

FI-115

DWR WAREHOUSE

# Request for Funding for Remediation of the Mammoth Mine

## Submitted by Mining Remedial Recovery Company

### Executive Summary

This proposal requests funding for remedial actions at the Mammoth Mine, which is located 3.5 miles northwest of Shasta Dam in the Little Backbone Creek watershed. The Mammoth Mine currently discharges approximately 40 lbs/day of copper and 80 lbs/day of zinc into Shasta Lake.

The primary biological and ecological objective of this project is to improve the spawning and rearing habitat for anadromous species in the Bay-Delta ecosystem. This objective will be achieved by reducing the cadmium, copper, and zinc load from the Mammoth Mine to Little Backbone Creek, Shasta Lake and the upper Sacramento River. This project is consistent with the CALFED objectives to fund actions which address non-flow related factors and focus on contaminant source reduction. Improvements to water quality in the upper Sacramento River should also benefit the health of the estuarine habitat downstream. Specifically, this project is expected to improve the instream aquatic habitat for key species such as chinook salmon and steelhead trout.

The proposed project components include passive chemical and biological acid mine drainage (AMD) treatment systems. The project tasks, anticipated completion dates, and associated costs are shown in Table 1.

Table 1. Mammoth Mine Remediation Project Tasks

Task	Cost	Completion Date
Install a passive limestone treatment system in the Friday Loudon Portal and in Shoemaker Gulch	\$380,000	10/17/97
Release water from behind the bulkhead located in the Friday Loudon Portal (This action should eliminate or reduce AMD discharges from an acidic spring and other portals.)	14,500	10/21/97
If other portals continue to discharge AMD, install limestone and wetland treatment systems in the vicinity of the portals	145,000	4/30/98
If the acidic spring continues to discharge AMD, construct road to the spring and install a passive limestone treatment system	340,000	5/30/98
<b>Total Cost</b>	<b>\$879,500</b>	

The Mammoth Mine is the property of Mining Remedial Recovery Company (MRRC). MRRC was formed specifically to remediate sites impacted by mining activities, and is actively reclaiming several mine, mill, and smelter sites located throughout the United States. Key personnel at MRRC have extensive knowledge of general mine remediation technologies, as well as the site specific conditions at the Mammoth Mine. Michael W.

Baum (President and CEO) has over 20 years of management experience related to mining and mine reclamation. Linda M. Mercurio (Environmental Engineer/Project Manager) is managing the design, implementation, and monitoring of remedial activities at several MRRC owned mines in the Shasta Lake area. Ken Henderson (Construction Manager) has extensive experience in mine reclamation and construction management.

Since 1991, MRRC has collected samples from the Mammoth Mine adits on a monthly basis, and from Little Backbone Creek on a quarterly basis. In August 1996 and March 1997, MRRC and Adrian Brown, Inc., sampled discharges from portals, waste rock dumps, seeps, springs, and receiving streams. MRRC plans to continue with the current monitoring program in order to properly evaluate the effectiveness of completed control actions.

It is not expected that implementation of this project will result in significant third party impacts. The Mammoth Mine is remotely located, and the mine site and the surrounding acreage are the property of MRRC. However, MRRC will submit a description of selected remedial actions to appropriate parties at the California Regional Water Quality Control Board, the California Department of Fish and Game, the Forest Service, the Bureau of Land Management, and Bureau of Reclamation. MRRC will also post applicable signs along the access road to the work site during construction.

To date, MRRC has coordinated and funded water quality studies, the production of detailed base maps, and the completion of a comprehensive feasibility study for several MRRC owned mines located in the Shasta Lake area. In addition, MRRC has expended \$2,000,000 to implement control actions at the Mammoth, Balaklala, Stowell, and Keystone Mine sites. MRRC is open to negotiating a cost sharing plan with the CALFED Program to complete the remediation projects described in this proposal. CALFED Program resources allocated to a Mammoth Mine project component would increase the economic feasibility of that component and increase the expected water quality benefits in the upper Sacramento River. MRRC welcomes the opportunity to work together with the CALFED Program to achieve a substantial and rapid reduction in heavy metal loads to the Sacramento River watershed.

