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December 30, 1999

VIA TELECOPY -
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Steve E. Rosenbaum
Senior Engineering Geologist
California Regional Water Quality Control Board
Central Valley Region
3443 Routier Road, Suite A
Sacramento CA 95827-3003

Re: Response to Tentative Revised Waste Discharge Requirements—Walker Mine Tailings, Plumas National Forest

Dear Mr. Rosenbaum:

This firm represents ARCO Environmental Remediation L.L.C. ("ARCO") with respect to the above-referenced matter. We are in receipt of your December 1, 1999 Notice of Tentative Order revising Waste Discharge Requirements ("WDRs") relating to the Walker Mine Tailings Site (the "Site"). The Notice seeks comments by December 30, 1999. ARCO appreciates the opportunity to provide these preliminary comments in advance of any formal issuance of the Tentative Order.

I. Introduction/Reservations of Rights.

As reflected in the information contained in the Tentative Order and other sources, the Walker Mine area has an extensive history of water quality regulation by various California agencies, dating back to at least the 1950s. ARCO has been trying to assimilate the various sources of information relating to this extensive regulatory history since receipt of your December 1 letter. However, given the short time provided to submit these comments, particularly in light of the holiday season, ARCO is not yet in position to comment on the technical feasibility of the new WDRs or scheduling requirements and related requirements in the

Steve E. Rosenbaum

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Tentative Order. Instead, this submission provides the legal and policy rationale for ARCO's position that naming ARCO as a "Discharger" under the revised WDRs is legally unsupportable, against federal and state policy, and plainly unwarranted. After outlining the bases for this position, we present ARCO's recommendation as to how the parties can avoid a contentious legal battle over this matter and instead create a forum in which the technical issues raised by the WDRs, as well as remaining issues surrounding the Site, can be systematically and efficiently addressed.

Please note that this submission represents only an informal set of comments on the Tentative Order, which we understand is not a final action of either the Central Valley Region of the California Regional Water Quality Control Board ("Regional Board") or any other state or federal agency. Thus, by presenting these comments, ARCO does not waive any argument, issue, point, submission, or other right it may have or assert in any future action taken by the Regional Board or any other party.

For purposes of brevity and given time restraints, these comments simply highlight the legal/policy problems and concerns raised by the Regional Board's proposal to name ARCO as a "Discharger" on the revised WDRs. Thus, while we occasionally cite legal authority relevant to ARCO's position, we intend to, and reserve all rights to, supplement and augment this statement if the Regional Board issues formal revised WDRs or pursues any related process.

II. Legal/Policy Objections to the Revised WDRs.

A. *ARCO Is Not and Has Never Been Involved with this Site.* The Tentative Order makes the bald assertion that the "Walker Mine Site was operated, in part, by the International Smelting and Refining Company ("ISRC")." Tentative Order ¶ 1. The Tentative Order goes on to state that since ISRC was a "subsidiary" of Anaconda Copper Mining Company, and ARCO is a successor to Anaconda, ARCO, along with the U.S. Department of Agriculture, Forest Service ("Forest Service"), are jointly referred to as the "Discharger" for purposes of the new WDRs.

The contention that ISRC "operated" the Walker Mine Site is wholly unsupported in the Tentative Order and finds no basis in law or fact. The Site was never owned or operated by ISRC, but rather by the Walker Mining Company ("WMC"), a separate company. While ISRC held slightly more than a 50% stock interest in WMC during a majority of that company's period of existence (approximately 1916 to 1941), WMC was always an independent company. In fact, when WMC wound down its affairs in 1944-45, it formally resolved its debts to ISRC and others

through a bankruptcy proceeding in which the bankruptcy court decreed that WMC "is not and has never at any time been an alter ego or instrument or department" of Anaconda or ISRC.¹

The Bankruptcy Court's holding is consistent with applicable law as it existed at the time and as it has now evolved. In In re Aluminum Company of America ("Alcoa"), Order No. WQ 93-9, 1993 WL 303166 (Cal. St. Wat. Res. Bd. July 22, 1993), the State Water Resources Control Board ("State Board") recognized that the shareholders of a corporation generally are not liable under the California water quality laws for the actions of the corporation. An exception to this rule arises when: (1) there is such unity of interest and ownership that the separate personalities of the corporation and the shareholder no longer exist; and (2) if the acts are treated as those of the corporation alone, an inequitable result will follow. Id. at *6 n.4.²

At issue in Alcoa was whether Alcoa was the alter ego of two of its wholly owned subsidiaries. The Board found that Alcoa was not an alter ego despite the following facts: (1) Alcoa and its subsidiaries were jointly represented by the same counsel throughout the proceedings; (2) correspondence from Alcoa to the Regional Water Board indicated that Alcoa at one time held an interest in the mining site; (3) the principal executive office and the business address of all of the officers and directors of one of the subsidiaries was the Alcoa headquarters; (4) a senior financial officer for Alcoa served as a director and vice president of one subsidiary and a director of the other; (5) three of the four directors and four of the officers of one subsidiary had their business address at Alcoa's office. On its behalf, Alcoa submitted evidence that both subsidiaries were fully capitalized, independently operating companies, with their own boards of directors, assets, and bank accounts. The State Board concluded that "the evidence in the record is insufficient to support the conclusion that Alcoa exercised the type of pervasive management and control over [the subsidiaries] which would render Alcoa liable as the alter ego of the two subsidiaries." Id. at 3.

Unlike in the Alcoa case, where wholly-owned subsidiaries of Alcoa were involved in this case, ISRC held only about a 50% interest in WMC. However, like the relationship between

¹The dissolution of WMC in bankruptcy raises separate questions of whether any liabilities at this Site arising from WMC's past actions have been discharged, an argument that we would pursue further if this proceeding continues.

²As discussed below, a similar standard is applied under federal law. The Supreme Court recognized in United States v. Bestfoods, 524 U.S. 51 (1998), that a corporate veil may be pierced and a shareholder held liable for the corporation's conduct when "the corporate form would otherwise be misused to accomplish certain wrongful purposes, most notably fraud, on the shareholder's behalf." The Court also reaffirmed the principle that mere majority ownership of a company's stock is not a sufficient basis on which to pierce the corporate veil.

Alcoa and its subsidiaries, the relationship between ISRC and the WMC was entirely within the bounds of the law. The WMC was fully capitalized, independently operated, with its own managers, assets, and bank accounts. Significantly, when the WMC could not pay its debt to ISRC, WMC was forced into bankruptcy, which resulted in the bankruptcy court's finding that ISRC was not the alter ego of WMC. Under the Alcoa case and applicable California law, the State Board would not sustain expanding the WDRs to include ARCO under these circumstances.

The Tentative Order's statement that ISRC "operated" the "Walker Mine Site" also suggests that the Regional Board believes that ISRC is "directly" liable under a Bestfoods analysis. In United States v. Bestfoods, 524 U.S. 51 (1998), after addressing the corporate veil piercing issues discussed above, the U.S. Supreme Court articulated the applicable standard in determining whether a shareholder is an "operator" of a facility under CERCLA. The Court held that a shareholder can be "directly" liable if it actually conducts operations at the facility that have to do with the leakage or disposal of hazardous waste or compliance with environmental regulations.

A similar theory of direct liability has been articulated by the State Board and the California courts in construing the California water quality laws. In re County of San Diego, Order No. WQ 96-2, 1996 WL 101751, at *4 (Cal. St. Wat. Res. Bd. Feb. 22, 1996) (observing that an entity is liable if its action "is the direct cause of a waste discharge."). Under either the federal or state test, ARCO is not a liable party here. ISRC did not "cause" any waste discharge or otherwise direct environmentally-related operations at the Site — as described below, the tailings "discharge" at issue here did not even materialize until after WMC's operations were terminated. There simply is no basis to conclude that ISRC is directly liable at the Walker Mine Site under either federal or state law.

B. California Water Laws Do Not Apply Retroactively in this Situation. Even if ARCO could be held liable for WMC's activities — which it cannot — WMC's wholly-past activities would not be subject to retroactive regulation in these circumstances under California water quality laws. As an initial matter, the State Board has specifically held under similar circumstances that the issuance of WDRs is not the appropriate procedure for addressing clean-up obligations. See In re County of San Diego, 1996 WL 101751, at *3-*4 (rescinding WDRs because a cleanup and abatement order pursuant to Water Code § 13304 "is the appropriate means to require clean-up actions, not WDRs."). WDRs are intended to address "proposed or current discharges, as opposed to past discharges," Id. at *3 (emphasis supplied). In this vein, the State Board noted in the Alcoa case that "dischargers are those with legal control over the property." 1993 WL 303166, at *4. ARCO does not have any control over the Site and is not the appropriate party to implement WDRs, and could not do so even if it desired, since the Site is on public land administered by the Forest Service.

As noted above, the procedural mechanism approved by the State Board in certain circumstances for imposing cleanup obligations is through a clean-up and abatement order under Water Code § 13304. See generally *In re County of San Diego*, 1996 WL 101751 at *3-*4 (collecting cases). However, Section 13304(f) contains an express provision that precludes the application of retroactive liability for conduct that occurred prior to 1981 when, at the time it occurred, the conduct at issue was lawful. It is clear that the federally-approved mining activities of WMC were lawful at the time, and that Section 13304(f) therefore precludes liability here.

We recognize that the State Board has held on occasion that past conduct can be deemed "unlawful" at the time where some form of nuisance existed at the time the conduct occurred. This theory is inapplicable here. First, as a factual matter, the Information Sheet attached to the Tentative Order recognizes that during the time the Walker Mine was in operation, Dolly Creek was diverted around the tailings area. The information sheet also notes that "after the mine ceased operations the tailings area also fell into disrepair." An alleged nuisance could arise only as a result of contamination caused by Dolly Creek coming in contact with the tailings. See *In re County of San Diego*, 1996 WL 101751, at *4 (observing that it is the "release of pollutants associated with [the] waste into the ground water that is . . . a violation of law."). Therefore, since Dolly Creek was diverted around the tailings during the entire period in which WMC operated the Site, no nuisance could have arisen at that time.

Second, the evolution of water quality regulation at this Site belies any theory that a nuisance arose during WMC's tenure at the mine. The mine, mill, and tailings pond were not a nuisance but a major economic boost to the area, approved and sanctioned by the federal government and partially permitted on federal land. In addition, the earliest water quality laws in California even potentially applying to this Site were not enacted until 1949, well after WMC was dissolved. See *Alcoa*, 1993 WL at 303166, at *4 (describing timing of California mine drainage regulations).

Third, not only were activities at the tailings Site lawful at the time, even the acid mine drainage problem from the mine adit that preoccupied the Regional Board for decades did not even begin until after WMC's activities had ceased. See *People v. Barry*, 239 Cal. Rptr. 349, 351-352 (Cal. Ct. App. 1987) (noting that Walker Mine discharged acid mine drainage since the mid-1940s, while mining ceased in about 1941). Moreover, the WDRs in place at this Site for decades have specifically forbidden the Forest Service (as the Discharger) from maintaining a nuisance at the tailings site — and it has never been suggested that one exists. In short, regardless of whether the Regional Board ultimately issues revised WDRs or an abatement order for this Site, it cannot retroactively apply the water quality laws in this situation.

C. *The Site is Subject to a Separate Federal Regulatory Process that will be Undercut by this Proceeding.* There can be no question, and the Regional Board apparently recognizes, that the Forest Service is the key party to any future work relating to the Site. The Site is a CERCLA federal facility which has been listed on the Federal Agency Hazardous Waste Compliance Docket since 1991. The Forest Service has taken the lead at the Site for over a decade in developing and implementing a series of studies and remedial actions under CERCLA attempting to address the relatively manageable and defined water quality issues associated with the tailings at the Site.³ Discussions between ARCO and the Forest Service began in the early 1990s on these issues and there have been numerous meetings between Forest Service and ARCO regarding the appropriate remedial measures at the Site. As recently as last summer an ARCO team visited the Site to stay abreast of on-site developments. Discussions in recent years have centered on ways in which ARCO might lend future financial or technical assistance to identify and implement practical remedial approaches.

These discussions have stalled recently not by any "litigation" with ARCO, but by the Forest Service's unreasonable demands that ARCO pay a huge percentage of past costs incurred by that agency. By letter to the Forest Service's counsel dated May 21, 1999, ARCO described its position that it faces no CERCLA or other liability to the Forest Service and addressed the unreasonableness of the Forest Service's past cost demand. (Please let us know if you need a copy of this letter, which also addresses the Bestfoods issues outlined above.) No written response has been received by ARCO.

The point here is that the parties need to focus on what future course of action makes the most sense at the Site. This won't occur if the Regional Board proceeds with its proposed course of action. Instead, ARCO and the agencies will concentrate their resources on legal proceedings in which ARCO will almost certainly prevail. Even on the remote chance that ARCO is successfully named as a "discharger" along with the Forest Service under the revised WDRs, what would be accomplished? The Forest Service will remain the sole party responsible for remedial activities on this public-land site; it cannot cede this authority to ARCO even if it so desired.⁴

³The allegation in the Tentative Order that the Forest Service had planned to "build a total of 15 acres of wetlands but has not constructed them due to litigation with ARCO" is incorrect. There has never been litigation between ARCO and the Forest Service surrounding this Site and ARCO's discussions with the Forest Service have not prevented it from conducting any type of remedial activity.

⁴Nor can the Forest Service delegate preparation of such CERCLA reports as the five-year report required under Section 121(c), now incorporated in Provision E.7 of the Tentative Order. In this vein, there is a serious question as to whether this entire proceeding is subject to various federal preemption restraints, another issue which ARCO would explore further if this matter proceeds.

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ARCO has no access rights or legal interest in the Site that would allow it to proceed even if it were so inclined.

In short, the State's attempt to name ARCO as a Discharger will create a collateral legal battle which will only heighten the difficulties of resolving any future allocation of resources between ARCO and the Forest Service. The State Board has expressly declined to inject itself in such allocation disputes in the past. See *In re San Diego*, 1996 WL 101751, at *7, n.8 ("It is not within the authority of the [State or Regional Board] to apportion responsibility for the remediation activities").

D. *Any Action Against ARCO Is Time-Barred and Procedurally Suspect.* The WDRs at issue here have an extensive history, which is generally discussed in the Tentative Order itself and in the Barry case. The proposed revisions to the WDRs represent changes to longstanding WDRs under which the Forest Service has been operating for over 15 years; the history of WDRs at these sites goes back over 40 years. Nothing has changed with respect to the alleged role of ISRC and WMC in the decades since the State became involved at this Site. Various legal doctrines, such as laches, equitable estoppel, and the application of statutes of limitation would preclude Regional Board action against ARCO based on circumstances known for decades to both the State of California and the Forest Service. This is underscored by the very existence of the Barry case, involving many years of legal proceedings between the State and the site owner — long recognized as the only legally cognizable "discharger" here.

We also have serious questions regarding some of the procedural and financial mechanisms proposed in the Tentative Order. For instance, the Financial Assurance provisions relating to ARCO appear unwarranted and legally suspect. References are made in the Tentative Order to a public hearing of which ARCO has no knowledge. The procedural status of the prior Tentative Order is unclear. The entire process does not appear to meet due process requirements.

III. Conclusion/Proposed Approach.

Naming ARCO as a "Discharger" under the revised WDRs will simply result in contested proceedings and litigation, in which the State is unlikely to prevail and which will not change the basic situation at this Site. Rather than creating a legal quagmire, the Regional Board should take a productive and technically-oriented approach to facilitating discussions about how to proceed to address water quality issues at the Site. Use of a third-party mediator or other form of alternative dispute resolution might assist in these discussions. ARCO would be willing to engage in such discussions with representatives of the Regional Board and the Forest Service in lieu of the Tentative Order so long as all parties recognize that ARCO's role in this matter will always be subordinate to that of the Forest Service. We are willing to meet with all parties to discuss how

Steve E. Rosenbaum
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to shape such a process as an alternative to the expensive and cumbersome proceedings that would occur if ARCO were named in the Tentative Order. Please let us know if you wish to pursue such a course of action or wish to discuss this matter further.

Sincerely,



Roger L. Freeman
for

DAVIS, GRAHAM & STUBBS LLP

cc - Via Regular Mail:

- ✓ Ms. Sandra Stash, ARCO, Anaconda
- ✓ Mr. Neal Brody, Atlantic Richfield Company, Los Angeles
- ✓ Mr. Michael Hagood, ARCO Environmental Remediation, Los Angeles
- ✓ Ms. Rose Miksovsky, US Department of Agriculture, San Francisco
- ✓ Ms. Tracy Winsor, Office of the Attorney General, Sacramento
- ✓ Mr. Banky Curtis, Department of Fish and Game, Region II, Rancho Cordova
- ✓ Department of Health Services, Office of Drinking Water, Redding
- ✓ Department of Water Resources, Northern District, Red Bluff
- ✓ Ms. Frances McChesney, State Water Resources Control Board, OCC, Sacramento
- ✓ Ms. Liz Haven, State Water Resources Control Board, DWQ, Sacramento
- ✓ Plumas County Environmental Health Department, Quincy
- ✓ Plumas County Planning Department, Quincy
- ✓ Mr. James Richey, Atlantic Richfield Company, Los Angeles
- ✓ Mr. Dan Kennedy, Cedar Point Properties, Paradise



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Gray Davis
Governor

24 January 2000

Mr. Roger L. Freeman
Davis, Graham, and Stubbs, LLP
P.O. Box 185
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ATLANTIC RICHFIELD COMPANY, WALKER MINE TAILINGS

We have reviewed your 30 December 1999 letter regarding the Walker Mine Tailings site. The letter was in response to the 1 December 1999 tentative Waste Discharge Requirements (WDRs) wherein ARCO was named as a discharger at the site. Your letter discussed several reasons why ARCO should not be named in the WDRs. In response to your comments, we have removed ARCO from the tentative WDRs.

As mentioned in your letter, we agree that it may be beneficial to meet and discuss ARCO's participation with remedial activities at the Walker Mine Tailings site and at the Walker Mine. Please contact me at (916) 255-3121 so that we can begin discussions on an agreement for future remediation of these sites.

PATRICK MORRIS
Walker Mine Project

cc: Mr. Terry Benoit, Plumas National Forest, Quincy
Ms. Rose Miksovsky, US Department of Agriculture, San Francisco
Ms. Tracy Winsor, Office of the Attorney General, Sacramento
Ms. Frances McChesney, SWRCB, OCC, Sacramento
Mr. Neal Brody, Atlantic Richfield Company, Los Angeles
Mr. James Richey, Atlantic Richfield Company, Los Angeles

RECORD OF DECISION AMENDMENT
FOR REMEDIATION OF THE
WALKER MINE TAILINGS,
BECKWOURTH RANGER DISTRICT, PLUMAS NATIONAL FOREST

July 2001

RECORD OF DECISION AMENDMENT

FOR REMEDIATION OF THE

WALKER MINE TAILINGS,

BECKWOURTH RANGER DISTRICT, PLUMAS NATIONAL FOREST

July 2001

PREPARED BY:


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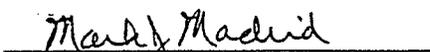
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RECOMMENDED BY:

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7/18/01
Date

APPROVED BY:


MELROY H. TEIGEN
Director, Engineering
Pacific Southwest Region
USDA Forest Service

8/02/01
Date

RECORD OF DECISION AMENDMENT
FOR REMEDIATION OF THE
WALKER MINE TAILINGS,
BECKWOURTH RANGER DISTRICT, PLUMAS NATIONAL FOREST

July 2001

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RECORD OF DECISION AMENDMENT
FOR REMEDIATION OF THE
WALKER MINE TAILINGS,
BECKWOURTH RANGER DISTRICT, PLUMAS NATIONAL FOREST

July 2001

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Section I: THE DECLARATION

A. Site Name and Location

The name of the site is the Walker Mine Tailings (Site). Located within Plumas County, California, the Site is on National Forest System lands under the jurisdiction, custody or control of the United States Department of Agriculture, Forest Service (Forest Service) in the Plumas National Forest.

B. Statement of Basis and Purpose

This decision document, called a Record of Decision Amendment (ROD Amendment), presents the Forest Service's Amended Selected Remedy for the Site, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§ 9601, *et seq.*, and, to the extent practicable, the National Contingency Plan (NCP). The ROD Amendment is based on the Administrative Record for the Site.

C. Assessment of the Site

Actual or threatened releases of hazardous substances at or from this Site, if not addressed by implementing the response action selected in the Record of Decision, as modified by this ROD Amendment, may present an imminent and substantial endangerment to public health, welfare, or the environment.

D. Description of the Amended Selected Remedy

This ROD Amendment modifies the Selected Remedy for the Site presented in the Record of Decision, which was signed on June 10, 1994. The modification affects the cleanup technologies selected in the 1994 Record of Decision. The impetus for this modification is the new information obtained by the Forest Service in its five-year review, which was conducted in 1999.

The Amended Selected Remedy provides for the remedial changes summarized in Table 1-1.

Table 1-1 AMENDED SELECTED REMEDY ROD AMENDMENT (2001)	
Remedial Change	
Dolly Creek	Diversion and Control of Dolly Creek Around the Tailings, and Monitoring of the Effectiveness of the Diversion and Control of Dolly Creek in Achieving Water Quality Standards (ARARs); and Reconstruction of 1,500 Feet of Upper Dolly Creek Channel to a Stable Geometry and Revegetation of Its Banks <i>(a component of the original Selected Remedy in the 1994 Record of Decision)</i>
	Completing the Construction of a 15-Acre Passive Water Treatment System in the Lower Portion of Dolly Creek as a Contingency Remedy <i>(a component of the original Selected Remedy in the 1994 Record of Decision)</i>
Little Grizzly Creek	Diversion of Little Grizzly Creek as a Contingency Remedy
Tailings	Neutralization of 10 Acres of Low pH Material with Crushed Limestone, and Revegetation of Tailings Area <i>(a component of the original Selected Remedy in the 1994 Record of Decision)</i>
General	Closure of the Site to Public Access When Necessary to Protect Treatment Features <i>(a component of the original Selected Remedy in the 1994 Record of Decision)</i>

The Amended Selected Remedy modifies the original Selected Remedy. This Amended Selected Remedy provides for the diversion and control of Dolly Creek around the tailings, and monitoring of the effectiveness of the diversion and control of Dolly Creek in achieving water quality standards (Applicable or Relevant and Appropriate Requirements (ARARs)). In specific, water flowing through the upper Dolly Creek channel above the confluence of Dolly Creek and Little Grizzly Creek would be diverted around the tailings through the construction of a diversion dam, a control gate, and a ditch or other means of diversion. This diversion ditch would divert relatively clean water from upstream of the tailings around the tailings area.

A water monitoring program would be conducted to evaluate the effectiveness of the diversion and control of Dolly Creek in achieving water quality standards. Under the Amended Selected Remedy, if, at the end of an initial three-year monitoring period, the diversion and control of Dolly Creek without a passive water treatment system achieves water quality standards, no further work would be done to construct an anaerobic wetland immediately downstream of the aerobic wetland built in 1994. As part of an ongoing monitoring program, the necessity of the passive water treatment system would be re-evaluated every five years for the next 25 years after the initial three-year monitoring period.

In addition, the remaining portions of three components of the original Selected Remedy would be implemented as part of the Amended Selected Remedy. As provided for in the original Selected Remedy, 1,500 feet of upper Dolly Creek channel would be reconstructed to a stable geometry and the creek banks would be revegetated. Also, in the 100-acre tailings area, 10 acres of low pH material would be neutralized with crushed limestone, and 60 acres would be revegetated with grasses, shrubs, and trees. In addition, the Site would be closed to public access when necessary to protect treatment features.

The Amended Selected Remedy incorporates two *contingency* remedies in the event that the diversion and control of Dolly Creek is not effective in achieving water quality standards. The first contingency remedy provides for completing the construction of a 15-acre passive water treatment system in the lower portion of Dolly Creek, as called for in the original Selected Remedy. This contingency remedy involves the construction of the remaining portion of the passive water treatment system—an anaerobic wetland—to treat leachate water by reducing heavy metals, specifically, copper and zinc, before the contaminated water reaches Little Grizzly Creek below the confluence with Dolly Creek. Residual heavy metals discharge from the Walker Mine would pass to Little Grizzly Creek by means of the Dolly Creek diversion. Currently, heavy metals are released from the Walker Mine during high spring run-off conditions. The first contingency remedy would work in tandem with the Dolly Creek diversion and control.

The second contingency remedy provides for the diversion of Little Grizzly Creek to optimize the treatment capacity of the passive water treatment system, if the first contingency remedy is implemented. A sufficiently high water table is necessary for the functioning and survival of the passive water treatment system because anaerobic wetlands require a constant supply of water to support an environment low in oxygen. Potentially, the water elevation could drop during dry periods to a level that is too low to support the anaerobic wetland. Consequently, the water elevation must be sustained above the ground surface. If the diversion of Little Grizzly becomes necessary, this contingency remedy entails the diversion of Little Grizzly Creek, above the confluence with Dolly Creek, to the anaerobic wetland. The diversion would operate during low flow conditions in summer months, and it would divert only the water needed to increase the water table elevation to maintain the anaerobic wetland. The second contingency remedy would work in conjunction with the Dolly Creek diversion and the first contingency remedy.

As part of the water monitoring program, data would be collected to determine the effectiveness of the diversion and control of Dolly Creek in achieving water quality standards, namely, ARARs. These data also would be used to determine operating requirements for the diversion and to evaluate the effects of the diversion on ground water levels. As part of this water monitoring program, water data would be collected at the downstream station on Dolly Creek (R-2) and at the compliance station (R-5) below the confluence of Dolly Creek and Little Grizzly Creek, with an additional station upstream of station R-2 at the Dolly Creek diversion outlet.

E. Statutory Determinations

The Amended Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

A statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment because this remedy will result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure.

F. ROD Amendment Data Certification Checklist

The following information is included in the Decision Summary section of this ROD Amendment:

- contaminants of concern and their respective concentrations (1994 ROD, p. 3, Figure 2 (Copper in Streams near Walker Mine));
- baseline risk represented by the contaminants of concern (1994 ROD, pp. 7-8);
- cleanup levels established for contaminants of concern and the basis for these levels (1994 ROD, pp. 8-10);
- how source materials, namely, the tailings, constituting principal threats are addressed (ROD Amendment, Section II.D (Description of New Alternatives));
- current and reasonably anticipated future land use assumptions and current and potential beneficial uses of ground water used in the baseline risk assessment, the 1994 Record of Decision, and the ROD Amendment (1994 ROD, pp. 5-6);
- estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the amended remedy cost estimates are projected (ROD Amendment, Section II.G.3 (Summary of the Estimated Remedy Costs)); and
- key factors that led to selecting the amended remedy (ROD Amendment, Section II.C. (Basis for the ROD Amendment)).

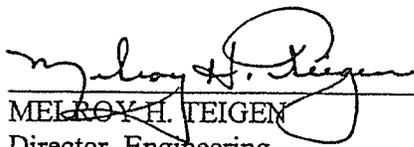
Additional information can be found in the Administrative Record for the Site.

G. Authorizing Signature

MELROY H. TEIGEN
Director, Engineering
Pacific Southwest Region
USDA Forest Service

DATE

G. Authorizing Signature



MELROY H. TEIGEN
Director, Engineering
Pacific Southwest Region
USDA Forest Service

8/02/01

DATE

Section II: DECISION SUMMARY

A. Introduction to the Site and Statement of Purpose

The Walker Mine Tailings (Site) is located on National Forest System (NFS) lands roughly 15 miles east of the community of Quincy in Section 12, T24N, R11E; and Sections 7 and 18, T24N, R12E, Mt. Diablo Baseline and Meridian, within Plumas County, California. The Site is approximately three-quarters of a mile southwest of the Walker Mine at the confluence of Dolly Creek and Little Grizzly Creek. Situated on private land, the Walker Mine is the source of the tailings material disposed of on NFS lands at the Site. Figures 2-1 and 2-2 depict the location and project areas of the Site, respectively. (All figures can be found at the end of this document.) A more complete description of the Site may be found in the 1994 Record of Decision, which is explained below (1994 ROD, pp. 3-4).

The United States Department of Agriculture, Forest Service (Forest Service) is the lead agency for the Site. The California Regional Water Quality Control Board, Central Valley Region (Water Board), and the United States Environmental Protection Agency (U.S. EPA) are support agencies. The Water Board is the lead agency for the Walker Mine.

As the lead agency for the Site, the Forest Service has complied with Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9617, and the National Contingency Plan (NCP) § 300.435(c)(2)(ii) in preparing this ROD Amendment.

The Forest Service signed the Record of Decision on June 10, 1994, which presents the Selected Remedy for the Site. In 1999, the Forest Service conducted its five-year review, which is documented in a report entitled, "Analysis of Surface Water Quality at the Walker Mine Tailings, Forest Service, Plumas National Forest, Beckwourth Ranger District, 1986-1999" (Appendix 1). As a result of this five-year review, the Forest Service obtained new information since the 1994 Record of Decision. The new information is discussed in detail in the section, "Basis for the ROD Amendment," of the Decision Summary. In light of the new information, the Forest Service determined that it was necessary to amend the 1994 Record of Decision in this ROD Amendment.

This decision is based on the Administrative Record for the Site. The ROD Amendment will become part of the Administrative Record. The Administrative Record is kept on file in the Watershed Office of the Plumas National Forest Supervisor's Office at 159 Lawrence Street, Quincy, California. The Administrative Record is available for review by appointment during normal business records by contacting the Forest Service's On-Scene Coordinator (OSC) at 530-283-2050.

B. Site History, Contamination, and Selected Remedy

The Walker Mine produced significant quantities of copper and minor amounts of gold and silver from 1915 to 1941. Located on private land, the Walker Mine has remained idle since 1941 with the exception of sporadic exploration activities. In connection with the 1915-41 period, mill operations generated numerous tailings that flowed downstream by gravity to a tailings pond and a small sediment retention dam about three-quarters of a mile from the Walker Mine. Much of the free water from the milling process evaporated, leaving a well-distributed pile of fine-grained, sandy, silty, and clay-like tailings material covering a 100-acre area to an average depth of 28 feet. These tailings are situated on NFS lands administered by the Forest Service.

The Walker Mine has a long history of water pollution as a result of acid mine drainage and heavy metals discharge (copper, iron and zinc) from the mine. Contaminants were released into nearby waters, Dolly Creek and Little Grizzly Creek, through a variety of pathways, exposing aquatic organisms to lethal or otherwise stressful concentrations of these metals. Prior to response actions having been undertaken at the Walker Mine by the Water Board, these organisms were either killed outright or their life cycles affected to such a degree that they could not maintain viable and productive populations. Approximately 3,800 feet of Dolly Creek above the confluence with Little Grizzly Creek and about seven miles of Little Grizzly Creek were affected.

In 1987, the Water Board installed a concrete seal in the mine tunnel to reduce acid mine drainage and heavy metals discharge from the mine to nearby waters. This seal has reduced significantly the contaminated flows to Dolly Creek and Little Grizzly Creek. Surface water monitoring data collected by the Water Board shows that the seal has reduced the discharge of copper from the Walker Mine to Dolly Creek by approximately 98% above the tailings area, and by roughly 85% at the compliance station (R-5) below the confluence of Dolly Creek and Little Grizzly Creek (Figure 2-3). Although the Water Board's response actions have significantly reduced contaminant releases from the Walker Mine as shown in Figure 2-3, residual releases of copper from the Walker Mine into Dolly Creek continue to occur.

The Site, which encompasses the 100-acre tailings area roughly three-quarters of a mile downstream of the Walker Mine, also affects the water quality of Dolly Creek near its mouth and Little Grizzly Creek below its confluence with Dolly Creek. The residual concentrations of copper in Dolly Creek below the Walker Mine increase as the creek flows over the tailings material. Dolly Creek flows northeast to southwest along the northern portion of the tailings, picking up contaminated leachate water from the tailings in the upper Dolly Creek channel, resulting in the release of heavy metals, sediment, and turbid water to Dolly Creek and Little Grizzly Creek.

In particular, the release of copper has resulted in the continued impairment of aquatic life in Dolly Creek and immediately downstream of the confluence of Dolly Creek and Little Grizzly Creek, and the exceedance of the Water Board's Waste Discharge Requirements (WDRs), which are discussed below. Aquatic life in Dolly Creek has remained heavily impacted, however, the impacted reach of Little Grizzly Creek appears to be limited to approximately one mile downstream of the confluence with Dolly Creek. Dilution and biological uptake have reduced contaminant concentrations to levels tolerable for the return of a viable, cold-water fishery within the seven-mile section of Little Grizzly Creek.

Efforts to address contaminant releases from the Walker Mine and the tailings area at the Site span several decades. In 1958, the Water Board adopted a resolution prescribing WDRs for the tailings, and named the owners of the Walker Mine and the Forest Service as the dischargers (Resolution 58-181). In 1986, the Water Board rescinded the 1958 resolution, and issued a new order naming the Forest Service as the sole discharger (Order No. 86-073). The Water Board updated the WDRs in 1991 (Order No. 91-017) and, again, in 2000 (Order No. 5-00-028). The most recent order established maximum receiving water quality criteria for the R-5 compliance station on Little Grizzly Creek, downstream of the Site and the confluence of Dolly Creek and Little Grizzly Creek.

From 1990 to 1992, the Forest Service performed a Site Investigation (SI) that included a site material characterization study. This SI was performed as part of a Remedial Investigation/Feasibility Study (RI/FS). The SI had a twofold focus: 1) the release and transport of copper and sediment from the tailings; and 2) the development of alternatives for stabilizing and reclaiming the tailings area. Ground water monitoring wells were installed at this time. The Forest Service also conducted a Preliminary Assessment that examined potential health risks to NFS users and workers at the Site. Other contamination pathways such as ground water were studied and determined to be insignificant or non-existent.

The RI/FS was completed in 1991, one year prior to completion of the site material characterization study. In the RI/FS, the Forest Service developed several remedial alternatives, including the diversion and control of Dolly Creek around the tailings. These alternatives are discussed in the section, "Basis for the ROD Amendment." This process culminated in the selection of the original Selected Remedy in the 1994 Record of Decision based on information available at that time. As described below, the Forest Service has implemented several components of the Selected Remedy.

The Forest Service signed the Record of Decision for the Site on June 10, 1994, which presents the Selected Remedy chosen in accordance with CERCLA, and, to the extent practicable, the NCP. The 1994 Record of Decision documents Alternatives 2 and 4 in the 1994 Proposed Plan as the original Selected Remedy (1994 ROD, pp. 19-20). This original Selected Remedy is summarized in Table 2-1.

Table 2-1 SELECTED REMEDY (ALTERNATIVES 2 AND 4) 1994 RECORD OF DECISION		
Alternative/ 1994 Proposed Plan	Description	Page (1994 ROD)
2	[Dolly Creek] Channel Erosion Control and Development of a Wetland for Passive Water Treatment	11
4	Revegetation and Wind Erosion Control	12

The original Selected Remedy included the following response action:

- treat the tailings material on-site;
- reconstruct 1,500 feet of Dolly Creek channel to a stable geometry and revegetate its banks, including the larger gully banks;
- construct a 15-acre passive water treatment system (wetland) in the lower portion of Dolly Creek;
- construct wind barriers on 50 acres of the tailings surface;
- neutralize 10 acres of low pH material with crushed limestone prior to revegetation;
- revegetate 60 acres of tailings area with grasses, shrubs, and trees;
- close the Site to public access where needed to protect treatment features; and
- monitor for success and compliance with Applicable or Relevant and Appropriate Requirements (ARARs).

(1994 ROD (Declaration), pp. 1-2.)

The Forest Service has implemented several components of the original Selected Remedy. As provided for in the 1994 Record of Decision, the Forest Service has completed the following:

- reconstructed 1,300 feet of the upper Dolly Creek channel;
- constructed four acres of the passive wetland treatment system (aerobic wetland) in the lower portion of Dolly Creek;
- installed wind fences on 50 acres of the tailings surface;
- revegetated roughly 80 acres of the tailings area with trees and some grasses and shrubs;
- installed a gate on the access road, blocked other access routes, and posted no vehicles allowed warning signs;
- conducted air quality monitoring while workers were present at the Site;
- performed routine site maintenance activities; and
- monitored for success and compliance with ARARs.

As part of the response action, the Forest Service has collected, reviewed, and analyzed additional surface and ground water monitoring data since 1994.

C. Basis for the ROD Amendment

The Forest Service considered six alternatives in the remedial process that culminated in the selection of Alternative 2, in combination with Alternative 4, in the 1994 Record of Decision. Among the alternatives that were not selected, the Forest Service used Alternative 1 (No Action) in the original Proposed Plan as a baseline for comparison of the alternatives. Of the remaining alternatives, the Forest Service considered and rejected Alternatives 3 (Diversion of Dolly Creek Around the Tailings Area, Stabilization of Dolly Creek Below the Diversion and Passive Water Treatment) and 5 (Vegetated Soil Islands and Wind Erosion Control), and eliminated Alternatives 6, 7, and 8 (treatment alternatives) in the Proposed Plan from further consideration.

~~In regard to Alternative 3, which is the subject of this ROD Amendment, the Forest Service rejected Alternative 3 due to inconclusive data. In the original Proposed Plan, Alternative 3 provided for the diversion and control of Dolly Creek, which flows unabated across the Site. Specifically, the 1994 Record of Decision states:~~

~~There is no evidence that there is (sic) any long-term advantages between Alternatives 2 and 3 at this time. Monitoring water quality is expected to give the evidence needed to consider the installation of the diversion structures in Alternative 3.~~

(1994 ROD, p. 15 (emphasis added).) As a result, the Forest Service concluded that there was insufficient data at the time the Record of Decision was signed in 1994 to determine whether the diversion and control of Dolly Creek was necessary to ensure the proper functioning of the passive water treatment system.

In comparing Alternatives 2 and 3 with respect to compliance with water quality standards, the 1994 Record of Decision notes:

The implementation of Alternative 2 alone (no upstream diversion) is expected to meet water quality ARARs. The success of the treatments would be evaluated at five year intervals. If water quality improvements are occurring, no further actions would be taken except monitoring. ~~If water quality is not improving, or doesn't appear to be able to meet ARARs, further remedial actions would be considered, including the diversion of Dolly Creek around the tailings area (Alternative 3).~~

(1994 ROD, p. 14 (emphasis added).)

In implementing the original Selected Remedy described in the preceding section, the Forest Service has been unable to verify water quality improvements. In 1994, the Forest Service constructed a four-acre anaerobic wetland in the lower portion of Dolly Creek as an integral part of a passive water treatment system, as provided for in the original Selected Remedy. The anaerobic wetland experienced a catastrophic failure during its first year of operation that changed it from an anaerobic wetland to an aerobic wetland only. This failure stemmed from high spring run-off conditions following higher-than-average snowfall during the 1994-95 winter, resulting in the anaerobic wetland being filled with sediment and ceasing to function properly as a passive water treatment system. As a result, meaningful data on treatment rates for heavy metals are not available.

The Forest Service has been able to collect, however, additional data on the water flow levels in Dolly Creek and ground water elevation levels in the tailings area since the 1994 Record of Decision. As part of its five-year review in 1999, the Forest Service analyzed water flow data. An analysis of these data shows that Dolly Creek is subject to greater than expected fluctuations in water flow levels on both annual and seasonal bases.

A comparison of high and low flows for Dolly Creek above the tailings area (R-1) during the period, 1986-1999, is presented in Figure 2-4. The high flows range from 0.31 cubic feet per second (cfs) in 1994 to 12.30 in 1996. The average high flow is 4.18 cfs for 1986-1999; however, the average high flow is 2.15 cfs for 1986-1994 while the average high flow is 7.83 cfs for 1995-1999. In contrast, the low flows range from 0.06 in 1988 to 0.93 in 1995. The average low flow is 0.42 cfs.

The hydrological data analyzed by the Forest Service can be found in the report entitled, "Analysis of Surface Water Quality at the Walker Mine Tailings, Forest Service, Plumas National Forest, Beckwourth Ranger District, 1986-1999" (Appendix 1). This report presents key Forest Service findings:

- Dolly Creek is subject to significant fluctuations in water flow levels;
- these fluctuations occur on both annual and seasonal bases; and
- high and low water flow levels are substantially different from those calculated or modeled at the time of the 1994 Record of Decision, as reflected in the RI/FS.

The import of these findings concerning fluctuations in the water flow levels in Dolly Creek is discussed below.

In addition, the Forest Service has observed increased erosion rates in the upper Dolly Creek channel and accelerated sedimentation under uncontrolled flow conditions since the 1994 Record of Decision. As explained above, in 1994, the Forest Service constructed a four-acre anaerobic wetland in the lower portion of Dolly Creek as an integral part of the passive water treatment system. This anaerobic wetland experienced a catastrophic failure during the first year

of operation that changed it from an anaerobic wetland to an aerobic wetland only. The failure stemmed from high spring run-off conditions following the higher-than-average snowfall during the 1994-95 winter, resulting in the wetland filling with sediment and ceasing to function properly as a passive water treatment system. The observed increased erosion rates and the accelerated sedimentation of the wetland can be found in the report entitled, "Analysis of Surface Water Quality at the Walker Mine Tailings, Forest Service, Plumas National Forest, Beckwourth Ranger District, 1986-1999" (Appendix 1, p. 7 (Critical Observations)). The importance of these observations is discussed below.

The Forest Service also has collected new ground water data since the 1994 Record of Decision. In the Forest Service's Annual Monitoring Report for 2000 prepared for the Water Board, the Forest Service analyzed ground water data from 1994 and 2000 for monitoring well W-3. The Annual Monitoring Report presents these data in Tables 5 and 6 of the report. A copy of this report can be found in Appendix 2. These data show seasonal fluctuations in ground water elevations in the monitoring well closest to the anaerobic wetland that was to be constructed as a component of the remedy selected in the 1994 Record of Decision. ~~While the ground water data from 1994 may be suspect on technical grounds as explained in the Annual Monitoring Report, the data from 2000 suggests that the average depth to water may be as little as six feet (Appendix 2, Table 5).~~ The significance of ground water elevations in the vicinity of the anaerobic wetland is discussed immediately below.

Based on the new information, the Forest Service has determined that ~~fluctuations in water flow levels in Dolly Creek have the potential to impair the functioning and survival of the passive water treatment system called for in the original Selected Remedy. During high flow periods, the sheer volume of water carried by Dolly Creek may overwhelm the treatment capacity of the wetland by reducing or eliminating residence (i.e., treatment) time. Contaminated water in Dolly Creek is likely to pass rapidly through (or even over) the passive water treatment system, and would have a reduced opportunity for treatment during high flow periods. Moreover, during high flow periods, the rise in water levels in Dolly Creek may cause additional erosion of the tailings material in the upper Dolly Creek channel, resulting in accelerated sedimentation of the wetland. Accelerated sedimentation reduces treatment effectiveness and life expectancy, thereby increasing maintenance costs and replacement frequency. In addition, during low flow periods, the available volume of water may not be adequate to maintain a relatively constant water elevation to sustain an anaerobic wetland (i.e., an environment without oxygen).~~

BASES FOR
ROD AMENDMENT

In light of the new information, the Forest Service believes that the response action selected in this ROD Amendment is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. Actual or threatened releases of hazardous substances, if not addressed by implementing the response action selected in the 1994 Record of Decision, as modified by this ROD Amendment, may present an imminent and substantial endangerment to public health, welfare, or the environment.

The following information in the Administrative Record supports the need for the ROD Amendment:

- Analysis of Surface Water Quality at the Walker Mine Tailings, Forest Service, Plumas National Forest, Beckwourth Ranger District, 1986-1999 (Appendix 1);
- Annual Monitoring Report [Walker Mine Tailings, calendar year 2000], Forest Service, Plumas National Forest, prepared for the Water Board (Appendix 2);
- USDA field notes, dated June 9, 1995; and
- Constructing Wetlands to Treat Acid Mine Drainage, Robert S. Hendin, Robert L.P. Kleinmann, and Greg Brodie, 1990 Course, p. 10 (Inflow and Surge/Constant Head Control ("The maintenance of a relatively constant head on the inflow to the wetland system will provide the wetland system with a relatively constant inflow rate and simplify design considerations. The wetland system will operate in a relatively constant, steady-state condition, which minimizes hydraulic, vegetative, and substrate stresses.")).

D. Description of New Alternatives

1. Original Selected Remedy (1994 Record of Decision)

Based on the 1994 Proposed Plan, the original Selected Remedy provided for the following response action:

- treat the tailings material on-site (removal of all or part of the material was not proposed); reconstruct 1,500 feet of Dolly Creek channel to a stable geometry and revegetate its banks, including the larger gully banks;
- construct a 15-acre passive water treatment system (wetland) in the lower portion of Dolly Creek (including raising the sediment retention dam approximately two feet);
- construct wind barriers on 50 acres of the tailings surface;
- neutralize 10 acres of low pH material in the tailings area with crushed limestone prior to revegetation;
- revegetate 60 acres of the tailings area with grasses, shrubs, and trees;
- close the Site to public access where needed to protect treatment features; and
- monitor for success and compliance with ARARs.

(1994 ROD (Declaration), pp. 1-2.)

2. Alternative 1 (2000 Proposed Plan)

As generally described in the 2000 Proposed Plan (April 21, 2000), Alternative 1 would implement the original Selected Remedy as described immediately above without modification. Under Alternative 1, the remaining portions of three components of the original Selected Remedy would be implemented as part of the Amended Selected Remedy. As provided for in the original

Selected Remedy, 1,500 feet of upper Dolly Creek channel would be reconstructed to a stable geometry and the creek banks would be revegetated. Also, in the 100-acre tailings area, 10 acres of low pH material would be neutralized with crushed limestone, and 60 acres would be revegetated with grasses, shrubs, and trees. Finally, the Site would be closed to public access when needed to protect treatment features.

3. Alternative 2 (2000 Proposed Plan)

Alternative 2 would modify the original Selected Remedy. This alternative provides for the diversion and control of Dolly Creek around the tailings, and monitoring the effectiveness of the diversion and control of Dolly Creek in achieving water quality standards (ARARs). In specific, water flowing through the Dolly Creek channel above the confluence with Little Grizzly Creek would be diverted around the tailings through the construction of a diversion dam, a control gate, and a ditch or other means of diversion. The ditch would divert relatively clean water from upstream of the tailings around the tailings, thus reducing copper contamination to Dolly Creek from the tailings leachate water, which is the primary source of copper contamination at the Site. Copper leaches to Dolly Creek along its path across the tailings area. The diversion ditch would be designed to carry a 20-year flow (100 cubic cfs), allowing all flows greater than that to flow unabated through the existing Dolly Creek channel. Flows associated with the potential catastrophic failure of the seal installed in the tunnel at the Walker Mine in 1987 would not be contained in the diversion channel, but rather would flow over the tailings area and retention dam to Little Grizzly Creek.

A water monitoring program would be conducted to evaluate the effectiveness of the diversion and control of Dolly Creek in achieving water quality standards. Under Alternative 2, if, at the end of an initial three-year water monitoring period, the diversion and control of Dolly Creek without a passive water treatment system achieves water quality standards, no further work would be done to construct an anaerobic wetland immediately downstream from the anaerobic wetland (now an aerobic wetland only) built in 1994. As part of an ongoing monitoring program, the necessity of the passive water treatment system would be re-evaluated every five years for the next 25 years after the initial three-year monitoring period.

Alternative 2 incorporates two *contingency* remedies in the event that the diversion and control of Dolly Creek is not effective in achieving water quality standards. The first contingency remedy provides for completing the construction of a 15-acre passive water treatment system in the lower portion of Dolly Creek, as reflected in the original Selected Remedy. This contingency remedy involves the construction of the remaining anaerobic wetland portion of the passive water treatment system, and the operation of the diversion to enhance the effectiveness of the passive water treatment system in meeting water quality standards. As a passive water treatment system, the anaerobic wetland would treat water contaminated by the tailings (and residual heavy metals discharge from the Walker Mine) by reducing heavy metals, specifically, copper and zinc, before the contaminated water reaches Little Grizzly Creek.

The second contingency remedy provides for the diversion of Little Grizzly Creek to optimize the treatment capacity of the passive water treatment system, if the first contingency remedy is implemented. Proper operation of the Dolly Creek diversion is necessary to regulate the volume and timing of water entering the passive water treatment system. The water table that sustains the anaerobic wetland may drop to a level that threatens the proper operation and survival of the wetland during low flow periods. A lowered water table has the potential to affect the functioning and survival of the passive water treatment system because anaerobic wetlands require a constant supply of water to maintain an environment that is low in oxygen. The low-oxygen environment is essential to the biological processes that remove the heavy metals from solution, thereby inhibiting their migration. Consequently, the water elevation must be maintained above the ground surface. If the water table drops below the ground surface, Alternative 2 will divert water from Little Grizzly Creek, above the confluence with Dolly Creek, to the wetland. The Little Grizzly Creek diversion would operate only during low flow, and it would be limited to the volume of water needed to increase the water table elevation to maintain the anaerobic wetland.

As part of the water monitoring program, data would be collected to determine the effectiveness of the diversion and control of Dolly Creek in achieving water quality standards, namely, ARARs. These data also would be used to determine operating requirements for the diversion and to evaluate the effects of the diversion on the Site's ground water. As part of this water monitoring program, data would be collected at the downstream station on Dolly Creek (R-2) and at the compliance station (R-5) below the confluence of Dolly Creek and Little Grizzly Creek, with additional stations upstream of station R-2 at the Dolly Creek diversion outlet and the sediment retention dam overflow.

The 1994 Record of Decision describes the remedial action goals and objectives for the Site. Specifically, two goals are described: 1) the protection of the beneficial uses of Little Grizzly Creek from the release of contaminants to the environment from the tailings; and 2) the protection of the health of users and workers at the Site from exposure to tailings dust (1994 ROD, p. 10). Further, two objectives are described: 1) to reduce the release of contaminants from the tailings to Dolly Creek and Little Grizzly Creek by meeting the requirements for receiving water as stated in Water Board Resolution No. 68-16 (anti-degradation policy statement), or, if not feasible, the requirements of Water Board's WDRs for the U.S. Department of Agriculture, Forest Service, Plumas National Forest, Walker Mine Tailings, Plumas County (Order No. 5-00-28) within five (5) years of completion of the remedial action (1994 ROD, p. 10).

Since the 1994 Record of Decision was signed, the Water Board has adopted revised WDRs for the U.S. Department of Agriculture, Forest Service, Plumas National Forest, Walker Mine Tailings, Plumas County (Order No. 5-00-28). These WDRs replace Order No. 91-017 which was in effect when the 1994 Record of Decision was signed. Order No. 5-00-28 requires the Forest Service to meet the provisions contained in Division 7 of the California Water Code

and to comply with certain other requirements. The most significant changes in the WDRs involve modification of the numerical receiving water limitations for copper from 9.22 micrograms per liter (ug/l) under Order No. 91-017 to 5.0 ug/l under Order No. 5-00-28, and, to a less significant degree, for zinc from 65 ug/l to 66 ug/l. These changes are the result of updated limitations calculated by the Water Board using the four-day average equations from the U.S. EPA's nationally recommended water quality criteria. Information Sheet, Order No. 5-00-28.

Changes in expected outcomes as a result of the ROD Amendment vary according to the alternative. Under Alternative 1, water quality in Little Grizzly Creek below the confluence with Dolly Creek would not improve above existing levels, resulting in continued impairment of aquatic life downstream of the Site. Available uses of surface water for human consumption below the Site would be unrestricted.

In contrast, under Alternative 2, available uses of surface water below the Site would be unrestricted upon achieving cleanup levels. Alternative 2 is expected to improve water quality downstream of the Site at the R-5 compliance station to a level that meets water quality standards and enhances conditions necessary for aquatic life. This represents a significant enhancement in available uses of surface water from the original Selected Remedy. The only exception may be residual contamination from the Walker Mine that has the potential to affect Dolly Creek upstream of the tailings and Little Grizzly Creek below the confluence with Dolly Creek.

Under Alternative 2, water quality standards are expected to be met immediately after the completion of the Dolly Creek diversion. A water monitoring program will confirm if the Dolly Creek diversion is effective in meeting water quality standards. If the water quality standards cannot be met with the Dolly Creek diversion alone, Alternative 2 provides for completing the construction of a 15-acre passive water treatment system in the lower portion of Dolly Creek as a contingency remedy. The anaerobic wetland is expected to take one to three years to become fully operational. A long-term monitoring program would be conducted to verify treatment success and maintenance needs.

Under Alternatives 1 and 2, water quality in Dolly Creek above the confluence with Little Grizzly Creek is not expected to improve except to the extent that contaminated water is treated under the first contingency remedy for Alternative 2. Under Alternative 2, the Dolly Creek diversion would reduce the loading of copper from the tailings to the creek by diverting the flow around the tailings area. In addition, residual heavy metals discharge from the Walker Mine would be limited from contaminating the Site further by diversion and control of Dolly Creek around the tailings. The Water Board is continuing to work with the owner of the Walker Mine to address the residual release or threat of release of hazardous substances from the mine itself.

In addition, under either Alternative 1 or 2, land uses would be limited due to the need to manage waste in the tailings area on a long-term basis. There are no changes in available uses of land under either alternative from the original Selected Remedy.

Both Alternatives 1 and 2 are expected to address potential hazards to human health by reducing fugitive dust at the Site.

E. Evaluation of Alternatives

Each of the alternatives is evaluated against the other using the nine criteria required under Section 121 of CERCLA and NCP § 300.430(f)(5)(i), 40 CFR § 300.430, paragraph (f)(5)(i). This evaluation is limited to the proposed diversion and control of Dolly Creek around the tailings, monitoring and evaluation of the effects of the diversion and control of Dolly Creek on the passive water treatment system; completing the construction of a 15-acre passive water treatment system in the lower portion of Dolly Creek as a contingency remedy; and the diversion of Little Grizzly Creek as a contingency remedy. Reference is made to the 1994 Record of Decision containing an evaluation of the other components of the response action that are common to both Alternative 1 and 2 in the Amended Record of Decision using the nine criteria.

1. Criterion #1: Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment, and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Alternative 1, which does not modify the original Selected Remedy, is not protective of human health and the environment by eliminating, reducing, or controlling risks posed by the Site through treatment, engineering controls, and/or institutional controls. This alternative does not address the protectiveness issues identified as a result of the new information since the 1994 Record of Decision. In particular, Alternative 1 fails to address potential impairment of the functioning and survival of the passive water treatment system called for in the original Selected Remedy. These issues include impairment in the functioning and survival of the passive water treatment system due to significant fluctuations in water flow levels in Dolly Creek during both high and low flow periods, and lowering of the ground water during low flow periods.

As explained in the section, "Basis for the ROD Amendment," during high flow periods, the sheer volume of water carried by Dolly Creek may overwhelm the treatment capacity of the wetland by reducing or eliminating residence time. Contaminated water in Dolly Creek is likely to pass rapidly through (or even over) the passive water treatment system, and would have a reduced opportunity for treatment during high flow periods. In addition, during high flow periods, the rise in water levels in Dolly Creek may cause additional erosion of the tailings material in the upper Dolly Creek channel, resulting in accelerated sedimentation of the wetland. Accelerated sedimentation reduces treatment effectiveness and life expectancy, thereby increasing maintenance costs and replacement frequency. Moreover, during low flow periods,

the available volume of water may not be adequate to maintain a relatively constant water elevation to sustain an anaerobic wetland (*i.e.*, an environment without oxygen).

Alternative 2 is protective of human health and the environment by eliminating, reducing, or controlling risks posed by the Site through engineering controls (diversion and control), treatment (passive water treatment system), if necessary, and institutional controls. Alternative 2 addresses the protectiveness issues identified as a result of the new information since the 1994 Record of Decision by diverting and controlling water flow levels in Dolly Creek.

