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Agriculture**

**Forest
Service**

**Pacific
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Date: July 17, 2003

Route To:

Subject: Signed Action Memorandum Siskon Mine Removal Action

To: Forest Supervisor, Six Rivers National Forest

Enclosed is the signed Action Memorandum for the non-time critical removal action at the Siskon Mine. The Action Memorandum describes the site investigation work conducted to date and identifies the site response action to be undertaken to address the site contamination concerns in accordance with the National Contingency Plan.

Upon completion of the removal action, Polly Haessig, the site On-Scene Coordinator, needs to provide the Regional Environmental Engineer with a copy of the removal action completion report and the Comprehensive Environmental Response, Compensation, and Liability Act administrative record for the project.

If you have any questions regarding this matter, please contact Dennis Geiser, Regional Environmental Engineer, at 707-562-8729.

/s/ James W. Stapleton
JAMES W. STAPLETON
Acting Regional Engineer

cc: Dennis J Geiser, Belinda R Walker, Polly A Haessig, Edward K Rose, Kenneth C Stagg



ACTION MEMORANDUM

For The
SISKON MINE TAILINGS AND MILL SITE
NON-TIME-CRITICAL REMOVAL ACTION
July 14, 2003

Six Rivers National Forest
1330 Bayshore Way
Eureka, CA 95501
U.S. D. A. -- Forest Service, Pacific Southwest Region



1) PURPOSE

The purpose of this Action Memorandum is to document the approval of the removal action described herein for the Siskon Mine Tailings and Mill Site, (“Site”), located on Ukonom Ranger District of the Klamath National Forest, which is administered by the Six Rivers National Forest¹. The action memorandum is prepared under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the Superfund Amendments and Reauthorization Act of 1986, Executive Order 12580, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

¹ Under existing agreements between the two forests since 1999, the Klamath National Forest is responsible for oversight of the Siskon Mine CERCLA Project through completion and monitoring.

2) SITE CONDITIONS AND BACKGROUND

A. Site Description

1. Removal Site Evaluation

Siskon Mine is listed in the Environmental Protection Agency's (EPA) CERCLA Information System under ID Number CA0000878058. A Removal Preliminary Assessment/Site Inspection (PA/SI) investigation took place over the period of 1996 – 2002 during which site information was documented, site conditions were investigated, potential contaminant sources were sampled and tested, and evaluations were made of contaminant sources, pathways and threats posed to human health and the environment.

A removal action response is necessary at the site because of the ongoing and potential releases into the environment of contaminated tailings containing high levels of heavy metals. The contaminant pathways and receptors at risk from the Site contamination are:

1. Surface Water Pathway & Receptors:

- (a) chronic erosion of the mill tailings sediment into Copper Creek
- (b) threatened mass tailings sediment releases into Copper Creek, Dillon Creek and the Klamath River
- (c) chronic exposure to contaminated stream sediments by aquatic organisms, and possible public health threat in the event of a mass tailings sediment release

2. Soil and Air Pathway & Receptors

- (a) human, plant, soil organisms, and animal exposure to contamination in the tailings soils through absorption², ingestion, and skin contact, and inhalation of contaminants in airborne dust.

2. Physical Location

The Siskon Mine Site is located in the Klamath National Forest approximately 16 miles northwest of the town of Somes Bar, California (Figure 1). The Site is within Copper Creek drainage, which is a tributary to Dillon Creek and the Klamath River. The Site is within Township 14 N, Range 5 E, Sections 20, and 29, Humboldt base and meridian (41° 35' 6.6" north latitude and 123° 37' 43.5" west longitude at Copper Creek road crossing). The former tailings pond and mill occupy an area of approximately 2 acres along Copper Creek, just upstream from the mouth of Medicine Creek. Access to the mine requires vehicle travel on Highway 96 to Forest Service roads 14N69 (Sidewinder Road), 13N35, and 14N31 to Copper Creek, which is currently a low water ford. The Site boundary includes mine roads that access the mill and continue approximately 1.5 miles to a large rockslide, beyond which the road is impassible by vehicles (Figure 2).

² Absorption or uptake of heavy metals by plants

3. Site Characteristics

Site Description

The Siskon Mine is an abandoned gold and silver mine. The mine tailings are the contamination source of concern. Tailings are present in the former tailings pond, and at the mine mill located adjacent to the former tailings pond. There are approximately 11,400 cubic yards (cyds) of tailings in the former tailings pond. Tailings are present in a remnant ore thickener vat, and in ore dump piles at the mill. At the mill there are approximately 20 cyds of tailings in piles, and 80 cyds yards of tailings in the vat. Other mine structures and remnant mine relics are present at the mill include building foundations and walls, wooden stairs, metal and wood debris, metal pipes and roofing, and artifacts associated with ore processing and assay, such as glass fragments and crucibles.

The tailings are a fine-grained reddish brown soil, typical of final process tailings slimes after milling and leaching out the gold and silver, using cyanide. The tailings have high concentrations of heavy metals, characteristic of similar massive sulfide gold ore deposits and mine wastes in the central Klamath Mountains. The contaminants of concern associated with the tailings are the following heavy metals: arsenic, cadmium, copper, iron, lead, mercury, molybdenum, selenium, silver, and zinc. A small amount of total cyanide is present in the tailings, but testing indicates that a majority of the cyanide is bound up with iron or other metals and is considered effectively immobile, and not a concern. Leaching tests performed on the tailings shows that the metals have a very low leaching potential indicating that the metals in the tailings are not readily soluble in water. This finding is borne out by water quality testing of Copper Creek, which showed an absence of dissolved metals in the water. The tailings also have very low sulfur contents and their neutralizing potential far exceeds acid generating potential. Based on these results, the tailings should not generate acid drainage. No acidic leachates have ever been observed coming from the tailings.

Mine History

Mining and exploration for gold and silver began in the early 1900s and was most active from 1951 through 1960. Ultimately six patented claims, 56 unpatented claims, and one unpatented mill site claim were located at Siskon Mine. The unpatented claims were relinquished in 1992 and 1993 and are currently abandoned. From 1951 through 1960, ore was removed from three open pits and trucked 2.5 miles to the mill located adjacent to Copper Creek. Ore milling and disposal of mine tailings first began in 1953. Ore was milled and gold and silver were concentrated using a cyanide slime processing plant. Processed tailings were deposited in the tailings pond. A photograph from May 24, 1955, indicated that an earthen dam was constructed to impound the tailings, and Copper Creek was diverted around the dam. One written account of the mining operation indicates that at least from 1957 to 1960, after milling operations ceased in late November, a hole was punched into the tailings dam releasing tailings accumulated over the year's operations (Smith, 1993). A California Department of Fish and Game (CDFG) memorandum from February 15, 1958, describes an event in the fall of 1957, during which the Siskon Mine tailings were released from the tailings impoundment, causing discoloration of the Klamath River (CDFG, 1958). When active mining operations ceased in 1960, maintenance activities were discontinued, resulting in the failure of impoundment berms and erosion of the

remaining tailings into Copper Creek. After 1960 no other mining or milling occurred at the site. The 1964 flood washed away the tailings dam and much of the tailings at the edge of the impoundment. In 1976, the mine mill buildings were demolished and equipment was salvaged. The activities that took place at the Siskon Mine from 1960 to 1992 consisted of limited sampling and exploration on the patented lands. None of these activities were at, or on the mine tailings. The six patented mining claims are currently privately owned, and no mining activities are occurring on them.

Land Use and Communities

The Siskon Mine Site is remotely located and there are no nearby residents. Except for the parcel of private land in Section 20 and 29 (approximately 120 acres) the land surrounding the mine area is National Forest System Lands (Figure 2). The nearest community is Somes Bar to the southeast. The 14N31 road, which accesses the Site and Copper Creek, is gated almost five miles from the Site. Dillon Creek Campground, the nearest developed recreational site, is located at the mouth of Dillon Creek, approximately five air miles from the site and eight stream miles downstream of the Site.

Heritage Resources

The Siskon Mine has been evaluated as a historical archeological site and recommended to be ineligible for the National Register of Historic Places. Parts of the mine road, former tailings pond and mill are within the Helkau Cultural Area, which was determined to be eligible to the National Register of Historic Places in 1981. Medicine Mountain, which is located north of Medicine Creek, is the center of the Helkau spiritual and ceremonial area. Helkau is located within Ancestral Territory of the Karuk Tribe of California. The area of Helkau and Elk Valley further to the west, are also culturally significant to the Yurok and Hoopa Tribes, and to the cultural practitioners from all three tribes.

Threatened and Sensitive Species

The Site is within Critical Habitat for *Southern Oregon / Northern California Coasts* (SONCC) Evolutionarily Significant Unit (ESU) Coho salmon (*Oncorhynchus kisutch*), which is a listed *Threatened* species under the federal Endangered Species Act. In addition, Essential Fish Habitat (EFH)³ for SONNC Coho salmon and Upper Klamath -Trinity River Chinook salmon occurs in Copper Creek, Dillon Creek and the Klamath River. Klamath Mountains Province (KMP) ESU steelhead trout (*O. mykiss*) and Upper Klamath – Trinity Rivers (UKTR) ESU Chinook salmon (*O. tshawytscha*) are both listed *Sensitive* fisheries species for the Pacific Southwest Region of the Forest Service. Steelhead and Chinook salmon, are important anadromous fish present in the Klamath River, Dillon Creek and Copper Creek. Suitable habitat for the Northern spotted owl, listed as *Threatened* under the federal Endangered Species Act, does not occur on the Site but does occur within 0.25 miles of the Site. There are no other Threatened, Endangered, Proposed, Forest Service Sensitive, or Survey and Manage plant or wildlife species requiring special management at the Site.

³ EFH is defined in Section 3 of the MSA as “those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity.”

