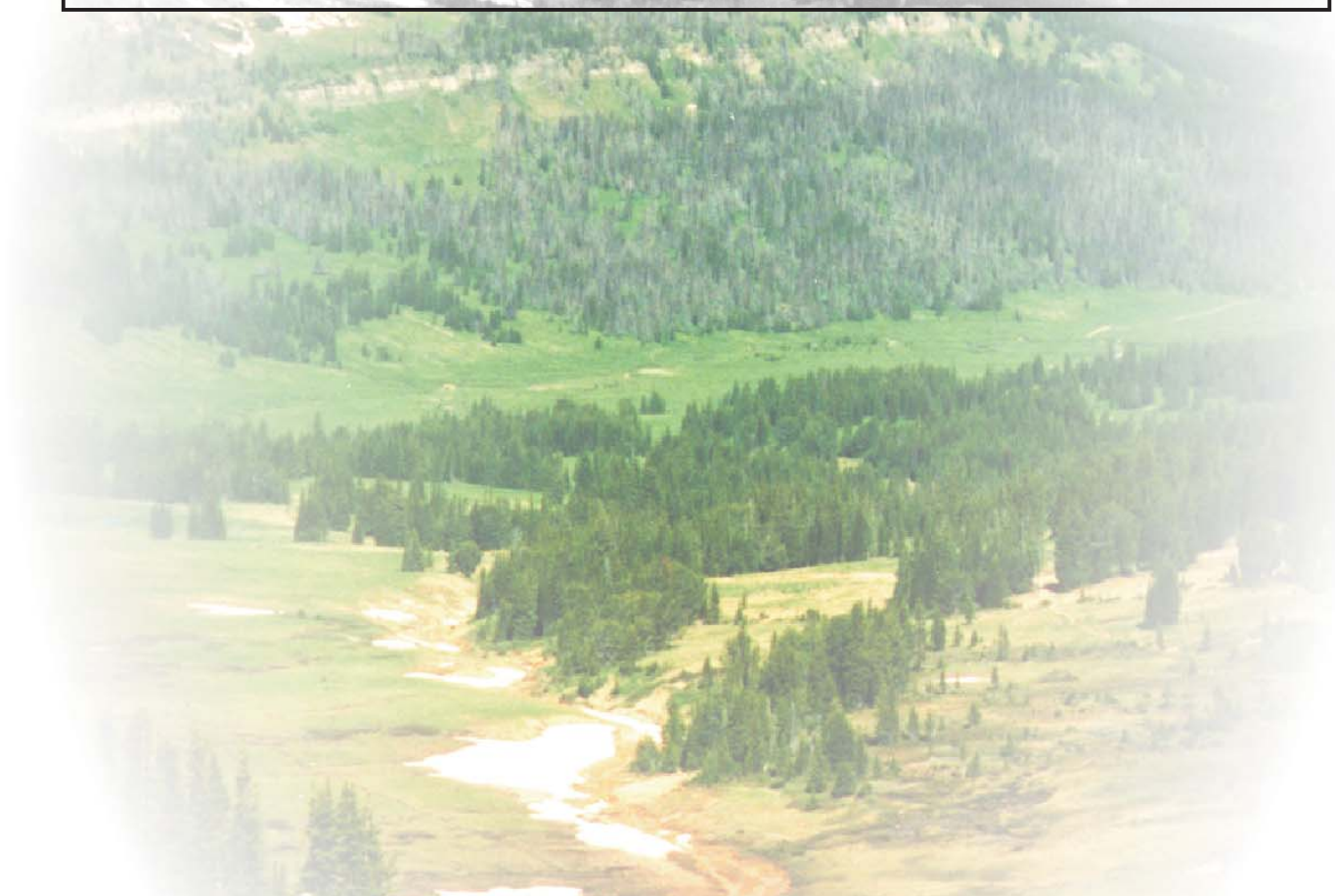
United States Department of Agriculture
Forest Service
Northern Region

2003 Surface Water and Groundwater Monitoring Report



New World Mining District Response and Restoration Project

MAXIM TECHNOLOGIES INC®

2003 SURFACE WATER AND GROUNDWATER MONITORING REPORT NEW WORLD MINING DISTRICT RESPONSE AND RESTORATION PROJECT

Prepared for:

USDA FOREST SERVICE
NORTHERN REGION
MISSOULA, MONTANA

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1.0 INTRODUCTION

Maxim Technologies, Inc. (Maxim) prepared this Surface Water and Groundwater Monitoring Report for the United States Department of Agriculture Forest Service (USDA-FS), Northern Region. This document presents surface water and groundwater data collected during the 2003 calendar year. Monitoring activities are being conducted in conjunction with on-going response and restoration work being completed in the New World Mining District (District).

Long-term monitoring of surface water and groundwater falls within the purpose and objectives of the overall project, which are described in detail in the *Overall Project Work Plan* (Maxim, 1999a). To avoid redundancy, only generalized descriptions of the site, study objectives, and organization of the project are provided herein. The reader is encouraged to review the *Overall Project Work Plan* and the *2003/2004 Work Plan* (Maxim, 2003a) to gain a better understanding of these aspects of the project.

Database summaries and laboratory analytical reports are included in appendices to this report. Separate technical memorandums referenced in this report, the project database, and other project documents are available on the project website at the following address:

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

1.1 PROJECT BACKGROUND

The District, which includes a mixture of National Forest System and private lands, is a historic metals mining district located in the vicinity of Cooke City, Montana. This historic mining district is centered about four miles northeast of the northeast gate to Yellowstone National Park, and contains hard rock mining wastes and acid discharges that impact the environment. Human health and environmental issues are related to elevated levels of heavy metals present in mine waste piles, open pits, acidic water discharging from mine openings, surface water, stream sediments, and groundwater.

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

The USDA-FS, as the lead agency responsible for implementing the cleanup of the District, has assembled an organization and guiding objectives to proceed with response actions and restoration of historic mining impacts in the District. Under their Superfund authority, the USDA-FS is conducting response and restoration activities by following guidance provided by the United States Environmental Protection Agency (U.S. EPA) for non-time-critical removal actions (U.S. EPA, 1993).

1.2 PURPOSE

The primary purpose of surface water and groundwater monitoring conducted during 2003 was to continue to collect data to document changes in water quality that result from response and restoration actions. Surface water quality monitoring is also being conducted in the District to comply with the requirements of the rule adopting temporary water quality standards for segments of Daisy Creek, the

Stillwater River, and Fisher Creek (Maxim, 2003b) in accordance with the Montana Water Quality Act (§ 75-5-201 et seq.).

In addition to year 2003 long-term surface water monitoring conducted at specific stations in the Daisy Creek, Fisher Creek, Clarks Fork River, Miller Creek, and Soda Butte Creek drainages; surface water monitoring was performed at other select sites in support of other, more detailed studies of water quality. These select sites include the Glengarry Adit area, Como Basin area, McLaren Millsite area, the McLaren Pit area, other discharging mine adits, the Selective Source Repository area, and water quality monitoring of construction activities associated with the Glengarry Mine Closure and the McLaren Pit Response Action.

Long-term groundwater monitoring was also conducted in 2003 along with additional groundwater monitoring performed in the McLaren Pit, Como Basin, and Selective Source Repository areas in support of more detailed studies of groundwater levels and water quality. Additional monitoring wells were installed in the McLaren Pit area to complement the existing well network. Separate technical memoranda have been prepared to describe groundwater monitoring in the McLaren Pit and Como Basin areas (Maxim, 2004a; 2004b).

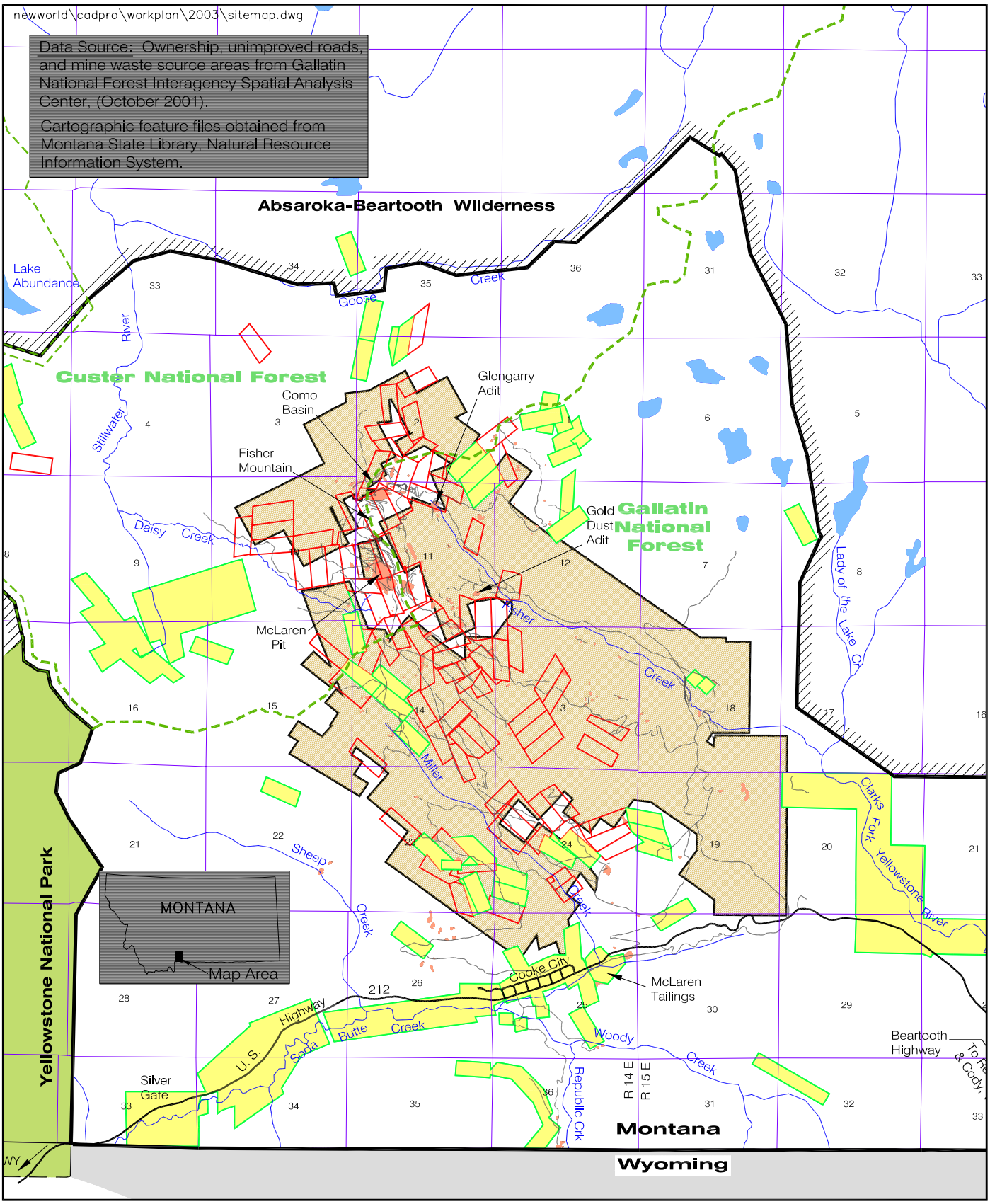
1.3 SITE LOCATION AND DESCRIPTION

The New World Mining District is located in southernmost Park County in south-central Montana. The District is bounded on the south by the Montana-Wyoming state line, on the west by Yellowstone National Park and on the north and east by the Absaroka-Beartooth Wilderness area boundary (Figure 1). The District is characteristic of subalpine regions of the northern Rocky Mountains with elevations that range from approximately 2,400 meters (7,900 feet) to over 3,100 meters (10,200 feet). Accumulated snow pack in the higher elevations range from three meters (10 feet) to over six meters (20 feet) where drifting occurs. The ground is generally snow covered from late October through mid-May at the lower elevations and from early October through late June at the higher elevations. Perennial and semi-perennial snowfields occupy the north facing slopes of the highest mountain peaks.

Area streams are high energy, first and second order tributaries of the Yellowstone River system. These streams occupy glacially carved valleys and are fed largely by melting snow pack. Peak streamflow is characteristically reached by mid-June or early July and may be several orders of magnitude higher than base flow conditions, which typically occur in late winter or early spring. Three drainage basins have been identified as being impacted by the proposed response and restoration actions: 1) Fisher Creek and the Clarks Fork of the Yellowstone River, 2) Daisy Creek and the Stillwater River, and 3) Miller Creek and Soda Butte Creek.

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, which includes all lands or interest in lands transferred to the United States by CBMI. Mining disturbances on non-District Property include: the McLaren Tailings and McLaren Millsite, which cover an additional 6.9 hectares (17 acres); the Great Republic Smelter (0.2 hectares; 0.5 acres); and waste associated with numerous scattered mines and prospects. 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 85 kilometers (50 miles) to the west.

Topography of the District is mountainous with dominant glacial features. Stream valleys are U-shaped and broad while the ridges are steep, rock covered, and narrow. Much of the District is located at or near tree line, especially in the Fisher Mountain area where the major mining disturbances are located.



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

2.0 METHODS

Surface water and groundwater monitoring activities were conducted in accordance with the *2003/2004 Work Plan* (Maxim, 2003a), the *Site-Wide Sampling and Analysis Plan* (Site-Wide SAP) (Maxim, 1999b), and the *Long-Term Surface Water Quality Monitoring Plan* (Maxim, 1999c). More detailed descriptions of Maxim's methods can be found in these documents. A summary of methods used to complete 2003 monitoring activities is provided in this section.

2.1 SURFACE WATER MONITORING

Surface water monitoring was conducted at 13 long-term stations and 13 supplemental stations during 2003. Five of the long-term sample sites were also used for construction monitoring. Sampling stations are shown on Figure 2 and listed in Table 1. In addition, 25 adit stations were visited, with samples collected from 19 sites (six adits were dry when visited in July). Adit locations are shown on Figure 2 and listed in Table 2. Sampling and analytical methods are described in the *Long-Term Surface Water Quality Monitoring Plan* (Maxim, 1999c).

2.1.1 Long-Term Monitoring

The 13 long-term surface water monitoring stations are have been consistently monitored since 1999, with many of the sites monitored regularly during the 1990s. Several of these sites were also used to monitor construction activities as indicated on Table 1. Long-term surface water monitoring was conducted in April, July, and September/October 2003. Monitoring occurred at or near low flow conditions (April), at or near high flow conditions (July), and at the end of the field season (September/October). All surface water samples were submitted to Northern Analytical Laboratories, Inc. (NAL), in Billings, Montana for analysis of parameters listed in the Site-Wide SAP (Maxim, 1999b). Discharge measurements, field parameters, and field observations were recorded at all surface water monitoring stations during each sampling event following established standard operating procedures.

2.1.2 Supplemental Water Quality Monitoring

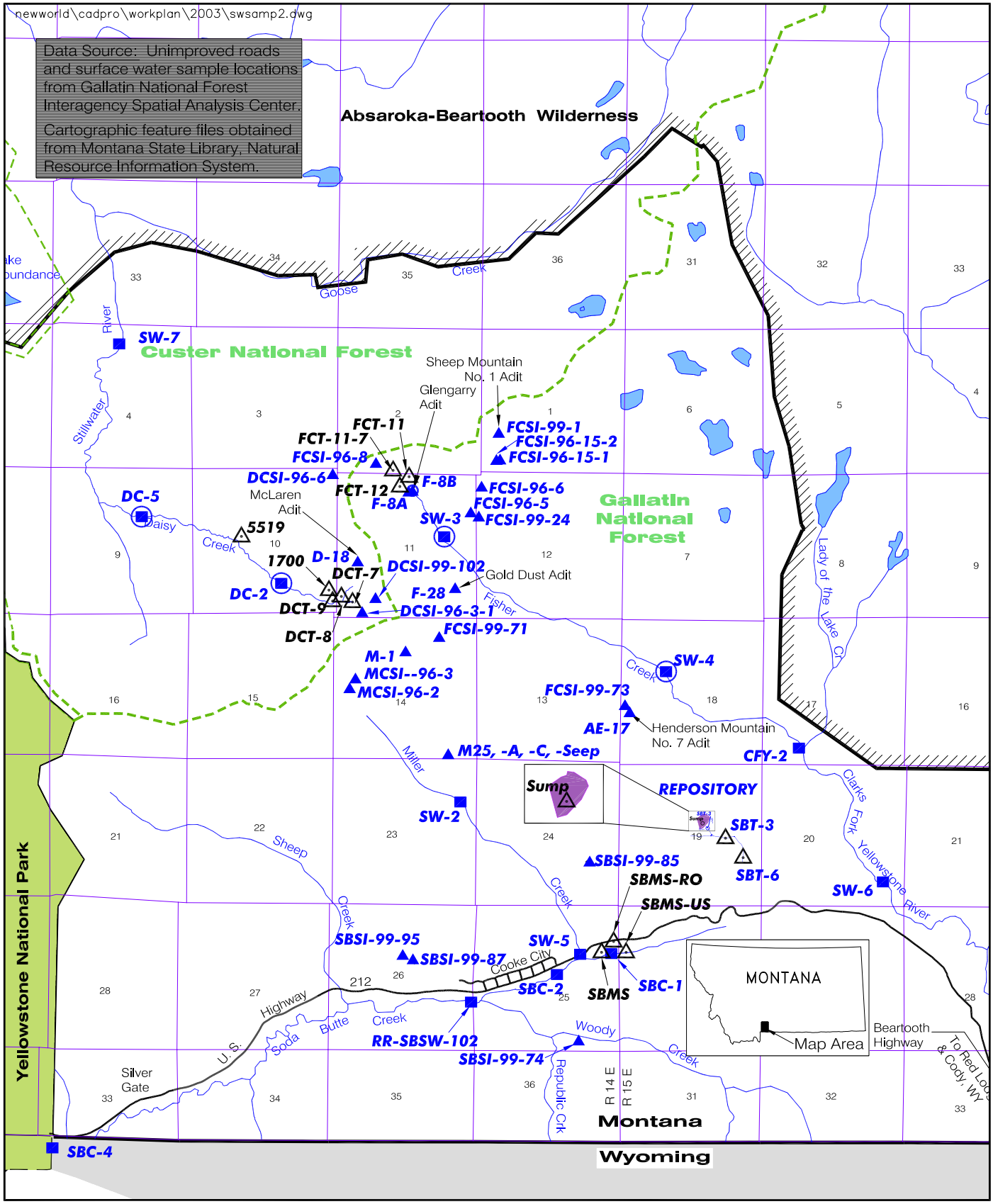
Supplemental water quality monitoring was conducted in tributaries to Daisy Creek, Fisher Creek, Soda Butte Creek, and a tributary to Soda Butte Creek. Table 1 identifies these supplemental stations. Stations FCT-11, FCT-11-7, and FCT-12 are headwater tributaries to Fisher Creek located upstream of the Glengarry Adit. These stations were monitored several times through the summer to characterize upstream water quality in these streams. Daisy Creek tributaries DCT-7, DCT-8, DCT-9, USGS 1700, and USGS 5519, were monitored on two occasions in conjunction with groundwater monitoring of the McLaren Pit area wells to determine the relationship between surface water quality and groundwater quality in that area.

In Soda Butte Creek, three supplemental stations in the vicinity of the McLaren Millsite were sampled during two rain events to determine the impacts of runoff from the millsite on water quality in Soda Butte Creek. The first sample was collected during a thunderstorm event on August 3. The sample of runoff (SBMS-RO) was collected near the end of the storm. On August 22, another sample was collected during a light rain. For both events, a visual estimate of runoff flow was obtained from the channel before the runoff entered Soda Butte Creek. Water samples were also collected from Soda Butte Creek upstream (SBMS-US) and downstream (SBMS) of the runoff channel. Samples were analyzed for total recoverable metals, common ions, and several other parameters. Supplemental water quality monitoring was also conducted at Soda Butte Creek tributary stations SBT-3 and SBT-6 as part of overall monitoring of the Selective Source Repository site.

