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SUPERFUND &
EMERGENCY
MANAGEMENT
DIVISON

ACTION MEMORANDUM

SUBJECT: Approval and Funding for a Removal Action at the Opalite Mine Site, Malheur County, Oregon

FROM: Michael Boykin, On-Scene Coordinator MB 2/20/2020
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THRU: Wally Moon, Section Chief WSM 2/20/2020
Superfund and Emergency Management Division

TO: Sheila Fleming, Acting Division Director
Superfund and Emergency Management Division

SITE ID: 10PY

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of a Time-Critical Removal Action described herein for the Opalite Mine Site (Site) located in the southeast corner of Oregon, in Malheur County, Oregon.

The Time-Critical Removal Action will be conducted as a U.S. Environmental Protection Agency (EPA) lead action in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601, *et seq.* (CERCLA).

The scope of this Time-Critical Removal Action will address the ongoing release of hazardous substances to the environment and restrict access to the hazardous substances at the Site in order to reduce the potential of exposure to the public.

II. SITE CONDITIONS AND BACKGROUND

A. Site Description

Site Name:	Opalite Mine Site
Superfund Site ID (SSID):	10PY
NRC Case Number:	None
CERCLIS Number:	ORN001002255

Site Location:	Section 33, Township 40 South, Range 40 East, W.M., Tax Lot #700, Malheur County, Oregon
Latitude:	42.050945
Longitude:	-118.035992
Potentially Responsible Party (PRP):	See Confidential Enforcement Addendum
Access:	Granted by Bradley Mining Company and Owyhee Caldera Minerals
NPL Status:	Not proposed as an NPL site
Anticipated Removal Start Date:	March 30, 2020

1. Removal Site Evaluation

The Opalite Mine Site is an inactive mercury mine located on private land in southeast Oregon (Figure 1). Figure 2 shows the Site and its major features, which include a large open pit known as the Glory Hole, two large Burned Ore Piles, an Ore Processing Area, several adits, a large Overburden Dump, and other smaller Waste Rock Piles. Past Site investigations have shown that these unsecured piles of mine waste rock and burned ore contain elevated levels of arsenic, mercury, and antimony and are distributed throughout the Site. Furthermore, field observations and reports from stakeholder representatives indicate that the public is likely removing material from the unsecured piles for off-Site use.

EPA and the Oregon Department of Environmental Quality (DEQ) have performed several previous site investigations to characterize the Site. The objectives and results of these investigations are summarized below.

DEQ Preliminary Assessment (2000)
DEQ conducted a Site visit on June 6, 2000 and collected three soil samples and one sediment sample. The samples were analyzed for total mercury, and the results are summarized below:

Sample Location	Total Mercury (mg/kg)
Glory Hole (Open Pit)	51
#1 Adit	478
Burned Ore	21.8
Mine Creek Sediment	110

Soil sample results were compared to EPA Region 9 Preliminary Remedial Goals (PRGs; November 2000) for residential and industrial sites and Oregon Level II Ecological Screening Benchmark for Terrestrial Receptors (1998) for plants and invertebrates. The sediment sample results were compared to National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Table (SQuiRT) (1999) values for freshwater sediments. The data from the limited number of samples indicated the presence of mercury above the residential PRG (23 milligrams per kilogram (mg/kg)) and the State of Oregon Ecological Benchmarks for Terrestrial Receptors (0.3 mg/kg for plants and 0.1 for invertebrates) (DEQ 2001).

The Preliminary Assessment evaluated targets for the four pathways to evaluate eligibility for potential placement on the National Priorities List. The report summarized that human receptors included occasional Site visitors and workers performing mineral exploration activities and ecological receptors

included Lahontan Cutthroat trout (federally-listed threatened species) present in McDermitt Creek, three miles downstream of the Site. Although the possibility of acid rock drainage was evaluated during the DEQ investigation, its presence was not noted in the field (DEQ 2001).

EPA Site Inspection (2002)

EPA's Superfund Technical Assessment and Response Team (START) contractor conducted a Site Inspection in 2002. During the investigation, soil samples were collected from 10 Site source areas and one background location analyzed for Target Analyte List Metals. The mercury and arsenic results of these samples are summarized below:

Sample Location	Number of Samples	Maximum Total Mercury (mg/kg)	Maximum Total Arsenic (mg/kg)
Burned Ore Piles	4	70.2	1,060
Ore Processing Area	4	498	334
Glory Hole	1	792	289
#1 Adit	1	38.4	286
Background	1	0.88	5

The sample results were compared to a background sample, and the Site Inspection report concluded that the Site sources contained several metals, including mercury and arsenic as well as barium, nickel, and selenium, that were present at concentrations significantly above background concentrations (Weston 2003).

In addition, four sediment samples were collected from Mine Creek downgradient of the Site and one background location from Mine Creek upstream of the Site. Mercury and arsenic were detected at concentrations that were significantly above background levels in all four downgradient samples in Mine Creek (Weston 2003).

Assessment of Opalite Mine on Macroinvertebrate Communities of Mine, Hot and McDermitt Creeks (2004)

The DEQ Watershed Assessment Division conducted an assessment of the benthic community of the Mine, Hot, and McDermitt Creeks. To assess the impact on the benthic community a set of six areas were sampled upstream, downstream, and in the Cottonwood Creek watershed, located east of the Site. The primary objective was to document the macroinvertebrate community composition to assess potential biological impairment due to impacts from the Opalite Mine. Lahontan Cutthroat trout occur in the McDermitt Creek drainage and are listed as sensitive by the Oregon Department of Fish and Wildlife (ODFW). Chemical water quality samples were also collected as part of this assessment. Study results indicated that impacts from the Opalite Mine exist in Mine, Hot, and McDermitt Creeks. It was stated that, although the River Invertebrate Prediction and Classification System (RIVPACS) model did not seem to indicate biotic impairment due to loss of taxa, the temperature, sediment, and metals diagnostic stressor tools indicated that there had been a noticeable shift in community structure that clearly implicated degraded biotic integrity which was caused by temperature, fine sediment pollution, and the presence of toxic metals. It was concluded that improvement in stream habitat and a decrease in toxic run-off from the Opalite Mine would be beneficial to the benthic communities of Mine, Hot, and McDermitt Creeks (DEQ 2004).

DEQ Opalite Mine Site Investigation (2003-2004)

In 2003 and 2004, DEQ performed a Site Investigation (SI). During the SI, surface soil, surface water, sediment, road material, and fish tissue samples were collected. Two samples were collected from the Glory Hole, and four samples were collected from waste rock. In addition to field screening and laboratory analysis for total metals, selected samples also were analyzed for methylmercury, mercury selective sequential extraction (SSE), synthetic precipitation leaching procedure (SPLP), acid generating potential, and arsenic speciation. Surface samples of source materials from the Glory Hole, Ore Processing Area, the Overburden Dump, Waste Rock Piles, and Burned Ore Piles as well as a downgradient sediment sample were analyzed for mercury SSE. Results indicated that the majority (between 86.9% to 99.9%) of the total mercury in the source samples and a Cowboy Creek sediment sample could be characterized as the comparatively less soluble fractions, including the strong complexed (also referred to as elemental mercury) or the mineral bound (also referred to as mercuric sulfide) fractions. Between 0.1% and 13.1% of the total mercury in the samples was in the comparatively more soluble fractions. Depending on location and environmental conditions, such relatively soluble forms of mercury may be more bioavailable and potentially pose an increased risk to ecological receptors (E & E 2005).