Sensitive Ecosystems

The Klamath River, approximately 8 miles downstream of the Site, is classified as a Recreational Wild and Scenic River under the National Wild and Scenic River System. Dillon Creek, less than one mile downstream from the Site, is recommended in the Klamath National Forest Land and Management Plan as a Recreational River to be included in the Wild and Scenic River System (USDA-Forest Service, 1995).

The Siskon Mine is within the Dillon Creek Watershed which is a designated Tier 1 Key Watershed under the Record of Decision (ROD) for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl, 1994, which amended existing forest plans (USDA&USDI, 1994). Tier 1 Key Watersheds are crucial refugia for at-risk fish species and that currently provide high quality water.

Many areas of the Site occur within the Riparian Reserve Management Area, which are reserves allocated for maintenance and restoration of riparian ecosystems. Riparian ecosystems at the Site include aquatic ecosystems, the stream channel, and adjacent terrestrial areas that extend 340 feet measured from either edge of Copper Creek (equivalent to a buffer zone of 680 feet in width), and which buffer the stream.

Water quality and aquatic habitats in the Dillon Creek watershed are considered to be in good to excellent condition. However, the Klamath River (CalWater Watershed # 10512050) into which Dillon Creek drains, is a Federal Clean Water Act 303d listed *impaired* waterbody for nutrients, organic enrichment/low dissolved oxygen and temperature. Sediment is also being monitored and evaluated for future listing as a pollutant/stressor.

Port-Orford-cedar (POC) trees are present on-Site in spring and seep areas but no POC root diseased trees or infections are present at the Site or along the 14N31 road leading to the Site. A small patch of spotted knapweed has recently been located in the Siskon Mine area, along the 14N31 road in the vicinity of the Copper Creek low water ford. The noxious weeds will be removed by hand-pulling prior to seed production, and before implementation of the removal action.

4. Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant or Contaminant

The contaminants of concern associated with the tailings are the following heavy metals: arsenic, cadmium, copper, iron, lead, mercury, molybdenum, selenium, silver, zinc. The metals exceed background (uncontaminated) levels of metals in soils from 7 to 640 times.

The Siskon Mine tailings material contains elevated concentrations of arsenic and copper at levels which exceed the values used by the State of California to classify a material as a toxic hazardous waste (California Code of Regulations (CCR) Title 22, § 66.261.24(a)(2)(A) and as a hazardous mine waste as the exceedances are above the “Persistent and Bioaccumulative Toxic Substances” hazardous waste characteristic (CCR, Title 22, Chapter 11, Division 4.5, § 66261.24). Six tailings samples exceeded the TTLCs for arsenic and 2 samples exceeded the criteria for copper.

Sediment from the mill tailings in the former mill tailings pond discharges directly into Copper Creek during the rainy season (November-March) and during large rain storms that may occur at any time of the year. Mill tailings have been observed directly eroding into Copper Creek, and the streambed in the downstream of the tailings discharge point is discolored with the fine-grained reddish tailings sediment. Testing results confirm tailings sediment deposited in Copper Creek downstream of the tailings pond discharge point and up to one-quarter mile downstream. As has been previously noted, the metals in the tailings are not readily soluble, and no dissolved metals have been detected in the water samples of Copper Creek downstream of the tailings discharge point. Surface erosion estimates made within the subwatershed of the mill and tailings pond indicates that annually, 17 cubic yards of sediment are mobilized of which 10 cubic yards per year are delivered into Copper Creek (USDA-Forest Service, 2003b). In simple terms, this equates to about one 10 cubic yard dump truck of contaminated sediment being deposited into the stream system every year from the tailings pond area. The high levels of metals in the tailings sediment are hazardous substances, which are chronically being released into a surface water target. Another 500 cubic yards of mine tailings mixed with channel alluvium sediment is proximal to the Copper Creek stream channel within the estimated 100-year flood zone. This tailings sediment poses a potential large volume release into the stream system in a major flood.

The uncovered and sparsely vegetated tailings in open areas in the former tailings pond, at the mill and in a relict cyanide vat at the mill present risks of exposures to wildlife, plants, soil organisms and humans at the Site. Safety hazards to wildlife and the public are present at the mill consisting of building debris and remnant ore thickener vats.

5. NPL Status

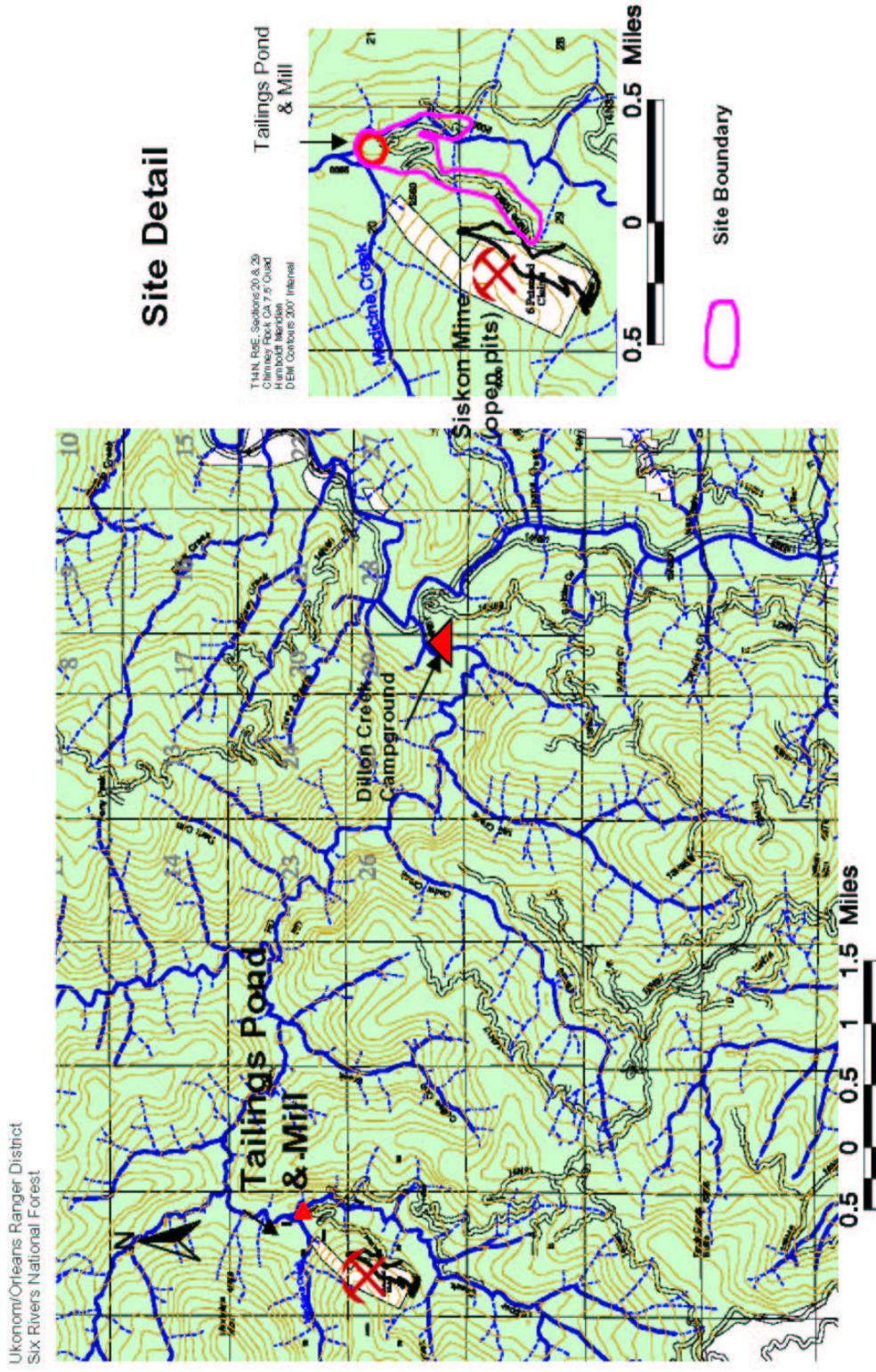
The Siskon Mine Site is a non-National Priorities List (non-NPL) Site.

6. Maps and Photographs



FIGURE 1
LOCATION MAP
SISKON MINE
ORLEANS/UKONOM RANGER DISTRICT
SIX RIVERS NATIONAL FOREST

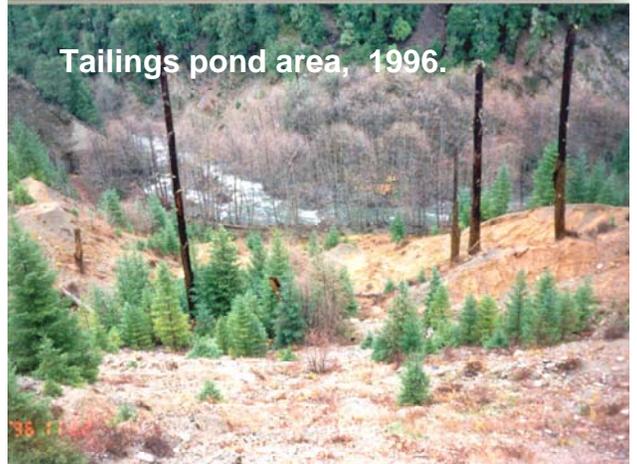
Figure 2. Siskon Mine Site Map



Ukonom/Orleans Ranger District
 Six Rivers National Forest



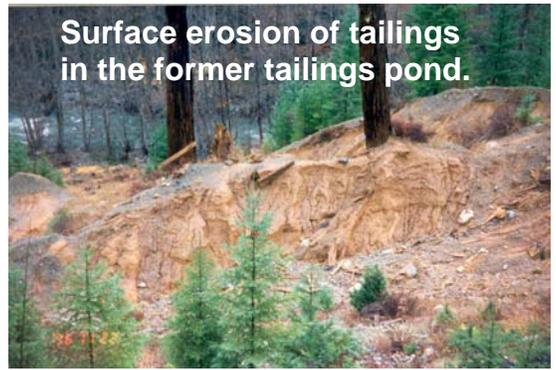
Tailings after the 1964 flood.



