	2,060	112	2,172	5,895	0	5,895
Total	**3,428**	**1,807**	**5,235**	**12,946**	**1,807**	**14,753**

Therefore, the Proposed Action analyzed in the EIS includes new surface disturbance on both public and private lands totaling approximately 2,172 acres and the expansion of the Project boundary on public land by approximately 5,895 acres. The Hycroft Mine currently employs approximately 200 workers. The Proposed Action would increase the mine life an additional 12 years and increase employment to 537 mine personnel. The actions associated with the Proposed Action would consist of the following:

- Expand the Plan boundary;
- Incorporate all or portions of five HRDI ROWs into the Plan and continue to use the ROWs outside of the Plan boundary associated with the Project;
- Expand the existing Brimstone, Bay Area, Boneyard, and Center open pits;
- Backfill all or portions of the Boneyard, Bay Area, and Brimstone open pits;
- Construct a dispatch center near the expanded Brimstone open pit;
- Expand haul and secondary roads around the open pits, WRFs, and heap leach facilities;
- Construct two ready line and heavy equipment fueling areas and expand the existing ready line and fueling area;
- Expand the existing WRFs;
- Construct, operate, and reclaim the South WRF and associated haul roads;
- Operate a portable crusher with conveyors at the South heap leach facility;
- Construct, operate, and close the South heap leach facility, Merrill-Crowe process plant, and solution ponds;
- Relocate a segment of the Seven Troughs Road to bypass the South heap leach facility;
- Expand the existing refinery;
- Construct, operate, and close the North Brimstone heap leach facility and associated process ponds and Merrill-Crowe process plant;
- Construct storm water diversions, install culverts, and other storm water controls;
- Close the existing Class III-waivered landfill and construct a new Class III-waivered landfill on private land;
- Relocate one potable water well and construct one process well;
- Relocate the existing Brimstone substation, upgrade the existing Crofoot substation, and extend powerlines to new process areas;
- Expand maintenance facilities;
- Conduct exploration activities throughout the Project Area;
- Construct growth media stockpiles; and
- Reclaim the Project consistent with the proposed Reclamation Plan.

Table 2.1-2 presents a summary of the acreages of authorized disturbance activities and total combined surface disturbance (authorized and proposed).

Table 2.1-2: Proposed and Total Surface Disturbance by Activity

Facility	Proposed Surface Disturbance Acreage (acres)*			Total Surface Disturbance Acreage - Authorized and Proposed (acres)*		
	Public	Private	Total	Public	Private	Total
Roads						
Exploration Drill Roads and Pads	30	0	30	50	54	104
Small Vehicle Mine Roads	0	0	0	20	15	35
Haul Roads[1]	-9	-11	-20	36	12	48
Total Road Acres	**21**	**-11**	**10**	**106**	**81**	**187**
Open Pits, Adits, Trenches						
Bay Area Open Pit	126	103	229	126	103	229
Boneyard Open Pit	0	44	44	0	64	64
Brimstone Open Pit	22	135	157	50	391	441
South Central Open Pit	157	144	301	182	370	552
Crofoot Open Pit[2]	-3	-1	-4	0	0	0
Gap Open Pit[2]	-40	-39	-79	0	0	0
North Open Pit[2]	-80	-41	-121	0	0	0
Total Open Pit, Adit, Trench Acres	**183**	**345**	**527**	**358**	**928**	**1,286**
Process Ponds and Pond Areas						
Brimstone Ponds	0	1	1	0	4	4
Crofoot Ponds	0	0	0	13	0	13
Freshwater Ponds	1	1	2	3	3	6
Lewis Ponds	0	0	0	0	5	5
North Ponds	17	0	17	17	0	17
South Ponds	17	0	17	17	0	17
Total Pond Acres	**35**	**2**	**37**	**50**	**12**	**62**
Heap Leach Facilities						
Crofoot Heap	1	0	1	355	0	355
Brimstone Heap Phase I[3]	0	-93	-93	0	0	0
Brimstone Heap Phase II[3]	-91	-40	-131	0	0	0
Brimstone Heap	201	246	447	201	246	447
South Heap	495	0	495	495	0	495
Lewis Heap[3]	-6	-61	-67	0	0	0
Total Heap Leach Facility Acres	**600**	**52**	**652**	**1,051**	**246**	**1,297**
Waste Rock Facilities						
East WRF[4]	1	-312	-311	6	244	250
North WRF[5]	41	-51	-10	205	63	268
South WRF	455	114	569	455	114	569
West WRF[6]	117	-9	108	359	13	372
Total WRF Acres	**614**	**-258**	**356**	**1,025**	**434**	**1,459**
Ancillary						
Borrow Area	0	0	0	14	0	14
Growth Media Stockpile	150	2	152	166	2	168

Facility	Proposed Surface Disturbance Acreage (acres)*			Total Surface Disturbance Acreage Authorized and Proposed (acres)*		
	Public	Private	Total	Public	Private	Total
Miscellaneous[7]	385	-23	362	566	91	657
Storm Water Diversion	73	12	85	73	12	85
Foundations and Buildings	7	0	7	10	1	11
Stockpile[8]	-4	-7	-11	0	0	0
Landfill[9]	-3	-2	-5	0	0	0
Total Ancillary Acres	**608**	**-18**	**590**	**829**	**106**	**935**
Lewis Camp Acreage	**0**	**0**	**0**	**9**	**0**	**9**
Total Acres	**2,060**	**112**	**2,172**	**3,428**	**1,807**	**5,235**

Notes:
*The values are rounded to the nearest whole number and may not be consistent with permitted acreage values.
1 - Haul Road disturbance decreases due to the increase in pit acreage and overall facility configuration changes
2 - The Crofoot, Gap and North Pits are consolidated into the South Central and Bay Area Pits
3 - The Brimstone Phase I & II and the Lewis Heap Leach acreage is consolidated into one category (Brimstone Heap)
4 - The East Waste Rock Facility is reduced in acreage due to the expansion of the Center and Brimstone Pits
5 - The North Waste Rock Facility is reduced in acreage due to the expansion of the Bay Area and Boneyard Pits
6 - The West Waste Rock Facility is reduced on private land due to the expansion of the Center Pit
7 - Miscellaneous acres on private land is reduced due to the expansion of open pits
8 - The Stockpile category has been changed to Growth Media and thus these acres are shown as negative
9 - The landfill category is removed as the facility acreage is included in the East Waste Rock Facility (private land)

2.1.1 Open Pit Mining Methods

HRDI would operate the proposed open pits in phases or push-backs that incorporate space for proper equipment operation, working geometries, and access roads. Multiple phases would always be in operation at any point in time.

A slope stability analysis was conducted for the proposed Brimstone, Center, and Bay Area open pit expansion areas (Call & Nicholas 2010). The study addresses the stability of the expanded pit walls with particular attention paid to the east Brimstone open pit highwall in the hanging wall of the East Fault Zone. Slope angle recommendations are based on review of the site geology, which includes the location of the major structures (East, Vortex, Fire, and Ramp Fault Zones); alteration solids for the Brimstone open pit; geotechnical drilling; and slope stability analysis. Proposed slope heights on the east wall of the Brimstone open pit are on the order of 900 to 1,100 feet. Proposed slope heights in the Bay Area open pit are limited to 400 feet, but past instability has occurred on structures in that slope height with overall slope angles greater than 40 degrees in the Brimstone open pit. Proposed slope heights in the Center open pit range from approximately 600 to 800 feet. The recommended overall slope angles and ultimate depth of each open pit are outlined in Table 2.1-3.

Table 2.1-3: Proposed Open Pit Parameters

Open Pit	Maximum Slope Angle	Bench Heights	Depth (feet amsl)	Percent Backfilled
Brimstone	40° - 46°	25	4,300	0
Boneyard	46°	25	4,350	100
Center	46°	25	4,100	75
Bay Area	46°	25	4,325	100

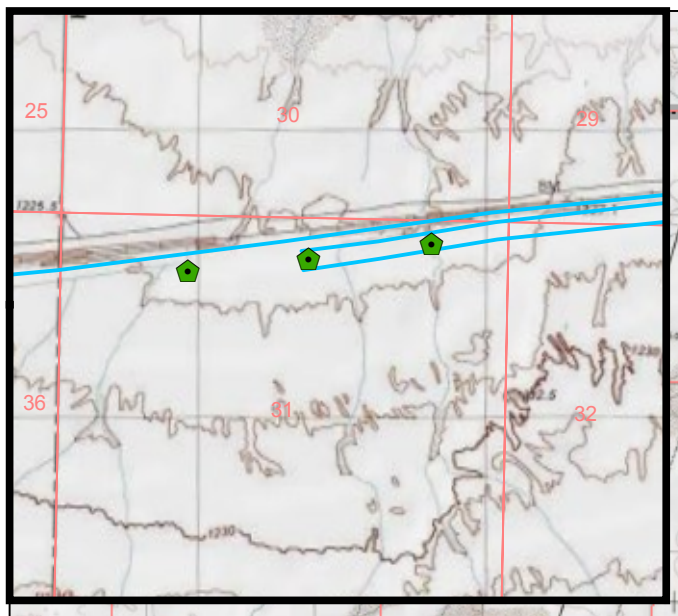
Conventional open pit mining methods (truck and shovel/loader) would continue to be used to extract ore and waste from the proposed open pit expansions. Rock would be drilled and blasted for excavation using ammonium nitrate and fuel oil or other appropriate blasting agents as determined by the rock characteristics. Explosives would be stored and used in accordance with MSHA and the regulations set forth by the BATF. One blast per day is anticipated in each of the active open pits. The amount of explosives used would vary depending on the size of the working face of the open pit.

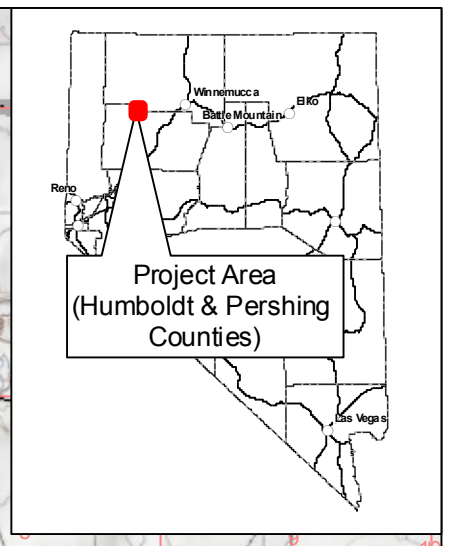
Trucks would be used to haul ore to the heap leach pads and waste rock to the WRFs. Ore would be hauled at varying rates and would generally result in approximately 0.089 million tons per day (tpd) or 32.5 million tons per year (tpy) during peak production. Waste rock would be transported to the WRFs at varying rates as well, with peak production at approximately 0.13 million tpd or 47.5 million tpy. Total production would have a peak rate at approximately 0.22 million tpd or 79.9 million tpy.

Table 2.1-4 shows the projected annual mining, waste rock placement, and ore placement. Table 2.1-5 shows the ore and waste rock that would come from each phase or open pit.

Table 2.1-4: Summary of Projected Annual Mining, Waste Rock Placement, and Ore Placement Sequences

Year	Working Open Pit	Pit Backfill	WRFs in Use	Heap
2013	Brimstone (3a, 3b, and pit 4), Boneyard and Bay	--	Center, Northwest	North Brimstone
2014	Brimstone (3a, 3b, phase 1, and phase 2), Boneyard, Bay, and Cut 5	--	Center, North Boneyard, North Bay, West, South	North Brimstone
2015	Brimstone (3a, 3b, phase 1, and phase 2), Bay and Pit 5, Cut 5	--	West, South	North Brimstone
2016	Brimstone (3a, 3b, phase 1, and phase 2), Bay and Pit 5, Cut 5	--	West, South	North Brimstone, South
2017	Brimstone (phase 1), Bay, Cut 5, and Pit 5	--	West, South	North Brimstone, South
2018	Brimstone (phase 1 and phase 2), Cut 5 and Pit 5	Bay-Boneyard	South	North Brimstone, South
2019	Brimstone (phase 1 and phase 2), Cut 5 and Pit 5	Bay-Boneyard	--	South
2020	Brimstone (phase 1 and phase 2), Cut 5 and Center	Bay-Boneyard	--	South
2021	Brimstone (phase 1 and phase 2), and Center	Bay-Boneyard	Cut 5	South
2022	Brimstone (phase 2), Center and Cut 6	Cut 5	--	South
2023	Brimstone (phase 2), Center and Cut 6	Cut 5	--	South





T35 1/2N R29E

T36 N R30E

T35N R29E

T35N R30E

T34N R29E

T34N R30E

Humboldt County

Pershing County

Jungo Rd

Jungo Road

See Inset Above

NVN-039119

NVN-044999

NVN-046292

NVN-046959

NVN-046564

North WRF

North Pit

Boneyard Pit

Lewis Heap

Brimstone Heap

Brimstone Heap Expansion

Gap Pit

West WRF

Sulfur Pit

East WRF

Crofoot Heap

Sou h-Central Pit

Cut 4 Pit

Brimstone Pit

South WRF

Sou h Heap Leach Facility

Explanation

- Proposed Project Area Boundary
- Existing/Authorized Disturbance
- Borrow Area
- Growth Media Stockpile
- Haul Road
- Heap Leach Pads
- Ancillary Facilities
- Open Pits
- Pit Backfill
- Pond
- Storm Water Diversion
- Waste Rock Facility
- Right-of-Way
- Potable Well Authorized
- Potable Well Proposed
- Production Well Authorized
- Production Well Proposed
- PCS Treatment
- Road Right-of-Way
- Utility Right-of-Way
- County Road
- Railroad
- Proposed Seven Troughs Road Realignment

Projection: UTM Zone 11 North, NAD83

1:45,000

0 0.25 0.5 1 Miles

N

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BUREAU OF LAND MANAGEMENT

HYCROFT MINE EXPANSION PROJECT

Proposed Disturbance and Facilities

Figure 2.1.1

11/28/2011

Table 2.1-5: Approximate Tonnages of Ore and Waste Rock

Phase/Pit	Ore (ktons)	Waste (ktons)	Total (ktons)
Center Stage 3a	5,203	1,696	6,899
Center Stage 3b	5,036	1,996	7,032
Center Pit 4	4,747	2,099	6,846
Center Pit 5	15,357	15,759	31,116
Brimstone, phase 1	70,063	73,885	143,948
Brimstone, phase 2	50,623	135,903	186,526
Boneyard	9,838	8,572	18,410
Bay Area	51,304	55,124	106,428
Center Cut	27,541	28,641	56,182
Center Cut 5	59,572	92,175	151,747
Center Cut 6	6,382	15,908	22,290
Total of Phases	**305,666**	**431,758**	**737,424**

Notes: ktons = kilotons

2.1.2 Equipment

Mining would be conducted up to 24 hours per day and seven days per week, which is the same as the current operations. A list of the anticipated mining equipment requirements at peak operations within the proposed Project Area boundary is provided in Table 2.1-6.

Table 2.1-6: Anticipated Mobile Surface Equipment

Equipment Type	Number
Komatsu 1200-Type loaders	8
Cat 994-Type front end loader	1
Komatsu 730E-Type trucks	25
Atlas Copco-DML Production-type drill	8
Komatsu 47-Type dozer	4
Komatsu 375A-Type dozer	4
Cat 835-Type rubber tired grader	4
Cat 16G-Type graders	4
Light plant	20
Water trucks	4
Ammonium Nitrate Fuel Oil (ANFO) trucks	4
Service trucks	8
Stemming loaders	6
Light vehicles	25

2.1.3 Waste Rock Facilities

The BLM has recently issued guidance (IM No. NV-2010-014) that clarifies the rock and water resources data information that needs to be collected under 43 CFR 3809.401(b)(2) and 3809.401(c)(1). The NDEP oversees the waste rock management program through the WPCP program. HRDI has collected waste rock characterization data per NDEP requirements in the WPCP Program and associated Nevada Administrative Code (NAC) 445A regulations and BLM IM. Per WPCP NEV94114, sampling and testing is performed quarterly on waste rock and overburden (i.e., alluvium) excavated from the active open pits. These data are presented in the *Hycroft Mine Final – Phase I Waste Rock Characterization Report* (SRK 2011b).

2.1.3.1 Waste Rock Facility Design

Waste rock would be hauled to either the expanded WRFs or to the proposed WRFs developed near the open pit locations. The waste rock facilities have been designed to manage potentially acid generating (PAG) materials and to minimize visual contrasts with natural topography. WRFs would generally be constructed by end dumping waste rock from mine haul trucks over existing waste rock facilities, onto native alluvial material, or into existing open pits. Material identified as PAG and non-potentially acid generating (non-PAG) would be deposited in the center of the WRFs and surrounded by 24-inches of non-PAG material, which includes six inches of growth media. The non-PAG material serves as an inert layer of material between the PAG material and the cover material. The non-PAG material layer also limits the PAG material's exposure to meteoric water during operation. After the portions of the dump reach ultimate design capacity, the slopes would be graded and covered.

The proposed WRF designs in the Plan incorporate the existing facilities and the native topography in ultimate facility designs that reduce the visual effects of reclaimed mine facilities. Design features include irregular shapes that blend the proposed and existing WRFs with natural topography, rounded bench crests, and abutments with undisturbed lands, concurrent reclamation where practicable, and varying slope angles on side slopes. As a WRF is constructed, the slopes of individual benches would be allowed to stand at the natural angle of repose, or approximately 38 degrees (1.3H:1V). The WRF would generally be placed using a lift/bench approach that is designed with bench setbacks sufficient to approximate the post-reclamation configuration utilizing no steeper than 2.5H:1V slopes. This provides both operational stability and reduction of required reclamation efforts. The WRF tops would be constructed without depressions and positive slopes to promote runoff from the tops and prevent ponding of meteoric water. The tops of the slopes would be rounded into the side slopes and the bottom of the slopes would be rounded and approximate a natural mature slope configuration found in nature. Regraded sideslopes would also include horizontal slope breaks along contours approximately every 100 vertical feet. Slope breaks would be small flat benches up to 20 feet wide and blended into the slopes. The toe and crest of the facilities would also be rounded to blend into the adjacent slopes. Minimizing the total continuous slope length with benches, and rounding the toe and crests, would help to limit erosion until vegetation is established.

2.1.3.1.1 Waste Rock Management

HRDI has developed a Waste Rock Management Plan (WRMP) in coordination with the NDEP and BLM (HRDI 2010b). The WRMP describes the procedures for characterizing, classifying, and managing waste rock associated with the Project for surface disposal. Specifically, the WRMP includes the following:

- Material types;
- Material characterization;
- Operational material classification and handling;
- Waste rock facility design and construction; and
- Monitoring and Reporting.

The WRMP also incorporates the results of the waste rock characterization and general waste rock volumes and types, to optimize the development of WRFs and minimize the potential for constituent release, while supporting final closure actions.

The WRMP would be updated and modified as needed to integrate data from ongoing geochemical studies, mine modeling changes, mine planning, WRF performance monitoring, or other information. The proposed mining operations, and thus the WRF construction, are estimated to last 12 years.

2.1.3.1.2 Waste Rock Classification

HRDI has been conducting an investigation of the geochemical characteristics of the material types encountered during operations. The results of the testing have indicated that the alteration type and oxidation state of the materials can be used to define the acid generating potential of the waste rock material and the ability of the material to leach metals. Waste rock at the Hycroft Mine site can be segregated into two waste rock management classes based on material type (as defined by alternation and oxidation): 1) Non-PAG; and 2) PAG. Table 2.1-7 shows a summary of the predicted waste rock geochemistry by rock type.

Table 2.1-7: Summary of Predicted Waste Rock Geochemistry

Rock Type	Alteration	Oxidation	Percent of Total	Acid Generation Classification
Alluvium	--	--	24.6	Non-PAG
Undifferentiated Felsic Volcanics	Acid Leach	Oxide	19.5	Non-PAG
	Argillic	Oxide	1.4	Non-PAG
		Mixed	10.9	PAG
		Non-Oxide	5.1	PAG
	Propylitic	Non-Oxide	4.2	PAG
	Silica	Oxide	1.8	Non-PAG
		Mixed	8.8	PAG
		Non-Oxide	19.3	PAG
	Unclassified	Oxide	0.1	--
		Mixed	0.7	--
		Non-Oxide	2.4	--
		Totals	**98.8**	**--**

Source: HRDI 2010b

The geochemical characterization results indicate that acid leach, oxidized argillic, oxidized silicic; and alluium materials are non-PAG. These material types make up approximately 49 percent of the total waste rock within the proposed pit limit.

Mixed and non-oxidized argillic, non-oxidized propylitic, and mixed and non-oxidized silicic materials would all be considered PAG and would be segregated during mining for selective placement. Any unclassified materials encountered during mining would be considered PAG and handled accordingly. PAG material types comprise approximately 51 percent of the total waste rock within the proposed pit limit.

When mining the acid leach material type, it is visually distinct to be differentiated in the field and is managed as non-PAG waste rock. All other material types are sampled from the blast holes and subjected acid base accounting (ABA) testing. Those material types that have an ABA ratio of 3:1 or greater are managed as non-PAG waste rock. Those material types that have an ABA ratio of less than 3:1 are managed as PAG waste rock.

2.1.4 Heap Leach Facilities

Two heap leach facilities are proposed for the Project: the North Brimstone and the South heap leach facilities. Figure 2.1.1 shows the location of the proposed heap leach facilities. Additionally, the existing Crofoot heap leach facility would be closed with a six-inch growth media cover. The authorized Brimstone heap leach facility would be expanded to create the North Brimstone heap leach facility. Waste rock would be placed to the north of the expanded heap to create an engineered (geotechnically sound) and compacted fill on which the four process ponds would be located. The North Brimstone Merrill-Crowe process plant would be located next to the ponds. Filtered precipitate would be trucked to the existing refinery for retorting and refining. Construction of the North Brimstone facility is planned for 2012 pending the authorization to proceed.

