
TR 132 Aresponse

Norma Townley <Norma.Townley2@newmont.com> Mon, Jan 30, 2023 at 8:59 AM
To: Elliott Russell - DNR <elliott.russell@state.co.us>
Cc: "Cunningham - DNR, Michael" <Michaela.Cunningham@state.co.us>, Patrick Lennberg - DNR <Patrick.Lennberg@state.co.us>, "Crepeau, Michael" <CrepeauM@co.teller.co.us>, Johnna Gonzalez <Johnna.Gonzalez@newmont.com>, Katie Blake <Katie.Blake@newmont.com>, Ronald Parratt <Ronald.Parratt@newmont.com>, Norma Townley <Norma.Townley2@newmont.com>

Elliott, please find attached the TR132 Aresponse. If you have any questions or concerns, please reach out to Johnna.Gonzalez@Newmont.com or Katie.Blake@Newmont.com. Thank you.

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CRIPPLE CREEK & VICTOR

Norma Townley

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January 26, 2023

ELECTRONIC DELIVERY

Mr. Elliott Russell
Environmental Protection Specialist
Colorado Department of Natural Resources
Division of Reclamation, Mining and Safety
Office of Mined Land Reclamation
1313 Sherman Street, Room 215
Denver, Colorado 80203

Re: Permit No. M-1980-244; Cripple Creek & Victor Gold Mining Company; Cresson Project; Technical Revision 132 – Adequacy Review Response-ECOSA

Dear Mr. Russell:

On November 4, 2022, Newmont Corporation's Cripple Creek and Victor Gold Mining Company (CC&V) received the Division of Reclamation, Mining, and Safety (DRMS) first adequacy review of Technical Revision (TR) 132 to Permit M-1980-244, ECOSA Monitoring Plan Update. Below are DRMS comments in **bold** followed by CC&V/s responses in *italics*.

Background:

1. **On December 13, 2021 the Operator submitted to the Division an Inspection Report Response (see attached) for problems cited in the Division's October 14, 2021 inspection report. In the response the Operator submitted a plan on how the new seep(s) were to be monitored and managed. It is not clear whether the plan presented in TR-132 is intended to modify or replace the plan submitted in 2021, as the current plan lacks the level of detail that was previously provided. Please be advised, the Division expects TR-132 to result in a stand-alone monitoring plan for the seeps, GVMW-25, GV-06, and any other locations (e.g. new point of compliance wells to be installed) as needed, which includes aspects of both submittals. At a minimum the plan shall contain two tables, one for the seep and groundwater locations and another for surface water locations, to present all sampling parameters and the respective standards for which they will be compared to. Additionally, map(s) depicting locations of all existing and proposed monitoring locations in the area shall be included in the plan.**

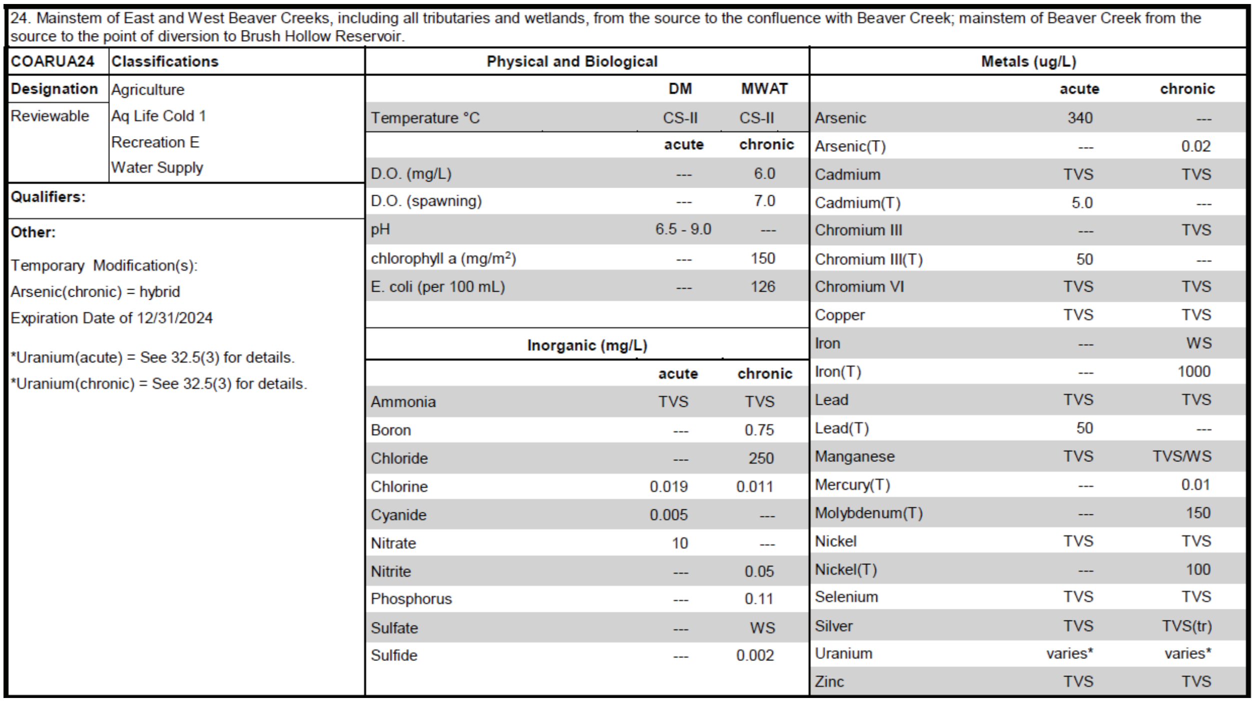
   Please see the attached updated QAPP for ECOSA.

Revised Surface Water Monitoring Plan:

1) **Please clearly state the CDPHE stream segmentation in which each of the existing and proposed surface water monitoring locations is located and provide the corresponding**

water quality standards for that segmentation. Please ensure the stream standards are presented in an easy-to-read manner (e.g., alphabetically).

The applicable stream segment for Grassy Creek is COARUA24, the applicable standards from Colorado Regulation 32 are presented below.



24. Mainstem of East and West Beaver Creeks, including all tributaries and wetlands, from the source to the confluence with Beaver Creek; mainstem of Beaver Creek from the source to the point of diversion to Brush Hollow Reservoir.

COARUA24	**Classifications**
Designation	Agriculture
Reviewable	Aq Life Cold 1
	Recreation E
	Water Supply

Qualifiers:

Other:

Temporary Modification(s):
Arsenic(chronic) = hybrid
Expiration Date of 12/31/2024

*Uranium(acute) = See 32.5(3) for details.
*Uranium(chronic) = See 32.5(3) for details.

Physical and Biological	**DM**	**MWAT**
Temperature °C	CS-II	CS-II
	acute	**chronic**
D.O. (mg/L)	---	6.0
D.O. (spawning)	---	7.0
pH	6.5 - 9.0	---
chlorophyll a (mg/m²)	---	150
E. coli (per 100 mL)	---	126

Inorganic (mg/L)	**acute**	**chronic**
Ammonia	TVS	TVS
Boron	---	0.75
Chloride	---	250
Chlorine	0.019	0.011
Cyanide	0.005	---
Nitrate	10	---
Nitrite	---	0.05
Phosphorus	---	0.11
Sulfate	---	WS
Sulfide	---	0.002

Metals (ug/L)	**acute**	**chronic**
Arsenic	340	---
Arsenic(T)	---	0.02
Cadmium	TVS	TVS
Cadmium(T)	5.0	---
Chromium III	---	TVS
Chromium III(T)	50	---
Chromium VI	TVS	TVS
Copper	TVS	TVS
Iron	---	WS
Iron(T)	---	1000
Lead	TVS	TVS
Lead(T)	50	---
Manganese	TVS	TVS/WS
Mercury(T)	---	0.01
Molybdenum(T)	---	150
Nickel	TVS	TVS
Nickel(T)	---	100
Selenium	TVS	TVS
Silver	TVS	TVS(tr)
Uranium	varies*	varies*
Zinc	TVS	TVS

2) **While the problem cited by the Division on September 30, 2022 required the operator to sample the new surface water location (GV-06) for the same constituents that monitoring well GVMW-25 is currently analyzed for, future sampling events, GV-06 should be sampled for the analytes with specified stream standards by CDPHE. Please revise the surface water sampling plan accordingly. The seeps must continue to be samples for the same constituents as GVMW-25**

For future sampling events, GV-06 will be sampled for specified stream standards by CDPHE. The surface water sampling plan will be revised accordingly. Seep-1 and Seep-2 will continue to be sampled for the same parameters as GVMW-25.

Should you require further information, please do not hesitate to contact Johnna Gonzalez at (719)851-4190, Johnna.Gonzalez@Newmont.com, or myself at (719)851-4042 or Katie.Blake@newmont.com.

Sincerely,

DocuSigned by:
Katie Blake
5A3D013B629844B...
Katie Blake
Sustainability & External Relations Manager
Cripple Creek & Victor Gold Mining Co

EC:

- M. Cunningham – DRMS
- P. Lennberg - DRMS
- E. Russell - DRMS
- M. Crepeau – Teller County
- J. Gonzalez – CC&V
- K. Blake – CC&V
- R. Parratt - CCV
- N. Townley – CC&V

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Cripple Creek and Victor Water Monitoring Quality Assurance Project Plan and Field Sampling Guidance for Grassy Valley Monthly Monitoring

January 24, 2023

Contents

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Appendices

1. Introduction

This Quality Assurance Project Plan (QAPP) for Grassy Valley monthly monitoring describes the quality assurance and quality control (QA/QC) procedures and practices for this location at Newmont's Cripple Creek and Victor Mine (CC&V). Included are standard operating procedures (SOP) for the various stages of sample collection, shipping and analyses. Sample schedules, location maps and analytical requirements are also included. This is a "living" document and is intended as guidance for site personnel; the QAPP is updated as needed to reflect changes to CC&V's water monitoring program and regulatory requirements.

Accurate water quality data are critical to ensure permit compliance and demonstrate that water resources are not impacted by operations. The generation of reliable data begins with the collection of the sample. Adherence to the SOPs will ensure that samples are representative, and collected in accordance with standard water sampling methods and QA/QC protocols. To produce data of defensible quality, this quality control program will be strictly adhered to during sample collection.

The water-sampling program includes collecting samples, recording field data, submitting samples for analyses, reviewing and recording analytical results.

1.1. Program Organization

Duties of key program personnel are listed in Table 1 below:

Table 1. Summary of Key Personnel

Name	Role	Contact Info
Katie Blake	Senior Environmental Manager	Katie.blake@Newmont.com (719) 851-4048
Antonio Matarrese	Site Water Coordinator	Antonio.matarrese@Newmont.com (719) 851-4185
TBD	Senior Environmental technician	TBD
SVL	Contract Laboratory	TBD
Heather Lapierre	Contract Laboratory Director	heather@svl.net (208) 783-1286

- **Senior Environmental Manager:** The Senior Environmental Manager ensures the overall QA/QC program development and implementation. The Senior Environmental Manager allocates resources to ensure QA/QC and compliance criteria are met.
- **Site Water Coordinator:** The Site Water Coordinator is the program technical expert. The Site Water Coordinator oversees resource allocation, program implementation, coordinates field efforts, ensures sampling schedules are met and manages laboratory sub-contracts.
- **Senior Environmental Technician:** The Senior Environmental Technician executes the QAPP as the sampler in the field, ensuring program adherence during sample collection and shipment.
- **Contract Laboratory Manager:** Ensure analyses of environmental samples are conducted in adherence with regulatory, industry and program QA/QC requirements.

1.2. Program Objectives

The general objectives of the environmental monitoring and sampling program are:

- Ensure environmental samples are collected and analyzed according to regulatory and program QA/QC requirements
- Provide a record and insight of natural variability in environmental data as a function of seasonal meteoric changes and site evolution as influenced by historic mining practices
- Document and record environmental data history

- Identify potential environmental impacts from site activities

2.0 SAMPLING PLAN

The following locations are recognized as Grassy Valley Monthly surface monitoring locations: one location on the southern toe of the ECOSA facility (SEEP 1), one location on the toe of the ECOSA Facility mid-way between the northern and southern extents of the facility (SEEP 2) and one location on Grassy Creek in Lower Grassy Valley (GV-06). Samples collected at the surface water monitoring stations, shown in Table 2.1. A list of surface water parameters is provided below in Table 2.2. This program monitors water quality at the toe of the ECOSA facility and downgradient surface water quality below the ECOSA facility.

2.1 Surface water sampling locations

CC&V collects surface water samples from 3 locations within Grassy Valley. Table 2.1 below presents the Grassy Valley Monthly monitoring compliance surface water monitoring locations, and Table 2.2 below depicts surface water compliance monitoring location water monitoring parameters. Table 2.3 below presents compliance limitations as specified in Colorado Regulation 32, and Figure 2.1 presents a map of the Grassy Valley monthly surface water monitoring locations.