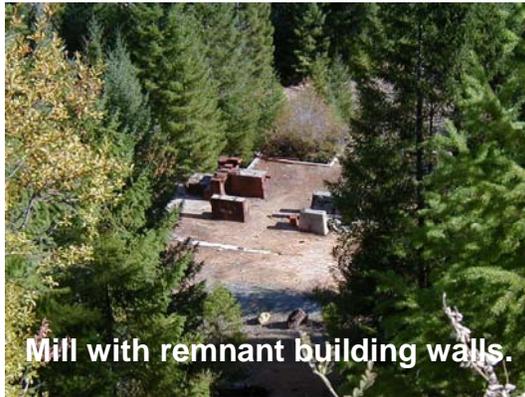
Tailings pond area, 1996.



Tailings entering Copper Creek.



Surface erosion of tailings in the former tailings pond.



Mill with remnant building walls.



Tailings in Ore Thickener Vat at Mill.



Lower level of Mill, with vats, building and metal debris.

B. Other Actions To Date

1. Site Discovery, 1992, Release Reporting, July, 1993.
2. Forest Service Preliminary Assessment in which sampling and testing documented the presence of contaminants on Site, the release was characterized, and pathways and targets identified (USDA-Forest Service, 1994).
3. Sampling, testing, and site characterization by a contractor and the Forest Service, 1996. Additional site investigations, 1996-2002.
4. Request for Applicable, Relevant and Appropriate Requirements (ARARs) from California State Agencies, 1998.
5. Cyanide Drum Removal Action, 1999. This was a non-time critical removal action in which a Removal Preliminary Assessment/Site Inspection, an EE/CA, and a Removal Action Memorandum were prepared (USDA-Forest Service, 1999a, 1999b, 1999c). 819 cyanide drums were removed from the Site, and the project was completed in September 1999.
6. Public notification and request for input for the Siskon Mine CERCLA Removal Action and Reclamation Project, January 17, 2003 – February 24, 2003.
7. Preparation and issuance of a *Community Involvement Plan*, January 31, 2003; revised March 3, 2003, (USDA-Forest Service, 2003c)
8. Completion and issuance to interested State agencies and the public, of the *Removal Preliminary Assessment/Site Inspection Report*, March 2003 (USDA-Forest Service, 2003b).
9. Completion and issuance to interested State agencies and the public, of the *Engineering Evaluation/Cost Analysis for the Siskon Mine Tailings and Mill Site*, May 19, 2003 (USDA-Forest Service, 2003a).
10. Completion of the 30-day public review period for the EE/CA and project Administrative Record, June 17, 2003.

C. State and Local Authorities' Role

The USDA- Forest Service is exercising its lead agency authority for National Forest System lands to address the contamination at the Siskon Mine Tailings and Mill Site. Agencies of the State of California, and Siskiyou County have been informed of the contamination at the site through issuance of a request for ARARs in 1998, and have received copies of the *Removal PA/SI Report*, March 2003 (USDA-Forest Service, 2003b) and the *EE/CA for the Siskon Mine Tailings and Mill Site*, May 12, 2003 (USDA-Forest Service, 2003a).

The removal action is consistent with addressing the water quality and fishery concerns raised by the North Coast Water Quality Control Board and the California Department of Fish and Game in correspondence dated October 14, 1998, March 26, 2003, January 6, 1999, and March 28, 2003 and from comments received from agency representatives at a field Site visit which occurred April 22, 2003.

3) THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The following discussions are summarized from the EE/CA (USDA-Forest Service, 2003a: 33-37) and the Removal PA/SI Report (USDA-Forest Service 2003b: 50-53). Both reports are available in the project Administrative Record File.

A. Threats to Public Health or Welfare

1. Actual or potential exposure to nearby human populations, or the food chain from hazardous substances, pollutants, or contaminants:

- The mine tailings contain high concentrations of heavy metals arsenic, cadmium, copper, iron, lead, mercury, molybdenum, selenium and zinc. The levels of arsenic and copper in the mine tailings are high enough to allow the mine waste to be classified as a toxic and hazardous under state regulations.
- The remoteness and limited accessibility of the Site suggests that the mine tailings pose a low threat to public health as recreational exposures to the tailings soil are anticipated to be rare. A reasonable human health exposure scenario was developed, considering the factors such as site remoteness, access, and recreational use. The human targets threatened by contamination are: hunters, hikers, Forest service workers conducting site surveys and field studies, (surveyor risk management criteria of Ford, 1996) , and industrial site workers (Preliminary Remediation Goals (PRG) of U.S EPA, Region 9, 2002) conducting activities on tailings-contaminated areas such as during implementation of the removal action on-Site. The routes of exposure for these individuals consist of: dermal (skin) absorption of metals contamination from the tailings; inhalation of dust during activities on or near the tailings; and incidental ingestion of contaminated soil. These exposures would be generally low and of short duration for hunters, hikers, or Forest Service workers. Industrial site workers would be subject to higher and longer duration exposures during heavy equipment use at the Site. Comparison of screening levels with the maximum on-site concentrations of metals indicates that arsenic and iron pose a human health risk. Nine out of 11 samples of tailings exceed the screening levels for arsenic and iron. Arsenic is also a known human carcinogen. The PRG for the cancer endpoint of arsenic is very low, 1.6 milligram/kilogram. All tailings samples exceed this level. The magnitude of threat to recreationists is anticipated to be much lower than that for workers as the actual incidences of recreationists hiking or hunting at the site of tailings contamination is anticipated to be very low. This is because of the remoteness of the Site, and the gate on the road accessing the site. The magnitude of the threat to workers is most significant for workers using heavy equipment at the tailings piles. Exposure to tailings dust is a concern during future response actions using heavy equipment.

- Tailings sediment that erodes into the stream system contains high levels of metals that pose ecological risks to other animals such as aquatic invertebrates, and insects that reside in the stream bottom. Fish, (steelhead, and resident trout) in turn, may be exposed to the contaminants through uptake of aquatic insects and macroinvertebrates, and may be exposed to high metals during early life cycle stages (egg, smolt, fry stages of life) in Copper Creek. Given the low angling use of Copper Creek, threats to the human food chain are anticipated to be low.

2. Actual or potential contamination of drinking water supplies:

- Surface water bodies of Copper Creek, Medicine Creek and Rough Creek have not shown evidence of metals contamination in the form of dissolved metals from past testing, and these surface water bodies are not used as drinking water sources. Recreational swimming at Dillon Creek Campground eight stream miles from the Site is not a public health threat from tailings contamination. Groundwater is not used as a source of drinking water within 4 miles of the Site.

3. Hazardous substances, pollutants or contaminants in drums, barrels, tanks or other bulk storage containers, that may pose a threat of release:

- Approximately 80 cubic yards of tailings are present in an open vat at the mill site. The tailings are accessible to wildlife and the public. Underneath the vat, there are pipes and plumbing that were used during ore concentration and cyanidation. The underground plumbing may contain unknown hazardous substances or other hazards. Building and metal debris, and tailings present at the mill site poses a public health and safety hazard.

4. High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate:

- The tailings piles are steep in place, lack vegetative cover, and chronically erode at high rates. Annually, it is estimated that 10 cyds of tailings sediment erodes into Copper Creek, depositing high amounts of hazardous metals into Copper Creek, impairing water quality, and aquatic habitat. The uncontained mine tailings are present within the 100 year flood plain, and an estimated 500 cyds of tailings mixed with alluvium would be deposited into the stream system during a large flood event. This large volume sediment discharge would negatively affect the water quality and beneficial uses of Dillon Creek, and the Klamath River and depending on the time of year, could threaten public health and welfare at Dillon Creek Campground and at recreational sites along the Klamath River.

5. Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released:

- As described in number 4 above, 500 cyds of uncontained tailings are present within the 100 year flood plain and are threatening release during the next large flood. The Site is in an area that receives approximately 80 inches of rain per year. This high rainfall, and the steep sparsely vegetated slopes of the tailings piles, contribute to very high erosion rates

as has been described. Evidence of chronic deposition of tailings into Copper Creek is borne out by testing results that show stream sediments are significantly elevated in arsenic, cadmium, copper, mercury, and zinc.

6. Threat of fire:

- Wildfire is a natural event in the forest and could occur during any fire season. Future severe wildfire at the Site, along the mine roads, at the mill, and in the tailings deposits would reduce the existing vegetative cover and accelerate erosion rates of the tailings. A severe wildfire within the Riparian Reserve area of the stream below the mill and tailings deposits, would remove any filtering, trapping, and buffering functions performed by the existing vegetation. This would increase erosion rates off of the tailings, and threaten public health and welfare downstream from the Site, as well as degrade the existing high water quality of Dillon Creek.

B. Threats to the Environment

1. Actual or potential exposure to plants, animals, or the food chain from hazardous substances, pollutants, or contaminants:

- The ecological targets threatened by the tailings contamination are: terrestrial plants, wildlife and soil organisms exposed to tailings-contaminated soil and, fisheries and aquatic organisms in Copper Creek exposed to tailings-contaminated sediments. Screening level ecological risk assessment (USDA-Forest Service, 2003a) indicates that the mine tailings contain high concentrations of heavy metals arsenic, cadmium, copper, iron, lead, mercury, molybdenum, selenium and zinc that pose a moderate to high ecological risk to terrestrial wildlife such as deer, bear, small mammals and birds, plants, soil organisms, and stream sediment dwelling organisms. Plant cover on the tailings piles is sparse. The lack of plants and other organic matter in or on the tailings is not indicative of a healthy soil. The high metals in the tailings may be phytotoxic to plants and may pose adverse risks to soil organisms. The tailings are used by deer and bear as a mineral salt lick. The magnitude of the threat to these animals is likely to be at least moderate to high, because they may ingest more than would be expected by incidental ingestion of soil during grazing. The high levels of arsenic, copper, mercury, cadmium and zinc in the stream sediments downstream of the tailings release when compared to screening criteria for macroinvertebrates, indicates a potential for an ecological risk to sediment dwelling receptors in Copper Creek. Bioaccumulation of heavy metals from the tailings is a potential threat to the wildlife and aquatic life exposed to the tailings soil and sediment.