Results of the SI and previous investigations indicated on-Site metals contamination over a broad area, including the Glory Hole, Ore Processing Area, Burned Ore Piles, Waste Rock Piles, and the Overburden Dump. Results also indicated that on-Site metals contamination may be impacting downgradient surface water, sediment, and fish. Contaminants of potential concern (COPCs) that may pose a risk to human health include antimony, arsenic, and mercury in Site sources, and organic arsenic, arsenic (III), chromium, lead, and mercury in fish. Compounds of potential ecological concern (CPECs) in Site sources that may pose a risk to ecological receptors include aluminum, antimony, arsenic, barium, chromium, iron, mercury, nickel, vanadium, and zinc. CPECs identified in sediment include arsenic, cadmium, mercury, nickel, selenium, and zinc. CPECs identified in surface water include arsenic, cadmium, mercury, nickel, selenium, vanadium, and zinc (E & E 2005).

Due to the depth of groundwater, and lack of receptors, the groundwater pathway for human receptors does not appear to be significant, although possible shallow groundwater-surface water interactions were not evaluated (E & E 2005).

An ecological survey was also completed as part of the SI. No threatened or endangered species were identified within a 2-mile radius of the Site during the SI (E & E 2005). However, the Lahontan cutthroat trout and the kit fox are federal or State-listed species with ranges that extend into the vicinity of the Site. The Lahontan cutthroat trout (Oncorhynchus clarki henshawi) is present in McDermitt Creek downstream of the Opalite Mine (Weston 2002). The Lahontan cutthroat trout is listed as a threatened species by the United States Fish and Wildlife Service (USFWS) as well as ODFW (USFWS 2017). The kit fox (Vulpes macrotis) is listed as a threatened species by the ODFW. Although kit foxes are rare in Oregon, ODFW has recently investigated their occurrence in the vicinity of Opalite Mine, specifically in the Trout Creek Mountains west of the Site (USFWS 2015, Oregon Wildlife Institute 2017).

DEQ Site Visit (2014)
DEQ visited Opalite Mine in 2014 and photographed Site conditions current at that time. The Site was open to the public with no physical access restrictions (e.g., fences or gates). DEQ photographed several of the posted warning signs and determined that maintenance was required to update degraded signage. DEQ observed areas of the Northern and Southern Burned Ore Piles that appeared to have been recently disturbed near the ground surface. DEQ expressed concern that the public may be removing burned ore from the Site, possibly for use as fill material. DEQ requested that EPA investigate the Site for potential threats to human health and the environment (DEQ 2014; 2016).

EPA Removal Site Evaluation (2016)
EPA, along with its START and Emergency and Rapid Response Services (ERRS) contractors, conducted a removal assessment with the assistance of DEQ at the Site in August 2016. Assessment activities included elemental mercury vapor screening of Site features in ambient conditions; excavation of eight test pits in the Ore Processing Area and Northern and Southern Burned Ore Piles; collection of soil/waste material samples for laboratory analysis; and in situ X-ray fluorescence (XRF) screening of Site features. Twenty field samples were collected for analysis of total mercury, arsenic, and antimony, with a subset of four samples submitted for mercury SSE analysis.

Southeast of the Ore Processing Area, an in situ XRF survey detected elevated concentrations of mercury, arsenic, and antimony in several Waste Rock Piles that had not been characterized during previous Site investigations. The results of air monitoring indicated that ambient mercury vapor concentrations were greater in the Ore Processing Area than at other Site features, and mercury vapor concentrations were even greater when Site materials were disturbed during test pit excavation in the Ore Processing Area.

The results of the test pit excavation in the Ore Processing Area indicated subsurface soil with concentrations of mercury and arsenic greater than the Regional Screening Level (RSL) and Removal Management Level (RML) values for industrial soil. Soil samples from all six of the test pits in the Ore Processing Area contained mercury at concentrations greater than the industrial soil RML and arsenic at concentrations greater than the industrial soil RSL. Analytical results of subsurface soil samples collected from an Ore Processing Area test pit in the immediate vicinity of a former ore processing structure indicated mercury concentrations as high as 5,360 mg/kg, which is much higher than the maximum concentration detected in the Ore Processing Area (498 mg/kg) from previous investigations.

Mercury SSE analytical results indicated that soil samples collected from the Burned Ore Piles contained lower total mercury concentrations in the form of minimally soluble fractions. Mercury concentrations in samples from the Ore Processing Area contained a majority percentage of comparatively mobile fractions, which likely consist mostly of elemental mercury.

The Northern and Southern Burned Ore Piles represent potential source areas for overland contamination transport via surface water migration. Although concentrations of mercury and arsenic generally decrease further away from the source areas, several screening locations down-gradient of the Site exceeded screening levels for mercury and arsenic. These exceedances may be due in part to down-gradient migration from one or more source areas.

At the time of the 2016 EPA removal assessment, warning signs previously installed by DEQ were present but were in degraded condition. Additionally, no physical access restrictions (e.g., fences or gates) were present at the Site, and anecdotal evidence and field observations by DEQ indicated that the public may have been taking material from the unsecured tailings piles for off-site use. Of the four mercury mines in the Opalite mercury district (Opalite, Bretz, Cordero, and McDermitt), Opalite Mine remains the last unsecured property in the area and it was likely a source of some contaminated material in the nearby town of McDermitt, Nevada that was removed or capped during an EPA Region 9 removal action in 2013.

2. Physical Location

The Site is located on privately owned patented mining claims in the extreme southern end of Malheur County, Oregon, approximately 16 miles northwest of McDermitt, Nevada (Figure 1, Figure 3). The precise location is 42.050945 latitude; -118.035992 longitude. The mine is surrounded by public land administered by the Vale District of the Bureau of Land Management (BLM). Access to the Site is provided via Disaster Peak Road, which is a primitive road maintained by Malheur County. In addition to Disaster Peak Road, there is an extensive network of primitive BLM and Malheur County roads throughout the area (Figure 3). The Malheur County easement for Disaster Peak Road ends at the private property boundary where the Site is located, but the physical road continues past the Site to a spring located to the northwest. Access to use the road is unrestricted.

The Site encompasses approximately 342 acres. The elevation of the Site is between approximately 5,200 and 5,400 feet above sea level. The climate of the area is arid, and the sparse vegetation consists of grasses, sagebrush, and other shrubs. Mine Creek flows towards the south along the west side of the Site. An unnamed tributary of Cowboy Creek flows southeast along the east side of the Site. Land use in the area of the Site consists mainly of livestock grazing. Two ranches with residences and other structures are located approximately 4 miles southwest of the Site (Figure 3).

According to Western Regional Climate Center (WRCC) data collected in McDermitt from January 1892 to June 2016, the average maximum annual temperature was 62.7° Fahrenheit (F), and the average minimum annual temperature was 30.7°F. Average annual total precipitation during this time was 8.88 inches, with the most precipitation occurring in April, May, and June. Average annual total snowfall was 19.1 inches, with the most snowfall occurring in November through March (WRCC 2017).

Ecological Receptors

As noted above in the summary of the 2005 DEQ SI, an ecological survey of the Site did not identify any threatened or endangered species within a 2-mile radius of the Site. However, the Lahontan cutthroat trout and the kit fox are federal or State-listed species with ranges that extend into the vicinity of the Site (E & E 2005).