# Proposal for Funding for Remediation of the Mammoth Mine

— — Submitted by

**Mining Remedial Recovery Company**

## *Principal Investigators*

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**Type of Organization: Private Corporation**  
**Tax Status: For Profit**  
**Tax Identification Number: 25-1612929**  
**RFP/Project Group Type: Construction**

## ***Project Description***

### **Background Information**

The Mammoth Mine is located in Shasta County, 3.5 miles northwest of Shasta Dam on the south side of Little Backbone Creek. A regional map that includes the Mammoth Mine is shown in Figure 1 and detailed base maps of the site are shown in Plates 1 and 2. A copper-zinc orebody was discovered at the Mammoth Mine site before 1890, and the overlying gossan was worked on a small scale for gold prior to 1900. The site was mined extensively for copper and zinc between 1905 and 1925. During this time, 3.3 million tons of direct-smelted copper-ore and 84,000 tons of high-grade zinc ore were produced at the Mammoth Mine.

Historically, portal discharges were considered the principal source of AMD from the Mammoth Mine, and surface runoff over waste rock material was identified as a less significant source. In 1981, a concrete seal was installed in the Main Mammoth Portal that effectively stopped all flow from the portal. As a result, metal loading to Little Backbone Creek from the Main Mammoth Portal ceased. However, soon after the Main Mammoth Portal seal was installed, flow and metal concentrations increased in the Friday Loudon Portal which drains into Shoemaker Gulch. This result indicated the existence of a hydraulic connection between the Friday Loudon and Main Mammoth. In 1983, a bulkhead was installed in the Friday Loudon Portal that resulted in increased flow from the Gossen No. 2 Portal. By 1993, all of the Mammoth Mine portals that were discharging AMD were sealed, including the North 470 and East 470. Flow and metal loads discharged directly from the portals have decreased significantly as a result of the portal sealing program. Pressure readings of up to 240 psi at the Friday Loudon Portal indicate that the mine workings are almost entirely flooded. However, in 1995, the pressure behind the Friday Loudon bulkhead dropped and soon thereafter a substantial acidic spring was discovered on a steep slope to the west of and several hundred feet below the Main Mammoth Portal. This spring is difficult to access due to the steepness of the terrain and is contributing substantial copper and zinc loads to Little Backbone Creek. If water is released from the Friday Loudon Portal, the spring flow may decrease or stop.

Typical metal loads from the Mammoth Mine are illustrated in Figure 2, and the metal concentrations in Little Backbone Creek are illustrated in Figure 3.

In August 1996 and March 1997, MRRC completed two separate phases of a comprehensive water sampling program designed to identify and quantify AMD sources in Little Backbone Creek. The concentrations of copper and zinc in Little Backbone Creek were lower in August than in March, while the metal loading in the creek was higher in March. Higher flows during March most likely caused a dilution in the concentration, while increasing overall metal loads.

Water quality analyses indicate that approximately 90-95% of the total copper and zinc load to Little Backbone Creek was discharged from the acidic spring in October 1996, and that approximately 55 to 60% of the total load was discharged from the acidic spring in March 1997. Water discharged from the acidic spring's tributary appears to cause a drop in pH in Little Backbone Creek from 7.0 upstream of the tributary input to 4.5 below the input during the March 1997 sampling. Approximately 5-9% of the metal loading to Little Backbone Creek is discharged from the Main Mammoth and East 470 tributary. The metal loads from the East 470 and North 470 portals combined, equal about one tenth of the copper and zinc loads currently released from the acidic spring.

### **Project Approach**

The components of the Mammoth Mine Remediation Project focus on the most significant sources of AMD in the vicinity of the mine site, and will be implemented in a phased approach. Due to the installation of portal seals, and resulting flooding of the mine workings, the sources of AMD at the Mammoth Mine are hydraulically connected. Hence, manipulating the flow from one portal may influence the flow and metal concentrations discharged from other portals or from springs. By implementing the project components sequentially, the need for each successive control measure can be evaluated before additional capital is invested. Further, each remedial action can be adapted appropriately should the site conditions change. The project tasks are outlined below.

1. *Install a passive limestone treatment system in the Friday Loudon Portal and in Shoemaker Gulch.*

Passive limestone treatment can consist of 3/4" to large boulders of limestone placed in a pond, reservoir, channel or mine portal. An example of limestone treatment in a portal is illustrated in Figure 4. Limestone treatment increases the pH of AMD and immobilizes heavy metals by precipitating metal hydroxides and oxides.