As discussed in the 1994 Record of Decision, the inhalation of crystalline silica dust emanating from the tailings material may affect human health (1994 ROD, p. 7). The California Safe Drinking Water and Toxic Enforcement Act of 1986 identifies airborne particles of respirable size such as crystalline silica as known to cause cancer (Chemical Abstracts Services Registry, October 1, 1988). The State of California Environmental Protection Agency, Department of Toxic Substances Control, did not identify any specific air quality ARARs for the Site. However, the Forest Service already has taken steps to limit access to the Site, including installing a gate on the access road; blocking other access routes, and posting no vehicles allowed warning signs. Also, the continued revegetation of the tailings area called for in the original Selected Remedy will help to reduce fugitive dust. In addition, Plumas County Department of Environmental Health has indicated that the County will enforce exposure restrictions upon frequent users and workers at the Site by requiring restricted access and/or use of proper respiratory equipment.

2. Criterion #2: Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121(d) of CERCLA and NCP § 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA § 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the

particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

The Forest Service has identified ARARs for the Site in consultation with the State, including the California Department of Justice, the Water Board, and other State and local agencies. None of the ARARS listed below are being waived.

Identified ARARs are listed in Table 2-2 on the following page.

Table 2-2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)	
ARAR	Description
Water Board Resolution 68-16 (Anti-Degradation Policy)	This resolution satisfies the Federal Clean Water Act's anti-degradation policy requirement. It requires the continued maintenance of high quality waters of the State even where that quality is better than needed to protect beneficial uses, unless specific findings are made. Water quality cannot be degraded below what is necessary to protect beneficial uses in any case.
Water Board Order No. 5-00-28 (Waste Discharge Requirements, U.S. Department of Agriculture, Forest Service, Plumas National Forest, Walker Mine Tailings, Plumas County)	<p>Order No. 5-00-28 supersedes Order No. 91-017, which was in effect when the 1994 Record of Decision was signed. The current Order requires the Forest Service to meet the provisions contained in Division 7 of the California Water Code and to comply with the following:</p> <hr/> <p>Discharge Prohibitions —Discharges causing the degradation of any water supply are prohibited. —Discharges having a pH less than 6.5 or greater than 8.5 are prohibited.</p> <hr/> <p>Discharge Specifications (for all waters leaving the Site) —Neither the treatment nor the discharge shall cause a pollution or nuisance as defined in Section 13050 of the California Water Code. —Storm water discharges to any surface or ground water shall not adversely impact human health or the environment. —Storm water discharges shall not cause or contribute to a violation of any applicable water quality standards contained in the Basin Plan.</p>

**Table 2-2
 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)**

ARAR	Description												
Water Board Order No. 5-00-28 (continued)	<p>Receiving Water Limitations —The discharge(s) shall not cause concentrations in Grizzly Creek at R-5 (immediately above Road 25N42 and above the west side spring discharge) to exceed the following limits:</p> <table border="1"> <thead> <tr> <th align="center"><u>Constituents</u></th> <th align="center"><u>Units</u></th> <th align="center"><u>Limitation*</u></th> </tr> </thead> <tbody> <tr> <td align="center">Copper</td> <td align="center">ug/l</td> <td align="center">5.0</td> </tr> <tr> <td align="center">Iron</td> <td align="center">ug/l</td> <td align="center">1000</td> </tr> <tr> <td align="center">Zinc</td> <td align="center">ug/l</td> <td align="center">66</td> </tr> </tbody> </table> <p>*The copper and zinc limitations are calculated using a hardness of 50 mg/l as CaCO₃. —The discharge shall not cause:</p> <ul style="list-style-type: none"> –Visible oil, grease, scum, foam, floating or suspended material in the receiving waters or watercourses. –Concentration of any materials in the receiving waters which are deleterious to human, animal, aquatic, or plant life. –Aesthetically undesirable discoloration of the receiving waters. –Bottom deposits in the receiving waters. –Fungus, slimes, or other objectionable growths in the receiving waters. –An increase in the turbidity of the receiving waters by more than 20% over background levels. –Alterations of the normal ambient pH of the receiving water more than 0.5 units. –Taste or odor producing substances to impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, or to cause nuisance or adversely affect beneficial uses. –Aquatic communities and populations, including vertebrate, invertebrate, and plant species, to be degraded. –Toxic pollutants to be present in the water column, sediments, or biota in concentrations that adversely affect beneficial uses; that produce detrimental response in human, plant, animal, or aquatic life; or that bioaccumulate in aquatic resources at levels which are harmful to human health. –Violations of any applicable water quality standard for receiving waters adopted by the [Water] Board or the State Water Resources Control Board. 	<u>Constituents</u>	<u>Units</u>	<u>Limitation*</u>	Copper	ug/l	5.0	Iron	ug/l	1000	Zinc	ug/l	66
<u>Constituents</u>	<u>Units</u>	<u>Limitation*</u>											
Copper	ug/l	5.0											
Iron	ug/l	1000											
Zinc	ug/l	66											

Alternative 1, which implements the original Selected Remedy using a combination anaerobic and aerobic wetland as the primary water treatment system, is not expected to comply with ARARs because this alternative fails to address potential impairment of the functioning and survival of the system. The Forest Service has observed significant fluctuations in water flow levels in Dolly Creek above the confluence with Little Grizzly Creek as discussed above in the section, "Basis for the ROD Amendment." Uncontrolled flow conditions have the potential to impair functioning and survival of the passive water treatment system during both high and low flow periods in three respects.

First, as explained previously, during high flow periods, the sheer volume of water carried by Dolly Creek may overwhelm the treatment capacity of the wetland by reducing or eliminating residence time. Contaminated water in Dolly Creek is likely to pass rapidly through (or even over) the passive water treatment system, and would have a reduced opportunity for treatment during high flow periods. Second, during high flow periods, the rise in water levels in Dolly Creek may cause additional erosion of the tailings material in the upper Dolly Creek channel, resulting in accelerated sedimentation of the wetland. Accelerated sedimentation reduces treatment effectiveness and life expectancy, increasing maintenance costs and replacement frequency. Third, during low flow periods, the available volume of water may not be adequate to maintain a relatively constant water elevation to sustain an anaerobic wetland (*i.e.*, an environment without oxygen).

Alternative 2 is expected to meet ARARs. Alternative 2 will enhance surface and ground water conditions necessary for proper anaerobic wetland functioning and survival. The water monitoring program under Alternative 2 will confirm compliance with ARARs, including physical and chemical water quality requirements.

In the event that the diversion and control of Dolly Creek does not meet ARARs, Alternative 2 incorporates a contingency remedy that provides for completing the construction of a 15-acre passive water treatment system in the lower portion of Dolly Creek, as reflected in the original Selected Remedy. This contingency remedy involves the construction of the remaining anaerobic wetland portion of the passive water treatment system, and the operation of the diversion to enhance the effectiveness of the system in meeting water quality standards. In addition, Alternative 2 incorporates a second contingency remedy that provides for the diversion of Little Grizzly Creek to optimize the treatment capacity of the system, if the first contingency remedy is implemented. Although partial construction of the passive water treatment system to date has not resulted in attainment of ARARs, it is expected that the passive water treatment system will attain ARARs when operated in conjunction with the diversion and control of Dolly Creek, as provided for in Alternative 2, by mitigating the effects of existing uncontrolled flow conditions on the system.

3. **Criterion #3: Long-Term Effectiveness and Permanence**

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Each alternative provides some degree of long-term protection. The alternatives increase in effectiveness of assuring protection against the discharge of heavy metals as additional treatment components are included. The effectiveness and permanence of Alternative 1 is dependent upon insulating the passive water treatment system from uncontrolled flow conditions in Dolly Creek. With the addition of the diversion and control of Dolly Creek in Alternative 2, this alternative provides a higher degree of long-term effectiveness and permanence in ensuring the proper functioning and survival of the passive water treatment system under controlled flow conditions and the concomitant removal of contaminants from the leachate water through passive treatment. This alternative would enhance surface and ground water conditions necessary for anaerobic wetland functioning and survival.

4. **Criterion #4: Reduction of Toxicity, Mobility, or Volume through Treatment**

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternative 1 is not expected to reduce the toxicity, mobility, or volume of the contaminants of concern, namely, copper, iron and zinc, through treatment. Without the diversion and control of Dolly Creek, uncontrolled flow conditions during both high and low flow periods have the potential to impair functioning and survival of the passive water treatment system. In the absence of a functioning passive water treatment system, this alternative cannot be expected to reduce the toxicity, mobility, or volume of the contaminants of concern.

Alternative 2, in contrast, is expected to reduce the toxicity, mobility, or volume of the contaminants of concern through treatment. The diversion and control of Dolly Creek would reduce the loading of copper from the tailings to the creek by diverting the flow around the tailings area. The volume of contaminated water leaving the Site may be reduced significantly or eliminated because leachate water generated from the tailings is not expected to contaminate the re-routed Dolly Creek flow. Although the heavy metals in the tailings would not be "treated" as that term is used in the NCP, Alternative 2 is expected to reduce the release of contaminants from the Site to the environment by containing them on-site.

If the diversion and control of Dolly Creek does not meet ARARs alone, the first contingency remedy for Alternative 2 provides for completing the construction of a 15-acre passive water treatment system in the lower portion of Dolly Creek, as reflected in the original

Selected Remedy. Passive treatment involves the removal of heavy metals in contaminated water by a wetland system in which both aerobic and anaerobic environments function. Heavy metals present in the contaminated water would be removed from solution by a complex interaction with plants, organic matter, and bacteria as the contaminated water flows through the wetland system.

The diversion and control of Dolly Creek would reduce the toxicity, mobility, or volume of the contaminants through treatment by allowing the treatment method selected in the 1994 Record of Decision, namely, the passive water treatment system, to function effectively. This system would treat any residual flows from Dolly Creek above the confluence with Little Grizzly Creek, and it would treat residual contamination in the diverted Dolly Creek flows above the tailings area. With the diversion and control of Dolly Creek, passive treatment of heavy metals would be made feasible by regulating flow conditions that, if left uncontrolled, have the potential to impair the functioning and survival of the passive water treatment system. In addition, the Dolly Creek diversion would be designed to maximize the feasibility of the system by sealing the diversion ditch against leakage, increasing the volume of water released at the outlet. This increased volume of water would be released at the wetland, raising the elevation of the ground water at the location where it is most needed. It also would be released at a location that creates a backwater which will have the beneficial effect of extending the residence time of the leachate water in the wetland, maximizing treatment opportunities.

5. Criterion #5: Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternative 1 would be completed in approximately three years. During this period, the construction activities associated with building the passive water treatment system would take place. This alternative would mobilize sediment during the construction of the anaerobic wetland. Sediment basins or other controls would be used to capture work-generated sediments. The construction would occur during the summer months when the Dolly Creek flow is lowest, and, consequently, sediment from the construction activities is not expected to reach Little Grizzly Creek.

Alternative 2 would be completed in approximately three years, assuming that it is not necessary to implement the contingency remedies. During this time, construction activities associated with the diversion and control of Dolly Creek would include the clearing of trees and other vegetation to accommodate the ditch and its access road. This alternative also would mobilize sediment during construction. Sediment would be mobilized during the re-routing of Dolly Creek around construction activities. Sediment basins or other controls would be used to capture work-generated sediments. Construction would occur during the summer months when

the Dolly Creek flow is lowest, and, consequently, sediment from the construction activities is not expected to reach Little Grizzly Creek below the confluence with Dolly Creek.

Under both alternatives, health and safety risks to workers would be addressed and minimized. Workers would be required to wear appropriate levels of protection and air quality would be monitored to avoid exposure to the Site's fugitive dust that arises during windy conditions. No exposure to hazardous substances would occur for members of the public during these activities due to restricted access to the Site.

6. Criterion #6: Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Implementation of Alternative 1, which provides for the original Selected Remedy including construction of a 15-acre passive water treatment system, is relatively straightforward. All materials needed for implementation are readily and commercially available. The construction of a diversion dam, a control gate, and a ditch under Alternative 2 is easily implemented. Materials and equipment necessary for construction are readily available. The site logistics are constrained by limited access to the Site during the winter months, however, construction is expected to take place during the summer months. If it becomes necessary to implement the first contingency remedy under Alternative 2 involving completing the construction of a 15-acre passive water treatment system, such implementation is relatively straightforward. Similarly, if it becomes necessary to implement the second contingency remedy entailing the diversion of Little Grizzly Creek to optimize the treatment capacity of the passive water treatment system, such implementation also is relatively straightforward. In the latter instance, it would be necessary for the United States, through the Forest Service, to claim a water right under the Reservation Principle from the State, and an in-stream flow study would need to be conducted to determine the water needs of Little Grizzly Creek.

7. Criterion #7: Cost

The estimated present worth cost of the alternatives ranges from \$2,142,384 for Alternative 1 to \$3,062,083 for Alternative 2. Cost summaries for each of the alternatives can be found in Table 2- 3 (Summary Comparative Analysis of Alternatives).

8. Criterion #8: State/Support Agency Acceptance

The Water Board previously expressed its support for Alternative 1, which would implement the original Selected Remedy. However, based on a letter from the Supervising Engineer for the Water Board to the Forest Supervisor for the Plumas National Forest, Forest

Service dated May 11, 2000, the Water Board is currently on record in support of Alternative 2 (Appendix 5). No comments have been received from any other agency, department, or commission of the State of California.

The County of Plumas is not on record in support of or opposition to either of the alternatives. However, the County of Plumas Department of Environmental Health has indicated that the County will enforce exposure restrictions upon frequent users and workers at the Site by requiring restricted access and/or use of proper respiratory equipment (Appendix 6).

9. Criterion #9: Community Acceptance

The Forest Service did not receive any written responses to its 2000 Proposed Plan from community members. Mr. Jack Boise, a downstream landowner near Genessee, Plumas County, contacted the Forest Service by telephone, and indicated that he was supportive of Alternative 2 (Appendix 7).

Atlantic Richfield Company (ARCO), a potentially responsible party which is on record in support of the original Selected Remedy, opposed modification of the remedy at this time. ARCO requested that the Forest Service consider completing implementation of the remedy selected in the 1994 Record of Decision (Appendix 4).

Table 2-3 contains a summary of the comparative analysis of the nine criteria discussed immediately above.

Table 2-3 SUMMARY COMPARATIVE ANALYSIS OF ALTERNATIVES		
Criteria	Alternative 1 Original Selected Remedy	Alternative 2 Diversion and Control of Dolly Creek & Contingency Remedies
#1: Overall Protectiveness	Not protective of human health and the environment; does not address new information since 1994 ROD	Protective of human health and the environment; addresses new information since 1994 ROD
#2: Compliance with ARARs		
Chemical-specific ARARs	Surface water is not expected to meet ARARs at R-5 compliance station	Surface water is expected to meet ARARs at R-5 compliance station
Location-specific ARARs	No location-specific ARARs	No location-specific ARARs
Action-specific ARARs	No action-specific ARARs	No action-specific ARARs
#3: Long-Term Effectiveness and Permanence		
Magnitude of Residual Risk		
◦Direct contact/soil ingestion	Not applicable; ARARs apply to aquatic life only	Not applicable; ARARs apply to aquatic life only
◦Ground water ingestion for current users	Not applicable; ARARs apply to aquatic life only	Not applicable; ARARs apply to aquatic life only
◦Ground water ingestion for potential future users	Not applicable; ARARs apply to aquatic life only	Not applicable; ARARs apply to aquatic life only
Adequacy and Reliability of Controls	Inadequate water treatment; partially reliable controls (technology)	Adequate water treatment; reliable controls (technology)
#4: Reduction of Toxicity, Mobility, or Volume Through Treatment		
Treatment Process Used	Passive water treatment system	Passive water treatment system
Amount Destroyed or Treated	Partial treatment	Complete treatment (<i>i.e.</i> , treatment expected to meet ARARs)

Criteria	Alternative 1 Original Selected Remedy	Alternative 2 Diversion and Control of Dolly Creek & Contingency Remedies
Reduction of Toxicity, Mobility, or Volume	Not expected to reduce toxicity, mobility, or volume in absence of diversion and control of Dolly Creek	Expected to reduce toxicity, mobility, or volume with diversion and control of Dolly Creek and, if necessary, additional passive water treatment system
Irreversible Treatment	None	None
Type and Quantity of Residuals After Treatment	Unknown quantity of heavy metals will continue to be contained in tailings	Unknown quantity of heavy metals will continue to be contained in tailings
#5: Short-Term Effectiveness		
Community Protection	Gated access road; no vehicles allowed signs posted	Gated access road; no vehicles allowed signs posted
Worker Protection	Workers to be required to wear appropriate levels of protection; air quality monitoring	Workers to be required to wear appropriate levels of protection; air quality monitoring
Environmental Impacts	Mobilization of sediments during construction activities	Mobilization of sediments during construction activities
Time Until Action is Complete	3 years	3 years (assuming no contingency remedies are necessary)
#6: Implementability		
Ability to Construct and Operate	Relatively straightforward implementation involving construction of wetland	Construction of diversion dam, control gate and ditch easily implemented
Ease of Doing More Action if Needed	Yes; road permits access to Site during non-winter months	Yes; road permits access to Site during non-winter months
Ability to Monitor Effectiveness	Monitoring stations in place	3-year water monitoring program will be performed at an additional compliance station(s)
Ability to Obtain Approvals and Coordinate with Other Agencies	Forest Service will work with County of Plumas to ensure worker health and safety during construction activities	Forest Service will work with County of Plumas to ensure worker health and safety during construction activities
Availability of Equipment, Specialists, and Materials	Materials and equipment necessary for implementation readily available	Materials and equipment necessary for implementation readily available
Availability of Technologies	Technologies readily available	Technologies readily available

Criteria	Alternative 1 Original Selected Remedy	Alternative 2 Diversion and Control of Dolly Creek & Contingency Remedies
#7: Cost		
Present Worth Cost	\$2,142,384	\$3,062,083
Capital Cost	\$1,110,720	\$1,875,414
Annual O&M Cost	\$59,113	\$67,292
Discount Rate	4%	4%
Number of Years Projected	30	30
#8: State Acceptance	No	Yes
#9: Community Acceptance	Yes	Yes, except for potentially responsible party

F. Support Agency Comments

In a letter from the Supervising Engineer, Water Board, to the Forest Supervisor, Plumas National Forest, Forest Service dated May 11, 2000, the State states, "[t]he Proposed Treatment Plan [2000] is in agreement with the Dolly Creek rehabilitation requirements of Order No. 5-00-028. We concur with the concepts described in the plan and look forward to its implementation and success" (Appendix 5).

G. Amended Selected Remedy

1. Summary of the Rationale for the Amended Selected Remedy

In developing remedial alternatives for the 1994 Proposed Plan, the Forest Service tacitly recognized that the excavation and off-site disposal of the 100-acre tailings was not a viable option. Based on available information, the lead agency selected a passive water treatment system in the 1994 Record of Decision. In selecting that remedial action, the Forest Service determined that the passive water treatment system would address the release or threat of release of hazardous substances at the Site. The Forest Service also noted that there was insufficient data at the time the Record of Decision was signed in 1994 to determine whether the diversion and control of Dolly Creek was necessary to ensure the proper functioning and survival of the passive water treatment system. The new information about the potential impairment of the functioning and survival of the passive water treatment system under uncontrolled flow conditions discussed in the section, "Basis for the ROD Amendment," has filled the data gap identified in 1994.

In light of the new information since 1994, the Forest Service has determined that the diversion and control of Dolly Creek is now required. This Amended Selected Remedy will reduce or eliminate the flow of water through the upper Dolly Creek channel where the water comes into contact with copper that leaches from the tailings. In the event that the diversion and control of Dolly Creek does not achieve cleanup levels (ARARs), the Amended Selected Remedy incorporates a contingency remedy that provides for completing the construction of a 15-acre passive water treatment system in the lower portion of Dolly Creek, as reflected in the original Selected Remedy. In addition, the Amended Selected Remedy incorporates a second contingency remedy that provides for the diversion of Little Grizzly Creek to optimize the treatment capacity of the passive water treatment system, if the first contingency remedy is implemented.

2. Description of the Amended Selected Remedy

Under the Amended Selected Remedy, the primary remedial action to address the release or threat of release of hazardous substances at the Site is the diversion of Dolly Creek from its present course to a diversion ditch. This diversion ditch would run generally along the north edge of the Site for a distance of approximately 3,500 feet, and the terminus of the diversion ditch would be an outlet located no more than 50 feet upstream of the tailings dam ending in a rock energy-dissipater. The excavated soil from building the diversion ditch would be used to construct a minimal width service road along most of the length of the ditch.

Although design specifications are subject to change during the Remedial Design, it is anticipated that the diversion structure would be constructed of concrete with wood flashboards, and it would be sealed and rock lined. The diversion ditch would have a flow capacity of up to 100 cfs. Discharges greater than 100 cfs would pass over the flashboards and into the existing Dolly Creek channel.

Flows from the diversion ditch would travel a short distance (not to exceed 50 feet) from the outlet before flowing over the tailings dam. Little or no contaminants are expected to be picked up in this confined area unless there are sufficient quantities of water flowing from the Site to the tailings dam. There are no known contamination sources below the tailings dam.

Off-site flows would continue to be monitored at the compliance station (R-5) below the confluence of Dolly Creek and Little Grizzly Creek. In addition, water samples from near the end of the diversion ditch would be taken at the same time. If, after monitoring at the compliance station shows that water quality standards are met, implementation of the contingency remedies for Alternative 2 would not be necessary. If, on the other hand, leachate water continues to be released from the Site resulting in water quality standards being exceeded at the compliance station, it would be necessary to complete the first Alternative 2 contingency remedy, and possibly the second contingency remedy.

The first contingency remedy involves completing the construction of a 15-acre passive water treatment system in the lower portion of Dolly Creek, as provided for in the original Selected Remedy. The second contingency remedy entails diverting water from Little Grizzly Creek upstream of the tailings if the wetland described immediately above requires additional water during the dry months of the year, or, more likely, during dry years. The diverted water would flow by gravity, or other appropriate means, to the anaerobic wetland. The Little Grizzly Creek diversion would be monitored to safeguard against harm to aquatic life.

Finally, the Amended Selected Remedy provides for additional components which were included in the original Selected Remedy. Namely, these components include neutralization of approximately 10 acres of low pH material in the tailings area with crushed limestone prior to revegetation; and fertilization and revegetation of roughly 60 acres of the tailings area with grasses, shrubs, and trees, including fertilization of tailings areas previously planted.

3. Summary of the Estimated Remedy Costs

Table 2-4 contains a cost estimate summary of capital costs for the Amended Selected Remedy including the two contingency remedies, and Table 2-5 below contains a cost estimate summary of annual operation and maintenance costs. Table 2-6 reflects a present worth analysis for the Amended Selected Remedy.

Table 2-4 PROJECT SCHEDULE AND CAPITAL COSTS					
Project Description	First Year Implementation Cost	Second Year Implementation Cost	Third Year Implementation Cost	Fourth Year Implementation Cost	Total Project Cost
Construct Concrete Diversion Structure on Dolly Creek	\$8,784				\$8,784
Develop Rock Source	\$13,200				\$13,200
Construct, Seal & Rip-Rap Diversion Ditch for Dolly Creek	\$361,612				\$361,612
Reconstruct and Rock Sediment Dam Access Road	\$9,000	\$15,600	\$78,880		\$182,960
Realign 1000 ft of Dolly Creek and Stabilize Adjoining Bank		\$95,080			\$95,080
Treat 10 Acres with Crushed Limestone	\$2,400	\$5,400			\$7,800
Scatter 100 Trees on 10 Acres From Adjoining Slope	\$32,400	\$138,800	\$108,800		\$280,000
Complete Tailings Area Vegetation Planting on 80 Acres				\$108,816	\$108,816
Construct Anaerobic Wetland and Raise Tailings Dam				\$47,124	\$47,124
Construct Little Grizzly Cr. Diversion Structure & Pipeline	\$61,700	\$61,700	\$61,700		\$185,100
Miscellaneous	\$489,096	\$339,860	\$249,380	\$155,940	\$1,234,276
Subtotal	\$73,364	\$50,979	\$37,407	\$23,391	\$185,141
Project Management (15%)	\$97,819	\$67,972	\$49,876	\$31,188	\$246,855
Remedial Design (20%)	\$73,364	\$50,979	\$37,407	\$23,391	\$185,141
Construction Management (15%)	\$733,644	\$509,790	\$374,070	\$233,910	\$1,851,414
Total Capital Cost	40%	28%	20%	13%	100%
Percent of Total					

Table 2-5			
ANNUAL OPERATION AND MAINTENANCE COSTS			
Description	1-5 yrs	6-10 yrs	11-30 yrs
Site Inspections	\$1,350	\$900	\$900
Diversion and Ditch Repair	\$6,750	\$6,750	\$6,750
Dolly Creek Maintenance	\$6,750	\$2,250	\$0
Vegetation Maintenance	\$30,000	\$15,000	\$3,000
Passive Water Treatment System (Anaerobic Wetland)	\$5,088	\$5,088	\$840
Diversion of Little Grizzly Creek	\$4,261	\$4,261	\$4,261
Vegetation Fertilization	\$36,000	\$36,000	\$12,000
Water Monitoring Sampling	\$3,150	\$3,150	\$3,150
Laboratory Analysis	\$3,600	\$3,600	\$3,600
Water Quality Report	\$1,200	\$1,200	\$1,200
Bioassessment Sampling	\$3,000	\$3,000	\$3,000
Bioassessment Analysis	\$900	\$900	\$900
Bioassessment Report	\$600	\$600	\$600
Progress Report	\$600	\$600	\$600
Five Year Reviews	\$3,000	\$3,000	\$12,000
Total Annual O&M Cost	\$106,249	\$86,299	\$52,801
Average Annual O&M Cost for 30 years is \$67,292.			

Table 2-6						
PRESENT WORTH ANALYSIS						
Year	Capital Cost	Annual O&M Cost	Perodic Cost	Total Cost	Discount Factor (4%*)	Present Worth
0	\$733,644	\$0		\$733,644	1.00	\$733,644
1	\$509,790	\$106,249		\$616,039	0.96	\$591,397
2	\$374,070	\$106,249		\$480,319	0.93	\$446,697
3	\$233,910	\$106,249		\$340,159	0.89	\$302,742
4	\$0	\$106,249		\$106,249	0.85	\$90,312
5	\$0	\$106,249	\$3,000	\$109,249	0.82	\$89,584
6	\$0	\$86,299		\$86,299	0.79	\$68,176
7	\$0	\$86,299		\$86,299	0.76	\$65,587
8	\$0	\$86,299		\$86,299	0.73	\$62,998
9	\$0	\$86,299		\$86,299	0.70	\$60,409
10	\$0	\$86,299	\$3,000	\$89,299	0.68	\$60,723
11	\$0	\$52,801		\$52,801	0.65	\$34,321
12	\$0	\$52,801		\$52,801	0.63	\$33,265
13	\$0	\$52,801		\$52,801	0.60	\$31,681
14	\$0	\$52,801		\$52,801	0.58	\$30,625
15	\$0	\$52,801	\$3,000	\$55,801	0.56	\$31,249
16	\$0	\$52,801		\$52,801	0.53	\$27,985
17	\$0	\$52,801		\$52,801	0.51	\$26,929
18	\$0	\$52,801		\$52,801	0.49	\$25,872
19	\$0	\$52,801		\$52,801	0.47	\$24,816
20	\$0	\$52,801	\$3,000	\$55,801	0.46	\$25,668
21	\$0	\$52,801		\$52,801	0.44	\$23,232
22	\$0	\$52,801		\$52,801	0.42	\$22,176
23	\$0	\$52,801		\$52,801	0.41	\$21,648
24	\$0	\$52,801		\$52,801	0.39	\$20,592
25	\$0	\$52,801	\$3,000	\$55,801	0.37	\$20,646
26	\$0	\$52,801		\$52,801	0.36	\$19,008
27	\$0	\$52,801		\$52,801	0.35	\$18,480
28	\$0	\$52,801		\$52,801	0.33	\$17,424
29	\$0	\$52,801		\$52,801	0.32	\$16,896
30	\$0	\$52,801	\$3,000	\$55,801	0.31	\$17,298
Total	\$1,851,414	\$2,018,760	\$18,000	\$3,888,174		
Total Present Worth Cost						\$3,062,083
* Forest Service Manual No. 1950.						

The information in these cost estimate summary tables is based on the best available information regarding the scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Changes may be documented in the form of a memorandum in the Administrative Record for a minor change, an Explanation of Significant Differences (ESD), or a ROD Amendment for a fundamental change. These are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 of the actual project cost.

4. **Expected Outcomes of the Amended Selected Remedy**

Table 2-7 describes the expected outcomes of the Amended Selected Remedy.

Table 2-7 EXPECTED OUTCOMES OF THE AMENDED SELECTED REMEDY			
	Site Area A Dolly Creek (above confluence): Restricted Use	Site Area B Little Grizzly Creek (below confluence): Unrestricted Use	Site Area C (Tailings): Permanent Waste Management Area/ Restricted Use
Site Scenario	Exposure controlled through use of engineering controls (diversion) and/or treatment (passive water treatment system), followed by institutional controls	No exposure control necessary	Exposure controlled through use of engineering and institutional controls ONLY
Expected Outcomes	Reduced Dolly Creek flow contact with heavy metals-contaminated tailings; improved water quality in upper Dolly Creek channel	Water quality standards for aquatic life expected to be met	Long-term waste management and site control

H. **Statutory Determinations**

Under CERCLA § 121 and the NCP, the Forest Service, as the lead agency, must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal

element and a bias against off-site disposal of untreated wastes. The following sections discuss how the Amended Selected Remedy meets those statutory requirements.

1. Protection of Human Health and the Environment

The Amended Selected Remedy will protect human health and the environment by addressing the release or threat of release of hazardous substances at the Site through engineering controls (Dolly Creek diversion) and/or treatment (passive water treatment system), followed by institutional controls. In addition, the Amended Selected Remedy addresses the public health concern associated with crystalline silica dust insofar as the Forest Service already has taken steps to limit access to the Site. In addition, the Plumas County Department of Environmental Health has indicated that the County will enforce exposure restrictions upon frequent users and workers at the Site by requiring restricted access and/or use of proper respiratory equipment.

2. Compliance with ARARs

During the remedial process that culminated in the 1994 Record of Decision, the Forest Service identified ARARs for the Site in consultation with State and local authorities. At pages 8-10 of the 1994 Record of Decision, the following ARARs were identified:

Water Board Resolution 68-16 (Anti-degradation Policy); and

Water Board WDR for the U.S. Department of Agriculture, Forest Service, Plumas National Forest, Walker Mine Tailings, Plumas County (Order No. 91-017) (rescinded on January 17, 2000, and new WDRs certified in Order No. 5-005-028).

The WDRs are intended to satisfy the provisions contained in Division 7 of the California Water Code and regulations. Discharges from the Site are regulated by Title 27 and/or Part 258 (27 CCR § 20005 *et seq.* and 40 CFR § 258 *et seq.*).

Surface water leaving the Site by way of Dolly Creek contains concentrations of copper and zinc that harm aquatic life by adversely affecting the water of Little Grizzly Creek below the confluence with Dolly Creek. Copper and zinc concentrations in Little Grizzly Creek downstream of the confluence range from near zero during spring high flow months to 0.06 milligrams per liter (mg/l) during summer low flow months (Appendix 1). These copper and zinc concentrations in Little Grizzly Creek limit biological activities downstream of the confluence. Copper and zinc are known to be toxic to aquatic life in low concentrations. Quality criteria for water, U.S. EPA (July 1976), pp. 54 and 245. Iron, when exposed to dissolved oxygen, forms soluble iron, which can deposit on stream substrate material or form flacculants, either of which may be detrimental.

The primary remedial action called for in this ROD Amendment, namely, the diversion and control of Dolly Creek, is expected to meet ARARs. This Amended Selected Remedy would reduce significantly the amount of contaminated material eroded from the Site and the transport of that material off-site. Metal loading to Dolly Creek would be reduced or eliminated because the flow in the upper Dolly Creek channel would be diverted around the heavy metals-laden tailings. If it is necessary to complete construction of the passive water treatment system to meet ARARs, metals potentially released from the Site by the surfacing of groundwater along the existing Dolly Creek channel would be treated passively in an anaerobic wetland, maintained by water from the Dolly Creek diversion, and, if necessary, by temporarily diverting some Grizzly Creek water to the wetland.

The Amended Selected Remedy complies with all ARARs. The ARARs are summarized below and described in more detail in Table 2-2 above. The chemical-specific ARARs include the following:

Water Board Resolution 68-16 (Anti-degradation Policy); and

Water Board WDR for the U.S. Department of Agriculture, Forest Service, Plumas National Forest, Walker Mine Tailings, Plumas County (Order No. 5-00-28).

Table 2-8 identifies the authority for each ARAR, describes the medium, provides the status of requirement, provides a brief synopsis of each requirement, and provides a brief description of the response action to be taken to attain the requirement.

Table 2-8 DESCRIPTION OF ARARS FOR AMENDED SELECTED REMEDY					
Authority	Medium	Requirement	Status	Synopsis	Action to be Taken to Attain Requirement
State Regulatory Requirement	Groundwater	Anti-degradation policy (Water Board Resolution 68-16)	Relevant and Appropriate	This resolution satisfies the Federal Clean Water Act's anti-degradation policy requirement. It requires the continued maintenance of high quality waters of the State even where that quality is better than needed to protect beneficial uses, unless specific findings are made.	The Amended Selected Remedy will comply with the anti-degradation policy through engineering controls and passive treatment, if necessary, combined with institutional controls
State Regulatory Requirement	Surface water	Waste Discharge Requirements (Order No. 5-00-28)	Applicable	The current Order requires the Forest Service to meet the provisions contained in Division 7 of the California Water Code and to comply with the following: 1) discharge prohibitions; 2) discharge specifications; and 3) receiving water limitations	The Amended Selected Remedy will comply with these requirements through engineering controls and passive treatment, if necessary, combined with institutional controls

3. Cost-Effectiveness

In the Forest Service's judgment, the Amended Selected Remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition from the NCP was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (NCP § 300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (*i.e.*, were both protective of human health and the environment and were ARARs-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable value for the money to be spent.

The estimated present worth cost of the Amended Selected Remedy is \$3,062,083. While Alternative 1 is approximately \$920,000 less than Alternative 2, Alternative 1 does not satisfy the threshold criteria because this alternative is not ARARs-compliant. In light of the new information since the 1994 Record of Decision, the Forest Service does not believe that Alternative 1 addresses the potential impairment of the functioning and survival of the passive water treatment system under uncontrolled flow conditions in Dolly Creek. The Forest Service believes that the additional cost of diverting and controlling Dolly Creek in the Amended Selected Remedy provides a significant increase in the protection of human health and the environment, will be ARARs-compliant, and is cost-effective.

4. Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

The Forest Service has determined that the Amended Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at this Site. In the lead agency's view, the Amended Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against off-site treatment and disposal and considering State and community acceptance.

5. Preference for Treatment as a Principal Element

CERCLA creates a statutory preference for remedies that employ treatment as a principal element. In view of this statutory preference, the Forest Service selected a passive water treatment system in the 1994 Record of Decision. However, in light of the new information since 1994, namely, that Dolly Creek is subject to significant fluctuations in water flow levels on both annual and seasonal bases, the Forest Service has determined that the original Selected

Remedy will not comply with ARARs. In particular, the original Selected Remedy fails to address potential impairment of the functioning and survival of the passive water treatment system due to uncontrolled flow conditions. While water quality in the upper portion of Dolly Creek has improved dramatically with the installation of a seal in the mine tunnel at the Walker Mine, the relatively "clean," post-seal water continues to come into contact with the tailings along the lower Dolly Creek channel, leaching copper into the receiving waters. The Forest Service has determined that Dolly Creek is subject to significant fluctuations in water flow levels and that uncontrolled flow conditions exacerbate copper leaching as well as have an impact on treatment effectiveness. This new information is the impetus for this ROD Amendment.

The diversion and control of Dolly Creek satisfies the statutory preference for treatment for two key reasons. First, the diversion of Dolly Creek around the tailings will reduce or eliminate the need to treat water that is now contaminated as Dolly Creek flows unchecked across the heavy metals-contaminated tailings. Second, to the extent that residual contaminated water from the Site requires treatment through the implementation of the first and possibly second contingency remedies for Alternative 2, the Dolly Creek diversion will enhance treatment by maintaining adequate water elevation to ensure survival of the anaerobic wetland, increasing the residence time of the leachate water in the wetland, and extending the life of the wetland system by limiting sedimentation.

6. Five-Year Review Requirements

A statutory review will be conducted within five years after the initiation of remedial action to ensure that the Amended Selected Remedy is, or will be, protective of human health and the environment because the Amended Selected Remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure.

I. Public Participation Compliance

As provided for in NCP § 300.435(c)(2), the Forest Service has encouraged public participation in the selection of a remedy for the Site. The public was invited to participate in the development of the first Proposed Treatment Plan that culminated in the selection of a remedy in the 1994 Record of Decision, and the public again was invited to participate in the development of the second Proposed Treatment Plan for this ROD Amendment. The public, including individual members and community groups, local, State and Federal agencies, recognized Indian tribes, and potentially responsible parties were invited to participate. Communications included direct mailings, newspaper notices, and radio news releases. Two public meetings were held in 1993 for the first Proposed Treatment Plan.

Section III: RESPONSIVENESS SUMMARY

The Forest Service received limited comments regarding the 1999 Proposed Plan and the lead agency's preferred alternative. As explained in Section II.E.8 of the Decision Summary, the Water Board and the County of Plumas Department of Environmental Health generally have been supportive of the remedial change (Appendices 5 and 6, respectively). Also, as explained in Section II.E.9, there was limited comment by community members, and no express opposition to the preferred alternative.

The only significant public comment was in the form of comments from ARCO, a potentially responsible party that has been notified by the Forest Service that the party may have CERCLA liability in connection with the release or threat of release of a hazardous substance(s) at or from the Site. In its June 30, 2000 comments, ARCO opposed modification of the remedy at this time. ARCO requested that the Forest Service consider completing implementation of the remedy selected in the 1994 Record of Decision. ARCO's comments can be found in Appendix 3. The Forest Service is already on record as having responded to ARCO's comments in a letter dated January 22, 2001. The lead agency's response can be found in Appendix 5.

The comments and the Forest Service's response to ARCO's comments are incorporated by reference.

FIGURES

ROD Amendment
Walker Mine Tailings, Plumas National Forest

FIGURES

Walter M. Lippert, National Forest
Service, U.S. Department of Agriculture

Figure 2-1
(Map depicting the location of the Walker Mine Tailings)

ROD Amendment
Walker Mine Tailings, Plumas National Forest

10
11
12

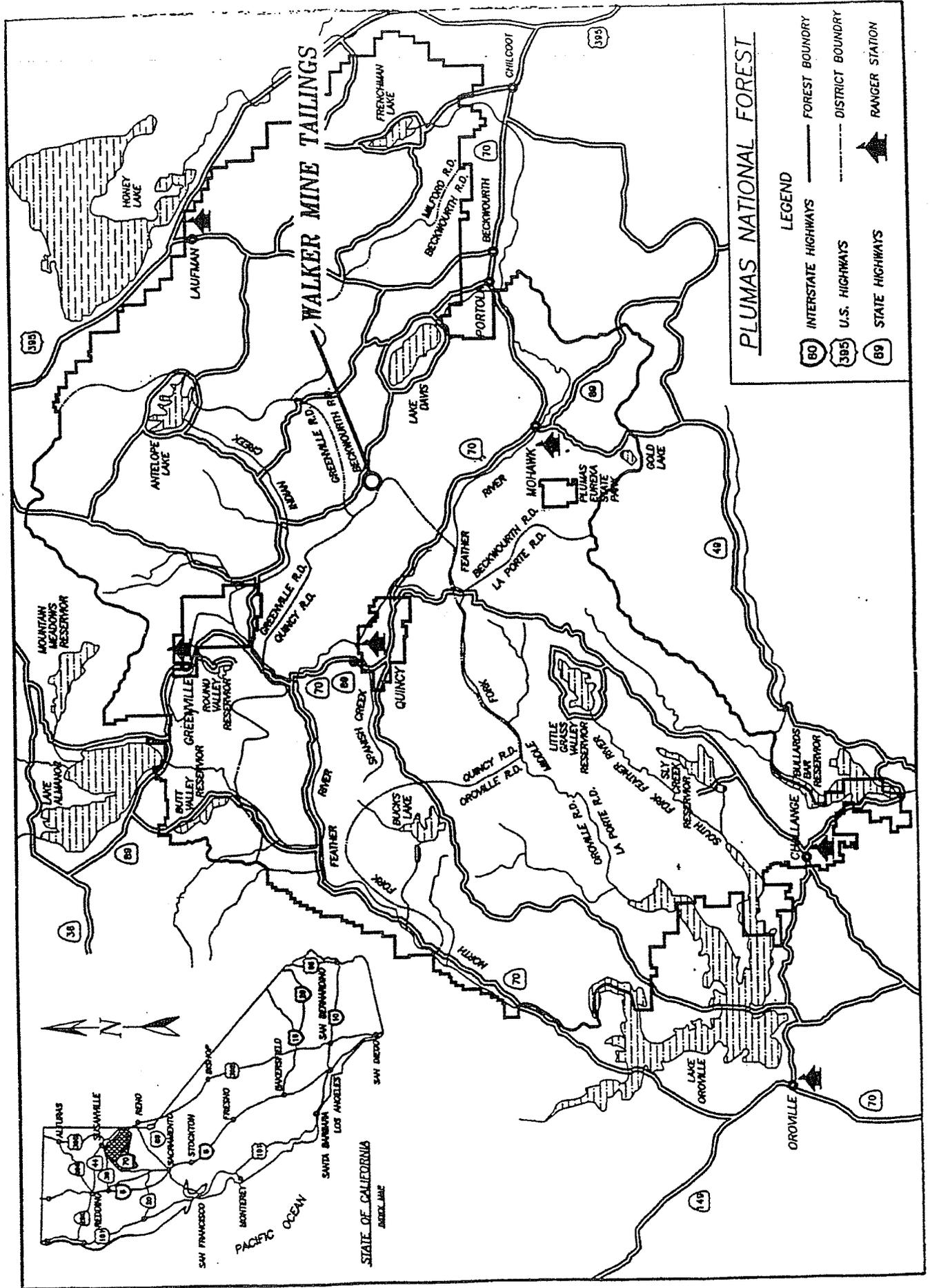
Figure 3-1

(Map showing the location of the Walker Mine Tailings)



Walker Mine Tailings
National Forest

FIGURE 2-1



FIGURES

01144 2402 0116

ROD Amendment
Walker Mine Tailings, Plumas National Forest

FIGURE 3

Walter M. Jones, Ph.D., National Forest
Department of Agriculture

Figure 2-1
(Map depicting the location of the Walker Mine Tailings)

ROD Amendment
Walker Mine Tailings, Plumas National Forest

Figure 1
(Map showing the location of the West Nile virus outbreak)

West Nile Virus National Research Center
CDC Atlanta

Figure 2-2
(Map showing the project areas for the Walker Mine Tailings)

ROD Amendment
Walker Mine Tailings, Plumas National Forest

Figure 1-3
(Map showing the project area for the White River Dam)

White River Dam
National Forest

Figure 2-3
(Copper in Streams near the Walker Mine before and after
the mine seal was installed in 1987)

ROD Amendment
Walker Mine Tailings, Plumas National Forest

Figure 1-1

(Copper in streams near the Walker Mine before and after
the mine was installed in 1987)

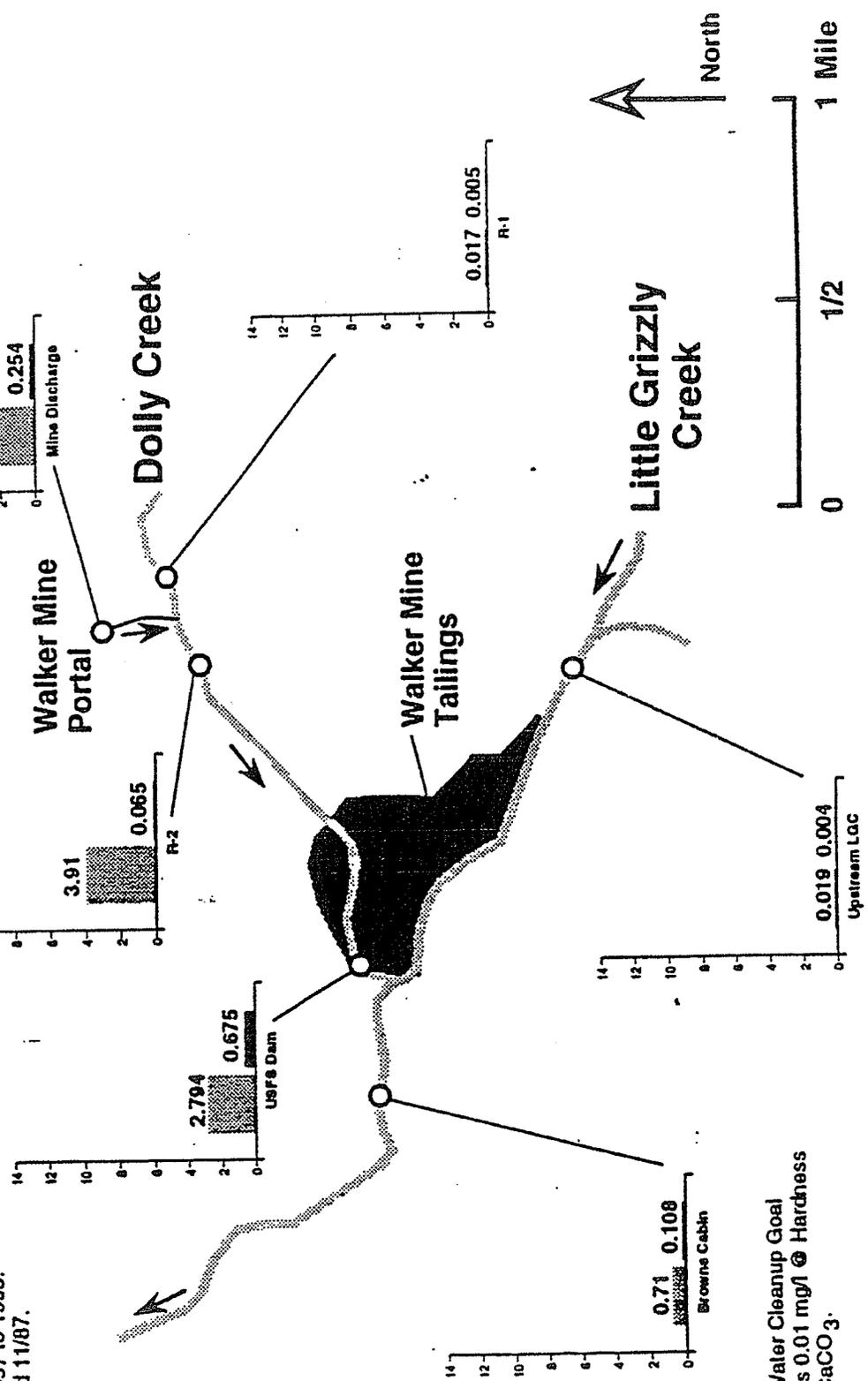
ROD Anderson
Walker Mine Tailings, Kansas National Forest

Copper in Streams near Walker Mine

FIGURE 2-3

Before Mine Seal
 After Mine Seal

Average copper values in mg/l.
 Data from 1957 to 1993.
 Seal installed 11/87.



Receiving Water Cleanup Goal
 for Copper is 0.01 mg/l @ Hardness
 of 50 mg/l CaCO₃.

Figure 2-4
(Comparison of high and low flows at compliance station (R-1)
for Dolly Creek above the tailings, 1986-1989)

Figure 3-4

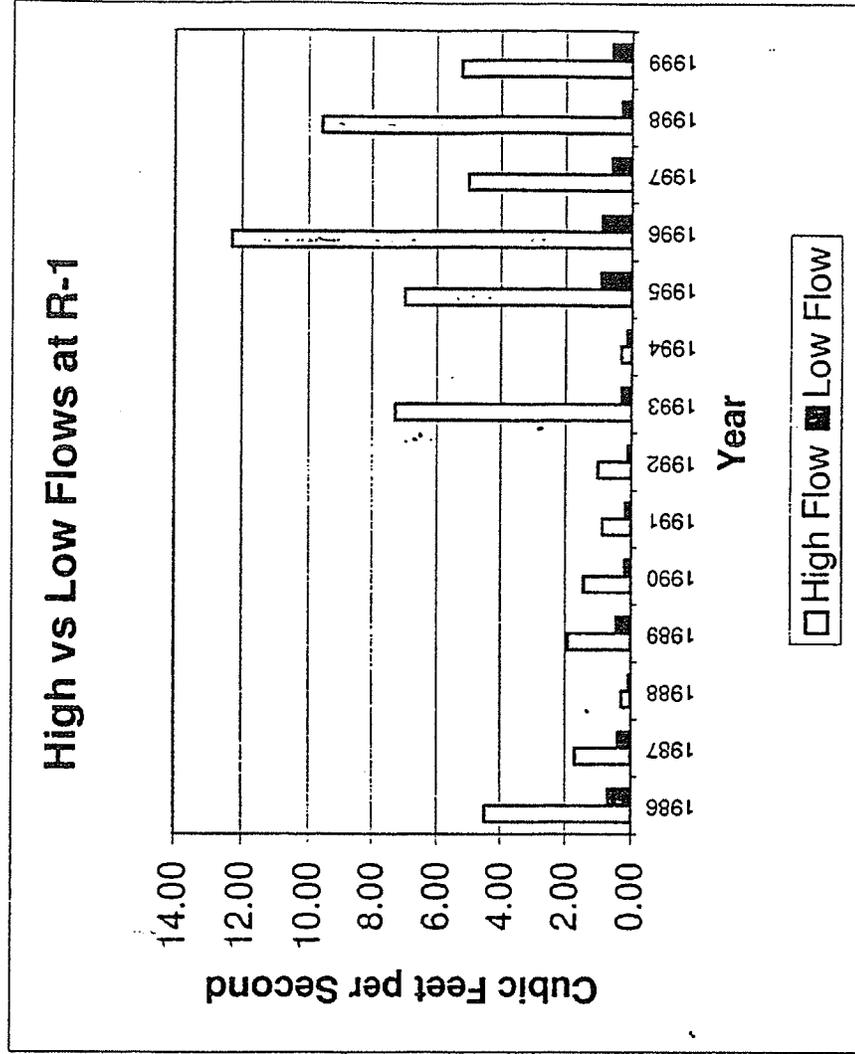
Comparison of high and low flow at competition trials (1-1) for Dohy (test above threshold 197-198)

32

FIGURE 2-4

**COMPARISON OF HIGH AND LOW FLOWS AT R-1
DOLLY CREEK ABOVE TAILINGS
1986-1999**

Year	High Flow (cfs)	Low Flow (cfs)
1986	4.50	0.69
1987	1.70	0.39
1988	0.29	0.06
1989	1.92	0.45
1990	1.44	0.19
1991	0.88	0.18
1992	1.01	0.11
1993	7.28	0.32
1994	0.31	0.14
1995	6.97	0.93
1996	12.30	0.90
1997	5.05	0.60
1998	9.60	0.30
1999	5.24	0.59
Average=	4.18	0.42



APPENDICES

ROD Amendment
Walker Mine Tailings, Plumas National Forest

APPENDICES

West Virginia National Forest
RFD Amendment

Appendix 1

ROD Amendment
Walker Mine Tailings, Plumas National Forest

Appendix A

800-444-4444
Walter Reed Army Institute of Research

**ANALYSIS OF SURFACE WATER QUALITY
AT THE WALKER MINE TAILINGS
USDA FOREST SERVICE, PLUMAS NATIONAL FOREST
BECKWOURTH RANGE DISTRICT**

1986 - 1999

Prepared By: Terry Benoit, Hydrologist and Walker Tailings OSC
Terrie Veliotes, Watershed Engineer
Rachael Tobener, Assistant

Date: January 7, 2000

**ANALYSIS OF SURFACE WATER QUALITY
AT THE WALKER MINE TAILINGS
USDA FOREST SERVICE, PLUMAS NATIONAL FOREST
BECKWOURTH RANGER DISTRICT**

1986 – 1999
January 7, 2000

Findings Summary

Despite recent remediation work, the tailings area continues to release copper, zinc, and iron to Dolly and Little Grizzly Creeks. Although zinc and iron concentrations are below established limitations, copper continues to exceed these limitations most of the time and there's no apparent change in the trend, either up or down. Copper, zinc, and iron continue to be released from the Walker Mine area to Dolly Creek and the tailings area, although the concentrations in Dolly Creek above the tailings are much less than those below the tailings. Before adding more wetland acres to treat the Dolly Creek flow, the flow entering the tailings area from Dolly Creek need to be controlled so that high winter and spring flows are reduced and all the low summer and fall flows can be used to maximize the amount of wetlands achievable. Controlling the flow over the tailings is also needed to reduce the amount of water to be treated and to increase the treatment time in the wetland.

Introduction

The Walker Mine Tailings are located in the central portion of the Plumas National Forest, approximately 20 miles east of Quincy and 20 miles north of Portola in Section 12, T24N, R11E and Sections 7 and 18, T24N, R12E, MDB&M (Map 1). The 100-acre tailings area is at the confluence of Little Grizzly Creek and Dolly Creek. Dolly Creek flows over the tailings area and is the primary transportation source of contaminants to Little Grizzly Creek, which flows along the edge of the tailings.

The Walker Mine, patented land located approximately three-quarters of a mile upstream of the tailings on Dolly Creek, is a non-operational copper mine with a long history of acid rock drainage, heavy metals pollution (primarily copper), and noncompliance with Waste Discharge Requirements (WDRs) established by the California Water Quality Control Board, Central Valley Region (CVRWQCB). Installation of a mine seal in 1987 reduced contaminant levels leaving the mine by over 90% and revealed that the tailings area is the primary source of much of the remaining contamination.

The primary contaminants entering the receiving waters (Dolly Creek and Little Grizzly Creek) from the tailings area include fine sediments and heavy metals (copper, iron, and zinc). Also affected is the water temperature of Dolly Creek as it flows across the exposed tailings area.

The CVRWQCB also established WDRs for the release of contaminants from the tailings area. These requirements establish limitations for copper, iron, zinc, sediments, and other water quality constituents affecting the beneficial uses of the receiving waters. A monitoring and reporting program is an integral part of the WDR, establishing monitoring stations, sampling frequency, water quality constituents and parameters, and reporting requirements. This report displays the results of the analysis, looking back to the start of the monitoring program, 1986, and ending with the most recent data, 1999.

From 1986-1990, sampling and testing was conducted by Forest Service personnel in a uncertified laboratory. The 1991 WDRs required the use of certified laboratories for testing and more stringent reporting units (ug/L instead of mg/L). Since 1991 all water samples have been sent to the Henrici Water Laboratory in Quincy. The Henrici Water Laboratory has used two other water laboratories to test for the metal constituents. In 1991, they used CH2M Hill in Redding and from 1992 through 1999 they used North Coast Laboratories, Ltd, in Arcata.

Treatments identified in the Record of Decision (ROD) for the Remediation of the Walker Mine Tailings were initiated immediately after signing in June 1994 and have included the construction of 4 acres of wetland, rehabilitation of 1300 feet of stream channel, installation of 50 acres of wind fences, and vegetation plantings over 80 acres of the area. Continued vegetation plantings, wetland construction, and stream channel treatments would occur under the existing ROD.

