United States Department of the Interior

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JUN 10 2010

In Reply Refer To:
3809 (NVB0630)
NVN-067601

Dear Reader:

The Bureau of Land Management (BLM), Mount Lewis Field Office (MLFO) has prepared an Environmental Assessment (EA) to analyze the impacts of expanding the existing barite mining operations at the Argenta Mine near Battle Mountain, Nevada. The expansion would allow Baker Hughes Drilling Fluids to continue to profitably recover barite reserves from mining claims in the project area utilizing, to the extent practical, existing facilities. Pursuant to the National Environmental Policy Act (NEPA) and the Council on Environmental Quality regulations on implementing NEPA, the EA identifies, describes, and evaluates resource protection measures that would mitigate the possible impacts of the proposed project.

In April 2010, Baker Hughes Drilling Fluids submitted to the MLFO the Argenta Mine Plan of Operations and Reclamation Plan (NVN-067601) to permit a total of 592.2 acres of disturbance within the Plan of Operations boundary. The Proposed Action would include permitting the continued use of current facilities, creating new haul roads, additional exploration roads, and drill sites, expansion of waste rock dumps, creation of the F Pit North, expansion of the Cuna Pit, creation of the evaporation pond to dispose of water in the F Pit, and backfilling of the F Pit. This would expand the current disturbance area of 433 acres, which includes 75.3 acres of public land and 357.7 acres of private land, by an additional 159.2 acres consisting of 45.8 acres of public land and 113.4 acres of private land.

The Argenta Mine is located approximately 15 miles east of Battle Mountain, Lander County Nevada. The mine is located in sections 18 and 19, Township 32 (T32N) North, Range 47 East (47E) and Sections 13 and 24, T32N, R46E.

The EA is enclosed for your review. Written comments on the EA will be accepted at the above listed address, until 4:30 p.m., June 30, 2010. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

If you have any questions or comments regarding this proposal, please contact Larry Turner, Mining Engineer/Project Lead or Cory Gardner, Planning and Environmental Coordinator at the above Mount Lewis Field Office address or at (775) 635-4000.

Sincerely,

Douglas W. Furtado
Field Manager
Mount Lewis Field Office

Enclosure

U.S. Department of the Interior
Bureau of Land Management

Environmental Assessment NV063-EA06-101
Date: June 2010

Argenta Mine Expansion
Baker Hughes Drilling Fluids
DRAFT ENVIRONMENTAL ASSESSMENT

File Number: NVN-067601

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MISSION STATEMENT

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

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

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LIST OF ACRONYMS & ABBREVIATIONS

AGP Acid-Generating Potential
AMSL Above Mean Sea Level
ANP Acid-Neutralizing Potential
ARD Acid Rock Drainage
ARPA Archaeological Resources Protection Act of 1979
AUM Animal Unit Month
Baker Hughes Baker Hughes Drilling Fluids
BAPC Bureau of Air Pollution Control
BLM Bureau of Land Management
BMP Best Management Practice

CESA	Cumulative Effects Study Area
CFR	Code of Federal Regulations
EA	Environmental Assessment
gpm	Gallons Per minute
HFRA	Healthy Forest Restoration Act
MBTA	Migratory Bird Treaty Act
MLFO	Mount Lewis Field Office
NAC	Nevada Administrative Code
NBMG	Nevada Bureau of Mines and Geology
NDEP	Nevada Division of Environmental Protection
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act of 1966
NNHP	Nevada Natural Heritage Program
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NSAAQS	Nevada State Ambient Air Quality Standards
PAG	Potentially Acid-Generating
PoO	Plan of Operations
RMP	Resource Management Plan
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
TDS	Total Dissolved Solids
TES	Threatened, Endangered, and other Special Status
TSF	Tailings Storage Facility
USFWS	United States Fish and Wildlife Service
WPCP	Water Pollution Control Permit

ARGENTA MINE EXPANSION
ENVIRONMENTAL ASSESSMENT
BAKER HUGHES DRILLING FLUIDS

1.0 INTRODUCTION

Baker Hughes Drilling Fluids (Baker Hughes) proposes to expand the existing barite mining operation at the Argenta Mine. The Argenta Mine is located on private lands and public lands administered by the Bureau of Land Management (BLM) Battle Mountain District and Elko District offices. The BLM Mount Lewis Field Office (MLFO) from the Battle Mountain District Office is the lead for this project. The Argenta Mine is located approximately 15 miles east of Battle Mountain, Lander County, Nevada. The mine is located in Sections 18 and 19, Township 32 North (T32N), Range 47 East (R47E) and Sections 13 and 24, T32N, R46E (Figure 1).

In April 2010, Baker Hughes submitted the *Argenta Mine Plan of Operations and Reclamation Plan* (NVN-067601) (Baker Hughes, 2010) to permit a total of 592.2 acres of disturbance within the Plan of Operations (PoO) boundary. The Proposed Action would expand the current disturbance area of 433 acres, which includes 75.3 acres of public land and 357.7 acres of private land, by an additional 159.2 acres consisting of 45.8 acres of public land and 113.4 acres of private land.

This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and in compliance with applicable regulations and laws passed subsequently, including the President's Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] parts 1500-1509), United States Department of Interior requirements, and guidelines listed in the BLM National Environmental Policy Handbook H-1790-1 (BLM, 2008a).

1.1 PURPOSE AND NEED FOR THE ACTION

The purpose of the Proposed Action is to allow the expansion of the existing barite mining operations at the Argenta Mine and continue to profitably recover barite reserves from mining claims in the project area utilizing, to the extent practical, existing facilities. If authorized, Baker Hughes, under the 1872 Mining Law, would mine locatable minerals within their approved PoO as provided by the BLM surface management regulations at 43 CFR 3809.

The need for the Proposed Action is to respond to a PoO application submitted under 43 CFR 3809 and allow Baker Hughes to mine a domestic source of barite in such a manner as to limit impacts to cultural and natural resources in compliance with applicable statutes and regulations and to prevent any undue or unnecessary degradation of the public lands, as required under the Federal Land Policy and Management Act and the surface management regulations. Barite is used for many commercial uses in the chemical and ceramic industries; however, the majority of it is consumed in oil and gas drilling. There has been a dramatic increase in domestic

exploration and drilling for oil and gas; thus, this increased drilling activity has increased demand and production of barite by 40 percent (USGS, 2007). The majority of domestic barite production comes from three major mines in Nevada: Argenta Mine, Greystone Mine, and Rossi Mine (USGS, 2008).

1.2 LAND USE PLAN CONFORMANCE STATEMENT

The Proposed Action is in conformance with the Shoshone-Eureka Resource Management Plan (RMP) dated March 1986 (BLM, 1986a and 1987b). Specifically on page 29 of the RMP Record of Decision, under the heading "Minerals" subtitled "Objective" 1: "Make available and encourage development of mineral resources to meet national, regional, and local needs consistent with national objectives for an adequate supply of minerals"; Under "Management Decisions," "Locatable Materials," page 29, number 1: "All public lands in the planning areas will be open for mining and prospecting unless withdrawn or restricted from mineral entry"; and Under "Management Decisions," number 5, Current Mineral Production Areas: "Recognize these areas as having a highest and best use for mineral production and encourage mining with minimum environmental disturbance..."

The Proposed Action is also in conformance with the Elko RMP dated March 1987 (BLM, 1987a). Specifically on page 35 of the RMP Record of Decision, under the heading "Minerals" subtitled "Objective": "Maintain public lands open for exploration, development, and production of mineral resources while mitigating conflicts with wildlife, wild horses, recreation, and wilderness resources."

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

Pursuant to 43 CFR §3809.411, the environmental effects of a PoO must be analyzed and disclosed to the public in compliance with NEPA. The analysis of the environmental effects of a Proposed Action and alternatives are described in a comprehensive analytical document, such as this EA. The EA would be used by the BLM to make an informed decision on the Proposed Action. The Federal Land Policy and Management Act and the related BLM surface management regulations (43 CFR §3809) require that all mineral exploration or mining operations on BLM-administered public land be conducted in a manner that prevents undue or unnecessary degradation of the public lands. This is achieved through the application of substantive environmental standards from federal and state laws and regulations, and incorporation of appropriate mitigation measures to lessen or eliminate the environmental effects of an action, such as the Proposed Action.

1.3 ISSUES

During the preliminary internal scoping in September 2006, the BLM resource specialists identified the following resources as being present and potentially impacted by the Proposed Action:

- Range Resources;
- Cultural Resources;
- Noxious Weeds, Invasive, and Non-native Species;
- Water Resources;
- Wildlife (including threatened, endangered, and other special status [TES] species); and
- Native American Traditional Values.

The issues discussed in the internal scoping meeting in addition to others noted on the BLM Interdisciplinary Team checklist are addressed within their respective sections in this EA.

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2.0 PROPOSED ACTION AND ALTERNATIVES

The Argenta Mine is in Lander County, Nevada. The nearest population center is the town of Battle Mountain, Nevada, approximately 15 miles west of the project area. Elko, Nevada is approximately 60 miles east of the project area. Primary access to the mine site is from Interstate 80 to the Argenta Exit (Exit 244), then south through Mosquito Canyon on a pre-existing, public gravel road to the mine site. Access to the processing facility is via Interstate 80 to the Argenta Exit (Exit 244), then east along the frontage road to the facilities. The existing disturbance in the mine area includes open pits, waste rock dumps, a maintenance shop, ancillary and support facilities, the main access road, and exploration areas (Figure 2). The processing facilities are located on the north side of Interstate 80 and include the process facilities, storage and equipment areas, administration building, a warehouse, and the tailings storage facility (TSF) (Figure 3).

2.1 BACKGROUND

The Argenta Mine was previously known as Barium King Mine and Nevada Barite Mine. In 1984, it was noted as being located in Sections 13 and 24, T32N, R46E (Papke, 1984). The original claim, Barium King No. 1, was located in January 1934 by H.S. Anderson, John Durkin, and Ed Hammond and was patented in August 1941. The Argenta Mine encompasses what was previously known as the Shelton Mine (also known as Yuba, Barite, and Baryte 1 and 3). The Shelton Mine (Papke, 1984) was located in Section 18, T32N, R47E; the earliest claim of which was noted as October 1934 by Edith Shelton.

The barite deposit at the Argenta Mine was first exploited by Milwhite Mud Sales Company during the 1930s. In 1962, Milwhite Mud Sales Company changed its name to Milchem. Baker International purchased Milchem in 1971 and Newpark Drilling Fluids in 1986, and then formed Baker Hughes after merging with Hughes Tool Company in 1987. The Argenta Mine barite operation is now an operating unit of Baker Hughes Drilling Fluids Division.

Although Milchem is generally noted to be the original owner of the Argenta Mine (Papke, 1984), other documents on file with the Nevada Bureau of Mines and Geology (NBMG) reference other companies with involvement at this site. Discrepancies in the historical records may be a result of several companies operating different claims within the project area. This additional historical information is discussed in chronological order below.

- According to a 1935 NBMG mining log (Carpenter, 1935), the barite mine at Argenta was opened in 1934 by the Chemical and Pigment Company of Oakland. It was noted that the surface deposit had not yet been defined but was expected to extend many miles along the flank of the range. The log states "It is blasted by means of an I.R. portable compressor, jackhammers using jackbits, and 40% dynamite. Some sorting is done ahead of the shovel, giving an 85% to 90% barium sulphate product." Records note that first extensive production of bedded barite likely came from the Barium King group of claims in 1934 (Papke, 1984).

- A 1938 mining log (Gianella, 1938) refers to the mine as the Nevada Barytes Property operated by E.L. Ralston of the Chemical and Pigment Company. The log states "This is undoubtedly the largest deposit of dark barite so far discovered in the west." At that time, the company's patented holdings were located in Section 19, T32N, R47E and Section 13, T32N, R46E. The company also held portions of Section 24, T32N, R46E and Section 18, T32N, R47E by location.
- Mineral Survey No. 4752, on file with NBMG, provides the 1939 plats of the six Barium King lodes and notes the claim owner as the Glidden Company. The plats include Sections 13 and 24, T32N, R46E and Sections 18 and 19, T32N, R47E. Mineral Survey No. 4785 (1945) included two new lodes: Barium New Discovery 1 and Barium New Discovery 2 located in Section 24, T32N, R46E, again a claim of the Glidden Company.
- Early production of barite utilized selective mining, hand sorting, and screening to grade the ore. The first beneficiation plant was built by the Yuba Mineral and Mining Company in the early 1960s at the Shelton Mine. The first jig plant started operation in 1968, owned by Milchem, and was used to upgrade ore from the Argenta Mine claims (Papke, 1984).
- A survey of mineral deposits along the Western Pacific Railroad in 1964 recorded the Argenta (Nevada Barite) Mine in Section 13, T32N, R46E and Section 18 and 19, T32N, R47E with an undetermined ownership and also the Yuba Minerals and Mining Company Barite Mine (Shelton Mine) in Section 18, T32N, R47E. The source for this data was listed as the "Southern Pacific Railroad report 'Minerals for Industry,' part 2, p.124 (1964)."
- A mining log from 1978 (Papke and Bentz) notes the Argenta Mine as a large group of patented and unpatented claims held by Milchem. Production was listed as 1,000,000 to 2,000,000 tons. The history simply lists the first claim (Barium King No. 1) as being located in January 1934 with production beginning in the mid-1930s. The log notes large south and north pits and extensive drilling. The mine was active and ore processed by jigging.
- By the late 1970s it had produced more than 100,000 tons of barite from several large open pits on the west side of Mosquito Canyon. The beds of barite are as much as 40 feet thick and strike north to northwest.
- Until 1991, the Argenta Mine was not subject to Nevada Division of Environmental Protection (NDEP) water pollution control permit (WPCP) regulatory requirements. Pursuant to Nevada Administrative Code (NAC) 445A.387, the facility was incorporated into the NDEP-Bureau of Mining Regulation and Reclamation Water Pollution Control Permitting program beginning in 1991. Mining of the F Pit ceased in 2004. The mining of barite at this site is by open-pit method; large tonnages of ore and waste are excavated by close-spaced drilling, blasting, and removal by power shovels, loaders, and trucks. The trucks transport the ore to the mill and the product is then transported by rail at the Argenta siding or by over-the-road trucks.
- The original PoO was submitted to the BLM in 1993 with a new PoO submitted in 2007 and a revised PoO submitted in 2010.

- A draft Pit Lake Plan was submitted to NDEP in March 2008, with a final submitted in November 2008. The Pit Lake Plan was amended and a minor modification to the WPCP was approved in April 2010.

2.2 PROPOSED ACTION

The Proposed Action would consist of permitting the continued use of current facilities, expanding the existing mining operation at the Argenta Mine, and reclamation of the lake in the F Pit. The Proposed Action would disturb an additional 159.2 (45.8 public and 113.4 private) acres, which includes new haul roads, additional exploration roads and drill sites, expansion of waste rock dumps, creation of the F Pit North, expansion of the Cuna Pit, creation of the evaporation pond to dispose of water in the F Pit, and backfilling of the F Pit. Existing and proposed disturbances for the project area are provided in Table 1.

Table 1. Existing and Proposed Disturbance in the Project Area

Category	Existing Disturbance			Proposed Disturbance			Total Disturbance		
	Public	Private	Total	Public	Private	Total	Public	Private	Total
Exploration Roads and Pads[1]	1.0	0.7	1.7	10.0	10.0	20.0	11.0	10.7	21.7
Roads[2]	0.0	7.4	7.4	0.5	1.8	2.3	0.5	9.2	9.7
Pits	7.7	75.9	83.6	13.6	54.4	68.0	21.3	130.3	151.6
Dumps[3]	66.0	181.6	247.6	21.7	47.2	68.9	87.7	228.8	316.5
Tailings	0	29.7	29.7	0	0	0	0	29.7	29.7
Foundations and Buildings	0	17.9	17.9	0	0	0	0	17.9	17.9
Yards	0.6	44.5	45.1	0	0	0	0.6	44.5	45.1
TOTAL	**75.3**	**357.7**	**433**	**45.8**	**113.4**	**159.2**	**121.1**	**471.1**	**592.2**

[1]Exploration Road and Pad disturbance does not include 13.3 acres of pre-1981 drill site disturbance.
[2]Road disturbance does not include the 20.3 acres of public access road that would not be reclaimed.
[3]Dump disturbance does not include 3.1 acres of pre-1981 dump disturbance.

The Proposed Action would not increase the amount of throughput to the mill on a daily basis but rather would extend the life of the mine by continuing to mine existing deposits in the area. The current project mine life is approximately six months. The Proposed Action would extend the life of the mine by ten years of active mining and processing, two years of reclamation, and five years of monitoring.

2.2.1 Open Pit Mining

Currently, there are 83.6 acres of existing open pits on both public and private land. The Proposed Action includes 68 acres of additional pit disturbance. The 68 acres of proposed pit disturbance is for creation of the new F Pit North (50.1 acres) encompassing previously disturbed ground; and expansion of the Cuna Pit (17.9 acres). The disturbance breakdown for the pits is shown in Table 2. The Yuba and Cuna pits are currently the primary area for active mining. Active mining in the F Pit was completed in early 2004. Active, non-active, and proposed pits are shown on Figure 2. There are no adits or trenches associated with the Argenta Mine.

Table 2. Pit Disturbance

Pits	Existing Disturbance			Proposed Disturbance			Total Disturbance		
	Public	Private	Total	Public	Private	Total	Public	Private	Total
Cuna Pit	1.8	38.5	40.3	3.2	14.7	17.9	5.0	53.2	58.2
Yuba Pit	5.9	14.3	20.2	0	0	0	5.9	14.3	20.2
F Pit	0	23.1	23.1	0	0	0	0	23.1	23.1
F Pit North	0	0	0	10.4	39.7	50.1	10.4	39.7	50.1
TOTAL	**7.7**	**75.9**	**83.6**	**13.6**	**54.4**	**68.0**	**21.3**	**130.3**	**151.6**

Typical drill and blast mining techniques are used and would continue to be used under the Proposed Action at the Argenta Mine. A drill rig is used to drill blast holes in the target area. Blasting is conducted by a contractor, approximately two to three times per month. Blast holes are filled with ammonium nitrate and fuel oil as the explosive. No explosives are stored on-site. The blasted material is identified as either waste rock or ore material. Waste rock is loaded into 50-ton haul trucks for transport to the waste rock dumps, and ore is loaded onto a 100-ton ore truck and transported to the processing facilities.

In 2004, when mining ceased in the F Pit, it began to fill with water creating the F Pit Lake. The F Pit is located on private land and is therefore permitted through the state. The F Pit has been included in the Proposed Action because material used to backfill the pit would be mined as part of the Proposed Action. The F Pit Lake is discussed further in Section 2.2.7.

2.2.2 Waste Rock Handling

Waste Rock Dumps

Waste rock hauled from the pits is dumped at one of the waste rock dumps near the pit being mined. There is approximately 247.6 acres of existing disturbance associated with waste rock dumps. Two waste rock dumps around the Yuba Pit are currently being used (Dumps B and I shown on Figure 2). The other waste rock dumps are associated with the Cuna Pit and F Pit (Figure 2). Waste rock from the proposed F Pit North would be used to backfill the F Pit. An additional 68.9 acres of disturbance associated with waste rock placement is proposed. The additional 68.9 acres of disturbance is associated with the expansion of existing waste rock dumps (Dumps E and F) and creation of a new waste rock dump (Dump G) as shown on Figure 2. Dump G would be reserved for excess waste rock and would only be used if necessary. Expansion at Waste Rock Dump E is for reclamation purposes; to allow the dump to be graded to a 2.5H:1V (Horizontal:Vertical) slope. No additional waste rock would be placed on this dump. Existing and proposed waste rock dump disturbances are provided in Table 3.

Table 3. Waste Rock Dump Disturbance

Dump	Existing Disturbance			Proposed Disturbance			Total Disturbance		
	Public	Private	Total	Public	Private	Total	Public	Private	Total
Dump A	6.4	67.1	73.5	0	0	0	6.4	67.1	73.5
Dump B	35.8	35.9	71.7	0	0	0	35.8	35.9	71.7

Table 3. Waste Rock Dump Disturbance (continued)

Dump	Existing Disturbance			Proposed Disturbance			Total Disturbance		
	Public	Private	Total	Public	Private	Total	Public	Private	Total
Dump C	10.5	9.6	20.1	0	0	0	10.5	9.6	20.1
Dump D	0	3.2	3.2	0	0	0	0	3.2	3.2
Dump E	7.7	22.0	29.7	6.3	1.0	7.3	14.0	23.0	37.0
Dump F	0	3.8	3.8	15.4	15.7	31.1	15.4	19.5	34.9
Dump G	0	0	0	0	30.5	30.5	0	30.5	30.5
Dump H	5.6	0.6	6.2	0	0	0	5.6	0.6	6.2
Dump I	0	16.2	16.2	0	0	0	0	16.2	16.2
Dump J	0	23.2	23.2	0	0	0	0	23.2	23.2
TOTAL	**66.0**	**181.6**	**247.6**	**21.7**	**47.2**	**68.9**	**87.7**	**228.8**	**316.5**

Waste Rock Types

Five types of rock have been identified at the Argenta Mine site. The five rock types include lakebed sediments, basalt flows of Tertiary age, Devonian Slaven Chert, Ordovician Valmy Formation, and Quaternary alluvial deposits. The lakebed sediments are composed of silty, bedded limestone and sediments with organic matter and clays. The basalt flows are mostly mafic aluminosilicates with minor amounts of iron, magnesium, and calcium. The Slaven Chert is composed of approximately 85 percent silica, 10 percent iron oxides and organic matter, and about 5 percent sericite. The Slaven Chert can also have interbedded layers of shale, which can be locally thick. The Valmy Formation consists of quartzite, sandstone, chert, shale, siltstone, greenstone, and small quantities of limestone. The alluvial deposits are composed of gravels, sands, and silts eroded from the surrounding hills.

It is anticipated that four of these rock types would be disturbed or generated as waste rock during mining activities and in the construction of the evaporation pond. The majority of the waste rock anticipated to be generated as a result of the Proposed Action would be Slaven Chert. Alluvium is the primary rock type anticipated to be encountered while constructing the evaporation pond. If lakebed sediments are encountered, the quantities generated would be minor. Basalt would be moved from existing waste rock dumps to the F Pit during reclamation and backfilling activities. The Valmy Formation is not anticipated to be encountered as a result of the Proposed Action. In addition to these rock types, two types of waste material are generated during the ore processing activities; fine tailings and coarse chert tailings.

Waste Rock Characteristics

Acid/base accounting (ABA) and Meteoric Water Mobility Procedure (MWMP) tests were performed on the five types of rock present at the mine. ABA is the balance between the acid-production and acid-consumption properties of a mine-waste material. ABA, as noted in Tables 4 and 5, is defined as ABA = acid-neutralizing potential (ANP) – acid-generating potential (AGP). The higher (and positive) the ABA, the greater potential for the material to be a net acid-

neutralizing material. Negative ABA indicates a material with a net acid-generating potential. MWMP is used to evaluate the potential for leaching of certain constituents from a mine-waste material by meteoric water. Because MWMP measures leachibility, the results from these tests are typically compared to groundwater and/or surface water standards. The results of the annual tests (2009) of the five rock types required by NDEP are presented in Table 4. The analytical data for these samples are included in Appendix A.

Table 4. Acid/Base Accounting and Meteoric Water Mobility Procedure Test Results

Constituent	Lakebed Sediments	Basalt	Alluvium	Slaven Chert	Valmy Formation
Acid/Base Accounting ($TCaCO_3$/kT)					
Acid Base Accounting (ABA)	972	151	31.5	-24.7	1.6
Acid Generating Potential (AGP)	<0.3	5.8	<0.3	24.7	<0.3
Acid Neutralizing Potential (ANP)	972	157	31.5	<0.3	1.6
Non-extractable Sulfur (%)	<0.01 %	<0.01 %	<0.01 %	3.72 %	<0.01 %
Pyritic Sulfur (%)	<0.01 %	0.18 %	<0.01 %	0.79 %	<0.01 %
Sulfate Sulfur (%)	<0.01 %	0.11 %	<0.01 %	0.28 %	0.04 %
Total Sulfur (%)	<0.01 %	0.29 %	<0.01 %	4.79 %	0.04 %
Meteoric Water Mobility Procedure (mg/L except pH)					
Aluminum	<0.08	<0.08	0.745	0.250	<0.08
Barium	0.0751	0.0297	0.100	0.234	0.114
Beryllium	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	0.982	0.118	0.104	0.131	0.132
Cadmium	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	11.7	28.3	22.9	3.02	2.1
Chromium	<0.006	<0.006	<0.006	<0.006	<0.006
Copper	<0.01	<0.01	<0.01	0.157	<0.01
Iron	0.06	<0.06	1.41	<0.06	<0.06
Magnesium	15.1	19.3	5.83	0.733	0.451
Manganese	<0.004	0.0331	0.108	0.0913	<0.004
Nickel	<0.01	<0.01	<0.01	0.023	<0.01
Potassium	3.6	1.59	1.49	1.87	1.11
Silver	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	117	7.95	11.4	2.93	2.72
Zinc	<0.01	<0.01	0.0168	0.0248	<0.01
Antimony	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic	0.0388	<0.003	<0.003	<0.003	<0.003
Lead	<0.003	<0.003	<0.003	<0.003	<0.003
Selenium	0.00322	<0.003	<0.003	<0.003	<0.003
Thallium	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury	<0.0002	<0.0002	0.00133	<0.0002	<0.0002
Nitrate/Nitrite as N	4.45	0.859	3.90	0.278	0.473
WAD Cyanide	<0.01	<0.01	<0.01	<0.01	<0.01
Bicarbonate	93.2	30.8	65.6	<1.0	9.3
Carbonate	3.6	<1.0	<1.0	<1.0	<1.0
Total Alkalinity	96.8	30.8	65.6	<1.0	9.3
Total Dissolved Solids	420	240	230	38	31
pH	8.44	7.34	7.65	4.91	6.73
Chloride	107	1.56	2.26	0.662	0.784
Fluoride	1.17	0.267	0.342	0.101	0.109
Sulfate	83.0	133	18.5	21.1	3.35

Previously, acid/base accounting tests have been conducted on numerous samples of material from the Slaven Chert. These additional samples of Slaven Chert represent past annual waste rock sampling conducted by Baker Hughes and samples collected from borings drilled when installing monitoring wells at the site. Table 5 represents 21 samples identified as chert from the Slaven Chert formation. Other samples of non-chert material were not included in Table 5 because the chert (from the Slaven Chert) is generally considered to be the most likely material to exhibit acid-generating characteristics. Conservatively, the samples listed in Table 5 and the ABA results presented, are considered representative of the majority of waste rock generated from the Proposed Action and disposed in F Pit.

Table 5. Waste Rock (Slaven Chert) Acid/Base Accounting Results

Sample ID	Rock Description	Acid Neutralizing Potential (ANP)	Acid Generating Potential (AGP)	Acid/Base Accounting (ABA)	ABA Ratio
SLAVEN-S-1	Chert	<0.3	24.7	-24.7	<0.01
CA-1 (3-Mar-09)	Chert	0.5	39.7	-39.2	0.01
CA-1 (4-Feb-09)	Chert	0.5	<0.3	0.5	>1.70
MW-4, 130'-135'	Chert	29.3	6.3	23	4.65
MW-4, 170'-175'	Chert	41.1	5.9	35.2	6.97
MW-4, 190’-195’	Chert	11.8	9.7	2.1	1.22
MW-4, 300’-305’	Chert	13.4	5.3	8.1	2.53
MW-5, 60’-70’	Chert	6.2	9.4	-3.2	0.66
MW-5, 80’-90’	Chert	14.1	1.3	12.8	10.85
MW-5, 100’-110’	Chert	18	12.2	5.8	1.48
MW-5, 140’-150’	Chert	11.6	10.3	1.3	1.13
MW-5, 160’-170’	Chert	38.6	23.4	15.2	1.65
MW-6, 60’-70’	Chert	7.7	0.6	7.1	12.83
MW-6, 90’-100’	Chert	9.3	0.6	8.7	15.50
MW-6, 120’-130’	Chert	6.7	<0.3	6.7	>22.30
MW-6, 140’-150’	Chert	6.7	0.6	6.1	11.17
MW-6, 160’-170’	Chert	0.5	1.3	-0.8	0.38
MW-6, 180’-190’	Chert	6.2	2.2	4.0	2.82
MW-6, 200’-210’	Chert	6.7	2.2	4.5	3.05
MW-6, 220’-230’	Chert	19.3	15	4.3	1.29
MW-6, 250’-260’	Chert	9.8	13.4	-3.6	0.73
Mean					4.90
Standard Deviation					6.11
95th Percent Confidence Interval					±2.25

The acid-generating characteristics of waste rock samples in Table 5 indicate the overall potential for acid generation from the waste rock material would be low. However, some individual waste rock samples did indicate the potential for generating acid. The acid-neutralizing potential (ANP)/acid-generating (AGP) ratio for the 21 samples that collectively represent the waste rock had a mean average ratio of 4.90. ANP/AGP ratios above 4.0 are generally considered to be in the range that would indicate acidic conditions would not be

produced. The 95th percent confidence interval of the ANA/AGP ratio for the waste rock showed a range of ±2.25 from this average. Based on the overall ABA coefficients of the waste rock, the potential for waste rock to generate acid would be low. Additional measures of protection to prevent acid generation for the waste rock are described further in Section 2.2.7 under "Pit Lake Reclamation."

Humidity cell tests were conducted on three different types of material from the Argenta Mine: rock from the F Pit highwall, fine tailings, and the coarse chert stockpile. Each test was conducted for ten weeks. The analytical results indicate the material in the highwall of the F Pit is potentially acid-generating. The alkalinity in the sample analyzed was expended by the end of the second week of the test. The sample also generated between 30 mg/kg and 85 mg/kg sulfate throughout the duration of the test. These results are consistent with the water quality results from the F Pit. Reclamation measures would be implemented to neutralize the potential acid-generating characteristics of the F Pit highwalls and are outlined in the approved PoO and in the section "Reclamation of Waste Rock Dumps" below.

The fine tailings exhibited no acidity in the sample and abundant alkalinity throughout the test. The available acidity was released from the coarse chert tailings sample by the third week, and the sample continued to produce between 4 mg/kg and 7 mg/kg alkalinity through the end of the test. Values of sulfate in both the fine tailings and coarse chert tailings decreased through the test from approximately 175 mg/kg to less than 10 mg/kg. In summary, the fine tailings and the coarse chert did not exhibit acid-generating properties after ten weeks of humidity cell testing.

Reclamation of Waste Rock Dumps

Historically, waste rock dumps at the Argenta Mine have been reclaimed by recountouring the dump surface topography to enhance runoff of meteoric water and revegetating the surface with a high elevation seed mixture. Additionally, the dumps have been isolated from groundwater and the location of the mine is within an area having high evaporation rates and low annual precipitation. Based on inspections of the historic waste rock dumps, acid rock drainage has not been observed to be an issue. Dumps B, F, G, and I would be constructed and reclaimed in this manner.

Because F Pit was excavated below the static water table, additional protective measures would be taken to prevent acid rock drainage (ARD) from this proposed waste rock dump. F Pit would be backfilled to a minimum elevation of 5,885 feet above mean sea level (AMSL) with stockpiled, run-of-mine basalt, which is five feet above the historic high water level observed during the winter of 2008 and spring of 2009. Backfilling of the F Pit with basalt would be completed in lifts of not more than five feet.

After the Pit Lake footprint has been covered with basalt, the remaining capacity of F Pit would be filled with waste rock from F Pit North as it is mined, with F Pit eventually reaching an

elevation of 5,925 feet amsl. The filling rate to the proposed final elevation would be dependent on the mining rate from F Pit North, but would likely extend until mining activities at F Pit North are complete. In the event the mined waste rock from F Pit North fails to reach the top of the F Pit (and leave highwalls exposed), the exposed highwalls would be tested to evaluate the presence of potentially acid-generating (PAG) material. Any remaining highwalls considered potentially acid-generating would be covered with benches of acid-neutralizing or inert material sloped at a ratio of not more than 3H:1V prior to construction of an evapo-transpiration cover. This would assure that no PAG material is left exposed upon completion of reclamation activities.

Upon completion of backfilling F Pit with waste rock, engineering controls (i.e. an evapo-transpiration cover system) would be constructed that is composed of an underlying foundation layer, a low hydraulic conductivity layer, and an overlying, erosion-resistant (vegetative) layer. This cap and cover system would be constructed of appropriate borrow material available on site (such as overburden or tailing materials). The purpose for the evapo-transpiration cover system is to preclude meteoric water from infiltrating the cover and contacting potential acid-generating material. Additionally, the cap and cover system would incorporate diversion ditches, re-grading and reshaping, and compaction to achieve appropriate performance requirements. By preventing surface water (i.e. meteoric water) from contacting waste rock, the pathway for creating acid generating conditions would be eliminated.

2.2.3 Process Facilities

One ore truck is used to transport ore from the pits to the plant site, which is located on private land north of Interstate 80. There are on average 10 ore trips per day. The ore is stockpiled next to the crusher in a 100,000-ton stockpile. A loader feeds the ore into a cone crusher where the material is crushed to minus ¾-inch. Conveyors transport the crushed ore to a 1,000-ton stockpile near the jig plant. Underground conveyors transport the crushed ore to the jig plant. The jigs use gravity to separate the chert waste from the ore. Water used in the jig plant is composed of tailings reclaim water and makeup water from the on-site production well. Fine chert waste is sent to the TSF while the larger chert waste is stockpiled.

Ore from the jig plant is stockpiled and transported to the mill using a loader. The ore is dried using heaters and then sent to one of two Raymond roller mills. The final product is a fine barite powder which is stored in a series of six silos. From the silos, the product is either sent to the bagging area, loaded into bulk delivery trucks, or loaded into railcars. Bagged product is placed on pallets and loaded onto flatbed trailers for transport. No chemicals are used in the processing of the barite product.

Baker Hughes processes approximately 1,000 tons of ore per day and produced approximately 92,460 tons of barite in 2008. Daily water use varies between 400,000 to 750,000 gallons. Fresh water from the on-site production well is needed as makeup water and varies from zero gallons

to 590,000 gallons per day with an average daily need of 240,000 gallons per day. The remainder of the water is reclaimed from the TSF.

2.2.4 Tailings Storage

The TSF is located northwest of the administration building (Figure 2). The facility covers approximately 29.7 acres and contains the fine waste from the jig plant. The tailings embankment was constructed primarily from chert and clay material from the mining operation. It was constructed in several phases with the first phase consisting of the northern portion. The second phase included the construction of a cell to the south of the first phase. Water is reclaimed from this second phase cell for process use. This facility would not be expanded under the Proposed Action.

Following construction and use of the second phase cell, a seep appeared in the TSF embankment where the first and second phase cells join. Because the chemistry of the seep water outside the embankment was presumably similar to that of water inside the embankment, which is analyzed quarterly, the seep chemistry was not analyzed. An investigation was performed on the embankment to determine if the stability of the embankment had been compromised by the seepage. This investigation indicated that the stability of the embankment had not been compromised (Knight Piésold, 2006). It was determined that the seep was a result of the high permeability of the chert material in the embankment. Placement of fine-grained material along the inside slope of the tailings embankment lowered the permeability of the embankment, resulting in cessation of seepage. The seeping started again in October 2008 and clay material was placed on the inside of the TSF where the seep occurred. The seepage stopped in September 2009 and has not reappeared. The TSF is inspected by Baker Hughes on a weekly basis to ensure the embankments are not leaking.

2.2.5 Process Water Management

Water from one production well is used for the jigging operations and other process needs, while a domestic water well supplies drinking water and water for other domestic uses. Both wells are located on Baker Hughes property near the plant site. Approximately 400,000 to 750,000 gallons of water per day is used for processing the ore. Approximately 160,000 to 510,000 gallons of water a day is reclaimed and reused from the TSF, with the remainder of the process water supplied from the production well.

2.2.6 Ancillary Facilities

<u>Power and Communication Facilities</u>

The mining area is remote and is not connected to the regional power grid; however, the processing facilities are operated from line power. Power needs at the mine site are provided by a generator located near the truck maintenance area at the mine. An emergency generator in the

warehouse located in the process area is used as backup during power outages. Facilities that use line power include the mill, warehouse, crusher, jig plant, and administration building.

Telephone service is available in the administration building. Cellular phone service is also available at the process area and in portions of the mine area. A radio communication system is used for communication between the process area and the mine area.

Water Source and Supply

There are two wells on the Baker Hughes property that supply water for all needs of the Argenta Mine. The domestic potable water well provides drinking water and water for sanitary facilities. The production well provides makeup water for the jig plant and for the truck wash area. The location of these wells is shown on Figure 3.

Access and Service Roads

Access to the processing and administrative facilities from Battle Mountain is via Interstate 80 east for approximately 15 miles to the Argenta Exit (Exit 244). From the Argenta Exit travel east on the north frontage road turning left into the plant site. Access to the mine site is via the Argenta Exit (Exit 244), then south on the existing gravel road to the mine. This access road to the mine was present prior to 1981 and has been used to access public and private lands to the south of the mine. Currently, there is a gate in the access road at the mouth of Mosquito Canyon that is closed and locked when the mine is not operating. Traffic is controlled on the road to the mine site due to the use by large equipment. There are other access and haul roads throughout the property accounting for 7.4 acres of disturbance.

An additional 2.3 acres of haul road disturbance is planned, which would allow access to the proposed F Pit North. The roads near the process area were constructed by repeated travel and compaction over relatively flat areas. The haul roads around the mine site are mainly cut-fill construction, depending upon the slope of the area. These roads are narrow relative to typical haul roads, having a total disturbance width of about 35 feet. A culvert has been installed where the haul road crosses the Mosquito Canyon drainage. The current access road would remain intact at the conclusion of mining operations to provide public access to the public and private lands south of the project area.

Growth Media Stockpiles

Due to a limited amount of naturally existing topsoil and the lack of stockpiling of existing material during previous operations, limited growth media is available at the Argenta Mine for reclamation activities. Growth media would be salvaged where feasible, and is currently being stockpiled near the truck maintenance building. Although past reclamation activities appear to have shown success with direct seeding of disturbed areas, these areas have not been evaluated for success under NDEP or BLM guidelines. The current reclamation plan indicates that during reclamation, the final contoured surface would be prepared to receive seed directly.

Chert Stockpile

The chert stockpile is stored in a 15-acre area near the processing facilities on private land. The stockpile would not be expanded under the Proposed Action as the stockpile area is adequate. Since chert is inert, it can be used for other applications as needed. Baker Hughes uses some of the chert waste for road base on some of their haul roads. Portions of the chert pile have been sold to Newmont Mining Corporation as road base on the access road to their power plant. Baker Hughes may use the chert waste material as a cover on the tailings during reclamation or sell the material to other parties for beneficial use (i.e., road base). It is anticipated there would be no chert remaining to reclaim when the plant closes.

Fuel Storage

Fuel storage includes two 500-gallon propane tanks, one located at the administration building and one at the mill; one 2,000-gallon #1 diesel double-walled tank at the jig plant; two 10,000-gallon #2 diesel tanks, one at the mine in concrete containment and one at the mill that is double-walled; and one 1,000-gallon gasoline tank in secondary containment located in the process area.

Sanitary and Solid Waste Disposal

Four septic systems exist at the site, three of which are currently in operation. Working septic facilities are located at the administration building, jig plant, and mill. The fourth system is located at the warehouse and is no longer in use. All septic systems are located on private land.

Waste bins are located around the mine, process facilities, and ancillary structures. These bins are emptied by a solid waste disposal contractor (Desert Disposal) on a weekly basis. All solid waste is disposed at a licensed facility (Battle Mountain Class II Landfill). Any petroleum waste products are stored in approved marked containers and taken off-site for recycling or disposal by a licensed contractor.

Fencing and Security

The access road to the mine site is gated at the entrance to Mosquito Canyon. This access is open during normal operating hours, and remains locked at all other times. The mine and processing plant typically operates 10 hours per day (5 a.m. through 3 p.m.) Monday through Friday. On occasion, the operating hours may be extended to 12 hours and the work week may extended to six days per week (Monday through Saturday). All visitors are required to check-in at the administration building (Figure 3) upon arrival on-site.

Support Facilities and Equipment

There are two areas with buildings and support facilities. The first area is located near the F Pit as shown on Figure 2. This area includes the truck maintenance shop and a laydown yard for spare parts and equipment. The other structures are located in the process area north of Interstate 80. This area is situated on private land that is either owned or leased by Baker Hughes.

Buildings and structures at the process area include the process buildings (crusher, jig plant, and mill building), an administration building, material loading facilities including a rail spur, a warehouse, and other ancillary and support facilities. Table 6 contains a list of the mobile and portable equipment utilized at the Argenta Mine.