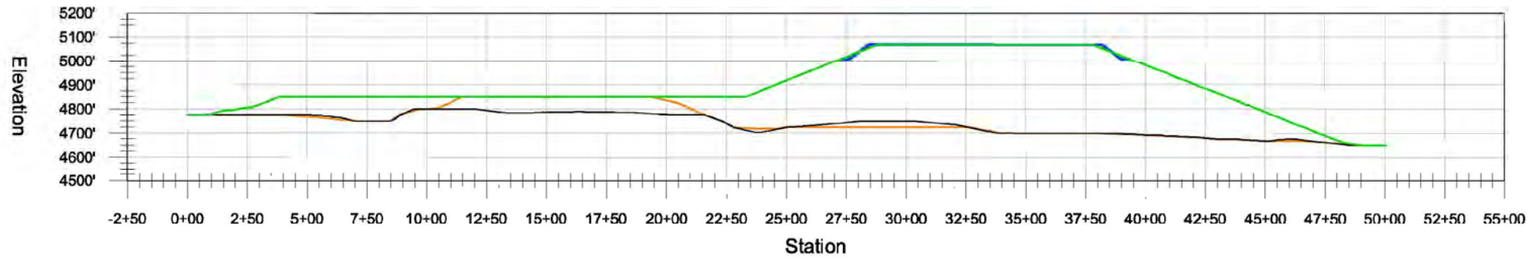
The existing Merrill-Crowe process plant and refinery would be expanded and the plant would be upgraded to receive high-grade pregnant solution. The refinery capacity would be approximately doubled by installing a new mercury retort and furnace with associated pollution control equipment. New Merrill-Crowe process plants would be installed at each of the proposed heap leach facilities. These plants would be very similar to the upgraded plant currently in operation at the site, and would include a vacuum de-aeration tower, clarifiers, pumps, tanks, a zinc feeder, zinc presses, and associated piping. The plant would either be located immediately adjacent to a process pond on double liners or provided with its own secondary containment as necessary to accommodate the individual components.

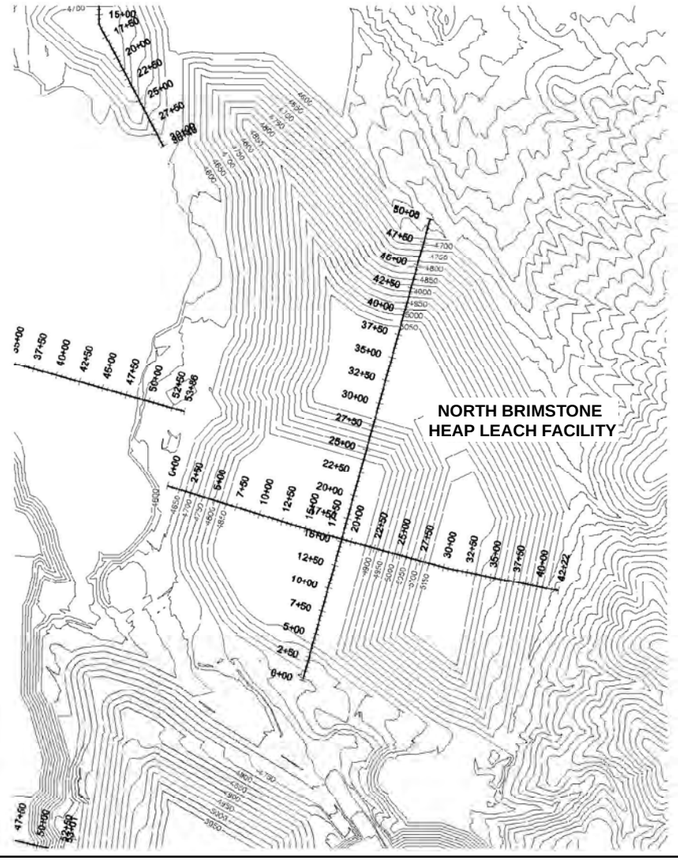
Mobile carbon plants may be installed at each process facility location. These mobile plants would be self-contained and where necessary, be placed on double-liners adjacent to a process pond to ensure full containment of the process fluids.

Preliminary design of the reagent storage pad at each heap leach facility assumes a 20,000 gallon cyanide tank and an 8,000 gallon anti-scalant tank. The proposed design consists of a 55-foot by 25-foot concrete pad with containment wall three feet high. The available secondary containment volume is 25,400 gallons, or approximately 127 percent of the largest tank volume. The required secondary containment capacity is 22,000 gallons (110 percent of 20,000 gallons).

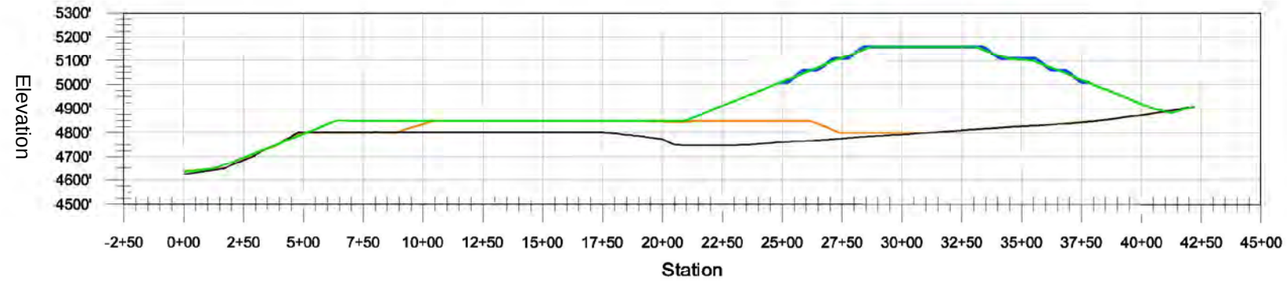
Construction on the South heap leach facility is projected to begin in 2015 with ore placement beginning in 2016. The South heap leach facility would include the heap, four process ponds, and a 5,000-gpm Merrill-Crowe process plant. The filtered precipitate would be trucked to the existing refinery. Ore to be added to the Brimstone heap leach facility would continue to be crushed and conveyed to the heap; ore may also be placed by end-dumping from trucks as necessary. A new portable crusher and conveyor would be operated at the South heap leach facility. General heap leach facility cross sections are shown in Figures 2.1.2 and 2.1.3. Figure 2.1.4 shows the proposed leach process flowsheet.

BRIMSTONE HEAP SOUTH-NORTH PROFILE





BRIMSTONE HEAP WEST-EAST PROFILE



EXPLANATION:

- 2008 TOPOGRAPHY
- 2012 TOPOGRAPHY
- 2024 ULTIMATE PIT
- 2024 POST-MINING TOPOGRAPHY
- 2024 POST-RECLAMATION TOPOGRAPHY

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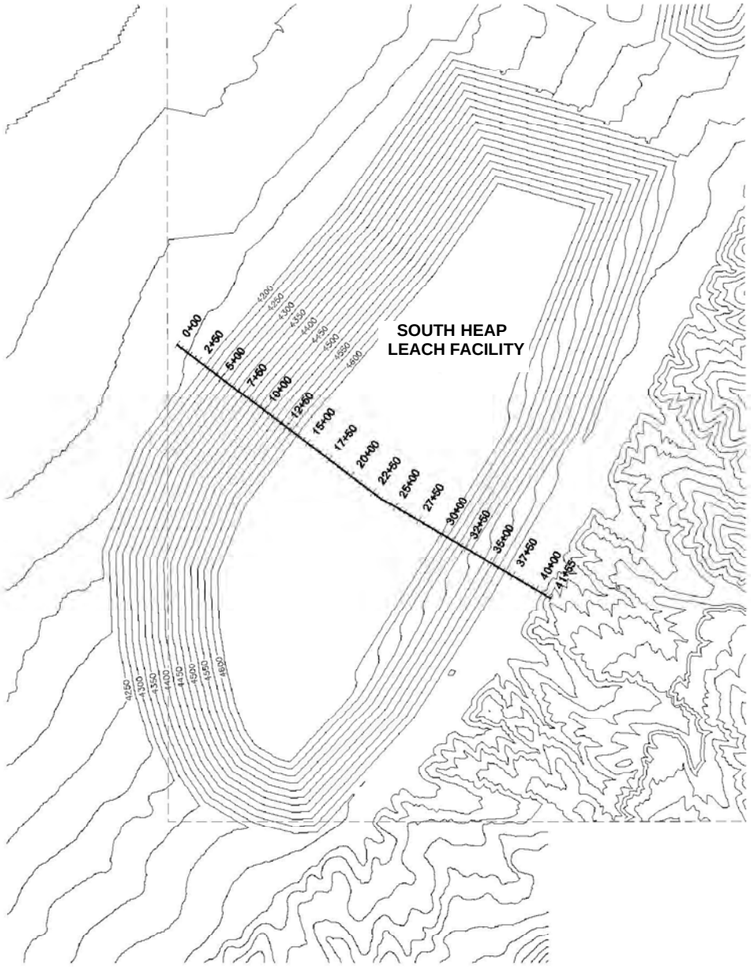
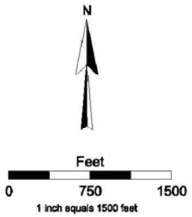
HYCROFT MINE EXPANSION PROJECT

Proposed North Brimstone Heap Leach Facility Cross Sections

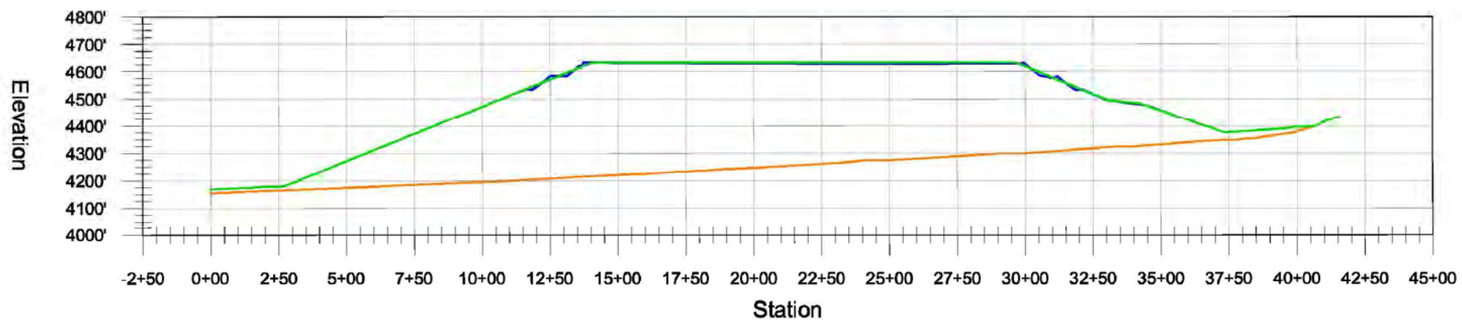
Figure 2.1.2

11/28/2011





SOUTH HEAP PROFILE



EXPLANATION:

- 2012 TOPOGRAPHY
- 2024 POST-MINING TOPOGRAPHY
- 2024 POST-RECLAMATION TOPOGRAPHY

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Proposed South Heap Leach
Facility Cross Sections

Figure 2.1.3

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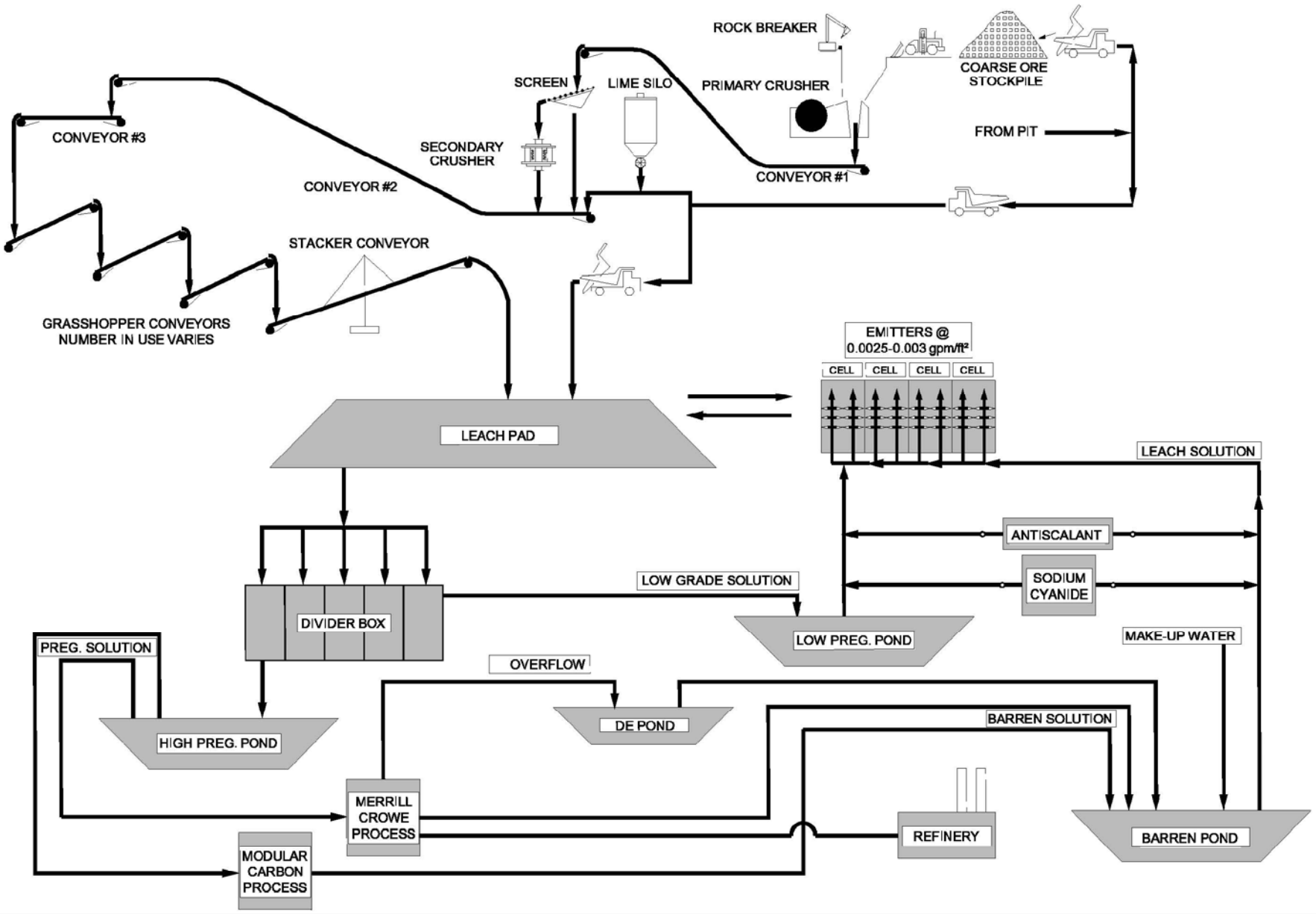

Notes:
gpm/ft^2 = Gallons Per Minute Per Square Foot
DE= Diatemaceous Earth

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Proposed Heap Leach Process Flowsheet

Figure 2.1.4

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The current list of reagents, which include sodium cyanide and anti-scalant, would continue to be used at the proposed North Brimstone and South heap leach facilities. Each facility would have appropriate engineered containment for these reagents. The outdoor storage facilities would be designed to hold 110 percent of the largest tank or series of tanks as well as direct precipitation from the 25-year, 24-hour storm event.

The North Brimstone heap leach pad would be designed with a total capacity of 113 million tons. The South heap leach pad would be designed with a total capacity of 236 million tons. The expanded heap leach facilities would be designed to contain leach material and solution in accordance with NAC 445A.432. Facilities would utilize the design principle of 100 percent containment (zero-discharge design) under both normal operating and emergency conditions. Each process pond would have a leak detection and collection system.

The liner system at each pad would consist of a primary synthetic liner, underlain by a compacted soil layer and partial leak detection system. The primary liner would consist of an 80 mil high density polyethylene (HDPE) liner placed over an underlying 12-inch-thick low permeability soil subliner. The soil subliner would have a hydraulic conductivity of $1x10^{-5}$ centimeters per second (cm/sec) or less. In addition, a secondary synthetic liner and associated leak detection and collection system would be placed in areas that have a greater potential for concentrated flow.

The solution connection and conveyance system would consist of a network of collection pipes, ditches and channels designed to collect overliner leach solution and transport it to the solution ponds. The solution collection pipes would be designed to flow at a maximum rate of 10,000 gpm. The solution channels along the perimeter of the leach pad would be formed by the offset from the heap toe to the perimeter containment berm and would be sufficient to accommodate the predicted runoff within the pad perimeter from the 100-year, 24-hour design storm.

A minimum of three feet of select overliner material (crushed ore or select drain rock) would be placed as an overliner drainage layer and liner cover layer to protect the synthetic liner and pipe network during subsequent stacking operations. Based on liner integrity testing, the material selected for use in the overliner layer would be crushed or screened to less than one-inch nominal diameter.

The leach pad leak detection and recovery system would consist of four-inch-diameter corrugated and perforated HDPE pipe, gravel drainage media, and geomembrane installed under the soil sub-liner at selected locations. The proposed layout of the leak detection system would generally follow the solution collection piping on top of the primary HDPE liner. Leak detection ports for the leach pad and solution channels would daylight in one of the preg ponds.

The heap leach facilities would be surrounded by containment berms to prevent run-on from entering the facilities. In addition, culverts and diversion ditches may be placed in and around the facilities as necessary for further storm water control. Table 2.1-8 presents a summary of the heap operating parameters.

Table 2.1-8: Heap Leach Design Parameters

Parameters	North Brimstone Heap Leach Facility	South Heap Leach Facility
Maximum heap height (feet)	400	400
Lift height (feet)	30	30
Slope angle	2.5H:1V	2.5H:1V
Heap capacity (ktons)	113,000	236,000
Application rate (gpm/ft^2)	0.0025 to 0.003	0.0025 to 0.003
Flow to Merrill-Crowe Plant (gpm)	5,000	5,000
Pumping Rate to Heap (gpm)	8,000 to 10,000	8,000 to 10,000

Source: HRDI 2010a.
Notes: gpm/ft^2 = gallons per minute per square foot
Final slope angles may vary according to topography, but would be no steeper than 2.5H:1V.

The design criteria for the solution ponds are as follows:

- Double-lined with leak detection (per NAC 445A.435 minimum design criteria: ponds);
- Four-foot pump draft and two feet of freeboard in high-grade preg, low-grade preg, and barren pond; no dump draft in DE settling pond;
- Pond operating volume equivalent to 12 hours or pumping at maximum potential pumping rate (10,000 gpm);
- No additional draindown capacity required; generator set to be located at each process pond area to operate pumps in case of line power outage; and
- Pursuant to NAC 445A.433(d), the primary process ponds would provide containment of all accumulations resulting from the 25-year 24-hour design storm. The emergency overflow pond would provide containment for the difference between the 100-year and 25-year storm accumulations.

The process ponds (including the DE pond) would be double-lined, with an 80-mil smooth HDPE primary liner underlain by a 60-mil HDPE Agru Drain Liner or equivalent secondary liner and "geonet" system which drains into a leak collection recovery system (LCRS) sump. Each process pond base would be graded at a one percent slope to the lowest corner where a leak detection sump is located. Each pond has a depressed sump area that is deeper than the main pond base to accommodate volume of the sump. The leak detection sump for detecting and recovering leakage would be accessed by a machine slotted six-inch PVC pipe. The pipe would be placed between the primary and secondary liners in one of the pond corners. An HDPE riser pipe would be installed between the primary and secondary liners to facilitate measurement of LCRS flows in the sump.

Alternatively, HRDI may elect to gravity drain the LCRS system to an external vertical riser sump to minimize head on the secondary liner. In this case, the LCRS drain outlet, conveyance pipe to the sump, and the sump itself would be dual-contained and provided with leak detection.

Design criteria for design of the emergency overflow ponds include a single HDPE liner (per NAC 445A.435[3]), and containment for the difference between the 100-year and 25-year storm runoff. Both the North Brimstone and South heap leach facilities would have five associated ponds. Table 2.1-9 presents a summary of the pond volumes associated with the heap facilities.

Table 2.1-9: Pond Volumes

Name	North (Mgal)	South (Mgal)
High-grade Preg Pond	16	16
Low-grade Preg Pond	16	16
Barren Pond	16	16
Event Ponds	7	7
DE Pond	4	4

Source: HRDI 2010a.
Mgal = million gallons

Storm water runoff would be contained within the heap leach facilities by use of berms and diversion ditches. Upgradient storm water diversion channels are designed to protect the proposed facilities from runoff generated by the 100-year, 24-hour storm event.

Upgradient storm water from the east side of the North Brimstone heap leach facility would be diverted by a constructed diversion channel and natural drainage along the east side of the heap leach facility. The constructed channel would be approximately 3,300 feet long, along the southern portion of the pad's east side, and would route collected storm water north to an existing natural drainage. The natural drainage slopes north along the pad's east side approximately 7,000 feet to the point where the drainage leaves the area of operations.

Upgradient storm water from the east side of the South heap would be diverted by a constructed channel along the east side of the heap. The constructed channel would be comprised of two sections: the northern section, which would divert storm water approximately 2,000 feet to the north, then curve to the west for approximately 3,500 feet where it would discharge to the playa; and the southern section, which would divert storm water approximately 5,500 feet to the south, then curve to the west for approximately 3,000 feet where it would discharge to the playa.

Solution that could be toxic to wildlife and domestic animals would be fenced and covered to prevent access as required by the NDOW Industrial Artificial Pond Permit.