A concrete seal located in the Friday Loudon Portal maintains a pressure of 180-240 psi. The distance between the seal and the portal opening is approximately 500 feet. The available area within the portal will be used for a primary limestone treatment system. Approximately 300 cubic yards of 3/4" limestone will be required to create a 2-foot deep limestone floor. A settling pond will be excavated just outside the portal, and sludge will be removed from the pond as needed.

A secondary limestone treatment system will be installed within Shoemaker Gulch. Due to the steepness of the terrain in Shoemaker Gulch, this system will be comprised of large limestone boulders. Approximately 600 cubic yards of boulders will be used. This secondary treatment will add alkalinity to the settling pond effluent before it enters Shasta Lake.

2. *Release water from behind the bulkhead located in the Friday Loudon Portal*  
This action should eliminate or reduce AMD discharges from an acidic spring and other portals. The flow from the Friday Loudon Portal can be managed to optimize the effectiveness of the limestone treatment system and possibly to control the flowrates from other AMD discharge locations.
3. *If the East 470 and North 470 Portals continue to discharge AMD, construct a wetland treatment system in the vicinity of the portals.*

Constructed wetlands are a relatively inexpensive and low maintenance method of treating AMD. ~~Anaerobic~~ wetland systems are designed to treat water with net acidity. Anaerobic wetlands improve the water quality of AMD by creating reducing conditions and adding alkalinity. Both processes result in the removal of metals from AMD. A general anaerobic wetlands system is illustrated in Figure 5.

4. *If the acidic spring continues to discharge AMD, construct a road to the spring and install a passive limestone treatment system.*

It is possible that releasing water from the Friday Loudon Portal will not result in a significant decrease in the flow from the acidic spring. If this is the case, a road will be cut along the steep hillside to the spring and a passive limestone treatment system will be installed in the gully where the spring emerges. The system will be similar to the Shoemaker Gulch limestone treatment described above.

### Expected Benefits

The focus of the proposed Mammoth Mine Remediation Project is to improve water quality in the upper Sacramento River for the winter-run and spring-run chinook salmon and the steelhead trout. This project will also achieve an obvious local benefit by reducing AMD discharge rates to Little Backbone Creek.

The Basin Plan contains the following quality objectives for copper, zinc, and cadmium for water with hardness = 40 mg/L as CaCO<sub>3</sub>.

Parameter	Concentration (µg/L) (Dissolved)
Copper	5.6
Zinc	16.0
Cadmium	0.22

Metal concentrations in excess of these limits can be harmful to chinook salmon and steelhead trout. (Water Resources Control Board, 1990). The USBR, and US EPA

routinely collect samples from the Sacramento River below Shasta Dam and below Keswick Reservoir. The results of these analyses indicate that the levels of copper, cadmium and zinc in these water samples regularly exceed detection limits. Hence, the ability of the Sacramento River to accommodate influxes of metals downstream is limited by the water quality in the upper reaches of the river. In order to achieve the Basin Plan objectives in the Sacramento River, major sources of metals upstream of Shasta Dam should be controlled as part of a comprehensive basin-wide contaminant source reduction program.

### **Background and Biological/Technical Justification**

MRRC recently completed a comprehensive feasibility study for the Mammoth Mine and other mines located in the West Shasta Mining District. The study evaluated a wide range of potential AMD control and treatment technologies including:

- active chemical treatment,
- wetlands treatment,
- passive limestone treatment,
- surface reclamation of mine waste,
- surface water diversion channels,
- neutralizing or reducing material injection into mine workings, and
- extermination of AMD generating microorganisms.

An active chemical treatment system was not considered to be feasible due to the remote location of the Mammoth Mine, limited space, energy requirements, labor intensiveness, and cost.

Reclaiming the steeply graded waste rock areas was not a preferred solution, due to substantial costs and limited water quality benefits.

Several miles of underground workings are located at the Mammoth Mine. This vast expanse of collapsed stopes and tunnels exceed the practicable volume limits for underground injections.

Extermination of AMD generation microorganisms was not a preferred solution due to a low expected benefit to cost ratio and considerable maintenance requirements.

The control actions included in this proposal were selected in part, because they focus on the most significant metal loads discharged from the Mammoth Mine. The extent of the benefits for aquatic species in the receiving water bodies is expected to be directly related to the achieved reduction in metal loading. Furthermore, the proposed passive treatment systems will require minimal maintenance and accommodate a wide range of flowrates.

If this project proposal is approved, MRRC is prepared to proceed with the proposed control actions in the near future. As stated earlier, a detailed feasibility study has been completed, and a comprehensive monitoring program is in place. To date, MRRC has expended over \$2,000,000 on remedial activities in the West Shasta Mining District.

