APPENDIX 25

Technical Data Report: Water Quality Model

EAGLE GOLD PROJECT

Technical Data Report:
Water Quality Model

Prepared for:

Victoria Gold Corp
680 – 1066 West Hastings Street
Vancouver, BC
V6E 3X2

Prepared by:

Stantec
4370 Dominion Street, Suite 500
Burnaby, BC
V5G 4L7
Tel: (604) 436-3014 Fax: (604) 436-3752

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Victoria GOLD CORP

Stantec

AUTHORSHIP

Neil MacLeod, Ph.D., R.P.Bio. .... Author

Karen Munro, M.Sc., R.P.Bio. .... Senior Review

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ACRONYMS AND ABBREVIATIONS

ARD	acid rock drainage
CCME	Canadian Council of Ministers of the Environment
DFO	Fisheries and Oceans Canada
EC	Environment Canada
EEM	Environmental Effects Monitoring
HLF	Heap Leach Facility
LAA	Local Assessment Area
ML	metal leaching
MMER	Metal Mining Effluent Regulation
MWTP	Mine Water Treatment Plant
SS WQO	Site-Specific Water Quality Guideline
TDR	Technical Data Report
TSS	Total Suspended Solids
WAD	Weak Acid Dissociable (cyanide)
WRSA	waste rock storage area
WQG	Water Quality Guideline
WQO	Water Quality Objective

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1 INTRODUCTION

A water quality model was developed to predict the concentrations resulting from mixing of the various bodies of water during construction, operations, closure and reclamation, and post-closure phases. The sources of water are shown in Figure 1 and include:

- Eagle Pup and Platinum Gulch waste rock storage areas (WRSAs) (contact water flowing over and through the storage areas and non-contact water diverted around or under them)
- Open pit (contact water flowing over exposed open pit surfaces and non-contact water from dewatering the open pit perimeter)
- Heap leach facility (HLF) (contact water flowing through the HLF, contact run-off flowing over the HLF post-closure, and non-contact water collected from drains under the HLF)
- Dublin Gulch, Eagle Pup, Ann Gulch, Stuttle Gulch, Platinum Gulch, and Haggart Creek.
- Mine water treatment plant (MWTP) effluent.

Concentrations were predicted for each month for all Project phases for all parameters with predicted source terms above Water Quality Guidelines (WQG). Section 6.5.1.10 of the Project Proposal provides a discussion of WQG, comprised for the most part of those published by the Canadian Council of Ministers of Environment (CCME 2009a), and augmented with WQG from British Columbia and other recent sources, where appropriate. Site-specific water quality objectives (SS WQO) will also be required for the Project, to reflect elevated levels of some parameters in baseline conditions. Worst case predicted values were compared with WQG through each phase of the mine (construction, operations, closure and reclamation, and post-closure).

References to appendices and Technical Data Reports (TDRs) are to information provided in the Eagle Gold Project Proposal, unless otherwise noted.

2 METHODS AND ASSUMPTIONS

In this analysis, reference is made to years during which an event may occur (e.g. closure of the MWTP, direction of WRSA seepage away from the MWTP back to Dublin Gulch or Platinum Gulch, number of years of draindown). These designations may change during the life of the mine, in response to conditions that develop, results of ongoing water monitoring, and emerging adaptive management strategies.

A simple mass balance model was developed to estimate concentrations of water quality parameters downstream of the Eagle Pup and Platinum Gulch WRSAs, the HLF, and the MWTP. The mass balance method assumes that incoming flows are thoroughly mixed a short distance downstream of the confluence and that there are no losses due to chemical reactions such as precipitation.

The mass balance equation is:

where:

C_{new} = mixed concentration (mg/L)

C_i = concentration of stream i (mg/L)

Q_i = flow rate of stream i (m^3/month)

C_{i+1} = concentration of stream i+1 (mg/L)

Q_{i+1} = flow rate of stream i+1 (mg/L)

mg/L = g/m^3

n = number of streams.

The data used in the model consisted of:

- Baseline surface water quality (Appendix 16 of the Project Proposal - Environmental Baseline Report: Water Quality and Aquatic Biota)
- Predicted surface water and mine process flows (Appendix 21 of the Project Proposal - Eagle Gold Project Surface Water Balance Model Report)
- Predicted source terms for contact water in Eagle Pup and Platinum Gulch WRSAs and the HLF, including nitrogen resulting from the destruction of cyanide (Appendix 8 of the Project Proposal - Eagle Gold Project Geochemical Characterization and Water Quality Predictions Report)
- Estimates of nitrogen leaching from unexploded blast residues, based on powder factors for ore and waste rock, percent loss and release of nitrogen blast residues in Fortan15 and Fortis Wet Emulsion (Hallam Knight Piésold Ltd. 1996)
- Groundwater quality (Appendix 15 of the Project Proposal - Environmental Baseline Report: Hydrogeology).
- Effluent quality from the MWTP during operations and draindown (Appendix 20 of the Project Proposal - Eagle Gold Project Technical Memorandum: Mine Water Treatment Conceptual Evaluation).

2.1 Baseline Surface Water Quality

Water quality data from 1993 to 2010 were used to characterize baseline conditions for most parameters. Where detection limits improved over time (cadmium, chromium, copper, lead, manganese, molybdenum, nickel, silver), data from 2007 to 2010 were used. Mean monthly concentrations were used to characterize baseline conditions in the streams for all parameters analyzed. At most of the monitoring sites, data were available from March to November, with

December, January, and February means interpolated from March and November results. Surrogate water quality values were developed for streams with low, intermittent flows, using data from neighbouring streams draining similar rock types. For example, Stuttle Gulch and Platinum Gulch water quality was assigned values from Eagle Pup (W9) and Ann Gulch water quality was assigned values from Dublin Gulch (W1). For parameters of concern, maximum baseline concentrations were also modeled to ensure a conservative estimate of potential water quality effects.

2.2 Surface Water and Mine Process Flows (Water Balance Model Predictions)

Hydrology data and predictions for average, wet, and dry scenarios were used (Appendix 18 – Eagle Gold Project Water Management Plan) to ensure the effects of variable annual precipitation were considered in the model. Average, wet, and dry scenarios were defined as follows, with the years selected based on time of maximum extent of mine development in operations (Year 9), maximum draindown of the HLF (Year 13), and ongoing release of porewater from the HLF (Post-closure Year 21):

- **Average scenario**—average annual precipitation in all phases, no hydrologic events, no process upsets
- **Wet scenario**—one wet year in each phase of the Project (operations Year 9, draindown Year 13, post-closure Year 21), no hydrologic events, no process upsets
- **Dry scenario**—one dry year in each phase of the Project (operations Year 9, draindown Year 13, post-closure Year 21), no hydrologic events, no process upsets.

Average, wet, and dry years were defined as:

- **Average year**—annual precipitation with a 2-year return period (50% chance of annual precipitation exceeding this level, 50% chance of annual precipitation less than this level).
- **Wet year**—annual precipitation with a 20-year return period (5% chance of annual precipitation exceeding this level, 95% chance of annual precipitation less than this level).
- **Dry year**—annual precipitation with 1.055-year return period (95% chance of annual precipitation exceeding this level, 5% chance of annual precipitation less than this level).

The most conservative results (those yielding highest concentrations of metals and metalloids, collectively referred to as metals) are presented in the assessment of environmental effects.

Water quality out of the HLF and WRSAs post-reclamation was modeled assuming 20% infiltration (Appendix 24 of the Project Proposal – Eagle Gold Project Preliminary Closure and Reclamation Plan; Appendix 18 of the Project Proposal). Further research and testing during the life of the mine will be needed to finalize the cover designs. The early closure of the Platinum Gulch WRSA will provide an ideal situation for refining the cover requirements and assessing performance.

2.3 Contact Water Source Term Predictions

Source term predictions for contact water are described in Appendix 8 of the Project Proposal. Acid base accounting, whole rock and metals analyses, mineralogical evaluations, and kinetic tests were conducted on material representative of the main rock units (metasediments and the oxidized, unaltered and altered granodiorite units). The results of the characterization program indicated that low pH seepage, or acid rock drainage (ARD), is not anticipated to occur at the Project. In the samples tested, the amount of carbonate minerals, predominantly calcite, were generally well in excess of sulphides. Kinetic testing, however, indicated the potential for some degree of metal leaching at neutral pH for parameters such as arsenic, antimony, selenium etc. when exposed to weathering conditions. Data from the kinetic testing program were used to develop water quality predictions for the potential source areas (WRSAs, open pit walls, and HLF).

The predictions for the waste rock and open pit-runoff quality were largely based on scale-up calculations using average steady state release rates for the main material types obtained from humidity cells, and included a series of conservative assumptions to account for differences between the laboratory conditions and anticipated field conditions. Geochemical speciation software was used to assess solubility limits that may influence seepage chemistry. An extensive analog dataset for similar deposits was included in the assessment.

Estimates of contact water quality for the HLF ore material after detoxification were conducted in a similar manner and relied in part on a modified kinetic test on an ore composite that had undergone cyanidation and detoxification (conducted by Kappes Cassidy and Associates [KSA]) and in part on a standard humidity cell on the same ore sample that had not been subjected to cyanidation.

Source term predictions are anticipated to represent conservative estimates of the quality of contact water from the WRSAs, open pit wall run-off, and the spent ore HLF (i.e., post detoxification). A number of assumptions are required for scale-up calculations conducted in the contact water source term predictions, many of which are conservative in nature. Further, calculations for some parameters (e.g. boron, bismuth, chromium, cadmium, mercury, nickel, silver, thallium) are influenced by detection limits in that, if measured leachate concentrations were reported as below detection limits, the detection limit was used in the calculations. In these cases, predicted values are likely over-estimated.

Source terms were predicted for:

- Years 1, 3, 5, 7, and post-closure at Eagle Pup WRSA
- Years 1, 3, and 7 at Platinum Gulch WRSA
- Years 1, 3, 5, and post-closure at the open pit
- Operations, detoxification/rinsing, and post-closure (short and long term) at the HLF. Short term is estimated at one to three decades post rinsing, related to release of pore water volumes from the HLF. Long term is estimated at several decades, related to ongoing geochemical reactions within the HLF materials. Monitoring and field trials could be developed to better define the duration of the short term period.

Source terms used in other years were interpolated from these data. Prior to capping, surface runoff from the WRSAs was considered to be contact water, using the open pit wall source terms to represent water quality in the runoff. After capping, runoff was considered to be non-contact water and water quality was estimated from Eagle Pup baseline data (W9) for Eagle Pup and Platinum Gulch WRSAs, and from Dublin Gulch baseline data (W1) for the HLF.

2.4 Baseline Groundwater Quality

Hydrogeology data from 1995 to 2010 were used to characterize baseline groundwater quality. These are contained in Appendix 15 of the Project Proposal (Environmental Baseline Report: Hydrogeology). Where detection limits improved over time (cadmium, chromium, copper, lead, manganese, molybdenum, nickel, silver), data from 2007 to 2010 were used. Sources include the following:

- Mean concentrations in groundwater from open pit dewatering were estimated using data from monitoring wells near the open pit footprint (MW95-105, MW95-106, MW96-18). Data were collected on six dates (n = 10).
- Mean concentrations in groundwater collected in the HLF sub-surface drains were estimated using data from monitoring wells in Ann Gulch (MW10-AG3, MW10-AG5, MW10-AG6) and Dublin Gulch (MW09-DG1, MW10-DG6). Data were collected on five dates (n = 11).
- Mean levels in groundwater entering Eagle Creek were estimated using data from well MW09-DG2 in Dublin Gulch. Data were collected on three dates (n = 3).

2.5 Nitrogen, Phosphorous, and Cyanide

Nitrate and ammonia concentrations for discharges from the WRSAs and HLF from unexploded blasting residues were predicted using powder factors of 0.2 kg/tonne for waste rock and 0.23 kg/tonne for ore (based on the mine plan). Fortan15 and Fortis Wet Emulsion were assumed to be 24.5% nitrogen by weight (NH_4NO_3 comprising 70% of blasting agents by weight – Material Safety Data Sheet; nitrogen comprising 35% of NH_4NO_3 by weight). It was assumed that 2% of the nitrogen from blasting was unexploded residue transported to the WRSAs and HLF, with losses reaching surface waters in the year that the waste rock and ore were stacked (Hallam Knight Piésold 1996).

Predicted phosphorous concentrations for discharges from the WRSAs, open pit wall runoff, and HLF were derived from humidity cell leach rates adjusted to anticipated field conditions, as described in Appendix 8. In most of the samples tested in the humidity cell program, phosphate concentrations were often below or near the detection limit (0.002 mg P/L) and predictions based on these values are likely conservative. In these instances, concentrations from analog sites are included in the assessment. Maximum phosphate levels for the analog sites were 0.2 mg P/L for Pogo, 0.5 mg P/L for True North, and 8.5 mg P/L for Brewery Creek. The Brewery Creek value appears to be an outlier. The 95th percentile from the Brewery Creek data is 0.78 mg P/L, similar to the other analog sites, and was selected as the source term concentration for the Project. Subsequent monitoring for the closed Brewery Creek mine has not identified phosphorus as a concern and phosphate monitoring is not a license requirement (Yukon Government 2003; Alexco 2010).

Cyanide will be removed in a detoxification plant prior to discharge and will be treated to two times the CCME WQG for free cyanide (0.01 mg/L) until the end of draindown. Rinse/detoxification of the HLF will continue until cyanide concentrations in the HLF reach 2.0 mg/L total cyanide and 0.2 mg/L weak acid dissociable (WAD) cyanide, at which point the effluent will discharge directly (untreated) to Haggart Creek, likely through a wetland.

2.6 Mine Water Treatment Plant

The MWTP will be online at the start of operations. It will consist of a feed pond, treatment plant and product pond. The maximum design flow rate for the treatment plant will be about 620 m^3/hr (173 L/s), to meet closure requirements. Inputs to the MWTP are expected to be low at the start of operations, increase as the mine facilities become developed, and be maximal during the first two years of draindown during closure (Figure 2). During operations, the MWTP will receive flows of any contact water not needed for the HLF or not suitable for direct discharge to the Dublin Gulch Diversion Channel or Haggart Creek. This includes flows from the open pit (including Platinum Gulch seepage collection pond) and Eagle Pup seepage collection pond. If needed, discharges from the sediment control ponds and ditches will also be sent to the treatment plant. The mixing model assumes the treatment plant will be operational until the end of draindown, Year 19.

The MWTP will be designed to reduce levels of nitrogen, phosphorous, and metals. Details of anticipated treatment technology are provided in the Eagle Gold Project Technical Memorandum - Mine Water Treatment Conceptual Evaluation (Appendix 20), and will likely include pH adjustment, precipitation with iron or alum, flocculation, clarification, filtration, and ion exchange. Effluent from the treatment plant will be discharged to Haggart Creek through a pipe on the creek bed. Discharge will occur mainly in May through October.

For the purpose of modeling effects on water quality, the mine water treatment plant end of pipe effluent criteria (Table 1) have been set at two times the downstream WQG or SS WQO (considerably lower and more protective than MMER criteria) to provide a conservative measure even when dilution in the receiving water is only 3:1. This minimum amount of dilution (worst case scenario) is predicted for one month of closure, during the peak of draindown; however dilution will generally be in the range of 12:1 to 61:1 annually during both operation and draindown of early closure. The actual discharge criteria for the effluent treatment plant will be defined during the water license and permitting stage.

2.7 Dissolved Versus Total Metal Concentrations

A blend of total and dissolved metals was used in most cases to develop the predictions of water quality. Results of geochemistry tests for leaching are provided as concentrations of dissolved metals. The most applicable groundwater data are dissolved levels (as particulate matter could reflect contamination during sampling). Effluent from the MWTP may contain both particulate and dissolved metals; however, the particulate content will be regulated through a discharge criterion for total suspended solids (TSS). Baseline surface water data are provided as both total and dissolved concentrations. Finally, water quality guidelines are set for total metals, although it is recognized the dissolved fraction is toxicologically and biologically relevant.

When metals levels were modeled for receiving waters, it was assumed that the mainly dissolved fraction would be discharged into an area with both dissolved and particulate matter. Total metals levels in the stream were used as the base for modeling. Hence, the predicted levels should be representative of conditions in the streams when the discharge is mixed in, and this provides a realistic basis for application of the WQG. This is supported by review of baseline data, which show that, for Haggart Creek and the tributaries, dissolved metals are predominant for most parameters for most of the year. The main exception is during freshet and storm events, when TSS and metals (aluminum, iron, others) levels are elevated.

2.8 Conservatism Built into Model

There are several technical limitations and uncertainties in developing water chemistry predictions. Generally, these are related to a number of assumptions inherent in the estimates of contact water quality from the planned mine facilities (Appendix 8) and to uncertainty about actual site conditions after mine construction. Also, there are technical and legislative requirements that force the adoption of reasonable but conservative inputs at all steps in the modeling process. The result is a water quality model that predicts discharge concentrations of parameters that are highly likely to be higher than actual concentrations (conservative worst case predictions).

The following points summarize some of the main sources of conservatism inherent to the Project water quality predictions:

- Where laboratory testing indicated a range of contaminant release rates, the average release rates for each of the material types were typically incorporated into the model, with each represented by a number of samples in the kinetic program, including at least one sample representing the median sulphur content and the 95th percentile for sulphur content.
- A number of assumptions are required in the calculations to estimate contact water qualities. Conservative values for these assumptions are generally applied as detailed in Appendix 8.
- Source terms were developed from the maximum levels reported in the humidity cell tests, and by comparison with analogs from operating mines with geologically similar deposits and climate (Fort Knox, True North, Pogo, Brewery Creek, and Zortman/ Landusky Mines). The analogs provide an upper bound for concentrations (rationale provided in Appendix 8). For example, the highest arsenic level measured in humidity cell tests of waste rock material was 0.18 mg/L; however, the source term used was 1.4 mg/L. Similarly for the HLF at closure, the highest arsenic level measured in test work was 2.3 mg/L; the source term used was 6.0 mg/L, from Brewery Creek. This conservatism is used to bridge the gap between the relatively small volumes of material used in the test work and the conditions for an operating mine.

- The model does not estimate metal removal that might occur via attenuation of dissolved species (either through adsorption or through secondary precipitation) along flow paths. These processes are generally accepted as providing important controls on metal mobility, but are not realistic to quantify given the various uncertainties.

The role of hardness in moderating metal toxicity is well recognized, particularly in the hardness-dependent WQG for cadmium, copper, lead, manganese, nickel and zinc. Instead of using the predicted hardness of HLF solution (150 to 340 mg/L $CaCO_3$, maximum in post-closure), the maximum hardness measured in Haggart Creek during baseline (150 mg/L $CaCO_3$) was used to calculate WQG. This provides additional conservatism to the predictions of Project effects.

Other considerations for various parameters include:

- Modifying the mass balance approach for parameters such as sulphate to reflect well-understood controls on dissolved concentrations (primarily mineral precipitation and dissolution, with sulphate levels adjusted to account for gypsum saturation). Any gypsum precipitation (which occurs at >2000 mg/L sulphate) would occur within the mine facilities, and not within the streams, where predicted sulphate levels are well below 2000 mg/L.
- Prediction of nitrate and ammonia concentrations in WRSA and HLF runoff and infiltration using estimated blasting residues and cyanide detoxification values as sources. Blasting residues were estimated based on rapid flushing of blast residues to the receiving environment to ensure worst case conditions were predicted. Nitrogen and ammonia species were modeled conservatively, with no account taken for losses due to biological uptake or denitrification.
- Prediction of phosphorous concentrations calculated via scaled up concentrations of contact water from the HLF, WRSAs and open pit wall rock runoff, and MWTP effluent as load source terms. Phosphorous concentrations were modeled with no consideration of attenuation or biological uptake.
- Cyanide will be removed in a detoxification plant , incorporating a standard copper (Cu) catalyzed hydrogen peroxide (H_2O_2) destruction of cyanide prior to discharge, and will be treated to two times the CCME WQG (0.005 mg/L) for free cyanide. Cyanide can be present as free cyanide (HCN and CN^-), simple cyanide salts (e.g. KCN, NaCN), metal-cyanide complexes, and in some organic compounds. Free cyanide is the most toxicologically relevant form with respect to aquatic life, as indicated by WQG specified in terms of free cyanide, whereas most metallocyanide complexes have low toxicity. Total cyanide measurements capture free cyanide plus metal-cyanide complexes.
- Baseline cyanide levels in surface waters were analyzed for total and WAD cyanide whereas HLF source terms were predicted for total cyanide. During operation of the detoxification plant (estimated to close following draindown, Year 19), the mixing model combined free cyanide from the detoxification plant with WAD cyanide in surface waters to provide a conservative estimate of bioavailable cyanide in Haggart Creek (Mixing Points B and C) downstream of the HLF. For post-closure of the detoxification plant, estimates of WAD cyanide in HLF seepage were combined with WAD cyanide in surface waters.

As a result of using these conservative approaches, there is high confidence that water quality will be no worse than predicted, but the extent to which it will be better than predicted has not been modeled. Monitoring of water quality during mine operations and during and after decommissioning will assess the accuracy of these predictions.

2.9 Sensitivity Analysis

Average, wet, and dry scenarios were modeled to determine sensitivity of the receiving environment to variable weather conditions. The sensitivity analysis assessed variation in monthly concentrations of parameters with elevated predicted concentrations (aluminum, antimony, arsenic, cadmium, iron, manganese, selenium, silver). Predicted surface water and process flows were conservatively estimated at the high end to ensure proper sizing of facilities and to ensure water quality predictions encompassed conditions likely to have the greatest effect on the receiving environment.

Subsequent to the initial analysis, parameters with elevated predicted concentrations (aluminum, antimony, arsenic, cadmium, iron, manganese, selenium, silver) were remodeled using maximum monthly baseline concentrations (worst case) to characterize each month. The effects of worst case baseline conditions on model predictions were discussed.

3 RESULTS AND DISCUSSION

The mass balance model was used to predict the quality of surface water downstream of various confluence mixing points in the local assessment area (LAA) during operations, closure and reclamation, and post-closure. These are illustrated in Figure 1 and outlined below:

- **Mixing Point A (W71)**—Dublin Gulch immediately downstream of the confluence with Eagle Pup WRSA discharge (a new site to be established)
- **Mixing Point B (W4)**—Haggart Creek immediately downstream of the confluence with the MWTP discharge (or the HLF discharge into Haggart Creek after capping and closure of the MWTP)
- **Mixing Point C (W29)**—Haggart Creek immediately downstream of the confluence with the Eagle Creek and the Platinum Gulch WRSA discharges.

3.1 Mixing Point A (W71)

The Eagle Pup WRSA will be built during construction and used in Years 3 through 9. A seepage collection pond will collect contact water, consisting of surface runoff and water flowing through the WRSAs, and groundwater from the rock drain collection system. During operations, water from the seepage collection pond will be sent to the events pond for use as mine process water; any excess water will be sent to the MWTP, and then discharged to Haggart Creek. Construction of a soil cap on the WRSAs will begin in January Year 10, and will be functional by September Year 11. It is estimated that by October Year 15, assuming water quality meets permit conditions (to be established), this seepage will be discharged to the Dublin Gulch diversion channel (DGDC) at Mixing Point A (W71).

Model predictions for the Eagle Pup seepage collection pond are presented in Figure 3 for all Project phases, in Table 2 for operations (Year 9), when the WRSA will be at its fullest extent and seepage will be sent to the MWTP, and in Table 3 for post-closure (Year 21), when concentrations are highest in the seepage collection pond post-closure and seepage will be sent to DGDC.

In Year 9, most parameters are predicted to exceed WQG in the seepage collection pond:

- Those at least ten times higher than WQG include antimony (67:1), arsenic (270:1), cadmium (27:1), copper (22:1), lead (19:1), manganese (31:1), selenium (20:1), silver (19:1), uranium (47:1), and zinc (13:1).
- Those less than ten times higher than WQG include sulphate, fluoride, aluminum, chromium, iron, mercury, molybdenum, nickel, and thallium.

Highest levels, relative to WQG are predicted for arsenic, antimony, uranium, manganese, cadmium, copper, selenium, and silver. The modeling results strongly suggest that contact water from the WRSA will not be suitable for discharge to the DGDC prior to reclamation and will need to be treated prior to discharge. Nitrate and ammonia levels, both very soluble in water, will be elevated due to leaching of blast residues from the waste rock, and decrease to minimal levels in closure, long before seepage from the Eagle Pup WRSA is likely to be discharged to Dublin Gulch (Year 15) and the treatment plant is to be shut down (estimated to be Year 19).

In Year 21, post-capping, maximum monthly concentrations are predicted to be lower than in Year 9 for all but four parameters (sulphate, aluminum, iron, selenium), although most parameters are predicted to exceed WQG:

- Those at least ten times higher than WQG include aluminum (14:1), antimony (63:1), arsenic (250:1), cadmium (21:1), copper (21:1), lead (11:1), manganese (16:1), selenium (22:1), silver (18:1), and uranium (25:1).
- Those less than ten times higher than WQG include sulphate, fluoride, chromium, mercury, molybdenum, nickel, thallium, uranium, and zinc.

Mean monthly baseline water quality in Dublin Gulch (W70), above Eagle Pup, is presented in Table 4. Most of the parameters modeled are predicted to meet WQG. Maximum monthly concentrations of aluminum (May) and arsenic (March) exceed WQG by 12 times and 9 times, respectively.

Predicted concentrations at Mixing Point A (W71) are shown in Figure 4 for all Project phases and in Table 5 for post-closure (Year 21). At that time, maximum monthly concentrations are predicted to exceed WQG for a number of parameters:

- Those at least ten times higher than WQG include aluminum (13:1), and arsenic (30:1).
- Those less than ten times higher than WQG include sulphate (1:1), antimony (6:1), cadmium (2:1), copper (2:1), lead (1:1), manganese (2:1), mercury (1:1), selenium (3:1), silver (2:1), and uranium (3:1).

Dilution ranges from 2.4:1 in April and June to 300:1 in March, with highest levels predicted for December through March and lowest levels for April through October.

3.2 Mixing Point B (W4)

Water quality at Mixing Point B (W4) is a function of baseline water quality at site W22 (above Dublin Gulch), and Project-related inputs, including contact water from the MWTP (during operations, rinse, and draindown) and the HLF (post-closure), and non-contact water from sub-surface drains beneath the HLF, the western diversion channel around the HLF (Ann West), and Stuttle Gulch.

Quality of treated effluent from the MWTP is outlined in Table 1. Influent to the MWTP feed pond is composed of contact water originating from the Eagle Pup WRSA seepage collection control pond, the HLF, and the open pit (including contact water diverted from the Platinum Gulch WRSA seepage collection pond).

Contact water will be diverted to the feed pond from Eagle Pup WRSA until it is suitable for direct discharge to Dublin Gulch Diversion Channel. As discussed above, this is expected to occur post-capping in Year 15, although the timing may change, based on monitoring results.

The HLF will expand progressively over Years 3 through 9 and will be irrigated with recirculated leach solution, with contact water from the open pit and WRSAs providing make-up water. Leach solution will drain to an in-heap storage area and be sent to the process recovery plant for gold extraction. Processed water will be returned to irrigate the HLF. During normal operations, recycling of process solution will result in no planned discharges to the mine water treatment plant.

Excess leach solution during peak flow events and HLF draindown (e.g. during plant shutdown and at closure) will be stored in the events ponds downstream of the HLF. The events ponds will be empty during winter to ensure full capacity during spring. Should the events ponds contain more water than needed for process water make-up the excess will be treated at the cyanide detoxification plant then the MWTP prior to discharge.

The east and west Ann Gulch Diversion Ditches will direct non-contact water around the HLF into the Dublin Gulch Diversion Channel and Haggart Creek, respectively. Non-contact groundwater from below the HLF will be collected, stored temporarily in an outflow storage facility at the toe of the HLF and sent to Haggart Creek if water quality is suitable for discharge. Otherwise, it will be circulated within the HLF. Table 6 describes water quality of groundwater in the area of the HLF, based on the Water Management Plan (Appendix 18 of the Project Proposal) and baseline studies (Appendix 15 of the Project Proposal – Environmental Baseline Report: Hydrogeology). This groundwater already discharges to the streams (Dublin Gulch or possibly Haggart Creek), contributing to elevated levels of metals in the streams, so should be considered suitable for release to Haggart Creek during operations. Post-closure, flows from east and west Ann Gulch, the HLF sub-surface drains, HLF run-off, and HLF seepage will be collected at the toe of the HLF, monitored and discharged directly (untreated) to Haggart Creek, likely through a wetland, if it meets water quality criteria.

The open pit will be developed throughout the 7.3 year operations phase. Contact water from the open pit will come from dewatering and depressurizing of open pit walls, rainfall and surface runoff, and runoff from the Platinum Gulch WRSA. This water will be sent to the events pond for use in processing (e.g. crusher or HLF). If the processing needs are met, the open pit water will go to the mine water treatment plant for treatment prior to discharge to Haggart Creek.

The chemical characteristics of the open pit, described in Table 7 for Operations Year 9 (last year of operations), are predicted to be high in most parameters:

- Those at least ten times higher than WQG include antimony (21:1), arsenic (170:1), cadmium (18:1), copper (16:1), selenium (17:1), and silver (18:1).
- Those less than ten times higher than WQG include sulphate, fluoride, chromium, lead, manganese, mercury, thallium, uranium, and zinc.

The Platinum Gulch WRSA will be built during construction and used for the first three years of operations (Years 3 through 5), then reclaimed. A diversion channel will be built around the south of the facility to divert non-contact water through a sediment control pond and into Platinum Gulch. A seepage collection pond will collect contact water from surface runoff and a system of rock drains below the WRSA; this will drain to the open pit sump through a channel.

The modeled chemical characteristics are described in Table 8 for Year 5, the last year of use. Flows from the WRSA will be measurable between May and October of each year. Levels of almost all metals, sulphate, fluoride and nutrients are predicted to be elevated in the contact water. Nitrate and ammonia levels, both very soluble in water, will be elevated due to leaching of blast residues from the waste rock, and decrease to minimal levels in closure, long before seepage from Platinum Gulch WRSA is scheduled to be discharge to Haggart Creek (Year 14) and the treatment plant is shut down (estimated to be Year 19).

Elevated levels of the following parameters are noted:

- Those at least ten times higher than WQG include antimony (65:1), arsenic (260:1), cadmium (22:1), copper (22:1), lead (13:1), manganese (20:1), selenium (25:1), silver (20:1), and uranium (25:1)
- Those less than ten times higher than WQG include sulphate, fluoride, chromium, mercury, molybdenum, nickel, thallium, and zinc
- Phosphate levels of about 7.5 mg/L are predicted beginning in July of Year 5, when there is flow from the WRSA.

After the area is reclaimed midway through the operations phase for the mine, contact water quality will be monitored and sent to the open pit until the rest of the mine site is reclaimed. At that time, flows will be re-established into Platinum Gulch then Haggart Creek. Contact water from the WRSAs is expected to flow directly (untreated) to the Platinum Gulch seepage collection pond beginning in draindown (Year 14). Contact water from the open pit is expected to flow directly (untreated) to the Platinum Gulch seepage collection pond beginning in draindown (Year 17).

Feed pond concentrations are shown in Figure 5 for all Project phases, in Table 9 for operations (Year 9), and in Table 10 for draindown (Year 13). Post-closure, concentrations shown in Figure 5 represent predicted quality of water collected at the toe of the HLF from HLF seepage, HLF run-off, HLF sub-subsurface drains, and east and west Ann Gulch. Concentrations of all parameters except boron are predicted to exceed WQG during operations, rinse, and draindown. Highest levels are predicted during draindown (Year 13):

- Those at least ten times higher than WQG include sulphate (24:1), aluminum (22:1), antimony (75:1), arsenic (1030:1), cadmium (16:1), copper (33:1), lead (41:1), manganese (13:1), mercury (13:1), selenium (96:1), silver (250:1), uranium (22:1), and zinc (16:1)
- Those less than ten times higher than WQG include chromium, iron, molybdenum, nickel, and thallium.

In post-closure, concentrations of most parameters are expected to exceed WQG (Table 11):

- Those at least ten times higher than WQG include antimony (17:1), arsenic (246:1), mercury (17:1), selenium (30:1), and silver (60:1).
- Those less than ten times higher than WQG include sulphate, fluoride, aluminum, cadmium, copper, lead, manganese, thallium, uranium, and zinc.
- Those less than WQG include boron, chromium, iron, molybdenum, and nickel.

Maximum flow rates from the HLF to Haggart in post-closure (0.04 m^3/s) are predicted to be higher than during operations (0.025 m^3/s) and lower than during draindown (0.142 m^3/s) when the contact water goes first to the MWTP before discharging to Haggart.

Mean monthly baseline water quality in Haggart Creek (W22), above the MWTP effluent discharge, is shown in Table 12. In baseline, most of the parameters modeled meet WQGs, with the exception of manganese (3:1 in March) and aluminum (2:1 in May). Predicted concentrations after mixing (W4) are shown in Figure 6 for all Project phases and in Table 13 for operations (Year 9), Table 14 for draindown (Year 13), Table 15 for post-closure short-term, and Table 16 for post-closure long-term.

Concentrations during operations and draindown, while the MWTP is operating, are predicted to be similar to baseline:

- No parameters are predicted to be at least ten times higher than WQG.
- Those less than ten times higher than WQG include aluminum (2:1) and manganese (3:1).

Concentrations are expected to increase in short term post-closure (untreated):

- Those at least ten times higher than WQG include arsenic (15:1)
- Those less than ten times higher than WQG include aluminum (3:1), antimony (1:1), manganese (3:1), selenium (2:1), and silver (4:1).
- Those less than WQG include sulphate, fluoride, boron, cadmium, chromium, copper, iron, lead, mercury, molybdenum, nickel, thallium, uranium, zinc, and cyanide.

Most of the long term source terms for the HLF are similar to or lower than short term source terms; predicted concentrations in Haggart Creek (W4) are similar between the two periods:

- Those at least ten times higher than WQG include arsenic (11:1)

- Those less than ten times higher than WQGs include aluminum (2:1), antimony (1:1), manganese (3:1), mercury (1:1), and selenium (2:1).
- Those less than WQG include sulphate, fluoride, boron, cadmium, chromium, copper, iron, lead, molybdenum, nickel, silver, thallium, uranium, zinc, and cyanide.

3.3 Mixing Point C (W29)

Mixing Point C (W29) is located on Haggart Creek downstream from all Project activities likely to affect surface water quality in the local assessment area. There are several planned inputs of contact water to Haggart Creek (W29) from the mine:

- MWTP effluent and reclaimed HLF at W4
- Reclaimed Eagle Pup WRSA via Dublin Gulch and Eagle Creek
- Reclaimed Platinum Gulch WRSA and open pit via Platinum Gulch.

Inputs to the model include predicted water quality at W4 downstream from the MWTP (operations and closure) and HLF (post-closure), predicted water quality at W71 downstream from the Eagle Pup WRSA, and predicted water quality from the Platinum Gulch WRSA.

The Platinum Gulch seepage collection pond will receive non-contact water diverted around the WRSA, and contact runoff from the WRSA beginning in Year 14 and from the open pit starting in approximately Year 17. Predicted water quality is shown in Figure 7 for all Project phases and Table 17 for post-closure (Year 21). Most parameters are expected to exceed WQG:

- Those at least ten times higher than WQG include antimony (19:1), arsenic (150:1), cadmium (16:1), copper (16:1), selenium (15:1), and silver (19:1).
- Those less than ten times higher than WQG include sulphate, fluoride, aluminum, chromium, lead, manganese, mercury, molybdenum, nickel, thallium, uranium, and zinc.
- Those less than WQG include boron and iron.

Minimum dilution is predicted to occur in May (16:1) at W29.

Predicted water quality at Mixing Point C (W29) is shown in Figure 8 for all Project phases, Table 18 for operations (Year 9), Table 19 for draindown (Year 13), Table 20 for post-closure (Year 21, short term), and Table 21 for post-closure (Year 21, long term). Predicted concentrations are expected to be similar during operations and draindown:

- No parameters are predicted to be at least ten times higher than WQG.
- Those less than ten times higher than WQG include aluminum (3:1), arsenic (2:1), and manganese (2:1).
- Those less than WQG include sulphate, fluoride, antimony, boron, cadmium, chromium, copper, iron, lead, mercury, molybdenum, nickel, selenium, silver, thallium, uranium, zinc, and cyanide.

Predicted concentrations are also expected to be similar during post-closure (Year 21) in both the short and long term:

- Those at least ten times higher than WQG include arsenic (15:1).
- Those less than ten times higher than WQG include aluminum (4:1), antimony (2:1), copper (1:1), manganese (2:1), selenium (2:1), and silver (4:1 short term).
- Those less than WQGs include sulphate, fluoride, boron, cadmium, chromium, iron, lead, mercury, molybdenum, nickel, silver (long term), thallium, uranium, zinc, and cyanide.

3.4 Sensitivity Analysis

3.4.1 Average, Wet, and Dry Scenarios

In each phase of the Project, one year was selected to evaluate the effect of variable annual precipitation on water quality in the receiving environment (Year 9 for operations, Year 13 for draindown, Year 21 for post-closure). Year 9 was selected for operations because this last year will have full development of the Eagle Pup WRSA and open pit, and maximum flows through the MWTP. In closure, the first year of draindown (Year 13) was selected because flows from the HLF will be much higher than in subsequent years and effects on the environment are expected to greatest at that time. In post-closure, there are no Project-related events to suggest that one year would be more sensitive than another, so Year 21 was selected. Average (50% chance of exceedance), wet (5% chance of exceedance), and dry (95% chance of exceedance) levels of precipitation were modeled. The effects assessment used the highest (most conservative) concentration predicted for the three levels of precipitation in each of these years.

The sensitivity analysis evaluated the effect of the three scenarios on concentrations of eight parameters of concern (aluminum, antimony, arsenic, iron, manganese, selenium, and silver), highlighted in the environmental assessment, at Mixing Points A (W71), B (W4), and C (W29).

Mixing Point A (W71)

At Mixing Point A, contact water from the Eagle Pup WRSA will be directed to the MWTP until Year 15, leaving post-closure (Year 21) as the only year modeled with the variable water balance scenarios. Predicted concentrations of the eight parameters for Year 21 are shown in Figure 9. Two parameters, aluminum and iron, have elevated baseline concentrations (Table 4) and will be relatively unaffected by the Eagle Pup WRSA or varying flow regimes. For the remaining parameters (antimony, arsenic, cadmium, manganese, selenium, and silver), modeled concentrations do respond to flow scenarios, with peak levels predicted for June with a wet scenario. Although not peak concentrations, levels in August and October are predicted to be highest with a dry scenario.

Mixing Point B (W4)

Mixing Point B will receive contact water from the MWTP in operations (from open pit and WRSAs) and closure (mainly HLF draindown) and from the HLF in post-closure, so wet, dry and average scenarios were compared for all three phases. Aluminum, iron, and manganese concentrations are greatest in March and May and are relatively unaffected by MWTP operations and the different hydrologic scenarios and phases of the Project (Figures 10, 11, 12).

For operations (Year 9), predicted concentrations of the eight parameters are shown in Figure 10. Concentrations of antimony, arsenic, cadmium, selenium, and silver have peak concentrations in wet years. Of these, arsenic concentrations are predicted to be highest in April, antimony, cadmium, and selenium in June, and silver in July; however, levels are strongly influenced by both the wet and dry scenarios.

For draindown (Year 13), predicted concentrations are shown in Figure 11. Peak concentrations of antimony, cadmium, selenium, and silver occur in July (lowest dilution for MWTP effluent), and are predicted to be highest for a dry scenario. The July peak is a result of the high initial draindown volumes leaving the HLF and passing through the MWTP into Haggart Creek. Under a dry scenario, volumes from the HLF remain high, compared to lower than average flows in Haggart Creek, resulting in lower dilution and higher concentrations of many parameters.

In post-closure (Year 21), peak concentrations are predicted for April (lowest dilution for reclaimed HLF discharge) under a wet scenario for antimony, arsenic, cadmium, selenium, and silver, as shown in Figure 12.

Mixing Point C (W29)

Mixing Point C will receive water from Mixing Point B, Eagle Creek (including seepage from the reclaimed Eagle Pup and Platinum Gulch WRSs and open pit in closure). As noted for Mixing Points A and B, aluminum, iron, and manganese concentrations are relatively unaffected by the different precipitation scenarios and MWTP discharge (Figures 13, 14, 15).

During operations (Year 9), predicted concentrations will be similar to Mixing Point B, although diluted by Eagle Creek and non-contact water from Platinum Gulch (Figure 13). Concentrations of antimony, arsenic, cadmium, selenium, and silver are predicted to be highest in wet years (with peaks in June and July for antimony, cadmium, selenium, and silver, as predicted upstream at Mixing Point B. Arsenic concentrations would peak in July, later than at Mixing Point B, due to the influence of high background levels in Eagle Creek.

During draindown (Year 13), peak concentrations of antimony, cadmium, selenium, and silver occur in July for a dry scenario (Figure 14), indicating the influence of MWTP discharge. Arsenic concentrations are predicted to be highest in July of wet scenarios as predicted at Mixing Point B due to the influence of MWTP effluent.

During post-closure (Year 21), concentrations of antimony, arsenic, cadmium, selenium, and silver are predicted to be highest under a wet scenario (Figure 15), with peak levels of arsenic, selenium, and silver in April and peak levels of antimony and cadmium in June.

Overall Trends

Results indicate that parameters already elevated at baseline (aluminum, iron, manganese), relative to contact water concentrations, are less influenced by variations in flow regime. Also, under most conditions, wet scenarios are predicted to result in highest concentrations in receiving environments, including months with peak levels, as the contact water flows from the mine is predicted to increase more than surface water flows in the receiving creeks, resulting in less dilution). During draindown, Haggart Creek is most susceptible to dry conditions due to the influence of large HLF draindown volumes on low receiving environment flows.

Figures 9 to 15 indicate that concentrations of antimony, arsenic, cadmium, selenium, and silver at Mixing Points A, B, and C are most dependent on hydrologic regimes. Table 22 summarizes the percent difference between concentrations in wet and average scenarios and concentrations in dry and average scenarios for the eight parameters at each Mixing Point.

Annual mean values of the monthly differences were small (<10%) for aluminum, iron, and manganese, and within 20% for selenium and silver. Differences were higher for antimony (70%), arsenic (21%), and cadmium (27%). Maximum differences between wet and dry scenarios and average scenarios were generally lower for aluminum (42%), iron (48%), and manganese (60%) than for antimony (410%), arsenic (53%), cadmium (133%), selenium (46%), and silver (83%). At the most sensitive time of year, during peak concentrations, maximum differences between scenarios were also lowest for aluminum – 4%, iron – 3%, and manganese – 28%, and higher for antimony – 170%, arsenic – 53%, cadmium – 133%, selenium – 42%, silver – 53%.

The analysis of predicted monthly concentrations for these eight parameters under average, wet, and dry scenarios suggests that, while aluminum, iron, and manganese levels are predominantly affected by baseline conditions in local surface waters, variation in hydrologic scenarios can affect relative contributions of non-Project related flows and, in turn, concentrations in the receiving waters. Antimony, arsenic, cadmium, selenium, and silver concentrations in receiving waters are more dependent on Project related flows such as the WRSAs, open pit, and the HLF and exhibit greater variability as hydrologic conditions are varied. Due to the level of variation predicted by the model, maximum predicted concentrations were used in the Water Quality effects assessment (Section 6.5) to ensure a conservative (protective of the environment) assessment was reached.

3.4.2 Maximum Monthly Baseline Concentrations

Subsequent to the initial analysis, parameters with elevated predicted concentrations (aluminum, antimony, arsenic, cadmium, iron, manganese, selenium, silver) were remodeled assuming that the maximum monthly baseline concentrations (worst case) occurred in every month. The analysis assists in the assessment of the effect of temporary natural events, such as spates, on water quality in the receiving environment at Mixing Points A, B, C. The sensitivity analysis was performed over the life of the Project from construction through post-closure (Figures 16, 17, 18). The effect of different hydrologic regimes (average, wet, and dry) was included to ensure that the potential effects of cumulative worst case conditions were assessed. Although the figures show the effect of maximum baseline concentrations at all times, they should be interpreted as the worst concentrations that could occur as a result of a temporary event.

A comparison of peak predicted concentrations using mean and maximum monthly baseline data for the eight parameters is provided in Table 23 at the three Mixing Points during operations (Year 9), draindown (Year 13), and post-closure (Year 21). Four of the parameters (antimony, iron, manganese, selenium) show little influence (<10% increase in peak concentrations) on predicted peak concentrations when maximum monthly baseline values were used in the model.

Aluminum concentrations are predicted to be more than 10% higher on three occasions (operations – 34%, draindown – 32%, and post-closure – 25%) at Mixing Point C using maximum monthly baseline values in the model. The predicted levels are well below the SS WQO proposed for Mixing Point C. Increases are predicted to less than 5% at Mixing Points A and B.

Arsenic concentrations are predicted to be more than 10% higher on three occasions (Mixing Point A, operations – 11%; Mixing Point C, operations – 27%, draindown – 25%) using maximum monthly baseline values in the model. At Mixing Point C, predicted levels are below the proposed SS WQO, whereas at Mixing Point A, the 11% increase is above already elevated arsenic concentrations (i.e., a small increase, but for already elevated levels). Increases are predicted to less than 3% in the other cases.

Cadmium concentrations are predicted to be more than 10% higher on six occasions (Mixing Point B, operations – 41%, draindown – 11%, post-closure – 18%; Mixing Point C, operations – 42%, draindown – 11%, post-closure – 15%) using maximum monthly baseline values in the model. The predicted levels are below the draft CCME WQO. A two percent increase is predicted at Mixing Point A.

Silver concentrations are predicted to be more than 10% higher on two occasions (Mixing Point B, operations – 14%, Mixing Point C, operations – 33%) using maximum monthly baseline values in the model. The predicted levels are below CCME guidelines. Increases are predicted to be less than 5% in the other cases.

Overall Trends

Results indicate that peak concentrations in the receiving environment may be as much as 42% higher than described in Sections 3.1 through 3.3 for some parameters if background concentrations temporarily increase to maximum baseline levels as a result of natural hydrologic events. During operations and closure, the temporary spikes are predicted to remain within WQO at each of the Mixing Points. In addition, peak concentrations during draindown are predicted to occur during dry conditions (see above) when dilution of HLF draindown effluent will be a minimum. It is anticipated that increased concentrations in baseline data will be most likely to occur during precipitation events and therefore not likely to coincide with worst case dilutions of HLF effluent that were used in the effects assessment. In post-closure, peak concentrations of aluminum, arsenic, and cadmium are predicted to increase by up to 20% if they were to coincide with a temporary increase in background concentrations up to maximum monthly levels. Aluminum and cadmium are predicted to remain within WQO, whereas arsenic concentrations could increase by up to 11% over already high levels.

The analysis of predicted monthly concentrations for these eight parameters suggests that during operations and closure, a temporary increase in baseline concentrations up to maximum background levels is unlikely to result in large increases in the receiving environment or a parameter exceeding WQG. During post-closure, predicted percent increases are lower than during operations (maximum 20%). In the case of arsenic, this could result in further increase of elevated levels in the receiving environment. The mitigation measures described in the environmental assessment (treatment wetlands at closure) provide additional capacity to reduce arsenic concentrations in the predicted scenarios and also for this sensitivity analysis of infrequent and temporary events. The potential for increased levels resulting from natural variation in background data is discussed further in the effects assessment.

3.5 Alternate Heap Cap (Post-closure, 10% Infiltration of Net Precipitation)

The water quality mixing model was also used to predict water quality at Mixing Points B and C assuming the HLF cap will be designed with 10% infiltration of net precipitation, rather than the 20% infiltration modeled above. Predicted concentrations in water collected at the toe of the HLF (post-closure) are shown in Table 24. Concentrations are predicted to be as much as 50% lower than with the 20% cap, with most parameters predicted to exceed WQG:

- Those at least 10 times higher than WQG include arsenic (127:1), selenium (15:1), and silver (30:1).
- Those less than 10 times higher than WQG include sulphate, fluoride, aluminum, antimony, cadmium, copper, lead, manganese, mercury, uranium, zinc, and cyanide.
- Those less than WQG include boron, chromium, iron, molybdenum, nickel, and thallium.

Mixing Point B (W4)

Predicted concentrations in Haggart Creek after mixing (W4) are shown in Figure 19 and in Table 25 for post-closure short-term and Table 26 for post-closure long-term. Concentrations are predicted to be as much as 50% lower than with the 20% cap in both short-term and long-term post-closure (untreated). In short-term:

- No parameters are predicted to be at least 10 times higher than WQG.
- Those less than 10 times higher than WQG include aluminum, arsenic, manganese, and silver.
- Those less than WQG include sulphate, fluoride, antimony, boron, cadmium, chromium, copper, iron, lead, mercury, molybdenum, nickel, selenium, thallium, uranium, zinc, and cyanide.

Most of the long term source terms for the HLF are similar to or lower than short term source terms; predicted concentrations in Haggart Creek (W4) are similar between the two periods:

- No parameters are predicted to be at least 10 times higher than WQG.
- Those less than 10 times higher than WQG include aluminum, arsenic, manganese, mercury, and selenium.
- Those less than WQG include sulphate, fluoride, antimony, boron, cadmium, chromium, copper, iron, lead, molybdenum, nickel, silver, thallium, uranium, zinc, and cyanide.

Mixing Point C (W29)

Predicted water quality at Mixing Point C (W29) is shown in Figure 20 and Table 27 for post-closure short-term and Table 28 for post-closure long-term. Concentrations are predicted to be as much as 50% lower than with the 20% cap in both short-term and long-term post-closure (untreated). Concentrations are predicted to be similar during post-closure in both the short- and long-term:

- No parameters are predicted to be at least 10 times higher than WQG.
- Those less than 10 times higher than WQG include aluminum, antimony, arsenic, manganese, mercury, selenium, and silver.
- Those less than WQG include sulphate, fluoride, boron, cadmium, chromium, copper, iron, lead, molybdenum, nickel, thallium, uranium, zinc, and cyanide.

3.6 Alternate Heap and Eagle Pup Waste Rock Storage Area Cap (Post-closure, 10% Infiltration of Net Precipitation)

The model was also used to predict water quality at Mixing Points A and C assuming both the HLF and Eagle Pup WRSA caps will be designed with 10% infiltration of net precipitation, rather than 20% infiltration modeled above. Predicted concentrations in seepage from the Eagle Pup WRSA are presented in Table 29. Concentrations are predicted to be slightly lower than in seepage from the WRSAs with a 20% infiltration cap. Peak concentrations of most parameters are predicted to occur in November when the water balance predicts low flows of contact water through the WRSAs.

Mixing Point A (W71)

Predicted concentrations at Mixing Point A (W71) are shown in Figure 21 and in Table 30 for post-closure (Year 21). Lower infiltration through Eagle Pup WRSA will result in greater dilution of contact water and generally lower predicted concentrations in Dublin Gulch than with the 20% cap:

- Arsenic (18:1) and aluminum (13:1) are predicted to be greater than 10 times WQG. The worst-case arsenic concentration (June - 0.089 mg/L) is slightly above the proposed site-specific water quality objective (0.07 mg/L) for the DGDC (SS WQO was based on concentrations recorded at W27 below Eagle Pup and Stuttle Gulch). The worst-case aluminum concentration (1.334 mg/L) remains well below the proposed SS WQO for DGDC (3.5 mg/L), also based on concentrations recorded at W27.
- Those less than 10 times higher than WQG include antimony, cadmium, copper, mercury, selenium, and uranium
- Those less than WQG include sulphate, fluoride, boron, chromium, iron, lead, manganese, molybdenum, nickel, silver, thallium, and zinc.

Mixing Point C (W29)

Predicted water quality at Mixing Point C (W29) is shown in Figure 22 and Table 31 for post-closure short-term and Table 32 for post-closure long-term. The influence of lower infiltration through the Eagle Pup WRSA is predicted to extend downstream to Mixing Point C (W29) in both short- and long-term post-closure (untreated). Of the parameters exceeding guidelines using a cap with 20% infiltration (aluminum, antimony, arsenic, manganese, mercury, and silver), slightly lower concentrations are predicted for antimony (no longer exceeding guidelines) and arsenic. Aluminum concentrations, predominantly dependent on baseline conditions, are predicted to increase slightly. Concentrations are predicted to be similar in both the short- and long-term:

- No parameters are predicted to be at least 10 times higher than WQG.
- Those less than 10 times higher than WQG include aluminum, arsenic, manganese, mercury, selenium (long-term), and silver (short-term).
- Those less than WQG include sulphate, fluoride, antimony, boron, cadmium, chromium, copper, iron, lead, molybdenum, nickel, selenium (short-term), silver (long-term), thallium, uranium, zinc, and cyanide.

4 REFERENCES

Alexco Resource Corp. (Alexco). *2010. Brewery Creek Mine. 2009 Annual Water License Report*. Submitted to the Yukon Water Board for Water License QZ96-007

BC Ministry of Environment (MoE). 2006. *British Columbia Approved Water Quality Guidelines, 2006 Edition*. Science and Information Branch. Available at: http://www.env.gov.bc.ca/wat/wq/BCguidelines/approv_wq_guide/approved.html

Canadian Council of Ministers of Environment (CCME). 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life. In: *Canadian environmental quality guidelines*, 1999, Canadian Council of Ministers of the Environment.

Canadian Council of Ministers of Environment (CCME). 2009a. Canadian Water Quality Guidelines for the Protection of Aquatic Life: Summary Table. Updated 2009. In: *Canadian environmental quality guidelines*, 1999, Canadian Council of Ministers of the Environment.

Canadian Council of Ministers of Environment (CCME). 2009b. *Scientific criteria document for the development of the Canadian Water Quality Guidelines for Boron*. November 2009. Available at: http://www.ccme.ca/assets/pdf/boron_scd_1.0.pdf.

Hallam Knight Piésold Ltd. *1996. Dublin Gulch Project Initial Environmental Evaluation Volume III Environmental Mitigation and Impact Assessment*. Report prepared for First Dynasty Mines Ltd., Denver, CO by Knight Piésold Ltd. Consulting Engineers, Vancouver, BC.

Nagpal, N.K., L.W. Pommen and L.G. Swain. 2006. A *Compendium of Working Water Quality Guidelines for British Columbia.* Available at: http://www.env.gov.bc.ca/wat/wq/BCguidelines/working.html

Yukon Government. 2003. *Comprehensive study report on the decommissioning and reclamation of the Brewery Creek Mine*. Report prepared by: Environmental Assessment Unit, Executive Council Office, Yukon Government.

5 TABLES AND FIGURES

Please see the following pages

Table 1: Effluent Discharge Criteria for the Mine Water Treatment Plant

Parameter	Concentration (mg/L)		Comment on Treatment Plant Criteria
	MMER Sched. 4[a]	Treatment Plant	
pH	6.0 to 9.5	6.0 to 9.5	
Sulphate	–	200	
Fluoride	–	0.6	Two times higher than BC WQG of 0.3 mg/L
Nitrate N	–	5.8 or 0.4	Two times higher than CCME WQG, based on aquatic toxicity To protect from eutrophication effects
Ammonia N	–	11.2 or 1.0	Two times higher than CCME WQG, adjusted for temperature and pH, based on aquatic toxicity To protect from eutrophication effects
Phosphate P		0.2	Best available technology, to protect from eutrophication effects
TSS	15	–	According to Yukon Water Board permit
Aluminum D	–	0.2	Two times higher than BC WQG, dissolved (0.10 mg/L) rather than total
Antimony T	–	0.04	Two times higher than BC WQG of 0.02 mg/L
Arsenic T	0.5	0.01	Two times higher than CCME WQG
Boron T	–	2.4	Two times higher than BC WQG
Cadmium T	–	0.0006	Two times higher than draft CCME WQG (2010) of 0.0003
Chromium T	–	0.0178	Two times higher than CCME WQG
Copper T	0.3	0.006	Two times higher than CCME WQG
Iron T	–	2.0	Two times higher than BC WQG (2008) for total iron of 1.0 mg/L, also considers BC WQG for dissolved iron of 0.35 mg/L
Lead T	0.2	0.008	Two times higher than CCME WQG
Manganese T	–	0.1	Two times higher than BC WQG for drinking water, 0.05 mg/L
Mercury T	–	0.00005	Two times higher than CCME WQG
Molybdenum T	–	0.146	Two times higher than CCME WQG
Nickel T	0.5	0.22	Two times higher than CCME WQG
Selenium T	–	0.004	Two times higher than BC WQG of 0.002
Silver T	–	0.0002	Two times higher than CCME WQG
Thallium T	–	0.0016	Two times higher than BC WQG of 0.008 mg/L
Uranium T	–	0.03	Two times higher than draft CCME WQG
Zinc T	0.5	0.06	Two times higher than CCME WQG
Radium 226	0.37 Bq/L	NA	
Cyanide (free)	1.0	0.01	Two times higher than CCME WQG

NOTE:
Effluent Discharge Criteria are two times higher than WQG or a SS WQO
[a] MMER maximum authorized monthly mean concentration, also includes a requirement for 100% non-acutely lethal effluent (survival of at least 50% of rainbow trout subjected to 100% concentration effluent for a period of 96 hours)

Table 2: Predicted Flows (average) and Water Quality (maximum) from Eagle Pup Waste Rock Storage Area Sediment Control Pond during Operations (Year 9)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	< 0.001	< 0.001	< 0.001	< 0.001	0.006	0.016	0.010	0.010	0.009	0.007	0.004	< 0.001		
Sulphate	29	29	29	29	**398**	**708**	**628**	**663**	**615**	78	**744**	29	100	**7.4**
Fluoride	0.106	0.106	0.106	0.106	**1.066**	**1.336**	**1.221**	**1.272**	**1.213**	**0.470**	**1.189**	0.106	0.30	**4.5**
Nitrate	0.270	0.270	0.270	0.270	0.028	0.135	0.187	0.133	0.109	0.336	0.270	0.270		
Ammonia	0.007	0.007	0.007	0.007	0.007	0.027	0.010	0.017	0.017	0.004	0.011	0.007		
Phosphate	0.092	0.092	0.092	0.092	0.662	0.803	0.728	0.761	0.721	0.239	0.819	0.092		
Aluminum	**0.7807**	**0.7807**	**0.7807**	**0.7807**	**0.3639**	0.0832	0.0814	**0.2425**	0.0825	0.0859	**0.7807**	**0.7807**	0.10	**7.8**
Antimony	0.0006	0.0006	0.0006	0.0006	**0.6598**	**1.2704**	**1.1148**	**1.1820**	**1.0882**	**0.0384**	**1.3430**	0.0006	0.02	**67**
Arsenic	**0.0299**	**0.0299**	**0.0299**	**0.0299**	**0.7037**	**1.2760**	**1.1248**	**1.1908**	**1.1009**	**0.0839**	**1.3442**	**0.0299**	0.005	**269**
Boron	0.024	0.024	0.024	0.024	0.046	0.049	0.048	0.048	0.046	0.030	0.049	0.024	1.2	<0.1
Cadmium	0.00002	0.00002	0.00002	0.00002	**0.00401**	**0.00770**	**0.00675**	**0.00716**	**0.00659**	0.00025	**0.00813**	0.00002	0.0003	**27**
Chromium	0.0006	0.0006	0.0006	0.0006	**0.0229**	**0.0301**	**0.0271**	**0.0284**	**0.0268**	0.0078	**0.0307**	0.0006	0.0089	**3.5**
Copper	0.0014	0.0014	0.0014	0.0014	**0.0409**	**0.0645**	**0.0574**	**0.0605**	**0.0563**	**0.0087**	**0.0672**	0.0014	0.003	**22**
Iron	0.948	0.948	0.948	0.948	**1.102**	**1.505**	**1.326**	**1.431**	**1.310**	0.072	**1.627**	0.948	1.0	**1.6**
Lead	0.00036	0.00036	0.00036	0.00036	**0.03701**	**0.07323**	**0.06414**	**0.06807**	**0.06256**	0.00120	**0.07759**	0.00036	0.004	**19**
Manganese	0.0049	0.0049	0.0049	0.0049	**0.7352**	**1.4641**	**1.2820**	**1.3606**	**1.2501**	0.0198	**1.5518**	0.0049	0.05	**31**
Mercury	0.00002	0.00002	0.00002	0.00002	**0.00009**	**0.00010**	**0.00009**	**0.00009**	**0.00009**	**0.00005**	**0.00010**	0.00002	0.00003	**3.7**
Molybdenum	0.00112	0.00112	0.00112	0.00112	**0.07363**	**0.08580**	**0.07837**	**0.08157**	**0.07794**	0.03065	**0.08638**	0.00112	0.073	**1.2**
Nickel	0.0009	0.0009	0.0009	0.0009	**0.5068**	**1.0065**	**0.8814**	**0.9354**	**0.8596**	0.0152	**1.0664**	0.0009	0.110	**9.7**
Selenium	0.0004	0.0004	0.0004	0.0004	**0.0209**	**0.0371**	**0.0328**	**0.0346**	**0.0321**	**0.0028**	**0.0390**	0.0004	0.002	**20**
Silver	0.00001	0.00001	0.00001	0.00001	**0.00167**	**0.00191**	**0.00175**	**0.00182**	**0.00174**	**0.00069**	**0.00192**	0.00001	0.0001	**19**
Thallium	0.00005	0.00005	0.00005	0.00005	**0.00134**	**0.00153**	**0.00140**	**0.00146**	**0.00140**	0.00058	**0.00154**	0.00005	0.0008	**1.9**
Uranium	0.0059	0.0059	0.0059	0.0059	**0.3317**	**0.6593**	**0.5780**	**0.6132**	**0.5638**	**0.0157**	**0.6985**	0.0059	0.015	**47**
Zinc	0.0062	0.0062	0.0062	0.0062	**0.1862**	**0.3663**	**0.3210**	**0.3407**	**0.3130**	0.0063	**0.3883**	0.0062	0.03	**12.9**

NOTE: Predicted values from Jan Year 9 to Dec Year 9 (last year of operations), based on geochemistry predictions and Eagle Pup baseline data

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 3: Predicted Flows (average) and Water Quality (maximum) from Eagle Pup Waste Rock Storage Area Sediment Control Pond in the Predicted Worst Year at and after Post-closure (Year 21), Untreated

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG	Max/ WQG ratio
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(mg/L)	
Flow (m^3/s)	< 0.001	< 0.001	< 0.001	0.004	0.035	0.030	0.024	0.019	0.017	0.009	0.002	< 0.001		
Sulphate	29	29	29	29	36	**317**	**222**	**260**	**217**	**524**	**851**	29	100	**8.5**
Fluoride	0.106	0.106	0.106	0.106	0.107	**0.536**	**0.392**	**0.451**	**0.392**	**0.813**	**1.274**	0.106	0.30	**4.2**
Nitrate	0.270	0.270	0.270	0.270	0.110	0.312	0.200	0.176	0.202	0.339	0.067	0.270		
Ammonia	0.007	0.007	0.007	0.007	0.009	0.004	0.003	0.004	0.006	0.004	0.002	0.007		
Phosphate	0.092	0.092	0.092	0.092	0.184	0.276	0.184	0.222	0.171	0.459	0.771	0.092		
Aluminum	**0.7807**	**0.7807**	**0.7807**	**0.7807**	**1.4225**	**0.1823**	0.0874	**0.3453**	**0.1436**	0.0870	**0.2154**	**0.7807**	0.10	**14.2**
Antimony	0.0006	0.0006	0.0006	0.0006	**0.0374**	**0.4301**	**0.2806**	**0.3358**	**0.2679**	**0.7433**	**1.2549**	0.0006	0.02	**63**
Arsenic	**0.0299**	**0.0299**	**0.0299**	**0.0299**	**0.0754**	**0.4406**	**0.2940**	**0.3540**	**0.2884**	**0.7525**	**1.2579**	**0.0299**	0.005	**252**
Boron	0.024	0.024	0.024	0.024	0.028	0.040	0.038	0.033	0.028	0.036	0.047	0.024	1.2	<0.1
Cadmium	0.00002	0.00002	0.00002	0.00002	0.00021	**0.00216**	**0.00142**	**0.00169**	**0.00135**	**0.00374**	**0.00630**	0.00002	0.0003	**21**
Chromium	0.0006	0.0006	0.0006	0.0006	0.0017	**0.0100**	0.0066	0.0078	0.0064	**0.0171**	**0.0287**	0.0006	0.0089	**3.2**
Copper	0.0014	0.0014	0.0014	0.0014	**0.0042**	**0.0220**	**0.0144**	**0.0171**	**0.0137**	**0.0373**	**0.0629**	0.0014	0.003	**21**
Iron	0.948	0.948	0.948	0.948	**1.799**	0.389	0.272	0.538	0.368	0.542	0.954	0.948	1.0	**1.8**
Lead	0.00036	0.00036	0.00036	0.00036	0.00193	**0.01554**	**0.01011**	**0.01208**	**0.00969**	**0.02674**	**0.04513**	0.00036	0.004	**11**
Manganese	0.0049	0.0049	0.0049	0.0049	0.0323	**0.2789**	**0.1819**	**0.2174**	**0.1741**	**0.4811**	**0.8120**	0.0049	0.05	**16**
Mercury	0.00002	0.00002	0.00002	0.00002	0.00002	**0.00003**	**0.00003**	**0.00003**	**0.00003**	**0.00006**	**0.00009**	0.00002	0.00003	**3.5**
Molybdenum	0.00112	0.00112	0.00112	0.00112	0.00307	0.02884	0.01923	0.02247	0.01828	0.04848	**0.08078**	0.00112	0.073	**1.1**
Nickel	0.0009	0.0009	0.0009	0.0009	0.0174	**0.1854**	**0.1207**	**0.1446**	**0.1153**	**0.3203**	**0.5409**	0.0009	0.110	**4.9**
Selenium	0.0004	0.0004	0.0004	0.0004	0.0017	**0.0158**	**0.0102**	**0.0122**	**0.0098**	**0.0266**	**0.0446**	0.0004	0.002	**22**
Silver	0.00001	0.00001	0.00001	0.00001	0.00007	**0.00062**	**0.00041**	**0.00048**	**0.00039**	**0.00106**	**0.00179**	0.00001	0.0001	**18**
Thallium	0.00005	0.00005	0.00005	0.00005	0.00009	0.00053	0.00036	0.00042	0.00035	**0.00087**	**0.00144**	0.00005	0.0008	**1.8**
Uranium	0.0059	0.0059	0.0059	0.0059	0.0133	**0.1348**	**0.0903**	**0.1069**	**0.0871**	**0.2287**	**0.3793**	0.0059	0.015	**25**
Zinc	0.0062	0.0062	0.0062	0.0062	0.0170	**0.0723**	**0.0480**	**0.0576**	**0.0455**	**0.1234**	**0.2081**	0.0062	0.03	**6.9**

NOTE: Predicted values from Jan Year 21 to Dec Year 21 (worst conditions in Post-closure), based on geochemistry predictions and Eagle Pup baseline data

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 4: Mean Monthly Baseline Flow Rates and Water Quality in Dublin Gulch (W70) above Eagle Pup

Parameter[1]	Mean Monthly Baseline Concentration (mg/L, unless indicated)												WQG[2] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.021	0.017	0.013	0.014	0.132	0.101	0.171	0.094	0.112	0.105	0.050	0.033		
Hardness	66	65	76	64	39	44	61	67	65	61	58	66		
TSS	9	9	17	2	49	2	2	2	5	2	2	9		
TDS	87	87	99	90	60	61	83	88	84	79	79	88		
DOC	1.12	1.11	0.94	1.45	9.05	4.21	1.96	1.92	1.80	1.52	1.45	1.17		
Sulphate	22	22	28	16	8	11	14	15	15	15	16	22	100	0.3
Fluoride	0.054	0.054	0.098	0.091	0.088	0.072	0.066	0.084	0.087	0.074	0.015	0.055	0.20	0.5
Nitrate	0.113	0.113	0.154	0.115	0.030	0.039	0.021	0.015	0.024	0.050	0.074	0.113		
Ammonia	0.003	0.003	0.004	0.003	0.009	0.003	0.003	0.007	0.005	0.007	0.003	0.003		
Phosphate T	0.007	0.007	0.009	0.008	0.075	0.011	0.012	0.006	0.009	0.005	0.004	0.007		
Cyanide T	0.0020	0.0020	0.0015	0.0025	0.0047	0.0016	0.0024	0.0022	0.0022	0.0020	0.0025	0.0020		
Aluminum T	0.0928	0.0930	**0.1791**	0.0283	**1.2154**	0.0840	0.0787	0.0464	0.0587	0.0230	0.0079	0.0919	0.10	**12**
Antimony T	0.0019	0.0019	0.0027	0.0014	0.0008	0.0010	0.0010	0.0012	0.0011	0.0011	0.0011	0.0019	0.02	0.1
Arsenic T	**0.0414**	**0.0415**	**0.0442**	**0.0363**	**0.0308**	**0.0289**	**0.0331**	**0.0346**	**0.0362**	**0.0344**	**0.0376**	**0.0411**	0.005	**8.9**
Boron T	0.016	0.016	0.027	0.004	0.029	0.040	0.034	0.020	0.021	0.017	0.007	0.017	1.2	<0.1
Cadmium T	0.00001	0.00001	0.00001	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.0003	0.1
Chromium T	0.0004	0.0004	0.0002	0.0001	0.0007	0.0004	0.0005	0.0002	0.0003	0.0004	0.0005	0.0004	0.0089	0.1
Copper T	0.0004	0.0004	0.0003	0.0005	0.0011	0.0008	0.0005	0.0003	0.0004	0.0004	0.0005	0.0004	0.003	0.4
Iron T	0.127	0.127	0.239	0.030	0.583	0.083	0.086	0.040	0.060	0.018	0.015	0.125	1.0	0.6
Lead T	0.00003	0.00003	0.00003	0.00007	0.00047	0.00025	0.00022	0.00005	0.00006	0.00003	0.00003	0.00003	0.004	0.1
Manganese T	0.0005	0.0005	0.0008	0.0023	0.0105	0.0032	0.0042	0.0013	0.0015	0.0006	0.0002	0.0005	0.05	0.2
Mercury T	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00003	0.8

Parameter[1]	Mean Monthly Baseline Concentration (mg/L, unless indicated)												WQG[2] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Molybdenum	0.0020	0.0020	0.0022	0.0022	0.0015	0.0019	0.0022	0.0021	0.0020	0.0020	0.0018	0.00C0	0.073	<0.1
Nickel T	0.0004	0.0004	0.0002	0.0003	0.0012	0.0006	0.0005	0.0002	0.0003	0.0004	0.0005	0.0004	0.110	<0.1
Selenium T	0.0004	0.0004	0.0004	0.0005	0.0004	0.0004	0.0003	0.0004	0.0004	0.0004	0.0005	0.0004	0.002	0.2
Silver T	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.0001	0.2
Thallium T	0.00008	0.00008	0.00005	0.00005	0.00005	0.00008	0.00005	0.00005	0.00006	0.00007	0.00010	0.00008	0.0008	0.1
Uranium T	0.0004	0.0004	0.0005	0.0007	0.0010	0.0005	0.0008	0.0009	0.0009	0.0008	0.0005	0.0004	0.015	0.1
Zinc T	0.0028	0.0028	0.0031	0.004	0.0053	0.0026	0.0022	0.0012	0.0017	0.0015	0.0025	0.0028	0.03	0.2

NOTES:

Derived from Baseline Flows and Water Quality (1993 – 2010) at W22 upstream of Dublin Gulch. Data from 2007 - 2010 were used for cadmium, chromium, copper, lead, manganese, molybdenum, nickel, silver, and thallium due to lower detection limits over that period.