2. Actual or potential contamination of sensitive ecosystems:

- Contamination is occurring within a variety of sensitive ecosystems. The mill and tailings soils are within the Riparian Reserve of Copper Creek. Copper Creek provides spawning, holding, and rearing habitat for KMP steelhead, a Forest Service Sensitive species. Copper Creek provides EFH under the Magnuson–Stevenson Act. Copper Creek is a tributary to Dillon Creek which is a Key Watershed under the 1994 ROD,

(USDA &USDI, 1994). Riparian Reserves, Key Watersheds, and Watershed Restoration are critical components of the Aquatic Conservation Strategy as outlined in the ROD. Restoration activities in Key Watersheds and Riparian Reserves include activities such as mine reclamation, restoration of riparian vegetation, and mitigation of sediment source inputs from roads and mine disturbances that degrade water quality and stream habitat. Less than one mile downstream of the tailings discharge point, Copper Creek enters Dillon Creek, which is a recommended Recreational River under the Wild And Scenic Rivers Act (USDA-Forest Service, 1995). Dillon Creek Watershed is tributary to the Middle Klamath River, which is a Federal Clean Water Act 303d listed impaired water body for nutrients, organic enrichment/low dissolved oxygen and temperature. Sediment is also being monitored and evaluated for future listing as a pollutant/stressor. Parts of the Siskon Mine road, including all of the mill and tailings pond area are within the Helkau Cultural Area, which was placed on the National Register Historical Places in 1981. Helkau is an area of spiritual significance to the Karuk Tribe whose ancestral lands are in this area of the Klamath River Watershed. Cultural practitioners of the Karuk and Yurok Tribes utilize the Helkau area for ceremonies. The tailings contaminant source has long been a concern to the local tribal governments.

3. Hazardous substances, pollutants or contaminants in drums, barrels, tanks or other bulk storage containers, that may pose a threat of release:

- See discussion in Threats to the Pulic Health and Welfare above. The uncontained tailings in the open ore thickener vat are are used as a mineral lick by deer and bear.

4. High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate:

- See discussion in Threats to the Pulic Health and Welfare above. Coho salmon, including juvenile fish, have been found near the mouth of Dillon Creek and downstream in the Klamath River. A large volume release of contaminated tailings from a flood event would have significant negative consequences on fish at their critical life stages: eggs, smolt, fry or juvenile fish. Other important anadromous fish occupy Dillon Creek and the Klamath River including spring and fall-run Chinook salmon, and summer and winter steelhead. These fish and their habitats would also be negatively affected.

5. Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released:

- See discussion in Threats to the Pulic Health and Welfare above.

6. Threat of fire:

- See discussion in Threats to the Pulic Health and Welfare above.

Considering these factors and conditions at the Site, a removal action is appropriate and necessary to remedy the dangers and threats to public health and welfare, and the environment that are posed by the Site.

4) ENDANGERMENT DETERMINATION

The continuing release of hazardous substances consisting of the heavy metals: arsenic, cadmium, copper, iron, lead, mercury, molybdenum, selenium, silver, zinc in the tailings from this Site, if not addressed by implementing the response action selected in this Action Memorandum, present an imminent and substantial endangerment to the environment, and to a lesser degree, public health and welfare. The primary threats posed by the tailings at the Site are to the environment: from migration of the tailings into the stream system through erosion; threatened large volume tailings release in the event of a major flood; from exposure to plants and terrestrial animals from uncovered tailings in the former tailings pond, and in piles and the relict ore thickener vat at the mill; and from exposure to tailings by stream sediment-dwelling organisms. A secondary threat is to humans from exposures to the tailings during work activities at the site, or from incidental exposure during hiking or hunting at the Site. If the tailings remain in their current condition, then the hazards and threats to the environment, human health, and occasional recreational visitors will remain.

5) PROPOSED ACTION AND ESTIMATED COSTS

A. Proposed Action

The USDA Forest Service is exercising its lead agency authority under CERCLA and the NCP to conduct a non-time-critical removal action. The overall goals of the removal action are to:

- Protect human health, improve riparian function, improve aquatic and wildlife habitats, attain water quality objectives, and maintain beneficial uses in the watershed area.

The objectives of the removal action are to:

1. Eliminate or reduce actual or potential human, plant, and animal, exposures to hazardous substances in the tailings.
2. Eliminate or reduce the chronic surface erosion of tailings and contaminants of concern into Copper Creek.
3. Eliminate or reduce the threat of an acute large-volume release of tailings containing hazardous substances into the stream system during a future major storm or flood event.
4. Eliminate or remove the safety hazards and ecological risks posed by the open vat containing tailings, and other metal debris and tailings piles on the mill.
5. Reduce the chronic on-Site sedimentation from mine roads into the mill, former tailings pond area and Copper Creek.

Proposed Action Description

Alternative 2 – Consolidation, Containment, and Capping in Place

This alternative, as described in the EE/CA, is the recommended alternative proposed for action at the Siskon Mine Tailings and Mill Site.

Mill tailings materials would be consolidated, contained, and closed in-place at the Siskon Mine Site. Tailings will be pulled back upslope from where they are deposited in the 100-year flood plain near the Copper Creek stream channel and consolidated with the other tailings piles within the former tailings pond area. Tailings in the vat leach tank at the mill, and in piles and spillover at the mill would also be combined with the rest of the tailings. The tailings would then be capped with a layer of clean soil, encompassing an area approximately 1.3 acres. The consolidated tailings and soil cap would be retained by an engineered gabion retaining wall. The gabion wall is designed to withstand the estimated 100-year flood without undercutting, overtopping, or sustaining any other serious damage. Riparian vegetation directly adjacent to the stream channel will be retained and protected from disturbance to the maximum extent practicable in order to construct the gabion wall. The gabion wall footing will be constructed at an elevation sufficiently below channel grade to provide for a high degree of slope stability and protection from flooding and channel scour. The front of the gabion wall (adjacent to the stream) will be protected with a “Reno Mattress” (partially buried scour prevention device). Riprap will be placed at the two ends of the gabion wall for additional flood protection at the transition to the natural slopes. Final closure of the tailings would be performed by: (1) grading and compacting the tailings; (2) capping the graded tailings with clean fill (uncontaminated soils); (3) fertilizing, seeding, and mulching the cap; (4) placement of erosion control matting on top of the seeded cap; and (5) planting of trees and other vegetation on the cap after the disturbed area has stabilized and grass has been established, in order to establish long-term vegetation. Specified rock material from a source off of the Forest will be hauled to the Site for filling the gabion baskets and for use as riprap. A minimum of two feet of capping material will be placed on the tailings. Native soil and rock material comprising the cap would be obtained locally from the Site from: old fill piles on-Site; 1.5 miles of road stormproofing (excess soil removed from road berms), and borrow sites along the mine road. It is estimated that 4500 – 5000 cubic yards of soil/rock material will be used to cap the estimated 11,500 cubic yards of tailings. All soil borrow sites shall be sloped and graded to ensure proper drainage, and seeded and mulched at the close of the season of use.

An engineered drainage structure (rock-lined surface trench drain) will be constructed along contour at the base of steeper uncontaminated slopes along the outside edge of the tailings cap. The drainage structure will collect excess surface runoff, slow it down and allow it to infiltrate into the subsurface soils. Within the area of capped tailings, another rock-lined drainage channel will be constructed to capture water flowing from the intermittent spring. This drainage structure will be constructed so that captured spring water and surface runoff from the cap will be isolated from the tailings using geotextile, fill and riprap.

Associated Removal and Reclamation Activities

Metal and wood debris at the mill site, including what remains of the two vat leach tanks, will be removed and disposed of off-Site at an appropriate landfill or waste facility. Concrete on the

floor of the mill site area will be ripped, broken up and removed. The disturbed areas will be sloped to drain, covered with soil, seeded, mulched and revegetated. None of the vertical concrete walls that are presently standing will be disturbed. Concrete removed from the mill area may be used for drainage control structures and riprap.

The following roadwork would occur:

- routine road maintenance along the 14N31 road access to Copper Creek;
- construction of a temporary vented rock ford with culverts on Copper Creek (allowing fish passage, and designed to handle and pass a 100-year flow);
- repair of one landslide area along the mine road (14N31B) that accesses the mill site;
- construction of a temporary road access from the existing mine road down into the mill and the former tailings pond area; and
- stormproofing 1.5 miles of mine road (14N31B) to a hydrologically self-maintaining condition (Maintenance Level 1), so that the risk of causing adverse watershed or water quality impacts is low.

Construction and removal of the temporary road crossing on Copper Creek will be implemented during the dry season when the stream flow is low, near base flow. The running course of the crossing will be removed seasonally at the close of operations for the year. This crossing will be decommissioned after the monitoring and revegetation phase of the project, when vehicles and heavy equipment are no longer needed to cross the creek. Stormproofing will involve removing road berms and out-sloping, and installation of critical dips in the road to prevent water diversion. A new temporary road will be constructed through the lower part of the mill to allow heavy equipment to access the former tailings pond area. The location is in an area of past mine-related disturbance. The temporary road will be decommissioned when access for heavy equipment into the former tailings pond area is no longer required.

Natural drainage patterns will be restored on slopes outside of the mill and former tailings pond area to eliminate or decrease erosion and gulying on steep erosive slopes, particularly in places where control of drainage is crucial to the success of the project.

Project implementation will require the use of hand tools and heavy equipment including excavators, loaders, graders, bulldozers, dump trucks, water tenders, pickup trucks, and off-highway vehicles (OHVs). Track mounted equipment will be used to construct the gabion wall, excavate and grade the tailings, and cap the tailings. Dump trucks would dump fill material down into the mill tailings pond where it can be handled by the track-mounted equipment.

