PROGRESS REPORT
TEMPORARY WATER QUALITY STANDARDS
3-YEAR REVIEW

NEW WORLD MINING DISTRICT
RESPONSE AND RESTORATION PROJECT

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INTRODUCTION

The New World Mining District (District) Response and Restoration Project is a mine waste cleanup project that is being undertaken by the U.S. Department of Agriculture (USDA) Forest Service to mitigate historic mining impacts to human health and the environment. This historic mining district, which is centered about four miles northeast of the northeast gate to Yellowstone National Park, has hard rock mining wastes and acid discharges that contain elevated levels of heavy metals.

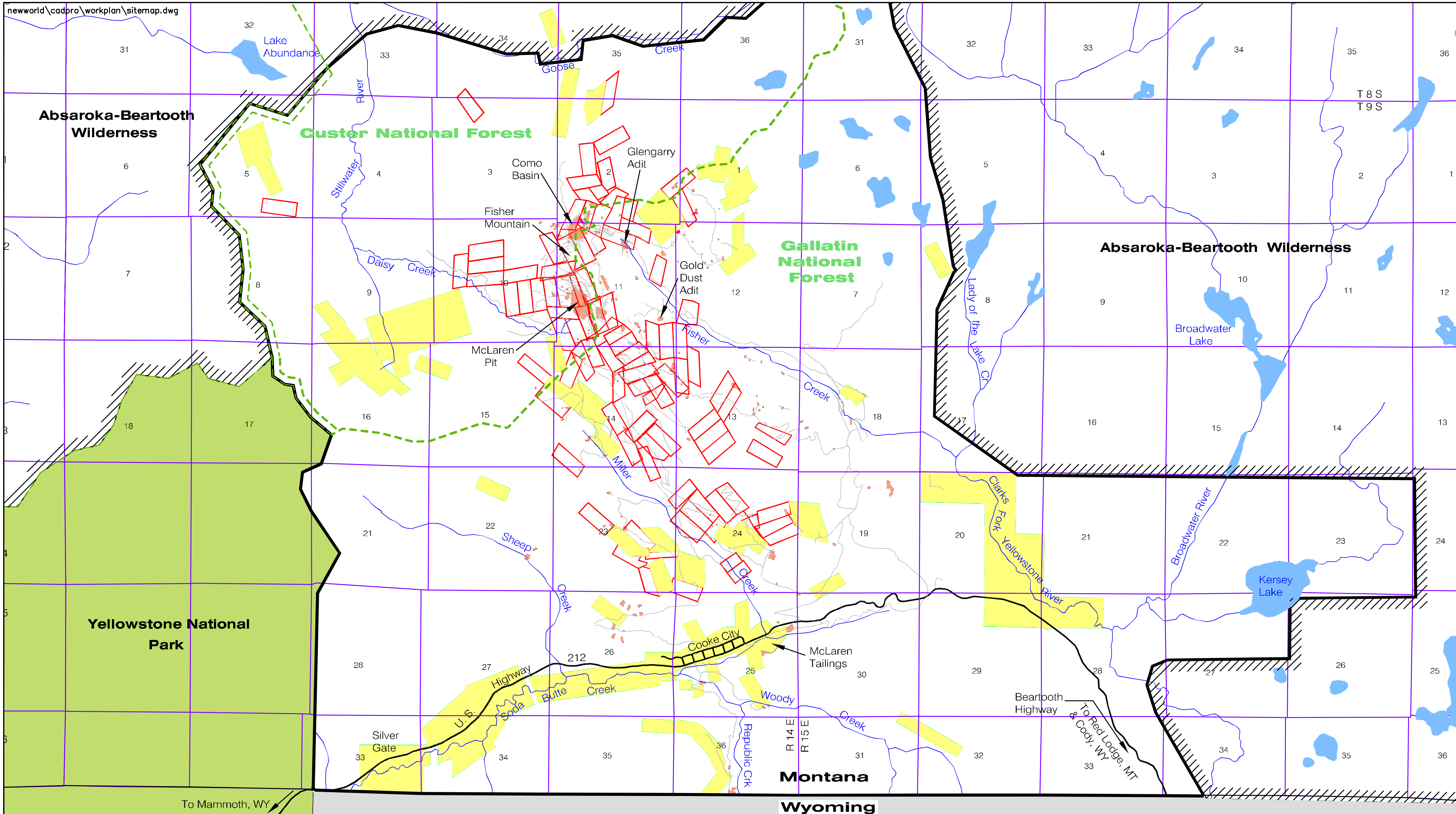
Under the State of Montana Water Quality Act, §§ 75-5-101 et seq., Montana Code Annotated (MCA), the state has promulgated regulations to protect, maintain, and improve the quality of surface waters in the state. The State of Montana has classified the streams in the District as B-1. The definition of B-1 is waters that are suitable for drinking, culinary and food processing (after conventional treatment), bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply. The B-1 stream classification also sets forth standards for coliform bacteria, dissolved oxygen content, pH, turbidity, temperature, sediment or floating solids, color, and concentrations of toxic or harmful parameters as specified in Circular WQB-7 (Montana Department of Environmental Quality, 2002). Water quality in portions of the District's streams does not meet these criteria, in part because of past mining disturbances and mining wastes.

A Support Document and Implementation Plan was submitted to the State of Montana Board of Environmental Review (Board) on January 22, 1999 (Maxim, 1998). The support document provides the necessary information required by the Montana Water Quality Act, which allows adoption of temporary water quality standards for particular parameters on streams or stream segments that are not supporting the State's designated use. The petition for adoption of temporary standards for Fisher Creek, Daisy Creek, and a portion of the upper Stillwater River was accepted by the Board and noticed for public hearing. The proposed rule was modified to reflect public comment and the temporary water quality standards were approved and adopted by the Board on June 4, 1999. Temporary standards are in effect for 15 years from the date of approval, at which time water quality issues in the District will be reevaluated by the Forest Service and the Montana Department of Environmental Quality (DEQ).

Section 75-5-312 (10), MCA, provides for a 3-year review of temporary standards and the implementation plan, which involves a public hearing with notice and opportunity for comment. Depending on the Board's review, temporary standards can be left unchanged, modified, or terminated. The purpose of this report is to present the cleanup actions taken to date in the District by the Forest Service, review long-term water quality data collected since the standards became effective in June 1999, and compare project progress with that presented in the Implementation Plan.

SITE LOCATION AND DESCRIPTION

The New World Mining District falls within the boundaries of the Gallatin and the Custer National Forests, and abuts Yellowstone National Park's northeast corner. The Absaroka-Beartooth Wilderness Area bounds the District to the north and east. The Montana-Wyoming state line forms the southern boundary of the District. The District lies entirely within Park County, Montana (Figure 1).



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Map Area

Data Source: Ownership, unimproved roads, and mine waste source areas from Gallatin National Forest Interagency Spatial Analysis Center, (October 27 1999).

Cartographic feature files obtained from Montana State Library, Natural Resource Information System.

District Boundary	Mine Waste Source Area
Unimproved Road	District Property (Patented Claims Only)
National Forest Boundary	Private Property
Wilderness Boundary	

Project Vicinity Map
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 1

The communities of Cooke City and Silver Gate, Montana are the only population centers near the District. The neighboring communities of Mammoth, Wyoming, and Gardiner, Montana are located about 50 miles to the west. Red Lodge, Montana is located about 65 miles to the northeast, via the Beartooth Highway, and Cody, Wyoming is located 60 miles to the southeast.

The District is located at an elevation that ranges from 7,900 feet to over 10,400 feet above sea level. The site is snow-covered for much of the year and only one route of travel is open on a year-round basis -- the highway between Mammoth and Cooke City. The Sunlight Basin road accesses the District from northwestern Wyoming during the spring, summer and fall but only allows access to within a few miles of the District in winter. The Beartooth Highway is closed during winter, as is Highway 212 from Cooke City eastward to Pilot Creek near the Montana/Wyoming state line.

The District covers an area of about 40 square miles (25,600 acres). Historic mining disturbances affect about 50 acres (0.19%). The McLaren Tailings, which is not a District Property, covers an additional 11 acres (0.04%). Topography of the District is mountainous with dominant glacial features, and is situated at the headwaters of three river systems that all flow into the Yellowstone River. The three river systems are the Clarks Fork of the Yellowstone, the Stillwater, and the Lamar. The Lamar River flows through Yellowstone Park. Major tributary streams in the District include Daisy, Miller, Fisher, Goose, Sheep, Lady of the Lake, Republic, Woody, and Soda Butte creeks.

PROJECT BACKGROUND

On August 12, 1996, the United States signed a Settlement Agreement with Crown Butte Mining, Inc. (CBMI) to purchase CBMI's interest in its District holdings. This transfer of property to the U.S. government effectively ended CBMI's proposed mine development plans and provided $22.5 million to cleanup historic mining impacts in the district. In June 1998, all interested parties and CBMI signed a Consent Decree (Decree). The Decree, approved by the United States District Court, finalized the terms of the Agreement and made available the funds that are being used for mine cleanup.

The Forest Service is the lead agency responsible for implementing the cleanup of mining related impacts in the District. Other state and federal agencies are cooperating with the effort, including the U.S. Department of Interior, the U.S. Environmental Protection Agency (EPA), and DEQ. As specified in the Decree, the Forest Service is able to use its Superfund authority, which is granted under the Comprehensive Environmental Response, Compensation, and Liability Act (the Superfund enabling law), to proceed with the cleanup. This Superfund law, in concert with guidance provided by the EPA, establishes a process whereby cleanup actions follow specific procedures. The Forest Service is executing the Response and Restoration Project by following the process for Non-Time-Critical Removal Actions.

Under Superfund, particulars such as characterizing the nature and extent of pollution, assessing risks, identifying and evaluating cleanup alternatives, and keeping the public informed and involved are part of the cleanup process. Following EPA guidance, the Forest Service custom-tailored this process to address the specific nature of contaminants in the District and the specific nuances of this project. Cleanup activities conducted by the Forest Service began in 1999. Those activities are described in the 1999, 2000, and 2001 Work Plans (Maxim, 1999b; 2000, 2001a). The 2002 Work Plan is currently being prepared and will be made available to the DEQ in April.

SUPPORT DOCUMENT AND IMPLEMENTATION PLAN

The Support Document and Implementation Plan was submitted to the Board in January 1999 along with a request to allow temporary water quality standards for portions of Fisher Creek, Daisy Creek, and a portion of the upper Stillwater River. The Support Document and Implementation Plan fulfilled requirements of the Montana Water Quality Act (75-5-312) by describing the chemical, biological, and physical condition of the stream segments, existing water quality standards that are not being achieved, temporary modifications to the standards that are requested for the stream segments, existing beneficial uses, designated uses considered attainable in the absence of water quality limiting factors, description of the proposed actions that will eliminate water quality limiting factors, and a schedule for cleanup.

The Implementation Plan identified 18 Operable Units (OUs) in the District. An OU is defined as a discrete action that comprises an incremental step toward comprehensively addressing site problems. For the Implementation Plan, the initial OUs were based on mine sites and associated wastes. The OUs that contribute the majority of impacts to water quality are the following:

- McLaren Pit
- Glengarry Adit and Shafts
- Spalding Tunnels
- Como Basin
- Gold Dust

The remaining OUs defined in the Implementation Plan are believed to be smaller contributors to water quality degradation, and many are defined in a broader sense, such as the Fisher Mountain, Sheep Mountain, and East Henderson Mountain OUs. These broader OUs include many smaller prospects and waste dumps that lie scattered throughout the District.

Thirteen of the OUs defined in the Implementation Plan include wastes on District Property. District Property is defined in the Decree as including all property or interests in property that CBMI relinquished to the United States. Non-District Property includes mining impacts on private property, and National Forest lands on unpatented claims or adjacent forest land that were not part of the Settlement Agreement. Under the Decree, work has to be completed on District Property before beginning work on non-District Property. The largest mine waste deposit in the District, the McLaren Tailings, which is located next to Soda Butte Creek above the town of Cooke City, is a non-District Property, as is the Great Republic Smelter, which is located on Soda Butte Creek just downstream of town. DEQ is taking the lead on these two sites.

The Implementation Plan provides a description of work that would be involved in each OU and a schedule for completing the work. An eight year schedule was given for the five key OUs listed above to complete cleanup activities, with open schedules for the remaining OUs where cleanup work could be done concurrent with other work in the District.

PROBLEM DESCRIPTION

The Forest Service has developed a conceptual model that describes sources of mine wastes in the District and pathways by which the metal contaminants move in the environment. This model is based on results of numerous previous investigations into the source and movement of metal contaminants. The conceptual model provides insight into the likely mechanisms that are involved in releasing pollutants into the environment, and the pathways in which humans and the environment are exposed to pollutants.

Major sources of contaminants at the site are acidic, metal-laden mine waste dumps located at mine openings and massive sulfide ore deposits underground that are exposed to the atmosphere by either mine workings or natural fracturing and faulting. Major sources in the District are the McLaren Pit, McLaren Tailings, Como Basin, and Glengarry Adit. Other secondary sources of contaminants include stream sediments that have been transported downstream from other sources. Primary mechanisms for movement of metal-laden mine wastes include the following:

- Erosion into surface water courses
- Dissolving contaminants in runoff
- Infiltrating dissolved metals into soil and groundwater
- Moving impacted water through open historic underground mine workings and improperly abandoned exploratory borings
- Groundwater discharge into surface water
- Contaminated surface water flow to groundwater.

Mine waste sources in the District are many and widely scattered. Not only are there over 150 mine dumps on District Property totaling about 430,000 cubic yards of mine waste, but there are 11 mine discharges, numerous acid seeps, and extensive reaches of streams impacted by metals-laden sediment.

Except for some of the larger waste dumps, individual contributions of specific mine waste sources via the pathways identified above are difficult to quantify. Work by previous investigators, primarily the U.S. Geological Survey (USGS), has shown that metal loadings in area streams are derived from groundwater inflow, adit discharges, tributary inputs, and leachate from waste dumps. For example, a study done on Fisher Creek showed that 20% of dissolved copper load in the creek comes from the Glengarry Adit discharge, with 14% ascribed to leachate from the Glengarry dump, 21% to tributary input from the Como Basin, and 14% in tributary input from Fisher Mountain. About 30% of the dissolved copper load could not be attributed to any particular source.

Using this information as a rough approximation of the potential beneficial effect of response and restoration actions, it is evident that adit discharges contribute a considerable amount of metals to Fisher Creek and cleanup actions directed at reducing or treating flows from the more substantial adit discharges like the Glengarry Adit should directly result in water quality improvements. This is also true of leachate generated from waste dumps that directly impact surface water, as shown in the example of the Glengarry dump. The effect on surface water or groundwater quality resulting from cleanup actions directed at mine waste sources located farther from surface water drainages or in areas where groundwater is deeper is much harder to quantify. Likewise, the effect response or restoration actions may have on other sources, such as stream sediment, is very difficult to quantify. Metals in stream sediment have complicated chemical reactions with surface water and change markedly with varying flows. However, even for these more distant sources, response and restoration actions should have a positive effect on water and sediment quality and monitoring of these environmental media should show improvements over time.