Table 6. Mobile and Portable Equipment List

Equipment Description	Equipment Description
1995 Chevy Suburban- 3/4 Ton 4x4	1979 Reed SK-35 Drill
1999 Ford F250 Super Cab -3/4 Ton 4x4	1989 Reed SK-35 Drill
2003 Ford F250XL SD Super Cab-3/4 Ton 4x4	1974 Gardner-Denver Compressor
1989 Chevy- Club Cab 4x4	1972 Ford SIMCO Truck
2006 Ford F150 Supercrew 4x4	1980 Euclid R-50 End Dump Truck-50 Ton
1982 Chevy C-10-1/2 Ton 2x4	1979 Euclid R-50 End Dump Truck-50 Ton
1990 Ford F-250-3/4 Ton 4x4	Cat 130G Grader
1989 Chevy Suburban-3/4 Ton 4x4	1978 Austin-Western 714 Crane
1980 Cat D8K Dozer	1981 Hyster H60H Challenger-#6000 Forklift
1973 Cat D8H Dozer	1990 Cat V60D-#6000 Forklift
1981 Cat D8K Dozer	1981 Cat V50C-#5000 Forklift
1980 Cat 988-B Loader-7 Yd Loader	1981 Hyster H80C-#9000 Forklift
1975 Cat 980-B Loader-5 Yd Loader	Scottsman 8'X19'
2002 Volvo L220E-7.25 bcy Loader	1973 Ford Flatbed-2 Ton
1977 Cat 988-B Loader-7 Yd Loader	1981 Chevy Flatbed-Maint. Truck-1 Ton
1977 Cat 980-B Loader-5 Yd Loader	1977 Ford Maintenance Truck
Bobcat Loader Model 553	1977 Ford LN70000- Lube Truck
Cat 772-B Haul Truck-100 Ton	1974 Peterbilt- Water Truck
Cat 772-B Haul Truck-100 Ton	1981 Ford F600- Anfo Truck
Atlas 100 Ton Trailer	2000 Case Backhoe 580SL
Atlas 100 Ton Trailer	2006 Cat P6000D Forklift
1990 Cat 988-B Loader-7 Yd Loader	

Fire Protection

Baker Hughes provides a fire extinguisher for every vehicle and building on the mine and processing sites. An additional 10 fire extinguishers are located in the warehouse. The Battle Mountain Volunteer Fire Department has agreed to assist in the event of a fire at the Argenta Mine.

2.2.7 Reclamation

The PoO and Reclamation Plan for the Argenta Mine (JBR, 2008a) include a detailed reclamation plan for this project. Reclamation would be consistent with the requirements of 43 CFR 3809, and the Nevada Revised Statute (NRS) and NAC 519A regulations. NDEP, Bureau of Mining Regulation and Reclamation issued a reclamation permit (No. 0252) for the Argenta Mine and Mill in June 2006. An application for a minor modification to the existing permit (No. 0252) was submitted to NDEP on January 29, 2010 and on February 10, 2010, Baker Hughes received the modification approval from NDEP for the proposed expansion activities at the

Argenta Mine. To ensure that the project site is safe, stable, and capable of providing for a productive post-mining land use in accordance with NRS and NAC 519A.350, Baker Hughes would adjust the existing surety bond (BLM Bond No. NVB001019) to reflect the revised reclamation cost estimate within 60 days of BLM approving the PoO.

Whenever possible, concurrent reclamation would be implemented. This would include revegetation of disturbed areas to minimize wind and water erosion and to minimize establishment of invasive, non-native species. The revegetation criteria for reclaimed areas would be to achieve as close to 100 percent of the perennial plant cover of selected comparison areas as possible. The seed mix and mulch, if applicable, used during reclamation would be certified as weed-free. Revegetation would be accomplished with the seed mixtures specified in Table 7. The actual seed mixture chosen would depend on the elevation at the reclamation site. Any changes to the seed mix would be submitted to and approved by the BLM prior to implementation.

Table 7. Reclamation Seed Mixes

Species		Pounds Pure Live Seed/acre
Scientific Name	**Common Name**	
Low-Elevations (Below 5,500 Feet)		
Atriplex canescens	Fourwing saltbush	4.00
Atriplex confertifolia	Shadscale	4.00
Kochia prostrate	Prostrate kochia	0.50
Chrysothamnus viscidiflorus	Douglas rabbitbrush	0.50
Penstemon palmeri	Palmer penstemon	0.25
Linum lewisii	Lewis' flax	0.75
Agropyron cristatum	Crested wheatgrass	1.00
Oryzopsis hymenoides	Indian ricegrass	1.00
Elymus cinereus	Great Basin wildrye	1.00
Sporobolus airoides	Alkali sacaton	0.10
	TOTAL	**13.10**
High-Elevations (Above 5,500 Feet)		
Artemisia tridentata var. wyomingensis	Wyoming big sagebrush	0.10
Atriplex canescens	Fourwing saltbush	2.00
Grayia spinosa	Spiny hopsage	1.00
Kochia prostrate	Prostrate kochia	0.25
Sphaeralcea grossulariaefolia	Gooseberryleaf globemallow	0.50

Table 7. Reclamation Seed Mixes (continued)

High-Elevations (Above 5,500 Feet)		
Penstemon palmeri	Palmer penstemon	0.50
Linum lewisii	Lewis' flax	1.00
Agropyron cristatum	Crested wheatgrass	2.00
Oryzopsis hymenoides	Indian ricegrass	2.00
Elymus cinereus	Great Basin wildrye	2.00
	TOTAL	**11.35**

Pit Lake Reclamation

As per NAC Chapter 445A.429, bodies of water that are a result of mine pits penetrating the water table must not create an impoundment that has the potential to degrade the groundwater of the state, or has the potential to adversely affect the health of human, terrestrial, or avian life. As a result, NDEP requested in a compliance letter dated August 11, 2005, a Pit Lake Plan be completed for the F Pit Lake demonstrating how applicable regulations would be met.

The F Pit has been filling with water since 2004 when mining ceased. According to Baker Hughes' estimate, the lake was holding approximately 15 million gallons of water with a maximum depth of 33 feet in 2006. The most recent calculation, at the stabilized water level in 2008, estimates the pit lake is holding approximately 20 million gallons of water with a surface elevation that varies seasonally between 5,875 and 5,880 feet. Water samples have been collected and analyzed at NDEP-certified laboratories. Analytical results indicate the water in the F Pit has a pH value of approximately 4 and elevated concentrations of sulfate and total dissolved solids (TDS). Surface water samples from F Pit were last collected on September 17, 2008 and are not required under WPCP NEV0091045. Other water samples at F Pit continue to be collected on a quarterly basis except when ice is present. Analytical results from water quality testing of the F Pit are located in Appendix B.

The Final Argenta Mine Pit Lake Plan (JBR, 2008b) was submitted in November 2008. An amendment to the plan was submitted in January 2010, which discusses the proposed final disposal of the pit lake water. The Pit Lake Plan consists of the following:

- Brief summary of the history of the open pit mining and development of the Argenta Mine;
- Introduction to the site geology, geochemistry, and hydrogeology, including major rocks and minerals identified from pit walls and adjacent monitoring wells;
- Acid/base accounting and wall rock leachate chemistry;
- Groundwater and surface water quality;
- Groundwater elevations and flow directions;
- Ultimate surface water elevation in the pit lake prior to backfilling;
- PHREEQC modeling of pyrite oxidation and acid generation in the lake;
- Pit lake water chemistry evolution;
- Pit lake water treatment options with various acid neutralizers and sulfate precipitating agents;
- Ecological risk assessment; and
- Pit lake short- and long-term management plans.

Treatment and disposal of the water in the pit lake is planned to begin during the summer of 2010. The disposal of this water would be overseen and approved by NDEP through the Bureau of Mining Regulation and Reclamation WPCP NEV0091045. A minor modification to the WPCP has been approved to include these activities. Water from the pit lake has previously been treated with lime to raise the pH and precipitate metals. However, lime treatment was halted in 2009 because it was ineffective in precipitating some of the metals.

Based on the alternatives presented in the Pit Lake Plan and Pit Lake Plan Amendment, evaporation was determined, with concurrence from NDEP, to be the most effective method of eliminating water from the F Pit lake. The pit lake water would be pumped from the pit into an evaporation pond where the water would be evaporated using both active and passive evaporation. The estimated time for evaporation of the water from the evaporation pond is approximately six months. Once use of the evaporation pond is complete, which is conservatively estimated to be within two years of startup, sediments would be analyzed for NDEP Profile I Standard parameters. Assuming the sediment characteristics are appropriate for burial, they would be reclaimed with the pond liner by burying them and covering with the material originally excavated for the pond construction. If the sediments characteristics exceed NDEP Profile I Standards, the sediments would be collected and disposed off site at an appropriate disposal facility.

The evaporation pond would be constructed entirely within the footprint of the proposed Waste Dump G (Figure 2). Waste Dump G is planned to be used only in the event excess waste rock is generated beyond the capacities of the remaining waste rock dumps. In the event Waste Dump G is needed, it would not be constructed until well after the evaporation pond has been constructed, used and reclaimed. This evaporation pond is permitted through NDEP as a minor modification to the WPCP.

After construction of the evaporation pond is complete, water would commence being pumped from the deepest part of F Pit (south end). Once the water level has started to decrease, the shallow-sloped north end of the pit would be the first area exposed and Baker Hughes would initiate the backfilling process at the north end of F Pit. As the water level continues to decrease, the backfill process would continue in a southerly trend toward the deeper part of the pit. By initiating backfill of the pit as soon as it is safe to operate equipment in the area, the potential for seepage to fill the pit would be minimized. Based on the planned pumping rate of 500 gallons per minute, it is anticipated F Pit would be completely drained in less than 60 days.

Basalt would be used to backfill F Pit to an elevation of 5,885 feet amsl due to its ABA coefficient. The ABA for basalt, as per table 4, is 151, which indicates the material has a high potential to be acid-neutralizing. The quantity of basalt necessary to backfill F Pit to 5,885 feet amsl is estimated to be 162,125 bank cubic yards. The amount of basalt excavated during the mining of F Pit and stockpiled at the Argenta Mine has been calculated to be approximately 2.2 million cubic yards of material, indicating there is more than an adequate supply of stockpiled

basalt for the proposed backfilling plan. The stockpiled basalt would come from Dump C and Dump I.

After the Pit Lake footprint has been covered with basalt, the remaining capacity of F Pit would be filled with waste rock from F Pit North as it is mined, with F Pit eventually reaching an elevation of 5,925 feet amsl. The filling rate to the proposed final elevation would be dependent on the mining rate from F Pit North, but would likely extend until mining activities at F Pit North are complete. Previous ABA testing has indicated that some materials within the Slaven Chert, which the highwalls are composed of, may be acid-generating. In the event the mined waste rock from F Pit North fails to reach the top of the F Pit (and leave highwalls exposed), the highwalls where Slaven Chert is exposed would be tested to evaluate the presence of potentially acid-generating (PAG) material. Any remaining highwalls considered potentially acid-generating would be covered with benches of acid-neutralizing or inert material sloped at a ratio of not more than 3H:1V prior to construction of an evapo-transpiration cover. This would assure that no PAG material is left exposed upon completion of reclamation activities.

Upon completion of backfilling F Pit with waste rock, engineering controls (i.e. an evapo-transpiration cover system) would be constructed that is composed of an underlying foundation layer, a low hydraulic conductivity layer, and an overlying, erosion-resistant (vegetative) layer. This cap and cover system would be constructed of appropriate borrow material available on site (such as overburden or tailing materials). The purpose for the evapo-transpiration cover system is to preclude meteoric water from infiltrating the cover and contacting potential acid-generating material. Additionally, the cap and cover system would incorporate diversion ditches, re-grading and reshaping, and compaction to achieve appropriate performance requirements. By preventing surface water (i.e. meteoric water) from contacting waste rock, the pathway for creating acid generating conditions is eliminated.

Groundwater monitoring is currently conducted on a quarterly basis from monitoring wells MW-4, MW-5, and MW-6, which are used to evaluate groundwater quality upgradient, and downgradient of F Pit. An additional monitoring well (MW-8) would be installed in the backfill material within the F Pit in order to monitor groundwater level and quality once backfilling has been completed. These monitoring wells will continue to be sampled on a quarterly basis through the end of mining and reclamation, as per the Environmental Monitoring Plan of the approved PoO and WPCP NEV0091045. The overall goal of the F Pit monitoring program would be to demonstrate that groundwater is not being degraded due to backfilling activities. In the event monitoring results indicate that backfilling F Pit does not provide adequate neutralization of potentially acid-generating fluids, Baker Hughes would provide additional mitigation measures, such as the injection of alkaline material into the groundwater at F Pit to provide additional acid neutralization measures.

2.3 ENVIRONMENTAL PROTECTION MEASURES

Baker Hughes has incorporated several environmental protection measures into the Proposed Action to reduce effects to the environment, ensure protection of cultural resources, and comply with regulatory protective and monitoring requirements of applicable permits and plan approvals. The following sections describe the environmental protection measures incorporated into the Proposed Action.

2.3.1 Concurrent Reclamation

Baker Hughes would conduct concurrent reclamation to the extent practical. This would enhance revegetation success and reduce erosion and sedimentation from disturbed areas. The approved seed mix would be used to accomplish revegetation. Reclamation activities would be conducted on facilities or portions of facilities that have been constructed to design limits. Reclamation completed to-date at the Argenta Mine includes recontouring and revegetation of portions of Waste Rock Dumps B and C, as well as, Waste Rock Dump H.

2.3.2 Air Quality

Baker Hughes would implement the following measures to protect air quality:

- All applicable state and federal air quality standards would be met through the use of the best available control technology to control emissions, as described in the NDEP air quality permit;
- Fugitive dust is specifically addressed as a condition in the Fugitive Dust Control Plan portion of the NDEP Surface Area Disturbance Permit Application. Baker Hughes would implement an ongoing program to control fugitive dust from disturbed areas using Best Management Practices (BMPs). It is anticipated that the Argenta Mine would control fugitive dust emissions primarily by watering roads, and water sprays at conveyor transfer points, if necessary. Additional BMPs may be used if watering is not sufficient in controlling fugitive dust emissions;
- Prudent speed limits would be observed on unpaved roads throughout the project area in order to reduce dust emissions;
- Access roads, project area roads, and other traffic areas would be maintained on a regular basis to minimize dust and provide for safe travel conditions; and
- The diesel generator would be maintained on a regular basis to ensure proper operation and to minimize emissions. Monitoring would be carried out as dictated by permit requirements, if applicable, which may include reporting of operating hours, throughput, production, and fuel consumption. Records would be maintained on-site.

2.3.3 Cultural Resources

The following cultural resource protection measures would be implemented by the Argenta Mine:

- Baker Hughes shall avoid known eligible and potentially eligible cultural resource sites through design, construction, and operation of the project;
- A 30-meter (approximately 100-foot) buffer zone shall be established around eligible and potentially eligible cultural resource sites to help provide protection to the sites. Project facilities would not encroach into the established 30-meter buffer zone. More specifically, site CrNV-12-15341 would be avoided with a 150 meter buffer, and site CrNV-62-6356 would be avoided with a 100 meter buffer;
- The project facilities would be operated in a manner consistent with the engineered design to prevent problems associated with the run-off that could affect adjacent cultural sites. This includes the use of BMPs to minimize off-site erosion and sedimentation;
- Where the installation of project facilities could impact eligible or potentially eligible cultural sites(s), a BLM-qualified archaeologist shall be present to monitor activities and ensure sites are avoided;
- Baker Hughes shall limit vehicle and equipment travel to established roads and construction areas;
- Any unplanned discovery of cultural resources, items of cultural patrimony, sacred objects or funerary items requires that all activity in the vicinity of the find ceases, and Doug Furtado, Field Manager, Mount Lewis Field Office, 50 Bastian Way, Battle Mountain, Nevada 89820, be notified immediately by phone (775-635-4000) with written confirmation to follow. The location of the find should not be publicly disclosed, and any human remains must be secured and preserved in place until a Notice to Proceed is issued by the authorized officer;
- Periodic monitoring would be required to ensure that National Register of Historic Places (NRHP)-eligible properties remain undamaged;
- If sites eligible for inclusion on the NRHP are damaged, or if it is not possible to avoid effects to them, the proponent shall contract with a BLM permitted cultural resource firm to complete data recovery using a plan written by the cultural resource firm and approved by the BLM and the Nevada State Historic Preservation Office (SHPO); and
- Damage to historic properties (archaeological sites) is a violation of the Archaeological Resources Protection Act of 1979 (ARPA) and involves additional investigation and associated penalties.

2.3.4 Grazing Management and Wildlife

Baker Hughes would implement the following measures to minimize impacts to wildlife and livestock resources in the project area:

- To meet the requirements of the Migratory Bird Treaty Act (MBTA) and avoid destruction of birds, nests, eggs, or young, Baker Hughes would avoid land clearing of native vegetation during the avian breeding season (March 1 to July 31). If it becomes necessary to clear any area during the breeding season, a survey for active nests would be conducted by a qualified biologist. If active nests are located, a buffer zone would be created around the nest and vegetation clearing within the buffer would be delayed until it

is confirmed that the young have fledged. The size of the buffer zone would depend on the species present and would be determined through discussion with the BLM;

- The U.S. Fish and Wildlife Service (USFWS) expressed concern regarding potential impact to the greater sage grouse (*Centrocerus urophasianus*). No greater sage grouse were observed in the wildlife survey conducted in May and November 2008. Further, the survey indicated the habitat in the project area was suitable for greater sage grouse. In the event a lek is observed in the project area, a suitable buffer would be established and no disturbance would occur until the mating season is complete. The size of the buffer zone would be determined through discussion with the BLM;
- The USFWS noted that the pygmy rabbit (*Brachylagus idahoensis*) may occur within the project area. No pygmy rabbits or sign of pygmy rabbits were observed in the wildlife survey conducted in May and November 2008. In accordance with USFWS guidance, a survey for pygmy rabbits would be conducted prior to disturbing potential habitat. In the event pygmy rabbits or sign of pygmy rabbits are observed in the project area, BLM would be consulted for further guidance;
- Trash and other waste products would be properly managed and Baker Hughes would control garbage that could attract wildlife;
- Company vehicles would be provided, and usage promoted, that would effectively reduce traffic on the access roads;
- Speed limits would be posted, and if necessary, speeds would be reduced, especially when wildlife is active near access and service roads;
- Employees and contractors would be prohibited from carrying firearms within the project area to discourage illegal hunting and harassment of wildlife. Hunting is prohibited within the project area; and
- Reclamation of the disturbed areas would be completed in order to return these areas to a productive grazing and wildlife habitat.

2.3.5 Noxious Weeds, Invasive, and Non-Native Species

To minimize the introduction and establishment of noxious weeds, invasive and non-native species in the disturbed areas, the following measures would be incorporated into the proposed project:

- Baker Hughes would implement a BLM-approved weed control program to eradicate and control existing noxious weed infestations. Weed control would include application of BLM-approved herbicides and weed control coordination with the BLM;
- Baker Hughes would use a certified weed-free seed mix during revegetation of disturbed areas;
- Baker Hughes would complete concurrent reclamation when feasible;
- Baker Hughes would revegetate growth media and overburden stockpiles with a weed-free seed mix as soon as possible following stockpile completion; and

- Vehicle traffic would be restricted to defined roads to reduce potential mechanical transport of noxious weed seeds.

2.3.6 Water Resources

Environmental protection measures that would be implemented for the protection of groundwater and surface water resources as follows:

- Baker Hughes would maintain and update a stormwater management plan in accordance with the NDEP General Stormwater Permit for mining operations. The stormwater management plan would provide methods for minimizing erosion and sedimentation in accordance with the NDEP Handbook of BMPs (1994);
- Disturbance of springs would be avoided;
- Travel across drainages would be limited to existing roads;
- Waste rock dumps would be graded to promote surface water run-off and minimize infiltration of meteoric water into the waste rock during operation;
- Diversion ditches, both permanent and temporary, would be constructed when needed, to divert run-off away from disturbed areas;
- Installation of silt fences and/or straw bales in areas requiring sediment control; and
- Installation of riprap in erosion-prone areas of ditches and channels.

2.3.7 Fire Management

To minimize impacts from fire, the following measures would be incorporated into the proposed project:

- All vehicles would carry fire extinguishers;
- Adequate firefighting equipment (i.e., shovel, Pulaski, extinguishers, and/or an ample water supply) would be kept at the site;
- Vehicle catalytic converters would be inspected often and cleaned of all brush and grass debris;
- Welding operations would be conducted in an area free from or mostly free from vegetation. An ample water supply and shovel would be on hand to extinguish any fires created from the sparks. Extra personnel would be at the welding site to watch for fires created from the welding sparks;
- Report wildland fires immediately to the BLM Central Nevada Interagency Dispatch Center at (775) 623-1555 during normal business hours and (775) 623-3444 after hours; and
- When conducting operations during the months of May through September, the operator must contact the BLM Battle Mountain District, Division of Fire and Aviation at (775) 635-4000 to find out about any fire restrictions in place for the area of operation and to advise the office of approximate beginning and ending dates for operation activities.

2.4 ALTERNATIVES TO THE PROPOSED ACTION

This section identifies alternatives to the Proposed Action. These alternatives include Alternative A – Partial F Pit North/Cuna Pit Backfill Alternative, No Action Alternative, and alternatives considered but eliminated from further detailed analysis.

2.4.1 Alternative A – Partial F Pit North/Cuna Pit Backfill Alternative

The Partial F Pit North/Cuna Pit Backfill Alternative would modify the Proposed Action by partially backfilling the F Pit North or the Cuna Pit with waste rock material. Once mining has been completed in one of these pits that pit would be partially backfilled with waste rock material from the other pit. This alternative would reduce the disturbance by an unknown amount by reducing the area needed for waste rock dumps. The amount of reduction is unknown because the final configurations of the Cuna Pit and proposed F Pit North are unknown. This alternative would eliminate the accessibility of additional ore in the pit by covering up future resources.

2.4.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be approved by the BLM. Baker Hughes would continue operations on private land at the Argenta Mine until reserves run out or another expansion plan is approved.

2.4.3 Alternatives Considered but Eliminated from Further Analysis

There are no feasible alternative locations for the proposed mining activity because the project location is determined by the specific favorable geologic conditions. Therefore, an alternative project location is not a viable alternative and no alternative locations are evaluated further in this EA. The proposed waste rock expansion areas are located adjacent to other disturbance in order to prevent additional disturbance for hauling material, therefore, other alternative locations for the waste rock facilities have no environmental benefits and were not evaluated further in this EA.

3.0 AFFECTED ENVIRONMENT

This section describes the affected environment in the vicinity of the Proposed Action. The project area lies at the north end of the Shoshone Range, east of Argenta Point, northwest of Argenta Butte, and west of Argenta Rim in Lander County, Nevada (Figure 1). It is situated along Mosquito Canyon. The elevation varies between 5,200 feet above mean sea level (AMSL) and 6,600 AMSL.

To comply with NEPA, the BLM is required to address specific elements of the environment subject to requirements specified in statute or regulations or by executive order (BLM, 1988 and 2008a). Table 8 identifies the resources that must be addressed in all environmental analyses, as well as, other resources deemed appropriate for evaluation by the BLM, and denotes if the Proposed Action or alternatives affects those elements.

Table 8. Required Environmental Element Analyses

Supplemental Authority[1]	Not Present[2]	Present/Not Affected	Present/May be Affected[3]	Rationale
Air Quality			X	See Section 3.1.1
Area of Critical Environmental Concern	X			No areas of critical environmental concern in the project area.
Cultural/Historical			X	See Section 3.1.2
Environmental Justice	X			No environmental justice populations in or near the project area.
Native American Traditional Values			X	See Section 3.1.3
Noxious Weeds, Invasive, and Non-native Species			X	See Section 3.1.4
Floodplains	X			No floodplains within the project area.
Riparian/Wetlands			X	See Section 3.1.5
TES Species			X	See Section 3.1.6
Migratory Birds			X	See Section 3.1.7
Waste – Hazardous/Solid		X		See Section 3.1.8
Water Quality			X	See Section 3.1.9
Wild and Scenic Rivers	X			No wild and scenic rivers within the project area.
Wilderness (Study Area)	X			No wilderness study areas within the project area.
Forests and Rangelands (HFRA only)	X			Project does not meet HFRA criteria.

Table 8. Required Environmental Element Analyses (continued)

Supplemental Authority[1]	Not Present[2]	Present/Not Affected	Present/May be Affected[3]	Rationale
Human Health and Safety		X		Under Executive Order (EO) 13045, children are protected from environmental health and safety risks. In accordance with EO 13045, the Proposed Action would not use pesticides or herbicides. Therefore, the Proposed Action poses no health and human safety risk, and health and human safety is not further addressed in this EA

[1]See H-1790-1 (BLM, 2008a) Appendix 1 Supplemental Authorities to be considered.
[2] Supplemental Authorities determined to be Not Present or Present/Not Affected need not be carried forward for analysis or discussed further in the document based on the rationale provided.
[3] Supplemental Authorities determined to be present/May be Affected *must* be carried forward for analysis in the document.
HFRA = Healthy Forest Restoration Act

Other resources of the human environment that have been considered for this EA are listed in Table 9. Elements that may be affected are further described in the EA. Rationale for those elements that would not be affected by the Proposed Action and alternative is listed in the table below.

Table 9. Other Elements of the Human Environment

Other Resources	Not Present[1]	Present/Not Affected	Present/May be Affected	Rationale
Grazing Management			X	See Section 3.1.10
Land Use Authorization			X	See Section 3.1.11
Minerals			X	See Section 3.1.12
Paleontological Resources			X	See Section 3.1.13
Recreation			X	See Section 3.1.14
Socio-Economic Values			X	See Section 3.1.15
Soils			X	See Section 3.1.16
Vegetation			X	See Section 3.1.17
Fire Management			X	See Section 3.1.18
Visual Resources			X	See Section 3.1.19
Wild Horses and Burros	X			No herd management area within the project area.
Wildlife			X	See Section 3.1.20

[1] Other Resources determined to be Not Present or Present/Not Affected need not be carried forward for analysis or discussed further in the document based on the rational provided.

3.1 PROPOSED ACTION

This section includes a description of the affected environment for the Proposed Action.

3.1.1 Air Quality

The Bureau of Air Pollution Control (BAPC) is the agency in the state of Nevada that has been delegated the responsibility for implementing a State Implementation Plan (SIP). Included in a SIP are the State of Nevada air quality permit programs (NAC 445B.001 through 445B.3791, inclusive). Also, part of a SIP is the Nevada State Ambient Air Quality Standards (NSAAQS). The NSAAQS are generally identical to the National Ambient Air Quality Standards, with the exception of the following: (a) an additional standard for carbon monoxide in areas with an elevation in excess of 5,000 feet AMSL; (b) a hydrogen sulfide standard; and (c) a violation of state standard occurs with the first annual exceedance of an ambient standard, while federal standards are generally not violated until the second annual exceedance. In addition to establishing the NSAAQS, the BAPC is responsible for permit and enforcement activities throughout the state of Nevada.

The project area is located in the unclassified Lower Reese River Valley Hydrographic Basin within the Central Region Hydrographic Region, which is considered in attainment relative to the federal air quality standards. The existing air quality is typical of largely undeveloped regions of the western United States with limited sources of pollutants.

Air pollution that does occur in the project area is in the form of particulate dust from traffic on unpaved roads; dust from bare ground and nearby mining activity, smoke from regional fires, and emissions from the process facilities, vehicle, and diesel generator use at the plant site. Currently, fugitive dust at the mine is controlled by application of water. On average, less than 30 vehicles commute to the mine on a daily basis with the majority of commuter travel on paved roads. During daily mine operations, approximately 15 vehicles/machines are operating at any given time. Air emissions are regulated by NDEP through the Class II Air Quality Permit issued to Baker Hughes.

3.1.2 Cultural and Historical Resources

The National Historic Preservation Act of 1966 (NHPA), as amended, and the Archaeological Resources Protection Act (ARPA) are the primary laws regulating preservation of cultural resources. Federal regulations obligate federal agencies to protect and manage cultural resource properties and prohibit the destruction of significant cultural sites and historic properties without first mitigating the adverse effect to the site. The BLM Nevada uses the Protocol Agreement with the Nevada SHPO to accomplish compliance under Section 106 of the National Historic Preservation Act (NHPA).

The NHPA sets forth procedures for considering effects to historic properties and supports and encourages the preservation of prehistoric and historic resources. It directs federal agencies to consider the impacts of their actions on historic properties. Section 106 of the NHPA, as amended, requires federal agencies to take into account any action that may adversely affect any structure or object that is, or can be, included in the NRHP. These regulations, codified in 36

CFR 800, provide criteria to determine if a site is eligible. Beyond that, the regulations define how those properties or sites are to be dealt with by federal agencies or other involved parties. These regulations apply to all federal undertakings and all cultural (archaeological, cultural, and historic) resources.

The ARPA provides some protection for archaeological resources in the form of civil and criminal penalties for damage and sets a broad policy that archaeological resources are important to the nation, as well as locally and regionally. The purpose of the ARPA is to secure the protection of archaeological resources and sites that are on public lands and Native American lands. The law applies to any agency that receives information that a federally assisted activity could cause irreparable harm to prehistoric, historic, or archaeological data and provides criminal and civil penalties for prohibited activities.

Cultural resources are the remains of past human activities, consisting of sites or locations where humans lived or conducted activity. Central Nevada has been inhabited by humans for at least 12,000 years (BLM, 1983). In the resource area, cultural resources are divided into three management types: prehistoric sites (open, rock shelter or cave, rock art), historic sites (euro-American, other immigrant group, aboriginal), and isolated finds (single artifacts, prehistoric or historic). Sacred sites, which are generally geographic areas of importance, represent another management type.

A Class III cultural resources inventory was conducted on a 945-acre block for the Argenta Mine property in the fall of 2008 and the spring of 2009. The block contains all areas of proposed disturbances. Class III inventories were deemed unnecessary on 213 acres of this block due to complete disturbance related to previous and ongoing mining activities. Two sites were determined eligible for inclusion on the NRHP (Kautz, 2009). The two sites are not within the proposed surface disturbance planned in the PoO and Baker Hughes would avoid disturbance of these two sites.

During the life of the mining operation, an archaeological consultant (BLM qualified) shall be retained by Baker Hughes to complete annual visits to site CrNV-12-15341, and produce annual site update reports submitted to the BLM. If mine personnel or the monitor note any new disturbance to this site then the site shall undergo data recovery, according to a data recovery plan acceptable to the BLM and to Nevada SHPO. Baker Hughes would also install a chain link or other substantial fence across the cave entrance to prevent unauthorized entrance. An archaeological monitor shall be onsite during installation of the barrier fence. This site must be avoided with a 150 meter buffer.

Regarding site CrNV-62-6356, any disturbance is planned within 100 meters of this site shall occur only in the presence of a BLM qualified archaeological monitor. Further, an archaeological monitor will inspect the site yearly, will document the site condition on an update form and submit it to the BLM.

3.1.3 Native American Traditional Values

In accordance with the NHPA (P.L. 89-665), NEPA (P.L. 91-190), the Federal Land Policy and Management Act (P.L.94-579), the American Indian Religious Freedom Act (P.L. 95-341), the Native American Graves Protection and Repatriation Act (P.L. 101-601), and Executive Order 13007, the BLM must provide affected tribes an opportunity to comment and consult on the proposed project. BLM must attempt to identify locations having traditional/cultural importance and reduce or possibly eliminate any negative impacts to identified traditional, cultural, spiritual sites, activities, and/or resources.

Known locations (to BLM) of cultural/traditional significance within the region are: Whirlwind Valley (approximately 10 miles to the southeast), which once contained a large geyser and hot spring complex; The Mount Tenabo/White Cliffs/Horse Canyon Traditional Cultural Property (approximately 35 miles to the south) in the Cortez Mountains; Stony Point, located approximately eight miles to the northwest in the Sheep Creek Range, was said to have served as a staging and lookout area for Shoshone campaigns against non-native encroachment and travel; the Rock Creek Traditional Cultural Property located approximately 17 miles to the north; and the Tosawihi Quarries Traditional Cultural Property located approximately 35 miles to the northeast.

The following documents have also produced descriptions of past traditional/cultural use of locations near the project boundary:

- Cultural Resource Management Plan for the Mule Canyon Project Area. Intermountain Research. 1992.

  > This report describes the area as a prime hunting area based on the evidence of prehistoric hunting blinds. It also states the area was important for plant gathering and toolstone processing and a significant link in a pre-contact inter-regional trade network.

- Behind the Argenta Rim: Prehistoric Land Use in Whirlwind Valley and the Northern Shoshone Range. Robert Elston and Margaret Bullock. 1994.

  > This report presents evidence that Mule Canyon (located just south of the project location) was used for perhaps 10,000 years. It was contemporaneous with Tosawihi quarry sites, with dates ranging from very late prehistoric to very early proto-historic events. It may have been part of an extensive inter-regional trade network that included obsidian sources from Paradise Valley, Timber Butte (Idaho), Owyhee, Topaz Mountain (Utah), and Mono Basin in eastern California.
  >
  > Archaeological evidence at Mule Canyon shows extensive plant processing based on analysis of residue on groundstone artifacts (pinyon, various grass seeds, onion, sagebrush, possibly bitterroot,

parsley/carrot family, and Cheno-am seeds - goosefoot family and pigweed family). There was also meat processing activity based on blood residue analysis of groundstone implements (rabbit, marmot, pronghorn, and deer).

- Background Study for BLM Consultation with Native Americans on Proposed Mining Development in the Mule Canyon Project Area, Shoshone Range within the Traditional Territory of the *Tosawihi* People, Western Shoshone Nation. Mary Rusco. 1992.

  This report describes the presence of an aboriginal residential camp base. Archaeological survey revealed presence of low rock-wall hunting blinds, indicative of the importance of big game hunting in the area in pre-contact times. This was also a traditional plant gathering area.

  There is a named landmark (*to-sam-boi*) with Mule Canyon said to be the location of three connecting traditional trails (between Battle Mountain and Beowawe, one leading south to the Hilltop area, and extending north to the Humboldt River).

Consultation initiation letters were sent to representatives/leadership of the Te-Moak Tribe of Western Shoshone and the Battle Mountain Band on January 5, 2009, asking for any possible issues or concerns resulting from this specific Proposed Action. Letters were also sent to the Western Shoshone Committee of Duck Valley and the Western Shoshone Defense Project seeking their participation. At this time, the letters and follow-up efforts have not produced any new information. However, consultation is ongoing and if specific activity and/or resource information and location are received, BLM would incorporate that input into the decision making and/or mitigation measure identification process.

3.1.4 Noxious Weeds, Invasive, Non-Native Species

The BLM defines a noxious weed as, "a plant that interferes with management objectives for a given area of land at a given point in time". The BLM Battle Mountain District recognizes the current noxious weed list designated by the State of Nevada Department of Agriculture statute, found at http://agri.nv.gov/nwac/PLANT_NoxWeedList.htm. An invasive species is defined as a non-native or alien plant or animal that has entered into an ecosystem. Invasive species are likely to cause economic harm or harm to human health (Executive Order 13112). Noxious weeds, invasive and non-native species are highly competitive, aggressive and easily spread. The BLM Battle Mountain District has developed an Integrated Weed Management Plan for the entire Battle Mountain District. In addition, the BLM follows all federal noxious and invasive weed laws, Executive Order 11312 (Prevention and Control of Invasive Species); various BLM Manuals, and NRS and NAC Chapter 555.

A survey of noxious weeds and other invasive non-native species was conducted in 2008 (JBR, 2008c). Noxious weed species found include saltcedar (*Tamarix* sp.), Canada thistle (*Cirsium*

arvense), perennial pepperweed (*Lepidium latifolium*), and Scotch thistle (*Onopordum acanthium*).

The noxious weed species, saltcedar and Canada thistle, were observed growing in the project area along the Mosquito Canyon access road as shown in Figure 4. Canada thistle was also observed growing along both the west and east unnamed drainages adjacent to active disturbance within the project area. Perennial pepperweed was observed growing in the unnamed western drainage (Figure 4). Saltcedar, Canada thistle, and perennial pepperweed are listed as Category C noxious weeds with the State of Nevada. Category C weeds are species that are "currently established and generally widespread in many counties of the state; actively eradicated from nursery stock dealer premises; abatement at the discretion of the state quarantine officer."

The noxious weed species Scotch thistle was observed growing at three spring locations in the project area. Scotch thistle is listed as a Category B noxious weed with the State of Nevada. Category B weeds are species that are "established in scattered populations in some counties of the state; control is required by the state in areas where populations are not well established or were previously unknown to occur" (UNCE, 2008). Invasive non-native species found throughout the project area include cheatgrass (*Bromus tectorum*), halogeton (*Halogeton glomeratus*), and annual mustard.

3.1.5 Riparian and Wetland Resources

A total of six wetted seep or spring sites were found within the project area during the baseline surveys (Figure 5). Multiple expressions of water (seeps and springs) were found at some sites, and other sites represent re-emergences of flow coming from higher-elevation springs. Areas of riparian vegetation were found at several locations with total riparian vegetation less than two acres (JBR, 2008c). Findings of the baseline surveys are discussed by drainage location as it corresponds with Mosquito Canyon, beginning with the highest expression of water found in a specific drainage and progressing downstream.

<u>Unnamed East Drainage</u>

Spring 06 was identified in the unnamed drainage in the eastern portion of the project area. This spring begins northeast of Waste Rock Dump E and was heavily utilized by domestic cattle. Flow supports a community of Woods' rose (*Rosa woodsii*) and willow (*Salix* sp.). An herbaceous hydrophytic community occupies a portion of the drainage bottom. Scotch thistle is also present at the spring and in the entire drainage (JBR, 2008c).

<u>Mosquito Canyon Drainage</u>

Mosquito Canyon occupies the central drainage found in the project area. Spring 01 is located below Waste Rock Dump A and supports a heavy growth of stinging nettle (*Urtica dioica*), cattails (*Typha*), and Woods' rose.

Spring 02 is located northwest of Spring 01 and supports a community of Woods' rose and watercress (*Nasturtium officinale*), as well as an herbaceous hydrophytic community of riparian grasses. Spring 02 showed heavy domestic cattle use and contains both Canada thistle and Scotch thistle.

Spring 03 and Seep 04 supported hydrophytic vegetation dominated by Woods' rose and desert peach (*Prunus andersonii*); however, this vegetation did not extend down-slope to the Mosquito Canyon drainage.

Additional patches of riparian vegetation were found throughout this drainage as surface water flow was intermittent until it was lost to the substrate at the mouth of the canyon. Vegetation supported by this intermittent flow includes Woods' rose, curly dock (*Rumex crispus)*, cattails, saltcedar, hydrophytic grasses, and Canada thistle (JBR, 2008c).

Unnamed West Drainage

Spring 07 is in the western portion of the project area and begins within a vegetated channel and produces surface flow supporting a community of Woods' rose, serviceberry (*Amelanchier*), and an herbaceous hydrophytic community that occupied the drainage bottom. The source, comprised mostly of large boulders and riparian grasses, has been heavily utilized by cattle, and contains Canada thistle and perennial pepperweed. Additional riparian vegetation observed along the surface flow included willow, cattails, and watercress (JBR, 2008c).

3.1.6 Threatened, Endangered, and Other Special Status Species

Consultation was conducted with the Nevada Department of Wildlife (NDOW), United States Fish and Wildlife Service (USFWS), and the Nevada Natural Heritage Program (NNHP) to determine the presence of threatened and endangered (T&E) species and potential habitat for T&E species within the project area (Appendices C and D). The BLM Sensitive Species, Battle Mountain District, Nevada list was also reviewed to determine species with potential habitat in the project area (Appendix D). The USFWS and NNHP did not identify any threatened or endangered species or critical habitat of concern that may occur in the project area. No T&E species were observed during baseline surveys.

Wildlife species of concern determined to have the potential to occur in the project area are provided in Table 10 (USFWS, 2008; NNHP, 2008; NDOW, 2008; BLM 2003).

Table 10. Threatened, Endangered, and Sensitive (TES) Wildlife Species with Potential to Occur in the Project Area

Common Name	Scientific Name
Mammals	
Preble's shrew	*Sorex preblei*
Pygmy rabbit	*Brachylagus idahoensis*
Townsend's big-eared bat	*Corynorhinus townsendii*

Table 10. TES Wildlife Species with Potential to Occur in the Project Area (continued)

Common Name	Scientific Name
Big brown bat	*Eptesicus fuscus*
Spotted bat	*Euderma maculatum*
California myotis	*Myotis californicus*
Small-footed myotis	*Myotis ciliolabrum*
Long-eared myotis	*Myotis evotis*
Little brown myotis	*Myotis lucifugus*
Fringed myotis	*Myotis thysanodes*
Long-legged myotis	*Myotis volans*
Yuma myotis	*Myotis yumanensis*
Western pipistrelle bat	*Pipistrellus hesperus*
Pallid bat	*Antrozous pallidus*
Birds	
Greater sage-grouse	*Centrocercus urophasianus*
Prairie falcon	*Falco mexicanus*
Golden eagle	*Aquila chrysaetos*
Bald eagle	*Haliaeetus leucocephalus*
Ferruginous hawk	*Buteo regalis*
Burrowing owl	*Athene cunicularia*
Loggerhead shrike	*Lanius ludovicianus*
Black rosy-finch	*Leucosticte atrata*
Vesper sparrow	*Pooecetes gramineus*
Reptiles	
Short-horned lizard	*Phrynosoma douglassii*

Suitable habitat for pygmy rabbit (undisturbed sagebrush) occurs in the northern portion of the project area that would not be disturbed. Potential habitat for Preble's shrew is limited to riparian areas in the project area. Raptor habitat in the project area includes potential foraging, as well as, nesting and perching habitat in rocky outcrops located in and adjacent the project area. Burrowing owl habitat exists in deeper, looser soils in lower elevations of the project area; often areas with other small existing mammal burrows.