A growth media cover would be placed on the Crofoot heap leach facility and proposed heaps to a depth of six inches. The growth media would be hauled to the heap surfaces from growth media stockpiles located near the facilities at locations shown on Figure 2.1.1. Covers for the heap leach pads are generally designed to accomplish the following:

- Limit infiltration of meteoric water;
- Isolate process materials from storm water runoff;
- Limit erosion; and
- Support successful revegetation.

With no cover and minimal vegetation, the Crofoot heap leach facility produced approximately three gpm as of September 2010 and averaged approximately three gpm over the previous year. According to the Lewis Final Closure Report (1999) the heap solution production from the Lewis heap leach facility had dropped to less than one gpm within nine months of the cessation of rinsing operations. The Lewis heap leach facility produced a solution flow rate of less than 0.1 gpm as of September 2010. For the Crofoot heap leach facility, 2.8 percent of annual average

rainfall is reporting through the heap to the ponds and for the Lewis heap leach facility less than 0.6 percent of the average annual rainfall is reporting through the heap. The Lewis heap leach facility has been draining since 1999 and is well vegetated and likely represents a good analogous data point to predict long-term steady state flow through the heap systems at the Hycroft Mine.

Based upon observations, a soil cover is not needed for the purpose of limiting infiltration of meteoric water into the heaps. Therefore, the design of an effective cover for the proposed heap leach pads at the Hycroft Mine would be based on the three remaining criteria: isolate process materials from storm water; limit erosion; and support vegetation. The use of a proposed six-inch cover/growth media application on the spent heaps and the cover's predicted performance with respect to these criteria is described in Appendix D of the Plan (HRDI 2010a).

2.1.5 Storm Water Management

Hydrologic studies have been undertaken to support the proposed activities for conceptual designs of the storm water management system. Figure 2.1.1 shows the location of the storm water channels, which would be permanent features at the Project. As with the current operations, storm water run-on from undisturbed upgradient areas would be diverted around the WRFs and would be returned to natural drainages during Project operations. The diversions would be designed to handle the 100-year, 24-hour storm event. Storm water generated in upgradient watersheds would be diverted as described below.

For the South WRF, upgradient storm water from the east would be diverted by a constructed channel along the east side of the dump. The constructed channel would be approximately 5,800 feet in length. The channel would follow the natural gradient to the south, flowing into an existing natural drainage that joins an existing storm water channel that slopes west along the south side of the South WRF. This existing South WRF channel would then meet and join the South heap leach facility channel (north section), and the confluence channel would then flow to an existing natural drainage.

For the heap leach facilities, the following would occur:

- North Brimstone Expansion Heap Leach Pad: Upgradient storm water from the east would be diverted by a constructed diversion channel and natural drainage along the east side of the pad (North heap leach pad east channel). The constructed channel is approximately 3,300 feet long, along the southern portion of the pad's east side, and routes collected storm water north to an existing natural drainage. The natural drainage slopes north along the pad's east side approximately 7,000 feet to the point where the channel leaves the area of operations.

- South Heap Leach Pad: Upgradient storm water from the east would be diverted by a constructed channel along the east side of the pad (South heap leach pad east channel). The constructed channel is comprised of two sections: 1) the northern section, which diverts storm water approximately 2,000 feet to the north, then curves to the west for approximately 3,500 feet where the channel discharges to the playa, and 2) the southern section, which diverts storm water approximately 5,500 feet to the south, then curves to the west for approximately 3,000 feet where the channel discharges to the playa.

Storm water flow would be directed around the heap leach facilities by diversion ditches designed for a 100 year/24-hour storm event as required by NAC 445A.433(1)(c). These ditches would remain in place following reclamation and closure of the heap leach facilities to ensure long-term stability. The diversion ditch locations are shown on Figure 2.1.1.

2.1.6 Support Facilities

Surfaces for support facilities would be grubbed and cleared. Salvageable growth media would be stockpiled for use in reclamation when the facilities are no longer needed.

2.1.6.1 Powerlines and Substations

HRDI would expand the existing power distribution system by upgrading the former Crofoot substation and re-locating and upgrading the Brimstone substation. Powerlines would be placed on existing and proposed surface disturbance areas to connect the substations with the new facilities. Powerlines would be constructed per the Suggested Practices for Raptor Protection on Powerlines Manual developed by the Edison Electric Institute, In addition, the design features would consist of Avian Powerline Interaction Committee construction standard and anti perching devices.

2.1.6.2 Project Facility Fencing

Fencing around the proposed Project facilities would be incorporated into the existing Project fencing. In addition, the proposed process ponds and refinery would be individually fenced.

2.1.6.3 Freshwater and Potable Water Supply

The Proposed Action would not require water beyond the total quantity of current water rights for the existing operation. Pumping rates would increase to the full capacity of the existing wells and a new replacement potable water well would be drilled in the northern end of the Project Area. The existing well would be abandoned in a manner that is consistent with applicable state requirements. The new well would be completed in permeable layers of the aquifer in order to produce the necessary quantities of water. Therefore, it is anticipated that the ground water replenishment would be similar to that of the existing wells as described in the existing operations. HRDI would continue to utilize the existing freshwater and potable distribution system. These facilities are shown on Figure 2.1.1. The construction of the new potable water well is to replace the existing potable water well that is located within the footprint of the new South heap leach facility.

2.1.6.4 Growth Media Stockpiles

Where practicable, growth media stockpiles would be located within yard areas or on the top of existing WRFs. The content of these stockpiles would be clearly identified using signs and other barriers to prevent access by motorized equipment. The stockpiles would be sloped and seeded with a fast-growing seed mixture to stabilize the surface from wind and water erosion. The stockpiles would be inspected periodically to ensure the signs/barriers are intact and the surfaces are stable. Table 2.1-10 shows a summary of the proposed growth media stockpile volumes. These facilities are shown on Figure 2.1.1.

Table 2.1-10: Growth Media Stockpile Volumes

Area	Volume (cubic yards)[1]
North Brimstone	2,385,900
North WRF	2,076,500
South Heap – GM-1	1,813,000
South Heap – GM-2	1,335,400
South Heap – GM-3	217,200
South WRF – GM-2	1,469,100
South WRF – GM-3	180,200
Total	**9,477,300**

Source: HRDI 2010a. [1] – Volumes are approximate and rounded to the nearest hundred

2.1.7 Rights-of-Way and Leases

HRDI ROWs located within the Project Area boundary would be incorporated into the Plan and included as a 43 CFR 3809 action. These ROWs include the following: NVN-039119 (water line/road); NVN-046292 (microwave repeater); NVN-046564 (powerline, wells, water line); NVN-046959 (pipeline, two wells, water line); and NVN-044999 (water pipeline from the Mabel Crofoot Estate). Figure 1.9.1 shows the existing ROWs that would be incorporated into the Plan. The portions of the ROWs outside of the Project Area would remain as ROWs used for the Project. For those ROWs within the Project Area that are controlled by other entities, HRDI would coordinate with the BLM and ROW holders if the ROW needs to be modified or relocated.

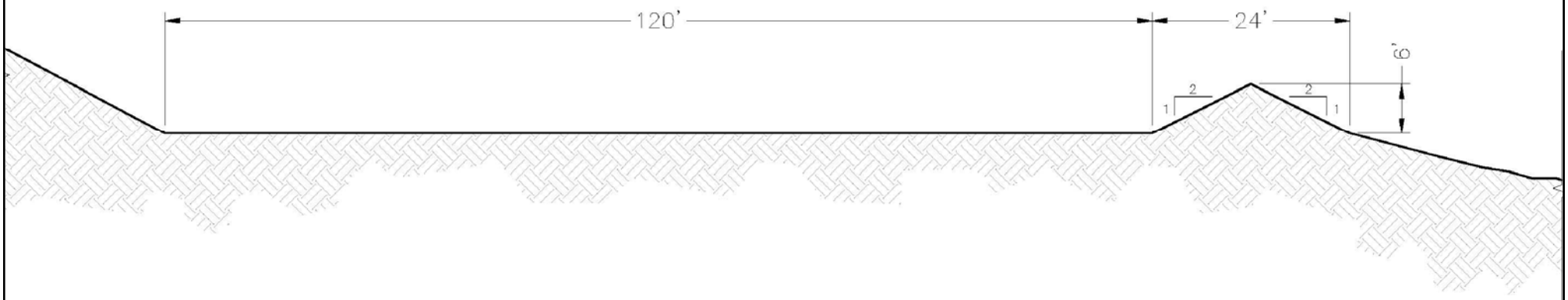
An application for a non-competitive geothermal lease (NVN-087416) within the approved Hycroft Mine Plan of Operations boundary was submitted to the BLM in April 2009. BLM action on the application is pending.

2.1.8 Haul and Access Roads

The mine components would be connected with haul roads and secondary roads. In general, the haul roads would have a maximum running width of 120 feet with average surface disturbance widths of approximately 150 feet; the actual road disturbance width may vary, depending on topography. A typical haul road cross section is shown in Figure 2.1.5.

Temporary ramps, secondary roads, and haul roads would be utilized for access to WRFs and other associated mining activities, in addition to ore hauling. Temporary ramps would generally be built to the same specifications as the haul roads and in accordance with MSHA safety regulations.

Deliveries would continue to arrive via Jungo Road from Winnemucca. HRDI would continue to work with Humboldt County to maintain this access road. A portion of Seven Troughs Road, a Pershing County road, would be realigned to accommodate the South heap leach facility. The reconstructed portion of this road would meet Pershing County standards and maintain public safety.



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Typical Haul Road Cross Section

Figure 2.1.5

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2.1.9 Transportation

Employees would continue to primarily use the HRDI parking lot in Winnemucca and company-provided transportation to get to the Project site. Two buses would be added to augment the current bus capacity. These vehicles would transport employees each shift for a total of four trips per day, seven days per week. Other light vehicles would continue to transport employees working different shifts. Personal vehicle travel to the site would be limited. Employees are encouraged to use company-provided transportation to the mine instead of using personal vehicles.

Bulk chemicals and supplies would continue to be transported to the site on trucks via Jungo Road from Winnemucca. Currently there are no restrictions on delivery times, and no restrictions would be proposed (HRDI 2010a).

HRDI currently provides maintenance support to Humboldt County on Jungo Road from the mine to Winnemucca, and would continue to do so for the duration of the Proposed Action. Road maintenance activities include providing equipment, manpower, and materials for maintenance, road watering, and general dust suppression activities.

2.1.10 Employment

HRDI presently employs approximately 160 full-time and 40 contract employees at the Hycroft Mine. This staffing level is expected to increase to approximately 537 employees at peak production in 2019. Table 2.1-11 shows the projected employment for the Proposed Action, which is approximately 337 full-time employees.

Table 2.1-11: Projected Mine Employment

Department	Number
Mine Operations	220
Mine Maintenance	50
Mine Total	***310***
Process Operations and Maintenance	28
Process Total	***28***
Administration and Technical	39
Administration Total	***39***
Total	**337**

Source: HRDI 2010a.

The Hycroft Mine facilities are currently located only in Humboldt County. The expansion would extend the Project Area boundary into Pershing County. Approximately 80 percent of the current employees of the Hycroft Mine live in Winnemucca and five percent live in Lovelock. The remaining 15 percent live in outlying areas such as Imlay, Fallon, Battle Mountain, Elko, Reno, Carson City, or out of the state. Those that live long distances away tend to stay in Winnemucca or Lovelock during their shifts. With the Hycroft expansion, this trend is expected to continue, with the exception of temporary construction crews that would likely live out of the area and stay temporarily in either Winnemucca or Lovelock. Potential crew members may live in Gerlach as well.

2.1.11 Public Safety

HRDI currently utilizes and would continue to provide public safety controls for the mine site to limit public access to the extent possible. Public safety measures used at the facility include security fences located at the entrance to the mine site, fencing around potentially hazardous areas such as the heap leach pads, process ponds, and process buildings. Chemicals on site are stored in secured buildings at locations throughout the main site. Other general safety measures used at the mine site include the following:

- Speed limits are posted and enforced on access routes;
- Warning signs are posted in areas where flammable materials and hazardous materials are stored and in areas where conditions warrant posting signs;
- Training is conducted for employees as required by MSHA; and
- Other MSHA training and safety requirements are followed and enforced by HRDI.

2.1.12 Chemical Use and Management

2.1.12.1 Solid and Hazardous Waste

No change to the existing non-hazardous solid waste streams (types and sources of non-hazardous waste) would occur as a result of the proposed activities. The currently authorized Class III-waivered landfill location would be closed and a new site would be constructed on private land within the Project Area (Figure 1.9.1).

The Hycroft Mine is currently classified as a Large Quantity Generator of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). No new hazardous waste streams would be generated as part of the proposed activities and the generator status would remain unchanged. The practice of recycling used oil, antifreeze, solvents, and batteries would continue. Currently authorized temporary on-site hazardous waste storage areas would be utilized for any hazardous waste generated.

2.1.12.2 Petroleum Contaminated Soils

HRDI submitted an initial PCS Management Plan to the BMRR and to the BLM in 2009, describing how PCS would be treated or disposed of at the mine. HRDI may also elect to ship PCS off site to an approved disposal facility. The PCS Management Plan was updated and submitted in June 2010, and approved in August 2011.

2.1.12.3 Fuels and Reagents

HRDI would continue to utilize the same types of fuels and reagents for the Proposed Action as their existing activities. Table 2.1-12 presents a summary of the usage and delivery of the proposed fuels and reagents.

Table 2.1-12: Summary of Proposed Fuels and Reagents Usage

Reagent	Proposed Average Annual Usage	Approximate Annual Deliveries	Proposed Storage Amount	Storage Method
Off-road Diesel Fuel	8,100,000 gallons	810	160,000 gallons	Above ground tanks
Unleaded Gasoline	178,200 gallons	18	10,000 gallons	Above ground tanks
Motor Oils	700,000 gallons	140	5,000 gallons	Bulk storage tanks
Antifreeze	180,000 gallons	60	5,000 gallons	Above ground tanks
Propane	191,250 gallons	48	37,000 gallons	Above ground tanks
Sodium Cyanide Solution (≤2%)	5,475,000 gallons	913	67,000 gallons	Above ground tanks
Prill	7,000 tons	228	125 tons	Silos
Lime	25,550 tons	720	600 tons	Silos
Antiscalant	328,500	66	24,000 gallons	Above ground tanks

Source: HRDI 2010a.

2.1.13 Sustainability

HRDI recognizes that the post-mining and post-reclamation mine area could provide opportunities for sustainable development. During the course of development, operations, reclamation, and closure, HRDI would work with private entities as well as federal, state, and local agencies to identify and plan for post-mining and post-reclamation uses such as the following: geothermal resources; utilization of the existing rail line; infrastructure support for activities in the Black Rock Desert; and a cell phone tower.

Numerous geothermal systems within the Basin and Range province (specifically the Battle Mountain High) have been characterized and developed for power generation (e.g., Beowawe, Brady's-Desert Peak, Blue Mountain, Dixie Valley). These geothermal systems result from deep circulation of meteoric water along normal faults: typically the north-northeast range front faults or fault systems which separate the mountain ranges and desert valleys in the area. The Hycroft Mine is located along a typical Basin and Range north-northeast range front fault system and in a similar geotectonic setting as these developed systems. HRDI intends to explore the nature and extent of any potential geothermal resource discovered within the Project Area. If there are any geothermal resources discovered during these exploration activities, HRDI may develop these resources in the future for purposes of power generation. HRDI would focus any exploration activities on private land within the Project Area and therefore these activities would not be subject to evaluation under NEPA and are not analyzed in this EIS.

2.1.14 Exploration

Exploration activities would continue throughout the Project Area in order to identify new reserves or expand existing reserves. Activities would consist of drill road and pad construction, surface sampling, trenching, bulk sampling, and drilling using both reverse circulation and core rigs. Exploration activities may also include water exploration and monitor well installation.

Exact locations of the exploration disturbance have not yet been determined. However, it is anticipated that up to 30 acres of surface disturbance may be created for exploration activities anywhere within the Project Area boundary. If additional disturbance for exploration activities is necessary, a Plan amendment would be prepared and submitted to the BLM for review and approval.

2.1.15 Applicant-Committed Environmental Protection Measures

The following environmental protection measures incorporated into the Proposed Action were designed in accordance with applicable laws and regulations and are considered industry standard with the exception of the lighting mitigation measure and the wildlife water development measure, which were developed and incorporated into the Proposed Action as a result of comments received during Project scoping.

2.1.15.1 Air Quality

Air emissions, including point and fugitive dust sources, would be controlled in accordance with the air quality operating permits for the Project and would be controlled in accordance with present BMPs shown in the *Hycroft Mine Dust Control Plan* and below in Table 2.1-13.

Table 2.1-13: Committed Practices for Fugitive Dust Control

Area	Control Practice
Drilling	Wet drilling as needed
Blasting	Stemming Optimize blast pattern
Exploration, clearing/grubbing	Application of water and dust suppressants Limit vehicle speed Controlling vehicle access by fences or berms
Hauling	Control vehicle speed Application of water and dust suppressants
Crushing	Water sprays Enclosures Minimize drop height
Conveying	Water sprays Enclosures Minimize drop height
WRF	Surface wetting Concurrent vegetation
Ancillary areas and growth media stockpiles	Application of water and dust suppressants Place gravel or pave Control vehicle access by fences or berms Revegetation

Source: HRDI 2010a.

2.1.15.2 Cultural Resources

- Pursuant to 43 CFR 10.4(g), HRDI would notify the BLM authorized officer, by telephone, and with written confirmation, immediately upon the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony (as defined in 43 CFR 10.2). Further pursuant to 43 CFR 10.4 (c) and (d), the operator would immediately stop all activities in the

vicinity of the discovery and not commence again for a maximum of 30 days or when notified to proceed by the BLM authorized officer.

- HRDI would not knowingly disturb, alter, injure, or destroy any historical or archaeological site, structure, building, or object. If HRDI discovers any cultural resource that might be altered or destroyed by operations, the discovery would be left intact and reported to the authorized BLM officer.

- In order to prevent impacts to cultural resources, HRDI would avoid eligible or unevaluated cultural sites within the Project Area. HRDI would ensure that eligible or unevaluated cultural sites within the Project Area are mapped and flagged by a qualified cultural resource specialist with a GPS unit prior to surface disturbance.

2.1.15.3 Fire Management

HRDI would comply with applicable federal and state fire laws and regulations and would take reasonable measures to prevent and suppress fires in the area of operations. HRDI and contractors would be required to carry fire extinguishers, hand tools, or backpack-type water pumps in their vehicles to suppress small fires.

2.1.15.4 Hazardous Materials Management

Solid and hazardous wastes would be managed according to the *Solid and Hazardous Waste Management Plan* (HRDI 2010c). Used oil, antifreeze, diesel fuel, grease, oil, solvents, ammonium nitrate, emulsion, and Class A explosives would be utilized as part of HRDI's proposed activities. Approved staging facilities, safety measures, transportation, and handling requirements are already in use and would continue to be utilized for the proposed Project. Used materials would be recycled where possible.

Aerosol cans would be emptied and de-pressurized prior to disposal. Liquid drained from aerosol cans would be tested to determine their waste status and managed appropriately. Accumulation of pressurized cans would be minimized.

Hazardous waste would be stored in properly labeled storage containers, dumpsters, or barrels. Storage containers would be closed except when materials were being placed in the containers. The storage containers would be clearly labeled or marked with the dates when accumulation began and when the container was filled. Storage containers would be in good repair with no defects and would be suitable for off-site shipment under NDOT requirements. Hazardous wastes would be shipped to an approved location by a certified hazardous waste vendor in accordance with RCRA requirements.

2.1.15.5 Lighting

HRDI would utilize screening on proposed stationary lights and light plants. Lighting would be directed onto the pertinent site only and away from adjacent areas not in use with safety and proper lighting of the active work areas being the primary goal. Lighting fixtures would be hooded and shielded as appropriate. The Proposed Action would also modify or retrofit the existing lighting facilities. HRDI would utilize the lighting measures provided in the *Hycroft*

Mine Lighting Management Plan (HRDI 2011a), which are designed to reduce the impacts to night skies.

2.1.15.6 Migratory Birds

Land clearing and surface disturbance would be timed to prevent destruction of active bird nests or young of birds during the avian breeding season and in accordance with the BRFO policies to comply with the Migratory Bird Treaty Act of 1918 (MBTA). If surface disturbing activities were unavoidable during the breeding season, HRDI would have a qualified biologist survey areas proposed for disturbance for the presence of active nests immediately prior to the disturbance.

2.1.15.7 Wildlife Water Developments

HRDI would coordinate with the NDOW if the existing small game guzzlers are impacted by the Project development to relocate the affected guzzler. In addition, HRDI would work with the NDOW on the development of a new big game guzzler in the vicinity of the Project Area to offset potential loss of big game habitat.

2.1.15.8 Noxious, Invasive and Nonnative Species

HRDI would work with the BLM to prevent the spread of noxious, invasive, and nonnative species in the area affected by the expansion. The ongoing weed control program would continue in the area of the proposed activity. Employees and contractors would be educated to identify weeds that could occur in the area disturbed. Should invasive weeds be identified, HRDI would take appropriate measures to prevent their spread, as identified in the *Hycroft Mine Noxious Weed Monitoring and Control Plan* (HRDI 2010d).

2.1.15.9 Storm Water

BMPs would be used to limit erosion and sediment transport from proposed facilities and disturbed areas during construction and operation, in accordance with the Nevada General Storm Water Permit NVR300000 and the Storm Water Pollution Prevention Plan (SWPPP). Following construction activities and in accordance with the BLM requirements, areas such as growth media stockpiles would be seeded as soon as practical and safe. Concurrent reclamation would be conducted to accelerate stabilization of disturbed areas.

In addition to the BMP inspections and reporting, an annual evaluation would be conducted, preferably following the spring runoff period. This evaluation would result in the preparation of a written report documenting the following:

- Inspection of areas contributing to storm water discharges containing pollution (i.e., sediment or product spills/leaks);
- Evaluation of BMPs for their effectiveness in reducing storm water pollutant loads; and
- Schedule for modifying the BMPs and revisions to the SWPPP, if practical reductions of pollutants can be achieved.