Values at the detection limit were included at one-half the detection limit when calculating mean values

Bold indicates maximum monthly mean exceeds WQG.

Total metals concentrations

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 5: Predicted Flows (average) and Water Quality (maximum) in Dublin Gulch Diversion Channel (W71) after Closure, with Untreated Runoff from Eagle Pup Waste Rock Storage Area

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.021	0.017	0.013	0.018	0.167	0.130	0.195	0.113	0.129	0.114	0.051	0.033		
Dilution	283.9	309.1	333.1	2.4	3.7	2.4	4.9	3.4	6.4	10.1	21.8	253.2		
Sulphate	22	22	28	20	14	**101**	47	66	41	56	53	22	100	**1.0**
Fluoride	0.054	0.054	0.098	0.095	0.091	0.208	0.119	0.160	0.129	0.133	0.065	0.055	0.30	0.7
Nitrate	0.114	0.114	0.154	0.160	0.047	0.118	0.051	0.051	0.048	0.076	0.073	0.114		
Ammonia	0.003	0.003	0.004	0.004	0.009	0.003	0.003	0.006	0.005	0.007	0.003	0.003		
Phosphate T	0.007	0.007	0.010	0.032	0.102	0.089	0.040	0.051	0.031	0.042	0.038	0.007		
Aluminum T	0.0954	0.0952	**0.1809**	**0.2479**	**1.3266**	**0.1111**	0.0811	**0.1153**	0.0705	0.0288	0.0120	0.0957	0.10	**13.3**
Antimony T	0.0019	0.0019	0.0027	0.0013	0.0085	**0.1276**	**0.0459**	**0.0701**	**0.0372**	**0.0615**	**0.0560**	0.0019	0.02	**6.4**
Arsenic T	**0.0415**	**0.0415**	**0.0442**	**0.0358**	**0.0411**	**0.1502**	**0.0750**	**0.1004**	**0.0703**	**0.0932**	**0.0914**	**0.0415**	0.005	**30.0**
Boron T	0.016	0.016	0.027	0.011	0.029	0.040	0.035	0.023	0.022	0.018	0.008	0.017	1.2	<0.1
Cadmium T	0.00001	0.00001	0.00001	0.00002	0.00006	**0.00065**	0.00024	**0.00036**	0.00019	**0.00032**	0.00028	0.00001	0.0003	**2.2**
Chromium T	0.0004	0.0004	0.0003	0.0003	0.0009	0.0032	0.0015	0.0018	0.0011	0.0017	0.0017	0.0004	0.0089	0.4
Copper T	0.0004	0.0004	0.0003	0.0008	0.0018	**0.0070**	0.0027	**0.0038**	0.0022	**0.0034**	**0.0033**	0.0004	0.003	**2.3**
Iron T	0.130	0.130	0.242	0.298	0.872	0.168	0.116	0.151	0.102	0.061	0.056	0.130	1.0	0.9
Lead T	0.00003	0.00003	0.00003	0.00016	0.00079	**0.00447**	0.00182	0.00253	0.00137	0.00220	0.00191	0.00003	0.004	**1.1**
Manganese T	0.0005	0.0005	0.0008	0.0031	0.0157	**0.0793**	0.0326	0.0458	0.0249	0.0397	0.0341	0.0005	0.05	**1.6**
Mercury T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00002	0.00002	**0.00003**	0.00001	0.00001	0.00003	**1.1**
Molybdenum	0.00197	0.00197	0.00225	0.00206	0.00182	0.00936	0.00480	0.00627	0.00425	0.00576	0.00505	0.00199	0.073	0.1
Nickel T	0.0004	0.0004	0.0003	0.0005	0.0047	0.0551	0.0198	0.0300	0.0159	0.0265	0.0242	0.0004	0.110	0.5
Selenium T	0.0004	0.0004	0.0004	0.0005	0.0007	**0.0049**	0.0019	**0.0029**	0.0017	**0.0026**	**0.0024**	0.0004	0.002	**2.5**
Silver T	0.00001	0.00001	0.00001	0.00001	0.00003	**0.00019**	0.00007	**0.00011**	0.00006	0.00009	0.00009	0.00001	0.0001	**1.9**
Thallium T	0.00007	0.00007	0.00005	0.00005	0.00006	0.00021	0.00010	0.00013	0.00010	0.00013	0.00016	0.00008	0.0008	0.3
Uranium T	0.0004	0.0004	0.0005	0.0022	0.0035	**0.0402**	**0.0152**	**0.0228**	0.0126	**0.0192**	**0.0170**	0.0005	0.015	**2.7**
Zinc T	0.0028	0.0028	0.0031	0.0046	0.0079	0.0232	0.0095	0.0130	0.0077	0.0114	0.0115	0.0028	0.03	0.8

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 6: Predicted Groundwater Quality from under the Heap Leach Facility during Operations (mean values from Ann Gulch, 2009 and 2010)

Parameter	Mean[1] (mg/L)	WQG[2] (mg/L)	Mean/WQG
Sulphate	82	100	0.8
Nitrate	0.044	NA	NA
Ammonia	0.051	NA	NA
Phosphate T	0.047	NA	NA
Hardness	177	NA	NA
TSS	132	NA	NA
Aluminum D	0.0122	0.10	0.1
Antimony D	0.0098	0.020	0.5
Arsenic D	**0.335**	0.005	**67**
Boron D	0.0064	1.20	0.01
Cadmium D	**0.00029**	0.00004	**7.2**
Chromium D	0.00025	0.0089	0.03
Copper D	0.00097	0.003	0.3
Iron D	**1.67**	0.30	**5.6**
Lead D	0.00005	0.0040	0.01
Manganese D	**0.248**	0.05	**5.0**
Mercury D	0.00001	0.00003	0.4
Molybdenum D	0.0029	0.073	0.04
Nickel D	0.0028	0.110	0.03
Selenium D	0.0005	0.001	0.5
Silver D	0.00001	0.0001	0.1
Thallium D	0.00005	0.0008	0.06
Uranium D	0.00074	0.0200	0.04
Zinc D	0.030	0.030	1.0

NOTES:

[1] Derived from baseline water quality (2009, 2010) on five dates (n = 11) for monitoring wells in Ann Gulch (MW10-AG3, MW10-AG5, MW10-AG6) and Dublin Gulch (MW09-DG1, MW10-DG6).

[2] CCME WQGs for protection of aquatic life, other than CCME drinking water (antimony, thallium, uranium), BC aquatic life (sulphate, fluoride), BC drinking water (manganese).

Bold indicates max monthly mean exceeds WQG

NA = not applicable

Table 7: Predicted Flows (average) and Water Quality (maximum) from the Eagle Gold Pit at Year 9

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	< 0.001	< 0.001	< 0.001	0.005	0.044	0.022	0.016	0.014	0.017	0.009	< 0.001	< 0.001		
Sulphate	96	96	96	**107**	**111**	**225**	**170**	**174**	**154**	**269**	**659**	96	100	**6.6**
Fluoride	0.099	0.099	0.099	**0.776**	**0.811**	**1.008**	**0.996**	**1.005**	**0.893**	**0.844**	**0.978**	0.099	0.30	**3.4**
Nitrate	0.015	0.015	0.015	0.077	0.037	0.094	0.054	0.045	0.058	0.116	0.010	0.015		
Ammonia	0.007	0.007	0.007	0.003	0.003	0.001	0.001	0.001	0.002	0.002	0.005	0.007		
Phosphate	0.085	0.085	0.085	0.475	0.522	0.604	0.598	0.604	0.526	0.502	0.615	0.085		
Aluminum	0.0734	0.0734	0.0734	**0.2411**	**0.4841**	0.0741	0.0436	**0.1089**	0.0604	0.0484	0.0600	0.0734	0.10	**4.8**
Antimony	0.0063	0.0063	0.0063	**0.0746**	**0.0831**	**0.1540**	**0.1180**	**0.1207**	**0.1065**	**0.1739**	**0.4187**	0.0063	0.02	**21**
Arsenic	**0.1944**	**0.1944**	**0.1944**	**0.1618**	**0.1673**	**0.2997**	**0.2299**	**0.2356**	**0.2088**	**0.3578**	**0.8654**	**0.1944**	0.005	**173**
Boron	0.005	0.005	0.005	0.041	0.043	0.047	0.046	0.046	0.043	0.041	0.036	0.005	1.2	<0.1
Cadmium	0.00002	0.00002	0.00002	**0.00048**	**0.00057**	**0.00152**	**0.00102**	**0.00104**	**0.00086**	**0.00189**	**0.00536**	0.00002	0.0003	**18**
Chromium	0.0003	0.0003	0.0003	**0.0150**	**0.0161**	**0.0204**	**0.0198**	**0.0200**	**0.0175**	**0.0171**	**0.0222**	0.0003	0.0089	**2.5**
Copper	0.0001	0.0001	0.0001	**0.0169**	**0.0186**	**0.0263**	**0.0231**	**0.0226**	**0.0207**	**0.0259**	**0.0485**	0.0001	0.003	**16**
Iron	0.023	0.023	0.023	0.307	0.620	0.116	0.088	0.149	0.112	0.120	0.264	0.023	1.0	**0.6**
Lead	0.00005	0.00005	0.00005	0.00233	0.00266	**0.00464**	0.00355	0.00363	0.00321	**0.00522**	**0.01252**	0.00005	0.004	**3**
Manganese	**0.1329**	**0.1329**	**0.1329**	**0.0586**	0.0462	**0.0883**	**0.0677**	**0.0668**	**0.0638**	**0.1144**	**0.2909**	**0.1329**	0.05	**6**
Mercury	0.00003	0.00003	0.00003	**0.00007**	**0.00008**	**0.00009**	**0.00009**	**0.00009**	**0.00008**	**0.00008**	**0.00008**	0.00003	0.00003	**3.5**
Molybdenum	0.01032	0.01032	0.01032	0.05870	0.06188	**0.07629**	**0.07707**	**0.07822**	0.06803	0.06104	0.06553	0.01032	0.073	**1.1**
Nickel	0.0020	0.0020	0.0020	0.0297	0.0334	0.0640	0.0481	0.0493	0.0431	0.0733	**0.1811**	0.0020	0.110	**1.6**
Selenium	0.0003	0.0003	0.0003	**0.0051**	**0.0057**	**0.0115**	**0.0085**	**0.0087**	**0.0075**	**0.0132**	**0.0331**	0.0003	0.002	**17**
Silver	0.00001	0.00001	0.00001	**0.00135**	**0.00144**	**0.00175**	**0.00177**	**0.00180**	**0.00155**	**0.00140**	**0.00139**	0.00001	0.0001	**18**
Thallium	0.00005	0.00005	0.00005	**0.00109**	**0.00116**	**0.00141**	**0.00142**	**0.00145**	**0.00125**	**0.00113**	**0.00112**	0.00005	0.0008	**1.8**
Uranium	0.0145	0.0145	0.0145	**0.0208**	**0.0214**	**0.0388**	**0.0305**	**0.0312**	**0.0281**	**0.0449**	**0.1017**	0.0145	0.015	**7**
Zinc	0.0042	0.0042	0.0042	0.0127	0.0152	0.0232	0.0178	0.0184	0.0161	0.0265	**0.0638**	0.0042	0.03	**2.1**

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 8: Predicted Flows (average) and Water Quality (maximum) from the Platinum Gulch Waste Rock Storage Area during Operations (Year 5)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	NF	NF	NF	NF	0.001	0.000	0.004	0.004	0.003	0.002	NF	NF		
Sulphate	NF	NF	NF	NF	**128**	**128**	**910**	**934**	**875**	**856**	NF	NF	100	**9.3**
Fluoride	NF	NF	NF	NF	**1.000**	**1.000**	**1.404**	**1.416**	**1.386**	**1.376**	NF	NF	0.20	**7.1**
Nitrate	NF	NF	NF	NF	<0.001	<0.001	0.026	0.027	0.025	0.024	NF	NF		
Ammonia	NF	NF	NF	NF	<0.001	<0.001	0.026	0.027	0.025	0.024	NF	NF		
Phosphate	NF	NF	NF	NF	0.591	0.591	0.823	0.830	0.812	0.807	NF	NF		
Aluminum	NF	NF	NF	NF	0.0264	0.0264	0.0292	0.0293	0.0291	0.0290	NF	NF	0.10	0.3
Antimony	NF	NF	NF	NF	**0.099**	**0.099**	**1.26**	**1.30**	**1.21**	**1.18**	NF	NF	0.02	**65**
Arsenic	NF	NF	NF	NF	**0.280**	**0.280**	**1.28**	**1.31**	**1.24**	**1.21**	NF	NF	0.005	**262**
Boron	NF	NF	NF	NF	0.050	0.050	0.050	0.050	0.050	0.050	NF	NF	1.2	<0.1
Cadmium	NF	NF	NF	NF	**0.00070**	**0.00070**	**0.00653**	**0.00671**	**0.00627**	**0.00613**	NF	NF	0.0003	**22**
Chromium	NF	NF	NF	NF	**0.0197**	**0.0197**	**0.0307**	**0.0310**	**0.0302**	**0.0299**	NF	NF	0.0089	**3.5**
Copper	NF	NF	NF	NF	**0.0200**	**0.0200**	**0.0647**	**0.0661**	**0.0627**	**0.0616**	NF	NF	0.003	**22**
Iron	NF	NF	NF	NF	0.048	0.048	1.015	1.045	0.972	0.949	NF	NF	1.0	1.0
Lead	NF	NF	NF	NF	0.0029	0.0029	**0.049**	**0.0504**	**0.0469**	**0.0458**	NF	NF	0.004	**13**
Manganese	NF	NF	NF	NF	**0.053**	**0.053**	**0.970**	**0.997**	**0.929**	**0.906**	NF	NF	0.05	**20**
Mercury	NF	NF	NF	NF	**0.00010**	**0.00010**	**0.00010**	**0.00010**	**0.00010**	**0.00010**	NF	NF	0.00003	**3.8**
Molybdenum	NF	NF	NF	NF	**0.0796**	**0.0796**	**0.0889**	**0.0892**	**0.0885**	**0.0883**	NF	NF	0.073	**1.2**
Nickel	NF	NF	NF	NF	0.0400	0.0400	**0.689**	**0.708**	**0.660**	**0.644**	NF	NF	0.110	**6.4**
Selenium	NF	NF	NF	NF	**0.0067**	**0.0067**	**0.0478**	**0.0490**	**0.0459**	**0.0449**	NF	NF	0.002	**25**
Silver	NF	NF	NF	NF	**0.0020**	**0.0020**	**0.0020**	**0.0020**	**0.0020**	**0.0020**	NF	NF	0.0001	**20**
Thallium	NF	NF	NF	NF	**0.0016**	**0.0016**	**0.0016**	**0.0016**	**0.0016**	**0.0016**	NF	NF	0.0008	**2.0**
Uranium	NF	NF	NF	NF	**0.0260**	**0.0260**	**0.3631**	**0.3734**	**0.3482**	**0.3399**	NF	NF	0.015	**25**
Zinc	NF	NF	NF	NF	0.0150	0.0150	**0.254**	**0.261**	**0.243**	**0.238**	NF	NF	0.03	**8.7**

NOTE: predicted values from September Year 4 to August Year 5

NF – no flow.

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 9: Predicted Flow (average) and Quality (maximum) of Influent Contact Water to the Mine Water Treatment Plant during Operations, Year 9 (from Pit and Waste Rock Storage Areas)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.021	0.025	0.021	0.023	0.008	< 0.001	< 0.001		
Sulphate	29	29	29	**106**	**153**	**474**	**374**	**407**	**342**	**221**	**735**	29	100	**7.4**
Fluoride	0.106	0.106	0.106	**0.766**	**0.849**	**1.137**	**1.040**	**1.083**	**1.015**	**0.759**	**1.167**	0.106	0.30	**3.9**
Nitrate	0.270	0.270	0.270	0.079	0.036	0.075	0.054	0.043	0.064	0.146	0.169	0.270		
Ammonia	0.007	0.007	0.007	0.003	0.003	0.010	0.004	0.005	0.009	0.002	0.010	0.007		
Phosphate	0.092	0.092	0.092	0.469	0.542	0.678	0.615	0.644	0.597	0.437	0.798	0.092		
Aluminum	**0.7807**	**0.7807**	**0.7807**	**0.2487**	**0.4707**	0.0636	0.0440	0.0985	0.0630	0.0566	**0.5000**	**0.7807**	0.10	**7.8**
Antimony	0.0006	0.0006	0.0006	**0.0735**	**0.1684**	**0.7342**	**0.5626**	**0.6261**	**0.5075**	**0.1387**	**1.2489**	0.0006	0.02	**62**
Arsenic	**0.0299**	**0.0299**	**0.0299**	**0.1579**	**0.2464**	**0.8040**	**0.6283**	**0.6904**	**0.5732**	**0.2878**	**1.2955**	**0.0299**	0.005	**259**
Boron	0.024	0.024	0.024	0.040	0.044	0.048	0.047	0.046	0.044	0.039	0.048	0.024	1.2	<0.1
Cadmium	0.00002	0.00002	0.00002	**0.00047**	**0.00108**	**0.00471**	**0.00358**	**0.00396**	**0.00320**	**0.00148**	**0.00785**	0.00002	0.0003	**26**
Chromium	0.0006	0.0006	0.0006	**0.0148**	**0.0171**	**0.0245**	**0.0219**	**0.0229**	**0.0211**	**0.0146**	**0.0299**	0.0006	0.0089	**3.4**
Copper	0.0014	0.0014	0.0014	**0.0167**	**0.0219**	**0.0457**	**0.0378**	**0.0406**	**0.0353**	**0.0211**	**0.0653**	0.0014	0.003	**22**
Iron	0.948	0.948	0.948	0.316	0.625	0.840	0.640	0.759	0.601	0.108	**1.489**	0.948	1.0	**1.5**
Lead	0.00036	0.00036	0.00036	0.00230	**0.00774**	**0.04036**	**0.03058**	**0.03431**	**0.02746**	**0.00417**	**0.07097**	0.00036	0.004	**18**
Manganese	0.0049	0.0049	0.0049	**0.0571**	**0.1472**	**0.8039**	**0.6078**	**0.6829**	**0.5451**	**0.0905**	**1.4234**	0.0049	0.05	**28**
Mercury	0.00002	0.00002	0.00002	**0.00007**	**0.00008**	**0.00009**	**0.00008**	**0.00009**	**0.00008**	**0.00007**	**0.00009**	0.00002	0.00003	**3.6**
Molybdenum	0.00112	0.00112	0.00112	0.05789	0.06362	**0.07711**	0.07191	**0.07446**	0.07056	0.05545	**0.08426**	0.00112	0.073	**1.2**
Nickel	0.0009	0.0009	0.0009	0.0293	0.1035	**0.5546**	**0.4198**	**0.4713**	**0.3766**	0.0583	**0.9762**	0.0009	0.110	**8.9**
Selenium	0.0004	0.0004	0.0004	**0.0050**	**0.0079**	**0.0247**	**0.0193**	**0.0210**	**0.0176**	**0.0105**	**0.0384**	0.0004	0.002	**19**
Silver	0.00001	0.00001	0.00001	**0.00133**	**0.00147**	**0.00174**	**0.00163**	**0.00169**	**0.00160**	**0.00127**	**0.00186**	0.00001	0.0001	**19**
Thallium	0.00005	0.00005	0.00005	**0.00108**	**0.00119**	**0.00140**	**0.00131**	**0.00136**	**0.00129**	**0.00103**	**0.00149**	0.00005	0.0008	**1.9**
Uranium	0.0059	0.0059	0.0059	**0.0206**	**0.0673**	**0.3620**	**0.2747**	**0.3083**	**0.2470**	**0.0375**	**0.6377**	0.0059	0.015	**43**
Zinc	0.0062	0.0062	0.0062	0.0126	**0.0405**	**0.2019**	**0.1531**	**0.1719**	**0.1374**	0.0213	**0.3552**	0.0062	0.03	**11.8**

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 10: Predicted Flow (average) and Water Quality (maximum) of Influent Water to the Mine Water Treatment Plant during Closure, Year 13 (Primarily from HLF Draindown)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.003	0.003	0.002	0.012	0.089	0.058	0.142	0.084	0.061	0.032	0.009	0.004		
Sulphate	**2310**	**2234**	**2169**	**1007**	**480**	**569**	**2413**	**2257**	**2094**	**1855**	**2385**	**2361**	100	**24.1**
Fluoride	**1.984**	**1.920**	**1.864**	**1.124**	**0.725**	**0.956**	**2.148**	**2.048**	**1.908**	**1.742**	**2.105**	**2.028**	0.30	**7.2**
Nitrate	28.67	27.70	26.85	12.03	5.29	4.43	29.49	27.74	25.59	22.32	28.61	29.35		
Ammonia	0.820	0.793	0.769	0.344	0.155	0.124	0.842	0.792	0.731	0.637	0.818	0.839		
Phosphate T	0.109	0.108	0.108	0.303	0.367	0.405	0.203	0.262	0.282	0.318	0.368	0.110		
Aluminum T	**2.1535**	**2.0835**	**2.0225**	**1.1639**	**1.1893**	**0.4189**	**2.1986**	**2.0996**	**1.9271**	**1.6772**	**2.1497**	**2.2097**	0.10	**22.1**
Antimony T	**1.3934**	**1.3462**	**1.3052**	**0.6140**	**0.3110**	**0.4653**	**1.4996**	**1.3915**	**1.2964**	**1.1660**	**1.5020**	**1.4259**	0.02	**75**
Arsenic T	**4.9470**	**4.7849**	**4.6446**	**2.1303**	**1.0073**	**1.0572**	**5.1320**	**4.8100**	**4.4509**	**3.9203**	**5.0444**	**5.0567**	0.005	**1026**
Boron T	0.411	0.397	0.385	0.191	0.104	0.099	0.428	0.404	0.374	0.329	0.414	0.420	1.2	0.4
Cadmium T	**0.00309**	**0.00298**	**0.00289**	**0.00146**	**0.00088**	**0.00200**	**0.00355**	**0.00321**	**0.00303**	**0.00285**	**0.00469**	**0.00316**	0.0003	**16**
Chromium T	0.0031	0.0030	0.0029	0.0088	**0.0098**	**0.0139**	0.0067	0.0088	**0.0096**	**0.0110**	**0.0133**	0.0032	0.0089	**1.6**
Copper T	**0.0917**	**0.0886**	**0.0859**	**0.0448**	**0.0263**	**0.0348**	**0.0989**	**0.0927**	**0.0861**	**0.0776**	**0.0982**	**0.0939**	0.003	**33**
Iron T	0.630	0.609	0.589	0.593	**1.128**	0.310	0.674	0.649	0.609	0.539	0.728	0.654	1.0	**1.1**
Lead T	**0.15564**	**0.15033**	**0.14574**	**0.06580**	**0.03033**	**0.03186**	**0.16236**	**0.15196**	**0.14060**	**0.12367**	**0.15921**	**0.15928**	0.004	**41**
Manganese T	**0.5387**	**0.5247**	**0.5127**	**0.2421**	**0.1291**	**0.2353**	**0.5740**	**0.5269**	**0.4956**	**0.4563**	**0.6299**	**0.5469**	0.05	**13**
Mercury T	**0.00033**	**0.00032**	**0.00031**	**0.00017**	**0.00010**	**0.00010**	**0.00035**	**0.00033**	**0.00031**	**0.00027**	**0.00034**	**0.00034**	0.00003	**13.3**
Molybdenum	**0.16554**	**0.16024**	**0.15566**	**0.09083**	0.05674	0.07067	**0.17704**	**0.16892**	**0.15637**	**0.14180**	**0.17280**	**0.16908**	0.073	**2.4**
Nickel T	0.0112	0.0109	0.0106	0.0186	0.0265	**0.1179**	0.0398	0.0601	0.0578	0.0923	**0.1820**	0.0114	0.110	**1.7**
Selenium T	**0.1834**	**0.1772**	**0.1718**	**0.0783**	**0.0365**	**0.0387**	**0.1913**	**0.1792**	**0.1657**	**0.1458**	**0.1877**	**0.1877**	0.002	**96**
Silver T	**0.02457**	**0.02374**	**0.02301**	**0.01071**	**0.00507**	**0.00467**	**0.02545**	**0.02399**	**0.02213**	**0.01938**	**0.02471**	**0.02515**	0.0001	**255**
Thallium T	0.00034	0.00033	0.00032	0.00063	0.00067	**0.00088**	0.00053	0.00063	0.00067	0.00072	0.00079	0.00034	0.0008	**1.1**
Uranium T	**0.3031**	**0.2932**	**0.2847**	**0.1367**	**0.0712**	**0.1212**	**0.3294**	**0.3043**	**0.2853**	**0.2601**	**0.3337**	**0.3098**	0.015	**22**
Zinc T	**0.4687**	**0.4528**	**0.4391**	**0.2014**	**0.0991**	**0.1108**	**0.4921**	**0.4596**	**0.4260**	**0.3768**	**0.4855**	**0.4796**	0.03	**16.4**

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 11: Maximum Predicted Flow (average year) and Water Quality collected at the Toe of the HLF of during Closure, Year 21 (Concentrations in mg/L)

Parameter	Concentration (mg/L unless noted)				Ratio to WQG
	Short-term	Long-term	WQG or SS WQO	MMER Sched. 4	
Flow (m^3/s)	0.04	0.04			
pH (standard units)	7.5	7.5	6.5 to 9.5	6.0 to 9.5	
Sulphate	588	477	100	–	5.9
Alkalinity as HCO_3	108	107	–	–	
Chloride	7	7	–	–	
Fluoride	0.55	0.52	0.3	–	1.8
Nitrate N	7.06	Not measured[1]	2.9	–	2.4
Ammonia N	0.208	Not measured[1]	Varies with temperature and pH	–	
Phosphorus[2]	0.040	0.104	–	–	
Total cyanide	0.40	Not measured[1]	–	–	
WAD cyanide	0.04	Not measured[1]	0.01	–	4.2
Cyanate	0.20	Not measured[1]	–	–	
Aluminum D	0.78	0.27	0.1 (Total, CCME), pH ≥6.5	–	7.8
Antimony D	0.34	0.34	0.02	–	17.1
Arsenic D	1.230	0.896	0.005 (CCME); 0.020 (SS WQO, Haggart)		246.0
Boron D[2]	0.1	0.1	1.2	–	0.1
Calcium D	127	75	–	–	
Cadmium D[2]	0.0008	0.0004	0.0003	–	2.6
Chromium D[2]	0.001	0.005	0.0089	–	0.5
Copper D	0.024	0.026	0.003	0.3	8.6
Iron D	0.46	0.44	1	–	0.5
Lead D	0.038	0.003	0.004	0.2	9.6
Magnesium D	16	57	–	–	
Manganese D	0.15	0.17	0.05	–	3.3
Mercury D[2, 3]	0.00010	0.00044	0.00003	–	16.7
Molybdenum D	0.04	0.04	0.073	–	0.6
Nickel D[2]	0.00	0.01	0.11	0.5	<0.1
Selenium D	0.05	0.06	0.002	–	29.8

Parameter	Concentration (mg/L unless noted)				Ratio to WQG
	Short-term	Long-term	WQG or SS WQO	MMER Sched. 4	
Silver D[2]	0.0060	0.0001	0.0001	–	60.0
Sodium	145	34	–	–	
Thallium D[2]	0.0001	0.0008	0.0008	–	1.0
Uranium D	0.07	0.07	0.015	–	4.9
Zinc D	0.12	0.03	0.03	0.5	3.9

NOTE:

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 12: Mean Monthly Flow Rates and Water Quality in Haggart Creek at W22 above Dublin Gulch

Parameter[1]	Mean Monthly Baseline Concentration (mg/L, unless indicated)												WQG[2] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.179	0.145	0.112	0.116	1.046	0.800	0.637	0.620	0.746	0.685	0.415	0.282		
Hardness	193	193	204	215	72	118	138	154	138	162	181	193		
TSS	2	2	2	2	18	3	4	1	2	2	2	2		
TDS	219	219	238	245	108	138	177	200	166	190	200	219		
DOC	1.09	1.09	0.98	0.88	11.4	3.98	2.06	2.33	3.02	1.56	1.19	1.09		
Sulphate	77	77	84	55	26	45	55	64	51	63	70	77	100	0.8
Fluoride	0.103	0.103	0.117	0.093	0.069	0.060	0.094	0.098	0.079	0.075	0.089	0.103	0.20	0.6
Nitrate	0.126	0.126	0.120	0.120	0.039	0.075	0.051	0.043	0.067	0.107	0.131	0.126		
Ammonia	0.005	0.005	0.007	0.003	0.003	0.003	0.003	0.006	0.005	0.010	0.003	0.005		
Phosphate T	0.006	0.006	0.010	0.002	0.016	0.003	0.007	0.002	0.004	0.001	0.001	0.006		
Cyanide T	0.0025	0.0025	0.0025	0.0062	0.0040	0.0040	0.0018	0.0022	0.0031	0.0025	0.0025	0.0025		
Aluminum T	0.0074	0.0074	0.0077	0.0128	**0.226**	0.0473	0.0274	0.0127	0.0272	0.0089	0.0071	0.0074	0.10	**2.3**
Antimony T	0.0002	0.0002	0.0002	0.0003	0.0002	0.0002	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.02	<0.1
Arsenic T	0.0007	0.0007	0.0007	0.0010	0.0011	0.0009	0.0010	0.0008	0.0008	0.0007	0.0007	0.0007	0.005	0.2
Boron T	0.028	0.028	0.005	0.005	0.005	0.028	0.020	0.012	0.020	0.020	0.050	0.028	1.2	<0.1
Cadmium T	0.00001	0.00001	0.00002	0.00002	0.00003	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.0003	0.1
Chromium T	0.0004	0.0004	0.0002	0.0002	0.0004	0.0004	0.0002	0.0002	0.0003	0.0003	0.0005	0.0004	0.0089	0.1
Copper T	0.0004	0.0004	0.0002	0.0002	0.0018	0.0007	0.0004	0.0004	0.0006	0.0004	0.0005	0.0004	0.003	0.6
Iron T	0.077	0.077	0.089	0.130	0.593	0.144	0.106	0.054	0.091	0.060	0.066	0.078	1.0	0.6
Lead T	0.00003	0.00003	0.00003	0.00003	0.00029	0.00016	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.004	0.1
Manganese T	**0.0855**	**0.0855**	0.1280	0.0836	0.0635	0.0367	0.0404	0.0279	0.0322	0.0235	0.0430	**0.0855**	0.05	**2.6**

Parameter[1]	Mean Monthly Baseline Concentration (mg/L, unless indicated)												WQG[2] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Mercury T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00003	0.00001	0.00001	0.00003	1.0
Molybdenum	0.00030	0.00030	0.00010	0.00003	0.00004	0.00030	0.00008	0.00006	0.00015	0.00023	0.00050	0.00028	0.073	<0.1
Nickel T	0.0015	0.0015	0.0017	0.0017	0.0025	0.0007	0.0009	0.0008	0.0009	0.0006	0.0012	0.0015	0.110	<0.1
Selenium T	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0004	0.0005	0.0005	0.0005	0.0005	0.0005	0.002	0.2
Silver T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.0001	0.2
Thallium T	0.00008	0.00008	0.00005	0.00005	0.00005	0.00008	0.00005	0.00005	0.00006	0.00007	0.00010	0.00008	0.0008	0.1
Uranium T	0.0012	0.0012	0.0014	0.0013	0.00035	0.00058	0.00072	0.00082	0.00066	0.00089	0.00106	0.00122	0.015	0.1
Zinc T	0.0065	0.0065	0.0027	0.0052	0.0047	0.0018	0.0018	0.0012	0.0019	0.0015	0.0103	0.0065	0.03	0.3

NOTES:

Derived from Baseline Flows and Water Quality (1993 - 2010) at W22 upstream of Dublin Gulch. Data from 2007 - 2010 were used for cadmium, chromium, copper, lead, manganese, molybdenum, nickel, silver, and thallium due to lower detection limits over that period.

Values at the detection limit were included at one-half the detection limit when calculating mean values

Bold indicates maximum monthly mean exceeds WQG.

Total metals concentrations

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 13: Predicted Flows (average) and Water Quality (maximum) in Haggart Creek (Site W4) Below the Initial Dilution Zone of the Mine Water Treatment Plant Effluent during Operations, Year 9

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.179	0.146	0.113	0.117	1.051	0.823	0.664	0.643	0.769	0.693	0.415	0.282		
Dilution	NF	NF	NF	NF	41.0	11.7	16.9	17.6	23.4	61.0	NF	NF		
Sulphate	77	77	84	55	29	57	63	71	57	64	70	77	100	0.8
Fluoride	0.103	0.103	0.117	0.094	0.082	0.103	0.122	0.126	0.100	0.084	0.089	0.103	0.30	0.4
Nitrate/Nitrite	0.126	0.126	0.121	0.120	0.039	0.076	0.052	0.044	0.067	0.108	0.132	0.126		
Ammonia	0.005	0.005	0.007	0.003	0.003	0.003	0.003	0.006	0.005	0.010	0.003	0.005		
Phosphate T	0.006	0.006	0.010	0.003	0.021	0.018	0.018	0.012	0.012	0.005	0.001	0.006		
Aluminum T	0.0074	0.0074	0.0077	0.0128	**0.2252**	0.0479	0.0281	0.0168	0.0284	0.0097	0.0071	0.0074	0.10	**2.3**
Antimony T	0.0002	0.0002	0.0002	0.0003	0.0012	0.0034	0.0025	0.0024	0.0019	0.0009	0.0003	0.0002	0.02	0.2
Arsenic T	0.0007	0.0007	0.0007	0.0035	0.0026	0.0025	0.0022	0.0020	0.0012	0.0013	0.0007	0.0007	0.005	0.7
Boron T	0.028	0.028	0.005	0.005	0.006	0.029	0.021	0.014	0.021	0.020	0.050	0.028	1.2	<0.1
Cadmium T	0.00001	0.00001	0.00002	0.00002	0.00005	0.00006	0.00004	0.00004	0.00003	0.00002	0.00001	0.00001	0.0003	0.2
Chromium T	0.0004	0.0004	0.0003	0.0003	0.0008	0.0017	0.0012	0.0012	0.0010	0.0006	0.0005	0.0004	0.0089	0.2
Copper T	0.0004	0.0004	0.0002	0.0002	0.0019	0.0011	0.0007	0.0007	0.0008	0.0005	0.0005	0.0004	0.003	0.6
Iron T	0.078	0.078	0.089	0.141	0.598	0.203	0.138	0.095	0.112	0.062	0.066	0.078	1.0	0.6
Lead T	0.00003	0.00003	0.00003	0.00003	0.00046	0.00077	0.00047	0.00045	0.00035	0.00007	0.00003	0.00003	0.004	0.2
Manganese T	**0.0855**	**0.0855**	**0.1280**	**0.0848**	**0.0650**	0.0422	0.0441	0.0321	0.0350	0.0242	0.0430	**0.0855**	0.05	**2.6**
Mercury T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00003	0.00001	0.00001	0.00003	**1.0**
Molybdenum	0.00028	0.00028	0.00007	0.00005	0.00157	0.00634	0.00409	0.00408	0.00303	0.00112	0.00050	0.00028	0.073	0.1
Nickel T	0.0015	0.0015	0.0017	0.0017	0.0049	0.0180	0.0131	0.0126	0.0098	0.0012	0.0012	0.0015	0.110	0.2
Selenium T	0.0005	0.0005	0.0005	0.0005	0.0006	0.0008	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.002	0.4
Silver T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00003	0.00002	0.00002	0.00001	0.00001	0.00001	0.0001	0.3
Thallium T	0.00008	0.00008	0.00005	0.00005	0.00008	0.00018	0.00012	0.00012	0.00011	0.00008	0.00010	0.00008	0.0008	0.2
Uranium T	0.0012	0.0012	0.0014	0.0013	0.0011	0.0029	0.0023	0.0024	0.0019	0.0013	0.0011	0.0012	0.015	0.2
Zinc T	0.0065	0.0065	0.0027	0.0054	0.0056	0.0065	0.0051	0.0044	0.0043	0.0017	0.0103	0.0065	0.03	0.3
Cyanide WAD	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.005	0.5

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 14: Predicted Flow (average) and Water Quality (maximum) in Haggart Creek (W4) during Draindown Year 13 of the Heap Leach Facility (Mine Water Treatment Plant Operating)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	Mat	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.182	0.148	0.114	0.132	1.167	0.875	0.794	0.715	0.820	0.722	0.424	0.285		
Dilution	37.2	42.7	45.8	6.9	12.1	10.7	2.7	4.1	12.2	20.5	40.1	56.5		
Sulphate	80	80	87	72	39	58	94	90	62	69	73	79	100	0.9
Fluoride	0.116	0.114	0.127	0.157	0.110	0.106	0.231	0.196	0.119	0.099	0.101	0.112	0.30	0.8
Nitrate/Nitrite	0.133	0.132	0.126	0.155	0.067	0.103	0.146	0.113	0.092	0.120	0.138	0.131		
Ammonia	0.026	0.023	0.023	0.023	0.014	0.010	0.231	0.160	0.052	0.038	0.022	0.019		
Phosphate T	0.008	0.008	0.012	0.028	0.031	0.020	0.051	0.036	0.018	0.011	0.005	0.007		
Aluminum T	0.0124	0.0118	0.0118	0.0384	**0.2271**	0.0610	0.0743	0.0494	0.0402	0.0178	0.0118	0.0107	0.10	**2.3**
Antimony T	0.0013	0.0011	0.0010	0.0054	0.0033	0.0037	0.0111	0.0080	0.0033	0.0021	0.0012	0.0009	0.02	0.6
Arsenic T	0.0009	0.0009	0.0009	0.0035	0.0026	0.0024	0.0039	0.0030	0.0020	0.0014	0.0009	0.0008	0.005	0.8
Boron T	0.038	0.036	0.013	0.018	0.012	0.032	0.131	0.089	0.043	0.034	0.059	0.034	1.2	0.1
Cadmium T	0.00003	0.00003	0.00003	0.00010	0.00008	0.00006	0.00017	0.00013	0.00005	0.00004	0.00002	0.00002	0.0003	0.6
Chromium T	0.0004	0.0004	0.0003	0.0013	0.0011	0.0015	0.0018	0.0013	0.0009	0.0008	0.0008	0.0004	0.0089	0.2
Copper T	0.0005	0.0005	0.0004	0.0010	0.0021	0.0011	0.0019	0.0015	0.0010	0.0007	0.0006	0.0005	0.003	0.7
Iron T	0.092	0.090	0.100	0.187	0.627	0.157	0.259	0.170	0.124	0.081	0.082	0.087	1.0	0.6
Lead T	0.00023	0.00021	0.00020	0.00104	0.00089	0.00083	0.00219	0.00158	0.00063	0.00040	0.00022	0.00016	0.004	0.5
Manganese T	**0.0859**	**0.0858**	**0.1275**	**0.0838**	**0.0649**	0.0412	**0.0562**	0.0417	0.0369	0.0268	0.0444	**0.0858**	0.05	**2.5**
Mercury T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00002	**0.00003**	0.00001	0.00001	0.00003	**1.0**
Molybdenum	0.00410	0.00362	0.00318	0.00811	0.00431	0.00554	0.03978	0.02859	0.00952	0.00663	0.00404	0.00282	0.073	0.5
Nickel T	0.0017	0.0017	0.0019	0.0038	0.0042	0.0107	0.0115	0.0070	0.0048	0.0049	0.0048	0.0016	0.110	0.1
Selenium T	0.0006	0.0006	0.0006	0.0009	0.0008	0.0008	0.0014	0.0012	0.0007	0.0007	0.0006	0.0006	0.002	0.7
Silver T	0.00001	0.00001	0.00001	0.00003	0.00002	0.00002	0.00007	0.00005	0.00003	0.00002	0.00001	0.00001	0.0001	0.7
Thallium T	0.00008	0.00008	0.00006	0.00012	0.00010	0.00014	0.00017	0.00014	0.00010	0.00010	0.00011	0.00008	0.0008	0.2
Uranium T	0.0020	0.0019	0.0020	0.0050	0.0026	0.0031	0.0087	0.0065	0.0029	0.0022	0.0018	0.0017	0.015	0.6
Zinc T	0.0079	0.0077	0.0039	0.0121	0.0089	0.0068	0.0176	0.0127	0.0063	0.0042	0.0115	0.0074	0.03	0.6
Cyanide WAD	0.0025	0.0025	0.0025	0.0024	0.0023	0.0024	0.0022	0.0022	0.0023	0.0024	0.0025	0.0025	0.005	0.5

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 15: Predicted Flow (average) and Water Quality (maximum) in Haggart Creek (W4) during Short-term of Closure (Untreated)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.179	0.145	0.112	0.121	1.086	0.821	0.656	0.634	0.760	0.692	0.415	0.282		
Dilution	NF	NF	NF	15.6	24.3	29.0	32.2	37.9	46.6	77.6	NF	NF		
Sulphate	77	77	84	87	47	63	70	77	62	70	70	77	100	0.9
Fluoride	0.103	0.103	0.117	0.120	0.088	0.076	0.107	0.110	0.089	0.081	0.089	0.103	0.30	0.4
Nitrate/Nitrite	0.126	0.126	0.121	0.538	0.316	0.307	0.261	0.222	0.213	0.195	0.132	0.126		
Ammonia	0.005	0.005	0.007	0.014	0.010	0.009	0.009	0.011	0.009	0.013	0.003	0.005		
Phosphate T	0.006	0.006	0.010	0.004	0.017	0.004	0.007	0.002	0.004	0.002	0.001	0.006		
Aluminum T	0.0074	0.0074	0.0077	0.0459	**0.2481**	0.0650	0.0429	0.0262	0.0378	0.0155	0.0071	0.0074	0.10	**2.5**
Antimony T	0.0002	0.0002	0.0002	**0.0208**	0.0137	0.0116	0.0105	0.0090	0.0074	0.0046	0.0003	0.0002	0.02	**1.0**
Arsenic T	0.0007	0.0007	0.0007	**0.0746**	**0.0494**	**0.0417**	**0.0380**	**0.0324**	**0.0266**	**0.0163**	0.0007	0.0007	0.005	**14.9**
Boron T	0.028	0.028	0.005	0.011	0.009	0.030	0.023	0.015	0.022	0.021	0.050	0.028	1.2	<0.1
Cadmium T	0.00001	0.00001	0.00002	0.00007	0.00006	0.00003	0.00003	0.00003	0.00003	0.00002	0.00001	0.00001	0.0003	0.2
Chromium T	0.0004	0.0004	0.0003	0.0003	0.0004	0.0004	0.0003	0.0003	0.0003	0.0003	0.0005	0.0004	0.0089	0.1
Copper T	0.0004	0.0004	0.0002	0.0016	0.0027	0.0014	0.0011	0.0010	0.0010	0.0007	0.0005	0.0004	0.003	0.9
Iron T	0.078	0.078	0.089	0.135	0.588	0.147	0.108	0.057	0.093	0.061	0.066	0.078	1.0	0.6
Lead T	0.00003	0.00003	0.00003	0.00231	0.00180	0.00142	0.00117	0.00100	0.00082	0.00051	0.00003	0.00003	0.004	0.6
Manganese T	**0.0855**	**0.0855**	**0.1280**	**0.0875**	**0.0664**	0.0397	0.0430	0.0304	0.0342	0.0248	0.0430	**0.0855**	0.05	**2.6**
Mercury T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00003	0.00001	0.00001	0.00003	**1.0**
Molybdenum	0.00028	0.00028	0.00007	0.00248	0.00165	0.00166	0.00132	0.00112	0.00101	0.00075	0.00050	0.00028	0.073	<0.1
Nickel T	0.0015	0.0015	0.0017	0.0018	0.0025	0.0008	0.0009	0.0009	0.0009	0.0007	0.0012	0.0015	0.110	<0.1
Selenium T	0.0005	0.0005	0.0005	**0.0032**	**0.0023**	0.0020	0.0018	0.0016	0.0014	0.0011	0.0005	0.0005	0.002	**1.6**
Silver T	0.00001	0.00001	0.00001	**0.00037**	**0.00025**	**0.00021**	**0.00020**	**0.00017**	**0.00014**	0.00008	0.00001	0.00001	0.0001	**3.7**
Thallium T	0.00008	0.00008	0.00005	0.00005	0.00005	0.00008	0.00005	0.00005	0.00006	0.00007	0.00010	0.00008	0.0008	0.1
Uranium T	0.0012	0.0012	0.0014	0.0057	0.0033	0.0030	0.0029	0.0027	0.0022	0.0018	0.0011	0.0012	0.015	0.4
Zinc T	0.0065	0.0065	0.0027	0.0119	0.0092	0.0056	0.0051	0.0041	0.0043	0.0029	0.0103	0.0065	0.03	0.4
Cyanide WAD	0.0025	0.0025	0.0025	0.0049	0.0041	0.0038	0.0037	0.0035	0.0033	0.0030	0.0025	0.0025	0.005	1.0

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 16: Predicted Flow (average) and Water Quality (maximum) in Haggart Creek (W4) during Long-term of Closure (Untreated)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.179	0.145	0.112	0.121	1.086	0.821	0.656	0.634	0.760	0.692	0.415	0.282		
Dilution	NF	NF	NF	15.6	24.3	29.0	32.2	37.9	46.6	77.6	NF	NF		
Sulphate	77	77	84	80	43	59	67	75	55	67	70	77	100	0.8
Fluoride	0.103	0.103	0.117	0.118	0.087	0.075	0.106	0.109	0.084	0.079	0.089	0.103	0.20	0.6
Nitrate/Nitrite	0.126	0.126	0.121	0.120	0.039	0.075	0.051	0.043	0.067	0.107	0.132	0.126		
Ammonia	0.005	0.005	0.007	0.002	0.002	0.002	0.002	0.006	0.005	0.010	0.003	0.005		
Phosphate T	0.006	0.006	0.010	0.008	0.020	0.006	0.009	0.004	0.004	0.002	0.001	0.006		
Aluminum T	0.0074	0.0074	0.0077	0.0150	**0.228**	0.0479	0.0274	0.0130	0.0272	0.0090	0.0071	0.0074	0.10	**2.3**
Antimony T	0.0002	0.0002	0.0002	0.0208	0.0137	0.0116	0.0105	0.0090	0.0038	0.0036	0.0003	0.0002	0.02	1.0
Arsenic T	0.0007	0.0007	0.0007	**0.0545**	**0.0362**	**0.0305**	**0.0280**	**0.0238**	**0.0106**	**0.0095**	0.0007	0.0007	0.005	**10.9**
Boron T	0.028	0.028	0.005	0.011	0.009	0.030	0.023	0.015	0.021	0.021	0.050	0.028	1.2	<0.1
Cadmium T	0.00001	0.00001	0.00002	0.00004	0.00005	0.00002	0.00002	0.00002	0.00001	0.00002	0.00001	0.00001	0.0003	0.2
Chromium T	0.0004	0.0004	0.0003	0.0005	0.0005	0.0005	0.0004	0.0004	0.0003	0.0004	0.0005	0.0004	0.0089	0.1
Copper T	0.0004	0.0004	0.0002	0.0017	0.0028	0.0015	0.0012	0.0010	0.0008	0.0006	0.0005	0.0004	0.003	0.9
Iron T	0.078	0.078	0.089	0.134	0.588	0.146	0.107	0.057	0.091	0.061	0.066	0.078	1.0	0.6
Lead T	0.00003	0.00003	0.00003	0.00015	0.00038	0.00022	0.00009	0.00008	0.00005	0.00005	0.00003	0.00003	0.004	0.1
Manganese T	0.0855	0.0855	0.1280	0.0885	0.0670	0.0403	0.0435	0.0309	0.0331	0.0247	0.0430	0.0855	0.05	**2.6**
Mercury T	0.00001	0.00001	0.00001	**0.00003**	0.00002	0.00002	0.00002	**0.00003**	0.00002	**0.00003**	0.00001	0.00001	**0.00003**	**1.2**
Molybdenum	0.00028	0.00028	0.00007	0.00248	0.00165	0.00166	0.00132	0.00112	0.00060	0.00063	0.00050	0.00028	0.073	<0.1
Nickel T	0.0015	0.0015	0.0017	0.0023	0.0028	0.0011	0.0012	0.0011	0.0010	0.0007	0.0012	0.0015	0.110	<0.1
Selenium T	0.0005	0.0005	0.0005	**0.0040**	**0.0028**	**0.0025**	**0.0022**	0.0020	0.0011	0.0011	0.0005	0.0005	0.002	**2.0**
Silver T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.0001	0.2
Thallium T	0.00008	0.00008	0.00005	0.00009	0.00008	0.00010	0.00007	0.00007	0.00007	0.00007	0.00010	0.00008	0.0008	0.1
Uranium T	0.0012	0.0012	0.0014	0.0057	0.0033	0.0030	0.0029	0.0027	0.0014	0.0016	0.0011	0.0012	0.015	0.4
Zinc T	0.0065	0.0065	0.0027	0.0067	0.0058	0.0027	0.0026	0.0019	0.0022	0.0017	0.0103	0.0065	0.03	0.3
Cyanide WAD	0.0025	0.0025	0.0025	0.0049	0.0041	0.0038	0.0037	0.0035	0.0033	0.0030	0.0025	0.0025	0.005	1.0

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 17: Predicted Flows (average) and Water Quality (maximum) from the Platinum Gulch Waste Rock Storage Area Sediment Control Pond in the Predicted Worst Year at and after Closure (Year 21), Untreated

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Apr	Sep	Oct	Nov	Dec		
Flow (m^3/s)	< 0.001	0.001	< 0.001	0.006	0.045	0.027	0.024	0.020	0.021	0.010	0.001	0.001		
Dilution	259.9	247.7	244.5	15.9	28.1	28.3	40.1	40.5	46.4	72.9	332.0	483.2		
Sulphate	**140**	**140**	**139**	**114**	**110**	**219**	**158**	**168**	**151**	**252**	**574**	**140**	100	**5.7**
Fluoride	1.033	1.029	1.024	0.807	0.772	0.928	0.969	0.991	0.845	0.860	1.090	1.034	0.30	**3.6**
Nitrate	0.001	0.001	0.001	0.075	0.040	0.102	0.076	0.054	0.065	0.131	0.041	0.057		
Ammonia	0.001	0.001	0.001	0.002	0.004	0.001	0.001	0.001	0.002	0.002	0.001	0.002		
Phosphate T	0.663	0.660	0.657	0.523	0.529	0.582	0.616	0.633	0.524	0.528	0.687	0.663		
Aluminum T	**0.0298**	**0.0300**	**0.0302**	**0.2377**	**0.5185**	**0.0789**	**0.0506**	**0.1258**	**0.0647**	**0.0513**	**0.1443**	**0.1867**	0.10	5.2
Antimony T	**0.1311**	**0.1304**	**0.1298**	0.0993	0.0989	**0.1641**	**0.1355**	**0.1334**	**0.1216**	**0.1811**	**0.3875**	**0.1311**	0.02	**19**
Arsenic T	**0.2371**	**0.2369**	**0.2366**	**0.1888**	**0.1880**	**0.3092**	**0.2508**	**0.2470**	**0.2245**	**0.3449**	**0.7489**	**0.2371**	0.005	**150**
Boron T	**0.047**	**0.047**	**0.047**	**0.041**	**0.042**	**0.045**	**0.046**	**0.046**	**0.042**	**0.041**	**0.045**	**0.047**	1.2	<0.1
Cadmium T	0.00065	0.00065	0.00065	0.00050	0.00054	0.00145	0.00090	0.00097	0.00082	0.00175	0.00471	0.00066	0.0003	**16**
Chromium T	**0.0219**	**0.0218**	**0.0217**	**0.0167**	**0.0162**	**0.0195**	**0.0204**	**0.0209**	**0.0173**	**0.0181**	**0.0246**	**0.0219**	0.0089	**2.8**
Copper T	**0.0243**	**0.0242**	**0.0240**	**0.0187**	**0.0187**	**0.0254**	**0.0238**	**0.0235**	**0.0208**	**0.0262**	**0.0477**	**0.0243**	0.003	**16**
Iron T	**0.058**	**0.058**	**0.057**	**0.304**	**0.663**	**0.118**	**0.091**	**0.163**	**0.117**	**0.119**	**0.378**	**0.245**	1.0	**0.7**
Lead T	0.00336	0.00335	0.00333	0.00262	0.00274	0.00459	0.00356	0.00360	0.00326	0.00513	0.01153	0.00336	0.004	**3**
Manganese T	**0.0652**	**0.0656**	**0.0659**	**0.0521**	**0.0509**	**0.0893**	**0.0707**	**0.0672**	**0.0598**	**0.1004**	**0.2293**	**0.0649**	0.05	**5**
Mercury T	0.00009	0.00009	0.00009	0.00008	0.00007	0.00008	0.00009	0.00009	0.00008	0.00008	0.00009	0.00010	0.00003	**3.7**
Molybdenum	**0.08466**	**0.08430**	**0.08392**	**0.06439**	**0.06152**	**0.07220**	**0.07802**	**0.08050**	**0.06673**	**0.06390**	**0.07615**	**0.08469**	0.073	**1.2**
Nickel T	0.0440	0.0438	0.0436	0.0335	0.0341	0.0629	0.0474	0.0486	0.0434	0.0713	**0.1646**	0.0440	0.110	**1.5**
Selenium T	0.0070	0.0070	0.0070	0.0054	0.0055	0.0110	0.0078	0.0083	0.0073	0.0126	0.0299	0.0070	0.002	**15**
Silver T	0.00187	0.00186	0.00185	0.00141	0.00136	0.00159	0.00172	0.00177	0.00146	0.00141	0.00168	0.00187	0.0001	**19**
Thallium T	**0.00150**	**0.00149**	**0.00148**	**0.00114**	**0.00110**	**0.00128**	**0.00138**	**0.00142**	**0.00118**	**0.00114**	**0.00135**	**0.00150**	0.0008	**1.9**
Uranium T	**0.0336**	**0.0335**	**0.0334**	**0.0270**	**0.0257**	**0.0419**	**0.0350**	**0.0348**	**0.0322**	**0.0464**	**0.0921**	**0.0336**	0.015	**6**
Zinc T	0.0162	0.0161	0.0160	0.0137	0.0155	0.0228	0.0174	0.0181	0.0161	0.0255	0.0581	0.0162	0.03	**1.9**

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 18: Predicted Flows (average) and Water Quality (maximum) in Haggart Creek (Site W29) Below the Initial Dilution Zone of the Eagle Creek and Platinum Gulch Waste Rock Storage Area during Operations, Year 9

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.208	0.169	0.131	0.136	1.245	0.988	0.928	0.798	0.948	0.852	0.485	0.328		
Sulphate	72	72	78	50	27	53	52	63	52	59	65	72	100	0.8
Fluoride	0.098	0.098	0.115	0.088	0.084	0.101	0.111	0.120	0.100	0.084	0.082	0.099	0.30	0.4
Nitrate/Nitrite	0.124	0.124	0.123	0.113	0.038	0.071	0.048	0.041	0.062	0.100	0.125	0.124		
Ammonia	0.004	0.004	0.006	0.003	0.003	0.003	0.003	0.006	0.005	0.010	0.003	0.004		
Phosphate T	0.006	0.006	0.010	0.003	0.027	0.017	0.016	0.011	0.011	0.005	0.001	0.006		
Aluminum T	0.0164	0.0163	0.0249	0.0137	**0.3426**	0.0521	0.0397	0.0232	0.0332	0.0125	0.0082	0.0169	0.10	**3.4**
Antimony T	0.0004	0.0004	0.0005	0.0004	0.0012	0.0032	0.0023	0.0023	0.0019	0.0010	0.0004	0.0004	0.02	0.2
Arsenic T	0.0049	0.0049	**0.0051**	0.0048	**0.0062**	**0.0054**	**0.0096**	**0.0076**	**0.0064**	**0.0062**	0.0049	**0.0051**	0.005	**1.9**
Boron T	0.026	0.026	0.007	0.005	0.008	0.029	0.024	0.015	0.021	0.020	0.045	0.026	1.2	<0.1
Cadmium T	0.00001	0.00001	0.00002	0.00002	0.00004	0.00005	0.00004	0.00004	0.00003	0.00002	0.00001	0.00001	0.0003	0.2
Chromium T	0.0004	0.0004	0.0003	0.0002	0.0008	0.0016	0.0011	0.0011	0.0009	0.0006	0.0005	0.0004	0.0089	0.2
Copper T	0.0004	0.0004	0.0003	0.0002	0.0018	0.0011	0.0007	0.0007	0.0008	0.0005	0.0005	0.0004	0.003	0.6
Iron T	0.084	0.084	0.105	0.130	0.600	0.195	0.132	0.093	0.111	0.063	0.064	0.085	1.0	0.6
Lead T	0.00003	0.00003	0.00003	0.00003	0.00047	0.00072	0.00042	0.00040	0.00032	0.00008	0.00003	0.00003	0.004	0.2
Manganese T	**0.0774**	**0.0773**	**0.1154**	**0.0763**	**0.0604**	0.0409	0.0411	0.0323	0.0334	0.0240	0.0394	**0.0774**	0.05	**2.3**
Mercury T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00002	0.00001	0.00001	0.00003	**0.9**
Molybdenum	0.00047	0.00047	0.00030	0.00015	0.00159	0.00588	0.00365	0.00376	0.00291	0.00128	0.00066	0.00048	0.073	0.1
Nickel T	0.0014	0.0014	0.0016	0.0016	0.0045	0.0162	0.0101	0.0106	0.0085	0.0012	0.0012	0.0014	0.110	0.1
Selenium T	0.0005	0.0005	0.0005	0.0005	0.0006	0.0007	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005	0.002	0.4
Silver T	0.00001	0.00001	0.00001	0.00000	0.00001	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001	0.0001	0.2
Thallium T	0.00007	0.00007	0.00005	0.00005	0.00007	0.00017	0.00010	0.00011	0.00010	0.00008	0.00010	0.00007	0.0008	0.2
Uranium T	0.0011	0.0011	0.0013	0.0012	0.0011	0.0027	0.0021	0.0022	0.0018	0.0013	0.0010	0.0012	0.015	0.2
Zinc T	0.0062	0.0062	0.0029	0.0051	0.0059	0.0066	0.0051	0.0045	0.0045	0.0023	0.0097	0.0063	0.03	0.3
Cyanide WAD	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.005	0.5

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 19: Predicted Flows (average) and Water Quality (maximum) in Haggart Creek (Site W29) Below the Initial Dilution Zone of Eagle Creek and Platinum Gulch Waste Rock Storage Area during Draindown, Year 13

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG Ratio
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.210	0.171	0.132	0.152	1.360	1.040	1.057	0.870	0.998	0.881	0.493	0.331		
Sulphate	75	74	81	66	36	54	87	85	57	63	68	74	100	0.9
Fluoride	0.110	0.109	0.124	0.146	0.109	0.104	0.215	0.187	0.116	0.098	0.093	0.106	0.30	0.7
Nitrate/Nitrite	0.131	0.130	0.129	0.144	0.063	0.096	0.132	0.103	0.083	0.111	0.131	0.129		
Ammonia	0.024	0.021	0.021	0.021	0.013	0.009	0.205	0.143	0.046	0.034	0.020	0.017		
Phosphate	0.008	0.008	0.012	0.025	0.035	0.019	0.047	0.033	0.017	0.010	0.005	0.007		
Aluminum	0.0207	0.0201	0.0284	0.0367	**0.3342**	0.0629	0.0738	0.0500	0.0430	0.0194	0.0122	0.0193	0.10	**3.3**
Antimony	0.0014	0.0012	0.0012	0.0050	0.0030	0.0035	0.0101	0.0075	0.0031	0.0021	0.0012	0.0010	0.02	0.5
Arsenic	**0.0051**	**0.0050**	**0.0053**	0.0047	**0.0060**	**0.0055**	**0.0097**	**0.0077**	**0.0069**	**0.0062**	0.0050	**0.0051**	0.005	**1.9**
Boron	0.035	0.034	0.014	0.017	0.014	0.032	0.119	0.081	0.040	0.031	0.053	0.032	1.2	0.1
Cadmium	0.00003	0.00002	0.00003	0.00009	0.00007	0.00005	0.00015	0.00012	0.00005	0.00004	0.00002	0.00002	0.0003	0.5
Chromium	0.0004	0.0004	0.0003	0.0012	0.0011	0.0014	0.0017	0.0013	0.0009	0.0008	0.0007	0.0004	0.0089	0.2
Copper	0.0005	0.0005	0.0004	0.0009	0.0020	0.0011	0.0018	0.0015	0.0010	0.0007	0.0006	0.0005	0.003	0.7
Iron	0.097	0.095	0.114	0.173	0.625	0.154	0.247	0.170	0.122	0.079	0.077	0.093	1.0	0.6
Lead	0.00022	0.00019	0.00018	0.00095	0.00085	0.00077	0.00198	0.00145	0.00057	0.00036	0.00020	0.00015	0.004	0.5
Manganese	**0.0778**	**0.0777**	**0.1151**	**0.0762**	**0.0606**	0.0401	**0.0549**	0.0439	0.0354	0.0263	0.0407	**0.0777**	0.05	**2.3**
Mercury	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00002	0.00003	0.00001	0.00001	0.00003	1.0
Molybdenum	0.00389	0.00345	0.00309	0.00743	0.00402	0.00518	0.03548	0.02581	0.00866	0.00599	0.00381	0.00274	0.073	0.5
Nickel	0.0016	0.0016	0.0018	0.0035	0.0040	0.0097	0.0103	0.0060	0.0042	0.0043	0.0043	0.0015	0.110	0.1
Selenium	0.0006	0.0006	0.0006	0.0009	0.0007	0.0008	0.0013	0.0011	0.0007	0.0006	0.0006	0.0005	0.002	0.6
Silver	0.00001	0.00001	0.00001	0.00003	0.00002	0.00002	0.00006	0.00004	0.00002	0.00001	0.00001	0.00001	0.0001	0.6
Thallium	0.00008	0.00008	0.00006	0.00011	0.00009	0.00013	0.00016	0.00013	0.00010	0.00009	0.00011	0.00008	0.0008	0.2
Uranium	0.0018	0.0017	0.0018	0.0045	0.0025	0.0029	0.0079	0.0060	0.0027	0.0021	0.0017	0.0016	0.015	0.5
Zinc	0.0075	0.0073	0.0039	0.0112	0.0088	0.0068	0.0167	0.0127	0.0063	0.0044	0.0107	0.0071	0.03	0.6
Cyanide WAD	0.0025	0.0025	0.0025	0.0024	0.0023	0.0024	0.0022	0.0023	0.0024	0.0024	0.0025	0.0025	0.005	0.5