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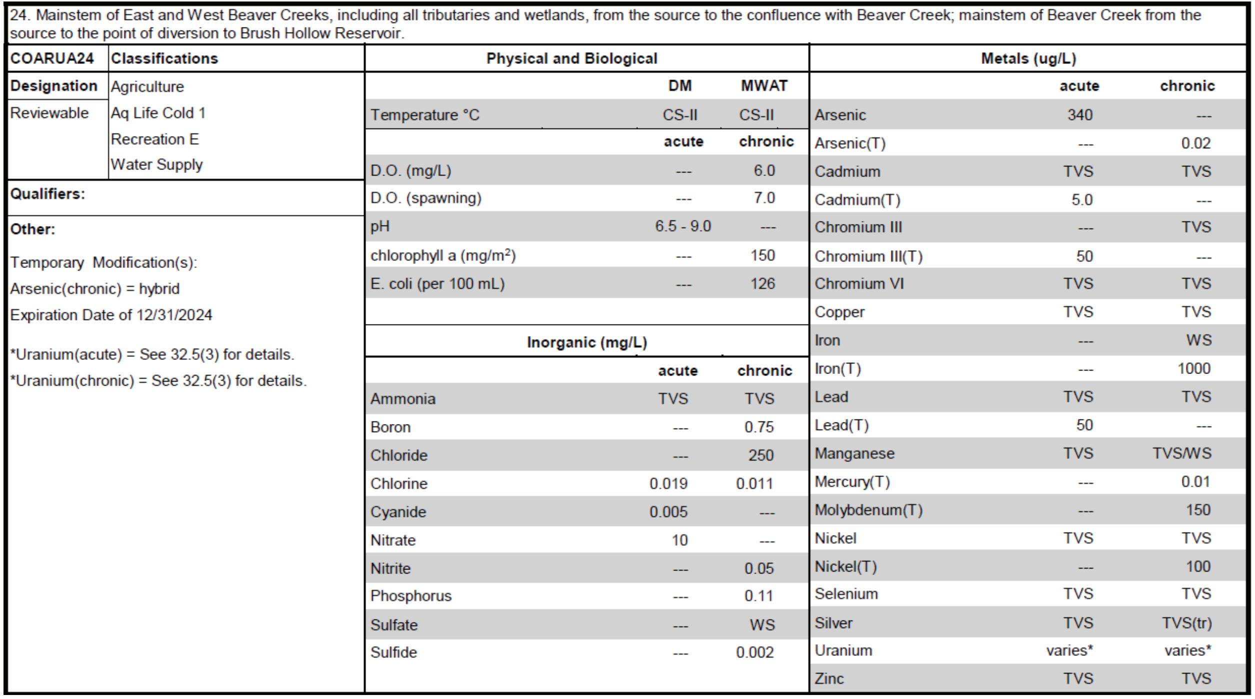
Table 2.1 Grassy Valley Monthly surface water monitoring locations

Site Number	Location	Monitoring Frequency
GV-06	Grassy Creek - Lower Grassy Valley	Monthly
Seep 1	South toe of ECOSA	Monthly
Seep 2	Toe of ECOSA	Monthly

Table 2.2 Monthly Grassy Valley Surface Water Monitoring Parameters

Parameters		
pH (Field)	Dissolved Oxygen (mg/L)	Temperature (°C)
Ammonia (mg/L as N) Total	Antimony (mg/L) Total Recoverable	Manganese (mg/L) Total Recoverable
Cyanide [FREE] (Dissolved)	Arsenic (mg/L) Total Recoverable	Mercury (mg/L) Total Recoverable
Fluoride (mg/L)	Barium (mg/L) Total Recoverable	Molybdenum (mg/L) Total Recoverable
Nitrate (mg/L as N)	Beryllium (mg/L) Total Recoverable	Nickel (mg/L) Dissolved
Nitrite (mg/L as N)	Cadmium (mg/L) Dissolved	Selenium (mg/L) Dissolved
Boron (mg/L)	Cadmium (mg/L) Total Recoverable	Silver (mg/L) Dissolved
Chloride (mg/L)	Chromium (mg/L) Dissolved	Thallium (mg/L) Dissolved
Sulfate (mg/L)	Copper (mg/L) Dissolved	Uranium (mg/L) Dissolved
Aluminum (mg/L) Dissolved	Iron (mg/L) Total Recoverable	Zinc (mg/L) Dissolved
Cyanide [WAD]	Lead (mg/L) Total Recoverable	

Table 2.3 Grassy Valley Surface water standards



24. Mainstem of East and West Beaver Creeks, including all tributaries and wetlands, from the source to the confluence with Beaver Creek; mainstem of Beaver Creek from the source to the point of diversion to Brush Hollow Reservoir.

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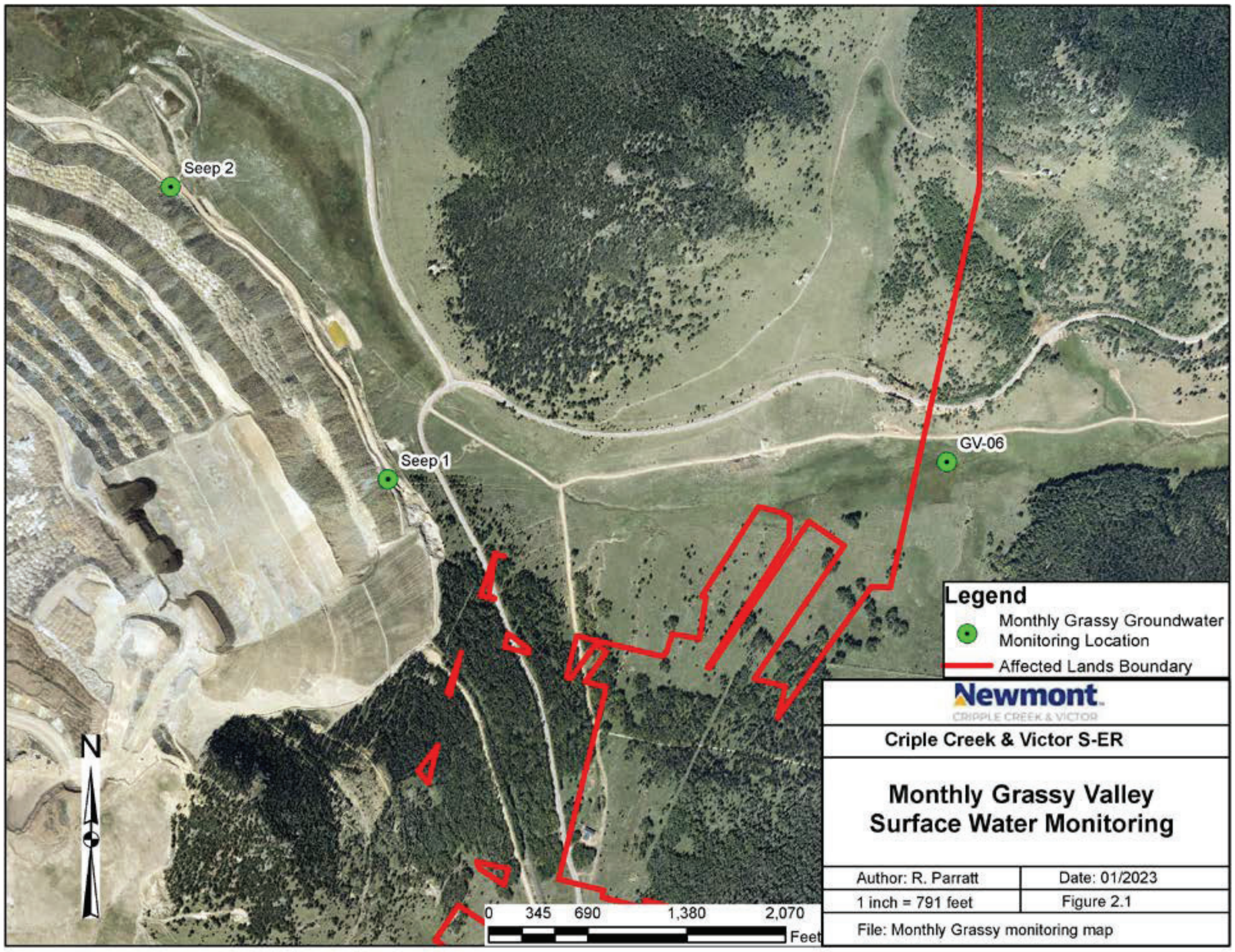
Nickel(T)	---	100
Selenium	TVS	TVS
Silver	TVS	TVS(tr)
Uranium	varies*	varies*
Zinc	TVS	TVS

Figure 2.1 Surface water monitoring locations



3.0 Monthly Grassy Valley Monitoring Groundwater Monitoring Locations

Monthly Grassy Valley groundwater monitoring locations within Grassy Valley for water quality downgradient of CC&V's ECOSA facility. Table 3.1 below presents the groundwater monitoring location for the monthly grassy valley sampling, Table 3.2 presents the constituents which this location is sampled for, Table 3.3 presents the standards to which this groundwater monitoring location is evaluated against, and Figure 3.1 shows where the groundwater monitoring location is in Grassy Valley.

Table 3.1.

Site Number	Location	Monitoring Frequency
GVMW-25	Grassy Valley Downgradient of ECOSA	Monthly

Table 3.2 Monthly Grassy Valley Groundwater Monitoring Parameters

Parameters		
Aluminum (dissolved)	Cyanide [FREE]	Nitrite (NO2)
Antimony (dissolved)	Fluoride (dissolved)	pH
Arsenic (dissolved)	Iron (dissolved)	Selenium (dissolved)
Barium (dissolved)	Lead (dissolved)	Silver (dissolved)
Beryllium (dissolved)	Lithium (dissolved)	Sulfate (dissolved)
Boron (dissolved)	Manganese (dissolved)	Thallium (dissolved)
Cadmium (dissolved)	Mercury (inorganic) (dissolved)	Total Nitrate + Nitrite (NO_2+NO_3-N)
Chloride (dissolved)	Molybdenum (dissolved)	Uranium (dissolved)
Chromium (dissolved)	Nickel (dissolved)	Vanadium (dissolved)
Cobalt (dissolved)	Nitrate (NO3)	Zinc (dissolved)
Copper (dissolved)	Cyanide [WAD][1]	

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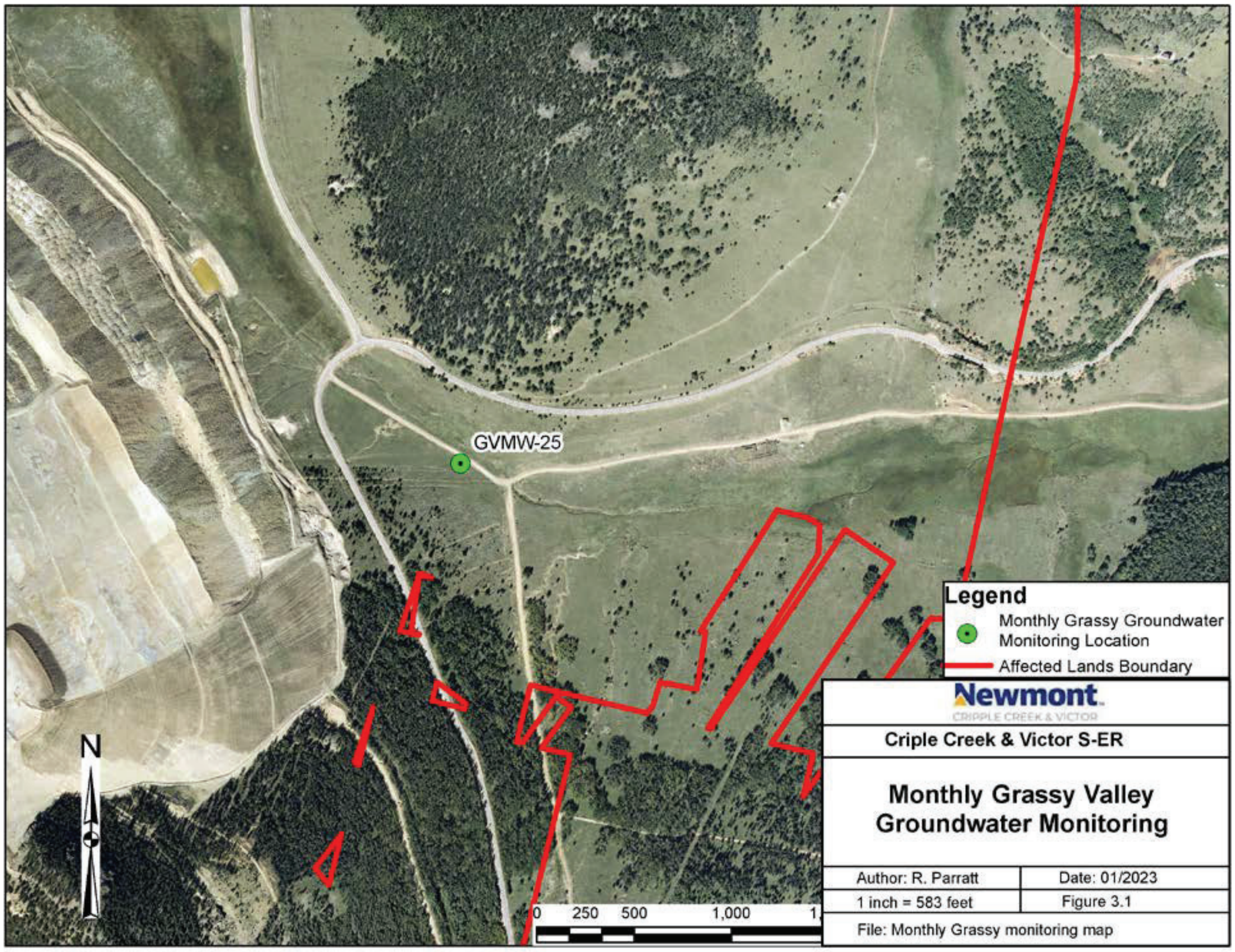
Table 3.3 Grassy Valley Groundwater standards

Parameter	mg/L	Parameter	mg/L
Aluminum	7	Molybdenum	0.21
Antimony	0.006	Nickel	0.2
Arsenic	0.01	Nitrate as N	10
Barium	2	Nitrite + Nitrate as N	11
Beryllium	0.004	Nitrite as N	1
Boron	0.75	pH	6.0 - 8.5
Cadmium	0.005	Selenium	0.024
Chromium	0.1	Silver	0.05
Cobalt	0.05	Sulfate (CRMW-3B)	1070
Copper	0.2	Sulfate (VIN-2B)	800
Cyanide [FREE]	0.2	Sulfate (WCMW-3)	250
Cyanide [WAD]	0.2	Sulfate (WCMW-6)	250
Fluoride	2	Sulfate (GVMW-8A)	250
Iron	14	Sulfate	250
Lead	0.05	Thallium	0.002
Lithium	2.5	Uranium	0.03
Manganese	3	Vanadium	0.1
Mercury	0.002	Zinc	2

Cells Highlighted in blue are Numeric Protection Limits

Cells Highlighted in white are Table Value Standards

Figure 3.1 Groundwater Monitoring Location



4. Field Technician Duties

Collection of reliable data and maintenance of analytical data are the foundation of compliance activities. Thus, the duties performed by the sampler provide the most critical element of the Environmental Department's efforts. Although this document primarily is focused on sample collection and handling methods, the generation of water data can be envisioned as a loop that includes more than simply sample collection. For any given sample, the sampler's duties have not been completed until this loop is closed. In general, a complete loop includes the collection of the sample, transmittal of the sample to a lab, receipt, review and, storage of analytical data.

