

**MAINTENANCE, MONITORING, AND REPAIR PLAN
BONANZA MINE SITE, NONPAREIL, OREGON**

December 2014

Maintenance, Monitoring, and Repair Plan Bonanza Mine Site, Nonpareil, Oregon

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1.0 INTRODUCTION

The Bonanza Mine Site (Site) is located near the small community of Nonpareil, 6 miles east of Sutherlin, Douglas, County, Oregon (Figure 1 and Figure 2). The Site is located in the SW ¼ of Section 16 of Township 25 South, Range 4 West, Willamette Meridian (latitude N43° 23'46", longitude W123°10'54"). The Site is owned by Donald C. Smith (Owner).

This Monitoring, Maintenance, and Repair (MM&R) Plan specifies the requirements for MM&R activities for the United States Environmental Protection Agency (EPA) removal action at the Site, which was conducted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA), 42 U.S.C. §9601 et seq.

This MM&R Plan describes the activities that are required to ensure the effectiveness and integrity of the removal action so that such action remains protective of human health and the environment.

2.0 BACKGROUND

The Bonanza Mine is an abandoned mercury mine and mill that operated intermittently from the mid-1860s through 1960. The main mercury-containing mineral is cinnabar. Total recorded mercury production was 39,540 flasks (or 3,005,040 pounds).

The primary contaminants of concern are mercury and arsenic. Historic mercury mining, processing, and disposal operations caused the concentration of these metals, which contaminated the soil.

EPA performed a removal action at the Site from August to December 2014. The removal action addressed the areas shown on Figure 3, and generally included: excavating and consolidating approximately 40,000 cubic yards (yd³) of mine-waste contaminated materials at an on-Site repository; grading and shaping the calcine (also referred to as tailings) and waste rock piles to form the footprint of the repository; and gravel backfilling of certain areas where mine-waste contaminated materials remain on-Site. The repository was covered with an impermeable geomembrane liner and cover soil.

Mine-waste contaminated materials may also remain in other areas of the Site where EPA did not perform cleanup activities (i.e., on steep and/or heavily vegetated slopes).

3.0 MONITORING ACTIVITIES

Monitoring activities are needed to periodically assess the condition and functionality of the protective barriers and drainage and erosion control features installed during the removal action. Inspections are categorized as Semi-Annual, Annual, Storm Event, and Reported

Incidents. Monitoring will generally include inspections, documentation, and reporting. Inspections shall be conducted by the Owner. Inspections will identify any situations warranting maintenance or repairs. Inspection activities and locations are discussed below. A Field Inspection Log is included as an attachment to this MM&R Plan.

3.1 Semi-Annual Inspections (May and September 2015)

The purpose of the semi-annual events is to assess actual and/or potential deficiencies associated with components of the removal action. Semi-annual events will include an inspection of removal action features and monitoring activities.

Semi-annual inspections shall be performed only in May and September commencing in 2015 and continue for one year. Upon completion of the semi-annual inspection period, inspections shall be conducted on an annual basis and shall continue as long as contaminants remain on-Site or until the Oregon Department of Environmental Quality (ODEQ) determines the inspections are no longer required. Annual inspections are discussed in Section 3.2 below.

3.1.1 Inspection Activities

Activities associated with inspections should include an evaluation of removal action features, including drainage and erosion control, gravel backfill, on-Site repository, and vegetation. The features to be inspected are shown on Figure 4.

3.1.1.1 Drainage and Erosion Control Features

Inspect drainage and erosion control features, including slope and channel protection and storm drainage shown on Figure 4. Inspections should document the condition of existing drainage and erosion control features, identify the need for repairs, and drainage and erosion patterns that could negatively affect the integrity of the on-Site repository and other Site features. Inspect drainage ditches for proper operation and potential changes in condition, such as the presence of debris, sediment, sloughing, scouring, or other similar types of disturbance that is obstructing diversions and/or drainage.