Risks to humans and animals from mine waste sources are primarily related to direct contact or ingestion of metals contaminants. Because the main sources present on District Property are located away from permanent residents, consumption of groundwater or surface water is not considered a significant exposure pathway for humans. Although the exposure risk of animals to surface water or consumption of surface water has not been quantified, and no site-specific risk assessment is planned, other sources of information on wildlife populations do not indicate that animals are at risk from exposure to mine waste contaminants.

Exposure pathways to aquatic organisms primarily occur in-stream. Aquatic exposure results from contact with or consumption of metals-laden sediment and surface water. Plants that might recolonize waste dumps are exposed to metal contaminants primarily from root uptake. These plants are often weakened or are absent due to chemical conditions in waste materials.

CLEANUP PROGRESS

The general schedule presented in the Support Document and Implementation Plan for the District Property OU was to develop overall plans for cleanup in 1999, conduct final site characterization activities in 1999, identify a potential waste repository in 1999, survey cultural features in 1999, prepare annual Engineering Evaluation/Cost Analysis (EE/CA) documents to evaluate potential cleanup alternatives (including 1999), and monitor groundwater and surface water on an annual basis. The general schedule for the five primary District Property OUs that contribute the greatest to water quality degradation was to finalize site characterization work in 1999, begin cleanup activities in 2000 and 2001, and complete active cleanup activities by 2002 (the fourth year). Years five through eight were dedicated to monitoring surface water quality, groundwater quality, and revegetation at the reclaimed sites, and to perform any necessary maintenance.

In March 1999, the Forest Service initiated the planning process for the project. Planning documents were in place in June 1999, and work began with the monitoring of surface water and groundwater quality at selected monitoring points. A list of activities that have been conducted to date is provided below. Some of these more important activities are described in greater detail following the list of activities.

- Established a database management system for the project.
- Cataloged existing information available for the site.
- Completed a technical evaluation of existing information and data.
- Improved portions of the Daisy Pass and Lulu Pass roads to accommodate construction traffic.
- Improved a previously constructed surface water diversion around the Como Shaft.
- Developed a suitable map base of District Property to support engineering design.
- Evaluated areas of erosion contributing excessive sediment to area drainages.
- Completed a repository siting evaluation report and collecting hydrogeologic data on two prospective repository sites.
- Completed a surface water tracer study on Daisy Creek and Miller Creek by the U.S. Geological Survey to determine surface water inputs of metal contaminants.
- Prepared a Selective Source Response Action EE/CA for potential response alternatives.
- Cleaned up selective waste dumps and placing wastes in an engineered repository for the Selective Source Response Action.
- Obtained data to fill identified data gaps for proposed response actions at the site.
- Identified unrecorded mine waste dumps, adits, and boreholes, and developing a database of site characteristics.

- Conducted geochemical sampling of mine wastes throughout the district
- Ranked mine waste sources according to a modified Hazard Ranking System to aid in the prioritization of sites slated for clean up.
- Identified unrecorded cultural features.
- Reopened the Glengarry Adit and Como Raise to more fully characterize underground sources of water within the mine.
- Evaluated water quality treatment alternatives for acid mine discharges.
- Satisfied the requirements of the petition for temporary standards submitted by CBMI.

All of the activities listed have been documented in work plans, reports, or technical memorandum and have been issued to DEQ, EPA, and the public for review and comment. Project reports and technical memorandum are listed in the *Pertinent References* section of this progress report. Most of these documents are available for downloading on the project web site (http://www.fs.fed.us/r1/gallatin), and all are available at three information repositories that have been established for the project. Information repositories are located in Cooke City at the Chamber of Commerce office, in Gardiner at the Forest Service's Gardiner Ranger District office, and in Bozeman at the Gallatin National Forest Supervisor's Office.

PROJECT WEB SITE AND DATABASE

Early on in the project, extensive environmental information gathered by CBMI to support their mine permit application was transferred to the Forest Service and placed in a documents room in Bozeman. This information was catalogued, and all available water quality data collected since 1989 was input into a project database. The project team reviewed this information, and produced several technical memoranda on the current state of knowledge of the District. The project team identified data gaps, and several Work Plans were prepared to guide data collection activities. The project team that was involved in this initial data analysis included technical specialists from the Forest Service, EPA, DEQ, USGS, and private contractors, in addition to agency project coordinators. The project database was added to the project Web site in 2000, making project data readily available to the public.

SITE CHARACTERIZATION

During the first field season, the USGS, the Forest Service, and Forest Service contractors gathered data needed for site characterization and cleanup. All known and newly identified mine waste sites were inventoried during this first field season, and important water quality, hydrologic, hydrogeologic, and waste data were collected. These data were used to characterize the repository site, further characterize metals loading characteristics in Fisher Creek, and to prioritize mine waste sites in the District for cleanup. The Forest Service also identified a suitable mine waste repository site in 1999 and began collecting extensive environmental data to ensure the site was adequate for disposal of waste. Repository site characterization was an important cleanup element identified in the Implementation Plan and Support Document.

A list of prioritized, mining-impacted sites present in the District was created using the Abandoned and Inactive Mines Scoring System (AIMSS). Site and waste characteristic information was input into this modified hazard ranking system (HRS), and 132 mining-related sites were prioritized. The AIMSS program ranks waste sources relative to each other using site-specific data and the HRS scoring algorithm. In AIMSS, four exposure pathways are evaluated -- groundwater, surface water, air, and direct contact. For each exposure pathway, three factors are evaluated: 1) likelihood of release; 2) waste characteristics; and, 3) potential receptors. The scores for the three factors are multiplied to derive a pathway score. Pathway scores are weighted more heavily toward certain situations and types of impacts. Higher weights are ascribed to the following: observed releases to groundwater and surface water, especially where an exceedance of a standard is documented; sources that are closer to a population base; and, higher contaminant concentrations, large contaminant quantities, and/or large areas of disturbance. Table 1 lists the top 20 sites on District Property, along with numerous other dumps that were considered high priorities because of high surface water pathway scores.

REPOSITORY STUDY

The idea of identifying a central repository site that could be used to isolate mining wastes that could not be reclaimed *in-situ* was determined to be a priority by the project team. The initial (Phase I) repository siting evaluation examined locations able to contain a minimum of 500,000 cubic yards (400,000 cubic meters) of waste material, or approximately 810,000 tons.

Phase 1 was conducted in March through July 1999, and used existing technical information available from previous investigations to identify sites with physical and environmental characteristics that would be suitable for disposal of mining wastes. The data evaluated included groundwater, surface water, geology, soil, geotechnical, vegetation, and other environmental information. Phase II was conducted from July 1999 through September 2000, and involved collecting site-specific data at the highest ranked sites determined in the Phase I evaluation.

The SB-4B site ranked the highest of the 28 sites evaluated. Evaluation criteria included: location of major faults; geologic setting; steepness of slopes; potential for avalanche; precipitation and snowfall; and, site access using existing roads. One of the key characteristics of the SB-4B site is the presence of glacial till, which is preferred to bedrock or alluvium because of its lower permeability and because it can be salvaged and used in repository construction. The heterogeneous nature and amount of fine-grained material in the till result in relatively low horizontal and vertical hydraulic conductivity, two characteristics important in limiting the movement of leachate that could potentially migrate below a repository facility.

RESPONSE ACTION CLEANUP PROJECTS

Following the non-time-critical removal action process, the Response and Restoration Project utilizes the Engineering Evaluation and Cost Analysis (EE/CA) procedure to identify, scope, and evaluate cleanup alternatives that can address specific mining-related risks and impacts. Preparing an EE/CA involves taking a comprehensive look at site characteristics and human health and environmental risks,

TABLE 1
Top Priority Source Areas on District Property
New World Mining District Response and Restoration Project

Site Name	AIMSS Rank*	Area (hectares)	Volume (cu. meters)**	Adit Discharge‡
McLaren Open Pit Mine	1	4.60	243,200	Yes
Miller Creek Headwaters Dump One	2	0.07	610	Yes
Soda Butte Dump Two	3	0.15	630	No
Soda Butte Dump Six-B	4	0.18	590	No
Soda Butte Dump One	5	0.11	270	Yes
Soda Butte Dump Four	6	0.09	670	No
Soda Butte Dump Five	7	0.06	510	No
Soda Butte Dump Six	8	0.06	570	No
McLaren Pit Spoils	9	1.19	16,420	Yes
West Miller Creek Dump Two	10	0.05	400	No
Rommel Tailings	11	0.90	13,730	No
Alice E Mill Site	12	0.53	2,550	Yes
Soda Butte Dump Eight	13	0.10	30	Yes
Soda Butte Dump Seven	14	1.25	6,080	No
Glengarry Dump	15	0.43	9,880	Yes
West Miller Creek Dump Four	16	0.10	140	No
McLaren Multicolor Dump	17	0.24	2,360	Yes
Soda Butte Dump Three	18	0.07	60	No
Soda Butte Dump Six-A	19	0.04	30	No
Little Daisy Adit and Dump	20	0.20	680	Yes
Glengarry Adit and Millsite	22	0.23	380	Yes
Lower Spalding Dump	23	0.13	2,000	Yes
Gold Dust Mine and Dump	24	0.22	4,330	Yes
Lower Tredennic Dump One	26	0.16	2,610	Yes
Como Basin	27	2.2	190,000	No
Upper and Middle Spalding Dump	33	0.11	560	No
Upper Tredennic – Five Dumps	36	0.11	375	Yes
Soda Butte Tailings Dump	39	0.06	330	No
Middle Tredennic - Three Dumps	45	0.11	620	Yes
Small Como Dump	96	0.10	310	No

Notes: * AIMSS - Abandoned and Inactive Mines Scoring System
** cu. meters - cubic meters
‡ Adit discharge associated with waste dump from adit, collapsed adit, or seep

and then follows an established process of screening relevant response options, developing response alternatives, and evaluating alternatives in detail. The detailed analysis of alternatives weighs the expected results of an alternative against seven criteria. After weighing the pros and cons of a number of alternatives, the Forest Service selects a preferred alternative and issues the EE/CA to the public to solicit comments. Significant comments are addressed in a final EE/CA and a decision document, called an Action Memorandum, is issued.

Selective Source Response Action

Using the AIMSS list as a starting point, source area characteristics were appraised and an initial cleanup project was proposed in 1999. The first draft of the Selective Source Response Action EE/CA, which targeted removal of eight waste dumps impacting surface water in the Fisher Creek headwaters, was written, and the preferred alternative (waste removal to the SB-4B repository site) was selected. As a result of public comment, however, the 1999 cleanup work was delayed so that more groundwater quality and flow information could be collected at the repository site.

Following an additional year of collecting data at the SB-4B repository site, the Selective Source Response Action EE/CA was re-released to the public in 2000, and the preferred alternative re-selected. An engineering design package was prepared in the fall of 2000 which detailed reclamation plans for the selected sites, and presented plans and specifications for the construction of a repository with a bottom liner, leachate collection system, and a double-lined capping system.

The Selective Source Response Action was initiated in 2001 and will be completed in 2002. This initial cleanup project involved removing approximately 32,000 cubic yards of mine waste rock and mill tailings from seven mine waste areas, disposing of these wastes in the SB-4B repository, and revegetating about 4.6 acres of the former waste areas. The waste areas cleaned up and the volume of waste permanently disposed represent about 9% of the area and 8% of the waste affecting District Property. The OUs included in this first cleanup action were the Spalding, Sheep Mountain, and Rommel Tailings.

Water quality improvements are expected from this action, although improvements are likely to be gradual from this action alone, and later augmented by additional work that is planned for the Fisher Creek drainage. Water quality will be monitored at select stations downstream of the reclaimed sites to document changes in water quality. The first water samples following waste removals were collected in October 2001 during low flow conditions.

McLaren Pit Response Action

Planning and preparation for the McLaren Pit Response Action began in 1999. A considerable amount of environmental and engineering data was needed, and the 2000 field season was the time when most of this data was collected. The USGS, working under a contractual arrangement with the Forest Service, conducted an ionic tracer study of metals loading in Daisy Creek in 2000, and the Forest Service's primary contractor, Maxim Technologies, Inc., collected data in the McLaren Pit that would support the preparation of an EE/CA. Hydrologic and metals loading models were completed with these data, indicating that the McLaren Pit contributed from 20% to 50% of the metals load in Daisy Creek. With the results of these studies substantially complete in the fall of 2000, a draft of the McLaren Pit Response Action EE/CA was prepared and submitted to the public in May 2001.

The preferred alternative for the McLaren Pit Response Action is consolidation of waste rock from dumps in the Daisy Creek headwaters into the McLaren Pit, and capping of the consolidated wastes with an impermeable cap. The scope of the McLaren Pit Response Action is limited to reducing or eliminating uncontrolled releases of metals from mine waste dumps in the Daisy Creek headwaters. However, by addressing releases from mine wastes in the McLaren Pit and nearby mine dumps, some reduction in contaminant concentrations are expected in surface water, groundwater, and new stream sediment accumulation as a result of removing or controlling these primary sources of mining-related metals contamination in Daisy Creek.

The waste dumps slated for consolidation into the pit are the McLaren Pit spoils (wastes located below the county road and west of the pit) and the multicolor dump. The dumps are all located within the Custer National Forest. Approximately 24,000 cubic yards of waste rock are contained in the dumps, which cover about 3.5 acres of disturbance.

An engineering design and construction package for the McLaren Pit response action was completed in March 2002, and bids solicited from qualified contractors in April. The design involves capping about 4.5 hectares of the pit with a geomembrane liner, covering the liner with a drainage layer and soil, and constructing runon and runoff channels to convey water off of the capped wastes. Construction is expected to begin in July 2002, with the cap completed in October 2003.

The scope of this response action does not include directly addressing contaminated groundwater, the McLaren Mine adit discharge, or other sources of potential contamination in the headwaters of Daisy Creek. More comprehensive analysis of response technologies applicable to the McLaren Mine adit discharge will be completed on a District-wide basis in 2003/2004.

Glengarry/Como Basin/Fisher Creek Response Action

The Glengarry Mine has been targeted for rehabilitation since the inception of the Response and Restoration Project because it is one of the principal sources of metals loading in the headwaters of Fisher Creek. The mine discharges 23 to 57 gallons per minute of low pH, iron-, zinc-, and copper-bearing water directly into Fisher Creek.

The Glengarry Mine consists of 3,060 feet of drifting and two nearly vertical raises. One of the raises extends 425 feet upward and surfaces in the Como Basin at the foot of the north flank of Fisher Mountain. The top of this raise passes through the Meagher Limestone formation, and a massive sulfide ore deposit hosted in the Meagher.