2.1.15.10 Monitoring

As part of the *Hycroft Mine Monitoring Plan*, HRDI proposes to monitor the following in compliance with state permits and other plans: air quality; WRFs and ore stockpiles; reagent and diesel storage; heap leach facilities; sediment controls; ground water; reclamation; noxious weeds; and wildlife (HRDI 2010e).

2.1.15.11 Reclamation and Closure

Reclamation of disturbed areas resulting from activities outlined in the Plan would be completed in accordance with BLM and NDEP regulations. The proposed disturbance areas are summarized in Table 2.2-1. The areas proposed for disturbance can be divided into the following: roads, heap leach facilities and process ponds, WRFs, stockpiles, buildings and equipment, and other ancillary areas. With the exception of the open pits, HRDI anticipates surface mine operations would be reclaimed and revegetated.

2.1.16 Growth Media

Growth media has been salvaged and stockpiled in areas associated with the existing facilities. Two of the existing growth media stockpiles (W-9 and W-29) are located in areas that would be mined under the Proposed Action. Prior to disturbance, these stockpiles would be moved. Both stockpiles would either be used for cover on the Crofoot heap leach facility or as cover on the Brimstone Phase I heap leach facility. Some growth media may be staged on top of nearby WRFs if not all of the material is used for concurrent reclamation. The location of the relocated material would be tracked and reported to the BLM and NDEP in updates to the Reclamation Plan for this Project.

Soil would be salvaged from new areas of surface disturbance prior to construction by bulldozing a minimum of two feet of material directly into stockpiles adjacent to disturbances. Where possible, growth media stockpiles would be located within yard areas or on the top of existing WRFs that would not be disturbed. These stockpiles would be clearly identified as to their content using signs and other barriers to prevent access by motorized equipment. Growth media stockpiles would be graded and seeded with the reclamation seed mix proposed for this Project to ensure stabilization and erosion control.

During final reclamation, salvaged growth media would be placed over the surface of the facilities. Growth media stockpile quantities shown in Tables 1.9-4 and 2.1-10 would be sufficient to cover the areas of disturbance with the prescribed depth of material during reclamation.

Prior to placement of growth media, the subsoil surface would be roughened by ripping or discing to ensure good contact. The growth media would be dumped and spread using a minimum of passes to limit compaction. Controlled dozer tracking may be performed during placement of the growth media to roughen the surface, lightly compact the soil, increase water retention, and prevent erosion.

2.1.16.1 Revegetation, Seeding, and Planting

All reclaimed surfaces would be revegetated to control runoff, reduce erosion, provide forage for wildlife and livestock, and reduce visual impacts. Seed would be applied with a mechanical broadcaster and harrow. All surfaces would be ripped where necessary to reduce compaction. Areas that are accessible to equipment would be scarified with a chisel tooth harrow and seeded by broadcasting either by hand or by equipment such as a tractor.

The harrow/mechanical broadcast equipment (tractor) would provide seedbed preparation and planting in one operation. Slopes that exceed 2.5H:1V, or other areas inaccessible to equipment, such as the steep terrain road locations, would be seeded by hand broadcasting. Seedbed preparation and seeding would take place in the fall after regrading on reclaimed areas and placement of the growth media. Compacted surfaces would be loosened and left in a rough condition by ripping. The seed would then be covered using a wire harrow pulled by the tractor. Seeding depths would range from 0.25- to 0.75-inch. Most grasses and forbs would not exceed a 0.5-inch seed depth. Areas requiring additional seedbed preparation would be scarified with the wire harrow prior to seeding. In steep or excessively rocky areas where uniform coverage would be difficult, hand broadcasting with a cyclone-type bucket spreader or a mechanical seed blower would be used in conjunction with the tractor. Hand broadcast seed would be covered by harrowing, raking or other site-specific appropriate methods.

Table 2.1-14 lists the seed mix for the site. The mix is designed to provide species that can be sustained in the environment of northcentral Nevada, are proven species for revegetation, or are native species found in the plant communities prior to disturbance.

Table 2.1-14: Recommended BLM Revegetation Seed Mixture

Common Name	Scientific Name	Application Rate (pounds PLS/acre)
Four-wing saltbush	*Atriplex canescens*	4.00
Shadscale	*Atriplex confertifolia*	0.50
Forage kochia	*Kochia prostrate*	1.00
Greasewood (Black)	*Sarcobatus vermiculatus*	0.50
Nevada Mormon tea	*Ephedra nevadensis*	4.00
Bottlebrush squirreltail grass	*Sitanion hystrix*	1.00
Total		**11.0**

Source: HRDI 2010a. Notes: PLS = pure live seed

Based on successful revegetation of historic disturbance on the site, it is not expected that any soil amendments would be necessary. If amendments were applied, they would be incorporated into the top four to six inches of the surface by mechanical or other means. This would be accomplished during ripping or dozer tracking.

2.1.16.1.1 Control of Undesirable Species

During vegetation establishment, weed control practices would be implemented to limit the growth and spread of noxious weeds, and to ensure that revegetation would be successful. The control program would include, but may not be limited to, the use of weed-free straw in the reclamation program, and all seeds would be tested for noxious weeds before planting. If noxious

weeds are found, the seed would be rejected. The primary method of control would be seeding of disturbed areas as soon as practicable after the seedbed has been prepared.

2.1.16.2 Proposed Reclamation Schedule

During the life of the Hycroft Mine, concurrent reclamation and interim reclamation would be performed whenever possible, to reduce erosion and weed invasion. The remainder of the revegetation would occur following the cessation of all site activities. Table 2.1-15 provides the time table for the proposed operations and for initiation and completion of reclamation activities. Reclamation activities would be timed to take advantage of optimal climatic conditions. Scheduling of reclamation activities would occur as soon as possible after the mining activities in a particular area are completed, thus minimizing erosion and sedimentation.

General scheduling procedures to be followed include, but are not limited to, the following:

- Grading, drainage control establishment, and maintenance would be conducted in late spring to late summer; and
- Seeding would preferably be completed in mid to late fall or in winter. In some cases, early to mid-spring seeding would take place when weather constraints or other unavoidable circumstances preclude fall seeding.

The post-closure monitoring time frames outlined in the reclamation schedule are based on the regulatory minimum. These time frames may be extended based on actual field conditions at the time of closure. Specific requirements for closure monitoring are outlined in the *Hycroft Mine Monitoring Plan* (HRDI 2010e).

2.1.16.3 Post-Mining Land Use

Post-mining land use objectives are recreation, wildlife habitat, and livestock grazing. Geothermal power generation potential exists in the Project Area.

2.1.16.4 Post-Mining Contours and Topography

Figure 2.1.6 shows the anticipated post-mining topography (i.e., end of operations) of the Project components. Figure 2.1.7 shows the final, post-reclamation topography for these same areas once final regrading of surfaces has occurred.

2.1.16.5 Final Gradient Slope Stability Criteria

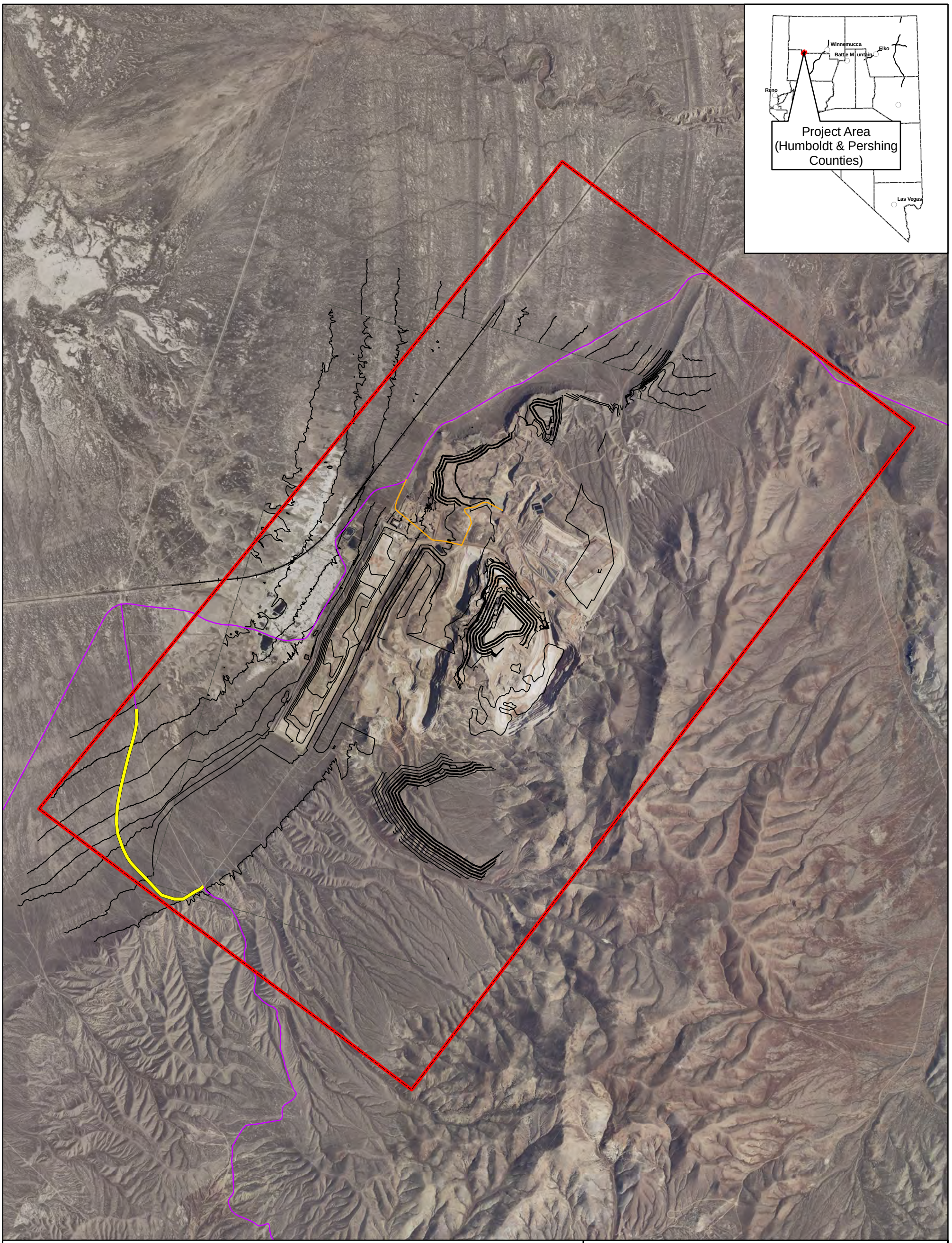
Final slope gradients for the proposed WRFs and the proposed heap leach facilities would be stable under post-reclamation static and pseudo-static conditions. One critical WRF cross section was selected to evaluate the stability of the overall WRF configuration. The critical cross section had a height of 432 feet, sideslopes of 2.5H:1V and consisted of alluvial foundation material. The results of the static and seismic slope stability analysis for the WRF are shown on Figure 2.1.8 and in Table 2.1-16.

Table 2.1-15: Proposed Reclamation Schedule

Task Name	Years																																													
	2013		2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030		2031		2032		2033		2034		2035	
	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
Earthwork																																														
Process Fluid Stabilization																																														
Structural Reclamation																																														
Post-Closure Monitoring and Final Reclamation																																														

Notes: H1 = first half of year; H2=second half of year

	Earthwork
	Stabilization
	Demolition/Structural Reclamation
	Monitoring and Final Reclamation



Projection: UTM Zone 11 North, NAD83

Explanation

- Proposed Project Area Boundary
- Proposed County Road
- Proposed Seven Troughs Road Realignment
- Proposed Mine Access Road
- Railroad Track

1:45,000

0 0.25 0.5 1 Miles

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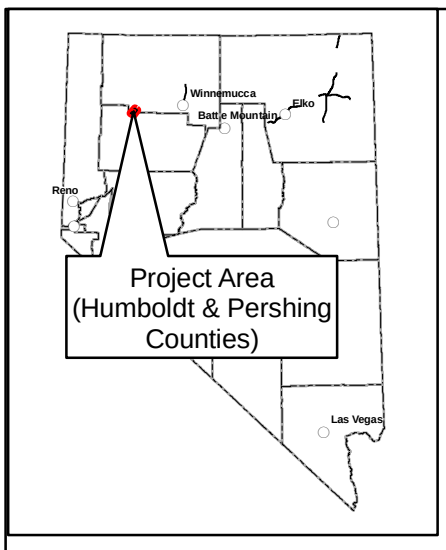
HYCROFT MINE EXPANSION PROJECT

Post-Mining Topography

Figure 2.1.6

11/28/2011



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Feet
0 1000 2000
1 inch equals 1000 feet

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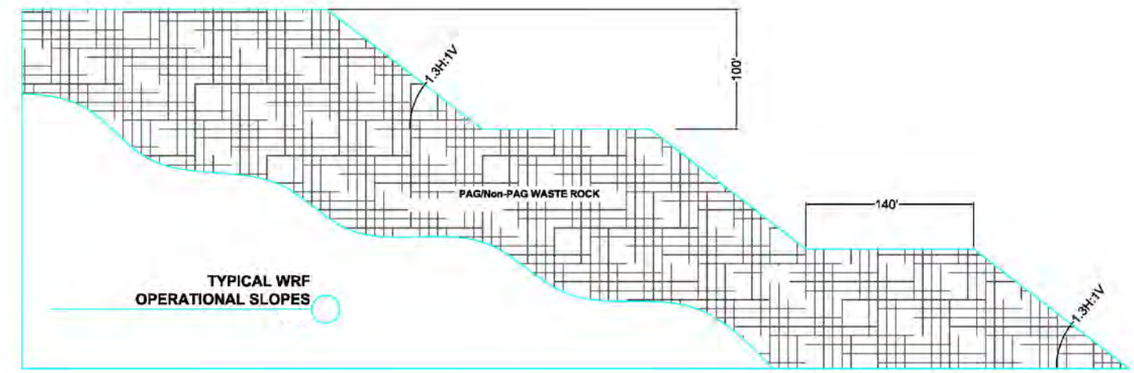
HYCROFT MINE EXPANSION PROJECT

Post-Reclamation Topography

Figure 2.1.7

11/28/2011



Notes:
WRF = Waste Rock Facility
PAG = Potentially Acid Generating
Non-PAG = Non-Potentially Acid Generating
H:V = Horizontal : Vertical

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HYCROFT MINE EXPANSION PROJECT

Typical Waste Rock Facility
Operational and Reclamation Detail

Figure 2.1.8

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Table 2.1-16: Slope Stability Analysis – Waste Rock Facility

Sections	Factor of Safety			
	Circular Failure Mode		Noncircular Failure Mode	
	Static	Seismic	Static	Seismic
Section C (critical WRF cross section)	1.69	1.27	--	--

Source: HRDI 2010a.

A critical cross section was selected for each proposed heap leach pad. The critical sections had the following specifications: 1) a height of 400 feet; 2) sideslopes of 2.5H:1V; 3) an 80 mil HDPE liner; 3) a 12-inch clay liner with natural ground slope toward the down-slope heap leach pad toe; and 4) alluvial foundation material.

Operating slopes for the proposed heap leach pads and WRFs would have benches at angle of repose with a factor of safety of greater than 1.0. The facilities would be constructed with bench setbacks sufficient to result in an overall slope that would not exceed 2.5H:1V which would result in facility height (overall) factors of safety equal to the values above. During operations the public would be prevented from accessing these facilities. The results of the static and seismic slope stability analysis of the heap leach pad are summarized in Table 2.1-17.

Table 2.1-17: Slope Stability Analysis – Heap Leach Pad

Sections	Factor of Safety			
	Circular Failure Mode		Noncircular Failure Mode	
	Static	Seismic	Static	Seismic
Section A (critical cross section for South Heap Leach Pad)	1.73	1.31	1.67	1.23
Section B (critical cross section for North Brimstone Leach Pad)	1.56	1.16	1.59	1.18

Source: HRDI 2010a.

2.1.17 Reclamation of Open Pits

The Boneyard and Bay Area open pits would be completely backfilled, the Center open pit would be backfilled up to 90 percent and the Brimstone open pit would not be backfilled. The backfilled open pit configurations and cross section details are shown on Figures 2.1.9, 2.1.10, and 2.1.11.

In order to comply with NAC 519A.315(3)(e) and BLM requirements to ensure public safety, remaining highwalls would include a safety berm located in a stable area set back from the open pit edges. A berm is assumed to be required around the entire perimeter of the Brimstone open pit and on the east side of the Center open pit. It is anticipated that all other highwalls would be backfilled. Setback areas between the barriers and open pit edges would not be revegetated.

2.1.18 Reclamation of Waste and Development Rock Piles

2.1.18.1 Regrading

Material identified as PAG and non-PAG would be deposited in the center of the WRFs and surrounded by 24-inches of non-PAG material, which includes six inches of growth media. The

non-PAG material serves as an inert layer of material between the PAG material and the cover material. The non-PAG material layer also limits the PAG material's exposure to meteoric water during operation. After the portions of the dump reach ultimate design capacity, the slopes would be graded and covered. The slope configuration is shown on Figure 2.1.8.

If any slopes are left after closure without encapsulation by non-PAG material they would be sloped prior to placement of a two-foot thickness of non-PAG material followed by six inches of growth media.

The waste rock facilities, including pit backfilled areas with slopes, would be reclaimed to meet certain general objectives including the following: visual continuity with surrounding landforms; stable slopes; reduced slope erosion; mass stability; rounded edges; revegetated surfaces; and control of sediment. The final slopes of the reclaimed waste rock facilities would not exceed 2.5H:1V.

During reclamation, the outer slopes would be irregularly contoured to achieve natural-looking overall slopes with a rounded crest to produce a more natural appearance. The top of the dump would be scarified to break up compaction and would be regraded to produce a positive slope toward the outer edges of one percent to promote runoff. Where final slopes exceed 100 vertical feet, small slope breaks (20 feet wide) would be constructed during final regrading. When available, large boulders would be randomly placed on slopes and tops. The final configuration of the WRF's and pit backfilled areas are shown on Figure 2.1.8.

2.1.18.2 Growth Media Placement

The primary purpose of the cover on WRFs would be to support vegetation and limit erosion. The proposed cover for the WRFs would be six inches. Cover material would come from growth media stockpile located near the facility. This cover depth has been proven successful on other mine site facilities, demonstrating vegetative covers in excess of 100 percent of the reference plots.

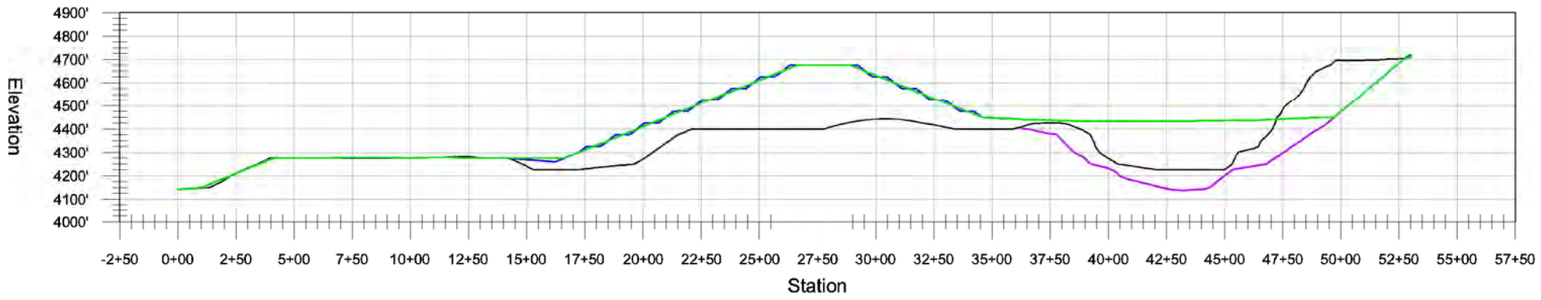
During final reclamation, salvaged growth media would be placed over the surface of the facilities. Growth media stockpiles quantities shown in Tables 1.8-4 and 2.1-10 would be sufficient to cover the areas of disturbance with the prescribed depth of material during reclamation.

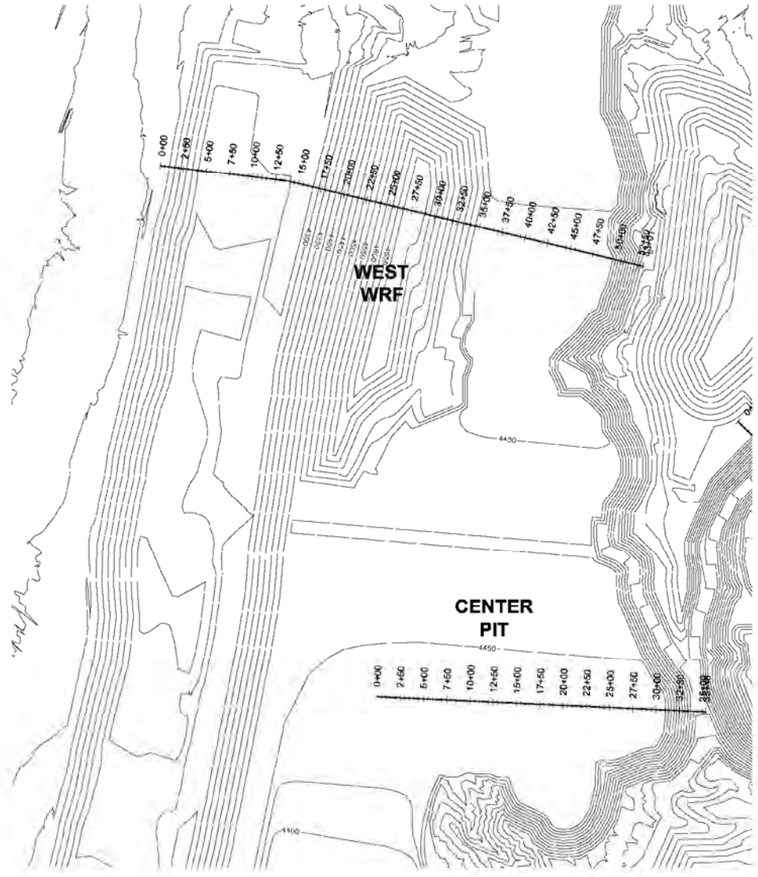
Before placement of the growth media, the subsoil surface would be roughened by ripping or discing to ensure good contact. The growth media would be dumped and spread using a minimum of passes to limit compaction. Controlled dozer tracking may be performed during placement of the growth media to roughen the surface, lightly compact the soil, increase water retention, and prevent erosion.