### **Proposed Scope of Work**

The proposed project is divided into four components:

*Design:* A detailed design will be completed of a limestone treatment system for the Friday Loudon Portal. If necessary, designs will be prepared for wetland treatment systems at the North 470 and East 470 Adits and for a road to the acidic seep. Deliverables: Detailed designs superimposed on base maps of site.

*Preconstruction:* Preconstruction activities include procurement of required permits and preparing the site and surrounding area for project implementation. Deliverables: Copies of all required permits, and photographs of site preparation.

*Construction:* The control actions will be implemented in a phased approach in order to evaluate the effects of each successive treatment system prior to proceeding with additional work. Deliverables: Weekly progress reports detailing technical and financial activities, and copies of all related purchase orders and invoices.

*Monitoring:* The existing monitoring program will continue throughout all phases of the project implementation. Deliverables: Monthly water quality reports.

### **Monitoring and Data Evaluation**

MRRC periodically collects water samples and measures flow at all portals, seeps, and springs associated with the Mammoth Mine. Samples are also collected from Little Backbone Creek on a quarterly basis. Samples will be collected on a more frequent basis during and immediately after the implementation of control actions.

MRRC participates in the Sacramento River Watershed Program (SRWP), an organization that plans to coordinate and supplement several existing water quality monitoring programs operating within the Sacramento River watershed. Results from monitoring activities the Mammoth Mine will be contributed to the SRWP, and the Mammoth Mine monitoring program will use sampling and analysis methods that are consistent with the SRWP. Cooperation with the SRWP will provide a venue for peer review of the monitoring and data evaluation process.