Rocky outcrop crevices found in the area and in the pit walls provide potential roost habitat for various bat species. Bats could potentially utilize springs in the project area for foraging.

The greater sage-grouse was listed as a candidate species in March 2010 by the USFWS. Candidate species are species that may warrant future protection under the Endangered Species Act. No greater sage grouse were observed in the wildlife survey conducted in May and November 2008 and the project area does not contain suitable lek (an opening with good visibility surrounded by sagebrush used for mating displays) habitat. The nearest greater sage-grouse lek occurs approximately eight miles southeast of the project area. Marginal habitat (low sage and reclaimed disturbance) is present within the project area and potential wintering sites

are present nearby on the ridges present on Argenta Butte. Potential brooding sites are also present in the limited wet meadow and riparian areas. Although greater sage-gouse do not appear to occupy the area now, potential wintering habitat and other suitable sagebrush within and in the vicinity of the expansion areas would be available during and after mining was completed and successful reclamation of sagebrush occurred. Potential habitat for the loggerhead shrike is present in salt desert scrub habitat located adjacent project facilities. Potential habitat for the black rosy-finch, vesper sparrow, and short-horned lizard is found throughout the project area. None of the species of concern identified as potentially occurring within the project area were observed during baseline surveys.

Plant species of concern identified as potentially occurring in the area are provided in Table 11 (USFWS, 2008; NNHP, 2008; BLM 2003).

Table 11. TES Plant Species with Potential to Occur in the Project Area

Common Name	Scientific Name
Winged milkvetch	*Astragalus pterocarpus*
Eastwood's milkvetch	*Astragalus eastwoodiae*
Needle Mountain milkvetch	*Astragalus eurylobus*
Sanicle biscuitroot	*Cymopterus ripleyi* var. *saniculoides*
Windloving buckwheat	*Eriogonum anemophilum*
Lewis' buckwheat	*Eriogonum lewisii*
Kingston Mountains bedstraw	*Galium hilendiae* ssp. *kingstonense*
Cordillia's beardtongue	*Penstemon floribundus*

Although habitat for these species may be available in the project area, none of the species in Table 11 was observed during baseline surveys.

3.1.7 Migratory Birds

Most of the bird species occurring in habitats within the project area (with the exception of the house sparrow (*Passer domesticus*) and the European starling (*Sturnus vulgaris*)), are protected as migratory birds. Due to the lack of permanent large areas of surface water and higher than normal noise generated by current mining activities, shorebirds and waterfowl would not likely occur in the project area. The pit lake would be drained within two months and no longer be a concern. Additionally, based on projected evaporation rates, the evaporation pond would be used for six months and have an active evaporation system, which is anticipated to discourage waterfowl from using the pond. No waterfowl have been observed on the F Pit lake and the elimination of this water would provide long-term safeguards to migratory birds. In the event waterfowl are observed on the evaporation pond, BLM will be consulted and bird deterrents would be installed, if necessary. A summary of the Pit lake water chemistry is provided in Appendix B.

Waterfowl have been observed on the water within the TSF, a NDEP-permitted process water impoundment. The TSF would remain functional for the life of the mine. The water chemistry of the TSF does support aquatic life and no impacts to waterfowl have ever been documented or observed at this facility. A summary of the TSF water chemistry is provided in Appendix E.

Migratory bird species likely to occur are those typically found in the upland sagebrush habitat, primarily passerine species. The Humboldt River, located south of the project area, is utilized by shorebirds and waterfowl. Migratory birds observed during the baseline survey are shown in Table 12. An active western meadowlark (*Sturnella neglecta)* nest was located south of the Waste Rock Dump. No raptors were observed but raptors may use the area for foraging (JBR, 2008c).

Table 12. Migratory Bird Species Observed During Baseline Surveys

Species		Habitat/Comments	Resident/ Migrant
Common Name	**Scientific Name**		
Birds			
Rock wren	*Salpinctes obsoletus*	Areas containing rocky outcrops	Migrant
Western meadowlark	*Sturnella neglecta*	Lower elevations of project area containing sagebrush.	Resident
Horned lark	*Eremophila alpestris*	Sagebrush habitats adjacent roads	Resident
Common raven	*Corvus corax*	Throughout area	Resident
Black-billed magpie	*Pica pica*	Active nest in aspen stand west-central project area	Resident
Chukar	*Alectoris chukar*	Sagebrush areas near rock outcrops	Resident
Brewer's blackbird	*Euphagus cyanocephalus*	Mainly near riparian areas	Resident

(JBR, 2008c)
NA = Not applicable

3.1.8 Wastes Hazardous and Solid

Land uses in the project area have primarily included grazing and mining. No history of solid or hazardous waste generation or disposal is known within the project area. Solid waste generated by the Argenta Mine is picked up by Desert Disposal and hauled to the Battle Mountain landfill. Scrap metal generated by the mine is recycled by Atlas Towing Service in Battle Mountain.

Public solid waste disposal in Lander County is served by the Class II permitted Battle Mountain Landfill (managed by the Lander County Public Works). This landfill is located approximately 3.9 miles southwest of Battle Mountain off State Route 305.

There is no hazardous waste disposal facility located in the area, thus hazardous wastes generated by the Argenta Mine are removed by a third-party contractor and disposed in a permitted hazardous waste facility. Used oils and antifreeze are also removed from the site by a third-party contractor and shipped for recycling.

3.1.9 Water Quality

The project area lies along the north end of the Shoshone Mountain Range in Lander County, Nevada. Topography for the project is predominantly moderate mountainous terrain, with intermittent drainages, typical of that found in the Basin and Range Physiographic Province. The average annual precipitation in the region is 8.40 inches as recorded at the Beowawe Weather Station approximately 10 miles west of the site (WRCC, 2009). The mine site is at a higher elevation than Beowawe, thus precipitation at the mine site is likely greater than indicated in Beowawe. The project area is within the Humboldt River Hydrographic Basin Area 4, Sub-Area 59, and Lower Reese River Valley (NDEP, 2005). The hydrographic basin 4 covers 16,843 square miles in parts of eight counties, and contains 34 hydrographic areas.

3.1.9.1 Surface Water

The Humboldt River and Mosquito Creek are the prominent surface waters within the general project area. In addition, six springs and three drainages are within the project area. Drainages and springs are shown on Figure 5 and include an unnamed drainage on the east side of the project area, Mosquito Canyon, and an unnamed drainage on the west side of the project area.

Unnamed East Drainage

Spring 06 is located in the unnamed drainage on the east side of the project area. Spring 06 is located in this drainage and provides intermittent flow below the source. Surface flow from Spring 06 is approximately three gallons per minute (gpm) and continues down drainage approximately a half a mile and is then lost to the substrate. Flow re-emerges approximately 180 feet downgradient from the point that it was lost to the substrate. All flow from this spring is lost to the alluvium before it reaches the mouth of the canyon (JBR, 2008c).

Mosquito Canyon

Mosquito Creek has intermittent surface flow year round until it reaches the mouth of Mosquito Canyon where the flow is lost to the alluvium. Flow in the drainage begins at Spring 01 below the existing Waste Rock Dump A (Figure 5) in the uppermost reaches of the canyon. Standing surface water below the source does not contain active flow and is lost to the substrate approximately 60 feet downgradient of the source. The water is intermittent for the remainder of the drainage.

Northwest of Spring 01, a tributary canyon to Mosquito Canyon contains Spring 02, which is also below the existing Waste Rock Dump A, as shown on Figure 5. This spring contains active surface flow of approximately 10 gpm that is lost to the substrate and/or redirected by a dirt road, but flow re-emerges approximately 900 feet downstream. Flow from this re-emergence continues down drainage at approximately five gpm for 45 feet where again it is lost to the substrate. A culvert along the existing haul road conveys water under the road (Figure 5).

Spring 03 and Seep 04 were identified on the east-facing slopes of Mosquito Canyon (Figure 5). Spring 03 contains surface flow of less than one gpm and is lost to the substrate approximately 75 feet downgradient. Seep 04 had standing water but no flow was observed downgradient in the drainage. Both sites showed signs of wildlife use.

Active surface flow re-emerges in Mosquito Canyon along the main access road. Surface flow at this location was estimated at approximately five gpm and flows along the eastern side of the access road. Flow continues downgradient along the access road and eventually confluences with flow from Spring 05 located on the west side of the access road outside the project area (Figure 5). Surface flow in Mosquito Creek is lost to the substrate at the canyon entrance (JBR, 2008c).

Unnamed Western Drainage

The unnamed drainage to the west of Mosquito Canyon is fed by Spring 07. This site was flowing at less than one gpm when visited in November 2008. Flow from this spring submerges approximately 900 feet downgradient of the source and re-emerges approximately 90 feet downgradient. Surface flow continues until being lost to the substrate at the mouth of the canyon. Surface water flow was estimated at approximately three gpm before it was lost to the alluvium at the mouth of the canyon.

Humboldt River

NDEP Bureau of Water Quality Planning monitors the Humboldt River quarterly at several locations, including monitoring sites at Battle Mountain (downstream from Argenta Mine) and Palisades (upstream from Argenta Mine). There are no bodies of water or stream segments within the project area that are noted on the Section 303(d) Impaired Waters List (NDEP, 2009). Six seeps and springs were noted in the project area during the baseline survey and are discussed further in Section 3.1.5 (JBR, 2008c).

Tailings Storage Facility

The TSF is a NDEP-permitted process water impoundment located adjacent to the mill. A seep in the TSF embankment developed where the first and second phase cells join, and was determined to be a result of high permeable chert material in the embankment (Knight Piésold, 2006). Placement of fine material along the inside slope of the tailings embankment lowered the permeability of the embankment resulting in cessation of seepage. Another seep in the same area of the TSF embankment was discovered in October 2008. Clay material was added to the TSF in the location of the seep. The seepage stopped in September 2009 and has not reappeared. The TSF contains material from the mill and no chemicals are used in the processing of the barite ore. Water quality samples of the TSF are collected quarterly. Recent water quality analytical results for the TSF water are included in Appendix E. The Humboldt River is located approximately 1,600 feet north of the TSF.

Temporary Process Water Impoundments

The F Pit (or pit lake) and proposed evaporation ponds are both NDEP-permitted, temporary process water bodies that either currently exist (F Pit) or would exist. F Pit is anticipated to be drained within two months and the evaporation pond is anticipated to be used and dry within six months, based on the projected evaporation rates. The water chemistry of the evaporation pond would be similar to the water chemistry of the F Pit. The analytical results of recent F Pit water quality samples are included in Appendix B.

3.1.9.2 Groundwater

The groundwater elevation in and around the F Pit is estimated from the water elevation in three monitoring wells and the water elevation in the F Pit. The groundwater elevation is approximately 5,880 feet AMSL to 5,885 feet AMSL based on seasonal water level fluctuations (JBR, 2008b). Groundwater level in the processing area is approximately 20 feet below ground surface.Groundwater samples have been collected from monitoring wells MW-4, MW-5, and MW-6 (Figure 2) on a quarterly basis following installation in March 2006. Water quality data indicate groundwater quality is relatively good in MW-4 and MW-5 with pH values around 7. MW-4 and MW-5 had slightly higher TDS than the Nevada Profile I standard. Groundwater from MW-4 is considered a regional baseline groundwater since it is located upgradient of the mining operation. The TDS values in MW-6 were within Profile I standards until June 2007. Since 2007, TDS values have exceeded Nevada Profile I standards, which may reflect impact from the F Pit Lake. The elimination of the Pit lake is anticipated to provide protection of the groundwater and long-term improvements in groundwater quality.

3.1.9.3 Pit Lake

Following cessation of mining in the F Pit in 2004 water began filling the F Pit. A pit lake study report was prepared in 2008/2009 to address water quality issues associated with the pit lake. The pit lake study provides modeling results for predicting pit lake water levels and chemistry, and proposes mitigation for treating the water and preventing further degradation of water quality. Three monitoring wells MW-4, MW-5, and MW-6 were drilled and installed around the F Pit in February 2006 (Figure 5). MW-4 and MW-5 are located upgradient of the pit lake (south and west side of the lake), and MW-6 is downgradient of the pit lake.

Surface water samples from the F Pit have been collected and field measurements have been performed on a quarterly basis since July 2005. Most of the water samples have pH values between three and four at the surface with lower pH readings near the bottom of the pit lake. Approximately 93,000 pounds of lime was added to the water from 2006 to 2008. The lime addition has raised the pH to approximately 4. The lime addition also resulted in metal precipitation, including aluminum, beryllium, fluoride, cadmium, iron, and zinc. Levels of magnesium, nickel, and sulfate in the pit lake water remain above Profile I standards. The pit lake water contains high sulfate, generally around 3,000 parts per million. Depth profiles show

that the lake water has basically the same chemistry from the surface to the middle of the lake. The lower half of the water in F Pit generally has a lower pH and slightly higher TDS concentrations compared to the upper portion of the water. The treatment and disposal of the water from the F Pit lake, and backfilling of the F Pit is discussed further in Section 2.2.7 under the Pit Lake Reclamation section.

3.1.10 Grazing Management

The Proposed Action lies within two livestock grazing allotments managed by the BLM. The BLM allotments are the Argenta allotment and the Geyser allotment (BLM, 1987a, 1987b, 1988). The locations of these allotments are shown on Figure 4.

The Argenta allotment consist of 331,523 acres with 12,107 animal unit months (AUMs) permitted for the allotment (BLM, 1988). The Argenta allotment is managed by the BLM Battle Mountain District. The BLM manages this grazing allotment through a planning process referred to as Selective Management Categorization. The process assigns extent and priorities for activity planning within an allotment including range improvement facilities, which would be required to accomplish management objectives. The Argenta grazing allotment has been classified by the BLM as an "Improve" (I) allotment where the objective is to improve current unsatisfactory conditions (BLM, 1988).

The Geyser allotment consists of 46,635 acres and is managed by the BLM Elko District. This allotment has 2,061 permitted AUMs (BLM, 1988). The Geyser allotment has been placed in the "Custodial" (C) category. The objectives of the custodial category are to continue to manage the project in a custodial fashion (BLM, 1987c).

3.1.11 Land Use Authorization

The project area is located in Lander County and consists of 75.3 acres of public lands administered by the BLM and 357.7 acres of private land. Access is gained to the site by traveling south on Mosquito Canyon Road from Interstate 80 on a pre-existing gravel improved road to the mine site. The gravel access road has no right-of-way associated with it through the county or BLM, but is included in the Proposed Action as part of the operation.

Lands in the project area are a mixture of alternating public and private lands. The BLM administers about 3.0 million acres (83 percent) of the approximately 3.6 million acres in Lander County.

The major land uses in the area include livestock grazing, wildlife habitat, mining, and dispersed recreation such as off-highway vehicle use, hunting, and camping.

There are no utility corridors within the project area. There are no BLM Wilderness Study Areas within the project area (BLM, 2008b). The project area is not within a designated Christmas

Tree Harvest Area or Fuel & Posts Harvest Area. There are also no designated pine nut harvest areas within the project area (BLM, 1986a, 1987a).

3.1.12 Minerals

The geologic structure and topographic configuration of Nevada are comprised of typical basin and range features. The basin and range extension began in the Tertiary Period, 30 to 40 million years ago (Price, 2003). As the earth's crust was pulled apart, valleys dropped relative to the mountains. Over the years, these basins have filled with sediments derived from erosion of the mountains.

Older rocks in Nevada are closely associated with volcanic and intrusive igneous activities in the Cenozoic, Mesozoic, and late Paleozoic eras. These igneous rocks are linked with sea-floor spreading about 450 million years ago (Price, 2003). Younger rocks, including limestone, dolomite, and silica-rich rocks, such as shale, chert, and sandstone, and economically important barite were deposited in northeastern and central parts of the state during the Devonian and Silurian periods (430 to 360 million years ago).

The north end of the Shoshone Range in the Argenta Mining District is underlain by siliceous and volcanic assemblage rocks of Ordovician and Devonian age that occur in a complex array of thrust slices (Stager, 1977). The principal rocks exposed in the areas of the Argenta Mine are thin-bedded dark radiolarian chert, with some interbedded argillaceous chert and limestone beds of the Slaven Chert of Devonian age. Thin to thick beds of massive barite are interbedded with the chert.

The general project area is east of the Central Nevada Seismic Belt. The largest recorded earthquake in the region occurred near Beowawe, southeast of the project area, with a magnitude of less than 6.0 but greater or equal to 5.0 magnitude (dePolo and dePolo, 1999).

The project area is within the Argenta Mining District. Minerals found in this district include barite, gold, and silver. Mining within this district has taken place since 1866 with the first discovery of barite around 1930 (Tingley, 1998). The project area has existing disturbance associated with previous and existing barite operations. The existing disturbance consists of pits, waste rock disposal areas, processing facilities, exploration, and access roads (JBR, 2008a).

Mineral exploration and development is of considerable economic benefit to Lander County and Nevada in general. The Battle Mountain and Elko BLM Districts contain a wide variety of metallic and industrial mineral deposits including copper, barite, gold, silver, lead, zinc, antimony, molybdenum, iron, turquoise, and sand and gravel. Much of the mineral extraction activity takes place on unpatented mining claims on public lands.

3.1.13 Paleontological Resources

The possible presence of paleontological resources within the project area is limited to two geologic formations. The Valmy Formation has been known to contain conodonts, graptolites, and radiolarians, which are all used to date the formation to the late Cambrian to early Ordovician Periods (Ramelli, et al., 2001). The Slaven Chert also contains conodonts and radiolarians which have been used to date the formation to the Devonian Period (House, et al., 2001). The volcanics and alluvial materials are not known to contain fossils.

3.1.14 Recreation

In Nevada, recreation activities tend to be of a more dispersed nature including hunting, off-highway vehicle use, rock-hounding, fishing, hiking, site-seeing, and backpacking. Opportunities for outdoor recreation in the Shoshone-Eureka and Elko Resource Areas are generally dispersed with few developed facilities. Developed BLM facilities include two BLM campgrounds within the Battle Mountain District (Hickison Petroglyphs and Mill Creek) and four BLM campgrounds within the Elko District (Wilson Reservoir, North Wildhorse Campground, Zunino/Jiggs Reservoir, and Tabor Creek); none of these are within 50 miles of the project area.

3.1.15 Socioeconomic Values

The project area is located within Lander County. The 2006 population estimate for the county was 5,272, a nine percent decrease in population from 2000 (USCB, 2008). With a land area of 5,493.63 square miles, that equates to 1.04 persons per square mile. The majority of the population in Lander County resides in Battle Mountain and Austin.

Mining and livestock oriented agriculture are the major industries in Lander County. During the first quarter of 2008, 1,225 individuals were employed in the mining industry which is approximately 23 percent of the population of the county. During the first quarter of 2008, 49 individuals were reported to be employed in the agricultural industry. Agriculture production consists of cattle, hay, sheep, and alfalfa production (DETR, 2008).

The closest community to the project area is Battle Mountain, the county seat, with a population of 2,573 in 2007. Mining is the largest industry for working adults in Battle Mountain with 27 percent of employed males and nine percent of employed females working in the mining industry. The median household income in 2007 was $50,597 (citydata.com, 2008).

In 2007, the Argenta Mine had 29 employees and four contract employees (Driesner and Coyner, 2008). The mine shipped 77,006 tons of barite in 2007.

3.1.16 Soils

The Soil Survey of the Tuscarora Mountain Area, Nevada, Parts of Elko, Eureka and Lander counties identifies six soils or soil associations within the project area (Figure 6). These are the

Humdun-Bucan association, Ramires-Chen-Pie Creek association, Whirlo-Tenabo association, Griver loam, drained soil, Glean-Rock Outcrop-Rubble land association, and Ocala silty clay loam, slightly saline soil (NRCS, 2004 and 2008). Details of these associations are discussed below.

Humdun-Bucan Association

The Humdun-Bucan association is the major soil association within the project area (Figure 6) and is found from 5,200 to 6,000 feet AMSL. In the project area, this association is found on hills and mountain slope of 15 to 50 percent. Soils in this association are well drained and have a surface texture of silt loam, stony loam, and gravelly silt loam. Depth to bedrock is 20 to 80 inches.

Ramires-Chen-Pie Creek Association

The Ramires-Chen-Pie Creek association is located in the southeast portion of the project area (Figure 6) and consists of soils that are found from 5,500 and 6,200 feet AMSL. In the project area, this association is found on mountain and hill slopes from 15 to 30 percent. Soils in this association are well drained with a surface texture of stony loam, cobbly loam, and very cobbly loam. Depth to bedrock is 12 to 40 inches.

Glean-Rock Outcrop-Rubble Land Association

This association is located in the southeast corner of the project area (Figure 6) and consists of soils found from 5,500 to 7,200 feet AMSL. In the project area, this association is found on mountains with slopes from 50 to 75 percent. Soils in this association are well drained with a surface texture of very stony loam also including rock outcrops and rubble land. Depth to bedrock is 40 to 60 inches.

Whirlo-Tenabo Association

This association is located in the processing areas (Figure 6) and consists of soils ranging in elevation from 4,900 to 5,100 feet AMSL. In the project area, this association is found on fan remnants and fan skirts with slopes from two to 15 percent. Soils in this association are well drained with a surface texture of very stony fine sandy loam to cobbly silt loam. Depth to bedrock is more than 80 inches with a duripan found in places at nine inches.

Griver Loam, Drained Soil

This association is located in the processing areas (Figure 6) and consists of soils from 4,500 to 4,600 feet AMSL. In the project area, this soil is found in the floodplains of the Humboldt River on slopes from zero to one percent. This soil is poorly drained and has a surface texture of loam. Depth to bedrock is more than 80 inches.

Ocala Silty Clay Loam, Slightly Saline

This soil is located in the processing areas (Figure 6) and consists of soils found from 4,400 to 4,700 feet AMSL. In the project area, this soil is found in the floodplain of the Humboldt River on slopes of zero to one percent. This soil is somewhat poorly drained and has surface texture of silty clay loam. Depth to bedrock is more than 80 inches.

3.1.17 Vegetation

Four vegetation community types were identified during baseline surveys, (JBR, 2008c): 1) reclaimed and fire rehabilitation areas, 2) big sagebrush community, 3) low sagebrush community, and 4) riparian vegetation. The distribution of these vegetation types are shown on Figure 4 (JBR, 2008c). The location of an individual vegetation community depends on several factors including elevation, soil type and depth, slope, aspect, and precipitation. Plant community structure is dynamic in accordance with specific micro and macro environmental conditions; especially in areas containing previous disturbance. Each vegetation community present in the project area is discussed below.

Disturbed, Reclaimed, and Fire Rehabilitation Areas

Approximately 80 percent of the project area was burned in 1999 and contains vegetation associated with seeding during the BLM wildland fire rehabilitation efforts. Reclaimed exploration and wildland fire disturbances are located adjacent to active disturbance in the project area. Burned areas on BLM lands were aerially seeded by the BLM in the fall of 1999 with the seed mix shown in Table 13.

Table 13. Revegetation Seed Mix used on BLM Land after the 1999 Fire

Scientific Name	Common Name
Kochia prostrata	Forage kochia
Agropyron cristatum	Crested wheatgrass
Artemisia tridentata var. wyomingensis	Wyoming big sagebrush
Atriplex canescens	Fourwing saltbush
Medicago sativa	Ladak alfalfa
*Purshia tridentata**	Bitterbrush

* Seedlings were planted using seedling plug method.

Although the disturbed areas do not comprise a true vegetation community type, the vegetation found growing in these areas contains either reclamation/fire rehabilitation seeded species or native species that are generally sparser than the adjacent communities. Dominant overstory species include gray rabbitbrush (*Chrysothamnus nauseosus*), forge kochia, and Wyoming big sagebrush. The understory is composed mostly of Sandberg's bluegrass (*Poa secunda*), bottlebrush squirreltail (*Elymus elymoides*), yellow sweetclover (*Melilotus officinalis*), and western wheatgrass (*Elymus smithii*). The areas were not excessively weedy other than the presence of annual invasive cheatgrass and annual mustard (*Chorispora* ssp.) species.

Big Sagebrush Community

The big sagebrush community is found in undisturbed sites in the northern portion of the project area in deeper soils of draws and saddles. The overstory is dominated by Wyoming big sagebrush, basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*), gray rabbitbrush, and mountain snowberry (*Symphoricarpos oreophilus*). The dominant understory species consists of lupine (*Lupinus* ssp.), Sandberg's bluegrass, bottlebrush squirreltail, bluebunch wheatgrass (*Agropyron spicatum*), and cushion phlox (*Phlox pulvinata*).

Low Sagebrush Community

The low sagebrush community is found on ridgelines containing shallow soils within undisturbed ground in the northern portion of the project area. The dominant overstory species include low sagebrush (*Artemisia arbuscula*), gray rabbitbrush, black sagebrush (*Artemisia nova*), and some basin big sagebrush. The dominant understory species are composed of grasses and forbs including Hooker's balsamroot (*Balsamorhiza hookeri*), Hood's phlox (*Phlox hoodii*), Sandberg's bluegrass, and bluebunch wheatgrass.

Riparian Vegetation

Riparian vegetation in the project area is limited to areas surrounding seeps and springs and riparian areas (Figure 4) and represents less than two acres within the project area. Species found in seep, spring, and riparian areas include sedge (*Carex sp.*), common spikerush (*Eleocharis palustris)*, common timothy *(Phleum pretense),* rabbitsfoot grass *(Polypogon monspeliensis),* Wood's Rose, curly dock, sandbar willow (*Salix exigua*), arroyo willow *(Salix lasiolepis),* cattails, and stinging nettle (JBR, 2008c). Riparian areas are discussed in Section 3.1.5.

3.1.18 Fire Management

The project area is located within the BLM Battle Mountain and Elko fire districts. Wildland fires, both natural and human caused, would be under BLM jurisdiction. The region is prone to wildfires and the majority of the project area, approximately 80 percent of the vegetated area, burned in 1999 (Figure 4).

3.1.19 Visual Resources

The project area is located in the northern Great Basin section of the Basin and Range Physiographic Province. The Great Basin is characterized by a pattern of isolated mountain ranges and broad sweeping basins, clear skies, and broad open vistas. Generally, the area is covered with a homogeneous pattern of sagebrush and grasses. Vegetation colors include tawny gray, brown, dark green, gray-green, and green. Soil colors range from beige to a chalky off-white, which when exposed, contrast highly with the surrounding vegetation. Rock colors vary from light to dark brown.

Existing man-made features in the overall project area include both block and linear forms and predominately consist of pits, waste rock dumps, and roads. The strong angular lines of pits and waste rock dumps create moderate contrasts with the gentle sloping and angular lines of the Shoshone Mountain Range while the horizontal lines of existing roads and mining activities in the area create weak to moderate contrasts. Moderate color contrasts have resulted from the vegetation removal associated with these activities. Very little of the existing mining operations can be seen from Interstate 80.

The project is within Visual Resource Management Classes III and IV. The Class III area is along Interstate 80 in the northern portion of the project area and the Class IV portion is in the southern portion of the project area (Figure 7). Class III allows for activities that involve moderate changes of the existing landscape. Activities in a Class III management area may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV allows for activities that involve high changes of the existing character of the landscape. The level of contrast can be high, and the activity can dominate the view and be the major focus of the viewer. However, every attempt should be made to reduce the impact of these activities through careful location, minimal disturbance, and repeating the basic elements of the characteristic landscape (BLM, 1986b).

3.1.20 Wildlife

The project area is located within the NDOW Mule Deer (*Odocoileus hemionus*) Management Area 15, Unit 152. Other big game species that may occur include pronghorn antelope (*Antilocapra americana*) and mountain lion (*Pumas concolor*). Upland game birds that may occur include chukar (*Alectoris chucker*) and Greater sage-grouse. Other species likely to occur include a variety of small mammals and birds. The highest diversity of wildlife occurs primarily during spring and summer months when migrant birds are nesting.

A baseline survey of wildlife was conducted in May and November of 2008 (JBR, 2008c). Species observed during the baseline survey are listed in Table 14. Wildlife habitats present in the project area include big sagebrush, low sagebrush, and limited riparian habitat communities. These communities provide habitat for various wildlife species including small and large mammals, bats, birds, and reptiles. Wildlife species listed in Table 14 do not represent all wildlife species with potential to occur in the project area, but represent species and/or their sign observed during baseline surveys conducted in May and November 2008. Additional species with the potential to occur in the general region, as identified by NDOW, are provided in Appendix F.

Table 14. Wildlife Species Observed During Baseline Surveys

Species		Habitat/Comments	Resident/ Migrant
Common Name	**Scientific Name**		
Birds			
Rock wren	*Salpinctes obsoletus*	Areas containing rocky outcrops	Migrant
Western meadowlark	*Sturnella neglecta*	Lower elevations of project area containing sagebrush.	Resident
Horned lark	*Eremophila alpestris*	Sagebrush habitats adjacent roads	Resident
Common raven	*Corvus corax*	Throughout area	Resident
Black-billed magpie	*Pica pica*	Active nest in aspen stand west-central project area	Resident
Chukar	*Alectoris chukar*	Sagebrush areas near rock outcrops	Resident
Northern oriole	*Icterus galbula*	Aspen stand near active springs	Migrant
Brewer's blackbird	*Euphagus cyanocephalus*	Mainly near riparian areas	Resident
Mammals			
Mountain cottontail rabbit	*Sylvilagus nuttallii*	Observed in the west drainage near the spring source	NA
Coyote	*Canis latrans*	Tracks and scat throughout the area	NA
Mule deer	*Odocoileus hemionus*	Scat and sheds throughout the area	NA
Pronghorn antelope	*Antilocapra americana*	One buck and five does in northeastern project area. Scat throughout the area	NA

(JBR, 2008c)
NA = Not applicable

Chukar were observed at several points near Mosquito Canyon and to the west of Argenta Butte. No raptors were observed; however, golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk (*Buteo regalis*), and prairie falcons (*Falco mexicanus*) are expected to use the area for foraging and may roost on basalt cliffs, south of Argenta Butte. The project area does not contain any suitable roost trees. Ferruginous hawks, however, have been known to nest on the ground. According to NDOW, one ferruginous hawk nest has been documented three miles northeast of the project area and a red-tailed hawk nest was documented at the mouth of Mosquito Canyon, about one mile north of the project area.

3.2 ALTERNATIVES

This section provides a description of the differences in the affected environment for Alternative A and the No Action Alternative compared to the Proposed Action.

3.2.1 Alternative A – Partial F Pit North/Cuna Pit Backfill Alternative

The affected environment described for the Proposed Action would be the same for Alternative A – Partial F Pit North/Cuna Pit Backfill Alternative.

3.2.2 No Action Alternative

The affected environment described for the Proposed Action would be the same for the No Action Alternative.

4.0 ENVIRONMENTAL CONSEQUENCES AND MITIGATION

4.1 PROPOSED ACTION

Baker Hughes has incorporated environmental protection measures into the Proposed Action to reduce potential impacts to the environment. Proposed environmental protection and reclamation measures are presented in Section 2.2.7. This section describes the identified impacts associated with the implementation of the Proposed Action.

4.1.1 Air Quality

Surface disturbances related to the removal of barite and waste material from the pits would result in short-term increases in particulate emission from the generation of fugitive dust. Dust would also be generated by traffic on unpaved roads within the project area. As discussed in Section 2.2.7, roads would be watered to control fugitive dust. These impacts would be temporary, occurring through the life of the Proposed Action. These emissions are anticipated to be minor, as approximately 15 vehicles would be utilized on-site on a daily basis and less than 30 vehicles commute to the site on a daily basis, most of which is on paved roads.

Air emissions from mobile and stationary equipment would result in short-term impacts to the air quality of the site. These activities would not be increased over existing uses, which are already permitted. These impacts would result from emission of pollutants from the burning of fossil fuels. These impacts would only be realized during the life of the mine and would be within air quality standards for the area and are already permitted with the State of Nevada. Impacts to air quality are anticipated to be minor and would be similar to the existing operation.

4.1.2 Cultural and Historical Resources

Known impacts to cultural resources include vandalism, development, and livestock/wildlife trampling. Vandalism includes unauthorized artifact collection, excavation, and salvage of historic structures/features. Impacts from livestock and wildlife have been severe in some areas of heavy use. Disturbance to any sites determined to be eligible for listing on the NRHP shall be avoided through mine planning.

ARPA (43 CFR 7) and the Native American Graves Protection and Repatriation Act (43 CFR 10), both provide protection for historic properties, cultural resources, and Native American funerary items and/or physical remains located on federal land. In addition, ARPA provides for the assessment of criminal and/or civil penalties for damaging cultural resources and possession without an appropriate permit if the artifacts were obtained on federally-managed lands. Any unplanned discovery of cultural resources, items of cultural patrimony, sacred objects or funerary items requires that all activity in the vicinity of the find ceases, and Doug Furtado, Field Manager, Mount Lewis Field Office, 50 Bastian Way, Battle Mountain, Nevada 89820, be notified immediately by phone (775-635-4000) with written confirmation to follow. The location of the find should not be publicly disclosed, and any human remains must be secured

and preserved in place until a Notice to Proceed is issued by the authorized officer. Monitoring would be conducted to ensure that historic properties remain undamaged. Any damage to cultural resources would be investigated as a potential ARPA violation.

Baker Hughes has committed to avoiding archaeological sites determined to be eligible for the NRHP or unevaluated sites. Due to extensive past mining and most of the proposed project activities being located within a previously disturbed area, it is highly unlikely that traditional cultural properties or activities exist, specifically within the mine plan boundary. Therefore, impacts to such resources are expected to be minimal to non-existent.

BLM cultural resource specialists, or BLM qualified monitors, accompanied by designated tribal observers, may periodically visit identified cultural resources/archaeological sites within or near the activity boundary. Native American consultation and monitoring by BLM and Tribal representatives can occur throughout the life of a project to ensure that any identified traditional cultural properties or eligible prehistoric or ethno-historic sites are not deteriorating as a result of the Proposed Action.

During the project activities, if any surface or subsurface artifacts (stone tools, projectile points, etc.) are encountered, it must be stressed to those involved in the proposed project activities that such items are not to be collected. Cultural and archaeological resources are protected under the ARPA (16 U.S.C 470ii) and the Federal Land Management Policy Act (43 U.S.C. 1701).

4.1.3 Native American Traditional Values

Various tribes and bands of the Western Shoshone have stated that federal projects and land actions can have widespread effects to their culture and traditional practices as they consider the landscape as sacred and as a provider. Various locations throughout the BLM MLFO administrative area continue to host traditional/spiritual/cultural use activities. Sites and resources considered sacred or essential to the continuation of tribal traditions include, but are not limited to: prehistoric and historic village sites, sources of water (hot and cold springs), pine nut gathering locations, sites of ceremony and prayer, prehistoric and ethno-historic archaeological sites, burial locations, “rock art” sites, medicinal/edible plant gathering locations, areas associated with creation stories, or any other tribally designated Traditional Cultural Property. BLM continues to provide local tribal entities opportunities for comment, participation, and cultural resource/traditional use site identification.

Though the possibility of disturbing Native American gravesites within most project areas is extremely low, inadvertent discovery procedures must be noted. Under the Native American Graves Protection and Repatriation Act, section (3)(d)(1), it states that the discovering individual must notify the land manager in writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation.

4.1.4 Noxious Weeds, Invasive, and Non-Native Species

The proposed disturbance has the potential to create conditions favorable for the establishment of noxious weeds, invasive, non-native species with the removal of 159.2 acres of vegetation. The use of approved seed mixes with only certified weed-free seed, combined with implementation of prompt and appropriate revegetation techniques would reduce the potential for noxious weeds, invasive, non-native species establishment. The saltcedar observed along the Mosquito Canyon Road would not be disturbed under the Proposed Action in order to avoid spreading this population. Noxious weeds could still spread into disturbance areas if environmental protection measures (Section 2.3) are not completely effective.

Cheatgrass that is present throughout the project area may spread further under the Proposed Action. Adverse impacts to vegetation resources from the further spread of cheatgrass in the project area, if it occurred, would be long-term and moderate. Implementation of the environmental protection measures discussed in Section 2.3 would be used to decrease the opportunity for the spread of invasive species such as cheatgrass. With proper reclamation and implementation of BMPs the establishment and spread of noxious weeds, invasive and non-native species would be minimized.

4.1.5 Riparian and Wetland Areas

The Proposed Action would have the potential of impacting riparian and wetland areas through sedimentation from disturbed areas. Environmental protection measures as discussed in Section 2.3 such as concurrent reclamation, and installation of proper BMPs would reduce impacts to riparian and wetland areas from the implementation of the Proposed Action.

4.1.6 Threatened, Endangered, and Other Special Status Species

None of the TES wildlife species identified in Table 10 was observed in the project area, but potential habitat for these species does exist within the project area. Potential habitat for pygmy rabbits and Preble's shrew within the project area would not be disturbed with the implementation of the Proposed Action.

Impact to bat habitat within the project area would be the reduction of foraging areas and roosting habitat. Limited roosting habitat would be disturbed since most pits would not be reclaimed following reclamation leaving existing pit walls available for roosting.

Some foraging habitat for raptors, 159.2 acres, would be removed during active mining operations and reclamation; however, there is abundant similar habitat in the surrounding and adjacent areas. Impacts to foraging habitat would be negligible considering the current level of disturbance in the area.

Suitable habitat for the vesper sparrow and black rosy-finch within the project area may be disturbed and these species would be displaced during the life of the Proposed Action. Habitat

within the project area for loggerhead shrike exists near the process facilities and would not be disturbed as part of the Proposed Action.

The project area does not contain suitable lek habitat. There would be 159.2 acres of marginal habitat (low sage and reclaimed disturbance) for greater sage-grouse removed under the Proposed Action. Potential wintering habitat near Argenta Butte would not be disturbed but the area would become less suitable for greater sage-grouse due to the increased proximity to human disturbance and noise with the implementation of the Proposed Action. The potential spread of cheatgrass within the project area and into undisturbed areas adjacent to the expansion areas would further reduce the suitability of the surrounding habitat for greater sage-grouse. Potential wintering habitat and other suitable sagebrush within and in the vicinity of the expansion areas would be available during and after mining was completed and successful reclamation of sagebrush occurred. Impacts would be minor because greater sage-grouse do not appear to occupy the area.

The short-horned lizard has habitat throughout the project area, but suitable habitat is also available adjacent to the project area. If this species is using the area it may be displaced to adjacent areas during the life of the project. If individuals are displaced to adjacent areas that cannot support additional individuals due to the available resources, some individuals may perish but the impact to the population would be insignificant.

No TES plant species or potential habitat was observed within the project area; therefore, no impacts to TES plant species are expected from the implementation of the Proposed Action. No BLM sensitive plant species were observed during baseline surveys, but potential habitat for several BLM sensitive plant species is present in the project area. Unburned habitat present in the project area is limited; therefore, reducing the quality of available habitat for sensitive plant species. Since potential habitat for sensitive species within the project area is limited and fragmented due to disturbance from mining and fires in the area, the loss of habitat associated with the implementation of the Proposed Action is expected to be minimal.

4.1.7 Migratory Birds

Most birds within the project area are protected by the MBTA and Executive Order 13186. There is a low risk of incidental take such as destroying migratory birds, nests, or young, as vegetation clearing activities would occur outside of the primary avian breeding (nesting) season. The Proposed Action would comply with the MBTA, with incidental take avoided by conducting construction outside the period when most migratory birds would be nesting. A qualified biologist would survey the area prior to entry if construction was required at any time during the primary nesting season. One hundred and fifty nine fewer acres of habitat for nesting would be available following implementation of the Proposed Action. Following mining activities, the pit highwall would provide roosting and nesting habitat for cliff nesting migratory birds. Impacts from a loss of potential nesting habitat for migratory birds would be short-term and minor

because the habitat in the project area is of marginal quality with adequate similar habitat adjacent to the project area. Successful reclamation would return the area to suitable habitat for nesting.

4.1.8 Wastes Hazardous or Solid

As noted in Sections 2.2.6, the same fuels and materials currently stored on-site would continue to be stored on-site in appropriate containment facilities with no increase in storage capacity. Since no chemicals are used in the processing of ore, there is no potential for release of chemicals from processing operations. Any solid waste generated would be disposed of properly in the Battle Mountain landfill. Other waste generated would include used oil, used antifreeze, aerosol cans, oil filters, and scrap metal. Used oil and antifreeze would be returned to a licensed handler for recycling. Aerosol cans and oil filters would be drained and disposed of with solid waste. Scrap metal generated at the Argenta Mine would be recycled.

A Spill Prevention, Control, and Countermeasures Plan has been developed for the Argenta Mine in accordance with federal regulations (40 CFR Part 112). The plan provides measures to prevent spills, actions to be taken in the event of a spill, reporting procedures, and remedial action procedures. Materials covered under this plan include petroleum products used on-site. Hazardous or solid waste impacts are not anticipated as a result of the Proposed Action.

