FINAL
2010/2011 WORK PLAN

NEW WORLD MINING DISTRICT
RESPONSE AND RESTORATION PROJECT

United States Department of Agriculture
Forest Service
Gallatin National Forest

TETRA TECH

Final

2010/2011 WORK PLAN
NEW WORLD MINING DISTRICT
RESPONSE AND RESTORATION PROJECT

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1.0 INTRODUCTION

This document provides descriptions of work tasks to be completed during 2010/2011for the New World Mining District Response and Restoration Project in Park County, Montana (**Figure 1**). The 2010/2011 Work Plan complements the Overall Project Work Plan (Maxim, 1999a) by providing a description of specific work elements that will be completed in 2010/2011. This work plan initiates the project cycle for the eleventh year of the project. Project activities conducted by the U.S. Department of Agriculture (USDA) Forest Service began in 1999. Those activities are described in the 1999, 2000, 2001, 2002/2003, 2003/2004, 2004/2005, 2005/2006, 2006/2007, 2007/2008, 2008/2009, and 2009/2010 Work Plans (Maxim, 1999b; 2000; 2001a; 2002a; 2003a; 2004a; 2005a; 2006a; and Tetra Tech 2007b, 2008b, and 2009).

This year's work plan for the project includes tasks to be completed during both 2010 and 2011 and is therefore, designated the 2010/2011 Work Plan. This time frame is more useful as a planning period to than an annual (January to December) schedule since it includes field activities that must be completed during a relatively short season beginning in April and ending in October with final reports completed during the fall and winter months of 2010 and 2011.

A general description of the site, project objectives, and project organization are provided in this introductory section. Following this introductory section is a detailed description of the work tasks that will be completed during 2010/2011, a project schedule, and project deliverables. For more detailed descriptions of the overall project, the reader can refer to the Overall Project Work Plan (Maxim, 1999a) and/or annual project summary documents produced in 2001 through 2008 (Maxim, 2001b; 2002b; 2003b, 2004b; 2005b; 2006b; 2007a; 2008a). These documents are available on the project website at,

http://www.fs.fed.us/r1/gallatin

and at two project information repositories located at the Gallatin National Forest Supervisor's Office in Bozeman, Montana and at the Cooke City Chamber of Commerce office in Cooke City, Montana. The reader is encouraged to review these documents to gain a better understanding of the overall project.

1.1 PROJECT BACKGROUND

On August 12, 1996, the United States signed a Settlement Agreement (Agreement) with Crown Butte Mines, Inc. (CBMI) to purchase CBMI's mining interests in the New World Mining District (District). 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 including 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. Monies available for cleanup will be spent first on District Property, which as defined in the Decree, includes all property or interests in property that CBMI relinquished to the United States (**Figure 1**). As funds are available after District Property is cleaned up to the satisfaction of the United States, other mining disturbances in the District may be addressed.

The USDA Forest Service, as the lead agency responsible for implementing the cleanup, has assembled a management team and has published objectives to guide reclamation and restoration of the historic mining impacts in the District. Under their Superfund authority, the USDA Forest Service will execute the response and restoration project by following guidance provided by the Environmental Protection Agency (EPA) for non-time-critical removal actions (EPA, 1993). Non-time-critical removal actions are

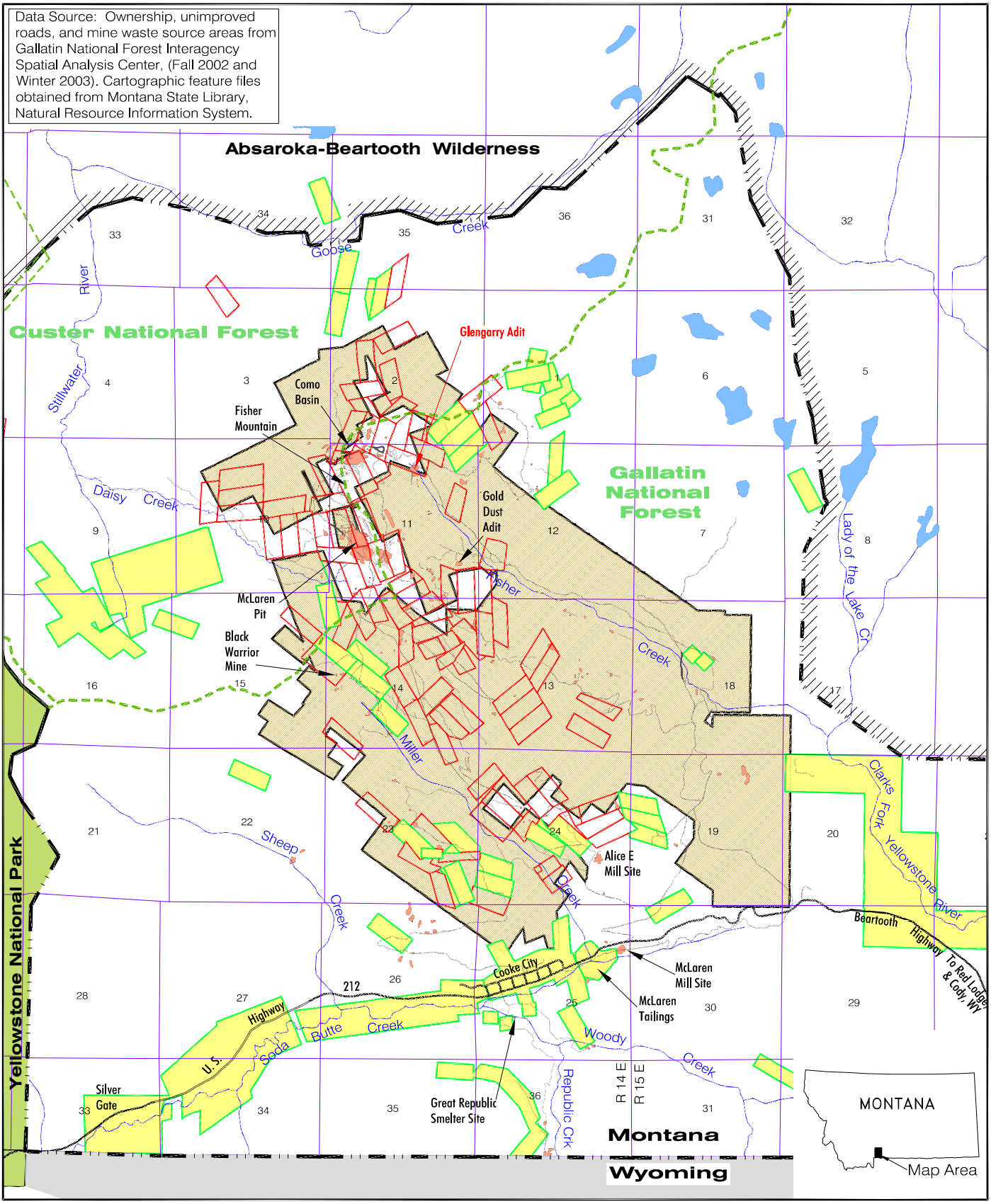
defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) as actions that are implemented by the lead agency to respond to "the cleanup or removal of released hazardous substances from the environment … as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment…" (EPA, 1993).