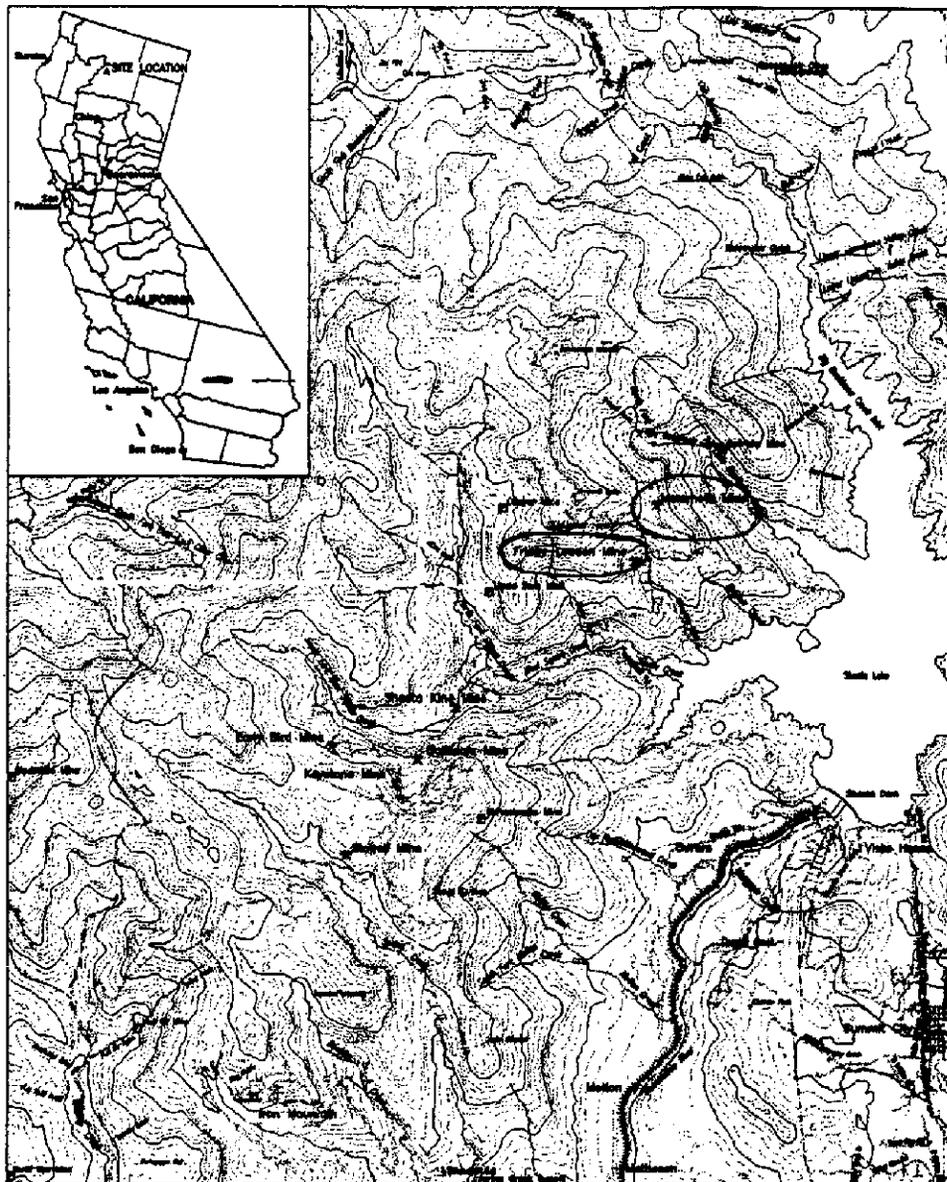
### **Implementability**

The CRWQCB-Central Valley Region issued two orders related to the Mammoth Mine site on June 20, 1996. Order No. 96-154 includes waste discharge requirements for the Mammoth Mine adits, and Cease and Desist Order No. 96-155 requires that MRRC comply with the following task schedule. To date, MRRC has met each of the compliance deadlines.

- Submit a remedial action plan describing completed and proposed control actions to reduce or prevent AMD discharges to Little Backbone Creek. (Compliance Date: August 1, 1996)
- Establish a program to obtain accurate flow measurements of discharges from portals, waste rock dumps, springs, seeps, and receiving waters. (Compliance Date: October 1, 1996)
- Submit accurate topographic base maps of the Mammoth Mine and Little Backbone Creek. (Compliance Date: November 1, 1996)
- Submit a report describing the feasibility of proposed solutions to restore beneficial uses to affected water courses. (Compliance Date: July 1, 1997)
- Commence implementation of selected remedial actions to achieve compliance with waste discharge requirements. (Compliance Date: December 1, 1997)
- Obtain full compliance with waste discharge requirements. (Compliance Date: December 1, 1998)

The Mammoth Mine is located on a parcel that is owned by MRRC, and there are no existing easements on the proposed work site. Hence, third party impacts are expected to be minimal.

If required to do so, MRRC will coordinate an environmental assessment prior to implementation of the proposed control actions. Further, MRRC will assure that all applicable OSHA and MSHA requirements are met.



**EXPLANATION**

Friday-Lauder Mine  MRRC MINE  
 Uncle Sam Mine  MINE - OTHERS



Mining Remedial Recovery Company

**MRRC**

8000 0 8000

SCALE IN FEET

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**LOCATION MAP OF  
MRRC MINES**