The Site is also within a Greater Sage-Grouse Core Area, as designated by the Oregon State Sage-Grouse Action Plan (Action Plan). Designated Core Areas for the greater sage-grouse were developed by the State of Oregon and partners to forestall the sage-grouse's listing under the federal Endangered Species Act (ESA). In 2015, the United States Department of Fish and Wildlife Service determined that protection of the species under the ESA was no longer warranted, and management of the sage-grouse in Oregon continues under the Action Plan. Core Areas were identified to provide a strong ecological foundation for focusing threat reduction efforts to key sage-grouse habitat and directs the highest level

of conservation effort in those areas (Sage-Grouse Conservation Partnership 2015). EPA and DEQ consulted with wildlife biologists from the ODFW and BLM regarding nearby sage-grouse populations. While the Site is located within a Priority Habitat Management Area for sage-grouse, the nearest known sage-grouse lek (i.e., an area where males gather to compete in courtship displays) is over 2 miles from the Site.

Historical Structures/Landmarks

The remains of several structures associated with the operation of the mine are still present on Site. Most of these are located in the Ore Processing Area, and they include several concrete structures associated with the former rotary furnace and condenser system, an ore crusher/hopper, and concrete lined-pits. Additionally, objects from past mining and ore processing operations, including broken pieces of ceramic condenser pipe, portions of old vehicles, rusted metal debris, old pieces of structural lumber, adit and mine shaft support beams, and other debris, are scattered on the ground of the Ore Processing Area and other areas at the Site (DEQ 2014, E & E 2017). EPA contacted the Oregon State Historic Preservation Officer (SHPO) to determine if any of the structures on site are historically significant.

Tribal Interests

EPA will continue to coordinate with the Fort McDermitt Paiute and Shoshone Tribes to determine their interests regarding the removal action. Should the Fort McDermitt Paiute and Shoshone Tribes determine there is tribal interest in this Time-Critical Removal Action, EPA will offer to continue informal coordination or a formal consultation process.

3. Site Characteristics

The Opalite Mine is an abandoned mercury mine and ore processing facility. The Opalite mercury deposit was discovered by William Bretz in 1924. In April 1925, F.W. Bradley formed the Mercury Mining Syndicate and began development of the Opalite Mine. The Opalite Mine was developed using the glory hole method, in which adits or tunnels were driven horizontally beneath the ore body and raises and inclines were driven upward to the surface to remove the near-surface ore deposit from the Glory Hole.

The Opalite Mine workings include a Glory Hole, #1 Adit (also previously referred to as Tunnel No. 1), #2 Adit (also previously referred to as Tunnel No. 2), two large trenches located northeast of the Glory Hole (referred to as the Northeast Trench and Southwest Trench), numerous shafts, raises, winzes, and inclines/declines, and numerous smaller exploratory prospects and excavations. The primary mine features are shown on Figure 2 and include the following:

- Ore Processing Area. See description in previous section.
- Northern and Southern Burned Ore Piles. Two large Burned Ore Piles are located on either side of the Ore Processing Area. The total volume of both is estimated to be 192,384 cubic yards.
- Waste Rock. Waste Rock Piles, including piles in the vicinity of the portals of #1 Adit, #2 Adit, and the Ore Processing Area.

Although the mine is no longer in operation, mine waste material remains in piles, including the Northern and Southern Burned Ore Piles, and on the ground surface throughout the Site. Additionally, the glory hole mining method resulted in a large, open pit that presents a physical as well as a chemical

and environmental hazard.

The metals known to be on Site at elevated concentrations (that are above background concentrations and that exceed EPA RSLs and RMLs for industrial soil) include the following:

- Mercury
- Arsenic
- Antimony

These metals are hazardous substances as defined by Sections 101(14) and 101(33) of CERCLA, 42 U.S.C. § 9601(14) and (33). Other hazardous substances may also be on Site.

These metals are present in mine tailings and waste rock from several Site sources:

Ore Processing Area. Samples of subsurface soil collected from all six test pits excavated during the 2016 EPA removal assessment exceeded the industrial soil RML of 140 mg/kg for mercury and the industrial soil RSL of 3 mg/kg for arsenic. Mercury was detected at concentrations as high as 5,360 mg/kg at a depth of 8 feet below ground surface (bgs) and at 4,580 mg/kg at a depth of 3 feet bgs, both of which exceed the industrial soil RML by more than an order of magnitude. Arsenic was detected as high as 670 mg/kg at a depth of 3 feet bgs, which exceeds the industrial soil RML of 300 mg/kg and also exceeds the industrial soil RSL of 3 mg/kg by two orders of magnitude. The small pile of gray, ashy material observed at the surface of the Ore Processing Area contained mercury at a concentration of 2,700 mg/kg (an order of magnitude greater than the industrial soil RML) and arsenic at a concentration of 62.5 mg/kg (an order of magnitude greater than the industrial soil RSL).

Waste Rock Piles. Southeast of the Ore Processing Area, an XRF survey of several Waste Rock Piles indicated concentrations of mercury, arsenic, and antimony that exceeded the industrial RMLs, with mercury and arsenic exceeding by an order of magnitude. Mercury was detected as high as 1,290 mg/kg (industrial soil RML is 140 mg/kg), arsenic was detected as high as 4,667 mg/kg (industrial soil RML is 300 mg/kg), and antimony was detected as high as 2,123 mg/kg (industrial soil RML is 1,400 mg/kg).

Glory Hole. Mercury and arsenic have been detected above the industrial soil RMLs. In an XRF screening result, mercury was detected as high as 1,263 mg/kg, which is almost an order of magnitude higher than the RML of 140 mg/kg. An off-Site laboratory result indicated arsenic as high as 289 mg/kg, which exceeds the industrial soil RSL of 3 mg/kg by two orders of magnitude.

Burned Ore Piles. The Northern and Southern Burned Ore Piles represent two of the largest Site features and potential sources of contamination. Although the concentrations of mercury, arsenic, and antimony are generally lower in the Burned Ore Piles than in other Site sources, these metals are still present at elevated concentrations that exceed EPA RSLs and/or RMLs. In the Burned Ore Piles, mercury has been detected at a concentration as high as 85.5 mg/kg (laboratory), which exceeds the industrial soil RSL of 46 mg/kg. Arsenic has been detected at a concentration as high as 1,700 mg/kg (laboratory), which is five times higher than the industrial soil RML of 300 mg/kg. Antimony has been detected in a laboratory sample at a concentration of 471 mg/kg, which exceeds the industrial soil RSL

of 470 mg/kg, and antimony has also been detected by XRF screening as high as 1,578 mg/kg, which exceeds the industrial soil RML of 1,400 mg/kg.

The elevated metal concentrations present at the Site in surface ash, waste rock, and burned ore are subject to ongoing releases to the environment due to wind and surface water flow, and they also present direct contact and inhalation exposure hazards to Site visitors. The elevated metal concentrations in the Burned Ore Piles also present the risk of future releases if local residents continue to remove and transport the material for potential uses such as gravel fill, road base material, or other residential and commercial uses.

4. NPL Status

The Site is not listed nor has been proposed to be placed on the NPL.

5. Maps

The following maps describe the Site location, layout, property boundaries, and the elements of the planned Removal Action:

Figure 1: Opalite Mine Site Location
Figure 2: Opalite Mine Site Features
Figure 3: Area Road Map
Figure 4: Property Boundaries
Figure 5: Planned Removal Action Activities

B. Other Actions to Date

1. Previous Actions

Installation of Warning Signs at Opalite Mine (2004)
DEQ installed warning signs at selected Site locations in June 2004.