Purpose

The purpose for this analysis is two fold. The analysis helps meet the requirements established in WDR Order No. 91-017 for monitoring and reporting. It also helps meet the requirements established in the 1994 ROD, page 20; "...the Forest Service, in cooperation with the CVRWQCB, will review the remedial action no less often than every five years after initiation of the selected remedial action [(40CFR300.430, paragraph (f)(4)(ii) and (f)(5)(iii)(c)]."

Findings

Tables 1 – 11 display all data collected at each station from 1986 through 1999. The location of the sampling sites is shown on Map 2 and are as follows:

SURFACE WATER MONITORING SITES

Station Identification	Location
R-1	Dolly Creek Above Tailings: Immediately upstream of County Road 112 crossing
R-2	Dolly Creek Below Tailings: Immediately below the Forest Service dam
R-3	Little Grizzly Creek Above Tailings: About 1000 feet below Road 24N60
R-4	Little Grizzly Creek Below Tailings: About 50 feet above confluence with Dolly Creek
R-5	Little Grizzly Creek Below Confluence with Dolly Creek: Immediately above Road 25N42 and the spring discharge from the west bank at Brown's Cabin
R-6	Settling Pond Culvert Outlet: Adjacent to Little Grizzly Creek

Stations R-5 and R-6 were added in 1991. R-5 is the compliance station and is given special analysis. The analysis was conducted for Dolly Creek and Little Grizzly Creek separately and downstream from where the two streams come together as follows:

1. Above and below the tailings on Dolly Creek, R-1 and R-2.
2. Above and below the tailings on Little Grizzly Creek, R-3 and R-4.
3. Below the confluence of Little Grizzly Creek and Dolly Creek, R-5.
4. The settling pond outlet, R-6.

Dolly Creek Above (R-1) and Below (R-2) the Tailings Area

COPPER (Tables 1 and 2; Charts 1 and 2): Copper loading from Walker Mine to Walker Mine Tailings continues to occur, exceeding receiving water limitations most months sampled (R-1 on Charts 1 and 2). The amount of copper released from the tailings at R-2 can be 15 to 20 times greater (includes that coming from Walker Mine). There's no doubt that copper is released from the tailings area to Dolly and Little Grizzly Creeks and

the concentration exceeds the WDRs. It is also obvious that copper continues to be transported to the tailings area from Walker Mine.

There is appearance of a downward trend in copper concentrations from 1991 to 1999 from both the mine site and the tailings area. As will be shown in the analysis of R-5, this appearance is deceiving as is actually directly related to the amount of water flowing in the streams, in other words, there's an apparent relationship between the wetness of the year and the amount of copper released from the sites. The wetter the year, the greater the flows, the less copper found in solution (as an average annual concentration).

Another apparent phenomenon is that the concentrations of copper at R-1 and R-2 are higher during high flow months than low flow months. This is believed to occur because of the increased flow from springs, seeps, and overland flow from the mine site during high flow months and the increased groundwater contribution along Dolly Creek as it flows across the tailings area.

ZINC (Tables 1 and 2; Charts 3 and 4): There appears to be a slight increase in the zinc concentration as Dolly Creek flows across the tailings area, but, except for a single sampling month (November 1995), since 1990, the concentrations are well below the WDR limitations, when testing requirements became more stringent.

The effects of copper on fish and other aquatic organisms increase in the presence of zinc, where the two metals act synergistically. The concentration of copper plus zinc in the tables looks at that bond as an additive arrangement. It should be noted that it's the much higher concentration of copper that predominates (compare the three columns *Copper*, *Zinc*, and *Cu+Zn*).

IRON (Tables 1 and 2; Chart 5): Iron was added to the list of primary water quality constituents after 1990. The concentration at R-1 has always tested well below the limitation of 1.0 mg/L while that at R-2 usually approaches or exceeds the limitation during the low flow months of the year.

SUMMARY: It is apparent that copper, zinc, and iron are released from the tailings to Dolly Creek, then to Little Grizzly Creek, and the concentrations are dependent on flows, both the average seasonal flows (related to the wetness of the year) and the average monthly flows. All three constituents are present in the R-1 samples, indicating contamination sources upstream of the tailings, most likely the mine site. It is also apparent that none of the treatments implemented to date have had an effect on these concentrations.

Little Grizzly Creek Above (R-3) and Below (R-4) the Tailings Area

COPPER and ZINC (Tables 3 and 4; Charts 6 through 9): Prior to 1991, the Forest Service conducted all water testing in an uncertified water-testing laboratory. For this reason, the results can only be looked at for trends and none are apparent. After 1990, several spikes appear in the data. These sampling sites, especially R-3, should be nearly

free of copper and zinc, except what may be occurring naturally. Wind erosion of the tailings area is evident most months of the year, but especially during the dry months. Air-born tailings material has been observed to reach as far as R-3. This may or may not explain some of the spiking observed in the data. No other explanation is apparent at this time.

IRON (Tables 3 and 4; Chart 10): Iron emanates along the base of the dike separating the tailings area from Little Grizzly Creek (Map 2). The average iron concentration at R-3, above the tailings, is 0.19 mg/L and that below the tailings is 0.35 mg/L, an increase of 0.16 mg/L (46%) in 5000 feet of channel. Much of the main channel upstream of R-3 flows through a meadow in which the volcanic parent material is high in iron. Iron precipitates, as flocculants, are readily apparent along the entire length of the dike and stream channel. Samples collected during several years approach the water quality limitation of 1.00 mg/L and only one year actually exceeded the limitation.

Little Grizzly Creek Below the Confluence with Dolly Creek at the Compliance Station, R-5

Since R-5 is the compliance station where the WDR limitations are measured against the contaminant releases, more in-depth analyses were conducted on the three main water quality constituents, copper, zinc, and iron. Station R-5 was added to the monitoring program in 1991. No water quality data was collected at the site prior to that year under this program.

COPPER (Table 5; Chart 11-15): Dolly Creek water mixes with Little Grizzly Creek water prior to reaching the R-5 station. Both water hardness and volume influence the effects and concentration of the copper and zinc constituents. During the high flow months of May and June, the flows at R-2 (Dolly Creek near its confluence with Little Grizzly Creek) are 8-12% of the flow volume at R-4 (Little Grizzly Creek immediately above the confluence with Dolly Creek). Even though the copper concentrations from R-2 are higher these months (Chart 2), the dilution at R-5 is significant; reducing copper concentrations to the lowest levels recorded each year (Chart 12).

During the lowest flow month of September, flows at R-2 can be as low as 4% of R-4 to greater than 100% of R-4. Again, this depends on the wetness of the year, but it also depends on the flow from the many springs in the area of Walker Mine that contributes greatly to the flow in Dolly Creek. Even though copper concentrations in Dolly Creek are the lowest during the low flow months, the copper concentration at R-5 are the highest these months (Charts 2 and 11). Dilution effects are much less this time of year.

Hardness values at R-5 also vary significantly between the high flow months and the low flow months (Chart 13). The lowest flow months show the highest hardness values while the inverse is true for the high flow months. Since water hardness affects metallic pollutants, rendering them less available to cause deleterious effects on aquatic life in harder water, the water quality limitations are higher (less restrictive) in hard water than

in soft water. The following table displays average values of hardness and the adjusted water quality limitations associated with those values:

**Receiving Water Limitations at R-5 Based on Average
Monthly and Annual Hardness Values**

Month	Average Monthly Hardness (mg/L)	Ave Monthly Limit Copper (ug/L)	Ave Monthly Limit Zinc (ug/L)
April	25	2.7	36.5
May	27	2.9	39.0
June	40	4.1	54.4
July	64	6.1	80.9
August	75	7.0	92.6
September	72	6.8	89.4
October	74	6.9	91.5
November	64	6.1	80.9
December	66	6.3	83.1
Average Seasonal	60	5.8	76.6

Average annual copper concentrations were evaluated against flows to determine whether or not the decreasing trend in those concentrations from 1991 to 1999 were independent of flows or not. They are not. Chart 14 displays the two parameters jointly and demonstrates the influence flows at R-5 have on the copper concentrations. During the lower flow years of 1991 through 1994, copper concentrations were relatively high, while during the higher flow years of 1995 through 1999, copper concentrations were relatively low; giving the impression of a decreasing trend in copper contaminations.

The bottom line to date is that copper concentrations at R-5, the compliance station, continue to be greater than the WDR limitations (Chart 15) and there appears to be no change in trends, either up or down.

ZINC (Table 5; Charts 16-18): Zinc by itself has been below the WDR limitations at R-5 each sampling month of each year (Chart 16). The average monthly zinc concentration at R-5 is well below the average monthly limitation value, as demonstrated in Chart 17. In combination with copper (Cu+Zn), the two have been well above the copper limitations almost all months of each sampling year (Chart 18). Because of the synergism between copper and zinc, zinc will remain a problem.

IRON (Table 5; Chart 19 and 20): Iron has not exceeded the water quality limitation (1.0 mg/L) in any month in any year. Chart 19 shows no obvious monthly trends in iron concentrations, but does show that, generally, there's no change through the years. A monthly trend is obvious when we look at average monthly values (Chart 20). Again, during the high flow months, iron concentrations are lower than during low flow months.

Settling Pond Outlet at Little Grizzly Creek (Map 2)

Three samples have been analyzed in the 9 years since R-6 was added to the monitoring program (Table 6). Of those three years, the culvert was discharging to Little Grizzly Creek only once. The other two years showed evidence of recent discharge, but were not discharging at the time of sampling, so samples were taken from the pond and not the culvert outlet. No discharge occurs during low flow months and dry years.

Copper concentrations exceed receiving water limitations in all three samples, while zinc and iron did not. This does provide evidence that these metals are being released from the main body of the tailings, even though the pH is near 7 through the area. This is not the same where Dolly Creek flows across the tailings. Low pH areas can be found along the length of the channel with copper oxides and iron precipitates forming during the summer months.

Annual Testing for a Large Array of Constituents at the Receiving Water Stations

A larger list of water quality constituents, including additional heavy metals, was tested for from each year's first set of samples and for each sampling station (Tables 7-12). The tests were for indicator parameters and metal constituents. All metal constituents were non-detectable (ND), at concentrations below the detection limits of the equipment used, or at very low levels.

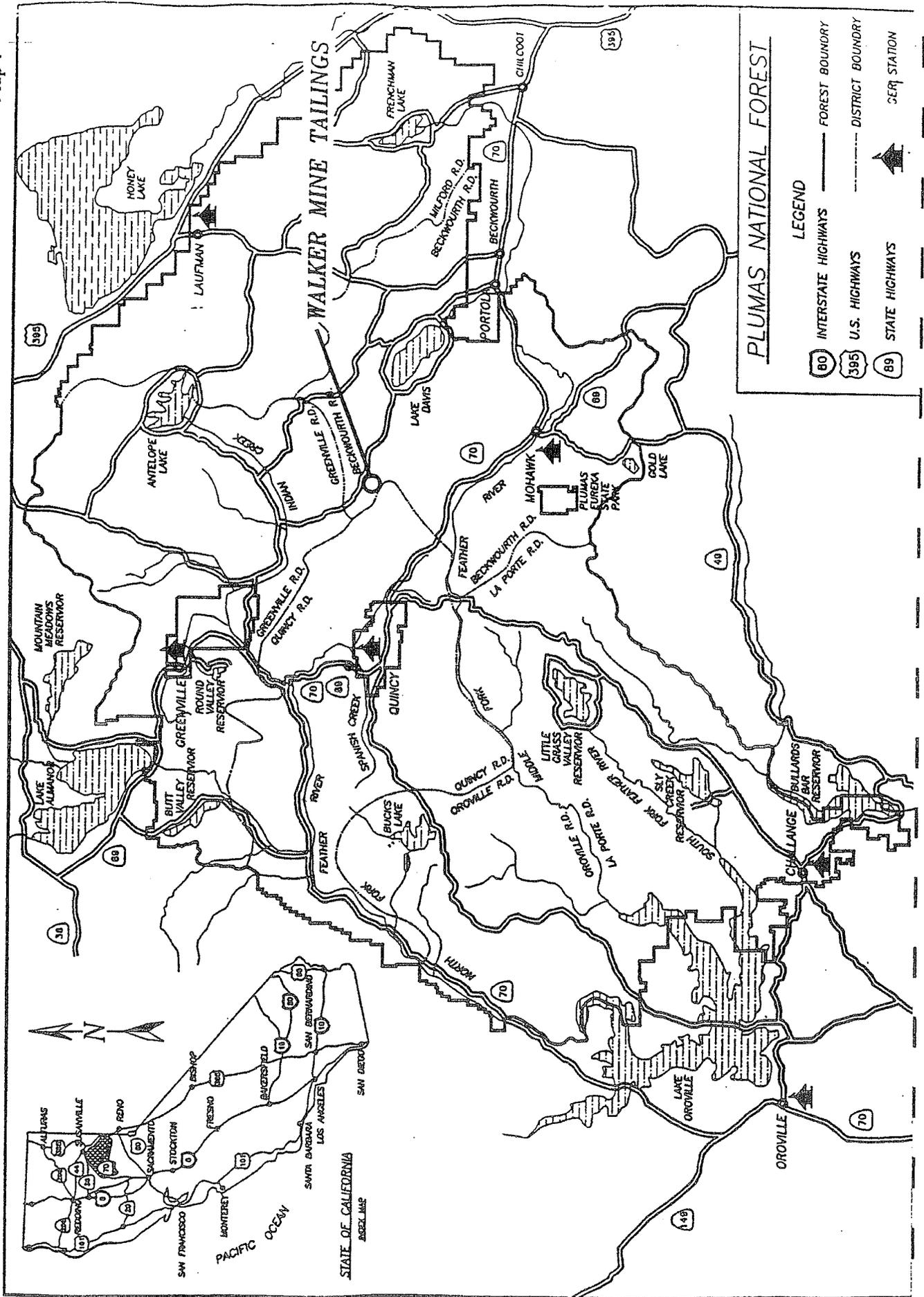
Critical Observations

Soon after construction of the first phase wetland area and the upper stream channel relocation and rehabilitation work in 1994, the site experienced a series of wetter than average years (1995-1999). The results destabilized portions of the gully banks, moved sections of the relocated channel back against those gully banks, and eroded much of the work area, washing the material into the stream and transporting it downstream into the newly constructed wetland. The wetland aggraded and changed from the needed anaerobic type with no definable channel to an aerobic type with several, definable channels.

It became apparent that the primary treatment system, an anaerobic wetland, would need its water input controlled to reduce erosion of the upper section of the Dolly Creek channel flowing across the tailings area, to reduce the aggradation of future wetland areas, and to increase residence time (treatment time) during the high flow months. To maintain maximum wetland size, all flows are needed during the low flow months.

MAPS

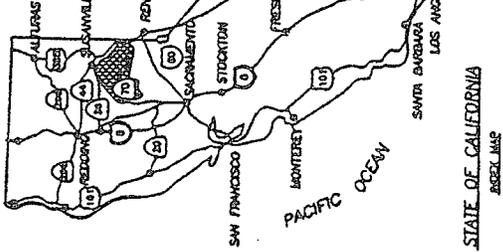
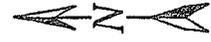
Map 1



PLUMAS NATIONAL FOREST

LEGEND

- 60 INTERSTATE HIGHWAYS
- 395 U.S. HIGHWAYS
- 89 STATE HIGHWAYS
- Solid line FOREST BOUNDARY
- Dashed line DISTRICT BOUNDARY
- Search station symbol SEARCH STATION



TABLES

Table 1

R-1 WATER QUALITY DATA
DOLLY CREEK ABOVE WALKER MINE TAILINGS
1986-1999

Date	Discharge cfs	Discharge cms	EC umhos/cm	pH	Disolved Solids mg/L	Suspended Solids mg/L	Settleable Solids mL/Jhr	Turbidity NTU	Copper mg/L	Zinc mg/L	sum cu+zn mg/L	Iron mg/L	Air Temp Celsius	Water Temp Celsius	Hardness (CaCO3) mg/L	Alkalinity (CaCO3) mg/L	Acidity to pH 0.3= (CaCO3) mg/L
Jun 86	4.50	0.127	260	7.2	-	19.60	<0.1	8.90	-	-	0.0000	-	21	15	-	-	-
Jul 86	1.87	0.053	240	7.3	-	10.60	<0.1	8.80	-	-	0.7100	-	19	10	-	-	-
Aug 86	1.89	0.054	260	6.9	-	10.00	<0.1	5.67	0.3600	0.3500	0.0000	-	13	10	-	-	-
Sep 86	1.97	0.056	250	8.8	-	7.00	<0.1	6.90	0.4800	0.2000	0.6800	-	6	5	-	-	-
Oct 86	0.69	0.020	210	8.3	-	1.20	<0.1	1.45	3.5000	0.0200	0.1700	-	11	7	-	-	-
May 87	1.70	0.048	320	6.9	-	30.60	<0.1	19.90	1.2100	0.1800	3.6200	-	26	15	-	-	-
Jun 87	0.72	0.020	250	6.5	-	26.80	-	-	1.0500	0.0600	1.3900	-	22	9	-	-	-
Jul 87	0.50	0.014	260	7.5	-	16.80	<0.1	18.80	0.5200	1.0600	2.1100	-	18	14	-	-	-
Aug 87	0.40	0.011	160	8.0	-	3.20	<0.1	6.10	0.2500	0.2500	0.7700	-	30	17	-	-	-
Sep 87	0.39	0.011	130	7.9	-	3.00	<0.1	8.00	0.2300	0.1000	0.3300	-	23	13	-	-	-
Oct 87	0.46	0.013	110	7.5	-	33.80	<0.1	7.50	0.2300	0.1800	0.4100	-	22	7	-	-	-
May 88	0.29	0.008	140	7.4	-	3.60	<0.1	3.00	0.0500	0.0600	0.1100	-	19	11	-	-	-
Jun 88	0.14	0.004	150	7.4	-	8.00	<0.1	1.70	0.0400	0.0700	0.1100	-	16	12	-	-	-
Jul 88	0.14	0.004	190	8.4	-	2.33	<0.1	1.80	0.0900	0.2800	0.3700	-	26	21	-	-	-
Aug 88	0.10	0.003	150	7.0	-	1.20	<0.1	1.20	0.0800	0.5000	0.5600	-	20	10	-	-	-
Sep 88	0.08	0.002	150	7.8	-	7.60	<0.1	1.60	0.1100	0.2600	0.3100	0.600	19	10	-	-	-
Oct 88	0.21	0.006	170	7.4	-	0.80	<0.1	-	0.1900	0.1800	0.3700	-	24	9	-	-	-
May 89	1.92	0.054	100	7.6	-	0.80	<0.1	-	0.1700	0.1100	0.2800	-	18	13	-	-	-
Jun 89	1.05	0.030	110	7.0	-	0.80	<0.1	-	0.0800	0.0900	0.1500	-	11	10	-	-	-
Jul 89	0.45	0.013	90	7.0	-	0.40	<0.1	-	0.0500	0.1300	0.1800	-	19	9	-	-	-
Aug 89	0.59	0.017	140	7.2	-	<0.1	<0.1	-	<0.05	0.2300	0.2300	-	20	11	-	-	-
Sep 89	0.98	0.028	170	8.3	-	0.80	<0.1	-	0.3100	<0.05	0.3100	-	10	3	-	-	-
Oct 89	0.31	0.026	130	7.1	-	2.00	<0.1	-	0.2500	0.2100	0.4600	-	5	5	-	-	-
May 90	1.44	0.041	85	5.8	-	8.10	0.10	-	0.2500	0.2100	0.4600	-	20	14	-	-	-
Jun 90	0.44	0.012	130	7.1	-	24.40	<0.01	-	0.2500	0.8000	1.5000	-	20	10	-	-	-
Jul 90	0.72	0.020	142	7.5	-	2.40	<0.01	-	<0.05	0.1500	0.1500	-	18	8	-	-	-
Aug 90	0.32	0.009	130	7.8	-	1.60	<0.01	-	<0.05	0.2700	0.2700	-	23	11	-	-	-
Sep 90	0.35	0.010	100	7.4	-	2.40	<0.01	-	<0.05	0.2200	0.2200	-	23	11	-	-	-
Oct 90	0.19	0.005	160	6.7	-	2.40	<0.01	-	<0.05	0.2200	0.2200	-	14	7	-	-	-
May 91	0.88	0.025	130	7.5	87.00	0.40	<0.1	0.80	0.1100	0.0130	0.1230	0.263	19	16	54	46	1
Jun 91	0.63	0.018	200	7.9	-	0.80	<0.1	-	0.0810	0.0110	0.0920	0.306	12	8	53	51	8
Jul 91	0.52	0.015	140	7.5	-	2.00	<0.1	-	0.0440	0.0090	0.0530	0.383	22	14	72	55	1
Aug 91	0.32	0.009	175	7.8	-	4.60	<0.1	-	0.0320	0.0100	0.0420	0.348	27	15	42	65	0.8
Sep 91	0.60	0.017	130	7.9	-	3.60	<0.1	-	0.0230	0.0220	0.0450	0.320	24	9	36	81	2
Oct 91	0.18	0.005	125	7.9	-	2.00	<0.1	-	0.0350	0.0250	0.0600	0.280	18	7	63	71	2
Nov 91	0.20	0.006	110	7.9	-	10.80	<0.1	-	0.0380	0.0240	0.0620	0.280	8	1	54	54	2
Dec 91	0.27	0.008	150	7.5	-	1.40	<0.1	-	0.1100	0.0150	0.1250	0.290	9	5	49	52	1
Jan 92	1.01	0.029	80	8.0	-	4.80	<0.1	0.50	0.0340	0.0120	0.0460	0.330	4	1	59	84	5
Feb 92	0.18	0.005	120	8.0	89.00	2.80	<0.1	-	0.0350	0.0040	0.0390	0.330	20	9	67	84	1
Mar 92	0.14	0.004	80	8.2	-	5.20	<0.1	-	0.0330	0.0060	0.0390	0.330	21	18	70	71	1
Apr 92	0.14	0.004	80	8.0	-	4.40	<0.1	-	0.0260	0.0120	0.0360	0.330	24	14	72	80	3
May 92	0.14	0.004	100	8.2	-	1.20	<0.1	-	0.0240	0.0280	0.0520	0.280	23	15	70	75	4
Jun 92	0.11	0.003	130	8.1	-	2.80	<0.1	-	0.0370	0.0120	0.0490	0.340	19	10	72	81	4
Jul 92	0.13	0.004	150	7.9	-	6.00	<0.1	-	0.0250	0.0140	0.0390	0.340	15	8	65	70	2
Aug 92	0.11	0.003	180	7.8	-	1.20	<0.1	-	0.1100	0.0080	0.1180	0.290	4	1	61	63	0.5
Sep 92	0.13	0.004	180	7.8	42.00	9.20	<0.1	0.10	0.0700	0.0140	0.0390	0.290	4	1	61	32	1
Oct 92	0.11	0.003	60	7.8	-	19.20	<0.1	-	0.0700	0.0140	0.0840	0.081	12	9	25	37	1
Nov 92	0.11	0.003	40	7.8	-	6.00	<0.1	-	0.0470	0.0063	0.0533	0.130	12	14	35	21	5
Dec 92	3.99	0.113	85	8.2	-	5.00	<0.1	-	0.0270	0.0025	0.0295	0.150	15	9	58	22	2
Jan 93	1.31	0.037	110	8.0	-	2.00	<0.1	-	0.0210	0.0058	0.0268	0.160	17	8	61	11	2
Feb 93	1.82	0.052	110	8.0	-	8.00	<0.1	-	0.0230	0.0068	0.0298	0.240	13	5	62	9	2
Mar 93	0.73	0.014	100	8.3	-	5.00	<0.1	-	0.0160	0.0068	0.0268	0.160	13	5	62	9	2
Apr 93	0.51	0.014	120	8.0	-	8.00	<0.1	-	0.0160	0.0068	0.0268	0.160	13	5	62	9	2
May 93	0.32	0.009	100	8.0	-	5.00	<0.1	-	0.0160	0.0068	0.0268	0.160	13	5	62	9	2

R-1 WATER QUALITY DATA
DOLLY CREEK ABOVE WALKER MINE TAILINGS (cont'd)
1986-1999

Table 1

Date	Discharge cfs	Discharge cms	EC umhos/cm	pH	Dissolved Solids mg/L	Suspended Solids mg/L	Settleable Solids ml/L/hr	Turbidity NTU	Copper mg/L	Zinc mg/L	sum Cu+Zn mg/L	Iron mg/L	Air Temp Celsius	Water Temp Celsius	Hardness (CaCO3) mg/L	Alkalinity (CaCO3) mg/L	Acidity to pH 8.3= (CaCO3) mg/L
May 94	0.31	0.009	120	8.2	104.00	1.60	<0.1	0.80	0.0740	0.0330	0.1070	0.320	7	50	70	6	
Jun 94	0.21	0.006	120	7.7	-	0.80	<0.1	-	0.0280	0.0077	0.0367	0.310	14	65	65	6	
Jul 94	0.14	0.004	70	7.8	-	10.00	<0.1	-	0.0290	ND	0.0290	0.450	20	61	71	5	
Aug 94	0.16	0.005	110	8.4	-	12.00	<0.1	-	0.0190	ND	0.0190	0.300	10	69	59	3	
Sep 94	0.14	0.004	120	8.2	-	13.00	<0.1	-	0.0210	ND	0.0210	0.350	13	69	72	5	
Oct 94	0.14	0.004	130	7.4	-	0.80	<0.1	-	0.0130	ND	0.0130	0.310	5	66	63	4	
Jun 95	6.97	0.197	90	8.2	37.00	0.80	<0.1	1.00	0.0660	ND	0.0660	0.230	12	25	34	5	
Jul 95	2.48	0.070	50	8.2	-	1.20	<0.1	-	0.0550	ND	0.0550	0.230	13	46	51	5	
Aug 95	1.21	0.034	120	8.2	-	2.80	<0.1	-	0.0350	0.0022	0.0372	0.180	14	56	51	3	
Sep 95	1.05	0.030	120	8.3	-	2.40	<0.1	-	0.0420	ND	0.0420	0.270	8	56	51	3	
Oct 95	0.93	0.026	130	8.1	-	6.00	<0.1	-	0.0380	0.0120	0.0500	0.330	11	58	62	3	
Nov 95	1.26	0.036	150	6.6	-	15.60	<0.1	-	0.0800	0.0430	0.1230	0.180	4	60	67	3	
May 96	12.30	0.348	50	7.7	33.00	4.60	<0.1	2.00	0.0650	0.0072	0.0722	0.120	3	62	69	3	
Jun 96	2.40	0.068	90	8.0	-	2.00	<0.1	-	0.0460	0.0057	0.0517	0.190	10	25	30	4	
Jul 96	1.10	0.031	110	7.1	-	1.40	<0.1	-	0.0170	0.0110	0.0280	0.190	15	45	42	4	
Aug 96	0.90	0.025	110	8.3	-	2.50	<0.1	-	0.0140	0.0140	0.0280	0.250	11	66	51	6	
Sep 96	0.80	0.025	80	8.2	-	1.20	<0.1	-	0.0140	0.0070	0.0210	0.280	10	61	58	6	
May 97	5.05	0.143	50	7.9	43.00	3.40	<0.1	1.00	0.0020	0.0100	0.0120	0.130	8	65	62	8	
Jun 97	1.34	0.038	110	7.8	-	2.60	<0.1	-	0.0190	0.0055	0.0245	0.200	12	32	48	2	
Jul 97	1.24	0.035	100	8.2	-	1.20	<0.1	-	0.0110	ND	0.0110	0.220	15	95	55	3	
Aug 97	0.80	0.023	110	7.5	-	2.40	<0.1	-	0.0130	ND	0.0130	0.320	23	112	63	3	
Sep 97	0.66	0.019	120	8.2	-	2.00	<0.1	-	0.0130	ND	0.0130	0.310	12	57	66	4	
Oct 97	0.60	0.017	120	8.1	-	1.20	<0.1	-	0.0230	0.0071	0.0301	0.230	10	60	62	6	
June 98	9.60	0.272	60	8.6	54.00	2.40	<0.1	0.20	0.0500	0.0200	0.0700	0.100	6	60	69	6	
July 98	1.80	0.051	120	8.3	-	3.20	<0.1	-	0.0150	0.0059	0.0209	0.150	12	27	45	6	
Aug 98	2.40	0.068	150	8.2	-	4.40	<0.1	-	0.0099	0.0098	0.0197	0.180	13	48	50	11	
Sep 98	1.00	0.028	176	8.2	-	4.00	<0.1	-	0.0110	ND	0.0110	0.210	9	47	71	13	
Oct 98	0.30	0.008	160	8.5	-	4.20	<0.1	-	0.0460	ND	0.0460	0.250	9	57	79	11	
June 99	5.24	0.148	90	7.8	63.00	4.40	<0.1	1.00	0.0160	0.0056	0.0216	0.100	5	59	78	13	
July 99	1.30	0.037	123	8.0	-	10.80	<0.1	-	0.0140	ND	0.0140	0.170	21	31	51	10	
Aug 99	0.81	0.023	146	8.0	-	20.00	<0.1	-	0.0160	ND	0.0160	0.240	13	51	54	12	
Sept 99	0.78	0.022	140	8.0	-	14.40	<0.1	-	0.0170	0.0070	0.0240	0.290	10	73	72	19	
Oct 99	0.59	0.017	154	8.0	-	3.40	<0.1	-	0.0210	ND	0.0210	0.300	13	65	84	14	
x	1.30	0.037	130	7.66	61.33	5.70	0.00	4.52	0.138	0.082	0.222	0.245	21	65	72	14	
n	87	87.000	87	86	8	88	88	24	88	85	86	59	9.91	55.07	54.68	4.99	
s	2.04	0.058	55	0.98	24.51	6.90	0.01	5.33	0.410	0.166	0.497	0.110	87	58	59	56	
max	12.30	0.348	320	8.55	104.00	33.80	0.10	18.80	3.500	1.060	3.620	0.600	4.28	18.66	22.24	4.12	
min	0.00	0.000	0	0.00	33.00	0.00	0.00	0.10	0.000	0.000	0.000	0.000	21.00	112.00	84.00	19.00	

Table 2
R-2 WATER QUALITY DATA
DOLLY CREEK BELOW WALKER MINE TAILINGS
1986 - 1999

Date	Discharge cfs	Discharge cms	EC umhos/cm	pH	Dissolved Solids mg/L	Suspended Solids mg/L	Settleable Solids mL/Lhr	Turbidity NTU	Copper mg/L	Zinc mg/L	sum cst* mg/L	Iron mg/L	Air Temp Celcius	Water Temp Celcius	Hardness (CaCO3) mg/L	Alkalinity (CaCO3) mg/L	Acidity to pH 8.3= (CaCO3) mg/L
Jun 86	3.90	0.11	255	7.80	26.60	<0.1	12.00	-	-	-	0.000	-	22	19	-	-	-
Jul 86	1.74	0.05	260	8.10	18.00	<0.1	5.50	-	-	-	0.000	-	21	20	-	-	-
Aug 86	1.72	0.05	280	7.50	11.20	<0.1	3.56	-	0.410	0.270	0.680	-	15	10	-	-	-
Sep 86	1.48	0.04	270	6.80	11.20	<0.1	6.50	-	0.360	0.200	0.580	-	7	7	-	-	-
Oct 86	0.79	0.02	220	7.70	1.60	<0.1	1.70	-	0.410	0.080	0.490	-	8	8	-	-	-
May 87	1.70	0.05	290	6.80	43.40	<0.1	23.30	-	2.500	0.140	2.640	-	24	24	-	-	-
Jun 87	0.82	0.02	270	7.20	36.00	<0.1	-	-	0.340	0.200	0.540	-	22	20	-	-	-
Jul 87	0.40	0.01	275	7.70	18.80	<0.1	20.30	-	0.730	0.060	0.790	-	24	27	-	-	-
Aug 87	0.30	0.01	220	8.00	21.80	<0.1	7.80	-	0.230	0.130	0.360	-	22	22	-	-	-
Sep 87	0.12	0.00	180	8.20	8.40	<0.1	10.60	-	0.390	0.100	0.490	-	25	21	-	-	-
Oct 87	0.48	0.01	120	8.10	37.80	<0.1	12.50	-	0.390	0.120	0.510	-	19	12	-	-	-
May 88	0.47	0.01	240	8.10	6.70	<0.1	6.70	-	0.800	0.080	0.880	-	25	26	-	-	-
Jun 88	0.31	0.01	210	7.80	0.00	<0.1	4.80	-	0.450	0.060	0.510	-	11	21	-	-	-
Jul 88	0.01	0.00	260	8.80	<0.10	<0.1	1.30	-	0.160	0.220	0.380	-	24	24	-	-	-
Aug 88	0.04	0.00	200	7.90	2.80	<0.1	2.50	-	0.500	0.180	0.680	0.860	18	11	-	-	-
Sep 88	0.06	0.00	185	7.90	26.40	<0.1	8.90	-	0.500	0.300	0.850	-	23	16	-	-	-
Oct 88	0.02	0.00	220	8.40	0.80	<0.1	-	-	0.390	0.180	0.570	-	22	20	-	-	-
May 89	1.94	0.05	170	7.80	6.00	<0.1	-	-	0.890	0.130	1.020	-	13	16	-	-	-
Jun 89	1.03	0.03	160	7.90	6.00	<0.1	-	-	0.620	0.070	0.690	-	22	22	-	-	-
Jul 89	0.31	0.01	140	8.30	2.00	<0.1	-	-	0.470	0.150	0.620	-	21	21	-	-	-
Aug 89	0.46	0.01	200	8.20	2.00	<0.1	-	-	0.340	0.240	0.580	-	19	23	-	-	-
Sep 89	0.67	0.02	250	8.80	14.40	<0.1	-	-	0.70	0.070	0.770	-	6	0	-	-	-
Oct 89	1.39	0.04	110	8.00	27.20	<0.1	-	-	0.650	0.090	0.740	-	5	5	-	-	-
May 90	3.22	0.09	70	6.90	14.00	<0.1	-	-	0.260	0.160	0.420	-	21	26	-	-	-
Jun 90	0.30	0.01	220	8.40	0.40	<0.1	-	-	0.520	0.090	0.610	-	26	30	-	-	-
Aug 90	0.39	0.01	161	8.10	1.60	<0.1	-	-	0.500	0.160	0.660	-	15	18	-	-	-
Sep 90	0.17	0.00	180	8.68	2.80	<0.1	-	-	0.460	0.300	0.760	-	16	12	-	-	-
Oct 90	0.20	0.01	170	7.96	2.80	<0.1	-	-	0.310	0.170	0.480	-	14	7	-	-	-
Oct 90	0.15	0.00	200	6.21	1.80	<0.1	1.00	-	0.572	0.025	0.597	0.705	17	21	-	-	8
May 91	1.28	0.04	210	7.85	0.40	<0.1	-	-	0.310	0.023	0.333	0.251	8	13	-	-	9
Jun 91	0.61	0.02	260	8.01	2.40	<0.1	-	-	0.256	0.018	0.274	0.544	24	25	-	-	1
Jul 91	0.31	0.01	230	8.17	1.60	<0.1	-	-	0.388	0.019	0.407	0.534	8	72	-	-	1
Aug 91	0.17	0.00	130	7.98	3.20	<0.1	-	-	0.362	0.018	0.380	0.739	24	39	-	-	3
Sep 91	0.28	0.01	130	7.77	1.80	<0.1	-	-	0.321	0.033	0.354	0.845	3	12	-	-	1
Oct 91	0.15	0.00	140	7.95	23.00	<0.1	-	-	0.207	0.042	0.249	0.628	3	62	-	-	1
Nov 91	0.40	0.01	170	7.77	10.00	<0.1	-	-	0.320	0.020	0.340	0.420	0	52	-	-	1
Dec 91	0.14	0.00	110	7.40	11.20	<0.1	3.00	-	0.250	0.015	0.265	0.550	12	14	-	-	1
Apr 92	0.85	0.02	150	8.20	9.20	<0.1	-	-	0.300	0.013	0.313	0.560	19	18	-	-	1
May 92	0.12	0.00	120	8.30	3.20	<0.1	-	-	0.360	0.013	0.360	0.700	24	24	-	-	1
Jun 92	0.35	0.01	100	8.40	2.20	<0.1	-	-	0.140	0.019	0.159	0.230	28	23	-	-	1
Jul 92	0.08	0.00	170	8.50	2.40	<0.1	-	-	0.240	0.034	0.274	0.400	19	14	-	-	1
Aug 92	0.00	0.00	150	8.70	0.80	<0.1	-	-	0.180	0.025	0.195	0.630	17	11	-	-	0.5
Sep 92	0.02	0.00	170	8.30	2.40	<0.1	-	-	0.180	0.019	0.195	0.630	9	4	-	-	4.5
Oct 92	0.10	0.00	200	8.80	33.60	<0.1	0.25	-	0.370	0.024	0.394	0.590	10	14	-	-	2
Nov 92	0.13	0.00	80	7.80	84.00	<0.1	-	-	0.390	0.030	0.414	0.670	20	18	-	-	5
May 93	7.28	0.11	60	8.00	17.60	<0.1	-	-	0.450	0.017	0.460	1.200	18	21	-	-	2
Jun 93	3.98	0.11	125	8.30	4.00	<0.1	-	-	0.340	0.200	0.357	0.920	16	16	-	-	1
Aug 93	0.95	0.03	130	8.20	30.00	<0.1	-	-	0.230	0.013	0.243	0.700	4	20	-	-	3
Sep 93	0.57	0.02	130	8.60	3.00	<0.1	-	-	0.140	0.017	0.157	0.660	6	3	-	-	2
Oct 93	0.67	0.02	130	8.40	12.00	<0.1	3.50	-	0.500	0.027	0.527	0.900	5	8	-	-	1
Nov 93	0.43	0.01	100	8.10	2.60	<0.1	-	-	0.246	0.008	0.246	0.260	27	29	-	-	2
May 94	0.72	0.00	130	8.20	5.60	<0.1	-	-	0.210	ND	0.210	1.400	27	22	-	-	3
Jun 94	-	0.00	160	8.00	7.00	<0.1	-	-	0.090	ND	0.090	0.810	29	21	-	-	3
Jul 94	-	0.00	80	7.80	6.00	<0.1	-	-	0.088	ND	0.088	1.600	27	22	-	-	4
Aug 94	0.06	0.00	110	8.50	15.00	<0.1	-	-	0.057	ND	0.057	1.000	27	22	-	-	4
Sep 94	0.01	0.00	160	8.70	2.00	<0.1	-	-	-	-	-	-	20	9	-	-	2
Oct 94	0.14	0.00	140	7.50	2.00	<0.1	-	-	-	-	-	-	9	9	-	-	2

R-2 WATER QUALITY DATA
DOLLY CREEK BELOW WALKER MINE TAILINGS (cont')
1986 - 1999

Table 2

Date	Discharge cfs	Discharge cms	EC umhos/cm	pH	Dissolved Solids mg/L	Suspended Solids mg/L	Settleable Solids ml/l/hr	Turbidity NTU	Copper mg/L	Zinc mg/L	sum cu-in mg/L	Iron mg/L	Air Temp Celsius	Water Temp Celsius	Hardness (CaCO3) mg/L	Alkalinity (CaCO3) mg/L	Acidity to pH 8.3= (CaCO3) mg/L
Jun 95	8.22	0.23	60	8.00	40.00	25.60	<0.1	5.00	0.190	ND	0.190	0.420	30	22	25	31	5
Jul 95	2.38	0.07	100	8.40	-	14.60	<0.1	-	0.220	0.008	0.225	0.850	25	25	48	46	4
Aug 95	1.33	0.04	140	8.30	-	6.00	<0.1	-	0.170	0.008	0.178	1.000	20	17	57	65	1
Sep 95	2.01	0.06	120	8.90	-	2.40	<0.1	-	0.100	ND	0.100	0.700	15	18	58	63	3
Oct 95	1.03	0.03	130	8.20	-	283.00	<0.1	-	0.330	0.022	0.352	3.700	18	10	62	64	4
Nov 95	1.28	0.04	120	7.60	-	6.40	<0.1	-	0.081	0.130	0.221	0.540	6	7	63	67	4
May 96	15.60	0.44	60	7.60	42.00	44.80	<0.1	4.50	0.150	0.008	0.156	0.350	8	13	25	33	3
June 96	2.80	0.08	110	8.00	-	4.60	<0.1	-	0.330	0.015	0.345	1.100	19	19	45	35	5
July 96	1.30	0.04	140	8.20	-	1.80	<0.1	-	0.180	0.015	0.195	0.720	24	24	61	42	5
Aug 96	1.10	0.03	22	8.50	-	0.80	<0.1	-	0.120	0.013	0.133	0.730	22	22	61	46	6
Sep 96	1.00	0.03	80	8.40	-	1.60	<0.1	-	0.066	0.008	0.074	0.640	20	19	62	60	6
May 97	5.69	0.18	70	7.90	47.00	8.00	<0.1	0.85	0.092	0.007	0.099	0.280	20	23	32	60	2
June 97	2.19	0.06	110	7.80	-	2.80	<0.1	-	0.095	ND	0.095	0.500	26	26	94	65	2
July 97	1.18	0.03	140	8.20	-	2.40	<0.1	-	0.082	ND	0.082	0.530	25	26	112	65	4
Aug 97	0.89	0.03	130	8.00	-	0.80	<0.1	-	0.073	0.016	0.089	0.680	19	21	56	72	5
Sep 97	0.86	0.02	150	8.40	-	1.60	<0.1	-	0.060	ND	0.060	0.650	17	13	57	61	5
Oct 97	0.70	0.29	150	7.68	-	1.60	<0.01	-	0.042	ND	0.042	0.490	14	13	59	63	5
June 98	10.20	0.29	80	8.49	51.00	9.20	<0.1	0.15	0.150	0.011	0.161	0.290	10	15	24	43	10
July 98	2.00	0.08	130	8.08	-	4.80	<0.1	-	0.180	0.011	0.191	0.180	21	20	49	50	13
Aug 98	1.20	0.03	160	8.24	-	3.20	<0.1	-	0.140	0.010	0.150	0.630	23	22	49	70	15
Sep 98	0.90	0.03	158	8.70	-	1.60	<0.1	-	0.080	ND	0.080	0.570	12	12	58	69	18
Oct 98	0.40	0.01	168	8.44	-	2.80	<0.1	-	0.097	ND	0.097	0.730	5	10	62	72	17
June 99	5.74	0.16	92	7.79	65.00	8.00	<0.1	1.00	0.017	0.008	0.025	0.380	15	15	32	73	15
July 99	1.13	0.03	132	7.98	-	0.80	<0.1	-	0.180	0.008	0.188	0.710	22	22	50	83	16
Aug 99	0.91	0.03	144	8.46	-	<1	<0.1	-	0.120	ND	0.120	0.750	25	22	77	75	14
Sep 99	0.72	0.02	151	8.35	-	<1	<0.1	-	0.071	0.008	0.079	0.730	21	20	64	76	18
Oct 99	0.64	0.02	162	8.25	-	2.40	<0.1	-	0.057	ND	0.057	0.730	19	11	63	73	17
x	1.37	0.04	154	7.96	63.22	12.48	0.00	6.14	0.298	0.058	0.352	0.703	17.76	16.66	56.62	54.34	5.12
n	87	87	87	86	9	88	88	24	85	88	86	59	87	87	58	59	56
8	2.36	0.07	64	0.98	25.97	31.88	0.00	5.91	0.303	0.076	0.340	0.480	7.35	7.40	20.21	22.66	5.20
max	15.60	0.44	280	8.80	122.00	283.00	0.00	23.30	2.500	0.300	2.640	3.700	30.00	30.00	112.00	86.00	18.00
min	0.00	0.00	0	0.00	40.00	0.00	0.00	0.15	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00

LITTLE GRIZZLY CREEK UPSTREAM OF WALKER MINE TAILINGS
1986 - 1999
R-3 WATER QUALITY DATA
Table 3

Date	Discharge cfs	Discharge cms	EC umhos/cm	pH	Dissolved Solids mg/L	Suspended Solids mg/L	Settleable Solids mL/hr	Turbidity NTU	Copper mg/L	Zinc mg/L	sum cuzn mg/L	Iron mg/L	Air Temp Celsius	Water Temp Celsius	Hardness (CaCO3) mg/L	Alkalinity (CaCO3) mg/L	Acidity to pH 8.3= (CaCO3) mg/L
Jun 86	4.70	0.133	142	7.70	-	1.40	<0.1	1.1	-	-	0.0000	-	23	12	-	-	-
Jul 86	0.80	0.023	180	7.90	-	1.40	<0.1	1.4	-	-	0.0000	-	20	17	-	-	-
Aug 86	0.36	0.010	200	7.80	-	0.80	<0.1	0.7	0.0500	0.1300	0.1800	-	15	12	-	-	-
Sep 86	1.63	0.048	170	7.10	-	0.40	<0.1	1.8	0.0100	0.0800	0.0900	-	7	6	-	-	-
Oct 86	0.92	0.026	162	7.40	-	0.80	<0.1	0.7	0.0200	0.0600	0.0800	-	11	6	-	-	-
May 87	7.30	0.207	100	7.60	-	-	<0.1	1.5	0.2800	0.0200	0.3000	-	26	16	-	-	-
Jun 87	1.57	0.044	145	7.30	-	0.40	-	-	0.0400	0.0500	0.0800	-	22	16	-	-	-
Jul 87	0.20	0.006	185	7.80	-	3.40	<0.1	3.7	0.0100	0.0300	0.0400	-	29	24	-	-	-
Aug 87	0.20	0.006	120	7.80	-	1.60	<0.1	2.4	0.0200	0.1200	0.1400	-	30	22	-	-	-
Sep 87	0.20	0.006	100	7.60	-	2.80	<0.1	2.0	0.0000	0.0800	0.0800	-	23	15	-	-	-
Oct 87	0.29	0.008	80	7.70	-	24.20	<0.1	8.0	0.0100	0.1000	0.1100	-	22	8	-	-	-
May 88	2.57	0.073	65	7.20	-	0.04	<0.1	1.1	0.0100	0.0900	0.1000	-	19	11	-	-	-
Jun 88	1.21	0.034	100	7.20	-	1.00	<0.1	1.1	0.0200	0.0800	0.1000	-	16	15	-	-	-
Jul 88	0.06	0.002	160	7.60	-	2.67	<0.1	3.5	0.0300	0.2600	0.2900	-	24	24	-	-	-
Aug 88	0.09	0.003	140	7.70	-	4.40	<0.1	1.9	0.0100	0.1200	0.1300	0.2500	23	21	-	-	-
Sep 88	0.12	0.003	130	7.10	-	0.00	<0.1	1.2	0.0200	0.2400	0.2600	-	18	9	-	-	-
Oct 88	0.11	0.003	110	7.60	-	0.00	<0.1	-	0.0630	0.2700	0.3300	-	24	12	-	-	-
May 89	20.03	0.567	50	7.60	-	1.10	<0.1	-	0.0300	0.1900	0.2200	-	17	13	-	-	-
Jun 89	4.25	0.120	80	7.50	-	3.20	<0.1	-	0.0100	0.1600	0.1900	-	24	20	-	-	-
Jul 89	4.32	0.009	100	7.70	-	1.60	<0.1	-	0.0200	0.0600	0.0700	-	20	16	-	-	-
Aug 89	1.20	0.034	150	8.30	-	4.40	<0.1	-	0.0200	0.1800	0.2000	-	18	16	-	-	-
Sep 89	0.73	0.021	155	8.30	-	2.00	<0.1	-	<0.05	0.2200	0.2200	-	20	16	-	-	-
Oct 89	2.63	0.072	90	6.80	-	2.00	<0.1	-	<0.05	<0.05	0.0000	-	12	1	-	-	-
May 90	21.19	0.600	45	8.40	-	7.20	0.3	-	0.0100	0.1600	0.1700	-	5	5	-	-	-
Jun 90	1.44	0.041	100	6.90	-	1.20	<0.1	-	0.0000	0.1400	0.1400	-	21	19	-	-	-
Jul 90	1.22	0.035	108	5.90	-	1.20	<0.1	-	<0.05	0.1200	0.1200	-	24	24	-	-	-
Aug 90	0.26	0.007	120	8.13	-	1.20	<0.1	-	<0.05	0.0900	0.0900	-	18	18	-	-	-
Sep 90	0.27	0.008	120	7.38	-	2.40	<0.1	-	<0.05	0.2700	0.2700	-	16	11	-	-	-
Oct 90	0.22	0.006	140	6.80	96	1.60	<0.1	0.7	<0.05	0.1800	0.1800	-	14	10	-	-	-
May 91	12.35	0.350	85	7.36	-	1.20	<0.1	-	<0.002	0.0040	0.0040	0.0700	19	7	44	44	9
Jun 91	2.37	0.067	140	7.66	-	1.60	<0.1	-	<0.002	0.0120	0.0120	0.1400	8	10	29	41	6
Jul 91	0.44	0.012	120	7.55	-	2.40	<0.1	-	<0.002	0.0090	0.0090	0.2100	27	21	42	47	2
Aug 91	0.17	0.005	190	7.60	-	2.80	<0.1	-	<0.002	0.0090	0.0090	0.2400	27	22	28	58	0.8
Sep 91	0.31	0.009	115	7.83	-	3.20	<0.1	-	<0.002	0.0040	0.0040	0.2300	25	15	32	72	100
Oct 91	0.15	0.004	110	7.68	-	3.20	<0.1	-	<0.002	0.0290	0.0290	0.2400	23	11	50	65	4
Nov 91	0.53	0.015	130	7.84	-	4.80	<0.1	-	<0.002	0.0140	0.0140	0.2000	3	0.5	43	62	3
Dec 91	0.5	0.014	110	7.36	-	3.60	<0.1	-	<0.002	0.0320	0.0320	0.1500	0	-0.5	2	2	2
Apr 92	6.5	0.184	40	8.00	-	0.40	<0.1	-	ND	0.0060	0.0060	0.1100	13	6	23	29	33
May 92	0.57	0.016	70	8.00	58	5.20	<0.1	0.55	ND	0.0084	0.0084	0.2100	19	15	37	57	4
Jun 92	0.26	0.007	70	7.80	-	6.00	<0.1	-	0.0039	0.0082	0.0121	0.0860	19	23	42	60	2
Jul 92	0.12	0.003	75	8.00	-	8.00	<0.1	-	ND	0.0550	0.0550	0.2800	27	23	36	67	3
Aug 92	0.06	0.002	110	8.10	-	2.80	<0.1	-	0.0036	ND	0.0036	0.2200	28	23	71	78	4
Sep 92	0.11	0.003	130	7.90	-	2.60	<0.1	-	0.1200	0.0280	0.1480	0.2500	16	16	53	70	6
Oct 92	0.17	0.005	100	7.80	-	5.20	<0.1	-	ND	0.0100	0.0100	0.1500	15	9	49	59	0.5
Nov 92	0.26	0.007	140	7.90	-	8.80	<0.1	0.05	ND	0.0046	0.0046	0.1600	5	4	4	54	1
May 93	39.8	1.121	40	7.40	32	0.80	<0.1	-	ND	0.0063	0.0063	0.0600	8	7	18	24	1
Jun 93	20.5	0.501	30	7.30	18.00	18.00	<0.1	-	0.0028	0.0076	0.0104	0.1100	20	10	23	30	2
Jul 93	2.28	0.064	70	7.80	-	9.60	<0.1	-	ND	0.0053	0.0053	0.1900	11	13	39	15	7
Aug 93	0.77	0.022	100	7.90	-	8.00	<0.1	-	ND	ND	0.0000	0.2000	17	12	40	17	1
Sep 93	0.56	0.016	100	8.00	-	2.00	<0.1	-	ND	ND	0.0000	0.9300	15	9	53	9	2
Oct 93	0.7	0.020	80	7.70	-	5.00	<0.1	-	ND	ND	0.0061	0.2300	3	3	46	12	1
Nov 93	0.52	0.015	90	7.90	-	4.00	<0.1	-	ND	0.0067	0.0067	0.2300	6	2	45	10	2

R-3 WATER QUALITY DATA
LITTLE GRIZZLY CREEK UPSTREAM OF WALKER MINE TAILINGS (cont.)
1986 - 1999

Table 3

Date	Discharge cfs	Discharge cms	EC umhos/cm	pH	Dissolved Solids mg/L	Suspended Solids mg/L	Settleable Solids mL/Lhr	Turbidity MTU	Copper mg/L	Zinc mg/L	sum Cu+Zn mg/L	Iron mg/L	Air Temp Celsius	Water Temp Celsius	Hardness (CaCO3) mg/L	Alkalinity (CaCO3) mg/L	Acidity to pH 8.3 ⁻ (CaCO3) mg/L
May 94	6.7	0.190	60	7.80	50	8.00	<0.1	0.4	ND	ND	0.0000	0.1200	5	6	37	37	1
Jun 94	-	0.000	90	7.60	-	12.40	<0.1	-	0.0050	0.0256	0.0346	0.2800	26	22	38	50	4
Jul 94	0.09	0.003	60	7.60	-	7.00	<0.1	-	ND	ND	0.0000	0.1000	32	27	44	63	5
Aug 94	0.16	0.005	90	8.00	-	12.00	<0.1	-	ND	ND	0.0000	0.1900	26	17	51	51	5
Sep 94	0.13	0.004	100	8.30	-	8.00	<0.1	-	ND	ND	0.0000	0.3600	26	19	54	64	3
Oct 94	0.2	0.008	110	7.30	-	3.20	<0.1	-	ND	ND	0.0000	0.2700	14	7	53	66	1
Jun 95	74	2.096	40	7.90	29	10.80	<0.1	3.5	ND	ND	0.0000	ND	27	13	37	37	6
Jul 95	4.31	0.122	60	8.20	-	43.20	<0.1	-	ND	ND	0.0000	ND	25	15	31	36	5
Aug 95	1.24	0.035	100	8.00	-	1.20	<0.1	-	0.0041	ND	0.0041	0.2400	19	11	43	48	3
Sep 95	0.71	0.020	110	8.30	-	2.40	<0.1	-	ND	ND	0.0000	0.2600	18	16	47	65	2
Oct 95	1.25	0.035	100	7.90	-	4.00	<0.1	-	ND	0.0130	0.0130	0.2000	11	5	50	47	3
Nov 95	0.92	0.028	100	7.60	-	10.40	<0.1	-	ND	0.1600	0.1600	0.1200	4	28	43	54	3
May 96	87.00	1.897	40	7.20	45	14.80	<0.1	1	ND	ND	0.0000	0.0800	7	26	18	27	4
June 96	8.80	0.249	50	7.20	-	4.00	<0.1	-	ND	ND	0.0000	0.1200	17	12	27	32	3
July 96	1.30	0.037	90	7.10	-	3.60	<0.1	-	0.0029	0.0028	0.0057	0.1100	27	20	43	40	4
Aug 96	0.60	0.017	100	8.20	-	2.80	<0.1	-	0.0022	0.0053	0.0075	0.1800	20	15	48	41	4
Sept 96	0.50	0.014	70	7.90	-	1.60	<0.1	0.6	ND	0.0210	0.0210	0.0460	20	10	57	62	5
May 97	43.64	1.236	40	7.70	23	6.00	<0.1	-	ND	ND	0.0000	0.1000	21	18	60	35	3
June 97	5.40	0.153	70	7.20	-	1.60	<0.1	-	ND	ND	0.0000	0.1200	23	18	78	46	3
July 97	1.35	0.038	60	7.80	-	1.20	<0.1	-	ND	ND	0.0000	0.2000	25	18	46	59	4
Aug 97	0.55	0.018	110	7.50	-	1.60	<0.1	-	ND	0.0087	0.0087	0.2100	14	13	50	56	4
Sept 97	0.51	0.014	120	8.00	-	2.40	<0.1	-	ND	ND	0.0000	0.1200	8	7	49	59	4
Oct 97	0.70	0.020	90	8.10	-	4.00	<0.1	-	ND	ND	0.0000	0.1200	8	7	18	-	-
June 98	92.10	2.608	40	8.71	41	5.20	<0.1	0.3	ND	ND	0.0000	0.0480	8	7	18	-	-
July 98	4.24	0.120	80	8.00	-	3.60	<0.1	-	0.0110	0.0079	0.0189	0.1800	22	19	31	38	20
Aug 98	0.90	0.025	120	8.00	-	3.20	<0.1	-	0.0046	0.0019	0.0065	0.2000	22	18	34	61	23
Sept 98	0.70	0.020	130	8.32	-	0.08	<0.1	-	ND	ND	0.0000	0.2200	12	12	37	52	14
Oct 98	0.40	0.011	129	8.28	-	3.00	<0.1	-	0.0130	ND	0.0000	0.3000	5	5	41	54	19
Jun 99	28.41	0.805	58	7.49	41	7.60	<0.1	0.5	ND	ND	0.0000	0.0520	18	13	18	46	12
Jul 99	1.92	0.054	91	6.96	-	0.80	<0.1	-	ND	ND	0.0000	0.1200	20	20	32	64	14
Aug 99	0.63	0.018	116	8.01	-	4.00	<0.1	-	ND	ND	0.0000	0.2000	25	15	59	70	19
Sept 99	0.35	0.010	144	7.82	-	<1.00	<0.1	-	ND	ND	0.0000	0.2100	19	16	56	72	11
Oct 99	0.45	0.013	140	7.90	-	<1.00	<0.1	-	ND	ND	0.0000	0.2400	20	9	52	69	25
x	5.93	0.168	100.34	7.60	46.11	4.26	0.00	1.57	0.01	0.05	0.06	0.19	17.40	13	39.95	46.14	7.62
n	87	87	87	86	9	88	88	24	88	85	86	59	87	87	58	58	57
s	15.71	0.445	40.38	0.93	20.34	5.86	0.03	1.61	0.03	0.07	0.08	0.13	7.78	7	15.17	20.13	14.10
max	92.10	2.608	200.00	8.71	96.00	43.20	0.30	3.00	0.28	0.27	0.33	0.93	32.00	27	78.00	78.00	100.00
min	0.00	0.00	0.00	0.00	23.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00