In 1995, EPA began a site investigation after initial announcement of the property transfer from CBMI. The EPA investigation involved installation of monitoring wells, surface water sampling, groundwater monitoring, and completion of a groundwater tracer study. In October 1998, the USDA Forest Service assisted CBMI in completing and submitting a Support Document and Implementation Plan to support the CBMI petition for temporary modification of water quality standards. Under the Decree and Agreement, CBMI is required to submit petitions regarding temporary standards if requested by the USDA Forest Service. The Support Document and Implementation Plan (Stanley and Maxim, 1998) was submitted to the State of Montana Board of Environmental Review (Board) on January 22, 1999. The petition for the 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. The goal of the temporary standards is to allow the project to proceed so that water quality in Fisher Creek, Daisy Creek, and the Stillwater River improves to the point where these streams meet uses for waters classified B-1 under classification standards established by the State of Montana.

The temporary standards are subject to change as improvements in water quality are realized. They are reviewed every three years to determine if changes are desirable, and the first review was required in 2002. The Board held a hearing on July 26, 2002, to review the long-term water quality data collected since the standards became effective in June 1999, and compared project progress with that presented in the implementation plan (Maxim, 2002c). As a result of this review, the Board took no action to modify the temporary standards as originally defined in June 1999. A second tri-annual review hearing on temporary water quality standards was held by the Board on June 3, 2005, with the same result. A third tri-annual review was held before the Board on May 30, 2008, and again resulted in no adjustment to the existing temporary water quality standards.

In March 1999, the USDA Forest Service initiated the planning process for the project. Planning documents were in place in June 1999, and work began on the project with the monitoring of surface water and groundwater quality at selected monitoring points. Activities that have been conducted to date include the following:

- Establishing a database management system for the project.
- Cataloging existing information available for the site.
- Conducting public meetings and annual technical meetings to distribute relevant project information to interested parties.
- Completing a technical evaluation of existing information and data.
- Developing a suitable base map to support engineering design.
- Conducting annual surface water and groundwater monitoring at select locations in the District.
- Obtaining data to fill identified data gaps for proposed response actions including installing monitoring wells, collecting environmental samples, and collecting other environmental data.



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

Figure 1- back page

- Identifying unrecorded mine waste dumps, adits, and boreholes, and developing a database of site characteristics.
- Improving portions of the Daisy Pass and Lulu Pass roads to accommodate construction traffic.
- Improving a previously constructed surface water diversion around the Como Shaft.
- Completing a repository siting evaluation report and collecting hydrogeologic data on two prospective repository sites.
- Completing a surface water tracer study by the U.S. Geological Survey on Daisy Creek and Miller Creek to determine surface water inputs of metal contaminants.
- Ranking mine waste sources according to a modified Hazard Ranking System to aid in the prioritization of sites slated for clean up.
- Identifying unrecorded cultural features.
- Reopening the Glengarry Adit and Como Raise to more fully characterize underground sources of water within the mine.
- Evaluating water quality treatment alternatives for acid mine discharges.
- Preparing a Selective Source Response Action Engineering Evaluation/Cost Analysis (EE/CA) for potential response alternatives (Maxim, 2001c).
- Removing approximately 25,000 cubic meters (32,700 cubic yards) of mine waste rock and mill tailings (nine percent of the total District waste) from seven mine waste areas, disposing of these wastes in an engineered repository, and revegetating about 1.9 hectares (4.6 acres) of the former waste areas for the Selective Source Response Action.
- Preparing a McLaren Pit Response Action EE/CA (Maxim, 2001d).
- Consolidating and capping waste rock dumps from the Daisy Creek headwaters into the McLaren Pit. These waste source areas account for about 67% of the District's total waste rock volume on District Property. Construction activities were initiated in 2002 with the consolidation of the wastes, and concluded with capping the consolidated wastes with an impermeable cover in 2003.
- Preparing a report for the Board of Environmental Review with respect to their review of the temporary water quality standards.
- Preparing a Como Basin/Glengarry Adit/Fisher Creek Response Action EE/CA (Maxim, 2002d).
- Closing the Glengarry Adit to eliminate contaminated outflows.
- Reopening and evaluating the McLaren Adit, and grouting an exploration boring that intersected the adit tunnel.
- Preparing the Miller Creek Response Action EE/CA (Maxim, 2004c).
- Monitoring reclaimed and revegetated sites in the District.
- Completing construction of surface controls at select sites in the Miller Creek and Fisher Creek drainages.
- Consolidating and capping mineralized disturbed soils in the Como Basin.

- Removing approximately 23,000 cubic meters (30,000 cubic yards) of mine waste rock from four waste rock dumps located in the Fisher and Miller Creek drainages and disposing of these wastes in the New World Waste Repository.
- Characterizing the distribution of sediment in Fisher Creek and Daisy Creek.
- Preparing an Adit Discharge EE/CA to evaluate alternatives that could reduce the flow or improve water quality discharging from historic adits in the District.
- Plugging and abandoning 53 former monitoring wells.
- Studying ferricrete deposition in Fisher Creek and Daisy Creek.
- Studying the effects of reclamation work on grizzly bear activity in the District.
- Studying the occurrence of metal contaminated sediment in the Stillwater wetland.
- Preparing documentation to list the District on the National Register of Historic Places.
- Preparing Project Summary documents to succinctly describe project activities over the years.
- Completing white bark and lodgepole pine tree planting at reclaimed site.
- Closure and reclamation of select road segments.
- Reconstruction of the Glengarry Channel
- Reconstruction of the Wolverine Trail on the north side of Daisy Pass
- Planting willows at the Glengarry and Black Warrior Mines
- Abandonment of nine neutron probe access tubes in the McLaren Pit
- Closing the Glengarry Mill-Site Adit

1.2 SITE LOCATION AND DESCRIPTION

The District falls within the Gallatin and Custer National Forests and abuts Yellowstone National Park's northeast corner. The Absaroka-Beartooth Wilderness Area bounds the District to the north and east, with the Montana-Wyoming state line forming the southern boundary of the District. The District lies entirely within Park County, 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 80 kilometers (50 miles) to the west. Red Lodge, Montana, is located about 105 kilometers (65 miles) to the northeast via the Beartooth Highway, and Cody, Wyoming, is located 95 kilometers (60 miles) to the southeast.

The District is located at an elevation that ranges from 2,400 meters (7,900 feet) to over 3,170 meters (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 (Highway 212) 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 allows access to the District from the east but is closed during winter.

The District covers an area of about 10,360 hectares (25,600 acres). Historic mining disturbances affect about 20 hectares (50 acres) located on District Property. Mining disturbances on non-District Property include the McLaren Tailings and McLaren Mill-Site, which cover an additional 6.9 hectares (17 acres).

The 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 tributaries are the Clarks Fork of the Yellowstone, the Stillwater, and the Lamar. The Lamar River flows through Yellowstone Park. The major tributary streams in the District include Daisy, Miller, Fisher, Goose, Sheep, Lady of the Lake, Republic, Woody, and Soda Butte creeks.

1.3 PURPOSE AND OBJECTIVES

The primary purpose of this work plan is to guide project activities that will be conducted in the 2010/2011 planning year. Objectives for the 2010/2011 Work Plan are consistent with those detailed in the Overall Project Work Plan (Maxim, 1999a) and those described in the Revised Support Document and Implementation Plan for Temporary Water Quality Standards (Maxim, 2003c). Primary objectives for work done in 2010/2011 include: conducting response actions; collecting sufficient information to support engineering analyses and designs for response actions; monitoring water quality and revegetation success to document the results of response and restoration actions; and, satisfying the requirements of the rule allowing adoption of temporary water quality standards.