4.1. Tasks

Each of these steps includes several tasks, each of which must be conducted in accordance with the procedures outlined in this document. Specific duties include the following:

- Collection of samples;
- Collection of duplicate and control samples;
- Collection of field data;
- Maintenance of equipment;
- Calibration of equipment used to collect field data;
- Tracking sample status;
- Data review and management;
- Review of invoices and coding for payment;
- Updating sample schedules, maps and other documents as needed;
- Conducting periodic inventory of equipment;

4.2. Quality Control

Newmont's quality control program consists of the following elements: sampler competence, utilization of standards, field blanks and duplicates, calibration of meters, equipment maintenance and routine auditing of sampling procedures. Analytical results of control samples will not be used to modify any sample analyses reports.

4.3. Training

To ensure samples are collected and managed accordingly, the approved SOPs and regulatory requirements, samplers are trained by department personnel who are knowledgeable and experienced in Newmont's monitoring program. Samplers will be familiar with site history and conditions and will maintain active Mine Safety and Health Administration (MSHA) certifications. The contracted laboratory will be required to maintain appropriate certifications as needed.

4.4. Calibration

All calibration and calibration check data will be documented in the field log book. All field equipment will be calibrated prior to field use. Calibration procedures shall follow the manufacturers' specifications. A calibration check will be performed after all samples have been collected for the day. Calibration checks will not be used to correct pH readings taken during the day.

5. Monthly Grassy Sampling Frequency

5.1. Sample Frequency

Per Technical Revision-132, surface water and groundwater samples are collected and reported to the Colorado Division of Reclamation and Mining Safety (DRMS). CC&V collects and submits surface and groundwater samples, duplicates and rinse blanks to our contracted laboratory for analysis.

Surface water, groundwater and QA/QC samples are collected monthly.

6. CC&V Monthly Grassy Sample Types

6.1. Duplicate Samples

Duplicate samples are two or more samples collected at the same time from the same location and are used to check the analyzing laboratory's accuracy. For CC&V's monthly Grassy sampling, one duplicate will be collected monthly.

6.2. Rinse Blanks

A rinse blank is a sample of analyte free water poured over or through a decontaminated field sampling equipment prior to the collection of environmental samples. Rinse blanks should be completed periodically to confirm that field sampling equipment is decontaminated. The field sampling technician will collect 1 rinse blank per month for laboratory analysis for the monthly Grassy sampling.

7. Documentation and Records

Field data is at least as important as the analytical data received from the outside laboratory. Because field data includes an evaluation of the specific instantaneous conditions at the site, this information cannot be reproduced by a later trip to the site.

The field data is often the first indication that there may be a concern with water quality at a given location. Therefore it is critical that any conditions observed are recorded in the field book.

7.1. Field Notes / Field Log Book

Any necessary field notes will be recorded in a permanently bound, "waterproof" notebook. The year and area will be neatly written in permanent ink on the spine and front cover of each book. Xerox or electronic copies of all field notes will be maintained in the Victor Admin building and will be updated quarterly. This system ensures that the field data will be preserved in the event of fire or other unusual circumstance, as well as provide convenient access to this data by all department staff.

The field book contains compliance data, and therefore can be used in any compliance related proceedings (ie. inspections, NOAV hearings, trials, etc.).

The field technician should strive to keep these notes suitably neat and well organized. Field notes shall be taken in pen with no erasures. Errors will be crossed out with a single line and corrected. The sampler will initial such corrections at the time they are made.

Field data recorded at each sampling site will include, at a minimum, pH, temperature, and sampling conditions (weather, etc.). Additional data that may be recorded, depending on the specific site are dissolved oxygen, conductivity, turbidity, flow, and depth to water. In many instances, careful recording of field observations has provided clues to questionable analytical results, thus saving considerable time and money. These observations may include water color, appearance, presence of floating matter or unusual amounts of suspended material, evidence of recent activity in the area or recent access by other persons, wildlife or stock, pumping rates (for monitor well samples), or any conditions that could conceivably impact water quality.

7.2. Field Data

Field data recorded at each surface, and groundwater monitoring location shall be recorded on the applicable field sheet (surface or groundwater) and will also be entered into the electronic data collection section for the Monitor Pro 5 Database Management System currently used by CC&V. All field parameters collected and recorded on the completed field sheet will be entered into the electronic data entry for storage in our database. Each compliance sampling location has an associated electronic data entry form which is used to enter data.

7.3. Calibration

All field instruments will be calibrated. The calibration and calibration check shall be documented in the field book. Calibration data will not be used to alter any readings taken during the day. Calibration procedures shall follow the manufacturer's specifications.

8. Collection and Preservation of Samples

The objective of sampling is to collect a representative sample that ensures the analytical results accurately represent the material being sampled. Following surface and groundwater sampling SOPs ensure that this is achieved. When alternative sampling methods are necessary due to unusual circumstances, the sampler will state plainly the nature of the modification in the field log book.

8.1. General Guidelines

A sampling event (day) should be scheduled to collect background samples first, and samples such as process solutions last, to avoid cross contamination of wells or streams.

Samples will be collected in new sample bottles of material consistent with the parameters to be analyzed. DO NOT touch the inside of sample vessel or cap or allow these surfaces to contact any material other than the sample media. Sample containers that are known, or suspected, to be contaminated will be discarded or clearly marked with an "X" or other designation to prevent their use. Holding times, minimum required sample bottles/volume, and necessary preservative types are contained within attachment I.

Table 8.1.1 below contains the required sample bottle, bottle volume, and preservative for the various analysis suites CC&V uses for our water monitoring program.

Table 8.1.1 - Sample Bottle Requirements by Analysis Suite

Surface Water Analysis Suite
1 - 500 mL NDPE unpreserved sample (grab sample) Black Label
1 - 250 mL HDPE unfiltered sample (grab sample) preserved with 1.25 mL H_2SO_4 (Sulfuric Acid, yellow label)
1 - 250 mL HDPE unfiltered sample (grab sample) preserved with 1.25 mL HNO_3 (Nitric Acid, red label)
1 - 250 mL Amber HDPE unpreserved sample (grab sample) preserved with 1.25 mL NaOH (Sodium Hydroxide, green label)
1 - 250 mL HDPE filtered sample (grab sample) preserved with 1.25 mL HNO_3 (Nitric Acid, red label)
Groundwater Analysis Suite
1 - 500 mL NDPE unpreserved sample (grab sample) Black Label
1 - 250 mL HDPE unfiltered sample (grab sample) preserved with 1.25 mL H_2SO_4 (Sulfuric Acid, yellow label)
1 - 250 mL HDPE unfiltered sample (grab sample) preserved with 1.25 mL HNO_3 (Nitric Acid, red label)
1 - 250 mL Amber HDPE unpreserved sample (grab sample) preserved with 1.25 mL NaOH (Sodium Hydroxide, green label)
1 - 250 mL HDPE filtered sample (grab sample) preserved with 1.25 mL HNO_3 (Nitric Acid, red label)

Disposable latex surgical gloves will be worn during the collection and preservation of samples to minimize potential contamination of the sample, and to protect hands from preservatives and process water.

When filling containers leave a small air space to allow for thermal expansion unless sampling for organics or dissolved oxygen which requires zero head space.

8.2. Field Book and Sample Field Sheets

A detailed record will be made at the time of collection of all pertinent information related to the sample. See Field Notes in the previous section (Section 7.1) for appropriate information. For locations requiring low-flow sampling protocols, a field sample sheet will be used to record stabilization criteria; these criteria include field parameters such as pH, conductivity, temperature, etc. An example low-flow field sheet is included as attachment I.

8.3. Sample Identification

Gummed paper labels or tags will be filled out with waterproof ink at the time the sample is collected. The labels should contain the following information: date and time of sample collection, sample location, sample identification (ID#), name of sample collector, whether the sample was filtered, and type of preservative used. The labels must be attached to the appropriate sample bottle. In the absence of labels, write the above information directly on the sample bottle with a permanent marker.

Care must be exercised to ensure that the sample ID# is the same as the official designation for each sample location. Failure to use the same ID# as specified in the applicable permit may result in analytical results being questioned. Officially designated sample ID's for compliance sampling locations are specified in appendix G. Non-compliance samples to be collected shall be collected as necessary, with all necessary information being recorded within the sampler's field notebook. It is extremely important that sample identification and recorded notes be sufficient to identify precisely where the samples came from.

Duplicate and control samples will be identified with an ID# which will not bias the laboratory by indicating the origin of the sample. At CC&V duplicate samples are identified by increasing the numerical component of the monitor well identifier by 100, and offsetting the position nomenclature by positive 5 (Increasing the letter count by 5). For example the duplicate for monitoring well VIN-2A would be VIN-102F, the duplicate for monitoring well GVMW-22B would be GVMW-122G. It is also necessary that all pertinent field data for the duplicate sample be recorded as any sample, and that the sample ID is identified as a duplicate, and which well it is a duplicate for is identified.

Blank samples will be identified with an ID# which will not bias the laboratory by indicating the origin of the sample. At CC&V Blank samples are identified by using the prefix CCVB and then following it by the month numerical value and the day numerical value (two digit). For example the blank sample collected on March 25 would be identified as CCVB-0325. It is also necessary that field data be collected for the blank sample (pH, DO, EC, temp). The field data needs to be recorded on a field sample sheet.

8.4. Sample Collection

Decontaminate all non-dedicated sampling equipment and meters, as appropriate, before and after use with deionized water (Type III reagent grade). Decontamination procedures include cleaning of equipment with a dilute phosphate free detergent solution (i.e. Alconox or Liquinox), followed by a fresh water rinse.

To assure an undiluted sample is collected, field cups, filter vessels, or other reusable equipment should be triple rinsed with sample solution if sufficient quantities are available.

Field readings will be measured from a separate container collected at the same time as the sample, and will not be taken from the actual sample bottle which will be analyzed. If a field sample was taken from a lined facility, it must be returned to a lined facility. Minimum field readings will be pH, conductivity, and temperature.

Sample collection from well, stream, pond, reservoir, & waste rock discussed below.

8.5. Well Sampling

To begin each sampling event, measure depth, to the nearest one-tenth of a foot, to static water level from the top of casing (TOC) with a water level indicator (Solinst). Rinse the level indicator with deionized water (type III reagent grade) before and after use.

A dry well will be recorded as "Dry at X feet" to assure that the Solinst did not hang up in the well.

Water standing in a well prior to sampling is not representative of in-situ ground water quality. Therefore, the stagnant water must be removed and replaced by fresh formation water. EPA protocol dictates that one to ten volumes of water standing in the well casing should be removed prior to collection of the sample. At CC&V the standard well sample collection method is the EPA Low Flow methodology (Low-Flow (minimal drawdown) Ground-water sampling procedures).

However, some wells yield such low volumes of water that this protocol cannot be followed. When sampling a low yield well evacuate the well to dryness once. Within 24 hours of this purge, collect, preserve, and handle the sample(s) according to normal procedures.

Another exception would be dedicated low flow pumping technologies (see section 9.1).

When sampling a high yield well, three casing volumes will be evacuated prior to sampling. Measure pH, temperature, and conductivity after each well volume is evacuated (ie, if the well volume is 5 gallons, take measurements after evacuation of 5, 10, and 15 gallons). In the field book, record the volume of water evacuated, the pH, temperature, conductivity, and time that the measurements were made. After three well volumes have been purged (appendix E, well evacuation calculation) check the last two sets of measurements to determine if the field parameters have stabilized. If the field readings have not stabilized
purge another well volume and take field measurements. Repeat until stabilized.

Stabilization criteria are met when the following parameters are met over three consecutive readings; Temperature = ±1.0°C, Specific Conductivity = ±3%, pH = ± 0.1. If the field values indicate stable conditions, collect, preserve, and handle the samples according to the procedures outlined in this document. An example of a well purging calculation is included in Appendix E.

8.6. Stream Sampling

Sampling results will vary with depth, stream flow, and distance from shore. When rinsing the field cup or bottles, discard the rinsate downstream from the sampling point. A grab sample should be collected at mid-depth from the middle of the stream, in an actively flowing section of the stream. In shallow streams, care should be taken not to disturb the bottom and put sediments into suspension, as these will affect the analytical results. If a stream has no visible flow, it will be recorded as dry and will not be sampled. If a stream sampling location has visible water, but not enough water to allow collection of a representative sample, it will be recorded as "too low to sample". An estimate of the flow rate of water at each stream sampling location should be recorded in the field book, along with the general appearance of the water (turbidity, color, etc.).