Table 4
R-4 WATER QUALITY DATA
LITTLE GRIZZLY CREEK BELOW WALKER MINE TAILINGS
1986-1999

Date	Discharge cfs	Discharge cms	EC umhos/cm	pH	Disolved Solids mg/L	Suspended Solids mg/L	Settleable Solids ml/L/hr	Turbidity NTU	Copper mg/L	Zinc mg/L	sum cu+zn mg/L	Iron mg/L	Air Temp Celsius	Water Temp Celsius	Hardness (CaCO3) mg/L	Alkalinity (CaCO3) mg/L	Acidity to pH 8.3= (CaCO3) mg/L
Jun 86	8.90	0.280	184	7.7	-	1.00	<0.1	0.9	-	-	0.0000	-	21	9	-	-	-
Jul 86	1.78	0.050	225	8.0	0.60	0.60	<0.1	1.1	-	0.1500	0.0000	-	22	15	-	-	-
Aug 86	0.58	0.016	280	7.7	1.40	1.40	<0.1	0.9	0.0500	0.0500	0.2000	-	15	12	-	-	-
Sep 86	1.85	0.052	220	6.8	1.40	1.40	<0.1	2.1	0.0200	0.0500	0.0700	-	7	5	-	-	-
Oct 86	1.30	0.037	210	7.5	10.00	10.00	0.1	1.2	0.0100	0.0400	0.0500	-	12	5	-	-	-
May 87	9.20	0.261	111	7.4	2.00	2.00	<0.1	1.5	0.2500	0.0100	0.2600	-	23	19	-	-	-
Jun 87	1.32	0.037	180	7.3	1.60	1.60	-	-	0.0600	0.0300	0.0900	-	25	13	-	-	-
Jul 87	0.50	0.014	270	7.9	1.60	1.60	<0.1	1.7	0.0200	0.0800	0.1000	-	24	22	-	-	-
Aug 87	0.20	0.008	210	7.7	2.00	2.00	<0.1	3.5	0.0200	0.0600	0.0800	-	22	22	-	-	-
Sep 87	0.19	0.005	170	7.8	2.00	2.00	<0.1	2.2	0.0100	0.0500	0.0600	-	23	13	-	-	-
Oct 87	0.38	0.011	120	7.7	40.20	40.20	<0.1	9.0	0.0200	0.0100	0.1400	-	19	5	-	-	-
May 88	2.73	0.077	95	7.6	0.04	0.04	<0.1	1.2	0.0100	0.0700	0.0800	-	23	15	-	-	-
Jun 88	1.07	0.030	110	7.0	2.00	2.00	<0.1	1.1	0.0000	0.0900	0.0900	-	15	12	-	-	-
Jul 88	0.32	0.009	320	8.0	2.00	2.00	<0.1	2.2	0.0200	0.2800	0.3000	-	26	22	-	-	-
Aug 88	0.18	0.005	285	7.4	2.00	2.00	<0.1	1.0	0.0100	0.0700	0.0800	0.27	23	15	-	-	-
Sep 88	0.43	0.012	260	7.3	275.20	275.20	<0.1	2.5	0.0100	0.2000	0.2400	-	19	9	-	-	-
Oct 88	0.20	0.006	240	7.4	188.00	188.00	<0.1	-	0.0200	0.2200	0.2400	-	21	8	-	-	-
May 89	24.46	0.693	50	7.5	4.20	4.20	<0.1	-	0.0300	0.1200	0.1500	-	22	12	-	-	-
Jun 89	5.79	0.164	90	7.5	3.20	3.20	<0.1	-	0.0400	0.1200	0.1600	-	19	12	-	-	-
Jul 89	0.71	0.020	130	7.7	4.00	4.00	<0.1	-	0.0100	0.0600	0.0700	-	28	16	-	-	-
Aug 89	2.83	0.080	190	7.6	1.60	1.60	<0.1	-	0.0060	0.1260	0.1260	-	18	14	-	-	-
Sep 89	2.71	0.074	205	8.1	1.20	1.20	<0.1	-	<0.05	0.2100	0.2100	-	19	11	-	-	-
Oct 89	2.63	0.074	110	6.8	2.80	2.80	<0.1	-	<0.05	<0.05	0.0000	-	2	0	-	-	-
May 90	23.35	0.661	50	8.0	8.60	8.60	0.3	-	0.0100	0.1300	0.1400	-	5	5	-	-	-
Jun 90	2.19	0.062	120	7.1	1.6	1.6	<0.1	-	0.0000	0.1200	0.1200	-	19	17	-	-	-
Jul 90	3.02	0.098	147	7.2	2	2	<0.1	-	<0.05	0.1600	0.1600	-	26	22	-	-	-
Aug 90	0.33	0.008	170	8.02	1.6	1.6	<0.1	-	<0.05	0.1500	0.1500	-	18	13	-	-	-
Sep 90	0.73	0.021	210	7.35	1.8	1.8	<0.1	-	<0.05	0.3000	0.3000	-	17	8	-	-	-
Oct 90	17.66	0.500	60	7.82	2	2	<0.1	0.25	<0.05	0.1600	0.1600	-	14	7	-	-	7
May 91	2.56	0.072	140	7.55	47	47	<0.1	-	0.0020	0.0060	0.0080	0.101	17	11	17	28	7
Jun 91	0.53	0.015	170	7.54	0.4	0.4	<0.1	-	<0.002	0.0120	0.0120	0.263	10	10	43	44	9
Aug 91	0.4	0.011	300	7.58	4.8	4.8	<0.1	-	<0.002	0.0100	0.0100	0.544	24	19	64	56	1
Sep 91	0.51	0.014	210	7.74	6.4	6.4	<0.1	-	0.0030	0.0080	0.0110	0.829	24	19	80	67	0.9
Oct 91	0.26	0.007	180	7.46	3.6	3.6	<0.1	-	<0.002	0.0110	0.0110	0.394	25	12	135	90	125
Nov 91	0.85	0.024	190	7.86	2.4	2.4	<0.1	-	<0.002	0.0130	0.0130	0.514	20	8	100	81	3
Dec 91	0.56	0.016	200	7.24	0.1	0.1	<0.1	-	<0.002	0.0280	0.0280	0.29	1	0	62	81	5
Apr 92	11.48	0.325	45	8	5.2	5.2	<0.1	-	0.0030	0.0200	0.0230	0.28	3	0	71	27	2
May 92	0.97	0.027	130	8	92	92	<0.1	0.65	ND	0.0030	0.0030	0.13	12	8	57	65	5
Jun 92	0.43	0.012	100	7.9	0.8	0.8	<0.1	-	ND	0.0435	0.0435	0.37	23	17	65	73	3
Jul 92	0.35	0.010	150	7.8	0.4	0.4	<0.1	-	ND	ND	0.0000	0.68	19	19	65	73	4
Aug 92	0.24	0.007	200	8	4.4	4.4	<0.1	-	ND	ND	0.0000	0.27	30	22	92	81	10
Sep 92	0.21	0.008	290	7.9	0.8	0.8	<0.1	-	0.1200	0.0510	0.0610	0.4	28	20	141	97	9
Oct 92	0.39	0.011	230	7.8	7.2	7.2	<0.1	-	0.0024	0.0150	0.0174	0.28	15	10	130	73	1
Nov 92	0.45	0.013	280	8	5.2	5.2	<0.1	0.15	ND	0.0160	0.0160	0.36	2	2	89	62	4.5
May 93	44.7	1.266	4	7.7	28	28	<0.1	-	ND	0.0026	0.0026	0.06	14	9	16	22	2
Jun 93	23.1	0.654	30	7.4	80	80	<0.1	-	ND	0.0069	0.0069	0.11	14	14	35	39	2
Jul 93	2.62	0.074	90	8	11.6	11.6	<0.1	-	0.0070	0.0000	0.0000	0.3	20	14	42	16	10
Aug 93	1.32	0.037	120	7.8	2	2	<0.1	-	ND	0.0078	0.0078	0.19	21	12	49	23	2
Sep 93	0.72	0.029	130	8.1	7	7	<0.1	-	0.0083	0.0083	0.0161	0.41	16	11	74	12	4
Oct 93	1.03	0.029	150	8	2	2	<0.1	-	ND	0.0120	0.0120	0.49	5	4	64	11	2
Nov 93	1.12	0.032	190	7.9	3	3	<0.1	-	0.0040	0.0081	0.0121	0.23	3	1	68	9	3

R-4 WATER QUALITY DATA
LITTLE GRIZZLY CREEK BELOW WALKER MINE TAILINGS (cont')
1986-1999

Table 4

Date	Discharge cfs	Discharge cms	EC umho/cm	pH	Dissolved Solids mg/L	Suspended Solids mg/L	Settleable Solids mil/hr	Turbidity NTU	Copper mg/L	Zinc mg/L	sum curzn mg/L	Iron mg/L	Air Temp Celsius	Water Temp Celsius	Hardness (CaCO3) mg/L	Alkalinity (CaCO3) mg/L	Acidity to pH 8.3= (CaCO3) mg/L
May 94	7.2	0.204	70	8.1	52	2.4	<0.1	0.6	ND	ND	0.0000	0.2	5	6	32	1	
Jun 94		0.000	110	7.6		6	<0.1		0.0057	ND	0.0005	0.54	30	19	60	1	
Jul 94	0.36	0.010	100	7.5		6	<0.1		ND	ND	0.0000	1.4	31	20	98	6	
Aug 94	0.29	0.008	160	7.9		16	<0.1		ND	ND	0.0000	0.27	27	17	104	6	
Sep 94	0.23	0.007	180	8.1		7	<0.1		ND	ND	0.0000	0.51	21	14	69	5	
Oct 94	0.38	0.011	210	7.4		0.8	<0.1		ND	ND	0.0000	0.39	13	7	93	1	
Jun 95	89	2.520	30	7.9	<0.5	7.8	<0.1	1.5	ND	ND	0.0000	0.1	21	13	32	3	
Jul 95	4.79	0.136	60	8.1		7.2	<0.1		ND	ND	0.0000	0.24	24	18	34	7	
Aug 95	1.95	0.044	120	8.1		1.2	<0.1		ND	ND	0.0000	0.51	21	12	53	3	
Sep 95	1	0.028	120	8.2		3.6	<0.1		ND	ND	0.0000	0.51	17	11	65	2	
Oct 95	1.16	0.033	120	8		0.8	<0.1		ND	0.0380	0.38	0.38	10	4	69	2	
Nov 95	1.03	0.029	140	7.5		0.8	<0.1		0.0023	0.0092	0.115	0.14	5	26	61	3	
May 96	7.7	2.181	40	7.8	34	9.2	<0.1	2.5	ND	ND	0.0000	0.068	17	9	17	3	
Jun 96	11.4	0.323	60	7.8		2.4	<0.1		ND	ND	0.0000	0.19	20	14	29	4	
Jul 96	1.7	0.048	110	7.9		2.8	<0.1		ND	0.0051	0.34	0.34	28	16	54	4	
Aug 96	1	0.028	140	8.3		2.6	<0.1		ND	0.0020	0.49	0.49	23	16	64	4	
Sep 96	0.7	0.020	100	7.9		0.4	<0.1		ND	ND	0.0000	0.4	21	11	71	4	
May 97	54.41	1.541	30	7.8	24	5.8	<0.1	0.7	ND	ND	0.0000	0.069	22	14	18	1	
Jun 97	5.02	0.142	80	8.1		4	<0.1		ND	ND	0.0000	0.2	26	18	63	2	
Jul 97	1.9	0.054	110	7.9		2	<0.1		ND	ND	0.0000	0.24	25	19	102	1	
Aug 97	0.88	0.019	150	7.5		1.8	<0.1		ND	ND	0.0000	0.39	23	13	61	4	
Sep 97	0.7	0.020	170	8.2		2.4	<0.1		ND	ND	0.0000	0.43	15	14	61	5	
Oct 97	0.9	0.025	110	8		9.6	<0.1		ND	ND	0.0000	0.073	16	4	65	5	
Jun 98	110	3.115	30	8.7	38	6	<0.1	0.35	ND	ND	0.0000	0.049	16	9	16	5	
Jul 98	4.4	0.125	100	8		1.2	<0.1		0.0034	0.0070	0.0104	0.26	22	18	30	10	
Aug 98	1.2	0.034	150	8.1		2.8	<0.1		0.0015	0.0034	0.0049	0.27	21	15	44	13	
Sep 98	0.9	0.025	181	8.6		3.8	<0.1		ND	ND	0.0000	0.34	12	11	46	13	
Oct 98	0.1	0.003	168	8.4		3.8	<0.1		0.0088	ND	0.0088	0.38	0	3	53	15	
Jun 99	32.98	0.934	62	7.5	48	6	<0.1	0.45	ND	ND	0.0000	0.069	19	11	19	13	
Jul 99	2.42	0.069	109	7.9		14	<0.1		ND	ND	0.0000	0.29	21	17	36	14	
Aug 99	0.98	0.027	158	8.4		1.2	<0.1		ND	ND	0.0000	0.48	26	16	82	17	
Sep 99	0.56	0.016	180	8		2.4	<0.1		ND	ND	0.0000	0.54	18	16	67	22	
Oct 99	0.83	0.024	190	7.8		<1	<0.1		ND	ND	0.0000	0.42	16	6	75	17	
x	7.25	0.21	146.20	7.68	40.44	9.92	0.00	1.63	0.01	0.04	0.05	0.33	17.80	12.10	59.69	53.29	7.92
n	87	87	87	86	9	89	88	24	85	88	86	59	87	87	58	59	58
s	18.61	0.53	76.78	0.90	23.51	35.72	0.03	1.74	0.03	0.07	0.08	0.23	7.66	6.02	32.04	25.38	16.55
max	110.00	3.12	330.00	8.70	92.00	275.20	0.30	9.00	0.25	0.30	0.30	1.40	31.00	26.00	141.00	97.00	125.00
min	0	0	0	0	0	0	0	0.15	0.0000	0.0000	0.0000	0	0	0	0	0	0

Table 5
R-5 WATER QUALITY DATA
LITTLE GRIZZLY CREEK AT COMPLIANCE STATION
1991 - 1999

Date	Discharge cfs	Discharge cms	EC umhos/cm	pH	Disolved Solids mg/L	Suspended Solids mg/L	Settleable Solids mL/hr	Turbidity NTU	Copper mg/L	Zinc mg/L	Cu + Zn mg/L	Iron mg/L	Air Temp Celsius	Water Temp Celsius	Hardness (CaCO3) mg/L	Alkalinity (CaCO3) mg/L	Acidity to pH 9.3= (CaCO3) mg/L
May 91	19.62	0.556	70	7.5	96	2.8	<-0.1	0.3	0.0400	0.0100	0.0500	0.146	22	13	22	27	4
Jun 91	3.54	0.100	160	7.6	-	1.2	<-0.1	-	0.0690	0.0120	0.0810	0.235	10	10	42	41	8
Jul 91	0.84	0.024	230	7.9	-	1.2	<-0.1	-	0.0600	0.0100	0.0700	0.363	21	14	49	58	5
Aug 91	0.61	0.017	200	7.9	-	3.8	<-0.1	-	0.1230	0.0110	0.1340	0.401	25	15	87	66	0
Sep 91	1.35	0.038	170	8.0	-	6.0	<-0.1	-	0.1020	0.0080	0.1100	0.404	19	8	61	87	-
Oct 91	0.48	0.014	190	7.5	-	2.0	<-0.1	-	0.0870	0.0300	0.1170	0.452	13	5	92	80	4
Nov 91	1.92	0.054	200	7.9	-	0.4	<-0.1	-	0.1080	0.0210	0.1280	0.512	1	-0.5	44	77	4
Dec 91	0.84	0.027	190	7.7	-	8.0	<-0.1	-	0.0560	0.0370	0.0930	0.437	4	0	66	53	1
Apr 92	10.63	0.301	50	8.0	-	0.8	<-0.1	-	ND	ND	0.0000	0.170	14	10	25	31	-
May 92	1.06	0.030	130	8.1	90	2.4	<-0.1	0.8	ND	0.0044	0.0044	0.480	15	13	56	71	3
Jun 92	0.85	0.018	120	8.3	-	1.2	<-0.1	-	0.0730	0.0061	0.0791	0.400	21	19	78	76	1
Jul 92	0.43	0.012	140	8.4	-	0.4	<-0.1	-	0.0660	0.0150	0.0810	0.550	21	19	92	86	4
Aug 92	0.20	0.006	230	8.4	-	0.8	<-0.1	-	0.0076	ND	0.0076	0.078	22	17	130	93	5
Sep 92	0.22	0.008	270	8.2	-	0.8	<-0.1	-	ND	0.0062	0.0062	0.120	14	12	126	100	5
Nov 92	0.62	0.018	270	8.2	-	5.8	<-0.1	-	0.0320	0.0130	0.0450	0.400	0	1	82	90	5
Oct 92	0.34	0.010	250	8.0	37	3.6	<-0.1	0.1	0.0420	0.0170	0.0590	0.330	12	7	94	83	2
May 93	46.10	1.308	40	7.8	-	11.2	<-0.1	-	0.0630	0.0068	0.0044	0.210	23	17	25	22	3
Jun 93	26.00	0.736	40	7.8	-	5.8	<-0.1	-	0.0350	0.0068	0.0044	0.470	21	12	58	21	10
Jul 93	3.53	0.100	90	8.1	-	8.0	<-0.1	-	0.1400	0.0190	0.1500	0.520	12	12	52	21	1
Aug 93	2.29	0.065	120	8.2	-	4.0	<-0.1	-	0.1300	0.0078	0.1378	0.520	13	10	56	12	1
Sep 93	1.10	0.031	130	8.4	-	4.0	<-0.1	-	0.0890	0.0077	0.1067	0.440	16	10	56	15	2
Oct 93	1.42	0.040	110	8.4	-	2.0	<-0.1	-	0.0750	0.0100	0.0950	0.630	8	6	65	15	2
Nov 93	1.88	0.053	140	8.1	-	2.5	<-0.1	-	0.0830	0.0220	0.0850	0.460	4	6	68	10	2
May 94	7.30	0.207	70	8.2	64	5.4	<-0.1	0.8	0.0500	ND	0.0500	0.260	9	7	28	33	3
Jun 94	1.80	0.045	120	7.4	-	10.0	<-0.1	-	0.0670	ND	0.0670	0.460	20	15	54	54	2
Jul 94	0.45	0.013	110	8.0	-	20.0	<-0.1	-	0.0510	ND	0.0510	1.000	32	25	87	74	4
Aug 94	0.53	0.015	180	8.3	-	7.5	<-0.1	-	0.0200	ND	0.0200	0.510	19	10	88	72	5
Sep 94	0.44	0.012	170	8.3	-	9.0	<-0.1	-	0.0170	ND	0.0170	0.630	25	12	95	63	3
Oct 94	0.36	0.010	190	7.5	-	0.4	<-0.1	-	0.0140	ND	0.0140	0.460	8	5	85	74	1
Jun 95	97.20	2.753	40	8.1	27	8.2	<-0.1	1.2	0.0240	ND	0.0240	0.110	24	14	12	32	5
Jul 95	7.46	0.211	80	7.7	-	7.2	<-0.1	-	0.0700	ND	0.0700	0.720	18	11	39	45	2
Aug 95	2.74	0.078	120	8.8	-	1.8	<-0.1	-	0.0720	0.0027	0.0747	0.220	9	9	57	54	2
Sep 95	1.88	0.053	140	8.3	-	0.8	<-0.1	-	0.0530	ND	0.0530	0.640	14	12	60	66	2
Oct 95	1.34	0.038	140	8.0	-	26.8	<-0.1	-	0.1300	0.0300	0.1600	0.330	-3	2	65	58	2
Nov 95	5.07	0.144	160	7.1	-	12.8	<-0.1	-	0.0600	0.0190	0.0790	0.320	5	3	64	61	2
May 96	80.90	2.291	40	7.7	44	16.0	<-0.1	2.5	0.0320	0.0190	0.0320	0.210	11	10	12	29	3
June 96	13.00	0.368	70	8.1	-	3.2	<-0.1	-	0.0760	0.0023	0.0803	0.410	22	18	33	41	5
July 96	3.40	0.098	120	8.1	-	1.8	<-0.1	-	0.0760	0.0120	0.0880	0.630	20	16	63	37	4
Aug 96	2.00	0.057	140	6.3	-	1.2	<-0.1	-	0.0580	0.0072	0.0652	0.670	11	11	73	40	5
Sep 96	1.70	0.048	100	8.1	-	1.2	<-0.1	-	0.0310	0.0039	0.0348	0.590	10	8	59	63	5
May 97	54.09	1.532	40	8.0	-	4.8	<-0.1	0.7	0.0150	ND	0.0150	0.099	19	9	20	38	3
June 97	7.24	0.205	60	7.5	31	3.2	<-0.1	-	0.0310	ND	0.0310	0.330	22	18	74	45	2
July 97	1.43	0.040	120	8.3	-	0.8	<-0.1	-	0.0360	ND	0.0360	0.430	22	17	107	52	6
Aug 97	1.57	0.044	130	7.7	-	2.8	<-0.1	-	0.0300	ND	0.0300	0.510	20	17	57	58	2
Sept 97	1.34	0.038	104	8.2	-	2.0	<-0.1	-	0.0290	ND	0.0290	0.590	13	13	71	62	4
Oct 97	1.90	0.054	140	7.8	-	0.8	<-0.1	-	0.0190	0.0087	0.0197	0.290	8	6	64	65	5
June 98	120.00	3.398	40	8.6	49	2.4	<-0.1	0.5	0.0120	0.0060	0.0160	0.072	15	12	36	45	6
July 98	7.10	0.201	100	8.0	-	2.6	<-0.1	-	0.0550	0.0380	0.0930	0.360	21	16	36	42	6
Aug 98	2.50	0.071	140	7.9	-	3.0	<-0.1	-	0.0400	ND	0.0400	0.500	18	16	43	61	8
Sept 98	2.10	0.059	167	8.5	-	0.4	<-0.1	-	0.0370	ND	0.0370	0.500	15	11	50	64	10
Oct 98	3.10	0.088	162	8.8	-	2.8	<-0.1	-	0.0370	ND	0.0370	0.500	4	5	57	63	9

R-5 WATER QUALITY DATA
LITTLE GRIZZLY CREEK AT COMPLIANCE STATION (cont)
1991 - 1999

Table 5

Date	Discharge cfs	Discharge cms	EC umhos/cm	pH	Dissolved Solids mg/L	Suspended Solids mg/L	Settleable Solids mL/hr	Turbidity NTU	Copper mg/L	Zinc mg/L	Cu + Zn mg/L	Iron mg/L	Air Temp Celsius	Water Temp Celsius	Hardness (CaCO3) mg/L	Alkalinity (CaCO3) mg/L	Acidity to pH 8.3- (CaCO3) mg/L
Jun 99	34.97	0.990	82	7.8	46	0.8	<0.1	0.7	0.0024	ND	0.0024	0.130	20	14	22	62	12
Jul 99	3.74	0.106	122	8.1	-	2.0	<0.1	-	0.0880	ND	0.0680	0.460	19	15	43	71	15
Aug 99	1.91	0.054	162	7.8	-	1.4	<0.1	-	0.0590	ND	0.0580	0.630	15	12	75	79	12
Sept 99	1.35	0.038	158	8.1	-	<1	<0.1	-	0.0280	ND	0.0280	0.540	19	16	67	81	22
Oct 99	1.93	0.055	162	8.2	-	<1	<0.1	-	0.0210	ND	0.0210	0.500	17	9	70	81	21
x	10.33	0.29	127.91	7.88	53.78	4.31	0.00	0.83	0.05	0.01	0.08	0.40	14.55	11.02	57.69	52.76	4.94
n	58	58	58	67	9	59	59	9	57	60	57	58	58	58	58	59	56
s	23.56	0.67	61.89	1.10	23.32	6.28	0.00	0.66	0.04	0.01	0.04	0.22	7.44	5.74	28.45	24.82	4.77
max	120.00	3.40	270.00	8.60	96.00	26.80	0.00	2.50	0.14	0.04	0.16	1.00	32.00	25.00	130.00	100.00	22.00
min	0.00	0.00	0.00	0.00	27.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	-3.00	0.00	0.00	0.00	0

Annual Water Quality Constituents
Dolly Creek below Tailings R-2
1991-1999

Table 8

Receiving Water Constituent	1991	1992	1993	1994	1995	1996	1997	1998	1999	Water Quality Limitations
Bicarbonate mg/L	55	87	36	69	38	33	73	52	88	
Carbonate mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Calcium mg/L	4.7	21	6.6	27	6.2	5.9	8	5.2	7.7	
Magnesium mg/L	8.5	7.3	2.8	3.1	2.3	2.5	2.9	2.7	3.1	
Sulfates mg/L	10	20	4	15.4	15.4	0.8	ND	ND	ND	
Hardness	47	71	28	80	25	25	32	24	32	
Alkalinity	45	72	30	57	31	33	60	45	73	
Acidity	8	1	1	1	5	3	2	6	15	
Chlorides mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Potassium mg/L	1.5	3.9	1	1.4	1	1.1	1.1	1	0.6	
Nitrate mg/L	1.2	ND	ND	ND	ND	ND	0.3	ND	0.5	
Sodium mg/L	3.4	2.5	2.1	3.7	2.1	2.5	2.6	2.4	1.4	
Chromium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.143
Arsenic mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Mercury mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Selenium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Aluminum mg/L	0.116	ND	0.16	ND	ND	0.25	0.066	0.087	0.052	
Antimony mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Cadmium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Lead mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0022
Manganese mg/L	0.169	0.27	0.11	0.26	0.071	0.058	0.05	0.055	0.043	
Nickel mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.921
Silver mg/L	0.001	ND	ND	ND	ND	ND	ND	ND	ND	
Thallium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dissolved Organic Carbon mg/L	2.8	ND	2	2	1.2	4.1	2	2	1.36	

**Annual Water Quality Constituents
Little Grizzly Creek above Tailings R-3
1991-1999**

Table 9

Receiving Water Constituent	1991	1992	1993	1994	1995	1996	1997	1998	1999	Water Quality Limitations
Bicarbonate mg/L	53	69	29	45	45	27	34	33	56	
Carbonate mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Calcium mg/L	3.5	9.2	4.7	6.4	2.3	4.4	5.9	4.8	4.7	
Magnesium mg/L	8.5	3.5	1.5	5.2	1.3	1.6	1.4	1.4	1.6	
Sulfates mg/L	4	15	ND	ND	ND	ND	ND	ND	ND	
Hardness	44	37	18	37	11	17	20	18	18	
Alkalinity	44	57	24	37	37	28	28	38	46	
Acidity	9	4	1	1	6	3	2	15	12	
Chlorides mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Potassium mg/L	1	2.8	0.6	0.7	0.7	1	0.7	0.8	0.6	
Nitrate mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Sodium mg/L	2.7	2	2.2	3	2.2	3.1	2.7	2.8	2	1.143
Chromium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Arsenic mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Mercury mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Selenium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Aluminum mg/L	0.027	ND	ND	ND	ND	0.13	0.38	0.067	ND	
Antimony mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Cadmium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Lead mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0022
Manganese mg/L	0.007	ND	ND	0.019	0.0089	0.0014	0.0016	0.002	ND	0.043
Nickel mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.921
Silver mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Thallium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dissolved Organic Carbon mg/L	2	ND	2.3	2.3	1.7	2.4	1.9	2.5	1.67	

Table 10
**Annual Water Quality Constituents
 Little Grizzly Creek below Tailings R-4
 1991-1999**

Receiving Water Constituent	1991	1992	1993	1994	1995	1996	1997	1998	1999	Water Quality Limitations
Bicarbonate mg/L	34	79	27	39	39	28	51	39	64	
Carbonate mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Calcium mg/L	1.9	16.9	3.8	7.2	2.3	4.3	5	4.1	4.9	
Magnesium mg/L	3	3.6	1.5	1.9	1.2	1.6	1.4	1.4	1.6	
Sulfates mg/L	ND	20	ND	ND	ND	ND	ND	ND	ND	
Hardness	17	57	16	26	11	17	18	16	19	
Alkalinity	28	65	22	32	32	28	42	41	53	
Acidity	7	5	1	1	3	3	1	10	13	
Chlorides mg/L	ND	ND	ND	ND	ND	ND	0.5	ND	ND	
Potassium mg/L	0.7	4	0.7	0.8	0.6	1	0.8	0.9	0.6	
Nitrate mg/L	1.6	ND	ND	ND	ND	ND	ND	ND	ND	
Sodium mg/L	2.6	2.2	2.4	3.1	2	3	3	2.9	1.8	
Chromium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.143
Arsenic mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Mercury mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Selenium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Aluminum mg/L	ND	ND	ND	ND	ND	0.095	0.11	0.058	0.08	
Antimony mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Cadmium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0022
Lead mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.043
Manganese mg/L	0.017	0.11	ND	0.044	0.011	0.0059	0.003	0.001	0.0015	
Nickel mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.921
Silver mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Thallium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dissolved Organic Carbon mg/L	2.1	1.4	2.2	2.2	1.5	3.3	2	2	1.58	

**Annual Water Quality Constituents
Little Grizzly Creek at Browns Cabin R-5
1991-1999**

Table 11

Receiving Water Constituent	1991	1992	1993	1994	1995	1996	1997	1998	1999	Water Quality Limitations
Bicarbonate mg/L	33	86	27	40	39	29	46	58	75	
Carbonate mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Calcium mg/L	2.1	15	4.2	8	2.6	4.4	5.1	5	5.8	
Magnesium mg/L	4	4.4	1.6	2	1.3	1.7	1.7	1.5	1.8	
Sulfates mg/L	ND	2.5	ND	ND	ND	ND	ND	ND	ND	
Hardness	22	56	17	28	12	18	20	19	22	
Alkalinity	27	71	22	32	32	29	38	48	62	
Acidity	4	3	3	3	5	3	2	3	12	
Chlorides mg/L	ND	ND	ND	ND	ND	ND	1	ND	ND	
Potassium mg/L	0.7	3.9	0.7	0.8	0.7	1	0.7	0.7	0.6	
Nitrate mg/L	ND	ND	ND	ND	ND	0.6	ND	ND	0.1	
Sodium mg/L	2.4	2.2	2.2	3	2.1	3	2.3	1	1.8	1.143
Chromium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Arsenic mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Mercury mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Selenium mg/L	ND	ND	ND	ND	ND	ND	0.046	0.064	ND	
Aluminum mg/L	ND	ND	ND	ND	ND	0.16	ND	ND	ND	
Antimony mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Cadmium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Lead mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0022
Manganese mg/L	0.023	0.098	ND	0.056	0.013	0.013	0.0095	0.005	0.016	0.043
Nickel mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.921
Silver mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Thallium mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dissolved Organic Carbon mg/L	2.6	1.7	2.4	2.4	1.6	2.4	1.5	1.8	1.56	

**Annual Water Quality Constituents
Sediment Basin Outlet R-6
1991-1999**

Table 12

Receiving Water Constituent	1991	1992	1993	1994	1995	1996	1997	1998	1999	Water Quality Limitations
Bicarbonate mg/L	-	-	-	-	33	29	-	-	-	-
Carbonate mg/L	-	-	-	-	ND	ND	-	-	-	-
Calcium mg/L	-	-	-	-	9.9	10.5	-	-	-	-
Magnesium mg/L	-	-	-	-	1	0.9	-	-	-	-
Sulfates mg/L	-	-	-	-	39	27.2	-	-	-	-
Hardness	-	-	-	-	29	30	-	-	-	-
Alkalinity	-	-	-	-	27	29	-	-	-	-
Acidity	-	-	-	-	5	5	-	-	-	-
Chlorides mg/L	-	-	-	-	ND	9	-	-	-	-
Potassium mg/L	-	-	-	-	3.2	16.4	-	-	-	-
Nitrate mg/L	-	-	-	-	ND	1	-	-	-	-
Sodium mg/L	-	-	-	-	0.7	0.7	-	-	-	-
Chromium mg/L	-	-	-	-	ND	ND	-	-	-	1.143
Arsenic mg/L	-	-	-	-	ND	ND	-	-	-	-
Mercury mg/L	-	-	-	-	ND	ND	-	-	-	-
Selenium mg/L	-	-	-	-	ND	ND	-	-	-	-
Aluminum mg/L	-	-	-	-	ND	0.42	-	-	-	-
Antimony mg/L	-	-	-	-	ND	ND	-	-	-	-
Cadmium mg/L	-	-	-	-	ND	ND	-	-	-	0.0022
Lead mg/L	-	-	-	-	ND	ND	-	-	-	0.043
Manganese mg/L	-	-	-	-	0.27	0.21	-	-	-	-
Nickel mg/L	-	-	-	-	ND	ND	-	-	-	0.921
Silver mg/L	-	-	-	-	ND	ND	-	-	-	-
Thallium mg/L	-	-	-	-	ND	ND	-	-	-	-
Dissolved Organic Carbon mg/L	-	-	-	-	ND	1.5	-	-	-	-

CHARTS

Chart 1

Copper Contractions at R-1 and R-2 Dolly Creek Above and Below Walker Tailings 1986 - 1999

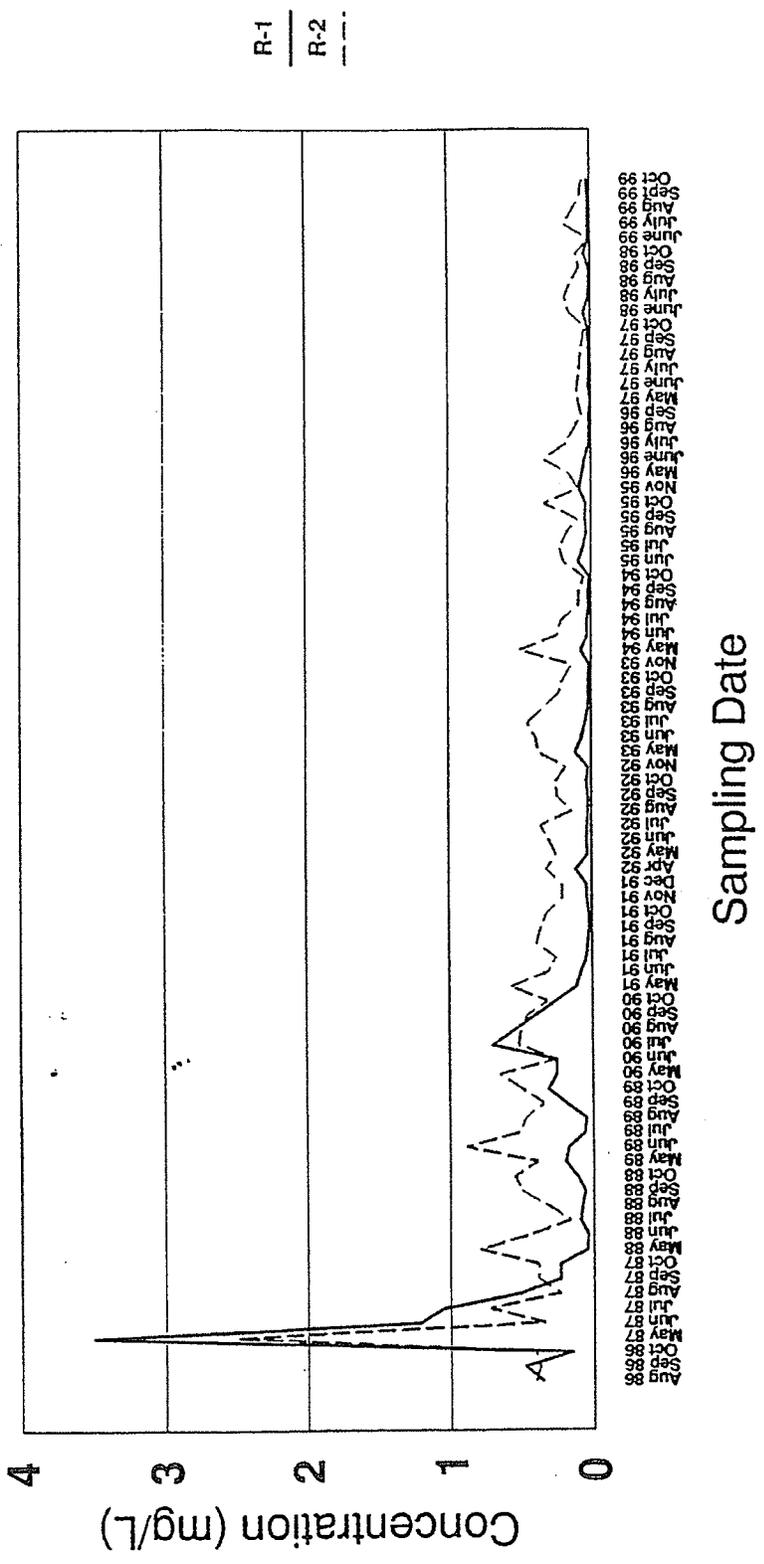


Chart 2

Copper Concentrations at R-1 and R-2 Dolly Creek Above and Below Walker Tailings 1991 - 1999

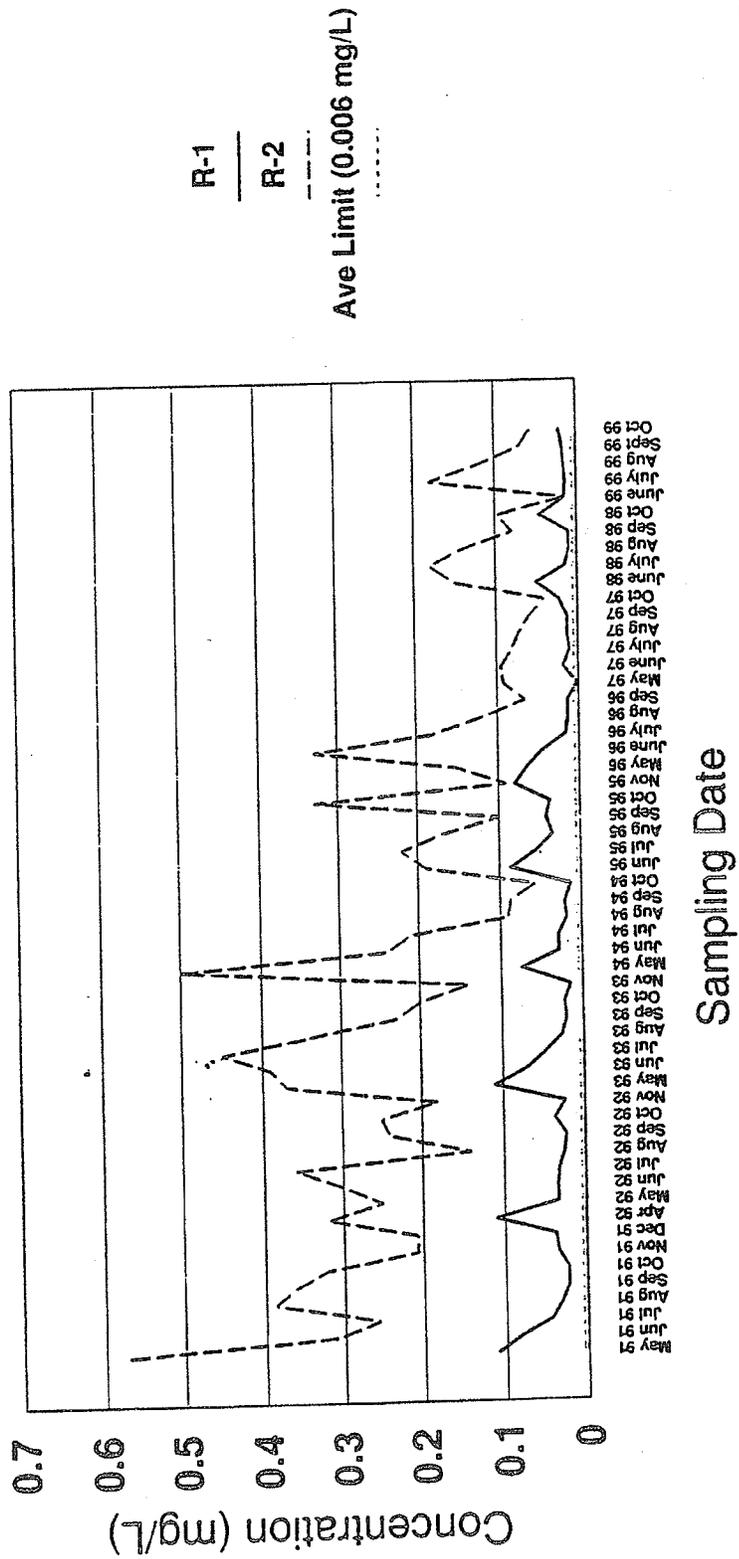


Chart 3

Zinc Concentrations at R-1 and R-2 Dolly Creek Above and Below Walker Tailings 1986 - 1999

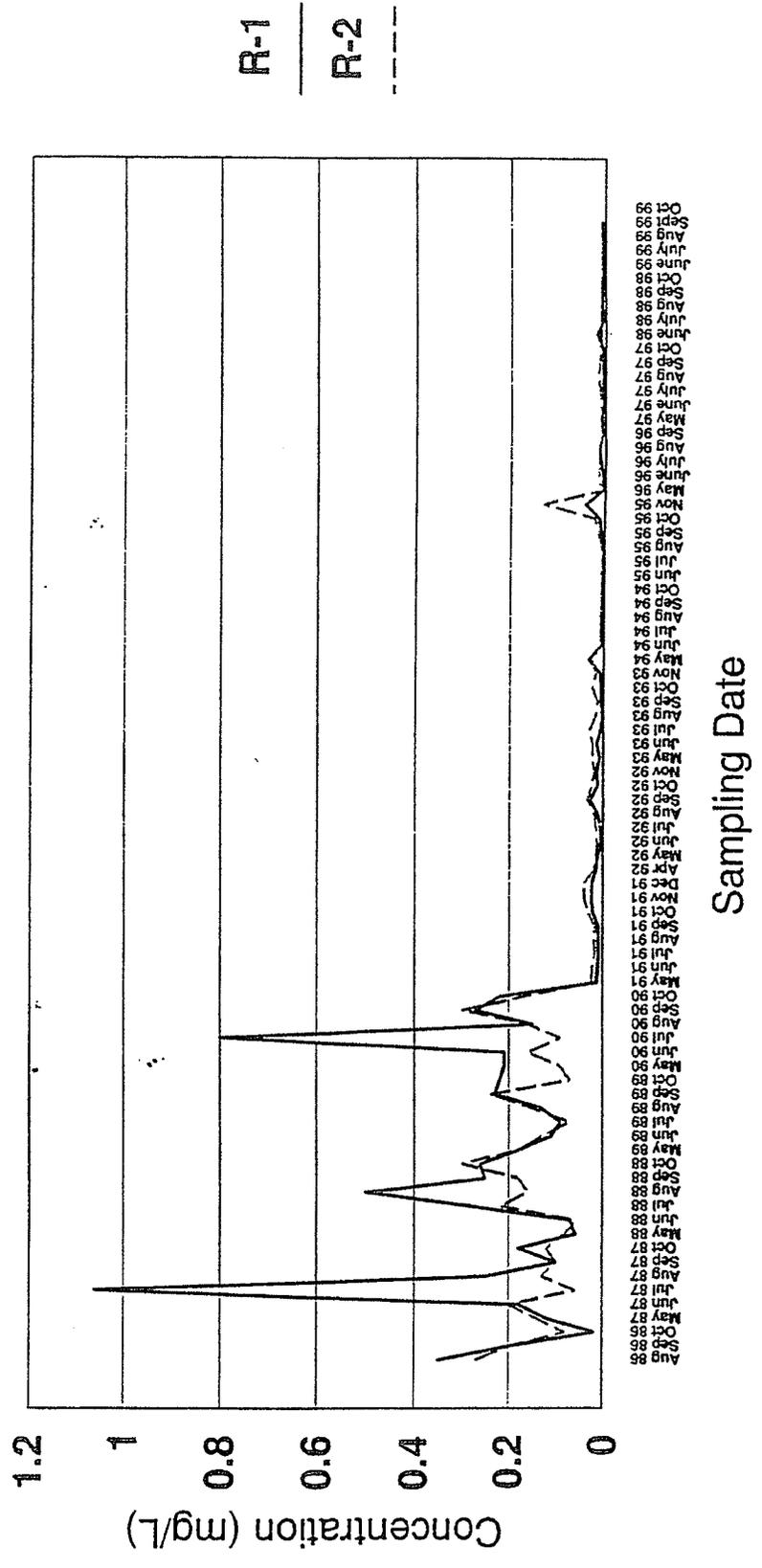


Chart 4

Zinc Concentrations at R-1 and R-2 Dolly Creek Above and Below Walker Tailings 1991 - 1999

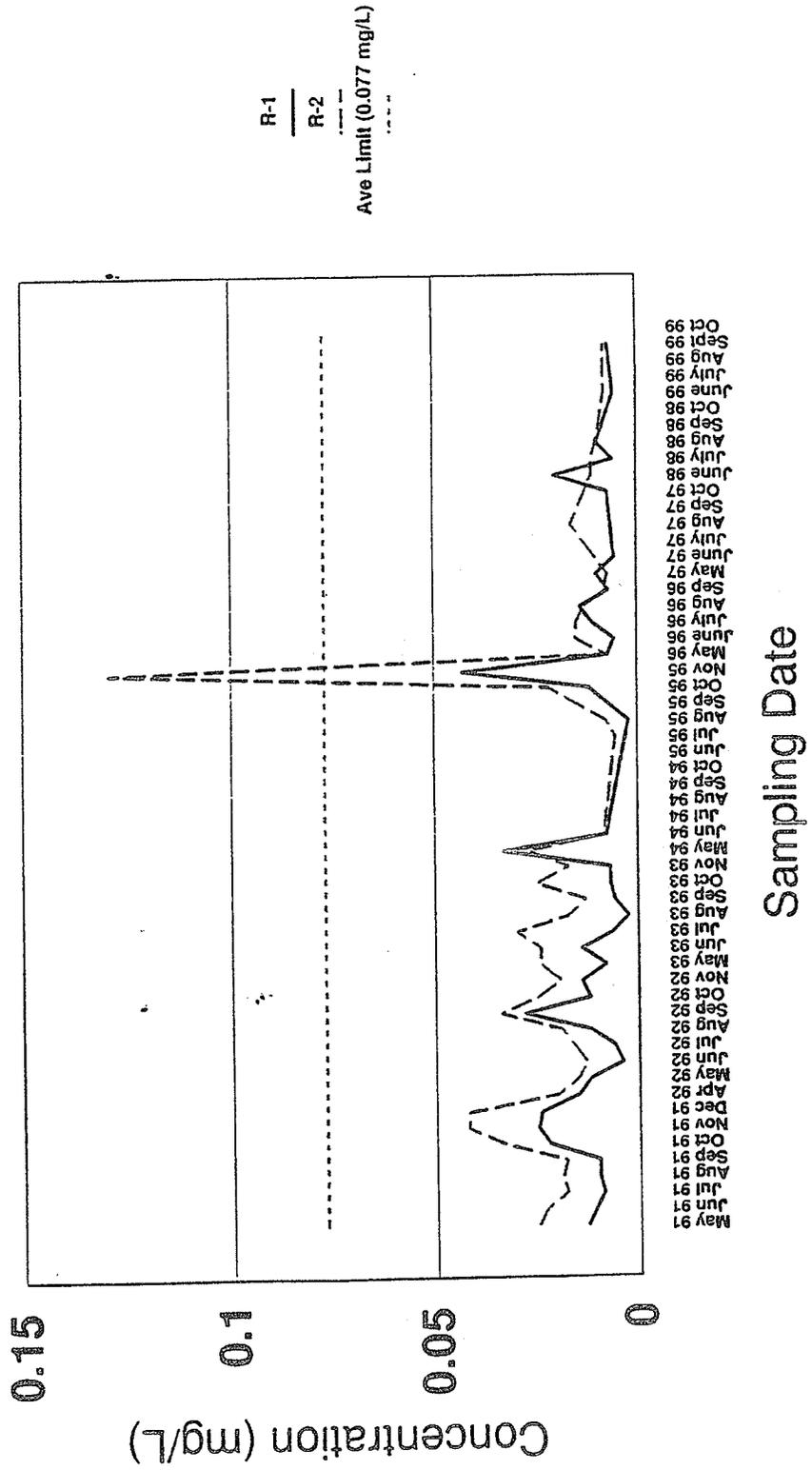


Chart 5

Iron Concentrations at R-1 and R-2 Dolly Creek Above and Below Walker Tailings 1991 - 1999

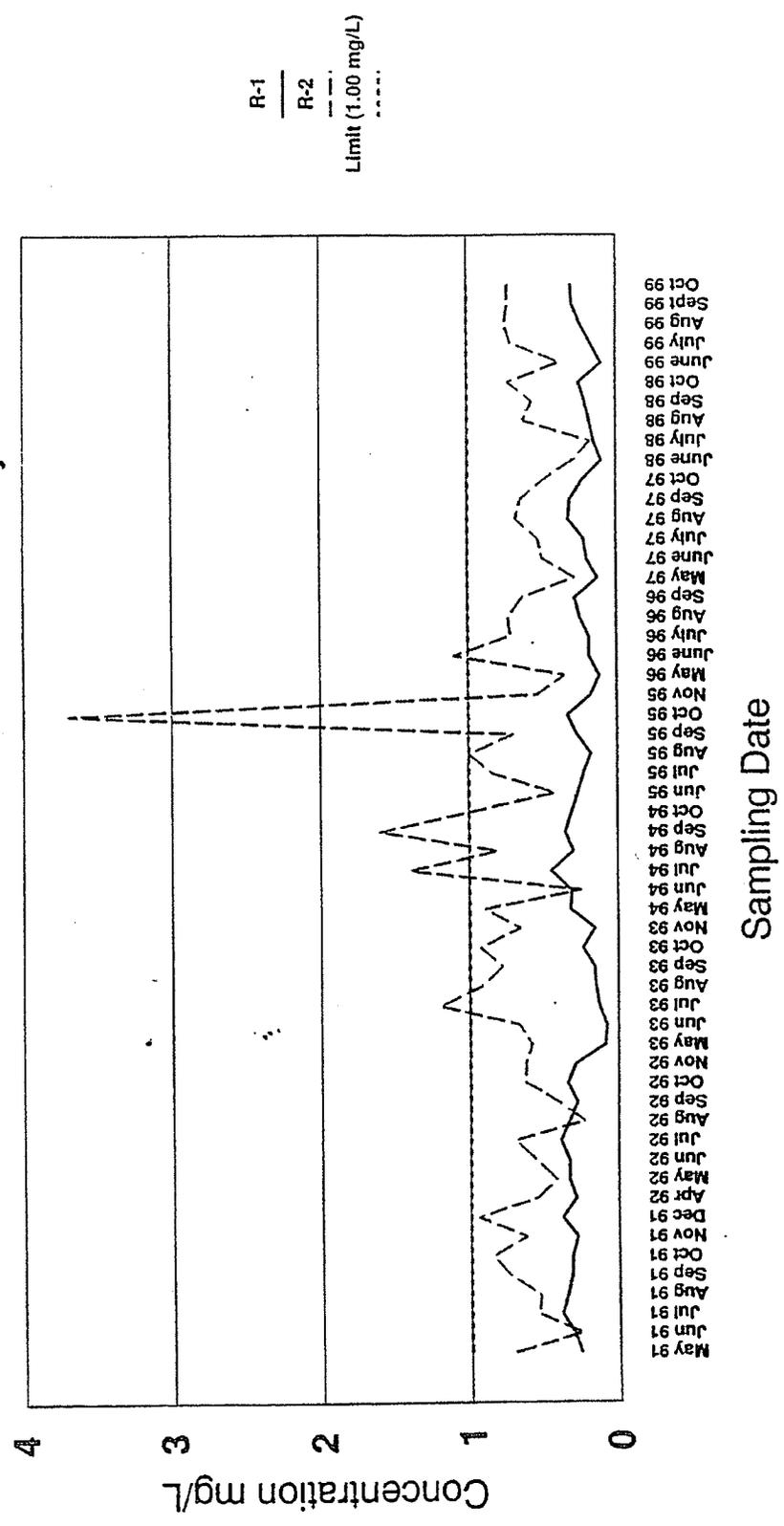


Chart 6

Copper Concentrations at R-3 and R-4 Little Grizzly Creek Above and Below Walker Tailings 1986 - 1999