2. Current Actions

No actions are currently underway at Opalite Mine.

C. State and Local Authorities' Roles

1. State and local actions to date

In July 2016, DEQ sent a letter to EPA Emergency Management Program requesting action by EPA's Removal Program at the Site to address elevated levels of mercury and arsenic contamination in unsecured mine waste piles and mill site remnants by limiting Site access with additional fencing, signage, and road blockage, or removal of the contaminated material.

2. Potential for continued State/local response

Orphan site account funding in Oregon has diminished in the last decade and, as a result, much of the focus for funding has been on maintenance of orphan sites with existing treatment systems or other

intensive maintenance requirements on existing remedies. According to the 2016 DEQ letter to EPA, this has limited DEQ's ability to conduct new assessment or removal at orphan sites (DEQ 2016). Before funding diminished, DEQ had planned to limit access to the Site by installing fencing and reducing road access. It is unlikely funding will increase in the near future and therefore it is not expected that DEQ will be able to proceed with any significant Removal Actions at the Site.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The current conditions at this Site meet the following factors which indicate that the Site is a threat to the public health or welfare or the environment, and a Removal Action is appropriate under Section 300.415(b)(2) of the NCP. Any or all these factors may be present at a site, and any one of these factors may determine the appropriateness of a Removal Action.

1. **Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants (40 CFR § 300.415(b)(2)(i)).**

Contaminated soil and mercury ore processing waste contain elevated levels of mercury, arsenic, and antimony at this Site. In waste rock and surface soils, mercury, arsenic, and antimony were found at concentrations of 1290 mg/kg, 4667 mg/kg, and 2123 mg/kg, respectively. In subsurface soils, mercury and arsenic were found at concentrations up to 5360 mg/kg and 670 mg/kg, respectively. The gray, ash-like material on surface soil, contained 2700 mg/kg of mercury and 625 mg/kg of arsenic. All these metal concentrations exceed the EPA RMLs and/or RSLs for industrial soil.

Field observations and anecdotal evidence by DEQ indicate that the public may be removing material from the unsecured tailings piles for construction or other aggregate uses such as driveway construction and/or residential fill (E & E 2016). It is known and has been observed that the public visits the Site to partake in recreational activities (sight-seeing, rock-hounding, off-road four-wheeling, camping, and hunting). Additionally, although no federal or State-listed threatened or endangered species have been observed on Site, the habitat and range of threatened species overlap with the Site.

Mercury exposure primarily occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms can reach the brain. Short-term exposure to high levels of metallic mercury vapors may cause health effects including lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation. At high levels, mercury may damage the brain, kidneys, and a developing fetus (ATSDR 1999).

Arsenic is a confirmed human carcinogen. Primary exposure routes are ingestion or direct contact. Unusually large doses of inorganic arsenic can cause symptoms ranging from nausea, vomiting, and diarrhea to dehydration and shock. Long-term exposure to high levels of inorganic arsenic in drinking water is associated with certain medical conditions, including skin disorders, an increased risk for diabetes, high blood pressure, and several types of cancer (ATSDR 2007).

Antimony exposure typically occurs through direct contact with contaminated soil. Long-term inhalation of high levels of antimony can irritate eyes and lungs and can cause heart and lung problems, stomach pain, diarrhea, vomiting, and stomach ulcers (ATSDR 1992).

High levels of hazardous substances or pollutants in soils largely at or near the surface that may migrate (40 CFR § 300.415(b)(2)(iv)).

Contaminated mine waste material at the Ore Processing Area contains laboratory concentrations of mercury as high as 5,360 mg/kg in the subsurface and 2,700 mg/kg at the surface. Additionally, an XRF survey identified arsenic as high as 4,667 mg/kg and antimony as high as 2,123 mg/kg in Waste Rock Piles near the Ore Processing Area. In the two large Burned Ore Piles, mercury has been detected as high as 85.5 mg/kg (laboratory), arsenic as high as 1,700 mg/kg (laboratory), and antimony as high as 1,578 (XRF). None of the Site source areas are currently secured. The piles of waste rock and burned ore at the Site are visibly subject to surface water and wind migration. In particular, the large volume of material (estimated 192,384 cubic yards) contained in the Northern and Southern Burned Ore Piles is particularly subject to overland transport.

The gray ash-like material pile adjacent to the main road through the ore-processing area contained mercury at a concentration of 2,700 mg/kg and arsenic at a concentration of 62.5 mg/kg. Since the gray ash is a powder-like material that is light and easily suspended by air movement, it can cause inhalation hazards to the public visiting the Site and traveling on the road through the ore-processing area. The hazardous substances can easily migrate via surface runoff.

2. **Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released (40 CFR § 300.415(b)(2)(v)).**

The mine waste materials at the Site are exposed to the elements throughout the entire year and are visibly subject to transportation by wind and surface water. Contamination spread by wind- and surface water-migration increases the likelihood of exposure to humans, livestock, and wildlife and ultimately increases the area requiring cleanup.

3. **The availability of other appropriate federal or state response mechanisms to respond to the release (40 CFR § 300.415(b)(2)(vii)).**

There are no other known federal or state agencies that possess the expertise or resources necessary to conduct the Removal Action in a timely manner, and to address the actual or potential human health risks associated with hazardous substances, pollutants or contaminants found at the Site. DEQ requested EPA assistance to conduct a Removal Assessment and Time-Critical Removal Action to restrict public access and exposure to the hazardous substances at this Site (DEQ 2016).

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this Site may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Action

1. Proposed Action Description

By volume, most of the contamination at the Site is contained in the two Burned Ore Piles. The concentrations of the contaminants of concern in these piles are lower than in other waste materials at the Site. The potential removal alternatives of removing and/or capping the Burned Ore Piles in place are not warranted based on the remote location of the Site, and additionally would be cost prohibitive. Because the primary exposure risk to these materials is through local residents removing the material from the Site for various uses, the vehicular restrictions through the installation of gates and signs will be sufficient to mitigate risk to human health from the Burned Ore Piles.

The elements of the planned Removal Action are depicted on Figure 5. The removal action will include improvements to Site security and access controls, including the installation of three gates to restrict the public's vehicular access. The gates to be installed will be constructed of tubular, galvanized steel with tamper-proof hasps, and their placement will capitalize on existing topographic features to the extent practicable to provide additional natural boundaries to limit Site access. Where necessary, equipment will be used to augment any natural features (i.e., through earth-movement or the placement of boulders) to help secure the gates and to prevent drive-arounds.

Currently, primary access to the Site is on Disaster Peak Road, which enters the Site from the south and passes close by the two Burned Ore Piles before crossing Mine Creek and extending to the northwest. Another road (Turner Ranch Road) approaches the Burned Ore Piles from the southwest. To restrict vehicular access to the Site, EPA will install a gate on Disaster Peak Road south of the Burned Ore Piles ("Ore Pile South Gate" on Figure 5). EPA will then construct a bypass road from the gate location that will extend to the northwest and reconnect with Disaster Peak Road as it leaves the Site to the northwest. At this location where the new bypass road reconnects to Disaster Peak Road, the current road will be permanently closed. EPA will also construct a berm and/or trench along the northeastern side of the new bypass road to further restrict access to the Site. The bypass road will cross Turner Ranch Road and the construction of the berm will result in blocking access to the Site from the southwest.