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 20: Predicted Flow (average) and Water Quality (maximum) in Haggart Creek (W29) during the Short-term of Closure (Untreated)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.208	0.169	0.130	0.150	1.358	1.037	0.958	0.821	0.973	0.868	0.487	0.328		
Sulphate	72	72	79	79	45	73	65	75	61	67	70	72	100	0.8
Fluoride	0.102	0.102	0.119	0.154	0.110	0.120	0.122	0.132	0.111	0.094	0.090	0.100	0.30	0.5
Nitrate/Nitrite	0.124	0.124	0.123	0.460	0.270	0.273	0.198	0.183	0.183	0.175	0.125	0.124		
Ammonia	0.004	0.004	0.006	0.012	0.010	0.008	0.007	0.010	0.008	0.011	0.003	0.004		
Phosphate T	0.008	0.008	0.013	0.036	0.044	0.032	0.024	0.021	0.018	0.012	0.007	0.007		
Aluminum T	0.0167	0.0167	0.0255	0.0830	**0.3907**	0.0708	0.0512	0.0398	0.0433	0.0185	0.0086	0.0170	0.10	**3.9**
Antimony T	0.0009	0.0009	0.0010	**0.0223**	0.0151	**0.0302**	0.0174	0.0186	0.0137	0.0120	0.0074	0.0007	0.02	**1.5**
Arsenic T	**0.0058**	**0.0059**	**0.0062**	**0.0752**	**0.0519**	**0.0630**	**0.0474**	**0.0454**	**0.0368**	**0.0248**	**0.0128**	**0.0055**	0.005	**15.0**
Boron T	0.026	0.026	0.007	0.013	0.012	0.032	0.025	0.016	0.022	0.021	0.045	0.026	1.2	<0.1
Cadmium T	0.00001	0.00002	0.00002	0.00008	0.00008	0.00015	0.00008	0.00009	0.00007	0.00007	0.00005	0.00001	0.0003	0.5
Chromium T	0.0005	0.0005	0.0003	0.0012	0.0010	0.0014	0.0009	0.0009	0.0008	0.0007	0.0007	0.0004	0.0089	0.2
Copper T	0.0005	0.0005	0.0004	0.0024	**0.0030**	0.0029	0.0018	0.0018	0.0016	0.0012	0.0010	0.0004	0.003	**1.0**
Iron T	0.084	0.084	0.105	0.167	0.624	0.152	0.116	0.079	0.100	0.067	0.068	0.085	1.0	0.6
Lead T	0.00004	0.00004	0.00004	0.00204	0.00168	0.00187	0.00121	0.00118	0.00094	0.00067	0.00027	0.00004	0.004	0.5
Manganese T	**0.0773**	**0.0772**	**0.1151**	**0.0755**	**0.0603**	0.0481	0.0455	0.0376	0.0359	0.0295	0.0434	**0.0773**	0.05	**2.3**
Mercury T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00002	**0.00003**	0.00001	0.00001	0.00003	**1.0**
Molybdenum	0.00079	0.00080	0.00064	0.00575	0.00356	0.00477	0.00335	0.00335	0.00283	0.00209	0.00123	0.00064	0.073	0.1
Nickel T	0.0015	0.0015	0.0018	0.0034	0.0038	0.0093	0.0048	0.0054	0.0039	0.0048	0.0042	0.0015	0.110	0.1
Selenium T	0.0005	0.0005	0.0005	**0.0029**	**0.0021**	**0.0026**	0.0018	0.0018	0.0015	0.0012	0.0008	0.0005	0.002	**1.5**
Silver T	0.00001	0.00001	0.00001	**0.00037**	**0.00024**	**0.00024**	**0.00019**	**0.00018**	**0.00015**	0.00009	0.00002	0.00001	0.0001	**3.7**
Thallium T	0.00008	0.00008	0.00006	0.00011	0.00009	0.00013	0.00008	0.00009	0.00009	0.00008	0.00011	0.00008	0.0008	0.2
Uranium T	0.0013	0.0013	0.0014	0.0064	0.0039	0.0087	0.0052	0.0057	0.0042	0.0042	0.0031	0.0012	0.015	0.6
Zinc T	0.0063	0.0063	0.0029	0.0111	0.0094	0.0087	0.0064	0.0059	0.0055	0.0042	0.0107	0.0063	0.03	0.4
Cyanide WAD	0.0025	0.0025	0.0025	0.0043	0.0038	0.0035	0.0033	0.0032	0.0031	0.0029	0.0025	0.0025	0.005	0.9

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 21: Predicted Flow (average) and Water Quality (maximum) in Haggart Creek (W29) over the Long-term of Closure (Untreated)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.208	0.169	0.130	0.150	1.358	1.037	0.958	0.821	0.973	0.868	0.487	0.328		
Sulphate	72	72	79	74	41	70	62	73	59	66	70	72	100	0.8
Fluoride	0.102	0.102	0.119	0.153	0.109	0.119	0.121	0.131	0.110	0.094	0.090	0.100	0.30	0.5
Nitrate/Nitrite	0.124	0.124	0.123	0.120	0.040	0.080	0.050	0.042	0.063	0.101	0.125	0.124		
Ammonia	0.004	0.004	0.006	0.003	0.003	0.003	0.003	0.006	0.005	0.009	0.003	0.004		
Phosphate T	0.008	0.008	0.013	0.039	0.046	0.034	0.025	0.022	0.019	0.012	0.007	0.007		
Aluminum T	0.0167	0.0167	0.0255	0.0580	**0.3738**	0.0566	0.0402	0.0294	0.0345	0.0131	0.0086	0.0170	0.10	**3.7**
Antimony T	0.0009	0.0009	0.0010	**0.0223**	0.0151	**0.0302**	0.0174	0.0186	0.0137	0.0120	0.0074	0.0007	0.02	**1.5**
Arsenic T	**0.0058**	**0.0059**	**0.0062**	**0.0589**	**0.0409**	**0.0538**	**0.0403**	**0.0387**	**0.0311**	**0.0215**	**0.0128**	**0.0055**	0.005	**11.8**
Boron T	0.026	0.026	0.007	0.013	0.012	0.032	0.025	0.016	0.022	0.021	0.045	0.026	1.2	<0.1
Cadmium T	0.00001	0.00002	0.00002	0.00007	0.00006	0.00014	0.00007	0.00008	0.00006	0.00007	0.00005	0.00001	0.0003	0.5
Chromium T	0.0005	0.0005	0.0003	0.0014	0.0011	0.0015	0.0010	0.0010	0.0009	0.0007	0.0007	0.0004	0.0089	0.2
Copper T	0.0005	0.0005	0.0004	0.0025	**0.0031**	0.0029	0.0018	0.0018	0.0017	0.0012	0.0010	0.0004	0.003	**1.0**
Iron T	0.084	0.084	0.105	0.166	0.623	0.151	0.116	0.079	0.099	0.067	0.068	0.085	1.0	0.6
Lead T	0.00004	0.00004	0.00004	0.00029	0.00050	0.00088	0.00044	0.00045	0.00033	0.00039	0.00027	0.00004	0.004	0.2
Manganese T	**0.0773**	**0.0772**	**0.1151**	**0.0758**	**0.0609**	0.0485	0.0457	0.0378	0.0362	0.0296	0.0434	**0.0773**	0.05	**2.3**
Mercury T	0.00001	0.00001	0.00001	**0.00003**	0.00002	0.00002	0.00002	**0.00003**	0.00002	**0.00003**	0.00001	0.00001	0.00003	**1.1**
Molybdenum	0.00079	0.00080	0.00064	0.00575	0.00356	0.00477	0.00335	0.00335	0.00283	0.00209	0.00123	0.00064	0.073	0.1
Nickel T	0.0015	0.0015	0.0018	0.0037	0.0041	0.0095	0.0049	0.0056	0.0040	0.0048	0.0042	0.0015	0.110	0.1
Selenium T	0.0005	0.0005	0.0005	**0.0036**	**0.0026**	**0.0030**	**0.0021**	**0.0021**	0.0018	0.0013	0.0008	0.0005	0.002	**1.8**
Silver T	0.00001	0.00001	0.00001	0.00009	0.00006	0.00008	0.00006	0.00006	0.00005	0.00003	0.00002	0.00001	0.0001	0.9
Thallium T	0.00008	0.00008	0.00006	0.00014	0.00011	0.00015	0.00010	0.00010	0.00010	0.00009	0.00011	0.00008	0.0008	0.2
Uranium T	0.0013	0.0013	0.0014	0.0064	0.0039	0.0087	0.0052	0.0057	0.0042	0.0042	0.0031	0.0012	0.015	0.6
Zinc T	0.0063	0.0063	0.0029	0.0069	0.0065	0.0063	0.0046	0.0043	0.0040	0.0037	0.0107	0.0063	0.03	0.4
Cyanide WAD	0.0025	0.0025	0.0025	0.0043	0.0038	0.0035	0.0033	0.0032	0.0031	0.0029	0.0025	0.0025	0.005	0.9

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 22: Summary of Differences between Monthly Predicted Concentrations for Average Scenarios and Wet and Dry Scenarios in Operations, Draindown, and Post-closure at Mixing Points A, B, and C

(Mean = Mean of Monthly Differences over the Year, Range = Range of Monthly Differences over the Year, Diff in Peak Month = Difference during Month with Peak Concentrations). Differences in percent (%)

		Aluminum	Antimony	Arsenic	Cadmium	Iron	Manganese	Selenium	Silver
Post-closure Year 21					**Mixing Point A (W71)**				
Wet	**Mean Difference**	**3**	**1**	**1**	**2**	**5**	**4**	**1**	**2**
	Range	-7 to 33	-30 to 44	-17 to 29	-29 to 43	-9 to 34	-15 to 38	-23 to 34	-28 to 38
	Diff in Peak Month	-2	38	29	38	-2	28	34	37
Dry	**Mean Difference**	**-3**	**0**	**0**	**-1**	**-3**	**-2**	**-1**	**-2**
	Range	-41 to 22	-47 to 60	-35 to 33	-46 to 58	-42 to 31	-47 to 60	-42 to 46	-45 to 55
	Diff in Peak Month	4	-47	-35	-46	3	-45	-42	-45
Operations Year 9					**Mixing Point B (W4)**				
Wet	**Mean Difference**	**1**	**70**	**13**	**27**	**7**	**2**	**7**	**18**
	Range	0 to 8	0 to 410	0 to 47	0 to 133	0 to 27	0 to 9	0 to 32	0 to 83
	Diff in Peak Month	0	170	33	133	0	0	32	12
Dry	**Mean Difference**	**-2**	**-31**	**-16**	**-23**	**-5**	**-2**	**-7**	**-11**
	Range	-18 to 0	-85 to 1	-41 to 2	-73 to 0	-28 to 0	-9 to 0	-25 to 0	-39 to 0
	Diff in Peak Month	0	-81	-33	-64	0	0	-15	-25
Draindown Year 13									
Wet	**Mean Difference**	**-1**	**-3**	**2**	**-2**	**-3**	**-1**	**-1**	**0**
	Range	-13 to 22	-24 to 34	-9 to 26	-23 to 26	-18 to 9	-5 to 3	-15 to 14	-15 to 28
	Diff in Peak Month	0	-24	-9	-23	0	0	-15	-15
Dry	**Mean Difference**	**7**	**12**	**-1**	**9**	**8**	**2**	**4**	**5**
	Range	-25 to 42	-38 to 62	-29 to 21	-31 to 57	-10 to 45	-3 to 16	-16 to 32	-32 to 42
	Diff in Peak Month	0	50	16	48	1	0	32	33

		Aluminum	Antimony	Arsenic	Cadmium	Iron	Manganese	Selenium	Silver
Post-closure Year 21									
Wet	**Mean Difference**	**5**	**12**	**12**	**7**	**0**	**1**	**8**	**11**
	Range	0 to 34	-4 to 53	-4 to 53	-2 to 31	0 to 1	0 to 2	-3 to 42	-4 to 53
	Diff in Peak Month	0	53	53	31	0	0	42	53
Dry	**Mean Difference**	**-8**	**-21**	**-21**	**-12**	**0**	**-1**	**-14**	**-20**
	Range	-34 to 1	-55 to 7	-56 to 7	-36 to 3	-1 to 0	-3 to 0	-43 to 6	-54 to 7
	Diff in Peak Month	1	-54	-54	-32	0	0	-43	-54
Operations Year 9				**Mixing Point C (W29)**					
Wet	**Mean Difference**	**2**	**46**	**5**	**24**	**5**	**1**	**6**	**15**
	Range	-1 to 9	0 to 231	0 to 20	0 to 123	0 to 25	-1 to 9	0 to 30	0 to 78
	Diff in Peak Month	-1	143	13	123	0	0	30	8
Dry	**Mean Difference**	**-3**	**-24**	**-7**	**-21**	**-3**	**0**	**-6**	**-10**
	Range	-14 to 1	-69 to 0	-31 to 1	-62 to 0	-13 to 0	-6 to 7	-19 to 0	-35 to 0
	Diff in Peak Month	1	-65	-31	-57	0	0	-14	-35
Draindown Year 13									
Wet	**Mean Difference**	**0**	**-3**	**3**	**-2**	**-3**	**-1**	**-1**	**-1**
	Range	-8 to 22	-25 to 34	-2 to 16	-25 to 26	-17 to 9	-9 to 3	-16 to 14	-18 to 28
	Diff in Peak Month	0	-25	9	-25	0	0	-16	-18
Dry	**Mean Difference**	**4**	**11**	**-5**	**10**	**8**	**4**	**4**	**6**
	Range	-24 to 34	-38 to 65	-20 to 2	-30 to 60	-10 to 48	-4 to 26	-16 to 38	-32 to 45
	Diff in Peak Month	1	61	-20	59	0	0	38	43
Post-closure Year 21									
Wet	**Mean Difference**	**5**	**8**	**10**	**8**	**1**	**1**	**8**	**9**
	Range	-2 to 37	-12 to 46	-3 to 44	-13 to 36	-2 to 10	-4 to 6	-2 to 37	-10 to 47
	Diff in Peak Month	-2	32	44	31	0	0	37	47
Dry	**Mean Difference**	**-8**	**-12**	**-16**	**-12**	**-1**	**0**	**-13**	**-14**
	Range	-41 to 4	-53 to 27	-47 to 6	-46 to 31	-11 to 6	-10 to 8	-40 to 4	-51 to 23
	Diff in Peak Month	4	-44	-47	-40	1	0	-40	-51

Table 23: Summary of Peak Predicted Concentrations at Mixing Points A, B, and C using Mean Monthly and Maximum Monthly Baseline Concentrations in Operations, Draindown, and Post-closure

(*Mean = using Mean Monthly Baseline Concentrations, Maximum = using Maximum Monthly Baseline Concentrations, % Difference = % Difference between Predicted Values for Mean and Maximum Baseline Concentrations; Concentrations in mg/L*)

Phase, Year	Monthly Baseline Level	Aluminum	Antimony	Arsenic	Cadmium	Iron	Manganese	Selenium	Silver
					Mixing Point A				
Post-closure, Year 21	Mean	1.3266	0.1276	0.1502	0.00065	0.872	0.0793	0.0049	0.00019
	Maximum	1.3538	0.1289	0.1661	0.00066	0.944	0.0861	0.0050	0.00020
	Difference	2.1	1.0	**10.6**	1.7	8.2	8.5	1.4	4.1
					Mixing Point B				
Operations, Year 9	Mean	0.2252	0.0034	0.0035	0.00006	0.598	0.1280	0.0008	0.00003
	Maximum	0.2260	0.0034	0.0035	0.00008	0.632	0.1289	0.0008	0.00003
	Difference	0.3	0.8	2.3	**41.2**	5.8	0.7	0.0	**13.7**
Draindown, Year 13	Mean	0.2271	0.0111	0.0039	0.00017	0.627	0.1275	0.0014	0.00007
	Maximum	0.2271	0.0111	0.0039	0.00019	0.641	0.1277	0.0015	0.00007
	Difference	0.0	0.0	1.7	**10.7**	2.2	0.2	4.4	0.1
Post-closure, Year 21	Mean	0.2481	0.0208	0.0746	0.00007	0.588	0.1280	0.0032	0.00037
	Maximum	0.2595	0.0208	0.0750	0.00008	0.593	0.1292	0.0032	0.00038
	Difference	4.6	0.0	0.5	**17.6**	0.8	1.0	0.3	3.9
					Mixing Point C				
Operations, Year 9	Mean	0.3426	0.0032	0.0096	0.00005	0.600	0.1154	0.0007	0.00002
	Maximum	0.4574	0.0034	0.0123	0.00007	0.624	0.1203	0.0007	0.00003
	Difference	**33.5**	5.3	**27.3**	**41.5**	4.1	4.2	1.2	**33.3**
Draindown, Year 13	Mean	0.3342	0.0101	0.0097	0.00015	0.625	0.1151	0.0013	0.00006
	Maximum	0.4405	0.0102	0.0122	0.00017	0.632	0.1162	0.0013	0.00006
	Difference	**31.8**	1.4	**25.0**	**11.0**	1.2	0.9	5.4	1.6
Post-closure, Year 21	Mean	0.3907	0.0302	0.0752	0.00015	0.624	0.1151	0.0029	0.00037
	Maximum	0.4891	0.0304	0.0767	0.00017	0.628	0.1226	0.0030	0.00039
	Difference	**25.2**	0.6	2.1	**14.5**	0.7	6.5	0.9	3.4

Table 24: Maximum Predicted Flow (average year) and Water Quality collected at the Toe of the HLF of during Closure, Year 21 (Concentrations in mg/L)

Parameter	Concentration (mg/L unless noted)				Ratio to WQG
	Short-term	Long-term	WQG or SS WQO	MMER Sched. 4	
Flow (m^3/s)	0.04	0.04			
pH (standard units)	7.5	7.5	6.5 to 9.5	6.0 to 9.5	
Sulphate	312	256	100	–	3.1
Alkalinity as HCO_3	75	74	–	–	
Chloride	3	3	–	–	
Fluoride	0.32	0.30	0.3	–	1.1
Nitrate N	3.57	Not measured[1]	2.9	–	1.2
Ammonia N	0.109	Not measured[1]	Varies with temperature and pH	–	
Phosphorus[2]	0.030	0.062	–	–	
Total cyanide	0.20	Not measured[1]	–	–	
WAD cyanide	0.02	Not measured[1]	0.01	–	2.2
Cyanate	1.0	Not measured[1]	–	–	
Aluminum D	0.56	0.30	0.1 (Total, CCME), pH ≥6.5	–	5.6
Antimony D	0.17	0.17	0.02	–	8.6
Arsenic D	0.634	0.467	0.005 (CCME); 0.020 (SS WQO, Haggart)		127
Boron D[2]	0.1	0.1	1.2	–	0.1
Calcium D	72	48	–	–	
Cadmium D[2]	0.0004	0.0002	0.0003	–	1.4
Chromium D[2]	0.001	0.003	0.0089	–	0.3
Copper D	0.013	0.014	0.003	0.3	4.6
Iron D	0.43	0.42	1	–	0.4
Lead D	0.020	0.002	0.004	0.2	4.9
Magnesium D	12	31	–	–	
Manganese D	0.09	0.10	0.05	–	1.9
Mercury D [2, 3]	0.00006	0.00023	0.00003	–	8.8
Molybdenum D	0.02	0.02	0.073	–	0.3
Nickel D[2]	0.00	0.01	0.11	0.5	0.0
Selenium D	0.02	0.03	0.002	–	15

Parameter	Concentration (mg/L unless noted)				Ratio to WQG
	Short-term	Long-term	WQG or SS WQO	MMER Sched. 4	
Silver D[2]	0.0030	0.0001	0.0001	–	30
Sodium	67	16	–	–	
Thallium D[2]	0.0001	0.0004	0.0008	–	0.5
Uranium D	0.04	0.04	0.015	–	2.5
Zinc D	0.06	0.02	0.03	0.5	2.1

NOTE:

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 25: Predicted Flow (average) and Water Quality (maximum) in Haggart Creek (W4) during Short-term of Closure (Untreated, 10% cap on HLF)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.179	0.145	0.112	0.121	1.086	0.821	0.656	0.634	0.760	0.692	0.415	0.282		
Dilution	NF	NF	NF	15.6	24.3	29.0	32.2	37.9	46.6	77.6	NF	NF		
Sulphate	77	77	84	70	36	54	62	70	56	66	70	77	100	0.8
Fluoride	0.103	0.103	0.117	0.106	0.079	0.068	0.100	0.104	0.084	0.078	0.089	0.103	0.30	0.4
Nitrate/Nitrite	0.126	0.126	0.121	0.328	0.178	0.191	0.156	0.132	0.139	0.151	0.132	0.126		
Ammonia	0.005	0.005	0.007	0.008	0.006	0.006	0.006	0.009	0.007	0.011	0.003	0.005		
Phosphate T	0.006	0.006	0.010	0.003	0.017	0.003	0.007	0.002	0.004	0.001	0.001	0.006		
Aluminum T	0.0074	0.0074	0.0077	0.0306	**0.2391**	0.0566	0.0351	0.0196	0.0324	0.0122	0.0071	0.0074	0.10	**2.4**
Antimony T	0.0002	0.0002	0.0002	0.0106	0.0069	0.0060	0.0054	0.0046	0.0038	0.0024	0.0003	0.0002	0.02	0.5
Arsenic T	0.0007	0.0007	0.0007	**0.0387**	**0.0258**	**0.0218**	**0.0201**	**0.0171**	**0.0141**	**0.0087**	0.0007	0.0007	0.005	**7.7**
Boron T	0.028	0.028	0.005	0.008	0.007	0.029	0.021	0.014	0.021	0.021	0.050	0.028	1.2	<0.1
Cadmium T	0.00001	0.00001	0.00002	0.00004	0.00005	0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.0003	0.2
Chromium T	0.0004	0.0004	0.0003	0.0003	0.0004	0.0004	0.0003	0.0003	0.0003	0.0003	0.0005	0.0004	0.0089	0.1
Copper T	0.0004	0.0004	0.0002	0.0009	0.0022	0.0010	0.0008	0.0007	0.0008	0.0005	0.0005	0.0004	0.003	0.7
Iron T	0.078	0.078	0.089	0.131	0.587	0.145	0.106	0.055	0.091	0.060	0.066	0.078	1.0	0.6
Lead T	0.00003	0.00003	0.00003	0.00117	0.00105	0.00079	0.00060	0.00051	0.00042	0.00027	0.00003	0.00003	0.004	0.3
Manganese T	**0.0855**	**0.0855**	**0.1280**	**0.0839**	**0.0639**	0.0376	0.0411	0.0288	0.0329	0.0240	0.0430	**0.0855**	0.05	**2.6**
Mercury T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00003	0.00001	0.00001	0.00003	**1.0**
Molybdenum	0.00028	0.00028	0.00007	0.00129	0.00087	0.00100	0.00072	0.00061	0.00060	0.00050	0.00050	0.00028	0.073	<0.1
Nickel T	0.0015	0.0015	0.0017	0.0018	0.0025	0.0008	0.0009	0.0008	0.0009	0.0006	0.0012	0.0015	0.110	<0.1
Selenium T	0.0005	0.0005	0.0005	0.0018	0.0014	0.0012	0.0011	0.0010	0.0009	0.0008	0.0005	0.0005	0.002	0.9
Silver T	0.00001	0.00001	0.00001	**0.00019**	**0.00013**	**0.00011**	**0.00011**	0.00009	0.00008	0.00004	0.00001	0.00001	0.0001	**1.9**
Thallium T	0.00008	0.00008	0.00005	0.00005	0.00005	0.00008	0.00005	0.00005	0.00006	0.00007	0.00010	0.00008	0.0008	0.1
Uranium T	0.0012	0.0012	0.0014	0.0035	0.0018	0.0018	0.0018	0.0018	0.0014	0.0014	0.0011	0.0012	0.015	0.2
Zinc T	0.0065	0.0065	0.0027	0.0085	0.0069	0.0037	0.0034	0.0027	0.0031	0.0022	0.0103	0.0065	0.03	0.3
Cyanide WAD	0.0025	0.0025	0.0025	0.0037	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0025	0.0025	0.005	0.7

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 26: Predicted Flow (average) and Water Quality (maximum) in Haggart Creek (W4) during Long-term of Closure (Untreated, 10% cap on HLF)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.179	0.145	0.112	0.121	1.086	0.821	0.656	0.634	0.760	0.692	0.415	0.282		
Dilution	NF	NF	NF	15.6	24.3	29.0	32.2	37.9	46.6	77.6	NF	NF		
Sulphate	77	77	84	67	34	52	60	69	55	65	70	77	100	0.8
Fluoride	0.103	0.103	0.117	0.105	0.078	0.068	0.099	0.104	0.084	0.078	0.089	0.103	0.30	0.4
Nitrate/Nitrite	0.126	0.126	0.121	0.120	0.040	0.075	0.051	0.043	0.067	0.107	0.132	0.126		
Ammonia	0.005	0.005	0.007	0.002	0.002	0.002	0.002	0.006	0.005	0.010	0.003	0.005		
Phosphate T	0.006	0.006	0.010	0.005	0.018	0.004	0.008	0.003	0.004	0.002	0.001	0.006		
Aluminum T	0.0074	0.0074	0.0077	0.0152	**0.2289**	0.0481	0.0274	0.0130	0.0272	0.0089	0.0071	0.0074	0.10	**2.3**
Antimony T	0.0002	0.0002	0.0002	0.0106	0.0069	0.0060	0.0054	0.0046	0.0038	0.0024	0.0003	0.0002	0.02	0.5
Arsenic T	0.0007	0.0007	0.0007	**0.0287**	**0.0192**	**0.0162**	**0.0151**	**0.0128**	**0.0106**	**0.0066**	0.0007	0.0007	0.005	**5.7**
Boron T	0.028	0.028	0.005	0.008	0.007	0.029	0.021	0.014	0.021	0.021	0.050	0.028	1.2	<0.1
Cadmium T	0.00001	0.00001	0.00002	0.00003	0.00004	0.00001	0.00001	0.00002	0.00001	0.00002	0.00001	0.00001	0.0003	0.1
Chromium T	0.0004	0.0004	0.0003	0.0004	0.0005	0.0004	0.0003	0.0003	0.0003	0.0004	0.0005	0.0004	0.0089	0.1
Copper T	0.0004	0.0004	0.0002	0.0010	0.0023	0.0011	0.0008	0.0007	0.0008	0.0005	0.0005	0.0004	0.003	0.8
Iron T	0.078	0.078	0.089	0.131	0.587	0.144	0.105	0.055	0.091	0.060	0.066	0.078	1.0	0.6
Lead T	0.00003	0.00003	0.00003	0.00009	0.00034	0.00019	0.00006	0.00005	0.00005	0.00004	0.00003	0.00003	0.004	0.1
Manganese T	**0.0855**	**0.0855**	**0.1280**	**0.0844**	**0.0643**	0.0379	0.0414	0.0290	0.0331	0.0241	0.0430	**0.0855**	0.05	**2.6**
Mercury T	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00002	0.00002	0.00002	**0.00003**	0.00001	0.00001	0.00003	**1.1**
Molybdenum	0.00028	0.00028	0.00007	0.00129	0.00087	0.00100	0.00072	0.00061	0.00060	0.00050	0.00050	0.00028	0.073	<0.1
Nickel T	0.0015	0.0015	0.0017	0.0020	0.0026	0.0009	0.0010	0.0009	0.0010	0.0007	0.0012	0.0015	0.110	<0.1
Selenium T	0.0005	0.0005	0.0005	**0.0023**	0.0017	0.0015	0.0013	0.0012	0.0011	0.0009	0.0005	0.0005	0.002	**1.1**
Silver T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.0001	0.2
Thallium T	0.00008	0.00008	0.00005	0.00007	0.00006	0.00009	0.00006	0.00006	0.00007	0.00007	0.00010	0.00008	0.0008	0.1
Uranium T	0.0012	0.0012	0.0014	0.0035	0.0018	0.0018	0.0018	0.0018	0.0014	0.0014	0.0011	0.0012	0.015	0.2
Zinc T	0.0065	0.0065	0.0027	0.0059	0.0052	0.0023	0.0021	0.0016	0.0022	0.0016	0.0103	0.0065	0.03	0.3
Cyanide WAD	0.0025	0.0025	0.0025	0.0037	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0025	0.0025	0.005	0.7

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 27: Predicted Flow (average) and Water Quality (maximum) in Haggart Creek (W29) during the Short-term of Closure (Untreated, 10% cap on HLF)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.208	0.169	0.130	0.150	1.358	1.037	0.958	0.821	0.973	0.868	0.487	0.328		
Sulphate	72	72	79	66	36	65	60	69	56	65	70	72	100	0.8
Fluoride	0.102	0.102	0.119	0.143	0.103	0.113	0.117	0.127	0.107	0.092	0.090	0.100	0.30	0.5
Nitrate/ Nitrite	0.124	0.124	0.123	0.291	0.155	0.176	0.123	0.112	0.123	0.138	0.125	0.124		
Ammonia	0.004	0.004	0.006	0.008	0.007	0.005	0.005	0.008	0.007	0.010	0.003	0.004		
Phosphate T	0.008	0.008	0.013	0.035	0.044	0.031	0.024	0.020	0.018	0.012	0.007	0.007		
Aluminum T	0.0167	0.0167	0.0255	0.0706	**0.3832**	0.0638	0.0457	0.0346	0.0389	0.0158	0.0086	0.0170	0.10	**3.8**
Antimony T	0.0009	0.0009	0.0010	0.0141	0.0097	**0.0256**	0.0138	0.0152	0.0108	0.0111	0.0074	0.0007	0.02	**1.3**
Arsenic T	**0.0058**	**0.0059**	**0.0062**	**0.0462**	**0.0322**	**0.0465**	**0.0346**	**0.0334**	**0.0266**	**0.0201**	**0.0128**	**0.0055**	0.005	**9.3**
Boron T	0.026	0.026	0.007	0.010	0.011	0.030	0.024	0.015	0.021	0.020	0.045	0.026	1.2	<0.1
Cadmium T	0.00001	0.00002	0.00002	0.00007	0.00006	0.00014	0.00007	0.00008	0.00006	0.00007	0.00005	0.00001	0.0003	0.5
Chromium T	0.0005	0.0005	0.0003	0.0012	0.0010	0.0014	0.0009	0.0009	0.0008	0.0007	0.0007	0.0004	0.0089	0.2
Copper T	0.0005	0.0005	0.0004	0.0019	0.0027	0.0026	0.0015	0.0016	0.0014	0.0011	0.0010	0.0004	0.003	0.9
Iron T	0.084	0.084	0.105	0.164	0.623	0.150	0.115	0.078	0.098	0.066	0.068	0.085	1.0	0.6
Lead T	0.00004	0.00004	0.00004	0.00112	0.00106	0.00135	0.00081	0.00080	0.00062	0.00048	0.00027	0.00004	0.004	0.3
Manganese T	**0.0773**	**0.0772**	**0.1151**	**0.0746**	**0.0584**	0.0463	0.0446	0.0368	0.0349	0.0292	0.0434	**0.0773**	0.05	**2.3**
Mercury T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00002	0.00003	0.00001	0.00001	0.00003	**1.0**
Molybdenum	0.00079	0.00080	0.00064	0.00478	0.00297	0.00422	0.00292	0.00295	0.00249	0.00188	0.00123	0.00064	0.073	0.1
Nickel T	0.0015	0.0015	0.0018	0.0033	0.0038	0.0093	0.0048	0.0054	0.0039	0.0048	0.0042	0.0015	0.110	0.1
Selenium T	0.0005	0.0005	0.0005	0.0018	0.0014	0.0020	0.0013	0.0014	0.0012	0.0010	0.0008	0.0005	0.002	1.0
Silver T	0.00001	0.00001	0.00001	**0.00023**	**0.00015**	**0.00016**	**0.00012**	**0.00012**	**0.00010**	0.00006	0.00002	0.00001	0.0001	**2.3**
Thallium T	0.00008	0.00008	0.00006	0.00011	0.00009	0.00013	0.00008	0.00009	0.00009	0.00008	0.00011	0.00008	0.0008	0.2
Uranium T	0.0013	0.0013	0.0014	0.0046	0.0027	0.0077	0.0044	0.0050	0.0036	0.0040	0.0031	0.0012	0.015	0.5
Zinc T	0.0063	0.0063	0.0029	0.0083	0.0075	0.0071	0.0052	0.0047	0.0045	0.0039	0.0107	0.0063	0.03	0.4
Cyanide WAD	0.0025	0.0025	0.0025	0.0034	0.0031	0.0030	0.0029	0.0028	0.0028	0.0027	0.0025	0.0025	0.005	0.7

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 28: Predicted Flow (average) and Water Quality (maximum) in Haggart Creek (W29) over the Long-term of Closure (Untreated, 10% cap on HLF)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.208	0.169	0.130	0.150	1.358	1.037	0.958	0.821	0.973	0.868	0.487	0.328		
Sulphate	72	72	79	63	34	64	59	69	55	65	70	72	100	0.8
Fluoride	0.102	0.102	0.119	0.142	0.103	0.113	0.116	0.127	0.106	0.092	0.090	0.100	0.30	0.5
Nitrate/ Nitrite	0.124	0.124	0.123	0.121	0.040	0.080	0.050	0.042	0.063	0.101	0.125	0.124		
Ammonia	0.004	0.004	0.006	0.003	0.003	0.003	0.003	0.006	0.005	0.009	0.003	0.004		
Phosphate T	0.008	0.008	0.013	0.037	0.045	0.032	0.024	0.021	0.019	0.012	0.007	0.007		
Aluminum T	0.0167	0.0167	0.0255	0.0581	**0.3748**	0.0567	0.0402	0.0294	0.0345	0.0131	0.0086	0.0170	0.10	**3.7**
Antimony T	0.0009	0.0009	0.0010	0.0141	0.0097	**0.0256**	0.0138	0.0152	0.0108	0.0111	0.0074	0.0007	0.02	**1.3**
Arsenic T	**0.0058**	**0.0059**	**0.0062**	**0.0380**	**0.0267**	**0.0419**	**0.0310**	**0.0301**	**0.0237**	**0.0193**	**0.0128**	**0.0055**	0.005	**8.4**
Boron T	0.026	0.026	0.007	0.010	0.011	0.030	0.024	0.015	0.021	0.020	0.045	0.026	1.2	<0.1
Cadmium T	0.00001	0.00002	0.00002	0.00006	0.00006	0.00014	0.00007	0.00008	0.00006	0.00007	0.00005	0.00001	0.0003	0.5
Chromium T	0.0005	0.0005	0.0003	0.0013	0.0010	0.0014	0.0009	0.0009	0.0008	0.0007	0.0007	0.0004	0.0089	0.2
Copper T	0.0005	0.0005	0.0004	0.0019	0.0027	0.0026	0.0016	0.0016	0.0015	0.0011	0.0010	0.0004	0.003	0.9
Iron T	0.084	0.084	0.105	0.163	0.622	0.150	0.115	0.078	0.098	0.066	0.068	0.085	1.0	0.6
Lead T	0.00004	0.00004	0.00004	0.00024	0.00047	0.00085	0.00042	0.00043	0.00031	0.00038	0.00027	0.00004	0.004	0.2
Manganese T	**0.0773**	**0.0772**	**0.1151**	**0.0747**	**0.0587**	0.0466	0.0447	0.0369	0.0350	0.0292	0.0434	**0.0773**	0.05	**2.3**
Mercury T	0.00001	0.00001	0.00001	0.00002	0.00001	0.00002	0.00002	0.00002	0.00002	**0.00003**	0.00001	0.00001	0.00003	**1.1**
Molybdenum	0.00079	0.00080	0.00064	0.00478	0.00297	0.00422	0.00292	0.00295	0.00249	0.00188	0.00123	0.00064	0.073	0.1
Nickel T	0.0015	0.0015	0.0018	0.0035	0.0039	0.0094	0.0048	0.0055	0.0039	0.0048	0.0042	0.0015	0.110	0.1
Selenium T	0.0005	0.0005	0.0005	**0.0022**	0.0016	**0.0022**	0.0014	0.0015	0.0013	0.0010	0.0008	0.0005	0.002	**1.1**
Silver T	0.00001	0.00001	0.00001	0.00008	0.00006	0.00008	0.00006	0.00006	0.00005	0.00003	0.00002	0.00001	0.0001	0.8
Thallium T	0.00008	0.00008	0.00006	0.00013	0.00010	0.00014	0.00009	0.00009	0.00009	0.00009	0.00011	0.00008	0.0008	0.2
Uranium T	0.0013	0.0013	0.0014	0.0046	0.0027	0.0077	0.0044	0.0050	0.0036	0.0040	0.0031	0.0012	0.015	0.5
Zinc T	0.0063	0.0063	0.0029	0.0063	0.0061	0.0060	0.0043	0.0041	0.0038	0.0037	0.0107	0.0063	0.03	0.4
Cyanide WAD	0.0025	0.0025	0.0025	0.0034	0.0031	0.0030	0.0029	0.0028	0.0028	0.0027	0.0025	0.0025	0.005	0.7

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 29: Predicted Flows (average) and Water Quality (max) from Eagle Pup Waste Rock Storage Area Sediment Control Pond in the Predicted Worst Year during Post-closure (Year 21), Untreated (10% Infiltration of Eagle Pup Waste Rock Storage Area)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	< 0.001	< 0.001	< 0.001	0.004	0.039	0.028	0.024	0.018	0.017	0.009	0.001	< 0.001		
Sulphate	29	29	29	29	23	**188**	**132**	**156**	**132**	**353**	**774**	29	100	**7.7**
Fluoride	0.106	0.106	0.106	0.106	0.088	**0.357**	0.266	**0.306**	0.272	**0.572**	**1.164**	0.106	0.30	**3.9**
Nitrate/ Nitrite	0.270	0.270	0.270	0.270	0.112	0.371	0.223	0.199	0.225	0.382	0.107	0.270		
Ammonia	0.007	0.007	0.007	0.007	0.009	0.004	0.003	0.004	0.007	0.004	0.003	0.007		
Phosphate T	0.092	0.092	0.092	0.092	0.174	0.158	0.102	0.127	0.091	0.301	0.708	0.092		
Aluminum T	**0.7807**	**0.7807**	**0.7807**	**0.7807**	**1.4427**	**0.2112**	0.0941	**0.3872**	**0.1565**	0.0943	**0.3275**	**0.7807**	0.10	**14.4**
Antimony T	0.0006	0.0006	0.0006	0.0006	0.0172	**0.2319**	**0.1421**	**0.1740**	**0.1351**	**0.4781**	**1.1371**	0.0006	0.02	**57**
Arsenic T	**0.0299**	**0.0299**	**0.0299**	**0.0299**	**0.0558**	**0.2445**	**0.1572**	**0.1949**	**0.1580**	**0.4910**	**1.1426**	**0.0299**	0.005	**229**
Boron T	0.024	0.024	0.024	0.024	0.028	0.037	0.037	0.030	0.026	0.030	0.045	0.024	1.2	<0.1
Cadmium T	0.00002	0.00002	0.00002	0.00002	0.00011	**0.00117**	**0.00072**	**0.00088**	**0.00068**	**0.00241**	**0.00571**	0.00002	0.0003	**19**
Chromium T	0.0006	0.0006	0.0006	0.0006	0.0012	0.0055	0.0035	0.0042	0.0034	**0.0111**	**0.0261**	0.0006	0.0089	**2.9**
Copper T	0.0014	0.0014	0.0014	0.0014	**0.0032**	**0.0122**	**0.0075**	**0.0091**	**0.0071**	**0.0242**	**0.0571**	0.0014	0.003	**19**
Iron T	0.948	0.948	0.948	0.948	**1.811**	0.274	0.188	0.474	0.299	0.376	0.954	0.948	1.0	**1.8**
Lead T	0.00036	0.00036	0.00036	0.00036	0.00121	**0.00843**	**0.00514**	**0.00627**	**0.00492**	**0.01722**	**0.04092**	0.00036	0.004	**10**
Manganese T	0.0049	0.0049	0.0049	0.0049	0.0194	**0.1509**	**0.0925**	**0.1127**	**0.0883**	**0.3097**	**0.7362**	0.0049	0.05	**15**
Mercury T	0.00002	0.00002	0.00002	0.00002	0.00001	0.00002	0.00002	0.00002	0.00002	**0.00005**	**0.00008**	0.00002	0.00003	**3.2**
Molybdenum	0.00112	0.00112	0.00112	0.00112	0.00179	0.01634	0.01048	0.01220	0.00986	0.03170	**0.07330**	0.00112	0.073	**1.0**
Nickel T	0.0009	0.0009	0.0009	0.0009	0.0088	0.0999	0.0611	0.0748	0.0581	**0.2060**	**0.4901**	0.0009	0.110	**4.5**
Selenium T	0.0004	0.0004	0.0004	0.0004	0.0010	**0.0088**	**0.0054**	**0.0066**	**0.0051**	**0.0172**	**0.0404**	0.0004	0.002	**20**
Silver T	0.00001	0.00001	0.00001	0.00001	0.00004	**0.00033**	**0.00021**	**0.00025**	**0.00020**	**0.00069**	**0.00163**	0.00001	0.0001	**16**
Thallium T	0.00005	0.00005	0.00005	0.00005	0.00007	0.00031	0.00021	0.00024	0.00020	0.00058	**0.00131**	0.00005	0.0008	**1.6**
Uranium T	0.0059	0.0059	0.0059	0.0059	0.0073	**0.0760**	**0.0492**	**0.0589**	**0.0477**	**0.1505**	**0.3442**	0.0059	0.015	**23**
Zinc T	0.0062	0.0062	0.0062	0.0062	0.0138	**0.0398**	0.0253	**0.0311**	0.0237	**0.0798**	**0.1891**	0.0062	0.03	**6.3**

Table 30: Predicted Flows (average) and Water Quality (max) in Dublin Gulch Diversion Channel (W71) after Closure, with Untreated Runoff from Eagle Pup Waste Rock Storage Area (10% Infiltration)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.021	0.017	0.013	0.018	0.170	0.128	0.195	0.112	0.129	0.114	0.050	0.033		
Dilution	283.9	309.1	333.1	2.2	3.4	2.6	4.9	3.5	6.4	10.3	39.6	253.2		
Sulphate	22	22	28	20	12	60	33	44	30	36	35	22	100	0.6
Fluoride	0.054	0.054	0.098	0.096	0.088	0.151	0.098	0.129	0.113	0.105	0.038	0.055	0.30	0.5
Nitrate	0.114	0.114	0.154	0.164	0.049	0.131	0.055	0.055	0.051	0.080	0.074	0.114		
Ammonia	0.003	0.003	0.004	0.004	0.009	0.003	0.003	0.007	0.005	0.007	0.003	0.003		
Phosphate T	0.007	0.007	0.010	0.034	0.102	0.052	0.026	0.031	0.020	0.024	0.021	0.007		
Aluminum T	0.0954	0.0952	**0.1809**	**0.2665**	**1.3334**	**0.1181**	0.0819	**0.1231**	0.0722	0.0293	0.0116	0.0957	0.10	**13.3**
Antimony T	0.0019	0.0019	0.0027	0.0013	0.0045	**0.0656**	**0.0235**	**0.0359**	0.0192	**0.0319**	**0.0291**	0.0019	0.02	**3.3**
Arsenic T	**0.0415**	**0.0415**	**0.0442**	**0.0357**	**0.0373**	**0.0890**	**0.0529**	**0.0668**	**0.0526**	**0.0642**	**0.0652**	**0.0415**	0.005	**17.8**
Boron T	0.016	0.016	0.027	0.011	0.028	0.040	0.035	0.022	0.022	0.017	0.007	0.017	1.2	<0.1
Cadmium T	0.00001	0.00001	0.00001	0.00002	0.00004	**0.00034**	0.00013	0.00019	0.00010	0.00017	0.00015	0.00001	0.0003	**1.1**
Chromium T	0.0004	0.0004	0.0003	0.0004	0.0008	0.0018	0.0010	0.0010	0.0007	0.0010	0.0011	0.0004	0.0089	0.2
Copper T	0.0004	0.0004	0.0003	0.0008	0.0016	**0.0040**	0.0016	0.0021	0.0013	0.0020	0.0019	0.0004	0.003	**1.3**
Iron T	0.130	0.130	0.242	0.321	0.895	0.133	0.102	0.136	0.092	0.042	0.038	0.130	1.0	0.9
Lead T	0.00003	0.00003	0.00003	0.00016	0.00066	0.00237	0.00101	0.00130	0.00072	0.00114	0.00096	0.00003	0.004	0.6
Manganese T	0.0005	0.0005	0.0008	0.0031	0.0131	0.0414	0.0181	0.0236	0.0132	0.0205	0.0169	0.0005	0.05	0.8
Mercury T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00002	**0.00003**	0.00001	0.00001	0.00003	**1.0**
Molybdenum	0.00197	0.00197	0.00225	0.00205	0.00157	0.00566	0.00339	0.00410	0.00311	0.00389	0.00337	0.00199	0.073	0.1
Nickel T	0.0004	0.0004	0.0003	0.0005	0.0030	0.0284	0.0101	0.0152	0.0081	0.0137	0.0126	0.0004	0.110	0.3
Selenium T	0.0004	0.0004	0.0004	0.0005	0.0005	**0.0028**	0.0011	0.0016	0.0011	0.0015	0.0015	0.0004	0.002	**1.4**
Silver T	0.00001	0.00001	0.00001	0.00001	0.00002	0.00010	0.00004	0.00006	0.00003	0.00005	0.00005	0.00001	0.0001	1.0
Thallium T	0.00007	0.00007	0.00005	0.00005	0.00006	0.00014	0.00007	0.00009	0.00008	0.00010	0.00013	0.00008	0.0008	0.2
Uranium T	0.0004	0.0004	0.0005	0.0023	0.0024	**0.0217**	0.0086	0.0126	0.0072	0.0103	0.0089	0.0005	0.015	**1.4**
Zinc T	0.0028	0.0028	0.0031	0.0047	0.0074	0.0130	0.0059	0.0074	0.0047	0.0066	0.0071	0.0028	0.03	0.4

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 31: Predicted Flow (average) and Water Quality (maximum) in Haggart Creek (W29) during the Short-term of Closure (Untreated, 10% HLF Infiltration, 10% EP WRSA Infiltration)

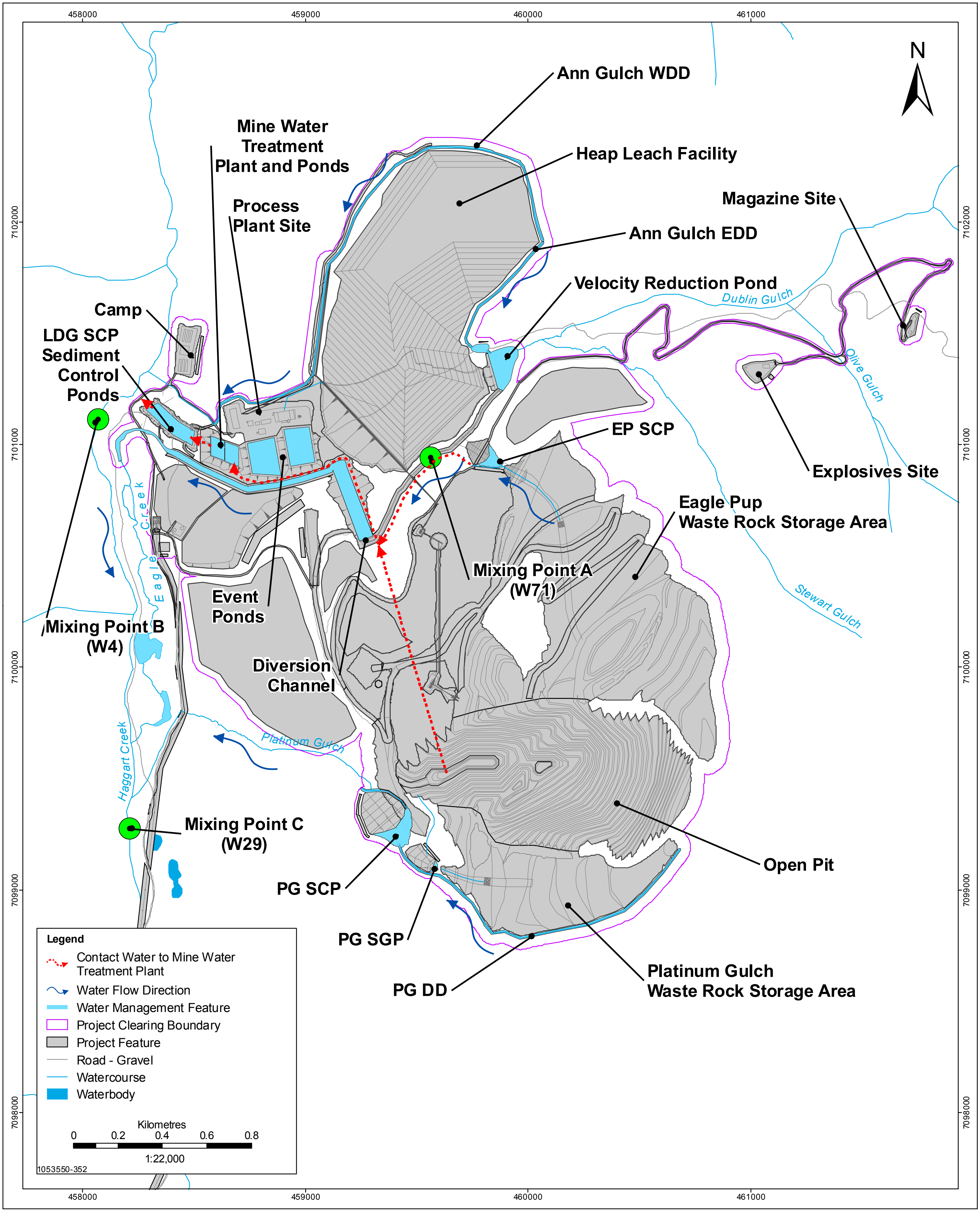
Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.208	0.169	0.130	0.150	1.358	1.037	0.958	0.821	0.973	0.868	0.487	0.328		
Sulphate	72	72	79	66	35	60	58	67	55	63	68	72	100	0.8
Fluoride	0.102	0.102	0.119	0.143	0.103	0.107	0.114	0.124	0.104	0.090	0.087	0.100	0.30	0.5
Nitrate/ Nitrite	0.124	0.124	0.123	0.291	0.155	0.178	0.124	0.113	0.123	0.139	0.125	0.124		
Ammonia	0.004	0.004	0.006	0.008	0.007	0.005	0.005	0.008	0.007	0.010	0.003	0.004		
Phosphate T	0.008	0.008	0.013	0.036	0.044	0.027	0.022	0.018	0.017	0.010	0.005	0.007		
Aluminum T	0.0167	0.0167	0.0255	0.0739	**0.3868**	0.0645	0.0459	0.0354	0.0391	0.0158	0.0086	0.0170	0.10	**3.9**
Antimony T	0.0009	0.0009	0.0010	0.0140	0.0092	0.0181	0.0105	0.0111	0.0084	0.0070	0.0045	0.0007	0.02	0.9
Arsenic T	**0.0058**	**0.0059**	**0.0062**	**0.0461**	**0.0317**	**0.0391**	**0.0313**	**0.0295**	**0.0242**	**0.0168**	**0.0099**	**0.0055**	0.005	**9.2**
Boron T	0.026	0.026	0.007	0.010	0.011	0.030	0.024	0.015	0.021	0.020	0.045	0.026	1.2	<0.1
Cadmium T	0.00001	0.00002	0.00002	0.00007	0.00006	0.00010	0.00006	0.00006	0.00005	0.00005	0.00004	0.00001	0.0003	0.3
Chromium T	0.0005	0.0005	0.0003	0.0012	0.0010	0.0012	0.0008	0.0008	0.0008	0.0006	0.0006	0.0004	0.0089	0.1
Copper T	0.0005	0.0005	0.0004	0.0019	0.0027	0.0022	0.0014	0.0014	0.0013	0.0009	0.0008	0.0004	0.003	0.9
Iron T	0.084	0.084	0.105	0.167	0.626	0.146	0.114	0.077	0.097	0.064	0.066	0.085	1.0	0.6
Lead T	0.00004	0.00004	0.00004	0.00111	0.00104	0.00110	0.00069	0.00065	0.00053	0.00039	0.00016	0.00004	0.004	0.3
Manganese T	**0.0773**	**0.0772**	**0.1151**	**0.0745**	**0.0580**	0.0418	0.0428	0.0348	0.0334	0.0266	0.0416	**0.0773**	0.05	**2.3**
Mercury T	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00003	0.00001	0.00001	0.00003	**1.0**
Molybdenum	0.00079	0.00080	0.00064	0.00477	0.00294	0.00378	0.00272	0.00270	0.00233	0.00172	0.00104	0.00064	0.073	0.1
Nickel T	0.0015	0.0015	0.0018	0.0033	0.0036	0.0061	0.0033	0.0037	0.0028	0.0031	0.0029	0.0015	0.110	0.1
Selenium T	0.0005	0.0005	0.0005	0.0018	0.0014	0.0017	0.0012	0.0012	0.0011	0.0009	0.0007	0.0005	0.002	0.9
Silver T	0.00001	0.00001	0.00001	**0.00023**	**0.00015**	**0.00015**	**0.00012**	**0.00011**	0.00010	0.00006	0.00002	0.00001	0.0001	**2.3**
Thallium T	0.00008	0.00008	0.00006	0.00011	0.00009	0.00012	0.00008	0.00008	0.00009	0.00008	0.00011	0.00008	0.0008	0.2
Uranium T	0.0013	0.0013	0.0014	0.0046	0.0026	0.0055	0.0035	0.0038	0.0029	0.0028	0.0022	0.0012	0.015	0.4
Zinc T	0.0063	0.0063	0.0029	0.0083	0.0074	0.0059	0.0047	0.0042	0.0041	0.0032	0.0102	0.0063	0.03	0.3
Cyanide WAD	0.0025	0.0025	0.0025	0.0034	0.0031	0.0030	0.0029	0.0028	0.0028	0.0027	0.0025	0.0025	0.005	0.7

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)

Table 32: Predicted Flow (average) and Water Quality (maximum) in Haggart Creek (W29) over the Long-term of Closure (Untreated, 10% HLF Infiltration, 10% EP WRSA Infiltration)

Parameter	Predicted Concentration (mg/L, unless indicated)												WQG[1] (mg/L)	Max/ WQG
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Flow (m^3/s)	0.208	0.169	0.130	0.150	1.358	1.037	0.958	0.821	0.973	0.868	0.487	0.328		
Sulphate	72	72	79	63	33	59	57	67	54	62	68	72	100	0.8
Fluoride	0.102	0.102	0.119	0.142	0.102	0.106	0.113	0.124	0.104	0.090	0.087	0.100	0.30	0.5
Nitrate/ Nitrite	0.124	0.124	0.123	0.121	0.040	0.081	0.050	0.043	0.063	0.102	0.125	0.124		
Ammonia	0.004	0.004	0.006	0.003	0.003	0.003	0.003	0.006	0.005	0.009	0.003	0.004		
Phosphate T	0.008	0.008	0.013	0.037	0.045	0.028	0.022	0.019	0.017	0.010	0.005	0.007		
Aluminum T	0.0167	0.0167	0.0255	0.0614	**0.3783**	0.0574	0.0403	0.0302	0.0347	0.0131	0.0086	0.0170	0.10	**3.8**
Antimony T	0.0009	0.0009	0.0010	0.0140	0.0092	0.0181	0.0105	0.0111	0.0084	0.0070	0.0045	0.0007	0.02	0.9
Arsenic T	**0.0058**	**0.0059**	**0.0062**	**0.0380**	**0.0263**	**0.0345**	**0.0277**	**0.0261**	**0.0213**	**0.0152**	**0.0099**	**0.0055**	0.005	**7.6**
Boron T	0.026	0.026	0.007	0.010	0.011	0.030	0.024	0.015	0.021	0.020	0.045	0.026	1.2	<0.1
Cadmium T	0.00001	0.00002	0.00002	0.00006	0.00006	0.00010	0.00005	0.00006	0.00004	0.00005	0.00004	0.00001	0.0003	0.3
Chromium T	0.0005	0.0005	0.0003	0.0013	0.0010	0.0012	0.0009	0.0008	0.0008	0.0006	0.0006	0.0004	0.0089	0.1
Copper T	0.0005	0.0005	0.0004	0.0019	0.0027	0.0022	0.0014	0.0014	0.0013	0.0009	0.0008	0.0004	0.003	0.9
Iron T	0.084	0.084	0.105	0.167	0.626	0.146	0.113	0.077	0.097	0.064	0.066	0.085	1.0	0.6
Lead T	0.00004	0.00004	0.00004	0.00024	0.00046	0.00060	0.00030	0.00029	0.00022	0.00024	0.00016	0.00004	0.004	0.1
Manganese T	**0.0773**	**0.0772**	**0.1151**	**0.0746**	**0.0583**	0.0421	0.0430	0.0349	0.0335	0.0266	0.0416	**0.0773**	0.05	**2.3**
Mercury T	0.00001	0.00001	0.00001	0.00002	0.00001	0.00002	0.00002	0.00002	0.00002	**0.00003**	0.00001	0.00001	0.00003	**1.1**
Molybdenum	0.00079	0.00080	0.00064	0.00477	0.00294	0.00378	0.00272	0.00270	0.00233	0.00172	0.00104	0.00064	0.073	0.1
Nickel T	0.0015	0.0015	0.0018	0.0035	0.0037	0.0062	0.0034	0.0037	0.0029	0.0031	0.0029	0.0015	0.110	0.1
Selenium T	0.0005	0.0005	0.0005	**0.0022**	0.0016	0.0019	0.0013	0.0014	0.0012	0.0010	0.0007	0.0005	0.002	**1.1**
Silver T	0.00001	0.00001	0.00001	0.00008	0.00006	0.00007	0.00005	0.00005	0.00005	0.00003	0.00002	0.00001	0.0001	0.8
Thallium T	0.00008	0.00008	0.00006	0.00013	0.00010	0.00013	0.00009	0.00009	0.00009	0.00009	0.00011	0.00008	0.0008	0.2
Uranium T	0.0013	0.0013	0.0014	0.0046	0.0026	0.0055	0.0035	0.0038	0.0029	0.0028	0.0022	0.0012	0.015	0.4
Zinc T	0.0063	0.0063	0.0029	0.0063	0.0060	0.0047	0.0038	0.0036	0.0034	0.0030	0.0102	0.0063	0.03	0.3
Cyanide WAD	0.0025	0.0025	0.0025	0.0034	0.0031	0.0030	0.0029	0.0028	0.0028	0.0027	0.0025	0.0025	0.005	0.7

[1] CCME WQGs for protection of aquatic life, with these exceptions: CCME drinking water (Sb, Tl, U), BC aquatic life (Se, SO_4, F^-), BC drinking water (Mn), draft CCME (Cd, U)



Data Sources; Government of Canada, Victoria Gold Corp.