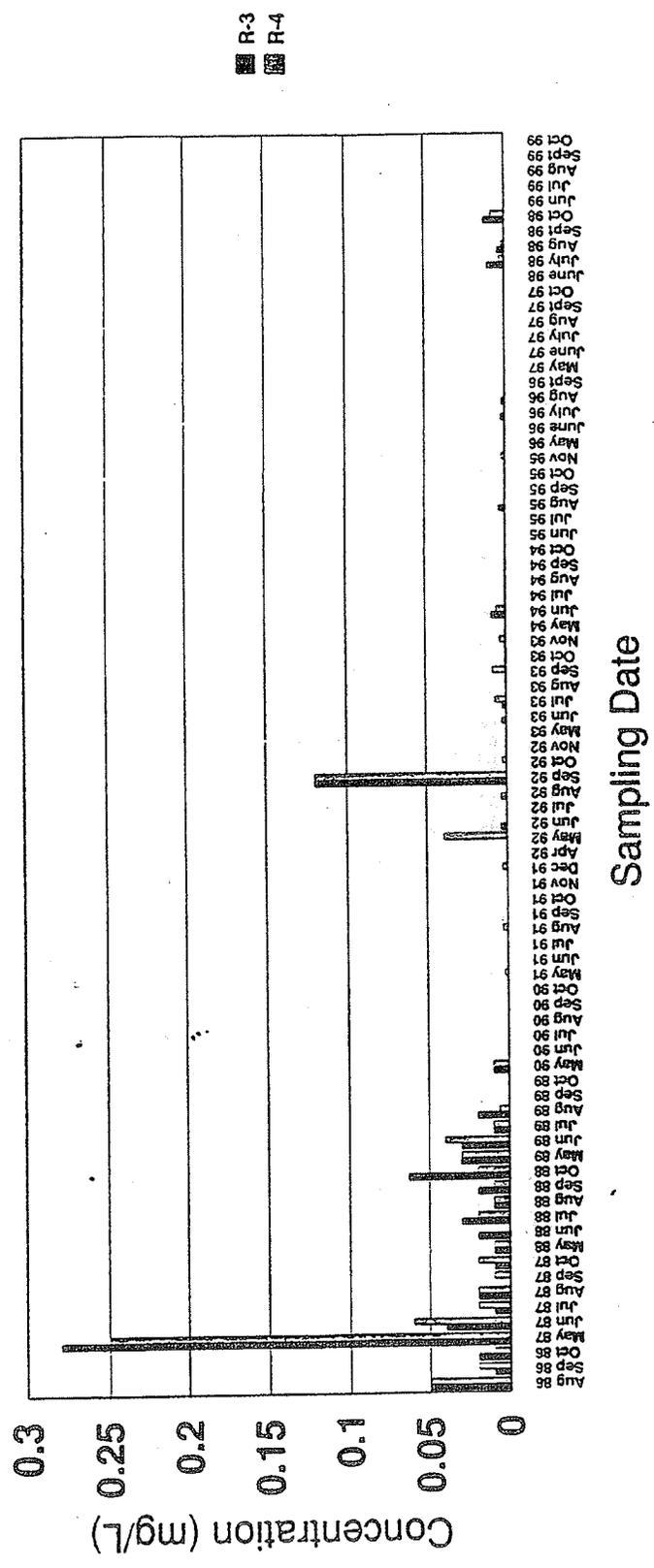


Chart 7

Copper Concentrations at R-3 and R-4 Little Grizzly Creek Above and Below Walker Tailings 1991 1999

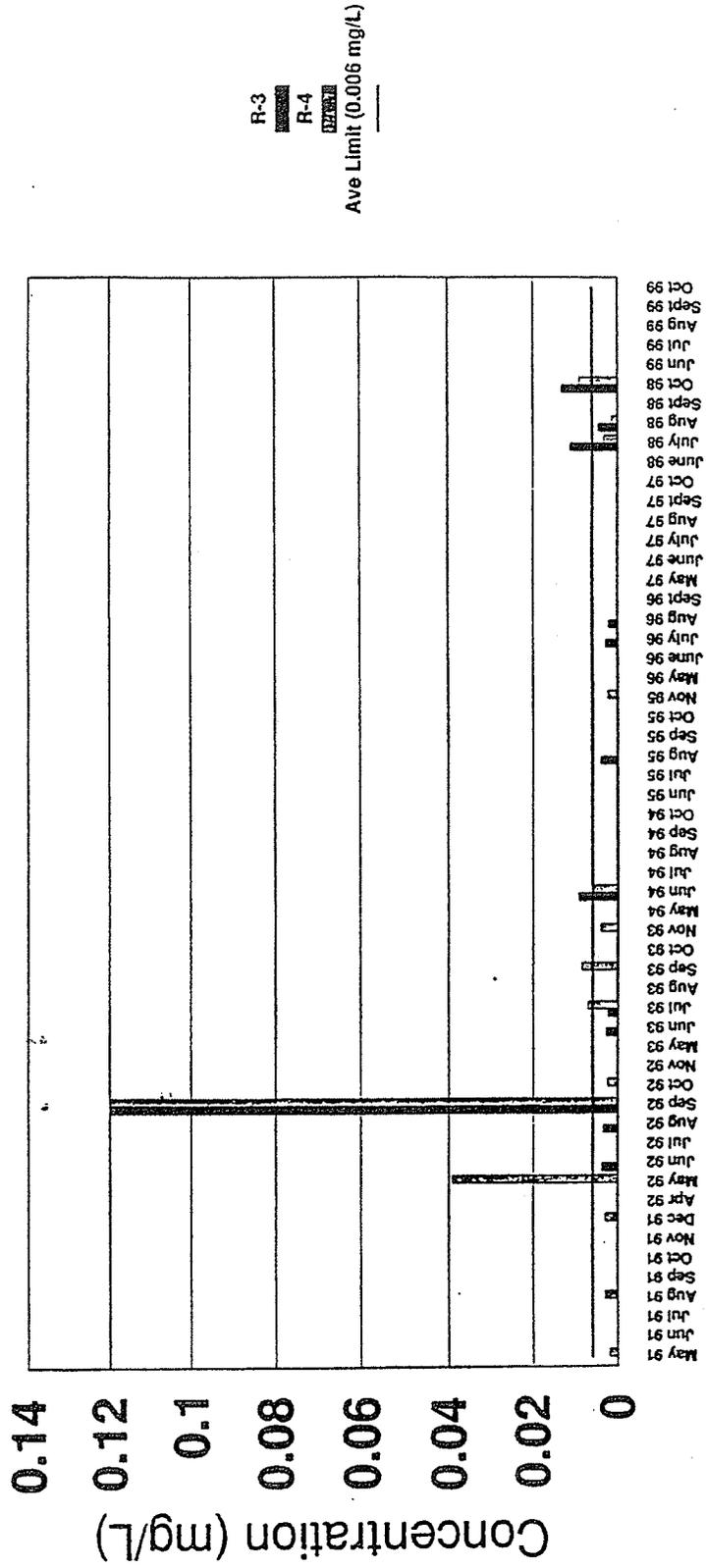


Chart 8

Zinc Concentrations at R-3 and R-4 Little Grizzly Creek Above and Below Walker Tailings 1986 - 1999

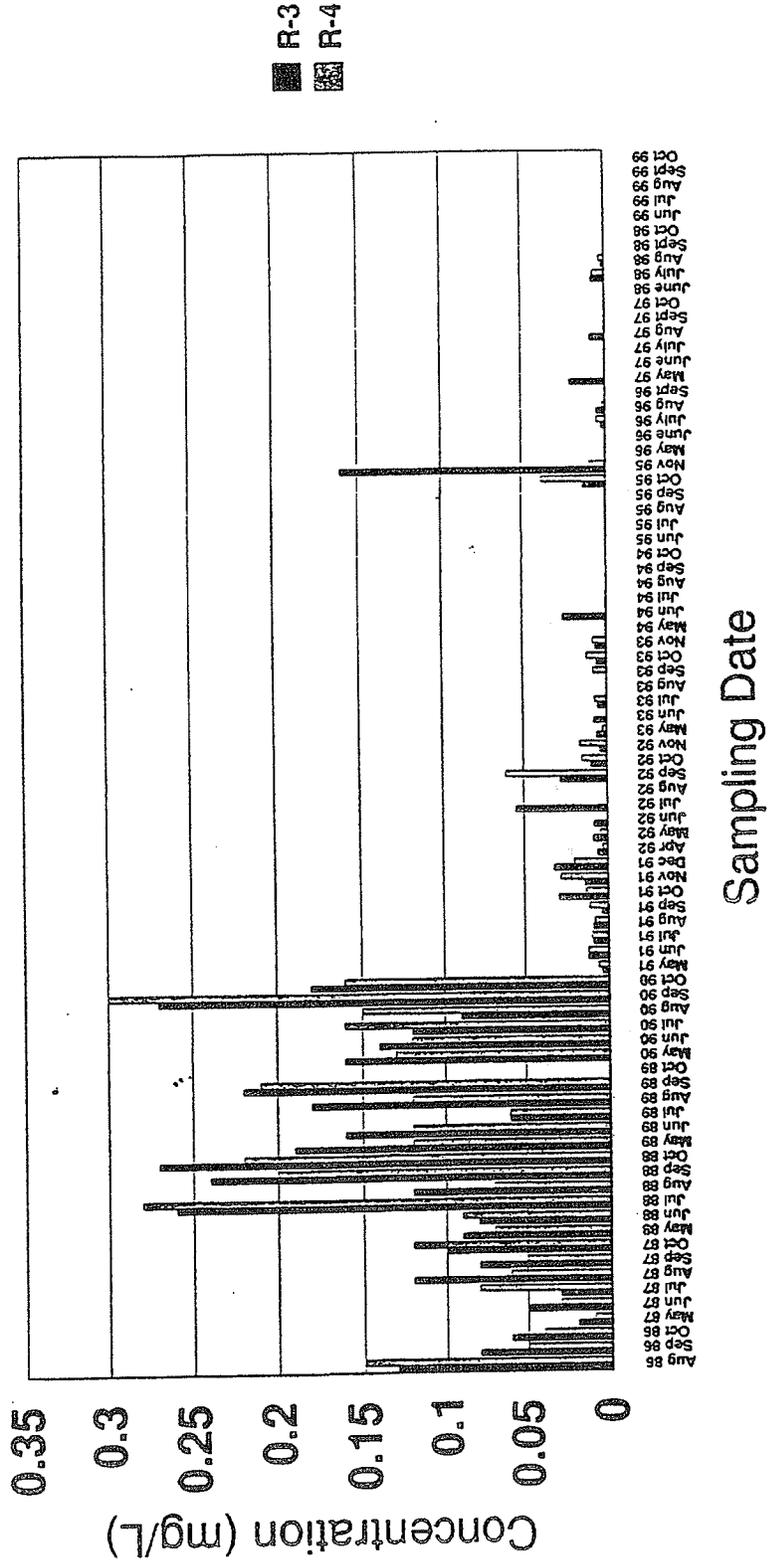


Chart 9

Zinc Concentrations at R-3 and R-4 Little Grizzly Creek Above and Below Walker Tailings 1991 - 1999

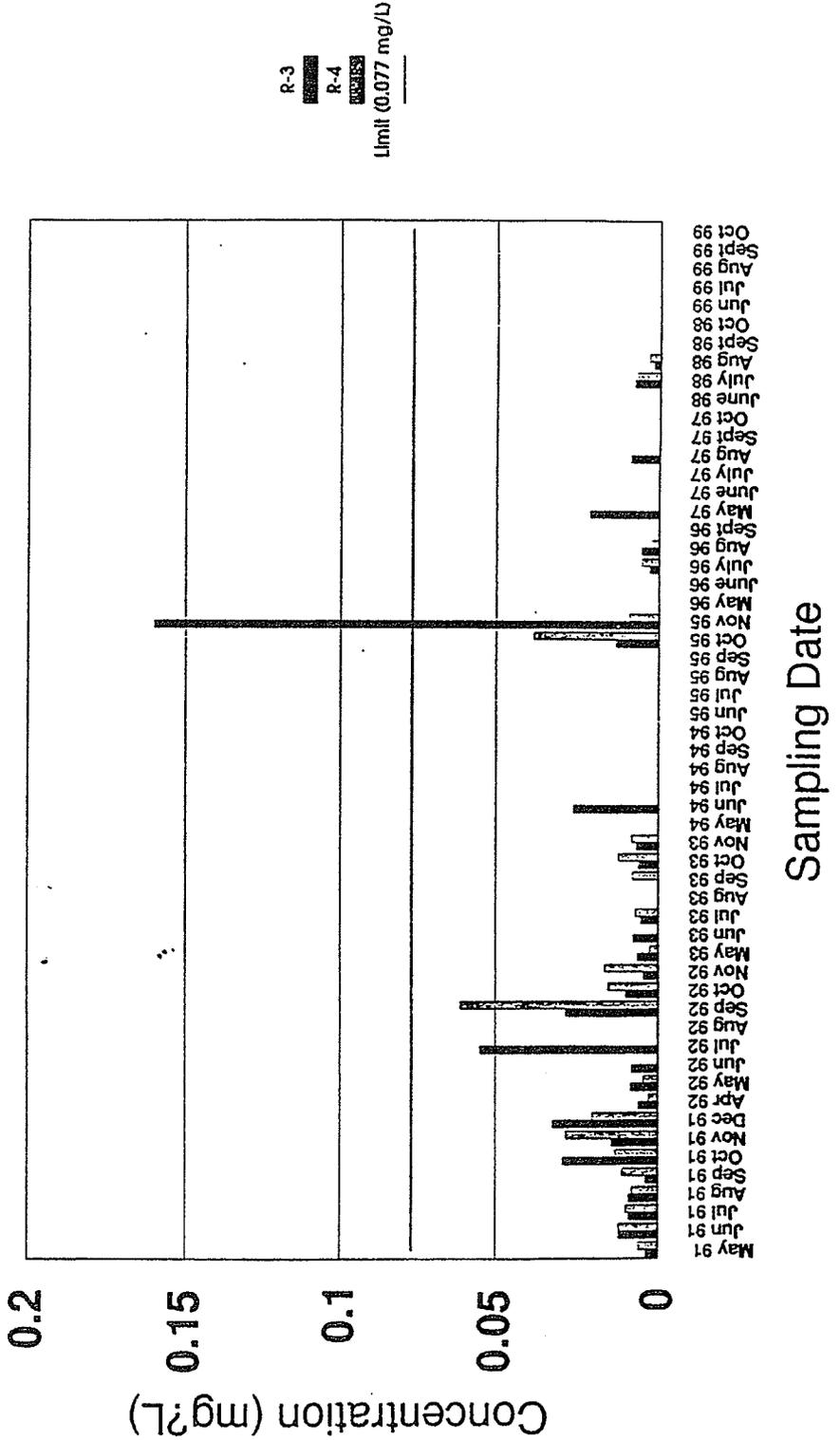


Chart 10

Iron Concentrations at R-3 and R-4 Little Grizzly Creek Above and Below Walker Tailings 1991 - 1999

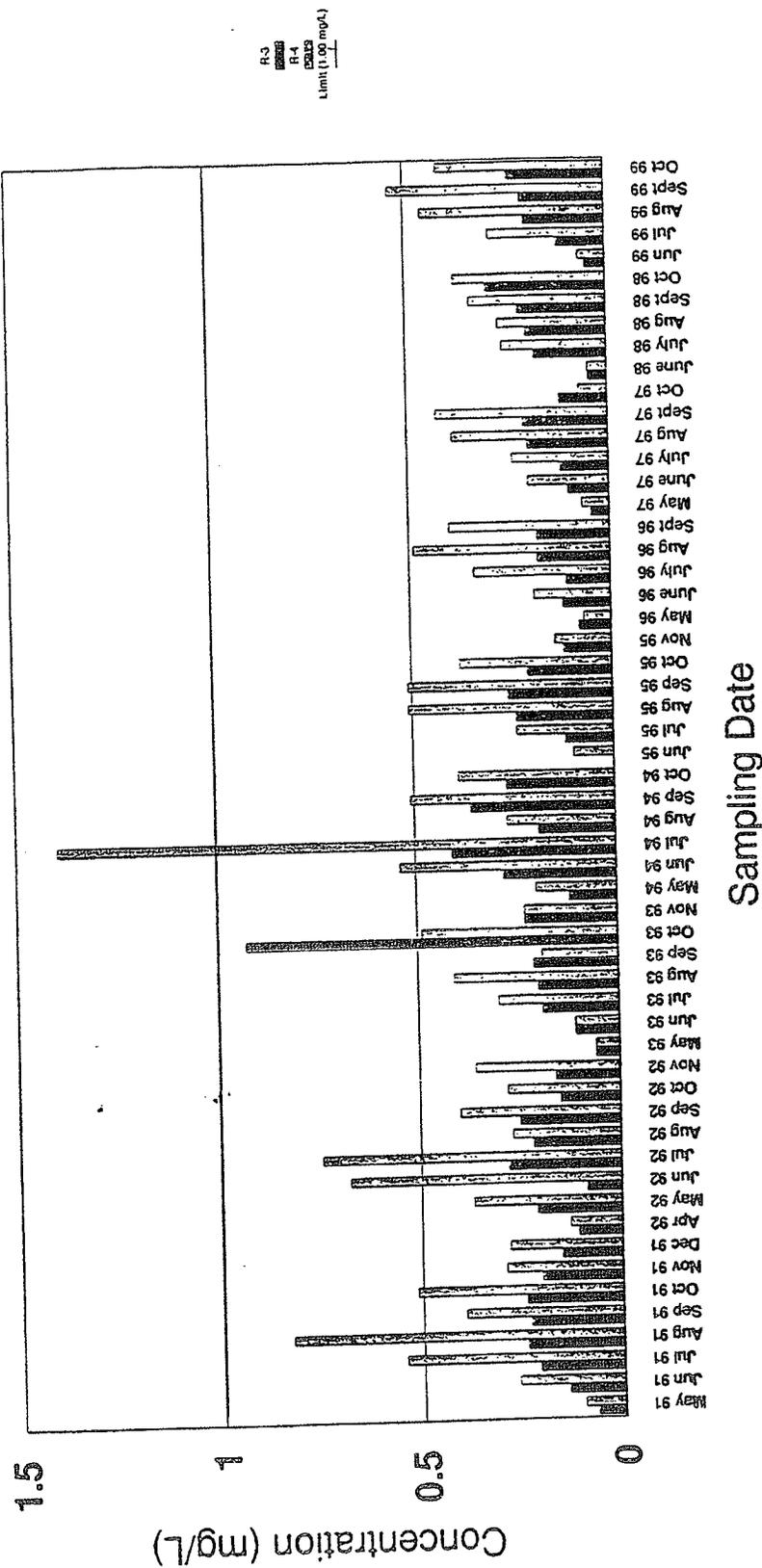
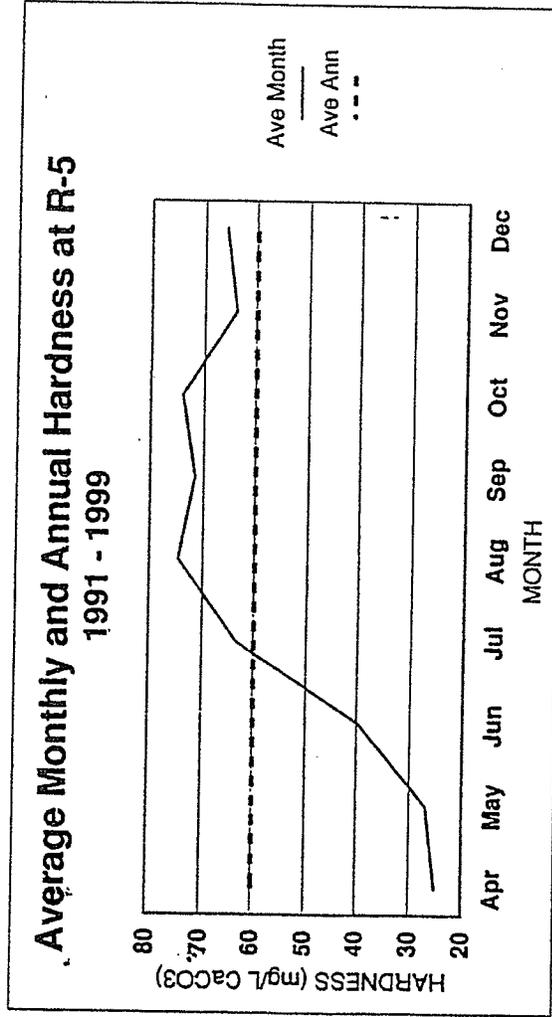


Chart 13



Ave Month Hardness mg/L	Ave Annual Hardness mg/L
25	60
27	60
40	60
64	60
75	60
72	60
74	60
64	60
66	60

Chart 14

YEAR	R-5 Average Cu Conc. mg/L	R-5 Ave Season Flow cfs
1991	0.081	3.66
1992	0.028	1.77
1993	0.087	11.76
1994	0.037	1.76
1995	0.068	19.28
1996	0.055	20.20
1997	0.026	11.26
1998	0.036	26.96
1999	0.036	8.78

**Average Annual Copper Concentrations and Flows at R-5
Little Grizzly Creek Below Confluence with Dolly Creek
1991 - 1999**

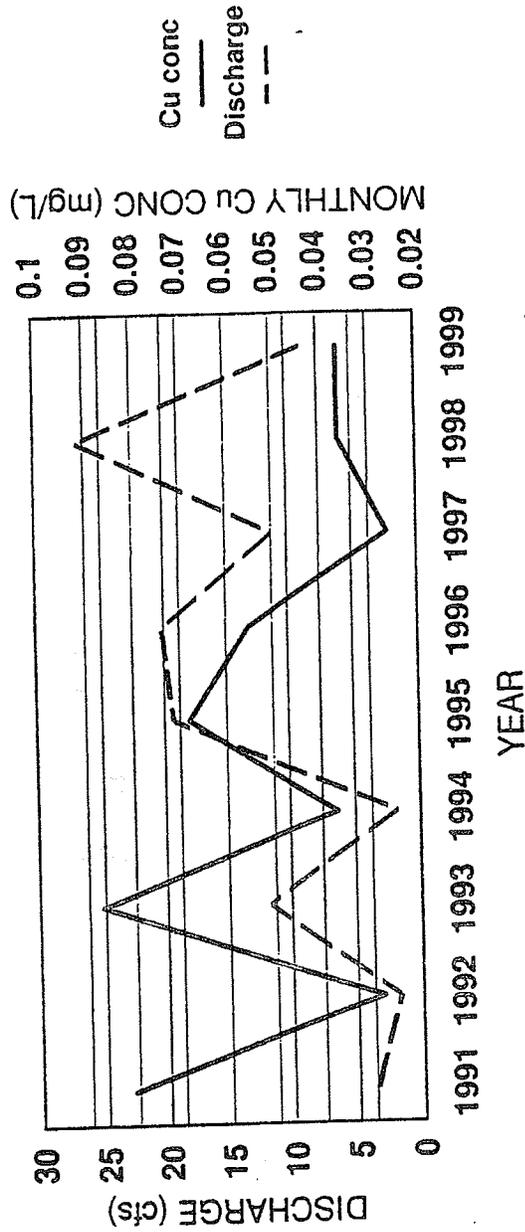


Chart 15

Ave Month Copper mg/L	Ave Monthly Cu Limit mg/L
0.0000	0.0027
0.0288	0.0029
0.0466	0.0041
0.0691	0.0061
0.0625	0.0070
0.0443	0.0068
0.0524	0.0069
0.0658	0.0061
0.0560	0.0063

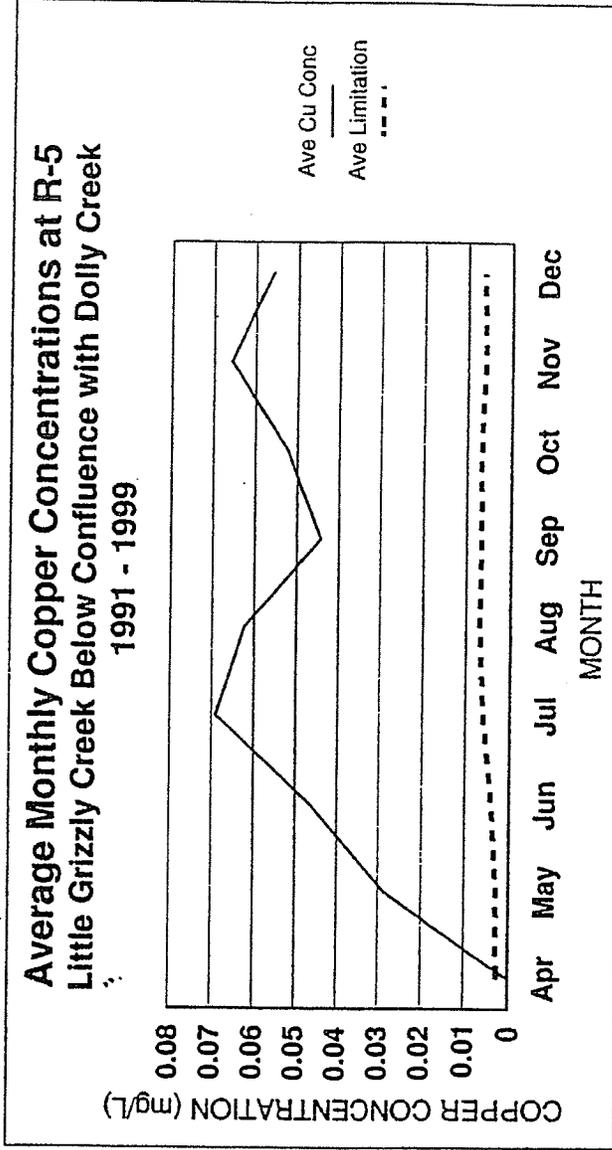
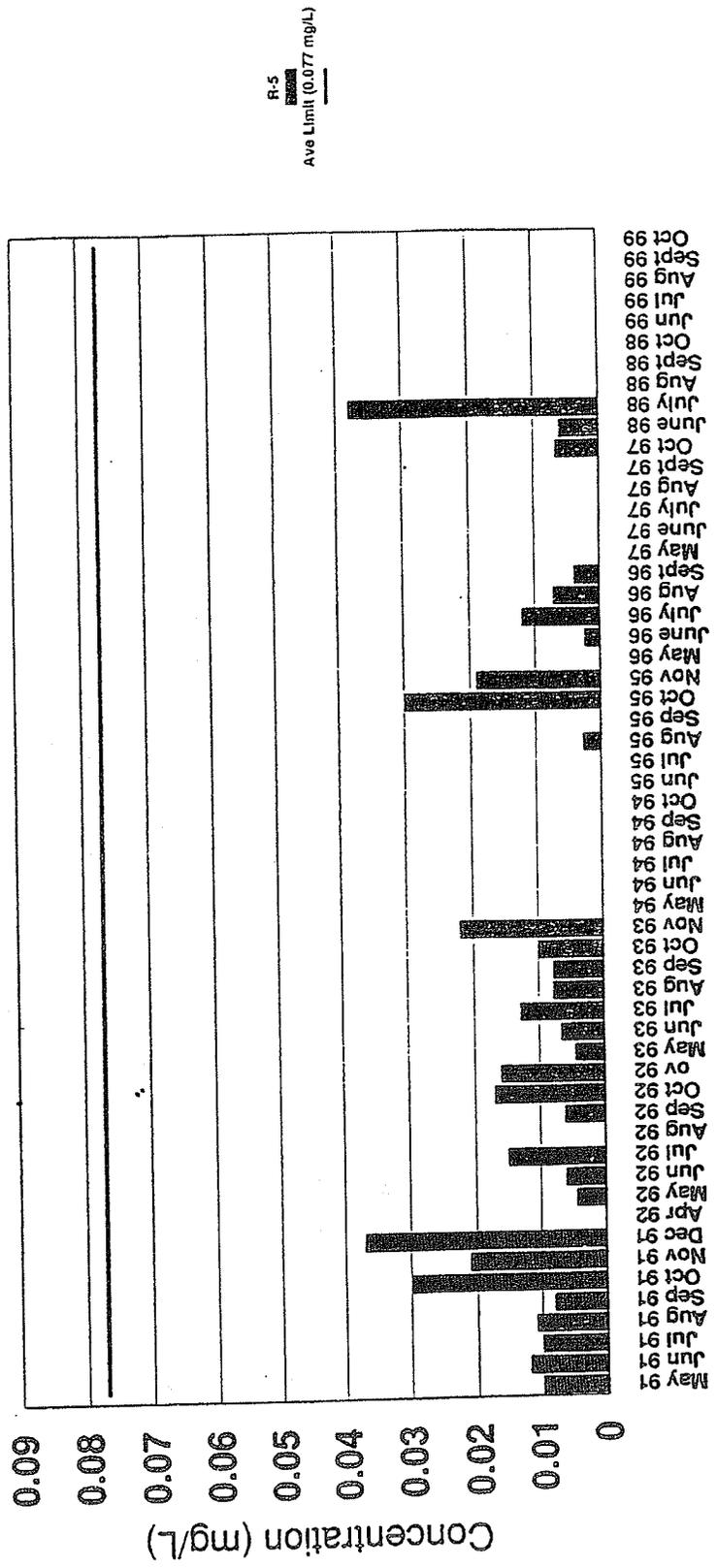


Chart 16

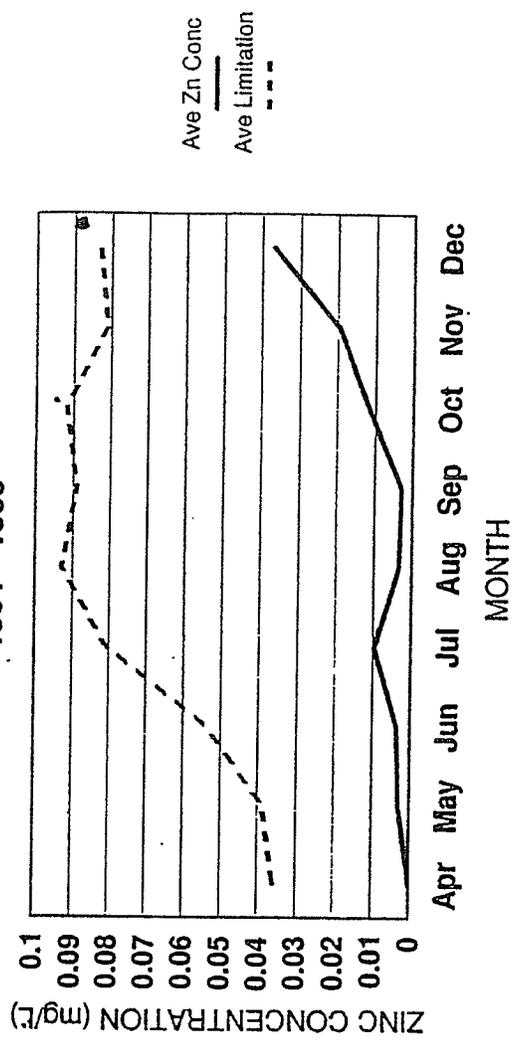
Zinc Concentrations at R-5 Little Grizzly Creek Below Confluence with Dolly Creek 1991 - 1999



Sampling Date

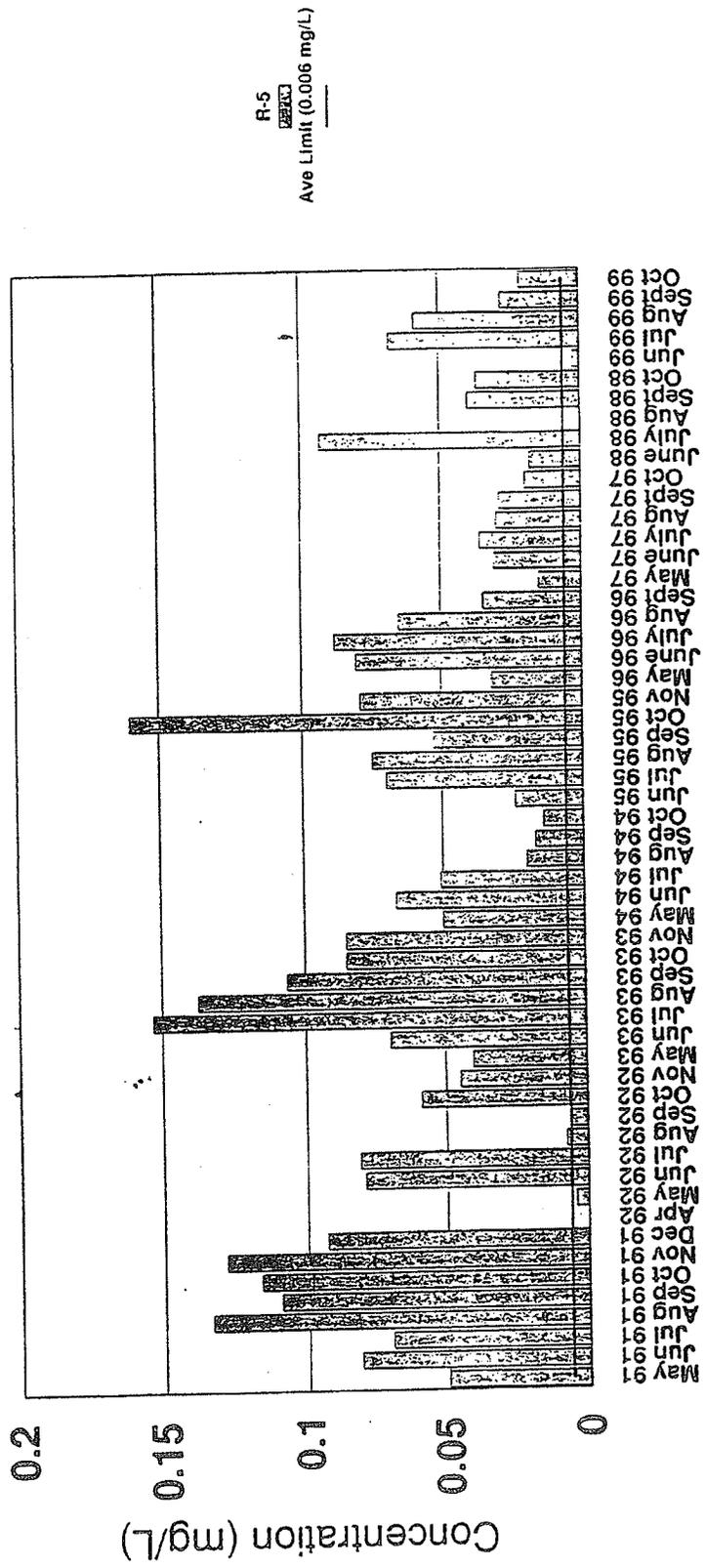
Chart 17

**Average Monthly Zinc Concentrations at R-5
Little Grizzly Creek Below Confluence with Dolly Creek
1991 - 1999**



MONTH	Ave Month Zinc mg/L	Ave Monthly Zn Limit mg/L
Apr	0.000	0.036
May	0.003	0.039
Jun	0.004	0.054
Jul	0.010	0.081
Aug	0.004	0.093
Sep	0.003	0.089
Oct	0.012	0.092
Nov	0.020	0.081
Dec	0.037	0.083

Cu + Zn Concentrations at R-5 Little Grizzly Creek Below Confluence with Dolly Creek 1991 - 1999



Sampling Date

R-5
Ave Limit (0.006 mg/L)

Iron Concentrations at R-5 Little Grizzly Creek Below Confluence with Dolly Creek 1991 - 1999

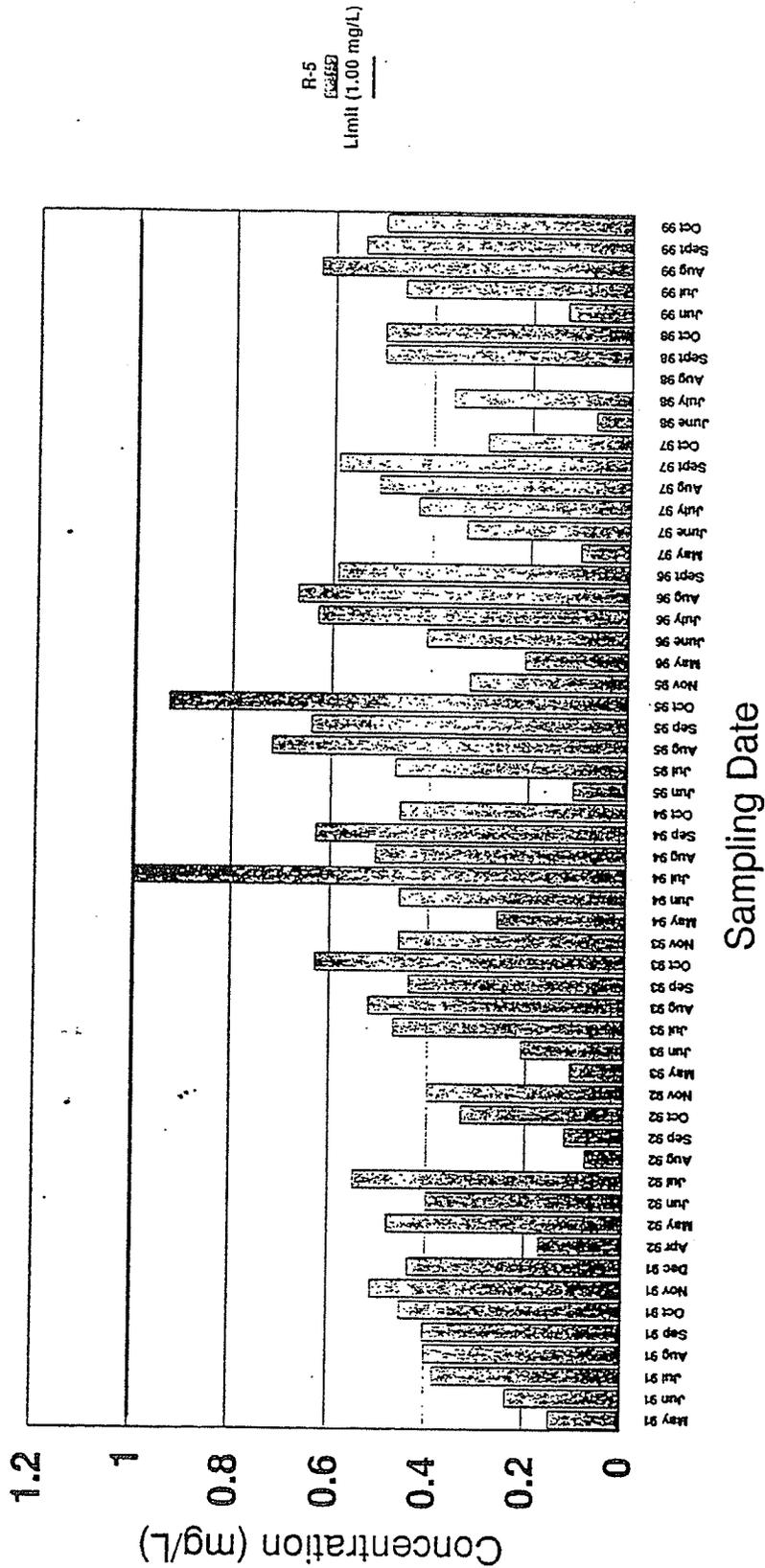
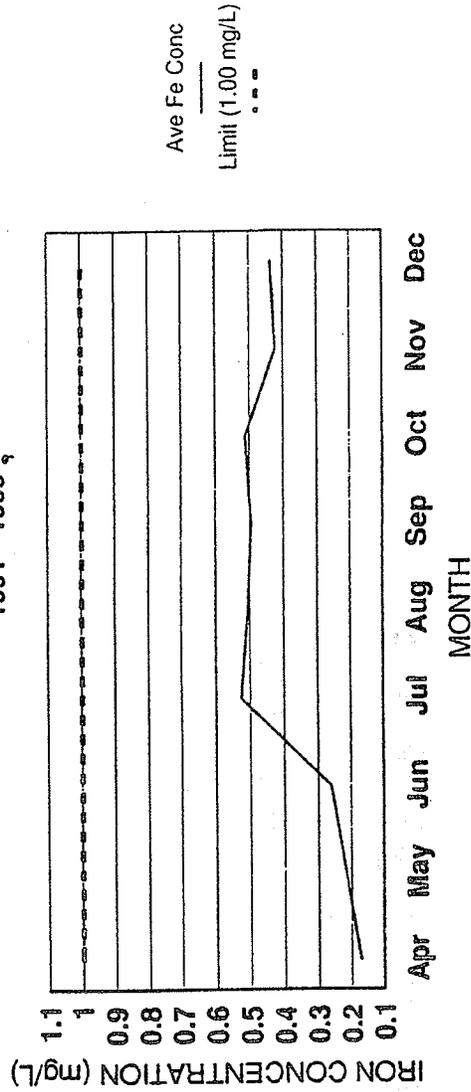


Chart 20

**Average Monthly Iron Concentrations at R-5
Little Grizzly Creek Below Confluence with Dolly Creek
1991 - 1999**



MONTH	Ave Month Iron mg/L	Limitation Iron mg/L
Apr	0.170	1.000
May	0.218	1.000
Jun	0.262	1.000
Jul	0.526	1.000
Aug	0.505	1.000
Sep	0.495	1.000
Oct	0.512	1.000
Nov	0.423	1.000
Dec	0.437	1.000

Chart 21a

Flows at R-1 and R-2

Dolly Creek Above and Below Walker Tailings

1986 - 1999

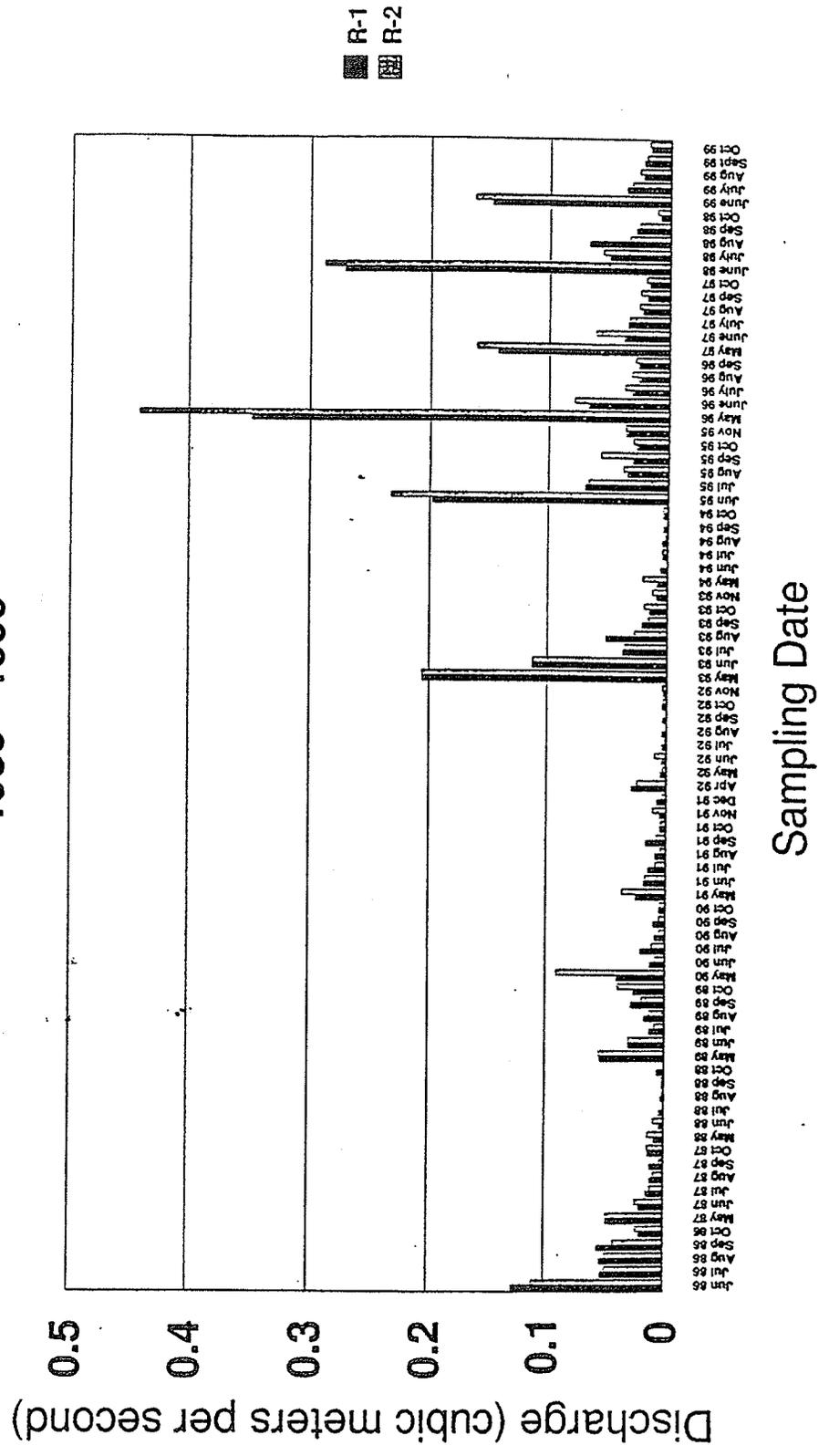
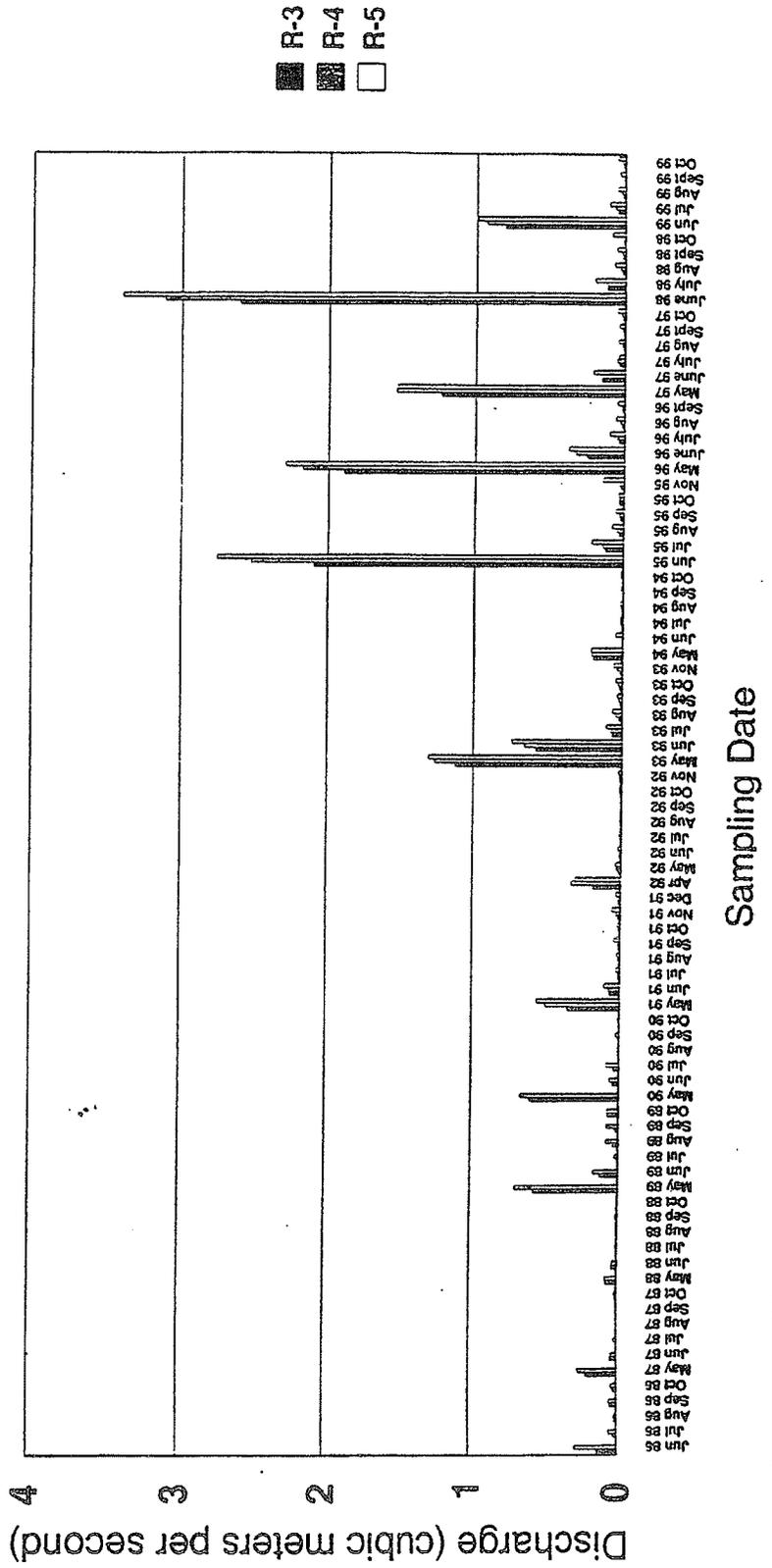


Chart 21b

Flows at R-3, R-4, and R-5 Little Grizzly Creek Above and Below Walker Tailings 1986 - 1999



Appendix 2

ROD Amendment
Walker Mine Tailings, Plumas National Forest



United States
Department of
Agriculture

Forest
Service

Plumas
National
Forest

159 Lawrence Street
P.O. Box 11500
Quincy, CA 95971-6025
(530) 534-7984 Text (TDD)
(530) 283-2050 Voice

File Code: 2540

Date: December 18, 2000

Mr. Patrick Morris
California Regional Water Quality Control Board
Central Valley Region
3443 Routier Road
Sacramento, CA 95827-3098

Dear Mr. Morris. ▸

Please find attached two reports required by Waste Discharge Requirements Order No. 5-00-028 for the U.S. Department of Agriculture, Forest Service, Plumas National Forest at the Walker Mine Tailings in Plumas County. The reports are (1) Quarterly Monitoring Report for September 2000 and (2) the Annual Monitoring Report.

Samples collected September 13, 2000 by Sierra Environmental were taken to Henrici Water Laboratory, near Quincy, for analysis. The Henrici laboratory sent a second set of samples to North Coast laboratories Ltd., in Arcata, California, for metals analyses.

Negotiations with the Atlantic Richfield Company (ARCO) over the Draft Revised Proposed Treatment Plan is still pending. We do expect to have a signed amended ROD in the near future.

Please call Terry Benoit of this office if you have questions.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in the attached documents and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

MARK J. MADRID
Forest Supervisor

attachment



ANNUAL MONITORING REPORT

WDR Order Number: 5-00-028

Discharger: USDA Forest Service, Plumas National Forest

Facility: Walker Mine Tailings, Plumas County

Reporting Frequency: Annual Summary

Monitoring Period: Calendar Year 2000

Findings:

(1) Surface Water. Samples were collected during May, July, and September, as prescribed in the Waste Discharge Requirements. Adjusting for hardness at the Compliance Station (R-5), the calculated limitation for dissolved copper was exceeded during each of the sampled months. The limitations for iron and zinc were not exceeded in any of the samples collected.

Testing for copper at R-3, the background station on Little Grizzly Creek, and R-4, Little Grizzly Creek above the confluence with Dolly Creek, has produced some unusual results (refer to Map 1). Test results from the July samples show a concentration of 23 ug/l at R-3 while the downstream result at R-4 was below the detection limit. The detection limit was raised from 5 ug/l to 10 ug/l due to the need to dilute the samples because of high concentrate readings. The water testing laboratory said that the reading for copper would probably have been non-detectable at R-4 even if the detection limit had been set at 5 ug/l.

Reviewing the copper test results from 1991 to present for R-3 and R-4 indicates that copper concentrations above the detection limits were found in the waters of Little Grizzly Creek above the confluence with Dolly Creek 22% and 24% of the time (Table 1). Only one set of samples, those taken in September 1992, exceeded water quality limitations. The reason is unknown. About half the time copper is detected at R-3 it is not detected downstream at R-4. Again, there's no explanation. In fact, there's no concrete explanation for the detection of copper at the R-3 station at all. The only apparent contamination of Little Grizzly Creek at that location is the occasional drift of tailings material blown by the wind into this upstream area. Even with this apparent contamination pathway, it does not seem plausible that concentrations of copper in samples taken at R-3 could be detected.

Although the copper concentrations at R-1, Dolly Creek above the tailings area, did not exceed the limitations calculated for R-5, copper was still detected from samples taken at that site, all three sampling times. The results from the R-2 samples, Dolly Creek below the tailings area, confirm the tailings area as the primary source of copper to the receiving waters, amounting to over 90% of the copper in Dolly Creek at that location (Table 2 and Chart 1). The reduction in copper concentrations between stations R-2 and R-5, the compliance station on Little Grizzly Creek, was 89% in May, 61% in July, and 66% in September. These results are more similar to those of the pre-1995 period, when weather conditions were dryer than normal. The 2000 water year was considered a near average year for precipitation, but below average runoff, probably due to a below average snow pack. Table 3 displays flow amounts for the three sampling periods from 1991 through 2000.

(2) Groundwater. As specified in the WDR, three monitoring wells (W-3, W-5, and W-7) were sampled twice, in May and September. A summary of the test results of this year's sampling is compared to that taken in 1992, the year the wells were installed, and 1994-1995, the only other years the wells were sampled (Table 4). Only well W-3 was sampled in 1992, but all wells were sampled in 1994 each month from July through October. All wells were sampled twice in 1995, June and November.

The test results for the 1992 sampling are questionable and may reflect the values taken from tailings material extraction water, rather than the well water itself (refer to Table 4.0 on page 14 of the Westec Report, "Monitoring Well As-Built and Waste Characterization Program for the Walker Mine Tailings", August 18, 1993, Report No. 732).

Generally, dissolved copper and zinc were not detected in any of the wells. The exceptions for copper are at W-4 and W-6 during three months in 1994, August through October. Like copper, zinc is generally at non-detectable concentrations, but does show up in W-4 in 1994 and again in W-1 and W-7 (the background well) in 1995 (Refer to Map 2). No explanation for the zinc in the background well.

Test results for total copper and zinc in the 1994 and 1995 samples indicate that these constituents are present throughout the tailings area. The characterization of the tailings material in 1992 by Westec confirmed the presence and established the concentration of these constituents throughout the tailings area. The characterization program included not only the seven monitoring wells, but also an additional seven boreholes.

One can basically conclude that even though copper and zinc are present in the tailings material throughout the site, they are not entering into solution (except along the Dolly Creek channel). This is confirmed by the surface water-sampling program, in which samples taken at the base of the tailings in Little Grizzly Creek (R-4) generally indicate that these constituents are at non-detectable levels. It's only after Little Grizzly Creek mixes with Dolly Creek that soluble copper and zinc are detected.

The same cannot be said about iron. Not only is dissolved iron found in all the wells sampled, it is prevalent in all surface waters sampled (refer to the January 7, 2000

summary report by the Forest Service, "Analysis of Surface Water Quality at the Walker Mine Tailings, 1986-1999"). This includes both background stations, W-7 and R-3. Iron precipitates are readily seen all along Little Grizzly Creek where it flows along the base of the tailings and in the Dolly Creek channel as it flows across the tailings area. Iron precipitates can also be found in both channels above and below the tailings area. The water level in each well is measured during each sampling month, May and September. A map displaying the groundwater gradient and direction was produced for each of the two months (refer to Maps 3 and 4). The maps show groundwater contour lines in five-foot increments. Generally, the groundwater in the tailings area drains in two directions, towards the tailings dam along Dolly Creek and towards the settling pond near R-6. The groundwater gradient steepens by the end of the summer season, dropping five feet near the dam and ten feet at the settling pond.