The other major access road through the Site is an unnamed road that turns north from Disaster Peak Road and crosses the Site to the north. This road is the primary access point to the Glory Hole, which opens to the west, and the upper/eastern section of the Ore Processing Area. Another existing road circles around the base of the hill that contains the Glory Hole (Figure 5). To restrict access to the Glory Hole and the Ore Processing Area, EPA will install two gates on the unnamed road (i.e., the Glory Hole North and South Gates on Figure 5). EPA will also install a berm beside the road near the south gate to restrict access to the Ore Processing Area. The north and south gates will be installed inside the intersections with the existing bypass road around the Glory Hole hill and EPA will repair this existing road so that it can be used as a detour and allow access to the private property to the north of the Site.

EPA plans to cap a small area of mine waste material that contains extremely high concentrations of the contaminants of concern. The material will be stabilized with a cement admixture to limit the mobility of elemental mercury. EPA will excavate a disposal pit near the Ore Processing Area, place the stabilized material inside, and then cover it with clean material. Off-site disposal of contaminated media is not

anticipated and, therefore, compliance with the off-site rule is not a consideration for this Removal Action.

EPA will coordinate with DEQ to install additional updated warning signs to communicate to the public the hazards posed by the Site.

As part of Post Removal Site Controls, DEQ will conduct necessary maintenance of the repaired roads, bypass roads, signs, berms, gates, and trenches installed at the Site pursuant to this Action Memorandum. EPA and DEQ intend to enter into a Memorandum of Understanding to address Post Removal Site Controls.

Additionally, EPA intends to require the two private property owners of the Site, Bradley Mining Company and Owyhee Caldera Minerals, to record easements on the property. The easements will restrict activity on the property so that contaminated material remaining on-Site will not be disturbed, provide access for DEQ so that DEQ can conduct Post Removal Site Controls, and provide public access to the repaired roads and bypass road so that the public can continue to use the road system to access public lands on either side of the Site.

2. Contribution to Remedial Performance

Future actions are not anticipated; but if warranted, the Removal Action should not impede future remedial actions based upon available information.

3. Engineering Evaluation/Cost Analysis (EE/CA)

This proposed action is for Time-Critical Removal Action, and an EE/CA therefore is not required.

4. Applicable or Relevant and Appropriate Requirements (ARARs)

Removal actions conducted under CERCLA are required to attain Applicable or Relevant and Appropriate Requirements (ARARs) to the extent practicable. In determining whether compliance with ARARs is practicable, the On-Scene Coordinator may consider appropriate factors, including the urgency of the situation and the scope of the Removal Action to be conducted. EPA also requested a list of ARARs from Oregon. EPA has developed the following list of ARARs.

Federal ARARs:

Clean Water Act, 33 USC § 1342: Section 402 regulations establish requirements for point source discharges and storm water runoff. If removal activities at the Site involve clearing, grading, excavating, or other activities that will disturb more than one acre of land resulting in storm water discharges, such activities must comply with the substantive requirements for a Construction Stormwater General Permit, to the extent practicable.

Endangered Species Act, 16 U.S.C. § 1536: Section 7 requires consultation with the U.S. Fish and Wildlife Service to identify the possible presence of protected species and mitigate potential impacts on such species. If threatened or endangered species or impacts to those species are identified within the removal area, activities must be designed to conserve the species and their habitat, to the extent practicable.

As noted above in the summary of the 2005 DEQ SI, an ecological survey of the Site did not identify any threatened or endangered species within a 2-mile radius of the Site. However, the Lahontan cutthroat trout and the kit fox are federal or State-listed species with ranges that extend into the vicinity of the Site.

National Historic Preservation Act, 16 U.S.C. § 470f: Establishes procedures to address protection of historical properties included on or eligible for inclusion on the National Register of Historic Places in relation to government actions. EPA is consulting with the State Historic Preservation Office regarding substantive requirements of the NHPA. This removal action will comply with substantive requirements of the NHPA, to the extent practicable.

State ARARs:

Hazardous Waste Management, OAR 340-100: Oregon has an authorized state hazardous waste program that applies in lieu of the federal Resource Conservation and Recovery Act (RCRA) program. These rules establish a regulatory structure for the generation, transportation, treatment, storage and disposal of hazardous wastes, and identifies additional residuals that are subject to regulation as hazardous waste under state law. The Bevill Amendment to RCRA likely exempts most wastes at the Site from these rules, but these rules may still apply to wastes that do not meet the exemption criteria at the Site.

Identification and Listing of Hazardous Waste, OAR 340-101: Identifies residues that are subject to regulation as hazardous waste under state law.

Hazardous Substance Remedial Action Rules, OAR 340-122: Requires documentation of releases and threats of releases of hazardous substances, and the criteria for additional investigation, removal, remedial action or long-term environmental controls or institutional controls. Sets standards for degree of cleanup required.

Best Management Practices:

Oregon State Sage-Grouse Action Plan (Action Plan): The Site is within a Greater Sage-Grouse Core Area, as designated by the Action Plan. Core Areas were identified to provide a strong ecological foundation for focusing threat reduction efforts to key sage-grouse habitat and directs the highest level of conservation effort in those areas (Sage-Grouse Conservation Partnership 2015). EPA and DEQ consulted with wildlife biologists from the Oregon Department of Fish and Wildlife (ODFW) and BLM regarding nearby sage-grouse populations. While the Site is located within a Priority Habitat

Management Area for sage-grouse, the nearest known sage-grouse lek (i.e., an area where males gather to compete in courtship displays) is over 2 miles from the Site. To the extent practicable, EPA will incorporate the recommendations from ODFW and BLM to minimize impacts to local sage-grouse populations.

5. Project Schedule

It is anticipated that the Time-Critical Removal Action project will begin on or about March 30, 2020 and will be approximately 1 to 2 weeks in duration.

B. Estimated Costs

Extramural Costs:	
Regional Removal Allowance Costs:	
Total Cleanup Contractor Costs	
ERRS	$ 219,426.65
START	$ 125,313.69
USCG Pacific Strike Team	$ 8,000.00
Subtotal Extramural Costs	$ 352,740.34
Extramural Costs Contingency	$ 70,548.07
(20% of Subtotal, Extramural Costs rounded to nearest thousand.)	
TOTAL REMOVAL ACTION PROJECT CEILING	$ 423,288.41

The total EPA costs for this Removal Action based on full-cost accounting practices that will be eligible for cost recovery are estimated to be $ 423,288.41.[1]

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Delays in implementing this proposed action could result in the public accessing the Site, removing contaminated material from the Site and transporting it to residential or commercial locations for private uses. This transportation of contaminated materials to residential areas could necessitate additional EPA Removal Actions to address contamination, similar to the 2013 removal action completed by EPA Region 9 in the town of McDermitt, Nevada.

[1] Direct Costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site-specific direct costs, consistent with the full cost accounting methodology effective 2 October 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustration purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual total costs from this estimate will affect the United States' right to cost recovery.

Without the Removal Action, unrestricted access and the public's exposure to hazardous substances on the Site will continue.

VII. OUTSTANDING POLICY ISSUES

None

VIII. ENFORCEMENT

See the attached "Confidential Enforcement Addendum" for enforcement details.

IX. RECOMMENDATION

This decision document represents the selected Time-Critical Removal Action for the Opalite Mine Site, in Malheur County, Oregon, developed in accordance with CERCLA, and not inconsistent with the NCP. This decision is based on the administrative record for the Site.