  
**Adrian Brown**  
 Consultant - Geology, Hydrology, Remediation  
 Department of Environmental Sciences  
 FOUR ROOMS

**1**

1 - 0 0 2 5 8 6

I-002586

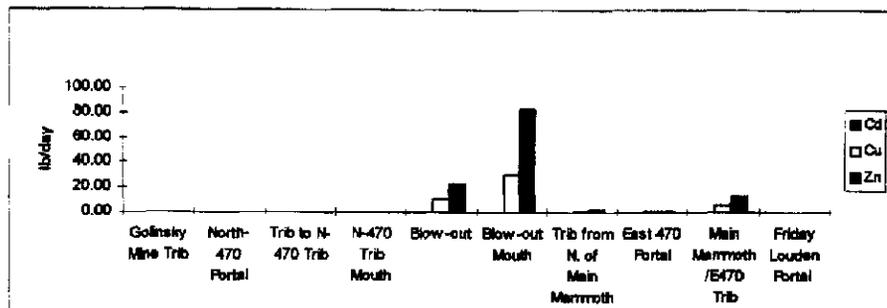


Figure 2. Metal Loads from the Mammoth Mine - March 1997

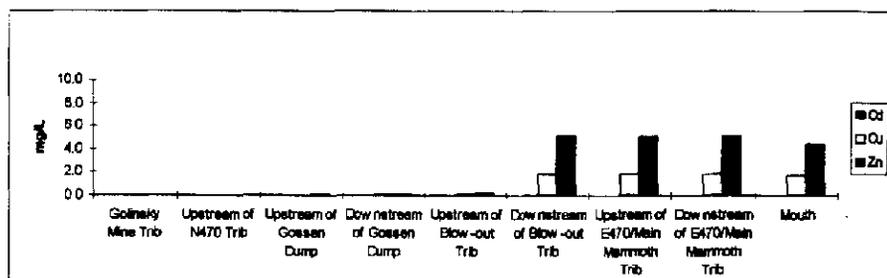
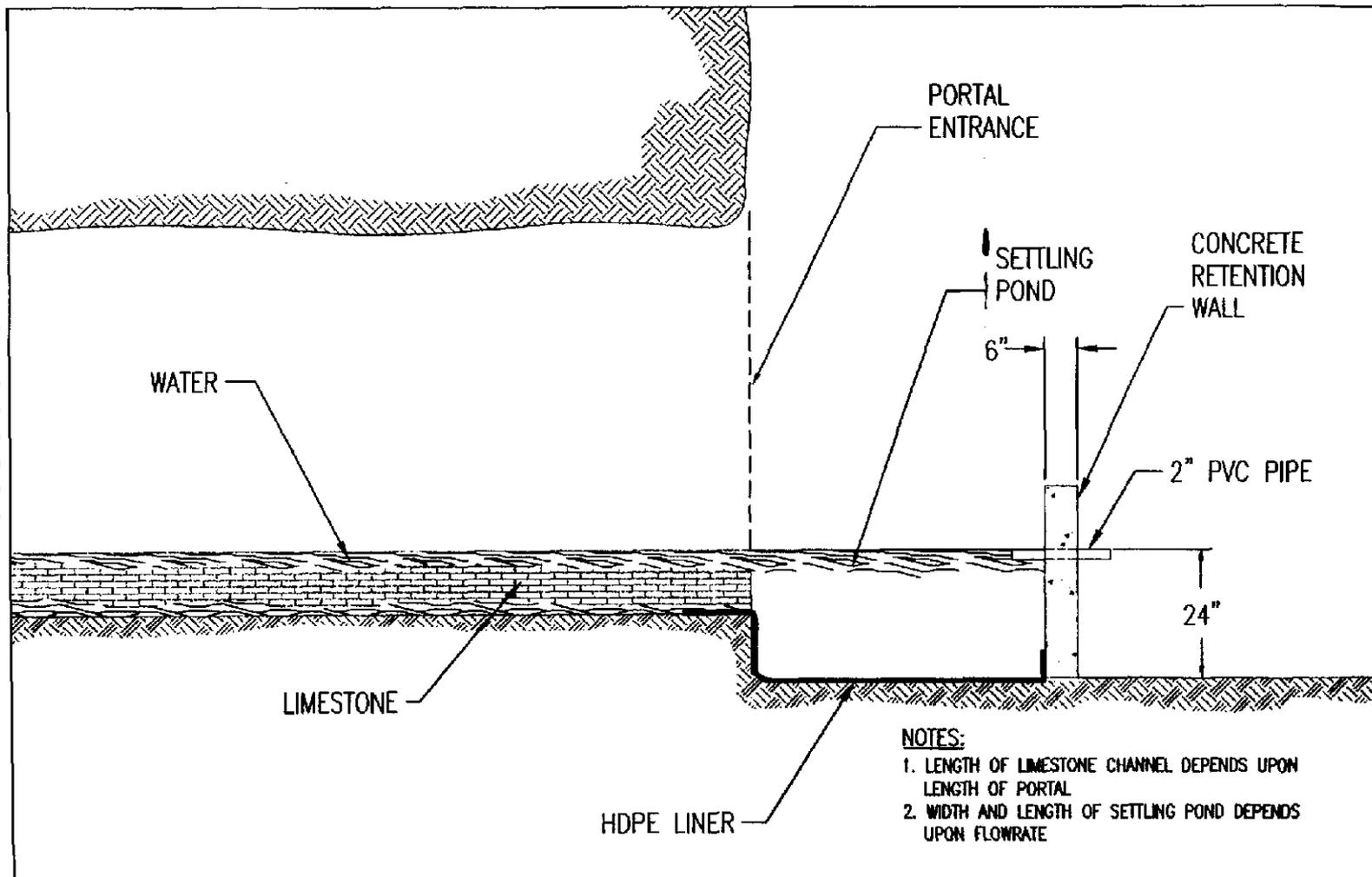