4.1.9 Water Quality

4.1.9.1 Surface Water

Environmental protection measures as discussed in Section 2.3 such as concurrent reclamation, installation of proper BMPs would reduce impacts to surface water from the implementation of the Proposed Action. No chemicals are used in the processing of the material; therefore, there would be no impacts from chemical spills.

<u>Unnamed Eastern Drainage</u>

The unnamed drainage to the east of Mosquito Canyon would not be impacted by the Proposed Action. One seep was identified in this drainage in a survey completed in November 2008. The locations of the waste rock dumps (specifically Dump E) have been modified to avoid impacts to this drainage.

<u>Mosquito Canyon</u>

The Mosquito Creek drainage runs alongside the access road to the mine. There are no proposed modifications to this access road with the implementation of the Proposed Action. Existing BMPs would continue to be used along this road to control sediment; therefore, no additional impacts are anticipated to this drainage from the implementation of the Proposed Action.

Unnamed Western Drainage

The unnamed drainage to the west of Mosquito Canyon would not be impacted by the Proposed Action.

4.1.9.2 Groundwater

Water used for the processing of the ore material is obtained from the TSF and makeup water from on-site wells. Daily water use is approximately 400,000 to 750,000 gallons. Approximately 160,000 to 510,000 gallons of water per day is reclaimed and reused from the TSF. The remaining water needs are supplied from the on-site production well. Daily water use would not increase with the implementation of the Proposed Action.

The active pit (Yuba Pit) has not intercepted water and the Proposed Action would not deepen the pit, thus interception of or impacts to groundwater are not expected with the implementation of the Proposed Action. Some impacts to groundwater have resulted from the creation of the pit lake in the F Pit. Increases in TDS and some elevated concentrations of metals have been detected in the downgradient well from the F Pit. Continued impacts to groundwater would be eliminated through implementation of the Proposed Action, which includes removal and evaporation of the existing water in the F Pit. The proposed F Pit North open pit is not expected to intercept groundwater, thus no other impacts to groundwater are anticipated.

Over 50 years of groundwater useage at the production area has not resulted in a noticeable decrease in groundwater levels, as evidenced by stable groundwater levels monitored quarterly in nearby monitoring wells MW-1, MW-2, and MW-3. Groundwater quantity, primarily in the processing area, would not be impacted beyond the currently approved usage.

4.1.10 Grazing Management

The Proposed Action would increase surface disturbance by 159.2 acres. The primary impact to range resources would be the removal of vegetation available as forage in the project area. This would amount to the loss of less than 0.5 AUM in the Argenta allotment with approximately 10.4 acres of disturbance, and approximately 1.6 AUMs in the Geyser allotment with approximately 35.4 acres of disturbance with the implementation of the Proposed Action. The remainder of the proposed disturbance would take place on private land. No range improvements would be affected by the Proposed Action. Impacts to rangeland resources can be considered short-term due to planned reclamation activities.

Impacts to rangeland resources would occur through the life of the Proposed Action until vegetation has been reestablished. Such reclamation would also enhance vegetation within the project area by increasing desirable species over the long-term. Baker Hughes would conduct reclamation as per the PoO and Reclamation Plan (JBR, 2008a). The minimal acreage of disturbance and reclamation of disturbance would result in negligible impacts to rangeland resources.

4.1.11 Lands Use Authorization

The Proposed Action would not interfere with current land uses or prevent existing access to public lands. After successful reclamation of the 159.2 acres of disturbance, the area would remain available for other uses; therefore, impacts would be minimal.

4.1.12 Minerals

Impacts to the geology and minerals in the project area would result from the removal of barite-bearing ore and waste rock from the pits. The amount of material to be removed is unknown at this time as the final pit configurations have not yet been determined. Waste rock would be redistributed to adjacent waste rock dumps and ore would be processed then transported off-site. The backfilling of the F Pit with waste rock would restrict future access to any geologic resources in this area. The area surrounding the project area would remain open and available for mineral exploration and development. The redistribution and removal of material from the site would be permanent, but would have minimal impacts on regional geology.

4.1.13 Paleontological Resources

The fossils that are commonly associated with the Valmy Formation and Slaven Chert include conodonts, radiolarians, and graptolites. These fossils are common fossils that are often used to date various geologic formations. Since the fossils expected in the area are not rare or unique, impacts to the paleontological resources from the Proposed Action would be minimal.

If rare or unique fossils are found during mining activities, it would require cessation of all activity in the vicinity of the find, and Doug Furtado, Field Manager, Mount Lewis Field Office, 50 Bastian Way, Battle Mountain, Nevada 89820, be notified immediately by phone (775-635-4000) with written confirmation to follow.

4.1.14 Recreation

The Proposed Action would not interfere with current recreational uses or change existing access to public lands since access to this area is already restricted by existing mining operations. Mining-related activities would cause continued visual disruption, noise, and fugitive dust. There are no developed recreational sites or areas located near the Argenta Mine. As the majority of recreation activities are dispersed and there are existing mining operations, it is unlikely that the Proposed Action would impact the overall recreation experience in the area. Impacts on dispersed recreation would be short-term and localized. After reclamation, the area would be expected to provide the same types of recreation use as available in the surrounding area; therefore, impacts to recreation would be negligible.

4.1.15 Socioeconomic Values

The Proposed Action would not involve hiring of additional employees or outside contractors. Work at the site would be accomplished by current Baker Hughes employees. No additional

employees would be needed. The small amount of supplies that would be required for the Proposed Action would be obtained from Battle Mountain, Carlin, and Elko. All three of these communities currently have a variety of mining support industries where supplies would be readily available (and are currently utilized for existing operations); therefore, socioeconomic impacts from the Proposed Action would be similar to the existing operation.

4.1.16 Soils

A total of 159.2 additional acres of soil would be disturbed under the Proposed Action. Approximately 39 acres of disturbance would take place on ground previously disturbed by mining activities. Therefore, approximately 120 acres of relatively undisturbed soils would be directly impacted as a result of the Proposed Action. The majority of soils impacted are within the Humdun-Bucan association, with smaller areas of the Ramires-Chen-Pie Creek association (NRCS, 2004 and 2008) also impacted. There is a limited amount of naturally existing topsoil within the disturbed areas, however growth media would be salvaged prior to disturbance, where feasible and stockpiled for future reclamation. Removal of vegetation and surface soil disturbance would result in increased wind and water erosion. Disturbance would result in loss of soil structure, therefore decreasing water-holding capacity and infiltration in the surface horizons. Soil microbial activity and soil productivity would also decrease.

Erosion and runoff control measures, such as diversion ditches, silt fences, straw bales, and other water control structures would be implemented in areas of surface disturbance to minimize sediment transport to adjacent undisturbed soils. Following cessation of operations, disturbed areas would be regraded, contoured, and seeded with an approved seed mixture to establish a ground cover to reduce erosion. Revegetation activities would commence at the earliest feasible time following reclamation activities. With the implementation of environmental protection measures and successful reclamation, impacts to soil resources are expected to be minimal.

4.1.17 Vegetation

Under the Proposed Action, 159.2 additional acres would be disturbed including 120 acres of areas disturbed by the 1999 Mule fire and reseeded vegetation, and 39 acres within previously disturbed areas. The 39 acres previously disturbed by mining activities are relatively barren, steep, and rocky, with little vegetative cover.

Only vegetation types previously disturbed by mining and wildland fire would be lost with the implementation of the Proposed Action. For this reason, impacts to vegetation resources would be minor since no native vegetation exists within the areas to be disturbed and much of the disturbance would be reseeded during reclamation. Impacts from vegetation loss would be short-term in most of the disturbed areas, lasting for the duration of the mine, until reclamation has been completed. The pits would not be reclaimed (with the exception of the F Pit) and therefore the loss of vegetation on 68 (13.6 public and 54.4 private) acres associated with the pits would be permanent.

4.1.18 Fire Management

Fires have the potential to affect vast areas of habitat and structures. Operations at the Argenta Mine present a low risk of initiating a wildland fire. Typical drill and blast mining techniques would be used under the Proposed Action. Blasting is conducted by a contractor and no explosives are stored on-site. Blasting occurs approximately two to three times per month. Vehicles and machinery would generally be present only on previously disturbed areas absent of vegetation, after initial clearing activities, and should not present a fire hazard. Use of a generator also presents a potential source of fire. Appropriate measures implemented to minimize the risk for starting a wildland fire include locating equipment in areas cleared of vegetation and maintaining all equipment in proper condition, as well as, implementing the environmental protection measure identified in Section 2.3.7. In the event of a fire, Baker Hughes would have sufficient firefighting equipment to extinguish the fire. With the above-mentioned precautions and environmental protection measures, impacts on fire management would be negligible.

4.1.19 Visual Resources

The Proposed Action would result in visual impacts principally affecting the elements of line, texture, and color with the addition of waste rock facilities, exploration roads, and pit expansion. These visual impacts would be consistent with the existing conditions at the site. Class III and Class IV visual resource objectives allowing for moderate to a strong degree of contrast would be met throughout the Proposed Action. With successful reclamation and revegetation, as discussed in Section 2.2.7, long-term visual impacts would be minimized.

4.1.20 Wildlife

Impacts to wildlife would include the disturbance of 159.2 acres with removal of approximately 120 acres of previously undisturbed big sagebrush and low sagebrush. The amount of riparian habitat within the project area is less than two acres and the Proposed Action would not impact this habitat on the mine site. Wildlife would likely avoid the expansion areas due to increased levels of human presence and noise from heavy equipment use and traffic, although the area is currently adjacent to such disturbances. Noise and human presence would occur for the duration of mining activities in the expansion areas.

Impacts from displacement of wildlife would occur until the completion of reclamation and establishment of seeded vegetation. Wildlife, especially individual small mammals, would be displaced into adjacent habitats. If these adjacent habitats cannot support these additional individuals, the populations may be temporarily reduced due to insufficient resources.

Individual wildlife species, such as small birds and mammals, may be affected by the pit lake and evaporation pond prior to reclamation efforts. Effects to individual wildlife species from the pit lake would be minimal as indicated in the ecological risk assessment prepared for the Pit Lake Plan. Additionally, these impoundments are temporary and are designed to mitigate

longer-term impacts by the elimination of the pit water. In the event waterfowl are observed on the evaporation pond, BLM will be consulted and bird deterrents would be installed, if necessary. Pit highwalls that remain after mining may provide roosting habitat for bats.

4.2 ALTERNATIVES

This section describes the impacts associated with the implementation of Alternative A and the No Action Alternative where they differ from that of the Proposed Action.

4.2.1 Alternative A – Partial F Pit North/Cuna Pit Backfill Alternative

The environmental consequences described in Section 4.1 would be the same for Partial F Pit North/Cuna Pit Backfill Alternative with proportional impacts due to the reduced amount of disturbance with this alternative. The reduced amount of disturbance cannot be determined because the volume of waste rock from the Cuna Pit and proposed F Pit North are unknown at this time. Resources with changes to environmental consequences other than a proportional reduction are described below.

Geology and Minerals

Impacts to geology and minerals with the implementation of Alternative A would include covering up potential future sources of barite during pit backfill. This would reduce the availability of this resource for future extraction as the market for barite changes.

4.2.2 No Action Alternative

The environmental consequences described in Section 4.1 would continue to occur under the No Action Alternative on a more limited basis until current permitted disturbance areas are exhausted. Once permitted disturbance has been exhausted reclamation of existing disturbance would begin. The impacts associated with the No Action Alternative would be proportional to the reduced amount of surface disturbance except as indicated below.

Socioeconomics

Socioeconomic impacts from the No Action Alternative would include the permanent loss of approximately 30 jobs in the next six months once the approved disturbance has been completed. This is a loss of approximately $25,800,000 of income in the Battle Mountain area over the life of the Proposed Action.

4.3 CUMULATIVE EFFECTS STUDY AREA

This section analyzes the potential cumulative impacts from past, present, and reasonably foreseeable future projects combined with the Proposed Action within the Cumulative Effects Study Area (CESA).

For the purposes of this EA, the cumulative impacts are the sum of all past, present (including the Proposed Action), and reasonably foreseeable future actions resulting primarily from mining,

commercial activities, and public uses. The purpose of the cumulative analysis in the EA is to evaluate the significance of the Proposed Action's contributions to cumulative impacts. A cumulative impact is defined under federal regulations as follows:

> "...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

As required under NEPA and the regulations implementing NEPA, this chapter addresses those cumulative effects on the environmental resources in the CESAs, which could result from the implementation of the Proposed Action and No Action Alternative, past actions, present actions, and reasonably foreseeable future actions. The extent of the CESAs can vary with each resource, based on the geographic or ecological limits of that resource. As a result, the list of projects considered under the cumulative analysis may vary according to the resource being considered.

For the purposes of this analysis and under federal regulations, 'impacts' and 'effects' are assumed to have the same meaning and are interchangeable. The cumulative impacts analysis was accomplished through the following three steps:

- Step 1: Identify, describe, and map CESAs for each resource to be evaluated in this chapter.
- Step 2: Define time frames, scenarios, and acreage estimates for cumulative impact analysis.
- Step 3: Identify and quantify the location of potential specific impacts from the Proposed Action and judge these contributions to the overall impacts.

According to the BLM Handbook Guidelines for Accessing and Documenting Cumulative Impacts (BLM, 1994), the analysis can be focused on those issues and resource values identified during scoping that are of major importance. The issue and resource value of major importance or public concern, which would be analyzed for cumulative impacts are air quality, water resources, visual resources, socioeconomics, wildlife (including special status species and migratory birds), wetland/riparian zones, soils, vegetation, cultural and historical resources, Native American traditional values, and invasive non-native species.

The CESA for air, water, soil, vegetation, noxious weeds, invasive, and non-native species, and visual resources have been defined as the hydrographic basin and is shown on Figure 8. The CESA for wildlife is shown in Figure 9. The CESA for cultural and historic resources consists of the PoO boundary shown on Figures 8 through 11. The CESA for Native American traditional values is shown on Figure 10. The CESA boundary for socioeconomic values

includes the towns of Battle Mountain, Carlin, Dunphy, Beowawe, Crescent Valley, and surrounding rural areas and is shown on Figure 11.

Table 15 gives details of the CESAs selected for each resource. The reasonably foreseeable time frame for the cumulative assessment analysis assumes 17 years, the life of the Proposed Action.

Table 15. Cultural Resources

Resource	Area Acres within CESA
Air, Water Resources, Wetland and Riparian Areas, Soils, Vegetation, Noxious Weeds, Invasive, and Non-Native Species, Migratory Birds, and Visual Resources	10,726
Wildlife	349,223
Cultural and Historic Resources	1,815
Native American Traditional Values	884,934
Socioeconomic Values	109,394

The following sections contain a description of interrelated activities that have occurred and may reasonably occur in the foreseeable future within the CESAs, and an analysis of the impacts of these interrelated activities within a regional context.

4.3.1 Description of Interrelated Projects

The primary interrelated activities from the past, present, and reasonably foreseeable future that would contribute to cumulative impacts, include recreation, grazing, wildland fires and wildland fire rehabilitation, commercial or residential development, and mining activities.

4.3.2 Past and Present Activities

Historic and present mineral exploration and mining activities have occurred within the CESAs. Disturbance associated with these historic operations included open pits, shafts and adits, roads, drill pads, waste rock dumps, and reclaimed areas. Additionally, portions of each CESA have been disturbed by historic wildland fires. Past and present activities within the CESA boundaries are described below and disturbance acreages associated with the activities are shown in Table 16.

Past and present activities within the air, water, soil, vegetation, noxious weeds, invasive and non-native species, and visual resources CESA include:

- Disturbance associated with previous mining activities in the project area;
- The Mule Fire in 1999;
- One Notice of Intent for Homeland Exploration has been filed within the CESA;
- An Operations Plan for Newmont Mining Company exists within the CESA.

Past and present activities within the wildlife CESA include:

- Disturbance associated with previous mining activities in the project area;

- Ten recently reported wildland fires occurred within the CESA including Mule (1999), Bobs Flat (2001), Rodeo Creek (2001), Sheep (2001), Dunphy (2001), Beowawe (2005), Dunphy (2005), Sheep (2006), Argenta (2006), Dunphy (2007);
- Six Notices of Intent including Newmont Mining Corporation, Redstar Gold USA Inc. Homeland Exploration Inc., Apollo Gold Corp, White Knight Gold US Inc., and Coral Resources Inc. have been filed within the CESA; and
- Five mining and exploration plans exist within the CESA including Newmont Mining Company, Nevada Drilling Fluids, Barrick Gold Exploration Inc., Nevada Rae Gold Inc., and Red Widow Mining Company.

Past and present activities within the Cultural Resources CESA include:

- Disturbance associated with previous mining activities in the project area; and
- The Mule Fire occurred within this CESA in 1999.

Past and present activities within the Native American Traditional Cultural Values CESA include:

- Disturbance associated with previous mining activities in the project area;
- Twenty-three recently reported wildland fires occurred within the CESA including the Horse Creek Fire (1999), Frenchie (1999), I Ranch (1999), Mule (1999), Beowawe (2000), Bobs Flat (2001), Mud Springs (2001), Rodeo Creek (2001), Sheep (2001), Dunphy (2001), Dee Gold (2001), Hot Lake (2001), Dry Hills (2002), Beowawe (2005), Dunphy (2005), Esmeralda (2005), North Antelope (2006), Sheep (2006). Argenta (2006), Horseshoe HQ (2007), Dunphy (2007), Rossi (2007), and Willow Creek (2007);
- Eleven Notices of Intent including Wintle Jay/Wintle Curtis, Rodeo Creek Gold Inc./Great Basin Gold Inc., White Knight Gold US Inc., Reliance Geological Services Inc., Apollo Gold Corp, Evolving Gold Corp, Homeland Exploration Inc, Reliance Geological Services Inc., Gold Reef International Inc., and Duncan Park Holdings NV LTD have been filed within the CESA; and
- Sixteen mining and exploration plans including Coral Resources Inc., two for Barrick Cortez Inc. (as MGR CJV), two for Newmont USA LTD (DBA NMC), two for Barrick Gold Exploration Inc., Barrick Goldstrike Mines Inc., two for Rodeo Creek Gold Inc./Great Basin Gold Inc., Placer Dome US Inc./Barrick Gold Explorations Inc., Barrick Gold of North America, Nevada Drilling Fluids, Nevada Rae Gold Inc., Red Widow Mining Co Inc., and Klondex Gold and Silver Mining exist within the CESA.

Past and present activities within the socioeconomic values CESA include:

- Disturbance associated with previous mining activities in the project area;
- Fourteen recently reported wildland fires occurred within the CESA including Rain (1999), Frenchie (1999), Rose (1999), Mule (1999), Bobs Flat (2001), Dunphy (2001), Carlin (2005), Beowawe (2005), Suzie (2006), Webb (2006), Horseshoe HQ (2007), Dunphy (2007), Party (2007), and Bobs Flat (2007); and

- A Newmont Mining Corporation PoO exists within the CESA.

Table 16. Past and Present Activities within the CESAs

Interrelated Projects	Air, Water, Wetland and Riparian Areas, Soil, Vegetation, Noxious Weeds Invasive and Non-native Species, Migratory Birds and Visual Resources CESA	Wildlife CESA	Cultural and Historic Resources CESA	Native American Traditional Values CESA	Socioeconomic Values CESA
Argenta Mine Previous Disturbance	433	433	433	433	433
Wildland Fires	5,477	59,381	1,532	322,392	47,665
Notices of Intent	3.3	17.3	0	27.6	0
Exploration/Operations Plan(s)*	150	539.8	0	22,515.7	139
Total	**6,063.3**	**60,371.1**	**1,965**	**345,368.3**	**48,237**

* Total acreage of exploration or operations plan has been assumed to be within the CESA

4.3.3 Reasonably Foreseeable Future Activities

Livestock grazing, recreation, wildland fires, mineral exploration, and mining activities would likely continue in the reasonably foreseeable future within the CESAs. Reasonably foreseeable future activities within the CESAs are shown in Table 17.

Table 17. Reasonably Foreseeable Future Activities within the CESAs

Interrelated Projects	Air, Water, Wetland and Riparian Areas, Soil, Vegetation, Noxious Weeds Invasive and Non-native Species, Migratory Birds and Visual Resources CESA	Wildlife CESA	Cultural and Historic Resources CESA	Native American Traditional Cultural Values CESA	Socioeconomic Values CESA
Argenta Mine Proposed Disturbance	159.2	159.2	159.2	159.2	159.2
Rodeo Creek Gold Hollister Mine	0	0	0	58	0
Tuscarora Sagebrush Habitat Restoration Project	0	10,000*	0	10,000*	0
Fire Creek Project (Klondex Gold and Silver Mining Company)	0	150	0	150	0
Baker Hughes Slaven Canyon Project	0	**	0	**	0
Wildland Fire	**	**	**	**	**
Total	**159.2**	**10,309**	**159.2**	**10,376**	**159.2**

* Estimate based in information from the Elko District BLM
** Acreage unknown

4.4 CUMULATIVE EFFECTS

The following sections discuss the cumulative effects of the Proposed Action when combined with past, present, and reasonably foreseeable future activities within the CESA.

4.4.1 Air Quality

The CESA for air quality is the immediate Mosquito Creek watershed and encompasses approximately 10,726 acres as shown of Figure 8. Cumulative impacts to air quality within this CESA would result from past, present and reasonably foreseeable future actions consisting of dust from the use of the gravel and dirt roads throughout the area, wildland fires, mining activity, grazing, and recreation. Fires would have the largest impact to air quality in the short-term. The incremental contribution of the Proposed Action's particulate and combustion emissions would be relatively small and the cumulative emissions are generally dispersed, and stationary sources would be regulated by the BAPC to ensure that impacts would be reduced to levels that are consistent with the ambient air quality standards.

The Proposed Action, when combined with the implementation of the environmental protection measures as discussed in Section 2.3, would not significantly contribute to the cumulative impacts to air quality within this CESA.

4.4.2 Cultural Resources

The CESA for Cultural Resources is the PoO boundary and consists of approximately 1,815 acres. Mining and mineral exploration activities have had indirect and cumulative effects upon cultural resources. Road construction associated with mining and exploration makes public lands more accessible, and looting, vandalism, and other damage to cultural resources have a high correlation to road proximity. Revisits to cultural resources demonstrate that many of the artifacts originally recorded on the sites have since disappeared. Many sites show evidence of recent damage, often inadvertent, and associated with increased recreational and other uses of public lands.

New road construction in the project area would take place within and adjacent to previously disturbed areas; therefore, would not open new areas to looting and vandalism of cultural resources. The Proposed Action, when combined with the implementation of the environmental protection measures as discussed in Section 2.3, would not significantly contribute to the cumulative impacts to cultural resources within this CESA.

4.4.3 Native American Traditional Values

The CESA for Native American Traditional Values consists of areas of cultural/traditional importance within the region and consist of approximately 884,934 acres as shown on Figure 10. It is believed that cultural resources, including tribal resources and sites of cultural, traditional, spiritual use and associated activities are increasingly in danger of losing their physical and

spiritual integrity. As populations grow, public interest in utilizing public lands increases and thus, the potential for the decline of culturally sensitive areas also increases. Different world views, social and spiritual practices, and beliefs also often conflict with each other.

As told by tribal participants, perhaps the leading contributors affecting cultural properties and traditional resources have been historic and modern mining, livestock grazing, cheatgrass invasion, catastrophic wildfire, and the general increase in population growth and public use in areas once considered remote.

Of the known locations (to BLM) of cultural/traditional significance within the general region noted under affected environment, the Tosawihi Quarries and Mount Tenabo/White Cliffs/Horse Canyon Traditional Cultural Property areas are experiencing exploration and mining activities, the Beowawe Geyser and associated hot springs in Whirlwind Valley no longer function due to geothermal energy development (power plant), and the Rock Creek Traditional Cultural Property is involved in a "checker board" private land sale and increased public use and presence.

The existing, growing, and developing uses of public lands including mining exploration, subsequent development, and expansion operations, may continue to contribute to the regional decline of cultural/traditional sites. However, contributions of this specific Proposed Action are expected to be minimal since most of the expansion activities are located within areas impacted by historic and previous mine projects (new surface disturbance is minimal); therefore, the Proposed Action, when combined with the implementation of the environmental protection measures as discussed in Section 2.3, would not significantly contribute to the cumulative impacts to Native American traditional values within the CESA.

4.4.4 Water Resources

The CESA for water resources is the immediate Mosquito Creek watershed and encompasses approximately 10,726 acres as shown on Figure 8. Surface water resources within the CESA consist of springs, ephemeral drainages, and the Humboldt River. Drainages within the CESA flow during the spring and typically flow is lost to the substrate once they reach the valley floor. Based on current knowledge of water resources and projects within the water resources CESA, the impacts to seeps, springs, and ephemeral drainages would be localized to disturbed areas, and limited to the life of the project. Past, present, and reasonably foreseeable future actions consists of wildland fires, mining activities, grazing, and recreation. Although approximately 51 percent (5,477 acres) of the CESA has burned, there are no specific data that quantify the amount of sediment runoff produced due to this disturbance. A total of 586.3 acres of disturbance has taken place or is approved for mineral activities in the CESA. Some of this disturbance has been reclaimed or has naturally stabilized and revegetated over the years, thereby limiting the amount of sediment runoff generated by this disturbance. There are no specific data on the amount of sediment runoff that could result from these activities. However, the mining activities would be required to have a stormwater permit regulating BMPs, spill prevention plans, handling

hazardous substances, and adherence to NAC 534.4369 and 534.4371, thus, minimizing impacts to water quality. Groundwater consumption within the CESA would be expected to continue at the permitted rates.

Removal of the pit lake water and reclamation of the F Pit would eliminate the current source of groundwater degradation at the mine, thus minimizing the impact to the immediate groundwater system and future degradation of the groundwater within the CESA. In addition, due to the neutralization potential of the backfill material to be placed in the F Pit, as discussed further in the Pit Lake Plan amendment and minor modification to the WPCP, oxidation of sulfide material that might cause degradation of water quality within the F Pit is expected to be minimal.

With the implementation of the Proposed Action, impacts to groundwater would be reduced by the removal of the pit lake water and placement in a lined evaporation pond where evaporation would prevent further contamination of groundwater resources.

The Proposed Action, when combined with the implementation of the environmental protection measures as discussed in Section 2.3, would not significantly contribute to the cumulative impacts to water resources within the CESA and would reduce existing impacts to groundwater from the F Pit lake.

4.4.5 Wetland and Riparian Areas

The CESA for wetland and riparian areas is the watershed boundary and encompasses approximately 10,726 acres as shown on Figure 8. Wetland and riparian areas within the CESA includes several ephemeral drainages, as well as, portions of the Humboldt River. Past, present, and reasonably foreseeable future actions within the CESA consists of wildland fires, mining activities, grazing, and recreation. Impacts from these activities may indirectly impact wetland and riparian areas within the CESA by adding sediment in runoff from disturbed areas. The Proposed Action would have no direct impacts to wetland and riparian areas.

The Proposed Action, when combined with the implementation of the environmental protection measures as discussed in Section 2.3, would not significantly contribute to the cumulative impacts to wetland and riparian areas within the CESA.

4.4.6 Soil Resources

The CESA for soil resources is the watershed boundary and encompasses approximately 10,726 acres as shown on Figure 8. The disturbance to soils from past, present, and reasonably foreseeable activities consists of wildland fires, mining activities, grazing, and recreation. Impacts to soils from these activities would include increased erosion of existing soils from disturbed areas. These impacts would be minimized by implementing environmental protection measures. Cumulative impacts to soil resources would not occur at one time, nor would they occur at one location, but would occur sporadically throughout the foreseeable future time period (17 years) and would be dispersed throughout the CESA.

The Proposed Action, when combined with the implementation of the environmental protection measures as discussed in Section 2.3, would not significantly contribute to the cumulative impacts to soils within the CESA.

4.4.7 Vegetation

The CESA for vegetation is the watershed boundary and encompasses approximately 10,726 acres as shown on Figure 8. Disturbance to vegetation in the CESA from past, present, and reasonably foreseeable future activities consists of wildland fires, mining activities, grazing, and recreation. The 1999 Mule Fire burned 51 percent of the CESA. This area was reseeded with the seed mix shown in Table 7. Any additional wildland fires within the CESA on public land would be seeded, and mining or exploration activities would require reclamation and seeding. Fire would have the greatest short-term cumulative effect to vegetation. The temporary loss of approximately 159.2 acres and a permanent loss of 68 acres of previously disturbed vegetation within the CESA as a result of the Proposed Action would have a negligible impact compared to impacts associated with fires within the CESA.

The Proposed Action, when combined with the implementation of the environmental protection measures as discussed in Section 2.3, would not significantly contribute to the cumulative impacts to vegetation within the CESA.

4.4.8 Noxious Weeds, Invasive, and Non-Native Species

The CESA for noxious weeds, invasive, and non-native species is the watershed boundary and encompasses approximately 10,726 acres as shown on Figure 8. Noxious weed, invasive, and non-native species within the CESA consist of tamarisk, bull thistle (*Cirsium vulgare*), hoarycress, musk thistle (*Carduus nutans*), Scotch thistle (*Onopordum acanthium*), perennial pepperweed, and cheatgrass. The past, present, and reasonably foreseeable future activities within the CESA consists of wildland fire, mining activities, grazing, and recreation. These activities have the potential to create conditions favorable for the establishment/invasion of noxious weeds, invasive, non-native species, and other undesirable plants.

Future occurrence of a large wildland fire poses the greatest risk for invasion of weeds in the area. Consistent with BLM policy, use of suitable seed mixes with only certified and tested seed, combined with implementation of prompt and appropriate revegetation techniques would reduce the potential for undesired weeds to invade burned areas. The potential for the establishment of noxious and/or invasive, non-native weeds within the CESA area may be greater if wildland fire burns on private lands where federal involvement is limited. Cumulative impacts to noxious weeds, invasive, and non-native species within the CESA would be minimized by the use of environmental protection measures, BMPs, and proper reclamation.

In addition, the potential impacts from the Proposed Action would be minimized due to the implementation of environmental protection measured in Section 2.3 and following BMPs such

as avoidance of areas with known noxious weeds, invasive, and non-native species infestation with vehicles, removal of noxious weeds, invasive, and non-native species on reclaimed areas, and washing of vehicles prior to entering weeds free areas and exiting areas of known noxious weeds, invasive and non-native species infestation. However, even with implementation of the measures, establishment of species such as cheatgrass would likely occur on a limited basis, especially large areas that have recently burned.

The Proposed Action, when combined with the implementation of the environmental protection measures as discussed in Section 2.3, would not significantly contribute to the cumulative impacts to noxious weeds, invasive, and non-native species within the CESA.

4.4.9 Wildlife

The CESA for wildlife encompasses approximately 349,223 acres as shown on Figure 9. Past, present, and reasonably foreseeable future activities within the CESA that would impact wildlife consists of wildland fires, mining activities, grazing, and recreation. Impacts to wildlife from these activities would include displacement from existing habitat to surrounding similar habitat. This displacement would occur for the duration of the projects or other activities within the CESA until reclamation has been completed and seeded areas establish vegetation. The loss of 159.2 acres of wildlife habitat or restoration would have impacts to wildlife habitat, and result in direct impacts to individual animals. Approximately 60,383.1 acres of past and present disturbance has taken place within the CESA. Most disturbances within the CESA are not permanent, as reclamation would be performed once the projects have been completed. Some projects within the CESA would implement concurrent reclamation resulting in several stages of vegetation reestablishment and habitat restoration over time. The 159.2 acres of disturbance represent less than 0.05 percent of the total CESA and approximately 0.3 percent of the approved and other disturbance within the CESA.

The Proposed Action, when combined with the implementation of the environmental protection measures as discussed in Section 2.3, would not significantly contribute to the cumulative impacts to wildlife within the CESA.

4.4.10 Migratory Birds

The CESA for migratory birds encompasses approximately 10,726 acres as shown on Figure 9. Past, present, and reasonably foreseeable future activities within the CESA that would impact migratory birds consists of wildland fires, mining activities, grazing, and recreation. Impacts to migratory birds would include loss of nesting habitat and displacement during the Proposed Action and other past, present, and reasonable foreseeable future activities. Past and present activities account for 6,063.3 acres of disturbance within the CESA. Successful reclamation following mining activities and fires would reduce affects to migratory birds. The Proposed Action disturbance represents less than 1.5 percent of the CESA and approximately 2.6 percent of the approved or other disturbance within the CESA.

The Proposed Action, when combined with the implementation of the environmental protection measures as discussed in Section 2.3, would not significantly contribute to the cumulative impacts to Migratory Birds within the CESA.

4.4.11 Visual Resources

The CESA for visual resources is the watershed boundary and encompasses approximately 10,726 acres as shown on Figure 8. The past, present, and reasonably foreseeable future activities within the CESA that has the potential to impact visual resources consists of wildland fire, mining activities, grazing, and recreation. The Proposed Action would result in a 159.2-acre incremental increase in disturbance through expansion of the open pits and waste rock dumps. Since the CESA is within a Class III and Class IV visual resource area, any cumulative impacts from the Proposed Action would continue to meet the objectives of the resource area. Disturbance from past and present actions within the CESA include 6,063.3 acres. Reclamation following mining activities and fires would result in a lessening of the visual impact from these activities.

The Proposed Action, when combined with the implementation of the environmental protection measures as discussed in Section 2.3, would not significantly contribute to the cumulative impacts to visual resources within the CESA.

4.4.12 Socioeconomic Values

The CESA for socioeconomic values encompasses approximately 109,394 acres as shown on Figure 11. Past, present, and reasonably foreseeable future actions with the CESA that would impact socioeconomic values consists of wildland fires, mining activities, grazing, and recreation. Socioeconomic impacts within the CESA would be minimal because no new jobs would be created from the implementation of the Proposed Action. The Rain Mine PoO is the only other project that falls within the CESA boundary.

Specific information regarding the timing, duration, and level of employment is not available for other future actions, which may occur within the CESA, precluding a comprehensive analysis of potential cumulative socioeconomic impacts. However, based on environmental consequences analysis presented in this EA, the Proposed Action and alternatives do not: induce substantial growth or concentration of population; displace a large number of people; cause a substantial reduction in employment; reduce wage and salary earnings; cause a substantial net increase in county expenditures; or create a substantial demand for public services. In the volatile economy of the foreseeable future, it is expected that the cumulative and incremental socioeconomic effects of the Proposed Action, would be beneficial and not significant.

5.0 CONSULTATION AND COORDINATION

This EA was prepared under the technical direction of the BLM MLFO, Battle Mountain, Nevada, and BLM Elko District Office, Elko, Nevada. Assistance was provided by BLM resource specialists (meetings and subsequent conversations); consultation with other local, state, and federal agency resource personnel; review of company and agency files; field reconnaissance; and review of supporting documentation.

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5.3 PUBLIC NOTICE AND AVAILABILITY

The BLM MLFO held an initial internal scoping meeting on September 30, 2006, and again in October 2008 to determine resources that may be affected by the Proposed Action. Copies of the PoO and EA can be obtained at the BLM MLFO, or on the web at:

http://www.blm.gov/nv/st/en/fo/battle_mountain_field/blm_information/national_environmental.html

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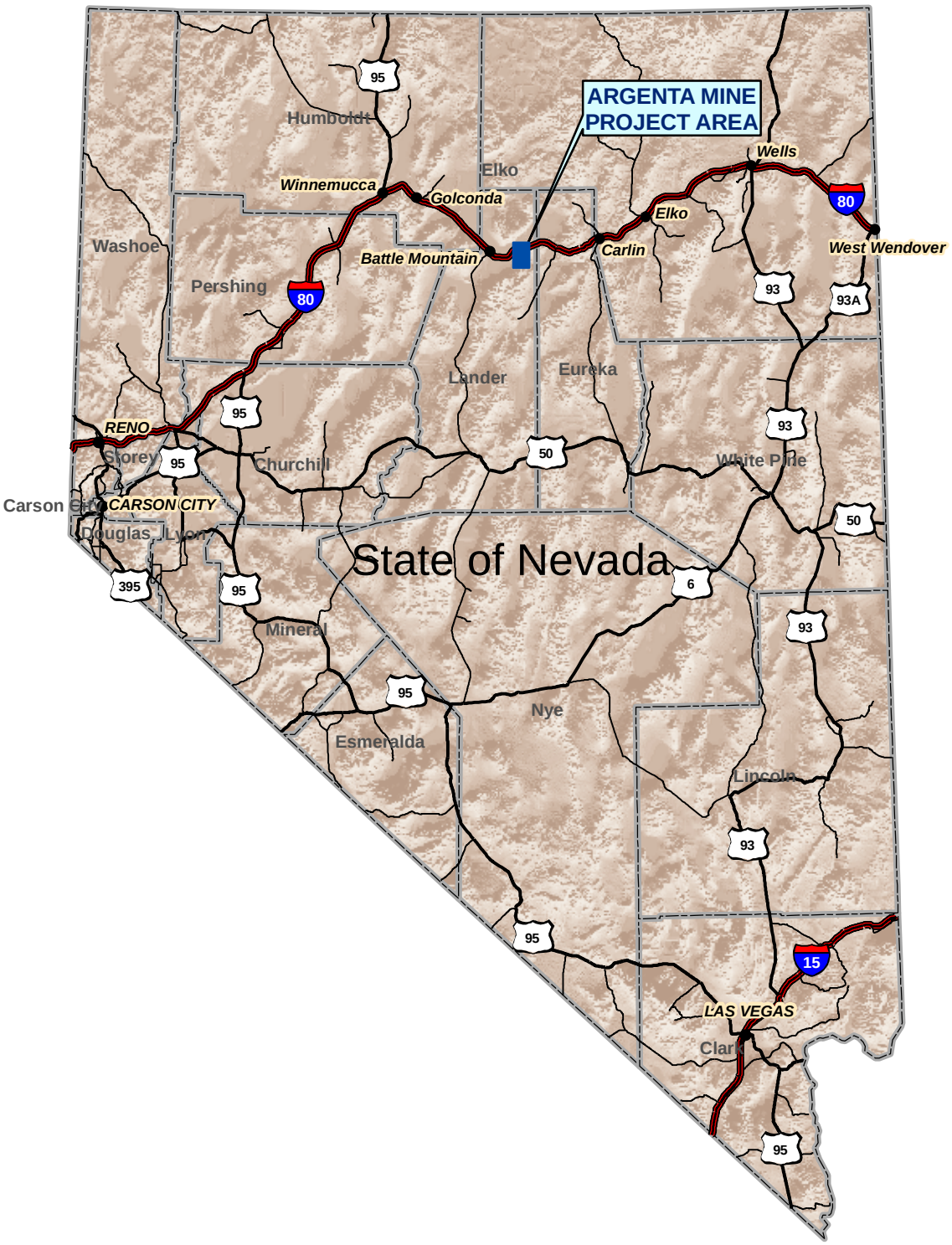


N

80 0 80 Miles

BAKER HUGHES DRILLING FLUIDS

ARGENTA MINE ENVIRONMENTAL ASSESSMENT

FIGURE 1
GENERAL LOCATION

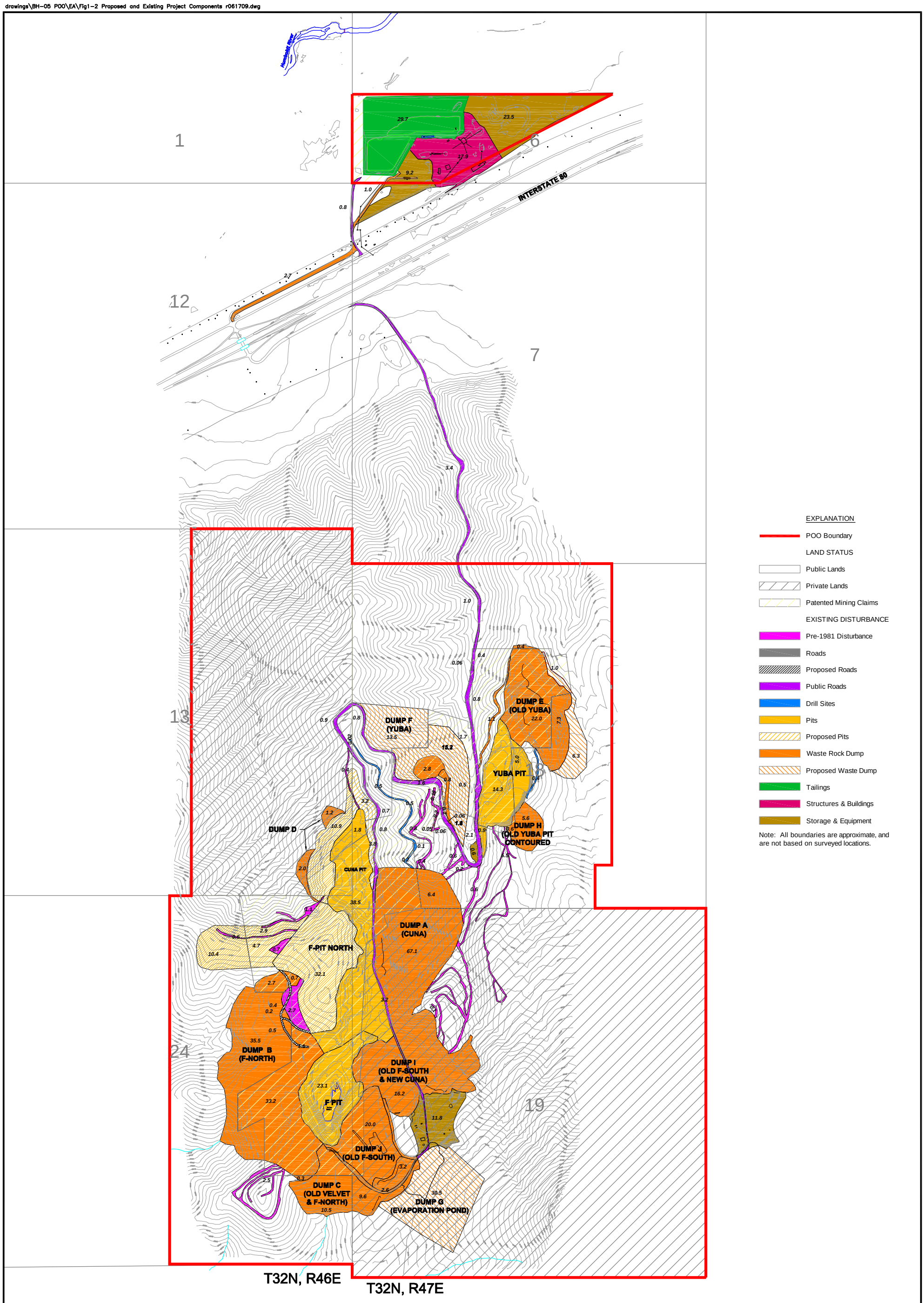
NATIONAL SYSTEM OF PUBLIC LANDS

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN
CP	CP	1:4,000,000	11/14/08

DATE REVISED

drawings\BH-05 Argenta POO\EA\Fig1 Location Map

drawings\BH-05 POO\EA\Fig1-2 Proposed and Existing Project Components r061709.dwg



Topography obtained from 2005 fly-over conducted by Horizons, Inc.