Stantec
4370 Dominion Street
Burnaby, British Columbia
V5G 4L7
Tel. (604) 436 3014
Fax. (604) 436 3752

Victoria Gold Corp

WATER MANAGEMENT AT THE PROJECT

EAGLE GOLD PROPERTY
YUKON TERRITORY

PROJECTION UTM - ZONE 8	DRAWN BY LS
DATUM NAD 83	CHECKED BY RS
DATE 8-December-2010	FIGURE NO. 1

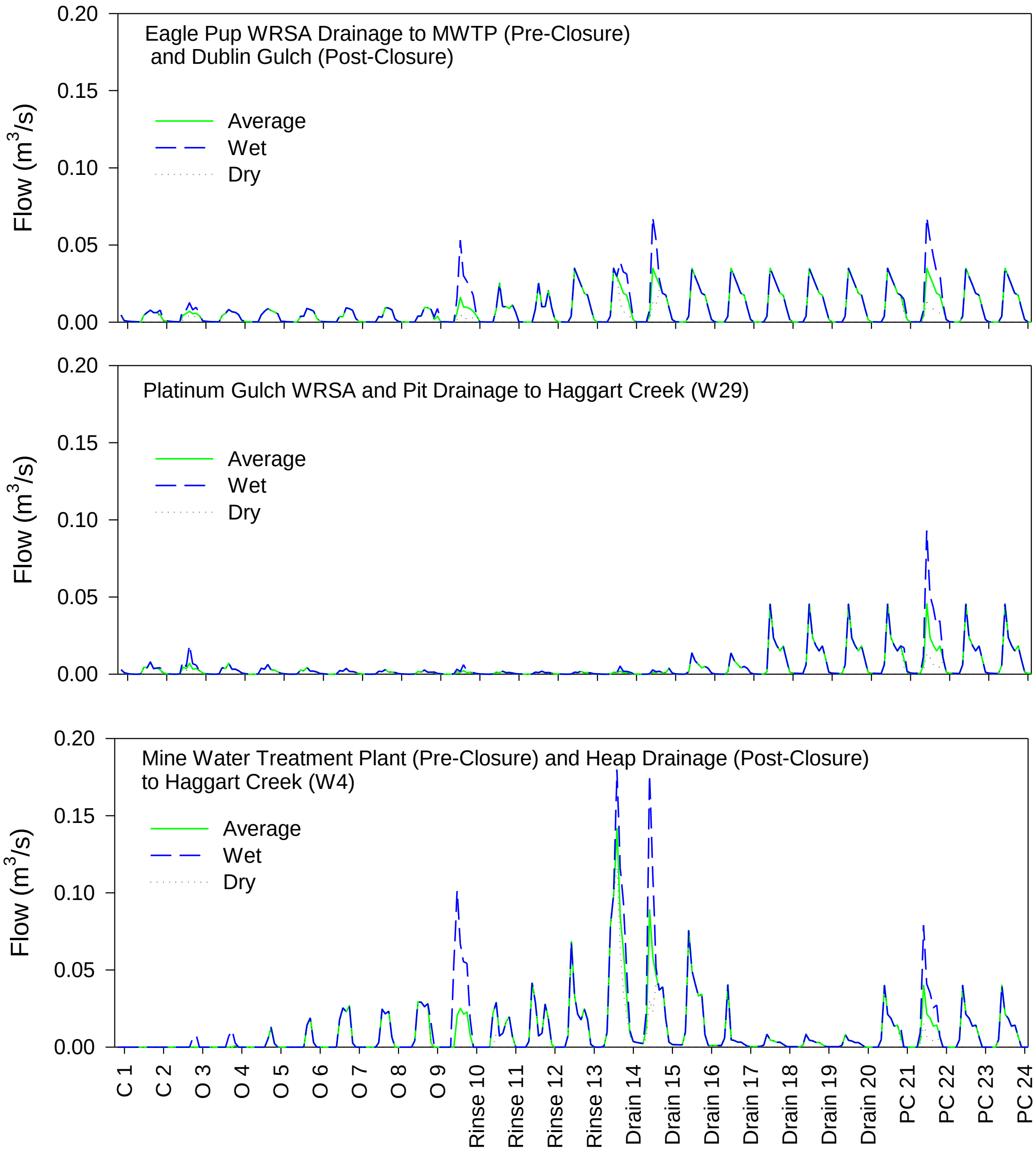


Figure 2: **Predicted Flows from the Eagle Pup Waste Rock Storage Area, Platinum Gulch Waste Rock Storage Area, and the Mine Water Treatment Plant and Heap Leach Facility (*C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure*)**

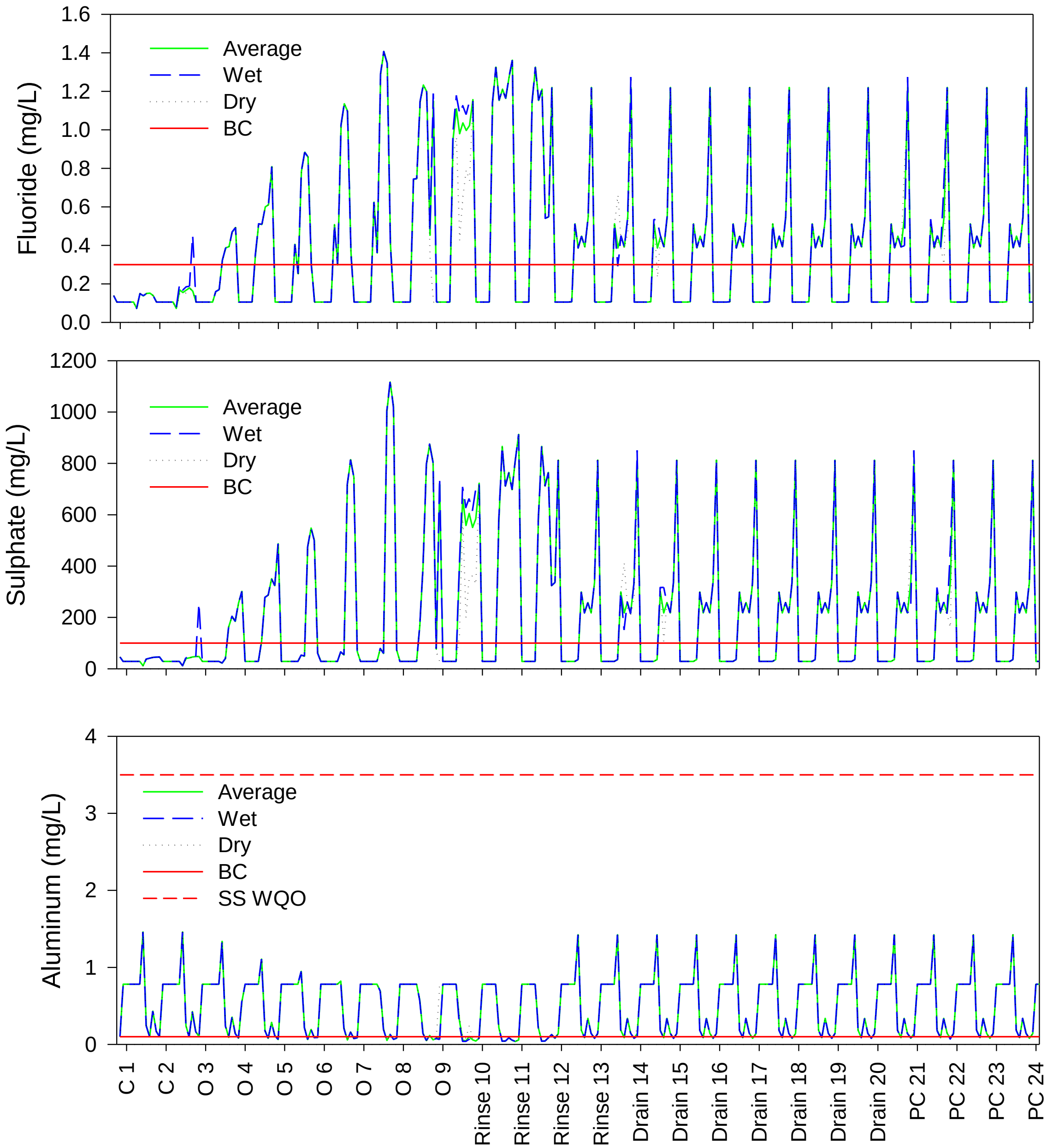


Figure 3: **Predicted Concentrations of Metals and Nutrients in Eagle Pup Waste Rock Storage Area Sediment Control Pond during all Project Phases (*C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure*)**

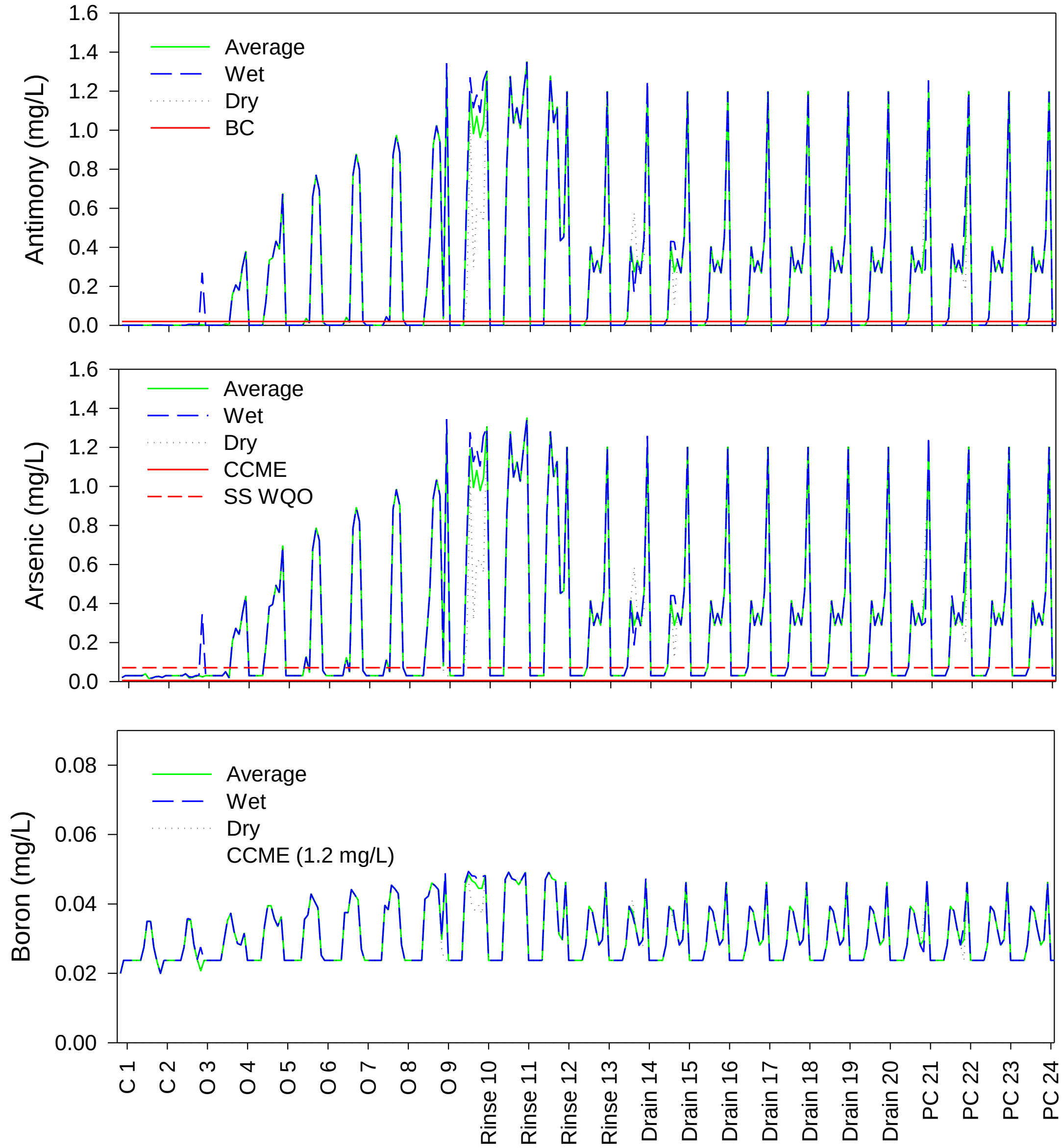


Figure 3: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Eagle Pup Waste Rock Storage Area Sediment Control Pond during all Project Phases**

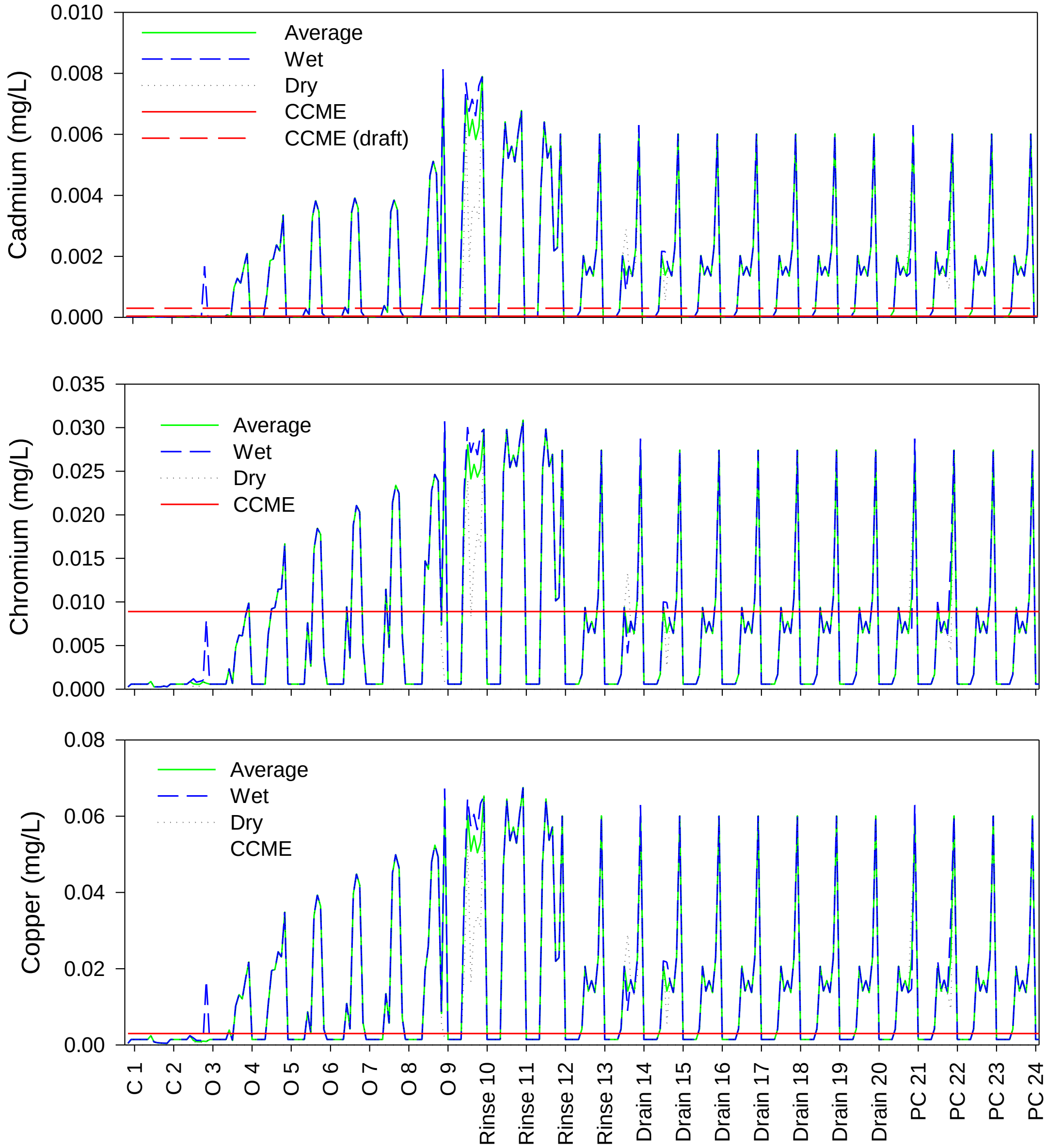


Figure 3: ***Continued*. Predicted Concentrations of Metals and Nutrients in Eagle Pup Waste Rock Storage Area Sediment Control Pond during all Project Phases**

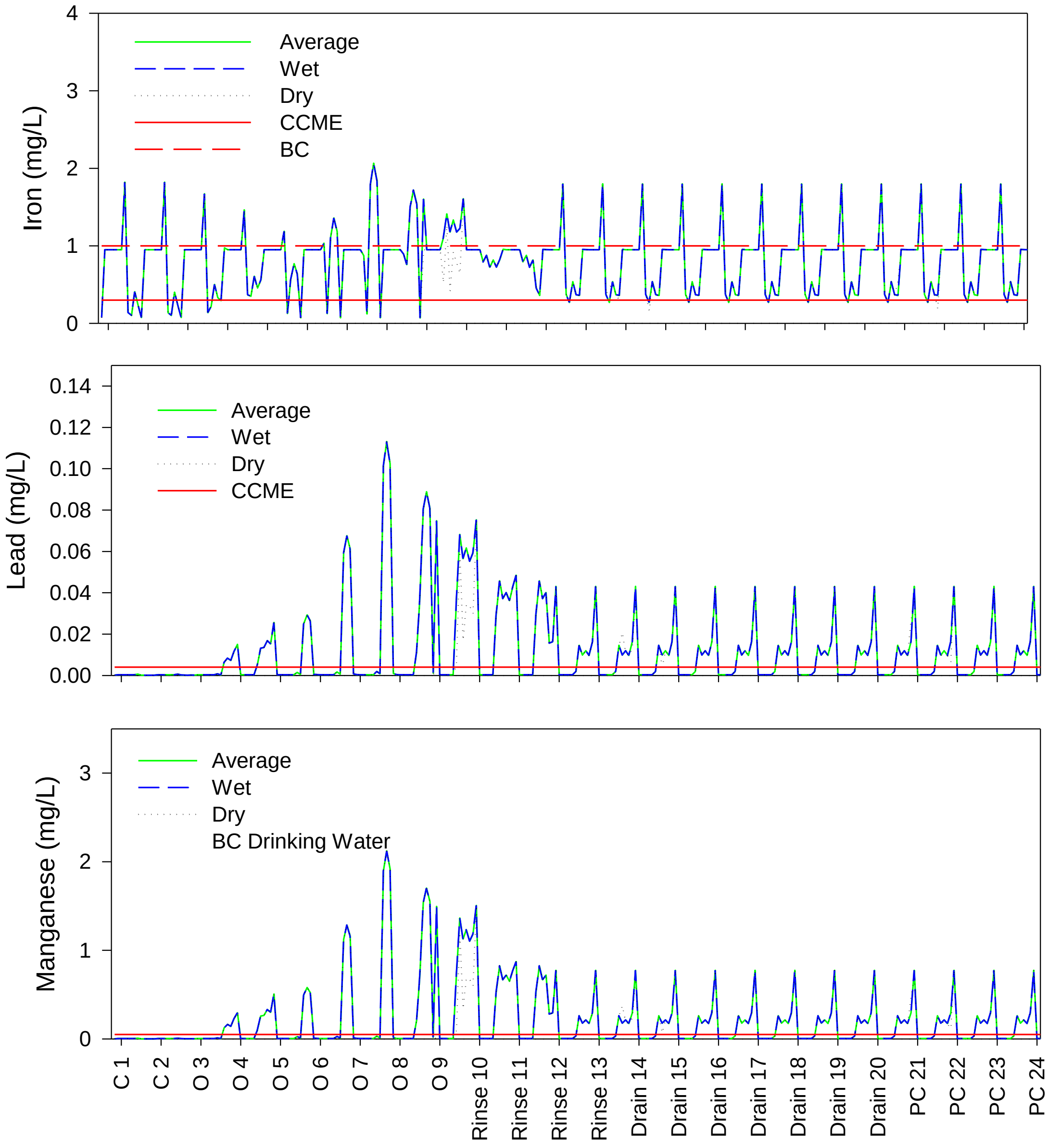


Figure 3: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Eagle Pup Waste Rock Storage Area Sediment Control Pond during all Project Phases**

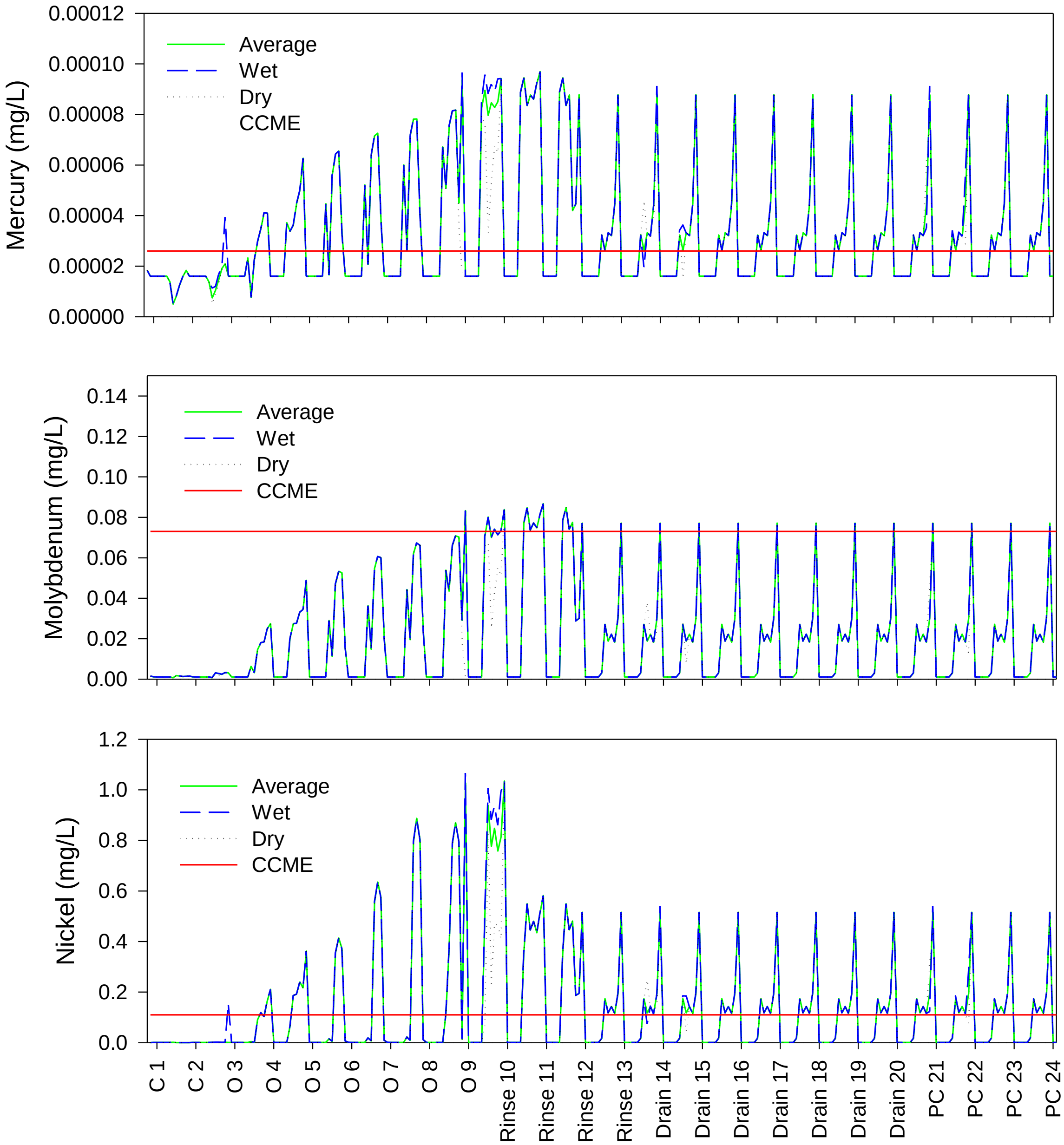


Figure 3: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Eagle Pup Waste Rock Storage Area Sediment Control Pond during all Project Phases**

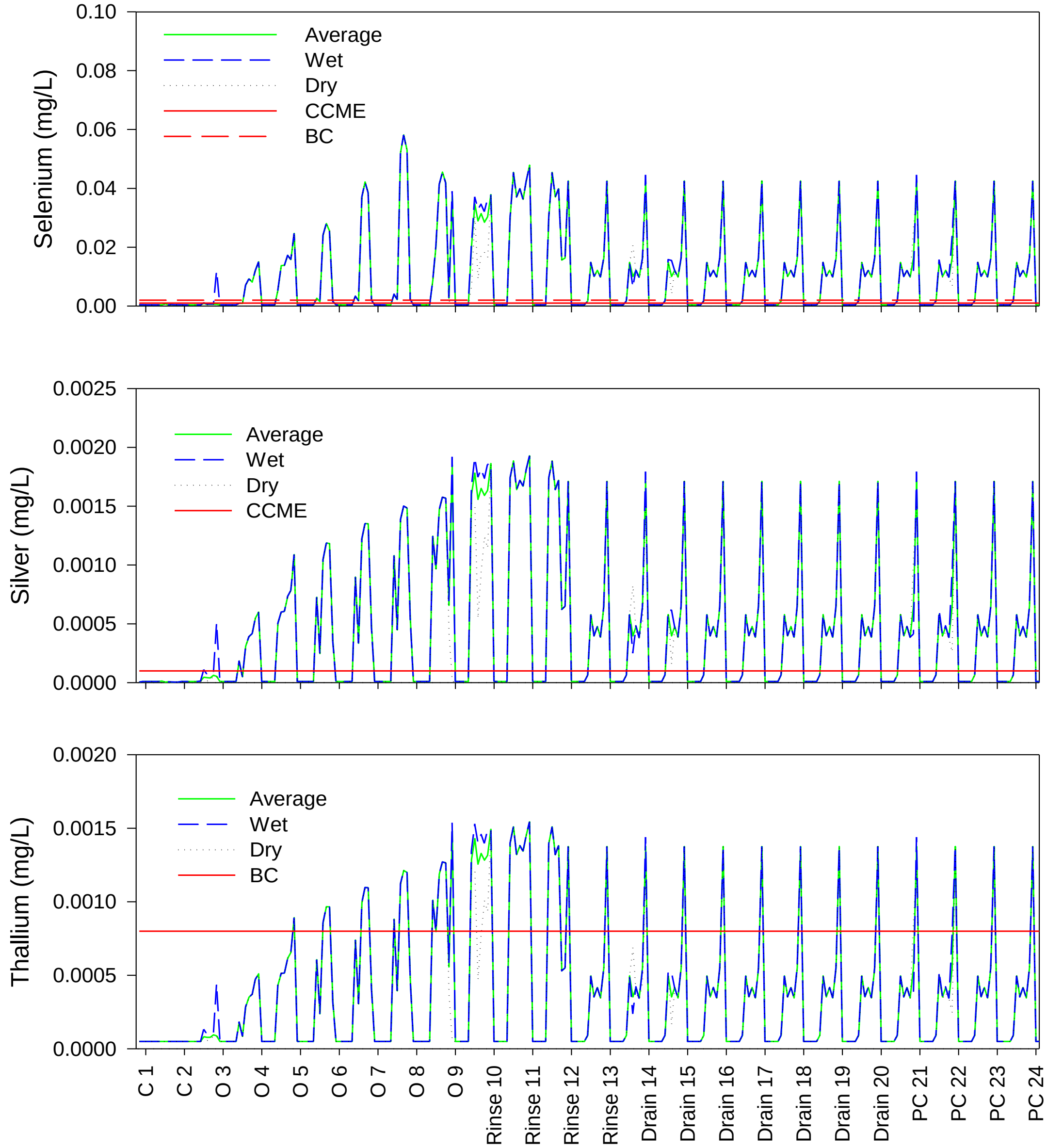


Figure 3: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Eagle Pup Waste Rock Storage Area Sediment Control Pond during all Project Phases**

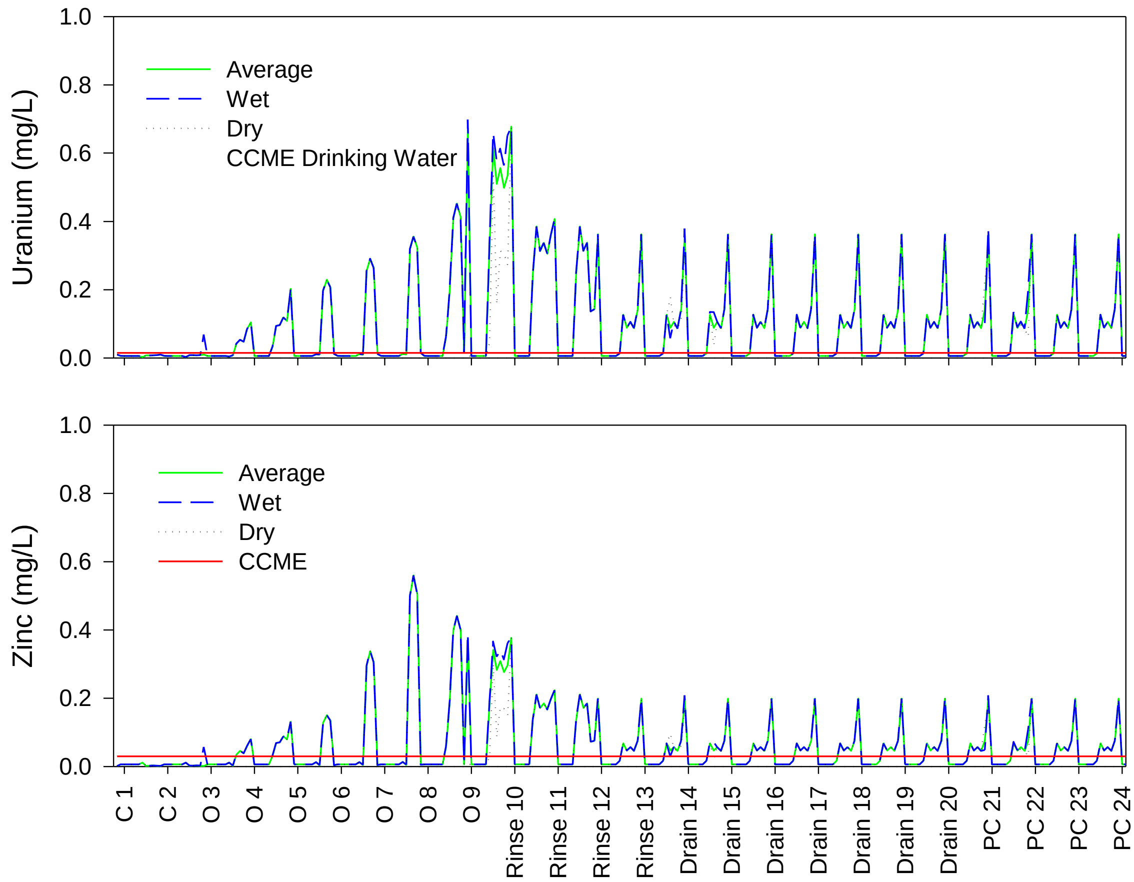


Figure 3: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Eagle Pup Waste Rock Storage Area Sediment Control Pond during all Project Phases**

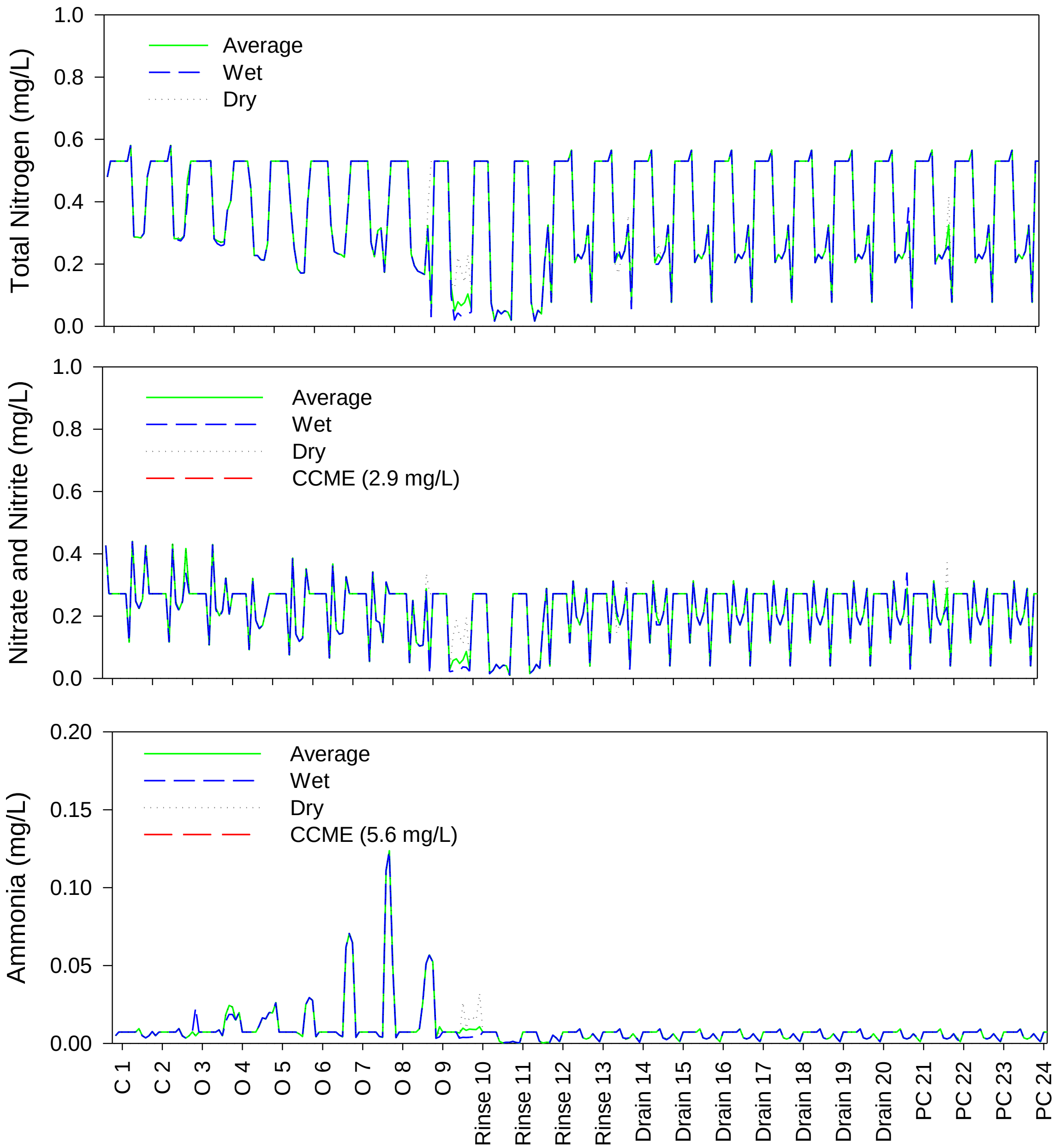


Figure 3: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Eagle Pup Waste Rock Storage Area Sediment Control Pond during all Project Phases**

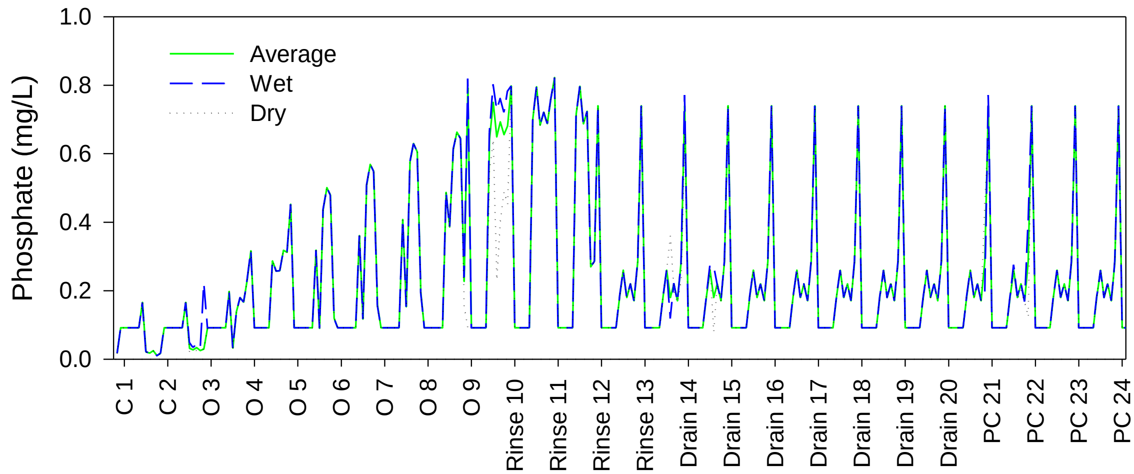


Figure 3: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Eagle Pup Waste Rock Storage Area Sediment Control Pond during all Project Phases**

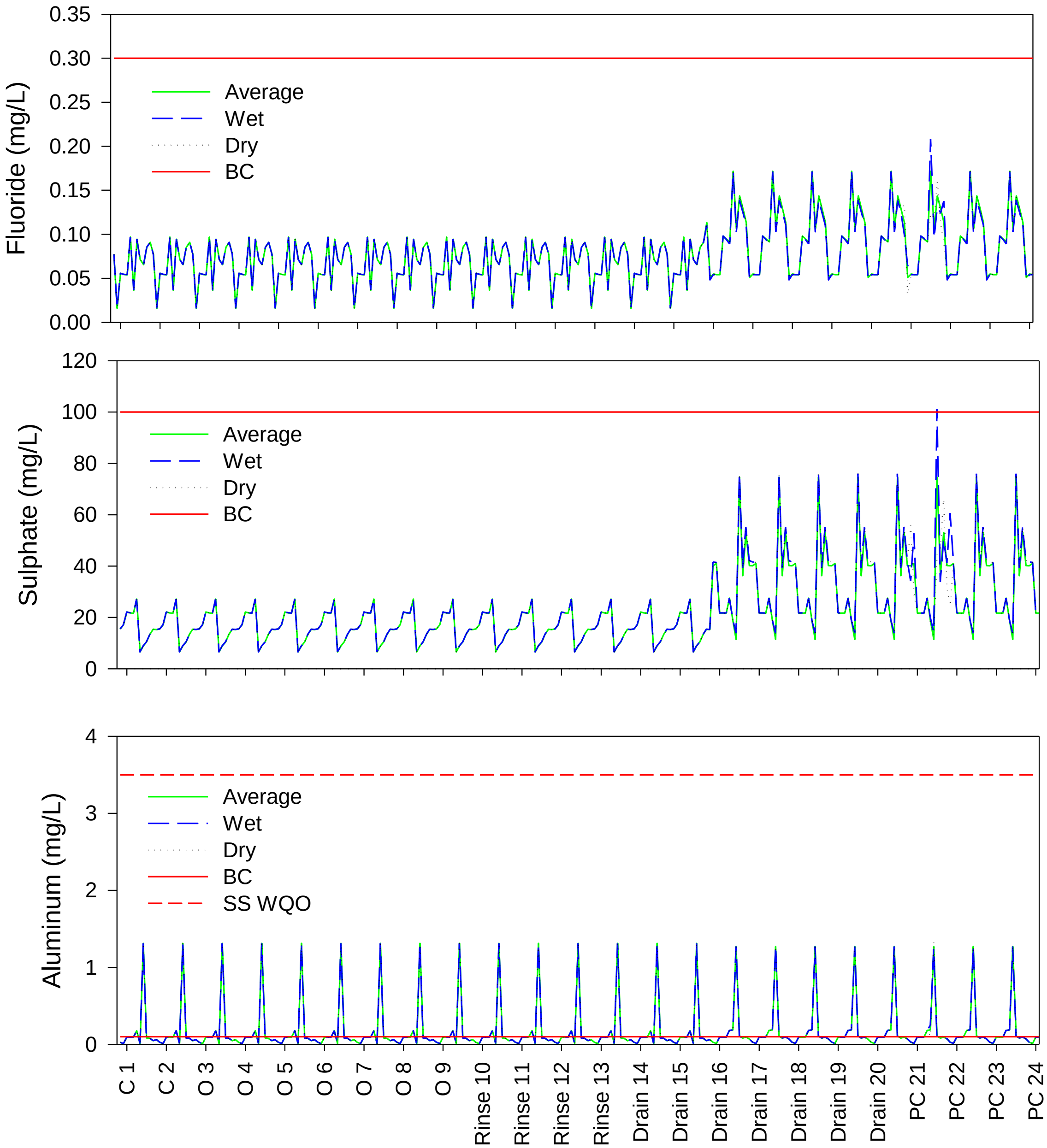


Figure 4: **Predicted Concentrations of Metals and Nutrients in Dublin Gulch (W71) during all Project Phases *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)***

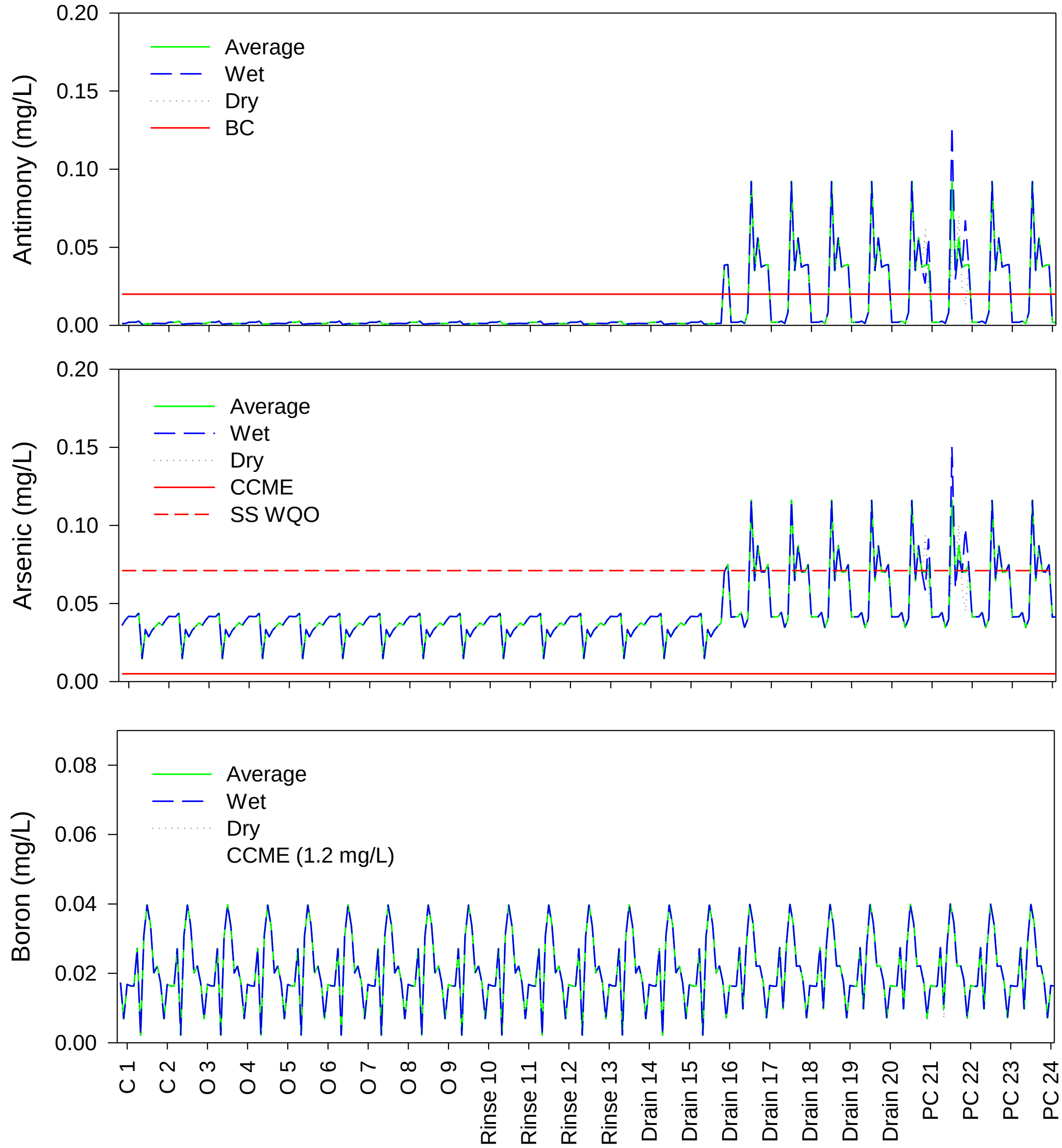


Figure 4: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Dublin Gulch (W71) during all Project Phases**

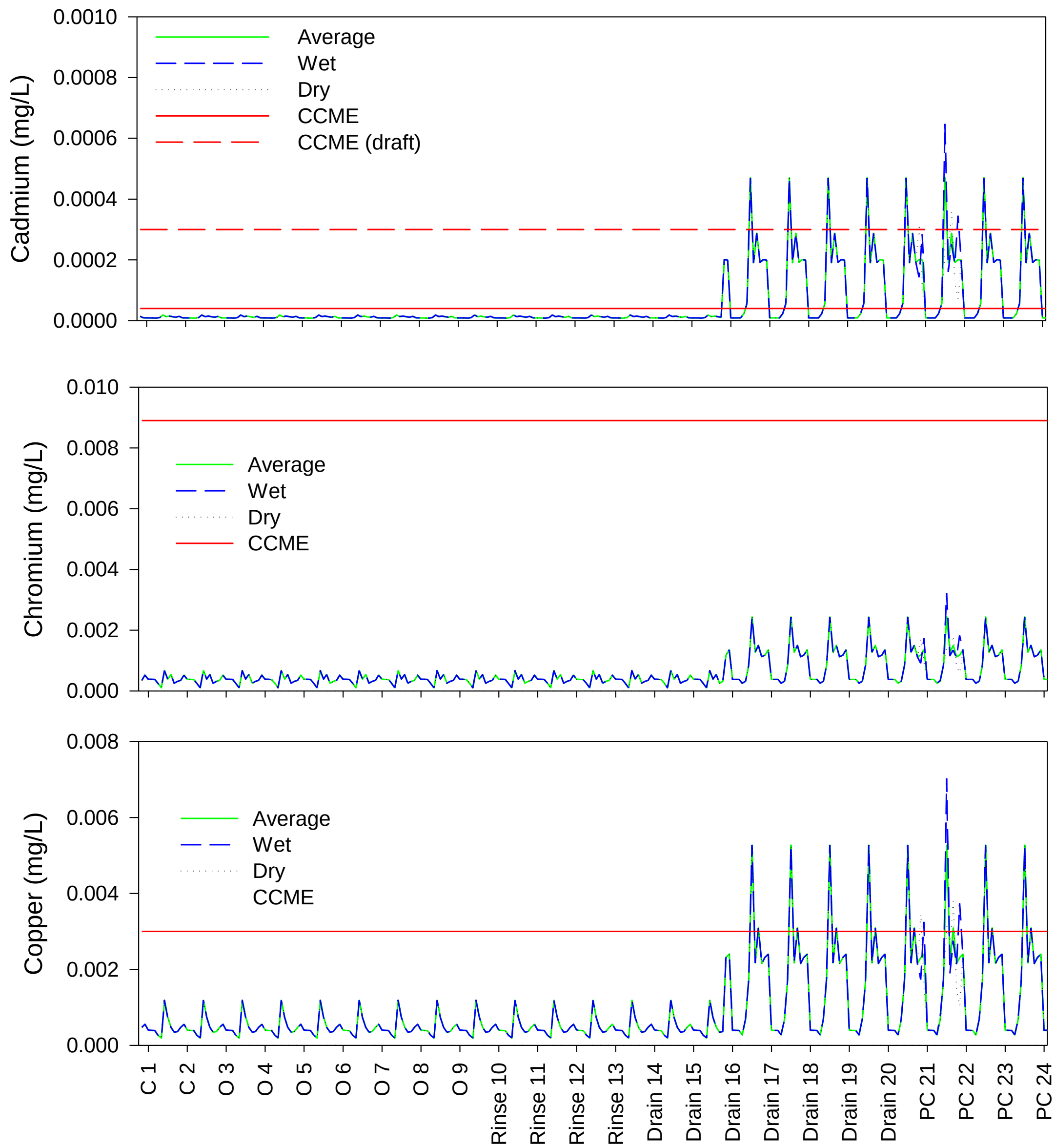


Figure 4: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Dublin Gulch (W71) during all Project Phases**

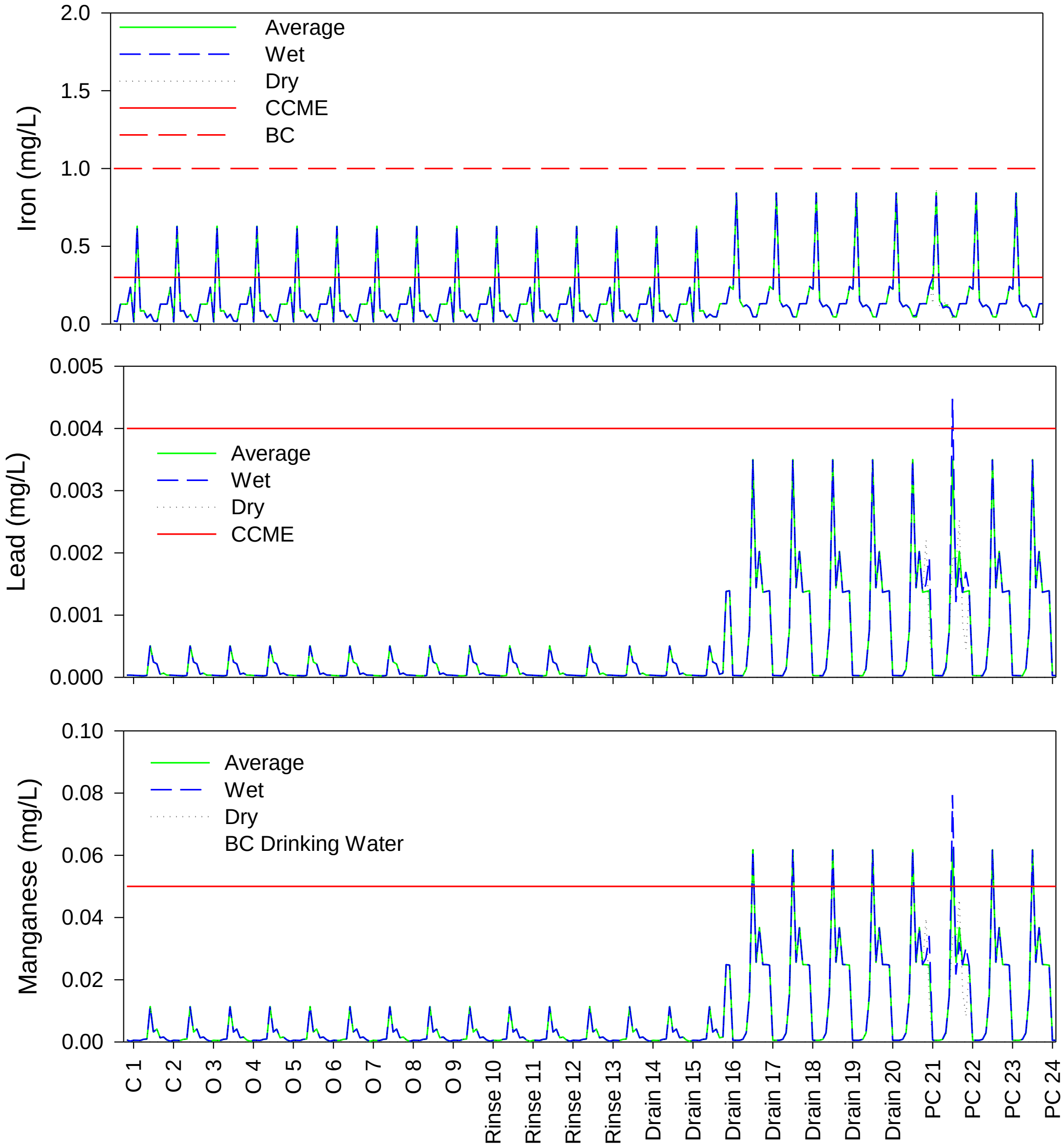


Figure 4: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Dublin Gulch (W71) during all Project Phases**

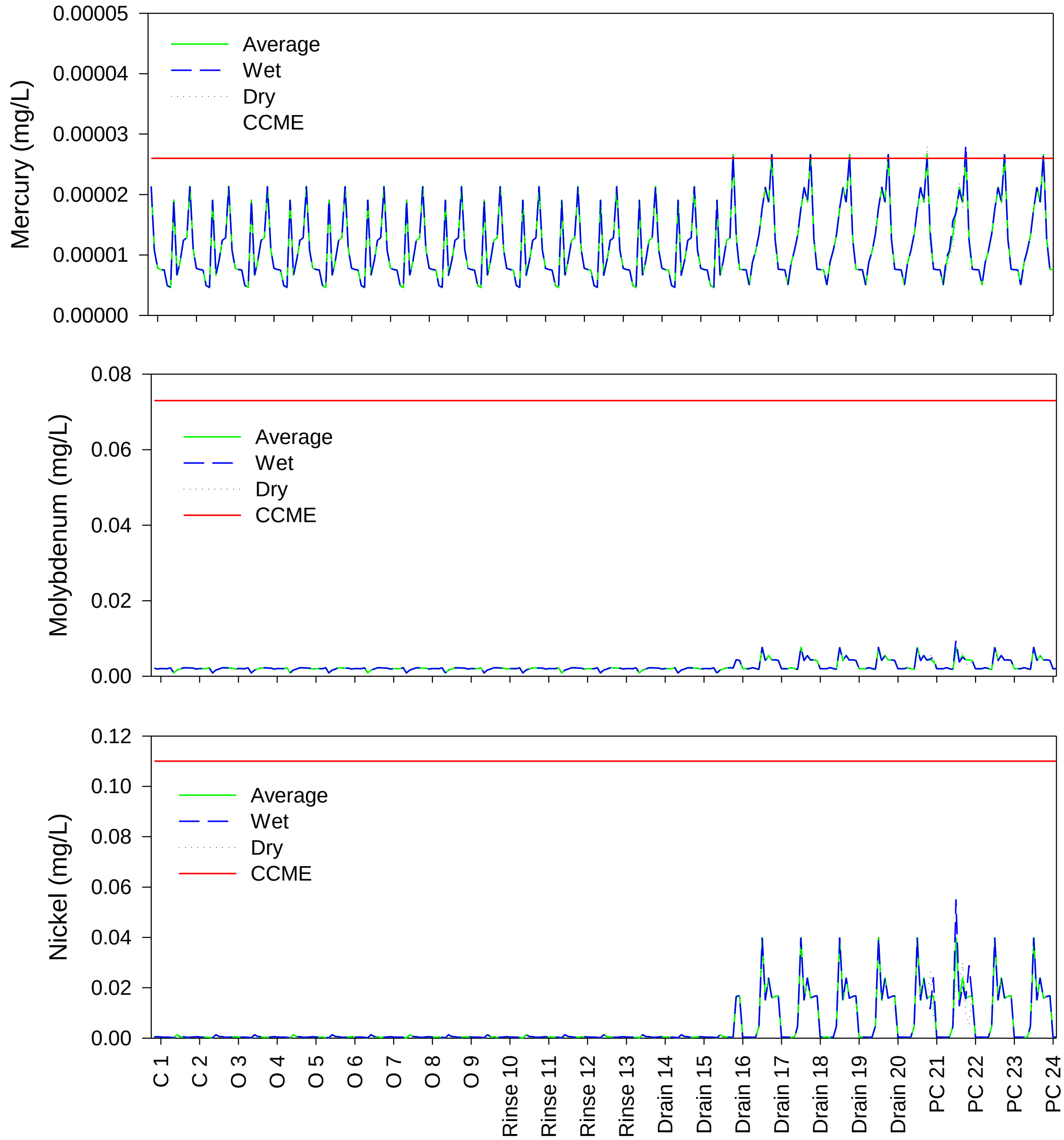


Figure 4: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Dublin Gulch (W71) during all Project Phases**

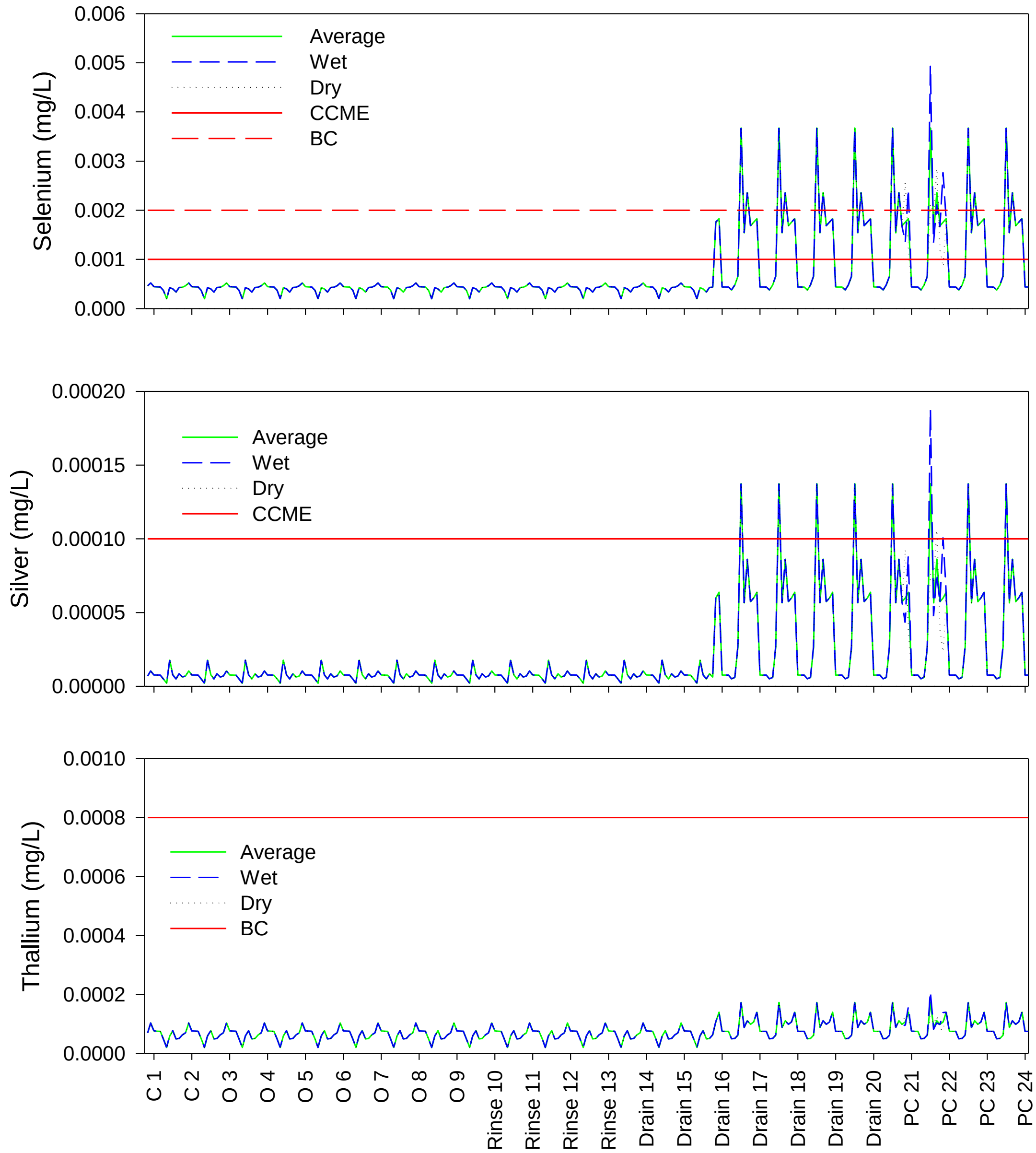


Figure 4: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Dublin Gulch (W71) during all Project Phases**

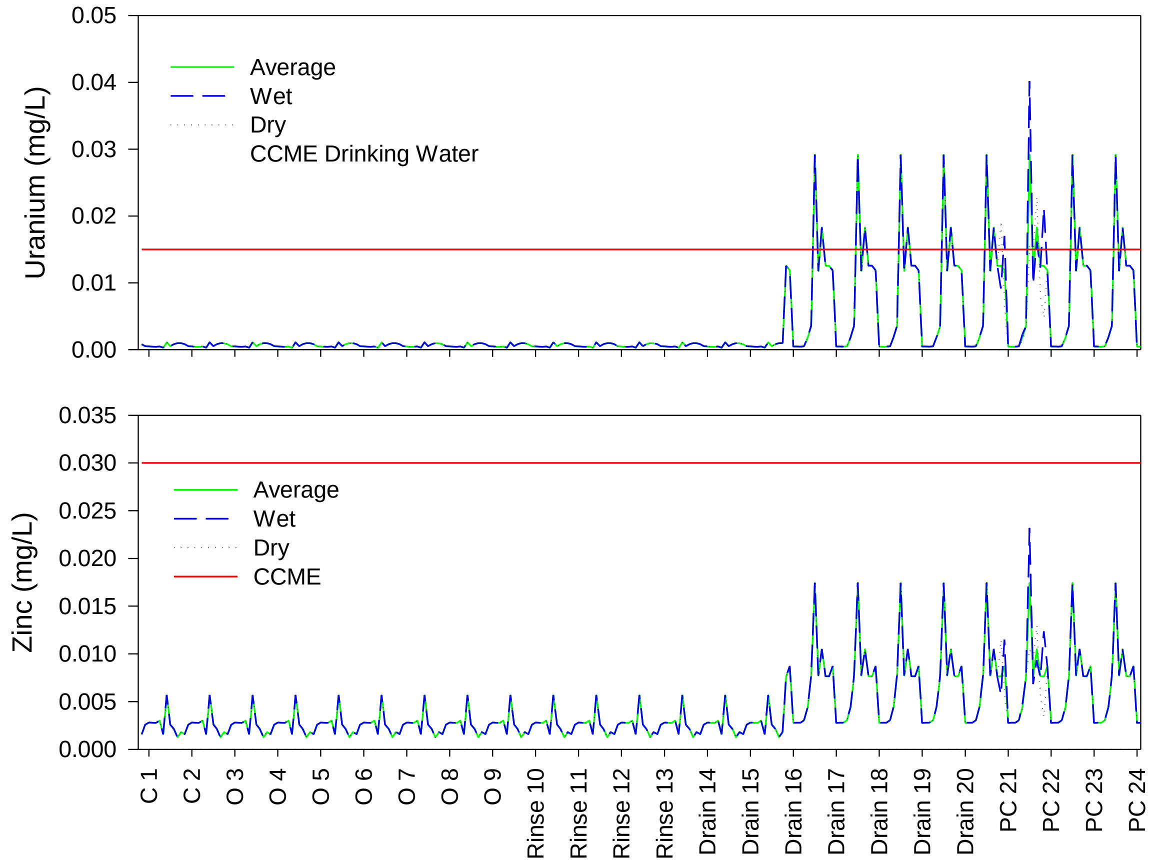


Figure 4: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Dublin Gulch (W71) during all Project Phases**

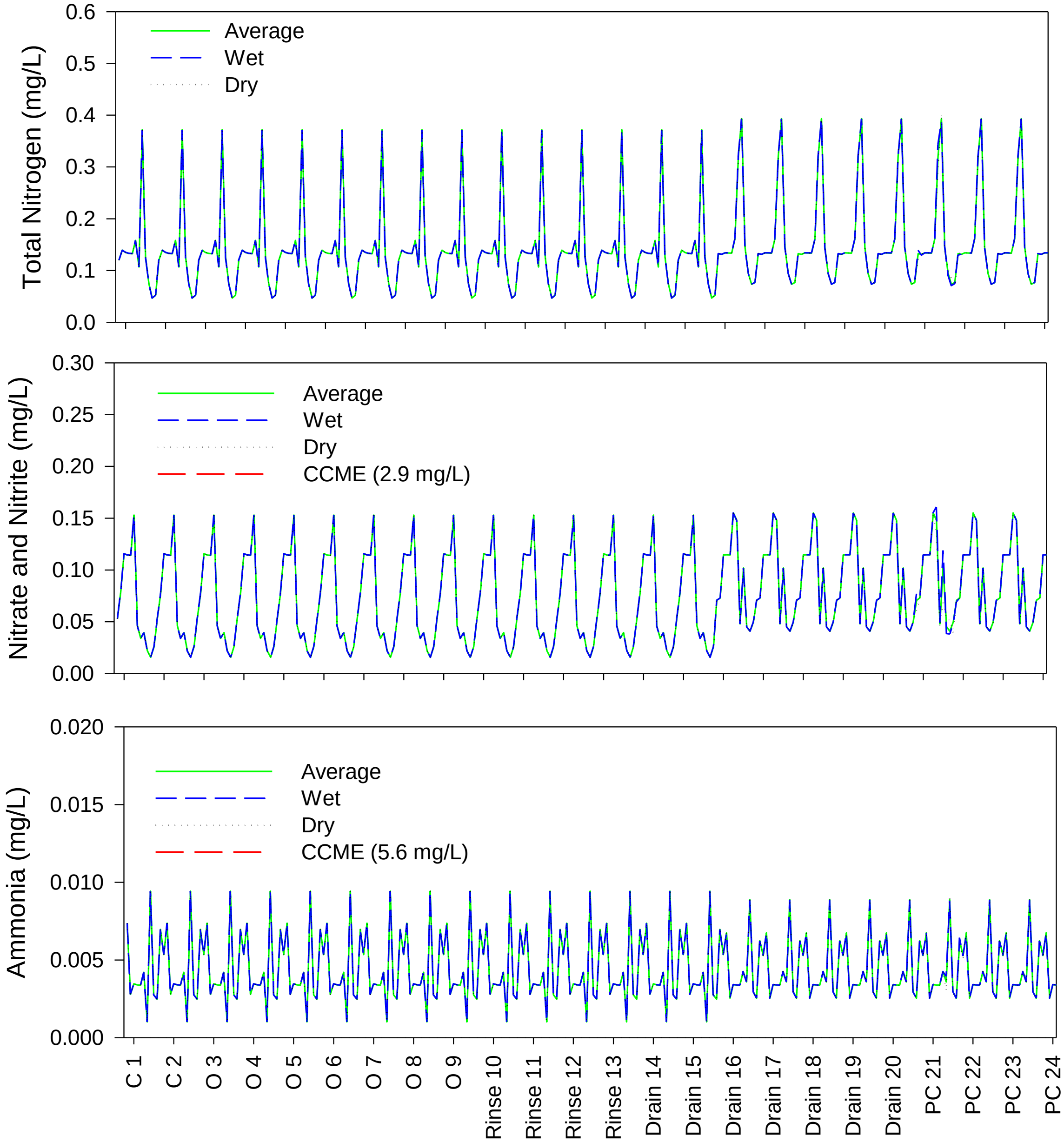


Figure 4: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Dublin Gulch (W71) during all Project Phases**

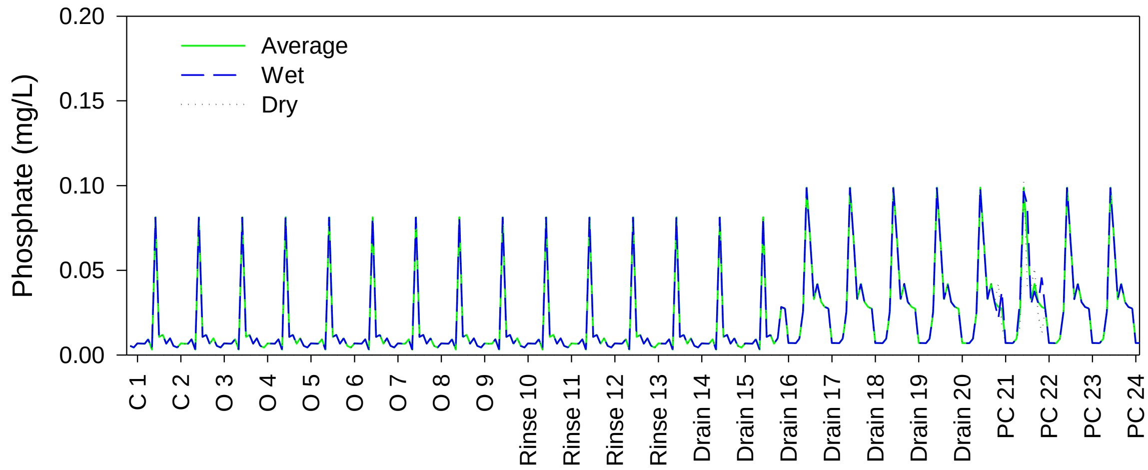


Figure 4: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Dublin Gulch (W71) during all Project Phases**

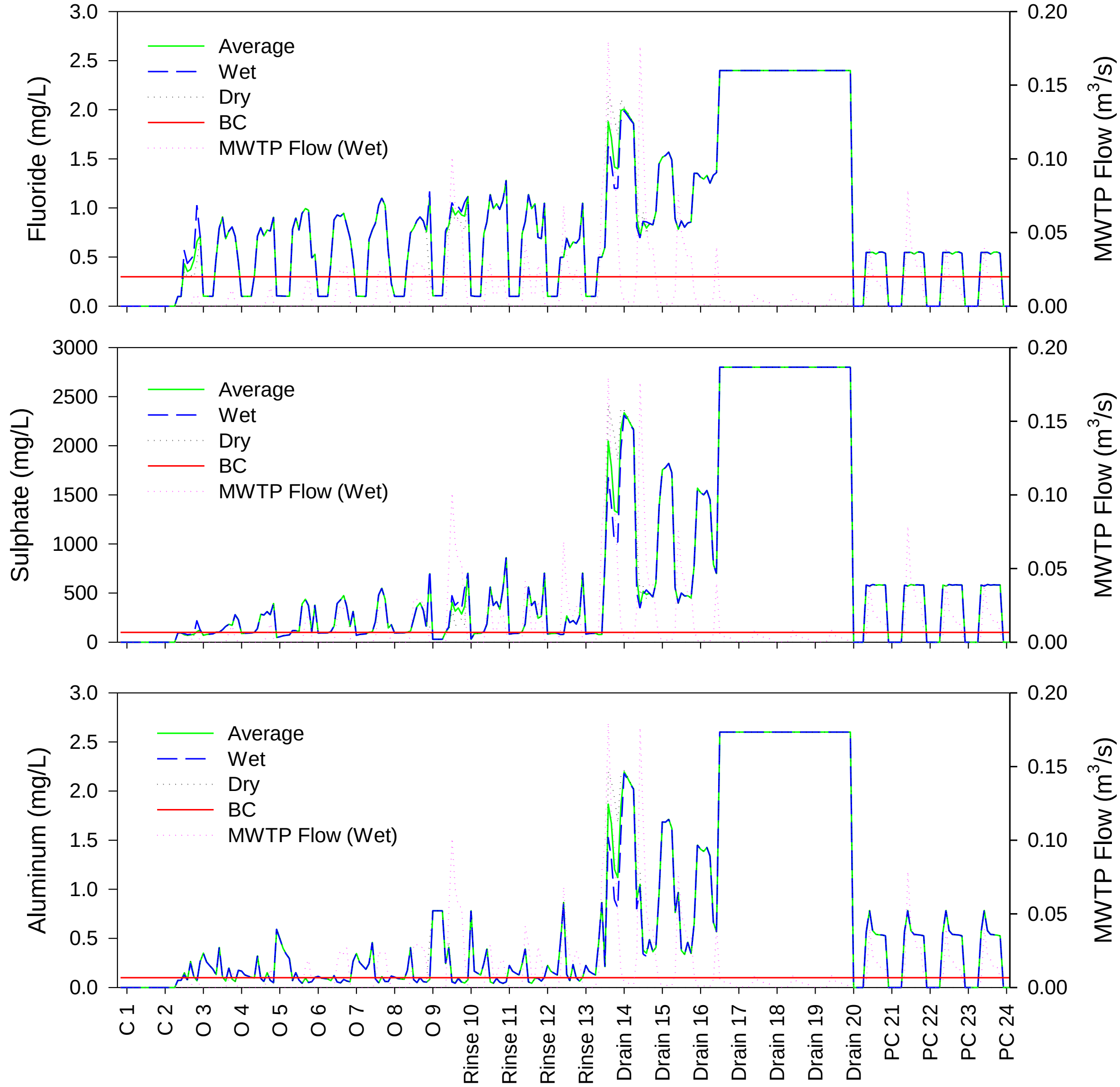


Figure 5: **Predicted Flows through the MWTP and Concentrations of Metals and Nutrients in the MWTP Feed Pond during all Project Phases** ***(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)***

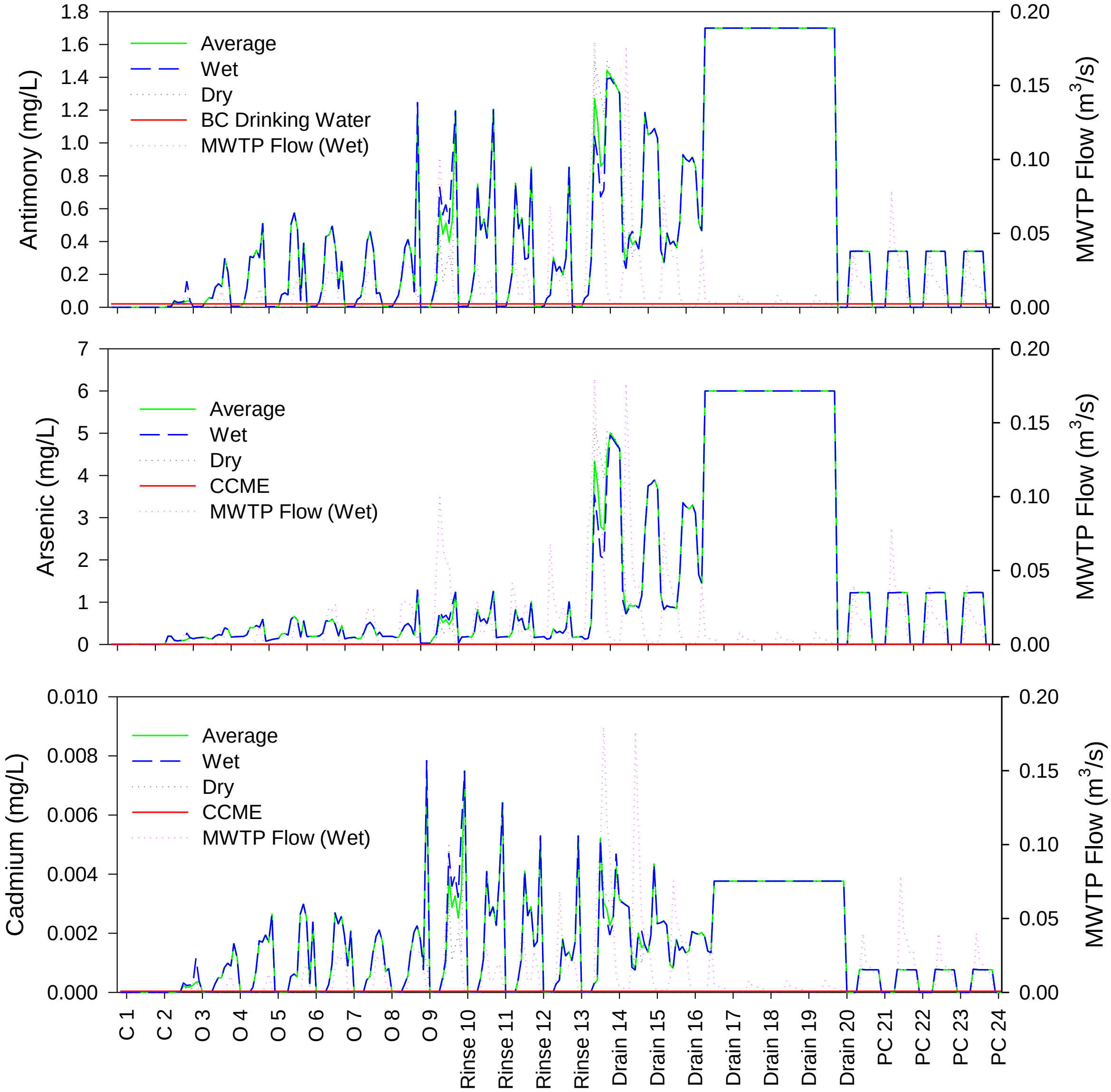


Figure 5: ***Continued.*** **Predicted Flows through the MWTP and Concentrations of Metals and Nutrients in the MWTP Feed Pond during all Project Phases**