Figure 3. Metal Concentrations in Little Backbone Creek - March 1997

1-002588



Mining Remedial Recovery Company

**MRRC**

NOT TO SCALE

## LIMESTONE TREATMENT IN A PORTAL



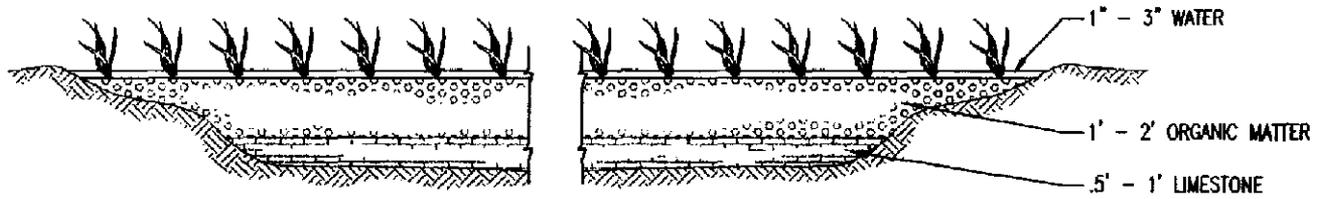
Shasta County, CA

PROJECT NUMBER

4

1-002588

1-002589



TAKEN FROM J. SKOUSEN, B. FAULKNER,  
AND P. STERNER, 1996

Mining Remedial Recovery Company

**MRRRC**

NOT TO SCALE

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## ANAEROBIC WETLANDS



Shasta County, CA

PROJECT NUMBER

5

1-002589

## **Costs and Schedule to Implement Mammoth Mine Remediation Project**

### **Budget Costs**

The budgeted cost for each proposed task is outlined in Table 2.

**Table 2. Cost breakdown for project tasks.**

<b>Project Task</b>	<b>Direct Salary and Benefits</b>	<b>Overhead Labor</b>	<b>Service Contracts</b>	<b>Material Costs</b>	<b>Maintenance Costs for 10 years</b>	<b>Total Costs</b>
1	\$2,000	\$500	\$50,000	\$127,500	\$20,000/yr	\$380,000
2	300	200	7,000	2,000	500/yr	14,500
3	2,000	500	50,000	42,500	5,000/yr	145,000
4	4,000	1,000	185,000	50,000	10,000/yr	340,000
					<b>Total Cost</b>	<b>\$879,500</b>

MRRC is open to negotiating a cost sharing plan with the CALFED Program to complete the remediation projects described in this proposal. CALFED Program resources allocated to any of the outlined tasks would increase the economical feasibility of the task, and increase the expected water quality benefits in the upper Sacramento River.

MRRC plans to hire subcontractors to complete the construction components of the proposed tasks. In selecting subcontractors, MRRC will solicit bids and evaluate potential subcontractors based upon the following factors:

- related project experience,
- appropriate licenses and credentials,
- OSHA certification,
- MSHA certification, and
- cost.

### **Schedule Milestones**

A schedule for the proposed project tasks is shown in Table 3. MRRC would appreciate receiving CALFED funding prior to each completion date, but is open to other payment schedules.

**Table 3. Task Schedule**

<b>Task</b>	<b>Completion Date</b>
Install a passive limestone treatment system in the Friday Loudon Portal and in Shoemaker Gulch	10/17/97
Release water from behind the bulkhead located in the Friday Loudon Portal (This action should eliminate or reduce AMD discharges from an acidic spring and other portals.)	10/21/97
If other portals continue to discharge AMD, install limestone and wetland treatment systems in the vicinity of the portals	4/30/98
If the acidic spring continues to discharge AMD, construct road to the spring and install a passive limestone treatment system	5/30/98

### **Third Party Impacts**

It is not expected that implementation of this project will result in any significant third party impacts. The Mammoth Mine is remotely located, and the mine site and the surrounding acreage are the property of MRRC. However, MRRC will submit a description of selected remedial actions to appropriate parties at the CRWQCB, the California Department of Fish and Game, the Forest Service, the Bureau of Land Management, and Bureau of Reclamation. MRRC will also post applicable signs along the access road to the work site during construction.

### **Applicant Qualifications**

MRRC was formed specifically to remediate sites impacted by mining activities, and is actively reclaiming several mine, mill, and smelter sites located throughout the United States. Key personnel at MRRC have extensive knowledge of general mine remediation technologies, as well as the site specific conditions at the Mammoth Mine.