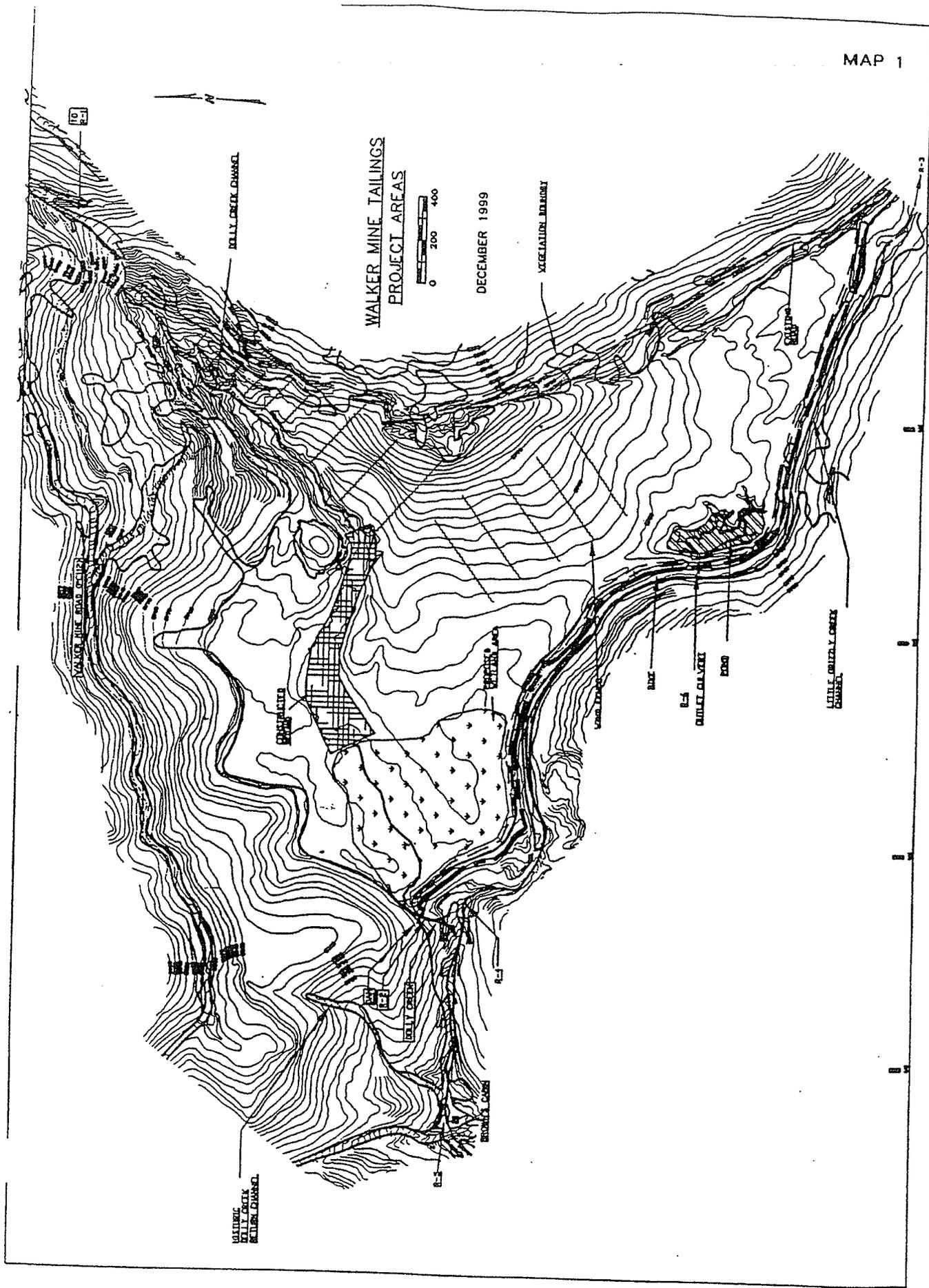
Groundwater depths are listed in Table 5 for 1993, 1994, 1995, and 2000. Though the data is preliminary, the W-7 data seems to indicate a lag time in response to weather changes with no change seasonally, while all other wells seem to respond primarily to seasonal changes and secondarily to weather changes.

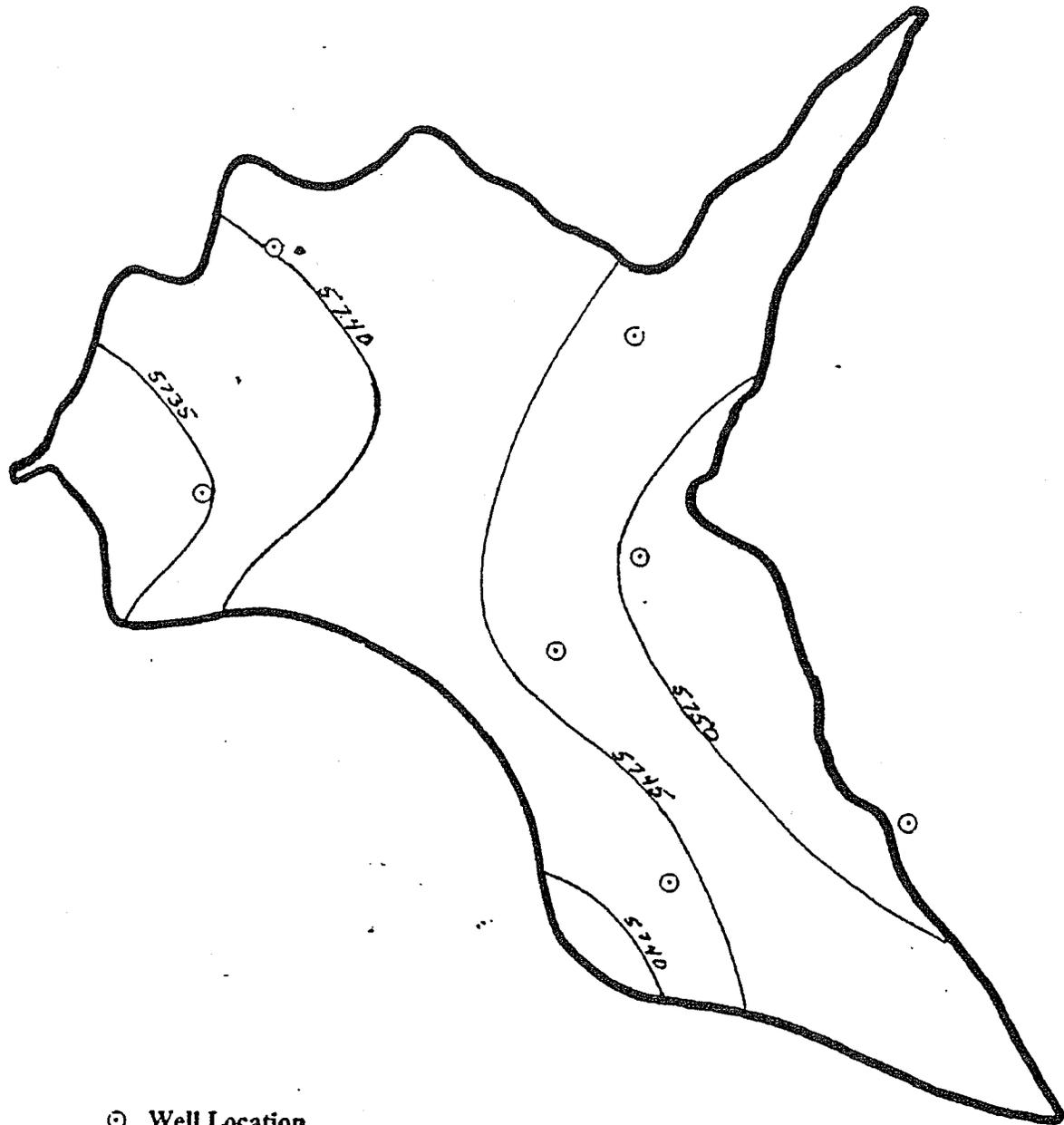
During the 2000 monitoring season, groundwater elevations at W-7 remained nearly constant throughout the season and that at W-4 dropped six feet (Table 6 and groundwater contour maps). W-4 receives water from the slope above the tailings area east side while W-7 is located in a seep area along the same slope (refer to Maps 1 and 2). Only the groundwater elevation data collected in 1994 can be added to this year's data. The table compares the wet month (May) depth to water with that of the dry month (September). The change in depth to water for each well shows a definite drop, but it also shows a definite response to weather conditions and location. As at W-7, W-2 is spring fed. The drop in groundwater elevation at W-2 seems to reach a maximum at about three feet.

Groundwater elevations at W-3 are important to look at from the standpoint of the proposed anaerobic wetland. The depth to water this year was from four to six feet, but the drop in 1994, the last year of dry period, was from six feet to over 34 feet. Implementation of the 1994 ROD was underway during the summer of that year, including construction of the aerobic wetland. This may be the cause of the dramatic drop in groundwater at W-3. Surface water did continue to flow over the dam all months that year. Excluding the 1994 data, the depth to groundwater at W-3 appears about six feet (Table 5) and the seasonal drop is less than two feet (Table 6). Except for the driest year since monitoring began, water continues to flow over the tailings dam at all times. In August 1992, Dolly Creek flows did not reach the tailings dam during the heat of the day.

(3) Channel Substrate Analysis (Pebble Count). One of the measured changes that should occur as a result of rehabilitating the tailings area is a decreased transport of tailings material to Little Grizzly Creek. Though most of the material moves during times of high flows when sampling does not normally occur, evidence of its occurrence should be measurable by analyzing channel substrate size classes. The current WDR requires that a "Wolman pebble count" be conducted once a year in September. A complete discussion

of the results of the first pebble count, conducted last September, can be found in that report. Essentially, the analysis found that some tailings material is depositing at the compliance station, R-5. This same material is not found upstream, near the R-6 station.



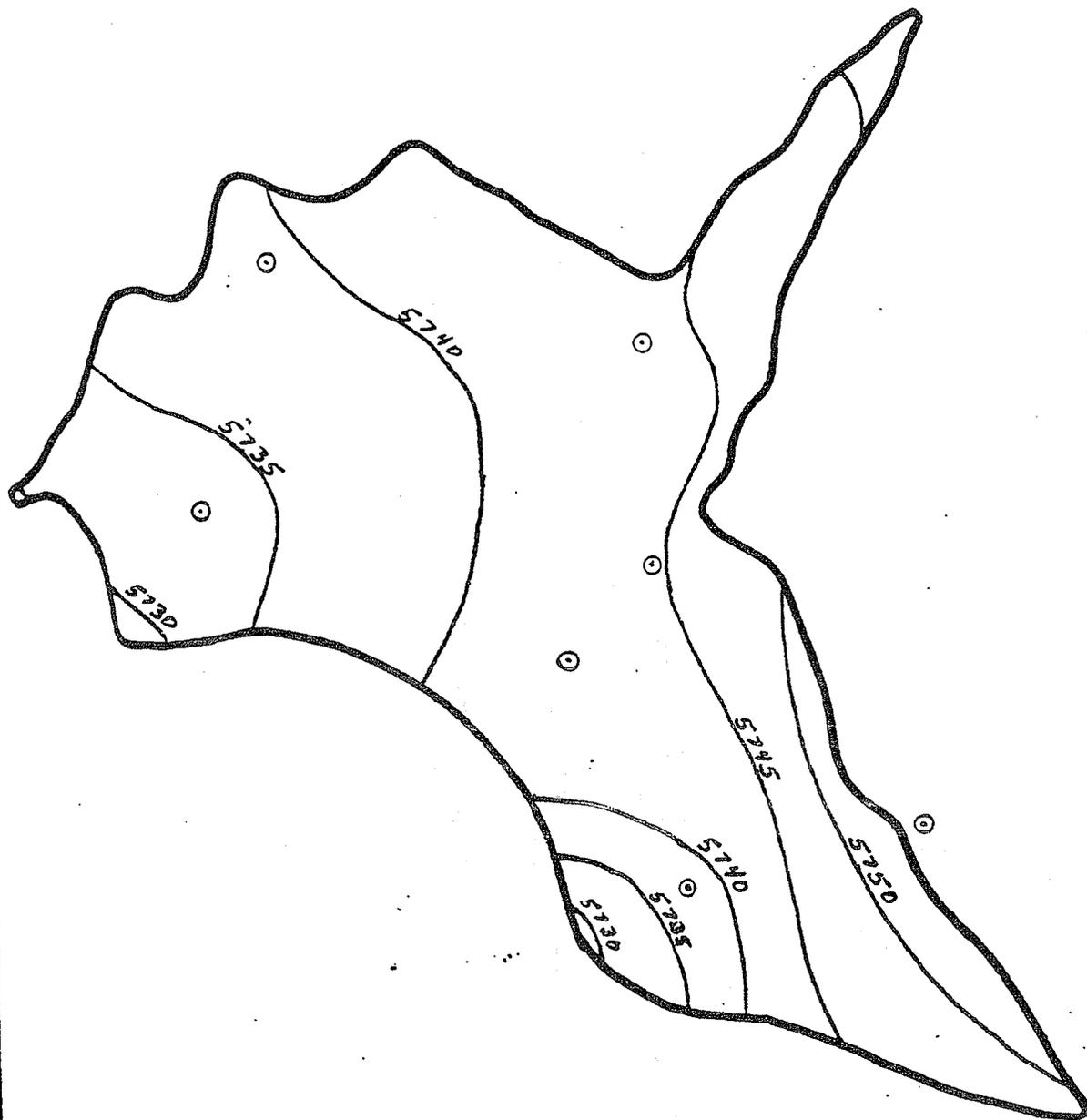


⊙ Well Location
Groundwater Elevation Isopleth

Scale: 1" = 500'

WALKER MINE TAILINGS
GROUNDWATER CONTOUR MAP

May 2000



⊙ Well Location
5740 Groundwater Elevation Isopleth

Scale: 1" = 500'

WALKER MINE TAILINGS
GROUNDWATER CONTOUR MAP

September 2000

**Copper Concentrations at R-3 and R-4
Little Grizzly Creek Above and Below Walker
Falls**

Table T

Date	R-3 Copper mg/L	R-4 Copper mg/L
May 91	ND	0.0020
Jun 91	ND	ND
Jul 91	ND	ND
Aug 91	ND	0.0030
Sep 91	ND	ND
Oct 91	ND	ND
Nov 91	ND	ND
Dec 91	ND	0.0030
Apr 92	ND	ND
May 92	ND	0.0390
Jun 92	0.0039	ND
Jul 92	ND	ND
Aug 92	0.0036	ND
Sep 92	0.1200	0.1200
Oct 92	ND	0.0024
Nov 92	ND	ND
May 93	ND	ND
Jun 93	0.0028	ND
Jul 93	0.0024	0.0070
Aug 93	ND	ND
Sep 93	ND	0.0083
Oct 93	ND	ND
Nov 93	ND	0.0040
May 94	ND	ND
Jun 94	0.0090	0.0057
Jul 94	ND	ND
Aug 94	ND	ND
Sep 94	ND	ND
Oct 94	ND	ND
Jun 95	ND	ND
Jul 95	ND	ND
Aug 95	0.0041	ND
Sep 95	ND	ND
Oct 95	ND	ND
Nov 95	ND	0.0023
May 96	ND	ND
June 96	ND	ND
July 96	0.0029	ND
Aug 96	0.0022	ND
Sept 96	ND	ND
May 97	ND	ND
June 97	ND	ND
July 97	ND	ND
Aug 97	ND	ND
Sept 97	ND	ND
Oct 97	ND	ND
June 98	ND	ND
July 98	0.0110	0.0034
Aug 98	0.0046	0.0015
Sept 98	ND	ND
Oct 98	0.0130	0.0088
Jun 99	ND	ND
Jul 99	ND	ND
Aug 99	ND	ND
Sept 99	ND	ND
Oct 99	ND	ND
May 00	ND	ND
Jul 00	0.023	ND
Sep 00	ND	ND
x	0.0034	0.0036
n	59	59
s	0.0158	0.0162
max	0.1200	0.1200
min	0.0000	0.0000

Summary Water Quality Data for R-1, R-2 and R-5 1991 - 2000

Table 2

Year	R-1 Cu Conc. (mg/l)			R-2 Cu Conc. (mg/l)			R-5 Cu Conc. (mg/l)		
	May/June	July	September	May/June	July	September	May/June	July	September
1991	0.110	0.044	0.023	0.572	0.256	0.362	0.040	0.060	0.102
1992	0.034	0.034	0.033	0.250	0.360	0.240	0.000	0.066	0.000
1993	0.024	0.110	0.047	0.370	0.450	0.230	0.036	0.140	0.099
1994	0.074	0.029	0.021	0.500	0.210	0.088	0.050	0.051	0.017
1995	0.086	0.055	0.042	0.190	0.220	0.100	0.024	0.070	0.053
1996	0.065	0.017	0.014	0.150	0.180	0.066	0.032	0.076	0.031
1997	0.002	0.011	0.013	0.092	0.082	0.060	0.015	0.036	0.029
1998	0.050	0.015	0.011	0.150	0.180	0.080	0.012	0.055	0.040
1999	0.016	0.014	0.017	0.017	0.180	0.071	0.002	0.068	0.028
2000	0.014	0.016	0.009	0.310	0.220	0.096	0.033	0.085	0.033
x	0.05	0.03	0.02	0.26	0.23	0.14	0.02	0.07	0.04
n	10	10	10	10	10	10	10	10	10
s	0.03	0.03	0.01	0.17	0.10	0.10	0.02	0.03	0.03
max	0.11	0.11	0.05	0.57	0.45	0.36	0.05	0.14	0.10
min	0.00	0.01	0.01	0.02	0.08	0.06	0.00	0.04	0.00

Copper Concentrations at R-1, R-2, & R-5 Dolly Creek and Little Grizzly Creek 1991 - 2000

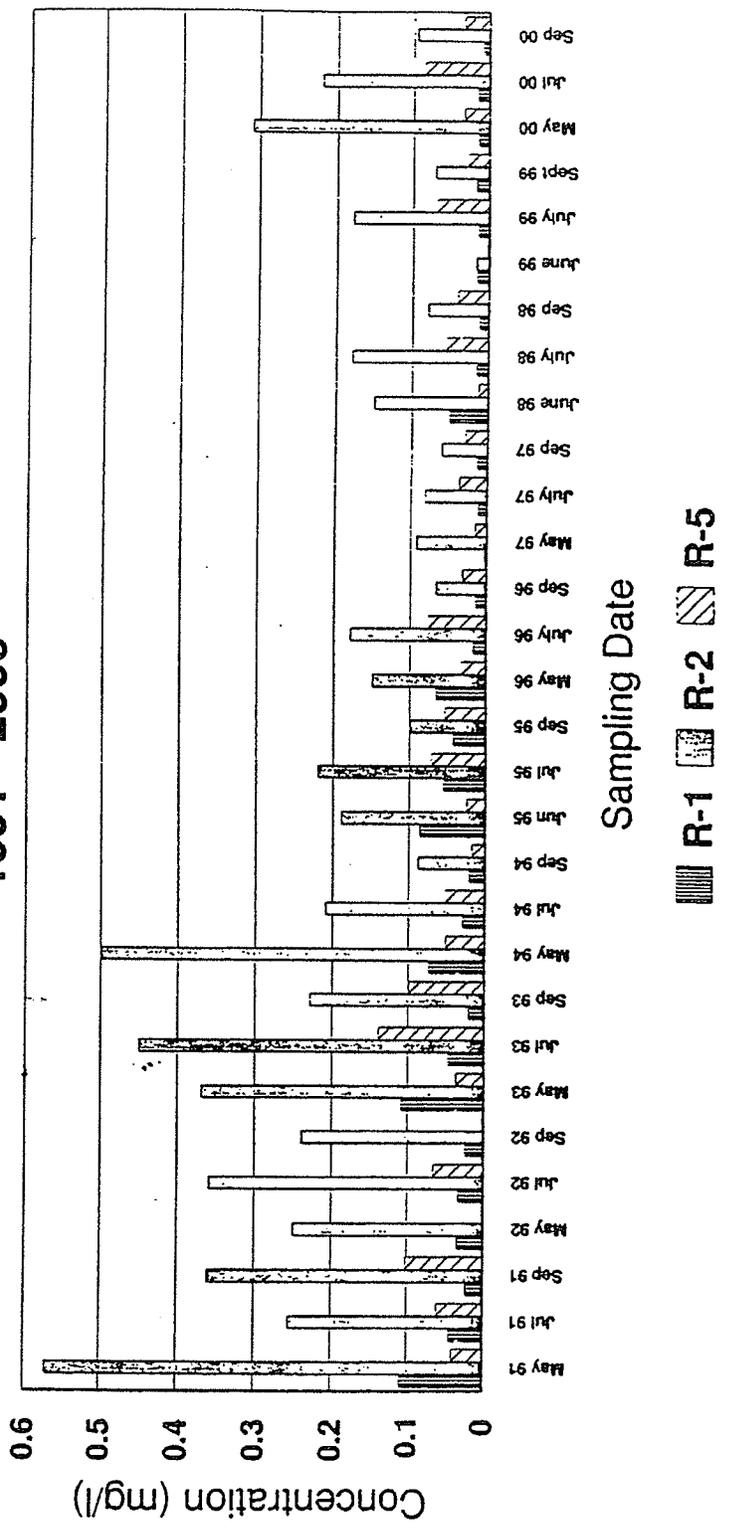


Table 3

Summary of Flows at R-1, R-2 and R-5
1991-2000

Year	R-1 Flows (cfs)			R-2 Flows (cfs)			R-5 Flows (cfs)		
	May/June	July	September	May/June	July	September	May/June	July	September
1991	0.88	0.52	0.60	1.28	0.31	0.28	19.62	0.84	1.35
1992	0.18	0.14	0.11	0.12	0.06	0.02	1.06	0.43	0.22
1993	7.28	1.31	0.73	7.28	1.25	0.57	46.10	3.53	1.10
1994	0.31	0.14	0.14	0.72	0.15	0.01	7.30	0.45	0.44
1995	6.97	2.48	1.05	8.22	2.38	2.01	97.20	7.46	1.88
1996	12.30	1.10	0.90	15.60	1.30	1.00	80.90	3.40	1.70
1997	5.05	1.24	0.66	5.69	1.18	0.86	54.09	1.43	1.34
1998	9.60	1.80	1.00	10.20	2.00	0.90	120.00	7.10	2.10
1999	5.24	1.30	0.78	5.74	1.13	0.72	34.97	3.74	1.35
2000	2.00	0.70	0.40	2.20	0.70	0.40	23.40	2.10	1.00
x	4.98	1.07	0.64	5.71	1.05	0.68	48.46	3.05	1.25
n	10	10	10	10	10	10	10	10	10
s	3.93	0.70	0.31	4.63	0.73	0.56	37.64	2.42	0.56
max	12.30	2.48	1.05	15.60	2.98	2.01	120.00	7.46	2.10
min	0.18	0.14	0.11	0.12	0.06	0.01	1.06	0.43	0.22

**GROUNDWATER QUALITY AT WALKER MINE TAILINGS
1992 - 2000**

Table 4

Well No.	Sampling Date	Copper		Iron		Zinc	
		Total (mg/l)	Filtered (mg/l)	Total (mg/l)	Filtered (mg/l)	Total (mg/l)	Filtered (mg/l)
W-1	10/04/1992	-	-	-	-	-	-
W-1	07/18/1994	0.46	-	78.00	-	0.08	-
W-1	08/24/1994	0.33	ND	73.00	0.22	0.07	ND
W-1	09/22/1994	0.22	ND	65.00	0.10	0.05	ND
W-1	10/25/1994	0.30	ND	68.00	1.30	0.05	ND
W-1	06/24/1995	ND	ND	0.30	0.30	ND	ND
W-1	11/13/1995	0.24	ND	44.00	0.51	0.05	0.01
W-1	05/24/2000	-	-	-	-	-	-
W-1	09/13/2000	-	-	-	-	-	-
W-2	10/16/1992	-	-	-	-	-	-
W-2	07/18/1994	0.18	-	21.00	-	0.02	-
W-2	08/24/1994	0.28	ND	21.00	0.18	ND	ND
W-2	09/22/1994	0.18	ND	18.00	0.87	ND	ND
W-2	10/25/1994	0.21	ND	16.00	1.10	ND	ND
W-2	06/24/1995	ND	ND	0.50	0.50	ND	ND
W-2	11/13/1995	0.13	ND	17.00	0.06	ND	ND
W-2	05/24/2000	-	-	-	-	-	-
W-2	09/13/2000	-	-	-	-	-	-
W-3	10/15/1992	0.28	-	3.40	-	0.28	-
W-3	07/18/1994	0.02	-	1.40	-	ND	-
W-3	08/24/1994	0.02	ND	1.40	ND	ND	ND
W-3	09/22/1994	ND	ND	0.73	0.17	ND	ND
W-3	10/25/1994	ND	ND	1.10	0.70	ND	ND
W-3	06/24/1995	ND	ND	1.60	ND	ND	ND
W-3	11/13/1995	ND	ND	0.36	0.04	ND	ND
W-3	05/24/2000	-	ND	-	21.00	ND	ND
W-3	09/13/2000	-	ND	-	ND	ND	ND
W-4	10/14/1992	-	-	-	-	-	-
W-4	07/18/1994	1.20	-	120.00	-	0.11	-
W-4	08/24/1994	0.89	0.55	93.00	0.41	0.08	0.04
W-4	09/22/1994	1.70	0.62	120.00	0.41	0.15	0.05
W-4	10/25/1994	0.98	ND	100.00	32.00	0.12	ND
W-4	06/24/1995	ND	ND	28.00	28.00	ND	ND
W-4	11/13/1995	ND	ND	47.00	25.00	ND	ND
W-4	05/24/2000	-	-	-	-	-	-
W-4	09/13/2000	-	-	-	-	-	-
W-5	10/03/1992	0.38	-	4.40	-	0.40	-
W-5	07/18/1994	0.11	-	32.00	-	ND	-
W-5	08/24/1994	0.04	ND	31.00	0.10	ND	ND
W-5	09/22/1994	0.05	ND	30.00	ND	ND	ND
W-5	10/25/1994	0.06	ND	32.00	2.20	ND	ND
W-5	06/24/1995	ND	ND	2.50	1.90	ND	ND
W-5	11/13/1995	ND	ND	17.00	0.15	ND	ND
W-5	05/24/2000	-	ND	-	68.00	ND	ND
W-5	09/13/2000	-	ND	-	740.00	ND	ND
W-6	10/02/1992	-	-	-	-	-	-
W-6	07/18/1994	0.08	-	3.80	-	ND	-
W-6	08/24/1994	0.46	ND	14.00	ND	0.04	ND
W-6	09/22/1994	0.99	0.01	31.00	0.69	0.08	ND
W-6	10/25/1994	0.72	0.01	23.00	0.27	0.02	ND
W-6	06/24/1995	ND	ND	ND	ND	ND	ND
W-6	11/13/1995	0.09	ND	3.90	0.06	ND	ND
W-6	05/24/2000	-	-	-	-	-	-
W-6	09/13/2000	-	-	-	-	-	-
W-7	10/19/1992	0.04	-	0.58	-	0.23	-
W-7	07/18/1994	ND	ND	1.90	-	0.02	-
W-7	08/24/1994	0.02	ND	30.00	0.45	0.05	ND
W-7	09/22/1994	0.04	ND	43.00	0.96	0.07	ND
W-7	10/25/1994	0.04	ND	52.00	1.10	0.06	ND
W-7	06/24/1995	ND	ND	ND	ND	ND	ND
W-7	11/13/1995	0.01	ND	14.00	0.67	0.02	0.01
W-7	05/24/2000	-	ND	-	79.00	-	ND
W-7	09/13/2000	-	ND	-	180.00	-	ND

Table 5

**Groundwater Depths at Walker Mine Tailings
1993 - 2000**

Depth to Groundwater From Top of Casing (ft)	Monitoring Well Number: Depth to Water (ft)							Average Depth (ft)
	W-1	W-2	W-3	W-4	W-5	W-6	W-7	
Top of Casing Elevation	5759.24	5741.74	5738.83	5768.00	5754.09	5747.87	5754.91	-
07/17/1993	13.34	2.14	5.12	16.96	7.90	5.64	1.06	7.45
07/18/1994	15.06	3.00	6.11	23.43	11.94	6.74	1.71	9.71
08/24/1994	15.35	3.26	6.59	24.52	12.88	7.63	2.07	10.33
09/22/1994	29.42	2.94	34.25	25.25	13.46	8.14	2.05	16.50
10/25/1994	15.59	2.60	6.28	25.90	13.97	8.33	1.91	10.65
06/24/1995	11.17	0.86	3.76	11.61	4.43	3.33	0.13	5.04
11/13/1995	14.75	2.34	5.98	22.64	11.32	7.09	1.03	9.31
05/24/2000	12.54	0.95	4.22	16.58	6.62	3.73	0.33	6.42
09/13/2000	14.80	2.77	6.08	22.76	11.34	7.09	0.25	9.30
Average Depth	15.78	2.32	8.71	21.07	10.43	6.41	1.17	9.41

Table 6

**Change In Seasonal Groundwater Elevations
1994 and 2000**

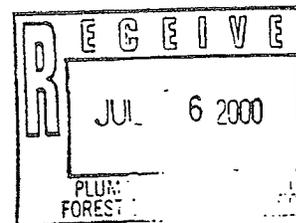
Well Number	Date	Depth to Water (ft)	Date	Depth to Water (ft)	Change in Depth (ft)	Well Number
W-1	07/18/1994	15.06	09/22/1994	29.42	14.36	W-1
W-1	05/24/2000	12.54	09/13/2000	14.80	2.26	W-1
W-2	07/18/1994	3.00	09/22/1994	2.94	-0.06	W-2
W-2	05/24/2000	0.95	09/13/2000	2.77	1.82	W-2
W-3	07/18/1994	6.11	09/22/1994	34.25	28.14	W-3
W-3	05/24/2000	4.22	09/13/2000	6.08	1.86	W-3
W-4	07/18/1994	23.43	09/22/1994	25.25	1.82	W-4
W-4	05/24/2000	16.58	09/13/2000	22.76	6.18	W-4
W-5	07/18/1994	11.94	09/22/1994	13.46	1.52	W-5
W-5	05/24/2000	6.62	09/13/2000	11.34	4.72	W-5
W-6	07/18/1994	6.74	09/22/1994	8.14	1.40	W-6
W-6	05/24/2000	3.73	09/13/2000	7.09	3.36	W-6
W-7	07/18/1994	1.71	09/22/1994	2.05	0.34	W-7
W-7	05/24/2000	0.33	09/13/2000	0.25	-0.08	W-7

Appendix 3

ROD Amendment
Walker Mine Tailings, Plumas National Forest



Legal
Office of the General Counsel
33 New Montgomery Street, 17th Floor
San Francisco, CA 94105



June 30, 2000

Rose Miksovsky, Esq.
United States Department of Agriculture
Office of the General Counsel
33 New Montgomery Street, 17th Floor
San Francisco, CA 94105

Mark J. Madrid
United States Department of Agriculture
Forest Supervisor, Plumas National Forest
159 Lawrence Street
P.O. Box 11500
Quincy, CA 95971-6025

Re: Revised Proposed Treatment Plan for the Walker Mine Tailings Site
Atlantic Richfield Company's Comments

Dear Mr. Madrid and Ms. Miksovsky:

Enclosed please find a copy of Atlantic Richfield Company's comments on the U.S. Forest Service's Revised Proposed Treatment Plan for the Walker Mine Tailings Site. These comments were prepared with the help of our outside counsel, Davis Graham & Stubbs, as well as the assistance of our in-house engineers. We look forward to discussing these comments with the Forest Service at a time that is mutually convenient for all parties.

Sincerely,

Jean A. Martin
Counsel for Atlantic Richfield Company and its
affiliate, ARCO Environmental Remediation, L.L.C.

Enc. (1)

cc: David B. Glazer, U.S. Dept. of Justice
John Pantano and Dave McCarthy, AERL
Roger Freeman, Davis Graham & Stubbs

**COMMENTS OF ATLANTIC RICHFIELD COMPANY
ON THE REVISED PROPOSED TREATMENT PLAN
FOR THE WALKER MINE TAILINGS SITE**

June 30, 2000

I. Introduction and Summary.

The Atlantic Richfield Company ("ARCO") appreciates the opportunity to comment on the U.S. Forest Service's Revised Proposed Treatment Plan, dated April 21, 2000 ("Proposed Plan") for the Walker Mine Tailings Site ("Site"). We appreciate your efforts to obtain input from parties who have an interest in the Proposed Plan, and hope that this process will continue. ARCO also thanks the Forest Service for granting ARCO an extension of time, through June 30, 2000, to submit these comments.

In these comments we make the following points:

Necessity: The proposed stream diversion project is not required by the new WDRs for this Site. If the Forest Service implements the erosion control and wetland system selected in the original remedy, the diversion project may be unnecessary.

Cost: The proposed stream diversion project in the Plan will quadruple the expected remedy cost, without significantly improving water quality below the site.

Alternatives: If additional work is needed to address flood conditions that might arise at the site, the Forest Service should consider less costly alternatives.

II. The New WDRs Are Not Enforceable Nor Realistic ARARs At This Site.

The driving force for the Proposed Plan, and the amendment to the Record of Decision for this Site ("ROD"), appears to be the new waste discharge requirements issued on February 2, 2000, by the California Regional Water Quality Control Board, Central Valley Region (Order No. S-00-028). The Order states that mine tailings add significant concentrations of copper to Dolly Creek. Order, Finding 9. It requires the U.S. Forest Service "to divert Dolly Creek and expand the wetlands (treatment) area or take other effective actions to improve water quality in Dolly Creek." Order, Finding 13.

Two months later, the U.S. Forest Service proposed to build a man-made channel that would divert Dolly Creek around the tailings and discharge its water directly into Little Grizzly Creek. This would significantly change the remedy for the tailings area at the Site.

We question the applicability of the Board's new waste discharge requirements ("WDRs") to the remedy at this Site. As you know, the WDRs were issued over 5 years after a remedy was selected for this Site. Such changes in the law generally will not change the previously chosen remedy. Here, the process of applying state water quality limits to this Site has been protracted and subject to several administrative proceedings. Recently, the California Regional Water Quality Control Board ("Board") attempted to apply these discharge limitations directly to ARCO. By letter dated December 30, 1999, a copy of which was submitted to the

Forest Service, ARCO presented its position that the application of these standards was not supportable under California law. Our comments explained why these water discharge limitations cannot be applied to a long-standing federal use such as the Walker tailings site that pre-dated state water quality laws. See ARCO's December 30, 1999 letter, pages 4-7.

Under the National Contingency Plan, when a remedy is selected it must meet applicable or relevant and appropriate legal requirements ("ARARs"). Once the remedy has been selected and a Record of Decision ("ROD") has been issued, however, the ARARs are typically "frozen" in place. 40 C.F.R. § 300.430(f)(ii)(B)(1). In other words, post-ROD requirements generally are not treated as ARARs. Only where the lead agency makes a specific finding that such requirements are relevant/appropriate and "necessary to ensure that the remedy is protective of human health and the environment," are post-ROD requirements applicable. Id. No such showing is made in the Forest Service's Proposed Plan, nor can this threshold be met given the Site history described in our December 30 letter.

Even if the new WDRs are applied to this Site, they do not mandate the proposed plan to divert Dolly Creek. The WDRs expressly allow the Forest Service to take any "other effective actions to improve water quality." Order, Section E.9, Task B.1. Other effective and less costly alternatives are discussed in the original ROD, and in these comments on page four.

The Dolly Creek diversion project is unlikely to achieve the desired stream standards, even with the expenditure of the significant additional costs identified in the diversion Plan. See Order, Finding 15. For example, before Dolly Creek enters the tailings area, its average dissolved copper concentration is 22 ug/l (Order, Finding 9). The selected remedy must meet a copper concentration limit of only 5 ug/l or less at the compliance point (Order, page 5, para. 1). We question whether this limit can be met simply by re-routing and discharging Dolly Creek water directly above the compliance point. Likewise, we question the impact of diverting clean water away from Little Grizzly Creek and into the tailings area, as overall water quality may deteriorate.

III. The Proposed Remedy Changes Are Premature. The Forest Service Should Not Revoke the 1994 Remedy Before Key Components Are Implemented.

The Forest Service proposes to adopt a new remedy before it even tries to implement the original remedy.¹ A fundamental component of the original remedy, as adopted by the Forest Service in June 1994, was the construction and operation of an anaerobic wetlands system that would remove metals from the tailings area through a complex interaction of plants, organic matter, bacteria and wetlands water. Another critical component was the stabilization of 1500 feet of the Dolly Creek Channel, to prevent additional metals from eroding into the creek and tailing/wetlands. At this point the wetlands have not been constructed yet and the stabilization work is only partially complete.

The Forest Service should complete the proposed work and obtain the benefit of water quality data on the effectiveness of the original remedy. Without such data, there is no basis for

¹ The Forest Service suggests that wetland construction was delayed by attempts to "reach a settlement with the [PRPs] prescribing responsibilities at the Site." However, neither CERCLA nor the NCP authorizes a lead agency to forego implementation of the selected remedy due to its inability to reach agreement with a PRP to undertake site work.

determining whether additional remedies are needed, or identifying the remedies (if any) which can achieve a significant further improvement in water quality.

The proposed diversion remedy will cost an estimated \$2,180,000 to construct. This is approximately 4 times higher than the \$450,000 remedy selected in the original Record of Decision for this Site. There is little or no data to indicate that the more expensive remedy will achieve substantially better water quality levels than the original remedy.

Given the limited data available, the marginal benefits of the proposed stream diversion remedy do not appear to justify the significantly higher cost of the proposed new remedy. "An alternative that far exceeds the cost of other alternatives evaluated and that does not provide substantially greater public health or environmental protection or technical reliability shall usually be excluded from further consideration." General Electric v. Litton Business Systems Inc., 715 F. Supp. 949, 962 (W.D. Mo. 1989); see also The Matter of Bell Petroleum Services Inc., 3 F.3d 889, 905-906 (5th Cir. 1993) (requirement for alternative water system held arbitrary and capricious where it "did not even reduce, much less eliminate, any public health threat.").

IV. The Proposed Plan Does Not Properly Factor In Certain Risks.

The proposed diversion of Dolly Creek around the tailings pond is likely to lower the water table within the tailings, affecting wetland survival and the effectiveness of the wetlands treatment system. To address this concern, the proposed remedy would convey clean water from Little Grizzly Creek back to the wetland at times via a pipeline system. The Proposed Plan does not explain how this situation would be monitored and who would be responsible for the considerable study and operational oversight that would be required to balance the water needs of the primary wetland treatment system against the expected diversions. There is a significant risk that the diversion remedy may drain and damage the wetlands area, undermining the primary method of removing metal from the tailings area. It is more reasonable and consistent with the National Contingency Plan to proceed with the original proposed remedy, than to potentially undermine the effectiveness of wetlands remedy in this way.

The Walker Mine site and associated tailings pile has been in existence on federal lands for many decades. The original tailings pond location and design was approved and managed by the federal government. This site has also been on the CERCLA federal cleanup docket for nearly a decade. There are no new risks at the Site which require a change in the remedy at this stage of the process. Against this backdrop, the brief comparative analysis between the current remedy and proposed new diversion remedy fails to meaningfully factor in environmental risk in choosing the new option. The diversion project could damage the wetlands remedy

Moreover, it could have an adverse (although temporary) impact on human health. The discussion of overall risk contained in the Proposed Plan fails to account for risks to workers and the environment that will be created if Dolly Creek is rechanneled in the manner proposed. The disturbance of contaminants during the construction work has not been factored into the analysis. Thus, the critical NCP "implementability" factor – both a screening factor and evaluation criterion – is not meaningfully applied to the two alternatives. See 40 C.F.R. § 300.430(f).²

² The Forest Service recognizes in its comments that public response to its prior remedial analysis was "low" and that any public health issue arising from the Site has been resolved through restriction of

V. The Forest Service's Proposal of a Single Remedial Alternative Is Insufficient.

The two alternatives presented by Forest Service in the Revised Plan consist simply of maintaining the current system as proposed under ROD, or constructing the Dolly Creek diversion. The Forest Service has not considered a variety of other options, which would be more cost-efficient than construction of a whole new diversion at this time, or more effective. In turn, there is no indication that the Forest Service has screened alternatives as required under the NCP, 40 C.F.R. § 300.430(e)(7).

For instance, one clearly viable option would be to improve erosion control/in-stream stabilization along the reach of Dolly Creek within the tailings pond area and monitor the effectiveness of this measure prior to determining whether a full diversion system is warranted. Another option would be to increase the size of the primary wetland treatment system and carefully monitor the result, rather than rely on the prediction contained in the January 7, 2000 water quality report that a ten acre system will not be fully effective. The system might be re-calibrated to account for occasional high flow conditions. These alternatives should be adequately considered and analyzed under the NCP rather than simply posing one alternative for public consideration. The Proposed Plan contains no meaningful alternative comparisons, advancing only a single alternative without any indication that the requisite alternative screening process has occurred.

VI. Conclusion.

ARCO appreciates the opportunity to provide these comments. We believe that the Forest Service's resources and attention should be devoted to continuing to implement the original remedy, and if necessary, refine the remedy later based on the resulting data, rather than making a premature and needlessly costly change. As always, ARCO remains willing to discuss with the Forest Service avenues whereby it can participate in implementation of these remedial measures on a basis that fairly reflects the technical and legal circumstances surrounding this Site.

recreational uses in the area. If so, there are no immediate public health threats at the Site that require a premature change in the remedy. This analysis does not consider potential risks to on-site workers.

Appendix 4

ROD Amendment
Walker Mine Tailings, Plumas National Forest



United States
Department of
Agriculture

Forest
Service

Plumas
National
Forest

159 Lawrence Street
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File Code: 2500

Date: January 22, 2001

Jean A. Martin, Esq.
Counsel for Atlantic Richfield Company
444 South Flower Street
Los Angeles, CA 90071

Re: Revised Proposed Treatment Plan for the Walker Mine Tailings Site
USDA Forest Service Response to Atlantic Richfield Company's Comments

Dear Ms. Martin:

Attached is the Forest Service response to ARCO's June 30, 2000, comments of the Revised Proposed Treatment Plan for the Walker Mine Tailings Site, dated April 21, 2000. The preparation of this response involved meeting with you and others from ARCO on site last August. It also involved meeting with our attorney, the Central Valley Regional Water Quality Control Board and the Environmental Protection Agency. Please direct questions or comments to Terry Benoit of this office at (530) 283-7822 or e-mail at tbenoit@fs.fed.us.

Sincerely,

MARK J. MADRID
Forest Supervisor

attachment

cc: District Ranger, Beckwourth RD
Rose Miksovsky, OGC
Dave McCauley, RO



**USDA FOREST SERVICE RESPONSE TO THE JUNE 30, 2000 COMMENTS FROM
ATLANTIC RICHFIELD COMPANY ON THE REVISED PROPOSED TREATMENT
PLAN FOR THE WALKER MINE TAILINGS SITE**

January 22, 2001

The USDA Forest Service distributed the Revised Proposed Treatment Plan for the Walker Mine Tailings for public comment on April 24, 2000. Three responses were received. First, a phone call was received from Mr. Jack Boise, downstream landowner in the Genesee Valley on May 1, 2000. He was supportive of the Revised Proposed Treatment Plan and added his observations of aquatic and riparian faunal changes during the past five years. Second, the California Regional Water Quality Control Board, Central Valley Region (CVRWQCB), sent a letter dated May 11, 2000, supporting the Revised Proposed Treatment Plan as in agreement with Waste Discharge Requirements Order No. 5-00-028. The third response was from the Atlantic Richfield Company (ARCO) on May 17, 2000, asking for a 30-day extension. The extension was granted and ARCO submitted their response letter June 30, 2000. Additionally, ARCO and the Forest Service met to visit the site and to review the proposed and existing treatments for the project site on August 28 & 29, 2000.

The Forest Service also met with the Environmental Protection Agency and the CVRWQCB on October 25, 2000, regarding treatment proposals at the Site. The agencies reached a consensus that the selected alternative identified in the Revised Proposed Treatment Plan would be the most effective remedy for the site to meet Federal and State water quality standards.

Set forth below is the response to ARCO's comment letter of June 30, 2000, following the format of that letter.

I. Introduction and Summary. No comments.

II. The New WDRs Are Not Enforceable Nor Realistic ARARs At This Site.

ARCO's comment briefly stated:

(1) The Forest Service has responded to new Waste Discharge Requirements (WDR Order No. 5-00-028) by proposing to divert Dolly Creek around the tailings area, discharging directly to Little Grizzly Creek, significantly changing the remedy established in the 1994 ROD (Record of Decision For Remediation of the Walker Mine Tailings, Beckwourth Ranger District, Plumas National Forest).

(2) These new WDRs are not applicable since the ROD was approved five years ago in response to the WDR in effect at that time (Order No. 91-017).

(3) The diversion of Dolly Creek is unlikely to achieve the desired stream standards.

(4) We question the impact of diverting clean water away from Little Grizzly Creek and into the tailings area, as overall water quality may deteriorate.

Forest Service response:

(1) The proposed ROD amendment is consistent with the 1994 ROD requirement that the Forest Service review remedial actions every five years using the remedy selection criteria of the NCP. The proposed amendment is also consistent with the WDR issued by the CVRWQCB. The Forest Service has worked cooperatively with the CVRWQCB water quality engineers in connection with the Site. The 1994 ROD provides that "...the Forest Service, in cooperation with the CVRWQCB, will review the remedial action no less than every five years after initiation of the selected remedial action..."(p.20). The intent is to adjust remedial treatments if necessary to meet water quality requirements.

The Forest Service analyzed the need to divert Dolly Creek around the tailings site in the 1994 ROD (Alternative 3, p. 11). Additionally, the diversion of Dolly Creek was analyzed and recommended in a phased approach to remediation of the site by Dames & Moore in their 1991 report (Walker Mine Tailings Rehabilitation Study, Plumas National Forest, For United States Forest Service) in their Alternative 5 – Diverting Dolly Creek (Chapter 6.6). Streamflow calculations made by Dames & Moore were inconsistent with actual streamflow data collected prior to the development of the 1994 ROD. Actual streamflow data collected before the 1994 ROD suggested a diversion may not be necessary because the Dolly Creek flow was sufficiently low and steady to support a wetland over time. However, this data was collected during a relatively dry period. Moderate to low streamflows were recorded by the Forest Service from the beginning of monitoring in 1986 through the 1994 season. The Dolly Creek watershed is not typical of most watersheds in the area and does not fit typical runoff models until saturated conditions develop. These conditions are exceeded during very wet years and runoff amounts more closely match the modeled amounts. The 1994 ROD selected the wetland only alternative, with the understanding that if the wetland alone was ineffective in treating the Dolly Creek flow before being released to Little Grizzly Creek, the alternative to divert Dolly Creek would be selected (1994 ROD).

In contrast to the earlier drought period, the period since 1994 has generally been much wetter than normal. Even though Dolly Creek flows are not as high and variable as calculated by Dames & Moore, the flows have been shown to be too high and variable for proper wetland operations (Analysis of Surface Water Quality at the Walker Mine Tailings, USDA Forest Service, Plumas National Forest, Beckwourth Ranger District, 1986 – 1999; "Findings Summary" on the first page, p. 7, "Critical Observations" and charts 14, 21a & b). Streamflow data collected since 1994 indicate that diversion and control of Dolly Creek is necessary for proper anaerobic wetland operations.

(2) The State periodically (approximately every 5 years) updates WDRs in response to their own requirements and in response to the data and information collected during monitoring. The water quality limitations for water released from the Walker Mine Tailings Site were adjusted to meet the most recent requirements established by the Environmental Protection Agency (EPA) in

which the 4-day average formula for calculating the limitation has been refined (refer to Order No. 5-00-028, p.2 of the "Information Sheet" for the most recent equation).

ARCO seems to suggest that the 1994 ROD "Froze" ARARs and that the new WDR requirements can't be incorporated into the Revised Proposed Treatment Plan. Under Section 121(c) of CERCLA, remedial actions may be reviewed for adequacy. The Forest Service's proposed ROD amendment is authorized under Section 121(c) and 40 C.F.R. §300.430(f)(1)(ii)(B)(1) to Account for new ARARs promulgated after issuance of the original ROD.

(3) Treatment of the Site, the proposed alternative, requires that two types of wetlands be constructed. Dolly Creek would flow through first an aerobic wetland, constructed in 1994, for sediment removal and initial removal of contaminants, such as iron, followed by an anaerobic wetland for the removal of copper and zinc. As stated above, the Forest Service, in cooperation with the CVRWQCB, reviewed the outcome of the work accomplished at the Walker Mine Tailings Site through 1999 and concluded that the primary treatment, the anaerobic wetland, initially designed to be 10 acres, would not function properly with the uncontrolled flows of Dolly Creek flowing through it. Streamflow variability does not affect the functioning of the aerobic wetland. If the proposed diversion is installed, it would be prudent to test when and to what degree releases of contaminants from the tailings would be reduced to meet WDRs at the compliance station before further wetland design and construction is implemented. If it is determined that a wetland is needed, a controlled outflow of water from the diversion would be released to the constructed wetland for proper maintenance and operations. In either event, the diversion of Dolly Creek is necessary to help meet water quality standards.

(4) We agree that diverting water from Little Grizzly Creek to the anaerobic wetland may or may not be necessary. Until the diversion is complete and the anaerobic wetland is functioning and additional monitoring data is collected, it is unknown whether additional water will actually be needed. On the other hand, it is known that maintaining an anaerobic wetland will require more water during the summer months of dry water years than can be supplied by Dolly Creek alone. It is also known that Little Grizzly Creek does not always have surplus water available for diversion during dry years, since there must be sufficient in-stream flows in the channel to meet aquatic needs. Recognizing that there are contingencies associated with the diversion of Little Grizzly Creek, the inclusion of this in the Revised Proposed Treatment Plan was made contingent upon certain criteria.

III. The Proposed remedy Changes are Premature. The Forest Service Should Not Revoke the 1994 Remedy Before Key Components Are Implemented.

ARCO's comment briefly stated: *The work proposed by the 1994 ROD needs to be completed and evaluated before determining if additional remedies are needed.*

Forest Service response:

As stated above, flows from the Dolly Creek watershed are greater and more variable than the original Forest Service data indicated. Streamflow data collected after 1994 supports the higher

flow regime similar to that projected by Dames & Moore and, therefore, is not new information. The wetland system must operate in a relatively constant, steady state condition, to minimize hydraulic, vegetative, and substrate stresses. To do this requires a relatively constant inflow rate (Robert S. Hedin, Robert L. P. Kleinmann, and Greg Brodie, "1990 Course Notes" and references, "Constructing Wetlands to Treat Acid Mine Drainage", p. 10).

Additionally, groundwater data collected at monitoring well W-3, which is next to the outer boundary of the proposed anaerobic wetland, indicates that during dry months the groundwater elevation is several feet below the surface of the tailings even though surface water flows over the dam at all times (refer to the Annual Monitoring Report for 2000). This information along with the streamflow differences between R-1, above the tailings site, and R-2, below the tailings site, indicate that Dolly Creek in the area of the proposed anaerobic wetland is a losing stream. In other words, water seeps away from the channel in this area of the tailings during the dry months, rather than flowing from the tailings to the channel.

Based on current information, the anaerobic wetland in the 1994 remedy cannot adequately treat all of the water flowing through it and the wetland would probably not function as an anaerobic system during the summer months without a Dolly Creek diversion and control system.

IV. The Proposed Plan Does Not Properly Factor in Certain Risks.

ARCO's comment briefly stated: *(1) The 1994 ROD remedy calls for a wetland treatment system that could be jeopardized by the diversion of the Dolly Creek and Little Grizzly Creek. The proposed remedy would likely lower the water table, draining and damaging the proposed wetland and demand considerable study and operational oversight. There are no new risks at the Site which require a change in the remedy at this stage of the process.*

(2) There could be an adverse health risk to workers constructing the diversion works.

Forest Service response:

(1) The proposed wetland would not be jeopardized by the proposed diversion of Dolly Creek because water inflow to the wetland would be controlled and maintained up to the maximum capacity of Dolly Creek. Additional water from Little Grizzly Creek could be added if necessary to maintain water table elevations. Key to the diversion question is the need to control flows through the wetland. Updated information about the Dolly Creek flow regime shows that the timing and magnitude of the flows are too variable for proper wetland operations. The subsequent higher flow data is not new information, as it is consistent with the Dames & Moore projections. Without the diversion and controlled flows from that diversion to the wetland, as proposed, the wetland would be in jeopardy of rapidly filling with sediment and of not sufficiently removing contaminants. With the diversion, the amount of wetland necessary to treat the effluent from the tailings may be less than originally designed and would be expected to last much longer before requiring replacement. It is true that all this water works would require extra oversight and whenever a system requires a lot of human intervention over a long period of time, things can go wrong, therefore jeopardizing wetland health and operations.

Because Dolly Creek is a "losing" stream at the location of the proposed anaerobic wetland, it may be hard to maintain anaerobic conditions when it is most needed, during the dry months, even with the addition of Little Grizzly Creek water. The placement of the proposed anaerobic wetland is critical to collecting and treating most of the contaminated water. For this reason, the best location for the wetland is just above the tailings dam, where the loss of water from Dolly Creek to the tailings seems to be the greatest.

To remedy the situation (too much human intervention and a groundwater elevation lower than the wetland), the Dolly Creek diversion is required along with raising the tailings dam to help pond the water. The diversion would end just upstream of the tailings dam, supplying water that would have been lost to the tailings upstream to just the area occupied by the anaerobic wetland. The anaerobic wetland would be part of the backwater area created by this outflow and excess water during high flow months would flow over the tailings dam without flowing through most of the wetland. Water from Little Grizzly Creek would most likely not be needed and control of flows through the wetland would be passively controlled, eliminating most of the human oversight originally proposed. Even though water would still seep into the tailings from this area, the amount of water supplied is expected to be greater than that lost and the water surface higher than ground level. The details of this proposal still need to be worked out before implementation and additional data about water volumes and timing gathered.

In any event, Dolly Creek needs to be diverted around most of the tailings before proper treatment can be realized. Again, just diverting Dolly Creek around the tailings area may be sufficient to meet water quality requirements by itself, with no anaerobic wetland. If the tailings still release contaminated water to Little Grizzly Creek, then an anaerobic wetland is proposed to treat that water, but the volume of that water is expected to be much less than now exists (no diversion). For this reason, less than 10 acres of anaerobic wetland would probably be sufficient to treat the reduced amount of water released from the Site. Because the proposed anaerobic wetland would be within the slackwater area created by the diversion and the raising of the tailings dam, residence time for treatment would be increased, also contributing to the need for less anaerobic wetland area.

(2) In 1996, the Forest Service contracted with Ecology & Environment, Inc., to analyze the site for airborne hazards and to develop a monitoring and worker safety plan. Since that time, all work at the site has followed a health and safety plan based on those findings and all future work is expected to also follow the plan, with no anticipated adverse health risks to workers.

V. The Forest Service Proposal of a Single Remedial Alternative is Insufficient.

ARCO's comment briefly stated: *The two alternatives presented in the revised plan are insufficient and other, more cost-efficient alternatives need to be included.*

Forest Service response:

The Revised Proposed Treatment Plan supplements the 1994 ROD and Proposed Treatment Plan where several alternatives were evaluated. The sole purpose of the Revised Proposed Treatment Plan is to propose the diversion of Dolly Creek, as in Alternative 3 of the 1994 ROD and the

1991 Dames & Moore report; this time with new and updated data and information. There are no other known, cost-efficient alternatives to be considered. Controlling water inflow to the wetland is a necessity with few, if any, options.

Appendix 5

ROD Amendment
Walker Mine Tailings, Plumas National Forest

California Regional Water Quality Control Board Central Valley Region

Steven T. Butler, Chair

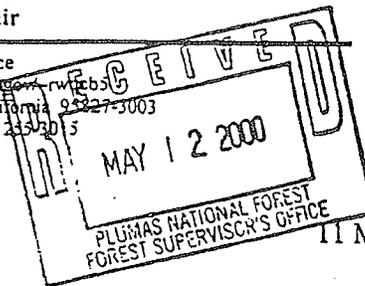


Winston H. Hickox
Secretary for
Environmental
Protection



Gray Davis
Governor

Sacramento Main Office
Internet Address: <http://www.swrcb.ca.gov>
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11 May 2000

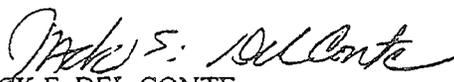
Mr. Mark Madrid, Forest Supervisor
Plumas National Forest
P.O. Box 11500
Quincy, CA 95971-6025

PROPOSED TREATMENT PLAN FOR WALKER MINE TAILINGS, PLUMAS COUNTY

We have reviewed the 21 April 2000 U.S. Department of Agriculture, Forest Service, Revised Proposed Treatment Plan for the Walker Mine Tailings Site. The Proposed Treatment Plan proposes to complete the remedial actions prescribed in the 1994 Record of Decision with modifications. Specifically, the modifications include diverting Dolly Creek around the Walker Mine Tailings during periods of high flows to reduce erosion and sedimentation. Diverting Dolly Creek away from the Tailings will also reduce the volume of water requiring treatment through the passive wetland treatment system. The second modification described in the Proposed Treatment Plan includes diverting some flow from Grizzly Creek to operate and maintain the wetlands treatment system during times of low flows.