2.1.18.3 Revegetation

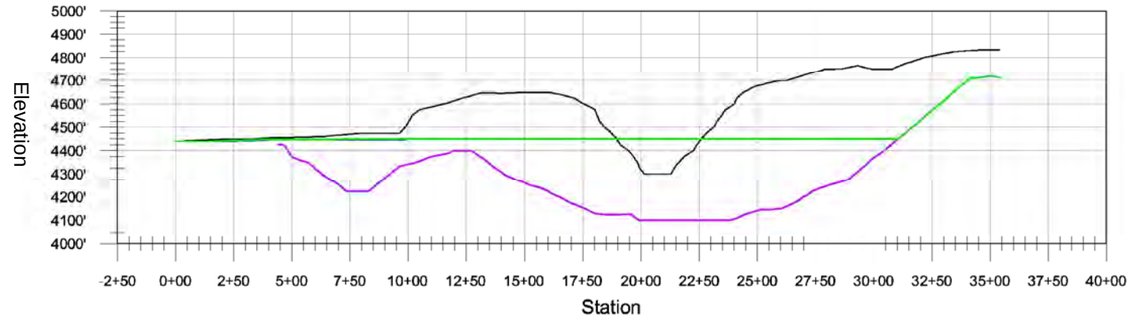
The regraded growth media stockpiles would be revegetated in accordance with the discussion under Section 2.1.16.1 Revegetation, Seeding and Planting of this EIS.

CENTER PIT - WEST WRF PROFILE





CENTER PIT PROFILE



EXPLANATION:

- 2008 TOPOGRAPHY
- 2024 ULTIMATE PIT
- 2024 POST-MINING TOPOGRAPHY
- 2024 POST-RECLAMATION TOPOGRAPHY

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HYCROFT MINE EXPANSION PROJECT

Proposed Center Open Pit and
West Waste Rock Facility
Cross Sections

Figure 2.1.9

11/28/2011

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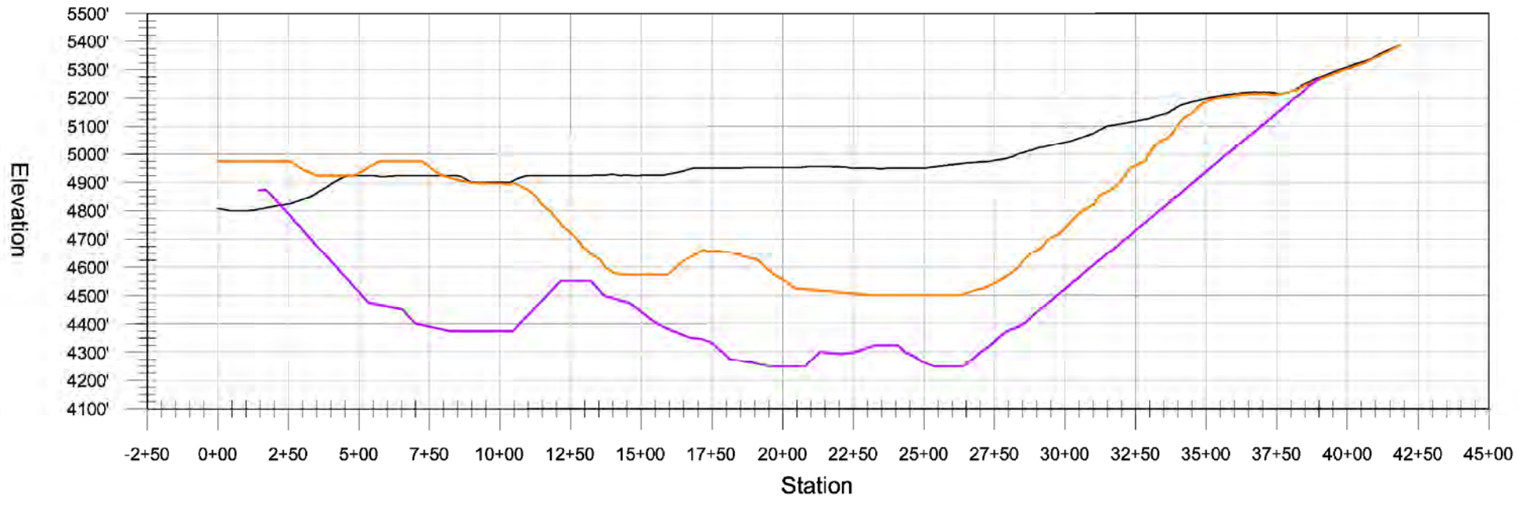
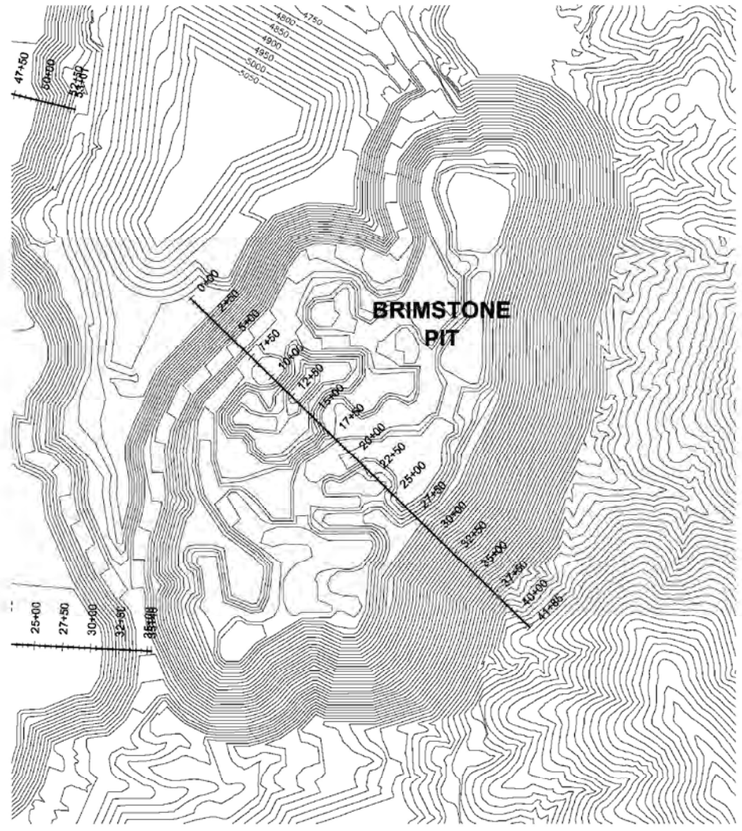
Feet

0 750 1500

1 inch equals 1500 feet

BRIMSTONE PIT PROFILE





EXPLANATION:

- 2008 TOPOGRAPHY
- 2012 TOPOGRAPHY
- 2024 ULTIMATE PIT

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HYCROFT MINE EXPANSION PROJECT

Proposed Brimstone Open Pit
Cross Section

Figure 2.1.10

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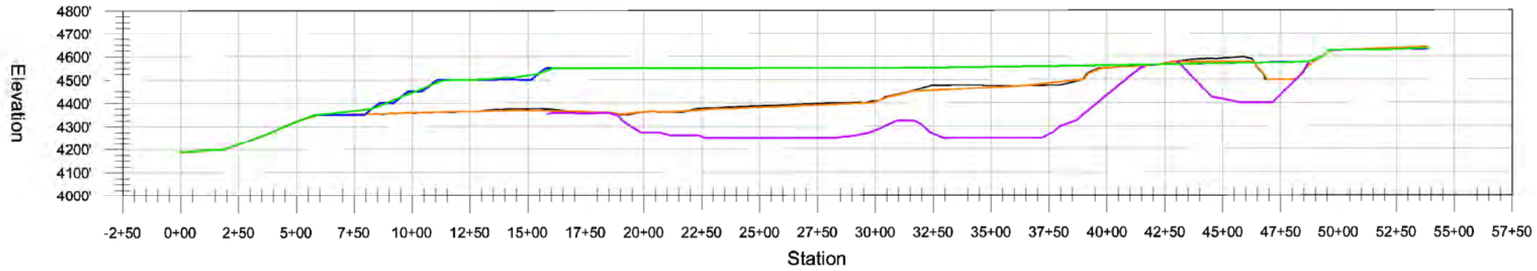
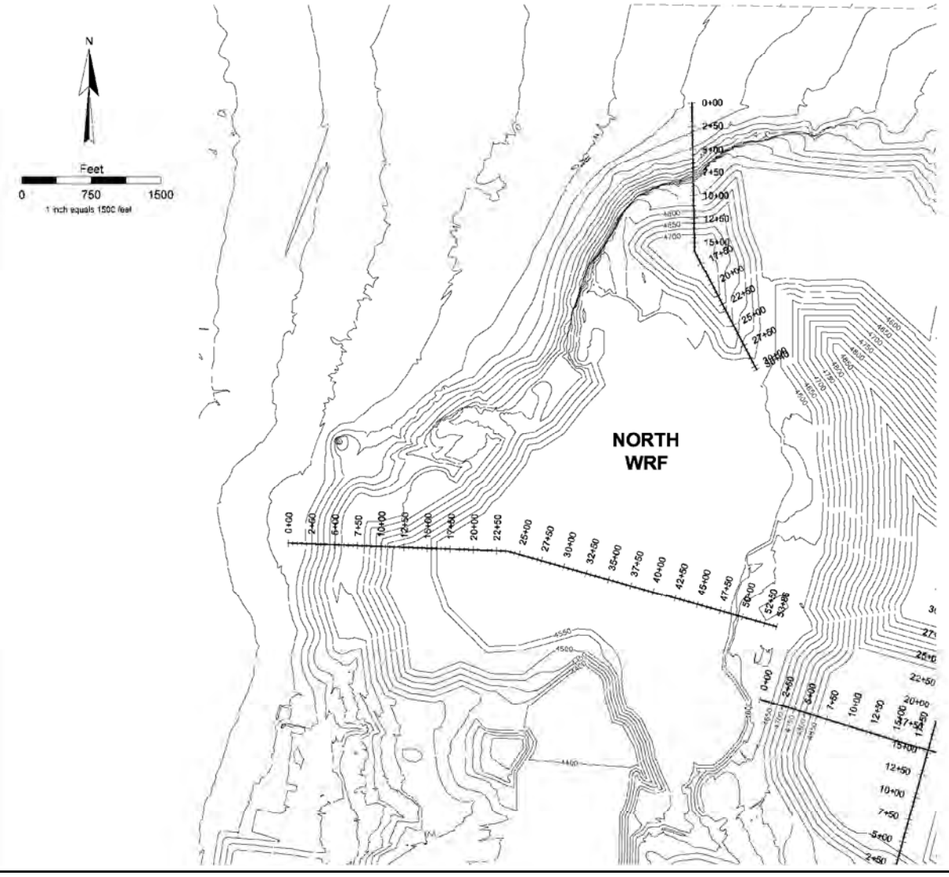
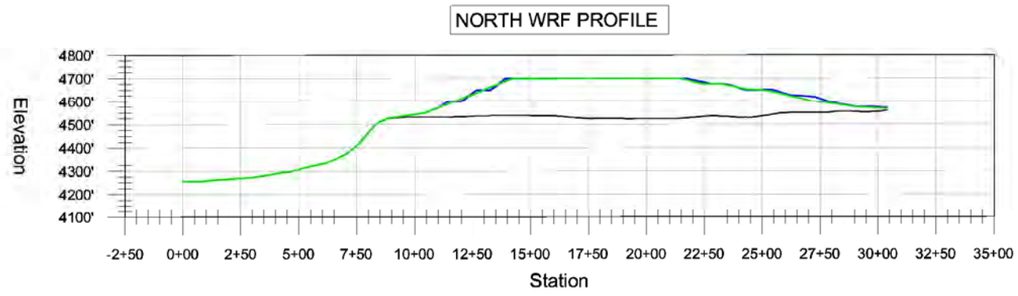
BAY AREA - BONEYARD PIT - NORTH WRF PROFILE





NORTH WRF PROFILE



EXPLANATION:

- 2008 TOPOGRAPHY
- 2012 TOPOGRAPHY
- 2024 ULTIMATE PIT
- 2024 POST-MINING TOPOGRAPHY
- 2024 POST-RECLAMATION TOPOGRAPHY

Notes:
WRF = Waste Rock Facility

WINNEMUCCA DISTRICT OFFICE
Black Rock Field Office
5100 East Winnemucca Blvd.
Winnemucca, NV 89445

BUREAU OF LAND MANAGEMENT

HYCROFT MINE EXPANSION PROJECT

Proposed Bay Area and Boneyard
Open Pits and North Waste Rock Facility
Cross Sections

Figure 2.1.11

11/28/2011

2.1.18.4 Soil Stabilization

Successful revegetation that approaches surrounding native vegetation densities would reduce surface erosion. Soil erosion at the site is also not considered a risk due to the low rainfall and the anticipated gravelly textures of the growth media to be applied. This is supported by site observations that confirm the existence of old waste rock areas and the Lewis heap leach pad, in some cases older than 20 years, without evidence of major erosion. Soil erosion from the WRFs would be minimized using the following methods:

- Regrading the heap leach facilities to an average final slope not steeper than 2.5H:1V;
- Leaving small horizontal benches along contour at least every 100 vertical feet of slope;
- Rounding the crest and toes to gradually match the top and bottom slopes;
- Scarifying the slopes along contours;
- Applying growth media; and
- Revegetating the surfaces.

2.1.19 Reclamation of Heap Leach Facilities

2.1.19.1 Regrading

The leach pads would be regraded to an average final slope configuration not steeper than 2.5H:1V to provide for long-term mass stability. The toe of the regraded slope would end inside and at the edge of the lined facility in such a way that the subsequently placed cover material would allow the surface runoff to be directed off of the lined area of the pad. Regraded sideslopes would also include slope breaks horizontally along contours approximately every 100 vertical feet. Slope breaks would be small flat benches up to 20-feet wide and blended into the slopes. The toe and crest of the facilities would also be rounded to blend into the adjacent slopes. Minimizing the total continuous slope length with benches and rounding the toe and crests would help to limit erosion until vegetation was established.

Regrading the heap leach pads to a final slope configuration no steeper than 2.5H:1V slope would cover the heap leach solution collection ditches. Prior to regrading, a drain pipe would be installed in the solution collection ditches to the edge of the liner as discussed above. Final reclaimed configurations for the heap leach pads are shown on Figure 2.1.8.

2.1.19.2 Cover Placement

A preliminary cover evaluation was performed in support of the Crofoot heap leach facility in 2001 (The Mines Group, Inc. 2001). This report determined that little benefit was seen in reducing infiltration by capping and that more than one foot of material gave no incremental benefit. A growth media cover would be placed on the heap leach pads to a depth of six inches. The growth media will be hauled to the heap surfaces from growth media stockpiles located near the facilities at locations shown on Figure 2.1.1.

Covers for heap leach pads are generally designed to accomplish the following:

- Limit infiltration of meteoric water;
- Isolate process materials from storm water runoff;

- Limit erosion; and
- Support successful revegetation.

Currently, with no cover and minimal vegetation, the Crofoot heap leach facility is producing approximately three gpm and has averaged approximately three gpm over the last year. According to the report (HRDI 1999) the heap solution production from the Lewis heap leach facility had dropped to less than one gpm within nine months of the cessation of rinsing operations. The Lewis heap leach facility is currently producing a solution flow rate of less than 0.1 gpm. For the Crofoot heap leach facility, 2.8 percent of annual average rainfall is reporting through the heap to the ponds and for the Lewis heap leach facility less than 0.6 percent of the average annual rainfall is reporting through the heap. The Lewis heap leach facility has been draining since 1999 and is well vegetated and represents a good data point to predict long-term steady state flow through the heap systems at the Project.

Assuming one percent of average annual precipitation would report through the proposed heaps, steady state flow for the North Brimstone heap leach facility would be one gpm, Brimstone heap leach pad 4 (existing) would be 0.8 gpm and the South heap leach facility would be two gpm. These flows could easily be managed in a zero discharge system by converting the proposed and existing process ponds to ET cells. Based upon these observations a soil cover is not needed for the purpose of limiting infiltration of meteoric water into the heaps.

ASW performed a recent cover study that included an evaluation of the rinse and draindown data from the Lewis heap leach facility and geotechnical and geohydrologic characteristics of the existing cover (ASW 2010). Rinse and draindown data were reviewed to determine the leach pad's typical response to a known applied flux. This data was then used to assist in evaluating the performance of the evapotranspiration (ET) cover in response to precipitation events. By determining the geotechnical and geohydrologic specifications of the existing cover, material and construction specifications can be developed for future covers to achieve similar performance. ASW concluded that the cover on the Lewis heap leach pad was performing well and had reduced the drain down precipitation from 11.7 percent to 2.4 percent. Based on ASW's experience a deep percolation rate of 2.4 percent is considered excellent performance for an ET cover. The cover material is composed of clayey sands and clayey gravels. The moisture retention properties of the cover soils are within a range that can both sustain typical arid-region vegetation and can evaporate or store an amount of water that may be introduced in the arid environment of the mine site. It is to be expected that future covers, constructed of similar materials, would perform to the same standard as the existing Lewis heap leach pad with the following considerations: the cover should be a six inches thick; the cover should be constructed of similar soils; and the cover should be placed at similar moisture contents and compacted similar to the original cover.

Therefore, the design of an effective cover for the proposed heap leach facilities at the Project would be based on the three remaining criteria: isolate process materials from storm water; limit erosion; and support vegetation. The use of a proposed six-inch growth media application of the heap leach and its predicted performance with respect to these criteria are described below.

2.1.19.3 Isolate Process Materials

Therefore, as demonstrated in a cover study performed on the closed Lewis heap leach facility, application of six inches of growth media would isolate the process materials in the heap leach pads from storm water (ASW 2010). Slope regrading would be accomplished such that subsequent placement of growth media would project over the lined area and direct the runoff from the slopes onto the adjacent land and prevent contact between storm water and process materials.

2.1.19.4 Limit Erosion

Successful revegetation approaching surrounding native vegetation densities would reduce surface erosion. Soil erosion at the site is also not considered a major risk due to the low average annual rainfall and the anticipated gravelly textures of the growth media to be applied. This is supported by site observations that confirm the existence of old waste rock areas and the Lewis heap leach pad (surfaced with six inches of growth media) in some cases older than 20 years, without evidence of erosion.

2.1.19.5 Vegetation Success

The currently approved vegetation cover standard for the Hycroft site is 50 percent of the comparable cover of the established reference areas. The Lewis heap leach pad was last leached in 1992 and was reclaimed in 1999 by sloping and adding six inches of growth media and seeding. Vegetation success was evaluated by the Mines Group in 2003 and reported in 2004. One transect was evaluated on the Lewis heap leach facility. The measured total percent cover was 26.1 while the average of the two reference locations was 14.3 percent. Of the thirteen transects located on previously seeded areas all met the minimum cover requirement of 50 percent of the reference plot and nine of the 13 plots were in excess of 100 percent.

The available site data indicates that six inches of growth media would allow successful revegetation of the disturbed facilities and the application of six inches should perform as well as the existing and documented reclamation efforts.

2.1.19.6 Revegetation

The regraded heap leach facilities would be revegetated in accordance with the discussion under subsection 2.1.16.1 Revegetation, Seeding, and Planting of this EIS.

2.1.19.7 Soil Stabilization

Soil stabilization efforts for the heap leach facilities are the same as the efforts for the growth media stockpiles. Refer to subsection 2.1.18.4 of this EIS for a more detailed discussion.

2.1.19.8 Cyanide Stabilization and Neutralization

Rinsing of the heap leach pads with fresh water would provide no added benefit other than the reduction of cyanide, which can be achieved simply by recirculation of remaining heap solution during residual gold recovery and fluid management during closure. This has been demonstrated

by the Gold Acres heap rinsing case study (Bowell 2009). The results of this study indicate that rinsing of the heap with fresh water could actually result in an increase in the release of constituents by changing the pH-redox conditions within the heap. Rinsing would result in the consumption of a large quantity of fresh water that would then need to be managed by evaporation. Consequently, fresh water rinsing of the heap material is not proposed.

2.1.19.9 Treatment of Outflows, Residual Chemical or Fluids in the Heaps

After operations cease, solution in heap leach pads would be allowed to drain down until the rate of flow from these facilities can be passively managed through evaporation from the ponds or a combination of evaporation and infiltration. The time required to reach this point is primarily a function of the final reclamation strategy, rather than drain down rate, and depends upon the fluid management measures taken to reduce solution inventory.

Fluid management would include an active and passive phase. During the active phase, solution would be recirculated and evaporated through a forced spray evaporation system located on the heap leach pads, and or ponds. Heap solution may also be re-applied to the heap leach pad using the existing drip or sprinkler system. As the residual flow decreases the forced spray evaporation system would be limited to application over the pond surfaces. This would minimize the amount of solution being re-applied to the heap leach pad surfaces. The purpose of the active phase would be to rapidly reduce solution inventory in the heap leach pad, and associated ponds to allow transition to the passive management phase. The evaporation program would be continued until drain down from the heap leach pads has reached levels that can be handled through a passive management system.