8.7. Filtering Samples

A ground water sample to be analyzed for dissolved metals must be passed through a 0.45 micron membrane filter prior to preservation. For the determination of total metals, the sample is not filtered. As a general guideline, ground water (wells) samples requiring a metals analysis should be filtered and analyzed for dissolved metals, while surface water samples requiring a metals analysis should be unfiltered and analyzed for total metals. Samples requiring analysis for organics should not be filtered. Specify on the Newmont chain of custody whether or not the samples have been filtered.

8.8. Sample Preservation and Storage

Sample preservation is intended to retard breakdown of the constituents within the sample. Preservation methods include pH control, chemical control, temperature control, and protection from light. Common sample preservation measures include the following:

> To avoid changes in the concentration or physical state of the constituent to be analyzed, preserve accordingly, and pack samples in Ice in the field and when shipping. Samples should be stored in a locked refrigerator and shipped to the laboratory as soon as possible. As samples are transferred to the storage refrigerator, a double check that the lids are securely tightened is conducted.

8.9. Sample Handling and Custody

The contracted laboratory will provide necessary coolers, sample bottles, chain-of-custody (COC) forms and shipping labels. After sample collection, samples will be stored in a refrigerator and shipped to the laboratory as soon as possible and within allowable holding times. Samples will be cooled to ≤4°±2°C. Sample containers will be packed to prevent breakage or contamination during shipment.

8.10. Chain of Custody Procedures

Chain of custody procedures will allow for the tracking of individual samples from the time of collection through laboratory analysis. All records relating to chain of custody documentation are to be made in ink. If errors are made on any of these documents, corrections are to be made by crossing a single line through the mistake and entering the correct information. All corrections are to be initialed and dated by the individual making the error, if possible, or by the investigator. All paperwork completed in the course of collecting and shipping samples must be correct, accurate, and defensible in a court of law.

The complete COC will accompany the sample from the site, through delivery to the contracted laboratory. To ensure complete documentation of sample custody, field personnel and laboratory personnel will sign and date the COC upon shipment and receipt.

8.11. Field Log Book

The field log book contains the first record in the chain of custody of the sample. It is previously discussed in Section 4.0 (Field Data) of this document.

8.12. Chain of Custody Record

A chain of custody record will be completed and must accompany each sample or each cooler of samples (see Appendix A). The record will include the following information: specific area/permit name, sample identification, sample type (well, grab, soil, other), preservative(s) used, whether the sample was filtered, type of analysis(es) required, number of sample containers, signatures of persons involved in the chain of possession, inclusive dates of possession, a unique NMC identification number which includes the area (NA = North Area, SA = South Area, RN = Rain Mine, EM = Emigrant Mine, WA = Waste, HO= Hollister) and date, cooler number, and method of shipment. If an analysis is to be rushed, state this on the Chain of Custody. One copy of the chain of custody is kept by Newmont. The laboratory keeps one copy for its records, and returns a copy to Newmont with the analysis reports.

8.13. Shipping Papers

A shipping label is attached to the top of cooler or shipping container along with a laboratory's address label. The cooler or shipping container must be secured with shipping fasteners or packing tape to prevent opening during transportation.

8.14. Delivery to Laboratory

Planning is required to ship the samples so the lab personnel are available to receive them, especially if shipping over the weekend. If a rush analysis is requested, notify the laboratory ahead of time. To ship samples, fill out a shipping paper for each cooler (see Appendix C) and deliver the coolers and shipping papers to the shipper. Make a copy of the shipping paper, COC and file in the Chain of Custody folder (see Tracking System section below). **Note**: For water quality samples there must be enough ice in the cooler to ensure the sample temperature is maintained at ≤4°±2°C.

8.15. Data Receipt and Review

Analysis reports are received with the invoices. The data should be reviewed relative to the applicable standards, and invoices filed appropriately. Should any analytical results deviate from expectation or exceed the applicable standards the coordinator should be informed.

9. Well Sampling Equipment

If possible, dedicated sampling devices should be used in water quality monitoring. When non-dedicated equipment is used, equipment will decontaminated using the procedures detailed above, before and after use to avoid cross contamination of wells. Equipment should be used according to manufacturers' guidelines. A brief summary of guidelines for various types of equipment used by CC&V follows:

9.1. Dedicated Electric Powered Sampling Pump

When possible, use the dedicated electric powered sampling pump to purge sampling wells. If the electrical connection coming from the dedicated sampling pump is a 240 volt connection, connect directly to the 240 volt input on the generator. If a four prong electrical connection comes from the dedicated sampling pump, connect the four prong connection from the sampling pump to the four prong connection on the control box. Then connect the 240 volt connection on the flow control box with the 240 volt input on the generator. Once the electrical connections are made pull out the choke on the generator, ensure the gas valve is open and start the generator. Once the generator is started push in the choke, if the control box is connected, adjust the flow rate using the nob on the control box. The optimum flow rate should allow at least three well volumes to be purged without purging the well dry.

After sampling turn off the generator and close the gas valve. Disconnect the electrical connections from the sample pump, control box, and generator. Ensure the sampling pump's electric connection and wiring is inside the well casing and secured below the well cap.

9.2. Field Deployable Submersible Pump

When a dedicated electric powered sampling pump is not available for use at the monitoring well to be sampled, a field deployable submersible pump is to be used. Currently CC&V uses a Geotech Environmetnal SS Geosub portable submersible pump for sample collection. This submersible pump has an external controller to manage the pump. To use the pump follow the instructions and training provided to you, if you have not received the necessary or adequate instruction contact your supervisor to receive the necessary training. Insure that all electrical connections are solid, and that the necessary grounding is in place. Operate the necessary power equipment (generator or inverter) to power the controller to collect the sample.

After sampling turn off the generator and close the gas valve (if used). Disconnect the electrical connections from the sample pump, control box, and generator.

9.3. Bailer

The hand bailer is a cylindrical tube, constructed of either plastic or metal, with a ball valve at the bottom. The ball valve allows water into the tube while the bailer is descending and closes, thus trapping water, when the bailer is ascending.

The bailer is to be decontaminated as described above, before and after use. The bailer is lowered into the well with a nylon rope, or a stainless steel mesh rope, which is decontaminated after each use. Care must be taken to ensure that the rope does not come into contact with the ground while sampling, to avoid any possible contamination. A disposable bailer must be used and then discarded when sampling for VOCs. Otherwise, it may be decontaminated and reused.

The line should be securely affixed to the bailer, and the opposite end should be securely affixed to something to prevent losing the bailer

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APPENDIX A

CHAIN OF CUSTODY RECORD

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CHAIN OF CUSTODY RECORD

Page____ of ____

SVL Analytical, Inc. • One Government Gulch • Kellogg, ID 83837 • (208) 784-1258 • FAX: (208) 783-0891

FOR SVL USE ONLY
SVL Work Order #

Temperature on Receipt:

Table 1. -- Matrix Type
1 = Surface Water, 2 = Ground Water
3 = Soil, 4 = Sediment, 5 = Rock, 6 = Rinsate, 7 = Oil
8 = Waste, 9= Other:____________________

Report to Company: ____________________
Contact: ____________________
Address: ____________________
____
Phone Number: ____________________
FAX Number: ____________________
E-mail: ____________________

Invoice Sent To: ____________________
Contact: ____________________
Address: ____________________
____
Phone Number: ____________________
FAX Number: ____________________
PO#: ____________________

Project Name: ____________________
Sampler's Signature: ____________________

Indicate State of sample origination: __________

Sample ID	Collection			Misc.		Preservative(s)							Analyses Required											Comments
Please take care to distinguish between: 1 and I 2 and Z 5 and S Ø and O Thanks!	Date	Time	Collected by: (Init.)	Matrix Type (From Table 1)	No. of Containers	Unpreserved	HNO_3 Filtered	HNO_3 Unfiltered	HCl	H_2SO_4	NaOH	Other (Specify)											Rush Instructions (Days)	
1																								
2																								
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

* Sample Reject: ☐ Return ☐ Dispose ☐ Store (30 Days)

White: LAB COPY Yellow: CUSTOMER COPY

SVL-COC 07/17

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APPENDIX B

Field Sampling Bottle Requirements and Holding Times

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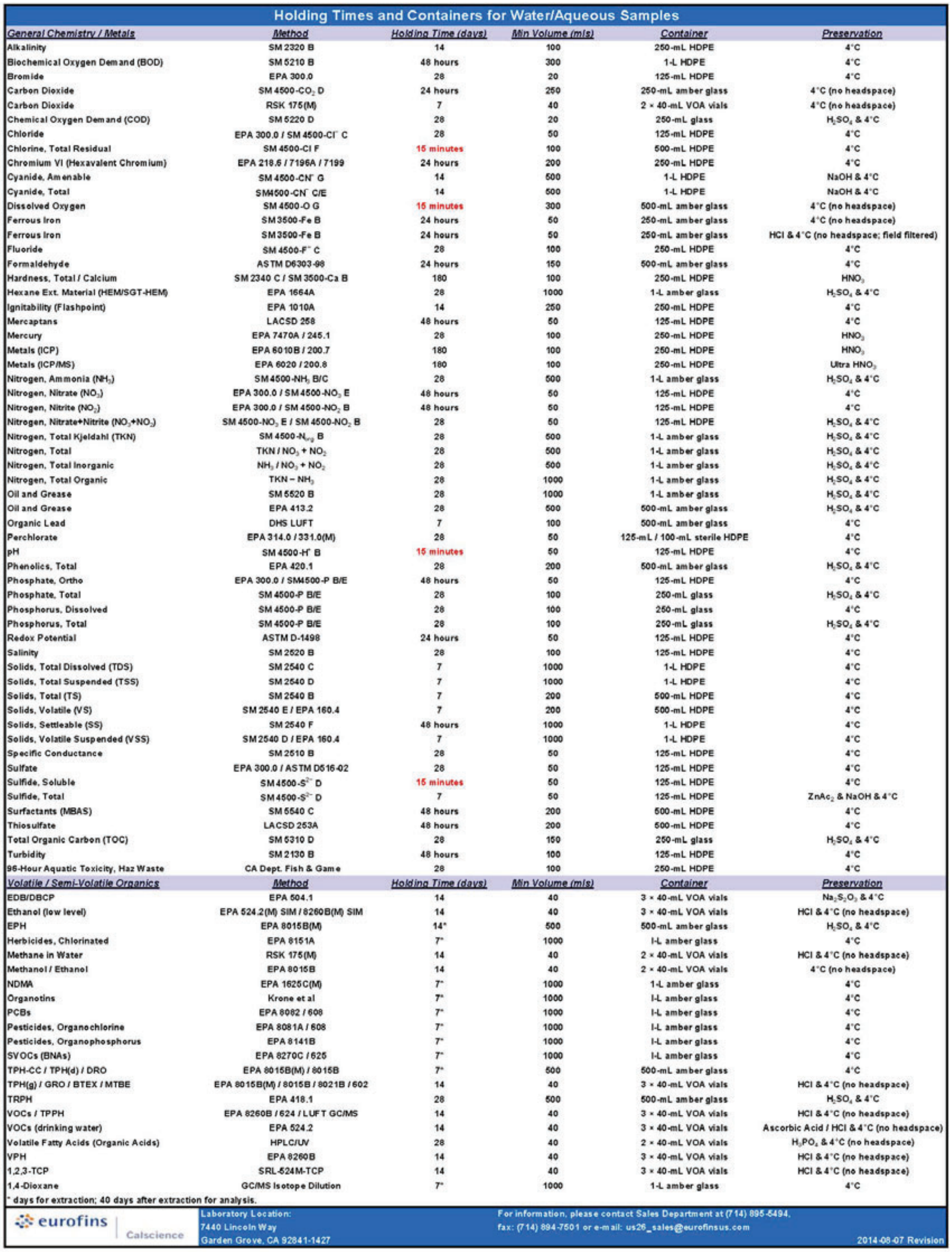