In 1995, MRRC completed a remediation project at the Sunbank Mine site located near Silverton, Colorado. Sixty percent of the funding for this project was provided by the US EPA. The mine openings and adits were backfilled, regraded and capped. The mine dump was removed from the stream, consolidated into one area, regraded, and capped. Currently, AMD from the mine is collected and passed through a limestone treatment system which then feeds into a series of settling ponds. This project has resulted in substantial improvements to water quality, and demonstrates MRRC ability to work with a government agency to achieve a common goal.

MRRC personnel who are involved in the Mammoth Mine project are profiled below.

#### **Michael W. Baum, President**

Michael Baum will manage the financial aspects of the proposed Mammoth Mine remediation project. Mr. Baum has over 20 years of management experience in the areas of construction, mine operation and mine reclamation. He has been directly in charge of operations and reclamation at more than twenty mine, mill, and smelter sites located throughout the United States. Mr. Baum has been involved in numerous negotiations involving Consent Decrees for remedial activities in both the CERCLA and RCRA programs, and has been responsible for the attainment of several permits required to perform remedial and mining activities.

#### **Ken Henderson, Construction Manager/Administration**

Ken Henderson will manage the construction of the proposed Mammoth Mine remediation project. Mr. Henderson has over 30 years of management and technical experience in the areas of mine operations, project design, and construction management. He holds a degree in Mining Engineering for the University of Colorado and an Environmental Law Degree from the University of Arizona. Mr. Henderson has been involved in the management of several mining operations and mine remediation projects throughout the western United States.

#### **Linda Mercurio, Environmental Engineer/Project Manager**

Linda Mercurio will coordinate the design, implementation, and monitoring components of the proposed project. Ms. Mercurio holds an M.S. in Environmental Engineering from Utah State University and a B.S. in Mathematics Education from Northeastern University. She has extensive knowledge of the water quality issues related to the Mammoth Mine and has been instrumental in evaluating potential control actions.

**Don Simpson, Project Designer**

Don Simpson will assist with remedial actions related to underground mine workings. Mr. Simpson has been involved with the management of metal mining and milling for over 40 years. He holds a degree in Mining Engineering from the University of Arizona. During his career, Mr. Simpson has held senior management positions in mine exploration, production, and reclamation.

***Compliance with Standard Terms and Conditions***

Attached please find ~~the~~ required forms for a successful proposal. MRRC has elected not to submit a bidder's bond at this time because subcontractors will perform the majority of the public works construction efforts. As stated on the CALFED Category III RFP internet site, under these circumstances, bid and payment bonds can be deferred until such time as subcontracts are sought and awarded, and before work is performed. It is understood that obligations from CALFED to MRRC will be contingent upon receiving the bid/payment bonds.

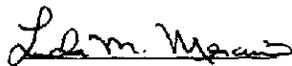
Ken Henderson is a licenced general contractor in the State of California.  
(Licence No. 728820)

## **NONDISCRIMINATION COMPLIANCE STATEMENT**

Mining Remedial Recovery Company (MRRC) hereby certifies, unless specifically exempted, compliance with Government Code Section 12990 (a-f) and California Code of Regulations, Title 2, Division 4, Chapter 5 in matters relating to reporting requirements and the development, implementation and maintenance of a Nondiscrimination Program. MRRC agrees not to unlawfully discriminate, harass or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, disability (including HIV and AIDS), medical condition (cancer), age, marital status, denial of family and medical care leave and denial of pregnancy disability leave.

### **CERTIFICATION**

*I, Linda Mercurio, hereby swear that I am duly authorized to legally bind MRRC to the above described certification. I am fully aware that this certification, executed on the date and in the county below, is made under penalty of perjury under the laws of the State of California.*



July 25, 1997, Shasta County, California

Linda M. Mercurio  
Environmental Engineer and Project Manager  
Mining Remedial Recovery Company

**NONCOLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER AND  
SUBMITTED WITH BID FOR PUBLIC WORKS**

**STATE OF CALIFORNIA  
COUNTY OF SHASTA**

Linda Mercurio, being first duly sworn, deposes and says that she is a Project Manager and Environmental Engineer employed by Mining Remedial Recovery Company (MRRRC) the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly colluded, conspired, connived, or agreed with the any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

DATED: 25 July 1997

By L. Mercurio

Subscribe and sworn to before me on

July 25, 1997

Laure Carroll  
(Notary Public)



DWR WAREHOUSE  
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