Resource Protection Measures

Alternative 2, is consistent with management direction found in the Klamath Forest Land and Resource Management Plan (USDA-Forest Service, 1995), Klamath National Forest Standards and Guidelines, and the Aquatic Conservation Strategy (USDA & USDI, April 1994).

Resource protection measures and Best Management Practices have been incorporated into the project design, and are to be incorporated into contract specifications for project implementation. Resource protection measures not already mentioned in the alternative description and are summarized here and can be found in the Project Design Standards and Best Management Practices Report, (USDA-Forest Service-KNF, 2003d) which is incorporated by reference, and

available in the Administrative Record File.

- Best Management Practices applicable to the project will be implemented. These measures have been certified by the State Water Quality Board and approved by the EPA to maintain water quality and protecting beneficial uses. These practices have been routinely applied in timber sales, road construction and watershed restoration projects on the Klamath National Forest.
- Klamath National Forest Wet Weather Operations (WWO) Guidelines will be used to determine appropriate operations during periods of wet weather. The project will be implemented during the dry season from June 1 to October 15. WWO Guidelines include cessation of operations whenever project implementation would cause adverse effects. Forecast periods will also be of a suitable length to allow completion or winterization of the task undertaken before precipitation events occur. When precipitation is forecast, the project Inspector/COR/CO will be on site to insure that winterization procedures are implemented in a timely fashion and to initiate shutdown operations. Operations will not resume until suitable weather, soil and forecast conditions exist. The Inspector/COR/CO and/or project earth scientist will examine field conditions to determine when the soil and/or road has dried out enough to enable operations to resume without adverse affects to soil and water resources.
- An Erosion Control Plan is required to be submitted by the contractor(s) implementing the project. The plan must be approved and agreed to by the Forest Service prior to initiation of construction activities (BMP2.2).
- All contractors operating at the Site are responsible for preparation and implementation of a Hazardous Spill Contingency and Countermeasures Plans as specified in the contract, and shall be prepared to contain, control and cleanup any accidental spills onto the land or water bodies on the Forest.
- All refueling, lubricating, and servicing of vehicles and equipment will take place at designated staging or servicing areas (BMP 2.12).
- All disturbed sites are to be seeded and mulched (Certified Noxious Weed Free) prior to winter weather.
- Unsuitable soil and rock material will be placed in stable, non-floodplain sites, and then seeded and mulched to limit erosion. Timber slash will be placed in designated landings along Forest system roads. Suitable landslide, road fill and timber slash may be used to restore natural or near-natural contours, as approved by the geotechnical engineer or other qualified personnel.
- Disturbance of existing vegetation will be minimized within the road clearing limits, at stream crossings, and at approved borrow and waste repository sites to maintain and improve hydrologic functions.
- All vehicles, transport trucks and other large equipment shall comply with cleaning of equipment specifications to prevent the introduction and spread of noxious weeds, Port-Orford-cedar root disease, Sudden Oak Death etc. Vehicles and equipment shall be inspected and approved for entry by the Forest Service. Cleaning and washing sites shall be inspected and approved by the Forest Service.
- All operators and equipment on-Site shall comply with the Fire Plan specifications and requirements.
- Fine sediment generated and transported from work sites, along roads used for haul of materials or tailings, including roads in ultramafic rock, will be minimized by implementing dust abatement measures (BMP2.23).
- Water drafting sites will be developed following guidelines set forth by the National Marine Fisheries Service, and following BMP 2.21.
- Public access to the Site will be restricted during operations at the Site.
- Tribal Governments and practitioners will be notified routinely of the projected schedule of work at the Site (e.g. haul road being used, and work being performed), and when changes occur. This

- action will be tracked by the project On-Scene Coordinator.
- Elk Valley or the adjacent high-country areas in Helkau will not be used by contractors for project-related camping or parking of equipment.
 - The Go-Road will be signed between Orleans and Rock Creek Butte, during periods when haul trucks for the project are using the road.

An additional project design standard relating to noxious weeds has been added since the issuance of the EE/CA to the public on May 19, 2003.

- The small population of spotted knapweed located on the mine road on the east side of Copper Creek shall be manually removed before the plant goes to seed and prior to project implementation in 2003. The treated site shall be mulched or covered with wood chips, and the area will be staked and flagged for identification. The area is not targeted for any mine rehabilitation activities, and no project-related vehicle or equipment disturbance will occur on the area. The site will be revisited annually after treating to ensure weeds are no longer present. If weeds are present, the site will be manually treated, mulched or covered with wood chips.

Monitoring

Best Management Practices Implementation and Effectiveness monitoring will be conducted according to established Forest and Region procedures. Project monitoring during implementation will include water and air quality monitoring and assessment. Post project monitoring will include erosion and vegetation photo point monitoring, noxious weed monitoring, and stream sediment sampling and testing. Post project monitoring will occur annually for 3 to 5 years, and after big storm events when the Site is accessible.

Contribution to Remedial Performance

Alternative 2 – Consolidation, Containment, and Capping in Place, constitutes the long-term cleanup plan for the tailings contaminant source at the Site. The proposed removal action should substantially reduce the threats posed by the Site for a period of 50 years or longer. The engineering structures i.e. the gabion wall, has a design life of 50 years or more, and the capping and revegetation of the Site should stabilize the soils and reduce erosion substantially over the long-term, thereby achieving the goals and objectives of the removal action. No other contaminant sources exist at the Site, and no further removal actions are anticipated. This action meets the removal action criteria described in section 3 of this action memorandum.

Description of Alternative Technologies

No alternative technologies are proposed for use at the Site.

Engineering Evaluation/Cost Analysis (EE/CA)

An Engineering Evaluation/Cost Analysis (EE/CA) for the Siskon Mine Tailings and Mill Site was completed and issued to the public for comment on May 19, 2003 (USDA-Forest Service, 2003a). The purpose of the EE/CA was to provide a vehicle for public involvement, conduct a screening level risk evaluation of contaminants, evaluate different removal action alternatives, and recommend a preferred alternative to minimize or eliminate any on-going release or

threatened release of hazardous substances into the environment. The EE/CA document is briefly summarized here and is contained in the project Administrative Record File. The EE/CA analyzed four alternatives for the non-time-critical removal action. The four alternatives consisted of:

- **Alternative 1. No Action**
- **Alternative 2. Consolidation, Containment, and Capping In Place**
- **Alternative 3. Tailings Removal to an Off-Site Repository Within the Ukonom/Orleans Ranger District, Cap and Revegetate**
- **Alternative 4. Removal and Disposal**

Alternative 1 (No Action) would leave the tailings on Site in their current condition. Alternative 2 has been described in the section on the Proposed Action Description. Alternative 3, would require development of an off-Site mine waste repository for the tailings on lands managed by the National Forest. The tailings would be removed from their present location and hauled to the waste repository, where they would be capped with clean soil and revegetated. Alternative 4 would require removal of the tailings from their present location, and hauling them to Kettleman City, California where they would be treated and disposed of at the Class I Hazardous Waste Landfill.

Table B1 in Appendix B, compares the four alternatives based on evaluation criteria used in the EE/CA. Alternative 3, is more costly to implement than Alternative 2, and implementation would be more difficult because of the evaluation of site suitability, obtaining approval of waste repository sites on the Forest from state and local agencies, and there would be added risks associated with transport of the hazardous mine tailings waste off-Site on public roads. A suitable site for the waste repository or suitable borrow sources to cap the tailings may not be readily available.

The cost estimate for Alternative 4 (Appendix B, Table B2) exceeds the \$2 million dollar constraint on removal actions by a large amount and would not be implementable for that reason. Like Alternative 3, implementation would be more difficult because of the large amount of waste handling, constraints on the size of the transport trucks, and the added risks associated with the transport of the hazardous mine tailings off-Site and along many miles of public roads and highways. The large number of qualified drivers, trucks, and containers needed to haul the tailings to the disposal site may be somewhat difficult to obtain locally. The public comments received prefer Alternative 4, because complete removal of the tailings to a hazardous waste landfill is viewed as a complete solution to the problem.

Alternative 2 is the recommended alternative because it achieves the goals and objectives of the removal action, is both administratively and technologically feasible, and is easier to implement. It can be implemented at a lower cost than the other action alternatives, 3 and 4.

Public Comments

Please see Appendix A for a summary of all significant public comments on the EE/CA and Forest Service responses to the comments.

The 30 day public notice for comment and review of the EE/CA and the Administrative File Record began May 19, 2003, and ended June 17, 2003. Copies of the EE/CA were mailed to five environmental groups and individuals, to representatives from three Indian tribes, and to eight representatives from state and local agencies. The public mailing list is available in the project Administrative Record File. A publicly available internet web site for the Siskon Mine Project has been maintained and updated since February, 2003. The site contains copies of letters sent to the public as well as the EE/CA. The site is located at:

<http://www.fs.fed.us/r5/klamath/projects/projects/siskonmine/index.shtml>.

A public meeting for the project was held on June 17, 2003 in Orleans, California. No members of the public attended this meeting. No other phone calls or other inquiries were made to the Six Rivers Forest Supervisor, the Orleans District Ranger or the project On-Scene Coordinator during the public comment period.

Seven public comment letters on the EE/CA were received. Six comment letters were similar, and expressed a preference for Alternative 4, Removal and Disposal of the tailings to an off-Site hazardous waste landfill. One other comment letter expressed a preference for disposing of the mine tailings on privately held lands where the existing open pits of the Siskon Mine are located. This is somewhat similar to the scope of Alternative 3, Tailings Removal to an Off-Site Repository Within the Ukonom/Orleans Ranger District, Cap and Revegetate.

To date, no other comment letters were received from any Indian tribe, State or Local agency.