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2.0 SCOPE OF WORK

To meet the objectives for 2010/2011, the following activities will be performed:

- Maintain community relations in accordance with the Community Relations Plan (Maxim, 1999c).
- Maintain the project database and project website.
- Continue monitoring surface water and groundwater in the District including closely monitoring surface water and groundwater conditions in the Fisher Creek drainage downstream of the reclaimed Como Basin, the closed Glengarry Adit and Glengarry Mill-Site Adit and in the Daisy Creek drainage downstream and within the capped McLaren Pit.
- Continue to monitor the New World Waste Repository and associated surface water and groundwater locations.
- Monitor reclamation at the New World Waste Repository, Como Basin, Tredennic adits/waste rock dumps, Glengarry adit/waste rock dump, Glengarry Mill-site adit, Gold Dust Adit/waste rock dump, McLaren Pit Cap Area, McLaren Triangle, Borrow Area, Little Daisy Adit/waste rock dump, and the Black Warrior adit/waste dump.
- Pumping of the Repository sump.
- Prepare an Action Memorandum for the Adit Discharge EE/CA.
- Preparation of Draft and Final Como Basin Construction Report.
- Preparation of Fisher Creek and Miller Creek Surface Control Construction Reports
- Conduct final road maintenance, including road surfaces, culvert maintenance or replacement , and regrading and revegetation of cut-and-fill slopes.
- Conduct reclamation and closure of the McLaren Adit, and soil amendment and revegetation of approximately 3 acres of disturbed ground immediately down-gradient of the adit.
- Prepare the 2011 Project Summary.

A more complete description of each of these activities is presented below.

2.1 COMMUNITY RELATIONS

A Community Relations Plan (Maxim, 1999c) was developed for the project and is included in the Overall Project Work Plan (Maxim, 1999a). This plan describes community relation strategies that will be used to share information with the public and obtain timely input on proposed project activities. Community relation techniques include preparing news releases, preparing project summaries, conducting technical workshops and public meetings, making project documents readily available to interested parties, and accepting and responding to public comment on project activities.

Community relation activities described in the plan will be used in 2010/2011 to keep the public informed of project activities. Events expected for 2010/2011 with the anticipated timing of the events are listed in **Table 1**. As other events arise during the year, the public will be informed in a timely manner in accordance with the Community Relations Plan.

TABLE 1
COMMUNITY RELATION ACTIVITIES
2010/2011 Work Plan

Event/Task	Timing
Public Meeting and Site Tour	August/September 2010 - Cooke City
Technical Meeting Presenting 2010 Monitoring Results	January 2011 – Bozeman

2.2 MAINTAIN PROJECT WEBSITE AND DATABASE

The USDA Forest Service has maintained a project website since project inception. The website address is:

http://www.fs.fed.us/r1/gallatin

The project website contains general information on the project as well as a library of archived information specific to the work that has been conducted over the past nine years. The library contains downloadable versions of all documents that have been made available to the public in addition to a list of historic documents produced by various authors during the 1990's. Project information stored at the New World Response and Restoration Project document repository in Bozeman is also listed on the website. Environmental data that have been collected at the New World site are cataloged in a Microsoft Access® database, and analytical data for surface water and mine waste samples are available for downloading from this database.

The project website will be maintained to disseminate information, reports, and data related to the project. Relevant final reports prepared during 2010/2011 will be posted to the website after hard copy documents are made available to the public. Other reports, such as technical memoranda, will also be available on the project website. The project water quality database will continue to be updated annually with new project information collected during 2010/2011.

2.3 SURFACE WATER QUALITY MONITORING

This section of the work plan describes long-term and supplemental surface water monitoring activities that will be completed in 2010-2011. In addition, surface and groundwater samples will be collected from stations in the New World Waste Repository area.

2.3.1 Long-Term Surface Water Quality Monitoring

Surface water quality monitoring will be conducted in 2010 at the 12 sampling stations identified in the Long-Term Surface Water Quality Monitoring Plan (Maxim, 1999d). Long-term surface water sampling sites are shown on **Figure 2** and listed in **Table 2**. Samples will be collected before the onset of snowmelt (April), during high flow conditions (June/July), and during low flow conditions in the fall (September/October).

Surface water samples will be collected and analyzed in accordance with procedures and methods described in the Site-Wide Sampling and Analysis Plan (SAP) (Maxim, 1999f). In addition to the analytical methods described in the Site-Wide SAP, analysis of dissolved metals will be added to the parameter list for selected sites. Analysis of dissolved metals will allow further evaluation of reclamation success,

particularly in the McLaren Pit area, as dissolved metals analysis removes the contribution of metals present in suspended sediment that are generally biologically unavailable. Sites selected for dissolved metals analysis are identified in **Table 2**.

Table 3 lists surface water field parameters and standard operating procedures (SOPs) from the Site-Wide SAP. **Table 4** lists preservation and bottle requirements and **Table 5** lists surface water analytical requirements and practical quantitation limits (PQLs).

2.3.2 Supplemental Water Quality Monitoring

Supplemental surface water stations will be monitored in Daisy Creek, Fisher Creek, and Miller Creek (**Table 2**). The monitoring objectives for each of the supplemental stations are listed in **Table 6**.

Samples will be collected from all supplemental surface water stations in conjunction with other long-term monitoring events (**Table 2**). Supplemental stations will be sampled and analyzed in accordance with procedures and methods described in the Site-Wide SAP (Maxim, 1999f). **Tables 3, 4, and 5** list field parameters, sampling requirements, and analytical requirements.