Pony Mining Contractors reopened the Glengarry Tunnel for assessment in September and October 2000. During this phase of reopening and assessment, accumulated debris and ferricrete mud two to five feet deep were removed from the tunnel beginning at the portal and extending back to a "Y" intersection 1,540 feet in from the portal. The two branches of the "Y" were made accessible, but debris and ferricrete were not removed. The Glengarry Tunnel was surveyed and a planimetric map produced.

The following year, in June 2001, Pony Mining Contractors was contracted to reopen and repair the second raise from the surface in the Como Basin down to a point well below the base of the Meagher Limestone. The second raise consisted of two square-set compartments. Old ladders and debris were removed from the north compartment. New ladders and landings were installed down to a depth of 215 feet below the surface. Three separate short horizontal workings were encountered in the Meagher Limestone at 35, 75, and 100 feet below the surface. Each horizontal level and the raise down to 215 feet were surveyed and the geology was mapped. Water inflows were measured and sampled at the collar of the raise and at each horizontal level during July and August 2001. Water was also sampled at the contact of overburden with bedrock (Park Shale) in the exposed wall of the excavation during re-construction of the raise collar.

Later in 2001, Pony Mining Contractors was contracted to remove debris and install temporary ladders up the middle compartment of the first raise beyond the "Y" intersection. The purpose of this work was to determine whether the top of the raise was open or if it extended beyond the 50 feet shown on the 1930's map. Debris was removed, and aluminum ladders were nailed in place extending approximately 25 feet up the center compartment. From there a round timber bulkhead was seen at the same elevation as the other two bulkheads in the adjacent compartments. Removing the bulkheads to determine what was above them or to identify the source of the water inflow was considered too dangerous to pursue.

A total of five sampling events have been completed in the Glengarry underground that were timed to catch key points of peak and low flow in the hydrograph year. Total flow from the adit ranged from less than 10 gpm to 50 gpm. Water flowing into the Glengarry Mine comes from essentially three point sources and one diffuse source. Each of these sources is described below.

The **Como raise** which collars in the Como Basin, contributes 2 gpm to 10 gpm of inflow. During snowmelt, most of the flow is derived from water passing through the colluvial material exposed at the surface in the Como Basin and flowing along the bedrock/colluvial surface, into and down the raise. This seasonal (snowmelt late spring-summer) water flow is characterized by a pH of 2.5, 100 to 400 milligrams per liter (mg/l) iron, and 10 to 40 mg/l copper.

The **short raise** has a fairly constant flow in the range of 10 gpm to 20 gpm with the lowest flow occurring in the spring (prior to snowmelt). The water is characterized by a pH of 3.2 to 3.3, 75 to 85 mg/l iron, and 0.015 to 0.032 mg/l copper. Manganese ranging from 5 to 7 mg/l is typical of both raises.

The **1050 roof leak** varies seasonally from 3 to 13 gpm and is characterized by a pH of 4 to 5, 25 to 110 mg/l iron, and 0.004 to 0.05 mg/l copper. Concentrations of aluminum (4 to 23 mg/l), arsenic (0.2 mg/l), and cadmium (0.002 to 0.003 mg/l), which are higher than concentrations of discharging from the raises or diffuse leaks, are typical for the 1050 roof leak.

The **diffuse roof leaks** dry-up in the winter but collectively contribute up to 15 gpm during snowmelt. These leaks exhibit a pH of 3 to 6, 2 to 10 mg/l iron, and 0.001 to 0.006 mg/l copper.

Load analysis shows that the vast majority of loading into the adit comes from the raises and the 1050 fracture and dike, and not the diffuse fractures. Comparison of loading sources between elements shows that the Glengarry Tunnel receives several orders of magnitude more copper from the top of the Como raise than from all the other in-flow sources combined. The raises also contribute more manganese load as well. The 1050 roof leak contributes more arsenic, aluminum, and cadmium load than the raises. In addition, the two raises and the 1050 roof leak each contribute at least an order of magnitude more iron loading than do the diffuse roof leaks. Comparison of the percent contribution of inflows, relative to outflow, shows that roughly equal loads of iron, lead, and zinc are released by the raises and the 1050 fracture, varying depending upon flow. These results clearly show that control of discharge from the Como raises and the 1050 fracture are most important in reducing contaminant loading from the Glengarry Adit to Fisher Creek.

An EE/CA is currently being prepared to evaluate response action alternatives to address mining impacts from the Glengarry Adit, the Como Basin, and in Fisher Creek. Included in the EE/CA will be waste sources present in the headwaters of Fisher Creek. The EE/CA will be structured around each of the three mine areas: Glengarry Adit, Como Basin, and upper Fisher Creek dumps. Based on the assessment work completed in the Glengarry Adit, Como Basin, and at the Gold Dust during the 2001 field season, several potential Response Action alternatives will be developed for each of the mine areas. Response Action alternatives will be developed to specifically address human health and environmental problems that occur in each of the mine areas.

Response Action options for the Glengarry Adit will include seven different actions that specifically address each of the four major sources of water in the underground workings. For the Como Basin, alternatives that will be developed will be similar to those described for the McLaren Pit Response Action EE/CA. These include total removal of waste to an on-site repository, in-situ treatment, and capping. For the mine dumps in upper Fisher Creek, surface controls, in-situ treatment, and total removal will be considered. A combination of the options and alternatives may be assembled depending on results of the detailed analysis of alternatives for each of the three source areas. A preferred alternative will be then be selected for each source area.

Work on the preferred alternative for the Glengarry/Como Basin/Fisher Creek sources is expected to begin in 2003 and will likely take two to three years to complete. Work in the Glengarry Adit is expected to be conducted first, with work in the Como Basin and the remaining dumps in Fisher Creek to follow.

Miller Creek Response Action

An EE/CA for sources located on District Property in the Miller Creek drainage will be prepared during late 2002/early 2003. This EE/CA will evaluate response options and technologies to mitigate potential impacts from mine waste areas that contribute to surface water quality degradation. The primary sources of information to make this determination are the USGS report on metal concentrations in Miller Creek (USGS, provisional draft, 2001) and the project mine waste ranking system, which lists several waste dumps in the top 20 mine sites in the District.

Adit Discharge Response Action

Response Actions associated with adit discharges in the District will be evaluated in a separate EE/CA in 2004. There are 10 discharging adits in the District (excluding the Glengarry, which is a separate cleanup action) and the likely response actions that would treat or eliminate these discharges are similar. The EE/CA will address risks to water quality from these discharges, potential treatment scenarios, and resulting load reductions that might be realized.

Cleanup Activities Planned for 2002

To meet project objectives for 2002, the following work will be performed:

- Maintain community relations by implementing activities described in the Community Relations Plan (Maxim, 1999c).
- Maintain project database and project Web site.
- Prepare a report on the status of temporary water quality standards.
- Continue long-term monitoring of surface water areas as described in the respective long-term planning documents (Maxim, 1999d) and prepare a report for submittal to the Montana Board of Environmental Review.
- Monitor groundwater at selected locations in July 2002.
- Characterize impacts to wetlands, streambanks, and sediments in the District.

- Complete the McLaren Pit groundwater investigation that was initiated in 2001.
- Plug and abandon monitoring wells located in the McLaren Pit.
- Characterize wetlands, stream banks, and stream sediments impacted by historic mining.
- Complete investigation of the McLaren Adit (Winter tunnel).
- Complete construction of the Selective Source Response Action.
- Monitor germination success at revegetated dumps reclaimed in 2001.
- Initiate Phase I of the McLaren Pit Response Action.
- Prepare an EE/CA to evaluate alternatives that would affect cleanup actions for the Glengarry Adit/Como Basin/Fisher Creek Response Action.
- Determine a preferred alternative for the Glengarry Adit/Como Basin/Fisher Creek Response Action.
- Prepare a construction package for the preferred cleanup alternative for the Glengarry Adit/Como Basin/Fisher Creek Response Action.
- Characterize mine waste sources in the vicinity of the Republic Smelter.
- Prepare an EE/CA to evaluate alternatives that would affect clean up actions for sources in the Miller Creek drainage.
- Coordinate with the Gallatin and Custer National Forests on an analysis of roads in the District.
- Prepare 2003 Work Plan.

WATER QUALITY STATUS

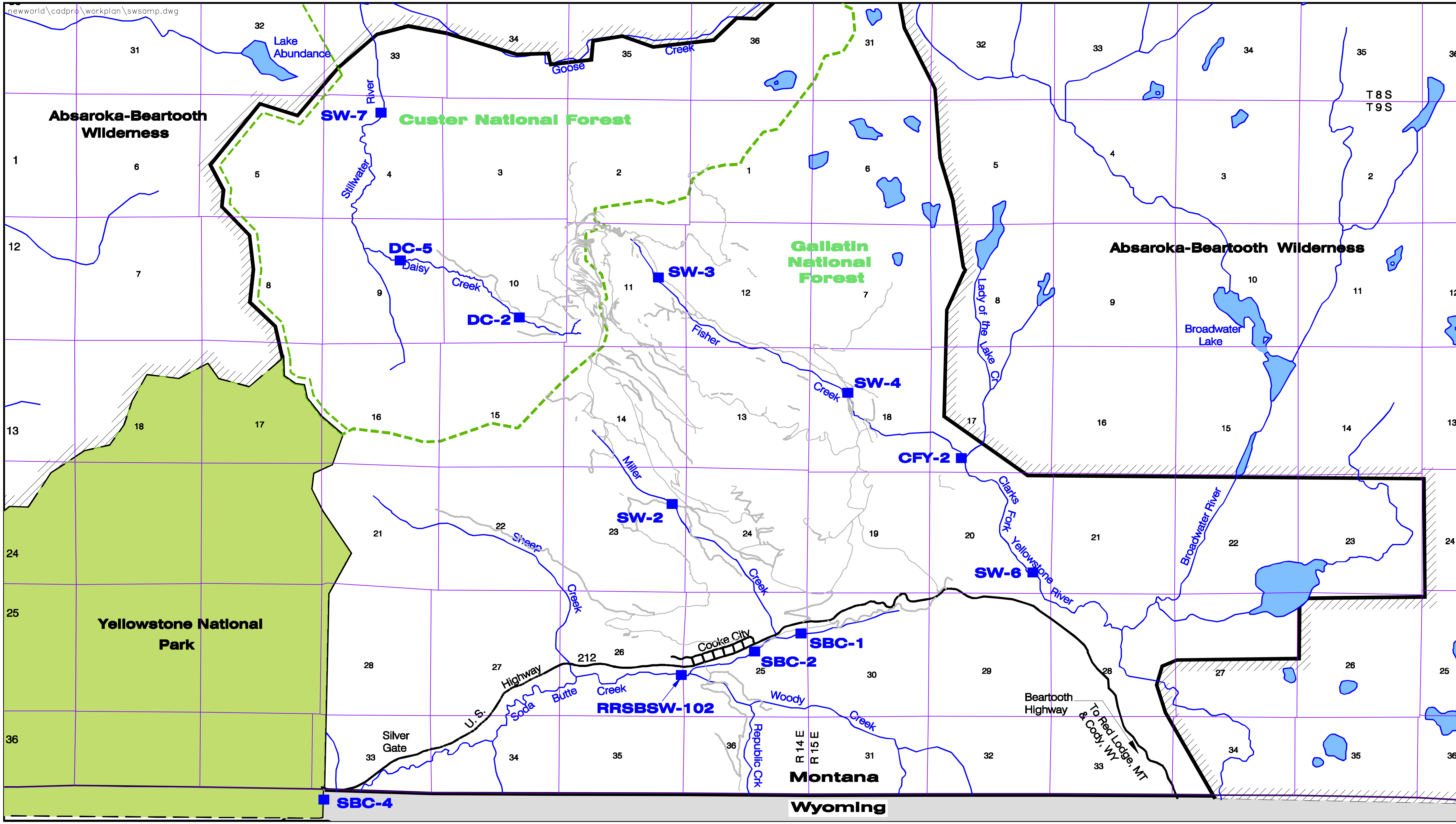
The temporary water quality standards approved by the Board are presented in Table 2 along with the accompanying water quality data that have been measured since 1989 in the three stream segments under the temporary standards. Figures showing copper, iron, and zinc concentrations at four sampling stations in the three stream segments are also presented. Because Table 2 consists of ten pages, it is included as Attachment A to this report. The figures are included in the text.

Temporary standards were determined in the Support Document and Implementation Plan by calculating the mean and standard deviation for each parameter, and then adding two standard deviations from the mean. All data collected from 1989 through 1998 were used in the calculation. Parameters that were not detected above the practical quantitation limit (PQL) or method detection limit (MDL) were estimated by dividing the PQL or MDL in half. Temporary standards were determined numerically at three sampling stations in the District (CFY-2 on Fisher Creek, DC-5 on Daisy Creek, and SW-7 on the Stillwater River) in the rule adopted by the Board. Narrative standards apply at any other station in these three stream segments, and are calculated in the same manner as the numeric temporary standards.

Figure 2 shows the location of water quality monitoring stations in the District. For those stations affected by the temporary standards rule, temporary standards and narrative standards are shown in Table 2 and on Figures 3 through 6. Water quality data is shown graphically for these four stations on Figures 3 through 6 because these stations best represent the range in water quality on the portions of streams affected by the temporary standards rule. Copper, iron, and zinc were the parameters selected to present graphically on these figures, as these metals are the most robust of the parameters that are affected by temporary standards in depicting water quality changes.

In addition, at the request of John Koerth, the Project Coordinator for DEQ, statistics were calculated on two additional subsets of the available water quality data. Shown in yellow, gray, and blue bands for each sample station in Table 2 are the original calculation for the temporary standard that was included in the Support Document and Implementation Plan (yellow shading), a calculation of the mean and standard deviation for data collected since the temporary standards were requested (blue shading), and the mean and standard deviation for all data collected since 1989 (gray shading). It is evident from a cursory review of these data that, at most of the surface water sampling stations monitored, and for many of the parameters, the mean and standard deviation calculated for the most recently collected water quality data (blue shading) have decreased. However, a statistical evaluation of these data, using non-parametric methods and accounting for seasonality, does not demonstrate a statistical significance to the decreases. Water quality data are sensitive to a wide variety of environmental factors that could influence the decreases in concentrations, including changes in the timing and amount of precipitation, the timing and methods used to collect water samples, and diurnal variations in water quality. After a few more years of monitoring, the population of water quality data should be large enough to demonstrate a statistical significance in water quality changes.

Biological impairment of Fisher Creek, Daisy Creek, and the headwaters of the Stillwater River are not believed to have changed since the filing of the Support Document and Implementation Plan. Biological monitoring (macroinvertebrate and fisheries) is planned to follow completion of the McLaren Pit Response Action and the Glengarry Adit/Como Basin/Fisher Creek Response Action. Biological monitoring data will be used to determine if response action cleanups have improved conditions for aquatic life populations.



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MONTANA

Map Area

Data Source: Unimproved roads and surface water sample locations from Gallatin National Forest Interagency Spatial Analysis Center.