3.1.1.2 Gravel Backfill

Inspect the gravel backfill placed at certain areas identified on Figure 4 to ensure that the backfill material is covering the underlying soil. Any activity that damages or disturbs the integrity of the gravel backfill or otherwise results in the release or exposure to the environment of any mine-waste contaminated materials beneath the backfill material is prohibited and should be documented. Some examples of activities that are prohibited include drilling, digging, excavating, and piercing the surface with a rod, spike or similar item. Inspections will document the presence of any activity potentially damaging the backfill material. Inspections will note indications of ruts, erosion or similar types of

disturbance that indicate diminished backfill thickness and areas that may need repair.

3.1.1.3 On-Site Repository

Inspect the on-Site repository (see Figure 4). Any activity that damages or disturbs the integrity of the protective barrier or otherwise exposes underlying contaminated materials is prohibited and should be documented. Any motor-powered vehicle is prohibited from using the surface of the repository. Examples of other activities that are prohibited include drilling, digging, excavating, and piercing the surface with a rod, spike or similar item. Inspections will document the presence of any activity potentially damaging the protective barrier as well as erosion features such as rills or ruts that could compromise the integrity of the barrier. Inspections also will document the presence of plant species on the surface of the repository with root systems that could potentially penetrate the impermeable membrane liner.

3.1.1.4 Vegetation

Calcine and waste rock likely remain in certain areas of the Site where cleanup actions were not performed such as steep hillsides and/or heavily vegetated slopes. In these areas, vegetation should be left undisturbed to discourage use where calcine, a scarlet-red, pinkish-red, and/or brownish-red angular material, is present.

Additionally, vegetation was added to areas of the Site as part of the protective barriers installed during the removal action (see Figure 4), and these areas of vegetation should also not be disturbed.

3.1.1.5 Signs

Signs will be inspected to ensure that they are functioning as designed and constructed. Inspections will note whether the signs are visible, have become damaged or are no longer legible, are properly fastened to posts or vegetation, and identify the need for repair or replacement. Signs will warn against the on-Site hazards and will include an ODEQ telephone contact number. The locations of the signs are indicated on Figure 4 and the sign contents are shown in Figure 5.

3.1.2 Documentation and Reporting

The results of the inspections should be documented on the attached field inspection log, and in a brief MM&R report to be submitted to ODEQ each year no later than April 30th for annual inspections after the first year of semi-annual inspections. Reports to ODEQ shall be made as described in Section 6.

3.2 Annual Inspections

The purpose of the annual events is to assess the long-term integrity and durability of the removal action, and will include an inspection of removal action features only. The annual inspection will include the activities outlined in Sections 3.1.1.1 through 3.1.1.5 above.

3.3 Storm Event and Reported Incident Inspections

Storm event and/or reported incident inspections will be reported to ODEQ within five working days of a major storm event or reported incident. For the first two years, a major storm event is defined as 3 or more inches of precipitation within a 24-hour period as measured by the National Weather Service at Roseburg, Oregon. Thereafter, ODEQ will determine the reporting frequency based on the establishment of vegetation on the repository and other site conditions.

For the purposes of this plan, a reported incident is defined as any public or private notification reporting site activities and/or damage that could compromise the overall cleanup action.

3.3.1 Storm Event Inspections

The purpose of storm event inspections is to assess removal action features for damage potentially caused by flooding and/or erosion following a storm event. Storm event inspections will include the activities outlined in Sections 3.1.1.1 through 3.1.1.5, and may be reported via telephone (541-687-7424) or email to ODEQ as noted in Section 6.3.

If repairs to removal action features are required because of damage caused by the storm event, those repairs will be performed in accordance with Section 4 prior to the next semi-annual or annual inspection and the status of repairs will be documented in the following semi-annual and/or annual report.

3.3.2 Reported Incident Inspections

The purpose of reported incident inspections is to assess removal action features for damage potentially caused by the reported activity. Reported incident inspections will include the activities outlined in Sections 3.1.1.1 through 3.1.1.5, and will be reported in the following semi-annual or annual report.

If repairs to removal action features are required because of damage caused by the reported incident, those repairs will be performed in accordance with Section 4 prior to the next semi-annual or annual inspection and the status of repairs will be documented in the following semi-annual and/or annual report.