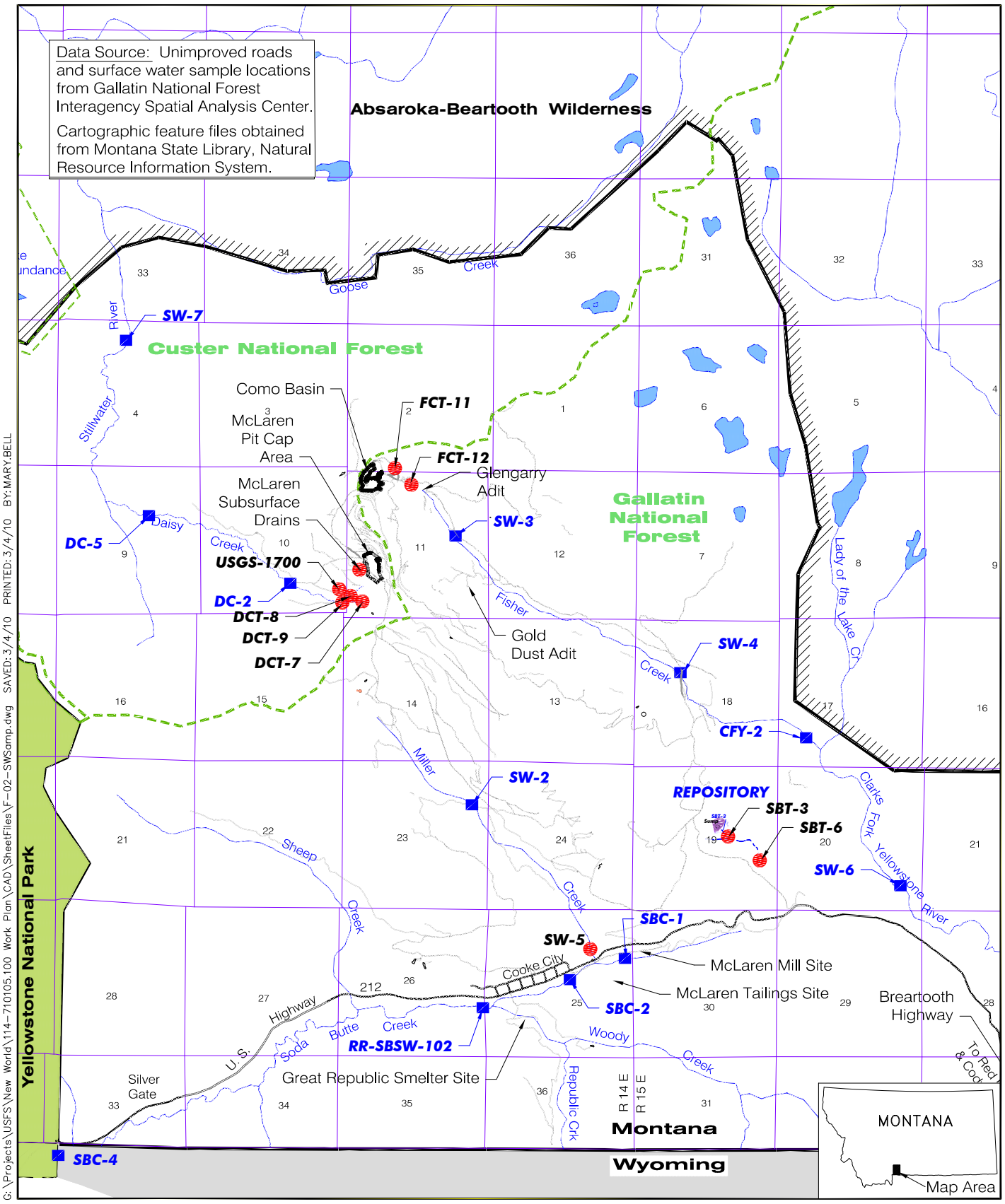
2.3.3 New World Repository Monitoring

Surface water monitoring will be conducted at the New World waste repository in accordance with the methods and procedures described in the New World Waste Repository Long-Term Monitoring Plan (Maxim, January 2006c). Surface water monitoring includes monitoring water quality at two surface water stations SBT-3 and SBT-6, on a tributary to Soda Butte Creek, downstream of the repository. Monitoring will be conducted in April prior to snowmelt, during high flow conditions in May, and during low flow conditions in the fall (September/October). Samples will be collected for both dissolved and total recoverable metals analysis as well as field parameters, physical parameters, and common ions.

TABLE 2
2010 SURFACE WATER SAMPLE SITES
2010/2011 Work Plan

Site Name	Location	April	May	June/ July	Sept/ Oct
Daisy Creek Drainage					
DCT-7*	Daisy Cr. tributary south of McLaren Pit	--	--	X	X
DCT-8*	Daisy Cr. tributary south of McLaren Pit	--	--	X	X
DCT-9*	Daisy Cr. tributary south of McLaren Pit	--	--	X	X
USGS-1700*	Daisy Cr. tributary south of McLaren Pit	--	--	X	X
Cover Drains*	McLaren Pit drains beneath cover (DCSW-101, -102, -103)**	--	--	X	X
DC-2*	Daisy Creek below confluence of McLaren tributaries	X	--	X	X
DC-5*	Daisy Creek above confluence with Stillwater River	X	--	X	X
SW-7*	Stillwater River at Stillwater Trail Crossing	X	--	X	X
Fisher Creek Drainage					
FCT-12*	Tributary south of former Glengarry Adit	--	--	X	X
FCT-11*	Tributary below Como Basin	--	--	X	X
SW-3*	Fisher Creek below former Glengarry Adit	X	--	X	X
SW-4*	Fisher Creek at Lulu Pass Road Crossing	X	--	X	X
CFY-2*	Fisher Creek above Clarks Fork confluence	X	--	X	X
Clarks Fork River Drainage					
SW-6*	Clarks Fork Yellowstone River at Saw Mill Road	X	--	X	X
Miller Creek Drainage					
SW-2*	Miller Creek below Miller Mountain Road Crossing	X	--	X	X
SW-5*	Miller Creek near mouth	X	--	X	X
Soda Butte Creek Drainage					
SBT-3*	Soda Butte Creek Tributary below Repository Site	X	X	--	X
SBT-6*	Soda Butte Creek Tributary below Repository Site	X	X	--	X
SBC-1*	Soda Butte Creek above confluence with Miller Creek	X	--	X	X
SBC-2*	Soda Butte Creek below McLaren Tailings	X	--	X	X
RR-SBSW-102	Soda Butte Creek below Woody Creek	X	--	X	X
SBC-4*	Soda Butte Creek at Park Boundary	X	--	X	X

* Indicates sample will be analyzed for both total and dissolved metals
** Continuous water level/flow monitoring instrumentation installed in DCSW-101 and DCSW-102



McLaren Subsurface Drains include DCSW-101, DCSW-102, and DCSW-103

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2010 Surface Water Monitoring Stations
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 2

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TABLE 3
SURFACE WATER FIELD PARAMETERS
2010/2011 Work Plan

Parameter	SOP Number(1)	SOP Title	Event
Specific Conductance	SOP-05	Field Measurement of Specific Conductance	All
pH	SOP-06	Field Measurement of pH	All
Water Temperature	SOP-07	Field Measurement of Water Temperature	All
Flow	SOP-01	Stream-flow Measurement; Wading Technique	All

1 Tetra Tech Standard Operating Procedures (Appendix A, Site-Wide SAP)

TABLE 4
SURFACE WATER SAMPLING REQUIREMENTS
2010/2011 Work Plan

Parameter	Preservation(1)	Bottle Size/Type
Total Recoverable Metals	HNO3 to pH < 2; Iced to 4°C	250 milliliter polyethylene
Dissolved Metals	Filtered through 0.45 micron filter; HNO3 to pH < 2; Iced to 4°C	250 milliliter polyethylene
Common Ions/Physicochemical	Iced to 4°C	500 milliliter polyethylene

1 HNO_3 : nitric acid

TABLE 5
SURFACE WATER ANALYTICAL REQUIREMENTS
2010/2011 Work Plan

Parameter	PQL (mg/L)[1]	EPA Method No.	Max. Holding Time
Physicochemical			
Specific Conductance	10.0	2510B	28 days
pH	0.10	4500-H-B	Flagged if greater than 15 minutes after collection
Total Dissolved Solids	10.0	2540C	7 days
Total Suspended Solids	10.0	2540D	7 days
Hardness	0.36	200.8	6 months
Acidity	5.0	2310	14 days
Metals[2]			
Aluminum	0.0040	200.8	6 months
Cadmium	0.000080	200.8	6 months
Copper	0.00050	200.8	6 months
Iron	0.050	200.8	6 months
Lead	0.00010	200.8	6 months
Manganese	0.00050	200.8	6 months
Zinc	0.0050	200.8	6 months
Common Cations[3]			
Calcium	0.000080	200.8	6 months
Magnesium	0.0050	200.8	6 months
Potassium	0.020	200.8	6 months
Sodium	0.050	200.8	6 months
Common Anions[4]			
Sulfate	10.0	300.0	28 Days
Bicarbonate	10.0	2320B	14 Days
Carbonate	10.0	2320B	14 Days
Chloride	2.0	300.0	28 Days