Applicable or Relevant and Appropriate Requirements (ARARs)

Potential Federal, and State ARARs are listed in Section 4.0 and Table 6 of the EE/CA (USDA-Forest Service, 2003a). The proposed action, Alternative 2 - Consolidation, Containment, and Capping In Place has been evaluated for compliance with the following State and Federal requirements:

Federal and State Requirements

- Federal and State Occupational Health and Safety Act requirements will be met, including Hazardous Worker Operations and Emergency Response regulations.

State Requirements

- California Hazardous Waste Control Law and Disposal Regulations will be complied with.
- Special Treatment, Storage, and Disposal Units, Mine Waste Management requirements of California Title 27 will be complied with to the extent feasible.
- Discharges of Waste to Land, requirements of California Title 23, will be complied with to the extent feasible.
- Applicable California Fish and Game Code regulations will be complied with to correct and abate pollution sources including review of project implementation plans, and protection of fish and wildlife.
- North Coast Basin Plan water quality objectives will be met, including incorporation of Best Management Practices to project water quality.
- The Porter Cologne Water Quality Control Act, and Resolutions of the State Water Resources Control Board will be followed.
- Notification and dust abatement measures required by the Asbestos Toxic Control Measure for Construction, Grading, Quarrying and Surface Mining, California Title 17, Section 93105, will be

complied with.

Federal Requirements

- Forest Service specialists in Botany have completed biological assessments and evaluations and found that there are no Federally listed Threatened, Endangered or Proposed plant species or Region 5 Sensitive plant species, populations or habitat known to occur within the project area, or require special management considerations.
- The Forest Service District Wildlife Biologist has completed a biological assessment and though there is suitable habitat within one-quarter mile of the Site, no nesting Northern spotted owls have been found in the 2003 survey, making the determination a No Effect. Likewise, because of the lack of Critical Habitat, Alternative 2 will have No Effect on the marbled murrelet, or bald eagle.
- The Forest Service District Fisheries Biologist has completed a biological assessment and evaluation and has determined that Alternative 2 May Affect but is not Likely to Adversely Affect SONCC Coho salmon. Implementation of Alternative 2 is likely to result in beneficial effects to SONCC Coho salmon in the long term. Alternative 2 is Not Likely to Adversely Affect SONCC Coho salmon Critical Habitat. Alternative 2 may affect individuals, and may have beneficial effects to their habitat but is not likely to result in a trend towards Federal listing or loss of viability of Klamath Mountains Province steelhead trout or UKTR Chinook salmon, both Forest Service Sensitive Species.
- The Site has been evaluated and recorded as a historical archeological site in compliance with the National Historic Preservation Act. The Siskon Mine has been recommended to be Not Eligible as a property for the National Register of Historic Places, and Alternative 2 has been recommended to have no adverse effect on the remaining features, or mining debris present on the Site.
- The mine road, mill and tailings piles are within the Helkau Cultural Area which was determined Eligible to the National Register of Historic Places in 1981. Implementation of Alternative 2 may potentially create an adverse effect to the eligible property over the short-term, in addition to noise disturbance for Native American practitioners using Medicine Mountain and certain high country areas during the summer months.
- Government-to-Government coordination and consultation with Tribes is ongoing in compliance with the National Historic Preservation Act as amended, (NHPA); implementing regulations of 36 CFR 800; American Indian Religious Freedom Act (AIRFA); Executive Order 13007 (Sacred Sites); Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments); and the 1994 Presidential Memorandum regarding Government-to-Government relations with Native American Tribal Governments.
- Alternative 2 has been evaluated for compliance with the Wild and Scenic Rivers Act, and the proposed river classification of Dillon Creek as a free flowing recreational river and the outstandingly remarkable values within the river corridor and immediate vicinities would not be unreasonably diminished. Alternative 2 will enhance Wild and Scenic River values in the long term.
- Alternative 2 will comply with the Federal Noxious Weed Act through use of Certified Noxious Weed Free seed and mulch, and by implementation of vehicle inspection and equipment cleaning provisions in all contracts and other associated work at the Site. There is no Port-Orford-Cedar (POC) infestation in the project area. Implementation of the project during the dry season of the year, June-October, will reduce the potential for spread of POC disease. Contract provisions for vehicle equipment inspection and cleaning prior to work being conducted on Forest roads and at the Site will reduce the likelihood that noxious weeds or POC disease will be introduced by the project. Vehicles entering the Forest from counties quarantined because of the presence of *Phytophthora ramorum* (Sudden Oak Death) will be inspected in compliance with USDA requirements. The small existing noxious weed infestation will be treated prior to the project, and protected from disturbance during the project. Post-project monitoring will include monitoring for any new noxious weed infestations in the project area.

Project Schedule

The removal action will be implemented in phases over two years beginning in 2003, and is projected to be completed in October, 2004, depending on funding and administrative factors. During the first year, project operations would include all road and stream crossing-related work. The second year would include all other work related to the tailings, including clearing and demolition, removal of mill site debris, construction of a temporary mill access road, earthwork to consolidate and shape the tailings, soil borrow source development, capping the tailings with soil, construction of a gabion tailings retention dam andrevet mattress, riprap placement, construction of drainage ditches, seeding, mulching, and erosion mat placement. Project monitoring, and establishment of long-term vegetation would occur following completion of the removal action for a minimum of three years, during 2004-2007. Removal action implementation would be seasonal and would occur within the aquatic limited operating period (LOP) between June 1 and October 15 each year. The aquatic operating period may be extended with fisheries biologist determination and approval, depending on weather forecast, magnitude and duration of the work, and location of work. If nesting Northern Spotted owls are found within 0.25 miles of the Site, removal action operations involving noise disturbance will be restricted until July 10th of that year.

Estimated Costs

See Appendix B, Table B2, for a detailed breakdown of costs by alternative. The results of the cost analysis done in the EE/CA show that Alternatives 1, 2, 3 and 4 would cost approximately \$0, \$570,000, \$950,000, and \$4,160,000 respectively. Alternative 4 at greater than \$4 million cost, exceeds the \$2 million cap on removal actions as prescribed in the NCP section 300.415 (b)(5). The cost of Alternative 2, is a reasonable expense that appropriately deals with the problems posed by the mine tailings at the site, namely, erosion, stream sedimentation, surface exposure, and the potential for a large volume release of tailings during a major flood or storm event.

6) EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

A delay in implementing this removal action will permit continuing discharge of heavy metal-contaminated tailings sediment to enter Copper Creek seasonally, and will allow a threatened large volume tailings release in the event of future large flood or storm to exist, unabated. Wildlife will continue to be exposed to the uncovered tailings on Site, and there will be risks of exposure to unknowing site visitors or recreationists that wander into tailings-contaminated areas. The risks to site visitors or recreationists would be from exposure to contaminants in airborne dust raised from the wind or from walking on the tailings.

7) OUTSTANDING POLICY ISSUES

None

8) ENFORCEMENT

The Site is on a mining claim, which was abandoned in 1992-1993. Mining activity associated with the Siskon Mine Site and the tailings contamination source occurred from 1950-1960. The Site is located on National Forest System land. There are no currently viable Potentially Responsible Parties for which performance of the removal action or recovery of costs can be sought.

9) DECISION

It is the Forest Service's decision to implement **Alternative 2 – Consolidation, Containment, and Capping In Place**, as documented in the EE/CA for the Siskon Mine Tailings and Mill Site, located on the Ukonom Ranger District of the Klamath National Forest, and administered by the Six Rivers National Forest. This decision is based on the evaluation in the EE/CA, as well as review of the Administrative Record, and consideration of public input received throughout the Community Involvement process and comments received on the EE/CA during the 30 day public review. In making the decision, the Forest Service kept in mind the differences in the administrative feasibility, availability of materials and sources, state and community acceptance, and cost between the three action alternatives. Alternative 2 completely achieves the removal action goals and objectives and reduces or eliminates the mobility of contaminants at the Site, and does so at a reasonable cost, using established engineering designs and principles, without requiring off-Site removal and transport of the tailings on roads and highways. State and local agencies have been kept informed of the project, and representatives from the California Department of Fish and Game and the North Coast Water Quality Control Board have visited the Site and proposed project area, and fully support Alternative 2 as the most suitable method to control the current tailings discharge.

The Forest Service's decision takes note that the Dillon Creek Watershed is a key watershed that provides habitat for a number of anadromous fish species including the Threatened SONCC Coho salmon. The water quality of Dillon Creek is very good, and meets all water quality standards, and provides many beneficial uses. Contrary to several public comments, there is no evidence that public health and safety is endangered during recreational activities in Dillon Creek downstream of the Site. Testing results have shown that there are no detectible dissolved heavy metals in Copper Creek either upstream or downstream from the Site, and it is unlikely that there are heavy metals attributed to the tailings at levels above background in the stream sediments at Dillon Creek Campground, located 8 stream miles downstream of the tailings discharge point. The current situation with the tailings entering Copper Creek does not meet North Coast Basin Plan objectives for settleable material, and during a significant storm or flood event, objectives for sediment and turbidity would also not be met, as the tailings discharge would adversely affect beneficial uses of Copper Creek, Dillon Creek and the Klamath River. Alternative 2 will be effective in controlling chronic tailings erosion, and eliminate the

threatened release of a large volume of tailings.

A number of comments focused on the threat of introduction of Port-Orford-cedar root disease, (*Phytophthora lateralis*) and Sudden Oak Death (*Phytophthora ramorum*). The Forest Service is also concerned about the introduction and spread of noxious weeds. Forest Service review of the EE/CA, the resource protection measures disclosed in the EE/CA and added since the EE/CA, and the project administrative file, indicates that Alternative 2 has built-in measures to minimize the risk of introduction and spread of noxious weeds, POC and Sudden Oak Death disease pathogens.