TABLE 1
2003 SURFACE WATER SAMPLING STATIONS
New World Mining District Response and Restoration Project

Site Name	Location	April/ May	July	Sept/ Oct	Constr- uction	Supple -mental
Daisy Creek Drainage						
DCT-7	Daisy Cr. tributary south of McLaren Pit					X
DCT-8	Daisy Cr. tributary south of McLaren Pit					X
DCT-9	Daisy Cr. tributary south of McLaren Pit					X
USGS-1700	Daisy Cr. tributary south of McLaren Pit					X
USGS-5519	Daisy Cr. tributary west of McLaren pit					X
DC-2	Daisy Creek below confluence of McLaren tributaries	X	X	X	X	
DC-5	Daisy Creek above Stillwater River confluence (DNRC-127)	X	X	X	X	
SW-7	Stillwater River at Stillwater Trail Crossing	X	X	X	--	
Fisher Creek Drainage						
FCT-12	Tributary south of Glengarry Adit					X
FCT-11	Tributary below Como Basin					X
FCT-11-7	Tributary below Como Basin					X
SPO	Fisher Creek, second sediment pond discharge				X	
SW-3	Fisher Creek below Glengarry Adit	X	X	X	X	
SW-4	Fisher Creek at Lulu Road Crossing	X	X	X	X	
CFY-2	Fisher Creek above Clarks Fork confluence	X	X	X		
Clarks Fork River Drainage						
SW-6	Clarks Fork Yellowstone at Saw Mill Road Crossing	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	Dry		
Soda Butte Creek Drainage						
SBT-3	Soda Butte Creek Trib below Repository & above SBT-6					X
SBT-6	Soda Butte Creek Tributary below Repository					X
SBC-1	Soda Butte Creek above confluence with Miller Creek	X	X	X		
SBMS-US	Soda Butte Creek upstream of Millsite					X
SBMS-RO	Millsite runoff sample					X
SBMS	Soda Butte Creek downstream of Millsite					X
SBC-2	Soda Butte Creek below McLaren Tailings	X	X	X		
RR-SBSW-102	Soda Butte Creek below confluence with Republic Creek	X	X	X		
SBC-4	Soda Butte Creek at Park Boundary	X	X	X		

Note: X denotes sample collected



2003 Surface Water Monitoring Stations
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 2

TABLE 2
2003 ADIT SAMPLING STATIONS
New World Mining District Response and Restoration Project

Site Name	Site No. (Adit Sample No.)	Location	Sampled June/July
Gold Dust Adit	FCSI-96-1A (F-28)	Middle Fisher Creek Valley	X(1)
Glengarry Adit	FCSI-96-2A (F-8A)	Glengarry Mine, base of Lulu Pass	X(2)
Glengarry Mill Site Adit	FCSI-96-4 (F-8B)	Glengarry Mine Mill site adit	X
Upper Tredennic Dump 1	FCSI-96-15-1	Upper Tredennic basin	Dry
Upper Tredennic Dump 2	FCSI-96-15-2	Upper Tredennic basin	X
Middle Tredennic Dump 1	FCSI-96-6 (F-11A)	Lower Tredennic basin	X
Lower Tredennic Dump 1	FCSI-96-5 (F-11)	Lower Tredennic Basin	X
Lower Tredennic Dump 2	FCSI-99-24	East of Lower Tredennic	Dry
Lower Spaulding Dump	FCSI-96-8 (F-1)	NE of Lulu Pass	Dry
Sheep Mountain #1 (NDP)[3]	FCSI-99-1	Upper Tredennic basin, flank of Sheep Mountain	X
Henderson Mountain Dump 10	FCSI-99-71	Above upper road to Homestake Mine	Dry
Henderson Mountain Dump 13	FCSI-99-73	SE Henderson Mtn, off Henderson Mtn. Rd.	X
Henderson Mountain Dump 7	FCSI-99-68 (AE-17)	SE Henderson Mtn, off Henderson Mtn. Rd.	X
McLaren Adit	DCSI-96-1 (D-18)	McLaren Mine, W flank of Fisher Mountain	X(2)
Near McLaren Pit	DCSI-99-102	Headwall below county road east of McLaren Pit	Dry
Daisy Pass Dump 1	DCSI-96-3-1	Below Daisy Pass	X
West of Como Dump 1	DCSI-96-6	West side of Lulu pass, Goose Creek	Dry
Black Warrior Adit	MCSI-96-2	SE Bull of the Woods Pass, Miller Creek	X
Upper Miller Creek Dump	MCSI-96-3	Near Black Warrior, private land	X
Little Daisy Adit	MCSI-96-6 (M-1)	SE Daisy Pass, Miller Creek	X
M-25 (Henderson Mtn. Adit)	(M-25)	SW Henderson Mountain, Miller Creek	X
Woody Creek Mine Dump 1 (NDP)	SBSI-99-74	Woody CK., Mohawk claim, private land	X
Alice E. Mill Site seep (NDP)	SBSI-99-85 (AE-6)	S Henderson Mountain, Miller Creek	X
Soda Butte Dump 8 (NDP)	SBSI-99-87	Off Miller Mtn. Road, near Cooke City	X
Soda Butte Dump 1 (NDP)	SBSI-99-95	Off Miller Mtn. Road, near Cooke City	X

Notes: **NDP:** **Non-District Property**
(1) **Also monitored in August and September 2003**
(2) **Also monitored in October 2003**

Supplemental water quality monitoring involved measuring flow and field parameters, and collecting samples for laboratory analysis. Samples were collected and shipped to NAL for analysis of parameters listed in the 2003/2004 Work Plan (Maxim, 2003a) and the Site-Wide SAP (Maxim, 1999b).

2.1.3 Construction Water Quality Monitoring

Construction water quality monitoring was conducted at select stations on Daisy Creek and Fisher Creek in association with construction activities at the McLaren Pit and Glengarry Mine. Construction monitoring was conducted prior to commencement of construction activities (mid-July), during

construction, and until construction was substantially complete (late September/early October). Initially, samples were collected daily or twice daily at two sites in Fisher Creek below the Glengarry Adit (the sediment pond outlet, SPO, and SW-3) and at two sites below the McLaren Pit (DC-2 and DC-5). The frequency of construction monitoring was varied based on construction activities, with less frequent monitoring occurring when either mucking was discontinued in the Glengarry Adit or when earthwork activities were curtailed at the McLaren Pit. In addition, Fisher Creek station SW-4, which is located about a mile below the Glengarry Adit discharge, was monitored weekly from August 7 to September 18 to determine if mucking operations in the Glengarry Adit were impacting this lower reach of Fisher Creek.

Construction monitoring consisted of measuring pH, specific conductance, turbidity, and total copper and iron using a Hach field test kit. Laboratory sample splits were collected for every 20 field samples and shipped to NAL for analysis of parameters listed in the 2003/2004 Work Plan (Maxim, 2003a).

2.1.4 Adit Water Quality Monitoring

Known adit discharges were monitored on at least one occasion in 2003, generally in July following the retreat of the high elevation snowpack. Most stations were accessible in mid-July, although several were covered in snow and could not be accessed until later in the month. Adits covered with snow drifts were not sampled to avoid measuring snowmelt-diluted discharge water. Water quality monitoring consisted of measuring or estimating flow, measuring field parameters, and collecting samples for analysis of parameters listed in the Site-Wide SAP and the *2003/2004 Work Plan*.

The three primary discharges in the District, the Glengarry Adit, McLaren Adit, and Gold Dust Adit, were monitored two (Gold Dust and McLaren) to several times. The Gold Dust Adit was monitored twice in August, once at the portal and once at several stations underground and at the portal. These stations are shown on Figure 3. The McLaren Adit was sampled in July and in October. The October sampling was completed after a borehole in the underground drift, located 111 meters (366 feet) from the adit portal, was grouted to eliminate water from flowing down the borehole into the underground workings. Figure 4 shows the location of this borehole.

2.2 GROUNDWATER MONITORING

Groundwater monitoring of 69 wells was conducted during 2003. Monitoring locations are listed in Tables 3, 4, and 5, and are shown on Figures 5 and 6.

2.2.1 Long-Term Monitoring

Long-term groundwater monitoring was conducted in 25 monitoring wells during July 2003 when groundwater levels were at or near seasonal highs. These stations have been monitored consistently since 1999 and occasionally during the previous 10 year period, depending on the date of installation. Long-term monitoring wells include three wells in the McLaren Pit area (first three listed in Table 3), six in the Como Basin (first six listed in Table 4), and those listed in Table 5. Monitoring activities involved measuring water levels and field parameters, purging wells prior to sampling, collecting samples, and laboratory analysis. Samples were submitted to NAL for analysis of parameters listed in the 2003/2004 Work Plan (Maxim, 2003a) and the Site-Wide SAP (Maxim, 1999b).

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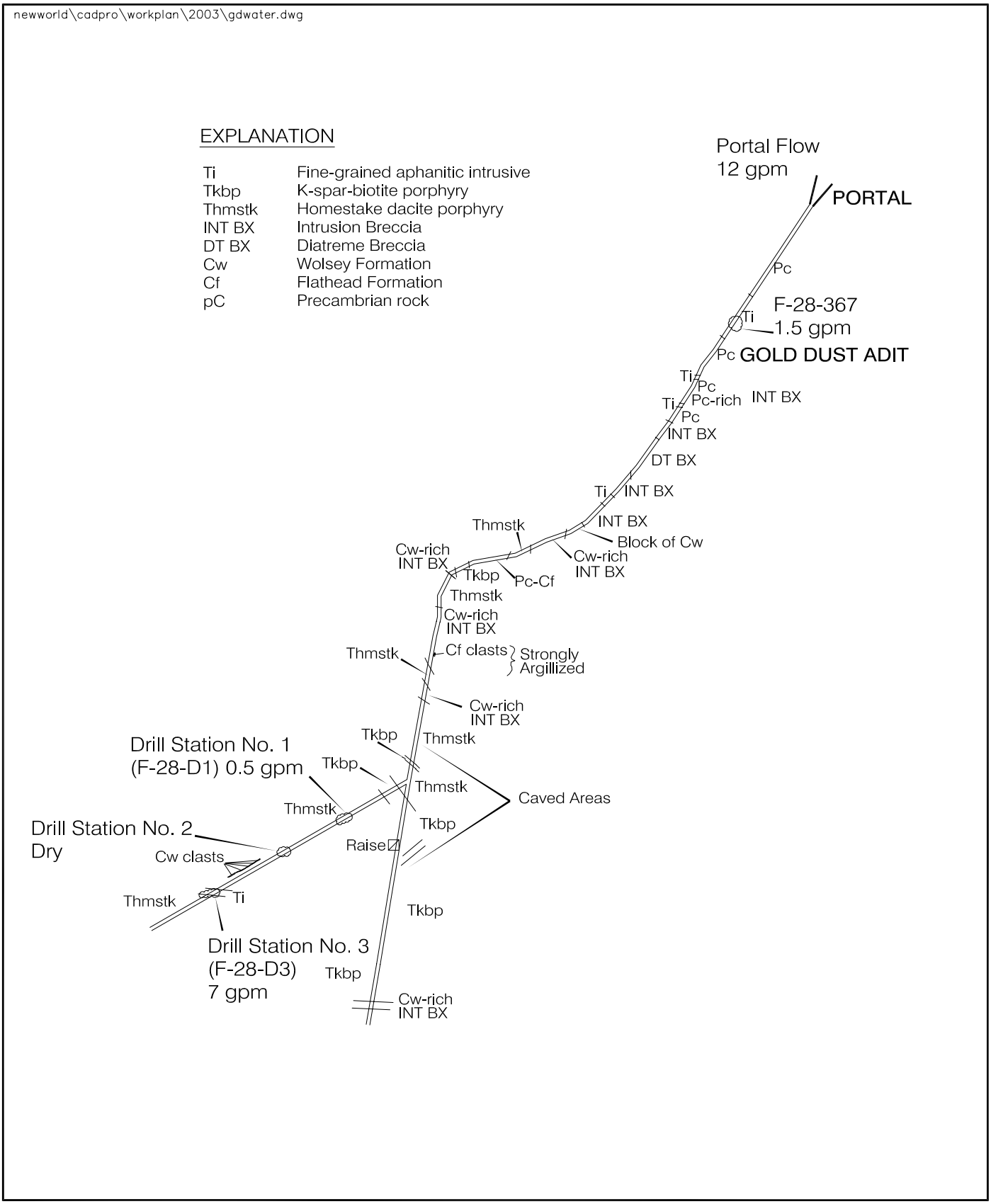

(after Crown Butte Mines, 1993)

N

0 Feet 300

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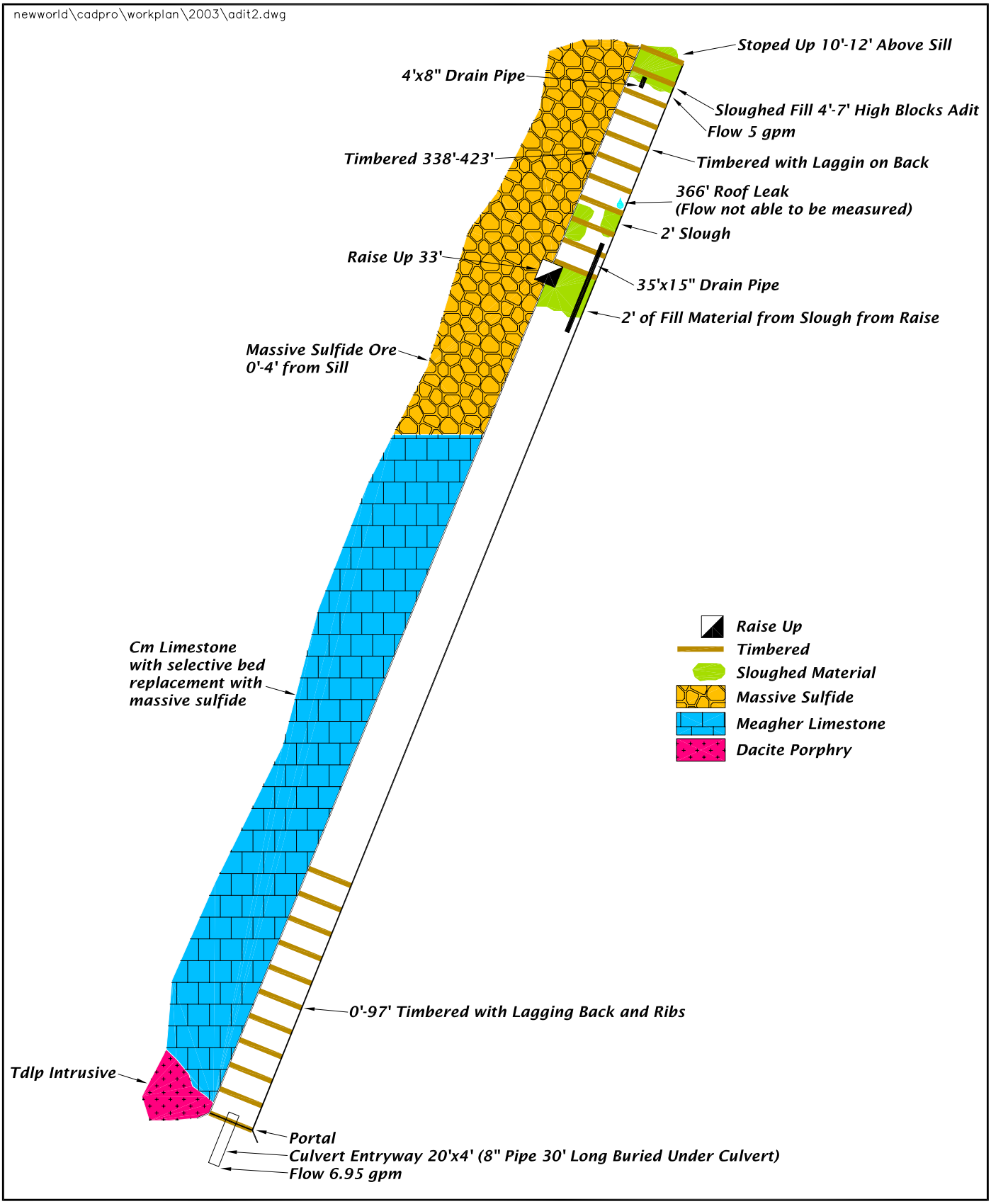
Flow in gallons per minute (gpm)

Geologic Map of the Gold Dust Adit
Showing Water Sources and Flow - August 14, 2003
New World Mining District
Response and Restoration Project
FIGURE 3



N

0 Feet 50
(Width Exagerated)

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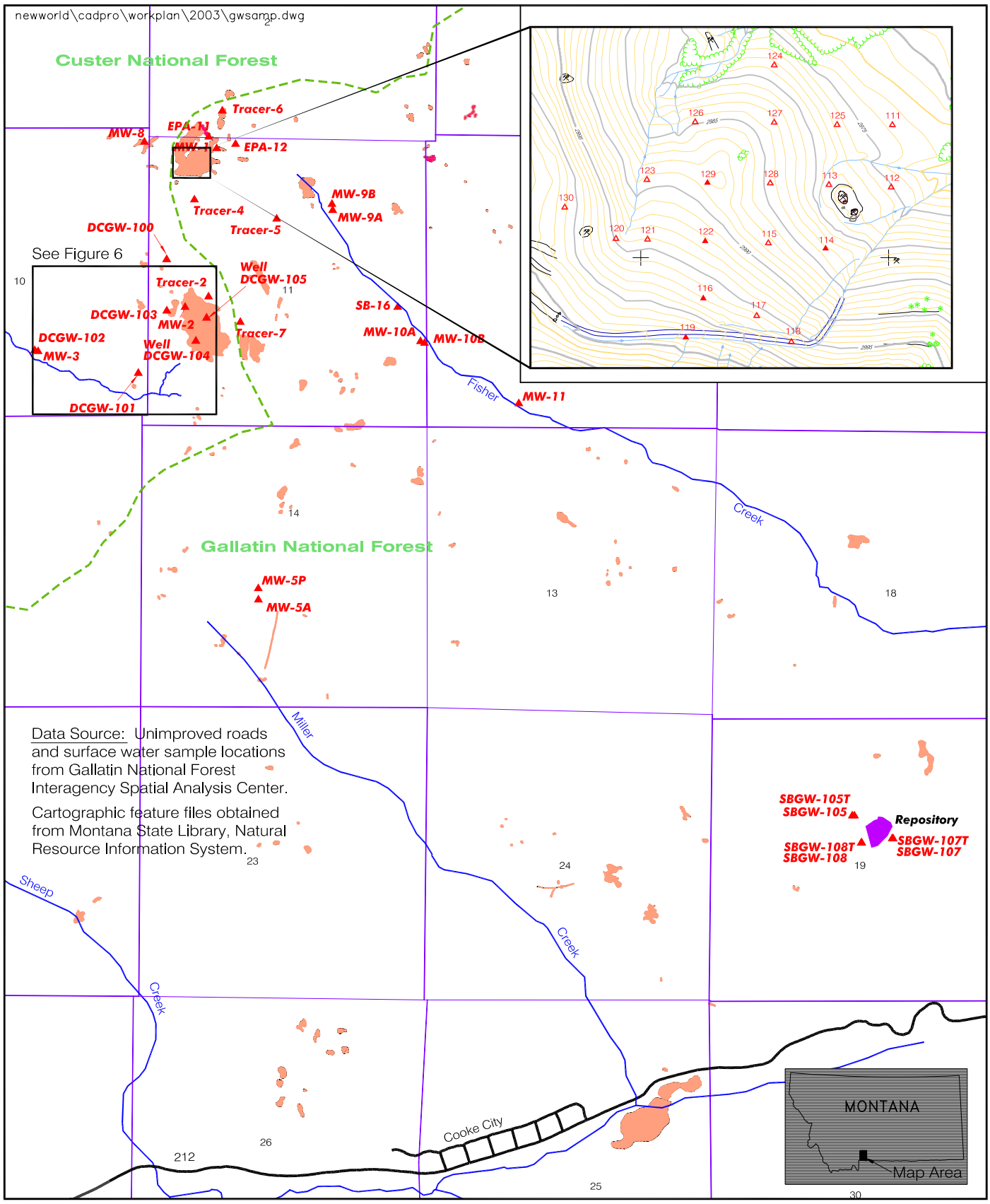
gpm = gallons per minute

Map of the McLaren Adit
Showing Water Sources and Flow - August 7, 2003
New World Mining District
Response and Restoration Project
Cooke City, Montana
FIGURE 4



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0 Feet 2500

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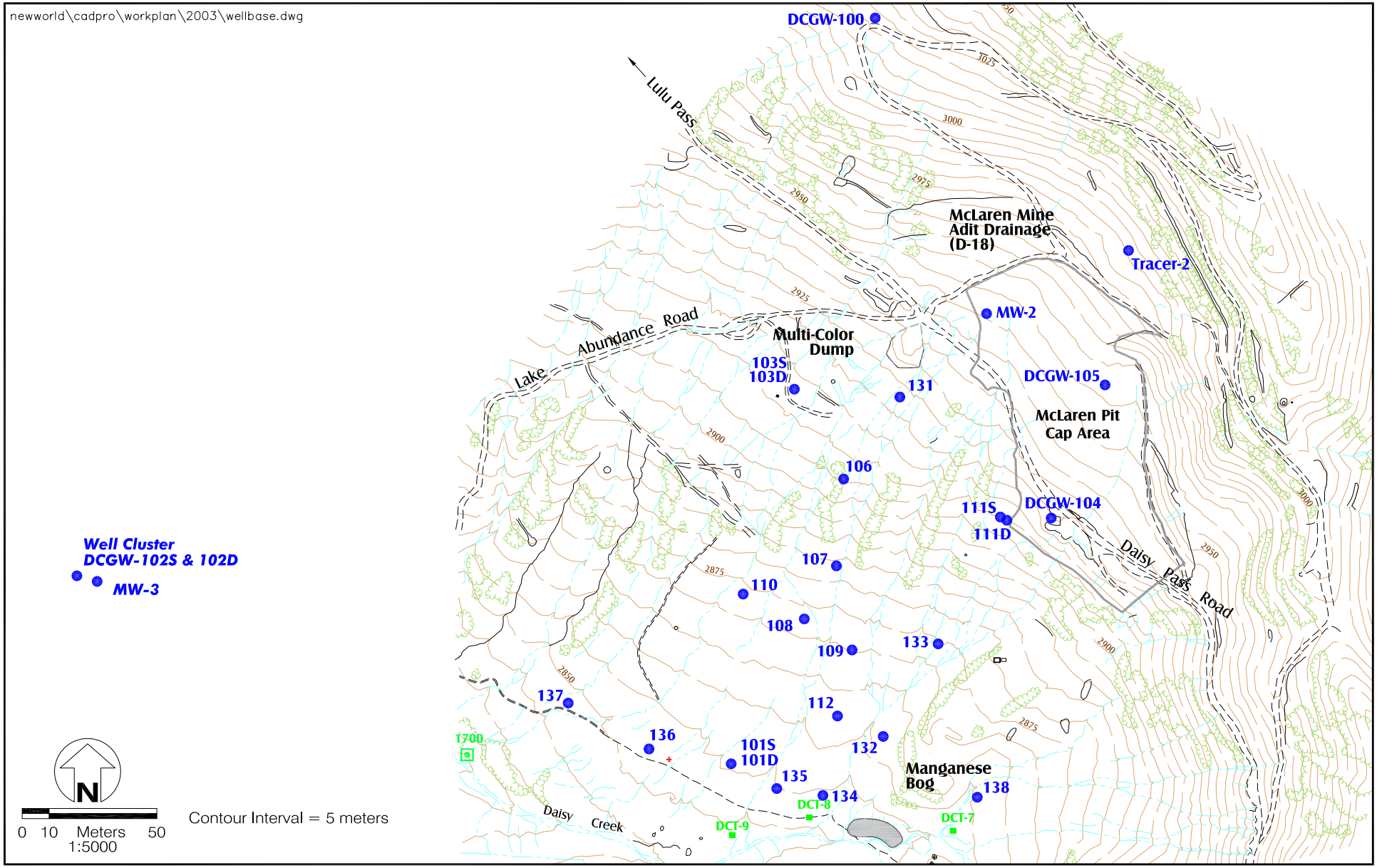
DCGW▲ Groundwater Monitoring Location
District Boundary
Unimproved Road
National Forest Boundary
Wilderness Boundary
Mine Waste Source Area

2003 Groundwater Monitoring Stations
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 5



2003 McLaren Pit Area Monitoring Wells
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 6

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TABLE 3
2003 McLAREN PIT AREA MONITORING WELLS
New World Mining District Response and Restoration Project

Well No.	Year Installed	Completion Formation	July[1]	Biweekly[2]
Tracer-2	1997	Fisher Mtn. Intrusive	X	X
MW-2	1989	Wolsey Shale	X	X
MW-3	1989	Wolsey Shale	X	X
DCGW-100	2003	Meagher Limestone	X	X
DCGW-101D	2001	Lulu Pass Rhyodacite Porphyry	X	X
DCGW-102S	2001	Glacial Till	X	X
DCGW-102D	2001	Wolsey Shale	X	X
DCGW-103S	2001	Glacial Till	X	X
DCGW-103D	2001	Park Shale	X	X
DCGW-104	2001	Waste Rock	X	X
DCGW-105	2001	Waste Rock	X	X
DCGW-106	2002	Colluvium	X	X
DCGW-107	2002	Colluvium	X	X
DCGW-108	2002	Colluvium	X	X
DCGW-109	2002	Colluvium	X	X
DCGW-110	2002	Colluvium	X	X
DCGW-111S	2003	Colluvium	X	X
DCGW-111D	2003	Bedrock	X	X
DCGW-112	2003	Bedrock	X	X
DCGW-131	2002	Colluvium	X	X
DCGW-132	2002	Colluvium	X	X
DCGW-133	2002	Colluvium	X	X
DCGW-134	2002	Colluvium	X	X
DCGW-135	2002	Colluvium	X	X
DCGW-136	2002	Colluvium	X	X
DCGW-137	2002	Colluvium	X	X
DCGW-138	2002	Colluvium	X	X

Notes: (1) The July 2003 sampling event involved measuring depth to water and field parameters and collecting samples for chemical analysis.
(2) Biweekly sampling involved measuring depth to water and field parameters only from mid-July through September

TABLE 4
2003 COMO BASIN AREA MONITORING WELLS
New World Mining District Response and Restoration Project

Well No.	Year Installed	Completion Formation	July[1]	Biweekly[2]
EPA-11	1996	Tertiary Intrusive Dike	X	X
EPA-12	1996	Scotch Bonnet Diorite	X	X
MW-1	1989	Wolsey Shale	X	X
MW-8	1989	Lulu Pass Rhyodacite	X	X
Tracer-4	1997	Fisher Mtn. Intrusive	X	X
Tracer-6	1997	Scotch Bonnet Diorite	X	X
FCGW-111	2002	Colluvium	--	X
FCGW-112	2002	Colluvium	--	X
FCGW-113	2002	Colluvium	--	X
FCGW-114	2002	Colluvium	--	X
FCGW-115	2002	Colluvium	--	X
FCGW-116	2002	Colluvium	--	X
FCGW-117	2002	Colluvium	--	X
FCGW-118	2002	Colluvium	--	X
FCGW-119	2002	Colluvium	--	X
FCGW-120	2002	Colluvium	--	X
FCGW-121	2002	Colluvium	--	X
FCGW-122	2002	Colluvium	--	X
FCGW-123	2002	Colluvium	--	X
FCGW-124	2002	Colluvium	--	X
FCGW-125	2002	Colluvium	--	X
FCGW-126	2002	Colluvium	--	X
FCGW-127	2002	Colluvium	--	X
FCGW-128	2002	Colluvium	--	X
FCGW-129	2002	Colluvium	--	X
FCGW-130	2002	Colluvium	--	X

Notes: (1) July sampling event involved measuring depth to water and field parameters and collecting samples for chemical analysis.
(2) Biweekly sampling involved measuring depth to water and field parameters only from mid-July through September.