Holding Times and Containers for Water/Aqueous Samples

General Chemistry / Metals	*Method*	*Holding Time (days)*	*Min Volume (mls)*	*Container*	*Preservation*
Alkalinity	SM 2320 B	14	100	250-mL HDPE	4°C
Biochemical Oxygen Demand (BOD)	SM 5210 B	48 hours	300	1-L HDPE	4°C
Bromide	EPA 300.0	28	20	125-mL HDPE	4°C
Carbon Dioxide	SM 4500-CO_2 D	24 hours	250	250-mL amber glass	4°C (no headspace)
Carbon Dioxide	RSK 175(M)	7	40	2 × 40-mL VOA vials	4°C (no headspace)
Chemical Oxygen Demand (COD)	SM 5220 D	28	20	250-mL glass	H_2SO_4 & 4°C
Chloride	EPA 300.0 / SM 4500-Cl^- C	28	50	125-mL HDPE	4°C
Chlorine, Total Residual	SM 4500-Cl F	15 minutes	100	500-mL HDPE	4°C
Chromium VI (Hexavalent Chromium)	EPA 218.6 / 7196A / 7199	24 hours	200	250-mL HDPE	4°C
Cyanide, Amenable	SM 4500-CN^- G	14	500	1-L HDPE	NaOH & 4°C
Cyanide, Total	SM4500-CN^- C/E	14	500	1-L HDPE	NaOH & 4°C
Dissolved Oxygen	SM 4500-O G	15 minutes	300	500-mL amber glass	4°C (no headspace)
Ferrous Iron	SM 3500-Fe B	24 hours	50	250-mL amber glass	4°C (no headspace)
Ferrous Iron	SM 3500-Fe B	24 hours	50	250-mL amber glass	HCl & 4°C (no headspace; field filtered)
Fluoride	SM 4500-F^- C	28	100	250-mL HDPE	4°C
Formaldehyde	ASTM D6303-98	24 hours	150	500-mL amber glass	4°C
Hardness, Total / Calcium	SM 2340 C / SM 3500-Ca B	180	100	250-mL HDPE	HNO_3
Hexane Ext. Material (HEM/SGT-HEM)	EPA 1664A	28	1000	1-L amber glass	H_2SO_4 & 4°C
Ignitability (Flashpoint)	EPA 1010A	14	250	250-mL HDPE	4°C
Mercaptans	LACSD 258	48 hours	50	125-mL HDPE	4°C
Mercury	EPA 7470A / 245.1	28	100	250-mL HDPE	HNO_3
Metals (ICP)	EPA 6010B / 200.7	180	100	250-mL HDPE	HNO_3
Metals (ICP/MS)	EPA 6020 / 200.8	180	100	250-mL HDPE	Ultra HNO_3
Nitrogen, Ammonia (NH_3)	SM 4500-NH_3 B/C	28	500	1-L amber glass	H_2SO_4 & 4°C
Nitrogen, Nitrate (NO_3)	EPA 300.0 / SM 4500-NO_3 E	48 hours	50	125-mL HDPE	4°C
Nitrogen, Nitrite (NO_2)	EPA 300.0 / SM 4500-NO_2 B	48 hours	50	125-mL HDPE	4°C
Nitrogen, Nitrate+Nitrite (NO_3+NO_2)	SM 4500-NO_3 E / SM 4500-NO_2 B	28	50	125-mL HDPE	H_2SO_4 & 4°C
Nitrogen, Total Kjeldahl (TKN)	SM 4500-N_{org} B	28	500	1-L amber glass	H_2SO_4 & 4°C
Nitrogen, Total	TKN / NO_3 + NO_2	28	500	1-L amber glass	H_2SO_4 & 4°C
Nitrogen, Total Inorganic	NH_3 / NO_3 + NO_2	28	500	1-L amber glass	H_2SO_4 & 4°C
Nitrogen, Total Organic	TKN – NH_3	28	1000	1-L amber glass	H_2SO_4 & 4°C
Oil and Grease	SM 5520 B	28	1000	1-L amber glass	H_2SO_4 & 4°C
Oil and Grease	EPA 413.2	28	500	500-mL amber glass	H_2SO_4 & 4°C
Organic Lead	DHS LUFT	7	100	500-mL amber glass	4°C
Perchlorate	EPA 314.0 / 331.0(M)	28	50	125-mL / 100-mL sterile HDPE	4°C
pH	SM 4500-H^+ B	15 minutes	50	125-mL HDPE	4°C
Phenolics, Total	EPA 420.1	28	200	500-mL amber glass	H_2SO_4 & 4°C
Phosphate, Ortho	EPA 300.0 / SM4500-P B/E	48 hours	50	125-mL HDPE	4°C
Phosphate, Total	SM 4500-P B/E	28	100	250-mL glass	H_2SO_4 & 4°C
Phosphorus, Dissolved	SM 4500-P B/E	28	100	250-mL glass	4°C
Phosphorus, Total	SM 4500-P B/E	28	100	250-mL glass	H_2SO_4 & 4°C
Redox Potential	ASTM D-1498	24 hours	50	125-mL HDPE	4°C
Salinity	SM 2520 B	28	100	125-mL HDPE	4°C
Solids, Total Dissolved (TDS)	SM 2540 C	7	1000	1-L HDPE	4°C
Solids, Total Suspended (TSS)	SM 2540 D	7	1000	1-L HDPE	4°C
Solids, Total (TS)	SM 2540 B	7	200	500-mL HDPE	4°C
Solids, Volatile (VS)	SM 2540 E / EPA 160.4	7	200	500-mL HDPE	4°C
Solids, Settleable (SS)	SM 2540 F	48 hours	1000	1-L HDPE	4°C
Solids, Volatile Suspended (VSS)	SM 2540 D / EPA 160.4	7	1000	1-L HDPE	4°C
Specific Conductance	SM 2510 B	28	50	125-mL HDPE	4°C
Sulfate	EPA 300.0 / ASTM D516-02	28	50	125-mL HDPE	4°C
Sulfide, Soluble	SM 4500-S^{2-} D	15 minutes	50	125-mL HDPE	4°C
Sulfide, Total	SM 4500-S^{2-} D	7	50	125-mL HDPE	$ZnAc_2$ & NaOH & 4°C
Surfactants (MBAS)	SM 5540 C	48 hours	200	500-mL HDPE	4°C
Thiosulfate	LACSD 253A	48 hours	200	500-mL HDPE	4°C
Total Organic Carbon (TOC)	SM 5310 D	28	150	250-mL glass	H_2SO_4 & 4°C
Turbidity	SM 2130 B	48 hours	100	125-mL HDPE	4°C
96-Hour Aquatic Toxicity, Haz Waste	CA Dept. Fish & Game	28	100	250-mL HDPE	4°C
Volatile / Semi-Volatile Organics	*Method*	*Holding Time (days)*	*Min Volume (mls)*	*Container*	*Preservation*
EDB/DBCP	EPA 504.1	14	40	3 × 40-mL VOA vials	$Na_2S_2O_3$ & 4°C
Ethanol (low level)	EPA 524.2(M) SIM / 8260B(M) SIM	14	40	3 × 40-mL VOA vials	HCl & 4°C (no headspace)
EPH	EPA 8015B(M)	14*	500	500-mL amber glass	H_2SO_4 & 4°C
Herbicides, Chlorinated	EPA 8151A	7*	1000	l-L amber glass	4°C
Methane in Water	RSK 175(M)	14	40	2 × 40-mL VOA vials	HCl & 4°C (no headspace)
Methanol / Ethanol	EPA 8015B	14	40	2 × 40-mL VOA vials	4°C (no headspace)
NDMA	EPA 1625C(M)	7*	1000	1-L amber glass	4°C
Organotins	Krone et al	7*	1000	l-L amber glass	4°C
PCBs	EPA 8082 / 608	7*	1000	l-L amber glass	4°C
Pesticides, Organochlorine	EPA 8081A / 608	7*	1000	l-L amber glass	4°C
Pesticides, Organophosphorus	EPA 8141B	7*	1000	l-L amber glass	4°C
SVOCs (BNAs)	EPA 8270C / 625	7*	1000	l-L amber glass	4°C
TPH-CC / TPH(d) / DRO	EPA 8015B(M) / 8015B	7*	500	500-mL amber glass	4°C
TPH(g) / GRO / BTEX / MTBE	EPA 8015B(M) / 8015B / 8021B / 602	14	40	3 × 40-mL VOA vials	HCl & 4°C (no headspace)
TRPH	EPA 418.1	28	500	500-mL amber glass	H_2SO_4 & 4°C
VOCs / TPPH	EPA 8260B / 624 / LUFT GC/MS	14	40	3 × 40-mL VOA vials	HCl & 4°C (no headspace)
VOCs (drinking water)	EPA 524.2	14	40	3 × 40-mL VOA vials	Ascorbic Acid / HCl & 4°C (no headspace)
Volatile Fatty Acids (Organic Acids)	HPLC/UV	28	40	2 × 40-mL VOA vials	H_3PO_4 & 4°C (no headspace)
VPH	EPA 8260B	14	40	3 × 40-mL VOA vials	HCl & 4°C (no headspace)
1,2,3-TCP	SRL-524M-TCP	14	40	3 × 40-mL VOA vials	HCl & 4°C (no headspace)
1,4-Dioxane	GC/MS Isotope Dilution	7*	1000	1-L amber glass	4°C

* days for extraction; 40 days after extraction for analysis.

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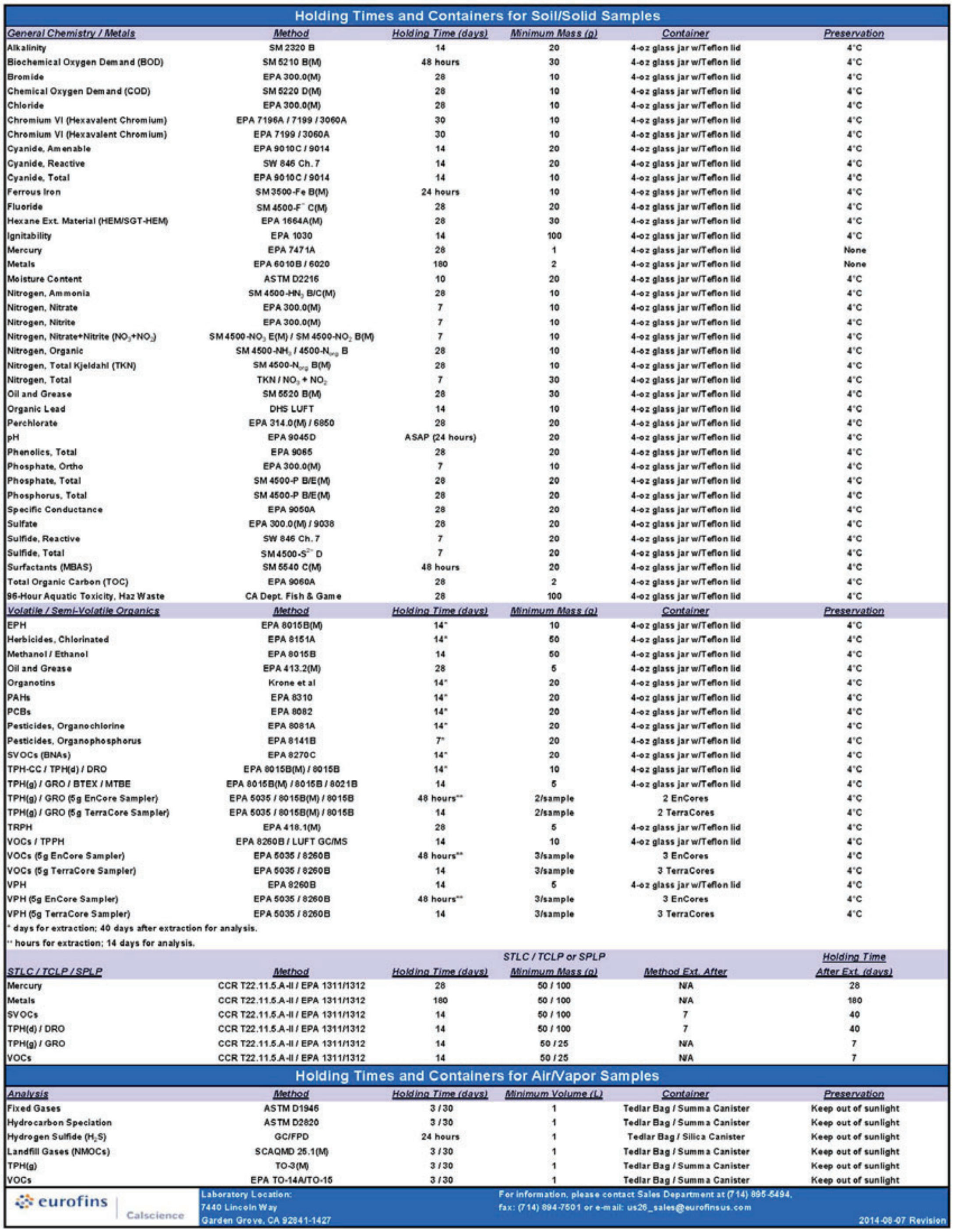
Laboratory Location:
7440 Lincoln Way
Garden Grove, CA 92841-1427

For information, please contact Sales Department at (714) 895-5494,
fax: (714) 894-7501 or e-mail: us26_sales@eurofinsus.com