Active evaporation on the heap surfaces would occur for two to five years after closure begins. Until active evaporation on the facility surfaces ceases, growth media would not be placed on those portions of the facility surfaces that are being used for evaporation.

Management of drain down solution during the passive phase would include converting the associated ponds into ET cells. These cells would be created by backfilling the ponds and the ET cells would be planted with the reclamation seed mix or a seed mix designed to work with wetter conditions. Existing event ponds used in the passive management phase would be double lined with HDPE prior to being converted into ET cells. If additional pond capacity was needed, more ponds would be constructed that would be designed to evaporate residual drain down flows.

In-place closure is proposed for process ponds that are not used for the purposes of passive fluid management. It is assumed that all ponds would be converted to ET ponds in order to shorten the active management period and allow passive management to begin sooner.

2.1.20 Reclamation of Solution Ponds

Ponds not planned to be converted to ET ponds would be reclaimed as described below.

2.1.20.1 Backfilling and Regrading

Any sediment remaining in the ponds would be tested prior to decommissioning and either placed on the leach pad, disposed in accordance with state and federal regulations, or left in place

after seeking authorization from the NDEP and the BLM. All pond liners would be folded down over the bottom of the pond. The ponds would be backfilled with soil, regraded to shed runoff away from the pond footprint, and the surfaces would be revegetated. The placement of fill material and regrading would be completed in a manner that promotes runoff and inhibits infiltration.

2.1.21 Road Reclamation

Exploration, small vehicle mine roads and haul roads without a defined post-mining use would be reclaimed concurrently when they were no longer needed for access. Haul and small vehicle roads required during closure would be reclaimed when they were no longer needed. The primary reclamation objectives for the roads would be long-term stabilization and surface water management.

All roads scheduled for reclamation would be recontoured to approximate original topography or in a manner consistent with the final surrounding topography. This would be completed by pulling in road safety berms, ripping the road surface, removing any culverts and reestablishing drainage. Where roads were constructed by cutting, the edge berm and fill would be pulled back against the inside cut of the road. Ditches that would no longer be required would be regraded. Since roads are constructed with near surface soils, which would be replaced on the road surface during reclamation activities, no growth media would be needed prior to seeding with the reclamation seed mix.

2.1.22 Measures to Minimize Loading of Sediment to Drainage Channels

There are no lakes or perennial streams in the immediate vicinity of the Project Area and no specific measures to contain sediment are proposed, other than successful surface stabilization via revegetation. During the establishment of vegetation, HRDI would construct sediment collection facilities as required to capture (for subsequent replacement), sediments eroded from the slopes.

HRDI proposes to convey runoff from reclaimed areas and upstream undisturbed areas through the Project Area in a manner that would protect the reclaimed areas and prevent degradation of downstream water quality. The drainage and sediment control plan is designed to require no maintenance. Natural drainages would be reestablished, and existing natural channels would be used.

2.1.22.1 Diversion Features and Swales

All diversion features and swales to control erosion would be designed to limit erosion and scouring, and to discharge flows resulting from a 25-year/24-hour storm. Refer to Section 2.1.5 Storm Water Management for a description of drainage and diversion facilities.

2.1.22.2 Sediment Traps

Sediment traps are considered to be temporary sediment control structures, which would only be required during operations, reclamation activities and the period required for establishing vegetation. These facilities would be designed to safely accommodate flows generated by a 25-

year/24-hour design storm. During operations, these facilities would be periodically maintained during reclamation monitoring and would be removed when reclamation is deemed successful.

2.1.23 Disposition of Buildings and Ancillary Facilities

All buildings and facilities associated with the Project would be removed from the site during the salvage and site demolition phase. Most of the building materials would be salvageable and would be removed from the site. Those materials that are unsalvageable and meet the solid waste disposal criteria would be disposed of in the Class III-waivered landfill. Concrete foundations and stem walls would be demolished to natural grade, broken up to allow drainage through slab foundations and buried in place. Coarse waste rock fill would be used to fill subgrade portions of the foundations. The sites would then be covered with growth media and revegetated. All reagents, chemicals and other hazardous or toxic chemicals would be removed from the site. Any above surface pipelines would be removed. Underground pipelines would be capped and left in place. Power poles would be cut off at ground level and removed. Perimeter fences would also be removed.

2.1.24 Surface Facilities or Roads Not Subject to Reclamation

No surface facilities are currently planned to remain within the Project Area boundary following reclamation. However, HRDI is currently investigating the geothermal potential in the Project Area and if a viable resource is discovered, then some infrastructure would remain to support power generation. In coordination with the BLM, HRDI may leave some infrastructure in place in support of activities in the Black Rock NCA.

As deemed appropriate by the BLM, any roads on public lands determined to be suitable for public access would not be reclaimed at mine closure. At this time, this includes the main access road to the mine facilities and the public access roads (Jungo Road and Seven Troughs Road).

2.1.25 Post-Reclamation Monitoring and Maintenance

The reclaimed site would be inspected on an annual basis in coordination with the BLM and NDEP until the reclamation has been released. During this time HRDI would maintain and repair site perimeter and open pit access fences/berms and warning signs. WRF slopes, heap surfaces and diversion ditches/runoff control structures would be monitored for excessive erosion or sedimentation. The stability of remaining open pit highwalls would also be monitored and open pit backfill/waste rock facilities would be checked for subsidence.

Heap effluent drainage from the closed heaps would be monitored in accordance with the WPCP. Analytical parameters and procedures would be consistent with those contained in HRDI's State of Nevada WPCP NEV94114.

Post-reclamation monitoring would commence on any reclaimed area following completion of the reclamation work for the area, and would occur until the Project is fully reclaimed. Post-closure vegetation monitoring would consist of surveys coordinated with the BLM and the NDEP. These surveys would determine the revegetation success rate using the method described in the Plan. Vegetation monitoring obligations would cease upon the NDEP and BLM's approval of site revegetation and approval of submitted post-closure vegetation surveys. The existing mine

perimeter fence would remain to prevent livestock access until revegetation surety release at which time it would be removed.

Post-mining ground water quality would be monitored according to the requirements established by NDEP upon approval of the permanent closure plan, with the goal of demonstrating non-degradation of ground water quality.

2.1.26 Drill Hole Plugging Procedures

All mineral exploration and development drill holes, monitoring and observation wells and ground water production wells subject to NDWR regulations would be abandoned in accordance with applicable rules and regulations (NAC 534.425 through 534.428). Boreholes would be sealed to prevent cross-contamination between aquifers and the required shallow seal would be placed to prevent contamination by surface access.

Monitoring wells around the facility would be maintained by HRDI until released of this requirement by the NDEP. These wells would then be plugged and abandoned according to the requirements of the State Engineer.

2.1.27 Concurrent Reclamation

HRDI is committed to maximize concurrent reclamation within operating constraints. The Crofoot heap leach facility is currently in closure and reclamation activities would continue while the Hycroft mine remains active. The existing Brimstone heap leach facility would be reclaimed after active leaching ceases.

The proposed Brimstone North heap leach expansion and the South heap leach facility would both be concurrently reclaimed by performing earthwork on the sideslopes during active operation of the pads. A maximum of three lifts would remain open at any one time. Other activities would include the maintenance of the mine site to minimize surface erosion and adverse environmental impacts.

2.2 Alternatives to the Proposed Action

The analysis of alternatives in this EIS is based on the following criteria: a) public or agency concern; b) technical feasibility; c) potential to reduce an environmental impact of the Proposed Action; d) ability to meet the purpose of and need for the Proposed Action; and e) compliance with regulatory and legal guidance (i.e., National Mineral Policy Act). A Scoping Summary outlined comments received during public scoping, and included recommendations from public comments on alternatives to be analyzed in this EIS. The Scoping Summary is on file and available for review at the BLM's BRFO during normal business hours. Alternatives to the Proposed Action derived through the scoping process (internal and public) include the following:

- No Action;
- Daylight Only Hours of Operation;
- Modified Exploration Activities; and
- Different WRF and Heap Leach Pad Configurations.

The following section of the EIS discusses alternatives to the Proposed Action and identifies one alternative that is to be analyzed in the remainder of the EIS, in addition to the Proposed Action, which is the No Action Alternative.

Mine operations are composed of a number of facility components. There can be alternative means and locations to implement these components in most settings. However, these alternative means are limited by the location of the mineral deposit, land and mineral ownership, and existing physical constraints, both natural and manmade. For the Proposed Action varying the location of a number of the proposed facilities is constrained by topographic features, existing transportation networks, surface ownership, ore body location, and water rights.

2.2.1 No Action Alternative

Under the No Action Alternative, HRDI would continue mining activities as outlined in previously approved plans of operation and reclamation and closure plans. Refer to Section 1.9.2 for a discussion of the existing mining activities. Based on disturbance calculations performed by HRDI in December 2011, there are approximately 453 acres authorized for disturbance within the existing Plan boundary that are subject to future disturbance. These acres include approximately 45 acres for road construction and exploration roads and drill pads; 132 acres for the expansion of the open pits, adits and trench areas; four acres for the expansion of the Lewis and Crofoot ponds; six acres for the expansion of the heap leach pads; and approximately 266 acres for the expansion of the WRFs, primarily the expansion of the East WRF. In addition, HRDI would continue to increase the heights and potentially change the configurations of the WRFs and heap leach pads and deepen the open pits within the authorized parameters. This incremental increase in disturbance would take place in time frames established by the annual mine plans developed by HRDI and approved by the BLM and NDEP.

Under the No Action Alternative, none of the open pits would be backfilled which represents approximately 758 acres of the Project Area that would not be subject to reclamation. The Crofoot heap leach facility is already in closure and has been regarded, capped, and revegetated. The Brimstone and Lewis heap leach facilities would be regraded and capped with a minimum of six inches of growth media composed of previously stockpiled native alluvium. The existing solution pipes would be covered to a depth of two feet with alluvium in the ditch to preserve a solution flow path for residual drainage to the permanent evaporation cell. One of the two existing solution pipes would be left in place to convey residual draindown and a four-inch diameter perforated drainage pipe would be added alongside the existing pipe in the solution flow ditch and covered with alluvium (The Mines Group 2002).

The existing solution ponds would be reconfigured to evaporation ponds, which would be expected to contain and evaporate residual draindown from the heap leach facilities in closure. The Brimstone high-grade solution pond and the Brimstone barren solution pond would be converted to permanent evaporation cells by covering the lined surface of the ponds with a minimum of 12 inches of alluvium. Following successful rinsing of the heaps, the other process solution ponds would be reclaimed in a manner consistent with the requirements of NAC 445A. Remaining rinse solutions would be removed by enhanced evaporation or land application. Sediments left in the ponds would be tested to determine if the sediments have the potential to degrade surface water or ground water. If the tests determine there is a potential for degradation

of water resources, the sludge material and the liners, if necessary, would be disposed of offsite in accordance with local, state, and federal regulations (The Mines Group 2002).

The two existing lined ponds that provide make-up water to the processing circuit would be reclaimed once the heap rinsing is complete. Remaining water would be removed by consumptive use or land application. The liners would be folded into the interior of the ponds. The pond sites would be backfilled, graded to promote free drainage, and covered with six inches of growth media. The reclaimed pond areas would then be revegetated (The Mines Group 2002).

Many of the existing WRFs have had earthwork completed including regrading and placement of growth media. Following the completion of mining, all of the WRFs would be reclaimed (The Mines Group 2002).

All equipment and facilities would be dismantled and removed from the site. The structures would be demolished and scrapped, or disposed of in the Class III waivered landfill at the site. Building foundations would be covered with two feet of alluvium and the surface would be regraded to a free draining conditions and revegetated. The perimeter fencing would remain in place until the revegetation standards have been met. Fencing around individual facilities would be removed at the time each of those facilities is reclaimed (The Mines Group 2002).

All other facilities including the tank farm, electrical substation, bioremediation cells and the Class III waivered landfill would be tested and closed according to regulations. Exploration roads and drill pads would be reclaimed to as near the original contours as possible (The Mines Group 2002).

The reclaimed site would be inspected on an annual basis in coordination with the BLM and NDEP until final release is attained (The Mines Group 2002).

Further mineral development on private land could occur even if the BLM selected the No Action Alternative. The public land area would remain available for future mineral development or for other purposes as approved by the BLM. Any additional activities proposed on public lands within the area would be analyzed under their own site-specific NEPA analysis at the time they are proposed.

2.2.2 Alternatives Considered but Eliminated from Detailed Analysis

Several alternatives were identified for consideration in this EIS. The following is a discussion of those alternatives identified through the scoping process, including alternatives identified by the public, that have been eliminated from detailed consideration in this EIS. The alternatives were considered relative to the criteria in Section 2.1.

2.2.2.1 Daylight Only Hours of Operation Alternative

Under this alternative the proposed Project activities would operate only during daylight hours. This alternative was developed to potentially eliminate impacts to night skies from Project lighting, as opposed to the 24-hour operations identified in the Proposed Action. This alternative would not restrict the existing authorized operations. Therefore, at some point during the life of the proposed Project the mining and processing under the current approvals would end and the

operations would be limited to daylight hours only. The implementation of this alternative would also eventually eliminate essentially all sources of light from night time operations and thus reduce effects to the dark skies element of visual resources. Leach operations would have to continue on a 24-hour basis to manage solution under the requirements of the facilities WPCP. As a result there would be some lights to meet operational and safety requirements.

The Proposed Action, as described in Section 2.1 and the Plan, is used as a basis of comparison for this alternative and addresses the specific equipment required for mining and processing. The operation of this equipment is proposed to be the same as existing operations, i.e., 24 hours per day seven days per week. Mining rates are designed to provide ore to the processing facility at a steady rate that approaches the design capacity of the equipment; these mining rates drive the selection of mining equipment. Therefore, the existing equipment that is being used under the existing operations and the Proposed Action would not be appropriate for a nominal 12 hours per day operation (assuming this alternative would still produce the same amount of gold per year as the Proposed Action).

An alternative with half the annual hours of operation of the Proposed Action has not been designed; however, for the sake of comparison, there are several facets of a hypothetical similar annual production rate project with half the hours of operation that could be anticipated. Mining and processing equipment would be larger, as would ancillary facilities (powerline supply and well field for example). However, ultimate disturbance from the heap leach facility, open pit and waste rock dumps would eventually grow to the same size as in the Proposed Action. Operations employee numbers would be less than that required for the Proposed Action, although the decrease would be less than 50 percent. Profitability would be reduced, as would tax revenues.

This alternative would not completely eliminate night lighting due to the requirements of 24-hour per day staffing to meet environmental permit requirements and the associated night lighting to meet safety requirements. Nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) emissions would be greater than under the Proposed Action; therefore, as under the Proposed Action, there would be an exceedance of the Federal 1-hour standards. This alternative would substantially reduce the employment and tax revenue generated, relative to that generated by the Proposed Action. This alternative would decrease, but not substantially reduce impacts to the visual resources in comparison with the Proposed Action over the entire life of the Project because of the existing facilities. For these reasons, the Daylight Hours Operation Alternative does not meet the criteria under Section 2.2 and has been eliminated from detailed consideration.

2.2.2.2 Project Design to Meet Federal Air Quality Standards Alternative

The design of the Proposed Action and other alternatives result in air quality impacts that would result in exceedances of the Federal 1-hour SO_2 and NO_2 ambient air quality standards. Under this alternative, the Project design or equipment would be changed such that air quality modeling would show that the Federal 1-hour SO_2 and NO_2 ambient air quality standards would not be exceeded. The Project design change would be to move the Project fence a sufficient distance from the Project activities; however, this would result in the Jungo Road and the railroad being within the fence boundary. To be able to model that the Federal 1-hour SO_2 and NO_2 ambient air quality standards would not be exceeded, the Jungo Road and the railroad track would have to be moved beyond the Project fence so that the public using the road or railroad would remain beyond the fence. The other option would be to use truck engines and fuel that decrease the SO_2

and NO_2 emissions sufficiently such that the ambient air quality standards would not be exceeded. However, engines and fuels that would have sufficiently low emissions and the same performance do not currently exist. For these reasons, the Project Design to Meet Federal Air Quality Standards Alternative does not meet the criteria under Section 2.2 and has been eliminated from detailed consideration.

2.2.2.3 Modified Exploration Activities Alternative

Under this alternative the mining portion of the Project would commence as outlined in the Proposed Action (Section 2.1). However, the proposed exploration activities within the Project Area would be conducted in a manner that would minimize or eliminate new road construction. Under the Proposed Action, 30 acres of the 2,172 acres, or less than two percent of the proposed new surface disturbance would be associated with exploration. This surface disturbance could occur anywhere within the 9,517-acre portion of the Project Area that does not have proposed facilities (Figure 2.2.2). HRDI would utilize only existing roads, overland or cross country travel and would not allow for construction of new roads for exploration activities. Utilization of cross country travel exclusively for the Project would eliminate much of the exploration area due to topographic limitations and minimal existing roads. An alternative that eliminates access to portions of the Project Area, which is located in an area that is open to mineral entry and is not closed to off-road use, would deny the mining claimant the opportunity to fully evaluate and characterize the mineral potential. However, the Proposed Action incorporates the use of cross country travel and would utilize this method where feasible. For these reasons, the Modified Exploration Activities Alternative does not meet the criteria under Section 2.2 and has been eliminated from detailed consideration.

2.2.2.4 Different Waste Rock Facility and Heap Leach Facility Configurations Alternative

Under this alternative, the WRF and heap leach facility configurations would be changed so that the heights would be lowered. Lower heights on the WRF and heap leach facility would be established in an effort to reduce the impacts to visual resources. As a result, the footprint of the WRF and heap leach facility would be increased to accommodate the change in storage volumes. This would include the time necessary to construct the WRF and heap leach facility, assuming the same equipment fleet as under the Proposed Action, and therefore increase the length of time necessary to complete the mining of the open pit. Therefore, activities under this alternative would occur over a longer time period in comparison with the Proposed Action. This alternative would increase the amount of surface disturbance and include a likely reroute of the Jungo Road. There would be increased impacts to vegetation, wildlife, and soils, as well as increased air emissions, due primarily to the increased time frames for mining and longer haul distances during the life of the Project. This alternative would decrease, but not substantially reduce impacts to the visual resources in comparison with the Proposed Action over the entire life of the Project because of the existing facilities. For these reasons, the Different Waste Rock Facility and Heap Leach Facility Configuration Alternative does not meet the criteria under Section 2.2 and has been eliminated from detailed consideration.

2.2.3 The BLM Preferred Alternative

Section 9.2.7.3 of the BLM NEPA Handbook directs that an EIS "...identify the agency's preferred alternative. ... For external proposals or applications, the proposed action may not turn out to be the BLM preferred alternative because the BLM would often present an alternative that would incorporate specific terms and conditions on the applicant."

Thus, the BLM has selected a Preferred Alternative based on the analysis in this EIS. This Preferred Alternative is the alternative that best fulfills the agency's statutory mission and responsibilities, 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 2 of the EIS, with the inclusion of the identified recommended mitigation measures to the Proposed Action as specified in Chapter 3 of the EIS.

2.3 Summary of Effects

A summary of the direct and indirect effects, as well as recommended mitigation measures, and the effectiveness of the mitigation for the Proposed Action and No Action Alternative are outlined in Table 2.3-1.