4.0 MAINTENANCE AND REPAIR

Maintenance and repair activities will be conducted to maintain the integrity of removal action features. Conditions requiring repairs likely will be identified during Site inspections as described in Section 3.0. Repairs will be implemented to restore removal action features to functioning conditions within 60 working days of initial identification, if feasible. Repairs required to address a breach in the on-Site repository cap, capped waste rock areas (i.e., areas with gravel backfill on Figure 4), or physical or safety hazards will be expedited and/or temporary measures will be implemented in consultation with ODEQ until a more permanent remedy can be designed and constructed. Best management practices (BMPs), outlined in Section 5.0, will be used during implementing maintenance and repair activities.

4.1 Drainage and Erosion Control Features

Drainage and erosion control features associated with the on-Site repository will be maintained or repaired when inspections indicate the presence of debris, sediment, sloughing, scouring, or other similar types of disturbance indicate they are not functioning as constructed. Debris and sediment that is obstructing diversions and/or drainage ditches will be removed to restore drainage.

4.2 Gravel Backfill

Gravel backfill areas will be repaired when erosion or similar types of disturbance penetrate greater than 50 percent of the thickness of the backfill at any given location. The eroded area will be backfilled to match adjacent undisturbed areas. Backfill material will meet the original design specifications. If the erosion/disturbance has penetrated the full thickness of the gravel backfill areas, then sampling and analysis may be required by ODEQ to document that contaminated material is removed during repairs and that adjacent portions of the backfill have not been contaminated by the eroded material. Excavated waste rock material will be backfilled in the eroded area and the exposed area will be covered with material meeting the original thickness.

4.3 On-Site Repository

The protective cap over the on-Site repository will be repaired when erosion or similar types of disturbance have exposed the impermeable membrane liner. The eroded area will be backfilled to match adjacent undisturbed areas for the barrier and in consultation with ODEQ. Backfill material will consist of material similar to that used to construct the repository cap.

If the erosion/disturbance has compromised the impermeable membrane liner, then sampling and analysis will be performed downgradient of the eroded area to document that contaminated material is removed during repairs and that adjacent portions or downgradient areas have not been contaminated by the eroded calcine and/or waste rock

material. Excavated material will be backfilled in the on-Site repository or transported off-Site for disposal. The exposed area of the repository will be covered with capping material meeting the original design specifications and design thickness.

Temporary repairs might be required if the on-Site repository cap is breached and it is not practical, because of inclement weather or other conditions, to perform permanent repairs within the 60 day timeframe. Under these circumstances, temporary repairs will be developed on a case-specific basis in consultation with ODEQ. The objectives of the temporary repairs will include: preventing cross-contamination of surrounding areas and covering exposed tailings until permanent repairs can be made. BMPs (see Section 5.0) will be used while implementing and maintaining temporary repairs. Temporary repairs will be maintained until the permanent repairs can be completed.

4.4 Vegetation

To the extent practicable, Site vegetation should be left undisturbed and allowed to grow under normal conditions to deter use in those areas where mine-waste contaminated materials remain. The only exception is the repository cover where trees or other vegetation with roots that may damage the liner should not be allowed to mature.

4.5 Signs

Signs will be repaired when the intended function is impaired or potentially compromised (e.g., damaged, weathered, or missing). When the required inspections indicate that maintenance or repair is necessary, the impaired signage will be replaced or repaired.

5.0 BEST MANAGEMENT PRACTICES

BMPs will be used while conducting inspections, monitoring, and maintenance and repair activities. These activities will be conducted in a manner that minimizes disturbance to the Site. When construction activities are required to conduct repairs at the Site, the limits of the work area will be delineated prior to initiating construction. Where appropriate, temporary erosion control measures (e.g., silt fencing, straw bales) will be installed to protect vegetation and Foster Creek and Calapooya Creek from sediment runoff.

If excavation of contaminated material is necessary to conduct repairs, appropriate measures will be taken to segregate contaminated material from non-contaminated material on the Site. Excavated material will be placed on a temporary liner or in bins and tarped to minimize erosion by wind, precipitation, and/or surface water. Silt-fence and/or straw bales might also be used as appropriate. Contaminated materials will either be reconsolidated beneath the cap or with prior approval of ODEQ may be hauled off-Site to an appropriate facility for disposal. Appropriate procedures will be used to decontaminate tools, equipment, and vehicles that contact contaminated materials. Any non-hazardous debris or

waste generated as part of the maintenance and repair activities will be transported off-Site for disposal at an appropriate facility.