Conditions at Opalite Mine Site meet the NCP Section 300.415(b)(2) criteria for a removal and I recommend your approval of the proposed Removal Action. The total project ceiling if approved will be $ 423,288.41. Of this, as much as $ 423,288.41 comes from the Regional Removal Allowance.

X. APPROVAL / DISAPPROVAL

APPROVAL:

_____	2/21/2020
Sheila Fleming, Acting Division Director Superfund and Emergency Management Division	Date

DISAPPROVAL:

_____	_____
Sheila Fleming, Acting Division Director Superfund and Emergency Management Division	Date

XI. ATTACHMENTS

Attachment A: Errata Sheet
Attachment B: Confidential Enforcement Addendum
Figure 1: Opalite Mine Site Location
Figure 2: Opalite Mine Site Features
Figure 3: Area Road Map
Figure 4: Property Boundaries
Figure 5: Planned Removal Action Activities
REFERENCES

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Attachment A
Errata Sheet

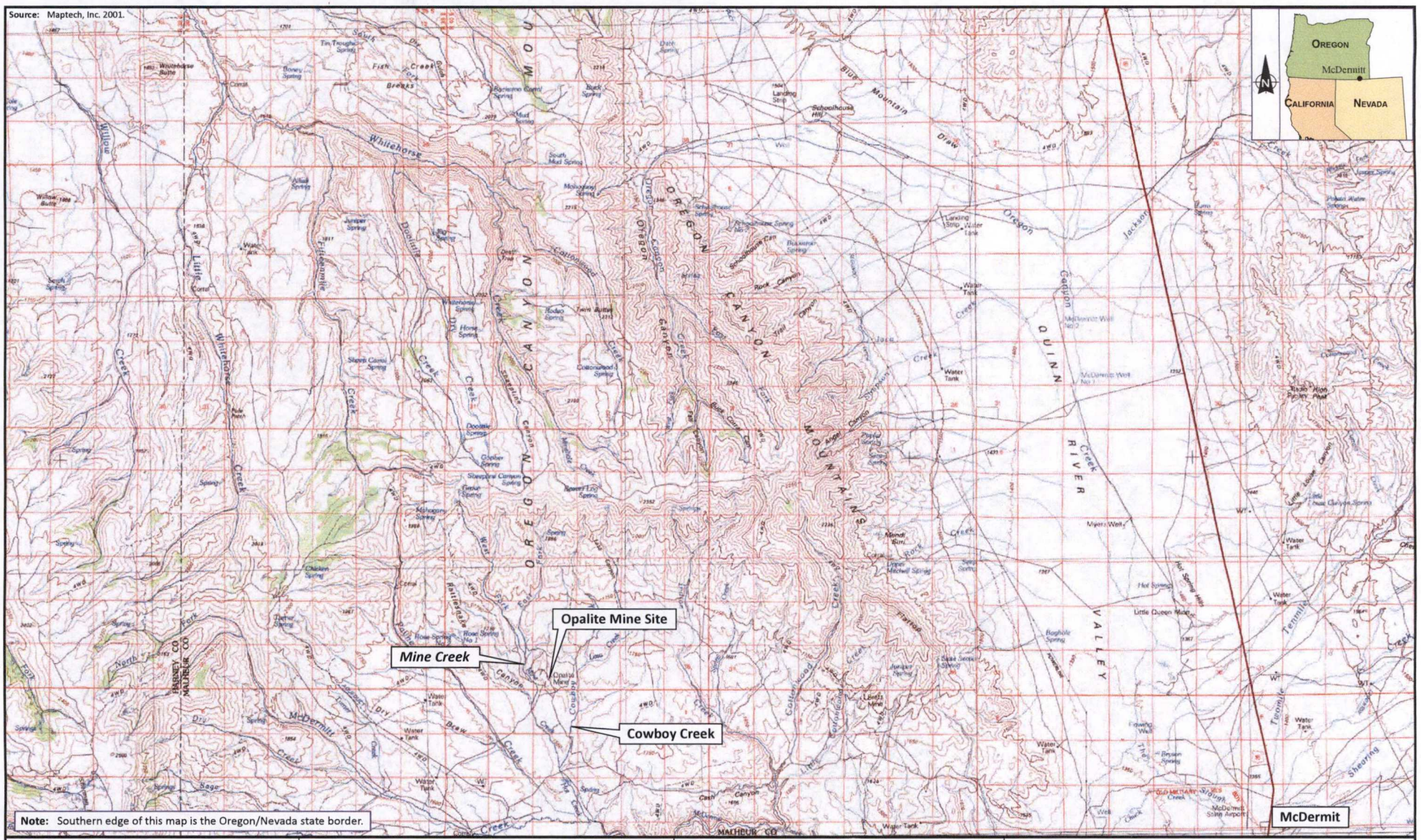
Action Memorandum
Approval and Funding for a Removal Action at the Opalite Mine Site
Malheur County, Oregon

ERRATA SHEET

Date: April 21, 2020

On February 21, 2020, the U.S. Environmental Protection Agency (EPA) issued an Action Memorandum for the Time Critical Removal Action at the Opalite Mine Site. Corrections to the Action Memorandum are summarized below and incorporated into this version of the document.

PAGE #	**SECTION OR PARAGRAPH, SENTENCE**
Page 7	1st Paragraph, last sentence: Should read "sage-grouse lek" instead of "sage-grouse elk
Page 15	1st Paragraph, first sentence: Should read "sage-grouse lek" instead of "sage-grouse elk
Page 17	XI. ATTACHMENTS: Insert new title for Attachment A: Errata Sheet Insert Attachment B: Confidential Enforcement Addendum, below 1st line of sentence
Page 19	Insert new Page 19 above Figure 1 and labeled: **"ATTACHMENT A: Errata Sheet"**
Page 20	Insert this Errata Sheet as new Page 20 above Figure 1.



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Global Environmental Specialists
Seattle, Washington