Cartographic feature files obtained from Montana State Library, Natural Resource Information System.

SW-2 ■	Long-Term Surface Water Quality Monitoring Station
	District Boundary
	Unimproved Road
	National Forest Boundary
	Wilderness Boundary

Long-Term Surface Water Quality Monitoring Stations
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 2

FISHER CREEK WATER QUALITY

Figure 3 shows temporary and chronic standards (WQB-7 standard for iron) and water quality data for copper, iron, and zinc at Station CFY-2, which is located at the mouth of Fisher Creek where the Clarks Fork of the Yellowstone River begins. Since the cleanup project began in 1999, no temporary standards have been exceeded at this station.

In terms of the B-1 standards, zinc concentrations are below both the chronic and acute aquatic standards, and copper concentrations have fallen below chronic aquatic standards during winter base flow conditions since 1999 at Station CFY-2. Copper exceeds acute and chronic aquatic standards during spring runoff at this station, when flows increase by 50 to 100 times and scoured sediments with high metals concentrations significantly impact water quality. During base flow conditions in the fall, only copper has exceeded acute or chronic aquatic standards. Aluminum exceeded chronic aquatic standards during high flow conditions in 1999 (Table 2), but did not exceed these standards in 2000 or 2001. Iron has been below the WQB-7 standard since 1994 at Station CFY-2 (Figure 3).

At Station SW-3, which is near the headwaters of Fisher Creek (Figure 2), zinc has exceeded the narrative standard on only two occasions since the standard was established, with both exceedences occurring during low flow periods (May 1999 and October 2000). No other exceedences of the temporary standards have been measured for any other parameters at this station. Figure 4 graphically shows the standards and water quality data for copper, iron, and zinc at Station SW-3.

For the B-1 standards, zinc has been measured at levels below the acute and chronic aquatic standard on numerous occasions. Aluminum, copper, and iron have exceeded acute and/or chronic aquatic standards since 1990. Water quality in Fisher Creek generally improves downstream, as shown in the lower concentrations measured at downstream Stations SW-4, CFY-2, and SW-6 (Table 2). At Station SW-4, which is located about 2.3 miles downstream of the Glengarry Adit (Figure 2), copper has exceeded acute aquatic standards since the project began in 1999, but zinc has exceeded acute aquatic standards only twice out of nine regularly scheduled monitoring events at this station since 1999 (Table 2).

STILLWATER RIVER WATER QUALITY

Figure 5 shows temporary standards, chronic standards, and water quality data for copper, iron, and zinc at Station SW-7 on the Stillwater River (Figure 2). Station SW-7 is located about 3.7 miles downstream of the McLaren Pit. No temporary standards have been exceeded at this station since the standards became effective in 1999.

For the B-1 standards, copper exceeded chronic and acute aquatic standards at this station during each of the three high flow events (June/July) monitored since 1999. Copper falls below the chronic aquatic standard generally during low flow conditions. Aluminum exceeded the chronic aquatic standard during each of the high flow events and one of the winter base flow events. Zinc concentrations have been lower than the acute/chronic aquatic standard at Station SW-7 since monitoring began in 1990, and iron concentrations have been lower than the chronic aquatic standard since the early ‘90s. During fall base flow at this station, there are no exceedences of aquatic criteria.

FIGURE 3
Copper, Iron, and Zinc Concentrations at Station CFY-2 - Fisher Creek

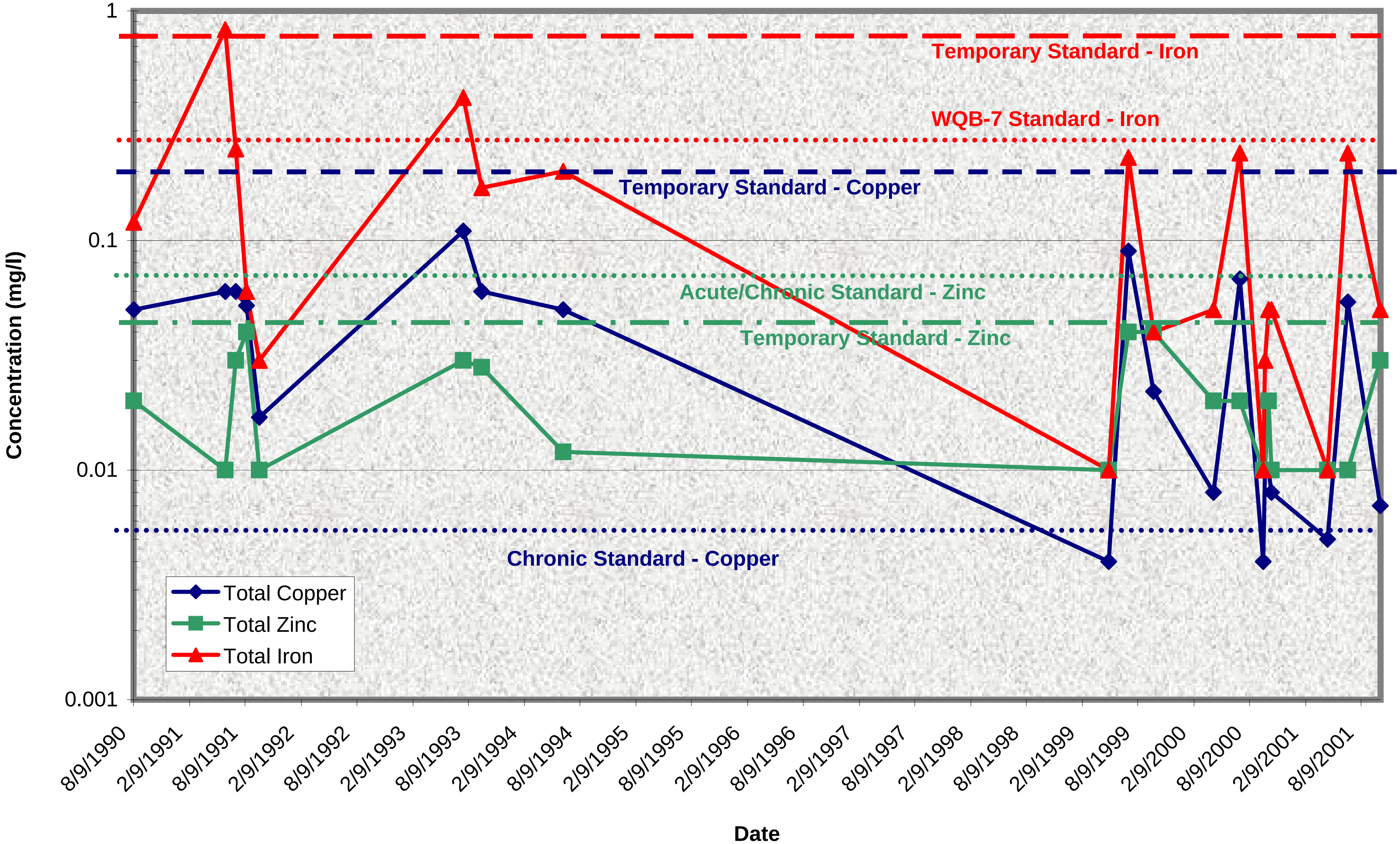


FIGURE 4
Copper, Iron, and Zinc Concentrations at Station SW-3 - Fisher Creek

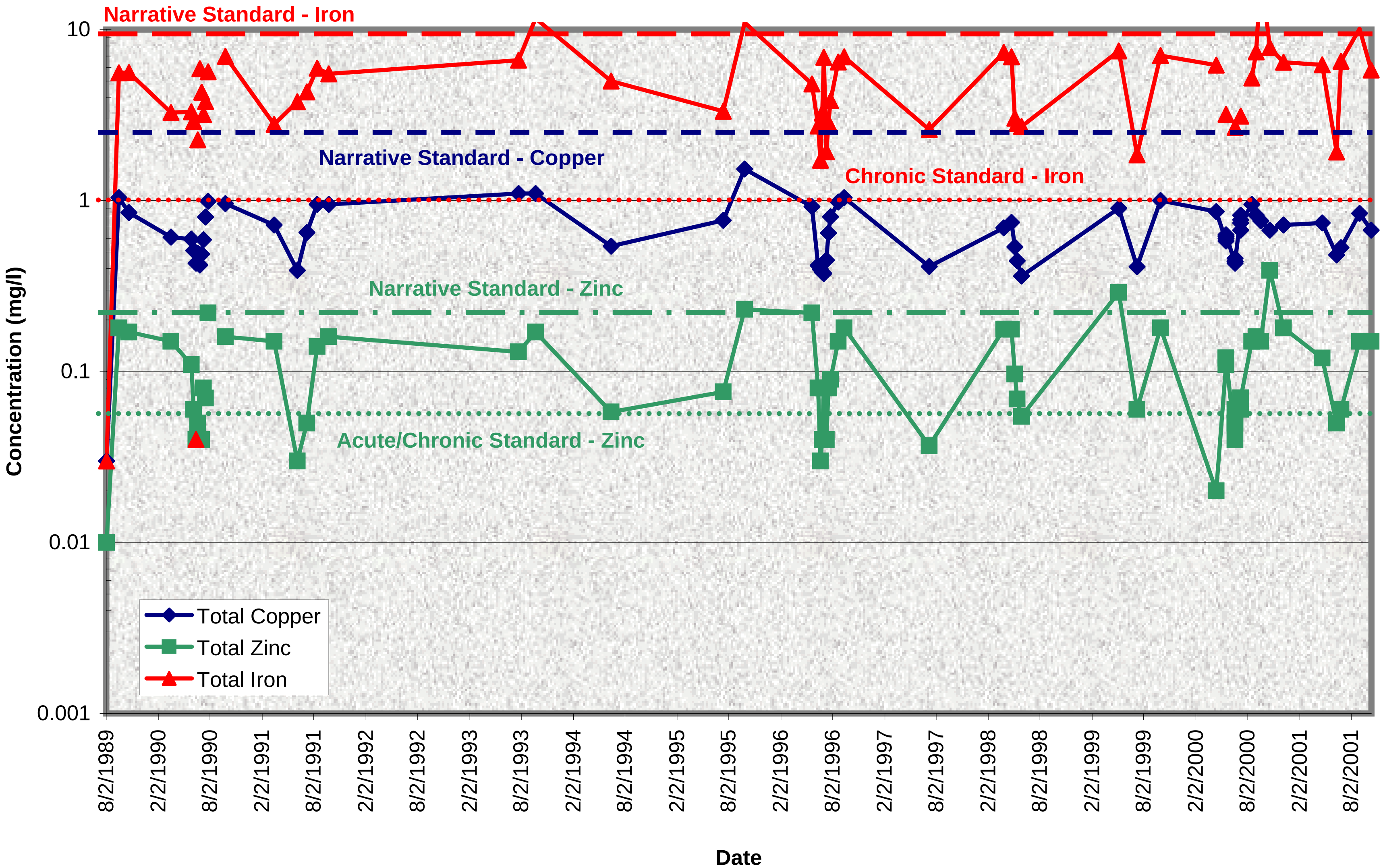
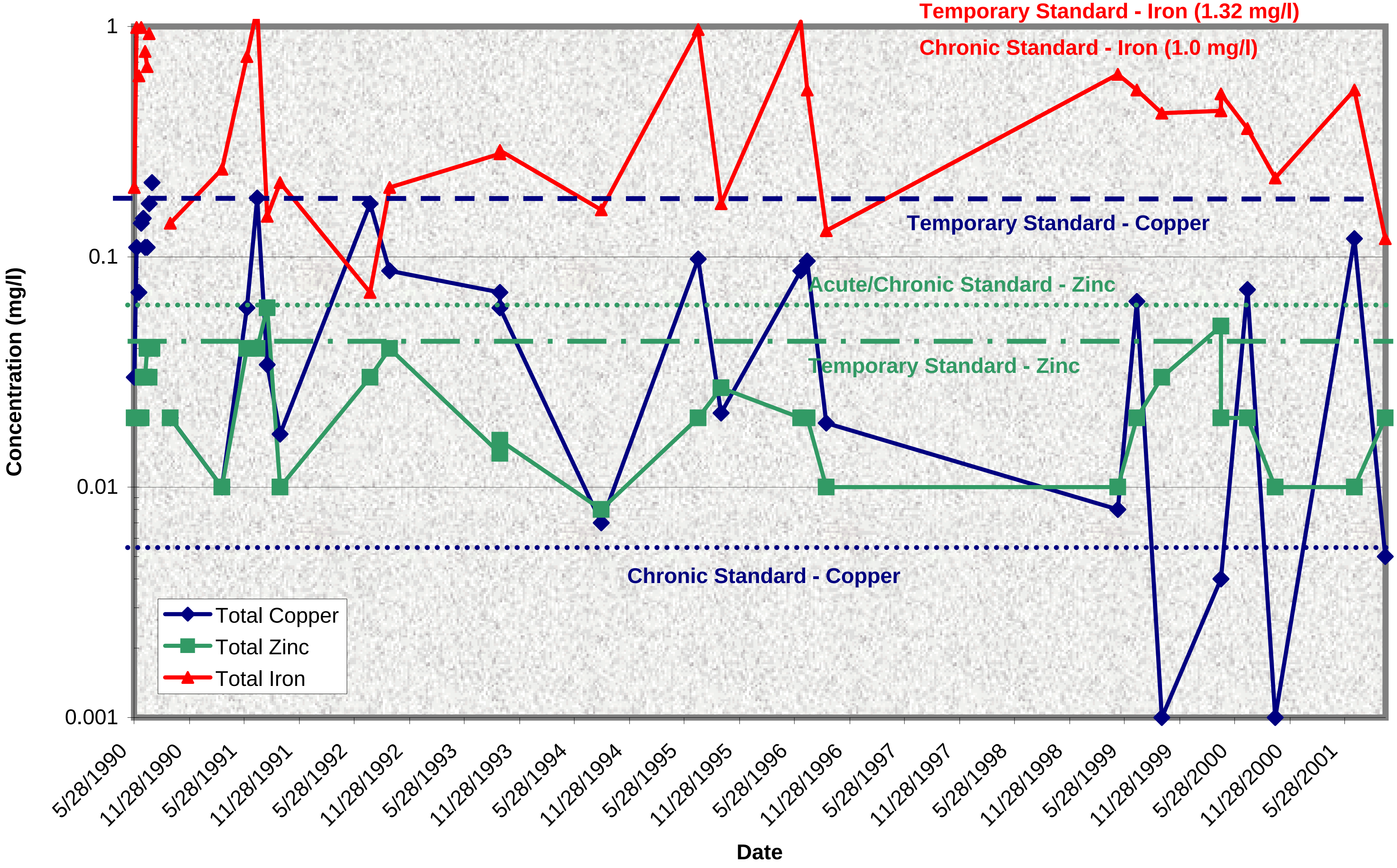


FIGURE 5
Copper, Iron, and Zinc Concentrations at Station SW-7 - Stillwater River