TABLE 5
OTHER DISTRICT MONITORING WELLS SAMPLED IN JULY 2003
New World Mining District Response and Restoration Project

Well No.	Year Installed	Completion Formation
Fisher Creek Area		
MW-9A	1990	Alluvium
MW-9B	1990	Precambrian
MW-10A	1990	Alluvium
MW-10B	1991	Precambrian
MW-11	1990	Precambrian
SB-16	1991	Precambrian
Tracer-5	1997	Fisher Mtn. Intrusive
Miller Creek Area		
MW-5A	1989	Glacial Till/Dolomite
MW-5P	1989	Wolsey Shale
MW-6	1989	Flathead Sandstone
SB-4B(B) Repository		
SBGW-105T	1999	Till
SBGW-105	1999	Granite
SBGW-107T	1999	Till
SBGW-107	1999	Granite
SBGW-108T	1999	Till
SBGW-108	1999	Granite

2.2.2 McLaren Pit and Como Basin Monitoring

Extensive groundwater monitoring was conducted in the McLaren Pit and Como Basin areas, during 2003. Groundwater monitoring was conducted biweekly between early July and early October and consisted of measuring depth to water and field parameters in all wells, and collecting samples for laboratory analysis from McLaren Pit area wells in July. Samples were shipped to NAL for laboratory analysis of dissolved metals, common ions, pH, and specific conductance (SC).

Depth to groundwater was measured in monitoring wells using a decontaminated electric water level indicator. Field parameters including pH, SC, ORP, and DO were measured using a YSI 556 downhole multiprobe, if possible, or measuring field parameters at the surface. Generally, the multiprobe was lowered into the water column of the well after two casing volumes of water were purged from each monitoring well. Some exceptions to this method were made based on specific field conditions. Monitoring results are presented and discussed in detail in two technical memoranda: *2003 McLaren Pit*

Area Groundwater Monitoring Technical Memorandum and *2003 Como Basin Area Groundwater Monitoring Technical Memorandum* (Maxim, 2004a; 2004b).

2.2.3 Selective Source Repository Well Monitoring

Three well pairs installed in till and bedrock on the margins of the Selective Source Repository site were monitored on July 2 and October 2 to document groundwater quality in this area. Monitoring activities involved measuring water levels and field parameters, purging wells prior to sampling, and collecting samples for laboratory analysis for the July event only. Samples were submitted to NAL for analysis of parameters listed in the 2003/2004 Work Plan (Maxim, 2003a) and the Site-Wide SAP (Maxim, 1999b).

In addition to monitoring groundwater characteristics, continuous water level monitors were installed in the repository sump and in the upgradient and downgradient till wells (105T and 107T, respectively). The water level monitors consist of a downhole pressure transducer with a data logger. Water level monitors were installed in October and set to record groundwater levels twice daily. The data loggers were downloaded in November to ensure that the monitors were working properly.

2.3 DEVIATIONS FROM 2003/2004 WORK PLAN

Deviations from the 2003/2004 Work Plan are listed below.

- Four monitoring events instead of three were conducted at surface water stations FCT-11, FCT-11-7, and FCT-12. The additional monitoring event and laboratory analysis was conducted to better define changes in surface water characteristics with decreasing streamflow.

- Six adit discharges were not sampled because no discharge was present following the retreat of accumulated snow. These sites are identified in Table 2.

3.0 RESULTS

Surface water and groundwater data collected for the New World Mining District Response and Restoration Project during 2003 are summarized in this section. Field sample forms and laboratory analytical reports are located in separate appendices at the end of this report. Discussions and data pertaining to the McLaren Pit area and Como Basin area groundwater monitoring are not included in this report, but are described in detail in separate technical memoranda (Maxim, 2004a; 2004b). Laboratory analytical reports and field forms associated with the McLaren Pit and Como Basin monitoring are included in appendices to this report.

3.1 SURFACE WATER

This section presents a discussion of surface water quality data collected during 2003. Laboratory analytical reports, chain of custody forms, and field notes for the 2003 surface water monitoring events are contained in Appendix A. Included in Appendix A-1 is Table A-1 which summarizes surface water flow and laboratory analytical results for 2003. Construction field monitoring data is presented separately in Tables A-2 and A-3.

Surface water quality data are compared to human health and aquatic standards in the following discussion. For cadmium, copper, lead, and zinc, the discussion of exceedances of acute and chronic aquatic water quality standards takes into consideration the adjustment of the standard for hardness measured at each station for each sampling event. The calculated standard for various hardness values for these metals is shown in the tables presented in the discussion. The formula used to determine the hardness-adjusted aquatic standard can be found in MDEQ Circular WQB-7 (MDEQ, 2002). Temporary and narrative standards are not adjusted for hardness.

3.1.1 Discussion of Long-Term Surface Water Quality Data - Daisy Creek

Table 6 presents 2003 surface water analytical results with corresponding regulatory standards for surface water stations on Daisy Creek. The shading and/or color of the concentration values for each monitoring station indicate exceedances of regulatory standards (e.g., yellow shading indicates exceedance of the acute aquatic life standard).

Data shown in Table 6 indicate that water quality improves downstream in Daisy Creek. Metals concentrations measured in samples collected from the three Daisy Creek stations in 2003 were below both temporary and narrative water quality standards. At station DC-2, aluminum, cadmium, copper, iron, lead (April and September 2003 events only), and zinc exceeded both acute and/or chronic aquatic life standards during 2003 sampling events. The human health standard for copper and the human health guidelines for iron and manganese were exceeded at station DC-2 in all three sampling events. At station DC-5, aluminum, cadmium, copper, iron (July and September 2003 events only), and zinc exceeded acute and/or chronic aquatic life standards during the 2003 sampling events, and the human health guidelines for iron and manganese were exceeded for all three events. At station SW-7 (the headwaters of the Stillwater River), aluminum and copper exceeded the acute and/or chronic aquatic life standards during July 2003, and the human health guideline for iron was exceeded in April at this station. No other exceedances of aquatic criteria were measured at this station during the April, July, and September 2003 sampling events.

3.1.2 Discussion of Long-Term Surface Water Quality Data – Fisher Creek

Table 7 presents 2003 surface water analytical results with corresponding regulatory standards for Fisher Creek. As in Table 6, shading and/or color of the concentration values for each monitoring station indicates which regulatory standard was exceeded.

As with Daisy Creek, water quality in Fisher Creek improves downstream, with marked improvements noted at stations CFY-2 and SW-6. No human health standards were exceeded at any Fisher Creek monitoring stations, although human health guidelines for iron and manganese were exceeded at station SW-3 for all events sampled and the guideline for manganese was exceeded at station SW-4 in September 2003.

Metal concentrations measured in samples collected from the four Fisher Creek stations were below both temporary and narrative water quality standards with three exceptions. At station SW-3, the narrative water quality standard for zinc was exceeded in April and iron and manganese exceeded their respective narrative standards in September. Acute and/or chronic aquatic life standards at Station SW-3 were exceeded for aluminum, cadmium, copper, and iron during the three monitoring events. Lead and zinc exceeded these standards in April and September at this station.

Exceedances in both acute and/or chronic aquatic life standards for aluminum and copper were noted in at least one of the three monitoring events at downstream stations SW-4, CFY-2, and SW-6 (Clarks Fork of the Yellowstone River) during 2003. At Station SW-4, cadmium also exceeded the chronic aquatic life standard in April, and zinc exceeded the acute and chronic aquatic life standards in September 2003.

3.1.3 Discussion of Long-Term Surface Water Quality Data - Miller Creek

Review of 2003 analytical data for Miller Creek station SW-2 (Table A-1) indicates that the chronic aquatic life standard for copper was exceeded in all three 2003 monitoring events. The chronic aquatic life standard for copper was also exceeded at Station SW-5 at the mouth of Miller Creek in the June 2003 monitoring event; this station was dry for the low flow event in October. Aluminum concentrations exceeded the chronic aquatic standard at both stations in June and iron concentrations were higher than the human health guideline of 0.3 milligrams per liter (mg/L) at both stations during high flow (June). Based on in-stream hardness concentrations, no other metals exceeded regulatory standards at Miller Creek stations SW-2 and SW-5.

3.1.4 Discussion of Long-Term Surface Water Quality Data - Soda Butte Creek

Water quality data for Soda Butte Creek stations SBC-1, SBC-2, RR-SBSW-102, and SBC-4 are shown in Table A-1. At station SBC-1, the chronic aquatic life standards for aluminum and iron were exceeded during the April monitoring event and copper exceeded the acute standard in April. At station SBC-2, the chronic aquatic life standards for aluminum and copper were exceeded during the June monitoring event and iron exceeded the chronic standard during the April and September monitoring events. Total recoverable iron and manganese concentrations in Soda Butte Creek typically increase between stations SBC-1 and SBC-2 as a result of input from the McLaren Millsite and the McLaren Tailings.

At station SBSW-102, the chronic aquatic life standard for aluminum was exceeded during the April and June monitoring events. Woody and Republic creeks flow into Soda Butte Creek just above this station (Figure 2), and are the probable source of the increase in aluminum concentrations from those measured at SBC-2. At station SBC-4 (located at the Yellowstone National Park boundary), the acute

TABLE 6

COMPARISON OF SURFACE WATER RESULTS TO STANDARDS
DAISY CREEK DRAINAGE SAMPLING STATIONS
2003 MONITORING EVENTS

Parameter (mg/l)	Aquatic Life (acute)	Aquatic Life (chronic)	Human Health Standard (iron & manganese values are guidelines)	DC-2				DC-5			
				Narrative Water Quality Standard(1)	Apr-03	Jul-03	Sep-03	**Temporary Water Quality Standard(2)**	Apr-03	Jul-03	Sep-03
Aluminum	0.75	0.087	NA	**28.4**	7.85	6.17	12.5	**9.510**	2.07	2.1	5.3
Cadmium	0.001054 (3)	0.000162 (3)	0.005	**0.009**	0.0038	0.0019	0.0043	**0.004**	0.0009	0.0006	0.0012
Copper	0.0073 (3)	0.00529 (3)	1.3	**8.064**	2.14	1.92	3.63	**3.530**	0.56	0.48	1.44
Iron	NA	1	0.3	**29.649**	8.79	4.86	8.69	**6.830**	1.3	1.55	3
Lead	0.082 (4)	0.0032 (4)	0.015	**0.018**	0.005	0.003	0.005	**NA**	0.002	0.001	0.003
Manganese	NA	NA	0.05	**4.088**	1.62	0.88	2.5	**1.710**	0.35	0.29	0.62
Zinc	0.067 (3)	0.067 (3)	2	**1.104**	0.45	0.25	0.76	**0.540**	0.13	0.07	0.3
Hardness	NA	NA	NA	NA	201	147	288	NA	181	90	234
pH (s.u.)	NA	NA	NA	**2.7**	4.5	4.8	4.5	**4.6**	7.3	7.4	7.1
Flow (cfs)	NA	NA	NA	NA	0.186	2.36	0.066	NA	0.57	5.458	0.185

Parameter (mg/l)	Aquatic Life (acute)	Aquatic Life (chronic)	Human Health Standard (iron & manganese values are guidelines)	SW-7			
				Temporary Water Quality Standard(2)	Apr-03	Jul-03	Sep-03
Aluminum	0.75	0.087	NA	**0.670**	<0.05	0.31	<0.05
Cadmium	0.002067 (3)	0.001429 (3)	0.005	**NA**	0.0001	0.0001	<0.0001
Copper	0.0073 (3)	0.00529 (3)	1.3	**0.200**	0.007	0.067	0.005
Iron	NA	1	0.3	**1.320**	0.31	0.27	0.29
Lead	0.082 (4)	0.0032 (4)	0.015	**0.013**	<0.001	<0.001	0.001
Manganese	NA	NA	0.05	**0.086**	0.018	<0.02	0.023
Zinc	0.067 (3)	0.067 (3)	2	**0.049**	0.01	<0.01	0.01
Hardness	NA	NA	NA	NA	101	64	116
pH (s.u.)	NA	NA	NA	**5.5**	6.8	7.2	7.8
Flow (cfs)	NA	NA	NA	NA	--	39.55	1.42

NOTES: *Shading/coloring indicates exceedance of respectively shaded/colored regulatory standard*

** - All metals are reported as Total Recoverable Metals*

mg/l = milligrams per liter; s.u. = standard units; cfs = cubic feet per second

-- - No measurement or analysis conducted; NA = not applicable

< - Indicates analyte not detected above laboratory Practical Quantitation Limit (PQL)

(1) - Narrative Water Quality Standards apply to **any point** *in affected stream segments. Like the Temporary Water Quality Standards, the Narrative Water Quality Standards are a calculated as the mean concentration plus two (2) standard deviations*

(2) - Temporary Water Quality Standards are set in accordance to the rule adopted by the Board of Environmental Review. These standards apply to specific surface water sampling stations and shall not be exceeded more than 3% of the time

(3) - Based on 50 mg/l hardness *(4) - Based on 100 mg/l hardness*

TABLE 7

COMPARISON OF SURFACE WATER RESULTS TO STANDARDS
FISHER CREEK DRAINAGE SAMPLING STATIONS
2003 MONITORING EVENTS

Parameter (mg/l)	Aquatic Life (acute)	Aquatic Life (chronic)	Human Health Standard (iron & manganese values are guidelines)	SW-3				SW-4			
				Narrative Water Quality Standard[1]	Apr-03	Jul-03	Sep-03	Narrative Water Quality Standard[1]	Apr-03	Jul-03	Sep-03
Aluminum	0.75	0.087	NA	**4.54**	2.51	1.6	2.86	**0.740**	<0.05	0.25	<0.05
Cadmium	0.001054[3]	0.000162[3]	0.005	**0.002**	0.0012	0.0002	0.0008	**0.001**	0.0003	<0.0001	0.0002
Copper	0.0073[3]	0.00529[3]	1.3	**1.256**	0.83	0.45	0.80	**0.172**	0.049	0.07	0.079
Iron	NA	1	0.3	**9.259**	6.92	2.32J	**10.5**	**1.726**	0.1	0.29J	0.02
Lead	0.082[4]	0.0032[4]	0.015	**0.01**	0.008	0.002	0.009	**0.005**	<0.001	<0.001	<0.001
Manganese	NA	NA	0.05	**1.718**	1.3	--	**1.74**	**0.790**	0.013	--	0.06
Zinc	0.067[3]	0.067[3]	2	**0.225**	**0.26**	0.02	0.21	**0.660**	0.08	<0.01	0.13
Hardness	NA	NA	NA	NA	91	23	98	NA	59	31	63
pH (s.u.)	NA	NA	NA	**2.1**	3.1	4	3.5	**5.241**	6.3	7.4	6.5
Flow (cfs)	NA	NA	NA	NA	0.054	6.566	0.258	NA	--	40.83	0.903

Parameter (mg/l)	Aquatic Life (acute)	Aquatic Life (chronic)	Human Health Standard (iron & manganese values are guidelines)	CFY-2				SW-6			
				Temporary Water Quality Standard[2]	Apr-03	Jul-03	Sep-03	Narrative Water Quality Standard[1]	Apr-03	Jul-03	Sep-03
Aluminum	0.75	0.087	NA	**0.470**	<0.05	0.17	<0.05	**0.763**	<0.05	0.12	<0.05
Cadmium	0.002067[3]	0.001429[3]	0.005	**NA**	< 0.0001	<0.0001	<0.0001	**0.03472**	<0.0001	<0.0001	<0.0001
Copper	0.0073[3]	0.00529[3]	1.3	**0.110**	0.004	0.04	0.008	**0.076**	0.005	0.021	0.003
Iron	NA	1	0.3	**0.750**	0.09	0.19	0.01	**1.132**	0.12	0.12	<0.01
Lead	0.082[4]	0.0032[4]	0.015	**0.002**	<0.001	<0.001	<0.001	**ND**	<0.001	0.001	<0.001
Manganese	NA	NA	0.05	**0.082**	<0.003	--	<0.003	**0.03415**	0.007	--	0.02
Zinc	0.067[3]	0.067[3]	2	**0.044**	<0.01	<0.01	0.01	**0.11032**	< 0.01	<0.01	0.03
Hardness	NA	NA	NA	NA	59	31	50	NA	33	19	47
pH (s.u.)	NA	NA	NA	**5.7**	7	7.6	7.2	**5.7**	7.2	7.6	7.2
Flow (cfs)	NA	NA	NA	NA	0.0016	4.04	0.014	NA	4.132	120.54	1.21

NOTES: *Shading/coloring indicates exceedance of respectively shaded/colored regulatory standard*

** - All metals are reported as Total Recoverable Metals*

mg/l = milligrams per liter; s.u. = standard units; cfs = cubic feet per second

-- - No measurement or analysis conducted; NA = not applicable

< - Indicates analyte not detected above laboratory Practical Quantitation Limit (PQL)

(1) - Narrative Water Quality Standards apply to **any point** *in affected stream segments. Like the Temporary Water Quality Standards, the Narrative Water Quality Standards are a calculated as the mean concentration plus two (2) standard deviations*

(2) - Temporary Water Quality Standards are set in accordance to the rule adopted by the Board of Environmental Review. These standards apply to specific surface water sampling stations and shall not be exceeded more than 3% of the time

(3) - Based on 50 mg/l hardness *(4) - Based on 100 mg/l hardness*

aquatic life standard for aluminum and the chronic aquatic life standard for iron were exceeded during the April monitoring event.

3.1.5 Discussion of Supplemental Surface Water Quality Monitoring

This section presents data collected at the supplemental surface water sampling sites. The discussion is divided into sections for each of the drainages monitored.

Tributaries to Daisy Creek (McLaren Pit Area Monitoring

Stations DCT-7, DCT-8, DCT-9, USGS-1700, and USGS-5519 are located on tributaries to Daisy Creek below the McLaren Pit and were sampled during July and October 2003. A summary of field measurements and analytical results for these stations are contained in Table A-1. Monitoring results for these stations are summarized here and discussed in detail in the *2003 McLaren Pit Area Groundwater Monitoring Technical Memorandum* (Maxim 2004a). Figure 6 shows the locations of supplemental stations monitored in the McLaren Pit area.

Surface water flows measured on July 9, 2003 in Daisy Creek tributaries below the McLaren Pit were 0.33 cubic feet per second (cfs) at station DCT-7, 0.028 cfs at station DCT-8, and 0.025 cfs at station DCT-9. In Daisy Creek downstream of these tributaries on July 9, 2003, a flow of 1.11 cfs was measured at station USGS 1700. By October 2003, flow at DCT-7 had decreased to about a tenth of the July flow (0.045 cfs) while flow at station DCT-8 had remained about the same as in July at 0.03 cfs. Flowing water was not observed at stations DCT-9 and USGS 1700 on October 1, 2003.

Analytical results from the July 2003 monitoring event indicate that surface water quality at station DCT-7 is relatively unimpacted, having a near neutral pH and SC below 340 micromhos per centimeter (µmhos/cm). Surface water in tributaries at stations DCT-8, DCT-9, and USGS-1700 is acidic (pH at or less than 3.5 standard units) with SC values greater than 400 µmhos/cm. Except for lead in the sample from station USGS 1700, surface water at station DCT-8 contained the highest metals and sulfate concentrations of these four tributaries.

The 2003 surface and groundwater water quality data suggest that DCT-8 is an important pathway for the transport of water with low pH and high metals concentrations from McLaren Pit waste rock into shallow groundwater, ultimately discharging to the manganese bog and Daisy Creek (Maxim, 2004a). Comparison of pH, sulfate, SC, and metals concentrations measured in groundwater samples from wells 104, 105, 132, and 133 to the July 9, 2003, sample from tributary DCT-8 indicates that groundwater quality in this area is equivalent to surface water quality at station DCT-8 (Maxim, 2004a). Metals concentrations increased at station DCT-8 between the July and October 2003 monitoring events, coincident with an observed decrease in pH in groundwater at wells 132 and 133 (Maxim, 2004a).