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Approximate Scale in Miles

OPALITE MINE SITE
Malheur County, Oregon

Figure 1
Site Location

Date:	Drawn by:	
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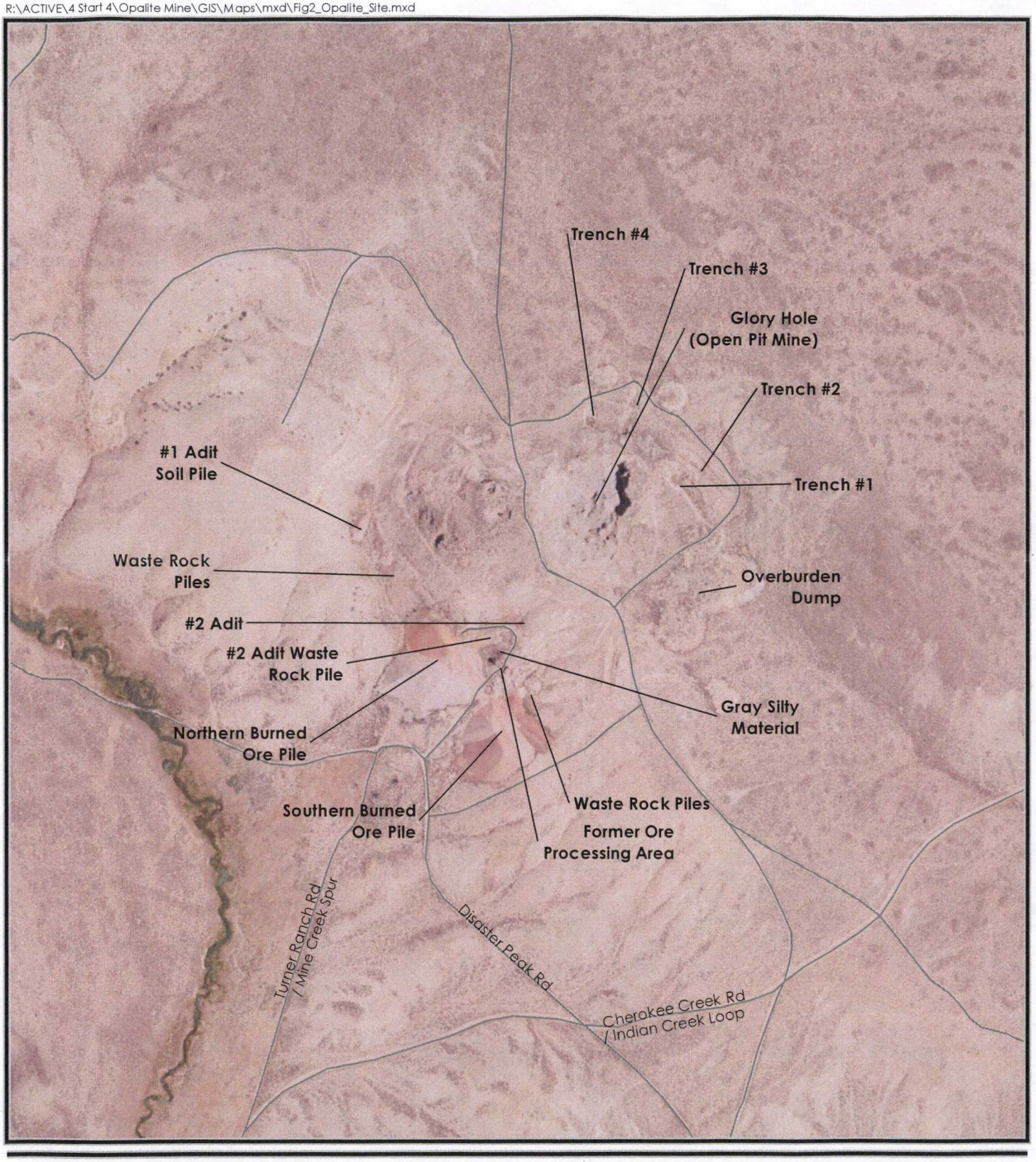

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Feet

Source: ESRI 2010

Figure 2
Site Layout and Key Features

Malheur County, Oregon
January, 2020

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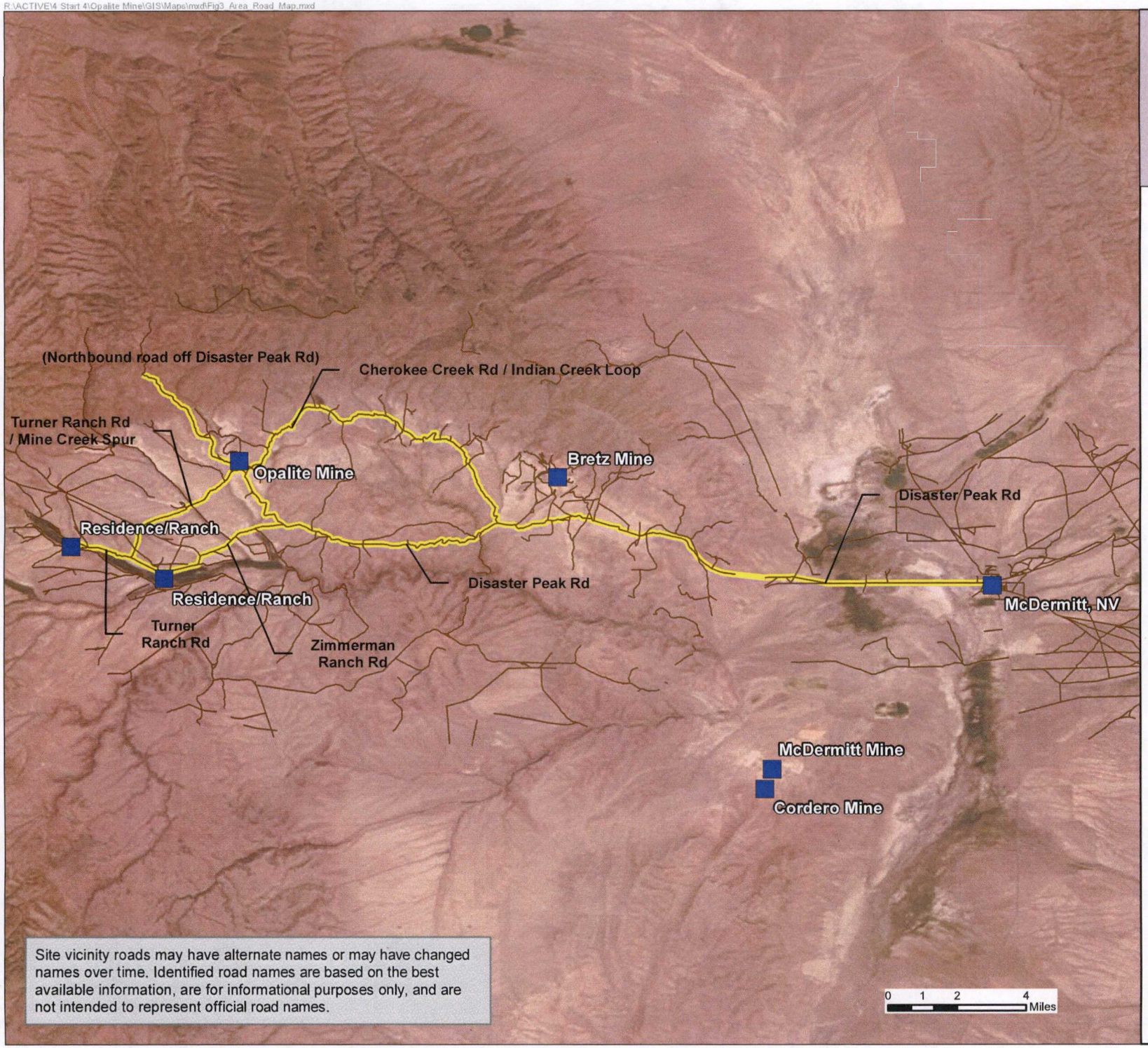

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FIGURE 3
AREA ROAD MAP
OPALITE MINE
Malheur County, Oregon