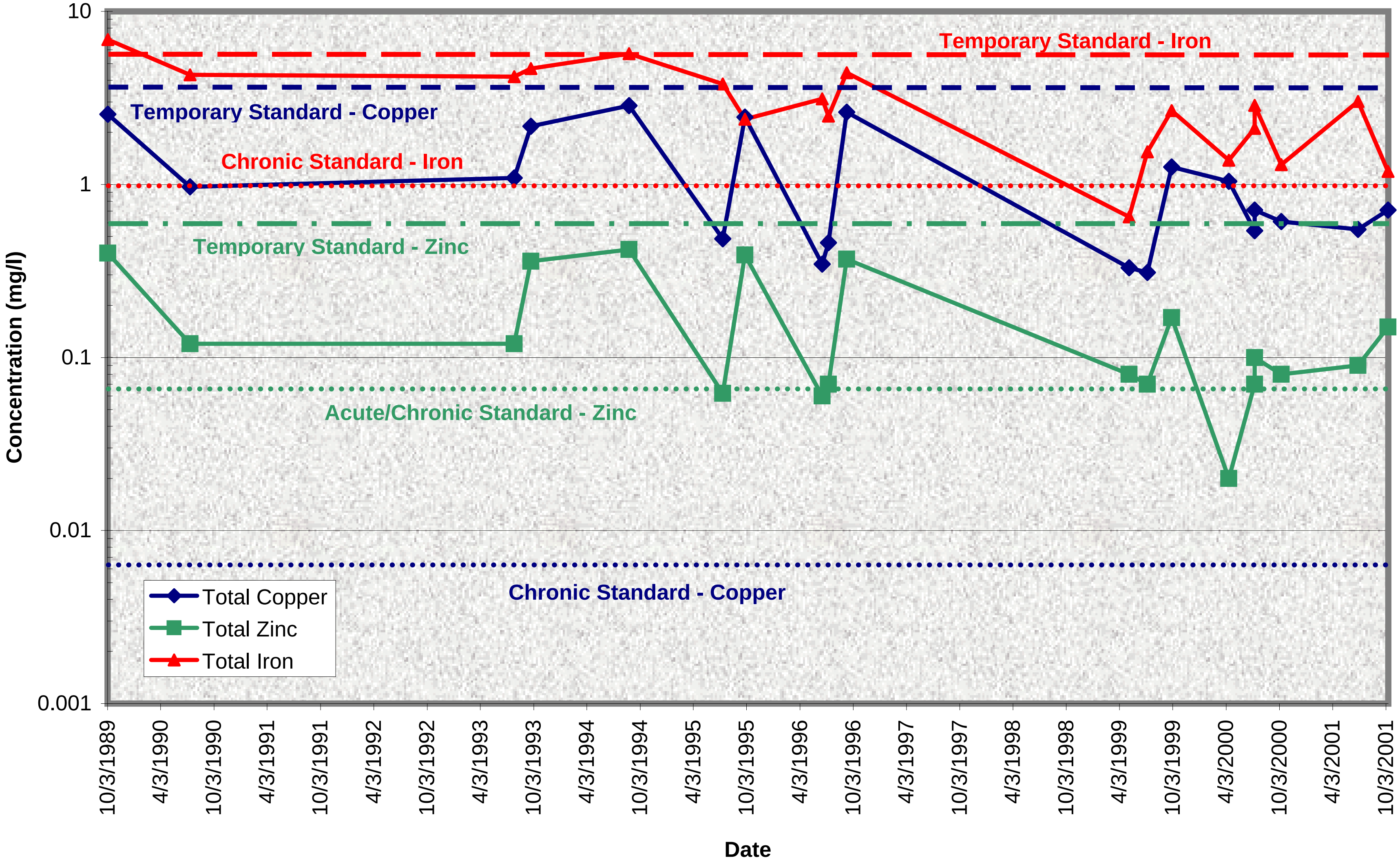
DAISY CREEK WATER QUALITY

Table 2 shows that all metal concentrations measured in samples collected from the two Daisy Creek stations (Stations DC-2 and DC-5) since 1999 were below both temporary and narrative water quality standards for the majority of the sampling events conducted and the parameters analyzed. The only exceptions occurred during the June 2001 event (lead was slightly above the narrative standard at Station DC-2) and during the October 2000 event (cadmium was slightly above the temporary standard at Station DC-5). Figure 6 shows temporary standards, acute/chronic aquatic standards, and water quality data for copper, iron, and zinc at Station DC-5.

In terms of the B-1 standards, aluminum, copper, and zinc have exceeded both acute and chronic aquatic standards during all monitoring events (except for zinc in April 2000) since 1999. Iron exceeds the chronic aquatic standard on a consistent basis at DC-5, and lead has exceeded the chronic aquatic standard on one occasion in the past three years. At Station DC-2, copper exceeds aquatic standards for all events. Iron exceeds the chronic aquatic standard all the time and lead has exceeded the chronic aquatic standard on most sampling events.

Review of Figure 6 and Table 2 shows metals concentrations at both stations DC-2 and DC-5 have declined since 1996. However, a statistical evaluation of these data, using non-parametric methods and accounting for seasonality, does not demonstrate a statistical significance to the decreases. Water quality data are sensitive to a wide variety of environmental factors that could influence the decreases in concentrations, including changes in the timing and amount of precipitation, the timing and methods used to collect water samples, and diurnal variations in water quality. After a few more years of monitoring, the population of water quality data should be large enough to demonstrate a statistical significance in water quality changes.

FIGURE 6
Copper, Iron, and Zinc Concentrations at Station DC-5 - Daisy Creek



REVISED CLEANUP SCHEDULE

The following revised schedule is anticipated for the remaining years of the project. The project is still expected to be completed within the eight year schedule developed in the Implementation Plan, but due to extending site characterization work for the Selective Source Response Action and the Glengarry Adit, cleanup work is delayed about one year. General elements of the Implementation Plan still apply.

2002
- ❖ Complete Glengarry/Como Basin/Fisher Creek EE/CA.
- ❖ Implement Phase I of McLaren Pit Response Action. Involves consolidating and grading McLaren Pit spoils and multicolor dump in pit area.
- ❖ Develop phased Response Action for Glengarry/Como Basin/Fisher Creek sources.
- ❖ Prepare internal review draft of Miller Creek EE/CA.

2003
- ❖ Construct Phase II of McLaren Pit Response Action. Involves installing soil cap and geocomposite liner on top of consolidated pit wastes.
- ❖ Implement Phase I of Response Action for Glengarry/Como Basin/Fisher Creek sources.
- ❖ Submit Miller Creek EE/CA for public review. Select preferred alternative for Miller Creek Response Action.
- ❖ Prepare internal review draft of EE/CA addressing acid mine drainage.

2004
- ❖ Implement Phase II of Response Action for Glengarry/Como Basin/Fisher Creek sources.
- ❖ Submit Acid Mine Drainage EE/CA for public review.
- ❖ Implement Miller Creek Response Action
- ❖ Develop Response Action for acid mine drainage sources and implement initial phase of work.
- ❖ Reopen the repository for remaining wastes in the District.

2005
- ❖ Implement remaining phases of acid mine drainage Response Action.
- ❖ Evaluate Response Actions

2006
- ❖ Other sources in District

SUMMARY

The rule adopting temporary standards in portions of Fisher Creek, Daisy Creek, and the Stillwater River has allowed the New World Response and Restoration Project to proceed with site characterization and cleanup actions on a defined schedule that will result in water quality improvement in the District over an eight year period. The original schedule presented in the Implementation Plan is delayed about one year, but cleanup actions are ongoing, and multiple Response Actions have been planned and will be implemented over the next three years. Cleanup activities should still be completed within the original eight year schedule.

Water quality improvements are beginning to be realized at the farthest downstream stations on the three streams, mainly as a result of reclamation work conducted by CBMI during the period between 1993 and 1995. With the initial cleanup activity completed by the Forest Service in 2001, and the McLaren Pit

Response Action due to start this year, additional water quality improvements are expected to be measured in the near future. No adjustment in the temporary standards is proposed as a result of cleanup progress realized during the first temporary water quality standards 3-year review period.

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ATTACHMENT A

WATER QUALITY DATA

Temporary Water Quality Standards 3-Year Review
New World Mining District Response and Restoration Project

TABLE 2 - WATER QUALITY DATA
TEMPORARY WATER QUALITY STANDARDS - 3-YEAR REVIEW
New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
CFY-2	08/09/90	Hydrometrics Data	0.69	6.8	0.1		0.0050	<	0.00100	<	0.0200	<	0.05		0.12		0.01	<	0.04		0.02	<
CFY-2	06/05/91	Hydrometrics Data	91.6	6.9	0.5		0.0010	<	0.00010	<	0.0200	<	0.06	<	0.83		0.002		0.03		0.01	<
CFY-2	07/09/91	Hydrometrics Data	4.7	7.1	0.1	<	0.0050	<	0.00020		0.0200	<	0.06		0.25			J	0.03		0.03	
CFY-2	08/13/91	Hydrometrics Data	2.4	7.6	0.1		0.0050	<	0.00020		0.0200	<	0.052		0.06		0.002	<	0.04		0.04	
CFY-2	09/24/91	Hydrometrics Data	1.4	7	0.1	<	0.0050	<	0.00010	<	0.0200	<	0.017		0.03	<	0.002	<	0.02	<	0.01	
CFY-2	07/23/93	Hydrometrics Data	17.03	7.1	0.3		0.0010	<	0.00010		0.0010	<	0.11		0.42		0.002	<	0.05		0.03	<
CFY-2	09/21/93	Hydrometrics Data	2.46	7.1	0.1		0.0010	<	0.00020		0.0010	<	0.06		0.17		0.002	<	0.09		0.028	
CFY-2	06/15/94	Hydrometrics Data	39.63	6.9	0.2		0.0010	<	0.00010	<	0.0010	<	0.05	J	0.2		0.002	<	0.03		0.012	J
CFY-2	05/06/99	Maxim	0.091	7.1	0.1	<			0.00010	<			0.004		0.01	<	0.001	<	0.005	<	0.01	<
CFY-2	07/09/99	Maxim	21.46	7.2	0.2				0.00010				0.09		0.23		0.001	<	0.019		0.04	
CFY-2	09/29/99	Maxim	2.071	6.9	0.1	<			0.00020				0.022		0.04		0.001	<	0.017		0.04	J
CFY-2	04/13/00	Maxim	0.658	6.9	0.05	<			0.00010	<			0.008		0.05	<	0.001	<	0.005	<	0.02	<
CFY-2	07/08/00	Maxim	20.55	6.8	0.2	J			0.00010	<			0.068	J	0.24	J	0.001	<	0.035	J	0.02	J
CFY-2	09/22/00	Maxim		7.1	0.1	<			0.00010	<			0.004		0.01		0.001	<	0.003	<	0.01	<
CFY-2	09/28/00	Maxim		7.1	0.1	<			0.00010	<			0.01		0.03		0.001	<	0.004		0.01	<
CFY-2	10/10/00	Maxim		7.3	0.1	<			0.00010	<			0.01		0.05	<	0.003	<	0.005	<	0.02	<
CFY-2	10/19/00	Maxim		6.8	0.1	<			0.00010	<			0.008		0.05	<	0.001	<	0.004		0.01	
CFY-2	04/21/01	Maxim	0.48	7.4	0.1	<			0.00010	<			0.005		0.01	<	0.001	<	0.003	<	0.01	
CFY-2	06/26/01	Maxim	30.66	7.5	0.1	<			0.00010				0.054		0.24		0.002	J	0.024		0.01	<
CFY-2	10/11/01	Maxim	0.49	7	0.1	<	0.0030	<	0.00010	<			0.007		0.05	<	0.001	<	0.003	<	0.03	J
Station CFY-2: Pre-1999 Samples (n)			8	8	8		8		8		8		8		8		7		8		8	
Minimum			0.690	6.800	0.050		0.0005		0.00005		0.0005		0.017		0.015		0.001		0.010		0.005	
Maximum			91.600	7.600	0.500		0.0025		0.00050		0.0100		0.110		0.830		0.005		0.090		0.040	
Mean			19.989	7.063	0.175		0.0015		0.00017		0.0064		0.054		0.258		0.002		0.040		0.019	
Standard Deviation (SD)			31.828	0.245	0.156		0.0011		0.00015		0.0049		0.027		0.262		0.001		0.023		0.012	
Mean + (2 x SD); for pH: Mean - (2 x SD)			83.644	6.573	0.487		0.0036		0.00047		0.0163		0.108		0.783		0.005		0.087		0.043	
Station CFY-2: 1989-2001 Samples (n)			16	20	20		9		20		8		20		20		19		20		20	
Minimum			0.091	6.800	0.025		0.0005		0.00005		0.0005		0.004		0.005		0.001		0.002		0.005	
Maximum			91.600	7.600	0.500		0.0025		0.00050		0.0100		0.110		0.830		0.005		0.090		0.040	
Mean			14.773	7.080	0.114		0.0015		0.00011		0.0064		0.036		0.148		0.001		0.022		0.017	
Standard Deviation (SD)			0.228	0.228	0.117		0.0010		0.00011		0.0049		0.032		0.198		0.001		0.023		0.013	
Mean + (2 x SD); for pH: Mean - (2 x SD)			15.230	6.623	0.347		0.0035		0.00033		0.0163		0.099		0.545		0.003		0.067		0.043	
Station CFY-2: 1999-2001 Samples (n)			8	12	12		1		12		0		12		12		12		12		12	
Minimum			0.091	6.800	0.025		0.0015		0.00005		0.0000		0.004		0.005		0.001		0.002		0.005	
Maximum			30.660	7.500	0.200		0.0015		0.00020		0.0000		0.090		0.240		0.002		0.035		0.040	
Mean			9.558	7.092	0.073		0.0015		0.00007				0.024		0.075		0.001		0.010		0.016	
Standard Deviation (SD)			12.520	0.227	0.060				0.00005				0.029		0.098		0.000		0.011		0.013	
Mean + (2 x SD); for pH: Mean - (2 x SD)			34.598	6.637	0.192				0.00016				0.083		0.271		0.002		0.032		0.043	
Temporary Standard - CFY-2				5.7	0.47		NA		NA		NA		0.11		0.75		0.002		0.082		0.044	