Tributaries to Fisher Creek

Stations FCT-11, FCT-11-7, and FCT-12 are located on tributaries to Fisher Creek, upstream of the Glengarry adit, and were sampled in early and late July and early and mid August 2003. Streamflow at station FCT-12, declined from 1.11 cubic feet per second (cfs) on July 1 to 0.0156 cfs (seven gallons per minute) on August 14, 2003. Streamflows at stations FCT-11 and FCT-11-7 also declined between early July and mid-August 2003 monitoring events. On August 14, flow in FCT-11-7 was nearly zero, with this tributary dry shortly after this date. FCT-11 and FCT-12 were dry by September 10.

While flows were higher in the tributaries during the early July monitoring event, metal concentrations, acidity, and sulfate concentrations increased with decreasing streamflow throughout the monitoring period. Concentrations of lead exceeded the human health standard (MDEQ, 2002) in samples collected from station FCT-11-7 in all of the monitoring events. Copper also exceeded the human health standard at FCT-11-7 on August 14, 2003.

Soda Butte Creek – McLaren Millsite Runoff Sampling

Table 8 summarizes the results of runoff sampling conducted in August at the three millsite sampling sites. These data indicate that samples collected from precipitation that runs over and through millsite wastes is extremely acidic (pH 2.4 s.u.) and contains very high concentrations of dissolved solids. Aluminum, copper, iron, lead, manganese, and zinc are all elevated with respect to concentrations present in the upstream Soda Butte Creek sample (SBMS-US), as are calcium, magnesium, sulfate, and chloride concentrations. The flow measured at the peak of the August 3rd event was about 10 gallons per minute (gpm) while the flow on August 22 was about 2½ gpm.

While stormwater runoff flows from the millsite are relatively low compared to flows in Soda Butte Creek at Station SBC-4 (Yellowstone National Park Boundary), which were 44 cubic feet per second (cfs) on August 3 and 18 cfs on August 22 (http://waterdata.usgs.gov/mt/nwis), impacts to Soda Butte Creek water quality are measurable. Comparing the downstream concentrations in Soda Butte Creek (SBMS) with the upstream concentrations, aluminum, copper, iron, and manganese concentrations are one to two orders of magnitude higher, and high enough to exceed the acute aquatic standard for aluminum (0.75 milligrams/liter (mg/L)) and copper (0.018 mg/L), and the chronic standard for iron (1.0 mg/L) in both sampling events. A noticeable decrease in pH, bicarbonate, and carbonate were also noted in the downstream sample, along with increases in specific conductance, total dissolved and suspended solids, and sulfate.

Soda Butte Creek – Selective Source Repository Site

Water quality data for the tributary to Soda Butte Creek downstream of the selective source repository are shown in Table A-1. At Station SBT-3, a sample was collected during July to determine if any impacts to surface water could be detected from the repository prior to the repository sump being pumped dry. No exceedances of aquatic or human health standards were detected at this location.

Station SBT-6 was sampled in April, July, and September 2003. Metal concentrations did not exceed human health standards, acute aquatic standards, or chronic aquatic standards at this station during these monitoring events except for lead, which exceeded the chronic aquatic life standard of 0.0032 mg/L in April 2003 monitoring event. Lead was below detection at this station during high flow in July and during fall low flow in September.

3.1.6 Discussion of Response Action Construction Monitoring

Construction activities occurred in the Daisy Creek and Fisher Creek drainages during 2003. Construction field monitoring data are shown in Tables A-2 and A-3, with complete suites of analytical data for these same sites listed in Table A-1 when the sites were monitored as part of long-term monitoring.

TABLE 8
MCLAREN MILLSITE STORMWATER RUNOFF ANALYTICAL RESULTS
New World Mining District Response and Restoration Project

Parameter (units)[1]	SBMS-RO[2] (8/3/03)	SBMS-US[3] (8/3/03)	SBMS[4] (8/3/03)	SBMS-RO[2] (8/22/03)	SBMS-US[3] (8/22/03)	SBMS[4] (8/22/03)
Physicochemical						
Specific Conductivity (μmhos/cm)	8,520	230	269	9,730	226	254
pH (standard units)	2.4	8.3	7.1	2.4	8.0	6.6
Total Dissolved Solids	18,700	119	170	27,000	136	189
Total Suspended Solids	2,530	3	50	10,000	<4	41
Hardness	2,780	112	130	3,260	116	143
Acidity	9,720	<2	<2	15,600	<2	<2
Metals						
Aluminum	724	<0.1	3.1	971	<0.1	2.5
Cadmium	0.0081	<0.0001	<0.0001	0.011	<0.0001	<0.0001
Copper	198	0.006	0.77	286	0.005	0.5
Iron	3,230	0.11	14.3	7,260	0.01	10.7
Lead	0.13	<0.001	0.003	0.015	<0.003	0.005
Manganese	18.4	<0.003	0.082	25.7	0.014	0.12
Zinc	3.6	<0.01	<0.01	5.47	<0.01	<0.01
Common Ions						
Calcium	263	35	37	217	35	39
Magnesium	515	6	9	660	7	11
Potassium	<1	<1	<1	<1	<1	<1
Sodium	3	<1	<1	4	1	1
Sulfate	11,300	21	67	18,700	8	51
Bicarbonate	<1	115	96	<1	136	100
Carbonate	<1	94	78	<1	112	82
Chloride	450	<2	<2	425	5	4

Notes: 1 Units in milligrams per liter unless otherwise indicated; < indicates less than the practical quantitation limit
2 Runoff channel sample
3 Soda Butte Creek upstream of runoff channel input
4 Soda Butte Creek downstream of runoff channel input

McLaren Pit Response Action Construction Monitoring

Construction activities were conducted from mid-July until early October. The major earthwork involved with the project included hauling and placing coversoil from the Daisy Creek borrow site downslope of the McLaren Pit, constructing runon ditches, and installing cover system drainage ditches and benches. Construction monitoring was conducted at downstream stations DC-2 and DC-5 in the Daisy Creek drainage between July 15 and September 8, 2003, which was coincident with the majority of earthmoving operations that could potentially impact water quality in Daisy Creek. Construction

monitoring was discontinued on a daily basis in September as these operations neared completion, and a final sampling event was conducted on September 29.

Samples collected from stations DC-2 and DC-5 remained below temporary standards during the period of monitoring on all but one date. On September 8, the iron concentration exceeded the temporary standard of 6.8 mg/L at Station DC-5.

Glengarry Mine Response Action Construction Monitoring

Construction activities at the Glengarry Mine commenced in mid-July and were completed on October 28, 2003. Construction monitoring was conducted daily at the sediment pond outlet (SPO) and at Station SW-3 when construction was active, and weekly at Station SW-4 between August 7 and September 29.

July through September 2003 averages of field parameter measurements for pH, copper, and iron at station SPO were 3.2 s.u., 2.9 mg/L, and 582 mg/L, respectively. Total copper and iron concentrations decreased at SW-3, with average concentrations of 1.0 and 6.7 mg/L, respectively.

Concentrations of copper and/or iron exceeded temporary standards in field monitoring of surface water at station SW-3 on the following dates: July 25; August 1, 21, 22, 23, and 27; and September 4 and 30, 2003. On two instances, exceedances of the temporary standards were due to problems encountered in the sediment ponds, which were corrected by the next monitoring event. One exceedance was associated with a rainstorm that lasted most of the day. The other three exceedances were likely associated with a shortened residence time in the sediment pond, which was corrected by adding a flocculent (sodium hydroxide) to the pond circuit. Temporary standards for copper and iron were not exceeded at station SW-4 during the 2003 construction monitoring period.

3.1.7 Discussion of Adit Discharge Monitoring

Twenty-five adits were monitored in the District during 2003 (Table 2). Water quality data for these discharges are summarized in Table 9, and complete water quality information is presented in Table A-1 in Appendix A. Adit discharges with water quality exceeding human health standards include the McLaren Adit, Glengarry Adit, Gold Dust Adit, Little Daisy Adit, Henderson Mountain adits/seeps, and Tredennic adits/seeps. These sites are discussed in the following sections. Water quality at the remainder of the adit stations did not exceed human health standards.

McLaren Adit

The McLaren adit discharge was monitored at the portal in July, August, and October 2003. Two inflows within the adit (D-18-366 and D-18-423) were also monitored on August 7, 2003. Discharge at the portal station was 10 gpm (0.0223 cfs) in July, decreasing to 3.5 gpm (0.008) cfs in October 2003. The majority of this decrease can be attributed to the grouting of the borehole at station D-18-366 (Figure 4), which was accomplished on September 23, 2003. A packer was set in the bottom of the 4.25 inch diameter hole, and 175 gallons of grout was pumped into the hole through the packer until pressures increased to the point that no more grout could be pumped. About 60 feet of the 130 foot deep borehole should have been filled with this volume of grout. Prior to grouting, the volume of water leaking from the hole was several gallons per minute (a more exact flow could not be measured due to its dispersed nature). Following grouting, no water was discharging from the borehole.

TABLE 9

2003 MINE ADIT DISCHARGE DATA

New World Mining District Response and Restoration Project

Site Number	Site Name	Sample Date	Flow (gpm)	pH Fld (su)	pH Lab (su)	Hard-ness	Total Recoverable Concentration - milligrams per liter						
							Aluminum	Cadmium	Copper	Iron	Lead	Manganese	Zinc
Human Health Standard or Guideline (Iron and Manganese)							*NA*	**0.005**	**1.3**	**0.300**	**0.015**	**0.050**	**2.0**
Acute Aquatic Standard *(where applicable, calculated for hardness = 50/250*)*							*0.750*	*0.00105/0.0054*	*0.0072/0.0331*	*NA*	*0.0337/0.262*	*--*	*0.067/0.260*
Chronic Aquatic Standard *(where applicable, calculated for hardness = 50/250*)*							*0.087*	*0.00016/0.00053*	*0.0051/0.0204*	*1.0*	*0.0013/0.0102*	*--*	*0.067/0.260*
D-18	McLaren Adit	7/28/2003	10	5.4	6.5	338	4.95	0.0005	0.14	8.35	<0.001	0.92	JF%0.09
D-18	McLaren Adit	8/7/2003	7	6.8	7.2	348	0.2	<0.0001	0.03	3.64	0.002	0.6	<0.01
D-18-366	McLaren Adit	8/7/2003	--	7.1	7.4	141	<0.1	0.0047	0.029	0.65	<0.001	0.68	<0.01
D-18-423	McLaren Adit	8/7/2003	5	7.1	6.5	438	0.3	<0.0001	0.006	29.7	<0.001	1.18	<0.01
D-18	McLaren Adit	10/1/2003	3.5	6.8	6.7	449	0.1	<0.0001	0.025	19.1	<0.001	0.96	0.05
M-1	Little Daisy Adit	7/16/2003	8	7.2	7	424	0.06	0.0001	0.008	0.58	0.015	0.42	0.01
DCSI-96-3-1	Daisy Pass Dump 1	7/22/2003	2	7.5	7.2	65	<0.05	0.0002	0.001	0.05	<0.003	<0.02	0.05
F-8A	Glengarry Adit	7/1/2003	40	2.4	3	168	15	0.0018	6.9	77.6	0.022	6.12	0.63
F-8B	Glengarry Millsite Adit	7/1/2003	3	3.1	3.4	23	0.32	0.0001	0.24	6.46	0.001	0.66	0.05
F-8A	Glengarry Adit	10/1/2003	48	3.4	3.5	208	4.79	0.0012	0.73	55.5	0.026	4.25	0.35
F-28	Gold Dust Adit	7/1/2003	250	6.8	7.6	376	0.06	<0.0001	0.002	0.26	<0.001	0.047	<0.01
F-28	Gold Dust Adit	8/14/2003	12	7.5	8.2	640	<0.05	<0.0001	0.002	0.38	<0.001	0.08	<0.01
F-28-367	Gold Dust Adit	8/14/2003	1.5	7.9	7.4	165	<0.05	<0.0001	<0.001	1.71	<0.001	0.3	<0.01
F-28-D1	Gold Dust Adit	8/14/2003	0.5	7.7	7.5	530	<0.05	<0.0001	<0.001	0.63	<0.001	0.025	<0.01
F-28-D3	Gold Dust Adit	8/14/2003	7	7.7	7.3	986	<0.05	<0.0001	0.001	1.51	<0.001	0.26	<0.01
F-28	Gold Dust Adit	9/30/2003	15	7.5	7.9	660	<0.05	<0.0001	0.012	0.23	<0.001	0.085	<0.01
FCSI-99-1	Sheep Mountain #1	7/15/2003	2	6.2	7.4	24	<0.05	<0.0001	0.005	0.19	0.007	<0.02	<0.01
M-25	Henderson Mountain Adit	7/10/2003	2	4.5	4.8	8	0.59	0.0001	0.29	<0.05	0.011	<0.02	<0.01
M25-B	Henderson Mountain Adit	7/14/2003	6.5	4.9	4.8	7	0.46	0.0002	0.31	0.05	0.007	0.02	<0.01
M25-C	Henderson Mountain Adit	7/14/2003	<1	5.6	6.1	40	<0.05	0.0018	1.21	0.08	0.083	0.03	0.25
M25-Seep	Henderson Mountain Adit	7/14/2003	<1	5.6	6.1	12	0.07	0.0002	0.18	0.07	<0.003	0.06	<0.01
FCSI-99-73	Henderson Mountain Dump 13	7/15/2003	5	6.6	7.5	68	<0.05	<0.0001	<0.001	<0.01	<0.003	<0.02	<0.01
FCSI-99-68	Henderson Mountain Dump 7	7/15/2003	5	6.7	6.9	68	0.11	0.0001	0.022	1.54	<0.003	0.08	0.05
FCSI-96-15-2	Upper Tredennic Dump 2	7/16/2003	<0.5	2.9	3.3	28	0.25	0.0004	0.1	3.06	0.076	0.13	0.16
FCSI-96-6	Middle Tredennic Dump 1	7/16/2003	3	4.4	5.1	14	0.12	0.0002	0.094	0.42	<0.003	0.06	0.01
FCSI-96-5	Lower Tredennic Dump 1	7/16/2003	<0.5	7.1	7	102	<0.05	0.0001	0.003	0.15	<0.003	0.12	0.02
MCSI-96-2	Black Warrior Adit	7/16/2003	8	7.4	7.8	106	<0.05	0.001	0.002	0.04	0.006	<0.02	0.24
MCSI-96-3	Upper Miller Creek Dump	7/16/2003	2	7.6	7.2	61	<0.05	0.0004	<0.001	0.02	<0.003	<0.02	0.11
SBSI-99-95 (NDP)	Soda Butte Dump 1	7/8/2003	1	7.4	8.2	172	0.28	<0.0001	<0.05	<0.05	<0.001	<0.02	<0.01
SBSI-99-87 (NDP)	Soda Butte Dump 8	7/8/2003	58	7.4	8.1	131	<0.05	<0.0001	<0.05	<0.05	<0.001	<0.02	<0.01
SBSI-99-85 (NDP)	Alice E. Mill Site Seep	7/16/2003	--	7.1	7.1	28	<0.05	<0.0001	0.002	0.06	<0.003	<0.02	<0.01
SBSI-99-74 (NDP)	Woody Creek Mine Dump 1	7/22/2003	3	7.5	7.7	163	0.05	<0.0001	0.001	0.05	<0.003	<0.02	<0.01

Notes:

Shading/coloring indicates exceedance of respective standard

Sc = specific conductance in microsiemens per centimeter (us/cm)

gpm = gallons per minute

su = standard units

NDP = Non-District Property

< = less than the practical quantitation limit

JF% = value estimated; field duplicate results exceed acceptable limits by relative % difference

** = Hardness and Metal concentrations in milligrams per liter*

Fld = Fld: Measurement conducted in field

Lab = Lab: Measurement conducted in laboratory

Water quality in the formerly leaking borehole contributed about 79% of the total copper load measured at the portal (Maxim, 2003d). Prior to plugging, borehole copper concentrations were 0.029 mg/L on August 7 (sample D-18-366, Table A-1, Appendix A), with a portal concentration of copper on that same date of 0.03 mg/L. On October 1, the portal concentration of copper was 0.025 mg/L. This small change in copper concentration may be due to copper continuing to desorb from precipitates located on the adit sill (the tunnel floor).

Water quality at the portal station and two inflow stations exceeded human health standards for iron and manganese during all monitoring events. Acute and/or chronic aquatic standards were also exceeded in these events.

Glengarry Adit

The Glengarry adit discharge (F-8A) was monitored on two occasions in July and October 2003. The Glengarry millsite adit discharge (F-8B) was also monitored in July 2003. Discharge at the portal station (F8-A) was 40 gpm (0.09 cfs) in July, increasing to 48 gpm (0.107 cfs) on October 1, 2003. While grouting of the Como Raise was completed during the intervening interval, grouting of the 1066 fault (previously referred to as the 1050 roof leak) was not completed until October 28. The portal discharge had decreased to 27 gpm by this date, a reduction of 13 gpm.

Water quality at the portal station exceeded human health standards for copper, iron, lead, and manganese in the July 2003 monitoring event and iron, lead, and manganese in the October monitoring event. Concentrations of aluminum, cadmium, copper, iron, lead, and zinc also exceeded the acute and/or chronic aquatic standards during these monitoring events.

The Glengarry millsite adit discharge (F8-B) was monitored on July 1. Discharge at this site was about 3 gpm (0.0067cfs). Water quality exceeded human health standards for iron and manganese. Concentrations of aluminum, copper, and iron also exceeded the acute and/or chronic aquatic standards from the adit on this date.

Gold Dust Adit

The Gold Dust Adit trends to the southwest beneath Henderson Mountain and is about 2350 feet in length. At a distance about 1,600 feet from the portal, there is a junction with a heading also trending southwest that has four drill stations, F-28-D1, D2, D3, and D4, located at 1,770, 1,920, 2,070 and 2,280 feet from the portal, respectively. Each of these drill stations had a number of long exploration holes drilled from the stations to target the Homestake Breccia Pipe.

The Gold Dust Adit discharge (F-28) was monitored in July, August, and September 2003. In addition to the portal station, underground flows were measured and sampled on August 14 from a fracture (F-28-367) located 367 feet in from the portal, and at two drill stations further back in the mine (F-28-D1 and -D3). Discharge at the portal station (F-28) was 250 gpm (0.55 cfs) in July, decreasing to about 12 gpm (0.0267 cfs) on August 14. September 30, 2003 flows (15 gpm) were similar to the August measurement. High portal flows are created from snowmelt leaking into the first hundred feet of the underground workings, as observed during an initial entry into the mine by Maxim personnel on July 8. During the August sampling event, relatively little flow was measured in the fracture (F-28-367) and the first drill station (-D1), while more than half the flow (approximately 7.0 gpm) was measured from several boreholes leaking at drill station 3 (F-28-D3). Drill stations D2, D4 and the rescue chamber at 2350 feet from the portal ware all-dry during the August sampling event.

With the dilution of snowmelt contributing to portal flows in July, water quality at the portal station changes markedly through the summer. Comparing the July 1 and August 14 samples, SC and total alkalinity approximately double, and concentrations of other common cations and anions increase. By September, copper concentrations rose to the chronic aquatic level, and manganese concentrations exceeded the human health standard. Drill station 3 (-D3) contributes a large load of iron to the total adit discharge on a relative basis (1.51 mg/L with 58% of the flow) compared to the fracture at F-28-367 (1.71 mg/L with 12% of the flow) and drill station F28-D1 (0.63 mg/L with 4% of the flow). Iron concentrations at the portal ranged from 0.23 mg/L in September to 0.38 mg/L in August. Based on the large difference in iron concentrations measured between underground stations and the portal, iron precipitates appear to be actively forming in the underground workings.

Little Daisy Adit

The Little Daisy adit discharge (M-1) was monitored during July. Discharge was about 8.0 gpm. Water quality exceeded human health standards for iron, lead, and manganese, as well as the chronic aquatic standard for lead.

Henderson Mountain Adits and Seeps

Six adit and seep stations were monitored on Henderson Mountain in July 2003 (Table 9). The M25 stations are seeps that originate at an adit at M25-B. Discharge was about 2.0 gpm at station M-25A and 6.5 gpm at the adit (M25-B). Stations M25-C and M25-Seep are located below the adit in a road cut, and discharge less than 1.0 gpm. These four stations drain water from the area of Henderson Mountain known to have anomalously high copper concentrations in soil (Maxim, 2003e). Acute standards for copper were exceeded in samples from all four sites. The chronic aquatic standards for aluminum were exceeded at two sites (M-25 and M25-B), and acute standards for cadmium, lead, and zinc were exceeded in the sample from M25-C. Water quality exceeded the human health standard for lead at station M25-C and manganese at station M25-Seep.

Discharge was approximately five gpm at stations FCSI-99-73 and FCSI-99-68 in July 2003. Water quality did not exceed regulatory standards in samples collected at station FCSI-99-73. Iron and manganese exceeded human health standards and aluminum, copper, and iron exceeded acute and/or chronic aquatic standards in the sample collected at station FCSI-99-68.

Tredennic Adits

Three adit/seep stations were monitored in the Tredennic area in July 2003 and included FCSI-96-15-2, FCSI-96-6, and FCSI-96-5. Approximate discharge at these stations ranged between 0.5 and 3 gpm. Water quality exceeded the human health standard for iron and manganese at stations FCSI-96-15-2 and FCSI-96-6 and manganese at station FCSI-96-5. In addition, the acute and/or chronic aquatic standards were exceeded for aluminum, cadmium, copper, iron, lead, and zinc at station FCSI-96-15-2 and aluminum, cadmium, and copper at station FCSI-96-6.

3.2 GROUNDWATER

Groundwater monitoring was conducted during 2003 in monitoring wells located in the McLaren Pit area, the Fisher Creek drainage, the Miller Creek drainage, and the Selective Source Repository area. Field parameters were measured and groundwater samples were collected at each well monitored. Well locations are shown on Figures 5 and 6. Laboratory analytical reports, chain of custody forms, and

field notes for the 2003 groundwater monitoring events are contained in Appendix B. Included in Appendix B-1 is Table B-1, which summarizes groundwater monitoring data collected during 2003.

3.2.1 McLaren Pit and Como Basin Areas

Results of groundwater monitoring in the McLaren Pit area and the Como Basin area during 2003 are discussed in the following Technical Memoranda: *2003 McLaren Pit Area Groundwater Monitoring* and *2003 Como Basin Area Groundwater Monitoring* (Maxim, 2004a and 2004b).