5.1 Exposure Reduction Measures

As previously noted, the Site was once a mercury mine and mill and an indeterminate amount of mine-waste contaminated material remain at certain areas beyond the cleanup boundaries. These materials are likely calcine, the by-product of the mercury recovery process, which is easily recognizable because of their scarlet-red, pinkish-red or brownish-red color.

People should not enter areas where calcine is observed or suspected; however, if someone were to enter such an area, certain exposure reduction measures (ERMs) are recommended. ERMs are simple, day-to-day things that individuals can do to limit or reduce exposure to soil contaminants. Examples include washing hands frequently, removing shoes before entering homes, wet mopping to clean surfaces indoors, and frequently bathing pets and washing toddler toys.

6.0 RECORDKEEPING AND REPORTING

6.1 Record Keeping

The Owner will provide ODEQ with copies of all project-related documents, including: inspection, MM&R, and monitoring records; summaries of inspection, MM&R, and monitoring activities; and all other pertinent records.

6.2 Reporting

A written report shall be submitted by the Owner to ODEQ within 60 days following each inspection, MM&R, and/or monitoring activities. The report shall include: results of inspection and MM&R activities; areas of potential concerns/issues; and plans for repair and/or replacement of problems.

A Field Inspection Log is included as an attachment to this MM&R Plan.

6.3 Notices and Submissions

All notices, reports or submissions required to be submitted to ODEQ under this MM&R Plan shall be sent to the person and address specified below, unless otherwise provided for by ODEQ in a written notice to the owners of the Site.

Attn: Bryn Thoms
Western Region Cleanup Program
Oregon Department of Environmental Quality
165 East 7th, Suite 100
Eugene, OR 97401

7.0 AMENDMENT

The requirements set forth in this MM&R Plan may only be amended or modified in a writing signed by the ODEQ and the Owner of the Site.

Source: Maptech, Inc. 2001.