2014-08-07 Revision



Holding Times and Containers for Soil/Solid Samples

General Chemistry / Metals	*Method*	*Holding Time (days)*	*Minimum Mass (g)*	*Container*	*Preservation*
Alkalinity	SM 2320 B	14	20	4-oz glass jar w/Teflon lid	4°C
Biochemical Oxygen Demand (BOD)	SM 5210 B(M)	48 hours	30	4-oz glass jar w/Teflon lid	4°C
Bromide	EPA 300.0(M)	28	10	4-oz glass jar w/Teflon lid	4°C
Chemical Oxygen Demand (COD)	SM 5220 D(M)	28	10	4-oz glass jar w/Teflon lid	4°C
Chloride	EPA 300.0(M)	28	10	4-oz glass jar w/Teflon lid	4°C
Chromium VI (Hexavalent Chromium)	EPA 7196A / 7199 / 3060A	30	10	4-oz glass jar w/Teflon lid	4°C
Chromium VI (Hexavalent Chromium)	EPA 7199 / 3060A	30	10	4-oz glass jar w/Teflon lid	4°C
Cyanide, Amenable	EPA 9010C / 9014	14	20	4-oz glass jar w/Teflon lid	4°C
Cyanide, Reactive	SW 846 Ch. 7	14	20	4-oz glass jar w/Teflon lid	4°C
Cyanide, Total	EPA 9010C / 9014	14	10	4-oz glass jar w/Teflon lid	4°C
Ferrous Iron	SM 3500-Fe B(M)	24 hours	10	4-oz glass jar w/Teflon lid	4°C
Fluoride	SM 4500-F$^-$ C(M)	28	20	4-oz glass jar w/Teflon lid	4°C
Hexane Ext. Material (HEM/SGT-HEM)	EPA 1664A(M)	28	30	4-oz glass jar w/Teflon lid	4°C
Ignitability	EPA 1030	14	100	4-oz glass jar w/Teflon lid	4°C
Mercury	EPA 7471A	28	1	4-oz glass jar w/Teflon lid	None
Metals	EPA 6010B / 6020	180	2	4-oz glass jar w/Teflon lid	None
Moisture Content	ASTM D2216	10	20	4-oz glass jar w/Teflon lid	4°C
Nitrogen, Ammonia	SM 4500-HN$_3$ B/C(M)	28	10	4-oz glass jar w/Teflon lid	4°C
Nitrogen, Nitrate	EPA 300.0(M)	7	10	4-oz glass jar w/Teflon lid	4°C
Nitrogen, Nitrite	EPA 300.0(M)	7	10	4-oz glass jar w/Teflon lid	4°C
Nitrogen, Nitrate+Nitrite (NO$_3$+NO$_2$)	SM 4500-NO$_3$ E(M) / SM 4500-NO$_2$ B(M)	7	10	4-oz glass jar w/Teflon lid	4°C
Nitrogen, Organic	SM 4500-NH$_3$ / 4500-N$_{org}$ B	28	10	4-oz glass jar w/Teflon lid	4°C
Nitrogen, Total Kjeldahl (TKN)	SM 4500-N$_{org}$ B(M)	28	10	4-oz glass jar w/Teflon lid	4°C
Nitrogen, Total	TKN / NO$_3$ + NO$_2$	7	30	4-oz glass jar w/Teflon lid	4°C
Oil and Grease	SM 5520 B(M)	28	30	4-oz glass jar w/Teflon lid	4°C
Organic Lead	DHS LUFT	14	10	4-oz glass jar w/Teflon lid	4°C
Perchlorate	EPA 314.0(M) / 6850	28	20	4-oz glass jar w/Teflon lid	4°C
pH	EPA 9045D	ASAP (24 hours)	20	4-oz glass jar w/Teflon lid	4°C
Phenolics, Total	EPA 9065	28	20	4-oz glass jar w/Teflon lid	4°C
Phosphate, Ortho	EPA 300.0(M)	7	10	4-oz glass jar w/Teflon lid	4°C
Phosphate, Total	SM 4500-P B/E(M)	28	20	4-oz glass jar w/Teflon lid	4°C
Phosphorus, Total	SM 4500-P B/E(M)	28	20	4-oz glass jar w/Teflon lid	4°C
Specific Conductance	EPA 9050A	28	20	4-oz glass jar w/Teflon lid	4°C
Sulfate	EPA 300.0(M) / 9038	28	20	4-oz glass jar w/Teflon lid	4°C
Sulfide, Reactive	SW 846 Ch. 7	7	20	4-oz glass jar w/Teflon lid	4°C
Sulfide, Total	SM 4500-S^{2-} D	7	20	4-oz glass jar w/Teflon lid	4°C
Surfactants (MBAS)	SM 5540 C(M)	48 hours	20	4-oz glass jar w/Teflon lid	4°C
Total Organic Carbon (TOC)	EPA 9060A	28	2	4-oz glass jar w/Teflon lid	4°C
96-Hour Aquatic Toxicity, Haz Waste	CA Dept. Fish & Game	28	100	4-oz glass jar w/Teflon lid	4°C
Volatile / Semi-Volatile Organics	*Method*	*Holding Time (days)*	*Minimum Mass (g)*	*Container*	*Preservation*
EPH	EPA 8015B(M)	14*	10	4-oz glass jar w/Teflon lid	4°C
Herbicides, Chlorinated	EPA 8151A	14*	50	4-oz glass jar w/Teflon lid	4°C
Methanol / Ethanol	EPA 8015B	14	50	4-oz glass jar w/Teflon lid	4°C
Oil and Grease	EPA 413.2(M)	28	5	4-oz glass jar w/Teflon lid	4°C
Organotins	Krone et al	14*	20	4-oz glass jar w/Teflon lid	4°C
PAHs	EPA 8310	14*	20	4-oz glass jar w/Teflon lid	4°C
PCBs	EPA 8082	14*	20	4-oz glass jar w/Teflon lid	4°C
Pesticides, Organochlorine	EPA 8081A	14*	20	4-oz glass jar w/Teflon lid	4°C
Pesticides, Organophosphorus	EPA 8141B	7*	20	4-oz glass jar w/Teflon lid	4°C
SVOCs (BNAs)	EPA 8270C	14*	20	4-oz glass jar w/Teflon lid	4°C
TPH-CC / TPH(d) / DRO	EPA 8015B(M) / 8015B	14*	10	4-oz glass jar w/Teflon lid	4°C
TPH(g) / GRO / BTEX / MTBE	EPA 8015B(M) / 8015B / 8021B	14	5	4-oz glass jar w/Teflon lid	4°C
TPH(g) / GRO (5g EnCore Sampler)	EPA 5035 / 8015B(M) / 8015B	48 hours**	2/sample	2 EnCores	4°C
TPH(g) / GRO (5g TerraCore Sampler)	EPA 5035 / 8015B(M) / 8015B	14	2/sample	2 TerraCores	4°C
TRPH	EPA 418.1(M)	28	5	4-oz glass jar w/Teflon lid	4°C
VOCs / TPPH	EPA 8260B / LUFT GC/MS	14	10	4-oz glass jar w/Teflon lid	4°C
VOCs (5g EnCore Sampler)	EPA 5035 / 8260B	48 hours**	3/sample	3 EnCores	4°C
VOCs (5g TerraCore Sampler)	EPA 5035 / 8260B	14	3/sample	3 TerraCores	4°C
VPH	EPA 8260B	14	5	4-oz glass jar w/Teflon lid	4°C
VPH (5g EnCore Sampler)	EPA 5035 / 8260B	48 hours**	3/sample	3 EnCores	4°C
VPH (5g TerraCore Sampler)	EPA 5035 / 8260B	14	3/sample	3 TerraCores	4°C

* days for extraction; 40 days after extraction for analysis.

** hours for extraction; 14 days for analysis.

STLC / TCLP / SPLP	*Method*	*Holding Time (days)*	STLC / TCLP or SPLP *Minimum Mass (g)*	*Method Ext. After*	*Holding Time After Ext. (days)*
Mercury	CCR T22.11.5.A-II / EPA 1311/1312	28	50 / 100	N/A	28
Metals	CCR T22.11.5.A-II / EPA 1311/1312	180	50 / 100	N/A	180
SVOCs	CCR T22.11.5.A-II / EPA 1311/1312	14	50 / 100	7	40
TPH(d) / DRO	CCR T22.11.5.A-II / EPA 1311/1312	14	50 / 100	7	40
TPH(g) / GRO	CCR T22.11.5.A-II / EPA 1311/1312	14	50 / 25	N/A	7
VOCs	CCR T22.11.5.A-II / EPA 1311/1312	14	50 / 25	N/A	7

Holding Times and Containers for Air/Vapor Samples

Analysis	*Method*	*Holding Time (days)*	*Minimum Volume (L)*	*Container*	*Preservation*
Fixed Gases	ASTM D1946	3 / 30	1	Tedlar Bag / Summa Canister	Keep out of sunlight
Hydrocarbon Speciation	ASTM D2820	3 / 30	1	Tedlar Bag / Summa Canister	Keep out of sunlight
Hydrogen Sulfide (H$_2$S)	GC/FPD	24 hours	1	Tedlar Bag / Silica Canister	Keep out of sunlight
Landfill Gases (NMOCs)	SCAQMD 25.1(M)	3 / 30	1	Tedlar Bag / Summa Canister	Keep out of sunlight
TPH(g)	TO-3(M)	3 / 30	1	Tedlar Bag / Summa Canister	Keep out of sunlight
VOCs	EPA TO-14A/TO-15	3 / 30	1	Tedlar Bag / Summa Canister	Keep out of sunlight

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Laboratory Location:
7440 Lincoln Way
Garden Grove, CA 92841-1427

For information, please contact Sales Department at (714) 895-5494,
fax: (714) 894-7501 or e-mail: us26_sales@eurofinsus.com

2014-08-07 Revision

APPENDIX C

Example Field Sample Record Sheets

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Groundwater Sampling Log

Location : ______________________ **Date:** ______________

Technician: ______________________ **Quarter:** ______________

Static Water Level: ______________ **Well ID:** ______________

Is well Dry? __________ **If so Dry at:** _______ **feet**

Time	Drawdown (ft)	pH (S.U.)	Cond. (uS/cm)	Temp. (°C)	Notes

Sample Method: ______________ **Rate (gpm):** _______ **Time Start:** _______ **Time End:** _______

Final Parameters	Stabilization Guidance		Met?	Comments
pH		0.1	Y/N	
Conductivity		3%	Y/N	
Temp©		10%	Y/N	
Final H2O level		feet		

O/G visible: Y/N Turbid? Y/N
Equipment Decontaminated: Y/N
Decontamination procedure used: ______________________

Signature: ______________________
Weather: ______________________

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Surface Water Sampling Log

Location : ____________________ **Date:** ______________________
Technician: _____________________ **Quarter**: __________________

Time	pH (S.U.}	Cond. (uS/cm)	Temp. (°C)	Notes

Sample Method: ________________

Oil/Gas visible [Y / N]

Turbid [Y / N]

Clear [Y / N]

Weather: ______________________

Signature: ____

Comments:

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Appendix D

Reagent Water Specifications

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REAGENT WATER SPECIFICATIONS

Quality Parameter	Type I	Type II	Type III
Bacteria, CFU/Ml	10	1000	NA
pH	NA	NA	8-May
Resistivity, megohm-cm at 25° C	> 10	> 1	0.11
Resistivity, megohm-cm at 25° C	> 10	> 1	0.1
Conductivity, umho/cm at 25° C	< 0.1	1	10
SiO_2, mg/L	< 0.05	< 0.1	< 1
Total Solids, mg/L	0.1	1	5
Total oxidizable organic carbon, mg/l	< 0.05	< 0.2	< 1

* NA = not applicable

Reference - Standard Methods for the
Examination of Water and Wastewater,
17th Edition, 1989.

APPENDIX E

WELL EVACUATION CALCULATION

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WELL EVACUATION CALCULATION - EXAMPLE

1. Measure depth to water from top of casing (TOC) prior to purging.
2. Begin purging well.
3. Determine well casing volume.

Total depth of well (TD) -depth to water (DTW) = total height of water in casing (H).

Example: TD = 66.60'
DTW = 46.15'
H = 20.45'

Volume in cubic feet (Vc) = 3.14 x (radius of well)^2 x H

Example: with a 4" casing, radius = 2" = 0.167'

Vc = 3.14 x (0.167')^2 x 20.45'
Vc = 0.09 square feet x 20.45 feet
Vc = 1.8 cubic feet

4. Convert cubic feet to gallons.

Cubic feet x 7.48 = gallons
Example: Vg = 1.8 cubic feet x 7.48 = 13.5 gallons

5. Three well volumes must be evacuated:

Example: Vw_3 = 3 x 13.5 gallons = 40.4 gallons

6. Hence, to evacuate three well volumes in the above example, 40.4 gallons need to be purged before sampling.

Since all values in the above calculations are constant except for the height of water in casing (H), the constant values may be pre-calculated to simplify well volume determinations.
Thus:
For a 2" well, three well volumes (Vw_3) = H x 0.5
For a 4" well, three well volumes (Vw_3) = H x 2

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APPENDIX F

YSI Pro Water Quality Meter Calibration

PURPOSE

CC&V uses the YSI Pro Plus water quality meter to collect water quality data that is submitted to regulatory agencies. It is the responsibility of the user to properly calibrate the probe before each use and keep an accurate record of each calibration.

SCOPE

The YSI pro plus is to be calibrated prior to use for the day and details of the calibration are to be recorded in calibration log book/ Sheet.

YSI CALIBRATION

Dissolved Oxygen Calibration

Moisten the plastic cup by adding a small amount of clean water (1/8 inch) in the plastic storage cup or by moistening the sponge in the bottom of the cup. Make sure there are no water droplets on the DO membrane or temperature sensor. Then install the cup over the sensors screw it on the cable and then disengage one or two threads to ensure atmospheric venting. Make sure the DO and temperature sensors are not immersed in water. Turn the instrument on and wait approximately 5 to 15 minutes for the storage container to become completely saturated and to allow the sensors to stabilize.

It is not necessary to calibrate in both % and mg/L or ppm. Calibrating in % will simultaneously calibrate mg/L and ppm and vice versa.

Press 'Cal' Highlight Probe ID
Highlight DO % and press enter to confirm.
Wait for the temperature and DO% values under "Actual Readings" to stabilize. Then highlight Accept Calibration and press enter to calibrate. Or, press Esc to cancel the calibration.

Specific Conductance Calibration

Press 'Cal' Highlight Probe ID.