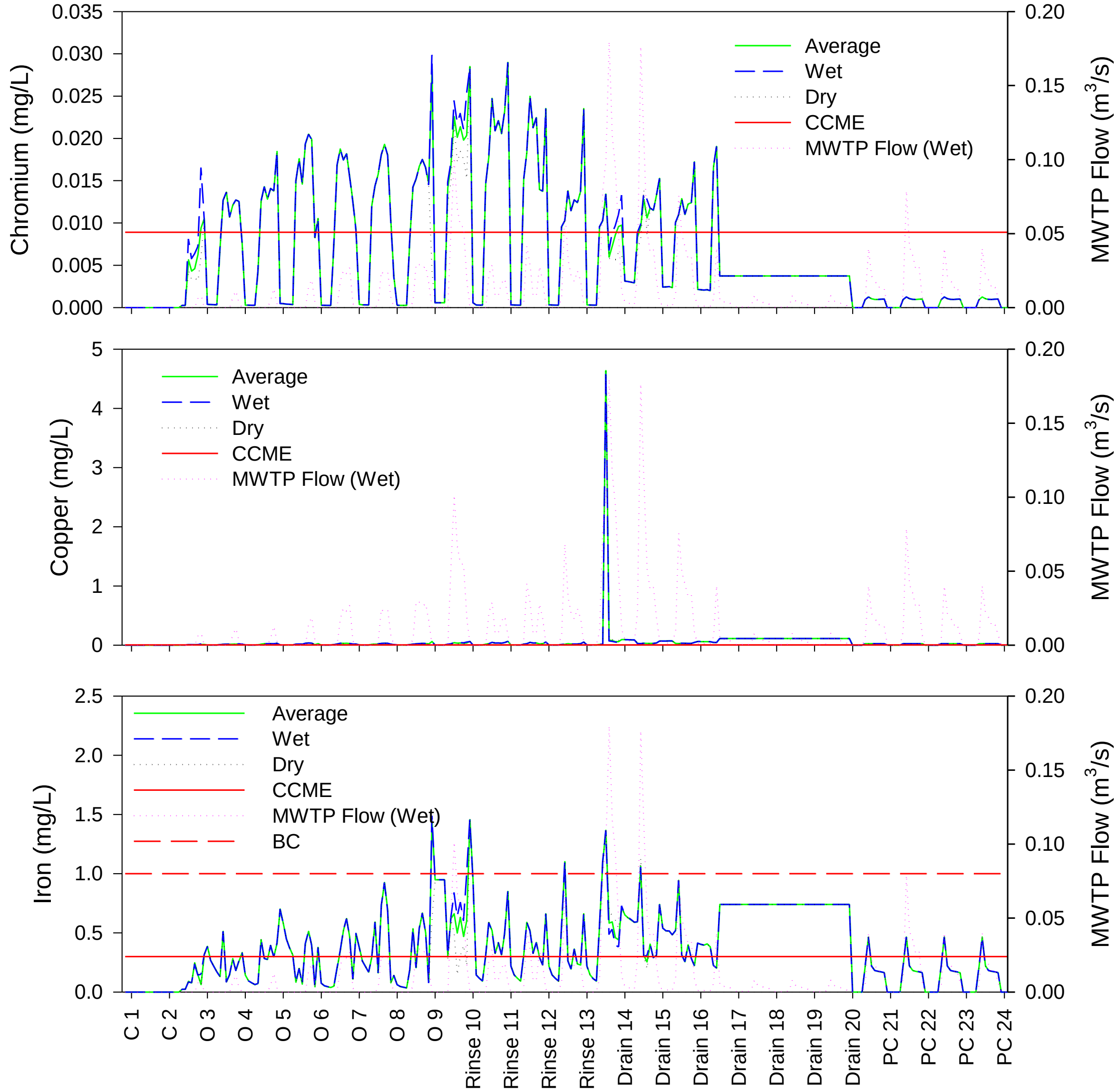


Figure 5: ***Continued.*** **Predicted Flows through the MWTP and Concentrations of Metals and Nutrients in the MWTP Feed Pond during all Project Phases**

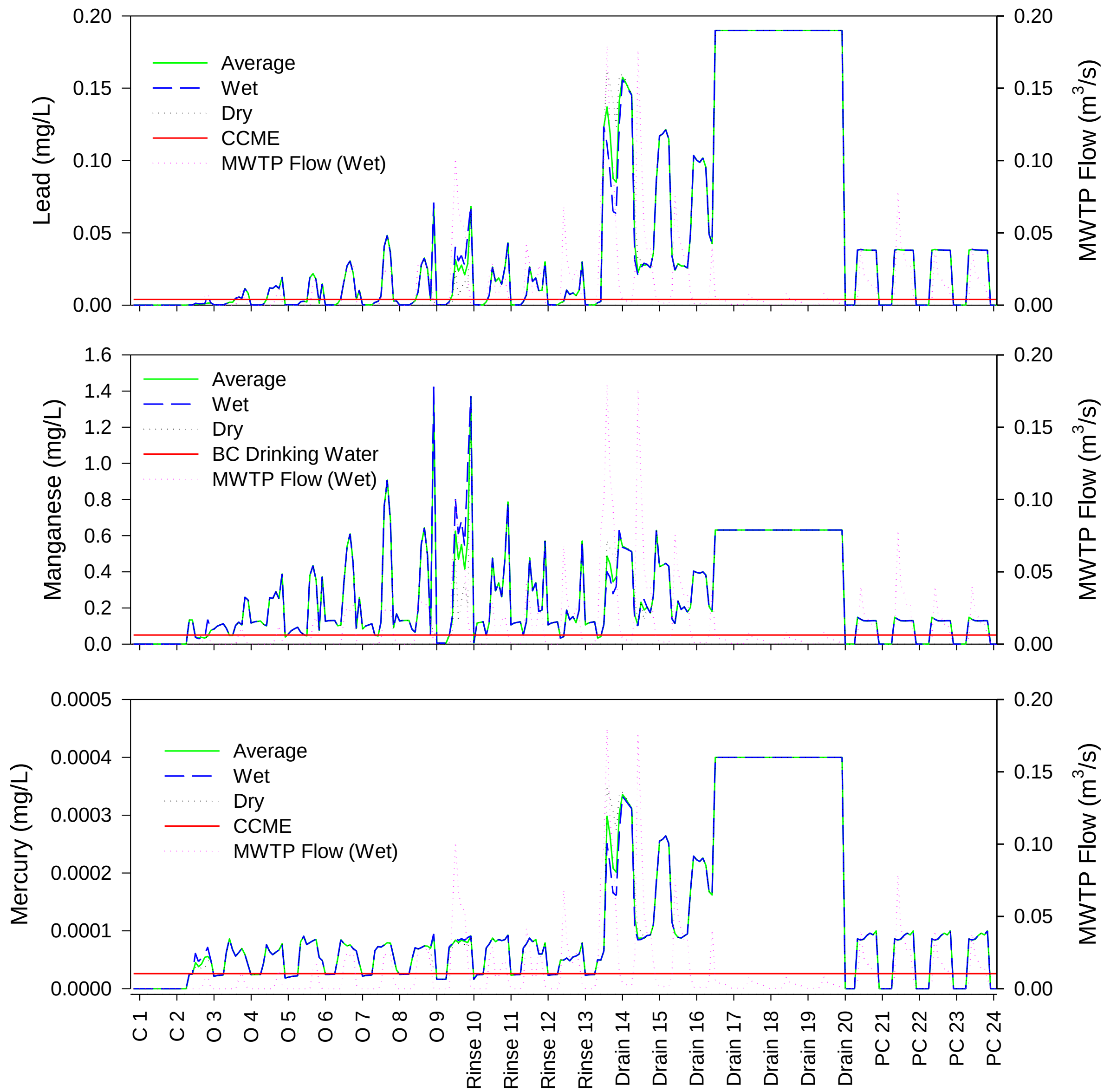


Figure 5: ***Continued.*** **Predicted Flows through the MWTP and Concentrations of Metals and Nutrients in the MWTP Feed Pond during all Project Phases**

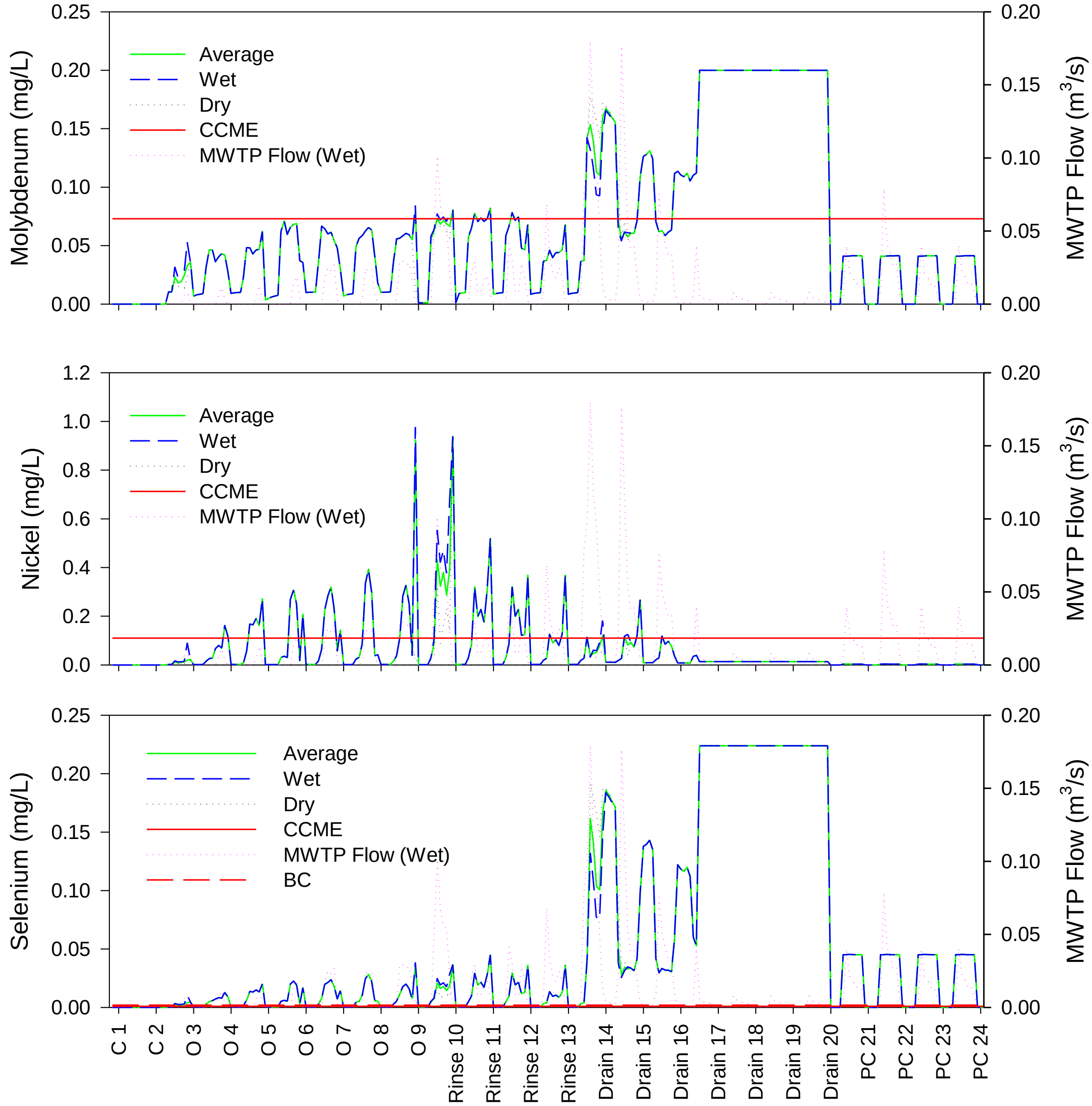


Figure 5: ***Continued.*** **Predicted Flows through the MWTP and Concentrations of Metals and Nutrients in the MWTP Feed Pond during all Project Phases**

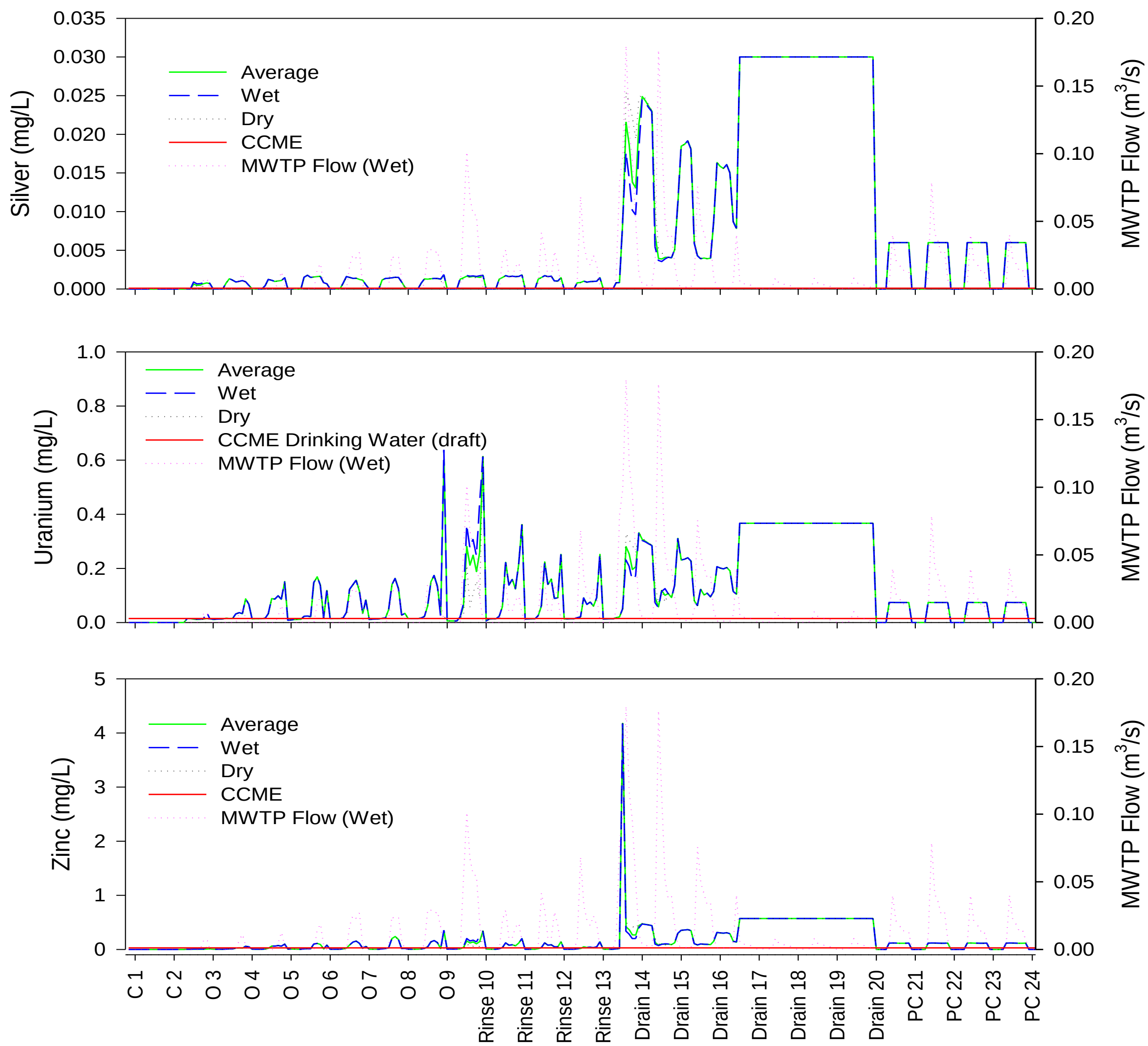


Figure 5: ***Continued.*** **Predicted Flows through the MWTP and Concentrations of Metals and Nutrients in the MWTP Feed Pond during all Project Phases**

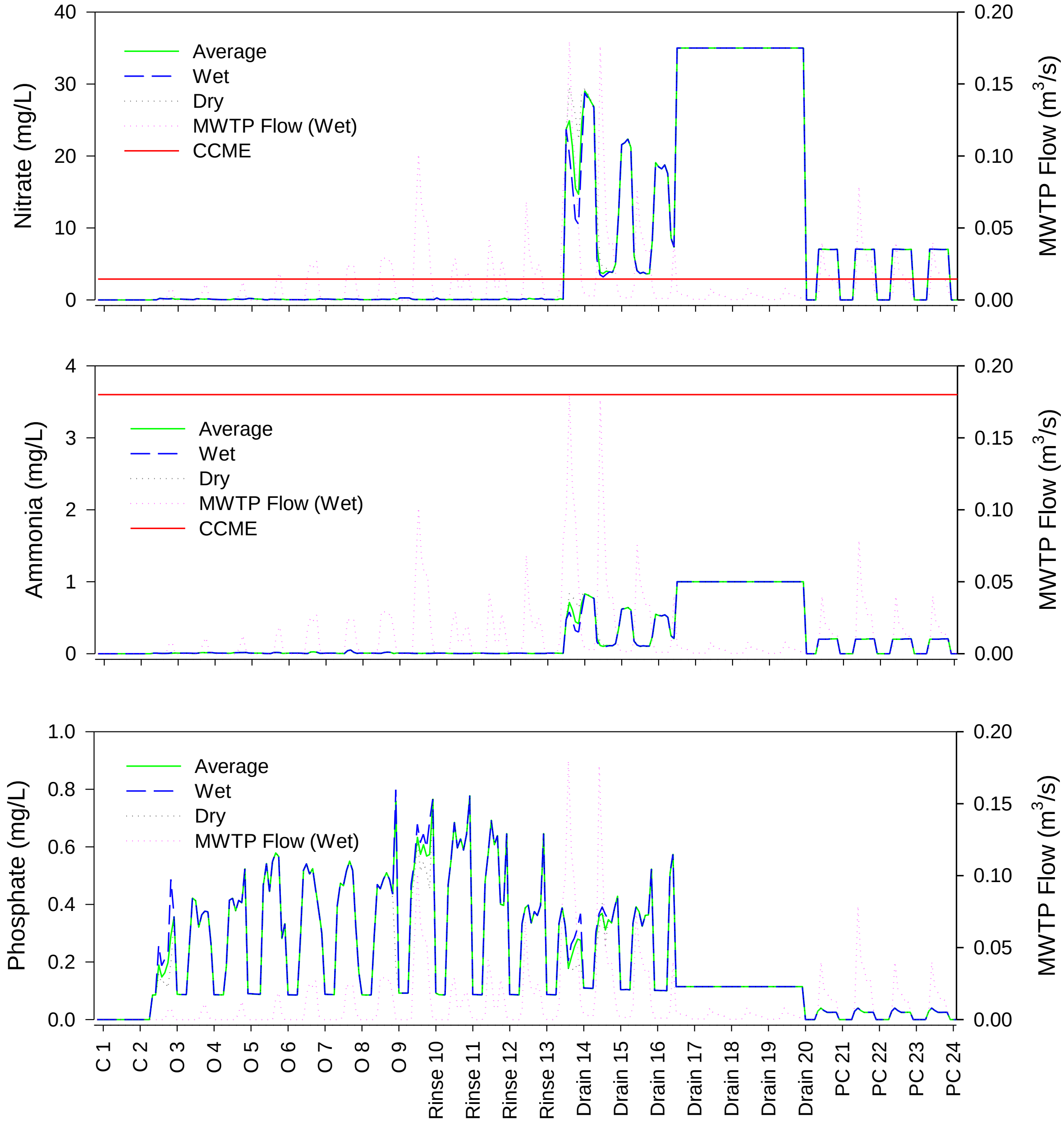


Figure 5: ***Continued.*** **Predicted Flows through the MWTP and Concentrations of Metals and Nutrients in the MWTP Feed Pond during all Project Phases**

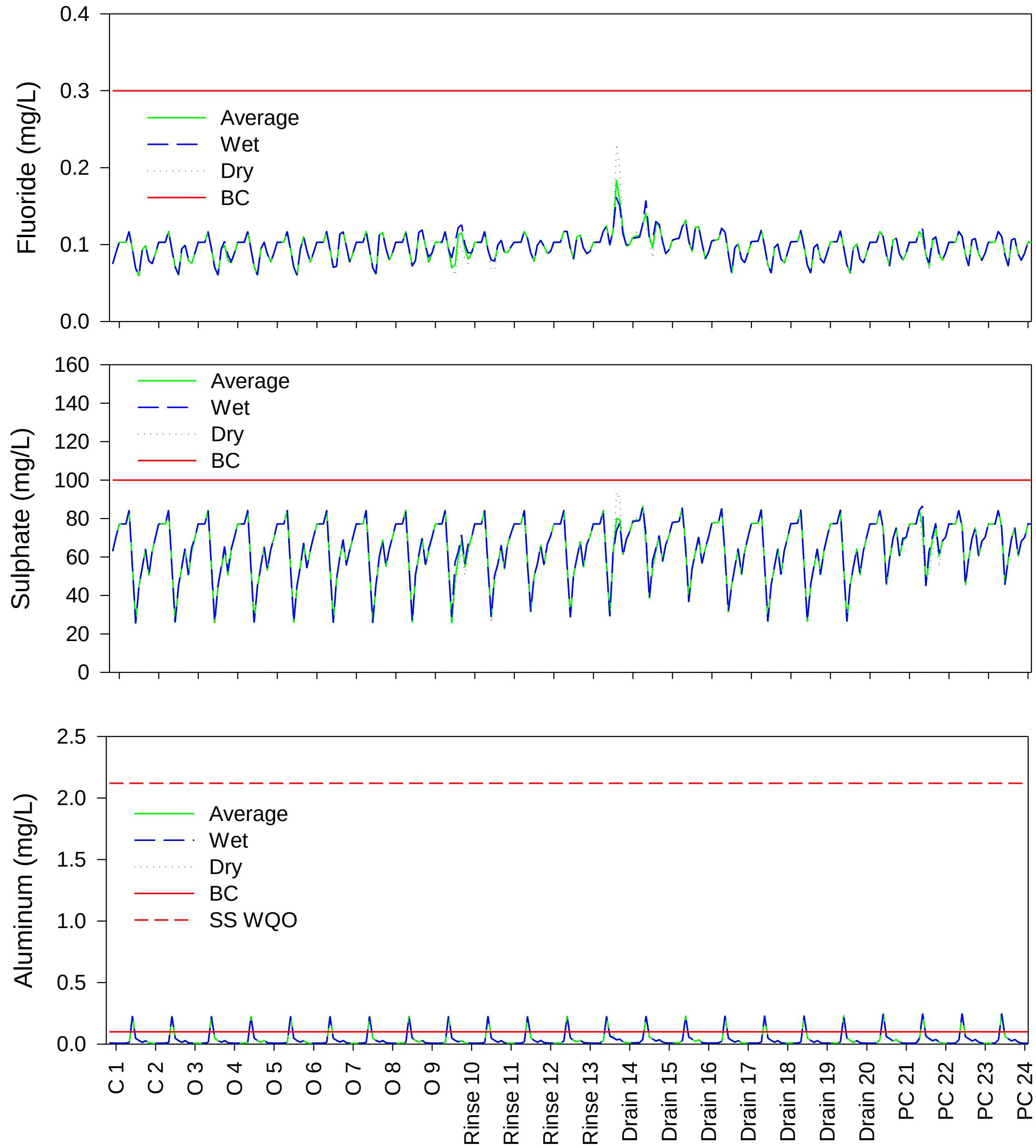


Figure 6: Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)*

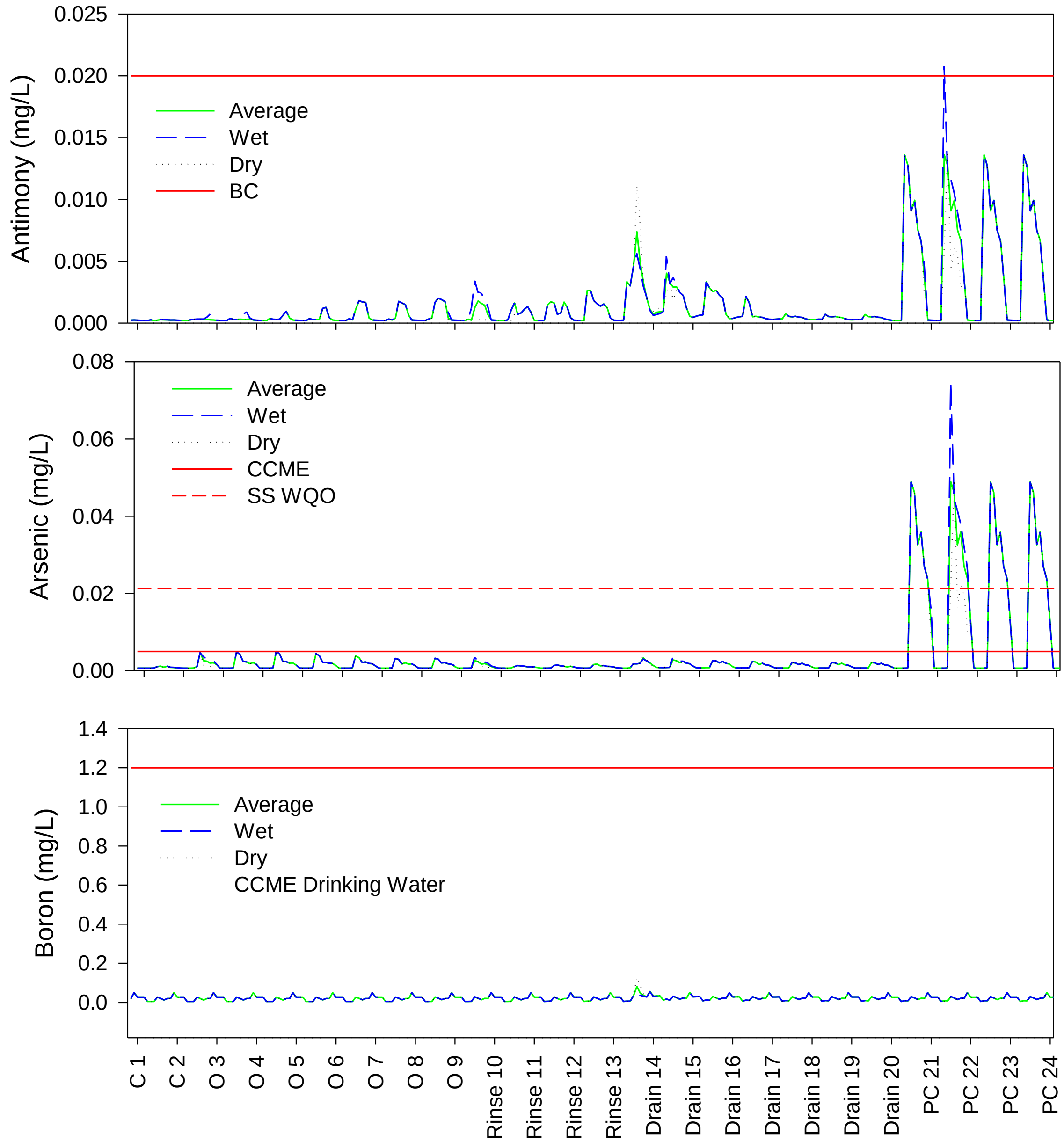


Figure 6: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases**

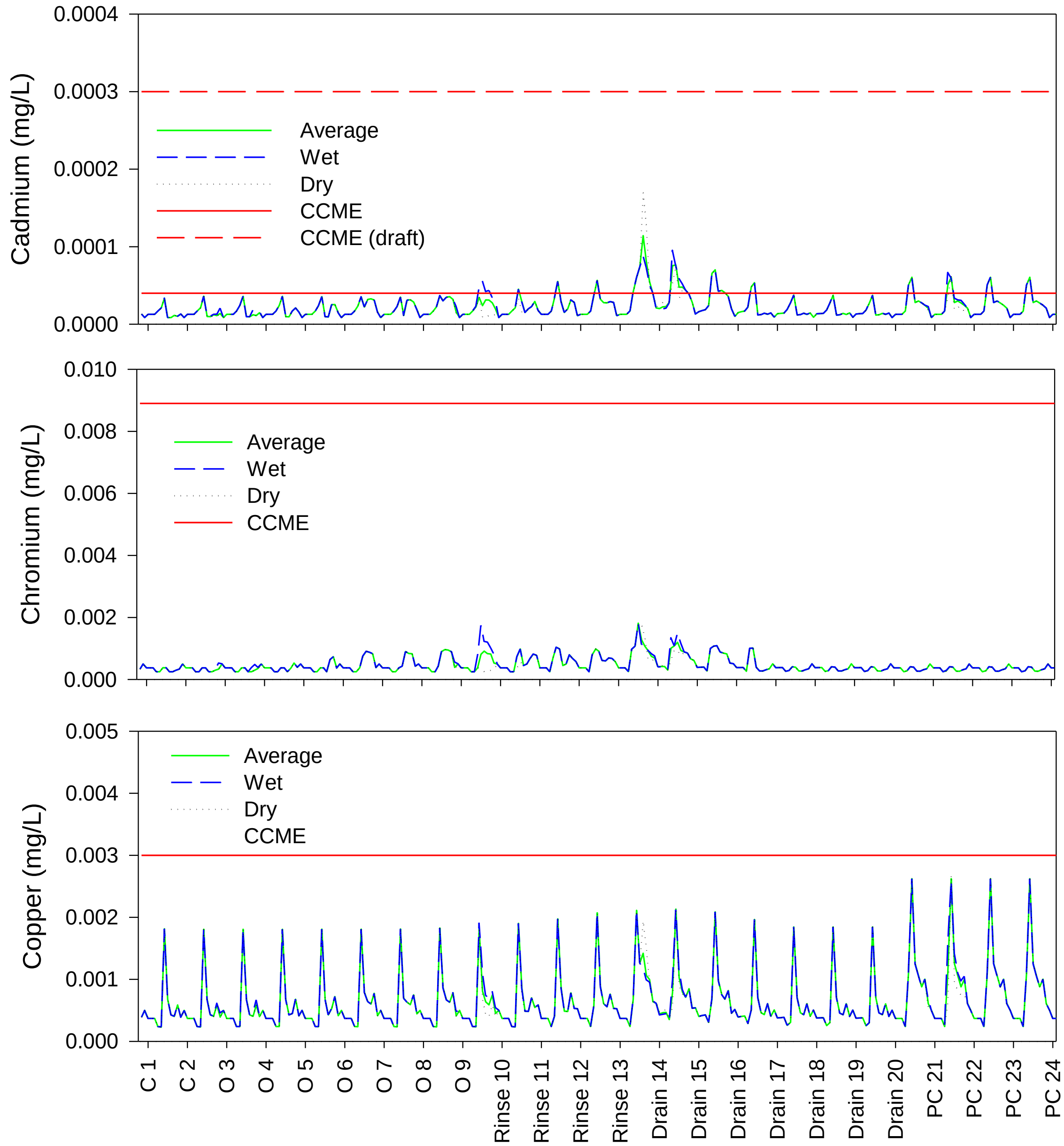


Figure 6: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases**

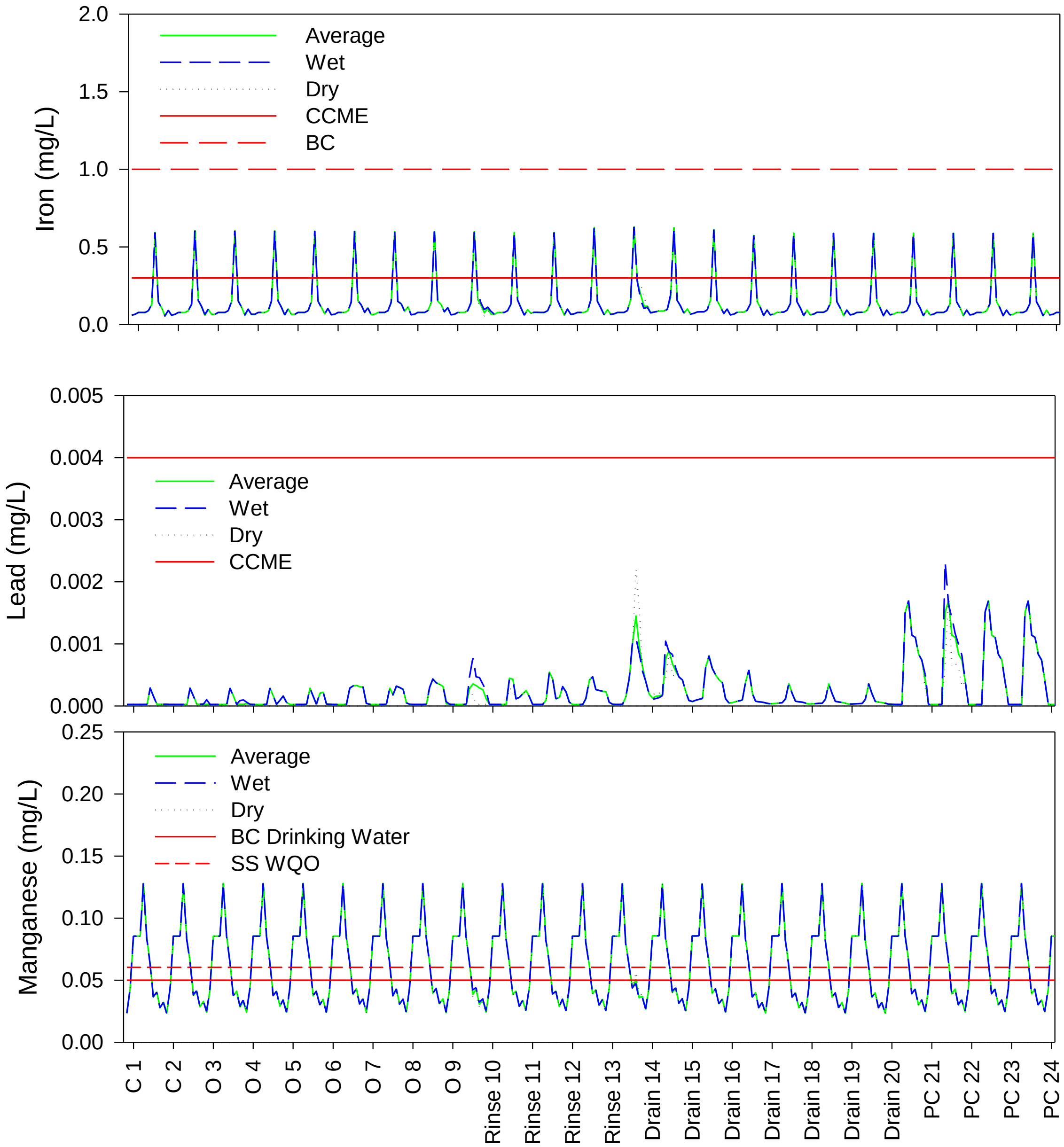


Figure 6: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases**

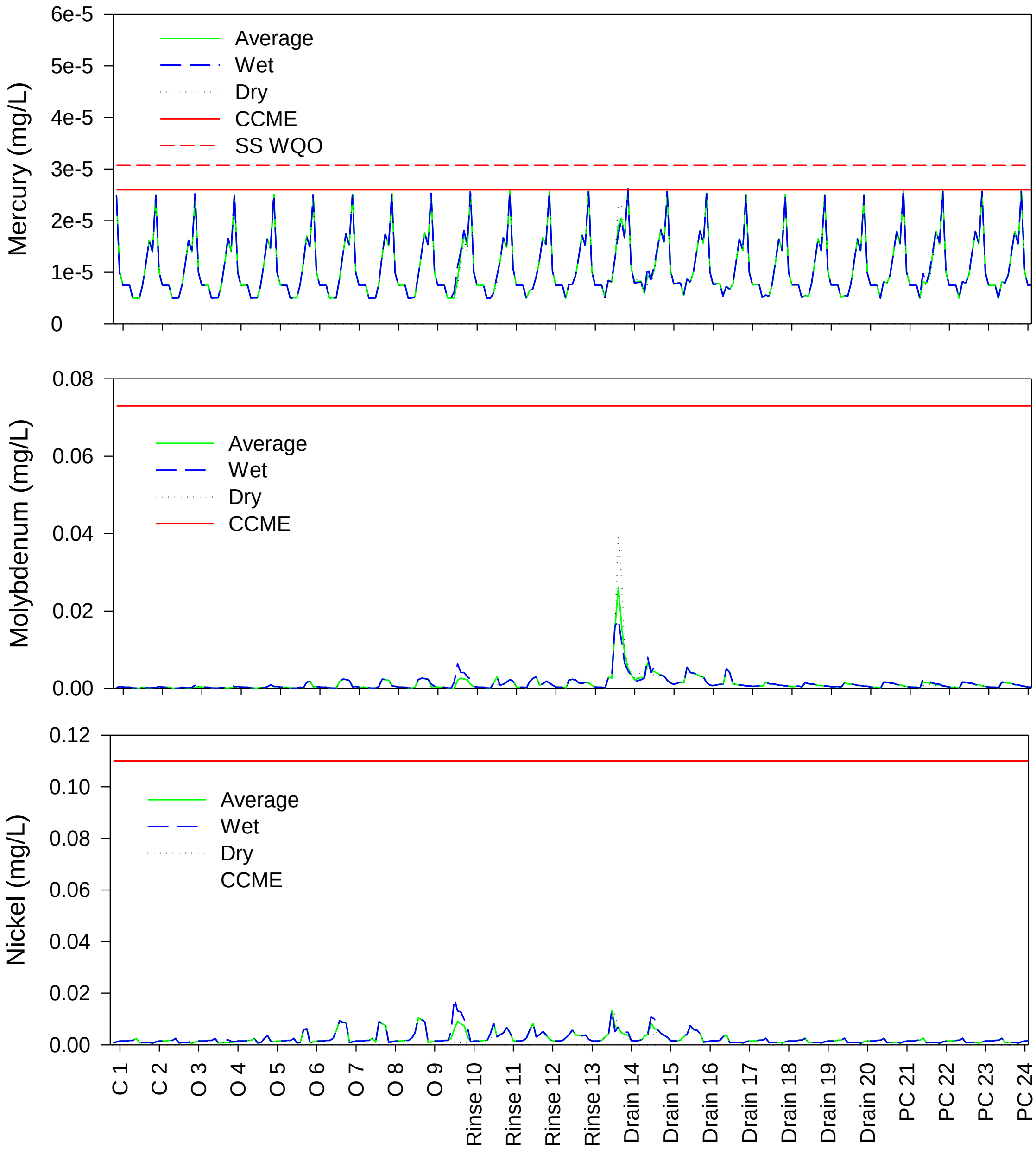


Figure 6: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases**

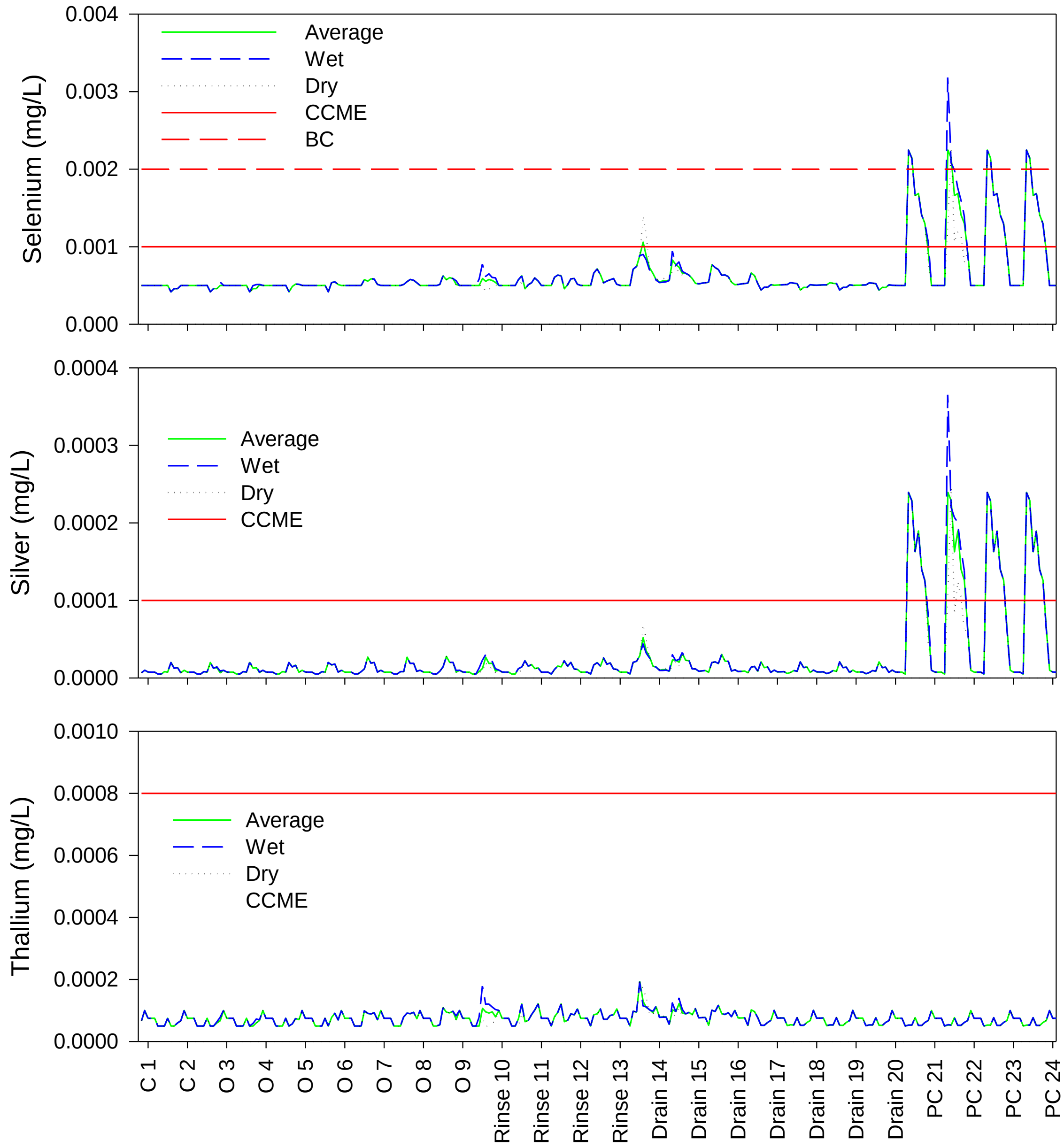


Figure 6: ***Continued.* Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases**

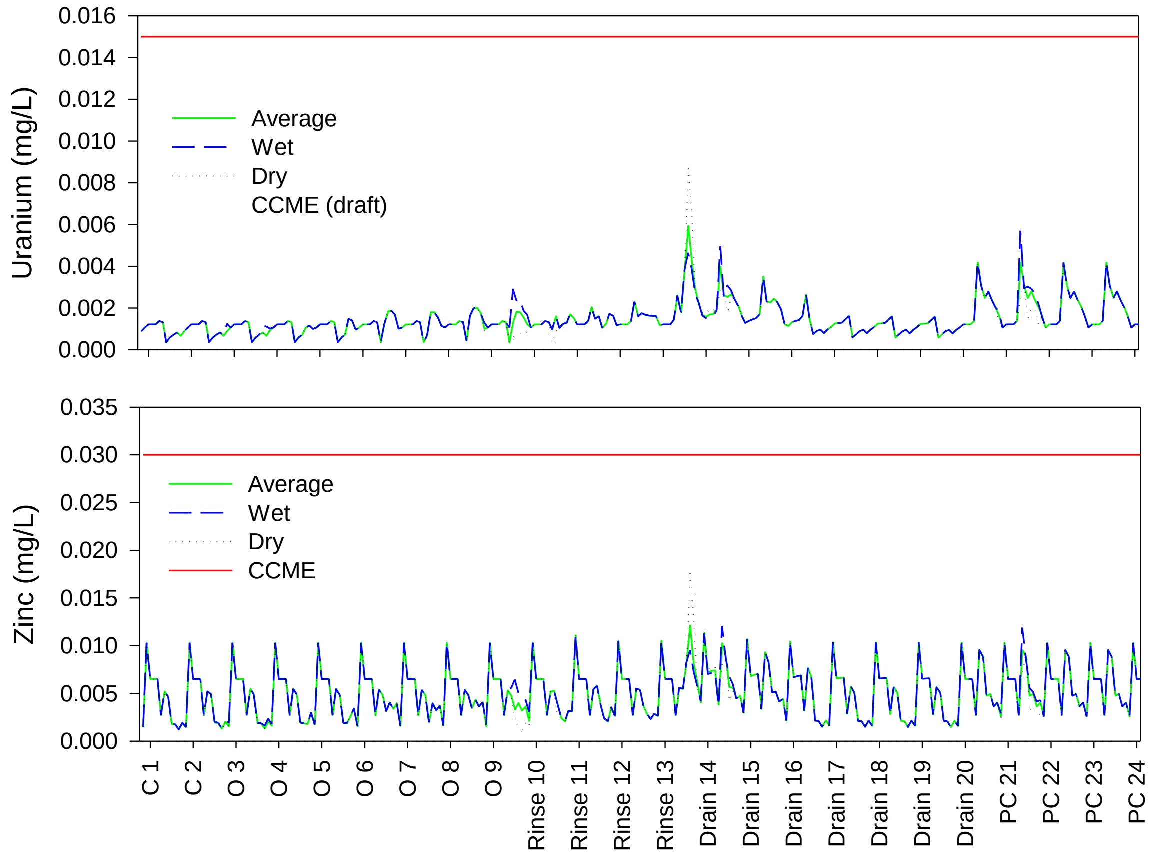


Figure 6: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases**

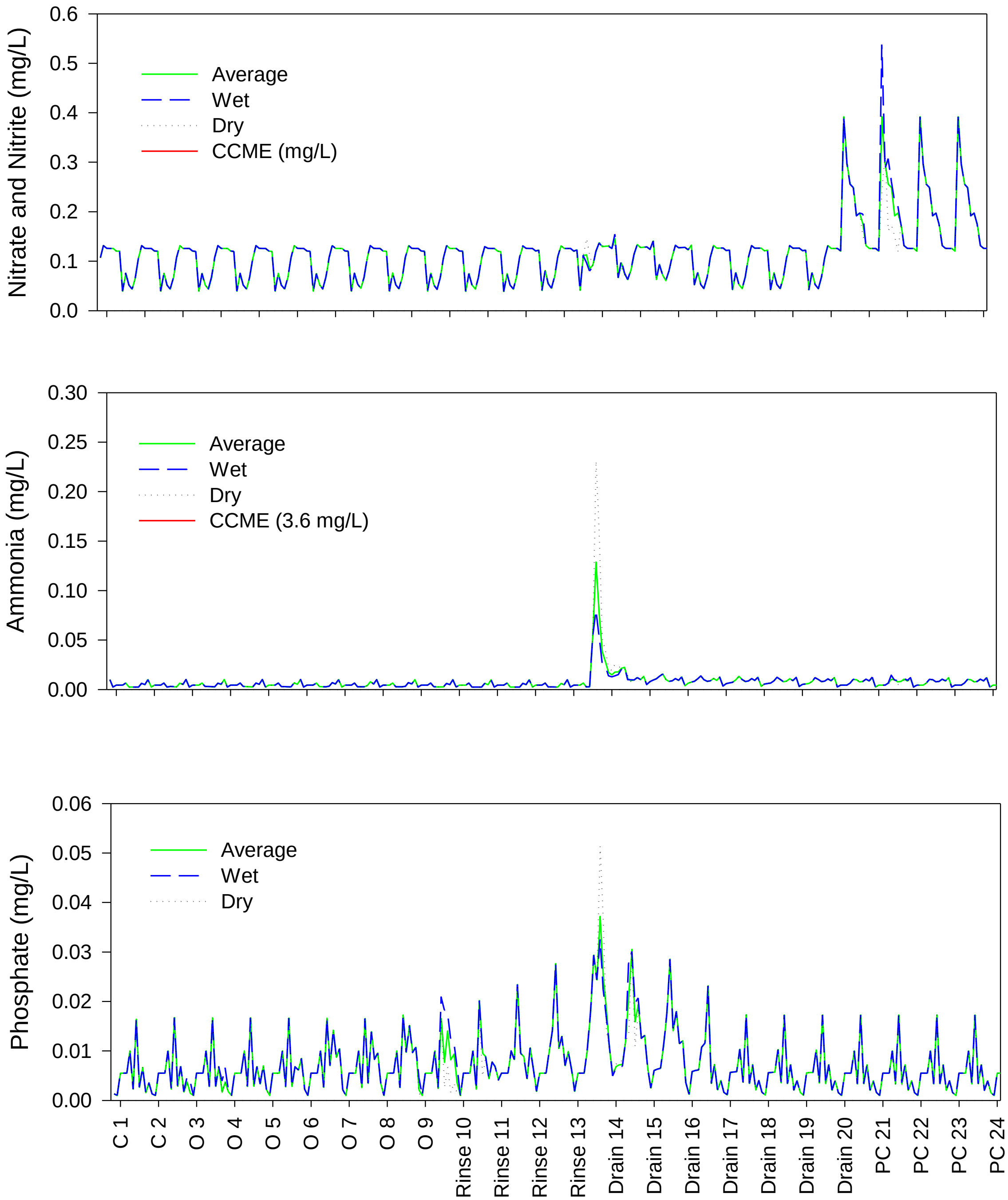


Figure 6: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases**

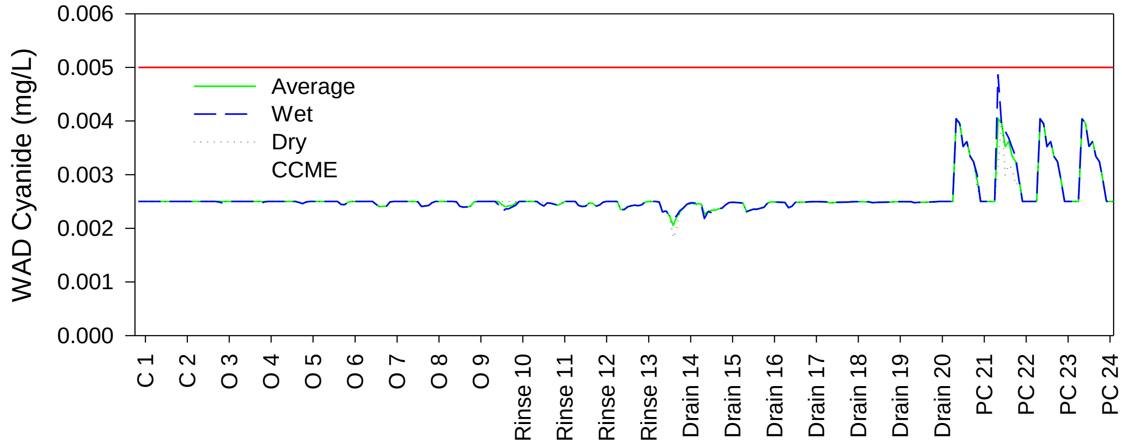


Figure 6: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases**

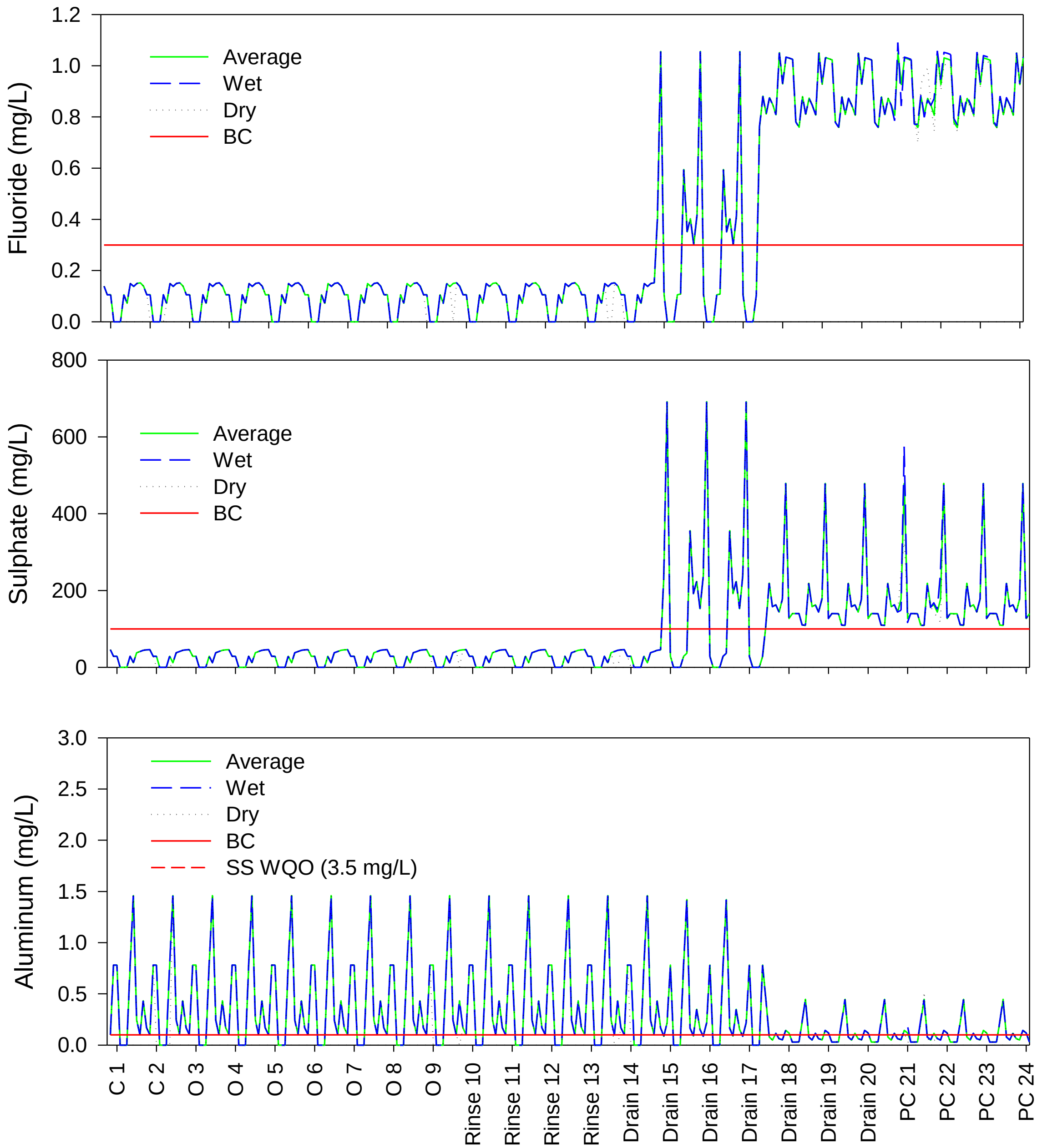


Figure 7: **Predicted Concentrations of Metals and Nutrients in Platinum Gulch Waste Rock Storage Area Sediment Control Pond during all Project Phases (*C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure*)**

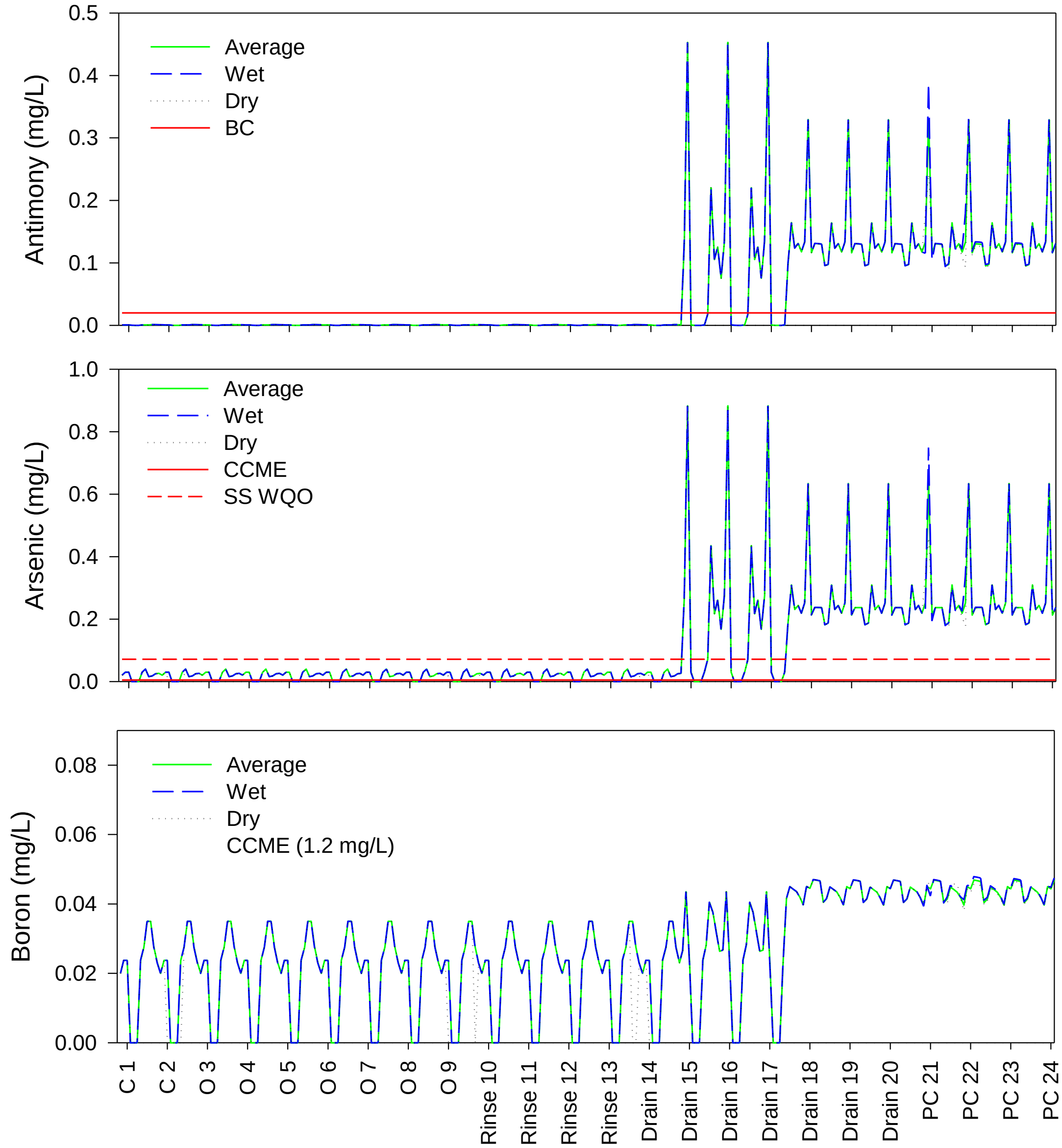


Figure 7: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Platinum Gulch Waste Rock Storage Area Sediment Control Pond during all Project Phases**

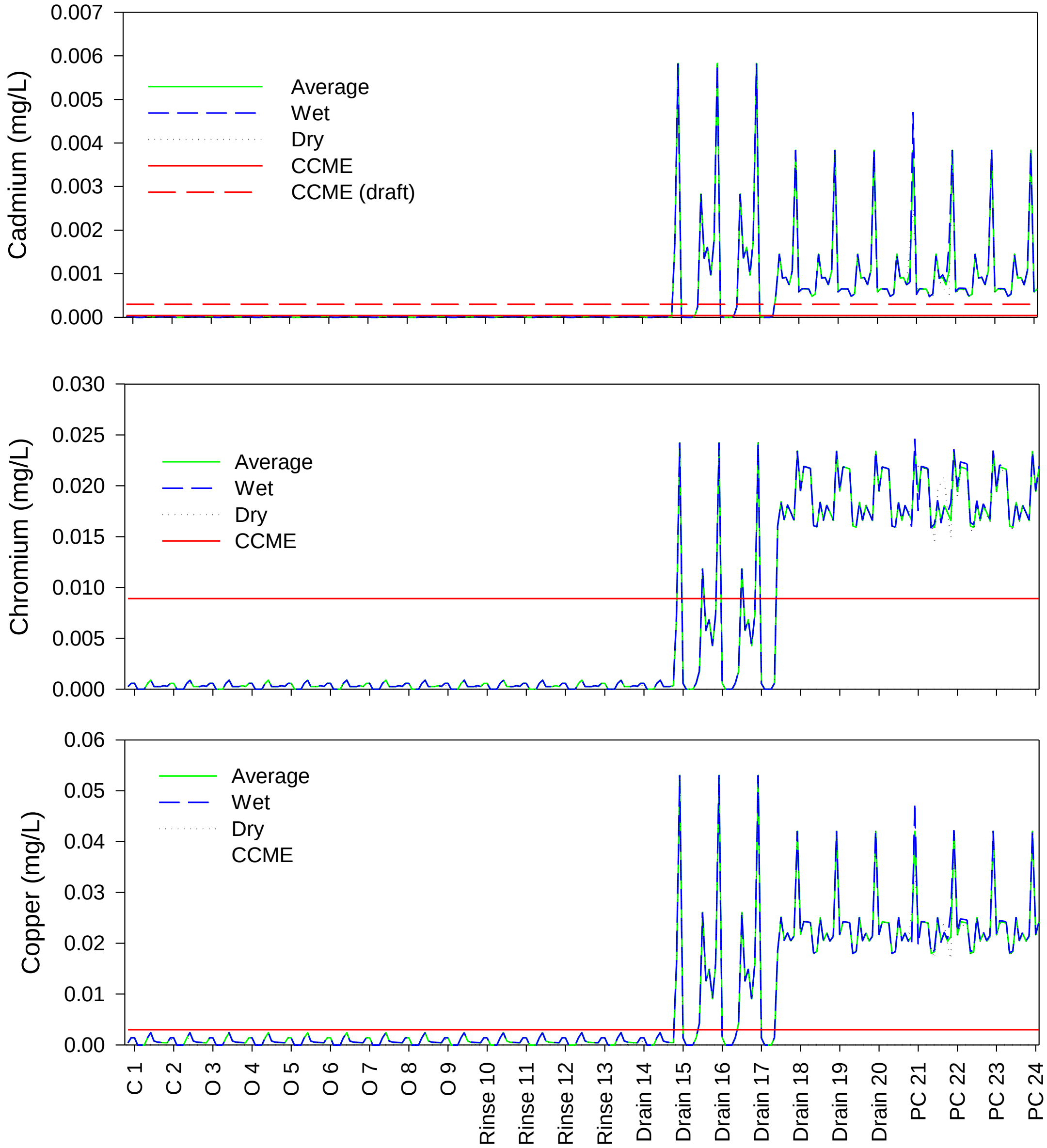


Figure 7: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Platinum Gulch Waste Rock Storage Area Sediment Control Pond during all Project Phases**

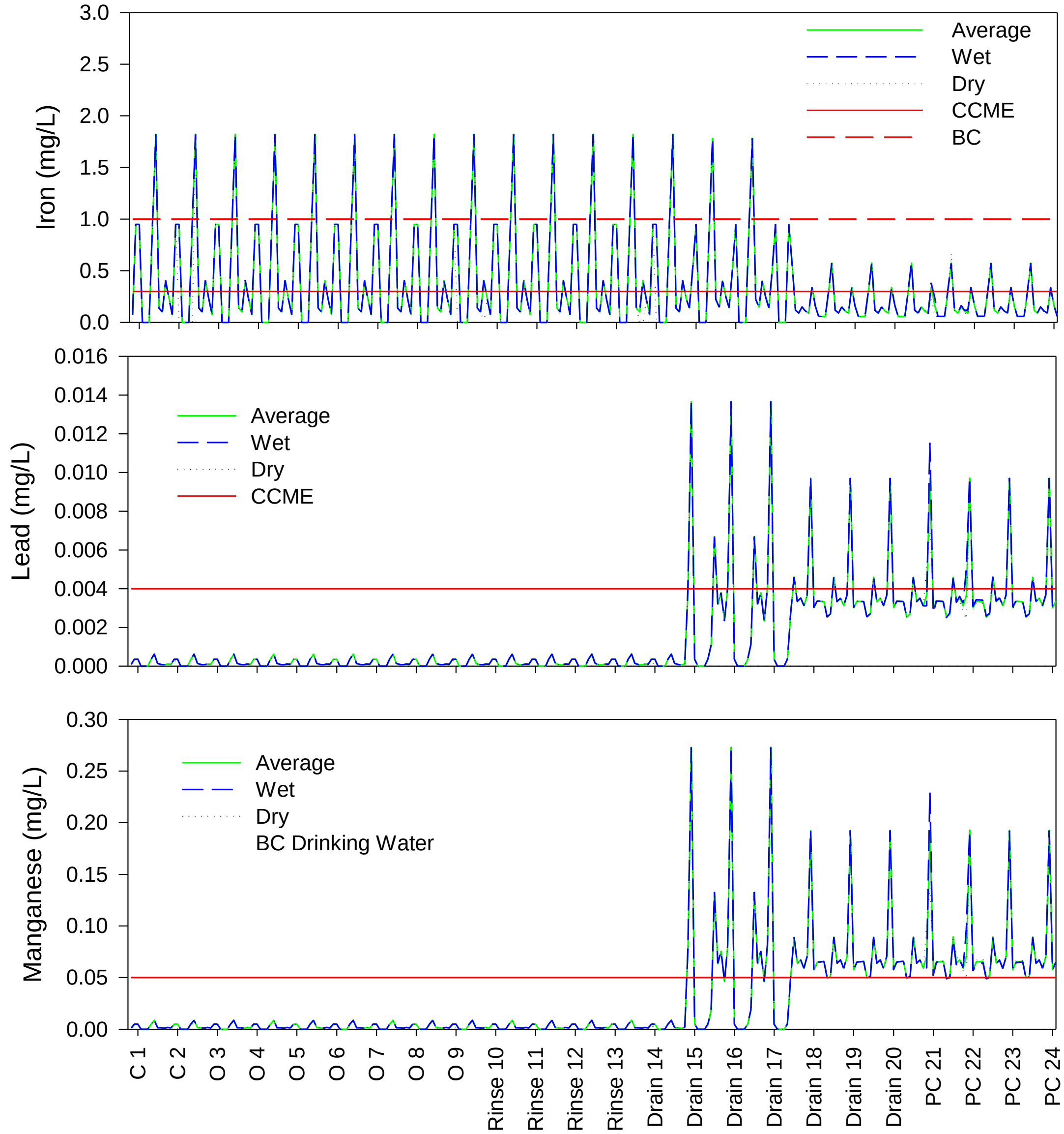


Figure 7: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Platinum Gulch Waste Rock Storage Area Sediment Control Pond during all Project Phases**

