

3.0 RATIONALE FOR REMOVAL ACTION, CLEANUP CRITERIA, AND REMOVAL ACTION OBJECTIVES

This section summarizes the regulatory basis of the removal action. The rationale for the removal includes a 2002 natural resource damage assessment (NRDA) and the SI (URS, 2009a), which compiles previous environmental data and data collected by URS in 2008. Applicable or relevant and appropriate requirements (ARARs) further support a removal action and provide the regulatory framework for implementation.

3.1 Natural Resource Damage Assessment

Environment International (2002) conducted a preassessment screen to assess whether conditions at the Site meet the criteria for a NRDA claim. Environment International's observations demonstrate that the Site meets the criteria for a NRDA claim. Their report provided data and analysis supporting the conclusion that the conditions for a NRDA claim are met. Environment International drew the following four conclusions regarding conditions at the Site:

- 1) A release of hazardous substances has occurred.
- 2) Natural resources under the trusteeship of the USFS and other natural resource trustees have been affected.
- 3) The quantity and concentration of released hazardous substance is sufficient to cause injury to natural resources.
- 4) An assessment can be conducted at a reasonable cost and response actions would not sufficiently remedy the injury without further action.

Environment International's assessment focused on impacts to aquatic life in Joe Creek. Environment International also stated "groundwater resources are likely to be impacted," but the report does not discuss groundwater impacts in detail.

Stratus Consulting, Inc (Stratus) conducted a preliminary evaluation of the potential range of natural resource damages resulting from injury to Trust resources at the Blue Ledge Mine (Stratus, 2007). Stratus followed procedures developed by the U.S. Department of the Interior for conducting NRDA's under CERCLA (43 CFR Part 11).

Natural resource damages are separate from, and in addition to, removal action or response costs incurred to control ongoing risks to human health or the environment. Damages under a NRDA claim compensate the public for past, present, or expected future harms to natural resources, considering the effect of any cleanup actions. Although NRDA damages are separate from removal action costs, the NRDA assessment demonstrates that the mine has degraded the environment.

Stratus observed the following potential injury to natural resources:

- Copper and zinc concentrations in Joe Creek and Elliott Creek in locations downstream of the Site exceed the Ambient Water Quality Criteria (AWQC), with the highest metals levels noted during spring high flows.
- Precipitation and erosion of the waste rock cause significant transport of contaminated sediments into Joe Creek, with likely transport into Elliott Creek, the Applegate River, and eventually into Applegate Reservoir.
- Fish surveys conducted by the USFS in September 2000 identified no fish in Joe Creek, except at the confluence with Elliott Creek. The few fish observed were all young-of-year rainbow trout, which likely migrated from Elliott Creek. In the absence of degradation caused by the mine, fish should be present in Joe Creek for an estimated two miles up from Elliott Creek.
- Stratus concludes that discharges from the mine have impacted resident fish populations in Joe Creek and the segment of Elliott Creek downstream of Joe Creek. Stratus inferred impacts to fish in the Applegate River between the Elliott Creek and the Applegate Reservoir.

Stratus calculated restoration-based damages as exceeding \$12 million.

3.2 Site Investigation Rationale for Removal Action

Waste rock from mines that exploit mineralized sulfide deposits are common sources of AMD and associated dissolved metals. Both the acidity and the metals in AMD are potentially harmful to aquatic and terrestrial natural resources and humans.

The PA/SI (Weston, 2004), investigations by Southern Oregon University (Elliott, 2007), a site review by Golder Associates (Golder, 2007), and the April 2009 SI report (URS, 2009a) document release of AMD from the Site and demonstrate environmental damage.

Percolation and run-off of water and erosion of waste rock are primary sources of AMD at the Site (see Section 2.5). Sampling at the Site demonstrates that water percolating through the waste rock at the Site carries dissolved cadmium, copper, zinc, and other metals into Joe Creek creating an environment toxic to aquatic life and potentially causing human health risks to residents of Joe Bar and others. Direct erosion of the waste rock into run-off from the Site contributes to spreading of the chemicals of concern into the watershed.

Removal or other mitigation of the waste rock risk is necessary to protect human health and the environment. The SI in combination with prior investigations clearly demonstrates that a removal action is justified for the following reasons:

- The site is a historic and ongoing source of AMD from adits and waste rock.
- Historic and ongoing releases of AMD and metals from the Site have adversely impacted groundwater, surface water, and sediment.