Notes: mg/l = milligrams/liter; su = standard units
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TABLE 2 - WATER QUALITY DATA
TEMPORARY WATER QUALITY STANDARDS - 3-YEAR REVIEW
New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
DC-2	10/03/89	Hydrometrics Data	0.2	2.9			0.0050	<	0.00100	<			7.89		28.26				3.37		1.03	
DC-2	07/12/90	Hydrometrics Data	4.39	3.6	7.2		0.0050	<	0.00500				2.74		17.9				0.71		0.31	
DC-2	06/15/94	Hydrometrics Data	2.86	3.7	9		0.0010	<	0.00210		0.0040		2.64	J	10.4		0.003		1.08		0.332	J
DC-2	07/26/94	Hydrometrics Data		3.6	16.4		0.0010	<	0.00540		0.0050		5.32		15.8		0.009		2.57		0.667	
DC-2	08/22/94	Hydrometrics Data		3.1	28.6		0.0020		0.00760		0.0100		8.26		41.8		0.024		3.65		0.904	
DC-2	08/23/94	Hydrometrics Data		3.4	23.9		0.0010	<	0.00740		0.0060		7.27		20.4		0.006		3.43		0.886	
DC-2	09/20/94	Hydrometrics Data			25		0.0010	<	0.00760		0.0070		7.44		23.6		0.004		3.59		1.2	J
DC-2	10/13/94	Hydrometrics Data		3.2																		
DC-2	09/26/95	Hydrometrics Data	0.194	3.3	22		0.0010	<	0.00520		0.0060		6.33		16.2		0.005		2.99		0.894	
DC-2	05/21/96	Hydrometrics Data	0.467	4	8.3				0.00270				1.91		5.55		0.004		1.12		0.43	
DC-2	05/30/96	Hydrometrics Data	1.116	4	6.9				0.00190				1.62		5.52		0.004		0.785		0.31	
DC-2	06/05/96	Hydrometrics Data	2.79	3.3	7				0.00140				1.83		19.3		0.008		0.629		0.24	
DC-2	06/12/96	Hydrometrics Data	10.8	4.1									1.25		10.7	J					0.21	J
DC-2	06/18/96	Hydrometrics Data	14.33	4.5	5				0.00120				1.44		9.69		0.003	<	0.481		0.19	
DC-2	06/26/96	Hydrometrics Data	11.3	4.5									1.52		8.54						0.19	
DC-2	07/02/96	Hydrometrics Data	13.79	5									1.38		6.76						0.24	J
DC-2	07/09/96	Hydrometrics Data	15.48	4.4	4.2	J			0.00080				1.11		8.05		0.01		0.379		0.15	
DC-2	07/18/96	Hydrometrics Data	4.937	3.9									2.23		8						0.33	
DC-2	07/25/96	Hydrometrics Data	1.175	4.1									2.7		9.84						0.39	
DC-2	08/21/96	Hydrometrics Data	0.138	3.3									4.74		15.4						0.64	
DC-2	09/10/96	Hydrometrics Data	0.18	3.1	20.2				0.00580				6.22		15.6		0.006		2.72		0.89	
DC-2	07/09/97	UOS Data			3.27		0.0100	<	0.00500	<	0.0100	<	0.876		5.32				0.304		0.129	
DC-2	03/30/98	UOS Data	0.13	4.2	12.3								2.69		12.8				2.14		0.688	
DC-2	04/22/98	UOS Data	0.072	4.3	12.1								2.66		11.2				1.95		0.589	
DC-2	05/04/98	UOS Data	0.699	4	5.4								1.23		6.43				0.574		0.162	
DC-2	05/29/98	UOS Data	2.67	3.6	5.34								1.47		10				0.592		0.22	
DC-2	05/06/99	Maxim	0.028	4.5	9.2				0.00380				1.94		16		0.006		1.61		0.51	
DC-2	07/08/99	Maxim	9.46	5.2	3.7				0.00120				1.07		4.83		0.002		0.37		0.15	
DC-2	09/29/99	Maxim	0.464	3.8	12.4				0.00440				3.98		13.6		0.002		1.93		0.6	J
DC-2	04/12/00	Maxim	0.012	4.5	10.7				0.00560				2.51		13.5		0.004		2.02		0.02	<
DC-2	05/20/00	Maxim	1.57	4									1.42								0.19	
DC-2	05/20/00	Maxim	1.57	3.9									1.44								0.19	
DC-2	05/20/00	Maxim	1.61	4									1.89								0.26	
DC-2	05/20/00	Maxim	2.61	3.9	5.5				0.00110				1.34		14.4		0.007		0.6		0.17	
DC-2	06/14/00	Maxim	5.16	4.4									1.59								0.24	
DC-2	06/14/00	Maxim	6.07	4.4									1.64								0.24	
DC-2	06/14/00	Maxim	6.44	4.3									1.61								0.22	
DC-2	06/14/00	Maxim	7.66	4.2	4.7				0.00140				1.43		8.26		0.002		0.5		0.2	
DC-2	07/09/00	Maxim	3.5	4.8									1.59	J							0.23	J
DC-2	07/09/00	Maxim	2.4	4.7	6.1	J			0.00190				2.01	J	8.55	J	0.003		0.72	J	0.26	J
DC-2	07/09/00	Maxim	2.83	4.6									2.04	J							0.28	J
DC-2	07/09/00	Maxim	3.35	4.8									1.75	J							0.26	J
DC-2	10/09/00	Maxim	0.2	4.1	14				0.00450				3.77		6.54	J	0.007		2.23		0.54	
DC-2	04/20/01	Maxim	0.15	4.3	11.1				0.00370				2.2		10.8		0.004		1.66		0.37	
DC-2	06/29/01	Maxim	3.217	5	5.5				0.00170				1.34		10.3		0.022	J	0.63		0.29	
DC-2	10/10/01	Maxim	0.17	4	17.1		0.0030	<	0.00540				4.15		14.5		0.007		2.62		0.79	

Notes: mg/l = milligrams/liter; su = standard units
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TABLE 2 - WATER QUALITY DATA
TEMPORARY WATER QUALITY STANDARDS - 3-YEAR REVIEW
New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
Station DC-2: Pre-1999 Samples (n)			20	24	18		15		15		7		25		25		12		19		25	
Minimum			0.072	2.900	3.270		0.0005		0.00050		0.0040		0.876		5.320		0.002		0.304		0.129	
Maximum			15.480	5.000	28.600		0.0050		0.00760		0.0100		8.260		41.800		0.024		3.650		1.200	
Mean			4.386	3.796	12.339		0.0015		0.00381		0.0061		3.391		13.722		0.007		1.740		0.489	
Standard Deviation (SD)			5.453	0.539	8.194		0.0013		0.00259		0.0020		2.458		8.361		0.006		1.252		0.322	
Mean + (2 x SD); for pH: Mean - (2 x SD)			15.292	2.717	28.728		0.0041		0.00898		0.0100		8.307		30.445		0.019		4.244		1.133	
Station DC-2: 1989-2001 Samples (n)			40	44	29		16		26		7		45		36		23		30		45	
Minimum			0.012	2.900	3.270		0.0005		0.0005		0.0040		0.876		4.830		0.002		0.304		0.010	
Maximum			15.480	5.200	28.600		0.0050		0.0076		0.0100		8.260		41.800		0.024		3.650		1.200	
Mean			3.655	4.057	11.107		0.0015		0.0035		0.0061		2.788		12.898		0.007		1.598		0.405	
Standard Deviation (SD)			4.329	0.555	7.077		0.0013		0.0022		0.0020		2.027		7.304		0.006		1.110		0.282	
Mean + (2 x SD); for pH: Mean - (2 x SD)			12.312	2.948	25.262		0.0041		0.0080		0.0100		6.842		27.507		0.018		3.819		0.969	
Station DC-2: 1999-2001 Samples (n)			20	20	11		1		11		0		20		11		11		11		20	
Minimum			0.012	3.800	3.700		0.0015		0.00110		0.0000		1.070		4.830		0.002		0.370		0.010	
Maximum			9.460	5.200	17.100		0.0015		0.00560		0.0000		4.150		16.000		0.022		2.620		0.790	
Mean			2.924	4.370	9.091		0.0015		0.00315				2.036		11.025		0.006		1.354		0.300	
Standard Deviation (SD)			2.757	0.393	4.346				0.00173				0.899		3.658		0.006		0.806		0.180	
Mean + (2 x SD); for pH: Mean - (2 x SD)			8.437	3.583	17.784				0.00661				3.834		18.342		0.017		2.966		0.661	
Narrative Standard - DC-2				**2.7**	**28.4**		**NA**		**0.009**		**NA**		**8.064**		**29.649**		**0.018**		**4.088**		**1.104**	

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TABLE 2 - WATER QUALITY DATA
TEMPORARY WATER QUALITY STANDARDS - 3-YEAR REVIEW
New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
DC-5	10/03/89	Hydrometrics Data	0.37	5.2			0.0050	<	0.00300				2.54		6.88				1.16		0.4	
DC-5	07/12/90	Hydrometrics Data	8.91	7.2	2.7		0.0050	<	0.00100	<			0.97		4.3				0.28		0.12	
DC-5	07/28/93	Hydrometrics Data		7.2	3.2		0.0020	<	0.00100	<	0.0020		1.09		4.19		0.002		0.35		0.12	
DC-5	09/23/93	Hydrometrics Data	0.54	5.8	5.3		0.0010	<	0.00230		0.0020		2.17		4.68		0.002		1.2		0.36	
DC-5	08/25/94	Hydrometrics Data	0.24	5.6	8.1	J	0.0010	<	0.00270		0.0020		2.85	J	5.7	J	0.002		1.23		0.42	
DC-5	07/13/95	Hydrometrics Data	30.43	6.5	2		0.0010	<	0.00050		0.0020		0.485	J	3.8	J	0.003		0.18		0.062	
DC-5	09/27/95	Hydrometrics Data	0.42	5.4	7.7		0.0010	<	0.00230		0.0020		2.45		2.38		0.003		1.18		0.391	
DC-5	06/18/96	Hydrometrics Data	30.74	5.8	1.4				0.00040				0.346		3.12		0.003	<	0.143		0.06	
DC-5	07/09/96	Hydrometrics Data	28.14	5.8	1.7	J			0.00040				0.46		2.48		0.003	<	0.166		0.07	
DC-5	09/10/96	Hydrometrics Data	0.312	5.4	7.2				0.00230				2.62		4.42		0.003	<	1.08		0.37	
DC-5	05/06/99	Maxim	1.18	7.6	1.4				0.00060				0.33		0.65		0.001		0.25		0.08	
DC-5	07/08/99	Maxim	23.83	7.7	1.2				0.00040				0.31		1.54		0.001		0.124		0.07	
DC-5	09/29/99	Maxim	1.484	7.5	4				0.00120				1.26		2.67		0.002		0.5		0.17	J
DC-5	04/12/00	Maxim	0.429	7.6	2.9				0.00140				1.04		1.38		0.004		0.041		0.02	<
DC-5	07/09/00	Maxim	8.9	7.2	1.6	J			0.00050				0.54	J	2.11	J	0.001	<	0.19	J	0.07	J
DC-5	07/09/00	Maxim		7	2.2				0.00040				0.71		2.86		0.001	<	0.26		0.1	
DC-5	10/09/00	Maxim	1.2	7.5	2.7				0.00460				0.61		1.3	J	0.003	<	0.23		0.08	
DC-5	06/29/01	Maxim	5.107	7.7	1.8				0.00060				0.55		3.02		0.002	J	0.21		0.09	
DC-5	10/10/01	Maxim	0.34	7.3	3.5		0.0030	<	0.00100				0.71		1.19		0.003		0.41		0.15	
Station DC-5: Pre-1999 Samples (n)			9	10	9		7		10		5		10		10		8		10		10	
Minimum			0.240	5.200	1.400		0.0005		0.00040		0.0020		0.346		2.380		0.002		0.143		0.060	
Maximum			30.740	7.200	8.100		0.0025		0.00300		0.0020		2.850		6.880		0.003		1.230		0.420	
Mean			11.122	5.990	4.367		0.0011		0.00149		0.0020		1.598		4.195		0.002		0.697		0.237	
Standard Deviation (SD)			14.272	0.728	2.729		0.0009		0.00111		0.0000		1.017		1.387		0.001		0.504		0.161	
Mean + (2 x SD); for pH: Mean - (2 x SD)			39.667	4.534	9.826		0.0030		0.00370		0.0020		3.632		6.969		0.003		1.704		0.560	
Station DC-5: 1989-2001 Samples (n)			17	19	18		8		19		5		19		19		17		19		19	
Minimum			0.240	5.200	1.200		0.0005		0.0004		0.0020		0.310		0.650		0.001		0.041		0.010	
Maximum			30.740	7.700	8.100		0.0025		0.0046		0.0020		2.850		6.880		0.004		1.230		0.420	
Mean			8.387	6.684	3.367		0.0012		0.0013		0.0020		1.160		3.088		0.002		0.483		0.168	
Standard Deviation (SD)			0.925	2.238	2.238		0.0009		0.0012		0.0000		0.886		1.647		0.001		0.434		0.140	
Mean + (2 x SD); for pH: Mean - (2 x SD)			10.237	2.207	7.844		0.0030		0.0037		0.0020		2.932		6.382		0.004		1.352		0.448	
Station DC-5: 1999-2001 Samples (n)			8	9	9		1		9		0		9		9		9		9		9	
Minimum			0.340	7.000	1.200		0.0015		0.00040		0.0000		0.310		0.650		0.001		0.041		0.010	
Maximum			23.830	7.700	4.000		0.0015		0.00460		0.0000		1.260		3.020		0.004		0.500		0.170	
Mean			5.309	7.456	2.367		0.0015		0.00119				0.673		1.858		0.002		0.246		0.091	
Standard Deviation (SD)			8.045	0.240	0.973				0.00133				0.310		0.838		0.001		0.138		0.047	
Mean + (2 x SD); for pH: Mean - (2 x SD)			21.398	6.975	4.313				0.00385				1.293		3.535		0.004		0.523		0.185	
Temporary Standard - DC-5				4.6	9.51		NA		0.004		NA		3.53		6.83		NA		1.71		0.54	

Notes: mg/l = milligrams/liter; su = standard units
n = number of samples
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J = estimated value
NA - not applicable