BAKER HUGHES DRILLING FLUIDS

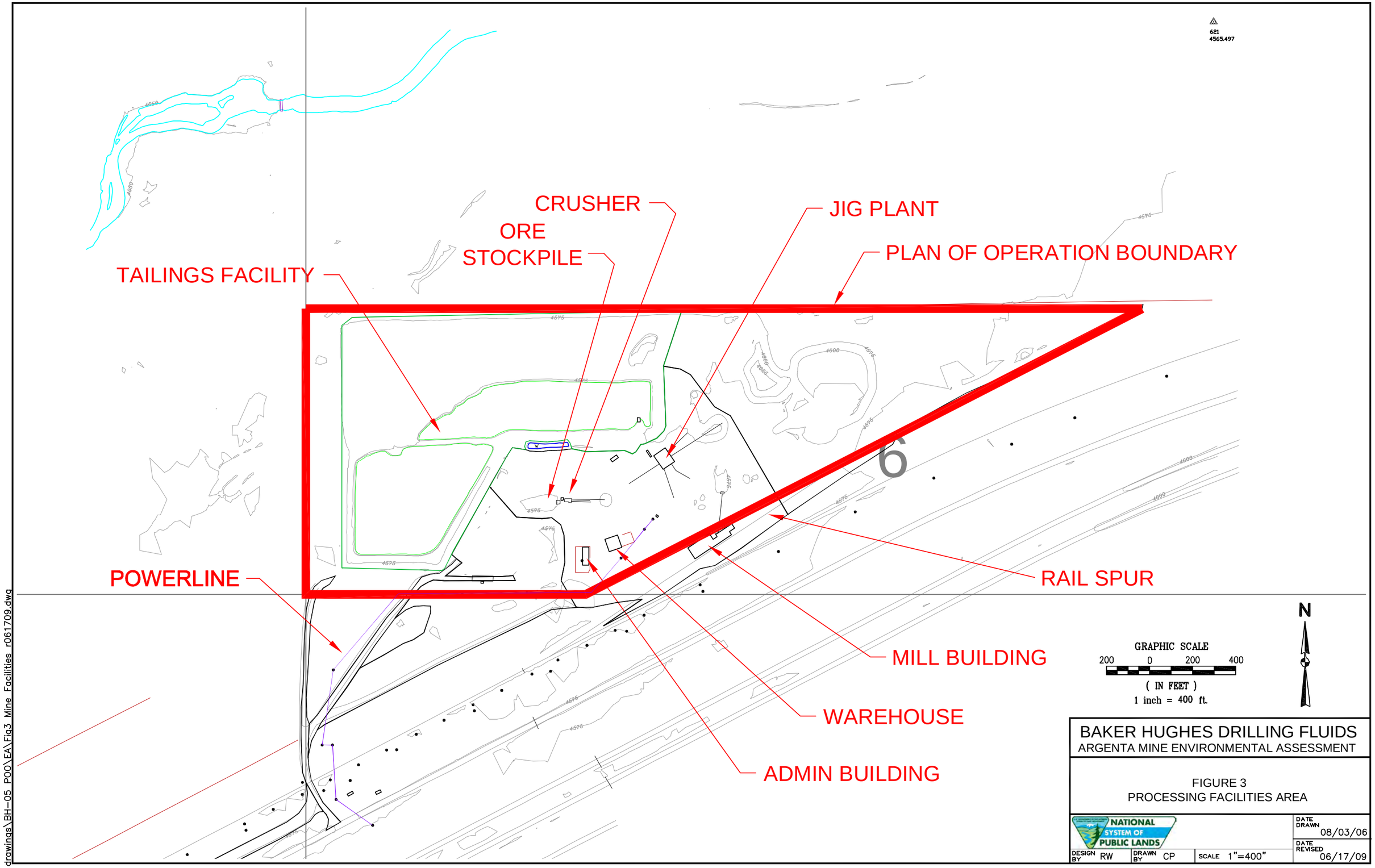
ARGENTA MINE ENVIRONMENTAL ASSESSMENT

FIGURE 2

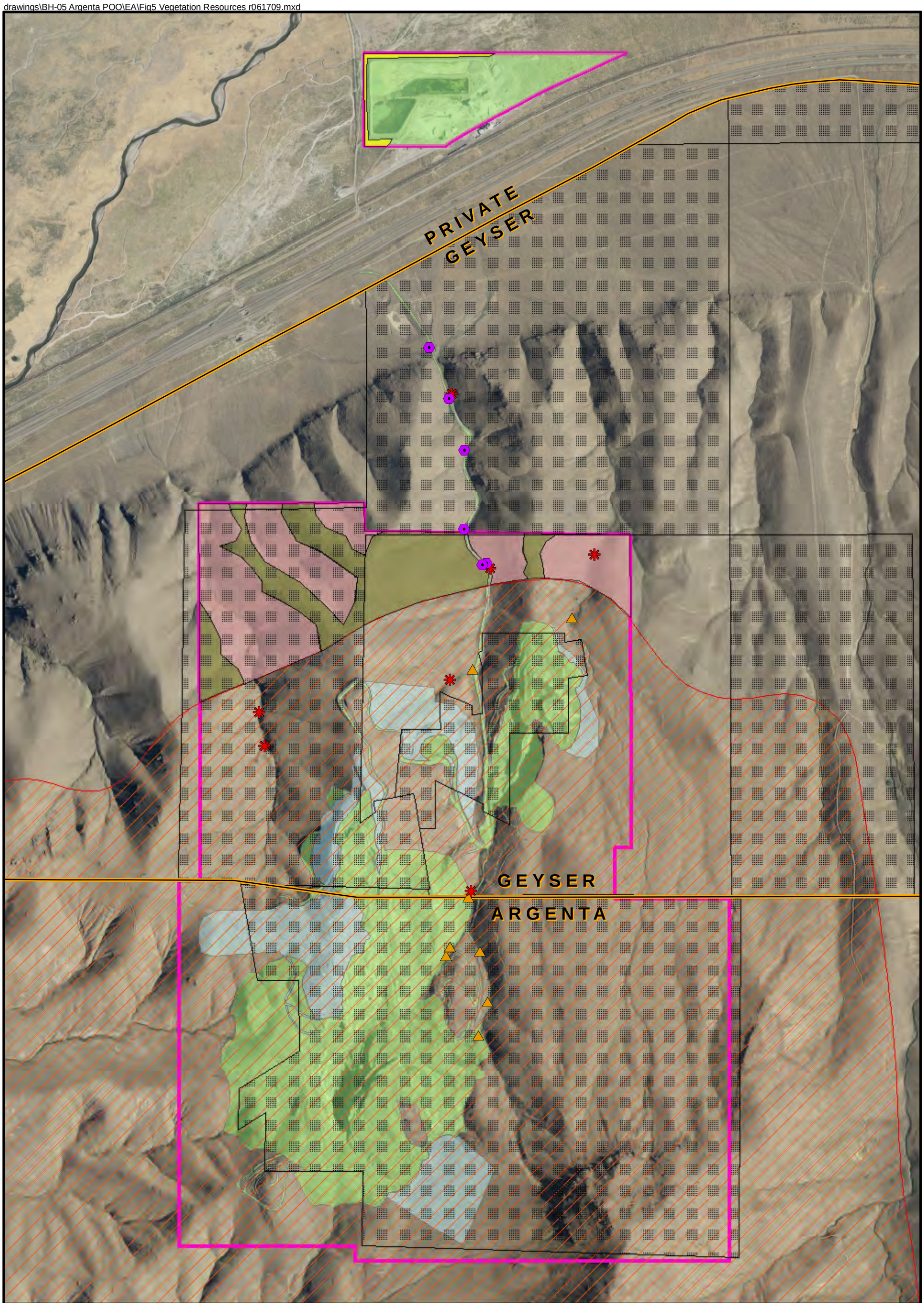
PROPOSED AND EXISTING PROJECT COMPONENTS

NATIONAL SYSTEM OF PUBLIC LANDS

DESIGN BY	DRAWN BY	CH'D BY	SCALE	DATE DRAWN	LAST REVISION DATE:
KM	CP		1:16,000	01/27/06	06/17/09


621
4565.497
CRUSHER
ORE
STOCKPILE
JIG PLANT
PLAN OF OPERATION BOUNDARY
TAILINGS FACILITY
POWERLINE
RAIL SPUR
MILL BUILDING
WAREHOUSE
ADMIN BUILDING
N
GRAPHIC SCALE
200 0 200 400
(IN FEET)
1 inch = 400 ft.
BAKER HUGHES DRILLING FLUIDS
ARGENTA MINE ENVIRONMENTAL ASSESSMENT
FIGURE 3
PROCESSING FACILITIES AREA
NATIONAL SYSTEM OF PUBLIC LANDS
DATE DRAWN 08/03/06
DATE REVISED 06/17/09
DESIGN BY RW
DRAWN BY CP
SCALE 1"=400"
drawings\BH-05 POO\EA\Fig3 Mine Facilities r061709.dwg

drawings\BH-05 Argenta POO\EA\Fig5 Vegetation Resources r061709.mxd



Aerial NAIP 2006

Legend

- Argenta Mine POO Boundary
- Proposed Disturbance
- Existing Permitted Disturbance
- Allotment Boundary
- Private Property within Allotments
- 1999 Mule Fire (Reclaimed and Unreclaimed Disturbances)

Vegetation

- Big Sagebrush
- Low Sagebrush
- Desert Scrub

Noxious Weeds

- CanadaThistle
- Scotch Thistle
- Tamarisk

N

2,000 0 2,000 Feet

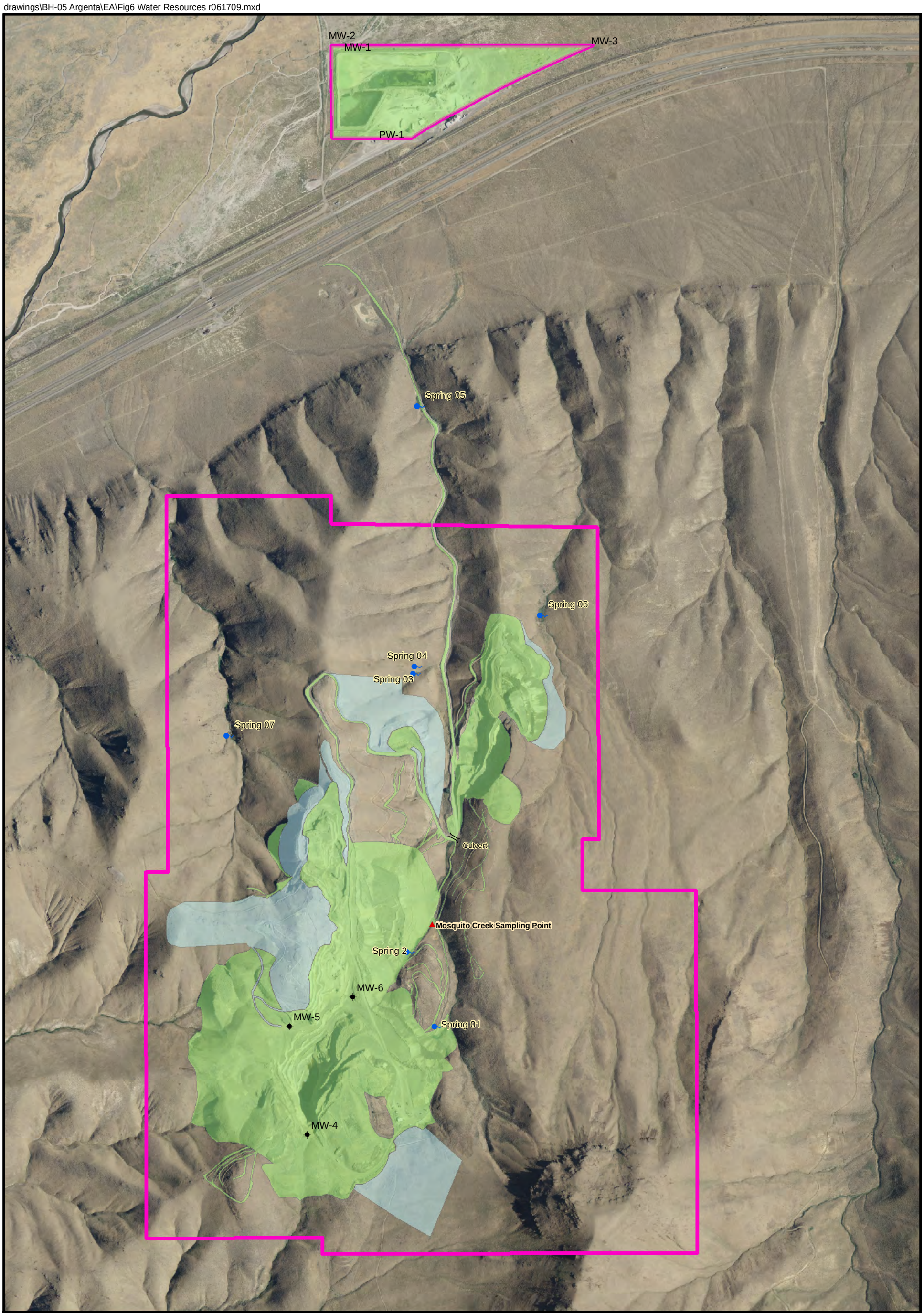
BAKER HUGHES DRILLING FLUIDS
ARGENTA MINE ENVIRONMENTAL ASSESSMENT

FIGURE 4
VEGETATION RESOURCES

NATIONAL SYSTEM OF PUBLIC LANDS

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	LAST REVISION DATE
KM	CP	1:16,000	12/11/08	06/17/09

drawings\BH-05 Argenta\EA\Fig6 Water Resources r061709.mxd



Aerial NAIP 2006

Legend

- Argenta Mine POO Boundary
- Proposed Disturbance
- Existing Permitted Disturbance
- Spring
- Monitoring Well
- Mosquito Creek Sampling Point

2,000 0 2,000 Feet

N

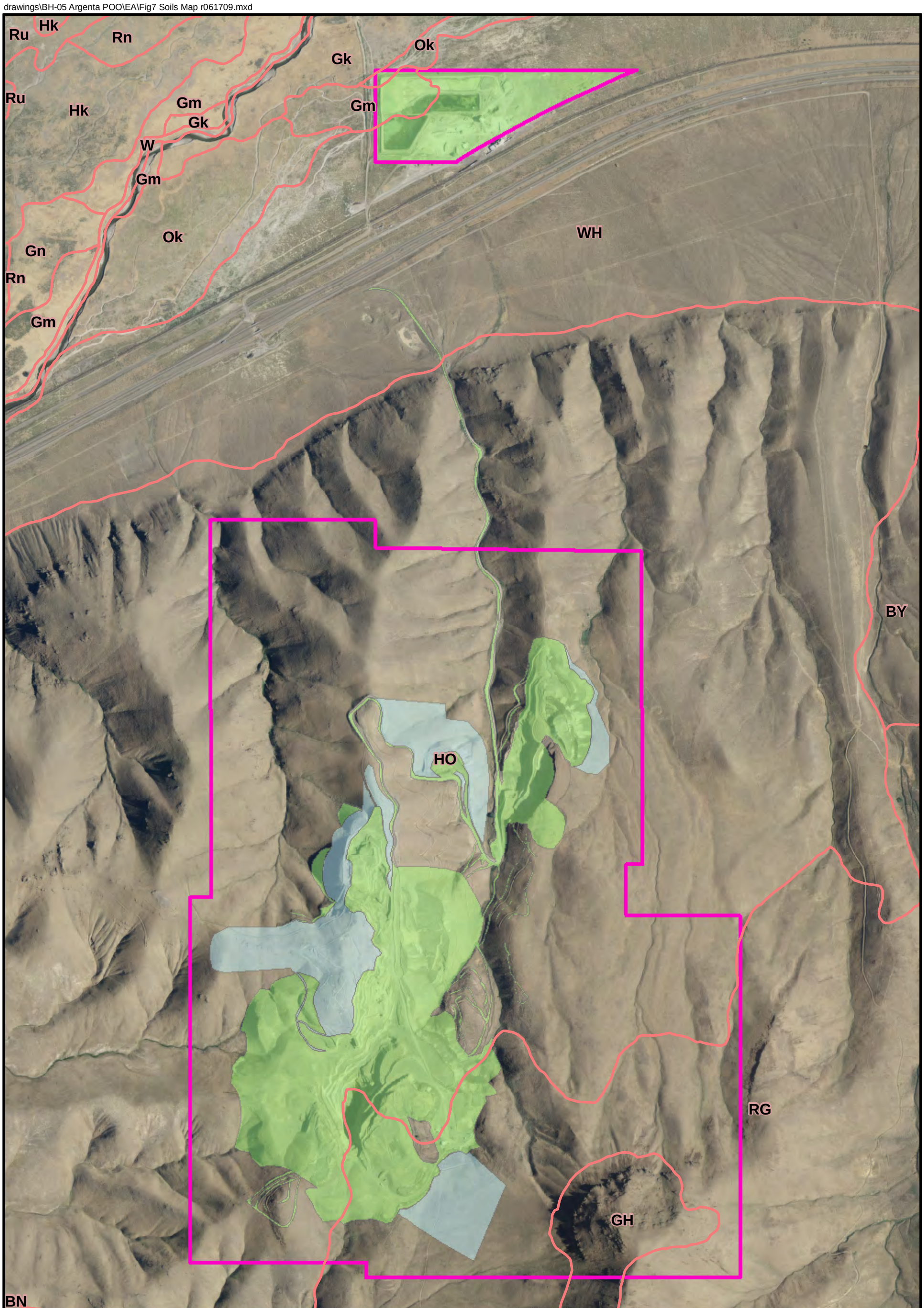
BAKER HUGHES DRILLING FLUIDS
ARGENTA MINE ENVIRONMENTAL ASSESSMENT

FIGURE 5
WATER RESOURCES

NATIONAL SYSTEM OF PUBLIC LANDS

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	LAST REVISION DATE
KM	CP	1:16,000	12/12/08	06/17/09

drawings\BH-05 Argenta POO\EA\Fig7 Soils Map r061709.mxd



Aerial NAIP 2006

Legend

- Argenta Mine POO Boundary
- Proposed Disturbance
- Existing Permitted Disturbance
- Soil Map Unit Boundary

Soil Map Units

BN - Boulflat-Humdun association
BY - Bucan-Humdun-Brock association
GH - Glean-Rock outcrop-Rubble land association
Gk - Griver loam
Gm - Griver loam, drained
Gn - Griver silt loam, clay substratum
HO - Humdun-Bucan association
Hk - Humboldt silty clay, slightly saline
Ok - Ocala silty clay loam, slightly saline
RG - Ramires-Chen-Pie Creek association
Rn - Rixie silty clay loam, drained, slightly saline
Ru - Rosney silt loam
W - Water
WH - Whirlo-Tenabo association

N

2,000 0 2,000 Feet

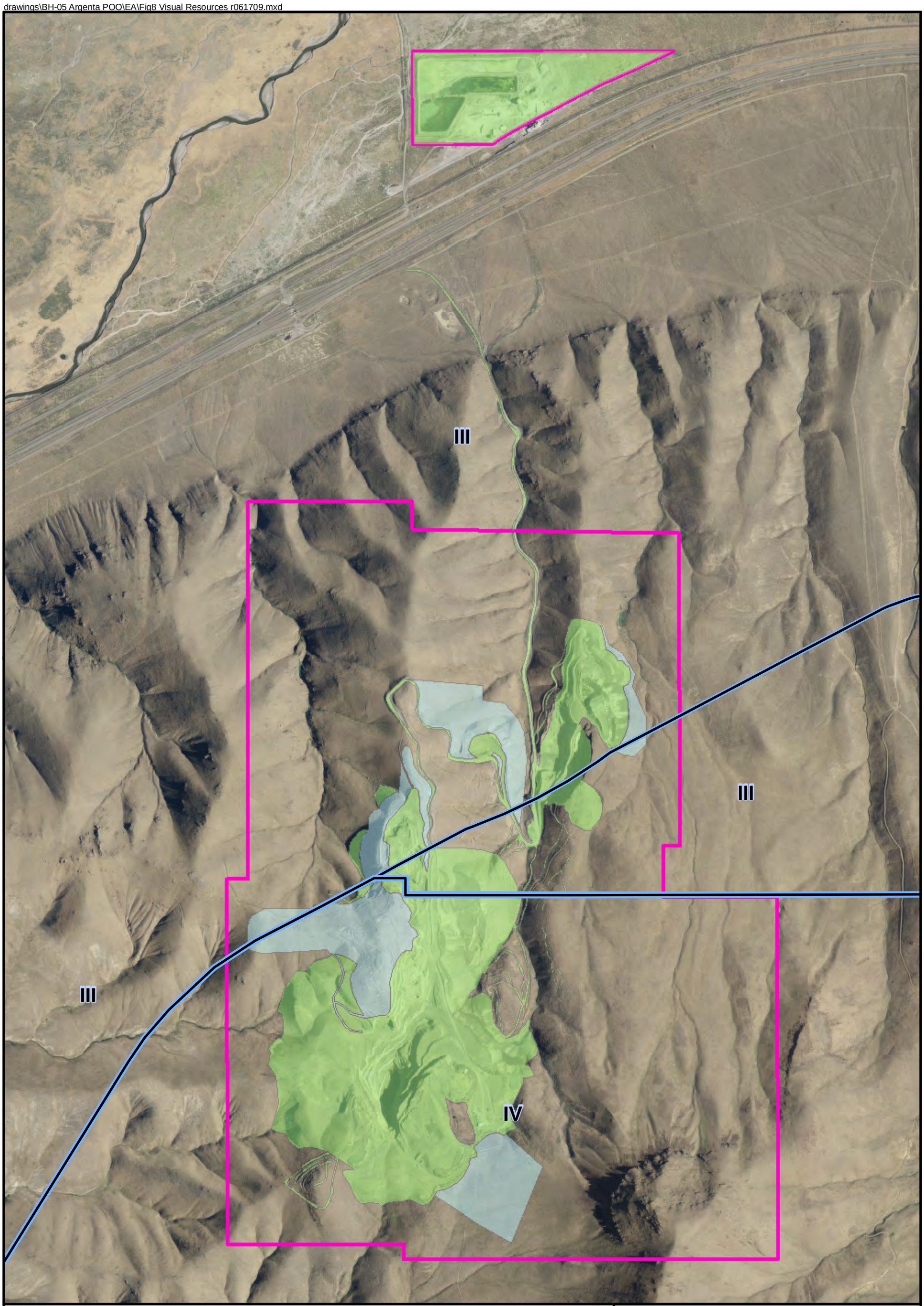
BAKER HUGHES DRILLING FLUIDS
ARGENTA MINE ENVIRONMENTAL ASSESSMENT

FIGURE 6
SOILS

NATIONAL SYSTEM OF PUBLIC LANDS

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	LAST REVISION DATE
KM	CP	1:16,000	12/11/08	06/17/09

drawings\BH-05 Argenta POO\EA\Fig8 Visual Resources r061709.mxd



Aerial NAIP 2006

Legend

- Argenta Mine POO Boundary
- Proposed Disturbance
- Existing Permitted Disturbance
- VRM Class Boundary

N

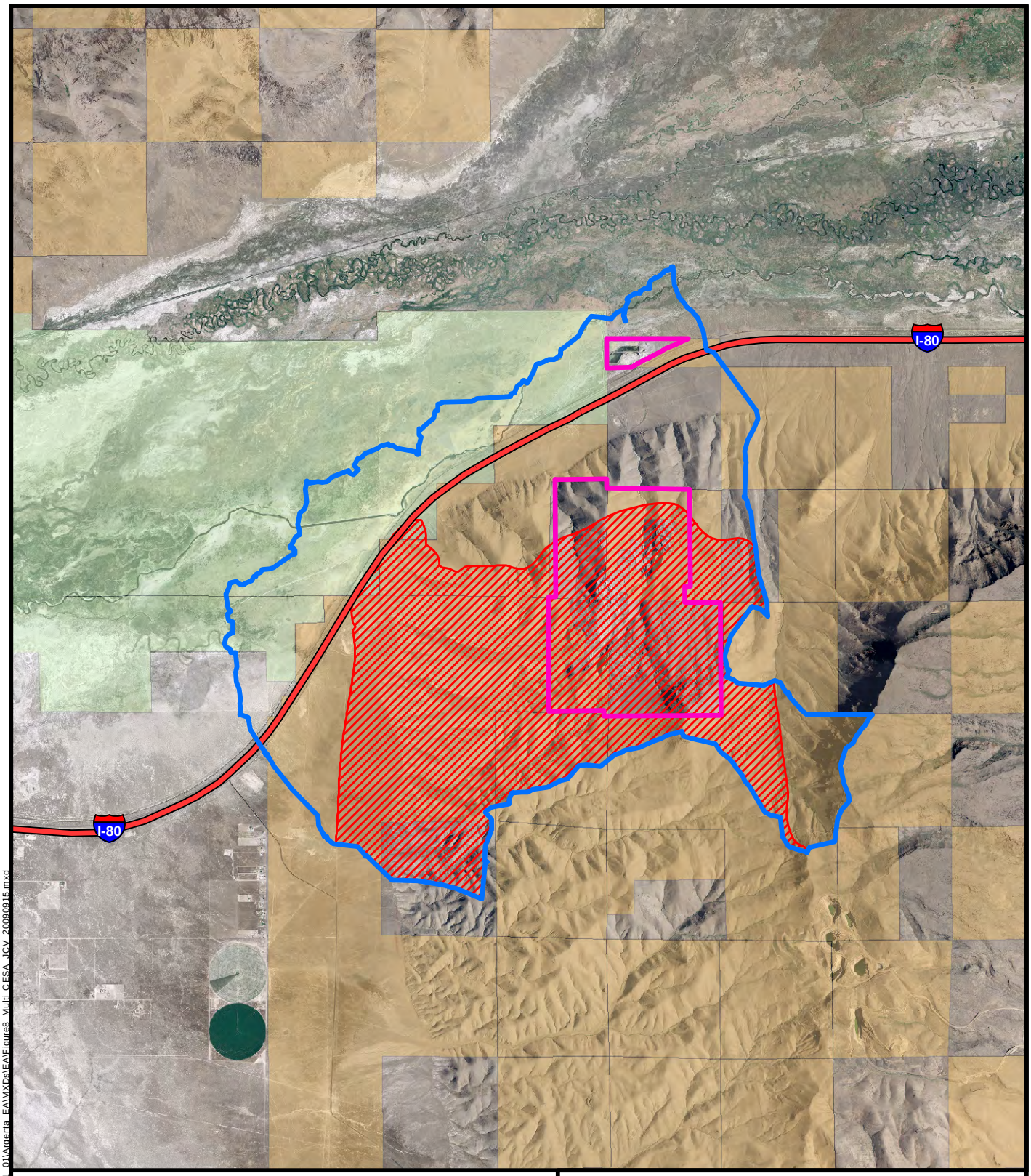
2,000 0 2,000 Feet

BAKER HUGHES DRILLING FLUIDS
ARGENTA MINE ENVIRONMENTAL ASSESSMENT

FIGURE 7
VISUAL RESOURCES

NATIONAL SYSTEM OF PUBLIC LANDS

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN
KM	CP	1:16,000	12/11/08
			LAST REVISION DATE 06/17/09



Legend

- Argenta Mine POO Boundary
- Air, Water, Soils, Vegetation, Noxious and Invasive Non-native Weed Species, and Visual Resources CESA
- Wildfire Disturbance within CESA

Land Ownership

- Bureau of Land Management
- Bureau of Reclamation
- Private

N

1 0 1 Miles

BAKER HUGHES DRILLING FLUIDS
ARGENTA MINE ENVIRONMENTAL ASSESSMENT

FIGURE 8
AIR, WATER, WETLAND/RIPARIAN, SOILS, VEGETATION, NOXIOUS AND INVASIVE NON-NATIVE WEED SPECIES AND VISUAL RESOURCES CUMULATIVE EFFECTS STUDY AREA

NATIONAL SYSTEM OF PUBLIC LANDS

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	LAST REVISION DATE
KM	JCV	1:78,000	12/12/08	02/10/10

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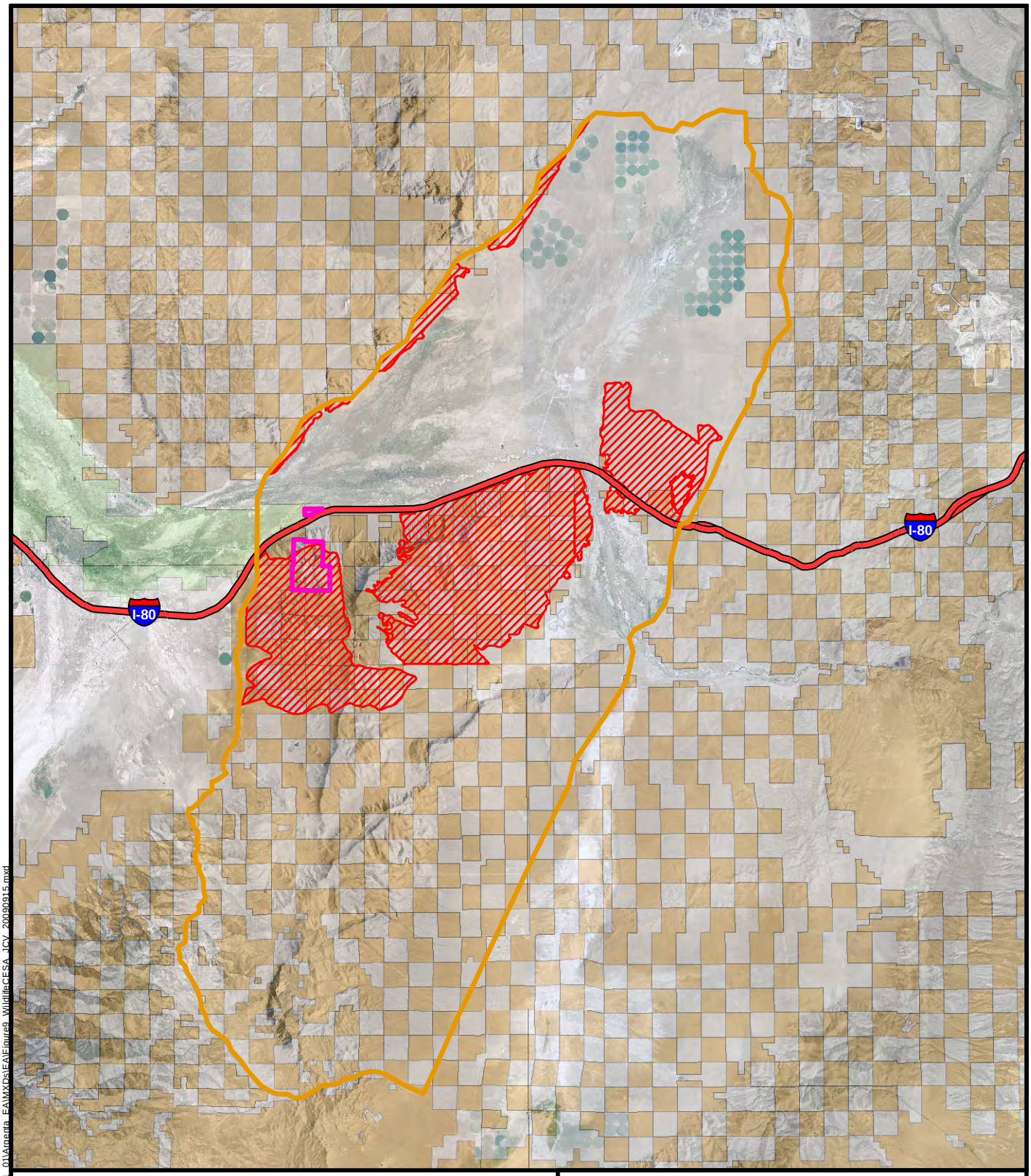

Legend

- Argenta Mine POO Boundary
- Wildlife CESA
- Wildfire Disturbance within CESA

Land Ownership

- Bureau of Land Management
- Bureau of Reclamation
- Private

N

0 10 Miles

BAKER HUGHES DRILLING FLUIDS
ARGENTA MINE ENVIRONMENTAL ASSESSMENT

FIGURE 9
WILDLIFE CUMULATIVE
EFFECTS STUDY AREA

NATIONAL SYSTEM OF PUBLIC LANDS

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	LAST REVISION DATE
KM	JCV	1:360,000	12/12/08	02/10/10

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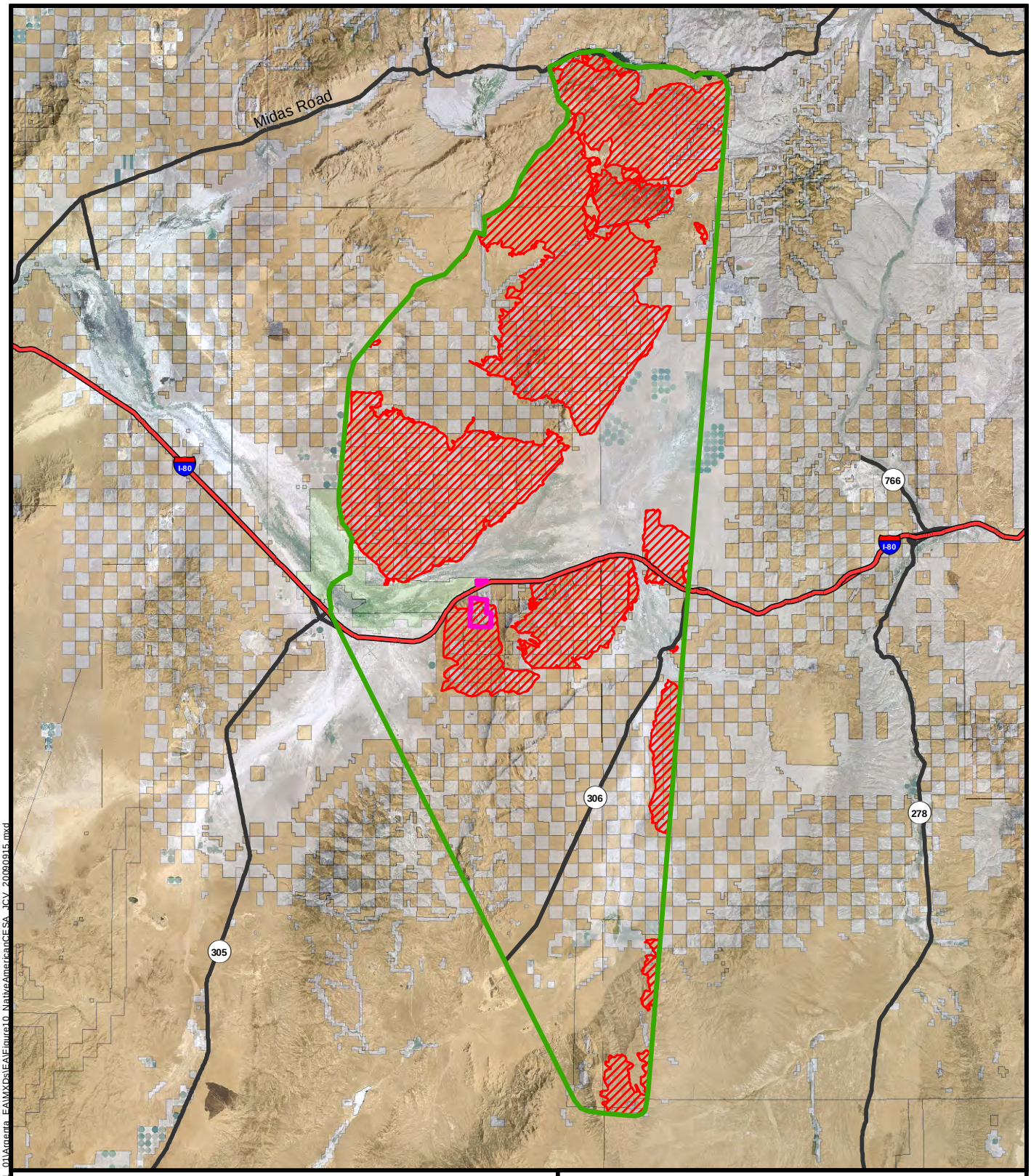


Legend

- Argenta Mine POO Boundary
- Native American Traditional Values CESA
- Wildfire Disturbance within CESA

Land Ownership

- Bureau of Land Management
- Bureau of Reclamation
- Private

N

0 10 Miles

BAKER HUGHES DRILLING FLUIDS

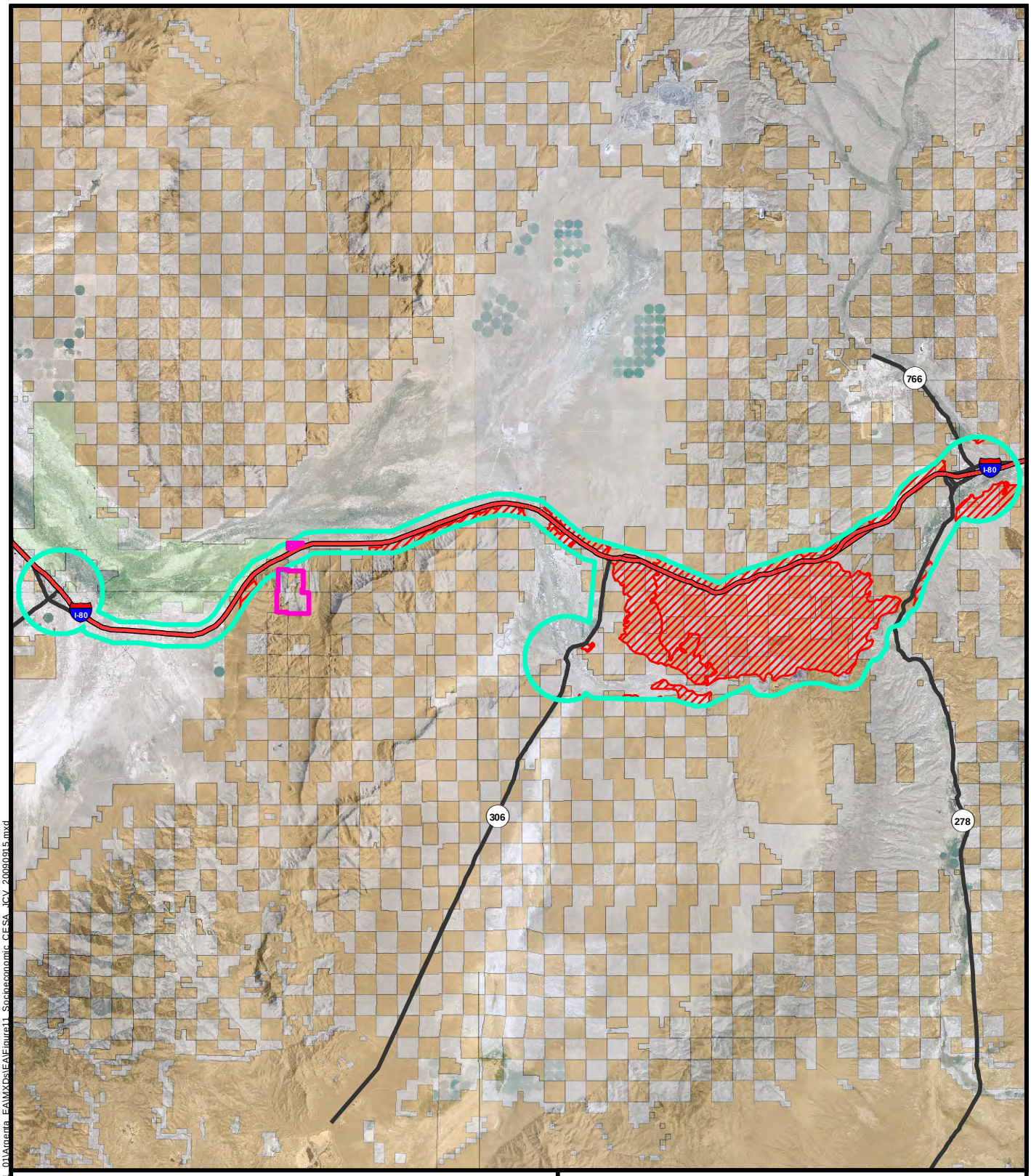
ARGENTA MINE ENVIRONMENTAL ASSESSMENT

FIGURE 10
NATIVE AMERICAN TRADITIONAL VALUES
CUMULATIVE EFFECTS STUDY AREA

NATIONAL SYSTEM OF PUBLIC LANDS

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	LAST REVISION DATE
KM	JCV	1:640,000	12/12/08	02/10/10