1 PQL : Practical Quantitation Limit in milligrams per liter (mg/L)

2 Surface water parameters will be analyzed as total recoverable (unfiltered) or total recoverable and dissolved (filtered) as specified in Table 2 (and chain of custody form). PQL values will vary according to parameter concentrations and/or interferences in sample determined during laboratory analysis. Therefore, PQL values in laboratory report may be higher than shown

3 Cations may be analyzed either from unfiltered or filtered sample. If the analysis includes analysis of dissolved metals then cations will be analyzed from the filtered sample. PQL values will vary according to parameter concentrations and/or interferences in sample determined during laboratory analysis. Therefore, PQL values in laboratory report may be higher than shown

4 Anions will be analyzed from the unfiltered sample

TABLE 6
SUPPLEMENTAL SURFACE WATER SAMPLE SITE MONITORING OBJECTIVE
2010/2011 Work Plan

Site Name	Location	Monitoring Objective
Daisy Creek Drainage		
DCT-7	Daisy Cr. tributary south of McLaren Pit	Measure water quality conditions upgradient of pit influence
DCT-8	Daisy Cr. tributary south of McLaren Pit	Measure impacts in major tributary draining capped area
DCT-9	Daisy Cr. tributary south of McLaren Pit	Measure impacts in tributary draining northern portion of capped area
USGS-1700	Daisy Cr. tributary south of McLaren Pit	Measure impacts down-slope of capped area and McLaren Mine drainage
Cover Drains	McLaren Pit drains beneath cover (DCSW-101, -102, -103)	Measure impacts of drainage from beneath capped area
Fisher Creek Drainage		
FCT-12	Tributary draining un-mined area below Fisher Mountain	Measure background water quality
FCT-11	Tributary draining the Como Basin	Measure Como Basin drainage/Upper Fisher Creek tributary water quality
Miller Creek Drainage		
SW-5	Miller Creek near mouth	Measure Miller Creek input to Soda Butte Creek
Soda Butte Creek Drainage		
SBT-3	Soda Butte Creek Tributary below Repository Site	Measure potential impacts immediately below repository in Soda Butte Creek tributary
SBT-6	Soda Butte Creek Tributary below Repository Site	Measures potential impacts further downstream of repository in Soda Butte Creek tributary

2.4 GROUNDWATER MONITORING

Groundwater monitoring will be conducted in 2010 at the wells shown in **Tables 7 and 8**. Well locations are shown on **Figures 3 and 4**. Groundwater monitoring activities are discussed in the following subsections.

2.4.1 Fisher Creek Groundwater Monitoring

Wells scheduled for the long-term monitoring event will be monitored one time in 2010 (**Table 7**). These wells have generally been monitored annually since installation. Monitoring will be conducted in July when higher elevation wells are typically at the highest water levels reached during the year. Past experience has shown that water quality is generally more mineralized and contains higher concentrations of contaminants during this high water level period. Field parameters and water level (or

flow rate if well is artesian) will also be measured in well FCGW-100, the Glengarry Adit well in September.

The July long-term groundwater monitoring event will involve measuring water levels, measuring field parameters, and collecting samples for laboratory analysis. **Table 9** lists field parameters that will be measured and **Tables 10 and 11** list groundwater analytical parameters and PQLs.

TABLE 7
FISHER CREEK AND REPOSITORY WELL MONITORING
2010/2011 Work Plan

Well No.	Year Installed	Completion Formation	Monitoring Event			
			May	July	Sep	Continuous
Fisher Creek Area						
EPA-11	1996	Tertiary Intrusive Dike	--	X	F	--
EPA-12	1996	Scotch Bonnet Diorite	--	X	F	--
FCGW-100	2004	Glengarry Adit behind plugs	--	X	F	--
MW-1	1989	Wolsey Shale	--	X	--	--
MW-9A	1990	Alluvium	--	X	--	--
MW-9B	1990	Precambrian	--	X	--	--
MW-10A	1990	Alluvium	--	X	--	--
MW-10B	1991	Precambrian	--	X	--	--
MW-11	1990	Precambrian	--	X	--	--
SB-16	1991	Precambrian	--	X	--	--
Tracer-5	1997	Fisher Mtn. Intrusive	--	X	--	--
New World Waste Repository						
SBGW-105T	1999	Till	X	X	--	W
SBGW-105	1999	Granite	X	X	--	--
SBGW-107T	1999	Till	X	X	--	W
SBGW-107	1999	Granite	X	X	--	--
SBGW-108T	1999	Till	X	X	--	--
SBGW-108	1999	Granite	X	X	--	--

X Indicates well will be sampled for full suite of laboratory parameters along with depth to water and field parameters
F Indicates only depth to water and field parameters monitored
W Continuous water level monitoring instrumentation installed
-- Indicates no monitoring conducted

TABLE 8
MCLAREN PIT AREA MONITORING WELLS
SCHEDULED FOR SAMPLING IN 2010
2010/2011 Work Plan

Well No.	Year Installed	Completion Formation	Monitoring Event	
			July	September
DCGW-100	2003	Meagher Limestone	**X**	**F**
DCGW-101S	2001	Colluvium	**X**	**F**
DCGW-101D	2001	Lulu Pass Rhyodacite Porphyry	**X**	**F**
DCGW-111S	2003	Colluvium	**X**	**F**
DCGW-111D	2003	Bedrock	**X**	**F**
Tracer-2	1997	Fisher Mtn. Intrusive	**X**	**F**
MW-2	1989	Wolsey Shale	**X**	**F**
MW-3	1989	Wolsey Shale	**X**	--
DCGW-103S	2001	Colluvium	**F**	--
DCGW-103D	2001	Bedrock	**F**	--
DCGW-104	2001	Waste Rock	**X**	**F W**
DCGW-105	2001	Waste Rock	**X**	**F W**
DCGW-106	2002	Colluvium	**F**	--
DCGW-107	2002	Colluvium	**X**	--
DCGW-108	2002	Colluvium	**X**	--
DCGW-109	2002	Colluvium	**F**	--
DCGW-110	2002	Colluvium	**F**	--
DCGW-112	2002	Colluvium	**F**	--
DCGW-131	2002	Colluvium	**F**	**F**
DCGW-132	2002	Colluvium	**X**	**F**
DCGW-133	2002	Colluvium	**X**	**F**
DCGW-134	2002	Colluvium	**F**	**F**
DCGW-135	2002	Colluvium	**F**	**F**
DCGW-136	2002	Colluvium	**X**	**F**
DCGW-137	2002	Colluvium	**X**	**F**
DCGW-138	2002	Colluvium	**X**	--

X Indicates well will be sampled for full suite of laboratory parameters along with depth to water and field parameters
F Indicates only depth to water and field parameters monitored
W Continuous water level monitoring instrumentation installed
-- Indicates no monitoring conducted