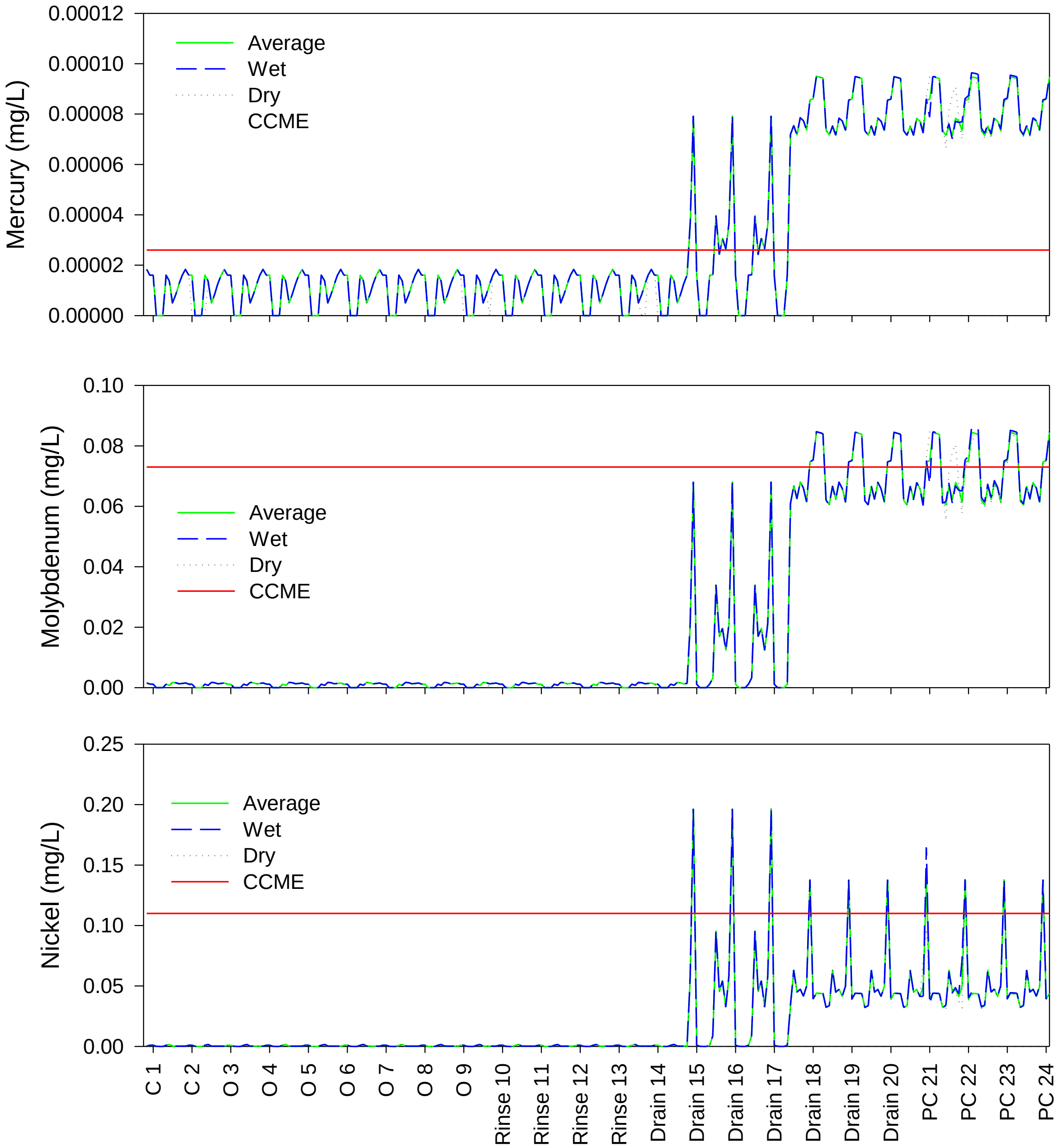


Figure 7: ***Continued*. Predicted Concentrations of Metals and Nutrients in Platinum Gulch Waste Rock Storage Area Sediment Control Pond during all Project Phases**

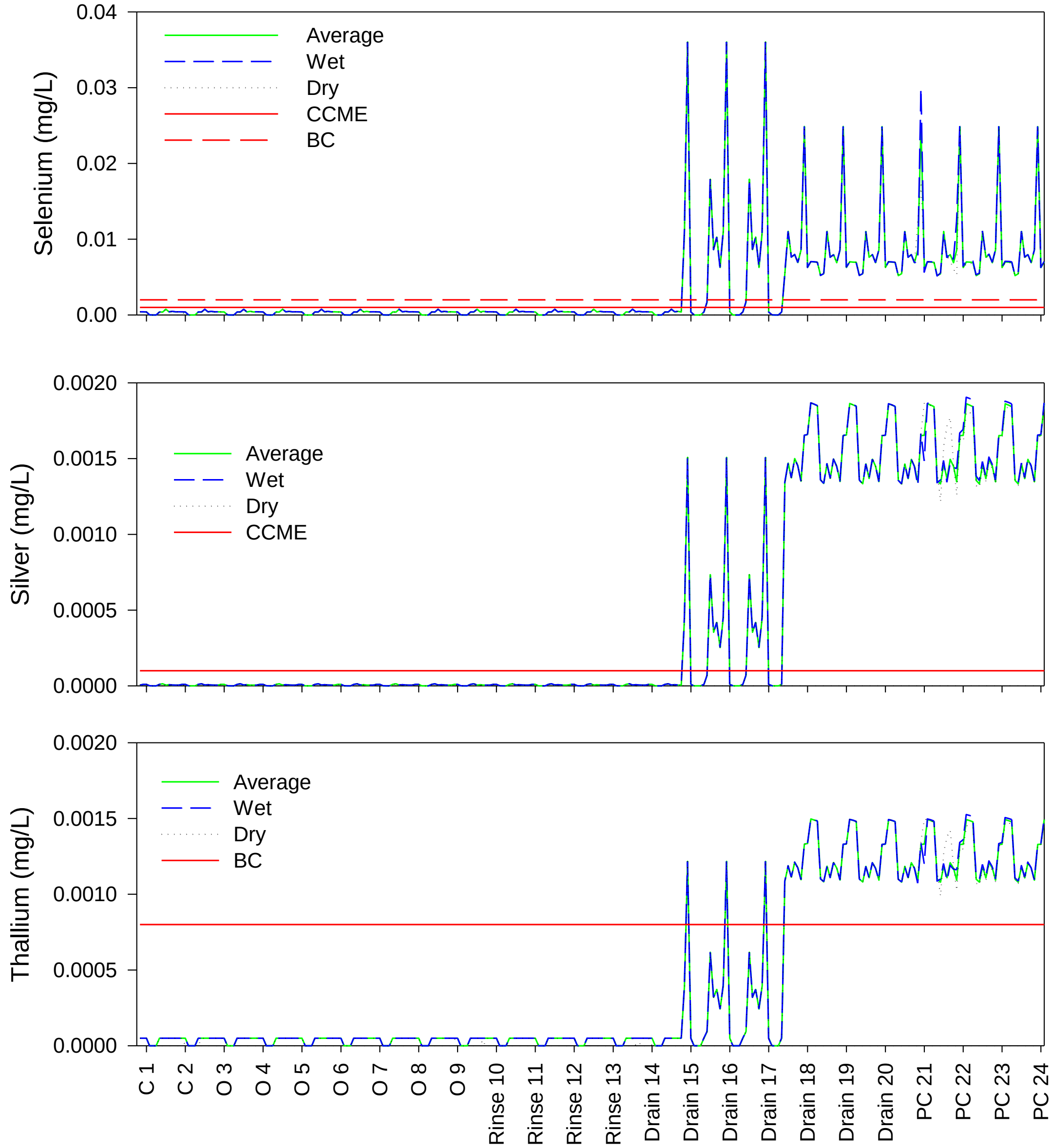


Figure 7: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Platinum Gulch Waste Rock Storage Area Sediment Control Pond during all Project Phases**

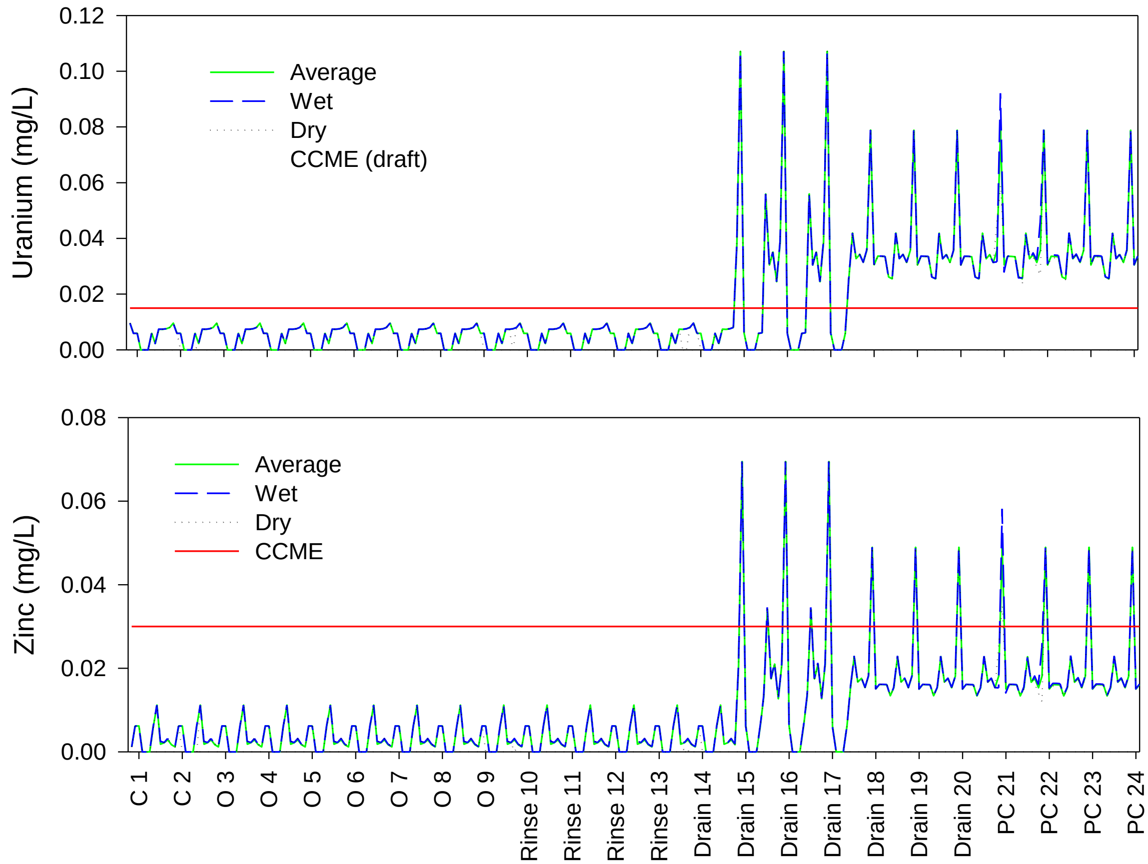


Figure 7: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Platinum Gulch Waste Rock Storage Area Sediment Control Pond during all Project Phases**

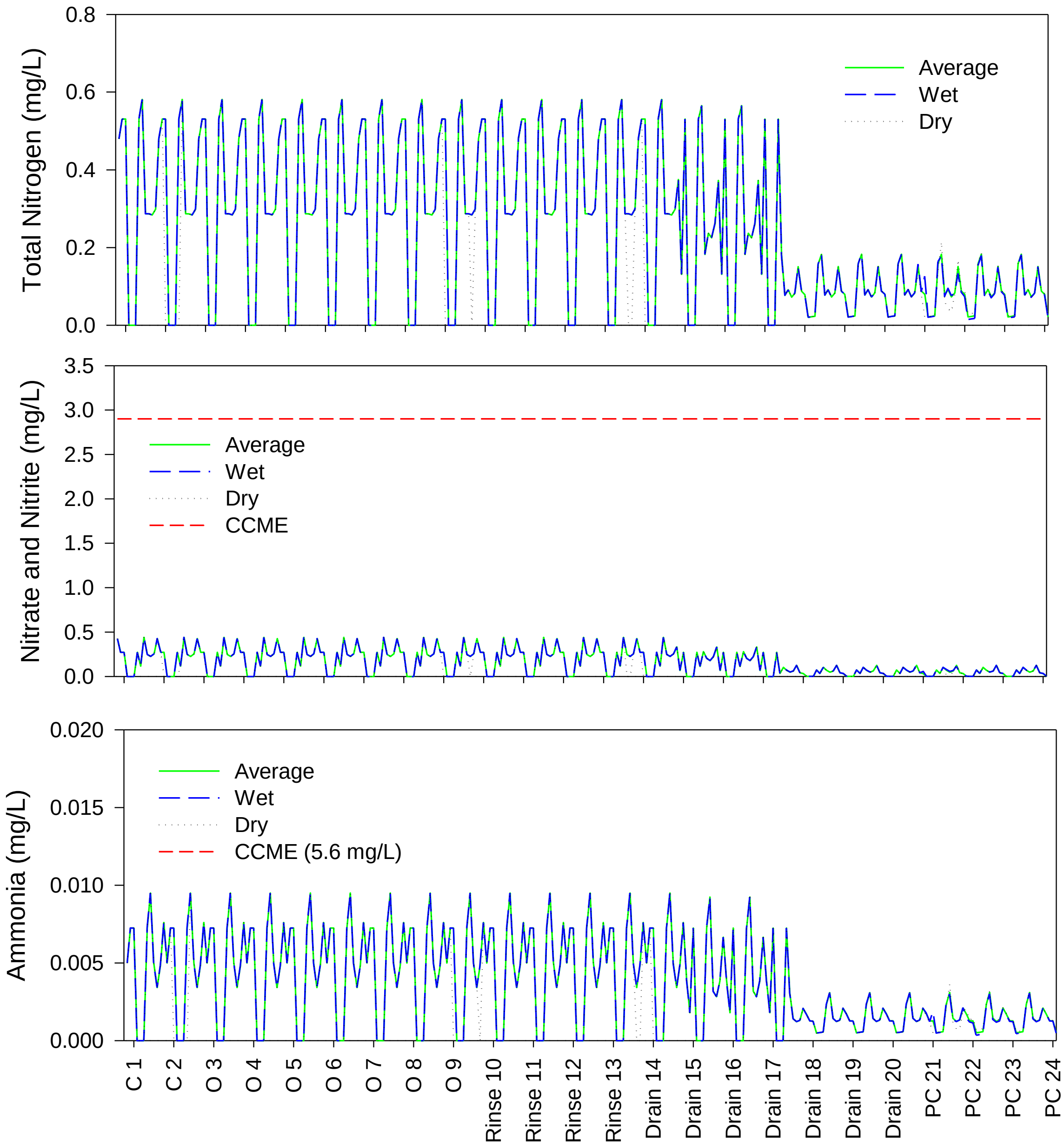


Figure 7: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Platinum Gulch Waste Rock Storage Area Sediment Control Pond during all Project Phases**

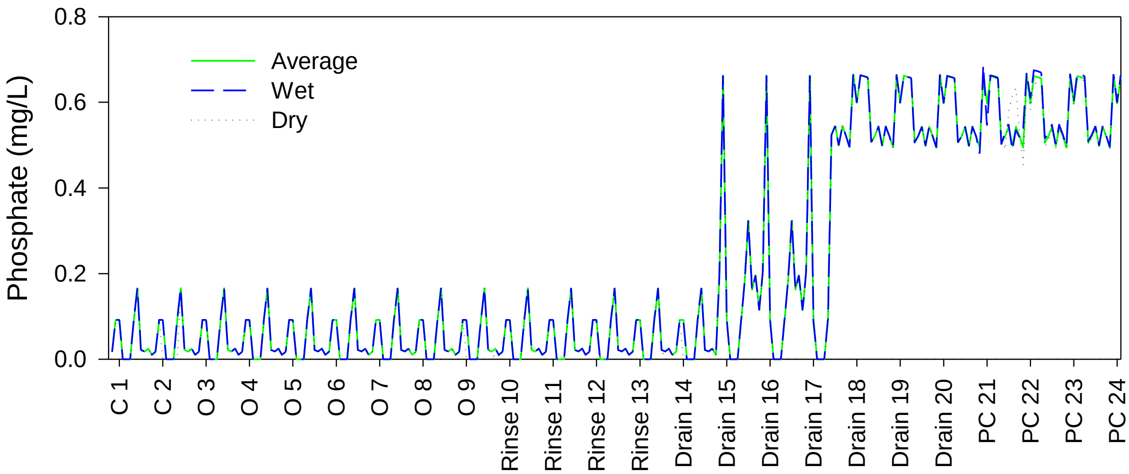


Figure 7: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Platinum Gulch Waste Rock Storage Area Sediment Control Pond during all Project Phases**

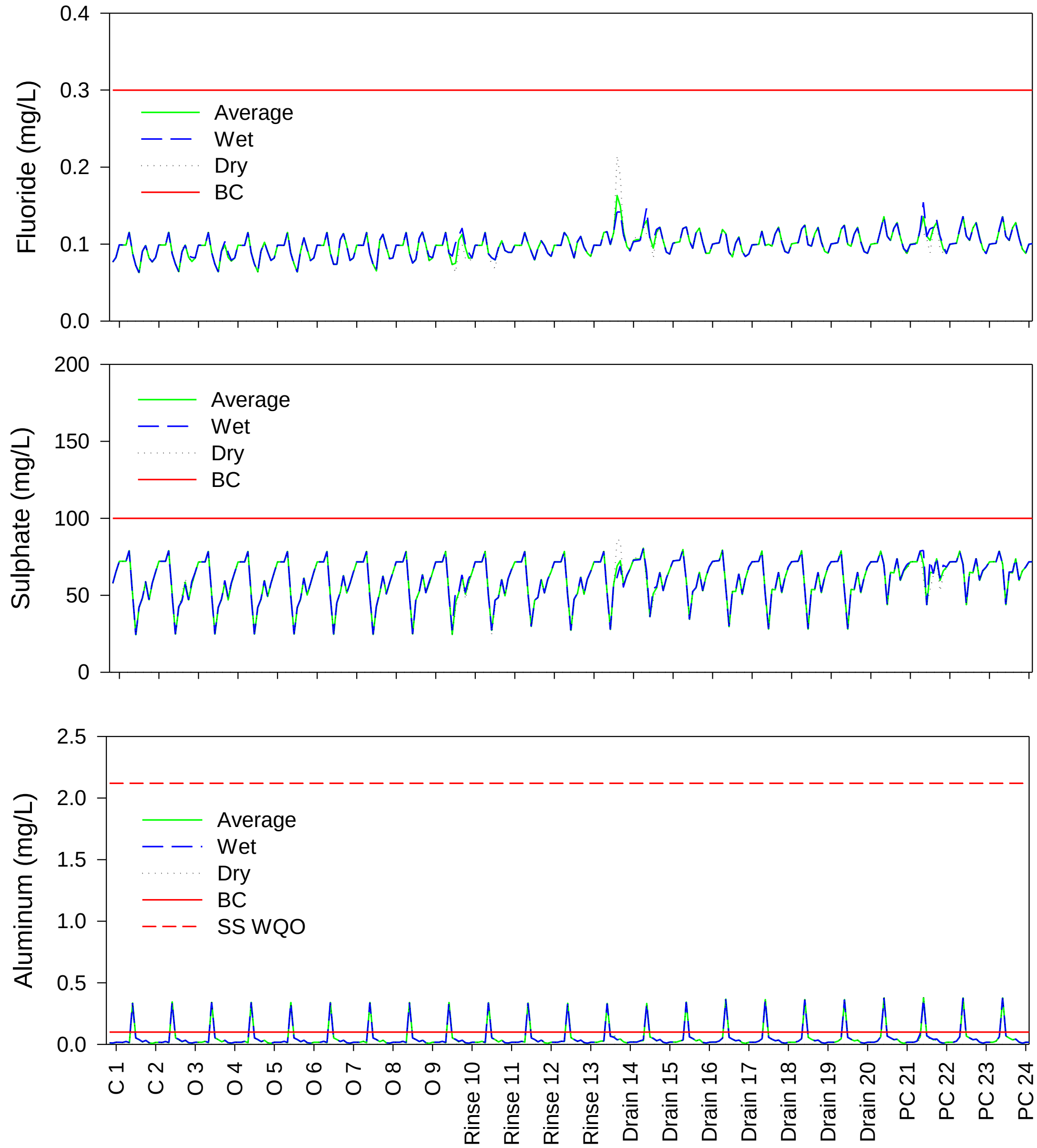


Figure 8: Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)*

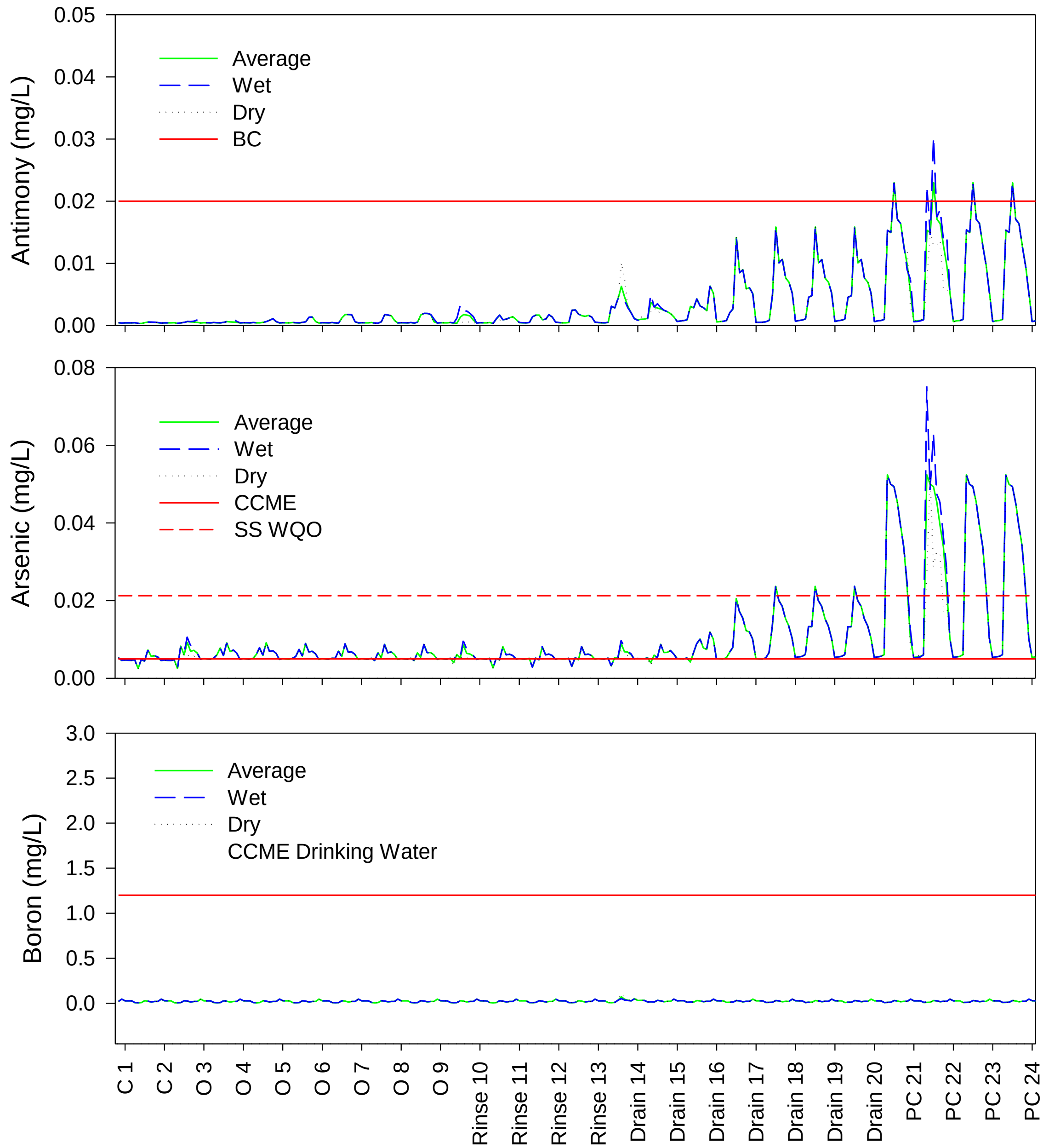


Figure 8: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases**

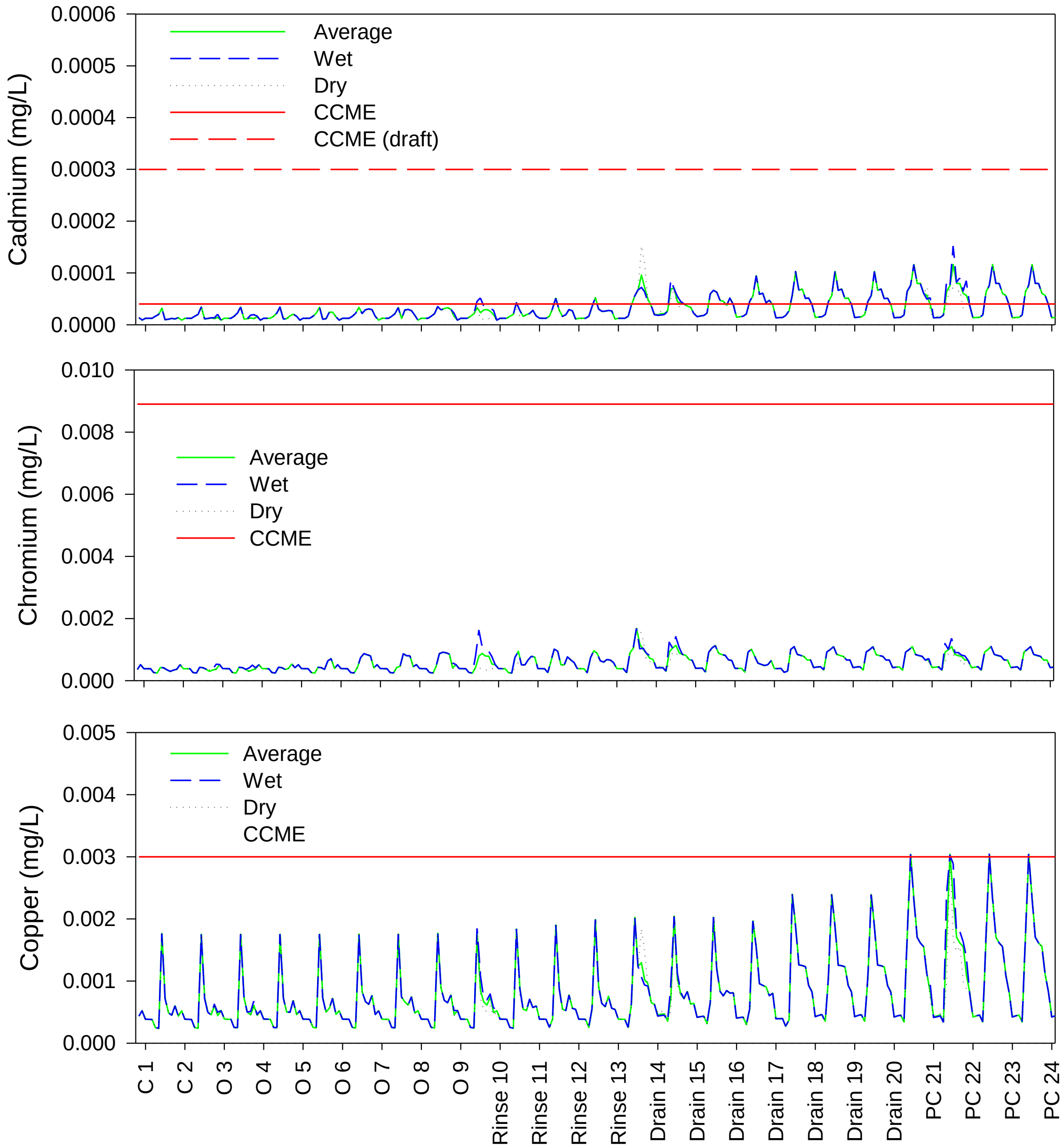


Figure 8: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases**

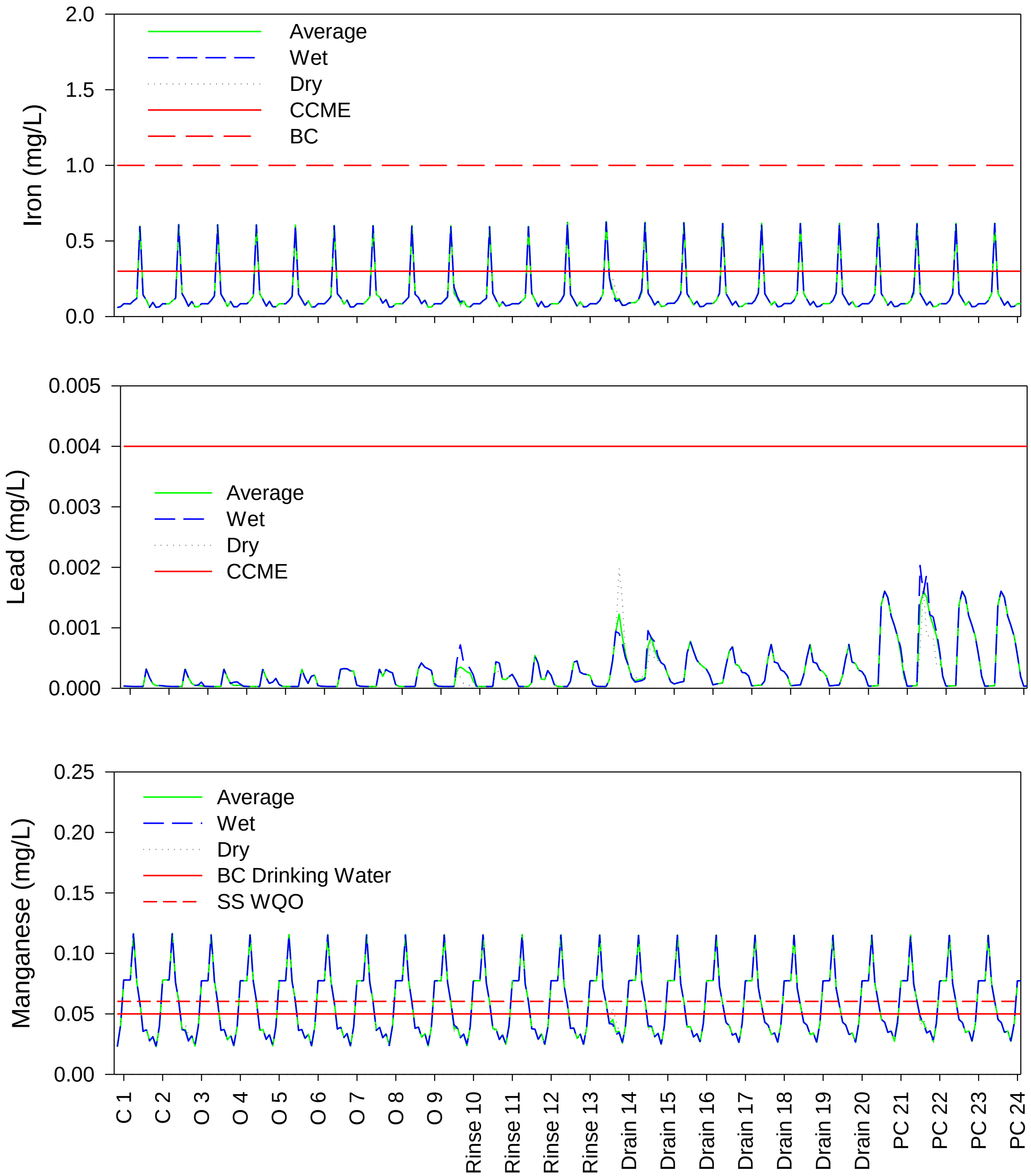


Figure 8: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases**

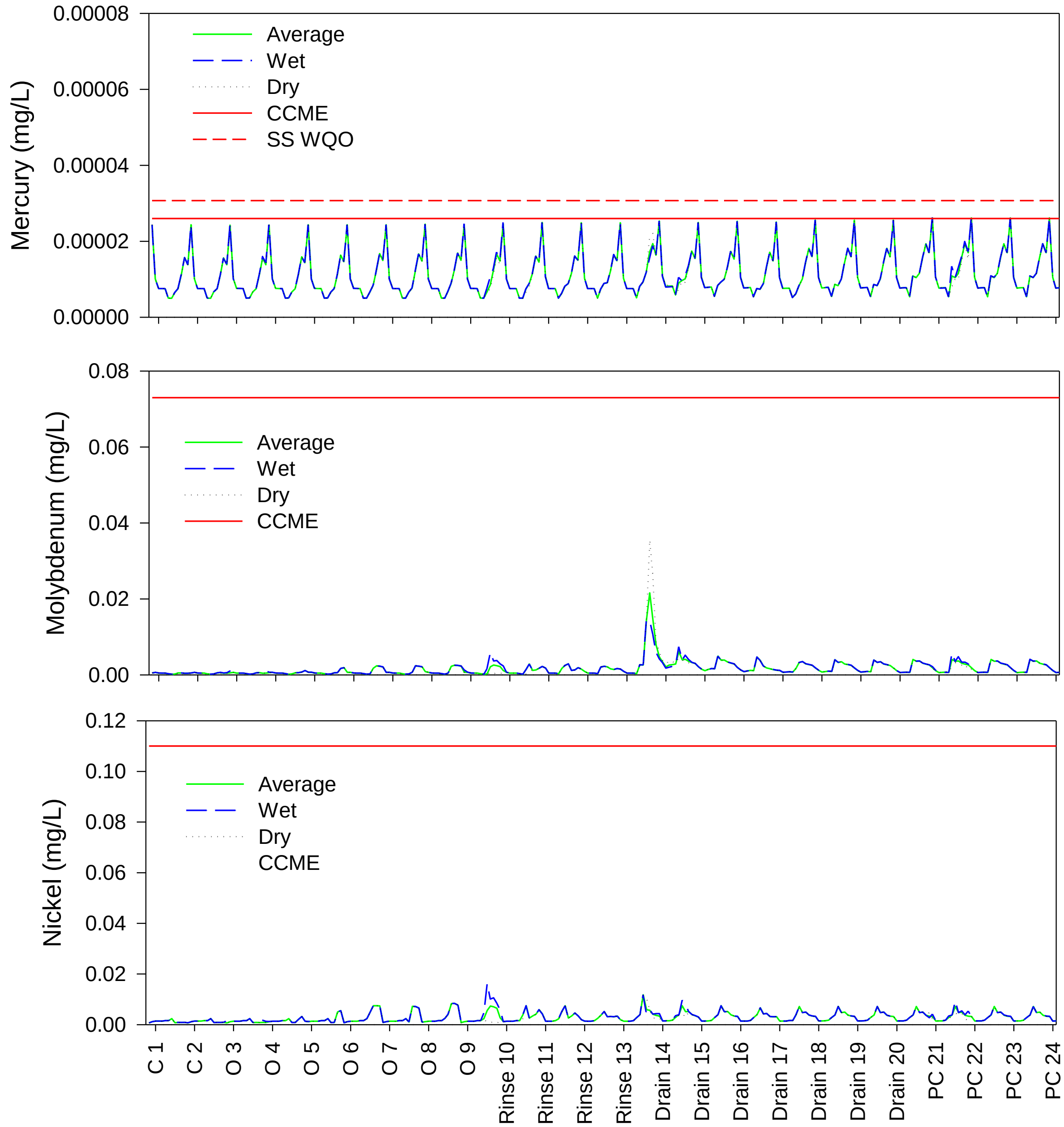


Figure 8: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases**

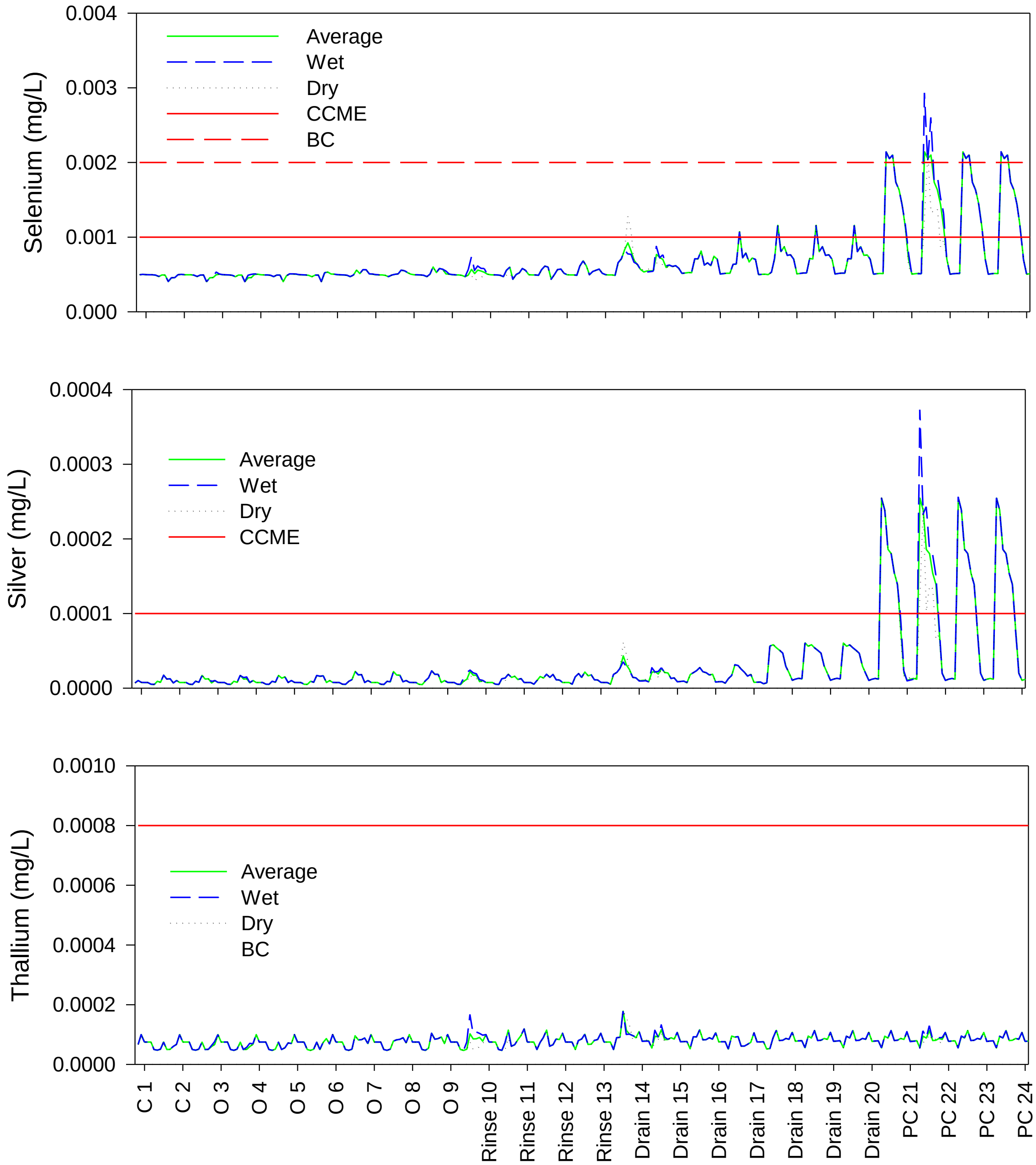


Figure 8: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases**

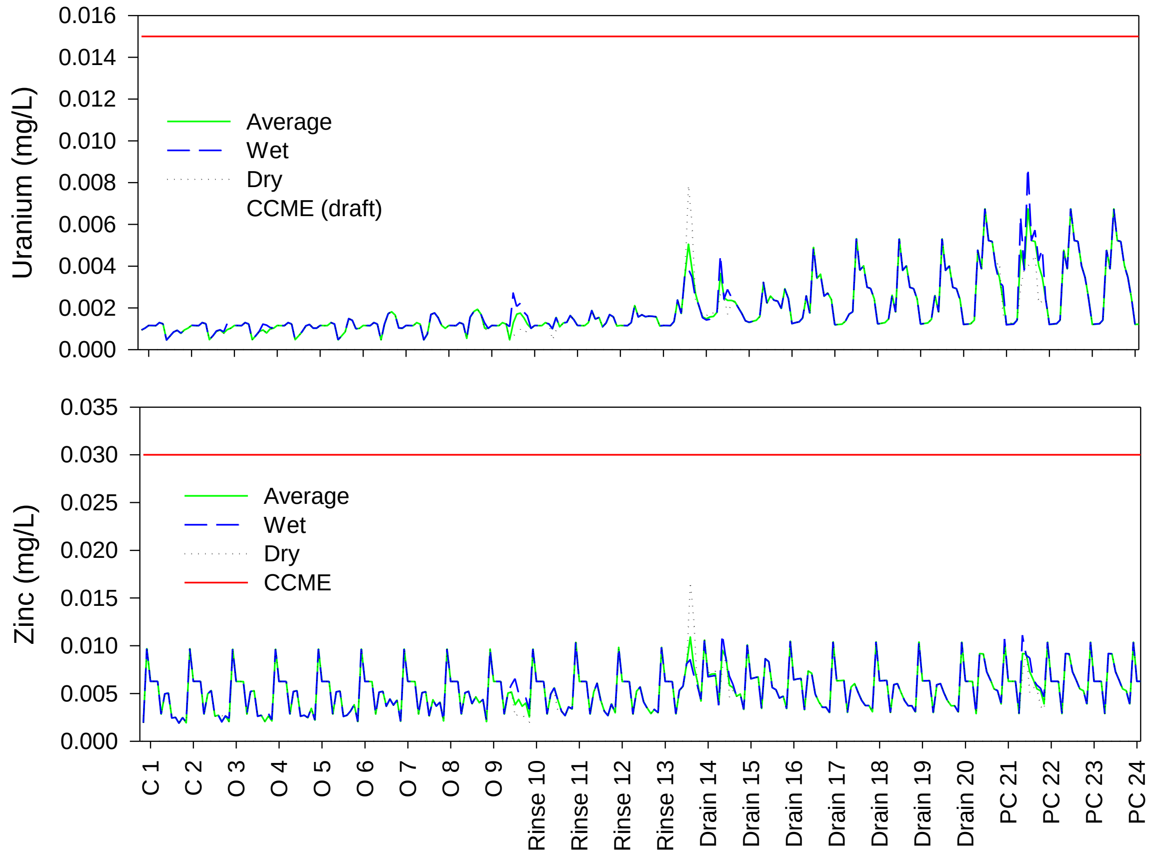


Figure 8: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases**

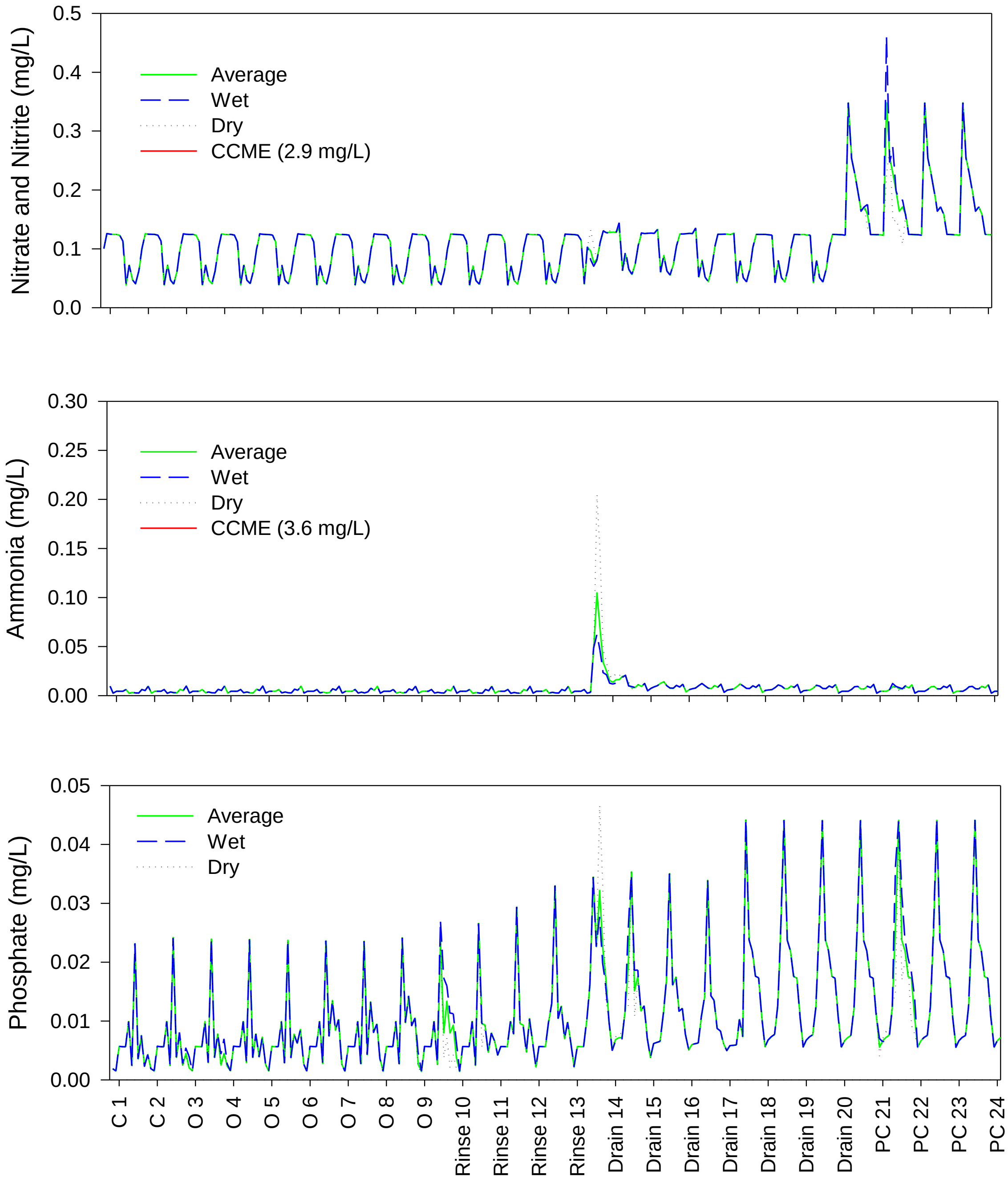


Figure 8: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases**

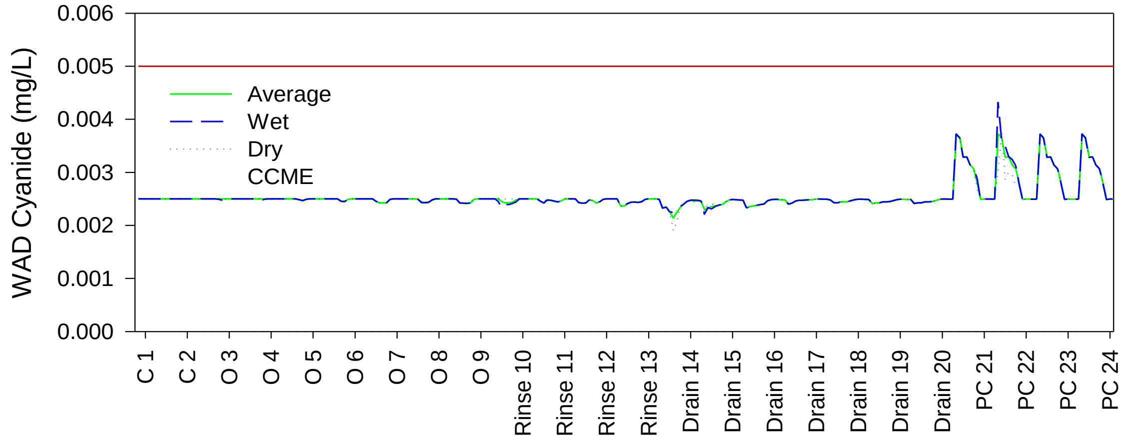


Figure 8: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases**

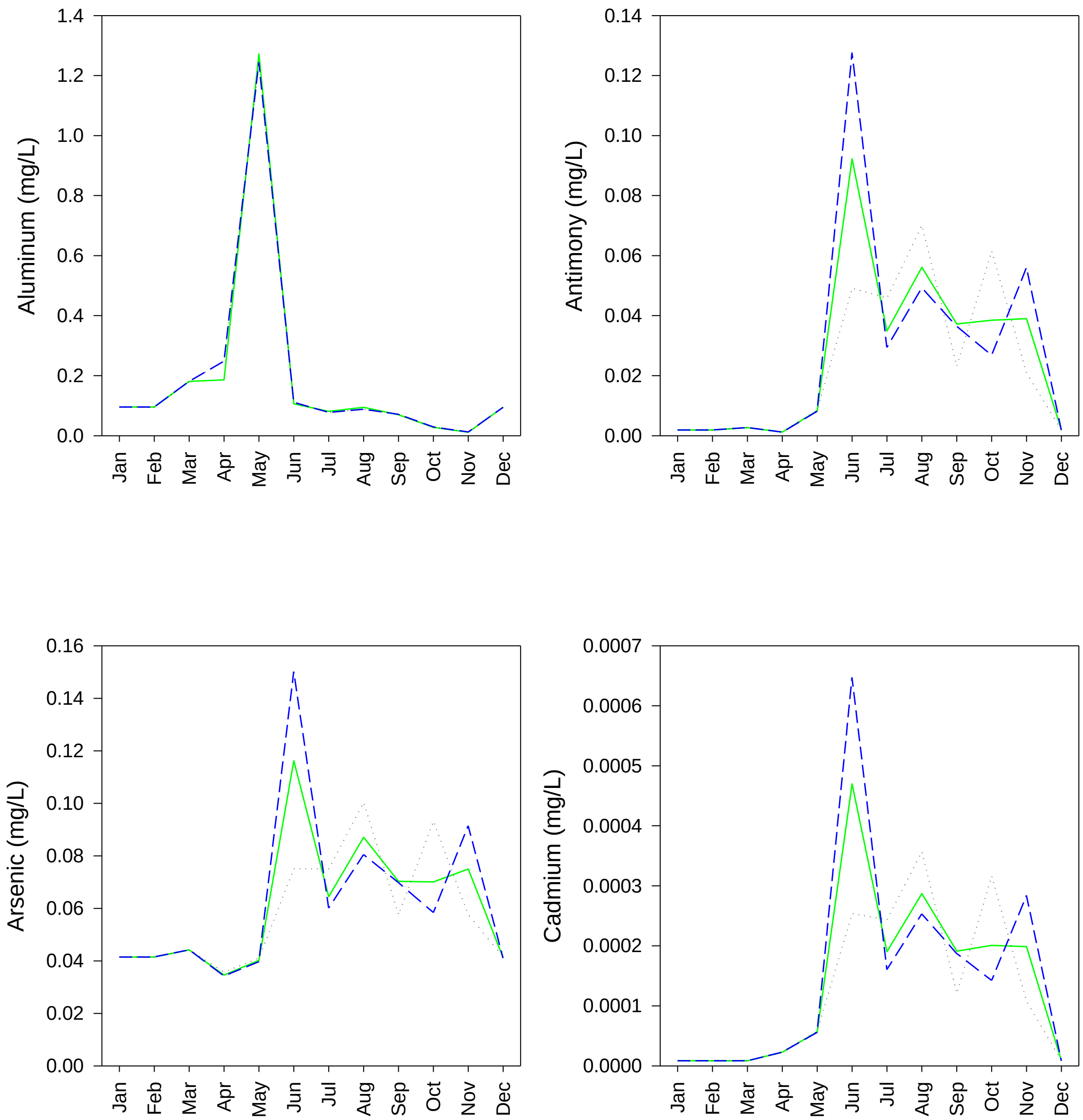


Figure 9: **Predicted Concentrations of Parameters of Concern in Dublin Gulch (W71) below Eagle Pup Waste Rock Storage Area during Closure Year 21 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).**

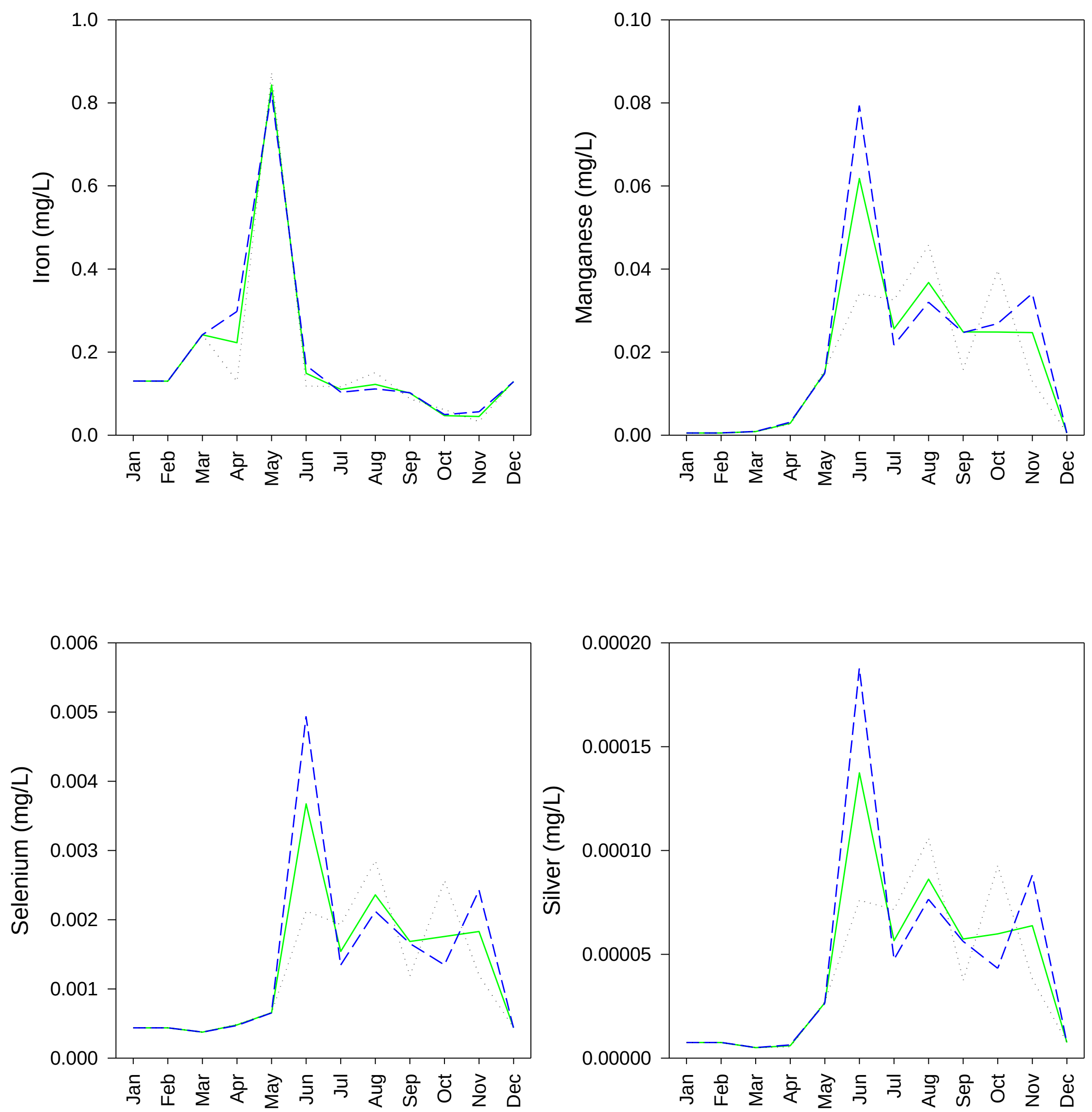


Figure 9: ***Continued*. Predicted Concentrations of Parameters of Concern in Dublin Gulch (W71) below Eagle Pup Waste Rock Storage Area during Closure Year 21 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).**

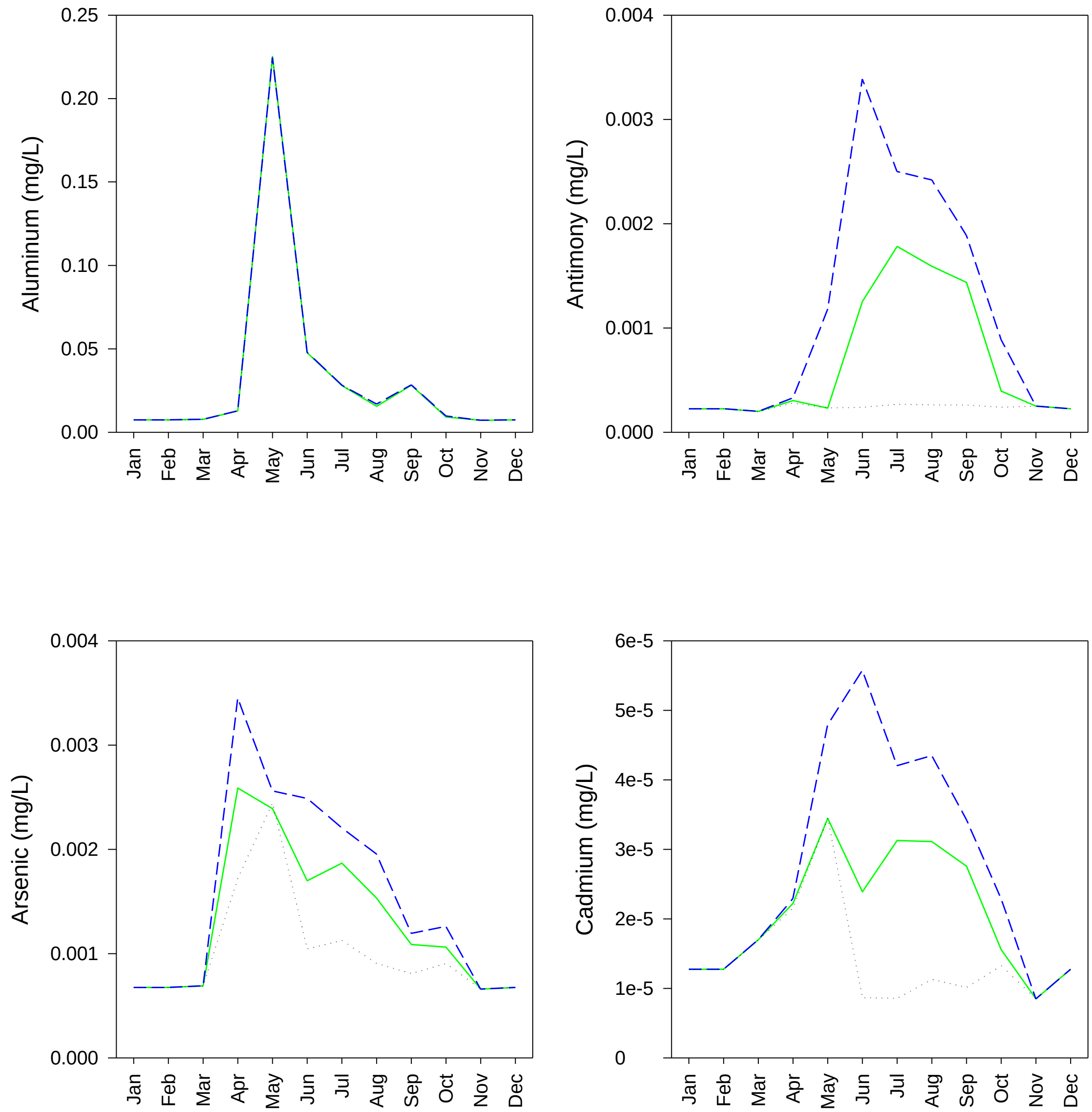


Figure 10: Predicted Concentrations of Parameters of Concern in Haggart Creek (W4) below the Mine Water Treatment Plant during Operations Year 9 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).

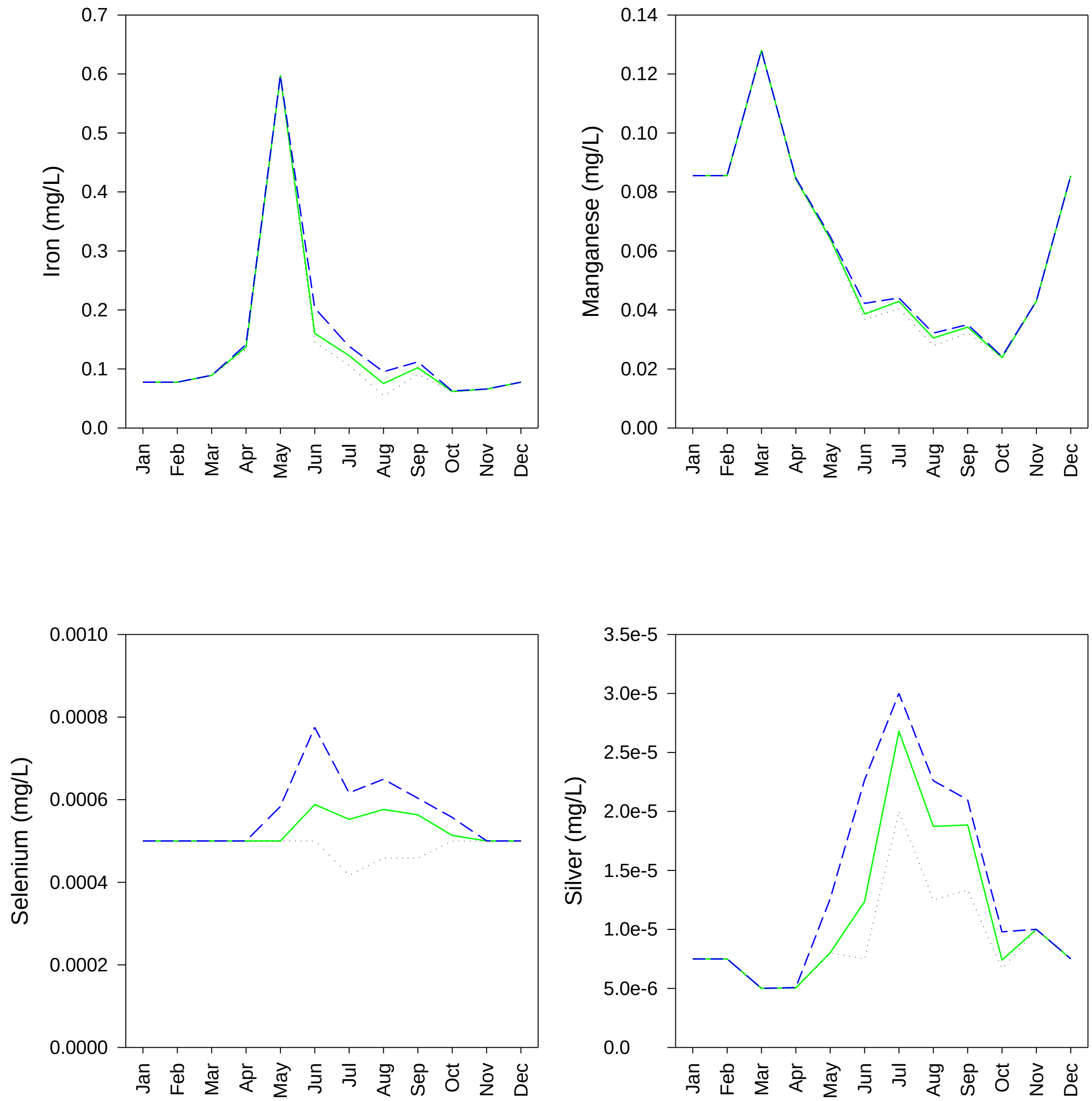


Figure 10: ***Continued.*** **Predicted Concentrations of Parameters of Concern in Haggart Creek (W4) below the Mine Water Treatment Plant during Operations Year 9 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).**

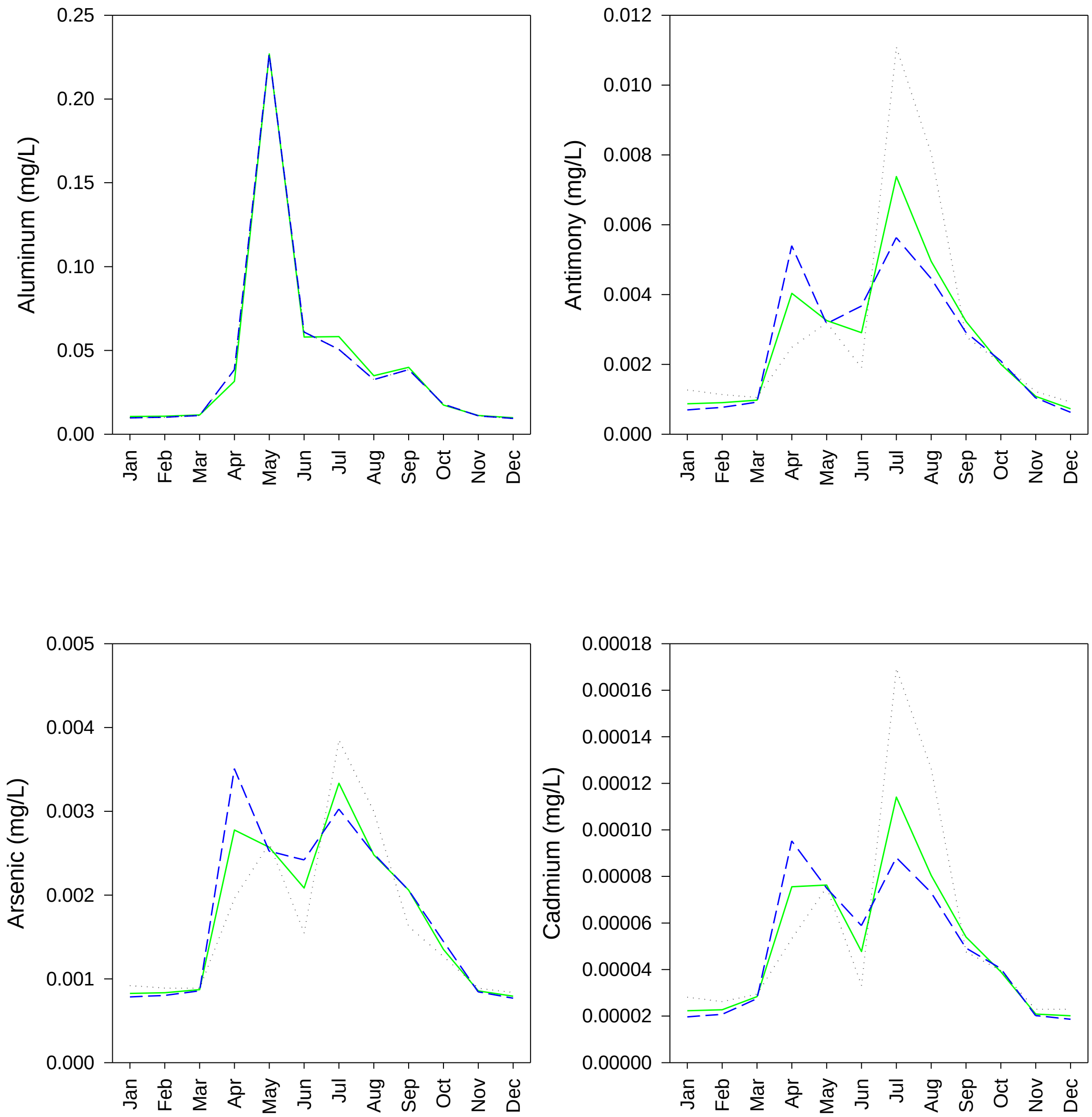


Figure 11: Predicted Concentrations of Parameters of Concern in Haggart Creek (W4) below the Mine Water Treatment Plant during Draindown Year 13 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).