TABLE 2 - WATER QUALITY DATA
TEMPORARY WATER QUALITY STANDARDS - 3-YEAR REVIEW
New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
SW-3	08/02/89	Hydrometrics Data			0.1	<	0.0050	<	0.00100	<			0.03		0.03	<	0.01	<	0.11		0.01	
SW-3	09/15/89	Hydrometrics Data	0.36	3.2	3.7		0.0050	<	0.00100	<			1.04		5.58		0.01	<	1.24		0.18	
SW-3	10/20/89	Hydrometrics Data	0.26	3.5	3.7		0.0050	<	0.00100	<			0.85		5.59		0.01	<	1.23		0.17	
SW-3	03/17/90	Hydrometrics Data	0.25	3.6	2.2		0.0050	<	0.00100	<			0.61		3.27		0.01	<	1		0.15	
SW-3	05/28/90	Hydrometrics Data	0.9	3.7	3		0.0050	<	0.00040		0.0200	<	0.593		3.3		0.003		0.49		0.11	
SW-3	06/05/90	Hydrometrics Data	5.75	3.7	2.1								0.51		2.9						0.06	
SW-3	06/06/90	Hydrometrics Data	4.9																			
SW-3	06/13/90	Hydrometrics Data	4.54	3.8	1.8								0.43		0.04						0.04	
SW-3	06/15/90	Hydrometrics Data	3.4																			
SW-3	06/20/90	Hydrometrics Data	6.15	3.9	1.8				0.00200		0.0200	<	0.49		2.26		0.01	<	0.23		0.05	
SW-3	06/22/90	Hydrometrics Data	13.2																			
SW-3	06/27/90	Hydrometrics Data	17.89	4	1.7		0.0050	<	0.00010		0.0200	<	0.419		5.89		0.004		0.16		0.04	
SW-3	06/28/90	Hydrometrics Data	16.25																			
SW-3	07/03/90	Hydrometrics Data	14.9	3.8	1.6				0.00100	<	0.0200	<	0.486		4.3		0.01	<	0.19		0.04	
SW-3	07/05/90	Hydrometrics Data	9.74																			
SW-3	07/10/90	Hydrometrics Data	3.9	3.7	1.7				0.00100	<	0.0200	<	0.59		3.18		0.01	<	0.27		0.08	
SW-3	07/12/90	Hydrometrics Data	3.2	3.7																		
SW-3	07/17/90	Hydrometrics Data	2.3	3.6	2								0.8		3.79						0.07	
SW-3	07/19/90	Hydrometrics Data	2.3	3.5																		
SW-3	07/26/90	Hydrometrics Data	1.6	3.6	2.6		0.0050	<	0.00040		0.0200	<	0.99		5.66		0.003		0.56		0.22	
SW-3	08/23/90	Hydrometrics Data	0.6	3.5																		
SW-3	09/25/90	Hydrometrics Data	0.4	3.4	3.3		0.0050	<	0.00090		0.0200	<	0.96		6.98		0.007		1.29		0.16	
SW-3	03/15/91	Hydrometrics Data	0.2	2.4	2.7		0.0050	<	0.00100	<	0.0200	<	0.72		2.79		0.01	<	0.89		0.15	
SW-3	06/05/91	Hydrometrics Data	7	3.5	1.1		0.0010	<	0.00010		0.0200	<	0.39		3.78		0.002		0.16		0.03	
SW-3	07/09/91	Hydrometrics Data	3	3.8	1.46		0.0050	<	0.00180	J	0.0200	<	0.65		4.32		0.002	J	0.29		0.05	
SW-3	08/14/91	Hydrometrics Data	0.5	3.5	2.9		0.0050	<	0.00070		0.0200		0.95		5.93		0.004		0.93		0.14	
SW-3	09/24/91	Hydrometrics Data	0.2	3.5	4.3		0.0050	<	0.00220		0.0200	<	0.95		5.51		0.006		1.26		0.16	
SW-3	07/23/93	Hydrometrics Data	2.36		3.3		0.0010		0.00040		0.0030		1.1		6.62		0.002	<	0.56		0.13	
SW-3	09/21/93	Hydrometrics Data	0.38	3.2	3.8		0.0010	<	0.00100		0.0010	<	1.1		11.6		0.009		1.67		0.17	
SW-3	06/14/94	Hydrometrics Data	5.42	3.8	2.6		0.0010	<	0.00030		0.0010	<	0.54	J	5		0.007		0.29		0.058	J
SW-3	07/14/95	Hydrometrics Data	7.29	3.7	2.5		0.0020		0.00040		0.0010		0.766	J	3.32	J	0.008		0.41		0.076	
SW-3	09/27/95	Hydrometrics Data	0.31	3.2	4.8		0.0010	<	0.00090		0.0010		1.53		11		0.008		1.66		0.231	
SW-3	05/21/96	Hydrometrics Data		3.2	4.3				0.00100				0.92		4.8		0.006		0.891		0.22	
SW-3	06/12/96	Hydrometrics Data	9.04	3.6									0.417		2.73	J					0.08	J
SW-3	06/20/96	Hydrometrics Data	7.795	4.1	1.6				0.00020				0.395		1.72		0.003	<	0.167		0.03	
SW-3	06/26/96	Hydrometrics Data	12.65	4									0.381		3.25						0.04	
SW-3	07/02/96	Hydrometrics Data	15.9	4									0.374		6.88						0.08	J
SW-3	07/11/96	Hydrometrics Data	9.18	3.8	1.3	J			0.00010				0.448		1.93		0.003	<	0.163		0.04	
SW-3	07/18/96	Hydrometrics Data	5.644	3.3									0.646		2.84						0.08	<
SW-3	07/25/96	Hydrometrics Data	6.767	3.4									0.803		3.83						0.09	
SW-3	08/21/96	Hydrometrics Data	2.552	3.3									0.98		6.46						0.15	
SW-3	09/11/96	Hydrometrics Data	0.38	3.1	3.5				0.00090	JS			1.04		6.91		0.008		1.32		0.18	
SW-3	07/08/97	UOS Data			1.81		0.0100	<	0.00500	<	0.0100	<	0.411		2.6				0.165		0.0368	
SW-3	03/27/98	UOS Data	0.17	3.3	3.15								0.691		7.35				1.31		0.177	
SW-3	04/23/98	UOS Data	0.112	3.5	3.08								0.745		6.92				1.26		0.177	
SW-3	05/05/98	UOS Data	0.217	3.6	2.51								0.535		3.03				0.502		0.0965	
SW-3	05/13/98	UOS Data	4.783	3.7	2.26								0.443		2.82				0.348		0.0689	
SW-3	05/29/98	UOS Data	2.172	3.9	1.77								0.361		2.71				0.231		0.0547	
SW-3	05/06/99	Maxim	0.2244	3.4	3.9				0.00110				0.9		7.49		0.007		1.35		0.29	
SW-3	07/09/99	Maxim	7.53	4.2	1.5				0.00020				0.41		1.85		0.002		0.162		0.06	

Notes: mg/l = milligrams/liter; su = standard units
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TABLE 2 - WATER QUALITY DATA
TEMPORARY WATER QUALITY STANDARDS - 3-YEAR REVIEW
New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
SW-3	09/30/99	Maxim	0.306	3.3	3.1				0.00050				1		7.03		0.002		1.3		0.18	J
SW-3	04/13/00	Maxim	0.055	3.4	3.2				0.00140				0.86		6.2		0.008		1.32		0.02	<
SW-3	05/18/00	Maxim	0.935	3.5									0.58								0.11	
SW-3	05/18/00	Maxim	0.797	3.5									0.62								0.12	
SW-3	05/18/00	Maxim	1.04	3.5	2.5				0.00040				0.6		3.19		0.003		0.56		0.12	
SW-3	05/18/00	Maxim		3.5									0.62								0.12	
SW-3	05/18/00	Maxim	0.809	3.5									0.63								0.12	
SW-3	06/18/00	Maxim	7.18	3.9	1.8				0.00020				0.43		2.67		0.003		0.18		0.04	
SW-3	06/18/00	Maxim	6.37	3.9									0.46								0.05	
SW-3	06/18/00	Maxim	6.24	3.9									0.44								0.05	
SW-3	06/18/00	Maxim	5.52	3.9									0.44								0.06	
SW-3	07/08/00	Maxim	3.02	3.7									0.82	J							0.07	J
SW-3	07/08/00	Maxim	3.03	3.7	2	J			0.00010	<			0.67	J	3.11	J	0.002		0.37	J	0.06	J
SW-3	07/08/00	Maxim	3.16	3.7									0.77	J							0.07	J
SW-3	07/08/00	Maxim	3.3	3.7									0.74	J							0.07	J
SW-3	08/16/00	Maxim			2.8				0.00110				0.95		5.21		0.007		1.06		0.15	
SW-3	09/01/00	Maxim		3.4	2.8				0.00060				0.82		7.38		0.005		1.11		0.16	
SW-3	09/17/00	Maxim			3.1								0.76		22		0.003		1.5		0.15	
SW-3	10/19/00	Maxim		2.9	2.9				0.00010	<			0.67		7.84	J	0.007		1.29		0.39	
SW-3	12/06/00	Maxim		3.3	3				0.00100				0.72		6.44		0.007		1.25		0.18	
SW-3	04/21/01	Maxim	0.103	3.4	2.6				0.00100				0.74		6.21		0.006		1.12		0.12	
SW-3	06/11/01	Maxim		3.9	1.7		0.0030	<	0.00010	<			0.48		1.92		0.003	<	0.2		0.05	J
SW-3	06/26/01	Maxim	4.208	3.7	2.5				0.00030				0.53		6.53		0.007	J	0.31		0.06	
SW-3	08/31/01	Maxim	0.29	3.3	2.7				0.00560				0.84		10.1		0.012		1.17		0.15	
SW-3	10/11/01	Maxim	0.27	3.5	2.4		0.0030	<	0.00110				0.67		5.79		0.004		0.87		0.15	
Station SW-3: Pre-1999 Samples (n)			45	40	34		19		26		18		40		40		25		31		40	
Minimum			0.112	2.400	0.050		0.0005		0.00010		0.0005		0.030		0.015		0.001		0.110		0.010	
Maximum			17.890	4.100	4.800		0.0050		0.00250		0.0200		1.530		11.600		0.009		1.670		0.231	
Mean			4.818	3.565	2.529		0.0021		0.00076		0.0078		0.677		4.485		0.005		0.685		0.103	
Standard Deviation (SD)			4.991	0.315	1.041		0.0011		0.00065		0.0050		0.291		2.446		0.002		0.507		0.063	
Mean + (2 x SD); for pH: Mean - (2 x SD)			14.800	2.935	4.611		0.0043		0.00207		0.0179		1.258		9.377		0.009		1.700		0.229	
Station SW-3: 1989-2001 Samples (n)			65	65	51		21		42		18		67		57		42		48		67	
Minimum			0.055	2.400	0.050		0.0005		0.0001		0.0005		0.030		0.015		0.001		0.110		0.010	
Maximum			17.890	4.200	4.800		0.0050		0.0056		0.0200		1.530		22.000		0.012		1.670		0.390	
Mean			4.172	3.572	2.559		0.0020		0.0008		0.0078		0.675		5.094		0.005		0.758		0.109	
Standard Deviation (SD)			0.299	0.912	0.914		0.0011		0.0010		0.0050		0.247		3.333		0.002		0.502		0.070	
Mean + (2 x SD); for pH: Mean - (2 x SD)			4.770	1.749	4.387		0.0042		0.0027		0.0179		1.169		11.761		0.010		1.761		0.250	
Station SW-3: 1999-2001 Samples (n)			20	25	17		2		16		0		27		17		17		17		27	
Minimum			0.055	2.900	1.500		0.0015		0.00005		0.0000		0.410		1.850		0.002		0.162		0.010	
Maximum			7.530	4.200	3.900		0.0015		0.00560		0.0000		1.000		22.000		0.012		1.500		0.390	
Mean			2.719	3.584	2.618		0.0015		0.00092				0.673		6.527		0.005		0.890		0.117	
Standard Deviation (SD)			2.624	0.276	0.611		0.0000		0.00133				0.168		4.604		0.003		0.478		0.081	
Mean + (2 x SD); for pH: Mean - (2 x SD)			7.967	3.031	3.839		0.0015		0.00357				1.008		15.734		0.011		1.846		0.278	
Narrative Standard - SW-3				**2.1**	**4.54**		**NA**		**0.002**		**NA**		**1.256**		**9.259**		**0.01**		**1.718**		**0.225**	

Notes: mg/l = milligrams/liter; su = standard units
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TABLE 2 - WATER QUALITY DATA
TEMPORARY WATER QUALITY STANDARDS - 3-YEAR REVIEW
New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
SW-6	10/02/89	Hydrometrics Data	4	6.7			0.0050	<	0.00100	<			0.01	<	0.03	<			0.02	<	0.01	
SW-6	10/20/89	Hydrometrics Data	4.52	7.2	0.1	<	0.0050	<	0.00100	<			0.01	<	0.03	<	0.01	<	0.02	<	0.01	
SW-6	05/29/90	Hydrometrics Data	102.1	7.2	0.2		0.0050	<	0.00010	<	0.0200	<	0.035		0.23		0.002	<	0.02		0.02	
SW-6	06/06/90	Hydrometrics Data	123.2	6.5	0.1				0.00200		0.0200	<	0.02		0.13		0.01		0.02	<	0.01	
SW-6	06/07/90	Hydrometrics Data	138.6																			
SW-6	06/13/90	Hydrometrics Data	116.97	6.7	0.1	<			0.08000		0.0200	<	0.01	<	0.06		0.01	<	0.02	<	0.01	
SW-6	06/14/90	Hydrometrics Data	86																			
SW-6	06/20/90	Hydrometrics Data	167.97	7.1	0.2				0.00100		0.0200	<	0.03		0.26		0.01	<	0.02		0.15	
SW-6	06/22/90	Hydrometrics Data	273.3																			
SW-6	06/26/90	Hydrometrics Data	251.5	6.6	0.2		0.0050	<	0.00010	<	0.0200	<	0.037		0.4		0.002	<	0.02		0.02	
SW-6	06/29/90	Hydrometrics Data	218.48																			
SW-6	07/02/90	Hydrometrics Data	210.6	7	0.2				0.00100	<	0.0200	<	0.039		0.35		0.01	<	0.02		0.04	
SW-6	07/04/90	Hydrometrics Data	165.4																			
SW-6	07/09/90	Hydrometrics Data	89.9	7.3	0.1				0.00100	<	0.0200	<	0.03		0.14		0.01	<	0.02	<	0.02	
SW-6	07/11/90	Hydrometrics Data	72	6.8																		
SW-6	07/17/90	Hydrometrics Data	35.4	7.4	0.2								0.07		0.3						0.03	<
SW-6	07/19/90	Hydrometrics Data	26.4	6.8																		
SW-6	07/27/90	Hydrometrics Data	18.9	7.3	0.1	<	0.0050	<	0.00010	<	0.0200	<	0.03		0.1		0.002	<	0.02	<	0.03	<
SW-6	08/23/90	Hydrometrics Data	10.1	6.6																		
SW-6	09/25/90	Hydrometrics Data	3.3	6.9	0.1	<	0.0050	<	0.00010	<	0.0200	<	0.007		0.03	<	0.002	<	0.02	<	0.04	
SW-6	03/15/91	Hydrometrics Data	1	6.8	0.1	<	0.0050	<	0.00100	<	0.0200	<	0.01	<	0.06		0.01	<	0.02	<	0.02	
SW-6	06/05/91	Hydrometrics Data	201.7	7	0.2		0.0010	<	0.00010	<	0.0200	<	0.017	<	0.18		0.002	<	0.02	<	0.01	<
SW-6	07/09/91	Hydrometrics Data	51.2	7.1	0.1		0.0050	<	0.00010		0.0200	<	0.033		0.14		0	J	0.02	<	0.03	
SW-6	08/14/91	Hydrometrics Data	3.9	7.3	0.1	<	0.0050	<	0.00010	<	0.0200	<	0.011		0.06		0.002	<	0.02	<	0.02	
SW-6	09/24/91	Hydrometrics Data	2.5	7	0.1	<	0.0050	<	0.00010	<	0.0200	<	0.013	<	0.03	<	0.002	<	0.02	<	0.01	<
SW-6	07/19/92	Hydrometrics Data	30.67	7.4	1.6		0.0050	<	0.00010	<	0.0100	<	0.11		2.88		0.002	<	0.05		0.13	
SW-6	09/23/92	Hydrometrics Data	3.54	7.4	0.1	<	0.0050	<	0.00010		0.0100	<	0.016		0.2		0.002	<	0.02		0.05	
SW-6	07/21/93	Hydrometrics Data	38.11	7.1	0.2		0.0010	<	0.00010		0.0010	<	0.062		0.24		0.002	<	0.03		0.01	J
SW-6	09/22/93	Hydrometrics Data	4.2	7.4	0.1	<	0.0010	<	0.00010		0.0010	<	0.019		0.03		0.002	<	0.03		0.018	<
SW-6	04/14/94	Hydrometrics Data	19.2	8.1			0.0010	<	0.00010	<			0.001	<			0.002	<				
SW-6	06/15/94	Hydrometrics Data	87.64	7	0.1		0.0010	<	0.00010	<	0.0010	<	0.016	J	0.11		0.002	<	0.01		0.005	J
SW-6	05/21/96	Hydrometrics Data	45.62	4.6	0.1				0.00010	<			0.021		0.15		0.003	<	0.012		0.04	<
SW-6	07/10/96	Hydrometrics Data	149.2	5.9	0.1	<			0.00010				0.024		0.01		0.003	<	0.013		0.01	<
SW-6	09/11/96	Hydrometrics Data	2.91	6.1	0.1	<			0.00010	<			0.011		0.02		0.003	<	0.007		0.01	<
SW-6	05/06/99	Maxim	13.65	7.3	0.1				0.00010	<			0.01		0.13		0.001	<	0.008		0.01	<
SW-6	07/07/99	Maxim	148.39	7.6	0.2				0.00010	<			0.034		0.27		0.001	<	0.014		0.02	
SW-6	09/29/99	Maxim	3.727	7	0.1	<			0.00010	<			0.016		0.06		0.001	<	0.007		0.02	J
SW-6	04/13/00	Maxim	2.55	6.9	0.05	<			0.00010	<			0.004		0.05	<	0.001	<	0.005	<	0.02	<
SW-6	07/08/00	Maxim	36.08	6.8	0.1	J			0.00010	<			0.032	J	0.14	J	0.001	<	0.018	J	0.01	J
SW-6	10/19/00	Maxim	3.34	7.1	0.1	<			0.00010	<			0.005		0.05	<	0.001	<	0.003	<	0.01	<
SW-6	04/21/01	Maxim	2.67	7.6	0.1	<			0.00010	<			0.004		0.02		0.001	<	0.003	<	0.01	<
SW-6	06/26/01	Maxim	60.42	7.6	0.1	<			0.00010	<			0.027		0.12		0.001	<	0.008		0.01	<
SW-6	10/11/01	Maxim	1.17	7	0.1	<	0.0030	<	0.00010	<			0.004		0.1		0.001	<	0.008		0.03	J