In summary, the Forest Service hereby authorizes the removal action, Alternative 2, to carryout rehabilitation work at the Siskon Mine Site consisting of: clearing and demolition, removal of mill site debris, construction of a temporary mill and tailings access road, earthwork to consolidate and shape the tailings, soil borrow source development, capping the tailings with soil, construction of a gabion tailings retention dam and revet mattress, riprap placement, construction of drainage ditches, seeding, mulching, and erosion mat placement. Other associated actions to carry out the removal action that are authorized include road work to construct a temporary stream crossing of Copper Creek, and road repair, reconditioning and stormproofing of 1.5 miles of the 14N31B road.

/s/ James W. Stapleton

July 17, 2003

JAMES W. STAPLETON
Director of Engineering
USDA – Forest Service, Pacific Southwest Region

DATE

APPENDIX A

RESPONSE TO COMMENTS ON THE EE/CA

Comment letters on the May 12, 2003 Engineering Evaluation/Cost Analysis for the Siskon Mine Tailings and Mill Site (EE/CA) were received from two groups and five concerned citizens. Similar comments have been combined and some comments have been summarized. After each comment number, the acronym of the group(s) that made the comment is included in parenthesis. The groups and their corresponding acronyms are as follows:

EPIC: Christine Ambrose, Environmental Protection Information Center, Arcata, CA

KFA: Kimberly Baker, Klamath Forest Alliance, Orleans, CA

Comment 1 (EPIC; KFA; Richard Bloom, Cotati, CA; Karen Menehan, Santa Cruz, CA; Jim Maurer, Milwaukee, WI): We are very concerned that the project does not accomplish enough, given the extensive contamination of the site and the excessive amount of contaminated sediment that is degrading water quality and the Dillon Creek watershed. We believe that further evaluation is needed and further remediation is required per the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to prevent surface erosion from carrying sediment into the creek. Additional evaluation and analysis of Copper Creek should also be required. The extremely toxic tailings are hazardous to the aquatic and terrestrial environment, Native Americans, and the hundreds of people who recreate at the Dillon Creek Campground! We believe that the contamination is endangering public health and safety and aquatic habitat, and should be considered a **time-critical removal action**.

Response 1: All of the action alternatives analyzed in the EE/CA are designed to prevent further migration of the tailings off-Site and a threatened large volume release of tailings sediment into Copper Creek, and the stream system, thereby achieving project goals and objectives (EE/CA, p.52 & 75). Extensive evaluation of the tailings contaminant source has gone on from 1996-2002, fully characterizing the nature and extent of tailings contamination. This is documented in the Removal Preliminary Assessment/Site Inspection (USDA-Forest Service, 2003b), and summarized in the EE/CA (p. 27-28). Removal actions, including non-time critical removals, are implemented to make hazardous waste cleanups more timely and efficient. Each response is unique and may require a more expedited response based on the threatened population, contaminants of concern and other factors. Removal actions may include on-Site stabilization, treatment, as well as off-site removal all of which were evaluated as options in the EE/CA (p. 53-57). Alternative 2, as the recommended removal action alternative, fully addresses the primary problem posed by the tailings at the site: their mobility, and exposure to wildlife, aquatic organisms and plants. The containment and capping of the tailings by engineered structures will ensure both short-term and long-term permanence, (EE/CA, p. 77) making future site remediation unnecessary. Concurrent implementation and post-project monitoring is an action common to Alternatives 2, 3, and 4 (EE/CA, p. 64), and will include stream water and sediment sampling and testing of Copper Creek, similar to the testing program conducted in 1996.

The response action is scheduled for implementation beginning in the summer of 2003, depending on funding and administrative constraints, and requires two seasons to fully implement (EE/CA p. 62). A time-critical response action is not warranted by conditions occurring at the site as no communities, populations, residents, drinking water and groundwater sources, are presently being threatened or harmed by the Site (see response to Comment 2 below). Extending site operations beyond the aquatic operating period of October 15, in order to complete the full Site rehabilitation during one season, would increase the risk of stream sedimentation, and risk of failure of erosion control measures. It is likely that the full project could not be completed in time before the winter rains and snows close the area. The risk of a large volume threatened release of tailings in a large flood or storm will remain for the winter of 2003-2004, until the removal action is completed in the summer of 2004.

Comment 2 (EPIC): “Public health and safety has been endangered by allowing the general public to recreate and partake in water contact recreational activities in Dillon Creek. The Dillon Creek Campground is a popular recreation area, with approximately 8,000 recreation visitor days (Dillon Creek Watershed Analysis, 1995, p. III-33). Public health may also be endangered by consuming salmon and steelhead fish from the Dillon Creek watershed.”

Response 2: A public health threat from water contact recreational activities in Dillon Creek or at the campground has never been identified as a threat in the evaluations conducted to date. The surface water of Dillon Creek has not been evaluated as part of the Siskon Mine investigations. The Dillon Creek Campground is approximately 8 stream miles downstream of the tailings discharge point. The water quality of Copper Creek was tested in 1996, both above and below the tailings discharge point in several locations, and no dissolved metals were detected above detection limits in any water samples. The Copper Creek water met drinking water standards. It is presumed from the Copper Creek testing that Dillon creek would also be of similar high water quality.

Stream sediment contaminated with metals from the tailings has been evaluated in Copper Creek. The furthest downstream sample location evaluated was approximately 0.25 miles from the tailings discharge point. Arsenic and mercury were detected at levels just over three times the background concentration. This evidence suggests that at points further downstream, metals concentrations in the stream sediment would be at or approaching background concentrations and would not comprise a public health, environmental, or ecological threat. This evaluation assumes the annual erosion and stream deposition rates estimated for the tailings from the Site, and not a large volume tailings release from a flood event.

The investigations done to date indicate that the evidence of tailings contamination in the stream system is localized close to the discharge point at the former tailings pond. The screening level risk evaluation of stream sediment contamination from the tailings did conclude that the high levels of arsenic, copper, mercury, cadmium and zinc in the stream sediments downstream of the tailings release (up to one quarter mile downstream) not only verify the presence of the release in the aquatic system, but indicate a potential for an ecological risk to sediment dwelling receptors in Copper Creek (EE/CA p. 36).

Among the metals found in the tailings, mercury presents the most significant risk of bioaccumulation, although it is unlikely that this contaminant is present in a bioavailable (methylated) form within the tailings pond soils, as they are oxidized and have low sulfur contents (USDA-Forest Service, 2003b: 44). The flow rate and moderately steep gradient of Copper Creek are also indicative of aerobic conditions, which is not conducive to mercury methylation in the bottom sediments of the creek (USDA-Forest Service, 2003b: 44). Human consumption of fish from Copper Creek and Dillon Creek is estimated to be a low amount, as fishing is closed on Dillon Creek, and although fishing is allowed on Copper Creek, angling use is anticipated to be low as the road is gated year round, and would require nearly a five mile hike along the road to get to the Creek (USDA-Forest Service, 2003b: 50). In summary, bioaccumulation of heavy metals from the tailings is a potential threat to the wildlife and aquatic life exposed to the tailings soil and sediment (see p. 14 of this action memorandum). However, bioaccumulation is not anticipated to be a major threat to humans from consumption of wildlife or fish because hunting and fishing activities in the mine area is thought to be low.

Comment 3 (EPIC; KFA; Arthur Mitchell, San Francisco, CA; Richard Bloom, Cotati, CA; Karen Menehan, Santa Cruz, CA; Jim Maurer, Milwaukee, WI): “We believe that alternative four should be the preferred alternative, which should be considered a time-critical removal action, with removal of the hazardous waste to a Class 1 hazardous waste landfill. We believe it will be difficult if not futile trying to prevent this heavy metal mess from continually contaminating the environment in the future. We encourage you to reconsider alternative four, ... rather than leaving all the toxic tailings onsite where they threaten water quality in Copper Creek, Rough Creek, the Dillon Creek watershed, and the ailing Klamath River. “

Response 3: In general, for most abandoned mine tailings contaminant problems, on- Site stabilization, containment, treatment and capping actions are viewed as most technologically and administratively feasible and cost-effective. A range of alternatives was analyzed, including two alternatives that considered off-Site removal and disposal. Alternative 2, completely achieves the removal action goals and objectives, reduces or eliminates the mobility of contaminants at the Site, and does so at a reasonable cost, using established engineering designs and principles, without requiring off-Site removal and transport of the tailings on roads and highways. Tailings volumes from abandoned mines are typically large, as in this case, >11,000 cubic yards, and it would be quite costly, difficult to implement, and time consuming, to haul them off for landfill disposal.

Alternative 2 is viewed as a long-term solution to the erosion problems associated with the tailings. The engineering structure consisting of the gabion wall has a design life of 50 years or more. Capping the tailings with clean soil, and revegetation of the Site with conifer trees and other vegetation should stabilize the soils and reduce erosion substantially over the long-term, thereby achieving the goals and objectives of the removal action.

Comment 4 (Raymundo J. Chico, Denver, CO): Cost effectively, Alternative 2 makes sense but it is not ideal. Choosing Alternative 2 should still leave the potential contaminated tailing-residue in place. This is not good long-term, for the former Siskon Mine reclamation program. Future ground water contamination carrying hazardous materials to the Copper Creek unexpectedly could take place due to subsurface fracturing, aging and/or defects of the

“engineering retaining wall”. Furthermore, today’s safety assurances could be at risk due to the fact that such “wall” would continue to be adjacent to a seasonally fluctuating water table.

Response 4: All engineering designs have some type of risk of failure inherent in their design. That is a given. These risks have been minimized with the design of the gabion tailings retaining dam. The gabion wall has been designed with acceptable geotechnical engineering factors of safety for internal, external, and global stability as well as seismic stability. The wall was designed with a minimum 50-year design life. The wall is being placed such that it will be above the 100-year storm event for Copper Creek. For storms of lesser intensity it has a “revet mattress” placed in front of it to prevent scour near the wall. The wall will either be founded on bedrock or compacted material. The wall is designed such that it is “self draining” and thus pore pressures will not build up behind the wall. All material behind the wall including the tailings will be compacted and placed as an engineered fill. Two feet of borrow material and geotextile fabric will separate the wall from the tailings. A minimum of two feet of borrow material will “cap” the tailings. The borrow cap material has been tested and has a low erosion potential. The cap will be seeded, fertilized and straw mulched. Erosion control matting will then be placed over the straw mulch. This will minimize any potential erosion of the cap. There will also be geotextile and rock-lined drainage ditches placed in strategic places on the cap to direct surface water off the borrow cap. After the first year, the cap will be planted with trees and other native vegetation suitable for the location to return the area to a naturally functioning riparian and terrestrial habitat. The tailings are not considered to be leachable or an “acid mine drainage” problem. Currently they are an erosion problem into Copper Creek and therefore this design is intended to stop the erosion problem for the long term.