3.2.2 Fisher Creek and Miller Creek Drainages

Wells MW-9A, MW-9B, MW-10A, MW-10B, MW-11, SB-16, and Tracer 5 in the Fisher Creek drainage were monitored in July. Wells MW-5A, MW-5P, and MW-6 in the Miller Creek drainage were also monitored in July. Monitoring results for these wells are summarized in Table B-1. Monitoring results for these wells are similar to that measured in previous years.

3.2.3 Selective Source Repository

Three well pairs, SBGW-105, -107, and -108 were monitored and sampled in July. Field parameters were also collected from the wells on October 2. Each well pair consists of a well completed in glacial till ("T" designation) and a deeper well completed in pre-Cambrian granite bedrock.

Table 10 summarizes field parameter measurements and analytical results for monitoring wells and compares 2003 water quality data with 1999 and 2002 data. Of the three well pairs, only bedrock well SBGW-108 was previously sampled in 1999. Other wells shown in Table 10 that were sampled in 1999 include two other bedrock wells (SBGW-106 and SBGW-101) and a shallow till well (SBGW-101-TS) adjacent to the Selective Source Repository location. Water quality in these wells is considered representative of bedrock and till water-bearing units in the repository area prior to constructing the repository. SBGW-106, which was located at the eastern edge of the repository prior to construction, was abandoned in 2001 when repository construction was initiated.

As in the 2002 monitoring event, an upward hydraulic gradient was documented in the area of well pair SBGW-105 by evidence of the bedrock well having a water level of greater elevation in comparison to the well screened in till. Groundwater level elevations were similar in well pairs SBGW-107 and SBGW-108 during July 2003.

All three well pairs sampled in 2003 had pH values in the neutral to alkaline range, with the highest pH of 10.2 s.u. measured in the upgradient bedrock well, SBGW-105. The concentration of manganese in the samples collected from wells SBGW-105T and SBGW-107 exceeded the MDEQ human health standard. Samples collected from these wells in 2002 also exceeded this action level for manganese as did the samples collected from wells SBGW-101TS and SBGW-106 in 1999.

The majority of the parameter concentrations either declined or remained unchanged between the 2002 and 2003 monitoring events in the three well pairs. Exceptions to this statement include the following: increases in zinc concentrations in well SBGW-105T; increases in bicarbonate (HCO_3) alkalinity in well SBGW-105; increases in calcium and manganese concentrations in well SBGW-107T; increases in sulfate and manganese concentrations in well SBGW-108; and increases in SC and total dissolved solids (TDS), sulfate and chloride concentrations in well SBGW-108T.

TABLE 10
GROUNDWATER QUALITY DATA – SELECTIVE SOURCE REPOSITORY AREA
New World Mining District Response and Restoration Project

Parameter[1]	Stan-dard[2]	Well Designation															
		SBGW-101	SBGW-101-TS	SBGW-106	SBGW-108	SBGW-105	SBGW-105T	SBGW-107	SBGW-107T	SBGW-108	SBGW-108T	SBGW-105	SBGW-105T	SBGW-107	SBGW-107T	SBGW-108	SBGW-108T
		Sampled September 24, 1999				Sampled July 9, 2002						Sampled July 2, 2003					
Depth to Water (feet)	--	2.32	12.23	15.38	13.28	3.52	8.02	11.41	9.58	9.13	8.27	2.71	6.65	9.50	9.18	7.36	7.05
Field pH (s.u.)[3]	--	9.01	6.78	9.61	11.83	8.87	6.56	8.36	6.69	7.39	7.93	9.87	6.44	8.15	7.23	7.18	7.13
Lab pH (s.u.)	--	8.6	7.8	8.4	11.7	10	8	8.6	7.3	7.4	7.5	10.2	7.9	9	7.2	7.4	7.7
Lab SC (umhos/cm)[4]	--	237	531	307	570	581	382	1570	386	273	357	456	344	951	478	265	390
TDS	--	153	342	208	180	434	261	1080	291	180	227	367	207	630	283	174	235
Hardness (CaCO3)[5]	--	109	260	83	142	22	215	114	243	169	211	17	198	77	244	140	203
Calcium	--	24	66	25	57	9	58	31	79	53	68	7	58	21	83	46	68
Magnesium	--	12	23	5	1	< 1	17	9	11	9	10	<1	13	6	9	6	8
Sodium	--	5	9	32	8	116	6	302	2	2	4	96	4	179	2	2	1
Potassium	--	3	4	3	1	2	2	3	< 1	< 1	< 1	1	2	1	<1	<1	<1
CaCO3 Alkalinity	--	110	204	118	147	437	419	207	194	133	203	170	188	165	180	129	165
CO3 Alkalinity	--	0	0	12	63	0	0	0	0	0	0	0	0	9	0	0	0
HCO3 Alkalinity	--	134	249	118	1	357	511	253	237	162	248	208	229	182	220	158	201
Acidity as CaCO3	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	< 2
Sulfate	--	20	78	46	9	125	37	497	52	18	22	55	31	271	46	22	25
Chloride	--	< 1	3	4	2	2	< 1	6	< 4	< 1	< 2	<2	<2	2	4	<2	6
Aluminum	--	< 0.1	< 0.1	6	< 0.1	0.3	< 0.1	0.2	0.2	< 0.1	< 0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium	0.005	< 0.0001	0.0002	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0053	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0001
Copper	1.3	< 0.001	0.012	0.03	< 0.001	0.004	0.002	0.003	0.008	< 0.001	< 0.001	<0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001
Iron	0.3	< 0.01	< 0.01	5.91	< 0.01	0.29	0.04	0.33	0.17	< 0.01	0.01	<0.001	0.01	<0.02	< 0.01	< 0.01	< 0.01
Lead	0.015	< 0.001	0.001	0.006	< 0.001	< 0.001	< 0.001	0.001	0.006	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	0.05	0.036	0.19	0.22	< 0.005	< 0.005	0.38	0.38	< 0.005	< 0.005	< 0.005	<0.003	0.15	0.12	0.003	0.003	<0.003
Zinc	2	< 0.01	0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 0.01	< 0.01	<0.01	0.02	< 0.01	0.02	< 0.01	< 0.01

Notes:
1 All chemical constituents are dissolved (filtered through a 0.45-micron filter); units are in milligrams per liter unless otherwise noted
2 Human health standard or guideline (iron and manganese) (MDEQ, 2002) Shading indicates exceedance of human health standard or guideline
3 Well locations shown on Figure 5
4 su = standard units
5 SC = specific conductance in umhos/cm (micromhos per centimeter)
6 CaCO3 = calcium carbonate

4.0 DATA VALIDATION

This section describes the data validation process used to determine the adequacy and quality of laboratory analytical data collected for surface water and groundwater monitoring conducted in 2003. The objective of data validation is to identify any unreliable or invalid measurements and qualify that data for interpretive use. These validations were performed according to guidelines prepared by US EPA (1994).

4.1 SURFACE WATER DATA VALIDATION

The 2003 surface water monitoring events were validated independently as separate sample matrices. Data qualifiers used to flag data are as follows: '<' indicates the material was analyzed for, but not detected above the level of the associated value practical quantitation limit (PQL); 'J' indicates the associated values are an estimated quantity; and, 'R' indicates the data are unacceptable.

4.1.1 Field QA/QC

During the 2003 sampling events, field duplicates were prepared and containerized by Maxim field personnel in accordance with the Site-Wide SAP (Maxim, 1999b). Field QA/QC samples collected/ prepared during the 2003 surface water monitoring events are summarized in Table 11.

TABLE 11
2003 SURFACE WATER QUALITY CONTROL SAMPLES
New World Mining District Response and Restoration Project

Monitoring Event	QA/QC Sample	Sample Designation
April 2003	Field Duplicate	SBC-4X
July 2003	Field Duplicate	D-18X
	Field Duplicate	USGS-5519X
September 2003	Field Duplicate	SBC-2X

Field duplicate results aid in the assessment of sampling and analytical accuracy. Analytical results for the original and duplicate samples collected from each sampling event were evaluated using relative percent difference (RPD) and absolute value difference. The RPD between the two samples was calculated when both values of the natural/duplicate pair were greater than five times the PQL for a given analyte. The absolute value difference between the natural and duplicate sample for a given analyte was calculated when one or both values were less than five times the PQL.

RPDs are calculated by dividing the difference between the two reported values for a given parameter by the average of the two parameters. Analytical results of parameters where the RPD was greater than 20 percent are considered estimated concentrations. Zinc in the natural/field duplicate pair DCSI96-1/ DCSI96-1X exhibited an RPD greater than 20 percent for the July sampling event. No other parameters exhibited an RPD greater than 20 percent in the 2003 sample event.

Results from natural/duplicate pairs with values less than five times the PQL are considered estimated when the absolute value difference exceeds the PQL. No parameters exhibited absolute differences greater than the PQL.

4.1.2 Laboratory QA/QC

Northern Analytical Laboratories received surface water samples from Maxim on April 25; July 3, 11, 18, and 25; August 1, 8, and 28; September 16; and, October 3, 2003. All samples arrived at the laboratory cool between (0.1º C and 3.8º C). All samples were analyzed within the required holding time except for samples received on September 16. The analysis for total suspended solids (TSS) exceeded the holding time on this date and was therefore not analyzed.

Northern Analytical Laboratories' quality assurance coordinator reviewed calibration standards, calibration verification, laboratory controls, laboratory duplicates, and laboratory spikes on a daily basis. Review of these indicators showed that all inorganic analyses were in compliance with NAL's QA/QC criteria and within the precision and accuracy guidelines specified in NAL's *Laboratory Quality Assurance Plan* (submitted to MDEQ, June 1997).

Accuracy is measured as the ability of the analytical procedure to determine the actual or known quantity of a particular substance in a sample. Accuracy acceptance or rejection is based on the percent recovery (%R) of the laboratory matrix spike for water samples. To determine accuracy, the %R for each matrix spike is compared to the acceptable range as specified in the applicable laboratory method. Natural results associated with percent recoveries outside acceptable limits are considered estimated. Natural results associated with percent recoveries of less than 50 percent are considered rejected, as recommended by U.S. EPA (1988). An overall assessment of accuracy is made upon completion of the project. Overall accuracy is stated as the mean %R. Under this criterion, all surface water data collected in 2003 are acceptable.

4.1.3 Data Completeness

No data have been rejected on the basis of field QA/QC or laboratory QA/QC in any sampling event. Therefore, a data completeness of 100 percent was achieved for the 2003 surface water monitoring events.

4.2 GROUNDWATER DATA VALIDATION

The 2003 groundwater monitoring event was validated independently as a separate sample matrix. Data flagging are the same as that used for surface water samples.

4.2.1 Field QA/QC

During the 2003 sampling event, field duplicates and a rinsate blank were prepared and containerized by Maxim field personnel in accordance with the Site-Wide SAP (Maxim, 1999b). Field QA/QC samples collected/prepared during the 2003 groundwater monitoring events are summarized in Table 12. No natural/field duplicate groundwater pairs exhibited RPDs greater than 20 percent in the 2003 sample event and no parameters exhibited absolute differences greater than the PQL.

TABLE 12
2003 GROUNDWATER QUALITY CONTROL SAMPLES
New World Mining District Response and Restoration Project

Monitoring Event	QA/QC Sample	Sample Designation
July 2003	Field Duplicate	DCGW-101DX
	Field Duplicate	MW-2X
	Field Duplicate	MW-6X
	Rinsate Blank	EPA-11R

All blank results (rinsate blank and deionized water blank) for both sampling events were evaluated using the following criteria to determine if any parameter was measured in the samples at detectable concentrations. The blank with the highest detectable concentrations was used for further evaluation in instances where more than one type of blank was contaminated. All results greater than or equal to the PQL but less than five times the concentration of the contaminated blank are considered estimated and are likely biased towards the high end.

Rinsate blank EPA-11R contained detectable concentrations of analytes shown in Table B-1. Therefore, all natural samples with a parameter concentration greater than or equal to the PQL but less than five times the concentration of the contaminated blank were flagged as estimated in Table B-1 for wells that were sampled with the submersible pump. Where disposable bailers were used for sampling, the rinsate blank results do not apply.

4.2.2 Laboratory QA/QC

Northern Analytical Laboratories received groundwater samples from Maxim on July 3, 11, and 18 and August 15 and 22, 2003. All samples arrived at the laboratory cool between (0.1º C and 3.8º C). All samples were analyzed within the required holding time for the parameters of interest.

Northern Analytical Laboratories' quality assurance coordinator reviewed calibration standards, calibration verification, laboratory controls, laboratory duplicates, and laboratory spikes on a daily basis. Review of these quality indicators showed that all inorganic analyses were in compliance with NAL's QA/QC criteria and within the precision and accuracy guidelines specified in NAL's *Laboratory Quality Assurance Plan* (submitted to MDEQ, June 1997). The laboratory flagged the TDS result associated with well DCGW-108 with J indicating the concentration is estimated.

Accuracy is measured as the ability of the analytical procedure to determine the actual or known quantity of a particular substance in a sample. Accuracy acceptance or rejection is based on the percent recovery (%R) of the laboratory matrix spike for water samples. To determine accuracy, the %R for each matrix spike is compared to the acceptable range as specified in the applicable laboratory method. Natural results associated with percent recoveries outside acceptable limits will be considered estimated. Natural results associated with percent recoveries of less than 50 percent will be considered rejected, as recommended by U.S. EPA (1988). Under this criterion, all groundwater data collected in 2003 data are acceptable. Recovery limits in the matrix spikes associated with sample digestion groups 2003080192 and 2003070225 were in excess of control parameters. The laboratory noted the sample results were greater than four times the spike added; therefore no corrective action was required.

4.2.3 Data Completeness

No data have been rejected on the basis of field QA/QC or laboratory QA/QC in either sampling event. Therefore, a data completeness of 100 percent was achieved for the 2003 groundwater monitoring event.

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APPENDIX A

2003 SURFACE WATER DATA
2003 SURFACE WATER AND GROUNDWATER MONITORING

New World Mining District Response and Restoration Project

APPENDIX A-1

SURFACE WATER SUMMARY TABLES

TABLE A-1
2003 SURFACE WATER SUMMARY
NEW WORLD MINING DISTRICT
Response and Restoration Project

Station Name	Sample Date	Flow Rate (cfs)	Anions (mg/L)					Cations (mg/L)								Total Recoverable Metals (mg/L)							
			Acid-idity as CaCO3	Alkalinity as		Chlor-ide	Sulfate	Calcium	Hard-ness as CaCO3	Magne-sium	Potass-ium	Sod-ium	SC (umhos/cm)	pH (s.u.)	Total Sus-pended Solids (mg/L)	Alum-inum	Arsenic	Cad-mium	Copper	Iron	Lead	Manga-nese	Zinc
				HCO3	Total CaCO3																		
Drainage: Adits																							
D-18	*7/22/2003*	*0.0045*	*<2*	*52*	*42*	*<2*	*39*	*16*	*65*	*6*	*<1*	*1*	*133*	*7.2*	*<2*	*<0.05*	*<0.001*	*0.0002*	*0.001*	*0.05*	*<0.003*	*<0.02*	*0.05*
D-18	*7/28/2003*	*0.0223*	*<2*	*45*	*37*	*1*	*332*	*109*	*338*	*16*	*2*	*3*	*627*	*6.5*	*9*	*4.95*	*<0.001*	*0.0005*	*0.14*	*8.35*	*<0.001*	*0.92*	*JF%0.09*
D-18X	*7/28/2003*	*--*	*<2*	*41*	*34*	*<1*	*309*	*112*	*346*	*16*	*2*	*3*	*629*	*6.5*	*10*	*4.67*	*<0.001*	*0.0005*	*0.14*	*8.3*	*0.002*	*0.87*	*0.07*
D-18	*8/7/2003*	*0.0155*	*<2*	*57*	*47*	*<2*	*302*	*113*	*348*	*16*	*2*	*3*	*654*	*7.2*	*12*	*0.2*	*<0.001*	*<0.0001*	*0.03*	*3.64*	*0.002*	*0.6*	*<0.01*
D-18-366	*8/7/2003*	*--*	*<2*	*79*	*65*	*<2*	*94*	*50*	*141*	*4*	*2*	*2*	*319*	*7.4*	*<2*	*<0.1*	*<0.001*	*0.0047*	*0.029*	*0.65*	*<0.001*	*0.68*	*<0.01*
D-18-423	*8/7/2003*	*0.0104*	*<2*	*48*	*39*	*<2*	*429*	*134*	*438*	*25*	*3*	*4*	*813*	*6.5*	*21*	*0.3*	*<0.001*	*<0.0001*	*0.006*	*29.7*	*<0.001*	*1.18*	*<0.01*
D-18	*10/1/2003*	*0.008*	*<2*	*63*	*51*	*2*	*379*	*142*	*449*	*23*	*4*	*4*	*778*	*6.7*	*39*	*0.1*	*<t0.001*	*<0.0001*	*0.025*	*19.1*	*<0.001*	*0.96*	*0.05*
F-28	*7/1/2003*	*0.55*	*<2*	*132*	*108*	*<2*	*JF%275*	*88*	*376*	*38*	*1*	*7*	*681*	*7.6*	*<2*	*0.06*	*<0.001*	*<0.0001*	*0.002*	*0.26*	*<0.001*	*0.047*	*<0.01*
F-28	*8/14/2003*	*0.0267*	*<2*	*265*	*217*	*<2*	*469*	*144*	*640*	*68*	*2*	*19*	*1180*	*8.2*	*<2*	*<0.05*	*<0.001*	*<0.0001*	*0.002*	*0.38*	*<0.001*	*0.08*	*<0.01*
F-28-367	*8/14/2003*	*0.0033*	*<2*	*72*	*59*	*<2*	*109*	*48*	*165*	*11*	*<1*	*<1*	*332*	*7.4*	*4*	*<0.05*	*<0.001*	*<0.0001*	*<0.001*	*1.71*	*<0.001*	*0.3*	*<0.01*
F-28-D1	*8/14/2003*	*0.0011*	*<2*	*249*	*204*	*<2*	*388*	*125*	*530*	*53*	*3*	*26*	*1050*	*7.5*	*4*	*<0.05*	*<0.001*	*<0.0001*	*<0.001*	*0.63*	*<0.001*	*0.025*	*<0.01*
F-28-D3	*8/14/2003*	*0.0156*	*<2*	*380*	*311*	*<2*	*678*	*220*	*986*	*106*	*3*	*19*	*1560*	*7.3*	*5*	*<0.05*	*<0.001*	*<0.0001*	*0.001*	*1.51*	*<0.001*	*0.26*	*<0.01*
F-28	*9/30/2003*	*0.033*	*<2*	*279*	*229*	*1*	*484*	*139*	*660*	*76*	*3*	*22*	*1170*	*7.9*	*<4*	*<0.05*	*<t0.001*	*<0.0001*	*0.012*	*0.23*	*<0.001*	*0.085*	*<0.01*
F-8A	*7/1/2003*	*0.09*	*301*	*<1*	*<1*	*<2*	*JF%450*	*46*	*168*	*13*	*2*	*1*	*1270*	*3*	*7*	*15*	*0.003*	*0.0018*	*6.9*	*77.6*	*0.022*	*6.12*	*0.63*
F-8A	*10/1/2003*	*0.107*	*141*	*<1*	*<1*	*3*	*332*	*57*	*208*	*16*	*3*	*5*	*862*	*3.5*	*18*	*4.79*	*t0.001*	*0.0012*	*0.73*	*55.5*	*0.026*	*4.25*	*0.35*
F-8B	*7/1/2003*	*0.00668*	*25*	*<1*	*<1*	*<2*	*JF%54*	*6*	*23*	*2*	*<1*	*2*	*224*	*3.4*	*3*	*0.32*	*<0.001*	*0.0001*	*0.24*	*6.46*	*0.001*	*0.66*	*0.05*
FCSI-96-15-2	*7/16/2003*	*0.00111*	*50*	*<1*	*<1*	*<2*	*44*	*8*	*28*	*2*	*<1*	*<1*	*172*	*3.3*	*8*	*0.25*	*<0.001*	*0.0004*	*0.1*	*3.06*	*0.076*	*0.13*	*0.16*
FCSI-96-5	*7/16/2003*	*0.00134*	*<2*	*43*	*35*	*<2*	*58*	*26*	*102*	*9*	*1*	*2*	*206*	*7*	*<2*	*<0.05*	*<0.001*	*0.0001*	*0.003*	*0.15*	*<0.003*	*0.12*	*0.02*
FCSI-96-6	*7/16/2003*	*0.00668*	*<2*	*14*	*12*	*<2*	*21*	*4*	*14*	*1*	*<1*	*1*	*50*	*5.1*	*<2*	*0.12*	*<0.001*	*0.0002*	*0.094*	*0.42*	*<0.003*	*0.06*	*0.01*
FCSI-99-1	*7/15/2003*	*0.00446*	*<2*	*11*	*9*	*<2*	*16*	*8*	*24*	*1*	*<1*	*<1*	*59*	*7.4*	*<4*	*<0.05*	*<0.001*	*<0.0001*	*0.005*	*0.19*	*0.007*	*<0.02*	*<0.01*
FCSI-99-68	*7/15/2003*	*0.0112*	*<2*	*57*	*47*	*<2*	*29*	*14*	*68*	*8*	*<1*	*1*	*136*	*6.9*	*<4*	*0.11*	*0.002*	*0.0001*	*0.022*	*1.54*	*<0.003*	*0.08*	*0.05*
FCSI-99-73	*7/15/2003*	*0.0112*	*<2*	*105*	*86*	*<2*	*10*	*14*	*68*	*8*	*<1*	*1*	*132*	*7.5*	*<2*	*<0.05*	*0.001*	*<0.0001*	*<0.001*	*<0.01*	*<0.003*	*<0.02*	*<0.01*
M-1	*7/16/2003*	*0.01756*	*<2*	*201*	*165*	*<2*	*246*	*112*	*424*	*35*	*2*	*3*	*712*	*7*	*<2*	*0.06*	*<0.001*	*0.0001*	*0.008*	*0.58*	*0.015*	*0.42*	*0.01*
M-25	*7/10/2003*	*0.00446*	*5*	*5*	*4*	*<4*	*18*	*3*	*8*	*<1*	*1*	*2*	*49*	*4.8*	*<7*	*0.59*	*<0.001*	*0.0001*	*0.29*	*<0.05*	*0.011*	*<0.02*	*<0.01*
M-25-B	*7/14/2003*	*0.01448*	*<2*	*<1*	*<1*	*<2*	*17*	*3*	*7*	*<1*	*1*	*2*	*49*	*4.8*	*<4*	*0.46*	*<0.001*	*0.0002*	*0.31*	*0.05*	*0.007*	*0.02*	*<0.01*

Notes:

cfs - Cubic feet per second
s.u. - Standard units
mg/L - Milligrams per liter
X - Field duplicate
umhos/cm - micromhos per centimeter

-- - Indicates data not collected or parameter not analyzed
< - Indicates analyte not detected above practical quantitation limit (PQL)
** - Indicates the test was performed on a filtered sample due to the presence of suspended sediment*
J - Indicates the test was performed after the holding time had passed
JF% - The associated values are estimated quantities because field duplicate results exceed acceptable limits by relative percent difference determination
t - The associated values are total, not total recoverable

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Maxim Technologies, Inc.