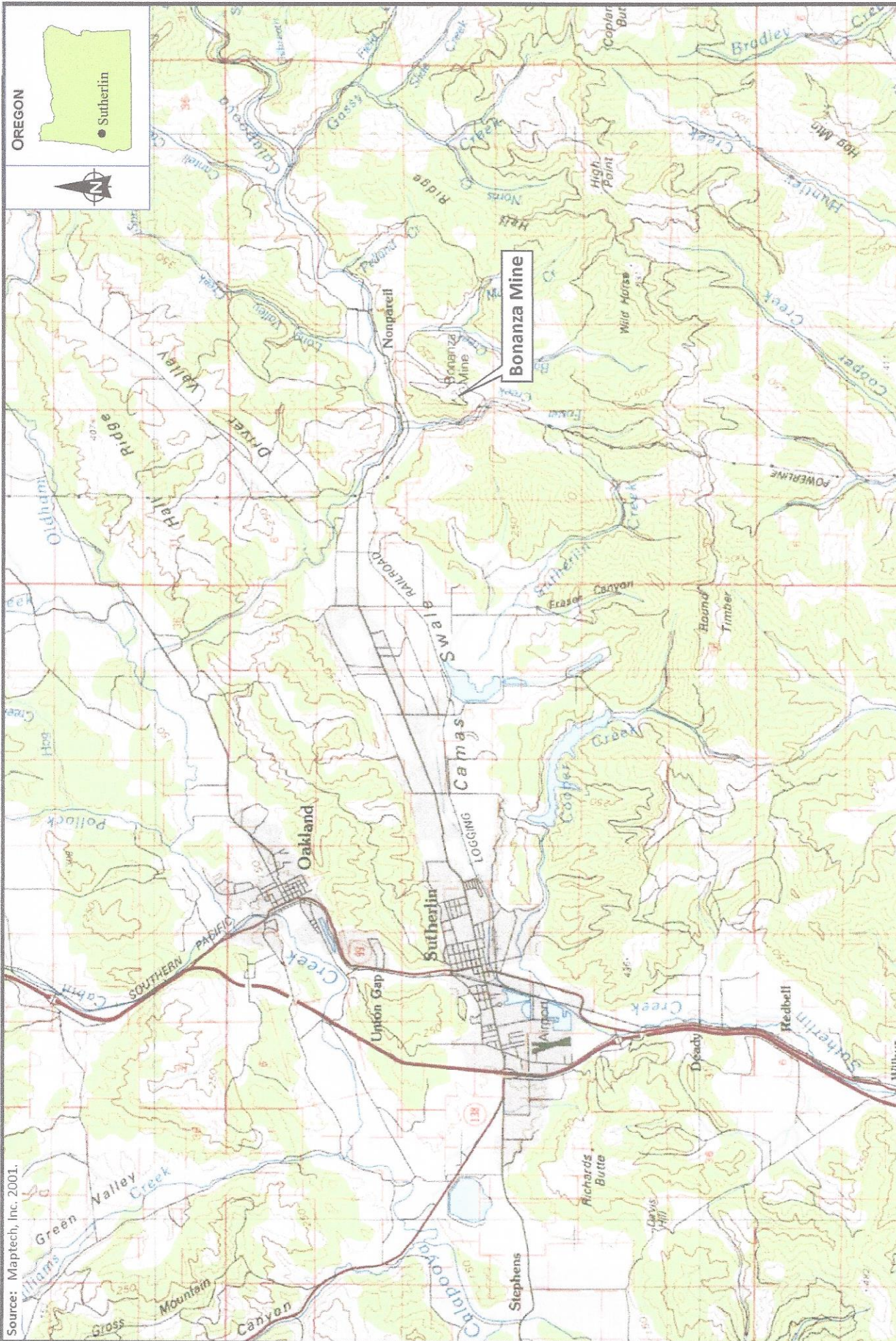
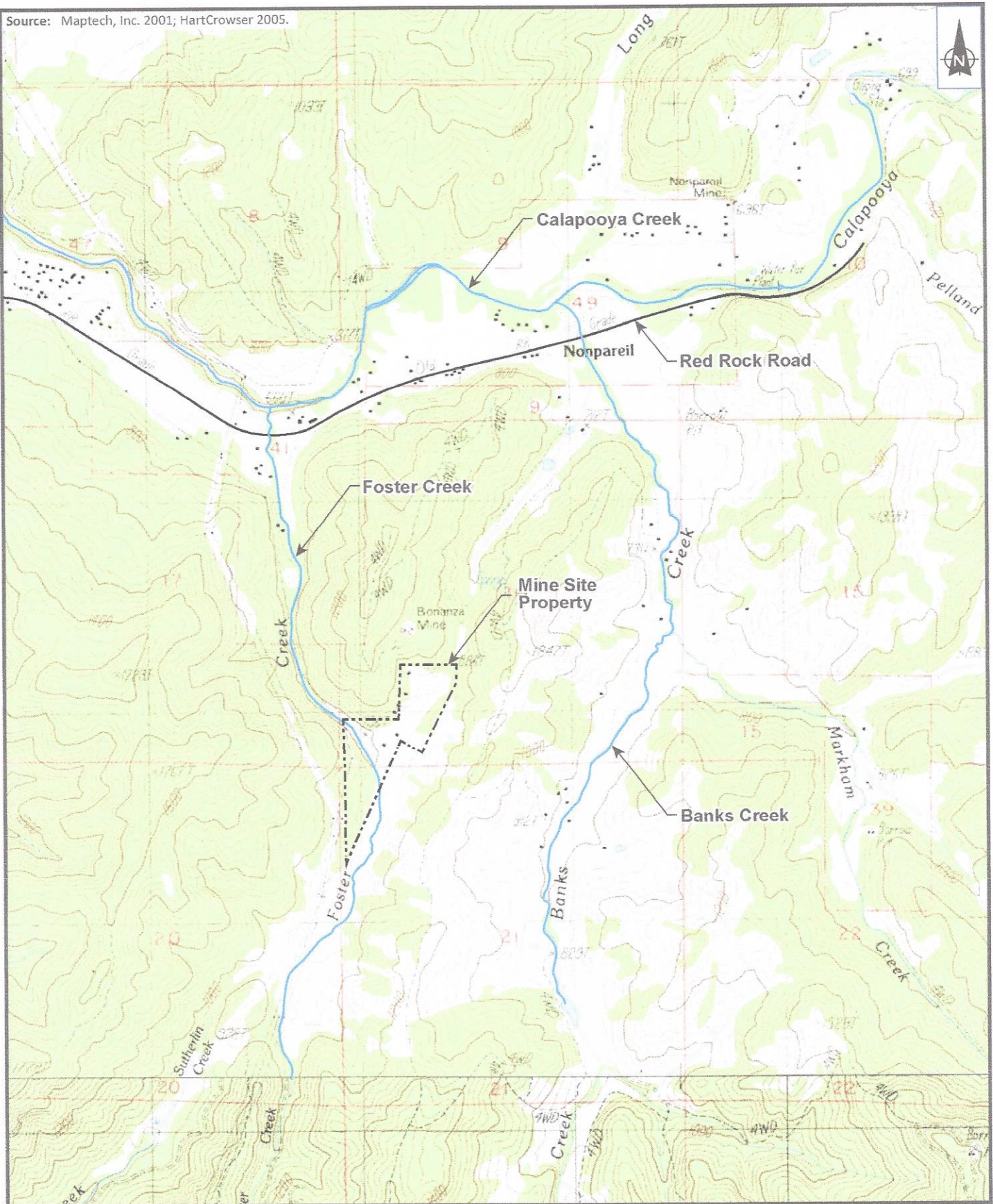