P:\FHG\GIS\Project_Files\Baker_Hughes\06_00171_01\Argenta_EA\MXDs\EA\Figure10_NativeAmericanCESA_JCV_20090915.mxd



Legend

- Argenta Mine POO Boundary
- Socioeconomic CESA
- Wildfire Disturbance within CESA

Land Ownership

- Bureau of Land Management
- Bureau of Reclamation
- Private

N

0 10 Miles

BAKER HUGHES DRILLING FLUIDS

ARGENTA MINE ENVIRONMENTAL ASSESSMENT

FIGURE 11
SOCIOECONOMIC VALUES CUMULATIVE
EFFECTS STUDY AREA

NATIONAL SYSTEM OF PUBLIC LANDS

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	LAST REVISION DATE
KM	JCV	1:420,000	12/12/08	02/10/10

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APPENDIX A

Waste Rock Characterization Data

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
LAKE BED-LB-1	W9C0103-01	Soil	03-Mar-09 10:00	06-Mar-2009
BASALT-B-1	W9C0103-02	Soil	03-Mar-09 10:10	06-Mar-2009
ALLUVIUM-A-1	W9C0103-03	Soil	03-Mar-09 10:15	06-Mar-2009
SLAVEN-S-1	W9C0103-04	Soil	03-Mar-09 10:25	06-Mar-2009
VALMY-V-1	W9C0103-05	Soil	03-Mar-09 10:30	06-Mar-2009

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.
Sample preparation is defined by the client as per their Data Quality Objectives.
This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.
The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Client Sample ID: **LAKE BED-LB-1**
SVL Sample ID: **W9C0103-01 (Soil)**

Sampled: 03-Mar-09 10:00
Received: 06-Mar-09
Sampled By:

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Acid/Base Accounting & Sulfur Forms										
Modified Sobek	**ABA**	972.0	TCaCO3/kT	0.3			N/A	BJF	03/17/09 18:34	
Modified Sobek	AGP	< 0.3	TCaCO3/kT	0.3			N/A	BJF	03/16/09 18:54	
Modified Sobek	**ANP**	972	TCaCO3/kT	0.3	0.01		W912037	BJF	03/17/09 18:34	
Modified Sobek	Non-extractable Sulfur	< 0.01	%	0.01			W912037	BJF	03/16/09 18:54	
Modified Sobek	Pyritic Sulfur	< 0.01	%	0.01			N/A	BJF	03/16/09 18:54	
Modified Sobek	Sulfate Sulfur	< 0.01	%	0.01			N/A	BJF	03/16/09 18:54	
Modified Sobek	Total Sulfur	< 0.01	%	0.01			W912037	BJF	03/16/09 18:54	
Meteoric Water Mobility Extraction Parameters										
ASTM E2242-02	Extraction Fluid pH	0.00	pH Units				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Extraction Time**	23.5	Hrs				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	Extraction Type	Column					W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Feed Moisture**	1.57	%				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Final Fluid pH**	8.51	pH Units				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Retained Moisture**	12.3	%				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Sample Weight**	5080	g				W912034	ESB	03/20/09 15:00	
Meteoric Water Mobility Leachates (Metals by 200 Series)										
EPA 200.7	Aluminum	< 0.080	mg/L Extract	0.080	0.014		W912251	DG	03/23/09 09:42	
EPA 200.7	**Barium**	0.0751	mg/L Extract	0.0020	0.0005		W912251	DG	03/23/09 09:44	
EPA 200.7	Beryllium	< 0.0020	mg/L Extract	0.0020	0.0004		W912251	DG	03/23/09 09:42	
EPA 200.7	**Boron**	0.982	mg/L Extract	0.040	0.009		W912251	DG	03/23/09 09:42	
EPA 200.7	Cadmium	< 0.0020	mg/L Extract	0.0020	0.0010		W912251	DG	03/23/09 09:44	
EPA 200.7	**Calcium**	11.7	mg/L Extract	0.040	0.018		W912251	DG	03/23/09 09:42	
EPA 200.7	Chromium	< 0.0060	mg/L Extract	0.0060	0.0010		W912251	DG	03/23/09 09:43	
EPA 200.7	Copper	< 0.010	mg/L Extract	0.010	0.004		W912251	DG	03/23/09 09:43	
EPA 200.7	Iron	< 0.060	mg/L Extract	0.060	0.020		W912251	DG	03/23/09 09:42	
EPA 200.7	**Magnesium**	15.1	mg/L Extract	0.060	0.015		W912251	DG	03/23/09 09:42	
EPA 200.7	Manganese	< 0.0040	mg/L Extract	0.0040	0.0013		W912251	DG	03/23/09 09:42	
EPA 200.7	Nickel	< 0.010	mg/L Extract	0.010	0.002		W912251	DG	03/23/09 09:44	
EPA 200.7	**Potassium**	3.60	mg/L Extract	0.50	0.07		W912251	DG	03/23/09 09:42	
EPA 200.7	Silver	< 0.0050	mg/L Extract	0.0050	0.0004		W912251	DG	03/23/09 09:43	
EPA 200.7	**Sodium**	117	mg/L Extract	0.50	0.04		W912251	DG	03/23/09 09:42	
EPA 200.7	Zinc	< 0.0100	mg/L Extract	0.0100	0.0019		W912251	DG	03/23/09 09:44	
EPA 200.8	Antimony	< 0.00300	mg/L Extract	0.00300	0.000220		W912220	KWH	03/24/09 09:13	
EPA 200.8	**Arsenic**	0.0388	mg/L Extract	0.00300	0.00050		W912220	KWH	03/24/09 09:13	
EPA 200.8	Lead	< 0.00300	mg/L Extract	0.00300	0.000053		W912220	KWH	03/24/09 09:13	
EPA 200.8	**Selenium**	0.00322	mg/L Extract	0.00300	0.00024		W912220	KWH	03/24/09 09:13	
EPA 200.8	Thallium	< 0.00100	mg/L Extract	0.00100	0.000023		W912220	KWH	03/24/09 09:13	
EPA 245.1	Mercury	< 0.00020	mg/L Extract	0.00020	0.00006		W912222	HB	03/20/09 09:01	
Meteoric Water Mobility Leachates (Classical)										
EPA 353.2	**Nitrate/Nitrite as N**	4.45	mg/L Extract	0.200	0.0120	10	W912228	DKG	03/20/09 11:41	D1
OIA 1677	Cyanide (WAD)	< 0.0100	mg/L Extract	0.0100	0.0007		W912242	JMJ	03/20/09 10:37	
SM 2320B	**Bicarbonate**	93.2	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:41	
SM 2320B	**Carbonate**	3.6	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:41	
SM 2320B	**Total Alkalinity**	96.8	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:41	
SM 2540C	**Total Diss. Solids**	420	mg/L Extract	10	4.3		W912225	JMS	03/19/09 16:02	
SM 4500 H B	**pH**	8.44 @22.0°C	pH Units				W912221	DKS	03/20/09 08:41	

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Client Sample ID: **LAKE BED-LB-1**
SVL Sample ID: **W9C0103-01 (Soil)**

Sampled: 03-Mar-09 10:00
Received: 06-Mar-09
Sampled By:

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Meteoric Water Mobility Leachates (Anions)										
EPA 300.0	**Chloride**	107	mg/L Extract	2.00	0.500	10	W913033	EML	03/23/09 14:34	D2
EPA 300.0	**Fluoride**	1.17	mg/L Extract	0.100	0.023		W913033	EML	03/23/09 14:21	
EPA 300.0	**Sulfate as SO4**	83.0	mg/L Extract	3.00	0.36	10	W913033	EML	03/23/09 14:34	D2

Cation/Anion Balance and TDS Ratios

Cation Sum: 7.01 meq/L Anion Sum: 7.08 meq/L C/A Balance: -0.51 % Calculated TDS: 416 TDS/cTDS: 1.01

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Client Sample ID: **BASALT-B-1**
SVL Sample ID: **W9C0103-02 (Soil)**

Sampled: 03-Mar-09 10:10
Received: 06-Mar-09
Sampled By:

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Acid/Base Accounting & Sulfur Forms										
Modified Sobek	**ABA**	151.0	TCaCO3/kT	0.3			N/A	BJF	03/17/09 19:09	
Modified Sobek	**AGP**	5.8	TCaCO3/kT	0.3			N/A	BJF	03/17/09 19:09	
Modified Sobek	**ANP**	157	TCaCO3/kT	0.3	0.01		W912037	BJF	03/17/09 18:34	
Modified Sobek	Non-extractable Sulfur	< 0.01	%	0.01			W912037	BJF	03/17/09 19:09	
Modified Sobek	**Pyritic Sulfur**	0.18	%	0.01			N/A	BJF	03/17/09 19:09	
Modified Sobek	**Sulfate Sulfur**	0.11	%	0.01			N/A	BJF	03/17/09 18:33	
Modified Sobek	**Total Sulfur**	0.29	%	0.01			W912037	BJF	03/16/09 18:59	
Meteoric Water Mobility Extraction Parameters										
ASTM E2242-02	Extraction Fluid pH	0.00	pH Units				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Extraction Time**	21.0	Hrs				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	Extraction Type	Column					W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Feed Moisture**	3.68	%				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Final Fluid pH**	7.83	pH Units				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Retained Moisture**	5.67	%				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Sample Weight**	5190	g				W912034	ESB	03/20/09 15:00	
Meteoric Water Mobility Leachates (Metals by 200 Series)										
EPA 200.7	Aluminum	< 0.080	mg/L Extract	0.080	0.014		W912251	DG	03/23/09 09:48	
EPA 200.7	**Barium**	0.0297	mg/L Extract	0.0020	0.0005		W912251	DG	03/23/09 09:49	
EPA 200.7	Beryllium	< 0.0020	mg/L Extract	0.0020	0.0004		W912251	DG	03/23/09 09:48	
EPA 200.7	**Boron**	0.118	mg/L Extract	0.040	0.009		W912251	DG	03/23/09 09:48	
EPA 200.7	Cadmium	< 0.0020	mg/L Extract	0.0020	0.0010		W912251	DG	03/23/09 09:49	
EPA 200.7	**Calcium**	28.3	mg/L Extract	0.040	0.018		W912251	DG	03/23/09 09:47	
EPA 200.7	Chromium	< 0.0060	mg/L Extract	0.0060	0.0010		W912251	DG	03/23/09 09:49	
EPA 200.7	Copper	< 0.010	mg/L Extract	0.010	0.004		W912251	DG	03/23/09 09:49	
EPA 200.7	Iron	< 0.060	mg/L Extract	0.060	0.020		W912251	DG	03/23/09 09:48	
EPA 200.7	**Magnesium**	19.3	mg/L Extract	0.060	0.015		W912251	DG	03/23/09 09:47	
EPA 200.7	**Manganese**	0.0331	mg/L Extract	0.0040	0.0013		W912251	DG	03/23/09 09:48	
EPA 200.7	Nickel	< 0.010	mg/L Extract	0.010	0.002		W912251	DG	03/23/09 09:49	
EPA 200.7	**Potassium**	1.59	mg/L Extract	0.50	0.07		W912251	DG	03/23/09 09:47	
EPA 200.7	Silver	< 0.0050	mg/L Extract	0.0050	0.0004		W912251	DG	03/23/09 09:49	
EPA 200.7	**Sodium**	7.95	mg/L Extract	0.50	0.04		W912251	DG	03/23/09 09:47	
EPA 200.7	Zinc	< 0.0100	mg/L Extract	0.0100	0.0019		W912251	DG	03/23/09 09:49	
EPA 200.8	Antimony	< 0.00300	mg/L Extract	0.00300	0.000220		W912220	KWH	03/24/09 09:18	
EPA 200.8	Arsenic	< 0.00300	mg/L Extract	0.00300	0.00050		W912220	KWH	03/24/09 09:18	
EPA 200.8	Lead	< 0.00300	mg/L Extract	0.00300	0.000053		W912220	KWH	03/24/09 09:18	
EPA 200.8	Selenium	< 0.00300	mg/L Extract	0.00300	0.00024		W912220	KWH	03/24/09 09:18	
EPA 200.8	Thallium	< 0.00100	mg/L Extract	0.00100	0.000023		W912220	KWH	03/24/09 09:18	
EPA 245.1	Mercury	< 0.00020	mg/L Extract	0.00020	0.00006		W912222	HB	03/20/09 09:06	
Meteoric Water Mobility Leachates (Classical)										
EPA 353.2	**Nitrate/Nitrite as N**	0.859	mg/L Extract	0.200	0.0120	10	W912228	DKG	03/20/09 11:44	D1
OIA 1677	Cyanide (WAD)	< 0.0100	mg/L Extract	0.0100	0.0007		W912242	JMJ	03/20/09 10:47	
SM 2320B	**Bicarbonate**	30.8	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:46	
SM 2320B	Carbonate	< 1.0	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:46	
SM 2320B	**Total Alkalinity**	30.8	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:46	
SM 2540C	**Total Diss. Solids**	240	mg/L Extract	10	4.3		W912225	JMS	03/19/09 16:02	
SM 4500 H B	**pH**	7.34 @21.0°C	pH Units				W912221	DKS	03/20/09 08:46	

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Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Client Sample ID: **BASALT-B-1**
SVL Sample ID: **W9C0103-02 (Soil)**

Sample Report Page 2 of 2

Sampled: 03-Mar-09 10:10
Received: 06-Mar-09
Sampled By:

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Meteoric Water Mobility Leachates (Anions)										
EPA 300.0	**Chloride**	1.56	mg/L Extract	0.200	0.050		W913033	EML	03/23/09 14:47	
EPA 300.0	**Fluoride**	0.267	mg/L Extract	0.100	0.023		W913033	EML	03/23/09 14:47	
EPA 300.0	**Sulfate as SO4**	133	mg/L Extract	1.50	0.18	5	W913033	EML	03/23/09 15:00	D2

Cation/Anion Balance and TDS Ratios

Cation Sum: 3.39 meq/L Anion Sum: 3.51 meq/L C/A Balance: -1.67 % Calculated TDS: 214 TDS/cTDS: 1.12

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Client Sample ID: **ALLUVIUM-A-1**
SVL Sample ID: **W9C0103-03 (Soil)**

Sampled: 03-Mar-09 10:15
Received: 06-Mar-09
Sampled By:

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Acid/Base Accounting & Sulfur Forms										
Modified Sobek	**ABA**	31.5	TCaCO3/kT	0.3			N/A	BJF	03/17/09 18:34	
Modified Sobek	AGP	< 0.3	TCaCO3/kT	0.3			N/A	BJF	03/16/09 19:07	
Modified Sobek	**ANP**	31.5	TCaCO3/kT	0.3	0.01		W912037	BJF	03/17/09 18:34	
Modified Sobek	Non-extractable Sulfur	< 0.01	%	0.01			W912037	BJF	03/16/09 19:07	
Modified Sobek	Pyritic Sulfur	< 0.01	%	0.01			N/A	BJF	03/16/09 19:07	
Modified Sobek	Sulfate Sulfur	< 0.01	%	0.01			N/A	BJF	03/16/09 19:07	
Modified Sobek	Total Sulfur	< 0.01	%	0.01			W912037	BJF	03/16/09 19:07	
Meteoric Water Mobility Extraction Parameters										
ASTM E2242-02	**Extraction Fluid pH**	7.68	pH Units				W912033	ESB	03/19/09 14:00	
ASTM E2242-02	**Extraction Time**	24.0	Hrs				W912033	ESB	03/19/09 14:00	
ASTM E2242-02	Extraction Type	Rotation					W912033	ESB	03/19/09 14:00	
ASTM E2242-02	**Feed Moisture**	22.7	%				W912033	ESB	03/19/09 14:00	
ASTM E2242-02	**Final Fluid pH**	7.68	pH Units				W912033	ESB	03/19/09 14:00	
ASTM E2242-02	Retained Moisture	0.00	%				W912033	ESB	03/19/09 14:00	
ASTM E2242-02	**Sample Weight**	5000	g				W912033	ESB	03/19/09 14:00	
Meteoric Water Mobility Leachates (Metals by 200 Series)										
EPA 200.7	**Aluminum**	0.745	mg/L Extract	0.080	0.014		W912251	DG	03/23/09 09:53	
EPA 200.7	**Barium**	0.100	mg/L Extract	0.0020	0.0005		W912251	DG	03/23/09 09:55	
EPA 200.7	Beryllium	< 0.0020	mg/L Extract	0.0020	0.0004		W912251	DG	03/23/09 09:53	
EPA 200.7	**Boron**	0.104	mg/L Extract	0.040	0.009		W912251	DG	03/23/09 09:53	
EPA 200.7	Cadmium	< 0.0020	mg/L Extract	0.0020	0.0010		W912251	DG	03/23/09 09:55	
EPA 200.7	**Calcium**	22.9	mg/L Extract	0.040	0.018		W912251	DG	03/23/09 09:53	
EPA 200.7	Chromium	< 0.0060	mg/L Extract	0.0060	0.0010		W912251	DG	03/23/09 09:54	
EPA 200.7	Copper	< 0.010	mg/L Extract	0.010	0.004		W912251	DG	03/23/09 09:54	
EPA 200.7	**Iron**	1.41	mg/L Extract	0.060	0.020		W912251	DG	03/23/09 09:53	
EPA 200.7	**Magnesium**	5.83	mg/L Extract	0.060	0.015		W912251	DG	03/23/09 09:53	
EPA 200.7	**Manganese**	0.108	mg/L Extract	0.0040	0.0013		W912251	DG	03/23/09 09:53	
EPA 200.7	Nickel	< 0.010	mg/L Extract	0.010	0.002		W912251	DG	03/23/09 09:55	
EPA 200.7	**Potassium**	1.49	mg/L Extract	0.50	0.07		W912251	DG	03/23/09 09:53	
EPA 200.7	Silver	< 0.0050	mg/L Extract	0.0050	0.0004		W912251	DG	03/23/09 09:54	
EPA 200.7	**Sodium**	11.4	mg/L Extract	0.50	0.04		W912251	DG	03/23/09 09:53	
EPA 200.7	**Zinc**	0.0168	mg/L Extract	0.0100	0.0019		W912251	DG	03/23/09 09:55	
EPA 200.8	Antimony	< 0.00300	mg/L Extract	0.00300	0.000220		W912220	KWH	03/24/09 09:19	
EPA 200.8	Arsenic	< 0.00300	mg/L Extract	0.00300	0.00050		W912220	KWH	03/24/09 09:19	
EPA 200.8	Lead	< 0.00300	mg/L Extract	0.00300	0.000053		W912220	KWH	03/24/09 09:19	
EPA 200.8	Selenium	< 0.00300	mg/L Extract	0.00300	0.00024		W912220	KWH	03/24/09 09:19	
EPA 200.8	Thallium	< 0.00100	mg/L Extract	0.00100	0.000023		W912220	KWH	03/24/09 09:19	
EPA 245.1	**Mercury**	0.00133	mg/L Extract	0.00020	0.00006		W912222	HB	03/20/09 09:08	
Meteoric Water Mobility Leachates (Classical)										
EPA 353.2	**Nitrate/Nitrite as N**	3.90	mg/L Extract	0.200	0.0120	10	W912228	DKG	03/20/09 11:45	D1
OIA 1677	Cyanide (WAD)	< 0.0100	mg/L Extract	0.0100	0.0007		W912242	JMJ	03/20/09 10:49	
SM 2320B	**Bicarbonate**	65.6	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:50	
SM 2320B	Carbonate	< 1.0	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:50	
SM 2320B	**Total Alkalinity**	65.6	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:50	
SM 2540C	**Total Diss. Solids**	230	mg/L Extract	10	4.3		W912225	JMS	03/19/09 16:02	
SM 4500 H B	**pH**	7.65 @22.0°C	pH Units				W912221	DKS	03/20/09 08:50	

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Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Client Sample ID: **ALLUVIUM-A-1**
SVL Sample ID: **W9C0103-03 (Soil)**

Sample Report Page 2 of 2

Sampled: 03-Mar-09 10:15
Received: 06-Mar-09
Sampled By:

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Meteoric Water Mobility Leachates (Anions)										
EPA 300.0	**Chloride**	2.26	mg/L Extract	0.200	0.050		W913033	EML	03/23/09 15:13	
EPA 300.0	**Fluoride**	0.342	mg/L Extract	0.100	0.023		W913033	EML	03/23/09 15:13	
EPA 300.0	**Sulfate as SO4**	18.5	mg/L Extract	0.30	0.04		W913033	EML	03/23/09 15:13	

Cation/Anion Balance and TDS Ratios

Cation Sum: 2.30 meq/L Anion Sum: 2.06 meq/L C/A Balance: 5.45 % Calculated TDS: 119 TDS/cTDS: 1.93

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Client Sample ID: **SLAVEN-S-1**
SVL Sample ID: **W9C0103-04 (Soil)**

Sampled: 03-Mar-09 10:25
Received: 06-Mar-09
Sampled By:

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Acid/Base Accounting & Sulfur Forms										
Modified Sobek	**ABA**	-24.7	TCaCO3/kT	0.3			N/A	BJF	03/17/09 19:16	
Modified Sobek	**AGP**	24.7	TCaCO3/kT	0.3			N/A	BJF	03/17/09 19:16	
Modified Sobek	ANP	< 0.3	TCaCO3/kT	0.3	0.01		W912037	BJF	03/17/09 18:34	
Modified Sobek	**Non-extractable Sulfur**	3.72	%	0.01			W912037	BJF	03/17/09 19:16	
Modified Sobek	**Pyritic Sulfur**	0.79	%	0.01			N/A	BJF	03/17/09 19:16	
Modified Sobek	**Sulfate Sulfur**	0.28	%	0.01			N/A	BJF	03/17/09 18:40	
Modified Sobek	**Total Sulfur**	4.79	%	0.01			W912037	BJF	03/16/09 19:14	
Meteoric Water Mobility Extraction Parameters										
ASTM E2242-02	Extraction Fluid pH	0.00	pH Units				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Extraction Time**	21.0	Hrs				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	Extraction Type	Column					W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Feed Moisture**	0.380	%				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Final Fluid pH**	7.60	pH Units				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Retained Moisture**	3.99	%				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Sample Weight**	5020	g				W912034	ESB	03/20/09 15:00	
Meteoric Water Mobility Leachates (Metals by 200 Series)										
EPA 200.7	**Aluminum**	0.250	mg/L Extract	0.080	0.014		W912251	DG	03/23/09 09:59	
EPA 200.7	**Barium**	0.234	mg/L Extract	0.0020	0.0005		W912251	DG	03/23/09 10:00	
EPA 200.7	Beryllium	< 0.0020	mg/L Extract	0.0020	0.0004		W912251	DG	03/23/09 09:59	
EPA 200.7	**Boron**	0.131	mg/L Extract	0.040	0.009		W912251	DG	03/23/09 09:59	
EPA 200.7	Cadmium	< 0.0020	mg/L Extract	0.0020	0.0010		W912251	DG	03/23/09 10:00	
EPA 200.7	**Calcium**	3.02	mg/L Extract	0.040	0.018		W912251	DG	03/23/09 09:58	
EPA 200.7	Chromium	< 0.0060	mg/L Extract	0.0060	0.0010		W912251	DG	03/23/09 10:00	
EPA 200.7	**Copper**	0.157	mg/L Extract	0.010	0.004		W912251	DG	03/23/09 10:00	
EPA 200.7	Iron	< 0.060	mg/L Extract	0.060	0.020		W912251	DG	03/23/09 09:59	
EPA 200.7	**Magnesium**	0.733	mg/L Extract	0.060	0.015		W912251	DG	03/23/09 09:59	
EPA 200.7	**Manganese**	0.0913	mg/L Extract	0.0040	0.0013		W912251	DG	03/23/09 09:59	
EPA 200.7	**Nickel**	0.023	mg/L Extract	0.010	0.002		W912251	DG	03/23/09 10:00	
EPA 200.7	**Potassium**	1.87	mg/L Extract	0.50	0.07		W912251	DG	03/23/09 09:58	
EPA 200.7	Silver	< 0.0050	mg/L Extract	0.0050	0.0004		W912251	DG	03/23/09 10:00	
EPA 200.7	**Sodium**	2.93	mg/L Extract	0.50	0.04		W912251	DG	03/23/09 09:58	
EPA 200.7	**Zinc**	0.0248	mg/L Extract	0.0100	0.0019		W912251	DG	03/23/09 10:00	
EPA 200.8	Antimony	< 0.00300	mg/L Extract	0.00300	0.000220		W912220	KWH	03/24/09 09:21	
EPA 200.8	Arsenic	< 0.00300	mg/L Extract	0.00300	0.00050		W912220	KWH	03/24/09 09:21	
EPA 200.8	Lead	< 0.00300	mg/L Extract	0.00300	0.000053		W912220	KWH	03/24/09 09:21	
EPA 200.8	Selenium	< 0.00300	mg/L Extract	0.00300	0.00024		W912220	KWH	03/24/09 09:21	
EPA 200.8	Thallium	< 0.00100	mg/L Extract	0.00100	0.000023		W912220	KWH	03/24/09 09:21	
EPA 245.1	Mercury	< 0.00020	mg/L Extract	0.00020	0.00006		W912222	HB	03/20/09 09:09	
Meteoric Water Mobility Leachates (Classical)										
EPA 353.2	**Nitrate/Nitrite as N**	0.278	mg/L Extract	0.200	0.0120	10	W912228	DKG	03/20/09 11:46	D1
OIA 1677	Cyanide (WAD)	< 0.0100	mg/L Extract	0.0100	0.0007		W912242	JMJ	03/20/09 10:52	
SM 2320B	Bicarbonate	< 1.0	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:55	
SM 2320B	Carbonate	< 1.0	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:55	
SM 2320B	Total Alkalinity	< 1.0	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:55	
SM 2540C	**Total Diss. Solids**	38	mg/L Extract	10	4.3		W912225	JMS	03/19/09 16:02	
SM 4500 H B	**pH**	4.91 @22.0°C	pH Units				W912221	DKS	03/20/09 08:55	

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Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Client Sample ID: **SLAVEN-S-1**
SVL Sample ID: **W9C0103-04 (Soil)**

Sampled: 03-Mar-09 10:25
Received: 06-Mar-09
Sampled By:

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Meteoric Water Mobility Leachates (Anions)										
EPA 300.0	**Chloride**	0.662	mg/L Extract	0.200	0.050		W913033	EML	03/23/09 15:39	
EPA 300.0	**Fluoride**	0.101	mg/L Extract	0.100	0.023		W913033	EML	03/23/09 15:39	
EPA 300.0	**Sulfate as SO4**	21.1	mg/L Extract	0.30	0.04		W913033	EML	03/23/09 15:39	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.43 meq/L Anion Sum: 0.49 meq/L C/A Balance: -7.06 % Calculated TDS: 32 TDS/cTDS: 1.20

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Client Sample ID: **VALMY-V-1**
SVL Sample ID: **W9C0103-05 (Soil)**

Sampled: 03-Mar-09 10:30
Received: 06-Mar-09
Sampled By:

Sample Report Page 1 of 2

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Acid/Base Accounting & Sulfur Forms										
Modified Sobek	**ABA**	1.6	TCaCO3/kT	0.3			N/A	BJF	03/17/09 19:19	
Modified Sobek	AGP	< 0.3	TCaCO3/kT	0.3			N/A	BJF	03/17/09 19:19	
Modified Sobek	**ANP**	1.6	TCaCO3/kT	0.3	0.01		W912037	BJF	03/17/09 18:34	
Modified Sobek	Non-extractable Sulfur	< 0.01	%	0.01			W912037	BJF	03/17/09 19:19	
Modified Sobek	Pyritic Sulfur	< 0.01	%	0.01			N/A	BJF	03/17/09 19:19	
Modified Sobek	**Sulfate Sulfur**	0.04	%	0.01			N/A	BJF	03/17/09 18:43	
Modified Sobek	**Total Sulfur**	0.04	%	0.01			W912037	BJF	03/16/09 19:17	
Meteoric Water Mobility Extraction Parameters										
ASTM E2242-02	Extraction Fluid pH	0.00	pH Units				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Extraction Time**	21.0	Hrs				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	Extraction Type	Column					W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Feed Moisture**	0.580	%				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Final Fluid pH**	7.64	pH Units				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Retained Moisture**	2.14	%				W912034	ESB	03/20/09 15:00	
ASTM E2242-02	**Sample Weight**	5030	g				W912034	ESB	03/20/09 15:00	
Meteoric Water Mobility Leachates (Metals by 200 Series)										
EPA 200.7	Aluminum	< 0.080	mg/L Extract	0.080	0.014		W912251	DG	03/23/09 10:04	
EPA 200.7	**Barium**	0.114	mg/L Extract	0.0020	0.0005		W912251	DG	03/23/09 10:05	
EPA 200.7	Beryllium	< 0.0020	mg/L Extract	0.0020	0.0004		W912251	DG	03/23/09 10:04	
EPA 200.7	**Boron**	0.132	mg/L Extract	0.040	0.009		W912251	DG	03/23/09 10:04	
EPA 200.7	Cadmium	< 0.0020	mg/L Extract	0.0020	0.0010		W912251	DG	03/23/09 10:06	
EPA 200.7	**Calcium**	2.19	mg/L Extract	0.040	0.018		W912251	DG	03/23/09 10:04	
EPA 200.7	Chromium	< 0.0060	mg/L Extract	0.0060	0.0010		W912251	DG	03/23/09 10:05	
EPA 200.7	Copper	< 0.010	mg/L Extract	0.010	0.004		W912251	DG	03/23/09 10:05	
EPA 200.7	Iron	< 0.060	mg/L Extract	0.060	0.020		W912251	DG	03/23/09 10:04	
EPA 200.7	**Magnesium**	0.451	mg/L Extract	0.060	0.015		W912251	DG	03/23/09 10:04	
EPA 200.7	Manganese	< 0.0040	mg/L Extract	0.0040	0.0013		W912251	DG	03/23/09 10:04	
EPA 200.7	Nickel	< 0.010	mg/L Extract	0.010	0.002		W912251	DG	03/23/09 10:06	
EPA 200.7	**Potassium**	1.11	mg/L Extract	0.50	0.07		W912251	DG	03/23/09 10:04	
EPA 200.7	Silver	< 0.0050	mg/L Extract	0.0050	0.0004		W912251	DG	03/23/09 10:05	
EPA 200.7	**Sodium**	2.72	mg/L Extract	0.50	0.04		W912251	DG	03/23/09 10:04	
EPA 200.7	Zinc	< 0.0100	mg/L Extract	0.0100	0.0019		W912251	DG	03/23/09 10:06	
EPA 200.8	Antimony	< 0.00300	mg/L Extract	0.00300	0.000220		W912220	KWH	03/24/09 09:22	
EPA 200.8	Arsenic	< 0.00300	mg/L Extract	0.00300	0.00050		W912220	KWH	03/24/09 09:22	
EPA 200.8	Lead	< 0.00300	mg/L Extract	0.00300	0.000053		W912220	KWH	03/24/09 09:22	
EPA 200.8	Selenium	< 0.00300	mg/L Extract	0.00300	0.00024		W912220	KWH	03/24/09 09:22	
EPA 200.8	Thallium	< 0.00100	mg/L Extract	0.00100	0.000023		W912220	KWH	03/24/09 09:22	
EPA 245.1	Mercury	< 0.00020	mg/L Extract	0.00020	0.00006		W912222	HB	03/20/09 09:11	
Meteoric Water Mobility Leachates (Classical)										
EPA 353.2	**Nitrate/Nitrite as N**	0.473	mg/L Extract	0.200	0.0120	10	W912228	DKG	03/20/09 11:47	D1
OIA 1677	Cyanide (WAD)	< 0.0100	mg/L Extract	0.0100	0.0007		W912242	JMJ	03/20/09 10:54	
SM 2320B	**Bicarbonate**	9.3	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:57	
SM 2320B	Carbonate	< 1.0	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:57	
SM 2320B	**Total Alkalinity**	9.3	mg/L Extract	1.0	0.3		W912221	DKS	03/20/09 08:57	
SM 2540C	**Total Diss. Solids**	31	mg/L Extract	10	4.3		W912225	JMS	03/19/09 16:02	
SM 4500 H B	**pH**	6.73 @23.0°C	pH Units				W912221	DKS	03/20/09 08:57	

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Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Client Sample ID: **VALMY-V-1**
SVL Sample ID: **W9C0103-05 (Soil)**

Sample Report Page 2 of 2

Sampled: 03-Mar-09 10:30
Received: 06-Mar-09
Sampled By:

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Meteoric Water Mobility Leachates (Anions)										
EPA 300.0	**Chloride**	0.784	mg/L Extract	0.200	0.050		W913033	EML	03/23/09 15:51	
EPA 300.0	**Fluoride**	0.109	mg/L Extract	0.100	0.023		W913033	EML	03/23/09 15:51	
EPA 300.0	**Sulfate as SO4**	3.35	mg/L Extract	0.30	0.04		W913033	EML	03/23/09 15:51	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.30 meq/L Anion Sum: 0.32 meq/L C/A Balance: -3.72 % Calculated TDS: 18 TDS/cTDS: 1.69

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
Acid/Base Accounting & Sulfur Forms								
Modified Sobek	ANP	TCaCO3/kT	<0.3	0.01	0.3	W912037	17-Mar-09	
Modified Sobek	Total Sulfur	%	<0.01		0.01	W912037	16-Mar-09	
Modified Sobek	Non-extractable Sulfur	%	<0.01		0.01	W912037	17-Mar-09	
Meteoric Water Mobility Leachates (Metals by 200 Series)								
EPA 200.7	Aluminum	mg/L Extract	<0.080	0.014	0.080	W912251	23-Mar-09	
EPA 200.7	Barium	mg/L Extract	<0.0020	0.0005	0.0020	W912251	23-Mar-09	
EPA 200.7	Beryllium	mg/L Extract	<0.0020	0.0004	0.0020	W912251	23-Mar-09	
EPA 200.7	Boron	mg/L Extract	<0.040	0.009	0.040	W912251	23-Mar-09	
EPA 200.7	Cadmium	mg/L Extract	<0.0020	0.0010	0.0020	W912251	23-Mar-09	
EPA 200.7	Calcium	mg/L Extract	<0.040	0.018	0.040	W912251	23-Mar-09	
EPA 200.7	Chromium	mg/L Extract	<0.0060	0.0010	0.0060	W912251	23-Mar-09	
EPA 200.7	Copper	mg/L Extract	<0.010	0.004	0.010	W912251	23-Mar-09	
EPA 200.7	Iron	mg/L Extract	<0.060	0.020	0.060	W912251	23-Mar-09	
EPA 200.7	Magnesium	mg/L Extract	<0.060	0.015	0.060	W912251	23-Mar-09	
EPA 200.7	Manganese	mg/L Extract	<0.0040	0.0013	0.0040	W912251	23-Mar-09	
EPA 200.7	Nickel	mg/L Extract	<0.010	0.002	0.010	W912251	23-Mar-09	
EPA 200.7	Potassium	mg/L Extract	<0.50	0.07	0.50	W912251	23-Mar-09	
EPA 200.7	Silver	mg/L Extract	<0.0050	0.0004	0.0050	W912251	23-Mar-09	
EPA 200.7	Sodium	mg/L Extract	<0.50	0.04	0.50	W912251	23-Mar-09	
EPA 200.7	Zinc	mg/L Extract	<0.0100	0.0019	0.0100	W912251	23-Mar-09	
EPA 200.8	Antimony	mg/L Extract	<0.00300	0.000220	0.00300	W912220	24-Mar-09	
EPA 200.8	Arsenic	mg/L Extract	<0.00300	0.00050	0.00300	W912220	24-Mar-09	
EPA 200.8	Lead	mg/L Extract	<0.00300	0.000053	0.00300	W912220	24-Mar-09	
EPA 200.8	Selenium	mg/L Extract	<0.00300	0.00024	0.00300	W912220	24-Mar-09	
EPA 200.8	Thallium	mg/L Extract	<0.00100	0.000023	0.00100	W912220	24-Mar-09	
EPA 245.1	Mercury	mg/L Extract	<0.00020	0.00006	0.00020	W912222	20-Mar-09	
Meteoric Water Mobility Leachates (Classical)								
EPA 353.2	Nitrate/Nitrite as N	mg/L Extract	<0.0200	0.0012	0.0200	W912228	20-Mar-09	
OIA 1677	Cyanide (WAD)	mg/L Extract	<0.0100	0.0007	0.0100	W912242	20-Mar-09	
Meteoric Water Mobility Leachates (Anions)								
EPA 300.0	Fluoride	mg/L Extract	<0.100	0.023	0.100	W913033	23-Mar-09	
EPA 300.0	Chloride	mg/L Extract	<0.200	0.050	0.200	W913033	23-Mar-09	
EPA 300.0	Sulfate as SO4	mg/L Extract	<0.30	0.04	0.30	W913033	23-Mar-09	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Acid/Base Accounting & Sulfur Forms									
Modified Sobek	ANP	TCaCO3/kT	42.8	38.3	112	80 - 120	W912037	17-Mar-09	
Modified Sobek	Total Sulfur	%	3.48	3.10	112	80 - 120	W912037	16-Mar-09	
Meteoric Water Mobility Leachates (Metals by 200 Series)									
EPA 200.7	Aluminum	mg/L Extract	1.00	1.00	100	85 - 115	W912251	23-Mar-09	
EPA 200.7	Barium	mg/L Extract	1.03	1.00	103	85 - 115	W912251	23-Mar-09	
EPA 200.7	Beryllium	mg/L Extract	1.04	1.00	104	85 - 115	W912251	23-Mar-09	
EPA 200.7	Boron	mg/L Extract	1.01	1.00	101	85 - 115	W912251	23-Mar-09	
EPA 200.7	Cadmium	mg/L Extract	0.968	1.00	96.8	85 - 115	W912251	23-Mar-09	
EPA 200.7	Calcium	mg/L Extract	19.5	20.0	97.5	85 - 115	W912251	23-Mar-09	
EPA 200.7	Chromium	mg/L Extract	0.941	1.00	94.1	85 - 115	W912251	23-Mar-09	
EPA 200.7	Copper	mg/L Extract	0.933	1.00	93.3	85 - 115	W912251	23-Mar-09	

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Exit 244 On I-80~PO Box 277
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Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Meteoric Water Mobility Leachates (Metals by 200 Series) (Continued)									
EPA 200.7	Iron	mg/L Extract	9.59	10.0	95.9	85 - 115	W912251	23-Mar-09	
EPA 200.7	Magnesium	mg/L Extract	19.2	20.0	95.9	85 - 115	W912251	23-Mar-09	
EPA 200.7	Manganese	mg/L Extract	1.01	1.00	101	85 - 115	W912251	23-Mar-09	
EPA 200.7	Nickel	mg/L Extract	0.871	1.00	87.1	85 - 115	W912251	23-Mar-09	
EPA 200.7	Potassium	mg/L Extract	19.6	20.0	97.9	85 - 115	W912251	23-Mar-09	
EPA 200.7	Silver	mg/L Extract	0.0489	0.0500	97.9	85 - 115	W912251	23-Mar-09	
EPA 200.7	Sodium	mg/L Extract	18.4	19.0	96.8	85 - 115	W912251	23-Mar-09	
EPA 200.7	Zinc	mg/L Extract	0.945	1.00	94.5	85 - 115	W912251	23-Mar-09	
EPA 200.8	Antimony	mg/L Extract	0.0259	0.0250	104	85 - 115	W912220	24-Mar-09	
EPA 200.8	Arsenic	mg/L Extract	0.0241	0.0250	96.4	85 - 115	W912220	24-Mar-09	
EPA 200.8	Lead	mg/L Extract	0.0253	0.0250	101	85 - 115	W912220	24-Mar-09	
EPA 200.8	Selenium	mg/L Extract	0.0244	0.0250	97.8	85 - 115	W912220	24-Mar-09	
EPA 200.8	Thallium	mg/L Extract	0.0255	0.0250	102	85 - 115	W912220	24-Mar-09	
EPA 245.1	Mercury	mg/L Extract	0.00561	0.00500	112	85 - 115	W912222	20-Mar-09	
Meteoric Water Mobility Leachates (Classical)									
EPA 353.2	Nitrate/Nitrite as N	mg/L Extract	2.02	2.00	101	90 - 110	W912228	20-Mar-09	
OIA 1677	Cyanide (WAD)	mg/L Extract	0.483	0.500	96.6	82 - 118	W912242	20-Mar-09	
Meteoric Water Mobility Leachates (Anions)									
EPA 300.0	Fluoride	mg/L Extract	2.50	2.50	100	90 - 110	W913033	23-Mar-09	
EPA 300.0	Chloride	mg/L Extract	5.07	5.00	101	90 - 110	W913033	23-Mar-09	
EPA 300.0	Sulfate as SO4	mg/L Extract	10.4	10.0	104	90 - 110	W913033	23-Mar-09	

Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch ID	Analyzed	Notes
Acid/Base Accounting & Sulfur Forms									
Modified Sobek	ANP	TCaCO3/kT	<0.3	<0.3	UDL	20	W912037	17-Mar-09	
Modified Sobek	Total Sulfur	%	0.09	0.09	3.5	20	W912037	16-Mar-09	
Modified Sobek	Non-extractable Sulfur	%	<0.01	<0.01	<RL	20	W912037	17-Mar-09	
Meteoric Water Mobility Leachates (Metals by 200 Series)									
EPA 200.7	Aluminum	mg/L Extract	<0.080	<0.080	UDL	20	W912251	23-Mar-09	
EPA 200.7	Barium	mg/L Extract	0.106	0.107	1.2	20	W912251	23-Mar-09	
EPA 200.7	Beryllium	mg/L Extract	<0.0020	<0.0020	UDL	20	W912251	23-Mar-09	
EPA 200.7	Boron	mg/L Extract	<0.040	<0.040	<RL	20	W912251	23-Mar-09	
EPA 200.7	Cadmium	mg/L Extract	<0.0020	<0.0020	UDL	20	W912251	23-Mar-09	
EPA 200.7	Calcium	mg/L Extract	62.2	62.8	0.9	20	W912251	23-Mar-09	
EPA 200.7	Chromium	mg/L Extract	<0.0060	<0.0060	UDL	20	W912251	23-Mar-09	
EPA 200.7	Copper	mg/L Extract	<0.010	<0.010	UDL	20	W912251	23-Mar-09	
EPA 200.7	Iron	mg/L Extract	<0.060	<0.060	UDL	20	W912251	23-Mar-09	
EPA 200.7	Magnesium	mg/L Extract	14.6	14.7	0.5	20	W912251	23-Mar-09	
EPA 200.7	Manganese	mg/L Extract	0.0448	0.0449	0.2	20	W912251	23-Mar-09	
EPA 200.7	Nickel	mg/L Extract	<0.010	<0.010	UDL	20	W912251	23-Mar-09	
EPA 200.7	Potassium	mg/L Extract	1.83	1.88	2.7	20	W912251	23-Mar-09	
EPA 200.7	Silver	mg/L Extract	<0.0050	<0.0050	UDL	20	W912251	23-Mar-09	
EPA 200.7	Sodium	mg/L Extract	4.96	5.02	1.4	20	W912251	23-Mar-09	
EPA 200.7	Zinc	mg/L Extract	<0.0100	<0.0100	<RL	20	W912251	23-Mar-09	
EPA 200.8	Antimony	mg/L Extract	<0.00300	<0.00300	<RL	20	W912220	24-Mar-09	R3
EPA 200.8	Arsenic	mg/L Extract	0.0392	0.0388	1.1	20	W912220	24-Mar-09	
EPA 200.8	Lead	mg/L Extract	<0.00300	<0.00300	<RL	20	W912220	24-Mar-09	
EPA 200.8	Selenium	mg/L Extract	<0.00300	0.00322	<RL	20	W912220	24-Mar-09	

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Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Quality Control - DUPLICATE Data (Continued)

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch ID	Analyzed	Notes
Meteoric Water Mobility Leachates (Metals by 200 Series) (Continued)									
EPA 200.8	Thallium	mg/L Extract	<0.00100	<0.00100	<RL	20	W912220	24-Mar-09	
EPA 245.1	Mercury	mg/L Extract	0.00022	<0.00020	<RL	20	W912222	20-Mar-09	
Meteoric Water Mobility Leachates (Classical)									
EPA 353.2	Nitrate/Nitrite as N	mg/L Extract	4.25	4.45	4.4	20	W912228	20-Mar-09	D1
OIA 1677	Cyanide (WAD)	mg/L Extract	<0.0100	<0.0100	UDL	20	W912242	20-Mar-09	
SM 2320B	Total Alkalinity	mg/L Extract	98.3	96.8	1.5	20	W912221	20-Mar-09	
SM 2320B	Bicarbonate	mg/L Extract	94.3	93.2	1.1	20	W912221	20-Mar-09	
SM 2320B	Carbonate	mg/L Extract	4.0	3.6	12.6	20	W912221	20-Mar-09	
SM 2540C	Total Diss. Solids	mg/L Extract	34	31	9.2	20	W912225	19-Mar-09	
SM 4500 H B	pH	pH Units	8.45	8.44	0.1	20	W912221	20-Mar-09	
Meteoric Water Mobility Leachates (Anions)									
EPA 300.0	Fluoride	mg/L Extract	0.109	0.109	0.0	20	W913033	23-Mar-09	
EPA 300.0	Chloride	mg/L Extract	0.794	0.784	1.3	20	W913033	23-Mar-09	
EPA 300.0	Sulfate as SO4	mg/L Extract	3.35	3.35	0.1	20	W913033	23-Mar-09	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Meteoric Water Mobility Leachates (Metals by 200 Series)										
EPA 200.7	Aluminum	mg/L Extract	1.02	<0.084	1.00	102	70 - 130	W912251	23-Mar-09	
EPA 200.7	Barium	mg/L Extract	1.14	0.107	1.00	103	70 - 130	W912251	23-Mar-09	
EPA 200.7	Beryllium	mg/L Extract	1.05	<0.0021	1.00	105	70 - 130	W912251	23-Mar-09	
EPA 200.7	Boron	mg/L Extract	1.06	<0.042	1.00	104	70 - 130	W912251	23-Mar-09	
EPA 200.7	Cadmium	mg/L Extract	0.961	<0.0021	1.00	96.1	70 - 130	W912251	23-Mar-09	
EPA 200.7	Calcium	mg/L Extract	82.3	62.8	20.0	97.6	70 - 130	W912251	23-Mar-09	
EPA 200.7	Chromium	mg/L Extract	0.956	<0.0063	1.00	95.6	70 - 130	W912251	23-Mar-09	
EPA 200.7	Copper	mg/L Extract	0.928	<0.010	1.00	92.8	70 - 130	W912251	23-Mar-09	
EPA 200.7	Iron	mg/L Extract	9.82	<0.063	10.0	98.2	70 - 130	W912251	23-Mar-09	
EPA 200.7	Magnesium	mg/L Extract	33.9	14.7	20.0	96.1	70 - 130	W912251	23-Mar-09	
EPA 200.7	Manganese	mg/L Extract	1.08	0.0449	1.00	104	70 - 130	W912251	23-Mar-09	
EPA 200.7	Nickel	mg/L Extract	0.858	<0.010	1.00	85.8	70 - 130	W912251	23-Mar-09	
EPA 200.7	Potassium	mg/L Extract	22.1	1.88	20.0	101	70 - 130	W912251	23-Mar-09	
EPA 200.7	Silver	mg/L Extract	0.0490	<0.0052	0.0500	98.0	70 - 130	W912251	23-Mar-09	
EPA 200.7	Sodium	mg/L Extract	23.9	5.02	19.0	99.4	70 - 130	W912251	23-Mar-09	
EPA 200.7	Zinc	mg/L Extract	0.919	<0.0105	1.00	91.6	70 - 130	W912251	23-Mar-09	
EPA 200.8	Antimony	mg/L Extract	0.0278	<0.003000	0.0250	106	70 - 130	W912220	24-Mar-09	
EPA 200.8	Arsenic	mg/L Extract	0.0648	0.0388	0.0250	104	70 - 130	W912220	24-Mar-09	
EPA 200.8	Lead	mg/L Extract	0.0237	<0.003000	0.0250	93.8	70 - 130	W912220	24-Mar-09	
EPA 200.8	Selenium	mg/L Extract	0.0292	0.00322	0.0250	104	70 - 130	W912220	24-Mar-09	
EPA 200.8	Thallium	mg/L Extract	0.0239	<0.001000	0.0250	95.3	70 - 130	W912220	24-Mar-09	
EPA 245.1	Mercury	mg/L Extract	0.00125	<0.00020	0.00100	109	70 - 130	W912222	20-Mar-09	
Meteoric Water Mobility Leachates (Classical)										
EPA 353.2	Nitrate/Nitrite as N	mg/L Extract	5.47	4.45	1.00	102	90 - 110	W912228	20-Mar-09	D1
OIA 1677	Cyanide (WAD)	mg/L Extract	0.489	<0.0100	0.500	97.9	82 - 118	W912242	20-Mar-09	
Meteoric Water Mobility Leachates (Anions)										
EPA 300.0	Fluoride	mg/L Extract	2.15	0.109	2.00	102	90 - 110	W913033	23-Mar-09	
EPA 300.0	Fluoride	mg/L Extract	2.17	0.136	2.00	102	90 - 110	W913033	23-Mar-09	
EPA 300.0	Chloride	mg/L Extract	3.81	0.784	3.00	101	90 - 110	W913033	23-Mar-09	
EPA 300.0	Chloride	mg/L Extract	3.36	0.217	3.00	105	90 - 110	W913033	23-Mar-09	
EPA 300.0	Sulfate as SO4	mg/L Extract	13.7	3.35	10.0	103	90 - 110	W913033	23-Mar-09	

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Baker Hughes Drilling Fluids
Exit 244 On I-80~PO Box 277
Battle Mountain, NV 89820

Work Order: **W9C0103**
Reported: 24-Mar-09 14:02

Quality Control - MATRIX SPIKE Data (Continued)

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Meteoric Water Mobility Leachates (Anions) (Continued)										
EPA 300.0	Sulfate as SO4	mg/L Extract	11.1	0.44	10.0	107	90 - 110	W913033	23-Mar-09	

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	Batch ID	Analyzed	Notes
Meteoric Water Mobility Leachates (Classical)										
OIA 1677	Cyanide (WAD)	mg/L Extract	0.489	0.489	0.500	0.0	20	W912242	20-Mar-09	

Notes and Definitions

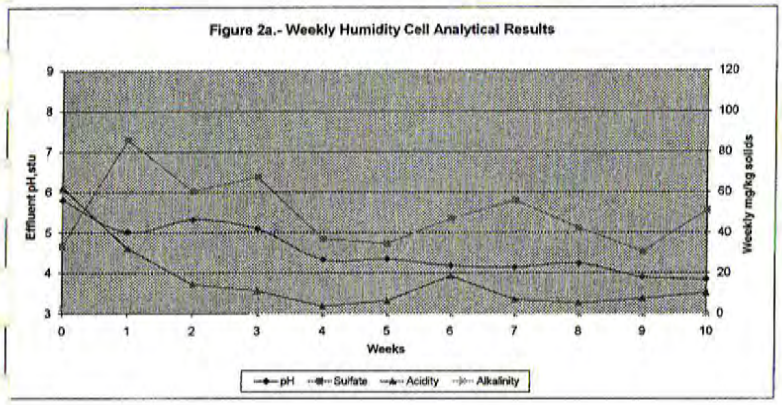
D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of target analyte.
R3	There is no control limit for the RPD if the concentration in the sample is less than five times the reporting limit
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
R > 4S	% recovery not applicable, sample concentration more than four times greater than spike level
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable

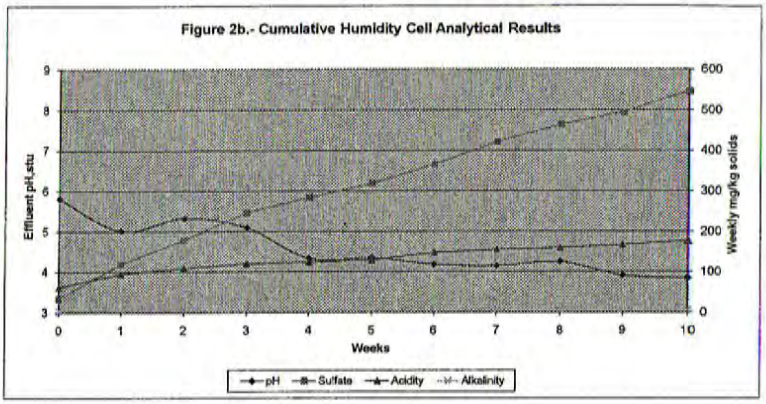
Ms. Ashley Fisher / **Baker Hughes Drilling Fluids**
MLI Job No. 3116

Table 2 . - Humidity Cell Analytical Results, FP-1 **(1.4181 Kg)**

					Total Fe					SO_4=			Acidity, $CaCO_3$ Equivalents			Alkalinity, $CaCO_3$ Equivalents		
Week	Vol. L	Effluent pH	Redox, mV (vs Ag/AgCl)	Conductivity mS/cm	mg/l	mg/kg	Cum. mg/kg	Fe^{2}+ mg/l	Fe^{3}+ mg/l	mg/l	mg/kg	Cum. mg/kg	mg/l	mg/kg	Cum. mg/kg	mg/l	mg/kg	Cum. mg/kg
0	0.588	5.80	75	0.18	0.97	0.402	0.402	0.97	0.00	80.2	33.23	33.23	150.0	62.14	62.14	6.00	2.49	2.49
1	0.634	5.01	536	0.30	2.68	1.197	1.599	1.75	0.93	192.0	85.77	119.00	72.0	32.16	94.31	6.00	2.68	5.17
2	0.597	5.32	300	0.24	2.60	1.095	2.694	1.05	1.55	143.5	60.41	179.41	34.0	14.31	108.62	4.00	1.68	6.85
3	0.656	5.09	304	0.19	2.82	1.305	3.999	1.36	1.46	146.0	67.54	246.95	24.0	11.10	119.72	0.00	0.00	6.85
4	0.606	4.33	320	0.21	2.01	0.859	4.858	1.02	0.99	86.2	36.82	283.77	8.0	3.42	123.14	0.00	0.00	6.85
5	0.722	4.34	355	0.20	1.42	0.723	5.581	0.89	0.53	68.0	34.60	318.37	12.0	6.11	129.25	0.00	0.00	6.85
6	0.722	4.18	313	0.19	1.30	0.662	6.243	0.73	0.57	92.2	46.95	365.32	36.0	18.33	147.58	0.00	0.00	6.85
7	0.595	4.14	330	0.18	1.65	0.692	6.935	1.11	0.54	133.0	55.77	421.09	16.0	6.71	154.29	0.00	0.00	6.85
8	0.724	4.24	331	0.15	1.31	0.669	7.604	0.95	0.36	83.0	42.38	463.47	10.0	5.11	159.40	0.00	0.00	6.85
9	0.470	3.90	368	0.18	1.23	0.407	8.011	0.59	0.64	92.4	30.61	494.08	22.0	7.29	166.68	0.00	0.00	6.85
10	0.654	3.84	404	0.18	1.12	0.516	8.527	0.86	0.26	110.5	50.94	545.02	22.0	10.14	176.83	0.00	0.00	6.85

Test Terminated





APPENDIX B

Water Quality Results from F Pit

F Pit Lake Water Quality Results at the Lake Surface**

Constituent	NDEP Profile I Standard	07/20/05	09/29/05	04/04/06	06/19/06	09/26/06	06/21/07	09/25/07	12/19/07	06/23/08	09/17/08
pH	6.5 – 8.5	3.2	3.2	3.11	2.99	3.03	2.97	3.96	3.53	4.66	6.11
Total Dissolved Solids	1,000	3,200	3,500	3,390	3,850	4,130	4,020	4,200	4,300	4,200	4,300
Alkalinity (Total as $CaCO_3$)	-	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<1.0	3.9
Bicarbonate (HCO_3)	-	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<1.0	<1.0
Boron*	-	0.180	0.180	0.16	0.05	0.13	0.178	0.169	0.153	0.159	0.175
Calcium*	-	360.0	390.0	331	379	432	407	530	527	521	618
Magnesium*	150	270	290	266	296	333	327	323	311	321	369
Potassium*	-	4.2	4.6	4.1	4.07	4.91	4.12	4.48	3.93	4.79	5.53
Sodium*	-	54	55	50.9	56.6	65.8	61.8	63	66.2	63.3	75.5
Aluminum*	0.2	5.3	5.2	6.2	9.22	9.78	9.49	4.59	2.23	1.47	0.099
Antimony*	0.006	<.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Beryllium*	0.004	0.0057	<0.004	0.0051	0.0068	0.0067	0.0057	0.00316	<0.002	<0.002	<0.002
Chloride	400	45	47	41.1	43.7	46.4	49.6	51.6	48.6	57.6	55.9
Fluoride	4.0	4.90	5.50	4.89	5.61	3.6	4.95	3.92	3.2	3.38	2.1
Nickel*	0.1	2.70	2.90	2.09	2.63	2.71	2.66	2.15	1.85	1.52	1.32
Nitrogen (NO_3+NO_2 as N)	10	<0.25	<0.25	<0.02	<0.02	<0.02	<0.02	<0.02	0.048	<0.05	<0.05
Sulfate	500	3100	2900	2270	2600	2830	2690	2860	2930	2790	3070
Arsenic*	0.010	<.005	<0.005	<0.025	<0.025	<0.025	<0.003	<0.003	0.00396	<0.003	<0.003
Barium*	2.0	0.025	0.022	0.108	0.0157	0.0166	0.0116	0.0109	0.0111	0.01	0.0112
Cadmium*	0.005	0.04	0.033	0.0295	0.037	0.0413	0.0297	0.0231	0.0162	0.0133	0.0092
Chromium*	0.1	<0.005	<0.005	0.0092	<0.006	0.0127	<0.006	<0.006	<0.006	<0.006	<0.006
Copper*	1.0	0.3000	0.2200	0.294	0.436	0.289	0.384	0.169	0.054	0.032	0.01
Iron*	0.6	33.0	48.0	67.9	78.2	85.8	54.5	1.01	67.5	2.45	0.809
Lead*	0.015	<0.005	<0.005	<0.0030	<0.0030	<0.0030	0.0036	<0.003	<0.003	<0.003	<0.003
Manganese*	0.10	58	70	57.3	60.5	66.7	57.2	51.6	50.1	44.3	45.6
Mercury	0.002	<0.001	<0.001	<0.00020	<0.00020	<0.00020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Selenium*	0.05	0.0110	0.0085	0.0081	0.0115	0.0068	0.0078	0.0046	0.00375	<0.003	<0.003
Silver*	0.1	<0.005	<0.005	0.0073	<0.005	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium*	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
Zinc*	5.0	8.400	7.900	6.43	8.19	7.06	6.44	4.77	3.87	2.6	1.78

All results in milligrams per liter (mg/L), except pH (standard units)

*Note: Metals results are in Total Recoverable Metals. NDEP Profile I Standards are for dissolved fractions only. Comparison between the results and NDEP Profile I Standards may not be appropriate.

**F Pit Lake surface sampling was discontinued in September 2008. Surface water sampling is not required by the Water Pollution Control Permit NEV0091045.

F Pit Lake Water Quality Results at Five Feet Below the Lake Surface

Constituent	NDEP Profile I Standard	06/29/06	09/26/06	06/21/07	09/25/07	06/23/08	09/17/08	06/18/09	09/22/09
pH	6.5 – 8.5	2.86	3.01	2.98	3.95	4.65	6.13	4.23	3.90
Total Dissolved Solids	1,000	4,060	4,070	4,100	4,200	4,100	4,400	4,060	4,170
Alkalinity (Total as $CaCO_3$)	-	-	-	-	<1.0	<1.0	3.8	<1.0	<1.0
Bicarbonate (HCO_3)	-	-	-	-	<1.0	<1.0	3.8	<1.0	<1.0
Boron*	-	<0.04	0.130	0.183	0.176	0.154	0.164	0.147	0.168
Calcium*	-	361.0	404.0	408	536	521	628	542	530
Magnesium*	150	283	337	326	326	318	366	331	341
Potassium*	-	4.29	4.99	4.34	4.48	4.73	5.47	5.66	5.70
Sodium*	-	54.9	63.4	60.9	61.7	62.1	73.9	71.6	76.7
Aluminum*	0.2	9.91	9.79	9.64	4.62	1.44	0.095	1.04	1.25
Antimony*	0.006	<0.003	<0.003	<0.003	<0.003	<0.0024	<0.003	<0.003	<0.003
Beryllium*	0.004	0.0064	0.0066	0.0059	0.00317	<0.002	<0.002	<0.002	<0.002
Chloride	400	44	46.7	49.5	51.9	55.6	55.3	59.1	56.9
Fluoride	4.0	5.23	4.00	4.75	4.14	3.36	2.02	1.75	3.65
Nickel*	0.1	2.61	2.88	2.63	2.27	1.49	1.34	0.938	0.968
Nitrogen (NO_3+NO_2 as N)	10	<0.02	<0.020	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05
Sulfate	500	2590	2880	2720	2880	2790	3060	2,920	2,900
Arsenic*	0.010	<0.025	<0.025	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium*	2.0	0.0144	0.0096	0.0108	0.02	0.0108	0.012	0.0404	0.0326
Cadmium*	0.005	0.0345	0.0431	0.0296	0.0242	0.0133	0.0095	0.005	0.0056
Chromium*	0.1	<0.006	0.0135	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Copper*	1.0	0.429	0.4210	0.37	0.182	0.03	<0.01	0.029	0.032
Iron*	0.6	63.1	86.0	54.6	1.03	1.66	0.78	3.70	1.85
Lead*	0.015	0.005	0.005	0.006	0.0167	<0.003	<0.003	0.00401	<0.003
Manganese*	0.10	62.8	62.5	57.1	51.9	43.8	45.9	30.7	30.4
Mercury	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Selenium*	0.05	0.0106	0.0070	0.0077	0.00508	0.00318	<0.003	<0.003	<0.003
Silver*	0.1	<0.005	<0.0050	<0.005	<0.005	<0.005	<0.005	0.0054	<0.005
Thallium*	0.002	<0.0020	<0.0020	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc*	5.0	9.130	7.560	6.37	4.84	2.57	1.92	0.882	0.871

All results in milligrams per liter (mg/L), except pH (standard units)

*Note: Metals results are in Total Recoverable Metals. NDEP Profile I Standards are for dissolved fractions only. Comparison between the results and NDEP Profile I Standards may not be appropriate.

F Pit Lake Water Quality Results at Mid-Depth in the Lake

Constituent	NDEP Profile I Standard	06/29/06	09/26/06	06/21/07	09/25/07	06/23/08	09/17/08	06/18/09	09/22/09
pH	6.5 – 8.5	2.77	3.1	3.03	3.96	4.17	5.89	3.95	3.89
Total Dissolved Solids	1,000	4,340	4,530	4,000	4,100	4,200	4,300	3,990	4,250
Alkalinity (Total as $CaCO_3$)	-	-	-	-	<1.0	<1.0	4.80	<1.0	<1.0
Bicarbonate (HCO_3)	-	-	-	-	<1.0	<1.0	4.80	<1.0	<1.0
Boron*	-	<0.04	0.110	0.172	0.168	0.152	0.171	0.153	0.170
Calcium*	-	343.0	397.0	397	519	512	602	580	533
Magnesium*	150	293	348	324	320	315	360	331	339
Potassium*	-	4.8	4.99	4.51	4.46	4.69	5.38	5.61	5.62
Sodium*	-	52.6	59	58.7	60.6	61.9	72.1	74.3	79.2
Aluminum*	0.2	11.9	10.6	9.58	4.56	1.54	0.101	1.01	1.28
Antimony*	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Beryllium*	0.004	0.0075	0.0057	0.0057	0.00312	<0.002	<0.002	<0.002	<0.002
Chloride	400	38.7	42.2	46.0	52.0	57.3	55.5	57.0	61.6
Fluoride	4.0	5.44	4.70	4.96	4.25	3.35	1.93	1.71	3.98
Nickel*	0.1	2.84	3.12	2.63	2.17	1.53	1.3	0.891	0.941
Nitrogen (NO_3+NO_2 as N)	10	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05
Sulfate	500	2670	3160	2690	2890	2750	3050	2,800	2,890
Arsenic*	0.010	<0.025	<0.025	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium*	2.0	0.0145	0.0059	0.0123	0.0118	0.0102	0.0111	0.0108	0.0692
Cadmium*	0.005	0.0314	0.0532	0.0294	0.0232	0.0135	0.0089	0.0043	0.0057
Chromium*	0.1	<0.006	0.0099	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Copper*	1.0	0.4830	0.4290	0.352	0.17	0.033	<0.01	0.021	0.030
Iron*	0.6	150	205	75.4	0.991	1.12	0.67	2.73	1.87
Lead*	0.015	0.0086	0.004	0.0033	<0.003	<0.003	<0.003	<0.003	<0.003
Manganese*	0.10	68.5	67.3	57.5	50.3	43.9	44.2	32.4	30.3
Mercury	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Selenium*	0.05	0.0112	0.0070	0.0071	0.00486	<0.003	<0.003	<0.003	<0.003
Silver*	0.1	<0.005	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium*	0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc*	5.0	10.60	8.88	6.40	4.91	2.67	1.71	0.747	0.850

All results in milligrams per liter (mg/L), except pH (standard units)

*Note: Metals results are in Total Recoverable Metals. NDEP Profile I Standards are for dissolved fractions only. Comparison between the results and NDEP Profile I Standards may not be appropriate.

F Pit Lake Water Quality Results at Five Feet above the Lake Bottom

Constituent	NDEP Profile I Standard	06/29/06	09/26/06	06/21/07	09/25/07	06/23/08	09/17/08	06/18/09	09/22/09
pH	6.5 – 8.5	3.55	3.32	3.41	3.59	4.17	3.69	3.84	3.50
Total Dissolved Solids	1,000	7,280	7,520	6,910	7,000	4,100	4,400	4,080	4,190
Alkalinity (Total as $CaCO_3$)	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0
Bicarbonate (HCO_3)	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0
Boron*	-	<0.4	0.170	0.217	0.211	0.151	0.185	0.146	0.163
Calcium*	-	402.0	409.0	416	418	498	599	538	521
Magnesium*	150	463	488	503	483	317	381	322	342
Potassium*	-	6.7	6.15	7.4	6.62	4.79	5.68	5.55	5.98
Sodium*	-	60.1	63.5	67.5	59.1	60	72.8	69.1	79.8
Aluminum*	0.2	6.14	10.6	7.21	13.8	1.79	0.288	0.953	1.46
Antimony*	0.006	<0.003	<0.00	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Beryllium*	0.004	<0.020	0.0067	0.006	0.00712	<0.002	<0.002	<0.002	<0.002
Chloride	400	31.4	32	110	34.1	56.8	53.4	68.6	58.2
Fluoride	4.0	7.40	6.50	6.1	4.72	3.38	2.08	1.70	2.76
Nickel*	0.1	4.89	4.89	5.11	6.00	1.71	1.3	0.940	1.08
Nitrogen (NO_3+NO_2 as N)	10	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05
Sulfate	500	4500	4770	4310	4490	2810	3090	2,790	2,870
Arsenic*	0.010	<0.25	<0.025	<0.003	0.0038	<0.003	<0.003	<0.003	<0.003
Barium*	2.0	0.020	<0.0020	0.0144	0.017	0.0102	0.0109	0.0122	0.0325
Cadmium*	0.005	<0.020	0.0833	0.0588	0.068	0.0126	0.0056	0.0046	0.0057
Chromium*	0.1	<0.060	<0.0060	<0.006	<0.006	<0.0060	<0.006	<0.006	<0.006
Copper*	1.0	<0.10	0.3090	0.202	0.443	0.046	<0.01	0.023	0.039
Iron*	0.6	872	785	717	701	15.2	19.5	2.38	13.0
Lead*	0.015	<0.0030	<0.0030	0.0424	<0.003	<0.003	<0.003	<0.003	<0.003
Manganese*	0.10	99.0	92.2	88.2	90.6	45.8	51.6	30.2	32.2
Mercury	0.002	<0.00020	<0.00020	<0.0002	0.00091	<0.0002	<0.0002	<0.0002	0.00077
Selenium*	0.05	0.0096	0.0077	0.0068	0.00556	0.00403	<0.003	<0.003	<0.003
Silver*	0.1	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	0.0054	<0.005
Thallium*	0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc*	5.0	16.2	14.1	13.5	16.7	3.37	2.24	0.782	1.06

All results in milligrams per liter (mg/L), except pH (standard units)

*Note: Metals results are in Total Recoverable Metals. NDEP Profile I Standards are for dissolved fractions only. Comparison between the results and NDEP Profile I Standards may not be appropriate.

APPENDIX C

Threatened, Endangered, and Special Status Species Consultation

Nevada Natural Heritage Program

Nevada Natural Heritage Program

Nevada Department of Conservation and Natural Resources
Richard H. Bryan Building
901 South Stewart Street, suite 5002 • Carson City, Nevada 89701-5245, U.S.A.
tel: (775) 684-2900 • internet: http://heritage.nv.gov

04 April 2007

Donovan Gross
JBR Environmental Consultants, Inc.
1053 Idaho St.
Elko, NV 89801

RE: Data request received 26 March 2007

Dear Mr. Gross:

We are pleased to provide the information you requested on endangered, threatened, candidate, and/or at risk plant and animal taxa recorded within or near the Baker Hughes-Argenta Mine project area. We searched our database and maps for the following, a five kilometer radius around:

Township 32N Range 46E Sections 13 and 24
Township 32N Range 47E Sections 13, 18 and 19

There are no at risk taxa recorded within the given area. However, habitat may be available for, the winged milkvetch, *Astragalus pterocarpus*, a Taxon determined to be Vulnerable by the Nevada Natural Heritage Program. We do not have complete data on various raptors that may also occur in the area; for more information contact Ralph Phenix, Nevada Division of Wildlife at (775) 688-1565. Note that all cacti, yuccas, and Christmas trees are protected by Nevada state law (NRS 527.060-.120), including taxa not tracked by this office.

Please note that our data are dependent on the research and observations of many individuals and organizations, and in most cases are not the result of comprehensive or site-specific field surveys. Natural Heritage reports should never be regarded as final statements on the taxa or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments.

Thank you for checking with our program. Please contact us for additional informationor further assistance.

Sincerely,

Eric S. Miskow
Biologist III/Data Manager

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Nevada Fish and Wildlife Office
1340 Financial Blvd., Suite 234
Reno, Nevada 89502
Ph: (775) 861-6300 ~ Fax: (775) 861-6301

May 21, 2008
File No. 2008-SL-0335

Mr. Joshua Vittori
JBR Environmental Consultants, Inc.
1165 East Jennings Way, Suite 101
Elko, Nevada 89801

Dear Mr. Vittori:

Subject: Species List Request for Baker Hughes Expansion – Argenta Mine Project, Lander County, Nevada

This responds to your letter received on May 8, 2008, requesting a species list for the Baker Hughes Expansion – Argenta Mine Project in Lander County, Nevada. To the best of our knowledge, no listed, proposed, or candidate species occur in the subject project area. This response fulfills the requirements of the Fish and Wildlife Service (Service) to provide a list of species pursuant to section 7(c) of the Endangered Species Act of 1973 (Act), as amended, for projects that are authorized, funded, or carried out by a Federal agency.

We note that the bald eagle (*Haliaetus leucocephalus*) may occur in the project area, and could be affected by it. On August 8, 2007, the bald eagle was removed from the Federal list of threatened and endangered species (72 FR37346). Bald Eagles will continue to be protected under the Bald and Golden Eagle Protection Act (BGEPA) of 1940, as amended (16 U.S.C. 668-668d) and the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703 *et seq.*). Both of these laws prohibit killing, selling or otherwise harming eagles, their nests, or their eggs. The bald eagle remains listed as endangered in the State of Nevada. Please also coordinate with state wildlife agencies to ensure compliance with state regulations regarding the bald eagle.

The Service has developed the National Bald Eagle Management Guidelines (Guidelines) to advise landowners, land managers, and others when and under what circumstance the protective provisions of the BGEPA may apply to their activities. These documents and more information

TAKE PRIDE IN AMERICA

about the bald eagle are available on the Service's website at http://www.fws.gov/migratorybirds/baldeagle.htm. A variety of human activities can potentially interfere with bald eagles, affecting their ability to forage, nest, roost, breed, or raise young. The Guidelines are intended to help people minimize such impacts to bald eagles, particularly where they may constitute "disturbance", which is prohibited by the BGEPA. The Service is developing regulations that would authorize, under limited circumstances, the use of permits if "take" of an eagle is anticipated but unavoidable. Until the permit system rulemaking is completed, the Service recommends that an agency or person follow the Guidelines to avoid violating the BGEPA.

The Nevada Fish and Wildlife Office no longer provides species of concern lists. Most of these species for which we have concern are also on the sensitive species list for Nevada maintained by the State of Nevada's Natural Heritage Program (Heritage). Instead of maintaining our own list, we are adopting Heritage's sensitive species list and partnering with them to provide distribution data and information on the conservation needs for sensitive species to agencies or project proponents. The mission of Heritage is to continually evaluate the conservation priorities of native plants, animals, and their habitats, particularly those most vulnerable to extinction or in serious decline. Consideration of these sensitive species and exploring management alternatives early in the planning process can provide long-term conservation benefits and avoid future conflicts.

For a list of sensitive species by county, visit Heritage's website at www.heritage.nv.gov. For a specific list of sensitive species that may occur in the project area, you can obtain a data request form from the website or by contacting Heritage at 901 South Stewart Street, Suite 5002, Carson City, Nevada 89701-5245, (775) 684-2900. Please indicate on the form that your request is being obtained as part of your coordination with the Service under the Act. During your project analysis, if you obtain new information or data for any Nevada sensitive species, we request that you provide the information to Heritage at the above address. Furthermore, certain species of fish and wildlife are classified as protected by the State of Nevada (see http://www.leg.state.nv.us/NAC/NAC-503.html). Before a person can hunt, take, or possess any parts of wildlife species classified as protected, they must first obtain the appropriate license, permit, or written authorization from the Nevada Department of Wildlife (visit http://www.ndow.org or call 775-777-2300).

We note that the pygmy rabbit (*Brachylagus idahoensis*) may occur within the planning area and could be affected by it. On January 8, 2008, the Service published a substantial 90-day finding on a petition to list the pygmy rabbit as threatened or endangered under the Act, thus initiating a status review of the species. Draft survey guidelines have been developed for this species and are available upon request from the Nevada Fish and Wildlife Office. We encourage you to survey the proposed project area for pygmy rabbits prior to any ground disturbing activities and to consider the needs of this species as you complete project planning and implementation. The Bureau of Land Management State Director for Nevada has directed all Field Office staff in Nevada to address the pygmy rabbit in all upcoming Land Use Plan revisions.

We are concerned that the proposed project may impact the greater sage-grouse *(Centrocercus urophasianus)*, a species listed as sensitive under the Heritage Program. On February 26, 2008, the Service published in the Federal Register an initiation of a status review for the species as threatened or endangered under the Act. The Western States Sage and Columbian Sharp-tailed Grouse Technical Committee, under direction of the Western Association of Fish and Wildlife Agencies, has developed and published guidelines to manage and protect sage grouse and their habitats in the Wildlife Society Bulletin (Connelly *et al.* 2000). We ask that you consider incorporating these guidelines (http://ndow.org/wild/sg) into the proposed project. On a more local level, the Sage Grouse Conservation Plan for Nevada and Portions of Eastern California was completed in June 2004. The Plan is available online at: http://www.ndow/org/wild/sg/plan/index.shtm. We encourage you to adopt all appropriate management guidance from this Plan as you implement your proposed action.

Based on the Service's conservation responsibilities and management authority for migratory birds under the MBTA we are concerned about potential impacts the proposed project may have on migratory birds in the area. Given these concerns, we recommend that any land clearing or other surface disturbance associated with proposed actions within the project area be timed to avoid potential destruction of bird nests or young, or birds that breed in the area. Such destruction may be in violation of the MBTA. Under the MBTA, nests with eggs or young of migratory birds may not be harmed, nor may migratory birds be killed. Therefore, we recommend land clearing be conducted outside the avian breeding season. If this is not feasible, we recommend a qualified biologist survey the area prior to land clearing. If nests are located, or if other evidence of nesting (*i.e.*, mated pairs, territorial defense, carrying nesting material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) should be delineated and the entire area avoided to prevent destruction or disturbance to nests until they are no longer active.

Please reference File No. 2008-SL-0335 in future correspondence concerning this species list. If you have any questions regarding this correspondence or require additional information, please contact me or James Harter at (775) 861-6300.

Sincerely,

Mercy Haworth

for Robert D. Williams
Field Supervisor

STATE OF NEVADA
DEPARTMENT OF WILDLIFE
1100 Valley Road
Reno, Nevada 89512
(775) 688-1500 • Fax (775) 688-1595

JIM GIBBONS
Governor

KENNETH E. MAYER
Director

DOUG HUNT
Deputy Director

October 29, 2008

Kendra Olcott
Environmental Analyst
JBR Environmental Consultants, Inc.
1165 East Jennings Way
Suite 101
Elko, NV 89801

RE: Baker Hughes Expansion – Argenta Mine Project

Dear Ms. Olcott,

This letter is in response to you request for information on wildlife occurrences in the Argenta Rim area for the Baker Hughes Expansion project at the Argenta Barite Mine.

Chukar are an important game species and are common on the Argenta Rim and in Mosquito canyon. The nearest sage grouse lek is approximately 8 miles southeast of the project area. However, wintering habitat for this species is present at the southern portion of the project area. Sage grouse use the higher elevations in the summer and move to the lower elevations in the winter.

Mule deer are present in low densities in the project area and vicinity. Mule deer move up and down elevationally throughout the seasons. They spend the summer months at higher elevations and the winter months at lower elevations.

Important raptor species are found in the project vicinity. A red-tailed hawk nest has been documented at the mouth of Mosquito Canyon. Additionally, a ferruginous hawk's nest was documented historically about 3 miles northeast of the project area. This nest was last checked in 1977 and may no longer be active. Both species, as well as prairie falcons and golden eagles, are likely to forage in the project area and vicinity. A bald eagle was documented 2 miles northeast of the project area on the Humboldt River.

STATE OF NEVADA
DEPARTMENT OF WILDLIFE
1100 Valley Road
Reno, Nevada 89512
(775) 688-1500 • Fax (775) 688-1595

JIM GIBBONS
Governor

KENNETH E. MAYER
Director

DOUG HUNT
Deputy Director

Should you have any questions about the information provided to you in this letter, please contact me at the number below.