Comment 5: (Raymundo J. Chico, Denver, CO): In order to avoid long-term, future negative events caused by the engineering and hydrology issues, it would be preferable to move, dump and cap the 11,400 cubic yards of tailings, etc. from its present location by Copper Creek (elevation 2000 feet) to higher ground – perhaps inside the “Virginia Pit”, “Tennessee Pit” or the “Florida Pit”, which are at 3,000 feet elevation and very nearby (3 thousand feet south of the site). This would reduce remediation costs, and prevent any future percolation of hazardous compounds into Copper Creek. Assuring the long-term protection of the environment at a reasonable cost might well be best served under this proposed scenario.

Response 5: Removal of the Siskon Mine Tailings to an off-Site waste repository situated on private land, would require compliance with the Resource Conservation and Recovery Act, Subtitle C hazardous waste treatment and disposal permitting requirements which would be very costly, and time consuming due to the nature of the investigations required. The process is equivalent to the permitting necessary for a new Class I Hazardous Waste Landfill. This was not considered an administratively feasible or implementable alternative for further analysis in the EE/CA, mainly because the open pits are situated on private lands. Alternatives that contain, stabilize and or treat contamination on-Site are generally preferred, as they do not require transport, treatment or disposal of hazardous wastes.

Comment 6 (EPIC; KFA; Richard Bloom, Cotati, CA; Karen Menehan, Santa Cruz, CA; Jim Maurer, Milwaukee, WI): The risk of spreading noxious weeds and forest pathogens such as the Port Orford Cedar root rot (*Phytophthora lateralis*, and the spread of sudden oak death

(*Phytophthora ramorum*), during restoration and storm-proofing activities should be addressed. Every effort should be taken to prevent the spread of noxious weeds and forest pathogens during remediation activities. All vehicles and equipment used at the site should be cleaned prior to entering the area to ensure that pathogens, and noxious weeds do not infest the area.

Response 6: A noxious weed risk assessment was conducted for the project and is included in the Administrative Record File. The small patch of weeds present along one of the mine roads at the Site will be manually removed by hand pulling prior to project implementation. The treated site will be covered with mulch and/or wood chips and will not be further disturbed by vehicles or equipment during the project (see p. 20 of this action memorandum). The weed site will be revisited annually after treating to ensure weeds are no longer present. The EE/CA describes further resource protection measures to reduce the risk of introduction and spread of POC root disease, Sudden Oak death, and noxious weeds (EE/CA, p. 63). The protection measure includes an equipment-cleaning clause in contracts and inspection of equipment and vehicles before their entry into the Forest.

Comment 7 (EPIC): Much more extensive decommissioning and restoration should be undertaken at the site. The entire road accessing the mine should be decommissioned after remediation activities have taken place.

Response 7: The actions proposed under Alternative 2 are those that achieve the removal action goals and objectives, and which are needed to implement the removal action at the Site. Decommissioning existing Forest system and unclassified roads in the mine area or in the Copper Creek watershed is beyond the scope of the removal action, except for new temporary roads required for implementing the project. The temporary road that accesses the mill and tailings, as well as the Copper Creek vented ford stream crossing will be decommissioned when access for heavy equipment and vehicles into the Site is no longer required (EE/CA p. 61-62). The mine road (Forest Road 14N31B) that leads to the private lands is proposed for stormproofing (1.5 miles) (EE/CA, p. 20 & 61). The stormproofing will configure the road into a hydrologically self-maintaining condition so that the risk of causing adverse watershed and water quality impacts is low. This road segment cannot be decommissioned at the present time because it provides access to privately held lands.

Comment 8 (EPIC): The USFS should acquire the private lands at Siskon Mine. We encourage the USFS to pursue acquisition of this property. If these sites have been determined to have low mineral value, than (then) the mineral rites (rights) and claims should be extinguished and the Siskon Mine site completely restored.

Response 8: Acquisition of the private lands and restoration of the mine area on the private lands is beyond the scope of the removal action, and was not analyzed as an alternative in the Engineering Evaluation/Cost Analysis for the Siskon Mine Tailings and Mill Site. Mr. Raymundo J. Chico has offered to sell the Siskon Mine private lands to the Forest Service and that offer is under review.

Comment 9 : (Raymundo J. Chico, Denver, CO): As the owner of the patented claims of the Siskon Mine with existing and unused open pits within the Virginia, Tennessee, Florida and Georgia patented claims (also owner of the Alabama and Texas claims); I offer the U.S. Forest

Service these assets/properties for the remediation uses as described (see **Comment #5** above). The U.S.F.S. could either (a) buy these deeded lands from me at reasonable cost, or (b) trade these deeded lands for land acreage in California or elsewhere.

Response 9: The Forest Service chooses not to contaminate additional lands with the mine tailings per **Response #5**. Forest Service purchase or exchange of the Siskon Mine private property is a separate matter and is being considered for the purpose of rehabilitating both the mine area access roads.

APPENDIX B

REMOVAL ACTION COSTS BY ALTERNATIVE

Table B1. Comparison of Alternatives

Criteria	Alternative 1 No Action	Alternative 2 Consolidation, Containment, and Capping In Place	Alternative 3 Tailings Removal to an Off-Site Repository Within the Ukonom/Orleans Ranger District, Cap and Revegetate	Alternative 4 Removal and Disposal
Ability to Achieve Removal Action Goals and Objectives	Unable to Achieve	Achieves	Achieves	Achieves
Reduction of Toxicity, Mobility or Volume	No Reduction	Mobility is Reduced; No Reduction in Toxicity or Volume; Contaminant Pathway is Removed	Mobility is Reduced; No Reduction in Toxicity or Volume; Contaminant Pathway is Removed	Mobility and Toxicity is Reduced; No Reduction in Volume; Contaminant Pathway is Removed
Short and Long Term Effectiveness and Permanence	Not Applicable	Adequate	Adequate	Adequate
Overall Protectiveness of Human Health and the Environment	Not Protective	Protective	Protective	Protective
Compliance with ARARS	Out of Compliance	Complies	Complies	Complies
Technical Feasibility	Not Applicable	Feasible	Feasible	Feasible
Administrative Feasibility	Not Applicable	Feasible	Difficult to Implement Due to Evaluation of Site Suitability, and Approvals; Increased Risks of Waste Transport	Difficult to Implement Due to Amount of Waste Handling, Cleaning, and Constraints on Size of Transport Trucks; Increased Risks of Waste Transport; Exceeds \$2.0 million cap
Availability of Materials and Sources	Not Applicable	Readily Available	Suitable Sites and Borrow Sources May Not be Readily Available	Qualified Drivers, Suitable Trucks and Containers May Not be Locally Available, or In the Quantities Desired
State Acceptance	Unacceptable	Fully Accepted & Preferred	Unacceptable	Unacceptable
Community Acceptance (from public comment letters received)	Unacceptable	Unacceptable	Unacceptable	Preferred
Capital Cost	\$0	\$0.5 million	\$1.0 million	\$4.0 million
Outyear Operations, Maintenance, Revegetation, and Monitoring Costs	\$0	\$25,000	\$50,000	\$50,000

Table B2. Cost Comparison of Alternatives (all costs include mobilization, cost, overhead and profit)

Item Description	Alternative 1, No Action	Alternative 2, Consolidation, Containment, and Capping In Place	Alternative 3, Tailings Removal to an Off-Site Repository within the Ukonom/Orleans Ranger District	Alternative 4, Removal and Disposal
Mine Road 14N31B Construction & Improvement	-0-	\$70,000	\$70,000	\$70,000
Tailings Access Road	-0-	\$15,000	\$30,000	\$30,000
Tailings Containment Gabion Wall	-0-	\$200,000	-0-	-0-
Tailings Pond Cap, Borrow Site Development, Drainage, Vegetation & Erosion Control	-0-	\$150,000	\$40,000	\$40,000
Repository Site Investigation for Groundwater and Stability	-0-	-0-	\$80,000	-0-
Repository Site Preparation	-0-	-0-	\$10,000	-0-
Haul Road Maintenance	-0-	-0-	\$10,000	\$10,000
Haul Road Dust Abatement	-0-	-0-	\$20,000	\$20,000
Load Tailings into 10 cyd Dump Trucks	-0-	-0-	\$30,000	\$30,000
Haul to Waste Repository	-0-	-0-	\$100,000	\$2,665,000
Landfill Disposal Cost	-0-	-0-	-0-	\$600,000
Truck Washing	-0-	-0-	\$150,000	\$250,000
Repository Grading and Drainage Control	-0-	-0-	\$90,000	-0-
Repository Borrow Site Development	-0-	-0-	\$80,000	-0-
Repository Cap Vegetation & Erosion Control	-0-	-0-	\$10,000	-0-
Site Safety, Health & Monitoring	-0-	\$10,000	\$20,000	\$20,000
Erosion Control Plan	-0-	\$5,000	\$10,000	\$5,000
Sub Total	-0-	\$450,000	\$750,000	\$3,740,000
Health & Safety Factor	-0-	\$5,000	\$10,000	\$45,000
Contingency Factor	-0-	\$115,000	\$190,000	\$374,000
CAPITAL COST TOTAL		\$570,000	\$950,000	\$4,160,000
Outyear Monitoring, Operations, Maintenance	-0-	\$25,000	\$50,000	\$20,000

APPENDIX C

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