Table 2.3-1: Summary of Potential Environmental Effects, Recommended Mitigation Measures, and Effectiveness of Mitigation

	PROPOSED ACTION	NO ACTION ALTERNATIVE
AIR AND ATMOSPHERIC RESOURCES		
Summary of Impact:	**Summary of Impact 3.2.3.3-1:** Emissions of PM_{10} and $PM_{2.5}$ would be generated by numerous processes as a result of the Proposed Action, including the resuspension 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 direct impact to air quality is quantified in the modeled PM_{10} and $PM_{2.5}$ concentrations, which show levels below the NAAQS and the NvAAQS, even with the addition of the background values.	**Summary of Impact 3.2.3.4-1:** Emissions of PM_{10} and $PM_{2.5}$ would be generated by numerous processes as a result of the No Action Alternative, including the resuspension 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 remainder of the No Action Alternative. The direct impact to air quality would be modeled from PM_{10} and $PM_{2.5}$ concentrations that would be similar but less than those under the Proposed Action and would be expected to show levels below the NAAQS and the NvAAQS, even with the addition of the background values.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.2.3.3-2:** Combustion emissions of CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and VOC would be generated by numerous processes as a result of the Proposed Action, including combustion emissions from diesel engines and burning propane or diesel in various process equipments. The modeled CO, PM_{10}, and $PM_{2.5}$ concentrations show levels below the NAAQS. The NO_2 and SO_2 modeled concentrations would be below the NAAQS (except the 1-hour standards). The modeled NO_2 and SO_2 1-hour concentrations would be in exceedance of the NAAQS. Even with this impact, the Proposed Action would be in compliance with the FCAA. This is due to the NAAQS exceedance resulting from mobile and fugitive sources of NO_2 and SO_2. The mobile sources are regulate under Title II of the FCAA, which requires engine manufacturers to meet specific emission standards. The Proposed Action is regulated	**Summary of Impact 3.2.3.4-2:** Combustion emissions of CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and VOC would be generated by numerous processes as a result of the No Action Alternative, including combustion emissions from diesel engines and burning propane or diesel in various process equipments. The direct impacts would be expected to be similar to those under the Proposed Action. As a result, a model of the CO, PM_{10}, and $PM_{2.5}$ concentrations would show levels below the NAAQS. In addition, the NO_2 and SO_2 modeled concentrations would be expected to be above the NAAQS (except the 1-hour standards). The modeled NO_2 and SO_2 1-hour concentrations would be expected to be in exceedance of the NAAQS. Even with this impact, the No Action Alternative would be in compliance with the FCAA. This is due to the NAAQS exceedance resulting from mobile and fugitive sources of NO_2 and SO_2. The mobile sources are regulated under Title II of the FCAA, which requires engine

	PROPOSED ACTION	NO ACTION ALTERNATIVE
	under Title I of the FCAA. Therefore, these mobile and fugitive sources are not considered when a permit is issued under Title I of the FCAA. The direct impacts from the Proposed Action would not exceed the NvAAQS. The Proposed Action activities would be permitted under an Operating Permit issued by the BAPC.	manufactures to meet specific emission standards. The No Action Alternative is regulated under Title I of the FCAA. Therefore, these mobile and fugitive sources are not considered when a permit is issued under Title I of the FCAA. The direct impacts from the No Action Alternative would not exceed the NvAAQS. The No Action Alternative is currently permitted under an Operating Permit issued by the BAPC.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.2.3.3-3:** HAPs emissions from the Proposed Action would result from the handling of earthen materials, the combustion of the hydrocarbon fuels, the emission of mercury for thermal sources covered by the facility's mercury operating permit; and the handling and use of various chemicals. The direct impact from the Project would be facility-wide emissions of 6.05 tpy of HAPs, including 0.0254 tpy of mercury emissions. These emissions would have an incidental, but not significant, impact on the air quality in the vicinity of the Project Area.	**Summary of Impact 3.2.3.4-3:** HAPs emission from the No Action Alternative would result from the handling of earthen materials, the combustion of the hydrocarbon fuels, the emission of mercury for thermal sources covered by the facility's existing mercury operating permit; and the handling and use of various chemicals. The direct impact of the existing facility-wide HAPs emissions that would be at a similar rate to the Proposed Action. Based on the existing mercury operating permit, the current operations are permitted for a mercury emissions rate of 0.00529 tpy, approximately 20 percent less than the projected emissions of the Proposed Action. However, this emission rate only represents the existing thermal units at the facility. These emissions would have an incidental, but not significant, impact on the air quality in the vicinity of the Project Area.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.2.3.3-4**: The direct effect of the Proposed Action would be the emission of 128,030 tpy of greenhouse gases.	**Summary of Impact 3.2.3.4-4**: The direct effect of the No Action Alternative would be the emission of 60,828 tpy of greenhouse gases.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Residual Impacts (Air and Atmospheric Resources):	No residual impacts would be expected to occur as a direct result of the Proposed Action to Air and Atmospheric Resources because all the emissions would cease once the Proposed Action activities cease.	No residual impacts would be expected to occur as a direct result of the No Action Alternative to Air Resources because all the emissions would cease once the No Action Alternative activities cease.
CULTURAL RESOURCES		
Summary of Impact:	**Summary of Impact 3.3.3.3-1:** Implementation of the Proposed Action would result in adverse effects to 21 eligible sites within the area of direct impacts. Outside of this area but within the Project APE, this action would also have indirect adverse impacts on five eligible sites. Increased visitation to areas with eligible sites and unauthorized collection of artifacts could also have indirect adverse impacts. These direct impacts to eligible sites are considered significant if unmitigated. Indirect impacts to the eligible and unevaluated cultural resources within the Project APE that are most likely to be subject to indirect effects are also considered to be significant. Indirect impacts to other eligible or unevaluated sites in the project APE would likely consist of visual and noise impacts (to sites eligible for NRHP under criterion A) and from increased unauthorized collection. Public access to the area would be restricted during mine operations, and no mitigation is proposed for noise or visual impacts. Mitigation for unauthorized collection would be addressed by monitoring and education as described in the following section.	**Summary of Impact 3.3.3.4-1:** Implementation of the No Action Alternative would not result in any additional adverse effects to eligible sites within the area of direct impacts.
Recommended Mitigation Measure:	**Recommended Mitigation Measure 3.3.3.3-1:** HRDI should develop, and submit to the BLM for approval, a treatment plan to address the potential impacts to the 21 eligible sites within the Project APE area of direct impacts (i.e., proposed disturbance and facilities footprint) and the five sites most likely to be subject to indirect impacts. HRDI should implement the treatment plan prior to any surface disturbance of eligible sites within the area of indirect impacts and the five sites most likely to be subject to indirect impacts. A	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
	mitigation plan is a standard and effective approach to reduce adverse effects to cultural resources. Indirect impacts to eligible cultural resources other than the five sites mentioned above within the Project APE are not considered to be significant, at this time. If these resources would be directly impacted by future activities, a treatment plan should be developed to mitigate potential impacts. HRDI should develop and submit to the BLM for approval, a mine workers education program on the consequences of unauthorized collection of artifacts. HRDI should install perimeter fencing delineating the proposed Project Area boundary within 180 days of Record of Decision (ROD) effective date to deter the public from visiting historic properties and potentially collecting artifacts. HRDI should maintain existing eligible roads (CrNV-22-6274, 9717, and 9894 [Jungo Road]) during all phases of the Project within the limits of the existing eligible roads cross section as feasible considering all appropriate health and safety regulations (e.g., MSHA and Office of Safety and Health Administration [OSHA], with the exception of CrNV-02-11443 [Seven Troughs Road], which would be relocated. Mitigation for adverse effects to this historic road should be described in the mitigation plan. HRDI should contract a qualified archaeological consulting firm, approved by the BLM, to provide quarterly monitoring for Year 1 and yearly monitoring for each subsequent year of eligible roads (CrNV-22-6274, 9717, and 9894 [Jungo Road] and CrNV-02-11443 [Seven Troughs Road]) to reduce the direct and cumulative effects of above described maintenance. Should damage be detected during monitoring, BLM may choose to consult with SHPO to determine if additional protective measures or	

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	further action to mitigate the impact are required. In addition, HRDI (through a qualified archeological consulting firm) should conduct quarterly monitoring during the first year, and twice a year monitoring of a sample of other eligible sites within the indirect effects area. The sample would consist of ten sites (both historic and prehistoric) concentrating on those containing artifacts likely to be of interest to illegal collectors. After each monitoring visit, a letter report should be sent to the BLM within two weeks of the fieldwork.	
Effectiveness of Mitigation:	**Effectiveness of Mitigation:** The implementation of the treatment plan under the mitigation measure would be effective at lessening the impacts.	None
Summary of Impact:	**Summary of Impact 3.3.3.3-2:** Implementation of the Proposed Action would result in a continued indirect visual impact to the Nobles and Applegate Trails. The proposed South heap leach facility would be the most prominent change in the how the mine would appear from the trails.	**Summary of Impact 3.3.3.4-2:** Implementation of the No Action Alternative would result in an indirect impact to the Nobles and Applegate Trails. The existing mine facility is visible from the trails and the incremental activities that would be conducted under the No Action Alternative in the future would not be discernable from the overall impression of the existing facility.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Residual Impacts (Cultural Resources):	The anticipated residual effects of the Proposed Action on cultural resources include sporadic impacts from the introduction of particulates into the air that would diminish the air quality of the sites. Other anticipated residual indirect impacts to the cultural resources would come in the form of continuing segmentation and disassociation of the once related sites and resources. In particular, changes to the transportation network, especially the closure of historic roads and routes due to the expanded mining operations, would also have residual impacts to the cultural resources. Visual impacts to the historic Applegate and Nobles Trails	The anticipated residual effects of the No Action Alternative on cultural resources include sporadic impacts from the introduction of particulates into the air that would diminish the air quality of the sites. These residual impacts are considered relatively minor. The direct impacts would be mitigated and once those eligible sites have been mitigated they would no longer be subject to residual impacts. Unauthorized collection of archeological artifacts is assumed to be taking place in the area around the existing mine. Even after the mine closure, this illegal activity can be expected to continue due to the increased access from road construction

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	described above would also continue indefinitely and are considered to be residual as well. These residual impacts are considered relatively minor. There would also be continued residual visual impacts to the historic Applegate and Nobles Trails during daylight hours, as the mine is visible along several miles of the trail. The direct impacts would be mitigated and once those eligible sites have been mitigated they would no longer be subject to residual impacts. Unauthorized collection of archeological artifacts is assumed to be taking place in the area around the existing mine operations and can be expected to increase with the mine expansion and increase in work force. Even after the mine closure, this illegal activity can be expected to continue due to the increased access from road construction and greater familiarity with the potential collection areas.	and greater familiarity with the potential collection areas.
MIGRATORY BIRDS		
Summary of Impact:	**Summary of Impact 3.4.3.3-1:** Approximately 2,172 acres of migratory bird and raptor habitat would be directly removed over the 12-year mine life as a result of the Proposed Action. This impact would be considered potentially significant with respect to vegetation removal during the avian breeding season that results in a violation of the MBTA. The implementation of the environmental protection measure listed 2.1.15.6 would prevent a violation of the MBTA and therefore this impact would not be considered significant.	**Summary of Impact 3.4.3.4-1:** Up to 453 acres of migratory bird and raptor habitat could be directly removed between December 2011 and the end of authorized activities under the existing mine plan. This would result in a total of 3,063 acres of habitat that would ultimately be disturbed. Approximately 758 acres of open pit would not be backfilled and reclaimed, resulting in the reclamation of 2,304 acres under the No Action Alternative. A similar protection measure to the one included in the Proposed Action is included in the existing mine plan and therefore this impact would not be considered significant.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None

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Residual Impacts (Migratory Birds):	The Proposed Action would result in the unavoidable loss of up to 441 acres of migratory bird habitat resulting from surface disturbance in the Brimstone open pit area that would not be backfilled or reclaimed. This may result in an increase in cliff nesting habitat for raptors. Approximately 1,731 acres of the total proposed disturbance acreage (2,172 acres) of migratory bird habitat would be disturbed and then reclaimed. The reclaimed land would have more grass and forb forage and less mature shrub forage in the short term which may result in a shift of avian species use within these areas. As the plant communities within the Project Area mature (within a period of 15 to 20 years) larger shrubs would provide additional cover and nesting opportunities, similar to the existing conditions.	The No Action Alternative would result in the unavoidable loss of up to 758 acres of migratory bird habitat resulting from surface disturbance in the open pit areas that would not be backfilled or reclaimed under the current mine plan. This may result in an increase in cliff nesting habitat for raptors. Approximately 453 acres of migratory bird habitat would still be disturbed from December 2011 to the end of mining activities under the current mine plan, which would total 2,304 acres of habitat that would be disturbed and then reclaimed. The reclaimed land would have more grass and forb forage and less mature shrub forage in the short term, which may result in a shift of avian species use within these areas. As the plant communities within the Project Area mature (within a period of 15 to 20 years) larger shrubs would provide additional cover and nesting opportunities, similar to the existing conditions.
NATIVE AMERICAN RELIGIOUS CONCERNS		
Summary of Impact:	The Proposed Action would not have any known impacts on Native American Religious Concerns.	The No Action Alternative would not have any known impacts on Native American Religious Concerns.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Residual Impacts (Native American Religious Concerns):	None	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
WASTES AND MATERIALS (HAZARDOUS AND SOLID)		
Summary of Impact:	**Summary of Impact 3.6.3.3-1**: Under the Proposed Action, the environmental effects of a release would depend on the substance, quantity, timing, and location of the release. The Proposed Action would result in an additional 247.25 truck deliveries per month, an average increase in storage capacity of 177 percent, and an average increase in annual usage of 476 percent of fuels and reagents compared to the existing operations, which may increase the risk of a release.	**Summary of Impact 3.6.3.4-1:** Under the No Action Alternative, the environmental effects of a release would depend on the substance, quantity, timing, and location of the release. The existing number of truck deliveries per month, current storage capacity, and average annual usage of fuels and reagents for the existing mine operations are less than Proposed Action. Therefore, the risk of a release due to the handling and storage the existing levels of fuels and reagents is less than the Proposed Action.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Residual Impacts (Wastes and Materials):	None	None
WATER QUALITY (SURFACE AND GROUND)		
Summary of Impact:	**Summary of Impact 3.7.3.3-1:** Implementation of the Proposed Action would result in the diversion of surface water flows that would increase the potential for erosion and sedimentation; however, the sediment control basins would control any sedimentation and any diverted flows would be directed by downgradient drainages. Therefore, there would be no impacts to the overall surface drainage flows downgradient of the Project. In addition, the Proposed Action would not impact the flows of nearby springs or seeps.	**Summary of Impact 3.7.3.4-1**: Implementation of the No Action Alternative would result in no new impacts to surface water quantity between December 2011 and the end of activities under this alternative. In addition, overall implementation of the No Action Alternative would result in the diversion of surface water flows that would increase the potential for erosion and sedimentation; however, the sediment control basins would control any sedimentation and any diverted flows would be directed by downgradient drainages. Therefore, there would be not impacts to the overall surface drainage flows downgradient of the Project. In addition, the No Action Alternative would not impact the flows of nearby springs or seeps.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Summary of Impact:	**Summary of Impact 3.7.3.3-2:** The modeling indicates that runoff from WRF surfaces, would be circum-neutral with all chemical constituents below NDEP Profile I and II reference values. Predictive geochemical modeling indicates that seepage and runoff from the proposed WRFs would not degrade waters of the state (SRK 2011a). Modeling also indicates runoff from WRF surfaces, comprised of acid leach material, would be circum-neutral with all chemical constituents below NDEP reference values. Furthermore, the presence of native sulfur in acid leach material does not measurably affect the quality of the resulting runoff and no constituents are predicted to exceed NDEP reference values.	**Summary of Impact 3.7.3.4-2:** The Proposed Action modeling implies that under the No Action Alternative the runoff from WRF surfaces, comprised of acid leach material, would be circum-neutral with all chemical constituents below NDEP reference values. Furthermore, the presence of native sulfur in acid leach material does not measurably affect the quality of the resulting runoff and no constituents are predicted to exceed NDEP reference values.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.7.3.3-3:** Due to the lack of other water users in the vicinity and the relatively quick ground water replenishment characteristics, there would be no impact from ground water draindown for other users or impact to other water rights holders.	**Summary of Impact 3.7.3.4-3:** Due to the lack of other water users in the vicinity and the relatively quick ground water replenishment characteristics, there would be no impact from ground water draindown for other users or impact to other water rights holders.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.7.3.3-4:** Modeling of potential waste rock seepage, as well as the depth of the open pits relative to the water table, indicates that the Proposed Action would not impact ground water in the vicinity of the Project Area.	**Summary of Impact 3.7.3.4-4:** Assessment of potential waste rock seepage, as well as the depth of the open pits relative to the water table, indicates that the No Action Alternative would not impact ground water in the vicinity of the Project Area.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Residual Impacts (Water Resources):	Residual impacts associated with the Proposed Action consist of potential effects to surface water quality from erosion of Project facilities.	Residual adverse impacts associated with the No Action Alternative consist of potential effects to surface water quality from erosion of project facilities. This residual impact would be of a similar scale as to those under the Proposed Action; however, it would occur sooner than under the Proposed Action.
GEOLOGY, MINERALS, AND ENERGY		
Summary of Impact:	**Summary of Impact 3.8.3.3-1:** Seismic events could potentially result in slope failures or structural damage to mine facilities if a 5.0 magnitude earthquake event having a ten year return period with an approximately .06 to .12 probability occurred during the operational life of the Project. Based on the results from SRK's analyses (2010), which indicate a safety factor of 1.2 to 1.60, the WRFs and heap leach facilities are stable for all conditions analyzed.	**Summary of Impact 3.8.3.4-1:** The No Action Alternative could result in impacts associated with normal earth dynamics (i.e., earthquakes), but the timing of the event could not be predicted. Open pit highwall failures could continue to occur depending on the geologic structures encountered and the size and frequency of earthquakes. Potential failures associated with the existing WRFs and heap leach facilities are likely similar to those under the Proposed Action.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.8.3.3-2:** Implementation of the Proposed Action would result in resource extraction and production of 2.5 million ounces of gold and 49.3 million ounces of silver. This is not considered a potentially significant impact to geology and minerals. The impact is economically significant. Based on the conclusions from the analysis, no additional mitigation is proposed.	**Summary of Impact 3.8.3.4-2:** The No Action Alternative would result in the resource extraction and production of gold and silver that are limited under the current mine plan, which would be significantly less than the Proposed Action. It is likely that the current extraction rate of 100,000 ounces of gold and silver per year would remain constant for several years and then begin to taper off to little or no production at the time of mine closure. This is not considered a potentially significant impact to geology and minerals.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Summary of Impact:	**Summary of Impact 3.8.3.3-3:** The Proposed Action impacts to energy resources are not readily quantifiable due to the limited amount of information on the location and extent of the identified geothermal resource in the southern portion of the Project Area.	**Summary of Impact 3.8.3.4-3**: The No Action Alternative impacts to energy resources are not readily quantifiable due to the limited amount of information on the location and extent of the identified geothermal resource in the southern portion of the Project Area.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Residual Impacts (Geology, Minerals, and Energy):	The potential residual impacts to geology and mineral resources from the Proposed Action are an irreversible and irretrievable commitment of mineral resources through the removal of 2.5 million ounces of gold and 49.3 million ounces of silver from the mined materials.	The potential residual impacts to geology and mineral resources from the No Action Alternative are an irreversible and irretrievable commitment of mineral resources through the removal of 100,000 ounces of gold and silver per year for a few years before tapering off.
NOISE		
Summary of Impact:	**Summary of Impact 3.9.3.3-1**: There would be an increase in noise level due to the Proposed Action; however, that increase would be less than 10 dB.	**Summary of Impact 3.9.3.4-1**: There would be no change in noise level due to the No Action Alternative. The Impact is less than under the Proposed Action.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.9.3.3-2**: There would be a increase in noise level due to traffic under the Proposed Action; however, that increase would be less than 3 dB.	**Summary of Impact 3.9.3.4-2**: There would be no change in noise level due to traffic under the No Action Alternative. This impact is less than under the Proposed Action.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.9.3.3-3**: Construction noise and blasting may be audible at the nearest residence under the Proposed Action. The nearest residence is 12 miles from the Project activities.	**Summary of Impact 3.9.3.4-3**: Construction noise and blasting may be audible at the nearest residence under the No Action Alternative. The nearest residence is 12 miles from the Project activities.
Recommended Mitigation Measure:	None	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Effectiveness of Mitigation:	None	None
Residual Impacts (Noise):	None	None
REALTY		
Summary of Impact:	**Summary of Impact 3.10.3.3-1**: A total of 2,057 acres of public lands potentially used for certain realty actions would be temporarily removed from use as a result of the construction and operation of the Project. Access to the Project facilities would be limited by fencing and physical barriers and the entire project boundary would be inaccessible for most realty actions.	**Summary of Impact 3.10.3.4-1**: Under the No Action Alternative, HRDI would disturb an additional 453 acres from now until project activities were completed for a total disturbance of approximately 3,063 acres. Existing facilities would remain fenced, and the entire area would be inaccessible for most realty actions. Under the No Action Alternative, there would be no additional impacts to short-term uses of public land. There would be no impacts to land use authorizations or conflicts with land use plans or policies. There would be no indirect impacts to realty under the No Action Alternative.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Residual Impacts (Realty):	The Proposed Action would result in the temporary loss of up to approximately 2,057 acres of public land resulting from surface disturbance activities associated with the Project. The 441 acres of open pit that would remain after the Project is reclaimed would restrict the future developments of certain types of ROWs.	The No Action Alternative would result in the temporary loss of up to approximately 1,368 acres of public land resulting from surface disturbance activities associated with the Project. The 758 acres of open pit that would remain after the Project is reclaimed and would restrict the future developments of certain types of ROWs.
RECREATION		
Summary of Impact:	**Summary of Impact 3.11.3.3-1:** A total of 2,057 acres of public lands potentially used for dispersed recreation would be temporarily removed from use as a result of the construction and operation of the Project. Access to Project facilities would be limited by fencing or physical barriers and the entire Project boundary would be less likely to be used for recreation activities due to its proximity to the mine operation. This impact is considered less than significant. Based on the	**Summary of Impact 3.11.3.4-1**: Under the No Action Alternative, HRDI would disturb an additional 453 acres from now until project activities were completed for a total disturbance of approximately 3,063 acres within the 8,858-acre Project boundary. Existing facilities would remain fenced and the entire Project Area would remain inaccessible to dispersed recreation activities. Although there are fewer acres disturbed under the No Action Alternative than the Proposed Action, recreation impacts would be similar to, but less than,

	PROPOSED ACTION	NO ACTION ALTERNATIVE
	conclusions from the analysis, no mitigation measures are proposed.	impacts from the Proposed Action due to the proximity to ample dispersed recreation opportunities in the vicinity. There would be no indirect impacts to recreation from the No Action Alternative.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Residual Impacts (Recreation):	The Project Area would be reclaimed and open for public use following closure of the mine with the exception of 441 acres of the Brimstone open pit.	The Project Area would be reclaimed and open for public use following closure of the mine, with the exception of 758 acres of open pits.
SOCIAL VALUES AND ECONOMICS		
Summary of Impact:	**Summary of Impact 3.12.3.3-1**: The 337 employees associated with the Proposed Action would live in assessment area communities and impact population numbers. This impact is considered less than significant.	**Summary of Impact 3.12.3.4-1**: The employees released as a result of the decrease in mine activities associated with the No Action Alternative may move out of the assessment area to find employment and impact population numbers. This impact is considered less than significant.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.12.3.3-2**: Under the Proposed Action, employment would increase and unemployment rates would be reduced in the assessment area.	**Summary of Impact 3.12.3.4-2**: Under the No Action Alternative, employment would decrease and unemployment rates would increase in the assessment area.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.12.3.3-3**: Under the Proposed Action, the addition of 337 employees may affect housing in the assessment area, but based on the availability of housing units in the assessment area, including 288 housing units in the Winnemucca area, this impact is considered less than significant.	**Summary of Impact 3.12.3.4-3**: Under the No Action Alternative, the addition reduction of employment at the mine may affect housing in the assessment area by increasing the number of housing units available as the work force moved out of the assessment area to seek employment. This impact is considered less than significant.
Recommended Mitigation Measure:	None	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.12.3.3-4**: Under the Proposed Action, the addition of 337 employees may impact public services in the assessment area, but based on the current levels of service and capacity in the assessment area communities, including the Winnemucca area, the public services would be able to accommodate the anticipated percentage of increased population under the Proposed Action. Therefore, this impact is considered less than significant.	**Summary of Impact 3.12.3.4-4**: Under the No Action Alternative, release of employees from the mine may impact public services in the assessment area by increasing the capacity in the assessment area communities. This impact is considered less than significant.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.12.3.3-5**: Under the Proposed Action, the addition of 337 employees may result in fiscal effects in the assessment area including revenues generated from sales and use taxes, property taxes, minerals taxes, and payroll taxes.	**Summary of Impact 3.12.3.4-5**: Under the No Action Alternative, the reduction of employees at the mine may result in fiscal effects in the assessment area as there would be a reduction in the workforce and individuals may move out of the region to seek employment.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Residual Impacts (Social Values and Economics):	Although the Proposed Action would add 337 employees to the assessment area, there would be no residual impacts to social values and economics.	Although there would be a potential decrease in workforce in the assessment area, there would be no residual adverse impacts to social values and economics from the No Action Alternative.