TABLE 9
GROUNDWATER FIELD PARAMETERS
2010/2011 Work Plan

Parameter	SOP Number[1]	SOP Title	Event
Specific Conductance	SOP-05	Field Measurement of Specific Conductance	All
pH	SOP-06	Field Measurement of pH	All
Water Temperature	SOP-07	Field Measurement of Water Temperature	All
Oxidation-Reduction	SOP-28	Field Measurement of Redox Potential (Eh)	All
Dissolved Oxygen	SOP-08	Field Measurement of Dissolved Oxygen	All
Depth to Water	SOP-20	Field Measurement of Groundwater Level	All

1 Maxim Standard Operating Procedures (Appendix A, Site-Wide SAP)

TABLE 10
GROUNDWATER SAMPLING REQUIREMENTS
2010/2011 Work Plan

Parameter	Preservation[1]	Bottle Size/Type
Dissolved Metals	Filtered through 0.45 micron filter; HNO3 to pH < 2	250 milliliter polyethylene
Common Ions/Physicochemical	Iced to 4°C	500 milliliter polyethylene

1 HNO_3 is nitric acid preservative

2.4.2 McLaren Pit Groundwater Monitoring

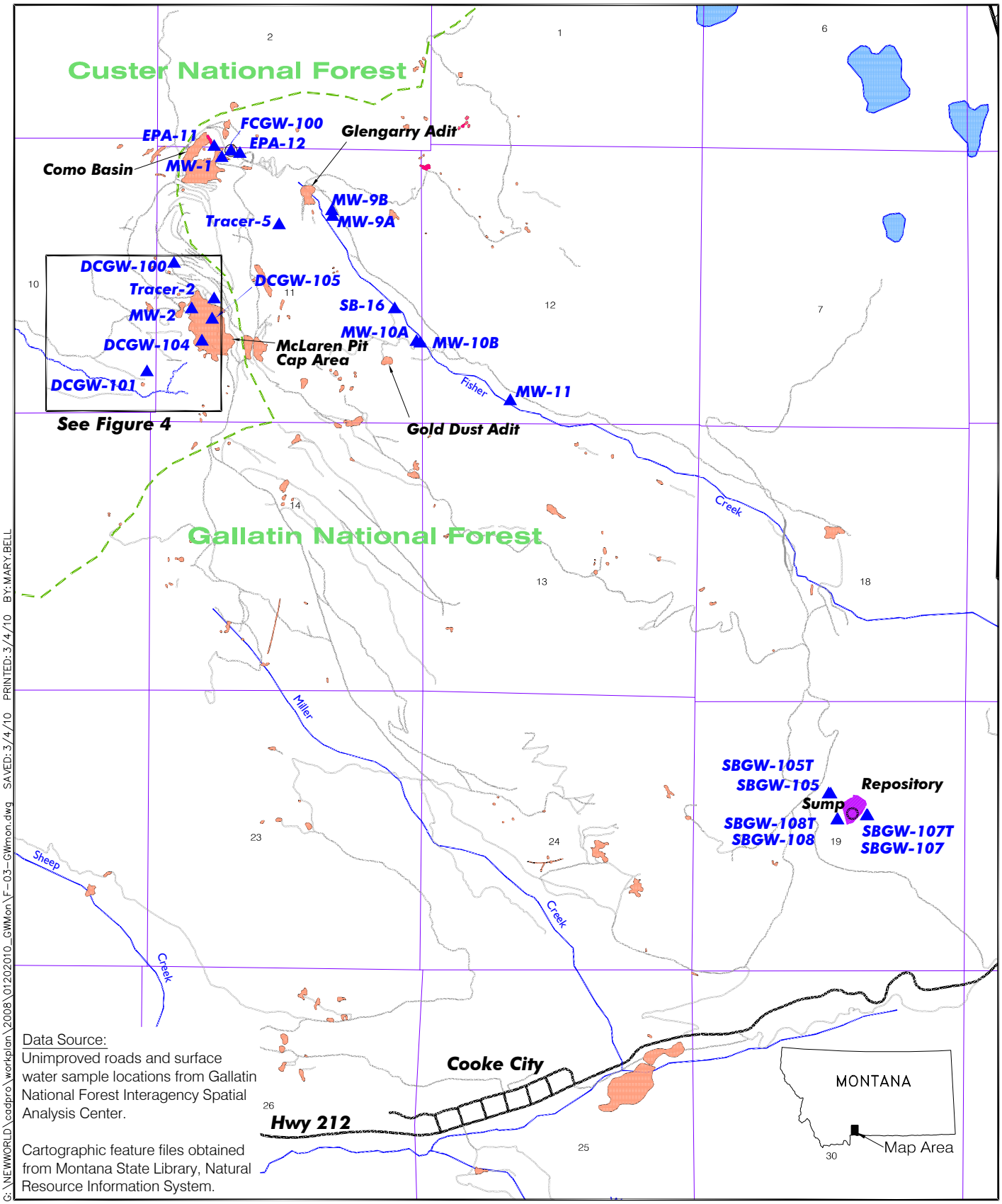
Extensive monitoring will be conducted in the McLaren Pit area (**Table 8**), as has been done in previous years. This will be to closely monitor changes in groundwater conditions/quality resulting from capping of the McLaren Pit, which was completed in October 2003. Wells in the McLaren Pit area will be monitored in July, when water levels are at or near seasonal highs, and once again in September/October. Monitoring will consist of measuring water levels, measuring field parameters, and collecting samples for laboratory analysis. As shown in **Table 8**, samples will only be collected from select wells for laboratory analysis in July. Field parameters will be measured in the remaining wells in July. In September, only field parameters will be measured from selected wells (**Table 9**). Groundwater samples will be submitted to an analytical laboratory for analysis of parameters listed in **Table 11**.

2.4.3 New World Repository Monitoring

Groundwater monitoring will be conducted at the New World waste repository in accordance with the methods and procedures described in the New World Waste Repository Long-Term Monitoring Plan (Maxim, 2006c). Monitoring will include maintaining and downloading water level data from the continuous water level instrumentation, measuring field parameters, and collecting water quality samples in the repository sump and monitoring wells.

Groundwater monitoring will be conducted at the three well pair locations SBGW-105, -107, and -108 in the repository vicinity. Continuous water level instrumentation is installed in wells SBGW-105T, SBGW-107T, and the repository sump. Well locations are shown on **Figure 3**. These wells will monitored in May when groundwater levels are typically the highest during the year and in July after groundwater levels have fallen to seasonal lows. Groundwater samples will be submitted to an analytical laboratory for analysis of parameters listed in **Table 11**.

Accumulated water in the repository sump is scheduled to be removed (pumped) once per year coinciding with the September/October monitoring event. As in previous pumping events, a pumping and water transport contractor has been retained to remove the accumulated water and haul the water, for disposal, to the Park County sewage treatment ponds located in Cody, Wyoming. Prior to the pumping event, a water sample will be collected from the sump and analyzed for analytical parameters listed in **Table 11**.



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.