Revision Date
4/27/2004

TABLE A-1
2003 SURFACE WATER SUMMARY
NEW WORLD MINING DISTRICT
Response and Restoration Project

Station Name	Sample Date	Flow Rate (cfs)	Anions (mg/L)					Cations (mg/L)								Total Recoverable Metals (mg/L)							
			Acidity as CaCO3	Alkalinity as HCO3	Alkalinity as Total CaCO3	Chloride	Sulfate	Calcium	Hardness as CaCO3	Magnesium	Potassium	Sodium	SC (umhos/cm)	pH (s.u.)	Total Suspended Solids (mg/L)	Aluminum	Arsenic	Cadmium	Copper	Iron	Lead	Manganese	Zinc
M-25-C	7/14/2003	<0.002	<2	22	18	<2	18	11	40	3	2	2	101	6.1	<4	<0.05	<0.001	0.0018	1.21	0.08	0.083	0.03	0.25
M-25-Seep	7/14/2003	<0.002	<2	18	15	<2	17	5	12	<1	1	2	47	6.1	<4	0.07	<0.001	0.0002	0.18	0.07	<0.003	0.06	<0.01
MCSI-96-2	7/16/2003	0.01756	<2	124	102	<2	23	36	106	4	<1	<1	194	7.8	<2	<0.05	<0.001	0.001	0.002	0.04	0.006	<0.02	0.24
MCSI-96-3	7/16/2003	0.0045	<2	72	59	<2	12	21	61	2	<1	<1	118	7.2	<2	<0.05	<0.001	0.0004	<0.001	0.02	<0.003	<0.02	0.11
SBSI-99-74	7/22/2003	0.0069	<2	201	165	<2	13	47	163	11	2	5	291	7.7	<2	0.05	<0.001	<0.0001	0.001	0.05	<0.003	<0.02	<0.01
SBSI-99-85	7/16/2003	Seep	7	38	31	<2	20	8	28	2	<1	1	64	7.1	<2	<0.05	<0.001	<0.0001	0.002	0.06	<0.003	<0.02	<0.01
SBSI-99-87	7/8/2003	0.13	<2	165	135	<4	10	31	131	13	1	1	247	8.1	<2	<0.05	<0.001	<0.0001	<0.05	<0.05	<0.001	<0.02	<0.01
SBSI-99-95	7/8/2003	0.002	<2	201	165	<4	6	36	172	20	<1	<1	277	8.2	<2	0.28	<0.001	<0.0001	<0.05	<0.05	<0.001	<0.02	<0.01
Drainage: Clarks Fork																							
SW-6	4/22/2003	4.13	<2	27	22	<2	16	10	33	2	<1	1	79	7.2	<1	<0.05	--	<0.0001	0.005	0.12	<0.001	0.007	<0.01
SW-6	7/1/2003	120.5	<2	17	14	<2	JF%9	6	19	1	<1	<1	51	7.6	3	0.12	--	<0.0001	0.021	0.12	0.001	0.014	<0.01
SW-6	9/30/2003	1.21	<2	31	26	1	26	14	47	3	<1	1	103	7.2	<4	<0.05	--	<0.0001	0.003	<0.01	<0.001	0.02	0.03
Drainage: Daisy Creek																							
DC-2	4/22/2003	0.19	59	<1	<1	<2	247	59	201	13	1	2	505	4.5	8	7.85	--	0.0038	2.14	8.79	0.005	1.62	0.45
DC-2	7/11/2003	2.36	17	6	5	<4	142	44	147	9	2	4	318	4.8	30	6.17	--	0.0019	1.92	4.86	0.003	0.88	0.25
DC-2	7/31/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.1	<0.001	0.0032	3.57	12.2	0.005	1.83	JF%0.57
DC-2	8/14/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.9	<0.001	0.0044	4.46	14.4	0.007	2.25	0.63
DC-2	8/21/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.3	--	0.0048	4.37	13.3	0.007	2.29	0.65
DC-2	8/22/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.2	--	0.0051	4.35	21.4	0.008	2.81	0.87
DC-2	9/8/2003	--	138	<1	<1	<4	404	75	257	22	2	3	859	3.5	--	18.5	--	0.0046	5.03	19.4	0.013	2.8	0.81
DC-2	9/29/2003	0.066	92	<1	<1	1	314	84	288	19	2	2	634	4.5	17	12.5	--	0.0043	3.63	8.69	0.005	2.5	0.76
DC-5	4/21/2003	0.57	<2	72	59	<2	113	56	181	10	<1	1	333	7.3	9	2.07	--	0.0009	0.56	1.3	0.002	0.35	0.13
DC-5	7/11/2003	5.46	<2	36	29	<4	57	26	90	6	<1	<1	193	7.4	12	2.1	--	0.0006	0.48	1.55	0.001	0.29	0.07
DC-5	9/8/2003	--	9	3	2	<4	213	63	215	14	1	2	436	5.9	--	7.84	--	0.0017	2.01	15.7	0.018	1.05	0.38
DC-5	9/29/2003	0.185	<2	39	32	1	174	69	234	15	<1	1	411	7.1	39	5.34	--	0.0012	1.44	3	0.003	0.62	0.3
DCT-7	7/9/2003	0.33	<2	32	26	<4	107	40	121	5	<1	1	274	6.5	<4	0.49	--	0.0033	0.44	<0.05	<0.001	0.41	0.52

Notes:

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-- - Indicates data not collected or parameter not analyzed
< - Indicates analyte not detected above practical quantitation limit (PQL)
** - Indicates the test was performed on a filtered sample due to the presence of suspended sediment*
J - Indicates the test was performed after the holding time had passed
JF% - The associated values are estimated quantities because field duplicate results exceed acceptable limits by relative percent difference determination
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TABLE A-1
2003 SURFACE WATER SUMMARY
NEW WORLD MINING DISTRICT
Response and Restoration Project

Station Name	Sample Date	Flow Rate (cfs)	Anions (mg/L)					Cations (mg/L)								Total Recoverable Metals (mg/L)							
			Acidity as CaCO3	Alkalinity as HCO3	Alkalinity as Total CaCO3	Chloride	Sulfate	Calcium	Hardness as CaCO3	Magnesium	Potassium	Sodium	SC (umhos/cm)	pH (s.u.)	Total Suspended Solids (mg/L)	Aluminum	Arsenic	Cadmium	Copper	Iron	Lead	Manganese	Zinc
DCT-7	10/1/2003	0.045	<2	60	49	<1	121	62	180	6	<1	1	337	7.2	<4	0.11	--	0.0008	0.17	0.05	<0.001	0.22	0.22
DCT-8	7/9/2003	0.028	253	<1	<1	<4	485	92	292	15	2	5	1080	3.1	20	27.1	--	0.0049	7.76	19.9	0.006	3.04	0.78
DCT-8	10/1/2003	0.033	437	<1	<1	4	756	129	450	31	3	4	1410	3.1	18	44.5	--	0.011	13.4	35.4	0.009	5.98	1.87
DCT-9	7/9/2003	0.025	69	<1	<1	<4	164	35	104	4	1	1	424	3.5	<2	7.6	--	0.0006	0.66	2.45	0.003	0.42	0.08
DCT-9	10/1/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-7	4/21/2003	Ice	<2	92	75	<2	29	29	101	7	<1	1	208	6.8	3	<0.05	--	0.0001	0.007	0.31	<0.001	0.018	0.01
SW-7	7/11/2003	39.6	<2	72	59	<4	13	19	64	4	<1	2	133	7.7	2	0.31	--	0.0001	0.067	0.27	<0.001	<0.02	<0.01
SW-7	9/29/2003	1.42	<2	111	91	<1	23	35	116	7	<1	1	214	7.8	38	<0.05	--	<0.0001	0.005	0.29	0.001	0.023	0.01
USGS-1700	7/9/2003	1.11	61	<1	<1	<4	210	54	180	11	2	4	542	3.5	18	6.23	--	0.0014	1.77	11	0.015	0.98	0.16
USGS-1700	10/1/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
USGS-5519	7/9/2003	0.83	<2	79	65	<4	11	16	69	7	<1	<1	111	7.9	<2	0.09	--	<0.0001	0.004	0.09	<0.001	<0.02	<0.01
USGS-5519X	7/9/2003	--	<2	67	55	<4	10	15	66	7	<1	<1	113	8	<2	0.07	--	<0.0001	0.004	0.09	<0.001	<0.02	<0.01
USGS-5519	10/1/2003	0.035	<2	141	115	2	24	36	148	14	<1	<1	253	8.2	<4	<0.05	--	<0.0001	0.5	0.03	<0.001	0.14	0.23
Drainage: Fisher Creek																							
CFY-2	4/22/2003	0.002	<2	20	16	<2	45	17	59	4	<1	1	141	7	<1	<0.05	--	<0.0001	0.004	0.09	<0.001	<0.003	<0.01
CFY-2	7/1/2003	4	<2	18	15	<2	JF%21	9	31	2	<1	<1	72	7.6	3	0.17	--	<0.0001	0.04	0.19	<0.001	0.024	<0.01
CFY-2	9/30/2003	0.014	<2	37	30	2	26	15	50	3	<1	1	110	7.2	<4	<0.05	--	<0.0001	0.008	0.01	<0.001	<0.003	0.01
FCT-11	7/2/2003	1.73	11	<1	<1	<2	JF%31	5	17	1	<1	<1	92	4.3	<2	1.49	--	0.0001	0.28	0.76	0.001	0.16	<0.01
FCT-11	7/24/2003	0.0891	15	<1	<1	<2	34	6	19	1	<1	1	104	4.3	5	1.84	<0.001	0.0002	0.22	1.74	<0.003	0.23	0.04
FCT-11	8/7/2003	0.0668	31	<1	<1	<2	47	6	19	1	<1	<1	171	4	6	2.5	<0.001	<0.0001	0.25	2.8	<0.001	0.3	<0.02
FCT-11	8/14/2003	0.033	39	<1	<1	<2	48	5	17	1	<1	2	184	2.9	4	3.17	<0.001	<0.0001	0.24	3.32	0.003	0.38	<0.01
FCT-11-7	7/17/2003	0.156	48	<1	<1	<2	57	10	29	1	<1	<1	209	3.6	51	4.13	--	0.0004	0.88	8.49	0.017	0.77	0.26
FCT-11-7	7/24/2003	0.078	50	<1	<1	<2	94	13	41	2	<1	<1	306	3.4	101	6.58	0.004	0.0007	1.05	12.6	0.033	0.97	0.15
FCT-11-7	8/7/2003	0.0334	12	10	8	<2	38	7	26	2	<1	<1	82	5.2	5	1.1	<0.001	<0.0001	0.29	0.24	<0.001	0.098	<0.01
FCT-11-7	8/14/2003	0.0006	171	<1	<1	<2	372	52	166	12	1	2	947	2.9	<4	11.3	<0.001	0.0022	3.39	10.5	0.021	4.25	0.31
FCT-12	7/1/2003	1.11	9	<1	<1	<2	JF%15	1	<7	<1	<1	<1	50	4.4	<2	0.99	--	<0.0001	0.48	0.09	0.002	0.029	<0.01

Notes:

cfs - Cubic feet per second
s.u. - Standard units
mg/L - Milligrams per liter
X - Field duplicate
umhos/cm - micromhos per centimeter

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Maxim Technologies, Inc.

Revision Date
4/27/2004

TABLE A-1
2003 SURFACE WATER SUMMARY
NEW WORLD MINING DISTRICT
Response and Restoration Project

Station Name	Sample Date	Flow Rate (cfs)	Anions (mg/L)					Cations (mg/L)								Total Recoverable Metals (mg/L)							
			Acid-idity as CaCO3	Alkalinity as		Chlor-ide	Sulfate	Calcium	Hard-ness as CaCO3	Magne-sium	Potass-ium	Sod-ium	SC (umhos/cm)	pH (s.u.)	Total Sus-pended Solids (mg/L)	Alum-inum	Arsenic	Cad-mium	Copper	Iron	Lead	Manga-nese	Zinc
				HCO3	Total CaCO3																		
FCT-12	7/24/2003	0.0668	7	<1	<1	<2	18	2	5	<1	<1	2	56	4.3	<2	1.08	<0.001	<0.0001	0.68	0.06	0.003	0.06	<0.01
FCT-12	8/7/2003	0.0222	20	<1	<1	<2	23	2	5	<1	<1	2	66	--4.3	<2	0.9	<0.001	<0.0001	0.61	0.06	<0.001	0.078	<0.01
FCT-12	8/14/2003	0.0156	16	6	5	<2	21	2	5	<1	<1	2	66	4.4	<2	0.91	<0.001	<0.0001	0.64	0.05	0.004	0.09	<0.01
SW-3	4/23/2003	0.05	51	<1	<1	<2	158	25	91	7	2	5	451	3.1	<2	2.51	--	0.0012	0.83	6.92	0.008	1.3	0.26
SW-3	7/1/2003	6.57	138	<1	<1	<2	JF%5	6	23	2	<1	<1	134	4	4	1.62	--	0.0002	0.45	2.32	0.002	0.29	0.02
SW-3	7/31/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.83	<0.001	0.0005	1.04	5.38	0.005	0.78	JF%0.14
SW-3	8/14/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.1	<0.001	0.0005	1.15	6.13	0.01	1.31	0.13
SW-3	8/21/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--	0.0009	1.06	10.9	0.009	1.5	0.14
SW-3	8/22/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.1	--	0.0009	0.94	8.58	0.013	1.48	0.19
SW-3	9/30/2003	0.258	58	<1	<1	2	150	26	98	8	2	4	418	3.5	8	2.86	--	0.0008	0.8	10.5	0.009	1.74	0.21
SW-4	4/23/2003	Ice	<2	9	7	<2	63	17	59	4	<1	2	149	6.3	<1	<0.05	--	0.0003	0.049	0.1	<0.001	0.013	0.08
SW-4	7/1/2003	40.8	<2	17	14	<2	JF%26	9	31	2	<1	<1	76	7.4	3	0.25	--	<0.0001	0.07	0.29	<0.001	0.044	<0.01
SW-4	9/30/2003	0.903	4	4	4	1	65	17	63	5	<1	2	148	6.5	<4	<0.05	--	0.0002	0.079	0.02	<0.001	0.055	0.13
Drainage: Miller Creek																							
SW-2	4/22/2003	0.32	<2	72	59	<2	42	31	98	5	<1	1	205	7.3	<1	<0.05	--	<0.0001	0.012	0.2	<0.001	0.008	0.02
SW-2	6/30/2003	31.4	<2	48	39	<2	JF%14	16	48	2	<1	<1	101	7.9	10	0.28	--	<0.0001	0.017	0.38	0.004	0.015	<0.01
SW-2	9/29/2003	0.247	<2	84	69	1	32	33	103	5	<1	<1	196	7.9	<4	<0.05	--	<0.0001	0.015	0.03	0.004	<0.003	<0.01
SW-5	4/22/2003	0.14	<2	75	61	<2	42	30	96	5	<1	1	203	7.8	<1	<0.05	--	<0.0001	0.004	0.16	<0.001	0.008	<0.01
SW-5	6/30/2003	21	<2	49	40	<2	JF%12	17	51	2	<1	<1	106	8	7	0.21	--	<0.0001	0.014	0.32	0.003	0.01	<0.01
SW-5	9/29/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Drainage: Soda Butte Creek																							
SBC-1	4/23/2003	2.09	<2	149	122	<2	18	40	129	7	<1	1	262	7.8	2	0.15	--	<0.0001	0.054	1.08	<0.001	0.009	0.01
SBC-1	6/30/2003	11	<2	122	100	<2	JF%7	34	110	6	<1	<1	198	8.4	<4	0.07	--	<0.0001	0.001	0.08	<0.001	<0.005	<0.01
SBC-1	9/30/2003	0.864	<2	144	118	<1	5	39	126	7	<1	1	226	8.3	<4	<0.05	--	<0.0001	<0.001	0.03	<0.001	<0.003	<0.01
SBC-2	4/23/2003	2.4	<2	138	113	<2	36	45	145	8	<1	1	282	7.7	4	<0.05	--	<0.0001	0.006	2.37	<0.001	0.059	0.02
SBC-2	6/30/2003	41.2	<2	86	71	<2	JF%18	22	70	3	<1	<1	140	8.2	6	0.19	--	<0.0001	0.012	0.34	0.003	0.014	<0.01

Notes:

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TABLE A-1
2003 SURFACE WATER SUMMARY
NEW WORLD MINING DISTRICT
Response and Restoration Project

Station Name	Sample Date	Flow Rate (cfs)	Anions (mg/L)					Cations (mg/L)								Total Recoverable Metals (mg/L)							
			Acidity as CaCO3	Alkalinity as HCO3	Alkalinity as Total CaCO3	Chloride	Sulfate	Calcium	Hardness as CaCO3	Magnesium	Potassium	Sodium	SC (umhos/cm)	pH (s.u.)	Total Suspended Solids (mg/L)	Aluminum	Arsenic	Cadmium	Copper	Iron	Lead	Manganese	Zinc
SBC-2	9/30/2003	0.783	<2	149	123	2	37	50	162	9	<1	1	300	8	4	<0.05	--	<0.0001	0.002	1.73	<0.001	0.073	0.01
SBC-2X	9/30/2003	--	<2	145	118	1	37	49	159	9	<1	1	290	8	<4	<0.05	--	<0.0001	0.001	1.73	<0.001	0.074	0.01
SBC-4	4/22/2003	21.1	<2	115	94	<2	13	26	94	7	2	5	186	8	101	2.28	--	<0.0001	0.005	3.47	0.002	0.059	0.01
SBC-4X	4/22/2003	--	<2	103	85	<2	12	25	91	7	1	5	182	8	95	2.41	--	<0.0001	0.005	3.43	0.002	0.058	0.01
SBC-4	7/2/2003	--	<2	65	53	<2	JF%5	12	42	3	<1	3	84	7.9	5	0.24	--	<0.0001	0.002	0.41	<0.001	0.007	<0.01
SBC-4	9/30/2003	7.16	<2	138	113	1	8	33	111	7	<1	4	216	8.4	<4	<0.05	--	<0.0001	<0.001	0.08	<0.001	<0.003	0.06
SBMS	8/3/2003	--	<2	96	78	<2	67	37	130	9	<1	<1	269	7.1	50	3.1	--	<0.0001	0.77	14.3	0.003	0.082	<0.01
SBMS	8/22/2003	--	<2	100	82	4	51	39	143	11	<1	1	254	6.6	41	2.5	--	<0.0001	0.5	10.7	0.005	0.12	<0.01
SBMS-RO	8/3/2003	0.022	9720	<1	<1	450	11300	263	2780	515	<1	3	8520	2.4	2530	724	--	0.0081	198	3230	0.13	18.4	3.6
SBMS-RO	8/20/2003	0.005	J*15600	<1	<1	425	*18700	*217	*3260	*660	<*1	*4	9730	2.4	10000	971	--	0.011	286	7260	0.015	25.7	5.47
SBMS-US	8/3/2003	--	<2	115	94	<2	21	35	112	6	<1	<1	230	8.3	3	<0.1	--	<0.0001	0.006	0.11	<0.001	<0.003	<0.01
SBMS-US	8/22/2003	--	<2	136	112	5	8	35	116	7	<1	1	226	8	<4	<0.1	--	<0.0001	0.005	0.01	<0.003	0.014	<0.01
SBSW-102	4/23/2003	3.77	<2	80	66	<2	10	17	63	5	<1	5	139	7.8	4	0.22	--	<0.0001	0.003	0.57	<0.001	0.007	0.09
SBSW-102	6/30/2003	179.2	<2	36	29	<2	<JF%5	8	28	2	<1	<1	69	8.1	14	0.45	--	<0.0001	0.003	0.73	0.002	0.013	<0.01
SBSW-102	9/30/2003	2.58	<2	81	66	<1	6	16	61	5	<1	5	125	8.2	<4	<0.05	--	<0.0001	0.002	0.34	<0.001	<0.003	0.01
SBT-3	7/1/2003	0.325	<2	89	73	<2	JF%13	27	84	4	<1	<1	150	8	<2	<0.05	--	<0.0001	0.002	0.02	<0.001	<0.005	<0.01
SBT-6	4/23/2003	1.09	<2	120	99	<2	17	35	112	6	<1	1	212	7.5	2	0.06	--	<0.0001	0.003	0.22	0.008	0.012	0.03
SBT-6	7/1/2003	1.29	<2	100	82	<2	<JF%5	28	86	4	<1	<1	159	8.2	<2	<0.05	--	<0.0001	0.002	0.02	<0.001	<0.005	<0.01
SBT-6	9/30/2003	0.003	<2	167	137	<1	7	47	146	7	<1	1	262	8.1	<4	<0.05	--	<0.0001	0.001	0.04	<0.001	<0.003	<0.01

Notes:

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TABLE A-2

2003 MCLAREN RESPONSE ACTION CONSTRUCTION MONITORING

New World Mining District Response and Restoration Project

SITE #	Date	Time	pH (su)	SC (umhos)	Turbidity (ntu)	Copper (mg/L)	Iron (mg/L)	Comment
DC-2	7/15/2003	1215	4.9	237	--	1.3	4.8	no turbidity meter
DC-2	7/16/2003	1500	5.3	300	17.8	1.2	4.2	
DC-2	7/17/2003	1500	5.5	300	16.5	1.3	4	
DC-2	7/18/2003	1115	4.6	350	21.3	1.5	4.4	
DC-2	7/21/2003	1410	4.5	350	18.7	1.4	4.6	
DC-2	7/22/2003	1445	5.7	350	26.8	1.4	4.8	
DC-2	7/23/2003	920	4.5	390	22.8	1.6	5.2	
DC-2	7/23/2003	1350	4.4	370	68.2	1.6	9.6	2:1 dilution
DC-2	7/24/2003	1115	4.6	390	71.1	1.6	5.8	
DC-2	7/25/2003	835	4.6	390	24.7	1.5	6.2	rain previous evening
DC-2	7/28/2003	1210	4.3	466	22.0	1.8	9.4	
DC-2	7/29/2003	1000	4.2	482	18.2	1.9	10.4	
DC-2	7/30/2003	1720	5.1	445	16.1	1.8	10	
DC-2	**7/31/2003**	945	4.6	480	23.1	2.3	13.2	**dilution 2:1; lab Cu (3.57); lab Fe (12.2)**
DC-2	8/5/2003	1340	4.4	560	63.3	2.2	16.8	Fe dilution 2:1
DC-2	8/6/2003	1340	4.4	560	63.3	2.2	16.8	Fe dilution 2:1
DC-2	8/7/2003	930	4.4	560	114.0	2.3	14.4	Fe dilution 3:1
DC-2	8/8/2003	845	4.6	540	20.4	2.2	13.2	Fe dilution 3:1
DC-2	8/11/2003	1445	4.7	590	20.4	2.7	14.0	Fe dilution 2:1
DC-2	8/12/2003	1610	5.1	590	24.6	2.4	12.8	Fe dilution 2:1
DC-2	8/13/2003	1050	4.9	630	23.3	2.5	16.4	Fe dilution 2:1
DC-2	**8/14/2003**	1225	4.1	620	20.5	2.5	16.8	**Fe dilution 2:1; lab Cu (4.46); lab Fe (14.4)**
DC-2	8/15/2003	835	4.0	630	25.2	2.7	14.8	Fe dilution 2:1
DC-2	8/18/2003	1420	3.9	650	19.0	2.5	15.2	Fe dilution 2:1
DC-2	8/19/2003	1230	3.7	700	22.4	2.9	14.0	Fe dilution 2:1
DC-2	8/20/2003	1420	3.9	660	19.0	2.7	15.6	Fe dilution 2:1
DC-2	**8/21/2003**	1355	3.6	650	19.8	2.6	14.8	**Fe dilution 2:1; lab Cu (4.37); lab Fe (13.3)**
DC-2	8/22/2003	730	3.9	660	31.2	2.7	11.0	Fe dilution 2:1
DC-2	8/25/2003	1425	3.5	355	22.9	2.6	16.4	Fe dilution 2:1
DC-2	8/26/2003	1005	4.5	670	26.2	2.8	16.8	Fe dilution 2:1
DC-2	8/27/2003	1345	3.9	640	147.0	2.7	18.4	Fe dilution 2:1; rain off/on all day
DC-2	**8/28/2003**	930	3.7	720	34.5	2.4	18.8	**Fe dilution 2:1; lab Cu (4.35); lab Fe (21.4); rain**
DC-2	9/4/2003	1600	3.6	670	18.0	2.5	10.8	Fe dilution 2:1
DC-2	9/6/2003	1100	3.5	680	103.6	2.7	18.4	Fe dilution 2:1
DC-2	**9/8/2003**	1515	3.6	740	66.7	**5.03**	**19.4**	**Results for Cu and Fe are lab data**
DC-2	**9/29/2003**	**1645**	**4.5**	**634**	**--**	**3.63**	**8.69**	**All results are lab data**
DC-2						**8.064**	**29.649**	**Temporary Standard**
DC-5	7/15/2003	1120	6.7	180	--	0.3	1.8	no turbidity meter
DC-5	7/16/2003	1400	8.0	220	9.1	0.2	1.6	
DC-5	7/17/2003	1415	8.0	230	9.8	0.3	1.4	
DC-5	7/18/2003	1100	7.8	230	14.1	0.3	1.6	
DC-5	7/21/2003	1345	7.6	250	12.3	0.3	1.8	
DC-5	7/22/2003	1430	8.4	250	14.1	0.3	1.8	
DC-5	7/23/2003	900	7.6	250	13.0	0.3	1.6	
DC-5	7/23/2003	1330	7.4	260	13.3	0.3	1.8	
DC-5	7/24/2003	1045	7.5	260	13.8	0.3	1.5	
DC-5	7/25/2003	820	7.1	260	14.7	0.3	1.8	rain previous evening
DC-5	7/28/2003	1130	6.3	293	19.3	0.3	2.6	
DC-5	7/29/2003	930	6.2	314	19.9	0.5	2.2	dilution 2:1
DC-5	7/30/2003	1700	7.4	313	18.0	0.4	2.4	dilution 2:1
DC-5	7/31/2003	920	7.1	290	21.7	0.5	2.6	
DC-5	8/5/2003	1320	7.1	350	40.0	0.4	2.8	
DC-5	8/6/2003	1320	7.1	350	40.0	0.4	2.8	
DC-5	8/7/2003	915	7.1	330	29.5	0.4	2.2	
DC-5	8/8/2003	830	7.0	340	27.7	0.3	2.4	
DC-5	8/11/2003	1430	8.3	360	33.4	0.4	1.8	
DC-5	8/12/2003	1550	8.5	360	38.1	0.3	2.0	
DC-5	8/13/2003	1030	8.8	390	35.4	0.4	2.0	

TABLE A-2

2003 MCLAREN RESPONSE ACTION CONSTRUCTION MONITORING

New World Mining District Response and Restoration Project

SITE #	Date	Time	pH (su)	SC (umhos)	Turbidity (ntu)	Copper (mg/L)	Iron (mg/L)	Comment
DC-5	*8/14/2003*	*1200*	*6.3*	*380*	*35.5*	*0.4*	*2.0*	
DC-5	*8/15/2003*	*815*	*8.5*	*390*	*30.4*	*0.4*	*2.0*	
DC-5	*8/18/2003*	*1400*	*7.9*	*390*	*39.3*	*0.6*	*1.8*	
DC-5	*8/19/2003*	*1215*	*8.4*	*400*	*38.4*	*0.4*	*1.8*	
DC-5	*8/20/2003*	*1400*	*8.1*	*390*	*34.3*	*0.3*	*1.4*	
DC-5	*8/21/2003*	*1335*	*5.8*	*380*	*32.5*	*0.3*	*1.8*	
DC-5	*8/22/2003*	*715*	*6.2*	*380*	*33.8*	*0.5*	*3.4*	
DC-5	*8/25/2003*	*1410*	*5.3*	*220*	*37.0*	*0.3*	*1.4*	
DC-5	*8/26/2003*	*945*	*8.1*	*400*	*31.9*	*0.4*	*1.8*	
DC-5	*8/27/2003*	*1330*	*8.0*	*400*	*60.1*	*0.7*	*1.6*	*rain off/on all day*
DC-5	*8/28/2003*	*910*	*7.8*	*440*	*201.0*	*0.7*	*3.0*	*morining rain*
DC-5	**9/8/2003**	*1430*	*5.7*	*400*	*144.0*	**2.01**	**15.7**	**lab results for Cu and Fe**
DC-5	**9/29/2003**	**1600**	**7.1**	**411**	**--**	**1.44**	**3.0**	**All results are lab data**
DC-5						**3.53**	**6.83**	**Temporary Standard**

Notes *Units - su = standard units; umhos = micromhos/centimeter; mg/L = milligrams per liter*
Boldface type indicates sample collected for laboratory analysis

TABLE A-3

2003 GLENGARRY ADIT RESPONSE CONSTRUCTION MONITORING

New World Mining District Response and Restoration Project

SITE #	Date	Time	pH (su)	SC (umhos)	Turbidity (ntu)	Copper (mg/L)	Iron (mg/L)	Comment
FCT-11	7/15/2003	1420	4.2	267	--	0.4	2.4	no turbidity meter
FCT-11	7/16/2003	1545	4.0	110	48.0	0.3	2.8	
FCT-11	7/23/2003	945	3.8	110	1.2	0.4	1.8	
FCT-11	7/23/2003	1415	3.7	90	26.6	0.3	2.0	
FCT-11	7/24/2003	1145	4.4	100	4.7	0.2	1.8	
FCT-11	9/10/2003	1250	--	--	--	--	--	Dry
FCT-11	9/18/2003	1450	--	--	--	--	--	Dry
SPO	7/17/2003	1850	2.8	980	56.5	4.3	62.5	12.5:1 dilution
SPO	7/18/2003	1130	2.8	1030	20.6	3.3	70.4	> 8:1 dilution
SPO	7/21/2003	1430	2.3	1040	19.3	4.4	57.5	12.5:1 dilution
SPO	7/22/2003	1515	3.2	1050	20.8	4.3	62.5	12.5:1 dilution
SPO	7/23/2003	--	--	--	--	--	--	no flow
SPO	7/24/2003	--	--	--	--	--	--	no flow
SPO	7/25/2003	745	2.3	980	19.9	5.0	45.0	12.5:1 dilution; rain previous evening
SPO	7/30/2003	1735	2.9	993	37.1	2.5	65.0	12.5:1 dilution
SPO	7/31/2003	1015	3.9	980	35.4	4.4	57.5	12.5:1 dilution
SPO	8/1/2003	915	3.3	980	28.3	5.4	52.5	
SPO	8/4/2003	--	--	--	--	--	--	no flow
SPO	8/5/2003	--	--	--	--	--	--	no flow
SPO	8/6/2003	--	--	--	--	--	--	no flow
SPO	8/7/2003	950	3.1	1010	34.6	3.3	67.5	Fe dilution 12.5:1
SPO	8/8/2003	900	3.1	1000	28.6	2.8	65.0	Fe dilution 12.5:1
SPO	8/11/2003	1500	3.9	950	32.1	3.0	47.5	Flow 50 gpm, Fe dilution 12.5:1
SPO	8/12/2003	1630	3.6	960	36.8	2.9	50.0	Flow 50 gpm, Fe dilution 12.5:1
SPO	8/13/2003	1115	4.2	960	33.3	2.7	55.0	Flow 50 gpm, Fe dilution 12.5:1
SPO	8/14/2003	1240	3.4	950	32.5	2.7	57.5	Flow 50 gpm, Fe dilution 12.5:1
SPO	8/15/2003	855	3.1	910	30.5	--	50.0	Flow 50 gpm, Fe dilution 12.5:1
SPO	8/18/2003	1435	3.1	900	22.8	2.7	47.5	Flow 40 gpm, Fe dilution 12.5:1
SPO	8/19/2003	1255	3.3	910	36.7	2.6	65.0	Flow 75 gpm, Fe dilution 12.5:1
SPO	8/20/2003	1435	3.4	960	46.9	2.2	65.0	Flow 75 gpm, Fe dilution 12.5:1
SPO	8/21/2003	1410	3.1	930	42.8	2.4	82.5	Flow 50 gpm, Fe dilution 12.5:1
SPO	8/22/2003	740	3.4	970	34.8	2.2	95.0	Flow 50 gpm, Fe dilution 12.5:1; rain previous evening
SPO	8/25/2003	1330	2.8	939	25.8	2.4	65.0	Flow 37.5 gpm, Fe dilution 12.5:1
SPO	8/26/2003	1025	4.0	860	24.2	2.4	55.0	Flow 75 gpm, Fe dilution 12.5:1
SPO	8/27/2003	1400	3.3	830	25.4	2.0	57.5	Flow 50 gpm, Fe dilution 12.5:1; rain on/off all day
SPO	8/28/2003	950	3.4	830	33.4	2.0	57.5	Flow 50 gpm, Fe dilution 12.5:1; morning rain
SPO	9/4/2003	1630	3.1	830	32.6	1.8	52.0	
SPO	9/10/2003	1230	3.2	850	29.6	1.9	54.0	Flow 30 gpm, Fe dilution 12.5:1
SPO	9/18/2003	1420	3.2	950	42.6	2.4	65	Flow 30 gpm, Fe dilution 12.5:1
SW-3	7/14/2003	1745	4.1	262	--	0.8	3.6	no turbidity meter
SW-3	7/15/2003	1500	3.9	340	--	0.8	5.0	no turbidity meter
SW-3	7/16/2003	1615	3.9	140	14.8	0.5	1.5	
SW-3	7/17/2003	1900	3.7	200	4.9	0.7	3.2	first day of sediment pond outflow
SW-3	7/18/2003	1145	3.3	250	1.9	0.9	4.0	
SW-3	7/21/2003	1445	2.9	250	10.5	0.7	4.6	
SW-3	7/22/2003	1530	4.1	260	9.9	0.9	4.2	
SW-3	7/23/2003	1000	3.2	170	2.0	0.5	1.2	
SW-3	7/23/2003	1430	3.1	160	7.4	0.4	1.8	
SW-3	7/24/2003	1200	3.6	180	1.6	0.6	1.2	
SW-3	7/25/2003	800	2.6	530	15.9	2.2	20.0	Pipe elbow fell off 1st pond; rain previous evening
SW-3	7/25/2003	1100	3.1	160	2.8	0.5	1.2	elbow fixed;+I81
SW-3	7/28/2003	1245	3.5	166	1.5	0.7	0.8	
SW-3	7/29/2003	1030	3.2	391	7.1	1.0	8.8	dil 2:1
SW-3	7/30/2003	1745	3.3	381	6.0	1.0	4.8	
SW-3	**7/31/2003**	1030	4.1	260	5.6	1.0	5.2	**dil 2:1; lab Cu (1.04); lab Fe (5.38)**
SW-3	8/1/2003	930	3.9	580	40.8	2.1	28.8	Second pond drained down at 0900
SW-3	8/1/2003	1120	3.5	340	3.0	1.1	5.8	Recheck
SW-3	8/4/2003	1430	3.4	192	3.0	0.8	1.4	no flow from pond

TABLE A-3

2003 GLENGARRY ADIT RESPONSE CONSTRUCTION MONITORING

New World Mining District Response and Restoration Project

SITE #	Date	Time	pH (su)	SC (umhos)	Turbidity (ntu)	Copper (mg/L)	Iron (mg/L)	Comment
SW-3	*8/5/2003*	*1400*	*3.6*	*210*	*2.0*	*0.7*	*1.4*	*no flow from pond*
SW-3	*8/6/2003*	*1400*	*3.6*	*210*	*2.0*	*0.7*	*1.4*	*no flow from pond*
SW-3	*8/7/2003*	*1000*	*3.6*	*270*	*2.2*	*0.8*	*4.6*	
SW-3	*8/8/2003*	*910*	*3.5*	*320*	*1.8*	*1.0*	*6.0*	
SW-3	*8/11/2003*	*1515*	*4.0*	*400*	*1.0*	*1.0*	*5.4*	
SW-3	*8/12/2003*	*1640*	*3.7*	*370*	*1.4*	*1.1*	*4.6*	
SW-3	*8/13/2003*	*1130*	*5.2*	*400*	*1.4*	*1.0*	*5.8*	
SW-3	**8/14/2003**	*1250*	*3.6*	*410*	*1.4*	*1.1*	*6.0*	**lab Cu (1.15); lab Fe (6.13)**
SW-3	*8/15/2003*	*905*	*3.4*	*380*	*2.0*	*1.1*	*6.6*	
SW-3	*8/18/2003*	*1445*	*3.5*	*370*	*1.2*	*1.0*	*3.6*	
SW-3	*8/19/2003*	*1305*	*3.4*	*450*	*1.3*	*1.1*	*7.0*	
SW-3	*8/20/2003*	*1445*	*3.4*	*440*	*1.2*	*1.0*	*8.6*	*Fe dilution 2:1*
SW-3	**8/21/2003**	*1420*	*3.2*	*440*	*1.2*	*1.1*	*12.4*	**Fe dilution 2:1; lab Cu (1.06); lab Fe (10.9)**
SW-3	*8/22/2003*	*750*	*3.4*	*420*	*1.6*	*0.9*	*13.8*	*Fe dilution 3:1*
SW-3	*8/23/2003*	*1530*	*3.1*	*470*	*4.7*	*1.0*	*14.4*	*Fe dilution 2:1*
SW-3	*8/25/2003*	*1340*	*3.0*	*490*	*1.1*	*1.1*	*7.6*	*Fe dilution 2:1; before mucking*
SW-3	*8/25/2003*	*1635*	*3.2*	*484*	*0.9*	*1.1*	*8.0*	*Fe dilution 2:1; after mucking*
SW-3	*8/26/2003*	*1035*	*4.1*	*430*	*1.7*	*1.1*	*7.8*	*Fe dilution 2:1*
SW-3	*8/27/2003*	*1410*	*3.5*	*410*	*12.1*	*1.1*	*11.4*	*Fe dilution 2:1; rain off/on all day*
SW-3	**8/28/2003**	*1000*	*3.4*	*410*	*5.6*	*1.1*	*7.6*	**Fe dilution 2:1; lab Cu (0.94); lab Fe (8.58); rain**
SW-3	*9/4/2003*	*1635*	*3.2*	*430*	*1.0*	*0.9*	*9.2*	
SW-3	*9/10/2003*	*1240*	*3.4*	*440*	*4.8*	*1.1*	*8.7*	*Fe dilution 2:1*
SW-3	*9/18/2003*	*1435*	*3.3*	*440*	*0.9*	*0.9*	*8.0*	*Fe dilution 2:1*
SW-3	**9/30/2003**	**1100**	**3.5**	**418**	**--**	**0.8**	**10.5**	**All results are lab data**
SW-3						**1.3**	**9.259**	**Narrative Standard**
SW-4	*8/7/2003*	*1010*	*5.8*	*120*	*2.2*	*0.0*	*0.4*	*No color for copper*
SW-4	*8/11/2003*	*1530*	*6.3*	*130*	*1.5*	*0.0*	*0.4*	*Staff gauge measurement - 0.43*
SW-4	*8/18/2003*	*1455*	*5.9*	*140*	*1.0*	*<0.1*	*<0.1*	*Staff gauge measurement - 0.40*
SW-4	*8/21/2003*	*1430*	*5.6*	*140*	*1.3*	*<0.1*	*<0.1*	
SW-4	*8/26/2003*	*1045*	*6.2*	*140*	*0.8*	*<0.1*	*<0.1*	*Staff gauge measurement - 0.40*
SW-4	*8/28/2003*	*1010*	*5.7*	*140*	*1.8*	*<0.1*	*<0.1*	*Staff gauge measurement - 0.40; morning rain*
SW-4	*9/4/2003*	*1640*	*5.6*	*140*	*0.7*	*<0.1*	*0.2*	*Staff gauge measurement - 0.38*
SW-4	*9/10/2003*	*1250*	*6.0*	*150*	*0.9*	*<0.1*	*0.1*	*tributary streams dry or frozen*
SW-4	*9/18/2003*	*1450*	*5.8*	*150*	*1.3*	*<0.1*	*<0.1*	*tributary streams dry*
SW-4	**9/29/2003**	**1030**	**6.5**	**148**	**--**	**0.079**	**0.02**	**All results are lab data**
SW-4						**0.2**	**1.726**	**Narrative Standard**

Notes *Shading indicates exceedance of narrative or temporary standard*
Units - su = standard units; umhos = micromhos/centimeter; mg/L = milligrams per liter
Boldface type indicates sample collected for laboratory analysis

APPENDIX A-2

SURFACE WATER FIELD NOTES

APPENDIX A-3

SURFACE WATER LABORATORY REPORTS

APPENDIX B

2003 GROUNDWATER DATA
2003 SURFACE WATER AND GROUNDWATER MONITORING

New World Mining District Response and Restoration Project

APPENDIX B-1

2003 GROUNDWATER SUMMARY TABLE

TABLE B-1 - 2003 SURFACE WATER SUMMARY

TABLE B-1
2003 GROUNDWATER SUMMARY
NEW WORLD MINING DISTRICT
Response and Restoration Project

Station Name	Sample Date	Depth to Water (feet)	Anions (mg/L)						Cations (mg/L)								Dissolved Metals (mg/L)						
			Acidity as CaCO3	Alkalinity as HCO3	Alkalinity as CO3	Alkalinity as Total CaCO3	Chloride	Sulfate	Calcium	Hardness as CaCO3	Magnesium	Potassium	Sodium	SC (umhos/cm)	pH (s.u.)	Total Dissolved Solids (mg/L)	Aluminum	Cadmium	Copper	Iron	Lead	Manganese	Zinc
Como Basin Area																							
EPA-11	7/15/2003	94.15	493	<1	0	<1	3	1040	204	825	77	4	3	2090	3.6	1910	4.34	0.0057	0.3	261	0.14	14.6	1.08
EPA-11R	7/15/2003	--	23	<1	0	<1	<2	5	<1	<7	<1	<1	<1	<10	5.6	32	0.07	<0.0001	0.002	0.03	<0.001	<0.003	<0.01
EPA-11	7/30/2003	90.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EPA-11	8/13/2003	92.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EPA-11	8/26/2003	96.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EPA-11	9/8/2003	101.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EPA-11	9/30/2003	110.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EPA-12	7/15/2003	21.97	JR44	17	0	14	<2	134	29	114	10	2	3	368	6.1	258	<JR0.05	<0.0001	<JR0.001	30.5	<0.001	1.62	0.03
EPA-12	7/30/2003	21.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EPA-12	8/13/2003	22.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EPA-12	8/26/2003	25.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EPA-12	9/8/2003	27.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EPA-12	9/30/2003	34.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-111	7/17/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-111	7/30/2003	15.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-111	8/12/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-112	7/17/2003	10.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-112	7/30/2003	13.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-112	8/12/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-113	7/17/2003	9.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-113	7/30/2003	9.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-113	8/12/2003	9.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-113	8/28/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-114	7/17/2003	2.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-114	7/30/2003	6.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-114	8/12/2003	8.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

s.u. - Standard units
mg/L - Milligrams per liter
R - Rinsate blank
X - Field duplicate
umhos/cm - micromhos per centimeter

-- - Indicates not applicable or parameter not analyzed
< - Indicates analyte not detected above practical quantitation limit (PQL)
JR - The associated values are estimated quantities because the rinsate blank shows evidence of contamination
J - The associated values are laboratory estimates

TABLE B-1
2003 GROUNDWATER SUMMARY
NEW WORLD MINING DISTRICT
Response and Restoration Project

Station Name	Sample Date	Depth to Water (feet)	Anions (mg/L)						Cations (mg/L)								Dissolved Metals (mg/L)						
			Acidity as CaCO3	Alkalinity as HCO3	Alkalinity as CO3	Alkalinity as Total CaCO3	Chloride	Sulfate	Calcium	Hardness as CaCO3	Magnesium	Potassium	Sodium	SC (umhos/cm)	pH (s.u.)	Total Dissolved Solids (mg/L)	Aluminum	Cadmium	Copper	Iron	Lead	Manganese	Zinc
FCGW-114	8/28/2003	10.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-114	9/9/2003	11.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-114	9/30/2003	11.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-115	7/17/2003	7.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-115	7/30/2003	9.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-115	8/12/2003	9.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-115	8/28/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-116	7/17/2003	2.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-116	7/30/2003	6.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-116	8/12/2003	10.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-116	8/28/2003	12.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-116	9/9/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-117	7/17/2003	9.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-117	7/30/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-117	8/12/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-118	7/17/2003	10.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-118	7/29/2003	12.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-118	8/12/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-119	7/17/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-119	7/29/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-119	8/12/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-119	8/28/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-120	7/17/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-120	7/30/2003	5.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-120	8/12/2003	8.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-120	8/28/2003	8.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-120	9/9/2003	8.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-120	9/30/2003	9.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

s.u. - *Standard units*
mg/L - *Milligrams per liter*
R - *Rinsate blank*
X - *Field duplicate*
umhos/cm - *micromhos per centimeter*