- Site contamination results in an unacceptable human health risk within the immediate site area.
- Site contamination results in an unacceptable ecological risk from the Site downstream to Applegate Reservoir.
- Site contamination has eliminated fish and reduced macroinvertebrate populations in Joe Creek, demonstrating the watershed-scale impacts.
- Adverse impacts and ecological and human health risks will continue if the sources are not eliminated or controlled.
- Continued discharge from the mine area and downstream transport of contaminants could cause adverse impacts and risk to human and ecological receptors as far downstream as Applegate Reservoir. The dam was built in 1980, sediments continue to accumulate in the reservoir and the system is not likely at equilibrium with contaminants being transported from the mine. Although the risk assessment identified no unacceptable human health risk in Applegate Reservoir, the risk to humans may increase in the future.
- Absent a removal action, fish, amphibians, macroinvertebrates and other aquatic life are unlikely to return to Joe Creek for the foreseeable future.

3.3 Applicable or Relevant and Appropriate Requirements

The EE/CA reflects requirements of the National Contingency Plan (NCP).² The NCP grants authority to lead agencies to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or the threat of release. The removal action must consider site conditions that result in actual or potential threat to humans or ecological populations.

Selection and implementation of a removal action must comply with ARARs to the extent practicable. ARARs are federal and state standards that are directly applicable or may be considered relevant and appropriate to the circumstances of the Site. The NCP (40 CFR 300.5) defines ARARs.

Applicable requirements are federal and state cleanup standards and other requirements promulgated under Federal or State law that specifically address a hazardous waste cleanup site. Only requirements that directly address circumstances at the Site are considered to be applicable.

Relevant and appropriate requirements are federal, state, and local standards cleanup standards and other requirements that are not specifically “applicable” to a hazardous waste cleanup site but address problems or situations that are sufficiently similar to those at the site that their use is well suited to the particular site. A requirement must be both relevant and appropriate to an ARAR. According to the NCP, only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements are relevant and appropriate [40 CFR 300.525(d)].

Federal requirements are considered ARARs if they directly address circumstances at the Site. State requirements are ARARs only if promulgated laws, substantive, consistently applied, and

² NCP 40CFR 300.415 Removal Action and particularly to (b)(1), (b)(2)(i-viii), and (b)(4)

more stringent than a Federal requirement. Criteria, guidance, or advisories that fail to meet all of the criteria to be defined as a Federal or State ARAR but are determined to be useful in the selection of protective cleanup levels or methods (or in the absence of regulatory standards) are classified as ‘to be considered’ in the ARARs summary.

Tables 3-1a, b, and c list ARARs identified by the USFS as potential ARARs for the Blue Ledge Site. The USFS previously notified several agencies/Native American tribes to solicit their interest in the Site and the cleanup process. Agencies that responded and were contacted for further comment on the proposed removal action included the following:

- The Confederated Tribes of Siletz Indians
- California Department of Fish and Game, Office of Spill Prevention and Response
- United States Department of the Interior, Fish and Wildlife Service, Oregon Fish and Wildlife Office
- United States Environmental Protection Agency, Region IX

In addition, the RWQCB, and the California Department of Toxic Substances Control (DTSC) were specifically asked to comment on the proposed ARARs. The RWQCB provided comments on March 29, 2010 (RWQCB, 2010) and the DTSC provided comments on April 13, 2010 (DTSC, 2010). All comments were considered in the ARARs analysis.

3.4 Removal Action Objectives

Removal action objectives (RAOs) reflect the objective to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or the threat of releases that pose environmental risk. 40 CFR 300.415(b)(2)(i)-(viii) lists factors to consider in determining site-specific RAOs. At the Blue Ledge Mine, “released” AMD has caused and continues to cause environmental risk and damage.

Proposed RAOs for the Site are as follows:

- Mitigate unacceptable human and ecological risks posed by exposures to waste rock constituents in soil, surface water, and groundwater.
- Minimize future erosion and transport of waste rock that contribute to unacceptable human or ecological risk in Joe Creek, Elliott Creek, and the Applegate Reservoir.
- Implement a removal action in a manner that satisfies ARARs to the extent practicable and minimizes unacceptable human health and ecological exposures during the removal action.

3.5 Removal Action Schedule

The removal action is scheduled to begin in the spring of 2010. The removal construction is estimated to take approximately two construction seasons. Three years of post-removal operations, maintenance and monitoring are planned.