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DCGW-100 Groundwater Monitoring Location
National Forest Boundary
Mine Waste Source Area
Unimproved Road

114-710105.100

2010 Groundwater Monitoring Stations
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 3

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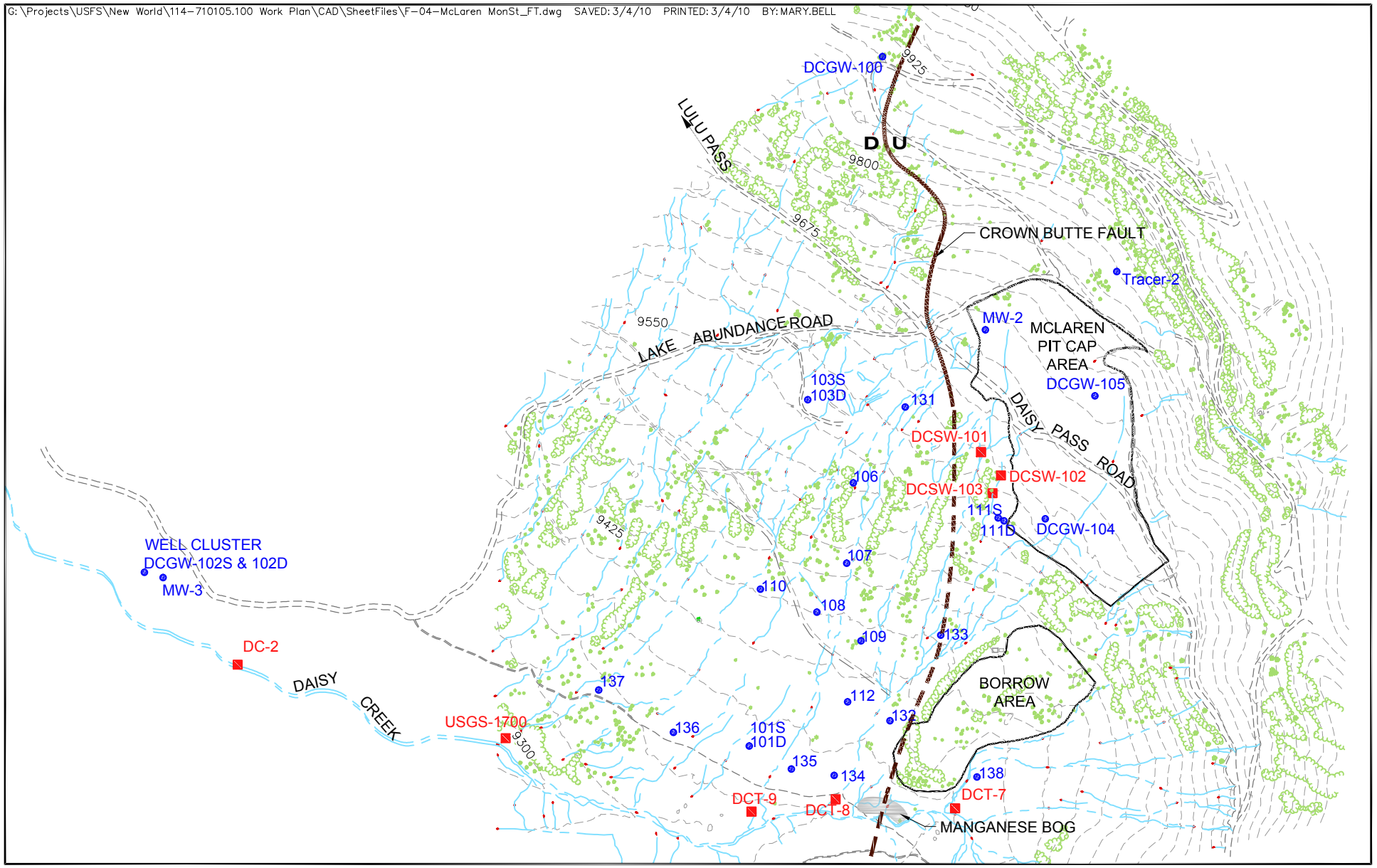

114-710105.100

2010 McLaren Pit Area Monitoring Stations
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 4

TABLE 11
GROUNDWATER ANALYTICAL REQUIREMENTS
2010/2011 Work Plan

Parameter	PQL (mg/l)[1]	EPA Method No.	Max. Holding Time
Physicochemical			
Specific Conductivity	10.0	2510B	28 days
pH	0.10	150.1	Upon arrival at lab
Total Dissolved Solids	10.0	2540C	7 days
Hardness	0.36	2340B	6 months
Acidity	5.0	305.1	14 days
Metals[2]			
Aluminum	0.0040	200.8	6 months
Cadmium	0.00010	200.8	6 months
Copper	0.00050	200.8	6 months
Iron	0.050	200.8	6 months
Lead	0.00010	200.8	6 months
Manganese	0.00050	200.8	6 months
Zinc	0.0050	200.8	6 months
Common Cations[2]			
Calcium	0.020	200.8	6 months
Magnesium	0.0050	200.8	6 months
Potassium	0.020	200.8	6 months
Sodium	0.050	200.8	6 months
Common Anions[3]			
Sulfate	1.0	300.0	28 Days
Bicarbonate	10.0	2320B	14 Days
Carbonate	10.0	2320B	14 Days
Chloride	1.0	300.0	28 Days

1 PQL : Practical Quantitation Limit in milligrams per liter (mg/L)

2 Groundwater parameters will be analyzed as dissolved (filtered) concentrations. Samples for analysis of metals and cations will be filtered through a 0.45 micron filter. PQL values will vary according to parameter concentrations and/or interferences in sample determined during laboratory analysis. Therefore, PQL values in laboratory report may be higher than shown

3 Anions will be analyzed from an unfiltered sample. PQL values will vary according to parameter concentrations and/or interferences in sample determined during laboratory analysis. Therefore, PQL values in laboratory report may be higher than shown

2.5 RECLAMATION MONITORING

Cover monitoring in 2010 will involve documenting percent cover values, species composition, and species diversity of vegetation at select sites reclaimed in the Daisy, Miller, and Fisher Creek drainages.

The purpose of cover monitoring at these sites is to determine if revegetation cover is attaining the project objectives. Sites that received area-wide monitoring in 2008 and at which revegetation was deemed "successfully reestablished" will, therefore, not be revisited in 2010. The ten reclamation and reference areas established in 2008 will continue to be revisited annually. **Table 12** lists the sites that will be monitored and the type of monitoring that will be conducted. Reclamation monitoring will be conducted in accordance with monitoring procedures that are described in the Long-Term Revegetation Monitoring Plan (Maxim, 1999e).

If bare or eroded areas are observed during cover monitoring, soil samples will be collected for laboratory analysis. Samples will be collected from a depth interval of 0-15 cm and placed in one-gallon polyethylene bags. Samples will be labeled by location and returned to a qualified laboratory for selected analyses in accordance with the parameters and methods in the Site-Wide SAP for native soil collection. Laboratory parameters may include USDA soil texture, coarse fragment content, organic matter, pH, electrical conductivity, nutrients, and total metals (aluminum, arsenic, cadmium, copper, lead, and zinc). Sample collection and parameter selection will be performed at the discretion of the field investigator to ensure site-specific conditions are being addressed. Following receipt of the laboratory analysis, recommendations will be made to amend soils or reseed barren areas.