Figure 1
SITE LOCATION MAP

Source: Maptech, Inc. 2001; HartCrowser 2005.



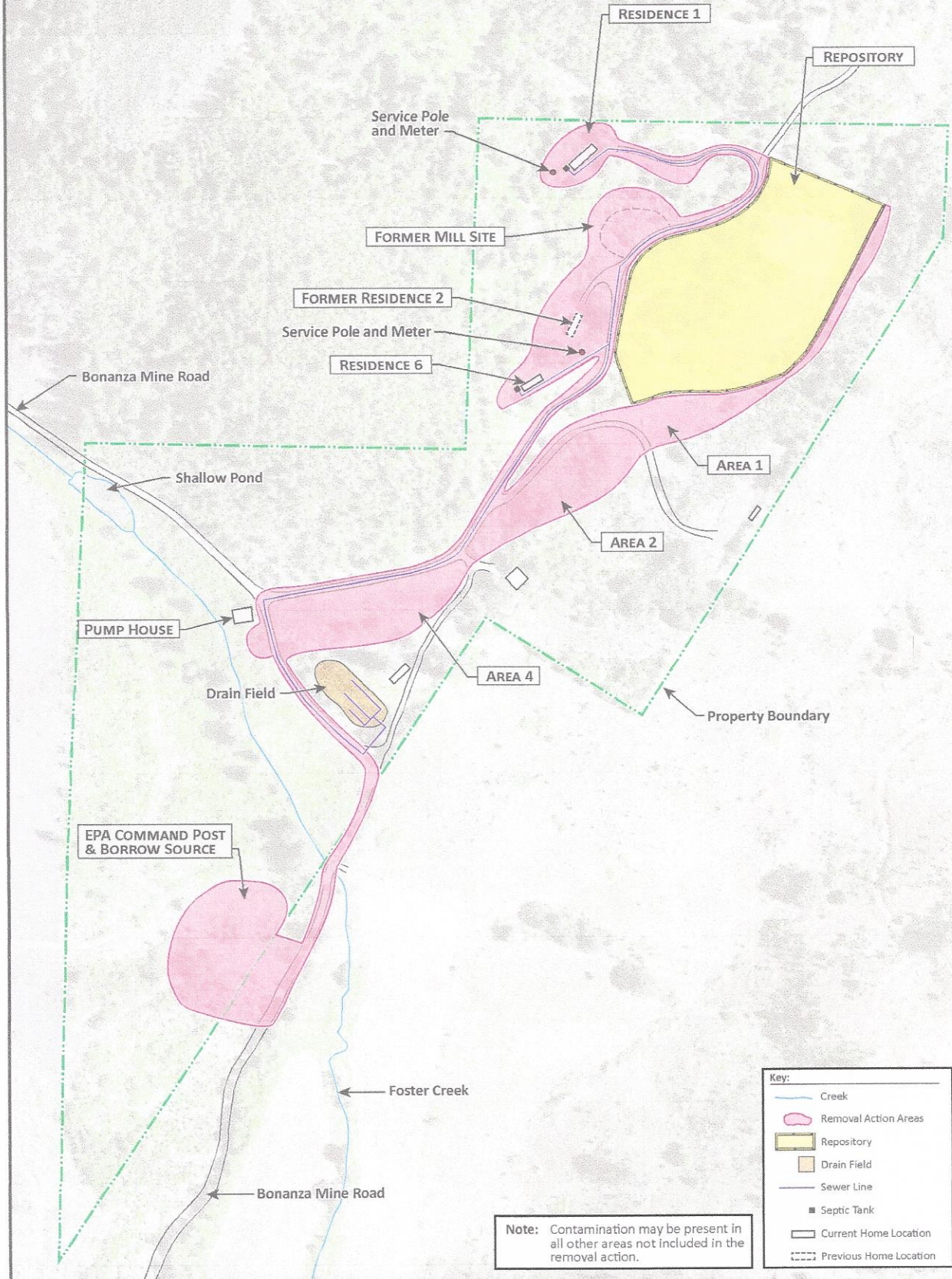
ecology and environment, inc.
Global Environmental Specialists
Seattle, Washington