	PROPOSED ACTION	NO ACTION ALTERNATIVE
SOILS		
Summary of Impact:	**Summary of Impact 3.13.3.3-1:** Based on the Proposed Action, 2,172 acres of direct disturbance of soils and the potential indirect effect to soils in the Project Area as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities. Based upon the implementation of committed operational performance standards, BMPs, and reclamation activities, this impact has been minimized.	**Summary of Impact 3.13.3.4-1:** Up to approximately 453 acres of soils may be disturbed from December 2011 until the end of mining activities under the authorized mine plan. Therefore, a total of 3,063 acres of direct effects to soils and accelerated soil erosion rates may occur under the No Action Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities. A total of 2,304 acres of the existing Project boundary would be subject to reclamation, which would include the placement of growth media and revegetation. Based upon the implementation of committed operational performance standards, BMPs, reclamation activities, impacts to soil resources caused by the No Action Alternative would be minimized.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.13.3.3-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbing activities under the Proposed Action. Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Proposed Action, these impacts have been minimized.	**Summary of Impact 3.13.3.4-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of 453 acres of surface disturbance that may be disturbed from December 2011 until the end of mining activities under the authorized mine plan, which would total 3,063 acres of growth media that would be removed and stockpiled for future use in reclamation. A total of 2,304 acres of the existing Project boundary would be subject to reclamation, which would include the placement of growth media and revegetation. Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the No Action Alternative, these impacts have been minimized.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Summary of Impact:	**Summary of Impact 3.13.3.3-3:** Surface disturbance activities under the Proposed Action would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity. Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Proposed Action, these impacts would be minimized.	**Summary of Impact 3.13.3.4-3:** Surface disturbing activities under the No Action Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Residual Impacts (Soils):	Approximately 441 acres of the Brimstone open pit area would not be reclaimed which, would result in permanent loss of growth media and soil productivity in this area as a result of the Proposed Action. Implementation of the Proposed Action would result in the unintentional and unavoidable loss of minor amounts of growth media during the salvaging process. This impact is mitigated by the ten percent loss consideration used to estimate the total amount of growth media that would be salvaged under the Proposed Action. Furthermore, minor degradation in soil stability and productivity may result from the physical processes of stripping, stockpiling, and replacing growth media over the course of the Project lifespan.	Approximately 758 acres of the open pit areas would not be backfilled or reclaimed, which would result in permanent loss of growth media and soil productivity in this area as a result of the No Action Alternative. The No Action Alternative would result in the unintentional and unavoidable loss of minor amounts of growth media during the salvaging process. This impact is mitigated by the ten percent loss consideration used to estimate the total amount of growth media that would be salvaged under the No Action Alternative. Furthermore, minor degradation in soil stability and productivity may result from the physical processes of stripping, stockpiling, and replacing growth media over the course of the Project lifespan.

	PROPOSED ACTION	NO ACTION ALTERNATIVE
SPECIAL STATUS SPECIES		
Summary of Impact:	**Summary of Impact 3.14.3.3-1:** Greater sage-grouse individuals and habitat could be impacted as a result of the 2,172 acres of surface disturbance associated with the Proposed Action. This impact is considered potentially significant with respect to greater sage-grouse, a USFWS candidate species and a BLM sensitive species, and greater sage-grouse habitat. However, the migratory bird protection measure incorporated into the Proposed Action and the reclamation and restoration of greater sage-grouse nesting habitat and summer and winter distribution would occur as a part of the Proposed Action reducing these impacts to less than significant. In addition, all power poles would be constructed with anti-perching devices to reduce predation as described in Section 2.1.6.1.	**Summary of Impact 3.14.3.4-1:** Greater sage-grouse individuals and habitat could be impacted as a result of the 453 acres of surface disturbance, including 202 acres of vegetation removal, associated with the authorized mining and exploration activities that would be conducted from December 2011 to the end of surface disturbing activities under the No Action Alternative. This impact is considered potentially significant with respect to greater sage-grouse, a USFWS candidate species and a BLM sensitive species, and greater sage-grouse habitat. However, an existing migratory bird protection measure and the reclamation and restoration of greater sage-grouse nesting habitat and summer and winter distribution would occur as a part of the No Action Alternative reducing these impacts to less than significant.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.14.3.3-2:** Up to 2,172 acres of potential golden eagle foraging habitat would be directly removed over the 12-year mine life as a result of the Proposed Action. This impact is not considered significant as there is comparable foraging habitat within the vicinity to support the nesting golden eagles in the territory. In addition, the existing mining disturbance and activity in the central portion of the Project Area may act as a deterrent to foraging golden eagles within the Project Area.	**Summary of Impact 3.14.3.4-2:** Up to 453 acres of potential golden eagle foraging habitat would be disturbed or removed as a result of the authorized mining and exploration activities that would be conducted from December 2011 to the end of surface disturbing activities under the No Action Alternative. This impact is not considered significant as there is comparable foraging habitat within the vicinity to support the nesting golden eagles in the territory.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Summary of Impact:	**Summary of Impact 3.14.3.3-3:** A known location of a golden eagle nest is present within the area proposed for surface disturbance and the nest may have to be removed. The nest removal would be considered a "take" under the MBTA and the Bald and Golden Eagle Protection Act.	None
Recommended Mitigation Measure:	**Recommended Mitigation Measure 3.14.3.3-3:** The nest removal should be coordinated with the USFWS. The nest removal should occur outside of golden eagle nesting season. Prior to the removal of the nest, a biologist should survey the nest to ensure that is not active.	None
Effectiveness of Mitigation:	**Effectiveness of Mitigation:** Nesting pairs of golden eagles often have multiple nests in a territory. The density of golden eagle nesting in the region is high with eight active nests/territories and an additional eight inactive nests or territories identified within a six- to ten-mile radius of the Project Area. The implementation of Mitigation Measure 3.14.3.3-3 would be effective to reduce direct impacts (i.e., harass, harm, death, or injury) to individual golden eagles or prevent the abandonment of the nest.	None
Summary of Impact:	**Summary of Impact 3.14.3.3-4:** Surface disturbance in potential burrowing owl habitat identified in the southwestern portion of the Project Area during burrowing owl breeding season could result in the destruction or abandonment of an active nest burrow. This impact is considered potentially significant with respect to burrow and nest destruction during the burrowing owl breeding season that results in a violation of the MBTA.	**Summary of Impact 3.14.3.4-3:** Surface disturbance in potential burrowing owl habitat identified in the southwestern portion of the Project Area during burrowing owl breeding season could result in the destruction or abandonment of an active nest burrow. This impact is considered potentially significant with respect to burrow and nest destruction during the burrowing owl breeding season that results in a violation of the MBTA. Implementation of the existing migratory bird protection measure to clear areas prior to disturbance would reduce the impact to nesting burrowing owls under the No Action Alternative.

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Recommended Mitigation Measure:	**Recommended Mitigation Measure 3.14.3.3-4:** During burrowing owl nesting season (March to late August), a burrowing owl clearance survey following the Winnemucca BLM's survey protocol should be conducted prior to surface disturbance in the areas identified as potential burrowing owl habitat within the Project Area.	None
Effectiveness of Mitigation:	**Effectiveness of Mitigation:** Mitigation measure 3.14.3.3-4 would reduce impacts to burrowing owls during Project activities to less than significant by ensuring no direct impacts to nesting birds would occur.	None
Summary of Impact:	**Summary of Impact 3.14.3.3-5:** Approximately 2,172 acres of bat foraging habitat would be impacted as a result of the surface disturbance and vegetation removal associated with the Proposed Action over the 12-year mine life. The bats foraging within the Project Area have likely adapted to existing disturbance from mining activities during their flight times. The expansion of the surface disturbance may reduce their prey base in the short term, but the long-term reclamation of the Project Area would restore the foraging potential. Existing ponds located in the western portion of the Project Area that may serve as water sources, would not be disturbed. Therefore, this impact is not considered significant.	**Summary of Impact 3.14.3.4-4:** Approximately 202 acres of bat foraging habitat would be impacted as a result of vegetation removal that would occur from December 2011 until the end of authorized mining and exploration activities under the No Action Alternative. The bats foraging within the existing Project boundary have likely adapted to existing disturbance from mining activities during their flight times. The expansion of the surface disturbance may reduce their prey base in the short term, but the long-term reclamation of the Project Area would restore the foraging potential. Existing ponds located in the western portion of the existing Project boundary that may serve as water sources, would not be disturbed. Therefore, this impact is not considered significant.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Summary of Impact:	**Summary of Impact 3.14.3.3-6:** The Proposed Action would result in loss of bat roosting habitat and probable death of bats when the workings near Silver Camel are disturbed or demolished. The Proposed Action would result in the destruction of active bat hibernacula. This impact also includes the potential to destroy maternity colonies. The destruction of a maternity colony or bat hibernacula would be considered significant.	None
Recommended Mitigation Measure:	**Recommended Mitigation Measure 3.14.3.3-6:** Bat exclusion activities should be conducted in the east and west Silver Camel workings prior to disturbance of this area. Exclusion activities should include the following: spreading exclusion materials (one-inch chicken wire or one-inch polyethylene avian netting) across the open workings, allowing bats to exit the site while discouraging their return; exclusions should be conducted at each opening with potential connection to the east and west Silver Camel workings prior to closure for a minimum of three to five nights; exclusion materials should be monitored nightly throughout the period of exclusion to reduce the potential for exclusion material collision stress, injury, and death; external surveys using night vision or thermal imaging equipment should be conducted to verify site vacancy; fire smoke bombs should be used on the final night of exclusion prior to closure; and physical closures should be conducted immediately following confirmation of vacancy. In addition to bat exclusion from the Silver Camel workings, warm and cold season surveys should be conducted in the vicinity of the Project for potential mitigation sites should additional mitigation be deemed necessary by the BLM.	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Effectiveness of Mitigation:	**Effectiveness of Mitigation:** The Project Area is located in close proximity to multiple historic mine workings that may serve as bat hibernacula and roosting sites; therefore, the removal of the Silver Camel workings is not likely to impact the overall bat population in the area. The implementation of Mitigation Measure 3.14.3.3-6 would be effective at preventing the destruction of an active bat hibernacula and, therefore, would reduce the impact to less than significant.	None
Summary of Impact:	**Summary of Impact 3.14.3.3-7:** Disturbance or removal of 46 acres of potential habitat for Crosby's buckwheat in the Project Area. There are 25 other known Nevada occurrences of Crosby's buckwheat within the region; however, the status of these populations is unknown. The elimination of the population within the Project Area would be considered significant if the removal of the population within the Project Area would lead to the extirpation of the species or lead to federal listing.	None
Recommended Mitigation Measure:	**Recommended Mitigation Measure 3.14.3.3-7:** Salvage and transplanting efforts should be conducted to preserve the genetics of the populations. Salvage activities should occur prior to any ground disturbing activities in the areas identified as Crosby's buckwheat habitat, as additional plants may have established since the last survey effort in the Project Area. The salvaged plants should be transplanted in three locations: one in the nearest suitable habitat outside of the Project Area; and at two different locations within the NCA or Wilderness Area where an established population already exists. Details of the transplanting effort should be further coordinated with local botanical experts to maximize the potential for success of the transplanting effort. As an additional measure, HRDI should provide funding towards the research and preservation of rare plants in Nevada.	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Effectiveness of Mitigation:	**Effectiveness of Mitigation:** The success of a transplant effort cannot be predicted. Due to the other known existing populations in the region, the removal of this population would not lead to the extinction of the species or federal listing. The additional funding to further the preservation of rare plants in Nevada would contribute to the overall protection of other rare plant species in more urgent need of preservation.	None
Residual Impacts (Special Status Species):	Residual impacts to special status wildlife species would include the permanent loss of vegetative productivity and associated habitat from approximately 441 acres of land associated with the open pit that would not be reclaimed and a long-term change in soils structure and vegetation composition of habitat as a result of Project development and operation. A permanent loss of a total of 46 acres of potential Crosby's buckwheat habitat, including five occupied acres, would result from the Proposed Action.	The No Action Alternative would result in the unavoidable loss of up to 758 acres of habitat resulting from surface disturbance in the open pit areas that would not be backfilled or reclaimed. This may result in an increase in cliff nesting habitat for raptors including the golden eagle. Approximately 2,306 acres of habitat would be removed in the short term and then reclaimed as a result of mine development, operation, and closure. The reclaimed land would have more grass and forb forage and less mature shrub forage in the short term which may result in a shift of species use within these areas. As the plant communities within the Project Area mature (within a period of 15 to 20 years) larger shrubs would provide additional cover and nesting opportunities, similar to the existing conditions.
TRANSPORTATION, ACCESS, AND PUBLIC SAFETY		
Summary of Impact:	**Summary of Impact 3.15.3.3-1**: For the life of the Project, which could be up to 20 years, there would be an increase in truck and other vehicle traffic to Jungo Road and other local area roadways.	**Summary of Impact 3.15.3.4-1**: For the remaining life of the activities under the No Action Alternative there would be continued truck and other vehicle traffic to Jungo Road and other local area roadways.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.15.3.3-2**: Access to the Project on Seven Troughs Road would be modified as a result of the realignment. The remaining access routes would remain open and available throughout the life of the Project.	**Summary of Impact 3.15.3.4-2**: The existing access routes would remain open and available throughout the remaining life of the activities under the No Action Alternative and there would be no effect to access under this alternative.

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.15.3.3-3**: An accident involving hazardous materials during transportation of those materials along Jungo Road could adversely affect public safety; however, the probability of such an incident is very small.	**Summary of Impact 3.15.3.4-3**: An accident involving hazardous materials during transportation of those materials along Jungo Road could adversely affect public safety; however, the probability of such an incident is very small and approximately half of that under the Proposed Action.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Residual Impacts (Transportation):	None	None
VEGETATION		
Summary of Impact:	**Summary of Impact 3.16.3.3-1:** Implementation of the Proposed Action would result in the removal of 2,172 acres of vegetation associated with the authorized surface disturbance from mining activities, including 30 acres from exploration disturbance throughout the Project Area. The Project Area would be reclaimed and revegetated so this impact is temporary. Test plots and monitoring activities are included in the Proposed Action which would ensure that the revegetation meets reclamation standards.	**Summary of Impact 3.16.3.4-1:** Implementation of the No Action Alternative would result in the removal of 170 acres of vegetation associated with the authorized surface disturbance from mining activities and 32 acres from exploration disturbance throughout the existing Project boundary. Ongoing reclamation would help to minimize impacts to vegetation through continuation of current and ongoing activities.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Summary of Impact:	**Summary of Impact 3.16.3.3-2:** The Proposed Action would result in the deposition of dust, which could result in lowered primary production in plants due to reduced photosynthesis and decreased water-use efficiency. The potential effects on vegetation from dust would be reduced by wind and periodic precipitation, which would remove accumulated dust.	**Summary of Impact 3.16.3.4-2:** The No Action Alternative would result in the deposition of dust could result in lowered primary production in plants due to reduced photosynthesis and decreased water-use efficiency. However, the impact would likely be less than under the Proposed Action due to a lesser amount of surface disturbance. The potential effects on vegetation from dust would be reduced by wind and periodic precipitation, which would remove accumulated dust.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.16.3.3-3:** The Proposed Action would result in vegetation removal and subsequent reclamation efforts, which would result in plant community simplification and the conversion from a shrub-dominated community to a grass/forb-dominated community during activities conducted over the 20-year life of the Project.	**Summary of Impact 3.16.3.4-3:** The No Action Alternative would result in continued vegetation removal and subsequent reclamation efforts, which would result in plant community simplification and the conversion from a shrub-dominated community to a grass/forb-dominated community during activities conducted under this alternative.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Residual Impacts (Vegetation):	Residual impacts to vegetation would include the permanent loss of vegetative productivity from approximately 441 acres of land associated with the open pit that would not be reclaimed and a long-term change in vegetation composition (i.e., tree and shrub dominated communities to grass and forb dominated communities) as a result of Project development and operation.	Residual impacts to vegetation would include the permanent loss of vegetative productivity from approximately 758 acres of land associated with the open pit that would not be reclaimed and a long-term change in vegetation composition (i.e., tree and shrub dominated communities to grass and forb dominated communities) as a result of continued development and operations under the No Action Alternative.

	PROPOSED ACTION	NO ACTION ALTERNATIVE
VISUAL RESOURCES		
Summary of Impact:	**Summary of Impact 3.17.3.3-1:** The proposed mining activities would be visible from all four KOPs. The visual impacts would be consistent with VRM Class IV management. This impact is not considered significant.	**Summary of Impact 3.17.3.4-1:** The continued mining activities under the No Action Alternative would be visible from all four KOPs. The visual impacts would be consistent with VRM Class IV management. This impact is not considered significant.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.17.3.3-2:** The proposed mining activities would increase light pollution in the region. This impact is not considered significant. HRDI has completed a lighting plan under the Proposed Action. The utilization of this plan would minimize visual disturbance through the following: facility perimeter lighting, including lighting used to illuminate walkways, roadways, staging areas and parking areas, would be shielded so that the light would be cast in a downward direction. Low-pressure sodium lighting (or an improved technology, if readily available) would be used to reduce or eliminate detrimental lighting impacts and prevent unnecessary light pollution in keeping with the objectives of dark sky goals. The Proposed Action would have less of an impact than the No Action Alternative.	**Summary of Impact 3.17.3.4-2:** The activities under the No Action Alternative would continue with the current amount of light pollution in the region. This impact is not considered significant. The impact under the No Action Alternative would be greater than under the Proposed Action.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Residual Impacts (Visual Resources):	There would be no residual impacts associated with lighting because when the mine is reclaimed, all the lights would be removed.	There would be no residual impacts associated with lighting because when the mine is reclaimed, all the lights would be removed.

	PROPOSED ACTION	NO ACTION ALTERNATIVE
	WILDLIFE	
Summary of Impact:	**Summary of Impact 3.18.3.3-1:** Approximately 2,172 acres of wildlife habitat would be directly removed as a result of the Proposed Action over the 20-year mine life.	**Summary of Impact 3.18.3.4-1:** Approximately 449 acres of wildlife habitat would be directly removed as a result of the No Action Alternative between December 2011 and the end of activities under this alternative and a total of 3,063 acres of wildlife habitat would be directly removed over the life of the No Action Alternative.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.18.3.3-2:** Modification of wildlife habitat and subsequent reclamation efforts would result in less available mature vegetation for cover, forage, and nesting habitat for many species of wildlife in the short term.	**Summary of Impact 3.18.3.4-2:** Modification of wildlife habitat and subsequent reclamation efforts would result in less available mature vegetation for cover, forage, and nesting habitat for many species of wildlife in the short term. This impact would be slightly less than under the Proposed Action.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None
Summary of Impact:	**Summary of Impact 3.18.3.3-3:** Loud and sudden noises associated with the Proposed Action could result in wildlife displacement for the life of the Project. The proposed Project may produce noise in exceedance of 55 dBA. No additional mitigation is proposed.	**Summary of Impact 3.18.3.4-3:** Loud and sudden noises associated with the continuation of activities under the No Action Alternative between December 2011 and the end of activities under this alternative could result in wildlife displacement for the life of the Project. The continued activities under the No Action Alternative may produce noise in exceedance of 55 dBA.
Recommended Mitigation Measure:	None	None
Effectiveness of Mitigation:	None	None

	PROPOSED ACTION	NO ACTION ALTERNATIVE
Residual Impacts (Wildlife):	The Proposed Action would result in the unavoidable loss of up to 441 acres of terrestrial wildlife habitat resulting from surface disturbance in the Brimstone open pit area that would not be backfilled or reclaimed. Approximately 1,731 acres of wildlife habitat would be removed in the short term and then reclaimed as a result of mine development, operation, and closure. The reclaimed land would have more grass and forb forage and less mature shrub forage in the short term. Browsers would benefit the most from the early seral stage vegetation in the short term. As the plant communities within the Project Area mature (within a period of 15 to 20 years) larger shrubs would provide additional cover for larger animals and less of a forage prey base for raptors, similar to the existing conditions.	The continuation of activities under the No Action Alternative would result in the unavoidable loss of up to 758 acres of terrestrial wildlife habitat resulting from surface disturbance in the open pits that would not be backfilled or reclaimed. Approximately 2,304 acres of wildlife habitat would be removed in the short term and then reclaimed as a result of mine development, operation, and closure. The reclaimed land would have more grass and forb forage and less mature shrub forage in the short term. Browsers would benefit the most from the early seral stage vegetation in the short term. As the plant communities within the reclaimed area mature (within a period of 15 to 20 years) larger shrubs would provide additional cover for larger animals and less of a forage prey base for raptors, similar to the existing conditions.

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