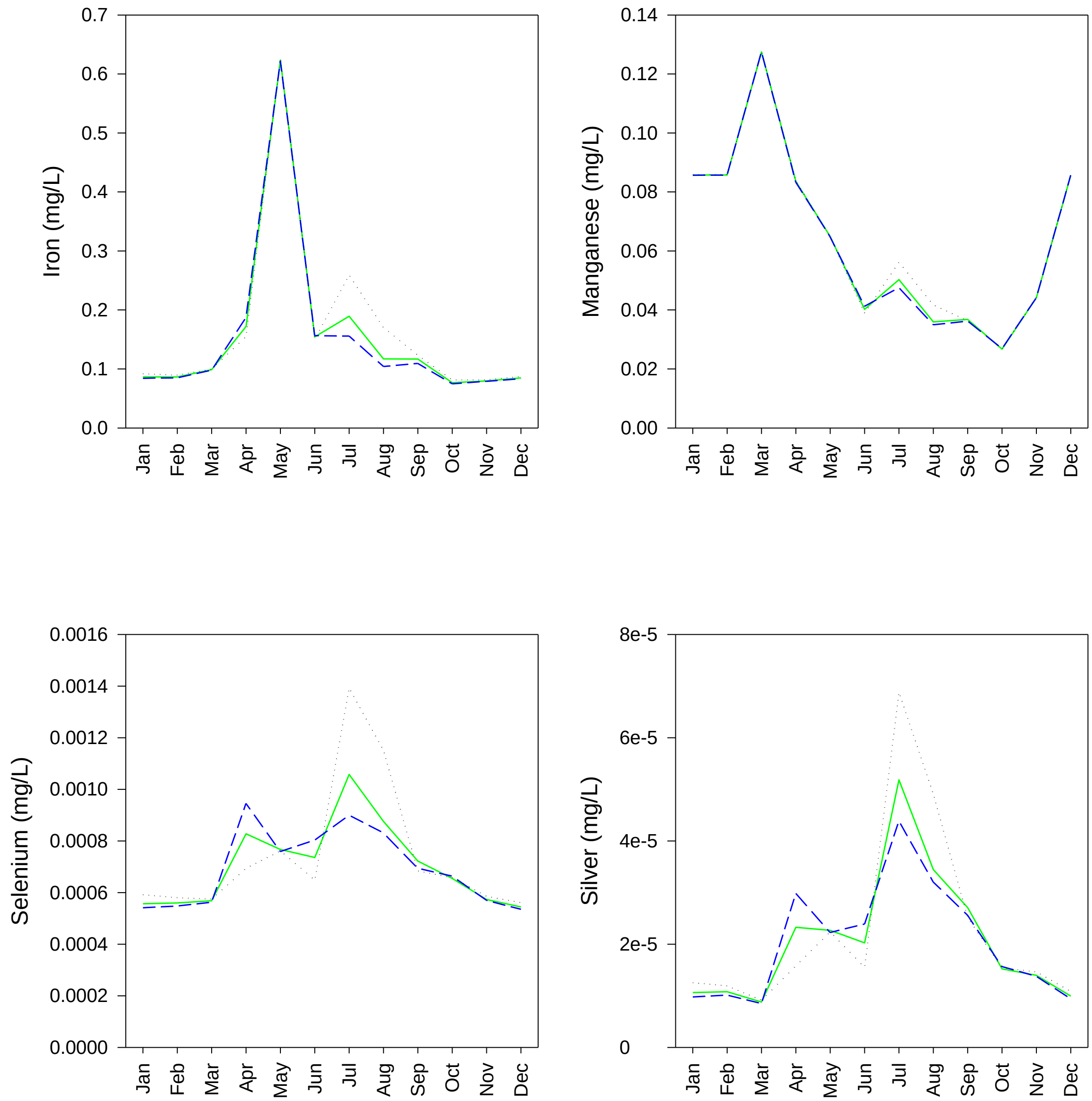


Figure 11: ***Continued.*** **Predicted Concentrations of Parameters of Concern in Haggart Creek (W4) below the Mine Water Treatment Plant during Draindown Year 13 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).**

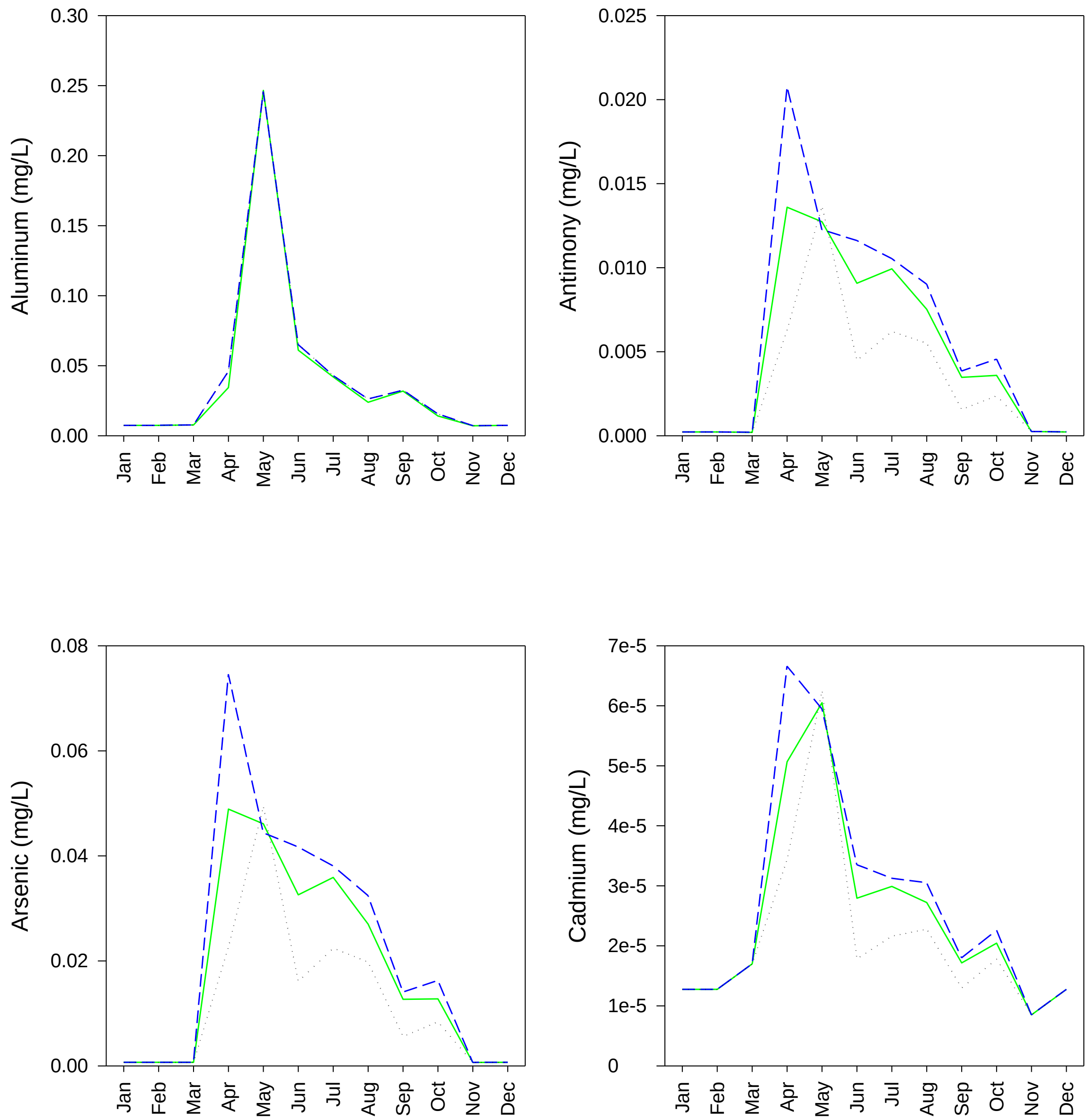


Figure 12: Predicted Concentrations of Parameters of Concern in Haggart Creek (W4) below the HLF (untreated) during Closure Year 21 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).

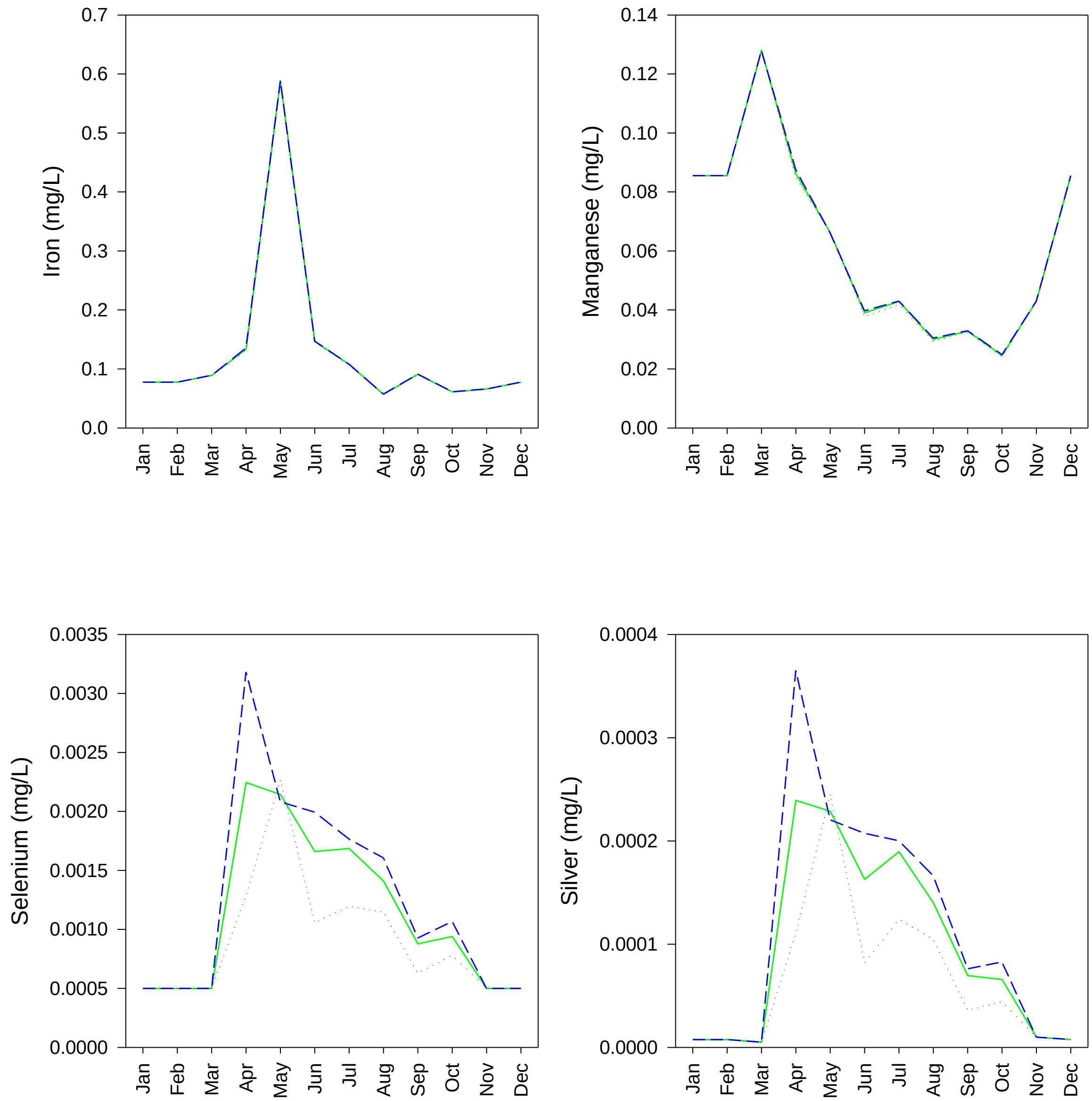


Figure 12: ***Continued*. Predicted Concentrations of Parameters of Concern in Haggart Creek (W4) below the HLF (untreated) during Closure Year 21 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).**

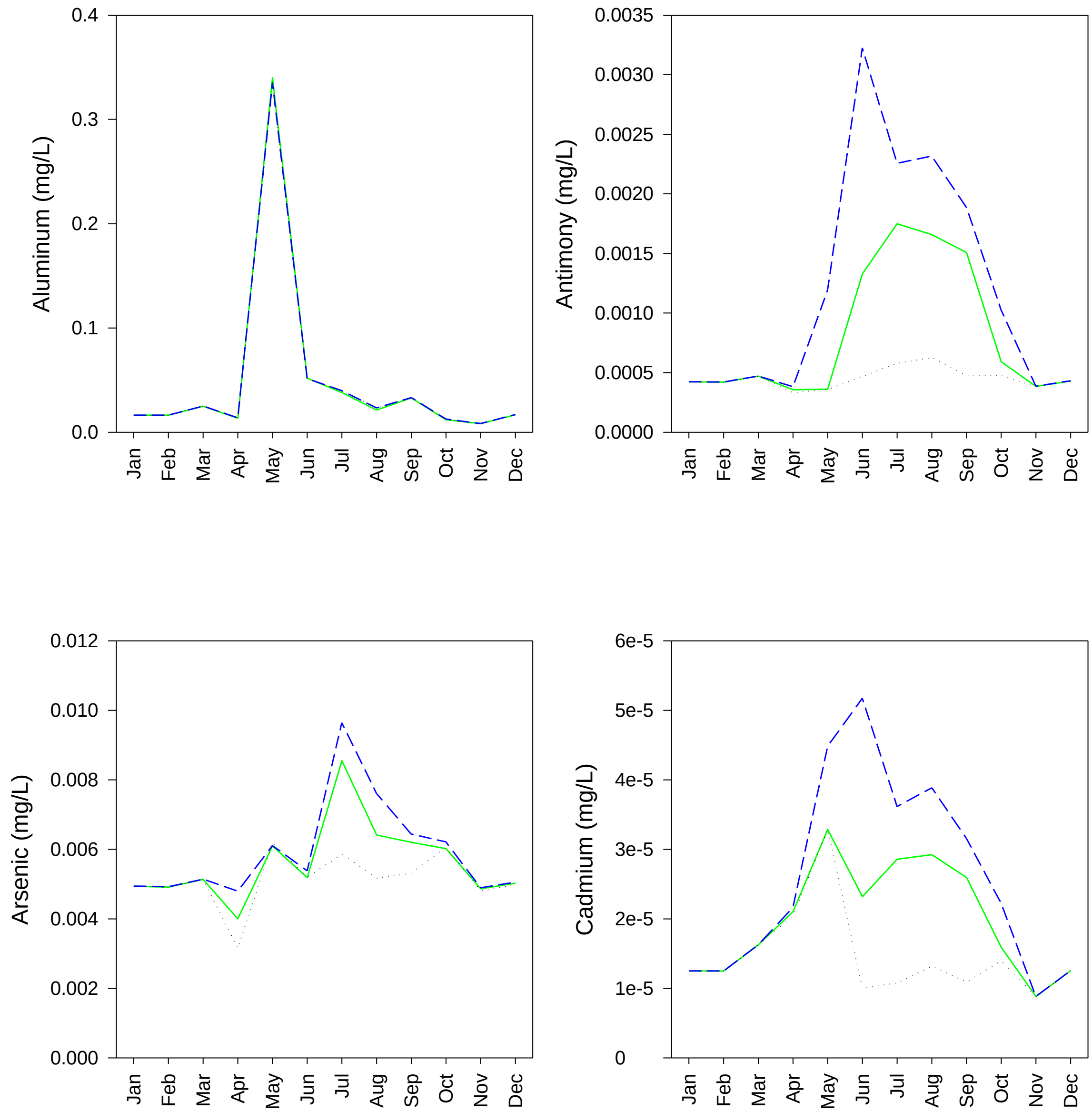


Figure 13: Predicted Concentrations of Parameters of Concern in Haggart Creek (W29) below the Mine Water Treatment Plant, Eagle Creek, and Non-Contact Discharge from Platinum Gulch Waste Rock Storage Area during Operations Year 9 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).

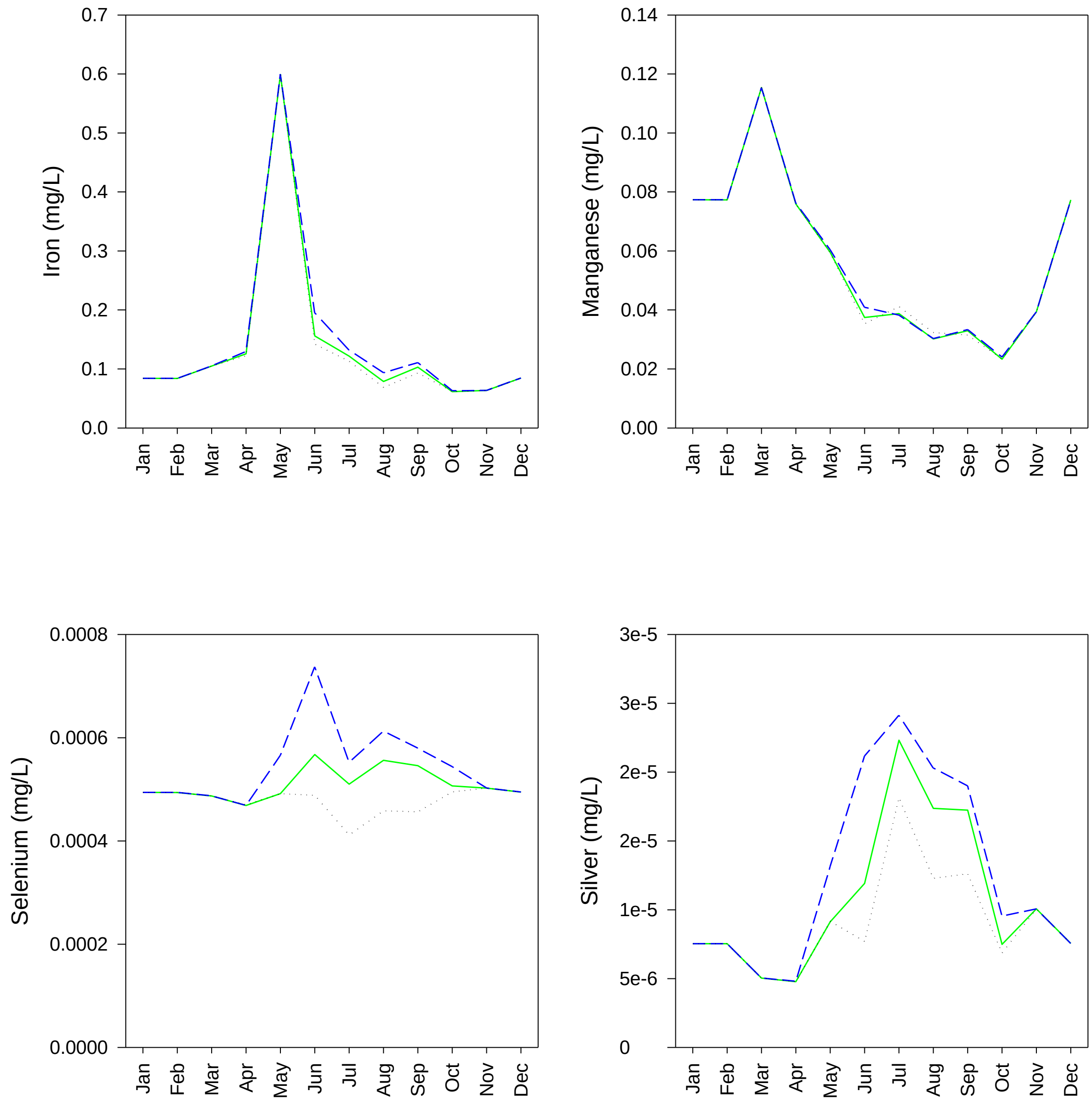


Figure 13: ***Continued*. Predicted Concentrations of Parameters of Concern in Haggart Creek (W29) below the Mine Water Treatment Plant, Eagle Creek, and Non-Contact Discharge from Platinum Gulch Waste Rock Storage Area during Operations Year 9 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).**

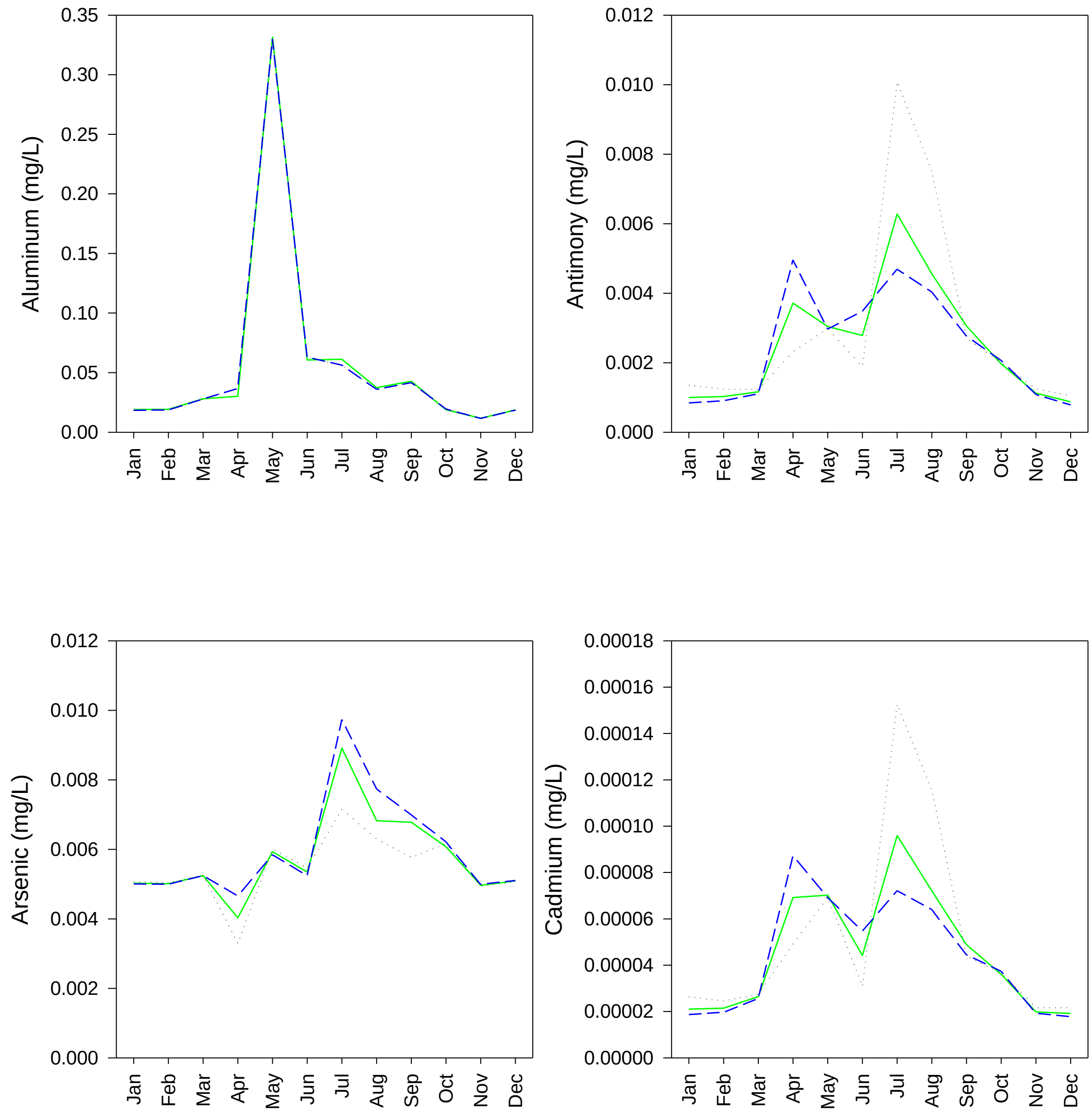


Figure 14: Predicted Concentrations of Parameters of Concern in Haggart Creek (W29) below the Mine Water Treatment Plant, Eagle Creek, and Non-Contact Discharge from Platinum Gulch Waste Rock Storage Area during Draindown Year 13 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).

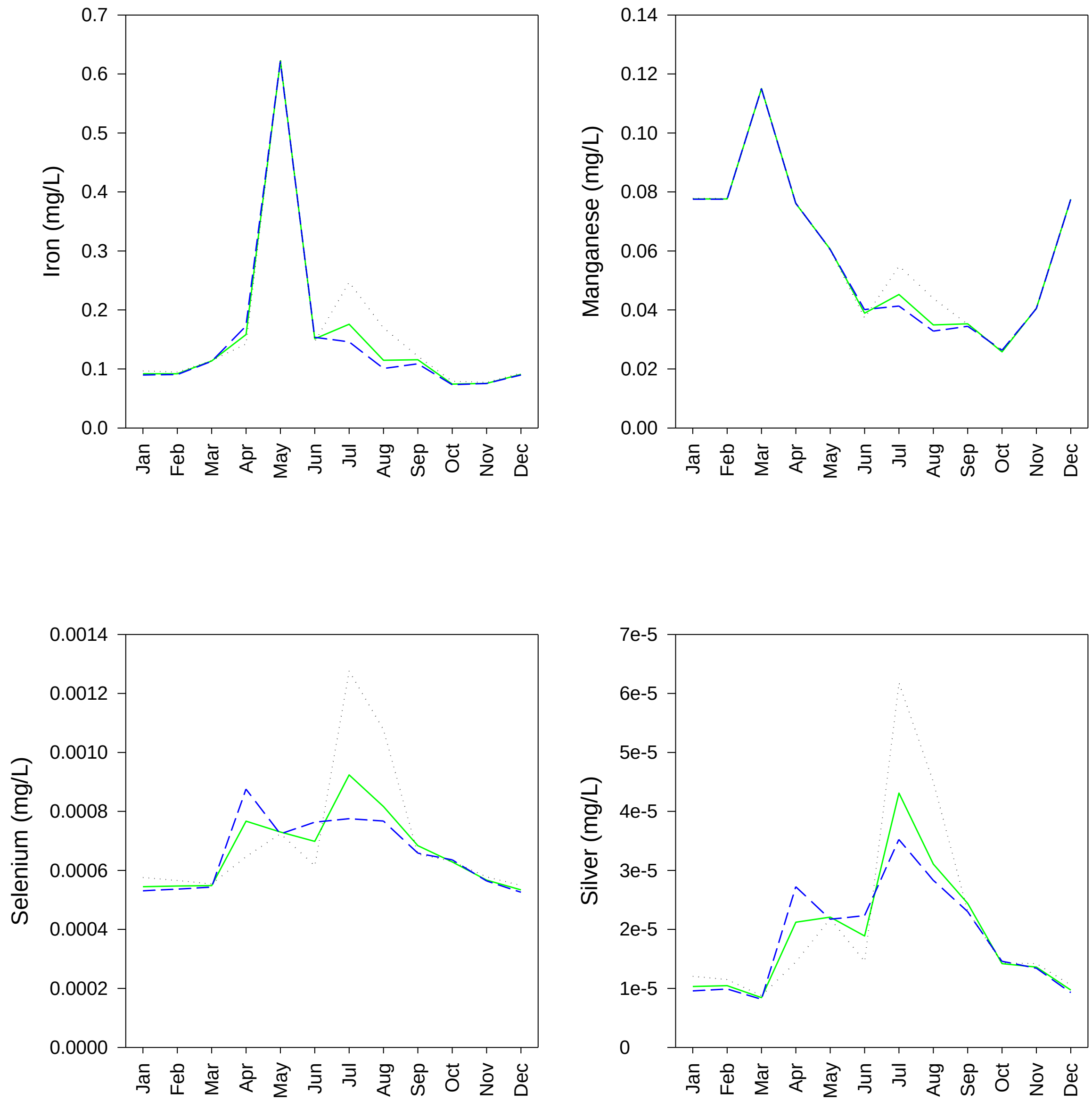


Figure 14: ***Continued*. Predicted Concentrations of Parameters of Concern in Haggart Creek (W29) below the Mine Water Treatment Plant, Eagle Creek, and Non-Contact Discharge from Platinum Gulch Waste Rock Storage Area during Draindown Year 13 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).**

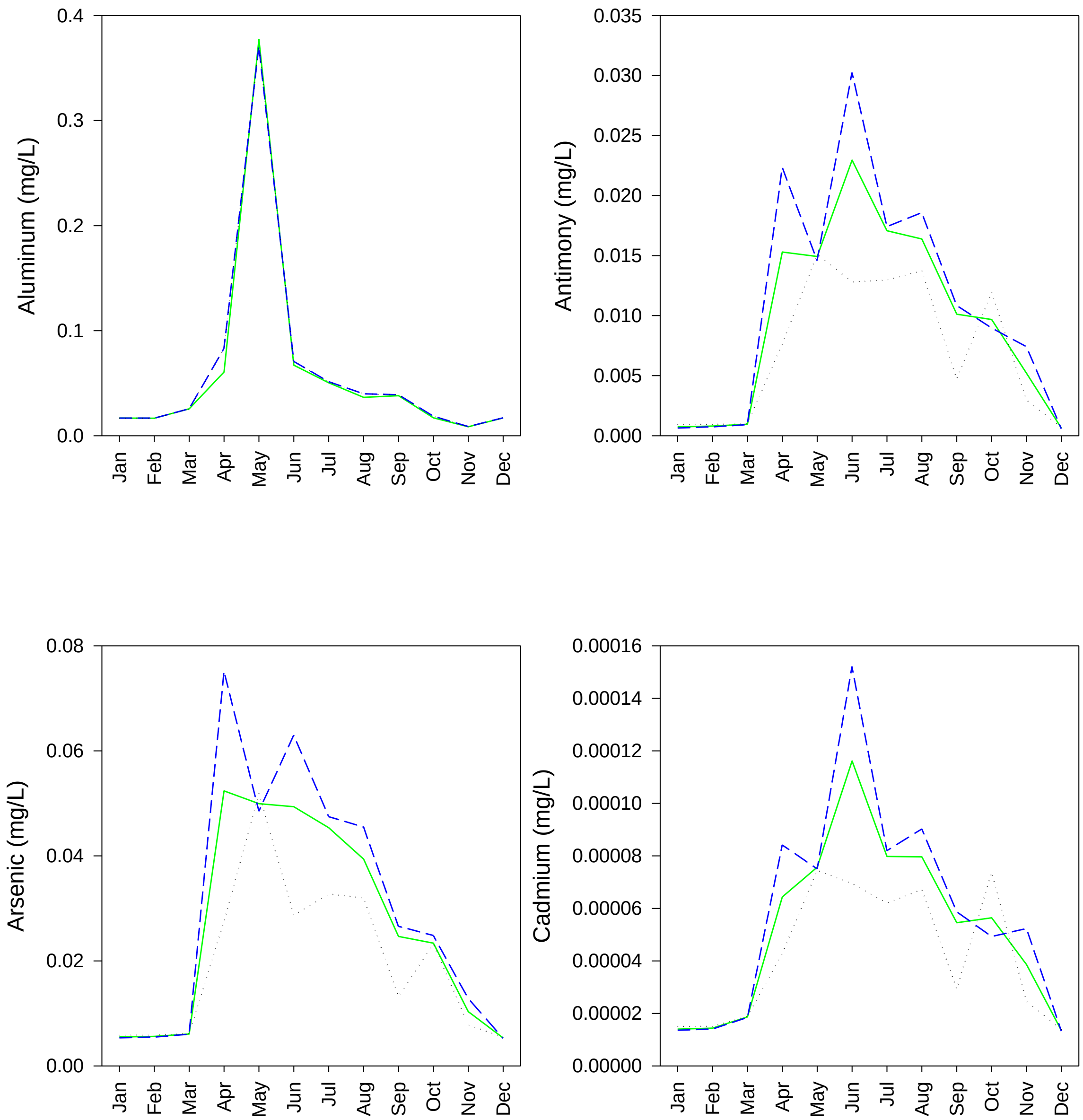


Figure 15: Predicted Concentrations of Parameters of Concern in Haggart Creek (W29) below the HLF, Eagle Creek (including the Eagle Pup Waste Rock Storage Area), and Platinum Gulch Waste Rock Storage Area (including the Pit) during Closure Year 21 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).

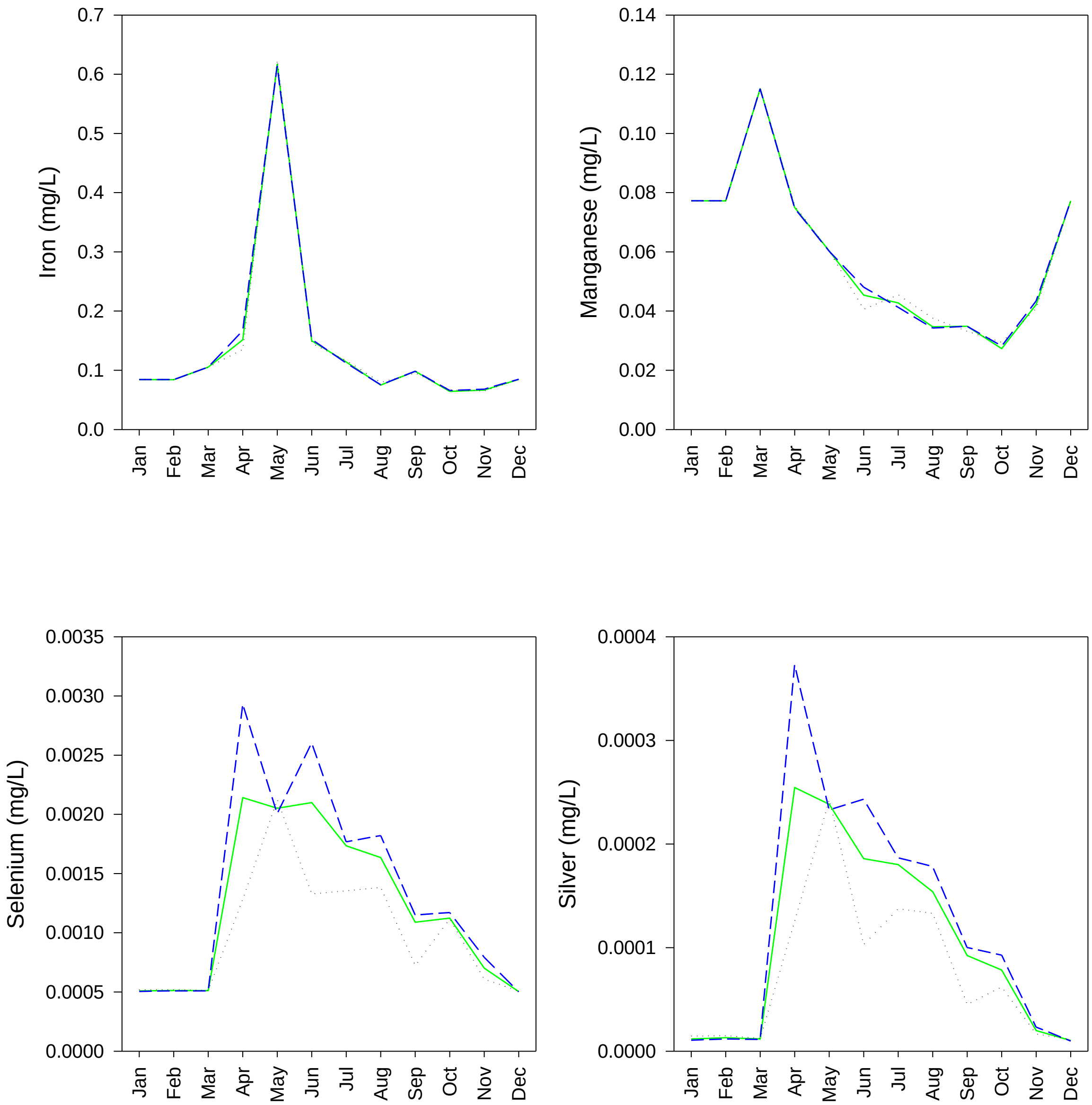


Figure 15: ***Continued*. Predicted Concentrations of Parameters of Concern in Haggart Creek (W29) below the HLF, Eagle Creek (including the Eagle Pup Waste Rock Storage Area), and Platinum Gulch Waste Rock Storage Area (including the Pit) during Closure Year 21 for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).**

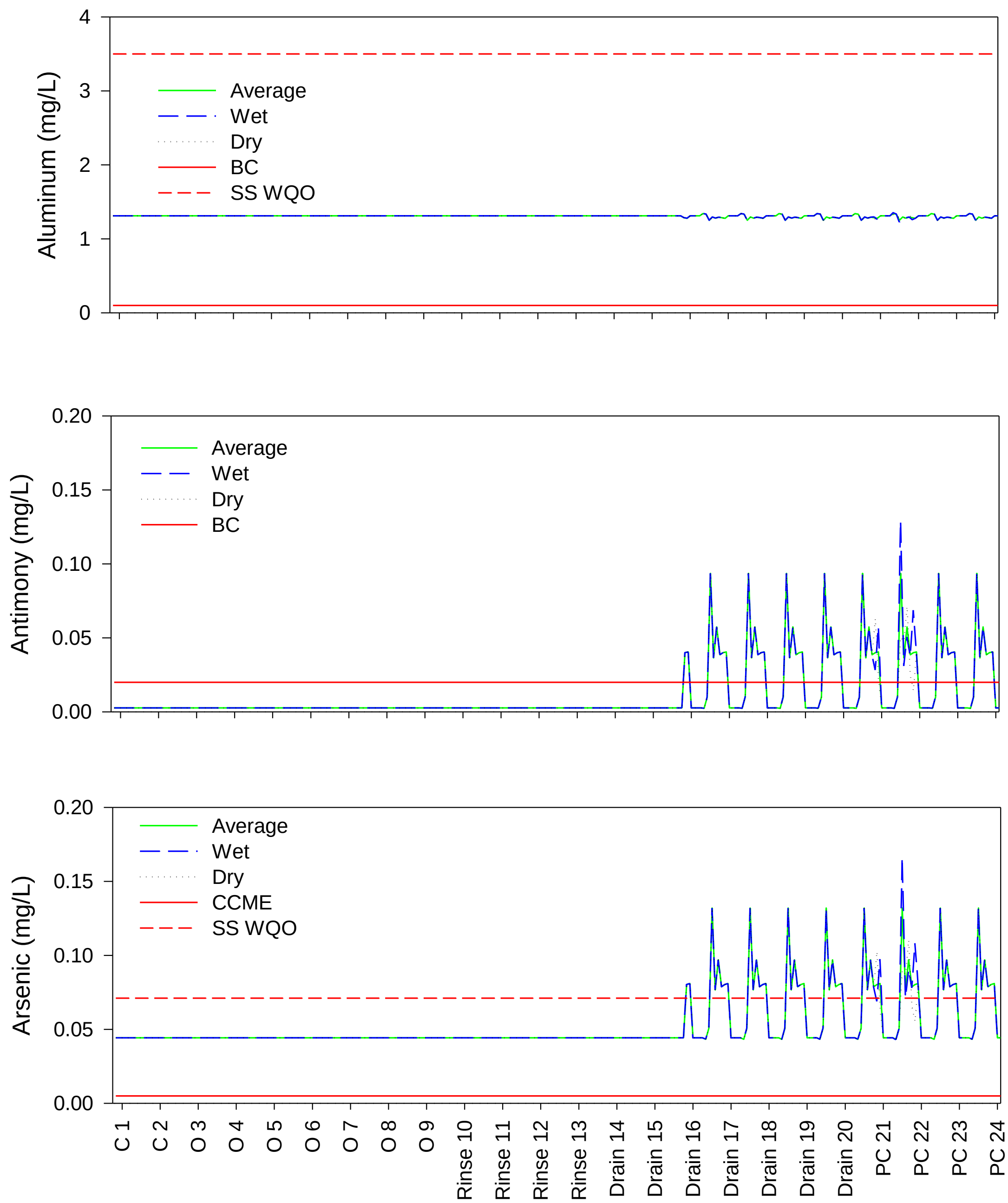


Figure 16: Predicted Concentrations of Parameters of Concern in Dublin Gulch (W71) below Eagle Pup Waste Rock Storage Area using Maximum Monthly Baseline Concentrations for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).

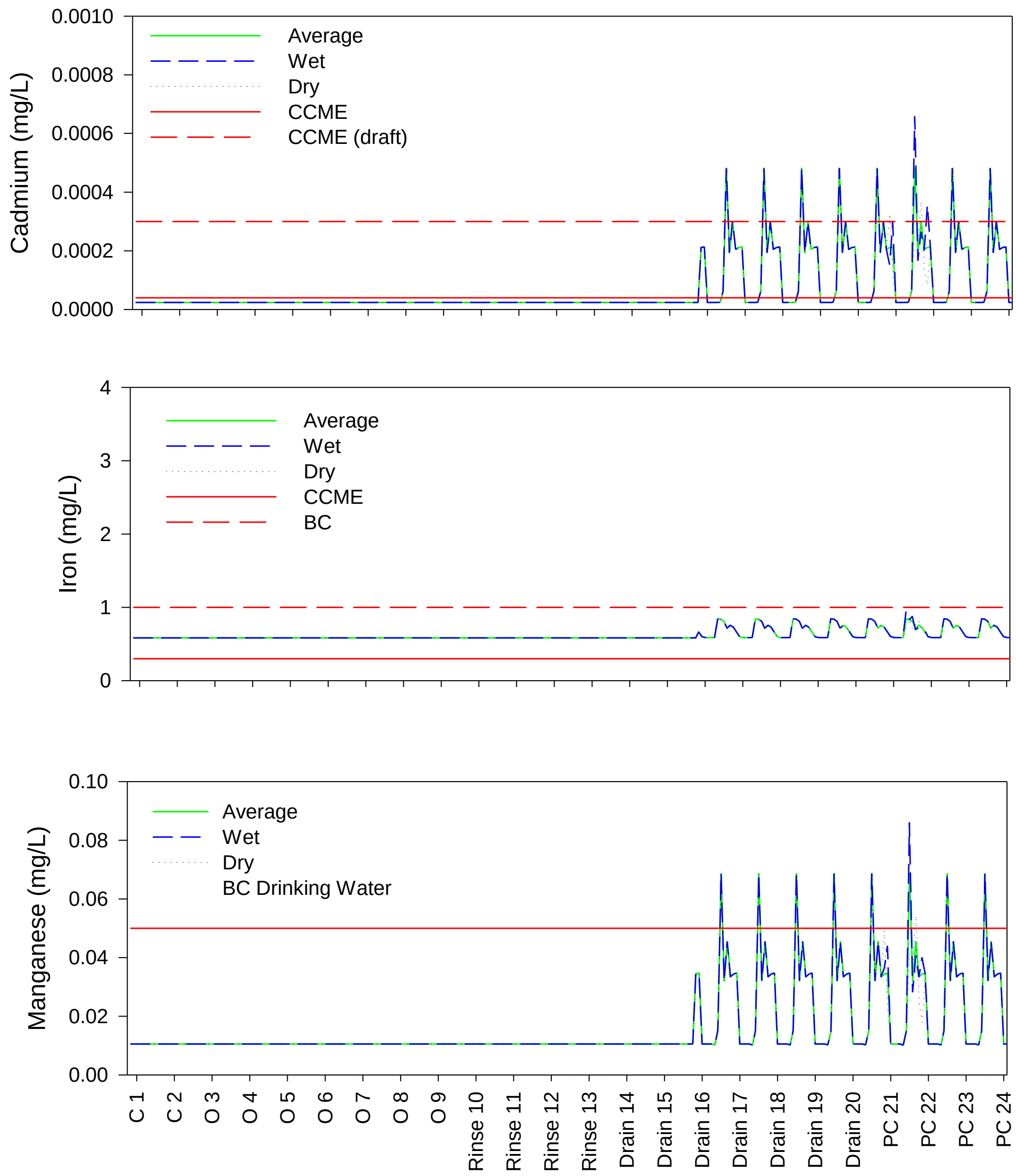


Figure 16: ***Continued*. Predicted Concentrations of Parameters of Concern in Dublin Gulch (W71) below Eagle Pup Waste Rock Storage Area using Maximum Monthly Baseline Concentrations for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).**

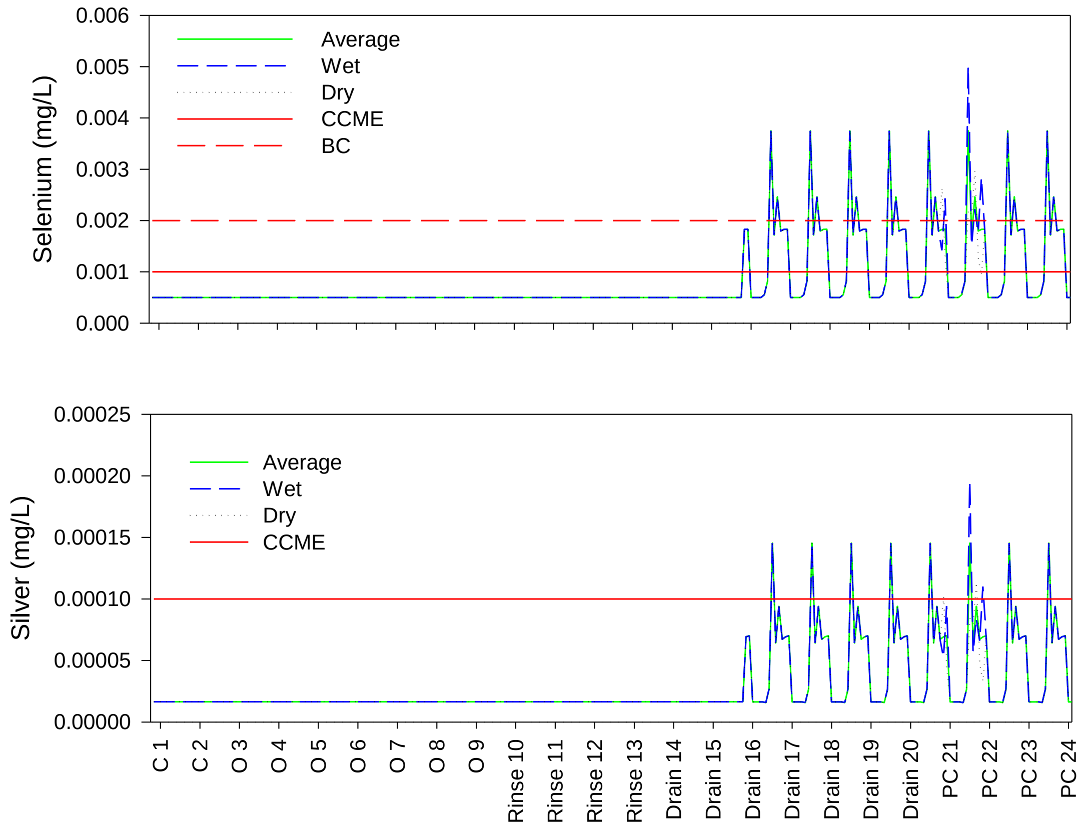


Figure 16: ***Continued*. Predicted Concentrations of Parameters of Concern in Dublin Gulch (W71) below Eagle Pup Waste Rock Storage Area using Maximum Monthly Baseline Concentrations for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).**

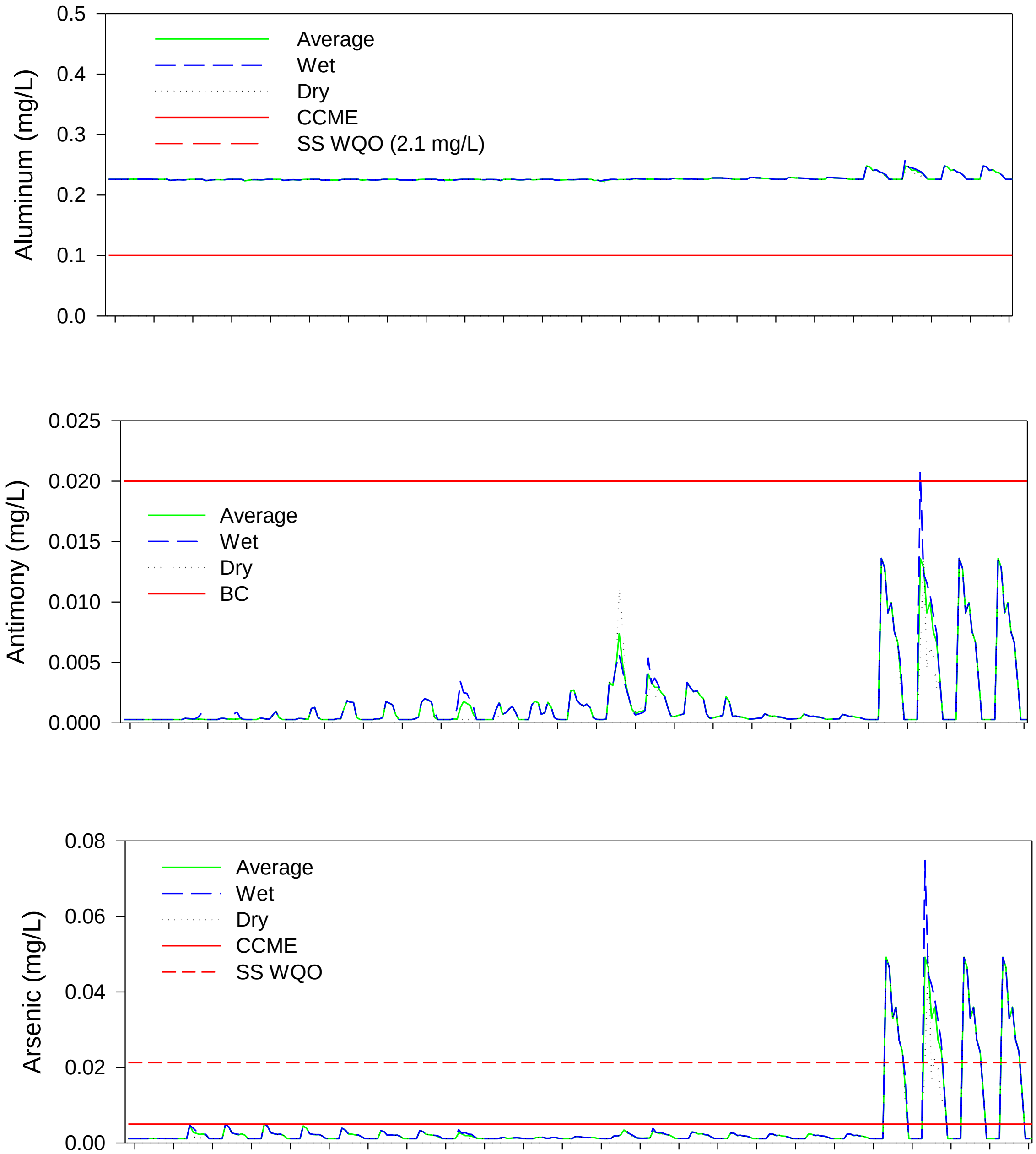


Figure 17: Predicted Concentrations of Parameters of Concern in Haggart Creek (W4) below Mine Water Treatment Plant (operations and closure) and HLF (post-closure) using Maximum Monthly Baseline Concentrations for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).

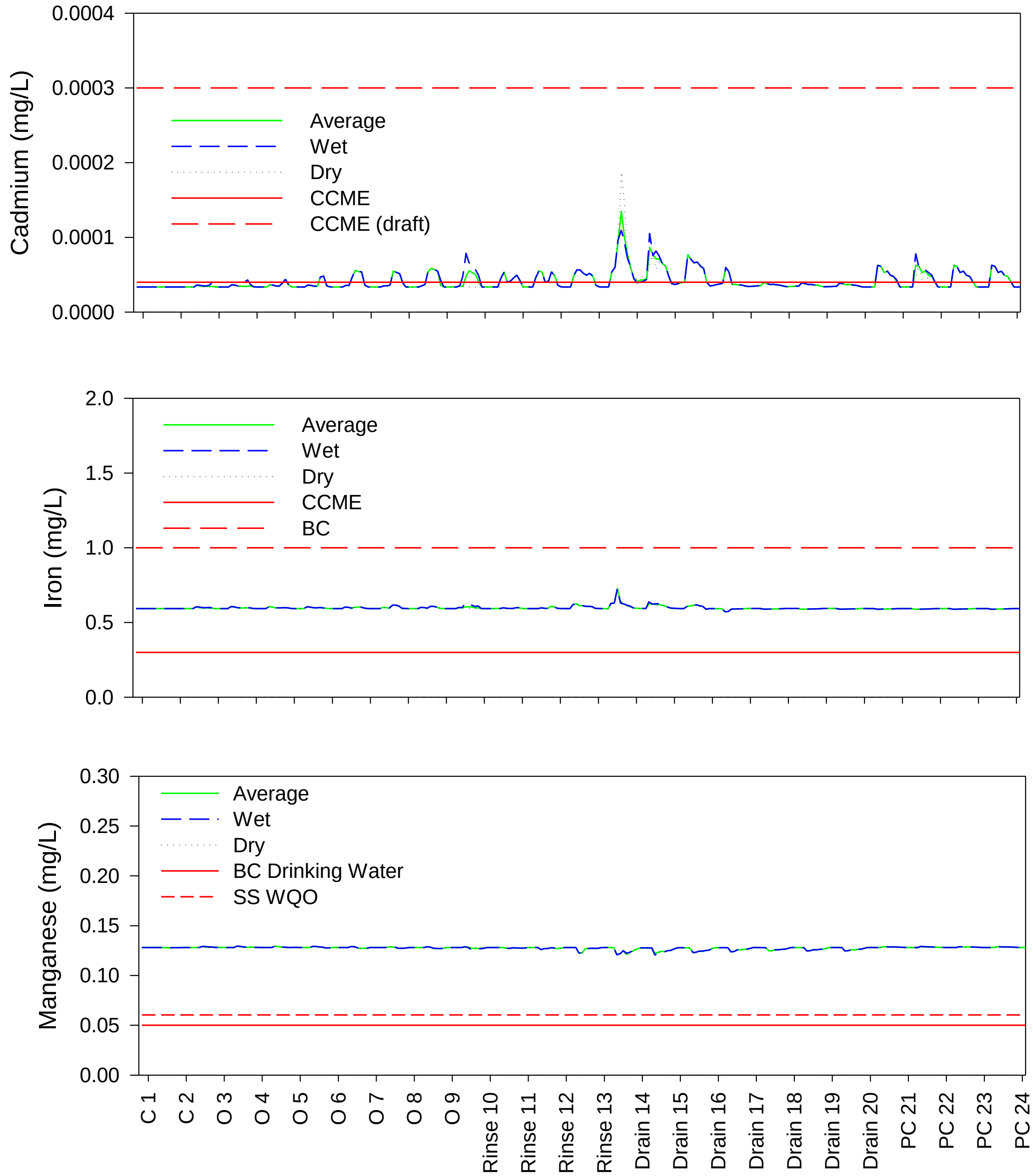


Figure 17: ***Continued*. Predicted Concentrations of Parameters of Concern in Haggart Creek (W4) below Mine Water Treatment Plant (operations and closure) and HLF (post-closure) using Maximum Monthly Baseline Concentrations for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).**

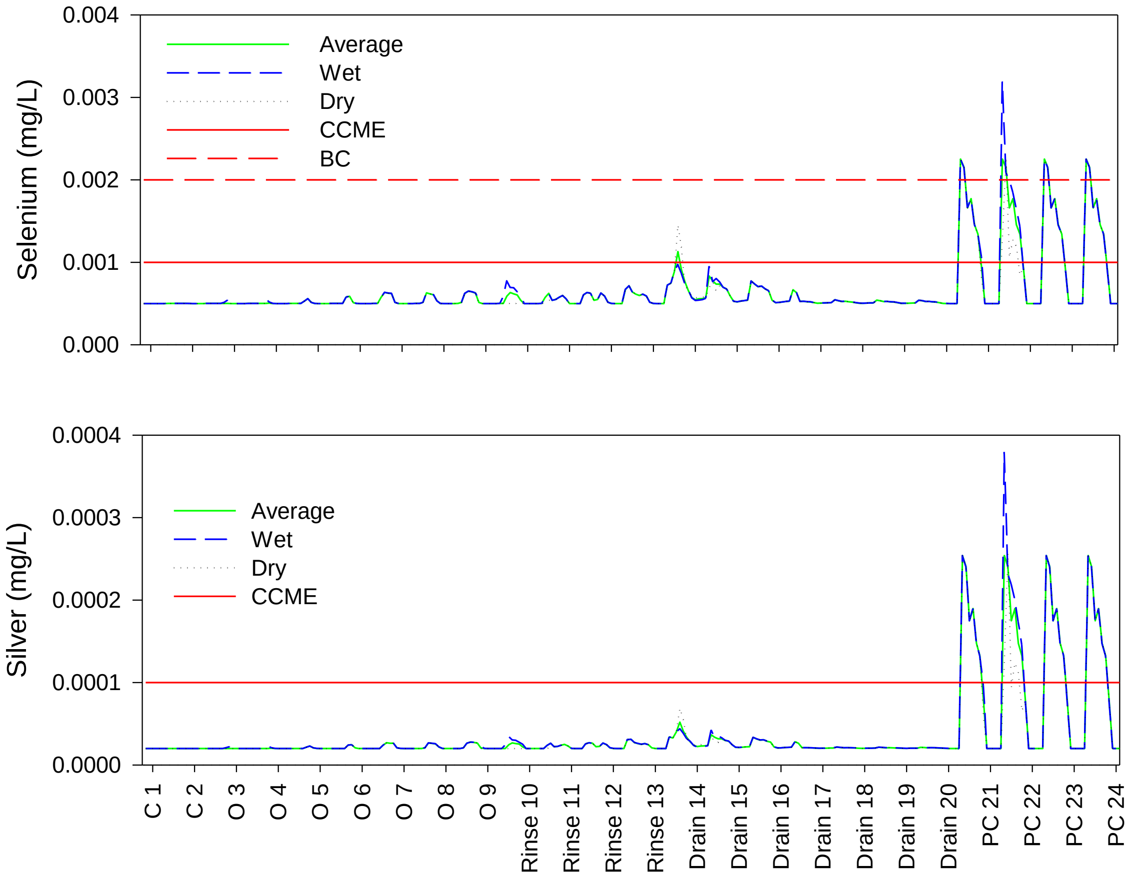


Figure 17: ***Continued*. Predicted Concentrations of Parameters of Concern in Haggart Creek (W4) below Mine Water Treatment Plant (operations and closure) and HLF (post-closure) using Maximum Monthly Baseline Concentrations for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*).**

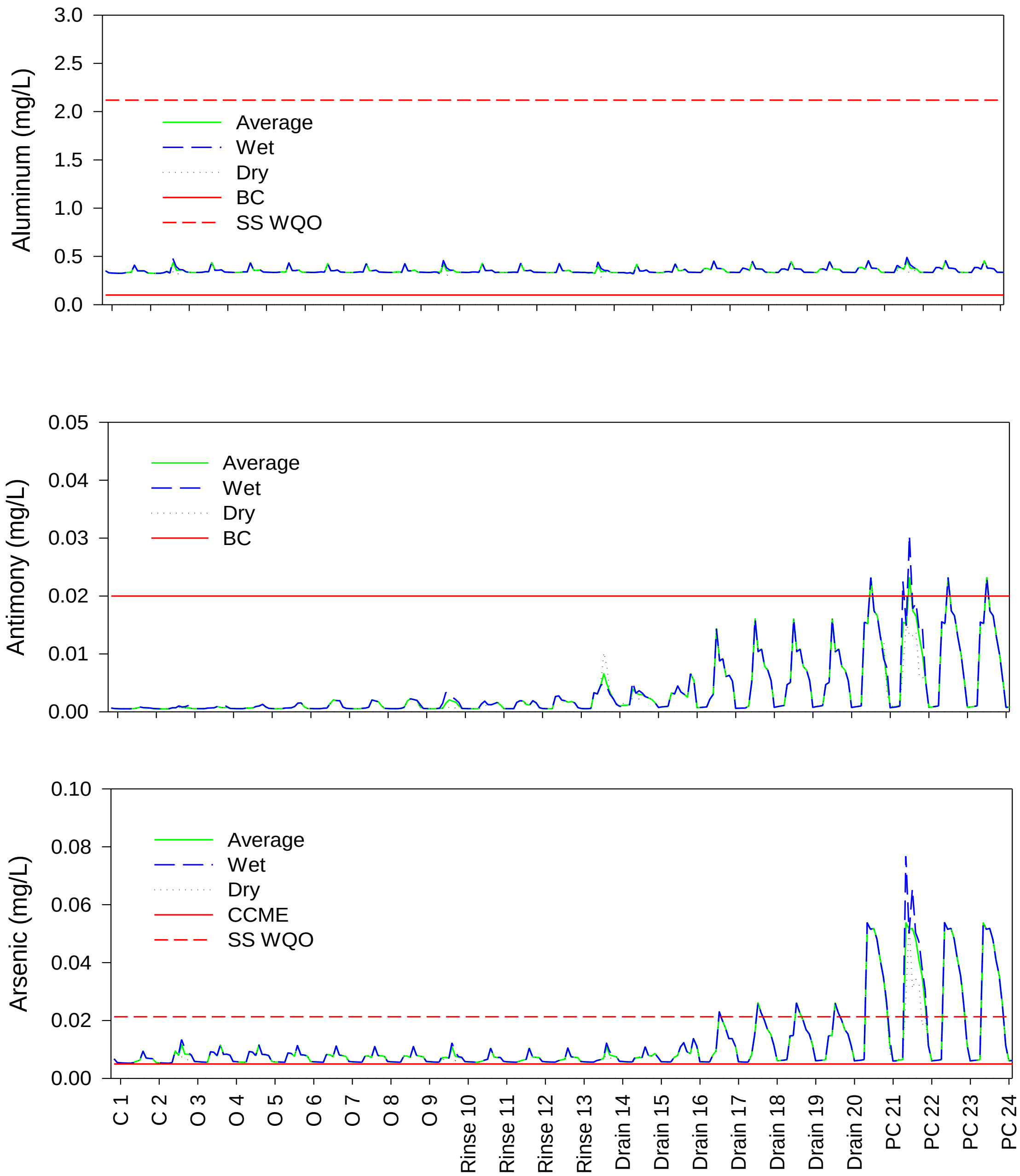


Figure 18: Predicted Concentrations of Parameters of Concern in Haggart Creek (W29) below Mine Water Treatment Plant (operations and closure) and HLF (post-closure), Eagle Creek (including Eagle Pup WRSA closure and post-closure), and Platinum Gulch WRSA (including open pit closure and post-closure) using Maximum Monthly Baseline Concentrations for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*)

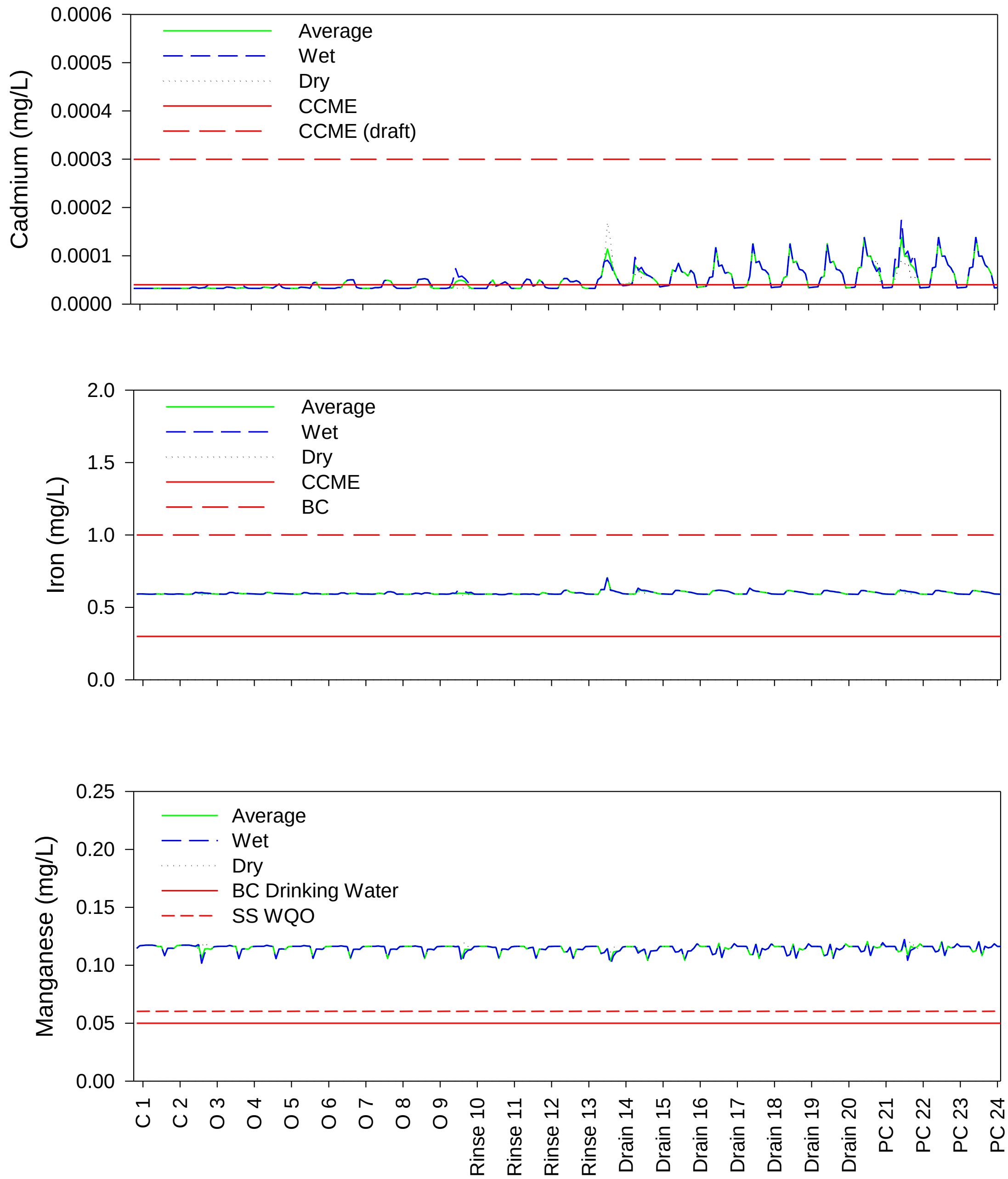


Figure 18: ***Continued*. Predicted Concentrations of Parameters of Concern in Haggart Creek (W29) below Mine Water Treatment Plant (operations and closure) and HLF (post-closure), Eagle Creek (including Eagle Pup WRSA closure and post-closure), and Platinum Gulch WRSA (including open pit closure and post-closure) using Maximum Monthly Baseline Concentrations for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*)**