Waste Discharge Requirements Order No. 5-00-028 requires the Forest Service to divert Dolly Creek or take other effective action as necessary to improve water quality and reduce sedimentation in Dolly and Grizzly Creeks. The Proposed Treatment Plan is in agreement with the Dolly Creek rehabilitation requirements of Order No. 5-00-028. We concur with the concepts described in the plan and look forward to its implementation and success.

Order No. 5-00-028 also requires additional work to revegetate and control erosion for the remainder of the Tailings. While the Proposed Treatment Plan does not address this work, the Forest Service may want to include any modifications to the Tailings rehabilitation program with the revised Proposed Treatment Plan. Please note that a detailed workplan for both the Dolly Creek work and the Tailings rehabilitation is due to the Board by 1 November 2001 and implementation shall begin six months after Board review and approval. Please contact Patrick Morris at (916) 255-3121 if you have any comments regarding this facility.


JACK E. DEL CONTE
Supervising Engineer

cc: Ms. Rose Miksovsky, US Department of Agriculture, San Francisco
Ms. Frances McChesney, SWRCB, OCC, Sacramento

California Environmental Protection Agency

Appendix 6

ROD Amendment
Walker Mine Tailings, Plumas National Forest

Treatment
Walker Plan Public Response (Phone Conversation)

5/4/2000
Norman Lamb [Revised Plan + 1994 ROD
Copy of

5/9/2000: Jerry Sipe, Co. Enviro. Health.
He's reviewed the Revised Plan & has no
comments.

Jerry A. Benoit
OSC

Appendix 7

ROD Amendment
Walker Mine Tailings, Plumas National Forest

Phone Conversation

5/1/2000

1000

Jack Boise — lives along L. Grizzly
Tot 4 — bought in 1986

L. Grizzly Cr — fish in Cr (front)
— ~~no~~ fish or beathies in past 5 yrs.
low pop. low

dippers & mergansers - ok

(Low macro #s?)

— remnant wood rail fence — red pine — white wood
post on bridge

No other concerns with Little Grizzly Cr
and no specific comments, positive or
negative, about the proposed plan.

Tommy A. Bennett
OSC

OFFICE COPY
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8 IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA
9 FOR THE COUNTY OF PLUMAS

10 PEOPLE OF THE STATE OF CALIFORNIA, ex)
11 rel. CALIFORNIA REGIONAL WATER)
QUALITY, CONTROL BOARD, CENTRAL)
12 VALLEY REGION; and the STATE OF)
CALIFORNIA WATER RESOURCES)
13 CONTROL BOARD on behalf of the)
CALIFORNIA REGIONAL WATER QUALITY)
14 CONTROL BOARD, CENTRAL VALLEY)
REGION,)

Case No.: 19897

JUDGMENT

15 Plaintiffs,

16 v.

17 CEDAR POINT PROPERTIES, INC., a,)
18 California Corporation; DANIEL R. KENNEDY,)
individually and as President of Cedar Point)
19 Properties, Inc., and DOES I - XXX,)

20 Defendants.

21
22 Plaintiffs and Defendant DANIEL R. KENNEDY having stipulated that the Court may make
23 and enter this Judgment, and the corporate powers of Defendant CEDAR POINT PROPERTIES,
24 INC., having been suspended, and good cause appearing therefor, it is hereby adjudged, ordered and
25 decreed as follows:

26 1. The timber harvest at the Walker Mine Property by Defendant CEDAR POINT
27 PROPERTIES, INC., pursuant to a written settlement agreement previously entered into by and
28 among Plaintiffs, CEDAR POINT PROPERTIES, INC., and DANIEL R. KENNEDY (the

1 "Settlement Agreement") and/or pursuant to a previous stipulated injunction previously entered by
2 this Court (the "Stipulated Injunction"), has been completed.

3 2. Defendant CEDAR POINT PROPERTIES, INC., shall conduct no further timber harvest at
4 the Walker Mine Property.

5 3. Defendant DANIEL R. KENNEDY shall not, whether in his individual capacity or through
6 his agents or family members, or through any other legal entity existing in the present or future, have
7 any further or future financial interest in activities on the Walker Mine Property. "Financial interest"
8 includes, but is not limited to, direct or indirect profits or income from activities including, but not
9 limited to, timber harvesting, Christmas tree production and harvesting, production of other
10 agricultural crops, and conduct of recreational activities.

11 4. The amount presently held in the escrow account pursuant to the Settlement Agreement
12 and the Stipulated Injunction is approximately \$119,609.78. Such amount represents the total of (a)
13 the logger's withhold pursuant to Section VI(B)(1) of the Settlement Agreement and/or Paragraph
14 3(A) of the Stipulated Injunction in the amount of approximately \$17,302.18, and (b) the amount to
15 be used by CEDAR POINT PROPERTIES, INC. ("CEDAR POINT") pursuant to the Settlement
16 Agreement and/or the Stipulated Injunction, for remedial activities at the Walker Mine Property, in
17 the amount of approximately \$102,307.60.

18 5. The amount of \$17,302.18, representing the logger's withhold, shall be distributed from the
19 Escrow Account as follows:

20 A. The held back funds will be distributed from the Escrow Account to the State of
21 California Department of Justice (DOJ), where they will be deposited in the Attorney
22 General's Trust Fund (the DOJ Account) to be held on behalf of the Regional Board.

23 B. The held back funds will be distributed from the DOJ Account on demand and
24 documentation by the staff of the Regional Water Quality Control Board, Central Valley
25 Region ("Regional Board"), to be used only for timber restocking and/or other timber
26 harvesting-related remediation of the Walker Mine Property, related activities and
27

28

1 expenditures, and reasonable DOJ attorneys' fees that may be incurred in representing the
2 Regional Board related to its possession and/or use of the held back funds.

3 6. Due to the suspended corporate status of CEDAR POINT, the funds remaining in the
4 Escrow Account after distribution of the logger's hold-back, which total approximately \$102,307.60,
5 plus any additional amount that may remain in the Escrow Account as the result of accrual of interest,
6 shall be distributed to the Regional Water Quality Control Board, Central Valley Region ("Regional
7 Board"), to be deposited in a segregated account of the State Water Resources Control Board Cleanup
8 and Abatement Account and to be used only for "remedial activities" (as defined in the Settlement
9 Agreement and/or the Stipulated Injunction) at the Walker Mine Property, or expenditures and/or
10 activities related to the conduct of remedial activities at the Walker Mine Property, consistent with
11 California Water Code, Division 7.

12 7. The Regional Board, its employees, agents, and contractors, may freely enter the Walker
13 Mine Property and conduct any monitoring, remediation, or related activities as may be deemed
14 necessary or desirable in the judgment of the Regional Board.

15 8. Defendant DANIEL R. KENNEDY is hereby released from any and all claims and
16 liabilities in connection with this action.

17 9. The complaint in this proceeding is hereby dismissed with prejudice as to Defendant
18 DANIEL R. KENNEDY.

19 10. The complaint in this proceeding is hereby dismissed without prejudice as to Defendant
20 CEDAR POINT PROPERTIES, INC.

21
22 Dated: APR 16 2004, 2004

GARRETT OLNEY
JUDGE OF THE SUPERIOR COURT

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21 Attorneys for the United States of America

22 UNITED STATES DISTRICT COURT FOR THE
23 EASTERN DISTRICT OF CALIFORNIA
24 SACRAMENTO DIVISION

25 _____)
26 UNITED STATES OF AMERICA,)
27)
28 Plaintiff,)
29)
30 v.) CIV. NO. S-05-00686 GEB-DAD
31)
32 ATLANTIC RICHFIELD COMPANY,)
33)
34)
35 Defendant.)
36 _____)

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I. BACKGROUND

A. The United States of America (“United States”), on behalf of the United States Department of Agriculture, Forest Service (“Forest Service”), has filed a complaint in this matter concurrently herewith, pursuant to Sections 104 and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act (“CERCLA”), 42 U.S.C. §§ 9604, 9607.

B. The United States in its complaint seeks, inter alia: (1) reimbursement of costs incurred by the Forest Service at the Walker Tailings Site located in the Plumas National Forest, Plumas County, California (“Site”), together with accrued interest; and (2) performance of studies and response work by the defendant at the Site consistent with the National Contingency Plan, 40 C.F.R. Part 300 (as amended) (“NCP”).

C. This Consent Decree is entered into under the authority vested in the President of the United States by Sections 104, 107, and 122 of CERCLA, 42 U.S.C. §§ 9604, 9607, 9622. The President’s authority relative to this Site was delegated to the Secretary of the United States Department of Agriculture (“Secretary”) by Executive Order 12580, 52 Fed. Reg. 2926 (Jan. 23, 1987). The Secretary’s authority was further delegated to the Chief of the Forest Service (“Chief”) by 7 C.F.R. 23 § 2.60(a)(39). The Chief redelegated the Secretary’s authority to enter into this Consent Decree to the Forest Service Region 5. Regional Forester (“Regional Forester”) by letter dated April 14, 1997. The Chief redelegated the Secretary’s authority to issue a Record of Decision under CERCLA to the Regional Forester by Forest Service Manual Region 5 2164.04, 2b, effective November 10, 1994. The Regional Forester redelegated the Secretary’s authority to issue a Record of Decision under CERCLA to the Forest Service Region 5 Director of Engineering by Forest Service Manual – Region 5 Supplement 2164.04c-2b.

D. The Site is located within Pacific Southwest Region 5, Plumas National Forest, Plumas County, California. The Plumas National Forest is under the administrative jurisdiction of the Forest Service.

E. The defendant does not admit any liability to the plaintiff arising out of the transactions or occurrences alleged in the complaint.

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F. The Site was a tailings reservoir for mine and mill tailings from the Walker Mine, located on private lands nearby. Plaintiff alleges that the Walker Mine was owned and operated by the Walker Mining Company ("Walker") from approximately 1915 through 1941. Plaintiff further alleges that the Walker Mine was also operated concurrently by the International Smelting Company and the International Smelting and Refining Company (collectively "International") and their parent corporation, the Anaconda Copper Mining Company, which subsequently changed its name to The Anaconda Company (collectively "Anaconda"), during most or all of its period of operation. Plaintiff further alleges that tailings, as well as acid mine drainage, both of which contain hazardous substances, were released from the Walker Mine onto the Site during the time that the Walker Mine was operated by Walker and International, and that hazardous substances contained in the tailings on the Site and acid mine drainage from the Walker Mine continue to be released from the Site today.

G. After the Walker Mine closed, International merged into Anaconda, and Anaconda merged into Atlantic Richfield Company ("Atlantic Richfield"). Settling Defendants deny that International, Anaconda or Atlantic Richfield engaged in any act or omission that would make them liable for hazardous substances released at or from the Walker Mine or the Site.

H. In 1990, in response to a release or a substantial threat of a release of one or more hazardous substances at or from the Site, the Forest Service commenced a Remedial Investigation and Feasibility Study ("RI/FS") for the Site pursuant to 40 C.F.R. § 300.430.

I. The Forest Service completed a Remedial Investigation ("RI") Report and a Feasibility Study ("FS") Report for the Site in August 1993.

J. Pursuant to Section 117 of CERCLA, 42 U.S.C. § 9617, the Forest Service published notice of the completion of the FS and of the proposed plan for remedial action, on September 17, 1993 and February 24, 1993, in major local newspapers of general circulation. The Forest Service provided an opportunity for written and oral comments from the State of California ("State") and the public on the proposed plan for remedial action. A copy of the

transcript of the public meeting is available to the public as part of the administrative record upon which the Regional Forester based the selection of the response action.

K. The decision by the Forest Service on the remedial action to be implemented at the Site is embodied in a final Record of Decision ("ROD"), executed on June 10, 1994, and amended on August 2, 2001. The State of California was given an opportunity to review and comment on the ROD and amended ROD and has concurred in the proposed remedial actions.

L. The ROD selected the following preferred remedial alternative: treatment of the tailings material on-site, reconstruction of a portion of the Dolly Creek channel to stabilize it and revegetate its banks, construction of aerobic and anaerobic wetlands to act as a passive water treatment system to reduce the metals content of contaminated waters, construction of wind barriers to control erosion and air releases, and neutralization of 10 acres of tailings and revegetation of 60 acres of tailings to reduce acidity. The amended ROD added the diversion of Dolly Creek around the tailings to ensure the effectiveness of the wetland treatment system and reduce releases of hazardous substances during heavy flows. The amended ROD also contemplates the possible construction of a 15-acre passive water treatment system and the diversion of Little Grizzly Creek as contingent remedial actions, to be implemented as needed.

M. Following issuance of the original ROD, the Forest Service completed construction of the aerobic wetland portion of the remedial action, using its own funding, together with other work to reduce erosion and wind dispersion of the tailings. To date, the Forest Service alleges that it has expended approximately \$1.24 million in response costs for Site investigation and engineering studies, construction of the aerobic wetlands and other work, and enforcement activities. Under the amended ROD, the remaining work required at the Site includes the diversion of Dolly Creek, along with the possible construction of the passive water treatment system and diversion of Little Grizzly Creek. Implementation of that work is projected to cost an estimated \$2.09 million. With the estimated cost of 30 years of operation and maintenance of the remedial action, the future costs of work required by the amended ROD are expected to total approximately \$3.3 million.

N. The Parties acknowledge that there are factual disputes with respect to the history of the Site, the condition of the Site, the remediation efforts, costs incurred in connection with the Site, and future remediation needs. Without admitting or denying the facts in dispute, the Parties have agreed that it is in their best interests to resolve these disputes through this Consent Decree.

O. The Parties recognize, and the Court by entering this Consent Decree finds, that this Consent Decree has been negotiated by the Parties in good faith and implementation of this Consent Decree will expedite the cleanup of the Site and will avoid prolonged and complicated litigation between the Parties, and that this Consent Decree is fair, reasonable, and in the public interest.

NOW, THEREFORE, it is hereby Ordered, Adjudged, and Decreed:

II. JURISDICTION

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1345, and 42 U.S.C. §§ 9604, 9607, and 9613(b). This Court also has personal jurisdiction over the Settling Defendants. Solely for the purposes of this Consent Decree and the underlying complaint, Settling Defendants waive all objections and defenses that they may have to jurisdiction of the Court or to venue in this District. Settling Defendants shall not challenge the terms of this Consent Decree or this Court's jurisdiction to enter and enforce this Consent Decree.

III. PARTIES BOUND

2. This Consent Decree applies to and is binding upon the United States and upon Settling Defendants and their successors and assigns. Any change in ownership or corporate status of Settling Defendants including, but not limited to, any transfer of assets or real or personal property, shall in no way alter the Settling Defendants' responsibilities under this Consent Decree.

IV. DEFINITIONS

3. Unless otherwise expressly provided herein, terms used in this Consent Decree that are defined in CERCLA or in regulations promulgated under CERCLA shall have the

meanings assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Consent Decree or in the appendices attached hereto and incorporated hereunder, the following definitions shall apply:

“CERCLA” shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601 et seq.

“Consent Decree” shall mean this Consent Decree [and the appendix and other attachments hereto]. In the event of conflict between this Consent Decree and any appendix, the Consent Decree shall control.

“CWA” shall mean the Clean Water Act, as amended, 33 U.S.C. § 1251, et seq.

“Day” shall mean a calendar day. In computing any period of time under this Consent Decree, where the last day would fall on a Saturday, Sunday, or federal holiday, the period shall run until the close of business of the next working day.

“DOJ” shall mean the United States Department of Justice and any of its successor departments, agencies or instrumentalities.

“EPA” shall mean the United States Environmental Protection Agency and any of its successor departments, agencies or instrumentalities.

“Escrow Account” shall mean the interest-bearing account established as a qualified settlement fund pursuant to Internal Revenue Code of 1986 § 468B, as amended, and Treasury Regulations promulgated thereunder.

“Escrow Agreement” is the instrument that establishes and governs the Escrow Account and is attached as Appendix A.

“Forest Service” shall mean the United States Department of Agriculture, Forest Service, and any of its successor departments, agencies or instrumentalities.

“Future Response Costs” shall mean all costs incurred, on or after the effective date of this consent Decree, in connection with the performance of environmental Response Actions by the United States or its designated contractor(s) at or in connection with the Site.

“Interest” shall mean interest at the rate specified for interest on investments of the Hazardous Substance Superfund established under Subchapter A of Chapter 98 of Title 26 of the U.S. Code, compounded on October 1 of each year, in accordance with 42 U.S.C. § 9607(a).

“Natural Resource Damages” shall mean damages or other relief for injury to, destruction of, or loss of any and all Natural Resources, including the costs of assessing such injury, destruction or loss, and including interest and litigation costs.

“Paragraph” shall mean a portion of this Consent Decree identified by an arabic numeral or an upper case letter.

“Parties” shall mean the United States and Settling Defendants.

“Past Response Costs” shall mean all costs incurred prior to the effective date of this Consent Decree, in connection with the performance of environmental Response Actions by the United States or its designated contractor(s) at or in connection with the Site.

“Plaintiff” shall mean the United States of America.

“RCRA” shall mean the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901 et seq. (also known as the Resource Conservation and Recovery Act).

“Response Action” shall mean remove, removal, remedy and remedial action, as those terms are defined in Section 101 of CERCLA, 42 U.S.C. § 9601; all such terms (including the terms “removal action” and “remedial action”) include enforcement activities related thereto.

“Response Costs” shall mean “Past Response Costs” and “Future Response Costs.”

“Section” shall mean a portion of this Consent Decree identified by a roman numeral.

“Settling Defendants” shall mean defendant Atlantic Richfield Company and its affiliate ARCO Environmental Remediation, L.L.C.

“Site” shall mean the Walker Mine Tailings Site, encompassing approximately 100 acres, located in the Plumas National Forest in Plumas County.

“United States” shall mean the United States of America, together with all departments and agencies thereof.

V. PAYMENT OF FUTURE RESPONSE COSTS

4. Within 30 business days after Settling Defendants receive notice that this Consent Decree has been lodged, Settling Defendants shall deposit the amount of \$2.5 Million into an escrow account bearing interest on commercially reasonable terms, in a federally-chartered bank, which Settling Defendants shall qualify as a qualified settlement fund (“QSF”) pursuant to Internal Revenue Code § 468B (the “Escrow Account”), in payment for Future Response Costs to be incurred by the United States at or in connection with the Site. Notice that payment has been made shall be made pursuant to Section XI of this Decree (Notices and Submissions) and shall reference U.S. DOJ No. 90-11-2-1320 and the Forest Service Account number to be provided by the Forest Service. Such monies shall be disbursed from the Escrow Account pursuant to the terms of Section VI of this Decree. The Forest Service has approved the Escrow Account as of the date that this Consent Decree is executed by a representative of the Forest Service, subject, however, to the Forest Service’s further review of such approval in accordance with, and to the extent permitted by, Section XIV of this Consent Decree. The Escrow Account also shall be subject to the continuing jurisdiction of the Forest Service in accordance with Section VI of this Consent Decree. If this Decree is not entered by the District Court, and the time for any appeal of that decision has run, or if the District Court’s denial of entry is upheld on appeal, the monies placed in escrow, together with accrued interest thereon, shall be returned to Settling Defendants.

5. In the event that the payment required by the preceding Paragraph is not made as required, Settling Defendants shall pay Interest on the amount owing. The Interest to be paid under this Paragraph shall begin to accrue thirty (30) days after the date payment was to be made and shall continue to accrue until payment is made. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to the United States by virtue of Settling Defendants’ failure to make timely payments under this Section. Settling Defendants shall make all payments required by this Paragraph in the manner described in the preceding Paragraph. Any Interest payable under this Paragraph shall be paid into the Escrow Account.

6. In addition to Interest, if payment of any portion of the amount due under this Section is not made by the 30th day after the payment was due to be made, Settling Defendants shall pay a stipulated penalty of \$1000 per day for each day the payment is late, until payment is made in full. Payments to the United States under this Section shall be paid by certified or cashier's check(s) made payable to "U.S. Department of Justice" and delivered to the office of the United States Attorney, Eastern District of California, Financial Litigation Unit, 501 "T" Street, Suite 10-100, Sacramento, California 95814, along with a transmittal notice indicating that the payment is for stipulated penalties and referencing the Forest Service Account number provided, U.S. DOJ No. 90-11-2-1320, and the name and address of the party making payment. Copies of check(s) paid pursuant to this Section, and any accompanying transmittal letter(s), shall be sent to the United States as provided in Section XI (Notices and Submissions). Notwithstanding any other provision of this Section, the United States may, in its unreviewable discretion, waive payment of any portion of the stipulated penalties that have accrued pursuant to this Consent Decree. Payment of stipulated penalties shall not excuse Settling Defendants from payment as required by this Section or from performance of any other requirements of this Consent Decree.

VI. DISBURSEMENTS FROM ESCROW ACCOUNT

7. The amount deposited in the Escrow Account pursuant to Section V of this Decree shall be disbursed, subject to the provisions of the following Paragraph, in accordance with escrow instructions executed by the Parties and the bank in which the Escrow Account is established. The Escrow Account shall be established prior to the lodging of this Decree, pursuant to an Escrow Agreement in substantially the form set out in Appendix A to this Decree.

8. The Forest Service shall submit an application for payment of Future Response Costs ("Application"), on a semi-annual or quarterly basis, to implement the CERCLA response activities at the Site. Such Application shall include documentation identifying each cost (actual or projected), including the amount incurred; the date incurred or to be incurred; the contractor or vendor performing the response activity, if applicable; and the items or services purchased or to

be purchased, if applicable. In the case of intramural costs or activities, the Application shall provide documentation sufficient to identify such costs or activities as being associated with Site response actions. The Application shall be submitted to the Escrow Agent for the Escrow Account, with a copy to Settling Defendants. Settling Defendants may, within 30 days of the Application's submission, serve an objection to the Application on the Forest Service, with a copy to the Escrow Agent, opposing the Application. Such an objection shall be limited to opposing costs identified in the Application on the grounds that the costs requested in the Application:

- (1) were not incurred at the Site, or
- (2) are not Future Response Costs within the definition set out in Section IV of this Consent Decree.

9. The Forest Service may thereupon withdraw or modify the Application. If the Forest Service submits a modified Application, Settling Defendants may treat it as an original Application and may serve an objection within 30 days of the Application on the grounds specified above. In the case of any Application as to which an objection is pending, the Escrow Agent shall not make disbursement except in accordance with the following Paragraph. Any pending objection to an Application shall be resolved by the Dispute Resolution provisions of this Paragraph. If the Parties are unable to informally resolve the dispute within 15 days from the date the pending objection was submitted, the Forest Service may make a motion to the Court requesting that its application or modified application be approved. Settling Defendants may oppose that motion, pursuant to the Local Rules of Court. In any such dispute brought to the Court, Settling Defendants shall bear the burden of demonstrating that the costs requested in the application: (1) were not incurred at the Site, or (2) are not Future Response Costs within the definition set out in Section IV of this Consent Decree.

10. By agreement of the Parties, and after payment has been made pursuant to Section V of this Decree, the escrow instructions governing disbursements from the Escrow Account may be modified by written agreement between the Parties and the bank in which the Escrow Account is established. Settling Defendants shall cooperate in the execution of such

documents as are necessary to effectuate such changes, provided that such changes do not affect the substantive rights of Settling Defendants with respect to the Escrow Account.

11. The Forest Service shall use the funds in the Escrow Account to properly implement the ROD and any amendments to the ROD required to remediate current conditions at the Site.

VII. COVENANTS NOT TO SUE BY THE UNITED STATES

12. In consideration of the payment, covenants and other promises made by Settling Defendants under the terms of this Consent Decree, and except as specifically provided in Paragraph 13 of this Section, the Forest Service covenants not to bring suit for any and all claims within the scope of its authority for Response Costs, Response Actions, or Natural Resources Damages at or to address the Site. The United States specifically covenants not to sue or to take administrative action for any of the following actions relating to the Site:

- (1) injunctive relief, Response Actions, Response Costs, contribution, or other relief under Sections 106 (including, without limitation, claims for penalties under Section 106(b)), 107, and 113 of CERCLA, 42 U.S.C. §§ 9606, 9607, and 9613, or
- (2) common law and/or other statutory claims based upon any alleged failure of Settling Defendants or their predecessors to pay Response Costs, Conduct Response Actions or remediate conditions at the Site, or
- (3) any action under Section 7003 of RCRA, 42 U.S.C. § 6973.

Except as provided in Paragraph 13 of this Section, the covenants not to sue set forth in this Paragraph include both past and future liability for those claims enumerated above arising from or relating to all conditions at or in connection with the Site. These covenants not to sue extend to the Settling Defendants, and to each such entity's respective officers, directors, and employees acting in their capacities as such. These covenants not to sue also extend to Settling Defendants' parents, affiliates, successors and assigns, and to each such entity's respective officers, directors and employees acting in their capacities as such, but only to the extent their liability derives from Settling Defendants' potential liability and only to the extent such entities provide covenants not to sue identical to those provided by Settling Defendants pursuant to Section VIII of this Consent

Decree. These covenants not to sue shall take effect upon the payment in full of the amount due under Section V of this Consent Decree (Payment of Future Response Costs), provided that Settling Defendants remain in compliance with the terms of Section VI (Disbursements from Escrow Account) of this Consent Decree until the Escrow Account is closed.

13. General reservations of rights. The covenants not to sue set forth above do not pertain to any matters other than those expressly specified in Paragraph 12. The United States reserves, and this Consent Decree is without prejudice to, all rights against Settling Defendants with respect to all other matters, including, but not limited to, the following:

(1) claims based on a failure by Settling Defendants to meet a requirement of this Consent Decree;

(2) criminal liability;

(3) liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments at the Site, on behalf of a federal agency other than the Forest Service;

(4) liability based upon Settling Defendants' ownership or operation of the Site after signature of this Consent Decree; and

(5) liability based upon Settling Defendants' transportation, treatment, storage, or disposal of, or arrangement for the transportation, treatment, storage, or disposal of, any hazardous substance or solid waste after signature of this Consent Decree.

14. Notwithstanding any other provision of this Consent Decree, the United States retains all authority and reserves all rights to take any and all Response Actions authorized by law.

VIII. COVENANTS BY SETTLING DEFENDANTS

15. Except as specifically provided in Paragraph 17 of this Section, Settling Defendants hereby covenant not to sue and agree not to assert any claims or causes of action against the United States with respect to the Site, Response Costs as defined herein, or this Consent Decree, including, but not limited to:

a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund based on Sections 106(b)(2), 107, 111, 112, or 113 of CERCLA, 42 U.S.C. §§ 9606(b)(2), 9607, 9611, 9612, or 9613, or any other provision of law;

b. any claim arising out of Response Actions at or in connection with the Site, including any claim under the United States Constitution, the California State Constitution, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, as amended, or at common law; or

c. any claim against the United States pursuant to Sections 107 and 113 of CERCLA, 42 U.S.C. §§ 9607 and 9613, in connection with the Site.

16. Nothing in this Consent Decree shall be deemed to constitute approval or preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. 300.700(d).

17. General Reservation of Rights by Settling Defendants. The Settling Defendants reserve any defenses to any order or claim brought by the United States pursuant to the reservations contained in Paragraph 13. In addition, the Settling Defendants reserve any cross-claims, counterclaims, or third-party claims against the United States in response to any claims brought by the United States against the Settling Defendants pursuant to the reservations contained in Paragraph 13.

IX.EFFECT OF SETTLEMENT; CONTRIBUTION PROTECTION

18. Nothing in this Consent Decree shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Consent Decree. The preceding sentence shall not be construed to waive or nullify any rights that any person not a signatory to this decree may have under applicable law. Settling Defendants expressly reserve any and all rights (including, but not limited to, any right to contribution), defenses, claims, demands, and causes of action that it may have with respect to any matter, transaction, or occurrence relating in any way to the Site against any person not a Party hereto.

19. The Parties agree, and by entering this Consent Decree this Court finds, that Settling Defendants are entitled, as of the effective date of this Consent Decree, to protection

from costs, damages, actions, or other claims (whether seeking contribution, indemnification, or however denominated) for matters addressed in this Consent Decree as provided by (1) CERCLA Section 113(f)(2), 42 U.S.C. § 9613(f)(2), and (2) any other applicable law. The “matters addressed” in this Consent Decree are all Response Actions taken or to be taken and all Response Costs incurred or to be incurred by the United States or any other person with respect to the Site, and specifically include without limitation those matters governed by the covenants contained in Sections VII and VIII of this Consent Decree. The “matters addressed” in this Consent Decree shall not include those Response Costs or Response Actions as to which Plaintiff has reserved its rights under this Consent Decree (except for claims for failure to comply with this Consent Decree), in the event that Plaintiff asserts against Settling Defendants rights coming within the scope of such reservations.

20. Settling Defendants agree that, with respect to any suit or claim for contribution brought by them for matters related to this Consent Decree, Settling Defendants will notify the United States in writing no later than sixty (60) days prior to the initiation of such suit or claim.

21. Settling Defendants also agree that, with respect to any suit or claim for contribution brought against them for matters related to this Consent Decree, Settling Defendants will notify the United States in writing within ten (10) days of service of the complaint on Settling Defendants. In addition, Settling Defendants shall notify the United States within ten (10) days of service or receipt of any motion for summary judgment and within ten (10) days of receipt of any order from a court setting a case for trial.

22. In any subsequent administrative or judicial proceeding initiated by the United States for injunctive relief, recovery of Response Costs, or other appropriate relief relating to the Site, Settling Defendants shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue or claim preclusion, claim splitting, or any other defenses based upon any contention that the claims raised by the United States in the subsequent proceeding were or should have been brought in the instant case; provided, however, that nothing in this Paragraph affects the enforceability of the covenants not to sue set forth in Section VII (Covenants Not to Sue by the United States).

X. CERTIFICATION

23. Settling Defendants hereby certify that, to the best of their knowledge and belief, after thorough inquiry, they have not altered, mutilated, discarded, destroyed or otherwise disposed of any records, documents or other information relating to their potential liability regarding the Site since notification of potential liability by the United States or the State or the filing of suit against them regarding the Site and that they have fully complied with any and all Forest Service requests for information pursuant to Section 104(e) and 122(e) of CERCLA, 42 U.S.C. §§ 9604(e), 9622(e).

XI. NOTICES AND SUBMISSIONS

24. Unless otherwise specified in this Consent Decree, whenever, under the terms of this Consent Decree, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be directed to the individuals at the addresses specified below, unless those individuals or their successors give notice of a change to the other Parties in writing. All notices and submissions shall be considered effective upon receipt, unless otherwise provided. Written notice as specified herein shall constitute complete satisfaction of any written notice requirement of this Consent Decree with respect to the United States and Settling Defendants.

As to the United States:

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
6 Ben Franklin Station
Washington, D.C. 20044
Re: DJ # 90-11-2-1320

David B. Glazer
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
301 Howard Street, Suite 1050
San Francisco, California 94105

and

Rose Miksovsky
Office of the General Counsel
33 New Montgomery Street, 17th Floor
San Francisco, California 94105

As to the Forest Service:

Dennis Geiser
Regional Environmental Engineer
Forest Service, Pacific Southwest Region
1323 Club Drive
Vallejo, California 94592

As to Settling Defendants:

Jean A. Martin
Environmental Counsel
Atlantic Richfield Company
6 Centerpointe Drive, 5th Floor
La Palma, CA 90623

Michael J. Gallagher
Davis Graham & Stubbs LLP
1550 Seventeenth Street, Suite 500
Denver, CO 80202

Robin J. Bullock
Regional Manager
Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

Mark Brekhus
Regional Manager
Atlantic Richfield Company
6 Centerpointe Drive, 1st Floor
La Palma, CA 90623

XII. EFFECTIVE DATE

25. The effective date of this Consent Decree shall be the date upon which this Consent Decree is entered by the Court, except as otherwise provided herein.

XIII. RETENTION OF JURISDICTION

26. This court shall retain jurisdiction over this matter for the purpose of interpreting and enforcing the terms of this Consent Decree.

XIV. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

27. This Consent Decree shall be lodged with the Court for a period of not less than thirty (30) days for public notice and comment. The United States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Decree disclose facts or considerations that indicate that the Consent Decree is inappropriate, improper, or inadequate. Settling Defendants consent to the entry of this Consent Decree without further notice.

28. If for any reason the Court should decline to approve this Consent Decree in the form presented, this agreement is voidable at the sole discretion of any Party and the terms of the agreement may not be used as evidence in any litigation between the Parties.

XV. SIGNATORIES/SERVICE

29. The undersigned representative of Settling Defendants, the Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice, and the Regional Forester, Region 5, Forest Service certify they are fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind Settling Defendants and the United States, respectively, to this document.

30. Settling Defendants hereby agree not to oppose entry of this Consent Decree by this Court or to challenge any provision of this Consent Decree unless the United States has notified Settling Defendants in writing that it no longer supports entry of the Consent Decree.

31. Settling Defendants shall identify, on the attached signature page, the name, address and telephone number of an agent who is authorized to accept service of process by mail on behalf of Settling Defendants with respect to all matters arising under or relating to this Consent Decree. Settling Defendants hereby agree to accept service in that manner and to waive the formal service requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and

any applicable local rules of this Court, including, but not limited to, service of a summons. The Parties agree that Settling Defendants need not file an answer to the Complaint in this Action unless or until thirty days after the Court expressly declines to enter this Consent Decree.

XVI. FINAL JUDGMENT

32. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute the final judgment between and among the United States and the Settling Defendants, and among other things, resolves all claims filed in the above-captioned cases between and among those Parties. The Court finds that there is no just reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P. 54 and 58

33. Retaining Jurisdiction. The Court shall retain jurisdiction over this case, until termination of this Consent Decree, to resolve disputes arising under the Consent Decree, enter orders modifying the Consent Decree, and effectuate and enforce compliance with the terms of the Consent Decree.

SO ORDERED.

DATED: 6/13/2005

/s/ Garland E. Burrell, Jr.

GARLAND E. BURRELL, JR.
United States District Judge

THE UNDERSIGNED PARTIES enter into this Consent Decree in the matter of United States v ATLANTIC RICHFIELD COMPANY, relating to the Walker Mine Tailings Site.

FOR THE UNITED STATES OF AMERICA

Date: April 8, 2005

KELLY JOHNSON
Assistant Attorney General
Environment and Natural Resources Division
U.S. Department of Justice
Washington, D.C. 20530

/s/ _____
DAVID B. GLAZER
Environment and Natural Resources Division
U.S. Department of Justice
301 Howard Street, Suite 1050
San Francisco, California 94105

/s/ _____
KENT CONNAUGHTON
Deputy Regional Forester, for
JACK BLACKWELL
Regional Forester
U.S. Department of Agriculture
Forest Service
1323 Club Drive
Vallejo, California 94592

THE UNDERSIGNED PARTIES enter into this Consent Decree in the matter of United States v. ATLANTIC RICHFIELD COMPANY, relating to the Walker Mine Tailings Site.

FOR THE ATLANTIC RICHFIELD
COMPANY AND ARCO
ENVIRONMENTAL REMEDIATION, L.L.C.

Date: January 18, 2005

/s/ _____

Luke Keller
President of Operations, The Americas
Atlantic Richfield Company
21800 Torch Parkway
Warrenville, IL 60555

/s/ _____

Jean A. Martin
Environmental Counsel
Atlantic Richfield Company
6 Centerpointe Drive
5th Floor
Palma, CA 90623

/s/ _____

Michael A. Gallagher
Davis Graham & Stubbs LLP
1550 Seventeenth Street
Suite 500
Denver, CO 80202

Agent Authorized to Accept Service of Complaint, Consent Decree and pleadings and orders related to entry of the Consent Decree on Behalf of Above-signed Parties:

Name: Jean Martin
Title: Environmental Counsel
Address: 6 Centerpointe Drive, LPC 6-557
Tel. Number: 714-228-6736

APPENDIX A

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FIRST AMENDED WALKER MINE ESCROW AGREEMENT

This First Amended Escrow Agreement (the "Escrow Agreement") dated as of the effective date (the "Effective Date") set forth on schedule 1 attached hereto ("Schedule 1") is made by and among Atlantic Richfield Company (the "Company") and the United States Department of Agriculture, Forest Service (the "Forest Service") (collectively, the "Parties"), the administrator identified on Schedule 1 (the "Administrator"), and JPMorgan Chase Bank, N.A. as escrow agent hereunder (the "Escrow Agent").

WHEREAS, the Parties entered into a Consent Decree ("Consent Decree") to resolve alleged liability for remediation of the Walker Mine Tailings Site located in the Plumas National Forest, Plumas County, California ("Site").

WHEREAS, pursuant to the Consent Decree, the Company has agreed to make certain contributions to a settlement fund to be held in escrow pending its release in accordance with the Consent Decree.

WHEREAS, the Parties and the Escrow Agent now desire to enter into this Escrow Agreement to provide for and to evidence their mutual agreement with respect to the holding and maintenance of the settlement fund in escrow.

NOW THEREFORE, in consideration of the foregoing and of the mutual covenants hereinafter set forth, the parties hereto agree as follows:

1. **Appointment.** The Parties hereby appoint the Escrow Agent as their escrow agent for the purposes set forth herein, and the Escrow Agent hereby accepts such appointment under the terms and conditions set forth herein.
2. **Settlement Fund.** The Company shall pay to the Escrow Agent for deposit the amount described in the Consent Decree. The Escrow Agent has the right to assume that any deposit received by it pursuant to the terms of this Escrow Agreement is proper and shall not be required to inquire into the adequacy, sufficiency or propriety of any such deposit. The Escrow Agent shall have no duty to solicit any deposits that may be due to it under the terms of this Escrow Agreement or the Settlement Agreement. All deposits received pursuant to this Section 2 shall hereinafter be referred to as the "Escrow Deposit." The Escrow Agent shall hold the Escrow Deposit and, subject to the terms and conditions hereof, shall invest and reinvest the Escrow Deposit and the proceeds thereof (the "Settlement Fund") as directed in Section 3.
3. **Investment of Settlement Fund.** During the term of this Escrow Agreement, the Settlement Fund shall be invested and reinvested by the Escrow Agent in the investment indicated on Schedule 1 or such other investments as shall be directed in writing by the Parties and as shall be acceptable to the Escrow Agent. Following the Escrow Deposit, the Escrow Agent will invest these Settlement Fund in investments limited to the following:
 - a. Obligations issued or granted by the United States, or any money fund which invests solely in the foregoing obligations;

b. Any obligations issued or guaranteed by any state or municipality in the United States that is rated AAA by Standard & Poor's, or Aaa by Moody's Investors Service, at the time of investment;

c. Any corporate bonds with an investment grade credit rating of AAA by Standard & Poor's, or Aaa by Moody's Investors Service, at the time of the investment;

d. Certificates of deposit of, accounts with repurchase obligations of, or money funds or other obligations of banks or of corporations endowed with trust powers having capital and surplus in excess of \$100,000,000; and

e. Certificates of deposit of, accounts with, or other obligations of any bank or corporation endowed with trust powers provided that the full amount of any such certificate of deposit, account, or other obligations is insured by FDIC or FSLIC.

The Settlement Fund shall not be invested in any other manner without the prior written instruction of the Forest Service. All investment orders involving U.S. Treasury obligations, commercial paper and other direct investments will be executed through JPMorgan Fleming Asset Management (JPMFAM), in the investment management division of JPMorgan Chase. Subject to principles of best execution, transactions are effected on behalf of the Settlement Fund through broker-dealers selected by JPMFAM. In this regard, JPMFAM seeks to attain the best overall result for the Settlement Fund, taking into consideration quality of service and reliability. An agency fee will be assessed in connection with each transaction. Periodic statements will be provided to the Parties and the Administrator reflecting transactions executed on behalf of the Settlement Fund. The Parties and the Administrator, upon written request, will receive a statement of transaction details upon completion of any securities transaction in the Settlement Fund without any additional cost. The Escrow Agent shall have the right to liquidate any investments held in order to provide funds necessary to make required payments under this Escrow Agreement. The Escrow Agent shall have no liability for any loss sustained as a result of any investment in an investment indicated on Schedule 1 or any investment made pursuant to the instructions of the parties hereto or as a result of any liquidation of any investment prior to its maturity or for the failure of the parties to give the Escrow Agent instructions to invest or reinvest the Settlement Fund.

4. **Settlement Fund Separate.** The Escrow Agent shall at all times hold the Settlement Fund wholly segregated from all other funds and securities deposited with or held by the Escrow Agent. The Escrow Agent shall not commingle the Settlement Fund with any other assets of the Escrow Agent. The Escrow Agent shall hold and dispose of the Settlement Fund only as set forth herein. The Settlement Fund shall always be maintained by the Escrow Agent in accordance with the terms of this Escrow Agreement and the Settlement Fund shall at all times be maintained on the books of the Escrow Agent as a special account evidencing such facts. The Escrow Deposit received by the Escrow Agent under this Escrow Agreement shall not be considered as a banking deposit or be subject to checks or drafts drawn by the Parties, and the Escrow Agent shall have no right or title with respect to the Settlement Fund except as Escrow Agent under the terms hereof. The Escrow Agent shall neither make nor permit any disbursement from the Settlement Fund except as directed in writing and as expressly provided herein.

5. **Title to Settlement Fund.** Prior to the termination of this Escrow Agreement, the Company shall not have legal title to the Settlement Fund. Title to the Settlement Fund shall be held by the Escrow Agent in its capacity as such.

6. **Distribution of Settlement Fund.** The Settlement Fund shall be distributed to the Forest Service in accordance with this Escrow Agreement. The Escrow Agent shall disburse the Settlement Fund semi-annually or quarterly, as applicable, upon application of the Forest Service made pursuant to the Disbursement Request Application ("Attachment 1"), for the purpose of paying the Forest Service for future Response Costs, as defined in the Consent Decree. The Forest Service representative with authority to make such application shall be the Forest Service Pacific Southwest Region's Regional Engineer ("Regional Engineer"). The Escrow Agent shall make the requested disbursement 30 days after receipt of such Disbursement Request Application, unless the Company submits an Objection to the Disbursement Request Application ("Attachment 2") within such 30 day period. If, upon the Company's objection made pursuant to this Section, the Forest Service withdraws its Disbursement Request Application, the Escrow Agent shall make no disbursement; if the Forest Service modifies its Disbursement Request Application (and the Company does not object to the modified Disbursement Request Application within 30 days of its resubmission), the Escrow Agent shall make disbursement as requested by the modified Disbursement Request Application. If any objection remains pending as to a Disbursement Request Application or modified application, the Escrow Agent shall make disbursement only in accordance with a judicial determination. If funds remain in the Settlement Fund after all Future Response Costs have been reimbursed, the Settlement Fund shall be disbursed to the Company. If one or both of the Parties elect to terminate the Consent Decree pursuant to Section 28 of the Consent Decree, then all funds in the Settlement Fund shall be promptly returned to the Company. If the United States elects to withdraw its consent to the Consent Decree pursuant to Section 27 of the Consent Decree, then all funds in the Settlement Fund shall be promptly returned to the Company. At any point when the Settlement Fund is only sufficient to pay fees and taxes on interest accruals, the Escrow Account shall be closed after payment of such fees and taxes.

7. **Termination.** After receipt of notice from the Escrow Agent that all claims have been paid and disbursement in full of the Settlement Fund pursuant to the provisions of Section 6 hereof, this Escrow Agreement shall terminate, subject, however, to the provisions of Section 13. Upon the taking of all actions as described by this Escrow Agreement, the Escrow Agent shall have no further obligations or responsibilities hereunder to the parties hereto or to any other person or persons in connection with this Escrow Agreement. The Escrow Agent may dispose of any records or reports concerning the Settlement Fund and any transactions relating to such account in accordance with the Escrow Agent's established procedures, but only upon 30 days prior written notice to the Parties and the Administrator.

8. **Escrow Agent.** The Escrow Agent undertakes to perform only such duties as are expressly set forth herein and no duties shall be implied. The Escrow Agent shall have no liability under and no duty to inquire as to the provisions of any agreement other than this Escrow Agreement. The Escrow Agent may rely upon and shall not be liable for acting or refraining from acting upon any written notice, instruction or request furnished to it hereunder and believed by it to be genuine and to have been signed or presented by the proper party or

parties. The Escrow Agent shall be under no duty to inquire into or investigate the validity, accuracy or content of any such document. The Escrow Agent shall have no duty to solicit any payments which may be due it or the Settlement Fund. The Escrow Agent shall not be liable for any action taken or omitted by it in good faith except to the extent that a court of competent jurisdiction determines that the Escrow Agent's gross negligence or willful misconduct was the primary cause of any loss to the Parties or the Administrator. The Escrow Agent may execute any of its powers and perform any of its duties hereunder directly or through agents or attorneys (and shall be liable only for the careful selection of any such agent or attorney) and may consult with counsel, accountants and other skilled persons to be selected and retained by it. The Escrow Agent shall not be liable for anything done, suffered or omitted in good faith by it in accordance with the advice or opinion of any such counsel, accountants or other skilled persons. In the event that the Escrow Agent shall be uncertain as to its duties or rights hereunder or shall receive instructions, claims or demands from any party hereto which, in its opinion, conflict with any of the provisions of this Escrow Agreement, it shall be entitled to refrain from taking any action and its sole obligation shall be to keep safely all property held in escrow until it shall be directed otherwise in writing by all of the other parties hereto or by a final order or judgment of a court of competent jurisdiction. Anything in this Escrow Agreement to the contrary notwithstanding, in no event shall the Escrow Agent be liable for special, indirect or consequential loss or damage of any kind whatsoever (including but not limited to lost profits), even if the Escrow Agent has been advised of the likelihood of such loss or damage and regardless of the form of action.

9. **Removal or Resignation of Escrow Agent.** The Escrow Agent may resign without obtaining the order of any court, by giving at least 30 days' prior written notice (unless waived) to the Parties and the Administrator. The Parties may remove the Escrow Agent only with the consent of each other at any time for any reason or for no reason by giving written notice thereof to the Escrow Agent at least 10 days prior to the date specified for such removal to take effect. If either of the Parties wishes to remove the Escrow Agent for good cause, it shall notify the other in writing of the reasons for such proposed removal, whereupon consent to such removal shall not be unreasonably withheld. On or before the effective date specified for resignation or removal of the Escrow Agent, the Parties shall appoint a successor Escrow Agent by a written instrument. The Company shall be deemed to have consented to such removal and appointment if the party receiving the notice fails to object to the removal or appointment within 5 days after having received notice from the other of its intent to replace the Escrow Agent. Such resignation or removal shall be effective upon the appointment of a successor Escrow Agent pursuant to the provisions hereof. Any successor Escrow Agent shall be a bank domiciled in the United States of America and having combined capital and surplus of at least \$500,000,000. Any successor Escrow Agent appointed under the provisions of this Escrow Agreement shall have all of the same obligations, rights, powers, privileges, immunities and authority with respect to the matters contemplated herein as are granted herein to the original Escrow Agent. Upon the effective date of any resignation or removal of an Escrow Agent, all fees and expenses owed to the retiring Escrow Agent shall be paid from the Settlement Fund and the Settlement Fund shall be delivered by the retiring Escrow Agent to the successor Escrow Agent, whereupon all of the retiring Escrow Agent's obligations hereunder shall cease and terminate. The indemnities contained herein in favor of the retiring Escrow Agent, its officers, directors and employees (or any of them) shall survive with respect to events or circumstances occurring prior to such resignation or removal.

10. **Merger.** Any corporation or association into which the Escrow Agent may be merged or converted or with which it may be consolidated or any corporation or association to which all or substantially all the escrow business of the Escrow Agent's corporate trust line of business may be transferred, shall be the Escrow Agent under this Escrow Agreement without further act.

11. **Fees.** The Parties agree jointly and severally to (i) pay the Escrow Agent upon execution of this Escrow Agreement and from time to time thereafter reasonable compensation for the services to be rendered hereunder, which unless otherwise agreed in writing shall be as described in Schedule 1 attached hereto, and (ii) pay or reimburse the Escrow Agent upon request for all expenses, disbursements and advances, including reasonable attorney's fees and expenses, incurred or made by it in connection with the preparation, execution, performance, delivery, modification and termination of this Escrow Agreement. Such compensation shall be billed to the Parties and shall be paid from amounts on deposit in the Settlement Fund. For services other than those described in the fee schedule, and as to which the parties have not agreed, the Escrow Agent shall be entitled to such compensation as may be allowed by the court.

12. **Records and Reports.** The Escrow Agent will keep books of record and account in which complete entries shall be made of all transactions relating to the receipts, disbursements and investment of the Settlement Fund, and such books shall be available for inspection at reasonable hours and under reasonable conditions by the parties hereto.

13. **Indemnity.** The Company shall defend and indemnify, and the Parties shall jointly and severally hold harmless, the Escrow Agent and its directors, officers, agents and employees (the "indemnitees") from all loss, liability or expense (including the fees and expenses of in house or outside counsel) arising out of or in connection with (i) the Escrow Agent's execution and performance of this Escrow Agreement, except in the case of any indemnitee to the extent that such loss, liability or expense is due to the gross negligence or willful misconduct of such indemnitee, or (ii) its following any instructions or other directions from the Parties, except to the extent that its following any such instruction or direction is expressly forbidden by the terms hereof. The parties hereto acknowledge that the foregoing indemnities shall survive the resignation or removal of the Escrow Agent or the termination of this Escrow Agreement. The parties hereby grant the Escrow Agent a lien on, right of set-off against and security interest in the Settlement Fund for the payment of any claim for indemnification, compensation, expenses and amounts due hereunder.

14. **Attachment of Settlement Fund.** It is the intent of the Parties that the Settlement Fund not be subject to attachment, garnishment or levy by creditors of the Company. However, if the Settlement Fund is at any time attached, garnished or levied upon or under any court order, or in case the payment or transfer of the Settlement Fund shall be stayed or enjoined by any court order, or in case any order, judgment or decree shall be made or entered by any court affecting the Settlement Fund or a portion thereof, then in any of such events the Escrow Agent is authorized, in its sole discretion, to rely upon and comply with any such order, writ, judgment or decree that it is advised by legal counsel of its own choosing as binding upon it under the terms of this Escrow Agreement or otherwise. To the extent practicable, the Escrow

Agent shall provide the Parties and the Administrator prompt notice of any such court order prior to taking any action thereon. If the Escrow Agent complies with any such order, writ, judgment or decree, it shall not be liable to the other parties to this Escrow Agreement or to any other person by reason of such compliance, even though such order, writ, judgment or decree may subsequently be reversed, modified, annulled, set aside or vacated.

15. **Taxes.** The Settlement Fund is to be treated for federal income tax purposes as a qualified settlement fund within the meaning of U.S. Department of Treasury ("Treas.") Reg. § 1.468B-1. The Administrator shall be the "administrator" (as that term is used in Treas. Reg. § 1.468B-2(k)(3)) of the Settlement Fund and as such will file such federal, state or local returns, pay such federal, state or local taxes, comply with applicable federal, state or local information reporting requirements and otherwise generally comply with the rules and regulations applicable to qualified settlement funds under Treas. Reg. § 1.468B-1 and relevant provisions of state and local tax law. The Administrator is explicitly authorized to use the assets of the Settlement Fund (i) to satisfy such federal, state and local taxes as may be due with respect to the Settlement Fund and (ii) to reduce the amount of any payments under this Escrow Agreement by taxes paid or which the Administrator reasonably concludes may become payable. The Company will comply with the provisions of the U.S. Department of Treasury Regulations applicable to the transferor to a qualified settlement fund and the Administrator will comply with its duties and obligations under the Reg. § 1.468B rules.

The Administrator, and, as required, the Company, shall jointly and timely make (or cause to be jointly and timely made) the "relation-back election" (as defined in Treas. Reg. § 1.468-1B) back to the earliest permitted date. Such election shall be made in compliance with the procedures and requirements contained in such regulations (or any successor regulations). It shall be the responsibility of the Administrator to timely and properly prepare, and deliver the necessary documentation (including but not limited to the disclosures and elections referred to above) for signature by all necessary parties, and thereafter to cause the appropriate filing to occur.

The parties hereto acknowledge that the Administrator shall not be held accountable for any fines, penalties or interest associated with late filings as a result of the failure or refusal of others to cooperate with the Administrator causing such filings to occur on a timely basis. The Administrator may retain or hire a qualified third party or parties ("Qualified Third Party") to perform any of its duties or responsibilities specified herein or in Treas. Reg. § 1-468B-2. The fees or costs of such Qualified Third Party shall be billed to the Administrator and shall be paid from amounts on deposit in the Settlement Fund in accordance with the provisions of Section 11 hereof.

The Escrow Agent shall have no duty to comply with the provisions of Treasury Reg. § 1.468B, cited above. Furthermore, the Escrow Agent shall not be deemed to have any knowledge or responsibility concerning the applicability of such regulation to the transactions contemplated by this Agreement.

16. **Notices.** All communications hereunder shall be deemed to be duly given and received:

- (i) upon delivery if delivered personally or upon confirmed transmittal if by facsimile;
- (ii) on the next Business Day (as hereinafter defined) if sent by overnight courier; or

(iii) four (4) Business Days after mailing if mailed by prepaid registered mail, return receipt requested, to the appropriate notice address set forth on Schedule 1 or at such other address as any party hereto may have furnished to the other parties in writing by registered mail, return receipt requested.

Notwithstanding the above, in the case of communications delivered to the Escrow Agent pursuant to (ii) and (iii) of this Section 16, such communications shall be deemed to have been given on the date received by the Escrow Agent. In the event that the Escrow Agent, in its sole discretion, shall determine that an emergency exists, the Escrow Agent may use such other means of communication as the Escrow Agent deems appropriate. "Business Day" shall mean any day other than a Saturday, Sunday or other day on which the Escrow Agent located at the notice address set forth on Schedule 1 is authorized or required by law or executive order to remain closed.

17. **Security Procedures.** In the event funds transfer instructions are given (other than in writing at the time of execution of this Escrow Agreement), whether in writing, by telecopier or otherwise, the Escrow Agent is authorized to seek confirmation of such instructions by telephone call-back to the person or persons designated on schedule 2 hereto ("Schedule 2"), and the Escrow Agent may rely upon the confirmations of anyone purporting to be the person or persons so designated. The persons and telephone numbers for call-backs may be changed only in a writing actually received and acknowledged by the Escrow Agent. The Escrow Agent and the beneficiary's bank in any funds transfer may rely solely upon any account numbers or similar identifying numbers provided by the Parties or the Administrator to identify (i) the beneficiary, (ii) the beneficiary's bank, or (iii) an intermediary bank. The Escrow Agent may apply any of the escrowed funds for any payment order it executes using any such identifying number, even where its use may result in a person other than the beneficiary being paid, or the transfer of funds to a bank other than the beneficiary's bank or an intermediary bank designated. The parties to this Escrow Agreement acknowledge that these security procedures are commercially reasonable.

18. **Miscellaneous.** The provisions of this Escrow Agreement may be waived, altered, amended or supplemented, in whole or in part, only by a writing signed by all of the parties hereto. Neither this Escrow Agreement nor any right or interest hereunder may be assigned in whole or in part by any party, except as provided in Sections 9 and 10, without the prior consent of the other parties. This Escrow Agreement shall be governed by and construed under the laws of the State of California. The Company irrevocably waives any objection on the grounds of venue, forum non-conveniens or any similar grounds, and waives any right to a trial by jury with respect to any lawsuit or judicial proceeding arising or relating to this Escrow Agreement. The Parties irrevocably consent to service of process by mail or in any other manner permitted by applicable law, except that service of process on the United States shall be effected in accordance with applicable law. The Parties other than the United States consent to the jurisdiction of the courts located in the State of California; jurisdiction over the United States shall be governed by applicable law. No party to this Escrow Agreement is liable to any other party for losses due to, or if it is unable to perform its obligations under the terms of this Escrow Agreement because of, acts of God, fire, floods, strikes, equipment or transmission failure, or other causes reasonably beyond its control. This Escrow Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties hereto have executed this Escrow Agreement as of the date set forth in Schedule 1.