After selecting the Probe ID, highlight Conductivity and press enter. Highlight the desired calibration method; Sp. Conductance. Remove sponge from cup. Place the sensor into a fresh, traceable conductivity calibration solution. The solution must cover the holes of the conductivity sensor that are closest to the cable. Ensure the entire conductivity sensor is submerged in the solution or the instrument will read approximately of half the expected value!
Choose the units in either SPC-us/cm and press enter.
Highlight Calibration value and press enter to input the value of the calibration standard. Then, once the temperature and conductivity readings stabilize, highlight Accept Calibration and press enter. Or, press Esc to cancel the calibration

pH Calibration

Press 'Cal'. Highlight Probe ID. After selecting your or Probe ID, highlight ISE (pH) and press enter. The message line will show the instrument is "Ready for point 1". The pH calibration allows up to six calibration points. Calibration for CCV purposes will be a 3 point calibration (4, 7, and 10). Place the sensor in a pH 7 buffer solution. The instrument should automatically recognize the buffer value and display it at the top of the calibration screen. If the calibration value is incorrect, the auto buffer recognition setting in the Sensor Setup menu may be incorrect. If necessary, highlight the Calibration Value and press enter to input the correct buffer value. Once the pH and temperature readings stabilize, highlight Accept Calibration and press enter to accept the first calibration point. The message line will then display "Ready for point 2".
To continue with the 2nd point, place the sensor in the second buffer solution (pH4). The instrument should automatically recognize the second buffer value (pH4) and display it at the top of the screen. If necessary, highlight the Calibration Value and press enter to input the correct buffer value. Once the pH and temperature readings stabilize, highlight Accept Calibration and press enter to confirm the second calibration point.
The message line will then display 'Ready for point 3" and you can continue with the 3rd calibration point (pH10) as detailed in previous steps for first and second calibration points.
Press 'Cal' to complete the calibration.

Calibration Finalization

Upon completing the calibrations prior to field use, return probes to pH 4 storage solution. pH 4 is the recommended storage solution to prevent the dehydration of the pH probe. While using YSI, place pH 4 storage solution in the storage solution container that is maintained in case, to be used for continued storage at days end. Insure you have recorded the required values on the YSI Pro Plus calibration log.

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APPENDIX G

CC&V Sample Location Identified Sample Names

Sample Location	**Area**	**Sample ID Name**
GV-06	Grassy Valley	GV-06
GVMW-25	Grassy Valley	GVMW-25
Seep-1	ECOSA Toe South	Seep-1
Seep-2	ECOSA Toe	Seep-2

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APPENDIX H

CC&V Surface Water & Groundwater SOP

PURPOSE

It is of utmost importance to collect samples in a consistent and unbiased manner to characterize the actual quality of the water. This guide summarizes the current CC&V procedures that are established for water quality sampling, shipment, as well as the equipment used to collect samples and field parameters. The results from these samples are used to insure compliance with permits and regulatory agencies.

SCOPE

This SOP outlines and covers the following

Monitor pro and field log sheets
Decontamination of sampling equipment
Surface water sampling
Ground water sampling, using both dedicated and submersible pumps
Stream flow measurements and equipment
Chain of Custody and sample shipment protocols

Procedure

This procedure covers the sampling techniques that will be used to collect the monthly, bi-monthly, quarterly, and occasional spot sampling that will be required. Both surface water and ground water are outlined. Information that will assist in the sampling process is also located below, such as preparation, equipment information, decontamination, tablet based programs to assist in logging information, chain of custody and sample shipment protocol. The ground water sampling procedure outlined here is based on guideline outlined in the EPA low flow method.

For all field sampling procedures to occur both on and off mine site, property sampling technician should maintain safety as a priority when visiting sampling locations. At all times the technician should use their best judgement to determine if the sampling location is safe to perform the sampling task or inspection they are to perform. When visiting sampling locations there may be times when bad weather creates an unsafe condition for collecting samples or performing field inspections. When bad weather has caused a field location to be unsafe it is the technician's responsibility to not perform the task for that location. If a site is considered unsafe to collect a sample or perform an inspection the unsafe condition should be recorded on a field level risk assessment card, and if possible a picture taken with field equipment to be recorded within Monitor Pro 5 software.

Monitor pro

Tablets enabled with Monitor pro allow field samplers to collect sampling and field data directly to the web based database. One limitation with the monitor pro- tablet configuration is that only the final parameter reading can be logged. It is suggested that a field log sheet is used to monitor the stabilization of parameters while sampling monitoring wells, to insure that stabilization has occurred.

Preparation

Prior to leaving office for field collect the needed pre-preserved bottles, sampling equipment, and decontamination equipment that will be needed for the planned sampling locations. By identifying and planning the sampling locations for the day you can minimize your vehicle load and maximize your potential sampling. Not all locations will require all equipment.

Decontamination Preparation

Three-phase decontamination is to be used. If decontamination solutions begin to appear dirty, the need to be changed out.

1. Prepare designated water containers with necessary water.
2. Prepare rinse containers for decontamination use, note which container is for Liquinox, H_2O, and D.I. H_2O
3. When ready to decontaminate fill rinse containers with appropriate H_2O
4. Add a small amount of nonphosphate detergent to the rinse container labeled “Liquinox”
5. Decontaminate submersible pump by submerging into rinse H_2O first, then submerge into “Liquinox” rinse container then submerge pump into D.I. H_2O rinse container. Submersible pump should remain in each container for approximately 1 minute. To decontaminate peristaltic pump purge approximately 250 ml of H_2O first through the line, then approximately 250 ml of “liquinox” through the line, then approximately 250 ml of D.I. H_2O through the line. To Decontaminate sounder submerge into rinse H_2O, then submerge in “Liquinox”, then submerge in D.I. H_2O. Sounder should remain in “liquinox” container for approximately 1 minute.

6. Properly dispose of H_2O used to decontaminate equipment

Surface Water Sampling

Prior to leaving for field identify the required parameters and analyses for planned sampling locations and collect equipment accordingly.

Surface Water Sampling Equipment List

- Field level risk assessment form (see section 4)
- YSI Professional Multi Meter, or Myron Ultrameter II
- Geo Peristaltic Pump
- D.I. water
- 100 ft. Tape measure
- Marsh McBirney 2000 portable Flow meter & Wadding Staff
- Wader Boots
- Monitor Pro compatible tablet
- Cooler with ice
- Sample Bottles
- 0.45 Micron Filters
- Sampling vessel
- Waterproof pen
- Pre preserved sample bottles
- Field sample log sheets

Stream Flow Measurements

Site inspection guidelines are as follows:

1. The channel should have as much straight run as possible.
2. Where the length of straight run is limited, the length up stream from the profile should be twice the downstream length.
3. The channel should be free of flow disturbances.
4. The flow should be free of swirls, eddies, vortices, backward flow, or dead zones.
5. Avoid areas immediately downstream from sharp bends or obstructions.
6. If flume or weir is in place, use flow measurement from the device, insure the devices have been calibrated prior to leaving for field.

Marsh McBirney Flow Meter

Technical guidance can be found in the Instruction Manual for the model 2000 portable flow meter.

The method that is being used is the .4 method, or the 60% method.

1. Upon arrival at field location perform field level risk assessment to determine location is safe to perform surface water sampling. Document risk assessment with field level risk assessment form, and record image with field equipment to be uploaded to Monitor Pro 5.
2. Measure the width of the channel.
3. Divide the width of the channel into a number of equal segments (more segments increases the accuracy of the resultant flow). If the difference in mean velocity between two adjacent segments is greater than 10%, the segments should be smaller.
4. Work from the downstream side of the tape beginning on the bank side of the stream, putting the Top-Setting Wading rod into the stream. Set the depth on the wading staff's sliding rod lock to the depth of the water which is read at the bottom of the rod.
5. Record the velocity and depth measurements.
6. Proceed to the next segments and make the depth measurement adjustment
7. Record the segment units used .5 ft., 1 ft., etc. then record the depth for that segment.

   Flow is calculated with the continuity equation ($Q= \hat{a} \times A$)

Whereas Q is flow, â is mean velocity and A is cross-sectional area. The flow of the channel is the sum of all segment areas times the mean velocity across the channel. Remember to account for the bank measurements.

Surface Water Sampling Procedure

1. Prior to leaving office turn on and calibrate YSI Pro plus water quality meter, record in calibration log the pH buffer values, DO calibration value, and Specific Conductance Calibration Values (See YSI Calibration SOP).
2. Upon arrival at field location perform field level risk assessment to determine location is safe to perform surface water sampling.

Document risk assessment with field level risk assessment form, and record image with field equipment to be uploaded to Monitor Pro 5.

3. When at sampling location, place YSI probe directly in stream, allow parameters to stabilized and record parameters.
4. Collect data to calculate flow rate
   - a. If location has a flume or weir, collect flow data from flume or weir and record
   - b. If no flume or weir is present and sufficient flow is present collect flow data by the following stream flow measurement procedure and the Marsh McBirney flow meter procedure. If insufficient flow is present to use Marsh McBirney flow meter estimate flow.
5. Collect a grab sample upstream from YSI probe by submerging a sampling vessel to mid depth of the stream, rinse the bottle 3 times with stream water and then collect sample.
6. Transfer sample into sample bottles that are labeled with the correct sample location, date, time, preservative and if filtration is required.
   - a. To collect samples that do not require filtration, pour sample directly from sampling vessel.
   - b. To collect samples that require filtration, use decontaminated peristaltic pump.
     - i. Attach 45 micron filter to peristaltic pump tubing.
     - ii. Allow sample to saturate and to flow through filter (approximately 200 mL).
     - iii. Discharge and discard approximately 100 mL of H_2O from filter
     - iv. Collect filtered sample in appropriate sample bottle(s).
7. Place samples in cooler on ice for storage.
8. Decontaminate sampling equipment.
9. Clean up sampling site and move to next location.

Ground Water Sampling

Prior to leaving for field identify the required parameters and analyses for planned sampling locations and collect equipment accordingly.

Monitoring Well Sampling Equipment List

- Field level risk assessment form (see section 4)
- YSI Professional Multi Meter, or Myron Ultrameter II
- Peristaltic Pump

- D.I. water
- Monitor pro compatible tablet
- Cooler with Ice
- Sample Bottles
- 0.45 Micron Filters
- Sample Bucket
- Water level meters (150ft and 500ft)
- Geo Sub pump and controller
- Generator
- Appropriate keys for locks on the well head
- Dedicated pump controller
- Waterproof pen
- Field sample log sheets

Monitoring Well Sampling Procedure, Submersible Pump

Prior to leaving for field identify the required parameters and analyses for planned sampling locations and collect equipment accordingly.

1. Upon arrival at the well location, perform field level risk assessment to determine location is safe to perform surface water sampling. Document risk assessment with field level risk assessment form, and record image with field equipment to be uploaded to Monitor Pro 5.
2. With well location determined to be safe, complete a visual inspection of well vault / monument, casing, site condition and if a dedicated pump is present
3. Measure the static water level in the well and record measurement listed as (depth to water). Water levels should be measured with a precision of $^+$ 0.01 foot.
4. Decontaminate water level meter after use.
5. You may calculate the volume of water in the well to aid in the purging process, there is no required purge volume for the EPA low flow sampling standard, rather it is based on parameter stabilization.

a. 2 in = 617 ml/ft

b. 4 in = 2470 ml/ft

6. Insert decontaminated pump and tubing into the well descending slowly until pump is in the desired screened interval, avoid letting the pump come in contact with the well bottom.
7. Attach the discharge tubing to the bottom port on the YSI water quality

meter flow cell.

8. Connect the pump to the controller with the cord provided
9. Start generator, allow it to warm up.
10. Connect controller box to generator with power cord provided.
11. Turn pump controller on and begin to purge water.
    a. When flow is present adjust flow rate by using the up and down arrow buttons.
    b. Attempt to maintain a flow rate of to 0.1 to 0.5 L of water per minute and generally speaking not to exceed 1 L per minute.
    c. Use 1 L vessel and stop watch to measure flow rate and record.
12. Begin to record parameters and draw down to monitor stabilization every 3 to 5 minutes, including;
    a. pH
    b. Specific conductance
    c. Dissolved Oxygen
    d. Temperature
13. Continue to monitor purge flow rate.
14. While the well is purging, compile and label sample bottles.
15. Three successive parameter readings must be within the following tolerances of each other in order to collect samples.
    a. pH +/- 0.1
    b. Specific Conductance +/- 3%
    c. Dissolved Oxygen +/- 10%
    d. Temperature +/-10%
16. Upon stabilization of parameters collect samples in pre labeled and pre preserved bottles, when possible following this general order; samples should be collected without passing thought YSI flow cell.
    a. Total Metals (unfiltered)
    b. Dissolved Metals (filtered)
    c. Cyanide
    d. TSS
    e. Nitrate/ Nitrites
17. To collect filtered samples;
    a. Attach 45 micron filter to peristaltic pump tubing.
    b. Allow sample to saturate and to flow through filter (approximately 200 mL).
    c. Discharge and discard approximately 100 mL of H_2O from filter

    d. Collect filtered sample in appropriate sample bottle(s).

18. Place samples in cooler on ice.
19. Turn off pump at pump controller box, remove power cord from pump.
20. Pull pump and tubing from well, reeling pump cord back onto pump reel.
21. Decontaminate equipment (submersible pump, peristaltic pump)
22. Clean up sampling site and move to next location.

Monitoring Well Sampling, Dedicated Electric Pumps

The compliance well at the External Storage Pond (ESPMW) has a 240 volt dedicated pump. Grounding on all electrical driven pumps must be certified by CC&V's electrical department once per year. It is of utmost importance that the sampler inspects all electrical leads and connection prior to use. The Onan 4000 watt generator has adequate power to run this pump. After the generator has warmed up, plug the twist lock power lead into the generators 30 amp receptacle, and switch the voltage control to 240 volts. There is a short time delay before water is pumped up, and out the discharge hose. If the well is purged dry the flow controller will shut the pump off automatically.

There are two wells in Grassy Valley, four Wells in Squaw Gulch, and four wells in lower Arequa Gulch that are also dedicated electric pumps that require a generator, and either the BCD, or converter controller. Be familiar with the safety features with the generator, and have the electrical department approve all grounding requirements prior to use.