Sincerely,

KMiller

Katie Erin G. Miller
Eastern Region Mining Biologist
Nevada Department of Wildlife
60 Youth Center Road
Elko, NV 89801
775-777-2368
kmiller@ndow.org

APPENDIX D

BLM Special Status Species
Battle Mountain District, Nevada List

BLM SPECIAL STATUS SPECIES

THREATENED AND ENDANGERED SPECIES BMD, NEVADA

(T&E species updated as listed)

U.S. Fish and Wildlife Service
Nevada Fish and Wildlife Office

Birds

E	Southwestern willow flycatcher (*Empidonax traillii extimus)*	Possible breeding habitat below US-6 in Nye and Esmeralda Counties particularly in Oasis Valley, Beatty, NV Area -
C	Yellow-billed cuckoo (*Coccyzus americanus)* (Western U.S. Distinct Population Segment)	Eureka and Nye Counties

[Note: Bald Eagle was delisted August 2007 – placed on BLM Sensitive list until status determination made by NV BLM State Director]

Reptile

T	Desert tortoise (*Gopherus agassizii*) (Mojave population)	Recovery Plan Nye and Esmeralda

Amphibian

C	Columbia spotted frog (*Rana luteiventris)* (Great Basin Distinct Population Segment)	*CA & Strategy Plan* Eureka, Lander, and Nye Counties – found in upper Reese River in Lander and Nye and at Clover Ranch in Nye County. Historical record only for Eureka Co

Fish

T	Lahontan cutthroat trout (*Oncorhynchus clarki henshawi)*	Recovery Plan - Lander, Eureka, & Nye Co.
T	Railroad Valley springfish *(Crenichthys nevadae)*	Recovery Plan - Nye
E	Devils Hole pupfish (*Cyprinodon diabolis)*	Nye County
E	Ash Meadows Amargosa pupfish (*Cyprinodon nevadensis mionectes)*	Nye County
E	Warm Springs pupfish (*Cyprinodon nevadensis pectoralis)*	Nye County
E	White River spinedace (*Lepidomeda albivallis)*	Nye County
E	Ash Meadows speckled dace (*Rhinichthys osculus nevadensis)*	Nye County

SENSITIVE SPECIES LIST
(Updated June 20, 2003)

Sensitive Species are taxa that are not already included as BLM Special Status Species under (1) Federally listed, proposed, or candidate species; or (2) State of Nevada listed species. BLM policy is to provide these species with the same level of protection as is provided for candidate species in BLM Manual 6840.06 C, that is to "ensure that actions authorized, funded, or carried out do not contribute to the need for the species to become listed". The Sensitive Species designation is normally used for species that occur on Bureau administered lands for which BLM has the capability to affect the conservation status of the species through management. The BLM Manual 6840.06 E provides factors by which a native species may be listed as "sensitive" if it:

1. Could become endangered or extirpated from a State or within a significant portion of its range in the near future;

2. Is under status review by the FWS and/or National Marine Fisheries Service;

3. Is undergoing significant current or predicted downward trends in: (1) habitat capability that would reduce a species' existing distribution; and/or (2) population or density such that federally listed, proposed, candidate, or State listed status may become necessary;

4. Typically consists of small and widely dispersed populations**;**

5. Inhabits ecological refugia, or specialized or unique habitats**;**

6. Is State-listed, but which may be better conserved through application of BLM sensitive species status**.**

- *Possible additions to the BLM Sensitive Species list for Nevada are at the end of the list on the page following the signatures.*

• **SCIENTIFIC NAME**	**COMMON NAME**	**FACTOR(S)**
Mammals (31 total)		
Antrozous pallidus	pallid bat	4,5,6
Brachylagus idahoensis	pygmy rabbit	1,2,3,4
Corynorhinus townsendi	Townsend's big-eared bat	4,5, 6
Eptesicus fuscus	big brown bat	4,5
Euderma maculatum	spotted bat	1,2,4,5, 6
Eumops perotis californicus	greater western mastiff bat	4,5, 6
Idionycteris phyllotis	Allen's lappet-browed bat	4,5,6
Lasionycteris noctivagans	silver-haired bat	4,5
Lasiurus blossevillii	Western red bat	4,5, 6
Lasiurus cinereus	hoary bat	4,5
Lontra canadensis	river otter	4,5
Macrotus californicus	California leaf-nosed bat	4,5, 6
Microdipodops megacephalus albiventer	Desert Valley kangaroo mouse	5, 6
Microdipodops megacephalus nasutus	Fletcher dark kangaroo mouse	5,
Microtus montanus fucosus	Pahranagat Valley montane vole	5, 6
Microtus montanus nevadensis	Ash Meadows montane vole	5, 6
Myotis californicus	California myotis	4,5
Myotis ciliolabrum	small-footed myotis	4,5
Myotis evotis	long-eared myotis	4,5
Myotis lucifugus	little brown myotis	4,5
Myotis thysanodes	fringed myotis	4,5, 6
Myotis velifer	cave myotis	4,5
Myotis volans	long-legged myotis	4,5
Myotis yumanensis	Yuma myotis	4,5
Nyctinomops macrotis	big free-tailed bat	4,5
Ovis canadensis nelsoni	desert bighorn sheep	3,4,5
Pipistrellus hesperus	western pipistrelle bat	4,5
Sorex preblei	Preble's shrew	4,5
Tadarida braziliensis	Brazilian free-tailed bat	5, 6
Thomomys bottae abstrusus	Fish Spring pocket gopher	5
Thomomys bottae curtatus	San Antonio pocket gopher	5

SCIENTIFIC NAME	COMMON NAME	FACTOR(S)
Birds (33 total)		
Accipiter gentilis	Northern Goshawk	3,4,5, 6
Agelaius tricolor	Tricolor Blackbird	3,4,5
Aquila chrysaetos	Golden Eagle	4,6
Asio flammeus	Short-eared Owl	4
Asio otus	Long-eared Owl	4
Athene cunicularia	Burrowing Owl	3,4
Baeolophus griseus	Juniper Titmouse	4,5
Buteo regalis	Ferruginous Hawk	4,5
Buteo swainsoni	Swainson's Hawk	4,5
Centrocercus urophasianus	Greater Sage-Grouse	2,3
Charadrius alexandrinus	Snowy Plover	3,4
Chlidonias niger	Black Tern	3,4.5
Dolichonyx oryzivorus	Bobolink	3,4
Falco mexicanus	Prairie Falcon	3,4
Falco peregrinus	Peregrine falcon	3,4,5, 6
Grus canadensis	Sandhill Crane	5
Gymnorhinus cyanocephalus	Pinyon Jay	3,5
Icteria virens	Yellow-breasted Chat	4,5
Ixobrychus exilis	Least Bittern	5
Lanius ludovicianus	Loggerhead Shrike	2,3,4, 6
Leucosticte atrata	Black Rosy-Finch	5
Melanerpes lewis	Lewis's Woodpecker	3
Numenius americanus	Long-billed Curlew	5
Oreortyx pictus	Mountain quail	3,4,5
Otus flammeolus	Flammulated Owl	4
Phainopepla nitens	Phainopepla	5
Pooecetes gramineus	Vesper Sparrow	3
Sphyrapicus nuchalis	Red-naped Sapsucker	3
Toxostoma crissale	Crissal Thrasher	3,5
Toxostoma lecontei	LeConte's Thrasher	3,5
Tympanuchus phasianellus columbianus	Columbian Sharp-tailed Grouse	1,3,4
Vermivora luciae	Lucy's Warbler	3,5
Vireo vicinior	Gray Vireo	3,5

- **Note Bald Eagle(*Haliaeetus leucocephalus)* was delisted in '08' was moved to the BLM Sensitive Species list.**

SCIENTIFIC NAME	COMMON NAME	FACTOR(S)
Reptiles (6 total)		
Elgaria coerulea palmeri	Sierra alligator lizard	5, 6
Eumeces gilberti rubricaudatus	western red-tailed skink	5
Heloderma suspectum	Gila monster	4, 5, 6
Lampropeltis pyromelana	Sonoran mountain kingsnake	5, 6
Phrynosoma douglassii	short-horned lizard	5
Sauromalus obesus	Chuckwalla	5
Amphibians (3 total)		
Bufo microscaphus	Southwestern toad	4, 5
Bufo nelsoni	Amargosa toad	3, 5, 6
Rana pipiens	northern leopard frog	1, 3, 5, 6
Fishes (25 total)		
Catostomus clarki intermedius	White River desert sucker	5
Catostomus clarki ssp.	Meadow Valley Wash desert sucker	5, 6
Catostomus latipinnis	Flannelmouth sucker	3, 5
Catostomus sp.	Wall Canyon sucker	3, 5, 6
Crenichthys baileyi albivallis	Preston White River springfish	5, 6
Crenichthys baileyi thermophilus	Moorman White River springfish	5, 6
Gila bicolor euchila	Fish Creek Springs tui chub	5, 6
Gila bicolor isolata	Independence Valley tui chub	5, 6
Gila bicolor newarkensis	Newark Valley tui chub	5, 6
Gila bicolor ssp.	Big Smoky Valley tui chub	5, 6
Gila bicolor ssp.	Fish Lake Valley tui chub	5, 6
Gila bicolor ssp.	Hot Creek Valley tui chub	5, 6
Gila bicolor ssp.	Railroad Valley tui chub	3, 5, 6
Gila seminuda	Virgin River chub (Muddy River population only)	3, 5, 6
Lepidomeda mollispinis mollispinis	Virgin River spinedace	5, 6
Oncorhynchus clarki bouvieri	Yellowstone cutthroat trout	5
Oncorhynchus clarki utah	Bonneville cutthroat trout	5
Oncorhynchus mykiss gairdneri	interior redband trout	5
Relictus solitarius	relict dace	5, 6
Rhinichthys osculus lariversi	Big Smoky Valley speckled dace	5, 6

SCIENTIFIC NAME	COMMON NAME	FACTOR(S)
(Fishes continued)		
Rhinichthys coriacea	Moapa speckled dace	5, 6
(R. osculus moapae)		
Rhinichthys osculus velifer	Pahranagat speckled dace	3, 5
Rhinichthys osculus ssp.	Meadow Valley Wash speckled dace	5, 6
Rhinichthys osculus ssp.	Monitor Valley speckled dace	5, 6
Rhinichthys osculus ssp.	Oasis Valley speckled dace	3,5, 6
Rhinichthys osculus ssp.	White River speckled dace	3,5, 6
Snails (26 total)		
Oreohelix nevadensis	Schell Creek mountain snail	5
Pyrgulopsis aloba	Duckwater pyrg	5
Pyrgulopsis anatina	southern Duckwater pyrg	5
Pyrgulopsis augusta	elongate Cain Spring pyrg	5
Pyrgulopsis basiglans	large-gland Carico pyrg	5
Pyrgulopsis bruesi	Fly Ranch pyrg	5
Pyrgulopsis carinata	carinate Duckwater pyrg	5
Pyrgulopsis cruciglans	transverse gland pyrg	5
Pyrgulopsis deaconi	Spring Mountains pyrg	5
Pyrgulopsis dixensis	Dixie Valley pyrg	5
Pyrgulopsis humboldtensis	Humboldt pyrg	5
Pyrgulopsis landeyi	Landyes pyrg	5
Pyrgulopsis limaria	squat Mud Meadows pyrg	5
Pyrgulopsis micrococcus	Oasis Valley pyrg	5
Pyrgulopsis militaris	northern Soldier Meadow pyrg	5
Pyrgulopsis orbiculata	sub-globose Steptoe Ranch pyrg	5
Pyrgulopsis papillata	Big Warm Spring pyrg	5
Pyrgulopsis peculiaris	bifid duct pyrg	5
Pyrgulopsis pictilis	ovate Cain Spring pyrg	5
Pyrgulopsis sulcata	southern Steptoe pyrg	5
Pyrgulopsis umbilicata	southern Soldier Meadow pyrg	5
Pyrgulopsis villacampae	Duckwater Warm Springs pyrg	5
Pyrgulopsis vinyardi	Vinyards pyrg	5
Pyrgulopsis wongi	Wongs pyrg	5
Tryonia clathrata	grated tryonia	5
T. variegata	Amargosa tryonia	5

SCIENTIFIC NAME	COMMON NAME	FACTOR(S)
Clams & Mussels (1 total)		
Anodonta californiensis	California floater	4, 5
Ants, Wasps, Bees (2 total)		
Andrena balsamorhiza	Mojave gypsum bee	5
Perdita meconis	Mojave poppy bee	5
True Bugs (1 total)		
Pelocoris shoshone shoshone	Pahranagat naucorid bug	5
Beetles (14 total)		
Aegialia crescenta	Crescent Dune aegialian scarab	5
Aegialia hardyi	Hardy's aegialian scarab	5
Aegialia knighti	aegialian scarab beetle	5
Aegialia magnifica	large aegialian scarab	5
Aphodius sp.	Crescent Dune aphodius scarab	5
Aphodius sp	Big Dune aphodius scarab	5
Aphodius sp.	Sand Mountain aphodius scarab	5
Miloderes sp.	Rulien's miloderes weevil	5
Pseudocotalpa giulianii	Giuliani's dune scarab	5
Serica psammobunus	Sand Mountain serican scarab	5
Serica ammomenisco	Crescent Dune serican scarab	5
Serica humboldti	Humboldt serican scarab	5
Stenelmis calida calida	Devils Hole warm spring riffle beetle	5
Stenelmis moapa	Moapa warm spring riffle beetle	5
Butterflies (28 total)		
Cercyonis oetus alkalorum	Big Smoky wood nymph	5
Cercyonis oetus pallescens	pallid wood nymph	5
Cercyonis pegala carsonensis	Carson Valley wood nymph	5
Cercyonis pegala pluvialis	White River wood nymph	5
Chlosyne acastus robusta	Spring Mountains acastus checkerspot	5
Euphilotes ancilla giulianii	Giuliani's blue	5
Euphilotes ancilla shieldsi	Shield's blue	5
Euphilotes battoides fusimaculata	fused battoides blue	5
Euphilotes bernadino minuta	Baking Powder Flat blue	5

SCIENTIFIC NAME	COMMON NAME	FACTOR(S)
(Butterflies continued)		
Euphilotes enoptes primavera	early blue	5
Euphilotes mojave virginensis	northern Mojave blue	5
Euphilotes pallescens arenamontana	Sand Mountain blue	5
Euphilotes pallescens calneva	Honey Lake blue	5
Euphilotes pallescens mattonii	Mattoni's blue	5
Euphilotes pallescens ricei	Rice's blue	5
Euphydryas editha koreti	Koret's checkerspot	5
Euphydryas editha monoensis	Mono checkerspot	5
Hesperia miriamae longaevicola	White Mountains skipper	5
Hesperia uncas fulvapalla	Railroad Valley skipper	5
Hesperia uncas giulianii	Mono Basin skipper	5
Hesperia uncas grandiosa	White River Valley skipper	5
Hesperopsis gracielae	MacNeill sooty wing skipper	5
Phyciodes pascoensis arenacolor	Steptoe Valley crescentspot	5
Philotiella speciosa septentrionalis	Great Basin small blue	5
Polites sabuleti sinemaculata	Denio sandhill skipper	5
Pseudocopaeodes eunus alinea	Ash meadows alkali skipper	5
S*peyeria hesperis greyi*	Grey's silverspot	5
Speyeria nokomis carsonensis	Carson Valley silverspot	5
Plants (106 total)		
Angelica scabrida	rough angelica	5
Antennaria arcuata	meadow pussytoes	5
Arabis bodiensis	Bodie Hills rockcress	5
Arabis falcatoria	Grouse Creek rockcress	5
Arabis falcifructa	Elko rockcress	5
Arctomecon merriamii	white bearpoppy; Merriam b.	3, 5
Asclepias eastwoodiana	Eastwood milkweed	4
Astragalus aequalis	Clokey milkvetch; equal m.	5
Astragalus amphioxys var. *musimonum*	Sheep Mountain milkvetch; crescent m.	5
Astragalus anserinus	Goose Creek milkvetch	5
Astragalus eurylobus	Needle Mountains milkvetch; Peck Station m.	5
Astragalus funereus	black woollypod; Funeral milkvetch; black m.; Rhyolite m.	5

SCIENTIFIC NAME	COMMON NAME	FACTOR(S)
(Plants continued)		
Astragalus gilmanii	Gilman milkvetch	5
Astragalus mohavensis var. *hemygyrus*	halfring milkvetch; curvepod Mojave m.; Darwin Mesa m.	5
Astragalus mokiacensis	Mokiak milkvetch	5
Astragalus oophorus var. *lavinii*	Lavin eggvetch	5
Astragalus oophorus var. *lonchocalyx*	long-calyx eggvetch; pink e.	5
Astragalus remotus	Spring Mountains milkvetch	5
Astragalus robbinsii var. *occidentalis*	Lamoille Canyon milkvetch; Ruby m.; Robbin's western m.	5
Astragalus solitarius	lonesome milkvetch; weak m.	5
Astragalus tiehmii	Tiehm milkvetch	5
Astragalus toquimanus	Toquima milkvetch	5
Astragalus uncialis	Currant milkvetch	5
Botrychium crenulatum	dainty moonwort; crenulate m.	5
Calochortus striatus	alkali mariposa lily; striped m. l.	5
Camissonia megalantha	Cane Spring evening-primrose	5
Chrysothamnus eremobius	remote rabbitbrush; Pintwater r.	5
Collomia renacta	Barren Valley collomia	5
Cordylanthus tecopensis	Tecopa birdbeak	5
C*ryptantha schoolcraftii*	Schoolcraft catseye	5
Cryptantha welshii	White River catseye; Welsh c.	5
Cusickiella quadricostata	Bodie Hills draba; four-rib whitlowgrass	5
Cymopterus goodrichii	Goodrich biscuitroot; G. parsley	5
Cymopterus ripleyi var. *saniculoides*	sanicle biscuitroot; Ripley b.	5
Dermatocarpon luridum	stream stippleback lichen	5
Didymodon nevadensis	Gold Butte moss	5
Enceliopsis argophylla	silverleaf sunray	5
Epilobium nevadense	Nevada willowherb	5
Erigeron latus	broad fleabane	5
Erigeron ovinus	sheep fleabane	5
Eriogonum anemophilum	windloving buckwheat	5
Eriogonum bifurcatum	Pahrump Valley buckwheat; forked b.	5
Eriogonum corymbosum	Las Vegas buckwheat	5
Eriogonum crosbyae	Crosby buckwheat	5

SCIENTIFIC NAME	COMMON NAME	FACTOR(S)
(Plants continued)		
Eriogonum diatomaceum	Churchill Narrows buckwheat	5
Eriogonum heermannii var. *clokeyi*	Clokey buckwheat	5
Eriogonum lewisii	Lewis buckwheat	5
Eriogonum phoeniceum	scarlet buckwheat	5
Eriogonum prociduum	prostrate buckwheat; Austin b.	5
Eriogonum robustum	altered andesite buckwheat; Lobb b.	5
Eriogonum tiehmii	Tiehm buckwheat	5
Eustoma exaltatum	catchfly gentian	5
Galium hilendiae ssp. *kingstonense*	Kingston bedstraw	5
Glossopetalon pungens var. *glabrum*	smooth dwarf greasebush	5
Glossopetalon pungens var. *pungens*	rough dwarf greasebush	5
Ionactis caelestis	Red Rock Canyon aster	5
Ivesia aperta var. *aperta*	Sierra Valley ivesia	5
Ivesia arizonica var. *saxosa*	rock purpusia	5
Ivesia jaegeri	Jaeger ivesia	5
Ivesia pityocharis	Pine Nut Mountains ivesia; P.N.M. mousetails	5
Ivesia rhypara var. *rhypara*	grimy ivesia	5
Jamesia tetrapetala	waxflower	5
Lathyrus grimesii	Grimes vetchling	5
Lepidium davisii	Davis peppergrass	5
Lepidium montanum var. *nevadense*	Pueblo Valley peppergrass	5
Leptodactylon glabrum	Bruneau River prickly phlox; Owyhee p. p.	5
Lotus argyraeus var. *multicaulis*	scrub lotus	5
Lupinus holmgrenianus	Holmgren lupine	5
Mentzelia argillicola	Pioche blazingstar	5
Mentzelia mollis	smooth stickleaf	5
Mentzelia tiehmii	Tiehm blazingstar	5
Oryctes nevadensis	oryctes	5
Parthenium ligulatum	ligulate feverfew	5
Penstemon albomarginatus	white-margined beardtongue	5
Penstemon arenarius	Nevada dune beardtongue	5
Penstemon bicolor ssp. *bicolor*	yellow twotone beardtongue	5
Penstemon bicolor ssp. *roseus*	rosy twotone beardtongue	5

SCIENTIFIC NAME	COMMON NAME	FACTOR(S)
(Plants continued)		
Penstemon concinnus	Tunnel Springs beardtongue	5
Penstemon floribundus	Cordelia beardtongue	5
Penstemon fruticiformis ssp. *amargosae*	Death Valley beardtongue; Amargosa bush penstemon	5
Penstemon pahutensis	Pahute Mesa beardtongue	5
Penstemon palmeri var. *macranthus*	Lahontan beardtongue	5
Penstemon pudicus	bashful beardtongue	5
Penstemon tiehmii	Tiehm beardtongue	5
Phacelia beatleyae	Beatley scorpion plant	5
Phacelia filiae	overlooked phacelia; Clarke phacelia	5
Phacelia inundata	playa phacelia	5
Phacelia minutissima	least phacelia; dwarf phacelia	5
Phacelia monoensis	Mono phacelia	5
Phacelia parishii	Parish phacelia; playa p.	5
Pinus washoensis	Washoe pine	5
Plagiobothrys glomeratus	altered andesite popcornflower	5
Porophyllum pygmaeum	pygmy poreleaf	5
Potentilla cottamii	Cottam cinquefoil	5
Salvia dorrii var. *clokeyi*	Clokey mountain sage; C. purple sage	5
Sclerocactus blainei	Blaine pincushion; B. fishhook cactus	5
Sclerocactus nyensis	Nye pincushion	5
Sclerocactus schlesseri	Schlesser pincushion; S. fishhook cactus	5
Silene nachlingerae	Jan's catchfly; Nachlinger catchfly	5
Sphaeralcea caespitosa var. *williamsiae*	Railroad Valley globemallow	5
Streptanthus oliganthus	Masonic Mountain jewelflower; M. M. twistflower	5
Stroganowia tiehmii	Tiehm stroganowia	5
Tonestus graniticus	Lone Mountain tonestus	5
Townsendia jonesii var. *tumulosa*	Charleston grounddaisy	5
Trifolium andinum var. *podocephalum*	Currant Summit clover	5
Trifolium leibergii	Leiberg clover	5
Viola lithion	rock violet	5

APPROVED BY

Signed by:
Robert V. Abbey
State Director, Nevada
U.S. Bureau of Land Management
Date: 07-01-03

Signed by:
R. Michael Turnipseed, P.E.
Director, Nevada Department of
Conservation and Natural Resources
Date: 07-10-03

Signed by:
Terry R. Crawforth
Director, Nevada Department of Wildlife
Date: 07-14-03

Species with a high probability of being added to the BLM's SSS List

Sorex merriami	*Merriam's shrew*	
Ochotona princeps	American pika	2, 4, 5, 6
Castillija salsuginosa	Monte Neva paintbrush	5, 6
Polyctenium williamsiae	William's combleaf	?

APPENDIX E

Water Quality Results for the Tailings Storage Facility

Summary of Fine Tailings Analytical Data

		3/17/2008	9/15/2008	9/15/2008	12/17/2008	3/19/2009	6/16/2009	9/23/2009	NDEP Profile I
Metals (Total)				**Dissolved**					**Dissolved**
EPA 245.1	Mercury	< 0.00020	0.00021	< 0.00020	0.00051	< 0.00020	< 0.00020	< 0.00020	**0.002**
Metals (Total Recoverable--reportable as Total per 40 CFR 136)									
EPA 200.7	Aluminum	**2.13**	**2.61**	0.099	**2.34**	**3.45**	**1.54**	**0.528**	**0.2**
EPA 200.7	Barium	**7.96**	**2.51**	0.174	**7.31**	**3.47**	0.683	0.158	**2.0**
EPA 200.7	Beryllium	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	**0.004**
EPA 200.7	Boron	0.217	0.292	0.314	0.259	0.220	0.174	0.178	--
EPA 200.7	Cadmium	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	**0.005**
EPA 200.7	Calcium	38.3	35.7	38.1	35.6	42.5	130	0.04	--
EPA 200.7	Chromium	0.0069	< 0.0060	< 0.0060	0.0068	0.0119	<0.0060	<0.0060	**0.1**
EPA 200.7	Copper	< 0.010	< 0.010	< 0.010	0.012	<0.010	<0.010	<0.010	**1.0**
EPA 200.7	Iron	**2.83**	**1.58**	< 0.060	**2.8**	**1.78**	**1.64**	0.060	**0.6**
EPA 200.7	Magnesium	14.0	12.4	13.3	10.8	16.3	58.5	56.0	**150**
EPA 200.7	Manganese	0.0300	0.0392	< 0.0040	0.0762	0.0520	**0.320**	0.0833	**0.10**
EPA 200.7	Nickel	< 0.010	< 0.010	< 0.010	< 0.010	<0.010	<0.010	<0.010	**0.1**
EPA 200.7	Potassium	11.1	13.6	13.6	12.7	11.4	2.85	2.85	--
EPA 200.7	Silver	< 0.0050	< 0.0050	< 0.0050	< 0.0050	<0.0050	<0.0050	<0.0050	**0.1**
EPA 200.7	Sodium	55.5	66.3	75.2	58.1	58.4	64.4	65.1	--
EPA 200.7	Zinc	< 0.0100	< 0.0100	< 0.0100	0.0165	< 0.0100	0.0105	< 0.0100	**5.0**
EPA 200.8	Antimony	< 0.00300	< 0.00300	< 0.00300	0.00313	< 0.00300	< 0.00300	< 0.00300	**0.006**
EPA 200.8	Arsenic	0.00754	0.0155	0.0104	0.00897	0.00540	< 0.00300	< 0.00300	**0.010**
EPA 200.8	Lead	0.00527	< 0.00300	< 0.00300	0.00813	< 0.00300	< 0.00300	< 0.00300	**0.015**
EPA 200.8	Selenium	0.00392	0.00311	0.00308	< 0.00300	< 0.00300	0.0113	0.00509	**0.05**
EPA 200.8	Thallium	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	**0.002**
Classical Chemistry Parameters									
EPA 353.2	Nitrate/Nitrite as N	0.154	< 0.0500		0.173	< 0.0500	0.877	< 0.0500	**10**
SM 2320B	Bicarbonate	143	166		167	148	111	111	--
SM 2320B	Carbonate	<1.0	9.4		< 1.0	< 1.0	< 1.0	<1.0	--
SM 2320B	Total Alkalinity	143	176		167	148	111	111	--
SM 2540 C	Total Diss. Solids	420	440		500	405	941	811	**1000**
SM 4500 H B	pH @20.0°C	8.15	8.4		7.86	8.17	8.24	8.16	**6.5 - 8.5**
Anions by Ion Chromatography									
EPA 300.0	Chloride	23.4	28.2		29.2	24.3	79.6	81.8	**400**
EPA 300.0	Fluoride	0.970	1.46		1.3	1.17	0.669	0.400	**4.0**
EPA 300.0	Sulfate as SO4	97.1	87.9		84.5	116	**542**	418	**500**

Note: All metals were analyzed for Total Recoverable Metals except the 09/15/2008 sample in the shaded box. NDEP Profile I Standards are for dissolved fraction only.

APPENDIX F

Wildlife Species with Potential to Occur in the Project Area

Wildlife Species List – Unit 141 – Cortez Range - Central Eureka County - Central Nevada

(Sagebrush Steppe, Mountain Brush and Pinyon Juniper Habitats)

Birds

Order: *Ciconiiformes* (Long-legged Waders)

Family: *Cathartidae* (New World Vultures)

Turkey Vulture	*Cathartes aura*

Order: *Falconiformes* (Diurnal Flesh Eaters)

Family: *Accipitridae* (Hawks, Eagles, Osprey)

Bald Eagle	*Haliaetus leucocephalus*
Northern Harrier	*Circus cyaneus*
Sharp-shinned Hawk	*Accipiter striatus*
Cooper's Hawk	*Accipiter cooperii*
Northern Goshawk	*Accipiter gentilis*
Swainson's Hawk	*Buteo swainsoni*
Red-tailed Hawk	*Buteo jamaicensis*
Ferruginous Hawk	*Buteo regalis*
Rough-legged Hawk	*Buteo lagopus*
Golden Eagle	*Aquila chrysaetos*

Family: *Falconidae* (Falcons)

American Kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Gyrfalcon	*Falco rusticolus*
Peregrine Falcon	*Falco perigrinus*
Prairie Falcon	*Falco mexicanus*

Order: *Galliformes* (Chicken Relatives)

Family: *Phasianidae* (Grouse, Partridge)

Chukar	*Alectoris chukar*
Gray Partridge	*Perdix perdix*
Greater Sage-Grouse	*Centrocercus urophasianus*

Family: *Odontophoridae* (New World Quail)

Mountain Quail	*Oreortyx pictus*

Order: *Columbiformes* (Pigeons and Allies)

Family: *Columbidae* (Doves)

Rock Dove	*Columba livia*
White-winged Dove	*Zenaida asiatica*
Mourning Dove	*Zenaida macroura*

Order: *Strigiformes* (Nocturnal Flesh Eaters)

Family: *Tytonidae* (Barn Owls)

Barn Owl	*Tyto alba*

Family: *Strigidae* (Owls)

Flammulated Owl	*Otus flammeolus*
Western Screech-Owl	*Otus kennicottii*
Great Horned Owl	*Bubo virginianus*
Snowy Owl	*Nyctea scandiaca*
Northern Pygmy-Owl	*Glaucidium gnoma*
Burrowing Owl	*Athene cunicularia*
Long-eared Owl	*Asio otus*
Short-eared Owl	*Asio flammeus*
Northern Saw-whet Owl	*Aegolius acadicus*

Order: *Caprimulgiformes* (Night Jars)

Family: *Caprimulgidae* (Goatsuckers)

Common Nighthawk	*Chordeiles minor*
Common Poorwill	*Phalaenoptilus nuttallii*

Order: *Apodiformes* (Small Fast Fliers)

Family: *Apodidae* (Swifts)

White-throated Swift	*Aeronautes saxatalis*

Family: *Trochilidae* (Hummingbirds)

Black-chinned Hummingbird	*Archilochus alexandri*
Calliope Hummingbird	*Stellula calliope*
Broad-tailed Hummingbird	*Selasphorus platycercus*
Rufous Hummingbird	*Selasphorus rufus*

Order: *Piciformes* (Cavity Builders)

Family: *Picidae* (Woodpeckers)

Lewis' Woodpecker	*Melanerpes lewis*
Red-naped Sapsucker	*Sphyrapicus nuchalis*
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*
Northern Flicker	*Colaptes auratus*

Order: *Passeriformes* (Perching Birds)

Family: *Tyrannidae* (Flycatchers)

Olive-sided Flycatcher	*Contopus cooperi*
Western Wood-Pewee	*Contopus sordidulus*
Willow Flycatcher	*Epidonax traillii*
Gray Flycatcher	*Epidonax wrightii*
Dusky Flycatcher	*Epidonax oberholseri*
Cordilleran Flycatcher	*Epidonax occidentalis*
Say's Phoebe	*Sayornis saya*
Ash-throated Flycatcher	*Myiarchus cinerascens*
Western Kingbird	*Tyrannus verticalis*

Family: *Laniidae* (Shrikes)

Loggerhead Shrike	*Lanius ludovicianus*
Northern Shrike	*Lanius excubitor*

Family: *Vireonidae* (Vireos)

Plumbeous Vireo	*Vireo plumbeus*
Warbling Vireo	*Vireo gilvus*

Family: *Corvidae* (Jays)

Western Scrub-Jay	*Aphelocoma californica*

Pinyon Jay	*Gymnorhinus cyanocephalus*
Clark's Nutcracker	*Nucifraga columbiana*
Black-billed Magpie	*Pica pica*
American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*

Family: *Alaudidae* (Larks)

Horned Lark	*Eremophila alpestris*

Family: *Hirundinidae* (Swallows)

Tree Swallow	*Tachycineta bicolor*
Violet-green Swallow	*Tachycineta thalassina*

Family: *Paridae* (Chickadees, Titmice)

Mountain Chickadee	*Poecile gambeli*
Juniper Titmouse	*Baeolophus griseus*

Family: *Aegithalidae* (Bushtits)

Bushtit	*Psaltriparus minimus*

Family: *Sittidae* (Nuthatches)

Red-breasted Nuthatch	*Sitta canadensis*
White-breasted Nuthatch	*Sitta carolinensis*

Family: *Certhiidae* (Creepers)

Brown Creeper	*Certhia americana*

Family: *Troglodytidae* (Wrens)

Rock Wren	*Salpinctes obsoletus*
Canyon Wren	*Catherpes mexicanus*

Family: *Regulidae* (Kinglets)

Golden-crowned Kinglet	*Regulus satrapa*
Ruby-crowned Kinglet	*Redulus calendula*

Family: *Sylviidae* (Gnatcatchers)

Blue-gray Gnatcatcher	*Polioptila caerulea*

Family: *Turdidae* (Thrushes)

Western Bluebird	*Sialia mexicana*
Mountain Bluebird	*Sialia currucoides*
Townsend's Solitaire	*Myadestes townsendi*
Swainson's Thrush	*Catharus ustulatus*
Hermit Thrush	*Catharus guttatus*
American Robin	*Turdus migratorius*

Family: *Mimidae* (Thrashers, Mockingbirds)

Northern Mockingbird	*Mimus polyglottos*
Sage Thrasher	*Oreoscoptes montanus*

Family: *Sturnidae* (Starlings)

European Starling	*Sturnus vulgaris*

Family: *Motacillidae* (Pipits)

American Pipit	*Anthus rubescens*

Family: *Bombycillidae* (Waxwings)

Bohemian Waxwing	*Bombycilla garrulus*
Cedar Waxwing	*Bombycilla cedrorum*

Family: *Parulidae* (Wood Warblers)

Virginia's Warbler	*Vermivora virginae*
Yellow Warbler	*Dendroica petechia*
Black-throated Gray Warbler	*Dendroica nigrescens*
Wilson's Warbler	*Wilsonia pusilla*

Family: *Thraupidae* (Tanagers)

Western Tanager	*Piranga ludoviciana*

Family: *Emberizidae* (Sparrows, Towhees, Juncos)

Green-tailed Towhee	*Pipilo chlorurus*
Spotted Towhee	*Pipilo maculatus*
American Tree Sparrow	*Spizella arborea*
Chipping Sparrow	*Spizella passerina*
Brewer's Sparrow	*Spizella breweri*
Vesper Sparrow	*Pooecetes gramineus*
Lark Sparrow	*Chondestes grammacus*
Black-throated Sparrow	*Amphispiza bileneata*
Sage Sparrow	*Amphispiza belli*
Fox Sparrow	*Passerella iliaca schistacea*
Song Sparrow	*Melospiza melodia*
Gambel'sWhite-crownedSparrow	*Zonotrichia leucophrys gambelii*
Mountain W-crowned Sparrow	*Zonotrichia leucophrys oriantha*
Dark-eyed Junco*(Oregon)*	*Junco hyemalis therburi*
Dark-eyed Junco(*Gray-headed*)	*Junco hyemalis caniceps*
Lapland Longspur	*Calcarius lapponicus*

Family: *Cardinalidae* (Grosbeaks, Buntings)

Black-headed Grosbeak	*Pheucticus melanocephalus*
Lazuli Bunting	*Passerina amoena*

Family: *Icteridae* (Blackbirds, Orioles)

Red-winged Blackbird	*Agelaius phoeniceus*
Western Meadowlark	*Sturnella neglecta*
Brewer's Blackbird	*Euphagus cyanocephalus*
Great-tailed Grackle	*Quiscalus mexicanus*
Brown-headed Cowbird	*Molothrus ater*
Bullock's Oriole	*Icterus bullockii*
Scott's Oriole	*Icterus parisorum*

Family: *Fringillidae* (Finches, Grosbeaks)

Gray-crowned Rosy-Finch	*Leucosticte tephrocotis*
Black Rosy-Finch	*Leucosticte atrata*
Cassin's Finch	*Carpodacus cassinii*
House Finch	*Carpodacus mexicanus*
Pine Siskin	*Carduelis pinus*
Lesser Goldfinch	*Carduelis psaltria*
American Goldfinch	*Carduelis tristis*
Evening Grosbeak	*Coccothraustes vespertinus*

Family: *Passeridae* (Old World Sparrows)

House Sparrow	*Passer domesticus*

Mammals

Order: *Insectivora* (Insect Eaters)

Family: *Soricidae* (Shrews)

Merriam's Shrew	*Sorex meriammi*
Dusky Shrew	*Sorex monticolus*
Vagrant Shrew	*Sorex vagrans*
Preble's Shrew	*Sorex preblei*

Order: *Chiroptera* (Bats)

Family: *Vespertilionidae* (Plainnose Bats)

California Myotis	*Myotis californicus*
Western Small-footed Myotis	*Myotis ciliolabrum*
Long-eared Myotis	*Myotis evotis*

Little Brown Bat	*Myotis lucifugus*
Fringed Myotis	*Myotis thysanodes*
Long-legged Myotis	*Myotis volans*
Yuma Myotis	*Myotis yumanensis*
Hoary Bat	*Lasiurus cinereus*
Silver-haired Bat	*Lasionycteris noctivagans*
Western Pipistrelle	*Pipistrellus hesperus*
Big Brown Bat	*Eptesicus fuscus*
Townsend's Big-eared Bat	*Corynorhinus townsendii*
Pallid Bat	*Antrozous pallidus*

Family: *Molossidae* (Freetail Bats)

Brazilian Free-tailed Bat	*Tadarida brasiliensis*

Order: *Lagomorpha* (Pikas, Hares, Rabbits)

Family: *Leporidae* (Hares, Rabbits)

Black-tailed Jackrabbit	*Lepus californicus*
Mountain Cottontail	*Sylvilagus nuttalli*
Desert Cottontail	*Sylvilagus audubonii*
Pygmy Rabbit	*Brachylagus idahoensis*

Order: *Rodentia* (Rodents)

Family: *Sciuridae* (Squirrels)

Least Chipmunk	*Tamias minimus*
Cliff Chipmunk	*Tamias dorsalis*
Uinta Chipmunk	*Tamias umbrinus*
Yellow-bellied Marmot	*Marmota flaviventris*
White-tailed Antelope Squirrel	*Ammospermophilus leucurus*
Great Basin Ground Squirrel	*Spermophilus mollis*
Belding's Ground Squirrel	*Spermophilus beldingi*
Golden-mantled Ground Squirrel	*Spermophilus lateralis*
Rock Squirrel	*Spermophilus variegatus*

Family: *Geomyidae* (Gophers)

Botta's Pocket Gopher	*Thomomys bottae*
Northern Pocket Gopher	*Thomomys talpoides*
Townsend's Pocket Gopher	*Thomomys townsendii*

Family: *Heteromyidae* (Kangaroo Rodents)

Little Pocket Mouse	*Perognathus longimembris*
Great Basin Pocket Mouse	*Perognathus parvus*
Dark Kangaroo Mouse	*Microdipodops megacephalus*

Family: *Heteromyidae* (Kangaroos cont.)

Ord Kangaroo Rat	*Dipodomys ordii*
Chisel-toothed Kangaroo Rat	*Dipodomys microps*

Family: *Cricetidae* (Mice, Rats, Voles)

Western Harvest Mouse	*Reithrodontomys megalotis*
Canyon Mouse	*Peromyscus crinitus*
Deer Mouse	*Peromyscus maniculatus*
Pinion Mouse	*Peromyscus truei*
Northern Grasshopper Mouse	*Onychomys leucogaster*
Desert Woodrat	*Neotoma lepida*
Bushy-tailed Woodrat	*Neotoma cinerea*
Mountain Vole	*Microtus montanus*
Sagebrush Vole	*Lemmiscus curtatus*

Family: *Erethizontidae* (New World Porcupines)

North American Porcupine	*Erethizon dorsatum*

Order: *Carnivora* (Flesh-Eaters)

Family: *Canidae* (Dogs)

Coyote	*Canis latrans*
Gray Wolf	*Canis lupus (L.E.)*
Common Gray Fox	*Urocyon cinereoargenteus*
Kit Fox	*Vulpes velox*
Red Fox	*Vulpes vulva*

Family: *Procyonidae* (Racoons and Allies)

Ringtail	*Bassariscus astutus*
Common Raccoon	*Procyon lotor*

Family: *Mustelidae* (Weasels and Allies)

Short-tailed Weasel	*Mustela erminae*
Long-tailed Weasel	*Mustela frenata*
American Badger	*Taxidea taxus*
Striped Skunk	*Mephitis mephitis*
Western Spotted Skunk	*Spilogale gracilis*

Family: *Felidae* (Cats)

Mountain Lion	*Felix concolor*
Bobcat	*Lynx rufus*

Order: *Artiodactyla* (Hoofed Mammals)

Family: *Cervidae* (Deer)

Rocky Mountain Elk	*Cervus canadensis*
Mule Deer	*Odocoileus hemionus*

Family: *Antilocapridae* (Pronghorn)

Pronghorn	*Antilocapra americana*

Family: *Bovidae* (Bison, Sheep, Goats)

Desert Bighorn Sheep	*Ovis canadensis nelsoni (L.E.)*

Reptiles

Order: *Squamata* (Lizards, Snakes)

Family: *Iguanidae* (Iguanas and Allies)

Common Zebra-tailed Lizard	*Callisaurus draconoides*
Long-nosed Leopard Lizard	*Gambelia wislizenii*
Desert Spiny Lizard	*Sceloporus magister*
Western Fence Lizard	*Sceloporus occidentalis*
Sagebrush Lizard	*Sceloporus graciosus*
Side-blotched Lizard	*Uta stansburiana*
Greater Short-horned Lizard	*Phrynosoma hernadesi*
Desert Horned Lizard	*Phrynosoma platyrhinos*

Family: *Scincidae* (Skinks)

Western Skink	*Eumeces skiltonianus*

Family: *Teiidae* (Whiptails)

Western Whiptail	*Cnemidophorus tigrus*

Family: *Colubridae* (Solid-toothed Snakes)

Striped Whipsnake	*Masticophis taeniatus*
Western Yellow-bellied Racer	*Coluber constrictor mormon*
Great Basin Gopher Snake	*Pituophis cantenifer deserticola*
Long-nosed Snake	*Rhinocheilus lecontei*
Western Terrestrial Garter	*Thamnophis elegans*

Ground Snake	*Sonora semiannulata*
Night Snake	*Hypsiglena torquata*

Family: *Viperidae* (Vipers)

Great Basin Rattlesnake	*Crotalus viridis lutosus*

Amphibians

Order: *Anura* (Frogs and Toads)

Family: *Pelobatidae* (Spadefoots)

Great Basin Spadefoot Toad	*Spea intermontana*

L.E. = Locally Extirpated

Note: This list is a combination of wildlife sight record data and our best effort to predict what wildlife species live in this area in all seasons and under optimum habitat conditions.

*With the exception of the European Starling, House Sparrow, Eurasian Collared-Dove,Ringed Turtle-Dove and Rock Dove, all birds are protected in Nevada by either the International Migratory Bird Treaty Act, Endangered Species Act or as game species. Several mammal, reptile and amphibian species are also protected as either game, sensitive, threatened or priority species. For further information on a species status, visit our web site at *NDOW.ORG.*

Updated: 10/2008 - Peter V. Bradley - Nevada Department of Wildlife - Elko, Nevada.

FIGURES