TABLE 12
RECLAMATION MONITORING SITES
2010/2011 Work Plan

Site	Year Reclaimed	Monitoring Type	Site	Year Reclaimed	Monitoring Type
Black Warrior	2005	Cover	Glengarry Waste Dump	2006	Cover
Little Daisy	2005	Cover	Gold Dust	2006	Cover
Como Basin	2006	Cover	New World Repository	2006	Cover
McLaren Pit Borrow Area	2003	Cover	New World Repository Borrow Area	2006	Cover
			Miller Creek	2005	Cover

2.6 PREPARATION OF COMO BASIN, AND FISHER CREEK AND MILLER CREEK SURFACE CONTROLS CONSTRUCTION REPORTS

The Como Basin was reclaimed in 2005 and 2006 by regrading, placement of a geomembrane cover, soil amendment and revegetation. Construction supervision was completed by the USDA - Forest Service, however, no report was prepared. Tetra Tech will prepare a draft construction report for review by the Forest Service and a final report. The report will include general site and setting characteristics of the Como Basin, information on the construction contract, a sequential summary discussion of overall project/construction activities, a discussion of problems encountered, contract changes and recommendations. An appendix will contain a table of the proposed and final contract quantities and costs. Digital photos will be included with the text of the report for clarification of discussions and construction methods, and a collection of construction photographs will be appended to the report.

The Fisher and Miller Creek surface controls contract consisted of closing adits and shafts along with reclaiming several historic mine dumps. The objective of this work was to stabilize mining related disturbances so as to minimize deleterious water and sediment discharges to area creeks and to establish self-sustaining vegetative growth over the mine waste reclamation areas. A total of seven (7) mine waster rock dumps were reclaimed in place by re-grading the waste dumps, incorporating lime to neutralize site acidity, incorporating organic amendments (compost), reseeding, and covering reclamation areas with erosion mat. Three (3) adits and one (1) shaft were closed by backfilling with native materials. The reclamation of an historic refuse dump adjacent to Miller Creek was added to the contract. The work was completed in the summer of 2004 for a total cost of $142,671.62 (approximately $33,400 under budget) The USDA-Forest Service will prepare this construction report.

2.7 PREPARE ACTION MEMORANDUM FOR THE ADIT EE/CA

Tetra Tech will prepare the draft Action Memorandum for the adit EECA for US Forest Service review. It is envisioned that this would include closure and reclamation of the McLaren Adit area as per the specifications and drawings prepared for the McLaren Adit / Roads Closure construction contract. It is also envisioned that other adits in the EECA would likely be selected for the no action or monitoring alternative and be sampled as per the annual sampling plan and eventually as per the long term Operations and Maintenance plan. The Action Memorandum will be finalized after USDA - Forest Service review.

2.8 RECLAMATION AND CLOSURE OF THE MCLAREN ADIT

Tetra Tech will provide advice and construction supervision (as requested) for reclamation and closure activities related to the McLaren Adit. Activities during 2009-2010 included the preparation of drawings and bid specifications for the McLaren adit closure as part of the larger roads reclamation package for the New World project. The adit closure plan is proposed for construction in 2010 wherein the adit is to be permanently closed using a coarse rock portal plug and a piping system to capture and direct adit discharge through a drop inlet and into an infiltration basin located outside and down gradient of the adit. Non-degradation calculations were completed for the infiltration basin for the McLaren adit discharge. Plugging the portal is also proposed for use in restricting access to the McLaren Adit, thereby preventing any access to underground workings that might result in personal injury. Tetra Tech will also prepare a construction report for the McLaren adit closure.

2.9 IMPLEMENTATIONOF THE ROAD RECLAMATION CONTRACT

The final road maintenance reclamation contract will be let for construction during the summer of 2010. This work will include local road resurfacing, culvert maintenance or replacement, construction of armored stream crossings, and regrading and revegetation of cut-and-fill slopes. The USDA-Forest Service will oversee the construction contract and prepare the final construction report.

2.10 PREPARE 2011 PROJECT SUMMARY

A summary will be prepared to document project activities completed since 1999.

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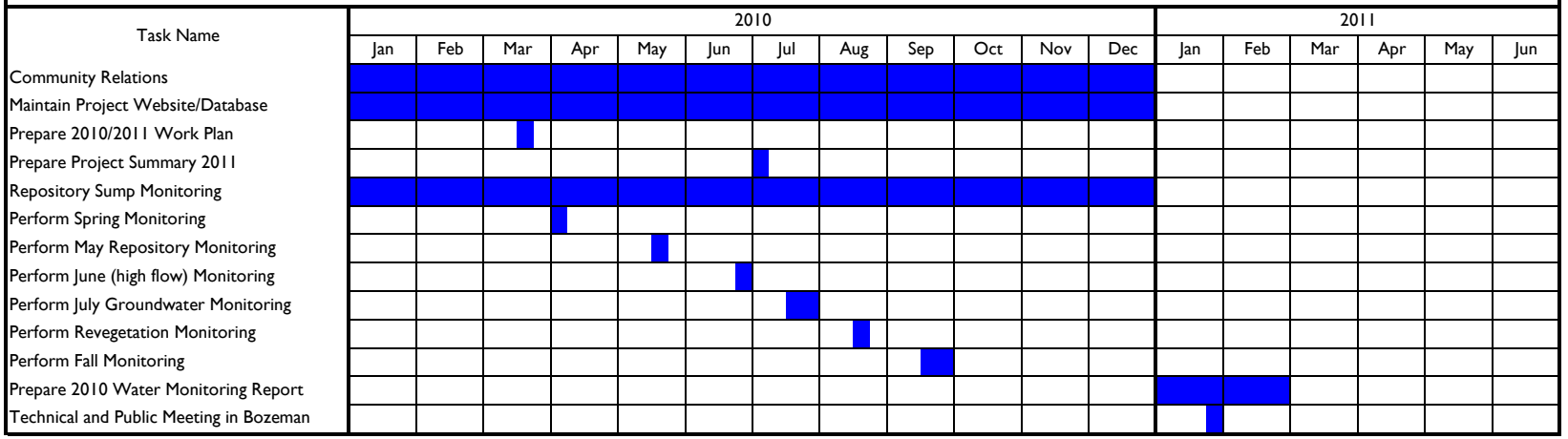
3.0 PROJECT SCHEDULE

Figure 5 illustrates the schedule for 2010/2011 activities.

FIGURE 5
NEW WORLD MINING DISTRICT RESPONSE AND RESTORATION PROJECT
2010/2011 PROJECT SCHEDULE



Revised : 12/28/2011

4.0 REPORTS

Project documents will be prepared during 2010/2011 for many of the items discussed in Section 2.0. These documents are summarized in **Table 13** along with a description of the document contents and approximate delivery schedule.

TABLE 13
PROJECT DOCUMENT LIST
2010/2011 Work Plan

Deliverable Title	Contents	Delivery Schedule
2010/2011 Work Plan	This Document	Draft – April 2010 Final – May 2010
Project Summary 2011	Summary document of project activities completed since 1999	July 2010
Reclamation Monitoring Report	Reclamation monitoring results	January 2011
2010 Surface Water and Groundwater Monitoring Report	Results and analyses of ongoing surface water and groundwater monitoring	February 2011
Preparation of Como Basin and Source Control Construction Reports (USFS)	Summary of Como Basin Construction Contract activities, material and costs.	October 2010
Road Maintenance and McLaren Adit/Revegetation area Construction Report (USFS)	Summary of Road Maintenance Construction and McLaren Adit Closure Contract activities, materials and costs.	February 2011
Final Adit EE/CA and Action Memorandum	Finalize Adit EE/CA as per comments and prepare Action Memorandum	March 2011

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