Notes: mg/l = milligrams/liter; su = standard units
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NA - not applicable

TABLE 2 - WATER QUALITY DATA
TEMPORARY WATER QUALITY STANDARDS - 3-YEAR REVIEW
New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
Station SW-6: Pre-1999 Samples (n)			34	29	24		17		25		19		26		25		24		24		25	
Minimum			1.000	4.600	0.050		0.0005		0.00005		0.0005		0.001		0.010		0.000		0.007		0.005	
Maximum			273.300	8.100	1.600		0.0025		0.08000		0.0100		0.110		2.880		0.010		0.050		0.150	
Mean			81.177	6.907	0.169		0.0019		0.00346		0.0080		0.025		0.244		0.002		0.016		0.027	
Standard Deviation (SD)			81.893	0.616	0.312		0.0009		0.01595		0.0037		0.024		0.560		0.002		0.010		0.036	
Mean + (2 x SD); for pH: Mean - (2 x SD)			244.963	5.674	0.792		0.0038		0.03537		0.0153		0.074		1.365		0.007		0.035		0.099	
Station SW-6: 1989-2001 Samples (n)			43	38	33		18		34		19		35		34		33		33		34	
Minimum			1.000	4.600	0.025		0.0005		0.0001		0.0005		0.001		0.010		0.000		0.002		0.005	
Maximum			273.300	8.100	1.600		0.0025		0.0800		0.0100		0.110		2.880		0.010		0.050		0.150	
Mean			70.512	6.979	0.143		0.0019		0.0026		0.0080		0.023		0.206		0.002		0.013		0.023	
Standard Deviation (SD)			0.572	0.261	0.269		0.0009		0.0137		0.0037		0.022		0.484		0.002		0.009		0.032	
Mean + (2 x SD); for pH: Mean - (2 x SD)			71.656	6.457	0.681		0.0037		0.0299		0.0153		0.067		1.174		0.006		0.032		0.087	
Station SW-6: 1999-2001 Samples (n)			9	9	9		1		9		0		9		9		9		9		9	
Minimum			1.170	6.800	0.025		0.0015		0.00005		0.0000		0.004		0.020		0.001		0.002		0.005	
Maximum			148.390	7.600	0.200		0.0015		0.00005		0.0000		0.034		0.270		0.001		0.018		0.030	
Mean			30.222	7.211	0.075		0.0015		0.00005				0.015		0.099		0.001		0.008		0.012	
Standard Deviation (SD)			48.706	0.322	0.053				0.00000				0.013		0.080		0.000		0.006		0.009	
Mean + (2 x SD); for pH: Mean - (2 x SD)			127.633	6.567	0.181				0.00005				0.040		0.259		0.001		0.019		0.030	
Narrative Standard - SW-6				**5.7**	**0.763**		**NA**		**0.03472**		**NA**		**0.076**		**1.132**		**NA**		**0.034**		**0.110**	

Notes: mg/l = milligrams/liter; su = standard units
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NA - not applicable

TABLE 2 - WATER QUALITY DATA
TEMPORARY WATER QUALITY STANDARDS - 3-YEAR REVIEW
New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
SW-7	05/28/90	Hydrometrics Data	40.3	7.5	0.1		0.0050	<	0.00010	<	0.0200	<	0.03		0.2		0.002	<	0.02	<	0.02	
SW-7	06/05/90	Hydrometrics Data	81.11	7.6	0.4								0.11		0.99						0.02	
SW-7	06/06/90	Hydrometrics Data	115.1																			
SW-7	06/13/90	Hydrometrics Data	69.81	7.4	0.26								0.07		0.61						0.02	
SW-7	06/15/90	Hydrometrics Data	56.3																			
SW-7	06/20/90	Hydrometrics Data	97.51	7.9	0.5								0.14		0.99						0.02	
SW-7	06/22/90	Hydrometrics Data	129.15																			
SW-7	06/27/90	Hydrometrics Data	138.8	7.5	0.6		0.0050	<	0.00020		0.0200	<	0.147		1.02		0.002	<	0.05		0.03	
SW-7	06/28/90	Hydrometrics Data	140.13																			
SW-7	07/03/90	Hydrometrics Data	122.9	7.3	0.4								0.11		0.78				0.05		0.03	
SW-7	07/10/90	Hydrometrics Data	50.2	7.2	0.3				0.00100	<	0.0200	<	0.11		0.67		0.01	<	0.04		0.04	
SW-7	07/12/90	Hydrometrics Data	41.7	7.2																		
SW-7	07/17/90	Hydrometrics Data	24.7	7.1	0.5								0.17		0.93						0.03	<
SW-7	07/19/90	Hydrometrics Data	20.9	7.2																		
SW-7	07/26/90	Hydrometrics Data	10.4	8	0.5		0.0050	<	0.00020		0.0200	<	0.21		1.05		0.003		0.07		0.04	
SW-7	08/22/90	Hydrometrics Data	5.6	7.2																		
SW-7	09/25/90	Hydrometrics Data	2.2	8.2	0.1	<	0.0050	<	0.00010	<	0.0200	<	0.02		0.14		0.002	<	0.05		0.02	
SW-7	03/15/91	Hydrometrics Data	1.5	7	0.1	<	0.0050	<	0.00100	<	0.0200	<	0.01	<	0.24		0.01	<	0.04		0.01	
SW-7	06/06/91	Hydrometrics Data	157.6	5.9	0.3		0.0050	<	0.00010	<	0.0200	<	0.06	<	0.74		0.002	J	0.03		0.04	
SW-7	07/10/91	Hydrometrics Data	37.7	7.4	0.4		0.0050	<	0.00010		0.0200	<	0.18		1.2		0.024	J	0.05		0.04	
SW-7	08/13/91	Hydrometrics Data	4.1	7.7	0.1		0.0050	<	0.00020		0.0200		0.034		0.15		0.002	<	0.07		0.06	
SW-7	09/24/91	Hydrometrics Data	3.5	7.7	0.1	<	0.0050	<	0.00010		0.0200	<	0.017		0.21		0.002	<	0.06		0.01	
SW-7	07/19/92	Hydrometrics Data	20	8	0.5		0.0050	<	0.00010	<	0.0100	<	0.17		0.07		0.002	<	0.07		0.03	
SW-7	09/22/92	Hydrometrics Data	3.23	7.8	0.1		0.0050	<	0.00020		0.0100	<	0.087	<	0.2	<	0.002	<	0.08		0.04	
SW-7	09/23/93	Hydrometrics Data	3.71	8	0.2		0.0010	<	0.00020		0.0010	<	0.07		0.28		0.002	<	0.07		0.014	
SW-7	09/23/93	Hydrometrics Data	3.71	8	0.2		0.0010	<	0.00010		0.0010	<	0.06		0.29		0.002	<	0.07		0.016	
SW-7	08/25/94	Hydrometrics Data	1.69	7.6	0.02	J	0.0010	<	0.00010	<	0.0010	<	0.007	J	0.16	J	0.002	<	0.027		0.008	<
SW-7	07/13/95	Hydrometrics Data	113.48	7	0.6		0.0010	<	0.00010		0.0030		0.098	J	0.97	J	0.002	<	0.05		0.02	
SW-7	09/27/95	Hydrometrics Data	2.8	6.8	0.1	<	0.0010	<	0.00010	<	0.0010	<	0.021		0.17		0.002	<	0.03		0.027	<
SW-7	06/18/96	Hydrometrics Data	223.08	7.2	0.5				0.00020				0.087		1.05		0.003	<	0.046		0.02	
SW-7	07/09/96	Hydrometrics Data	97.63	6.9	0.3	J			0.00010				0.096		0.53		0.003	<	0.038		0.02	
SW-7	09/10/96	Hydrometrics Data	2.1241	6.4	0.1	<			0.00010	<			0.019		0.13		0.003	<	0.025		0.01	
SW-7	05/06/99	Maxim	6.48	7.1	0.4				0.00010	<			0.008		0.62		0.001	<	0.036		0.01	<
SW-7	07/08/99	Maxim	111.83	7.9	0.4				0.00010				0.064		0.53		0.001	<	0.027		0.02	
SW-7	09/29/99	Maxim	2.493	7.5	0.1	<			0.00010	<			0.001	<	0.42		0.001	<	0.023		0.03	J
SW-7	04/12/00	Maxim	0.405	7.2	0.05	<			0.00010	<			0.004		0.43		0.001	<	0.066		0.05	
SW-7	04/12/00	Maxim		7.2	0.05	<			0.00010	<			0.004		0.51		0.001	<	0.072		0.02	<
SW-7	07/09/00	Maxim	32.25	7.3	0.3	J			0.00010	<			0.072	J	0.36	J	0.001	<	0.029	J	0.02	J
SW-7	10/09/00	Maxim	1.81	7.7	0.01	<			0.00010	<			0.001	<	0.22	J	0.003	<	0.02	<	0.01	<
SW-7	06/29/01	Maxim	36.63	7.9	0.2				0.00080				0.12		0.53		0.004	J	0.035		0.01	<
SW-7	10/10/01	Maxim	1.53	7.5	0.1	<	0.0030	<	0.00010	<			0.005		0.12		0.001		0.015		0.02	J

Notes: mg/l = milligrams/liter; su = standard units
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TABLE 2 - WATER QUALITY DATA
TEMPORARY WATER QUALITY STANDARDS - 3-YEAR REVIEW
New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
Station SW-7: Pre-1999 Samples (n)			32	28	25		16		20		17		25		25		20		21		25	
Minimum			1.500	5.900	0.020		0.0005		0.00005		0.0005		0.005		0.070		0.001		0.010		0.004	
Maximum			223.080	8.200	0.600		0.0025		0.00050		0.0200		0.210		1.200		0.024		0.080		0.060	
Mean			56.958	7.382	0.281		0.0019		0.00015		0.0074		0.082		0.547		0.003		0.049		0.024	
Standard Deviation (SD)			59.633	0.518	0.197		0.0010		0.00013		0.0052		0.061		0.391		0.005		0.019		0.013	
Mean + (2 x SD); for pH: Mean - (2 x SD)			176.225	6.346	0.676		0.0038		0.00042		0.0179		0.204		1.329		0.013		0.086		0.050	
Station SW-7: 1989-2001 Samples (n)			40	37	34		17		29		17		34		34		29		30		34	
Minimum			0.405	5.900	0.005		0.0005		0.0001		0.0005		0.0005		0.070		0.001		0.010		0.004	
Maximum			223.080	8.200	0.600		0.0025		0.0008		0.0200		0.2100		1.200		0.024		0.080		0.060	
Mean			50.402	7.405	0.250		0.0019		0.0001		0.0074		0.0686		0.512		0.002		0.045		0.023	
Standard Deviation (SD)			0.473	0.182	0.195		0.0009		0.0002		0.0052		0.0608		0.348		0.004		0.020		0.014	
Mean + (2 x SD); for pH: Mean - (2 x SD)			51.347	7.040	0.639		0.0037		0.0005		0.0179		0.1901		1.207		0.011		0.085		0.050	
Station SW-7: 1999-2001 Samples (n)			8	9	9		1		9		0		9		9		9		9		9	
Minimum			0.405	7.100	0.005		0.0015		0.00005		0.0000		0.001		0.120		0.001		0.010		0.005	
Maximum			111.830	7.900	0.400		0.0015		0.00080		0.0000		0.120		0.620		0.004		0.072		0.050	
Mean			24.179	7.478	0.162		0.0015		0.00014				0.031		0.416		0.001		0.035		0.018	
Standard Deviation (SD)			38.294	0.303	0.166				0.00025				0.044		0.160		0.001		0.021		0.015	
Mean + (2 x SD); for pH: Mean - (2 x SD)			100.766	6.871	0.494				0.00064				0.118		0.736		0.003		0.077		0.048	
Temporary Standard - SW-7				5.5	0.67		NA		NA		NA		0.2		1.32		0.013		0.086		0.049	

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