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Schedule 1

Effective Date:

Name of Company: Atlantic Richfield Company
Company Notice Address: 6 Centerpointe Drive, 5th Floor, Palma, CA 90623

Name of Administrator: Ehrhardt Keefe Steiner & Hottman
Administrator Notice Address: 7979 E. Tufts Avenue, Suite 400 · Denver, Colorado
80237-2843

Name: United States Dept of Agriculture, Forest Service, Pacific Southwest Region
Notice Address: 1323 Club Drive, Vallejo, California 94592

Investment: [specify]

- Obligations issued or granted by the United States, or any money fund which invests solely in the foregoing obligations;
- Any obligations issued or guaranteed by any state or municipality in the United States that is rated AAA by Standard & Poor's, or Aaa by Moody's Investors Service, at the time of investment;
- Any corporate bonds with an investment grade credit rating of AAA by Standard & Poor's, or Aaa by Moody's Investors Service, at the time of the investment;
- Certificates of deposit of, accounts with repurchase obligations of, or money funds or other obligations of banks or of corporations endowed with trust powers having capital and surplus in excess of \$100,000,000; and
- Certificates of deposit of, accounts with, or other obligations of any bank or corporation endowed with trust powers provided that the full amount of any such certificate of deposit, account, or other obligations is insured by FDIC or FSLIC.

The Funds shall not be invested in any other manner without the prior written instruction of the Forest Service. Absence of any written instructions, the Funds shall be invested in a Trust Account with the JPMorgan Chase Bank, N.A.

Escrow Agent notice address: JPMorgan Chase Bank
Institutional Trust Services
4 New York Plaza – 21st Floor
NY, NY 10004
Attention: Sandra Frierson
Fax No.: 212.623.6168

Escrow Agent's compensation: \$5,000 per annum without pro-ratio for partial years.

Schedule 2

**Telephone Number(s) for Call-Backs and
Person(s) Designated to Confirm Funds Transfer Instructions**

If to the Company:

<u>Name</u>	<u>Telephone Number</u>
1. Jean A. Martin	(714) 228-6736
2. Robert Chetwood	(714) 228-6704
3. Dave McCarthy	(406) 782-9964

If to the Forest Service:

<u>Name</u>	<u>Telephone Number</u>
1. _____	_____
2. _____	_____
3. _____	_____

Telephone call-backs shall be made to each appropriate party if more than one party's instructions are required pursuant to this Escrow Agreement.

Attachment 1

Disbursement Request Application

Application Date: _____

Check One:

Original Application

Modified Application. Original Application Date: _____

Application Quarter: _____

Applicant: _____

Summary of Response Costs Incurred or to be Incurred¹:

Response Activity	Cost Incurred or to be Incurred	Date of Activity	Service / Item Purchased or to be Purchased	Contractor / Consultant / Vendor

¹ **Documentation of the costs incurred or to be incurred for each activity is attached.**

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Attachment 2

Objection to Request for Disbursement

Original Application Date: _____

Application Quarter: _____

Original Applicant: _____

Settling Defendants object to the following Response Costs:

Response Activity or Service / Item	Cost Incurred or to be Incurred	Date of Activity	Contractor / Consultant / Vendor	Objection
				<input type="checkbox"/> costs not incurred at Site <input type="checkbox"/> costs are not Future Response Costs
				<input type="checkbox"/> costs not incurred at Site <input type="checkbox"/> costs are not Future Response Costs
				<input type="checkbox"/> costs not incurred at Site <input type="checkbox"/> costs are not Future Response Costs
				<input type="checkbox"/> costs not incurred at Site <input type="checkbox"/> costs are not

				Future Response Costs
--	--	--	--	----------------------------------



Linda S. Adams
Secretary for
Environmental Protection

State Water Resources Control Board

Division of Financial Assistance
1001 I Street • Sacramento, California 95814 • (916) 341-5700
Mailing Address: P.O. Box 944212 • Sacramento, California • 94244-2120
FAX (916) 341-5707 <http://www.waterboards.ca.gov>



Arnold Schwarzenegger
Governor

VJJ

TO: Pamela Creedon, Executive Officer
Central Valley Regional Water Quality Control Board

FROM: Barbara L. Evoy, Deputy Director
DIVISION OF FINANCIAL ASSISTANCE

DATE: JUN 10 2010

SUBJECT: APPROVAL OF ADDITIONAL FUNDING FROM THE CLEANUP AND
ABATEMENT ACCOUNT (CAA) TO THE WALKER MINE POLLUTION
ABATEMENT; C/A 069

10 JUN 21 AM 10:01
RECEIVED
SACRAMENTO
CVRWQCB

Your request for additional CAA funds to fund the inspection, maintenance, and repairs to the 700-level adit at Walker Mine has been approved in the amount of \$600,000. The term of the project is from May 18, 2010 to June 30, 2015. The Program Cost Allocation (PCA) code 27853 has been established for this project. The following documents are attached for your use:

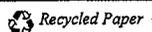
- The *CAA Approved Funding Information* form. A copy of this form will be sent to the Accounting Office.
- The *Request for Payment* form. This completed form must be submitted with each invoice. The Project Manager must sign the original invoice. The original invoice and three (3) copies should be attached and forwarded to Eric Santos for review and payment.
- The *Payee Data Record* form. This form accompanies the "Request for Payment" form and must be completed for each vendor used on this project. In addition, if the funds are used for contract or grant services, a copy of the signed contract/grant and the Contract/Grant Request Form must be forwarded to Eric Santos for inclusion in the project file.

Upon completion of the Project, please submit a Final Report describing the work accomplished. If you have any questions, please contact Eric Santos at 916.341.5378 or Toru Okamoto at 916.341.5649.

Enclosures (3)

cc: Hope Booke, Region 5
Debra Latour, DAS - Accounting
David Azevedo, DAS - Accounting
Eric Santos, DFA

California Environmental Protection Agency



**STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2010-0023**

TO ALLOCATE \$600,000 FROM THE CLEANUP AND ABATEMENT ACCOUNT (CAA) TO
FUND THE INSPECTION, MAINTENANCE, AND REPAIRS TO THE 700-LEVEL ADIT AT
WALKER MINE (PROJECT)

WHEREAS:

1. The Central Valley Regional Water Quality Control Board (Central Valley Water Board) is requesting an additional \$600,000 from the CAA to fund the Project for the next five years;
2. The Central Valley Water Board will not be able to meet its requirements to protect water quality as described in the Walker Mine (Mine) *Acid Mine Drainage Abatement Project, Operations and Maintenance Procedures* (May 1997), adopted by the Central Valley Water Board in Resolution No. 97-161;
3. The Mine discharged acid mine drainage (AMD) directly into Dolly Creek, and the discharge eliminated aquatic life downstream in Dolly Creek and Little Grizzly Creek for a distance of approximately 10 miles;
4. In November 1987, the Central Valley Water Board installed an engineered concrete mine seal to prevent the direct discharge of AMD;
5. In 1991, the Central Valley Water Board received a \$1.5 million settlement from the owners of the property. The money was paid to the CAA and the State Water Resources Control Board (State Water Board) adopted Resolution Nos. 1991-0016 and 1997-0082, which authorized \$1.2 million and \$1.5 million, respectively, from the CAA to the Central Valley Water Board for the Mine;
6. Inspection, maintenance, and repair of the 700-Level Adit are required before staff can inspect and further maintain the Mine seal; and
7. The requested allocation is consistent with the purposes of Water Code Section 13442. Section 13442 provides that the State Water Board may order moneys to be paid from the CAA to a public agency with authority to cleanup or abate the effects of a waste "to assist it in cleaning up the waste or abating its effects on the waters of the state."

THEREFORE BE IT RESOLVED THAT:

The State Water Board:

1. Approves funding an additional \$600,000 from the CAA to the Central Valley Water Board for the Project;
2. Directs that less than ten percent of the \$600,000 funding amount is authorized for Project oversight by the Central Valley Water Board; and

3. Reverts any unexpended funds to the CAA as of June 20, 2015, unless the Deputy Director or Assistant Deputy Director of the Division of Financial Assistance authorizes an extension. The funds will be available until June 30, 2015.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Board held on May 18, 2010.

AYE: Chairman Charles R. Hoppin
Board Member Arthur G. Baggett, Jr.
Board Member Tam M. Doduc
Board Member Walter G. Pettit

NAY: None

ABSENT: Vice Chair Frances Spivy-Weber

ABSTAIN: None



Jeanine Townsend
Clerk to the Board

APPROVED FUNDING INFORMATION

STATE WATER RESOURCES CONTROL BOARD
DIVISION OF FINANCIAL ASSISTANCE

AGENCY: Central Valley Regional Water Quality Control Board

PROJECT TITLE: Walker Mine Pollution Abatement

PROJECT NUMBER: CAA 069

NEW PROJECT _____ AMENDMENT # X

AMOUNT REQUESTED: \$600,000

TERM OF ORIGINAL PROJECT: 9/18/2007 – 07/01/2008
(Month/day/year - Month/day/year)AMENDED TERM END DATE: 6/30/2015
(Month/day/year)CONTACT PERSON: Eric Santos PHONE NUMBER: 916.341.5378

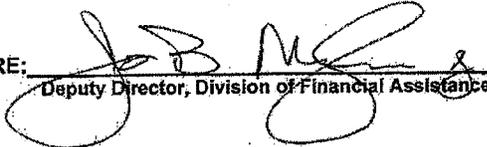
AMOUNT APPROVED: \$600,000

TOTAL FUNDS APPROVED TO DATE: \$3,300,000

FUNDING INFORMATION:

PCA Number: 27853

Index/Object Code Number: _____

INVOICES APPROVED BY: Toru OkamotoAUTHORIZED SIGNATURE: 
Deputy Director, Division of Financial AssistanceDate: 6/9/10

REQUEST FOR PAYMENT

**STATE WATER RESOURCES CONTROL BOARD
DIVISION OF FINANCIAL ASSISTANCE
CLEANUP AND ABATEMENT ACCOUNT (CAA)**

AGENCY: Central Valley Regional Water Quality Control Board

PROJECT TITLE: Walker Mine Pollution Abatement

TOTAL AMOUNT APPROVED FOR PROJECT: \$3,300,000

CAA PROJECT NUMBER: 069

AGREEMENT NUMBER: _____

INVOICE NUMBER: _____

PAYEE NAME: _____

PAYEE ADDRESS: _____

INVOICE TOTAL: \$ _____

REGIONAL BOARD REPRESENTATIVE: _____
Print Name Clearly Date

REGIONAL BOARD SIGNATURE: _____

PHONE NUMBER: _____

SERVICES OR GOODS PROVIDED UNDER THIS INVOICE: _____

FUNDING INFORMATION:

PCA Number: 27853

Index/Object Code Number: _____

PAYMENT APPROVED BY: _____
Manager Date:

PAYEE DATA RECORD

STD. 204 (Rev. 6-2003) (REVERSE)

1	<p><u>Requirement to Complete Payee Data Record, STD. 204</u></p> <p>A completed Payee Data Record, STD. 204, is required for payments to all non-governmental entities and will be kept on file at each State agency. Since each State agency with which you do business must have a separate STD. 204 on file, it is possible for a payee to receive this form from various State agencies.</p> <p>Payees who do not wish to complete the STD. 204 may elect to not do business with the State. If the payee does not complete the STD. 204 and the required payee data is not otherwise provided, payment may be reduced for federal backup withholding and nonresident State income tax withholding. Amounts reported on Information Returns (1099) are in accordance with the Internal Revenue Code and the California Revenue and Taxation Code.</p>
2	<p>Enter the payee's legal business name. Sole proprietorships must also include the owner's full name. An individual must list his/her full name. The mailing address should be the address at which the payee chooses to receive correspondence. Do not enter payment address or lock box information here.</p>
3	<p>Check the box that corresponds to the payee business type. Check only one box. Corporations must check the box that identifies the type of corporation. The State of California requires that all parties entering into business transactions that may lead to payment(s) from the State provide their Taxpayer Identification Number (TIN). The TIN is required by the California Revenue and Taxation Code Section 18646 to facilitate tax compliance enforcement activities and the preparation of Form 1099 and other information returns as required by the Internal Revenue Code Section 6109(a).</p> <p>The TIN for individuals and sole proprietorships is the Social Security Number (SSN). Only partnerships, estates, trusts, and corporations will enter their Federal Employer Identification Number (FEIN).</p>
4	<p><u>Are you a California resident or nonresident?</u></p> <p>A corporation will be defined as a "resident" if it has a permanent place of business in California or is qualified through the Secretary of State to do business in California.</p> <p>A partnership is considered a resident partnership if it has a permanent place of business in California. An estate is a resident if the decedent was a California resident at time of death. A trust is a resident if at least one trustee is a California resident.</p> <p>For individuals and sole proprietors, the term "resident" includes every individual who is in California for other than a temporary or transitory purpose and any individual domiciled in California who is absent for a temporary or transitory purpose. Generally, an individual who comes to California for a purpose that will extend over a long or indefinite period will be considered a resident. However, an individual who comes to perform a particular contract of short duration will be considered a nonresident.</p> <p>Payments to all nonresidents may be subject to withholding. Nonresident payees performing services in California or receiving rent, lease, or royalty payments from property (real or personal) located in California will have 7% of their total payments withheld for State income taxes. However, no withholding is required if total payments to the payee are \$1,500 or less for the calendar year.</p> <p>For information on Nonresident Withholding, contact the Franchise Tax Board at the numbers listed below: Withholding Services and Compliance Section: 1-888-792-4900 E-mail address: wscs.gen@ftb.ca.gov For hearing impaired with TDD, call: 1-800-822-6268 Website: www.ftb.ca.gov</p>
5	<p>Provide the name, title, signature, and telephone number of the individual completing this form. Provide the date the form was completed.</p>
6	<p>This section must be completed by the State agency requesting the STD. 204.</p>
	<p><u>Privacy Statement</u></p> <p>Section 7(b) of the Privacy Act of 1974 (Public Law 93-579) requires that any federal, State, or local governmental agency, which requests an individual to disclose their social security account number, shall inform that individual whether that disclosure is mandatory or voluntary, by which statutory or other authority such number is solicited, and what uses will be made of it.</p> <p>It is mandatory to furnish the information requested. Federal law requires that payment for which the requested information is not provided is subject to federal backup withholding and State law imposes noncompliance penalties of up to \$20,000.</p> <p>You have the right to access records containing your personal information, such as your SSN. To exercise that right, please contact the business services unit or the accounts payable unit of the State agency(ies) with which you transact that business.</p> <p>All questions should be referred to the requesting State agency listed on the bottom front of this form.</p>

From: "Gebhardt, Roberta" <RGebhardt@mt.gov>
To: jhuggins@waterboards.ca.gov
Date: 9/23/2010 10:42 AM
Subject: RE: Anaconda Copper Mining Company records

Hi Jeff-

I looked at the folder for the Walker Mining Co.

Most of the correspondence is to or from Fred Laist, Manager, Anaconda Copper Mining Company. The correspondence mostly pertains to expanding the mill at the Walker Mine. There is nothing directly from the Mine in CA in the file. Most of the correspondence is from the Washoe Reduction Works in Anaconda (regarding ore samples), or the International Smelting Company in New York. I believe there is 1 letter from Mr. Elton, who was the president of Walker Mining Company.

There is also a prospectus for investors from 1922 (4 pages). It is from Geo. Baglin of Salt Lake and contains a report called Analysis and facts of the history of the Walker Mine. It specifically states that the Anaconda Company "directs the destiny" of the Walker Mine. And owns control of the Walker Mine.

So where do we go from here? If you are interested in copies of any of these items you can submit a research request. There is a \$25.00 fee for the request and it includes an hour of research time and 10 free copies. Copies beyond 10 are \$.35 a piece. There are 50 pages total in this folder (an additional \$14.00 to have the whole folder copied). Here is a link to submit the research request <http://mhs.mt.gov/research/library/generalresearch.asp>

Your other option would be to hire a private researcher to look at the folder and determine what all you would be interested in from that folder. You can see a list of researchers here <http://mhs.mt.gov/research/library/contractres.asp>

Let me know if I can help in any other way.

Roberta

Roberta Gebhardt
Technical Services Librarian
Montana Historical Society
PO Box 201201
Helena MT 59620-1201
rgebhardt@mt.gov

406-444-4702

Join the Montana Historical Society today to receive 2 complimentary Research Requests each year. Support Montana History! Sign up at: www.montanahistoricalsociety.org.

-----Original Message-----

From: Stoltz, Zoe Ann On Behalf Of MHS Library
Sent: Thursday, September 23, 2010 11:18 AM
To: 'Jeff Huggins'
Cc: Gebhardt, Roberta
Subject: RE: Anaconda Copper Mining Company records

Dear Mr. Huggins, I have ff your inquiry to Roberta Gebhardt. I understand that you have recently spoken to Roberta about your project.

Thank you,

Zoe Ann Stoltz
Reference Historian
Montana Historical Society Research Center
P.O. Box 201201
Helena, MT 59620-1201
Phone: 406-444-1988
Email: zstoltz@mt.gov

Who will teach your children the meaning behind the facts?
- Tammy Drennan

-----Original Message-----

From: Jeff Huggins [mailto:jhuggins@waterboards.ca.gov]
Sent: Wednesday, September 22, 2010 3:11 PM
To: MHS Library
Subject: Anaconda Copper Mining Company records

Hi,

I am interested in obtaining more information about files pertaining to the Anaconda Copper Mining Company subsidiary operation named Walker Mining Company. I found a reference to it under the Reports heading:

Box/Folder 82 / 8 #6.46 Subsidiaries: Walker Mining Company, Utah, 1922-1929

We are interested specifically in correspondence between Anaconda's management and the Walker Mine in Plumas County, California.

Can you tell me how best to go about it. I just spoke with Roberta and she said that she would take a look and respond via telephone. Do we need anything more formal than the telephone request?

Thank you,

Jeff S Huggins
Water Resources Control Engineer
Title 27 Permitting and Mining
Regional Water Quality Control Board
11020 Sun Center Drive, # 200
Rancho Cordova, CA 95670
Phone (916)464-4639
Fax (916)464-4782



California Regional Water Quality Control Board Central Valley Region

Katherine Hart, Chair



Linda S. Adams
Acting Secretary for
Environmental Protection

11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114
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Edmund G. Brown Jr.
Governor

TO: Victor Izzo
Senior Engineering Geologist
Title 27 Permitting and Mining

FROM: Jeff Huggins *JSA*
WRCE
Title 27 Permitting and Mining

Richard Loncarovich
Assistant Executive Officer

SIGNATURE: *Victor Izzo*

DATE: 28 July 2011

SIGNATURE: *Richard Loncarovich*

SUBJECT: **WALKER MINE - RESPONSIBLE PARTY RECORDS SEARCH,
ANACONDA GEOLOGICAL COLLECTION, UNIVERSITY OF WYOMING**

Background

Walker Mine is an inactive copper mine in northeastern Plumas County. The mine was discovered in 1904 and in production from 1915 until 1941. The underground workings are extensive, with about thirteen horizontal miles of workings extending vertically almost 2,000-feet. Oxidation of the sulfides in these workings has caused acid mine drainage and severely impacted water quality in Dolly Creek and Little Grizzly Creek.

In 1987, the Central Valley Water Board, as part of an enforcement action against the Calicopia Corporation, placed a mine seal in Walker Mine. The mine seal stopped the discharge of acid mine drainage from within the mine to Little Grizzly Creek. Since that action, the quality of water in Little Grizzly Creek has improved significantly.

However, the Walker Mine has since been abandoned and Calicopia Corporation and any potential successors no longer exist. For the past 20-years, the Central Valley Water Board has incurred considerable obligations for long term operations and maintenance of the mine seal. This is expensive and the liabilities are not insignificant. If the Central Valley Water Board is to reduce its liabilities for Walker Mine, it must determine if a responsible party exists.

Walker Mine was operated by Walker Mining Company (WMC) of Salt Lake City. International Smelting and Refining Company (ISRC) held slightly more than a 50% stock interest in WMC during a majority of the company's period of existence (approximately 1916 to 1941). ISRC is believed to have been a subsidiary to Anaconda Copper Mining Company (Anaconda). Preliminary research by staff indicates that both WMC and ISRC were controlled during that same period by Anaconda. ARCO is successor to Anaconda.

Anaconda's Geological Documents Collection is maintained by the University of Wyoming. The Anaconda Geological Documents Collection is the scientific product of

California Environmental Protection Agency



the Anaconda Company's 90-year program of exploration and development work throughout the United States and in 110 foreign countries.

A previous search of the Anaconda Geological Documents Collection by Central Valley Water Board staff in the late 1990's provided information that links the operations of WMC to Anaconda. A review of the index of that search indicates that other documents exist which may provide a clearer link between WMC and Anaconda.

Paid Anaconda Collection Memberships are required in order to access the collection. The State agency membership annual fee is \$750.00.

This category is open to any State, County, or City Agency.

- Access by any designated researcher who is a full-time regular employee of the State Agency.
- Materials accessed from the files are limited to the state which the agency represents.
- Unlimited duplication at the rates specified.

Duplication Rates

Photocopies (Black/White) or Scans (Color or Black/White) up to 11x17": \$1.00/page. 50% discount offered for self-service black/white photocopies made on-site.

Oversize Duplication

Map Photocopies (black/white; up to 36" wide) or Scans (color or black/white, up to 42" wide): \$2.00/per square foot.

Scans burned to CD/DVD and shipped free of charge.

Summary

In the past year, staff has made considerable progress in understanding the relationship between WMC, ISRC, and Anaconda. However, if we are to name Anaconda and its successor (ARCO) as a responsible party, we need more detailed information showing that Anaconda directed the operations of WMC. Staff believes this information is in the University of Wyoming's Anaconda Geological Documents Collection.

Therefore, staff recommends that funds from Cleanup and Abatement Account No. 69 be approved to pay the State Government Agency Membership annual fee of \$750.00 and duplication rates shown on the attached invoice.

Attachment:

University of Wyoming – American Heritage Center Invoice and Transmittal Letter.



EDMUND G. BROWN JR.
GOVERNOR



MATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

TO: Pamela C. Creedon, Executive Officer
Andrew Altevogt, Assistant Executive Officer *asa*
Robert Busby, Supervising Engineering Geologist *ROB*

FROM: Victor J. Izzo *vji*
Senior Engineering Geologist
TITLE 27 PERMITTING AND MINING

DATE: 11 April 2013

SUBJECT: TENTATIVE CLEANUP AND ABATEMENT ORDERS
WALKER MINE AND WALKER MINE TAILINGS FACILITY, PLUMAS COUNTY

send out draft

Central Valley Water Board staff and the State Water Board's Office of Enforcement have prepared the attached tentative Cleanup and Abatement Orders (CAOs) for the Walker Mine and Walker Mine Tailings facility in Plumas County. The CAOs were developed after completing a Responsible Parties (RPs) search discussed in my 17 November 2011 memo.

Based on the results of the RP search, the Walker Mine CAO names ARCO as discharger and the Tailings CAO names both ARCO and the US Forest Service. Nearly all of the other potentially responsible parties are either long defunct (e.g., Walker Mining Company) or have previously settled with the Regional Board (e.g., recent landowners). Cedar Point Properties owns the mine and remains a potentially responsible party, but is no longer an active corporation and thus likely not a viable responsible party. Both CAOs would require the discharger(s) to assume responsibility at the respective sites and to take remedial actions.

Please review the tentative CAOs, determine if you concur with the CAO's and the remedial actions described. If so, please provide guidance on how the CAOs should be issued to the RPs, particularly regarding the following:

- Should we send a draft to the Discharger(s) and offer the opportunity to discuss the facts and potentially negotiate settlement of the remedial actions with the RPs before issuing the CAOs or go immediately to issuance of the Orders?
- Should the CAOs go to a Board hearing or have the Executive Officer sign the CAOs?
- Should the Executive Officer or an Attorney from the Office of Enforcement sign the transmittal letter for the CAOs?

Board staff and the Office of Enforcement's attorney recommend sending the draft CAOs to the Dischargers with the opportunity to discuss the facts and potentially negotiate a settlement of the remedial actions.

Please bear in mind that the Central Valley Water Board potentially is a responsible party for the mine seal and remedial actions that currently exist at the site and the sooner we bring ARCO in as a RP the sooner we are relieved of that responsibility.

cc: Andrew Tauriainen, Office of Enforcement

KARL E. LONGLEY SCD, P.E., CHAIR | PAMELA C. CREEDON, P.E., BCEE, EXECUTIVE OFFICER

11020 Sun Center Drive #200, Rancho Cordova, CA 95670 | www.waterboards.ca.gov/centralvalley



William J. Duffy
303 892 7372
william.duffy@dgslaw.com

December 6, 2013

David Coupe, Senior Staff Counsel
c/o San Francisco Bay Regional Water Quality
Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Kenneth Landau, Assistant Executive Officer
Central Valley Regional Water Quality Control
Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670

Re: Walker Mine and Walker Mine Tailings Sites, Plumas County – Atlantic
Richfield Company Objections to Proposed Hearing Procedures

Dear Mr. Coupe:

This letter sets forth the Atlantic Richfield Company's ("Atlantic Richfield") comments and objections concerning the Prosecution Team's November 22, 2013 proposed hearing procedures (the "Proposed Procedures") for the two draft Cleanup and Abatement Orders (the "Draft CAOs") applicable to the Walker Mine Site (the "Mine Site") and Walker Mine Tailings Site (the "Tailings Site") (collectively, the "Sites"). Atlantic Richfield is identified as the sole "Discharger" in the current Draft Mine Site CAO, while Atlantic Richfield and the United States Forest Service ("USFS") are each identified as a "Discharger" for the Tailings Site CAO. The Proposed Procedures contemplate a two-hour hearing before the Regional Water Quality Control Board for the Central Valley Region (the "Regional Board") to consider and resolve all matters among the Regional Board, Atlantic Richfield and the USFS related to the two Draft CAOs. The Proposed Procedures are deficient for all the reasons explained below. Further, as described below and also in the enclosed alternate procedures, Atlantic Richfield believes that a bifurcated hearing structure with issues of jurisdiction and liability presented first will best serve the Regional Board's interests in efficiently and fairly adjudicating the parties' rights and obligations.

The Proposed Procedures ignore two fundamental circumstances: (1) The complexity of the legal and factual / technical issues the Regional Board must consider and resolve before deciding whether to adopt or modify the Draft CAOs; and, (2) The interrelationship of the Sites resulting from their proximity and historical development as a single integrated mine operation. The Prosecution Team's neglect of these fundamental circumstances causes several deficiencies in the Proposed Procedures and results in a truncated framework that will severely prejudice Atlantic Richfield's due process right to develop and present all the legal and factual arguments

in its defense. Specifically, Atlantic Richfield hereby objects to the following deficiencies in the Proposed Procedures:

1. The proposed hearing is not long enough to allow for presentation of all argument and evidence relevant to the numerous issues raised in the Draft CAOs. The Prosecution Team's proposed two-hour hearing would afford the Prosecution Team one hour for presenting its case, while requiring Atlantic Richfield and USFS to share one hour of presentation time. Atlantic Richfield respects the Regional Board's time and its undoubtedly crowded docket. However, the proposed two-hour hearing is wholly inadequate for an orderly presentation of the parties' arguments and evidence in a manner that efficiently discharges the Regional Board's responsibility to conduct a full and fair inquiry into the merits.
2. The proposed hearing date is too soon to allow Atlantic Richfield to develop the various factual / technical evidence and legal arguments in its defense. Further, the Prosecution Team has offered no substantial basis to support a March 2013 hearing and appears to have taken much more time to develop its own case. Electronic copies of historical documents that the Prosecution Team provided with the Draft CAOs indicate the electronic files were created in February 2013 and file names on the CD of documents more recently received in response to Atlantic Richfield's first Public Records Act request suggest the Prosecution Team was compiling records as early as December 2011. Atlantic Richfield's due process rights will not be protected if it is forced to prepare for a March 2013 hearing without any substantial basis.
3. The Proposed Procedures lack a reasonable period of pre-hearing exchange to ensure adequate disclosure of key facts. A brief summary of the procedural timeline thus far demonstrates that there is no compelling reason to limit appropriate pre-hearing procedures to meet an arbitrary schedule that the Prosecution Team has already delayed considerably. The Draft CAOs were first transmitted to Atlantic Richfield and the USFS on April 29, 2013; Atlantic Richfield responded to the Draft CAOs on June 3, 2013 (after receiving an extension of the Prosecution Team's original May 20, 2013 deadline). Four months later, on October 2, 2013, the Prosecution Team provided notice of a December hearing and issued its first set of proposed hearing procedures. When the Prosecution Team proposed separate hearings on the Draft CAOs for each Site during the U.S. government shutdown, the Regional Board appropriately rejected the Prosecution Team's proposal based on "overlapping issues" as to the Sites (by email from David Coupe to the Prosecution team, Atlantic Richfield, and USFS

on October 11, 2013).¹ The Prosecution Team then issued the Proposed Procedures along with substantive revisions of the Draft CAOs dated November 22, 2013 that will frame the issues for hearing.²

4. The Proposed Procedures will not efficiently resolve the preliminary question of the parties' contested liability as alleged "Dischargers" at the Sites, including the Regional Board's own liability. Many of the issues involved in the Draft CAOs raise preliminary issues regarding the Regional Board's jurisdiction and the parties' alleged liability that could bar consideration of any further issues. It will be most efficient for the Regional Board to address these fundamental questions of jurisdiction and liability first before proceeding to address the complex factual questions inherent in the Draft CAOs.
5. The Proposed Procedures do not include USFS as a party to the Mine Site CAO. The USFS is an indispensable party to the proceedings for both Sites because it unquestionably bears an interest in both Sites, is at least a former owner of the lands underlying both Sites, and possesses witnesses as well as large amounts of documentary evidence relevant to both Sites. The Prosecution Team's failure to name USFS as a party to the Mine Site CAO prejudices Atlantic Richfield by denying it access to crucial evidence. Failing to include USFS as a party also will inefficiently use the Regional Board's time and will prevent the Regional Board from properly considering USFS's potential liability for both Sites.
6. Similarly, the Proposed Procedures also fail to include the Regional Board as a party to either CAO. If given a fair opportunity, Atlantic Richfield expects to discover and present evidence that the Regional Board itself also may be responsible for work contemplated by the Draft CAOs due to its own activities at the Mine Site and its settlements with other responsible parties. A procedural framework that denies Atlantic Richfield this opportunity does not comport with the Regional Board's due process obligations.
7. The Proposed Procedures do not articulate the Prosecution Team's burden of proof. The burden of proof borne by the Prosecution Team is a fundamental legal issue that will guide the entirety of any proceedings regarding the Draft CAOs.

¹ Despite the Regional Board's rejection of separate hearings for each Site, and despite the Prosecution Team's November 22, 2013 proposal that the hearings for each Site be unified ("Given the overlap between the parties, issues, alleged facts and evidence, the Central Valley Water Board will consider both CAOs during the same hearing," Proposed Procedures at p. 1), the Prosecution Team has persisted in suggesting separate Mine and Tailings Site hearings during subsequent communications.

² Important to the revised Draft CAOs, the Regional Board has abandoned its pursuit of an alter ego theory of liability against Atlantic Richfield. The Prosecution Team confirmed that intent in subsequent communications and thus comments pertinent to an alter ego theory of liability are not included here.

Ambiguity as to the Prosecution Team's burden, or an attempt to use a burden lower than that which would apply in civil court, will severely prejudice Atlantic Richfield's ability to defend against the allegations in the Draft CAOs.

8. The Proposed Procedures and the Draft CAOs appear to assume that Atlantic Richfield may be held jointly and severally liable for any and all costs or remedial activities the Regional Board determines may be necessary at the Sites. This assumption is unsupported and contrary to law.

The Regional Board must structure any hearing, and the process leading up to the hearing, to afford Atlantic Richfield and the USFS a full and fair opportunity to present evidence relevant to their alleged liability for the actions contemplated in the Draft CAOs. Because the above-described deficiencies in the Proposed Procedures would violate Atlantic Richfield's due process rights, Atlantic Richfield urges the Regional Board to reject the Proposed Procedures and adopt Atlantic Richfield's alternative procedures. The remainder of this letter elaborates on the bases for Atlantic Richfield's objections and explains why its alternative procedures would result in a more efficient and legally defensible process.

I. The Draft CAOs Raise Complex Legal and Factual Issues That Will Take Significant Time to Develop and Present to the Regional Board.

Many of the deficiencies in the Proposed Procedures result from the Prosecution Team's failure to appreciate the complexity of the numerous legal and factual / technical issues raised by the Draft CAOs. Some of the unique issues presented by these interrelated Sites are described below. As a fundamental point of departure, Atlantic Richfield (including its predecessors) never owned or operated the Sites, but instead was merely a shareholder in the publicly-traded company responsible for most of the mining known to have occurred at the Sites. The Draft CAOs thus require the Prosecution Team to present evidence and legal authority supporting an exception to the ordinary rule that it is the corporation – and not its shareholders – that bears responsibility for any liability arising from corporate operations. Further complicating the Prosecution Team's effort to impose liability for the work set forth in the Draft CAOs is the fact that the United States, through the USFS, once owned and managed all of the land area encompassed by the Sites, and continues to own and manage the land underlying the Tailings Site. In 2005, the USFS entered into a consent decree with Atlantic Richfield, and USFS is presently conducting remedial actions at the Tailings Site pursuant to its presidentially delegated authority under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"). USFS's involvement with the Sites raises several issues, most notably, the likelihood that CERCLA Section 113(h) bars any remedial actions at the Sites until USFS has completed its remedial efforts. The Regional Board itself also may be responsible for work

contemplated by the Draft CAOs due to its own activities at the Mine Site and its settlements with other responsible parties.³

The most important of the complex and important legal and factual / technical issues that will require the Regional Board's attention are briefly described below:

- CERCLA's Pre-Enforcement Review Bar: CERCLA Section 113(h) prevents any court or administrative agency from exercising jurisdiction over "challenges" to CERCLA cleanups. Consistent with CERCLA's goal of ensuring safe, efficient, and effective federal cleanups, case law in the U.S. Court of Appeals for the Ninth Circuit defines "challenge" broadly to include actions that "interfere with" or even those which seek to "improve upon" an ongoing CERCLA cleanup. The extent to which CERCLA 113(h) bars state-lead action at the Sites is a threshold legal issue implicating the Regional Board's jurisdiction to establish a competing cleanup plan. Resolving this legal question will also require the Regional Board to consider highly technical and scientific evidence regarding the interrelationship between the Sites.
- CERCLA's Bar on PRP Cleanups: CERCLA Section 122(e)(6) also limits interference with CERCLA cleanups by barring a "potentially responsible party" from "undertak[ing] any remedial action at the facility unless such remedial action has been approved by the President." The Draft CAOs thus raise multiple questions of both law and fact about the interplay between the federal CERCLA remediation program and the Prosecution Team's Draft CAOs, including whether Atlantic Richfield, USFS, and / or the Regional Board meet CERCLA's definition of "potentially responsible party," and whether the Sites constitute a single "facility."
- Shareholder Non-Liability: The general rule under state and federal law is that a corporate shareholder is not liable for the acts of the corporation, including any corporate operations that caused pollution. Atlantic Richfield's predecessors – first, International Smelting & Refining Company which was then succeeded by The Anaconda Company – were merely shareholders in the Walker Mining Company. Shares of Walker Mining Company traded publicly on the Salt Lake City and New York Curb Exchanges. The Regional Board has indicated it intends to prove an exception to the usual rule of shareholder non-liability by

³ Atlantic Richfield has submitted two Public Records Act requests to the Board for production of such settlements and other records relevant to the allegations set forth in the Draft CAOs. The Prosecution Team has replied to the first of these requests (and a pending informal request for records) in a November 25, 2013 letter producing records and asserting claims of privilege and work product concerning correspondence "related to" its Witness List, Witness and Expert Witness Declarations, Evidence List and Legal Statement. Atlantic Richfield will seek more information as to the basis of these claims.

demonstrating that Atlantic Richfield's predecessors were so closely involved with operations at Walker Mine as to warrant a finding that the shareholder was itself an "operator" of the Mine. This inquiry will require the Regional Board to analyze decades of historical documents, including thousands of pages of business records and correspondence related to Atlantic Richfield's predecessors' relationships with the Walker Mining Company. Based on established case law, past State Water Board decisions, and the documents so far produced by the Prosecution Team, the Regional Board would go well beyond the existing precedents if it were to make a finding of liability consistent with the Prosecution Team's argument. The Regional Board cannot, therefore, hold Atlantic Richfield (including its predecessors) liable for the acts of the separate and independent Walker Mining Company.

- Regional Board Liability: The Regional Board must also consider its own liability for the Sites. The Draft CAOs indicate that the Regional Board entered settlements with multiple former owners of the Mine Site. In exchange for payments from the settling parties, the Regional Board apparently agreed to indemnify those parties. Atlantic Richfield was not a party to those agreements and has a right to challenge whether those settlements fairly allocated liabilities amongst the settling parties consistent with their degree of ownership and involvement in the activities that have given rise to liabilities at these interrelated Sites. Consideration of this issue requires discovery and analysis of the communications, negotiations, and agreements between the Regional Board and the settling parties, as well as the activities of those parties that gave rise to potential liability. Additionally, the Regional Board has undertaken remedial actions at the Mine Site and is therefore liable for (1) any actions not consistent with the standard of care applicable to its remedial activities and, (2) any discharges the Regional Board may have caused or exacerbated in the course of its remedial activities. Here, too, the Regional Board will have to consider highly technical evidence regarding the work it has performed at the Sites and what impact that work has had on environmental conditions at the Sites.
- The Consent Decree: The Regional Board must evaluate the consent decree between USFS and Atlantic Richfield, including the scope of the contribution protection provisions therein, to determine its applicability to both Sites. To simply accept USFS's argument that the consent decree does not apply to the Mine Site without naming USFS a party to the Mine Site CAO proceedings and without providing Atlantic Richfield the corresponding opportunity to present argument and evidence on that point would be a further denial of Atlantic Richfield's due process rights.

- Apportionment: If the Regional Board were to find Atlantic Richfield liable for some aspect of operation at the Mine Site or Tailings Site, the Regional Board would then have to consider the extent of that liability. Numerous entities and individuals have conducted mining and remedial operations at the Sites under various owners. Prior to the Walker Mining Company staking claims at the Sites, unknown individuals conducted mining operations there while USFS owned all of the property. Even after Walker Mining Company patented its claims, there was a period of several years, perhaps over a decade, when Walker Mining Company (including any predecessor entities or individuals) was mining but Atlantic Richfield's predecessors had not yet acquired any stock in Walker Mining Company. And even when Atlantic Richfield's predecessors did hold stock in Walker Mining Company, mining operations stopped and started. Mining operations during those times also occurred in various locations at the Mine Site. Thus, the question of what (if any) share of responsibility Atlantic Richfield could bear for current environmental conditions is exceedingly complex and will depend on detailed analysis of highly technical issues involving facts that took place 70 or more years ago. As explained above, apportionment of harm arising from the Regional Board's operations and settlements with other owners, and USFS liability for pre-Walker Mining Company mining activities must also be considered.
- State Statutory Issues: In addition to the issues identified above, the Draft CAOs raise several more issues arising from California state law, including:
 - Application of the California Water Code, section 13304(j), which bars retroactive liability for lawful activities.
 - Application of statutes of limitation and repose for the Draft CAOs which seek to impose remedial obligations on the named Dischargers to each order.
 - Application of California Water Code Section 13304(c), which bars recovery of past costs through CAOs.
 - Application of California Code of Civil Procedure Section 877, which bars imposition of liability upon Atlantic Richfield for matters covered by the release of claims from the USFS.

Presenting the foregoing issues in either state or federal court would require two or more weeks of trial. Such a trial would be preceded by multiple rounds of extensively briefed and argued motions, as well as months of discovery including depositions of fact and expert witnesses. Atlantic Richfield recognizes that the Regional Board cannot replicate court procedures in its administrative framework, but the deficiencies in the Proposed Procedures must

David Coupe
Kenneth Landau
December 6, 2013
Page 8

be cured to allow presentation of the arguments and evidence the Regional Board will need to reach a reasoned decision on the many issues raised by the Draft CAOs.

II. The Sites are Interrelated as a Result of Both Historical Operations and Geography.

Besides overlooking the number and complexity of issues, the Proposed Procedures also fail to appreciate the interrelationship of the Sites. The Walker Mining Company operated the Sites as one facility and the connection between the Sites continues to this day. The Mine Site is adjacent to the Tailings Site less than a mile upstream along Little Dolly Creek. The tailings at the Tailings Site are the byproduct of mine operations at the Mine Site; after economically valuable portions of copper had been removed from the Walker Mine ore, the mill tailings were directed downstream for collection at the Tailings Site. Little Dolly Creek still connects the Sites. Accordingly, any remedial activity the Regional Board decides to require at the upstream Mine Site – which would almost certainly alter the quantity or character of Little Dolly Creek's flow, as well as possibly altering groundwater levels and movement in the area's aquifer – could potentially impact ongoing remedial activities at the downstream Tailings Site.

Considering both Sites at the same time is thus an integral part of Atlantic Richfield's counter-proposal. The interrelationship between the Sites means that most of the legal and factual defenses described above apply as much to the Mine Site as to the Tailings Site. Most importantly, the CERCLA Section 113(h) issue must be evaluated as to both Sites given the likely impact upstream remedial actions would have on the USFS's remedial work at the Tailings Site. Of course, the possibility that the Prosecution Team can prove some exception to the usual rules of shareholder non-liability is also dependent on historical facts relating to the integrated development and operation of the two Sites.

The Prosecution Team's continued suggestion to hold separate hearings on the two Sites, and USFS's apparent acquiescence in that suggestion, would only add to the inefficiencies inherent in the Proposed Procedures. USFS suggests that it would simplify matters for the Regional Board to consider the Tailings Site separately, if at all. That is not the case. As explained above, the Sites' histories cannot be considered separately and cannot be evaluated without USFS's full participation. The only issue related exclusively to USFS – sovereign immunity – relates to both sites insofar as Atlantic Richfield asserts that USFS must be a party to both Draft CAOs. If Atlantic Richfield's alternative procedures are adopted, the sovereign immunity issue may be evaluated along with all the other threshold issues implicating the Regional Board's jurisdiction and the parties' alleged liability. Given the litany of other issues the Regional Board must confront, no efficiency will result from separating the hearings based solely on the USFS's assertion of sovereign immunity.

III. Atlantic Richfield's Alternative Procedures Provide a More Efficient Framework for Resolving all the Issues the Regional Board Must Consider.

To efficiently address the many issues raised by the Draft CAOs, Atlantic Richfield proposes a hearing structure that bifurcates the more complex legal issues into a preliminary phase and leaves the more intensively factual / technical apportionment and remediation questions for a second phase. Atlantic Richfield's proposed calendar and protocols for pre-hearing discovery and disclosures is enclosed as an Addendum to this letter. A summary description of the bifurcated hearing structure follows.

A. Jurisdiction and Liability Phase

The first phase of the bifurcated hearing would consider all matters related to the Board's jurisdiction over the two Sites and the Parties identified as a "Discharger" for each site. This first phase would also consider all matters related to the liability of any Designated Party or third party for payment of costs, performance of actions, and any other relief at either or both Sites under the Draft CAOs.

The issues raised by the Prosecution Team's assertion of jurisdiction and designation of Atlantic Richfield and USFS as liable parties in these circumstances are the more complex legal questions the Regional Board must consider. Further, depending on how the Regional Board resolves these threshold legal questions, additional development of more complicated factual and technical issues may not be necessary. Atlantic Richfield therefore proposes dedicating a first phase hearing to the following issues:

1. Does CERCLA Section 113(h)'s bar on pre-enforcement review, the federal Consent Decree for the Walker Mine Tailings Site, sovereign immunity principles, and / or bankruptcy discharge provide a defense, in whole or in part, to the Regional Board's claims and grounds for jurisdiction at each Site?
2. Is the Regional Board a liable party as an "operator" for either Site or arising from settlements with other owners / operators for either Site?
3. Does The Anaconda Company's direct involvement with Walker Mining Company and the Walker Mine merit an exception to the usual rule that a corporate shareholder will not be held liable for the corporation's acts?
4. Is USFS a liable party as an "owner" or "operator" of the Tailings Site and does USFS bear any liability for the Mine Site?
5. Are there any third parties with liability for either Site?

6. Have all necessary parties been joined in the action?
7. Are any of the other issues raised above, or any further liability or jurisdictional issues that may later emerge, an impediment to the Regional Board's assertion of its authority in these circumstances?

The timeline and calendar appended to this letter outlines discovery and other pre-hearing tasks, and supports scheduling a "first phase" hearing in May 2014. The hearing would allocate time separately for both legal argument and factual testimony over the course of two days. The first three hours of hearing time would be devoted to oral argument and questions from the Regional Board concerning legal issues. The remainder of the first day of hearing and at least six hours on a second day of hearing would be used for presenting factual and expert testimony.

B. Apportionment and Remedy Phase

The second phase of the bifurcated hearing would consider the complex issues of apportionment and remedy. Phase 2 would proceed only in the event the Regional Board made liability determinations in the Phase 1 hearing that require further proceedings to resolve issues related to implementation of the Draft CAOs. In particular, if the Regional Board determined that Atlantic Richfield's predecessors had operated either of the Sites to some extent, further proceedings would be needed to determine what portion of the Walker Mine's operations Atlantic Richfield's predecessor had conducted, what (if any) ongoing environmental impacts those operations by Atlantic Richfield's predecessors caused, and what several (allocated) share of remedial costs or remedial actions Atlantic Richfield should bear as a result. Consistent with whatever findings the Regional Board made in Phase 1, the Regional Board would also need to consider allocation of costs and / or remedial action to USFS and the Regional Board itself.

As outlined in the appended timeline, deadlines for Phase 2 would begin to run only after the Regional Board issued a written decision addressing all of the issues raised in Phase 1. The Phase 2 determination would include such issues as:

1. Causation issues for each Site (i.e., specifically what operations each Designated Party conducted and what ongoing environmental conditions those operations caused).
2. Apportionment of costs and / or remedial responsibilities among liable Designated Parties for each Site.
3. The nature and relationship of the remedy for each Site.
4. Regional Board authority to bind a Designated Party to perform any future response action the Regional Board may identify after the Phase 1

and Phase 2 proceedings have been concluded and while any remedial activities are being carried out.

Assuming a written decision is available soon after the Phase 1 hearing, Phase 2 discovery could be completed in advance of a September or October hearing date. We refer to the appended timeline for a description of Phase 2 pre-hearing procedures and disclosures.

C. Applicable Rules.

The Proposed Procedures do not identify the Prosecution Team's burden of proof for the hearing. The Proposed Procedures also do not identify any basis on which the Prosecution Team may hold Atlantic Richfield jointly and severally liable under the Draft CAOs, though the Draft CAOs themselves suggest that is the Prosecution Team's intent. Accordingly, Atlantic Richfield urges the Regional Board to adopt the following procedural rules to govern any hearing it sets on the Draft CAOs:

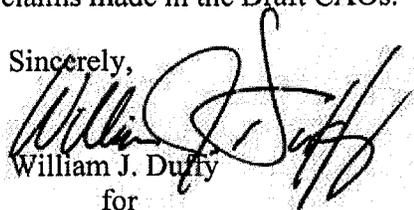
- At any hearing on the Walker Mine Site and / or the Walker Tailings Site, the Prosecution Team will have the burden of production, together with the burden of persuasion by a preponderance of the evidence, as to any finding of fact and as to any finding that one or more parties is responsible for cleaning up and abating the site in question, including the proportionate share of liability which should be allocated to each such party. Each respondent will have the burden of production, together with the burden of persuasion by a preponderance of the evidence, as to any affirmative defense offered at the hearing.
- In any portion of a hearing assigning responsibility to Atlantic Richfield for either remedial activities or the costs of remedial activities, the Prosecution Team shall have the burden to prove that any remedial activities or costs for which it seeks to hold Atlantic Richfield responsible are necessary because Anaconda or International Smelting & Refining Company has caused the specific condition requiring remediation by a discharge of wastes into the waters of the state.
- In any portion of a hearing assigning responsibility to Atlantic Richfield for either remedial activities or the costs of remedial activities, the Prosecution Team shall be precluded from presenting any evidence of remedial activities or costs attributable to a discharge of wastes into the waters of the state by any individual or entity other than Anaconda or International Smelting & Refining Company.

Proceeding to a hearing without additional clarification of the rules proposed above would be a further violation of Atlantic Richfield's due process rights.

David Coupe
Kenneth Landau
December 6, 2013
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On behalf of Atlantic Richfield, we look forward to the Regional Board's decision as to the appropriate procedures for resolving the claims made in the Draft CAOs.

Sincerely,


William J. Duffy

for

DAVIS GRAHAM & STUBBS LLP

Enclosures

cc: Andrew Tauriainen, Esq.
Michael Hope, Esq.

David Coupe
Kenneth Landau
December 6, 2013
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bcc: James L. Lucari, Esq.
Brian S. Johnson, P.E.
James Bruen, Esq.
Andrea Wang, Esq.

IMPORTANT DEADLINES

Phase 1 Hearing

December 6, 2013	<ul style="list-style-type: none">▪ Atlantic Richfield (AR) / USDA will transmit any requests under CPRA to the Regional Board by this date.▪ The Board will respond to each request within 10 days of receipt and produce documents and other responsive information within 30 days of receipt.
January 17, 2013	<ul style="list-style-type: none">▪ Each Designated Party may propound up to 20 interrogatories by this date. Responses to interrogatories are due within 20 days of receipt.
January 31, 2013	<ul style="list-style-type: none">▪ Each Designated Party may propound up to 20 requests for admission by this date.▪ Responses to requests for admission are due within 20 days of receipt.
February 7, 2014	<ul style="list-style-type: none">▪ Designated Parties must ask the Board to add additional parties by this date.
February 24, 2014	<ul style="list-style-type: none">▪ Each Designated Party shall disclose a list of witnesses that may be called to testify at the hearing, including a brief description of the topics each witness will cover. This disclosure shall include a general description of the type of experts, if any, the party intends to use. The identity of any expert need not be disclosed until the expert disclosure.
March 7, 2014	<ul style="list-style-type: none">▪ The Designated Parties will exchange expert disclosures that shall contain the qualifications of the expert, a summary of all opinions the expert may offer at the hearing, and a description of the basis for those opinions.
March 19, 2014	<ul style="list-style-type: none">▪ A Designated Party may make supplemental expert disclosures with opinions or comments in rebuttal to another party's expert, provided that supplementation is completed this day.
March 21, 2014	<ul style="list-style-type: none">▪ Each Designated Party may take up to four depositions of percipient witnesses, and depose all expert witnesses designated by the opposing side.▪ Each deposition shall be no longer than six hours. All non-expert depositions shall be completed by this date.
April 14, 2014	<ul style="list-style-type: none">▪ All expert depositions shall be completed by this date.
20 days prior to the date of the hearing	<ul style="list-style-type: none">▪ The Designated Parties may submit pre-hearing briefs, with a copy provided contemporaneously to each remaining Designated Party, that outline the legal and factual matters for determination by the Board at the Hearing. Any Designated Party may request oral argument on a legal matter raised for determination by the Board.▪ Each Designated Party may append to its pre-hearing brief proposed findings of fact and law for the Board's consideration.

10 days prior to the hearing	<ul style="list-style-type: none">▪ Each Designated Party shall disclose a list of exhibits it expects to use at the hearing, and disclose any and all demonstrative exhibits including all PowerPoint presentations that may be used at the hearing.
May 2014	<ul style="list-style-type: none">▪ The hearing shall take place on a mutually agreeable date in May 2014 and shall be no more than two days in length, depending upon the number of Designated Parties and Interested Persons involved and issues presented for determination by the Board.▪ The first three hours of hearing time will be dedicated to oral argument and questions from the Regional Board regarding legal issues identified in the parties' pre-hearing briefs.▪ The remainder of the first day's hearing time, and at least six hours during a second day of hearing, will be used for presentation of testimony and other evidence on factual issues.

IMPORTANT DEADLINES

Phase 2 Hearing

	<ul style="list-style-type: none">▪ Each Designated Party and/or its experts shall be permitted access to the Walker Mine Site and the Walker Mine Tailings Site, provided at least 4 days advanced notice is provided
15 days following receipt of Board's written decision in the liability hearing	<ul style="list-style-type: none">▪ AR/USDA will transmit any additional CPRA records requests by this date. The Board will respond to each such request within 10 days of receipt, and produce documents and other responsive information within 30 days of receipt.
30 days following the Board's written decision	<ul style="list-style-type: none">▪ Designated Parties must ask the Board to add additional parties by this date.
30 days following receipt of the Board's written decision	<ul style="list-style-type: none">▪ Each Designated Party shall disclose a list of witnesses that may be called to testify at the hearing, including a brief description of the topics each witness will cover. This disclosure shall include a general description of the expert testimony, if any, the party intends to offer at the hearing. The identity of any expert need not be disclosed until the expert disclosure, as described below.
45 days following receipt of the Board's written decision	<ul style="list-style-type: none">▪ Each Designated Party may propound up to 20 requests for admission by this date. Responses to requests for admission are due within 20 days of receipt.
45 days following receipt of the Board's written decision	<ul style="list-style-type: none">▪ Each Designated Party may propound up to 20 interrogatories by this date. Responses to interrogatories are due within 20 days of receipt.
60 days following receipt of the Board's written decision	<ul style="list-style-type: none">▪ The Designated Parties will exchange expert disclosures that shall contain the qualifications of the expert, a summary of all opinions the expert may offer at the hearing, and a description of the basis for those opinions.
14 days following receipt of expert disclosures	<ul style="list-style-type: none">▪ A Designated Party may make supplemental expert disclosures with opinions or comments in rebuttal to another party's expert, provided that supplementation is completed by this date.
60 days following receipt of the Board's written decision	<ul style="list-style-type: none">▪ Each Designated Party may take up to four depositions of percipient witnesses and depose all expert witnesses designated by the opposing side. Each deposition shall be no longer than six hours. All non-expert depositions shall be completed by this date.
90 days following receipt of the Board's written decision	<ul style="list-style-type: none">▪ All expert depositions shall be completed by this date.
20 days prior to the date of the hearing	<ul style="list-style-type: none">▪ Each Designated Party may submit pre-hearing briefs, with a copy provided contemporaneously to each party, that outline the legal and factual matters for determination by the Board at the Hearing. Any Designated Party may request oral argument on a legal matter raised for determination by the Board.

	<ul style="list-style-type: none"> ▪ Each Designated Party may append to its pre-hearing brief proposed findings of fact and law for the Board's consideration.
10 days prior to the hearing	<ul style="list-style-type: none"> ▪ Each Designated Party shall disclose a list of exhibits it expects to use at the hearing, and disclose any and all demonstrative exhibits including all PowerPoint presentations that may be used at the hearing.
No sooner than one hundred twenty (120) days following publication of the Board's written decision	<ul style="list-style-type: none"> ▪ The hearing shall take place on a mutually agreeable date no sooner than one hundred twenty (120) days following publication of the Board's written decision on the matters addressed in the Phase 1 hearing. ▪ The hearing shall be no more than two days in length, depending upon the number of Designated Parties and Interested Persons involved and issues presented for consideration by the Board.