1. Upon arrival at well location perform field level risk assessment to determine location is safe to perform surface water sampling. Document risk assessment with field level risk assessment form, and record image with field equipment to be uploaded to Monitor Pro 5.
2. With well location determined to be safe, complete a visual inspection of well vault / monument, casing, site condition and if a dedicated pump is present Upon arrive at the well site, complete a visual inspection of well vault / monument, casing, site condition and if a dedicated pump is present
3. Measure the static water level in the well and record measurement listed as (depth to water). Water levels should be measured with a precision of $^{+}$ 0.01 foot.
4. Decontaminate water level meter after use.

5. You may calculate the volume of water in the well to aid in the purging process, there is no required purge volume for the EPA low flow sampling standard, it is based on parameter stabilization.
a. 2 in = 617 ml/ft
b. 4 in = 2470 ml/ft
6. Connect tubing to sampling port on monument/ well vault.
7. Attach the discharge tubing to the bottom port on the YSI water quality meter flow cell.
8. Connect the pump to the controller with the cord provided
9. Start generator, allow it to warm up.
10. Connect controller box to generator with power cord provided.
11. Turn pump controller on and begin to purge water.
a. When flow is present adjust flow rate by using the up and down arrow buttons.
b. Attempt to maintain a flow rate of to 0.1 to 0.5 L of water per minute and generally speaking not to exceed 1 L per minute.
c. Use 1 L vessel and stop watch to measure flow rate and record.
12. Begin to record parameters and draw down to monitor stabilization every 3 to 5 minutes, including;
    a. pH
    b. Specific conductance
    c. Dissolved Oxygen
    d. Temperature
13. Continue to monitor purge flow rate.
14. While the well is purging, compile and label sample bottles.
15. Three successive parameter readings must be within the following tolerances of each other in order to collect samples.
    a. pH +/- 0.1
    b. Specific Conductance +/- 3%
    c. Dissolved Oxygen +/- 10%
    d. Temperature +/-10%
16. Upon stabilization of parameters collect samples in pre labeled and pre preserved bottles, when possible following this general order; samples should be collected without passing thought YSI flow cell.

17. To collect filtered samples;
    a. Attach filter to sample tube.
    b. Allow sample to saturate and to flow through filter (approximately 200 mL).
    c. Collect filtered sample in sample bottle labeled for filtration.
18. Place samples in cooler on ice.
19. Turn off pump at pump controller box, remove power cord from pump, unplug controller from generator.
20. Clean-up site and move to next location

Chain-of-Custody and Sample Shipment

A chain-of-custody (COC) is a procedure designed to allow the operator to reconstruct how and to whom the sample is transferred.

1. Upon preparing samples for shipment, the sampler should complete a COC.
2. Insure all bottles are labeled with the correct time, date, analyte, preservative, required filtration, and location of the sample by comparing to field notes.
3. List sample location, date, time, field parameters, number of containers, types of preservatives present and the requested analytes on the chain of custody form, print form (2 copies).
4. Double check the sample bottle labels against the chain of custody.
5. Print the pre filled ground water or surface water analytical request form, dependent on types of samples being submitted.
6. Place COC and analytical request form in plastic bag inside the cooler to be shipped.
7. After inspection of samples and comparison to COC, place samples in cooler, along with adequate contained ice to keep samples with in the hold temperatures during shipment.
8. If needed use packing material to fill spaces in cooler that contained ice too large to fill.
9. Close cooler lid and use 2 inch clear packaging tape to secure both ends of cooler, wrap tape multiple times around the ends of cooler, followed by strapping tape.
10. Attach a preprinted shipping label to the top of cooler, place shipment identification sticker on copy of COC.
11. File copy of COC until lab returns results and original COC.

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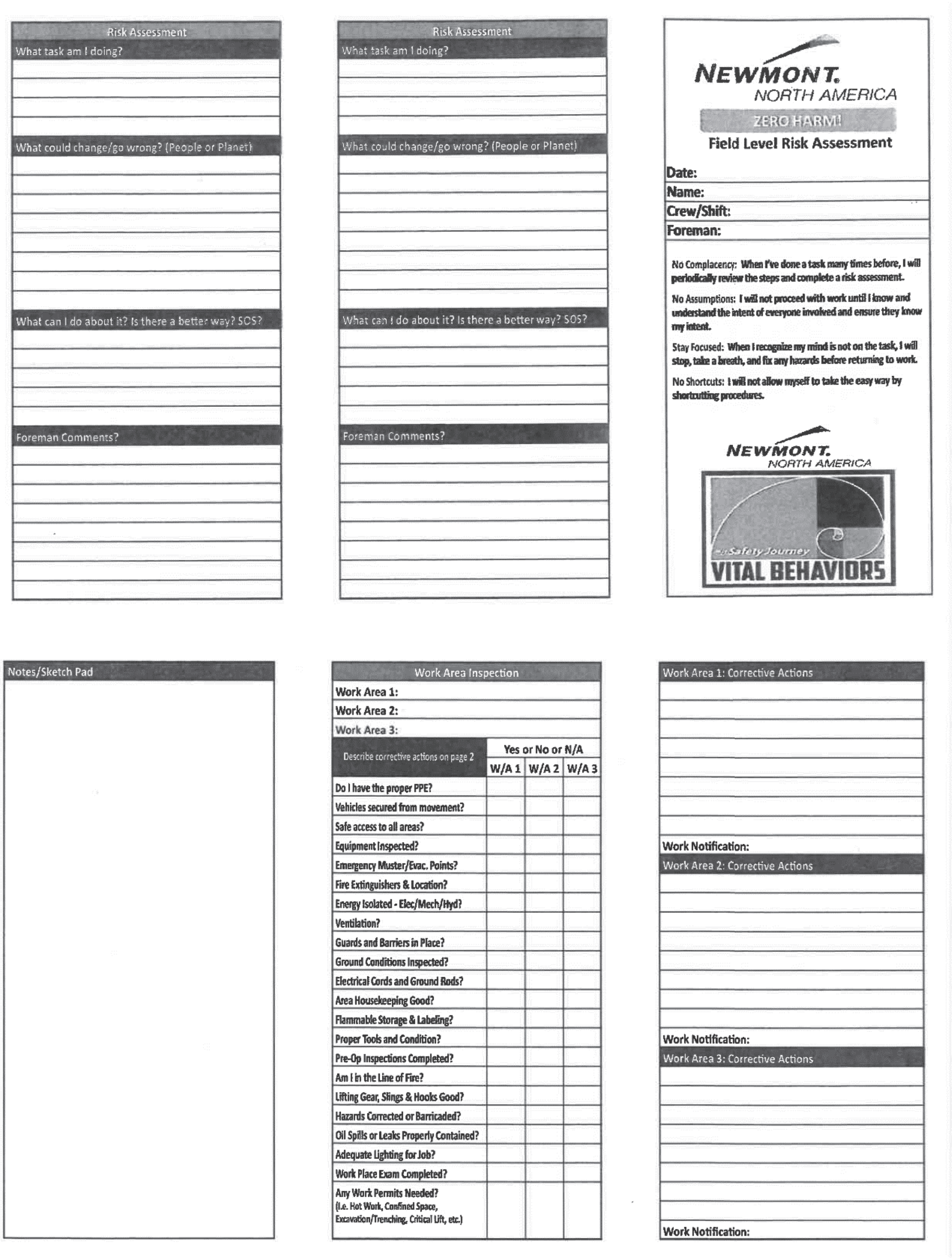

Risk Assessment

What task am I doing?

What could change/go wrong? (People or Planet)

What can I do about it? Is there a better way? SOS?

Foreman Comments?

Risk Assessment

What task am I doing?

What could change/go wrong? (People or Planet)

What can I do about it? Is there a better way? SOS?

Foreman Comments?

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ZERO HARM!

Field Level Risk Assessment

Date:
Name:
Crew/Shift:
Foreman:

No Complacency: **When I've done a task many times before, I will periodically review the steps and complete a risk assessment.**

No Assumptions: **I will not proceed with work until I know and understand the intent of everyone involved and ensure they know my intent.**

Stay Focused: **When I recognize my mind is not on the task, I will stop, take a breath, and fix any hazards before returning to work.**

No Shortcuts: **I will not allow myself to take the easy way by shortcutting procedures.**

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...Safety Journey
VITAL BEHAVIORS

Notes/Sketch Pad

Work Area Inspection

Work Area 1:
Work Area 2:
Work Area 3:

Describe corrective actions on page 2	Yes or No or N/A		
	W/A 1	W/A 2	W/A 3
Do I have the proper PPE?			
Vehicles secured from movement?			
Safe access to all areas?			
Equipment Inspected?			
Emergency Muster/Evac. Points?			
Fire Extinguishers & Location?			
Energy Isolated - Elec/Mech/Hyd?			
Ventilation?			
Guards and Barriers in Place?			
Ground Conditions Inspected?			
Electrical Cords and Ground Rods?			
Area Housekeeping Good?			
Flammable Storage & Labeling?			
Proper Tools and Condition?			
Pre-Op Inspections Completed?			
Am I in the Line of Fire?			
Lifting Gear, Slings & Hooks Good?			
Hazards Corrected or Barricaded?			
Oil Spills or Leaks Properly Contained?			
Adequate Lighting for Job?			
Work Place Exam Completed?			
Any Work Permits Needed? (I.e. Hot Work, Confined Space, Excavation/Trenching, Critical Lift, etc.)			

Work Area 1: Corrective Actions

Work Notification:

Work Area 2: Corrective Actions

Work Notification:

Work Area 3: Corrective Actions

Work Notification:

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APPENDIX J

CC&V Sample Shipping SOP

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CC&V – Sample Prep & Shipping SOP

SAMPLE PREP & SHIPPING SUMMARY

The following inventory of prepared sample bottles must be continually kept up:

1) **<u>Cyanide Bottles:</u>** green labels, brown 125 ml bottles preserved with 0.2 ml of Sodium Hydroxide ~60 bottles

2) **<u>Metals Bottles</u>**: red labels, white 250 ml bottles preserved with 1.5 ml of Nitric Acid ~ 60 bottles

3) **<u>Nitrogen Bottles</u>**: yellow labels, white 250 ml bottles preserved with 0.5 ml of Sulfuric Acid ~40 bottles

4) **<u>Mineral Bottles:</u>** white labels, 500 ml bottles non-preserved ~ 60 bottles

5) **<u>Verify expiration dates</u>** on reagent used in bottle preservation

Before running too low on bottles or preservatives order from SVL Analytical by emailing SVLSupplies@svl.net

ALWAYS WEAR NITRILE GLOVES AND SAFETY GLASSES WHEN PRESERVING BOTTLES!!!!

Shipping Samples

Check with staff daily if there will be samples ready to ship out at the end of the day, if there are samples to ship follow the shipping instructions:

1) Match COC's to bottles in the refrigerator
2) Sign and date the COC's
3) Make copies of COC's, place original in plastic bag – these will go with the cooler with samples. Place copies in red file folder for reference.
4) Load up samples, COC's, and ice into "five-day" cooler.

5) Sign and date Custody seal and place vertically across lid and cooler.

6) Tape up cooler lengthwise and width wise

7) Take cooler with appropriate shipping label and drop off at the UPS Store in Woodland Park, CO no later than 4:30 PM

8) Get mailing label sticker with the tracking number and place it on the copies of the COC's

9) Keep freezer stocked full of ice!!

Procedures for Water Quality Sample Shipments.

1) Any water quality samples collected from Monday thru Thursday should be shipped either before or on Thursday.

a) CDPS Water Quality Samples are to be shipped the day the sample was collected if time allows, otherwise they must be shipped the next day.

b) Ground & Surface Water Samples are to be shipped either on the day the sample was collected or the next day.

c) VLF Water Quality Samples are to be shipped either on the day the sample was collected or within two days.

2) Any water quality sample collected on Friday may sit in the refrigerator until the following Monday, but must be shipped on that Monday.

a) No water quality samples are to sit in refrigerator over a weekend, without prior approval.

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APPENDIX K

Myron L II Ultrameter Calibration procedure

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PURPOSE

The Myron L II is used to collect data that is submitted to regulatory agencies. It is the responsibility of the user to ensure that the probe is properly calibrated and that an accurate record is kept with each calibration.

SCOPE

The Myron L II is to be calibrated prior to use for the day and details of the calibration are to be recorded in calibration log book/ Sheet.

Myron L II Calibration

Specific Conductance Calibration

- Push the COND button
- With KCL 7000 solution, fill the conductivity cell cup completely and dump it 2 times.
- With KCL 7000 solution, fill the conductivity cell cup completely a 3rd time, and let it settle on a reading.
- Push the CAL button.
- Use the up or down buttons to make the display read 7000.
- Hit the CAL button, to accept the calibration.
- If the display does not read 7000, repeat steps 4-6 until it does.

Total Dissolved Solids Calibration

- Push the TDS button
- With the 442-3000 solution, fill the conductivity cell cup completely and dump it 2 times.
- With the 442-3000 solution, fill the conductivity cell cup completely a 3rd time and let it settle on a reading.
- Push the CAL button.
- Use the up or down buttons to make the display read 3000.
- Hit the CAL button, to accept the calibration.
- If the display does not read 3000, repeat steps 4-6 until it does.

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PH Calibration

- Push the PH button
- Remove the protective rubber cap from the PH sensor well.
- With the PH7 solution, fill the PH sensor well and the conductivity cell cup completely and dump it 2 times.
- With the PH7 solution, fill the PH sensor well and the conductivity cell cup completely a 3rd time and let it settle on a reading.
- Push the CAL button.
- Use the up or down buttons to make the display read 7.0.
- Hit the CAL button, to accept the calibration.
- If the display does not read 7.0, repeat steps 5-7 until it does.
- Repeat steps 3-8 with the PH4.0 and the PH10.0 solutions.