

QUALITY ASSURANCE AND QUALITY CONTROL PLAN
MV2019L2-0006

1.0 INTRODUCTION

The following Quality Assurance/Quality Control Plan for Water Quality Sampling and Laboratory Analysis at the Prairie Creek Project was developed to meet the needs of Part 2(i) of the Surveillance Network Program (SNP) specified in Water License MV2019L2-0006.

2.0 WATER SAMPLING QUALITY ASSURANCE/QUALITY CONTROL

To ensure acceptable QA/QC during water sampling, the following outlines the procedures to be adhered to for the field component of the program.

2.1 Preparations for Field Sampling

- Label all bottles prior to going out in the field (project, client, date, sample identification, and analyses required). Place each set of water sample bottles in a large Ziploc bag. Label the Ziploc bag with the station identification.
- Calibrate field instruments (i.e. pH meter) prior to going out into the field.
- All sampling stations should be located, staked and identified on a map with GPS coordinates.
- Place all bottles and preservatives in coolers with ice packs.

Notes

- Do not smoke while handling bottles or collecting water samples.
- Wear disposable powderless latex gloves at all times when collecting water samples. Change gloves between each station.
- Samples should be obtained in the same manner for all samples.
- All samples should be collected in an area free of contamination, e.g. engine exhaust or other contamination caused by the sampler (i.e. greasy boots).
- Certain samples are time sensitive and extra effort should be taken to ensure that the samples arrive at the laboratory within the required time limits. Check the back of the chain of custody forms for sample hold times.

2.2 Field Sampling, Storage and Shipment

1. All stations should be clearly identified with a fluorescent-painted stake. Use a permanent marker to identify the station number.
2. Collect field measurements.
3. Rinse the metals, standard and nutrients bottles and caps with the source water three times prior to collecting water samples.
4. **Do not** rinse the hydrocarbons bottles.
5. Collect all water samples from 'upstream' to avoid contamination, and from below the water surface.
6. Collect a blind duplicate from one station when the number of stations being sampled on any day exceeds four.
7. Place preservatives in the bottles that require preservatives (as per laboratory instructions) and close lid.
8. Place the bottles back in the Ziplock bag.
9. Keep samples in cooler(s).
10. Complete laboratory-supplied chain of custody forms and ship samples to laboratory as soon as possible.

2.3 Quality Assurance/Quality Control

It is normal for any sampling program to include quality assurance/quality control (QA/QC) samples. Such samples can take three forms:

- Field Blanks, to quantify contamination that may be introduced to the sample from environmental conditions, or through the sampler's actions or methods.
- Travel Blanks, to quantify possible contamination that may be introduced to the sample containers during transport in the field and to or from the lab.
- Field Duplicates, to monitor the precision of field sampling and analytical variability. Duplicates should be collected at the SNP station the same manner as a regular sample. Duplicate stations are not to be identified to the analytical laboratory.

Alberta Environment recommends that QA/QC samples should include at a minimum the collection and analysis of one field blank and one duplicate per ten samples, and one trip blank per trip.

BC Environment recommends a minimum of one field blank and one duplicate sample per sample set or one field blank and one duplicate sample per day.

CCME guidance advises that QA/QC is less important when the values obtained for particular variables are consistently well above the minimum detectable limit (MDL). They further advise that impact assessment and baseline monitoring generally require more QA/QC than compliance and trend monitoring. Practical approaches are also suggested such as taking a full suite of blanks but only initially analyzing field blanks. If the field blanks do not indicate problems, the travel blanks may be discarded or stored.

The samples associated with the SNP are primarily compliance samples. Typically, three samples are taken weekly. The most important analyte is total zinc. The average licence limit is 0.4 mg/L, compared to a DL of 0.001 mg/L. Monthly samples include receiving water samples. Occasionally, an extractable petroleum hydrocarbons (EPH) sample is required. The EPH licence limit is 5 mg/L, compared to a DL of 0.1 mg/L. There are licence limits for other metals, as well as TSS and ammonia.

In view of the above, the following QA/QC is proposed:

- o At the start of each sampling season (initially), travel and field blanks are collected for ICP metals analysis until it can be shown that there are no contamination issues.
- o At the start of each sampling season (initially), and for each monthly sampling, a duplicate sample is collected for ICP metals and TSS analysis. When activities are occurring underground, an ammonia analysis will be included.

3.0 LOCATION OF SURVEILLANCE NETWORK STATIONS

Table 1 identifies the station numbers and location descriptions for each of the SNP stations specified in the Water License Surveillance Network Program.

Table 1: Surveillance Network Program Stations

Station Number	Description
3-1	Freshwater pump house wet well
3-4	Polishing Pond discharge
3-5	Catchment pond discharge
3-6	Final discharge from Harrison Creek to Prairie Creek – confluence at culvert
3-7	870 metre portal final minewater discharge
3-8	Reagent storage facility catchment basin
3-9	Harrison Creek upstream of the reagent storage facility
3-10	Prairie Creek upstream of the airstrip
3-11	Downstream of the confluence of Prairie Creek and Harrison Creek

A map of SNP stations is attached. Coordinates are provided below.

Station	Location	UTM (NAD 83)		Lat./Long.	
		E	N	E	N
3-1	Well House	404382	6825871	61°33'16.110"	124°47'58.216"
3-4	Polishing pond discharge	404500	6825776	61°33'13.146"	124°47'50.049"
3-5	Catchment pond discharge	404581	6825575	61°33'06.726"	124°47'44.189"
3-6	Harrison Creek at Prairie	404561	6825531	61°33'05.287"	124°47'45.461"
3-7	870 portal drainage	404504	6825875	61°33'16.348"	124°47'49.963"
3-8	Reagent catchment basin	405117	6825126	61°32'52.699"	124°47'07.066"
3-9	Harrison Creek upstream	404892	6826147	61°33'25.479"	124°47'24.197"
3-10	Prairie Creek upstream	403351	6827775	61°34'16.685"	124°49'11.628"
3-11	Prairie Creek downstream	404741	6825362	61°32'59.988"	124°47'32.960"

4.0 LABORATORY ANALYSIS QUALITY ASSURANCE/QUALITY CONTROL

All water samples collected at the Prairie Creek Project will be stored and shipped in coolers from the site to an accredited commercial laboratory. Currently, samples are sent to ALS Global in Vancouver. All ALS locations are accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA).

ALS Vancouver has full-time Quality Specialists who work on-site and are responsible for the organisation, implementation, maintenance, and monitoring of the ALS nationally defined quality assurance program objectives, policies and procedures at ALS Vancouver. These specialists also oversee all proficiency testing (PT) programs, document control, control charts, corrective action reports, internal auditing, method validations and revalidations. These individuals also provide quality-related training programs for both new and existing staff.