BONANZA MINE SITE
Sutherlin, Oregon

0 1000 2000
Approximate Scale in Feet

Figure 2
SITE VICINITY MAP

Date:	Drawn by:	
5/14/14	AES	10:START-IV\14030011\fig 2



ecology and environment, inc.
Global Environmental Specialists
Seattle, Washington

BONANZA MINE SITE
Sutherlin, Oregon

Not to Scale

Figure 3
REMOVAL ACTION AREAS

Date:
11/17/14

Drawn by:
AES

10:START-IV\14030011\Fig 3



ecology and environment, inc.
Global Environmental Specialists
Seattle, Washington

Not to Scale

BONANZA MINE SITE
Sutherlin, Oregon

Figure 4
LOCATION OF FEATURES TO BE INSPECTED

Date: 10/19/14
Drawn by: AES

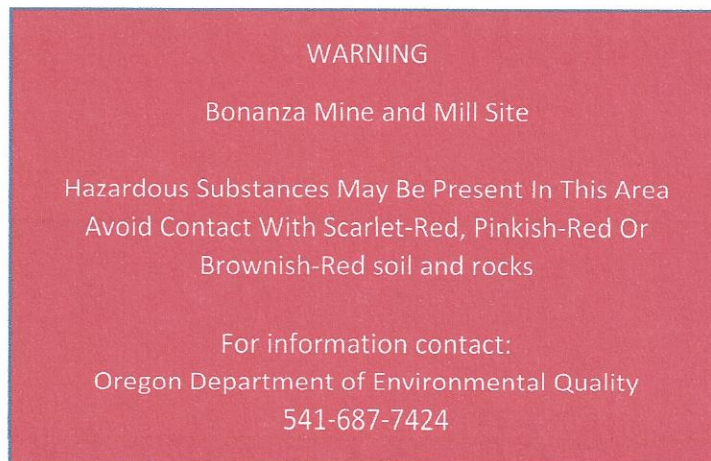
10:START-VU-4030011 fig 4

FIGURE 5 – WARNING SIGNS

For the repository:



For other areas:



Bonanza Mine Site - Field Inspection Log

Inspected By: _____

Date Inspected: _____

Site Structure	Inspected (Yes/No)	Inspection Observations	Maintenance and Repair Work Performed
1. Drainage and Erosion Control Features			
▪ Evidence of debris, sediment, sloughing, scouring in drainage ditches			
▪ Debris accumulation at culverts			
Comments:			
2. Gravel Backfill			
▪ Evidence of ruts or similar disturbance			
Comments:			
3. Repository			
▪ Evidence of erosion of the cap			
▪ Presence of deep-rooting vegetation			
Comments:			
4. Vegetation			
▪ Evidence of foot trails, play sites, or similar disturbance			
Comments:			
5. Signs			
▪ Evidence of damaged, weathered, or missing signs			
Comments:			