Legend

- Area Feature
- Main Roads to Opalite Mine
- Surrounding Roads

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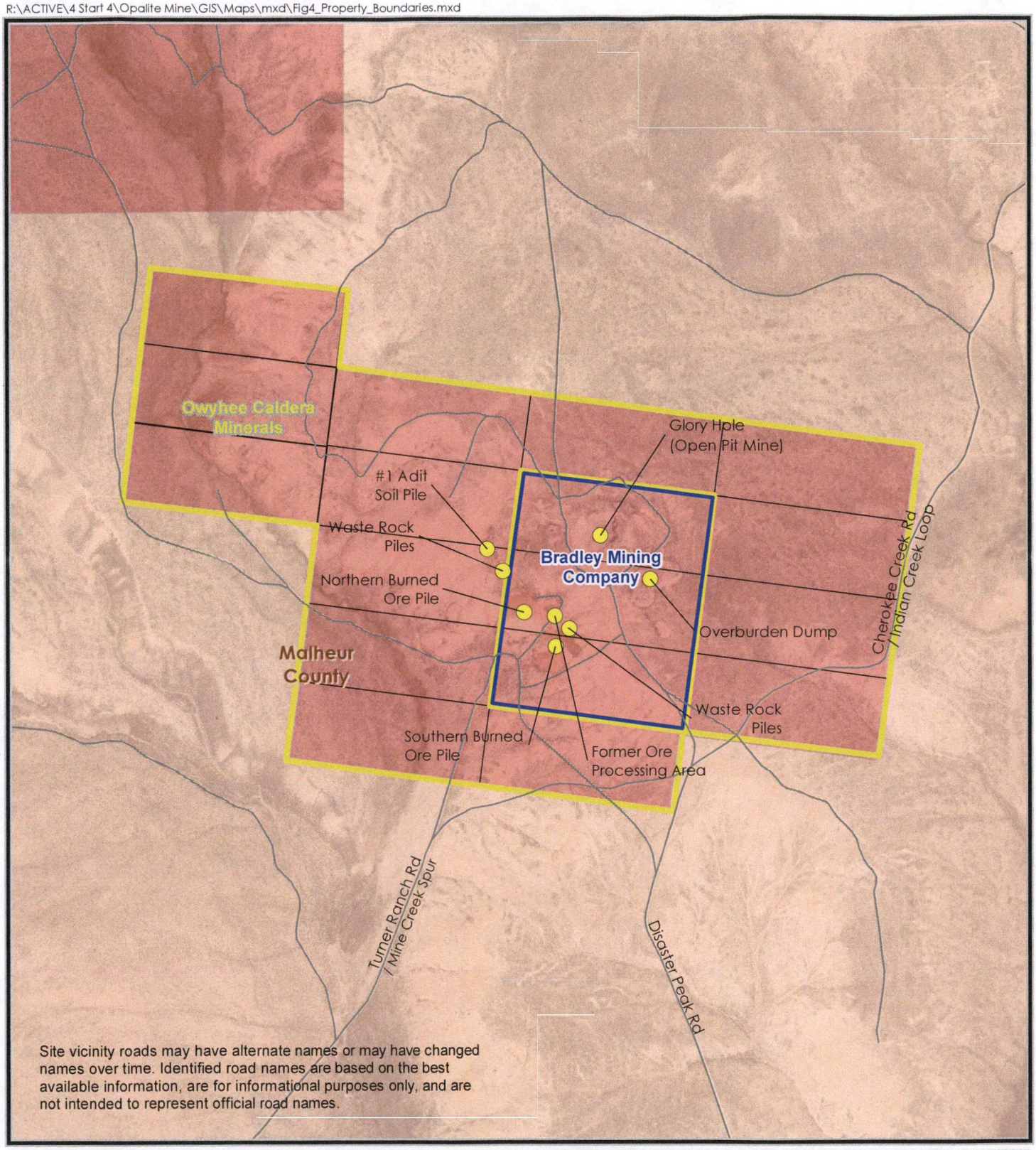

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Source: ESRI 2010

Legend

- Opalite Mine Features
- Roads
- Parcel
- BLM Land
- Private Land
- Bradley Mining Company
- Owyhee Caldera Minerals

Figure 4
Opalite Mine Location and Property Boundaries

Malheur County, Oregon
January, 2020

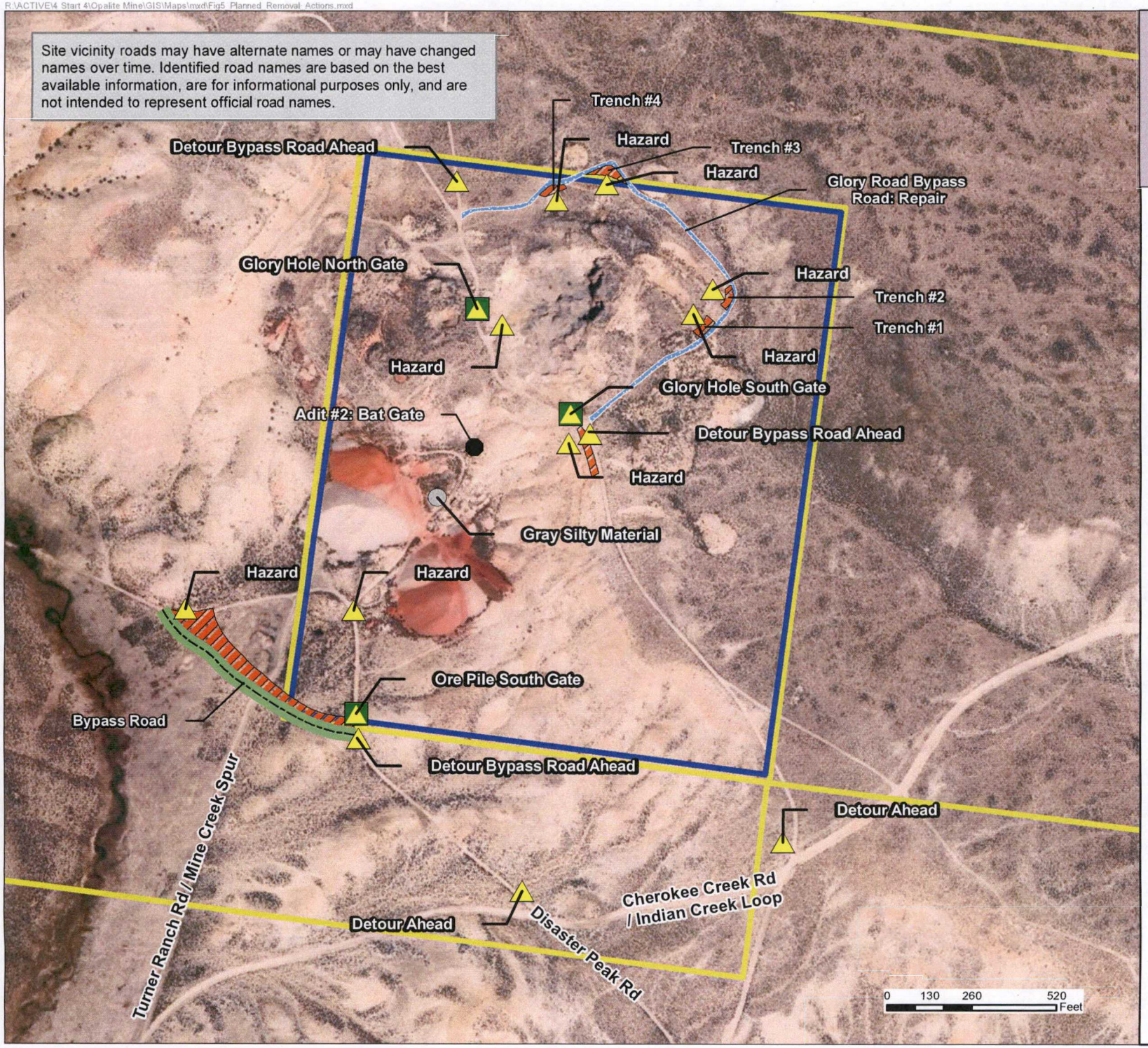

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FIGURE 5
PLANNED REMOVAL ACTIONS
OPALITE MINE
Malheur County, Oregon

Legend

- Adit and Bat Gate
- Gray Silty Material
- Sign
- Sign and Gate
- Road
- Berm
- Repair Road
- Bradley Mining Company
- Owyhee Caldera Minerals

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