-- - *Indicates not applicable or parameter not analyzed*
< - *Indicates analyte not detected above practical quantitation limit (PQL)*
JR - *The associated values are estimated quantities because the rinsate blank shows evidence of contamination*
J - *The associated values are laboratory estimates*

TABLE B-1
2003 GROUNDWATER SUMMARY
NEW WORLD MINING DISTRICT
Response and Restoration Project

Station Name	Sample Date	Depth to Water (feet)	Anions (mg/L)						Cations (mg/L)								Dissolved Metals (mg/L)						
			Acid-idity as CaCO3	Alkalinity as			Chlor-ide	Sulfate	Calcium	Hard-ness as CaCO3	Magne-sium	Potass-ium	Sod-ium	SC (umhos/cm)	pH (s.u.)	Total Dis-solved Solids (mg/L)	Alum-inum	Cad-mium	Copper	Iron	Lead	Manga-nese	Zinc
				HCO3	CO3	Total CaCO3																	
FCGW-121	7/17/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-121	7/30/2003	8.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-121	8/12/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-122	7/17/2003	3.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-122	7/30/2003	4.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-122	8/12/2003	6.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-122	8/28/2003	7.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-122	9/9/2003	7.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-122	9/30/2003	9.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-123	7/17/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-123	7/30/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-123	8/12/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-124	7/17/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-124	7/30/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-124	8/12/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-125	7/17/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-125	7/30/2003	12.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-125	8/12/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-126	7/17/2003	14.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-126	7/30/2003	13.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-126	8/12/2003	14.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-126	8/28/2003	15.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-126	9/9/2003	16.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-126	9/30/2003	16.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-127	7/17/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-127	7/30/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-127	8/12/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-128	7/17/2003	2.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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			Acidity as CaCO3	Alkalinity as HCO3	Alkalinity as CO3	Alkalinity as Total CaCO3	Chloride	Sulfate	Calcium	Hardness as CaCO3	Magnesium	Potassium	Sodium	SC (umhos/cm)	pH (s.u.)	Total Dissolved Solids (mg/L)	Aluminum	Cadmium	Copper	Iron	Lead	Manganese	Zinc
FCGW-128	7/30/2003	3.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-128	8/12/2003	5.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-128	8/28/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-129	7/17/2003	3.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-129	7/30/2003	3.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-129	8/12/2003	4.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-129	8/28/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-130	7/17/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-130	7/30/2003	10.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCGW-130	8/12/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	7/15/2003	54.81	JR9	<1	0	<1	<2	302	63	239	20	2	3	871	3.2	514	1.36	0.0005	0.15	38.7	0.011	3.08	0.09
MW-1	7/30/2003	53.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	8/13/2003	56.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	8/26/2003	59.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	9/8/2003	62.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	9/30/2003	71.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-8	7/15/2003	12.79	<2	224	0	183	<2	135	54	321	45	1	4	522	7.5	338	<0.05	<0.0001	0.001	0.02	<0.001	<0.003	<0.01
MW-8	8/1/2003	12.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-8	8/12/2003	12.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-8	8/28/2003	13.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-8	9/8/2003	13.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-8	9/30/2003	13.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 4	7/15/2003	104.27	204	<1	0	<1	<2	291	44	163	13	3	1	964	3.4	580	1.79	0.0006	0.31	99.3	0.019	9.06	1.7
Tracer 4	8/1/2003	95.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 4	8/12/2003	100.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 4	8/28/2003	112.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 4	9/9/2003	120.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 4	9/30/2003	137.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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			Acidity as CaCO3	Alkalinity as HCO3	Alkalinity as CO3	Alkalinity as Total CaCO3	Chloride	Sulfate	Calcium	Hardness as CaCO3	Magnesium	Potassium	Sodium	SC (umhos/cm)	pH (s.u.)	Total Dissolved Solids (mg/L)	Aluminum	Cadmium	Copper	Iron	Lead	Manganese	Zinc
Tracer 6	7/15/2003	17.33	JR9	36	0	29	<2	784	274	864	44	2	5	1260	5.9	1130	JR0.16	0.0006	0.12	26.7	<0.001	4.36	0.14
Tracer 6	7/30/2003	20.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 6	8/12/2003	21.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 6	8/26/2003	22.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 6	9/8/2003	24.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 6	9/30/2003	28.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fisher Creek																							
MW-9A	7/7/2003	6.49	3	10	0	8	<4	47	12	42	3	2	3	116	5.3	117	0.16	0.0001	0.007	1.11	<0.001	0.006	<0.01
MW-9B	7/7/2003	Artesian	<2	10	0	8	<2	58	14	51	4	2	4	147	6.6	112	<0.05	<0.0001	<0.001	1.13	<0.001	0.11	<0.01
MW-10A	7/7/2003	3.3	<2	9	0	7	<2	26	7	26	2	<1	2	68	5.8	48	<0.05	<0.0001	0.013	<0.01	<0.001	0.061	<0.01
MW-10B	7/7/2003	Artesian	<2	166	0	136	8	1170	311	1040	64	5	140	1960	7.2	1730	<0.05	<0.0001	0.002	2.37	<0.001	0.23	<0.01
MW-11	7/16/2003	10.64	<2	13	0	11	<2	15	4	15	2	1	1	41	6.4	40	0.11	0.0001	0.005	0.15	<0.001	0.003	<0.01
SB-16	7/8/2003	9.84	<2	98	0	80	<2	204	74	238	13	3	18	515	7.7	364	<0.05	<0.0001	<0.001	0.6	<0.001	0.18	<0.01
Tracer 5	7/7/2003	Artesian	196	<1	0	<1	<2	222	5	21	2	2	5	636	3.2	360	18.7	0.0015	5.42	41	0.003	0.78	0.26
McLaren Pit Area																							
DCGW-100	8/1/2003	90.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-100	8/11/2003	96.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-100	8/19/2003	99.61	<2	124	0	102	<4	218	104	326	16	2	5	589	7.6	462	<0.05	<0.0001	<0.001	0.01	<0.001	0.41	<0.01
DCGW-100	8/27/2003	113.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-100	9/9/2003	116.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-100	9/30/2003	120.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-101D	7/10/2003	4.95	<2	91	0	74	<2	129	60	191	10	2	4	392	7.8	285	<0.05	<0.0001	<0.001	0.04	<0.001	0.34	<0.01
DCGW-101DX	7/10/2003	--	<2	86	0	71	<2	130	60	191	10	2	3	381	7.8	267	<0.05	<0.0001	<0.001	0.04	<0.001	0.35	<0.01
DCGW-101D	7/31/2003	6.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-101D	8/11/2003	7.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-101D	8/27/2003	7.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-101D	9/9/2003	7.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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			Acidity as CaCO3	Alkalinity as			Chloride	Sulfate	Calcium	Hardness as CaCO3	Magnesium	Potassium	Sodium	SC (umhos/cm)	pH (s.u.)	Total Dissolved Solids (mg/L)	Aluminum	Cadmium	Copper	Iron	Lead	Manganese	Zinc
				HCO3	CO3	Total CaCO3																	
DCGW-101D	10/1/2003	8.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-101S	7/16/2003	6.08	25	<1	0	<1	<2	96	26	88	5	1	2	230	4.5	115	2.27	0.0004	0.11	0.02	0.002	0.2	0.07
DCGW-102D	7/16/2003	6.04	<JR2	258	0	212	<2	27	46	183	17	2	6	334	7.7	JR133	JR0.1	<0.0001	<JR0.001	JR0.1	<0.001	0.3	<0.01
DCGW-102D	7/31/2003	6.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-102D	8/13/2003	6.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-102D	8/26/2003	6.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-102D	9/8/2003	6.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-102D	9/29/2003	6.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-102S	7/16/2003	2.49	<JR2	210	0	172	<2	37	52	189	15	3	4	344	7.5	174	JR0.22	0.0002	JR0.005	0.81	0.01	0.4	<0.01
DCGW-102S	7/31/2003	5.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-102S	8/13/2003	3.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-102S	8/26/2003	2.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-102S	9/8/2003	2.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-102S	9/29/2003	3.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-103D	7/9/2003	Artesian	<2	212	0	174	<2	150	96	297	14	8	6	567	7.5	361	<0.05	<0.0001	<0.001	0.41	<0.001	0.2	<0.01
DCGW-103D	7/31/2003	Artesian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-103D	8/12/2003	Artesian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-103D	8/27/2003	Artesian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-103D	9/10/2003	Artesian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-103D	10/1/2003	Artesian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-103S	7/9/2003	0.01	<2	221	0	181	<2	230	116	360	17	10	8	664	7	475	<0.05	0.0004	<0.001	0.01	<0.001	1.08	0.08
DCGW-103S	7/31/2003	18.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-103S	8/12/2003	27.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-103S	8/27/2003	27.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-103S	9/10/2003	28.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-103S	10/1/2003	25.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-104	7/17/2003	13.42	557	<1	0	<1	3	1380	171	632	50	<1	3	2520	2.6	2150	82.8	0.019	35.4	91.8	0.001	10.4	3.47
DCGW-104	7/31/2003	12.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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DCGW-104	8/13/2003	14.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-104	8/27/2003	15.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-104	9/9/2003	15.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-104	10/1/2003	20.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-105	7/17/2003	14.99	488	<1	0	<1	2	495	14	61	7	2	3	1190	2.8	796	23.2	0.0033	9.74	116	0.015	1.05	0.47
DCGW-105	7/31/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-105	8/13/2003	23.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-105	8/27/2003	23.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-105	9/9/2003	23.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-105	10/1/2003	24.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-106	7/10/2003	Artesian	<2	258	0	212	<2	299	151	496	29	3	8	818	7.3	589	<0.05	<0.0001	<0.001	2.25	<0.001	0.19	<0.01
DCGW-106	7/31/2003	Artesian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-106	8/12/2003	Artesian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-106	8/27/2003	Artesian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-106	9/9/2003	Artesian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-106	10/1/2003	Artesian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-107	7/10/2003	15.94	<2	126	0	103	<2	246	95	295	14	9	22	637	7.9	423	<0.05	0.0001	0.001	0.02	<0.001	0.62	<0.01
DCGW-107	7/31/2003	16.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-107	8/13/2003	17.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-107	8/27/2003	17.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-107	9/9/2003	17.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-107	10/1/2003	18.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-108	7/9/2003	6.49	25	6	0	5	<2	125	29	97	6	2	3	273	4.4	J169	1.49	0.0007	0.43	0.11	<0.001	0.39	0.13
DCGW-108	7/31/2003	8.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-108	8/13/2003	9.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-108	8/27/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-109	7/10/2003	7.03	<2	161	0	132	<2	246	116	356	16	5	6	698	7.7	478	<0.05	<0.0001	<0.001	0.03	<0.001	1.61	<0.01
DCGW-109	7/31/2003	7.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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			Acidity as CaCO3	Alkalinity as HCO3	Alkalinity as CO3	Alkalinity as Total CaCO3	Chloride	Sulfate	Calcium	Hardness as CaCO3	Magnesium	Potassium	Sodium	SC (umhos/cm)	pH (s.u.)	Total Dissolved Solids (mg/L)	Aluminum	Cadmium	Copper	Iron	Lead	Manganese	Zinc
DCGW-109	8/13/2003	7.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-109	8/27/2003	7.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-109	9/9/2003	7.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-109	10/1/2003	7.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-110	7/9/2003	6.17	<2	149	0	122	<2	392	153	464	20	5	5	838	7.1	621	<0.05	0.0011	0.014	<0.01	<0.001	7.01	0.04
DCGW-110	7/31/2003	6.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-110	8/13/2003	6.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-110	8/27/2003	6.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-110	9/9/2003	6.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-110	10/1/2003	6.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-111-D	8/12/2003	10.93	133	11	0	9	<2	938	266	789	41	10	6	1430	5.1	1420	9.81	0.027	12.7	39.9	0.009	8.58	2.85
DCGW-111-D	8/27/2003	10.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-111-D	9/9/2003	11.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-111-D	10/1/2003	11.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-111-S	8/12/2003	4.27	37	11	0	9	<2	954	354	1050	40	7	5	1640	5.5	1490	3.8	0.033	8.65	4.2	0.003	8.17	3.86
DCGW-111-S	8/27/2003	4.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-111-S	9/9/2003	4.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-111-S	10/1/2003	6.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-112	7/31/2003	7.45	<2	129	0	106	4	675	251	800	42	9	22	1260	7	1100	<0.05	0.0005	0.002	2.76	<0.001	3.25	0.09
DCGW-112	8/12/2003	7.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-112	8/27/2003	7.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-112	9/9/2003	8.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-112	10/1/2003	7.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-131	7/9/2003	0.07	<2	264	0	216	<2	1260	574	1570	33	25	11	2110	6.7	1970	1.15	0.0002	0.021	11.5	0.005	5.22	0.01
DCGW-131	7/31/2003	1.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-131	8/12/2003	2.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-131	8/27/2003	3.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-131	9/9/2003	4.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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			Acidity as CaCO3	Alkalinity as HCO3	Alkalinity as CO3	Alkalinity as Total CaCO3	Chloride	Sulfate	Calcium	Hardness as CaCO3	Magnesium	Potassium	Sodium	SC (umhos/cm)	pH (s.u.)	Total Dissolved Solids (mg/L)	Aluminum	Cadmium	Copper	Iron	Lead	Manganese	Zinc
DCGW-131	10/1/2003	4.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-132	7/10/2003	5.06	551	<1	0	<1	<2	840	95	365	31	5	4	1830	3.1	1190	38	0.016	12.4	157	0.006	5.64	2.05
DCGW-132	7/31/2003	5.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-132	8/12/2003	5.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-132	8/27/2003	6.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-132	9/9/2003	6.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-132	10/1/2003	6.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-133	7/10/2003	3.36	261	<1	0	<1	<2	462	64	217	14	3	3	1160	2.9	602	19.5	0.0079	6.48	28.9	0.006	2.5	0.96
DCGW-133	7/31/2003	3.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-133	8/13/2003	3.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-133	8/27/2003	4.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-133	9/9/2003	4.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-133	10/1/2003	4.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-134	7/16/2003	3.55	<2	72	0	59	<2	114	51	169	10	2	3	328	7.2	148	0.53	0.0001	0.014	0.47	<0.001	0.086	<0.01
DCGW-134	7/31/2003	3.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-134	8/11/2003	4.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-134	8/27/2003	4.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-134	9/9/2003	4.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-134	10/1/2003	4.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-135	7/10/2003	5.79	<2	29	0	24	<2	44	18	61	4	3	1	156	6.8	92	<0.05	0.0002	0.006	0.03	<0.001	1.51	<0.01
DCGW-135	7/31/2003	6.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-135	8/11/2003	6.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-135	8/27/2003	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-136	7/10/2003	2.89	46	6	0	5	<2	207	53	174	10	1	2	421	4.5	281	7.91	0.003	2.08	3.46	0.047	1.11	0.39
DCGW-136	7/31/2003	4.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-136	8/11/2003	4.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-136	8/27/2003	4.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-136	9/9/2003	4.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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			Acidity as CaCO3	Alkalinity as HCO3	Alkalinity as CO3	Alkalinity as Total CaCO3	Chloride	Sulfate	Calcium	Hardness as CaCO3	Magnesium	Potassium	Sodium	SC (umhos/cm)	pH (s.u.)	Total Dissolved Solids (mg/L)	Aluminum	Cadmium	Copper	Iron	Lead	Manganese	Zinc
DCGW-136	10/1/2003	4.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-137	7/10/2003	3.25	<2	109	0	89	<2	43	36	110	5	6	7	223	8	144	0.2	<0.0001	0.002	0.25	0.002	0.15	<0.01
DCGW-137	7/31/2003	4.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-137	8/11/2003	4.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-137	8/27/2003	4.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-137	9/9/2003	4.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-137	10/1/2003	4.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-138	7/10/2003	4.58	<2	43	0	35	<2	76	38	120	6	5	3	219	6.9	135	0.12	0.0005	0.003	0.17	0.004	0.017	0.15
DCGW-138	7/31/2003	7.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-138	8/11/2003	8.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-138	8/27/2003	10.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-138	9/9/2003	10.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-138	10/1/2003	12.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-2	7/17/2003	Artesian	392	<1	0	<1	<2	372	21	79	7	4	3	956	4	678	37.4	0.0013	<JR0.001	90.6	0.009	1.1	0.24
MW-2X	7/17/2003	--	396	<1	0	<1	<2	396	21	79	6	4	3	988	3.9	680	37.6	0.0012	0.002	88.5	0.009	1.12	0.23
MW-2	8/1/2003	10.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-2	8/13/2003	10.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-2	8/27/2003	11.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-2	9/8/2003	11.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-2	9/30/2003	14.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-MW-3	7/16/2003	5.06	<JR2	249	0	204	<2	36	58	227	20	11	4	331	7.6	JR115	<JR0.05	<0.0001	<JR0.001	JR0.02	<0.001	0.22	<0.01
DCGW-MW-3	7/31/2003	5.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-MW-3	8/13/2003	3.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-MW-3	8/26/2003	5.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-MW-3	9/8/2003	5.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DCGW-MW-3	9/29/2003	5.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 2	7/17/2003	22.64	422	<1	0	<1	<2	385	7	41	6	4	3	897	3.7	634	50.4	0.0009	3.31	59.7	<0.001	0.41	0.14
Tracer 2	8/1/2003	30.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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			Acidity as CaCO3	Alkalinity as HCO3	Alkalinity as CO3	Alkalinity as Total CaCO3	Chloride	Sulfate	Calcium	Hardness as CaCO3	Magnesium	Potassium	Sodium	SC (umhos/cm)	pH (s.u.)	Total Dissolved Solids (mg/L)	Aluminum	Cadmium	Copper	Iron	Lead	Manganese	Zinc
Tracer 2	*8/11/2003*	*38.53*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 2	*8/27/2003*	*51.44*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 2	*9/8/2003*	*59.79*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tracer 2	*9/30/2003*	*71.97*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miller Creek																							
MW-5A	*7/14/2003*	*20.8*	*<JR2*	*72*	*0*	*59*	*<2*	*27*	*23*	*68*	*3*	*<1*	*1*	*134*	*7.2*	*JR87*	*<JR0.05*	*0.0001*	*<JR0.001*	*JR0.01*	*<0.001*	*<0.003*	*<0.01*
MW-5P	*7/16/2003*	--	*<JR2*	*80*	*0*	*66*	*<2*	*31*	*28*	*81*	*3*	*<1*	*1*	*162*	*7.2*	*JR56*	*<JR0.05*	*0.0001*	*<JR0.001*	*JR0.01*	*<0.001*	*0.004*	*0.06*
MW-6	*7/14/2003*	*11.4*	*JR75*	*<1*	*0*	*<1*	*<2*	*165*	*31*	*112*	*8*	*2*	*3*	*370*	*4*	*285*	*6.4*	*0.0009*	*0.1*	*19.8*	*0.14*	*0.37*	*0.14*
MW-6X	*7/14/2003*	--	*65*	*<1*	*0*	*<1*	*<2*	*164*	*31*	*113*	*8*	*2*	*3*	*369*	*3.9*	*278*	*6.31*	*0.0008*	*0.1*	*19.4*	*0.14*	*0.37*	*0.13*
Selective Source Repository																							
SBGW-108	*7/2/2003*	*7.36*	*<2*	*158*	*0*	*129*	*<2*	*22*	*46*	*140*	*6*	*<1*	*2*	*265*	*7.4*	*174*	*<0.05*	*0.0001*	*<0.001*	*<0.01*	*<0.001*	*0.003*	*<0.01*
SBGW-108T	*7/2/2003*	*7.05*	*<2*	*201*	*0*	*165*	*6*	*25*	*68*	*203*	*8*	*<1*	*1*	*390*	*7.7*	*235*	*<0.05*	*<0.0001*	*<0.001*	*<0.01*	*<0.001*	*<0.003*	*<0.01*
SBGW-105	*7/2/2003*	*2.71*	*<2*	*208*	*0*	*170*	*<2*	*55*	*7*	*17*	*<1*	*1*	*96*	*456*	*10.2*	*367*	*<0.05*	*<0.0001*	*<0.001*	*0.01*	*<0.001*	*<0.003*	*<0.01*
SBGW-105T	*7/2/2003*	*6.65*	*<2*	*229*	*0*	*188*	*<2*	*31*	*58*	*198*	*13*	*2*	*4*	*344*	*7.9*	*207*	*<0.05*	*<0.0001*	*0.001*	*0.01*	*<0.001*	*0.15*	*0.02*
SBGW-107	*7/2/2003*	*9.5*	*<2*	*182*	*9*	*165*	*2*	*271*	*21*	*77*	*6*	*1*	*179*	*951*	*9*	*630*	*<0.05*	*0.0001*	*<0.001*	*0.02*	*<0.001*	*0.12*	*<0.01*
SBGW-107T	*7/2/2003*	*9.18*	*<2*	*220*	*0*	*180*	*4*	*46*	*83*	*244*	*9*	*<1*	*2*	*478*	*7.2*	*283*	*<0.05*	*<0.0001*	*<0.001*	*<0.01*	*<0.001*	*0.003*	*0.02*
Soda Butte Creek																							
REPOSITORY SUMP	*1/8/2003*	--	*<2*	--	*0*	*1010*	*8*	*1220*	*603*	*2020*	*125*	*7*	*107*	*2920*	*6.5*	*2870*	--	--	--	--	--	--	--
REPOSITORY SUMP	*7/1/2003*	--	*<2*	*1170*	*0*	*959*	*13*	*1240*	*634*	*2140*	*136*	*6*	*126*	*3040*	*6.5*	*2920*	--	--	--	--	--	--	--

Notes:

s.u. - *Standard units*
mg/L - *Milligrams per liter*
R - *Rinsate blank*
X - *Field duplicate*
umhos/cm - *micromhos per centimeter*

-- - *Indicates not applicable or parameter not analyzed*
< - *Indicates analyte not detected above practical quantitation limit (PQL)*
JR - *The associated values are estimated quantities because the rinsate blank shows evidence of contamination*
J - *The associated values are laboratory estimates*

APPENDIX B-2

GROUNDWATER FIELD NOTES

APPENDIX B-3

GROUNDWATER LABORATORY REPORTS