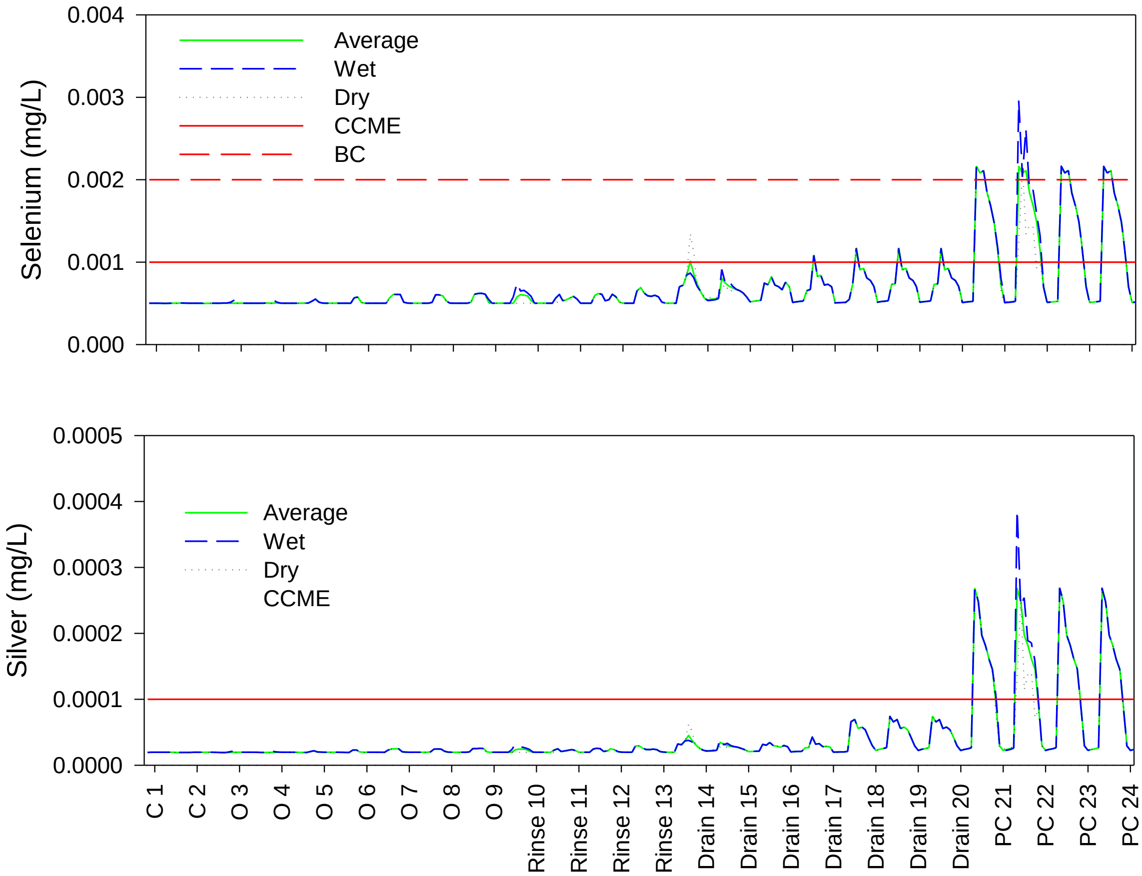


Figure 18: ***Continued*. Predicted Concentrations of Parameters of Concern in Haggart Creek (W29) below Mine Water Treatment Plant (operations and closure) and HLF (post-closure), Eagle Creek (including Eagle Pup WRSA closure and post-closure), and Platinum Gulch WRSA (including open pit closure and post-closure) using Maximum Monthly Baseline Concentrations for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*)**

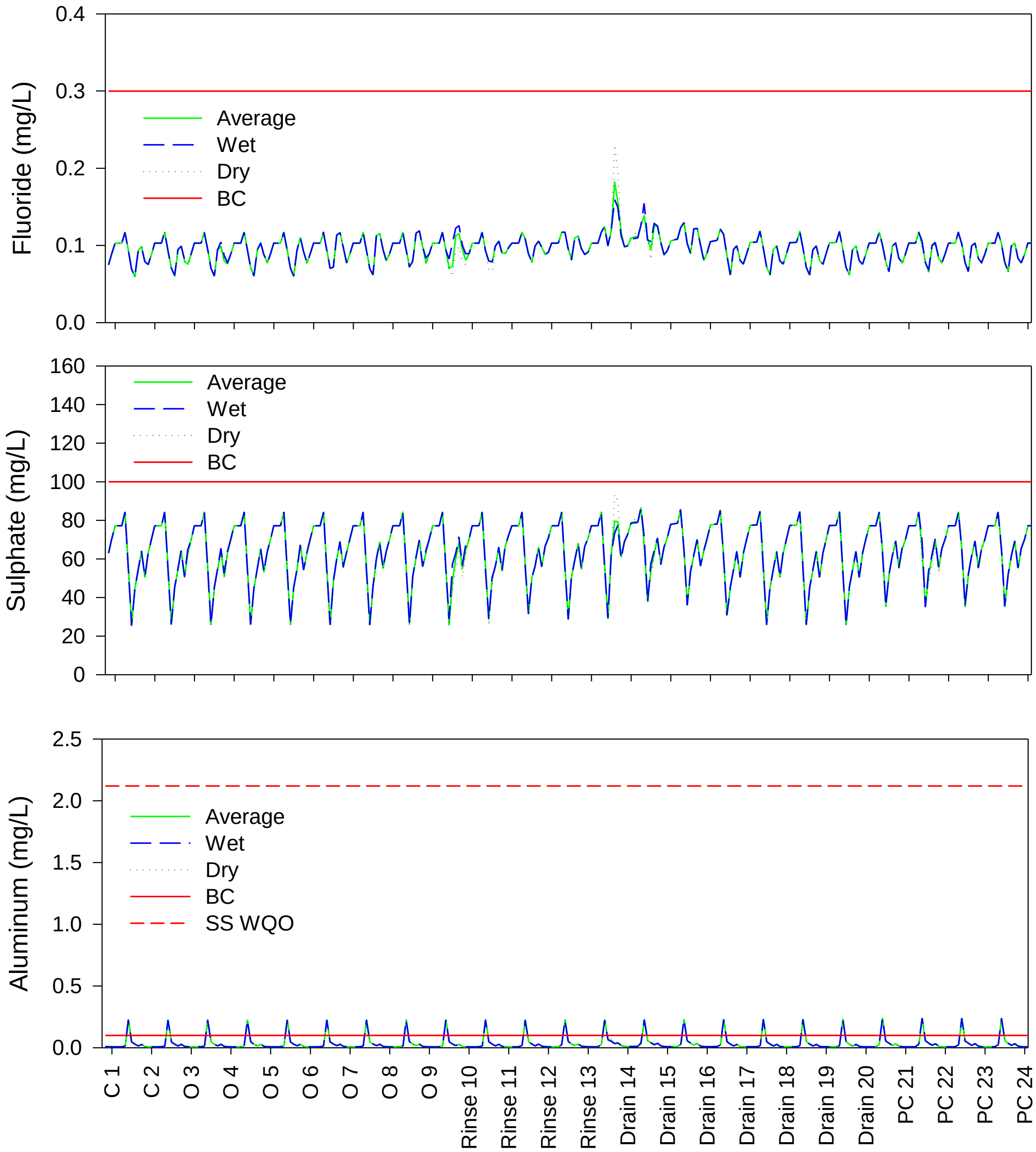


Figure 19: Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)* using 10% Infiltration Cap on HLF

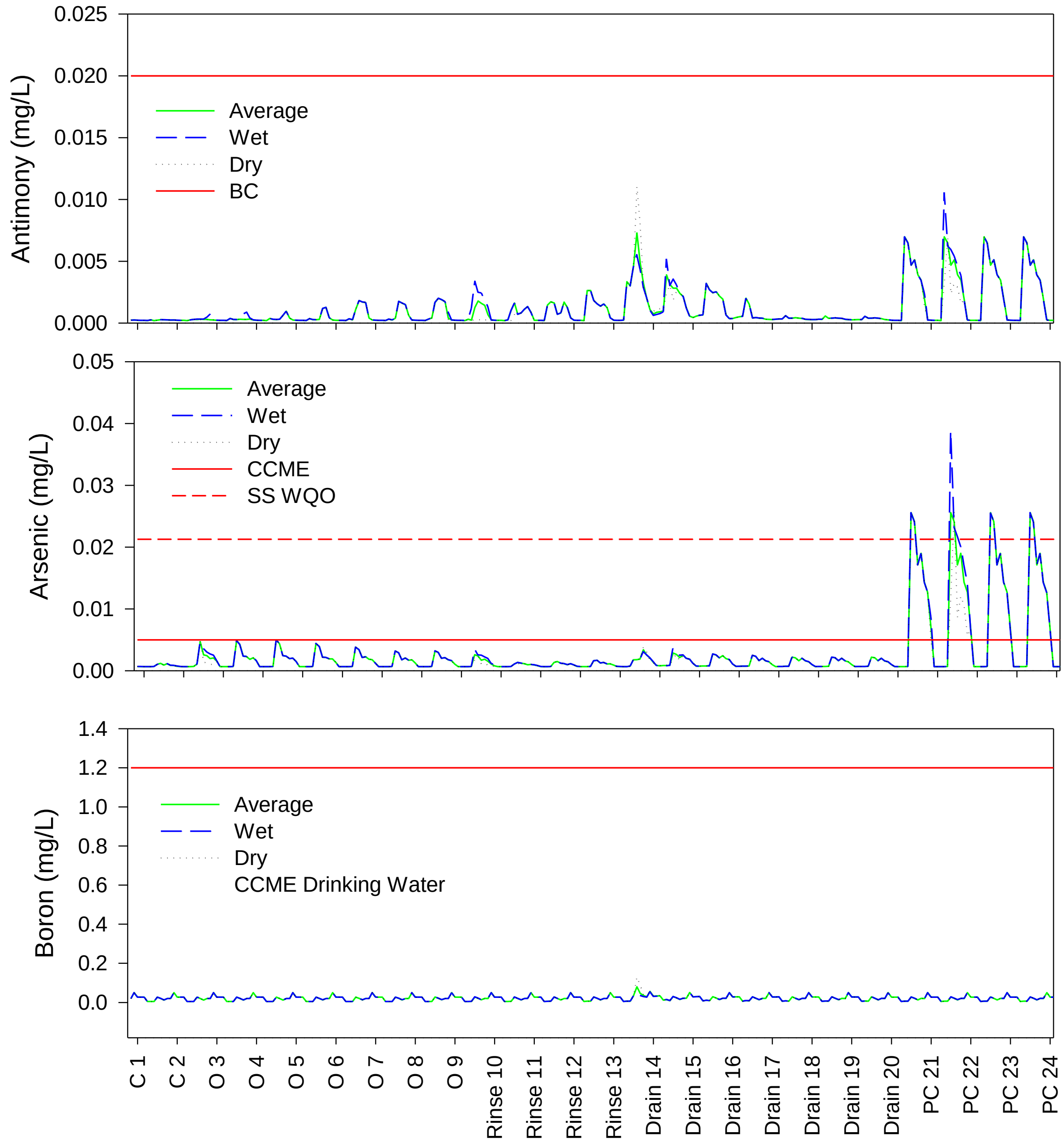


Figure 19: ***Continued.* Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases using 10% Infiltration Cap on HLF**

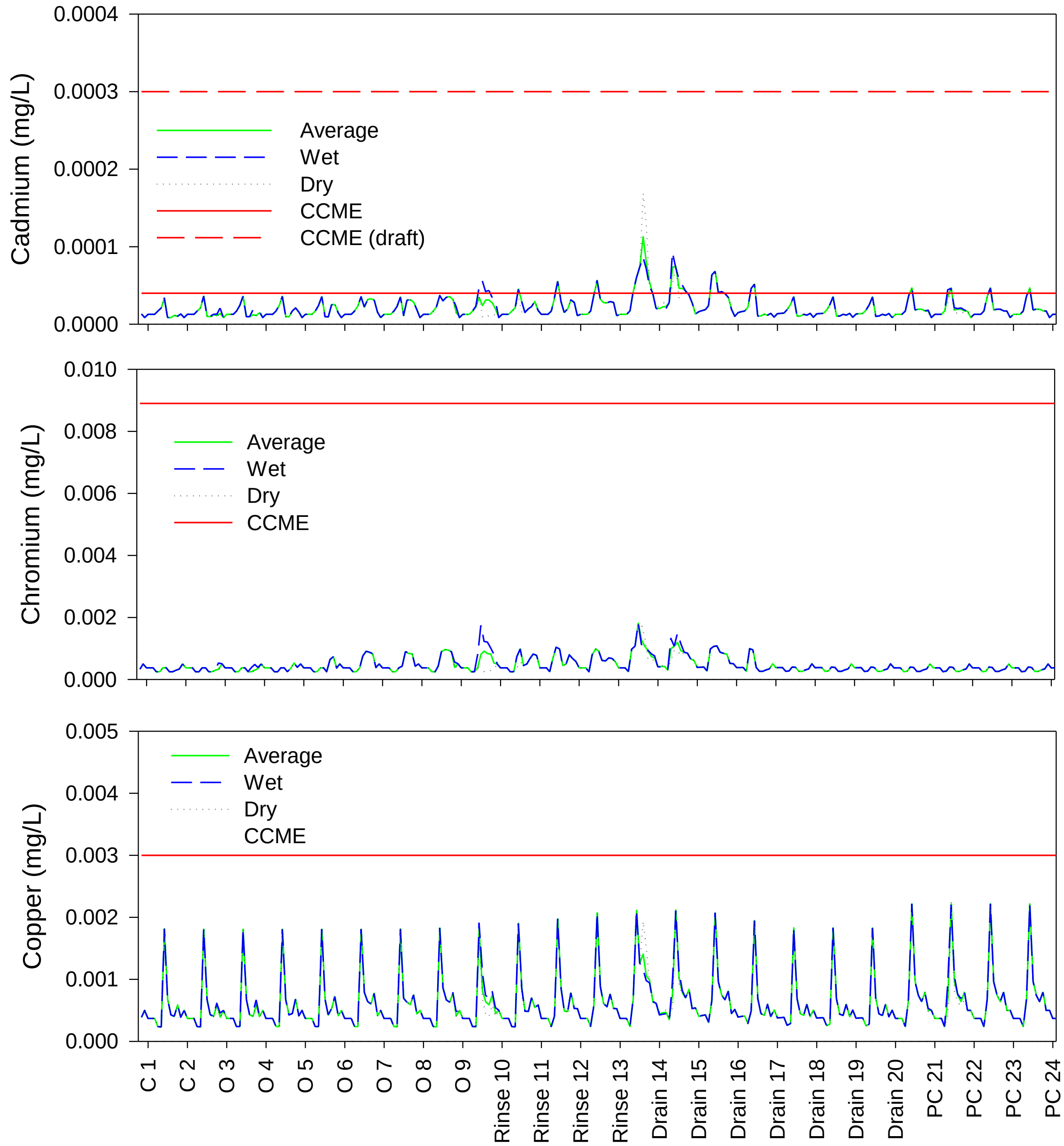


Figure 19: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases using 10% Infiltration Cap on HLF**

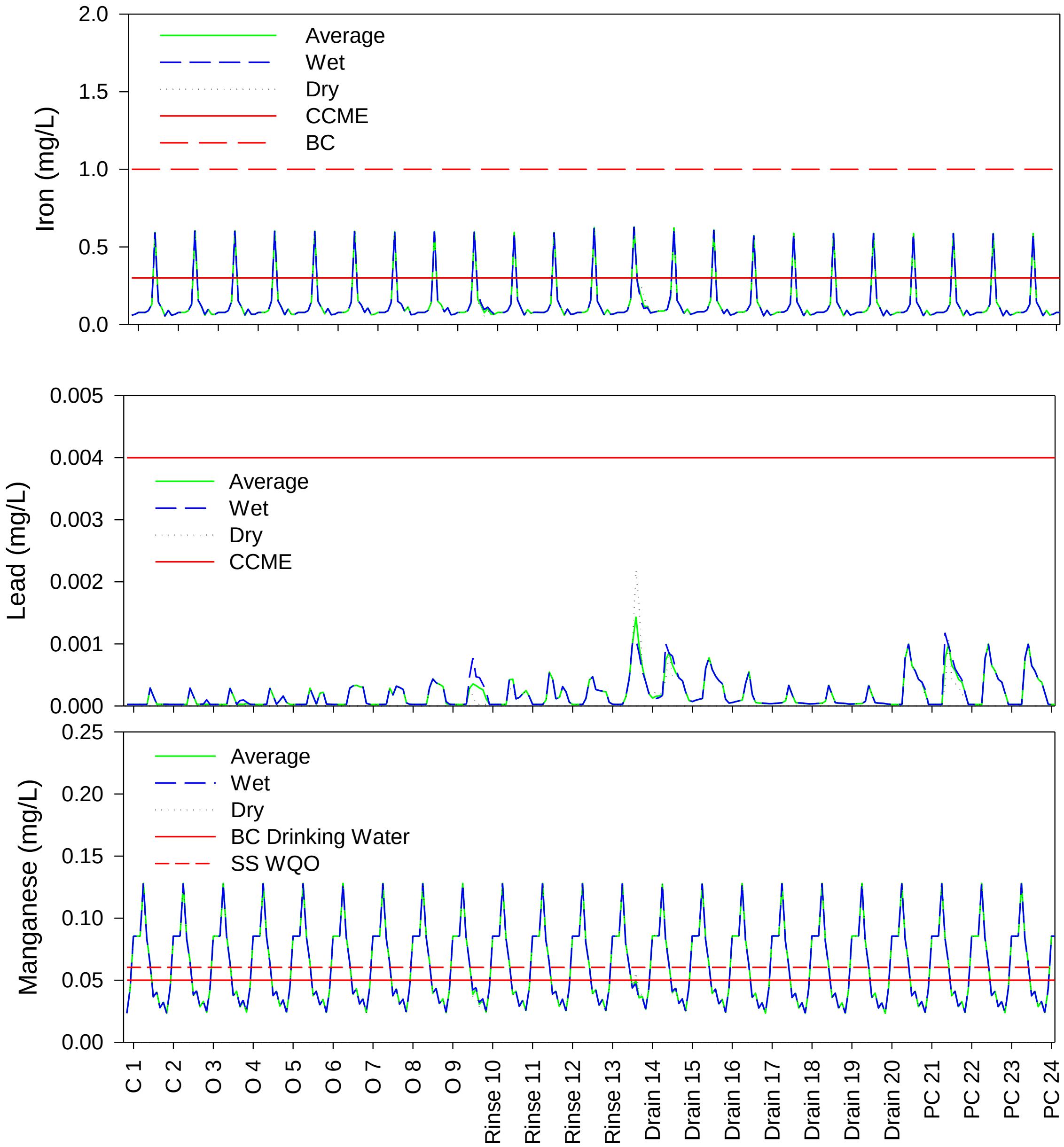


Figure 19: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases using 10% Infiltration Cap on HLF**

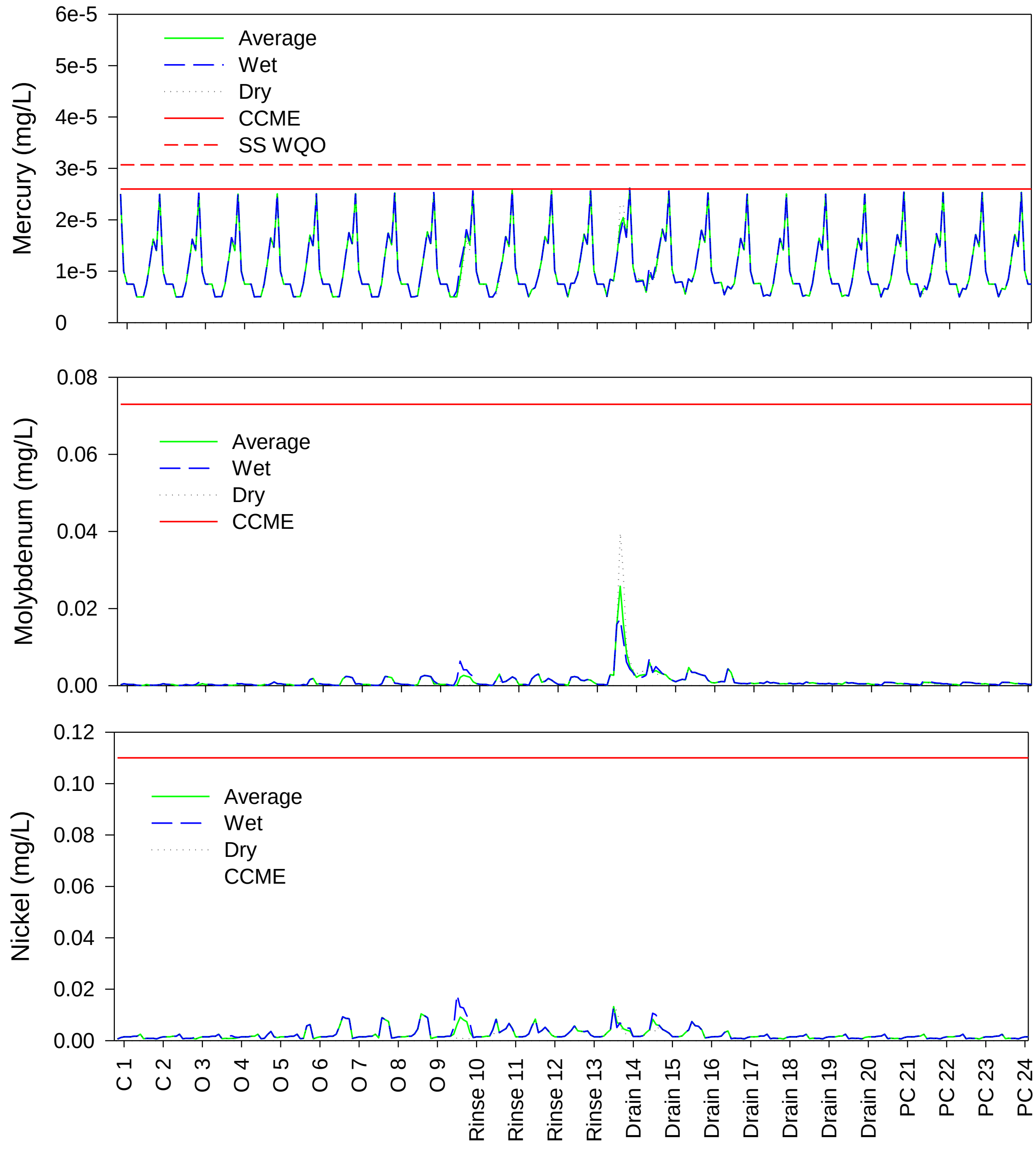


Figure 19: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases using 10% Infiltration Cap on HLF**

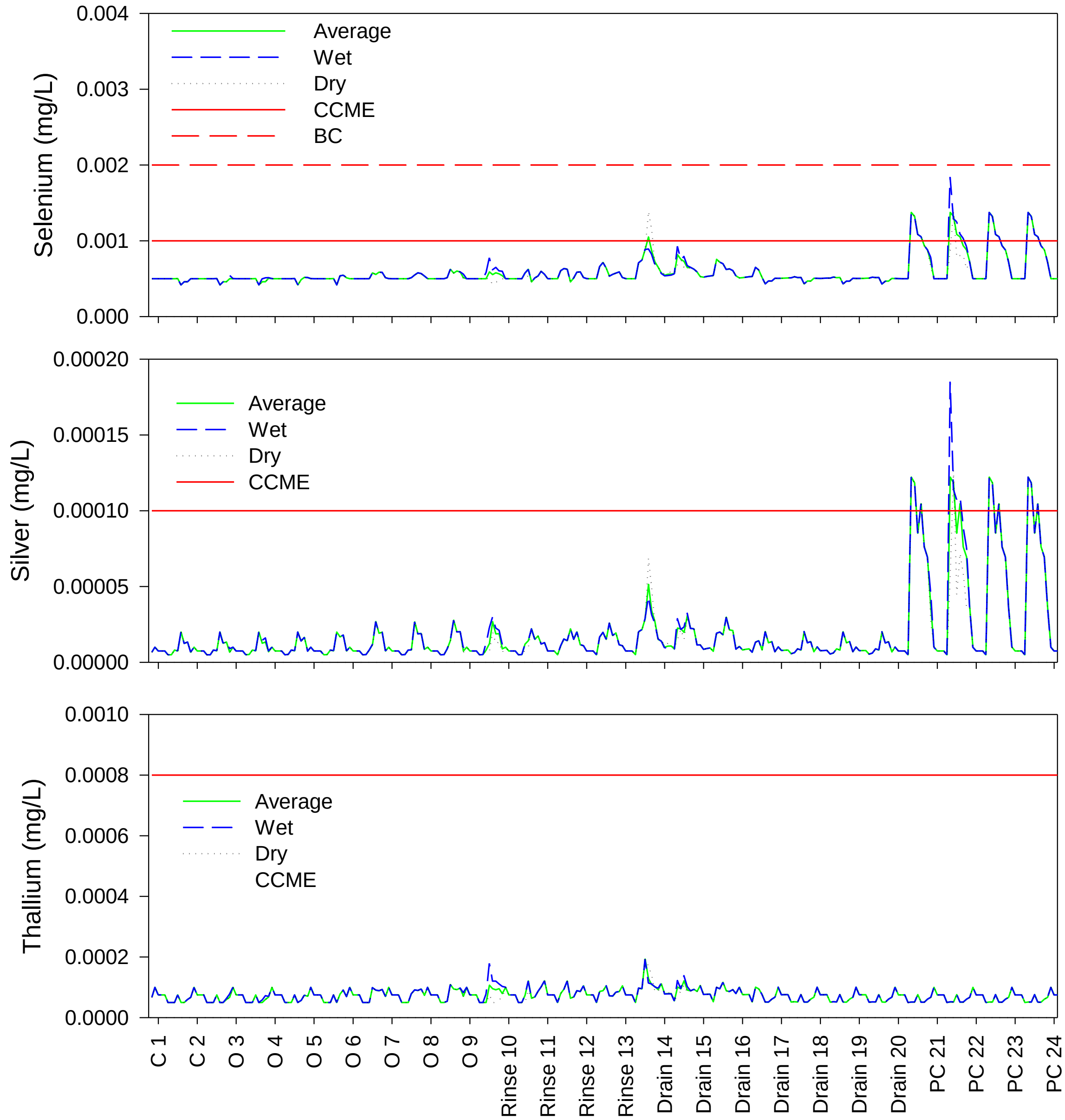


Figure 19: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases using 10% Infiltration Cap on HLF**

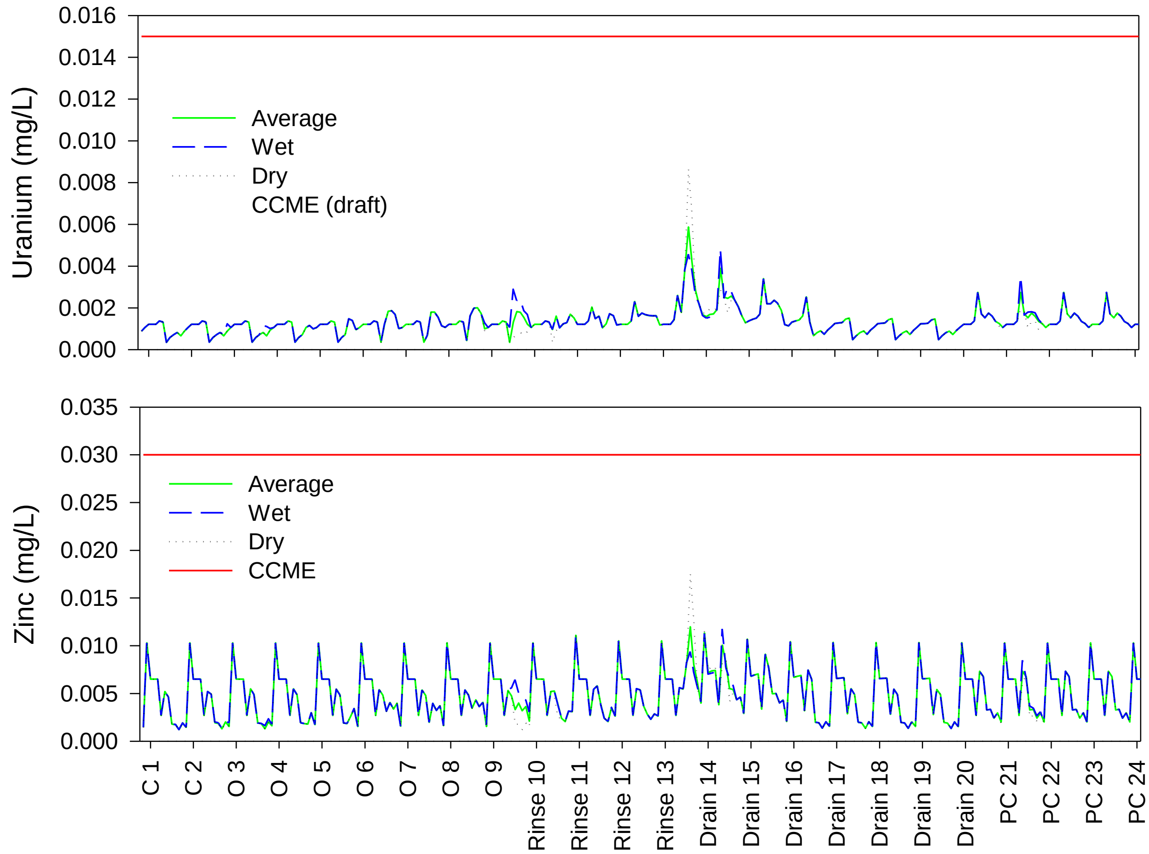


Figure 19: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases using 10% Infiltration Cap on HLF**

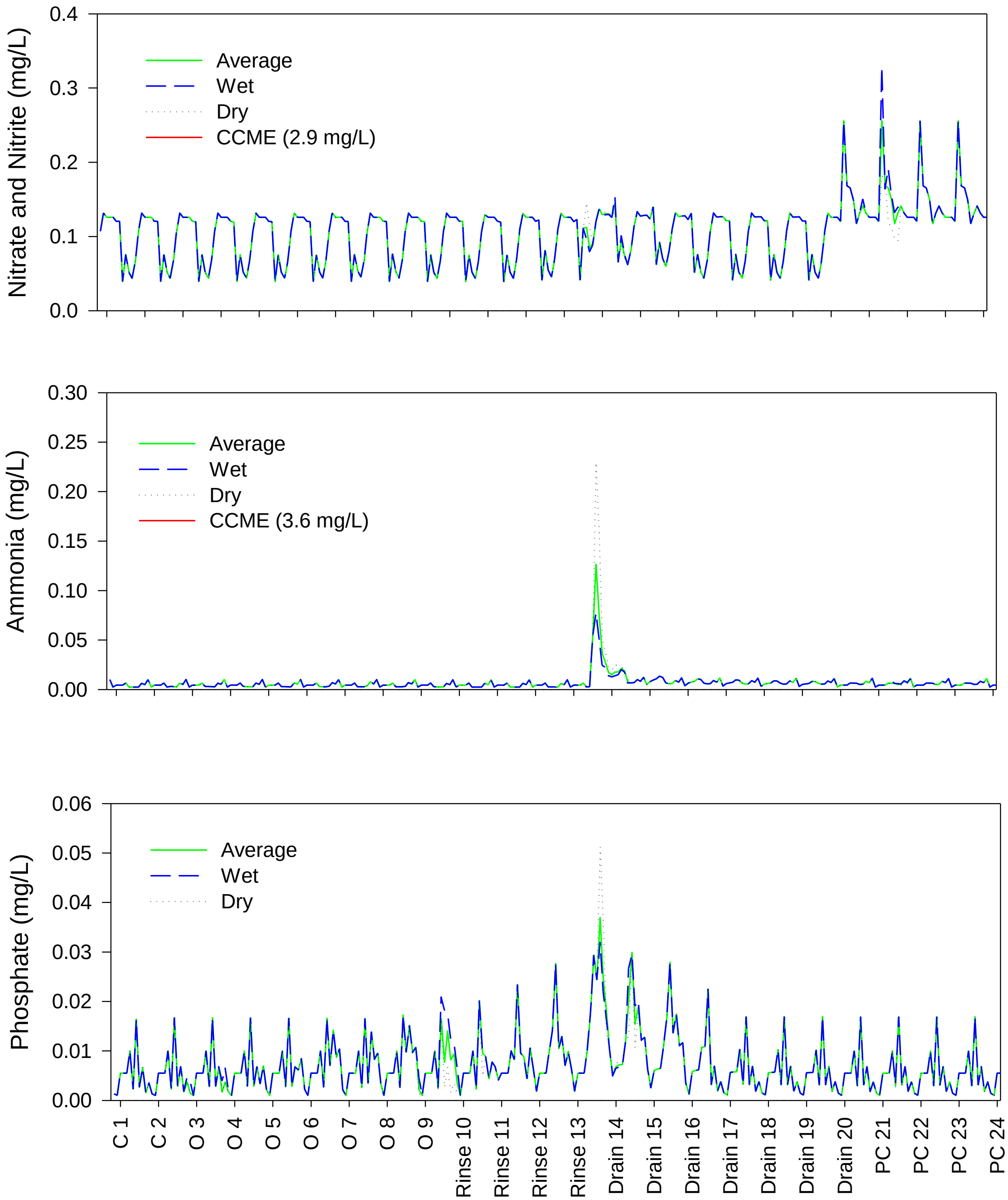


Figure 19: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases using 10% Infiltration Cap on HLF**

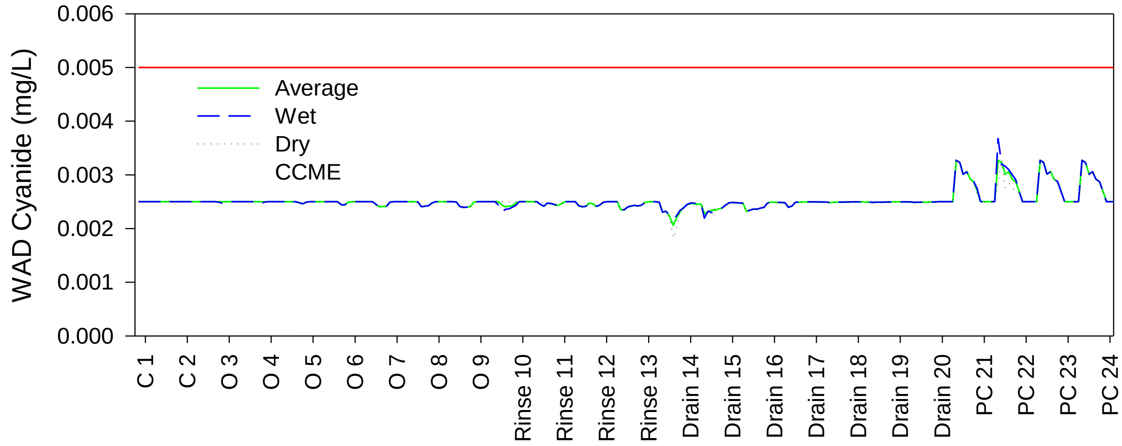


Figure 19: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W4) below the MWTP during all Project Phases using 10% Infiltration Cap on HLF**

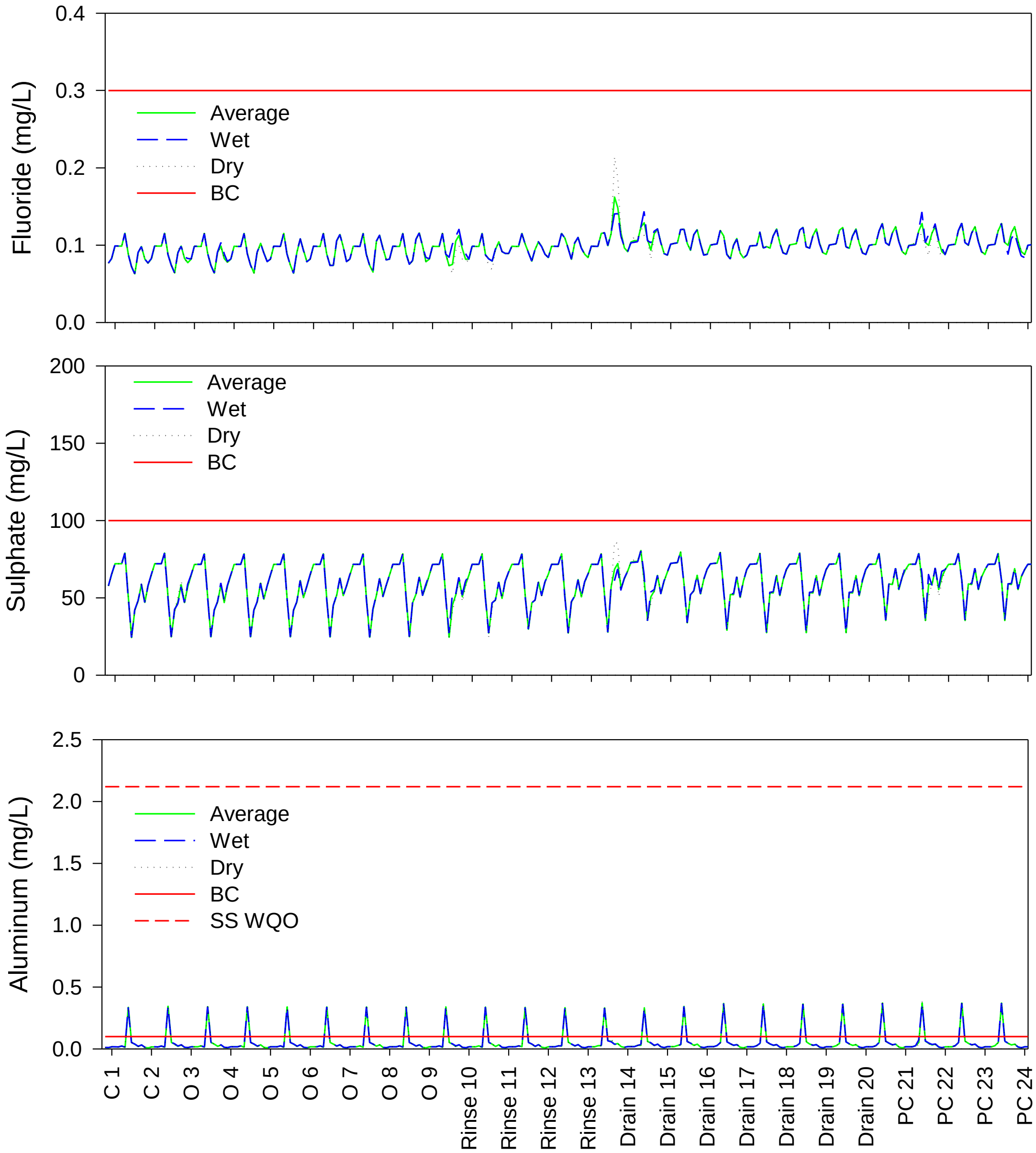


Figure 20: Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)*

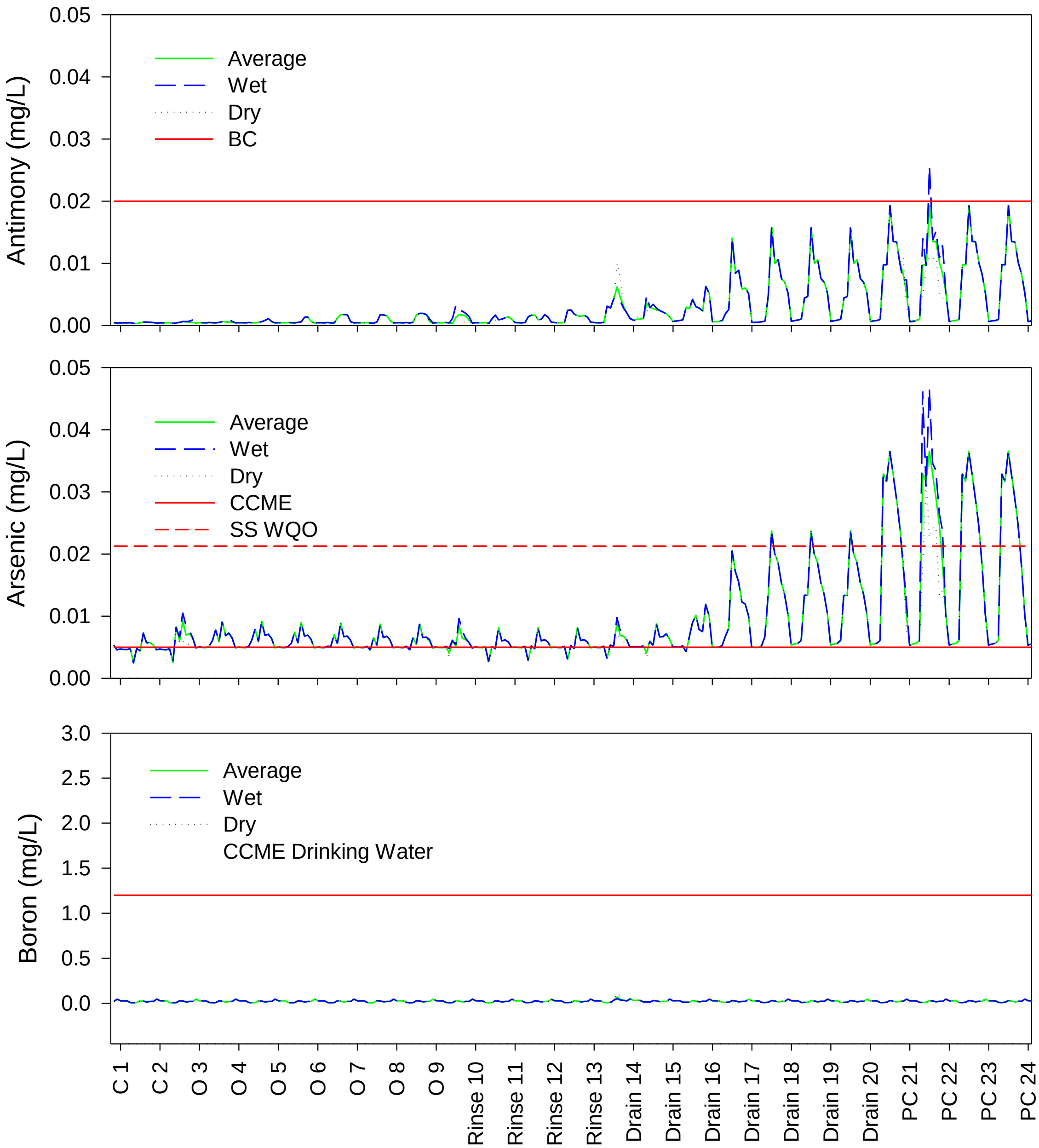


Figure 20: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF**

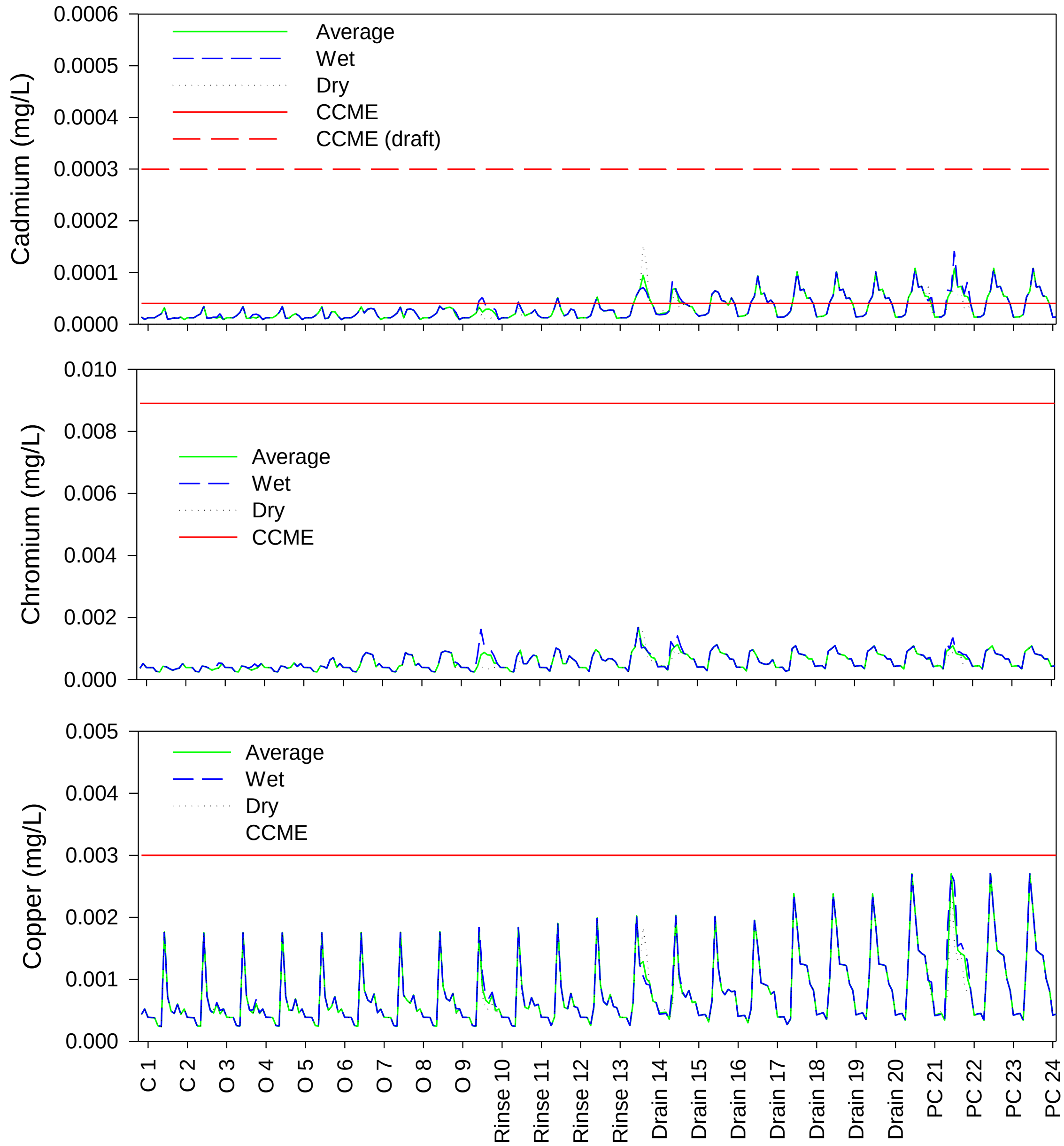


Figure 20: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF**

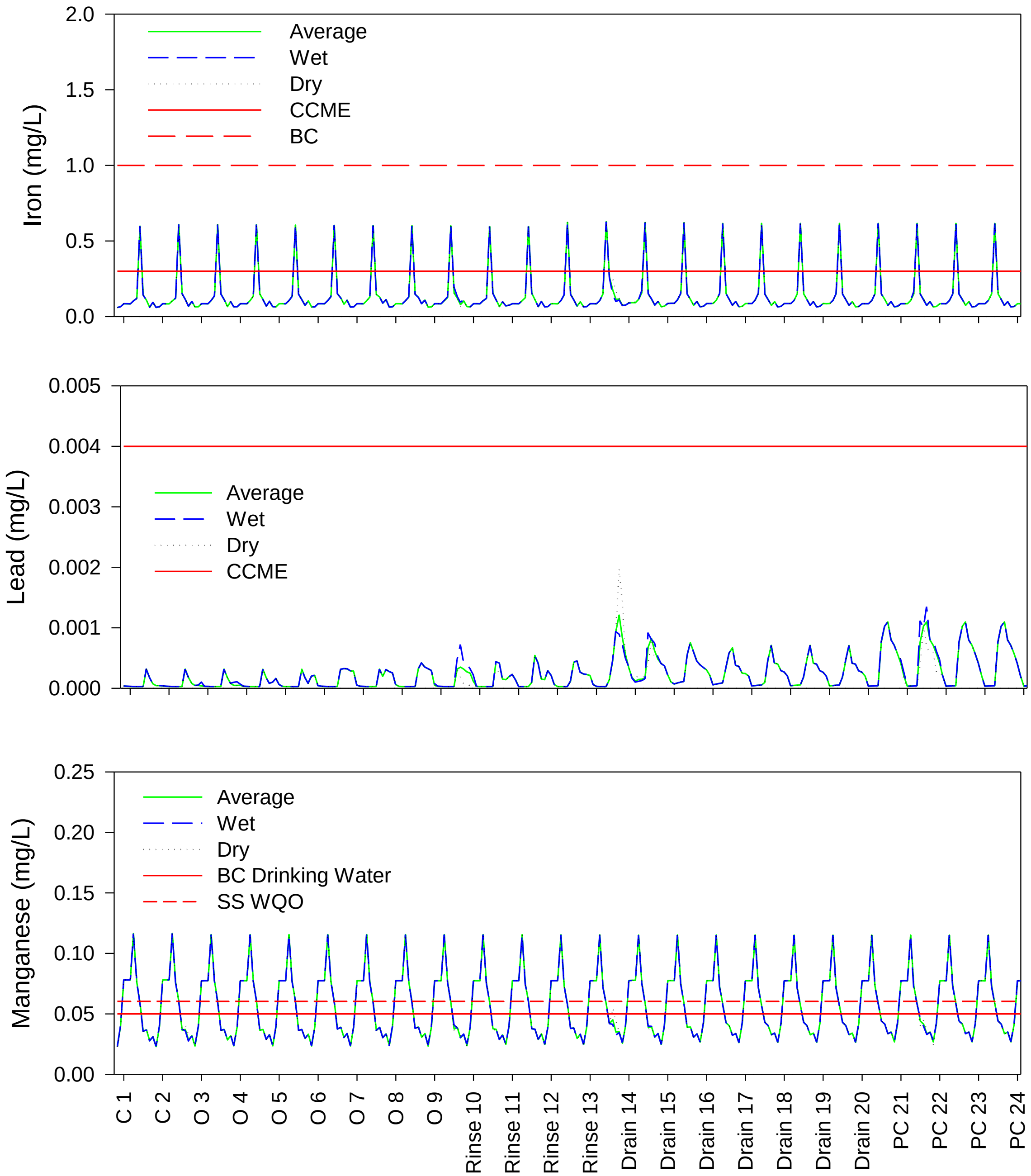


Figure 20: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF**

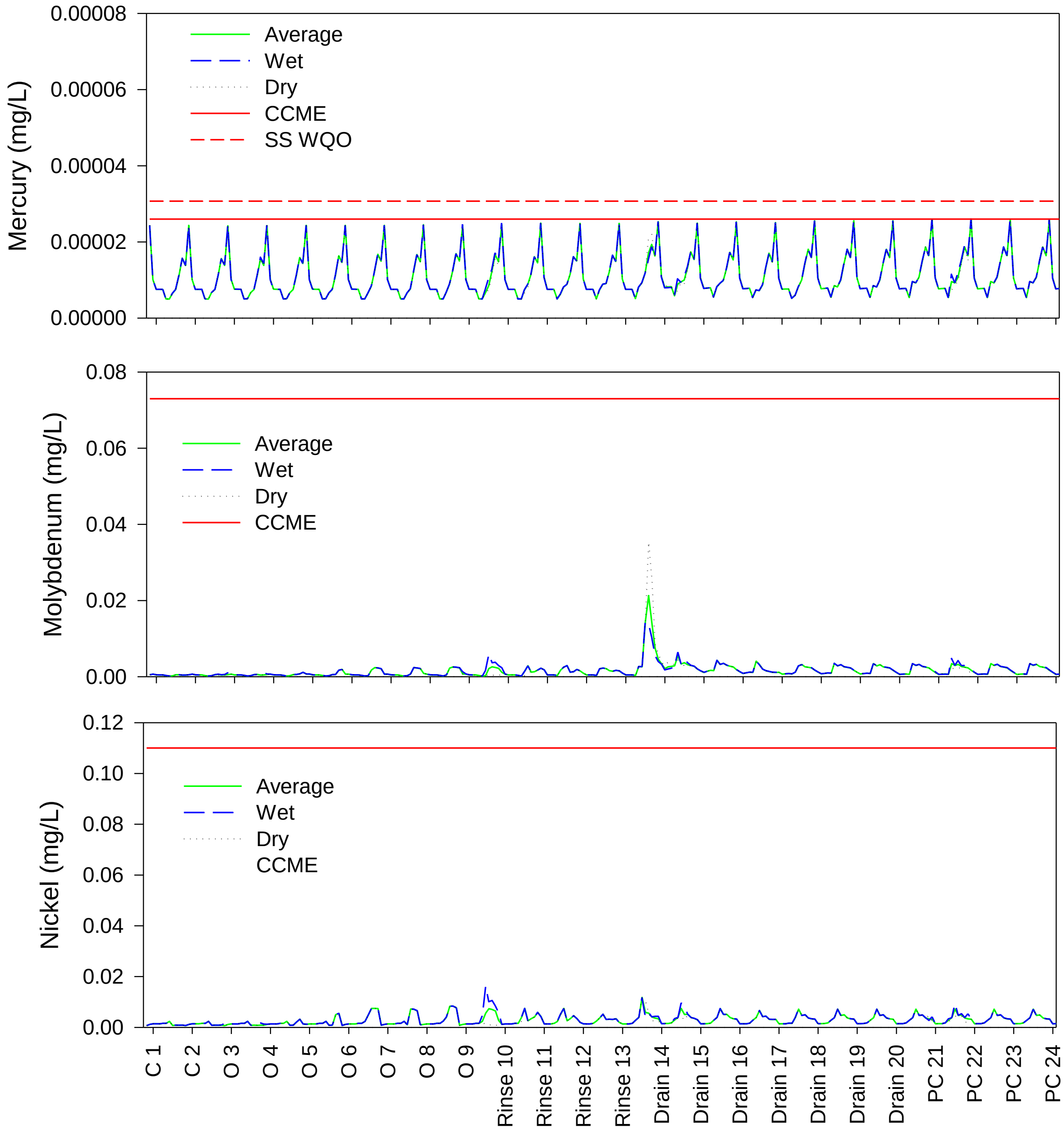


Figure 20: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF**

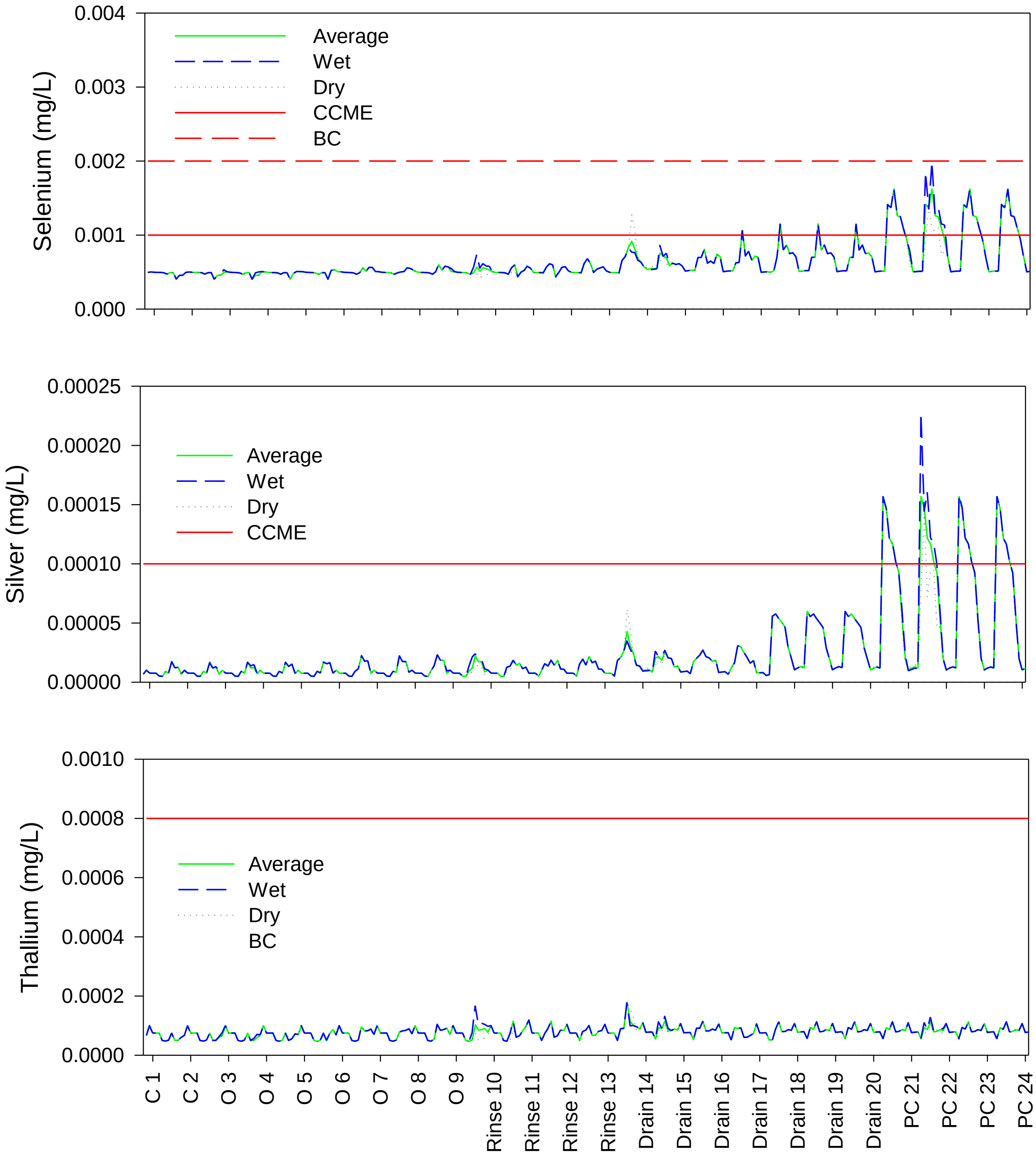


Figure 20: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF**

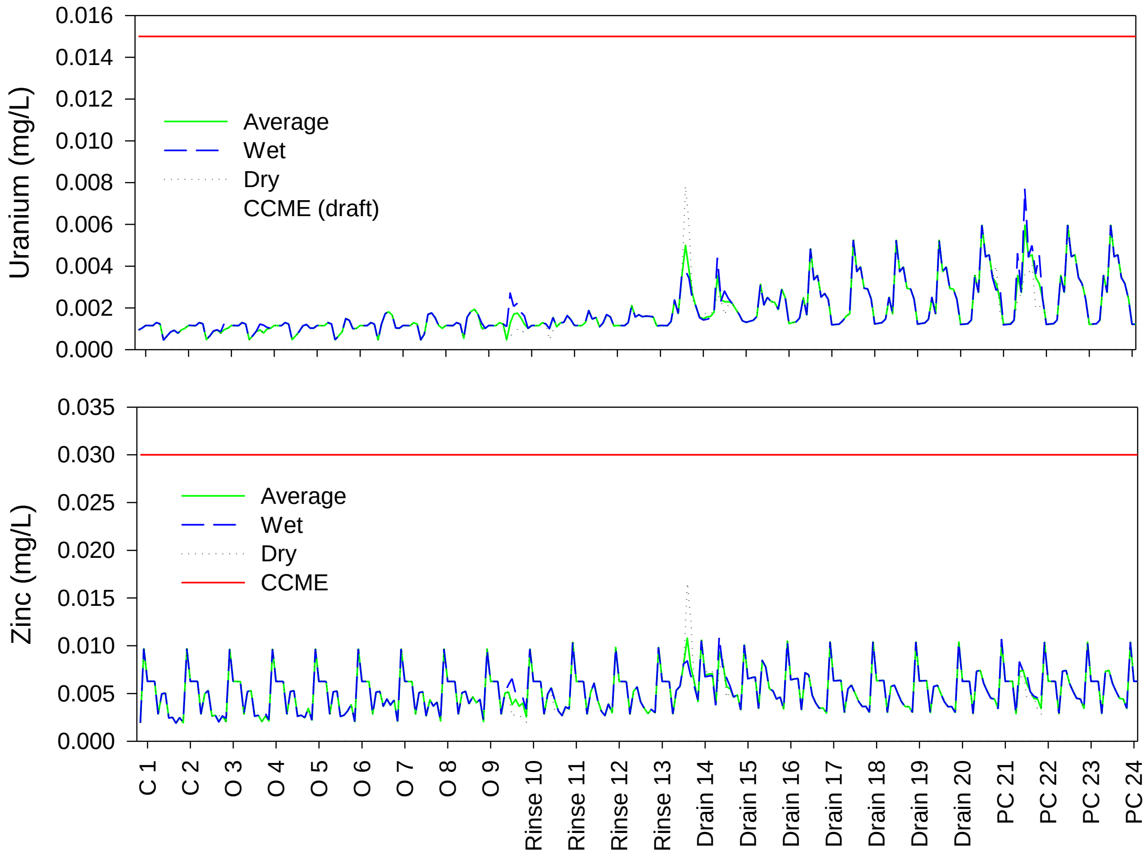


Figure 20: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF**

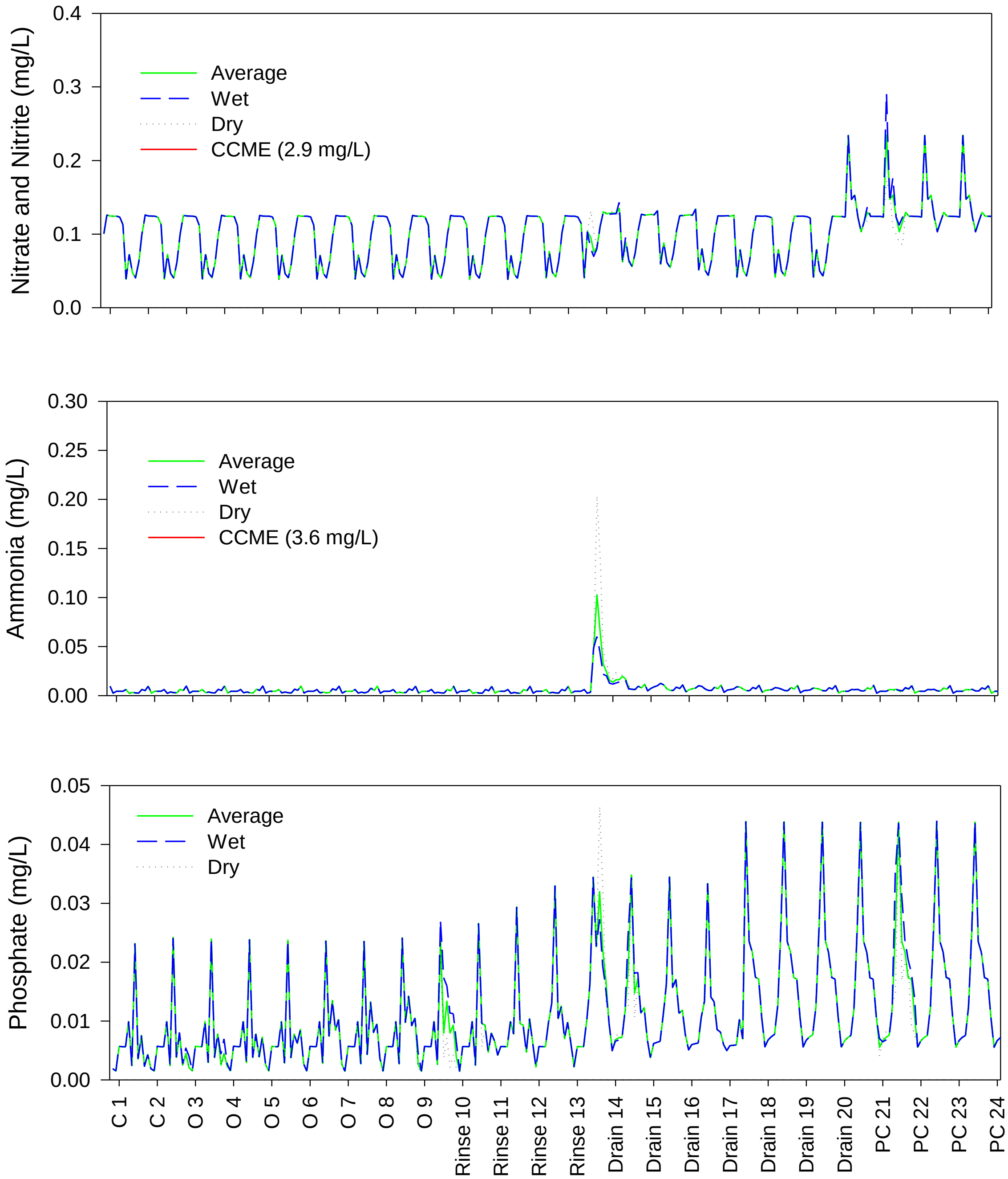


Figure 20: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF**

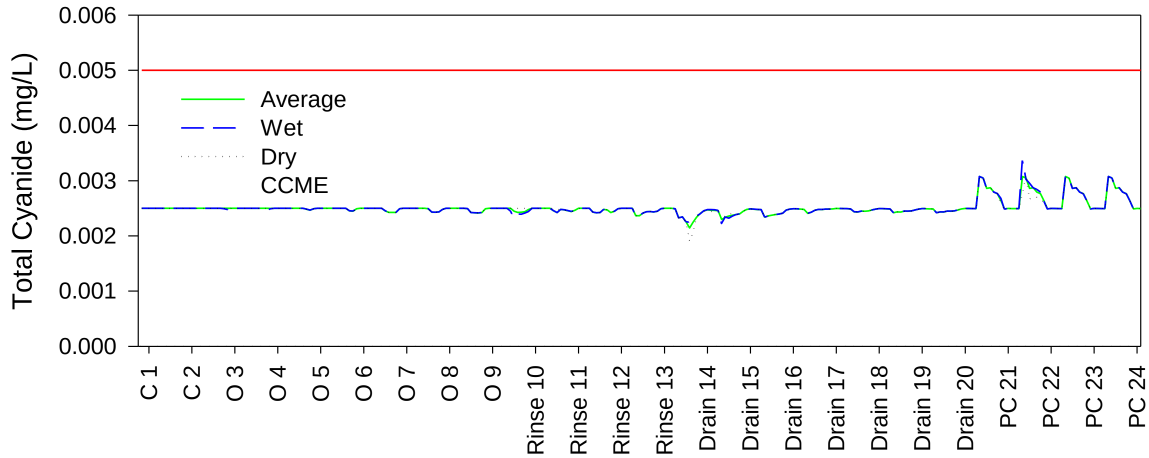


Figure 20: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF**

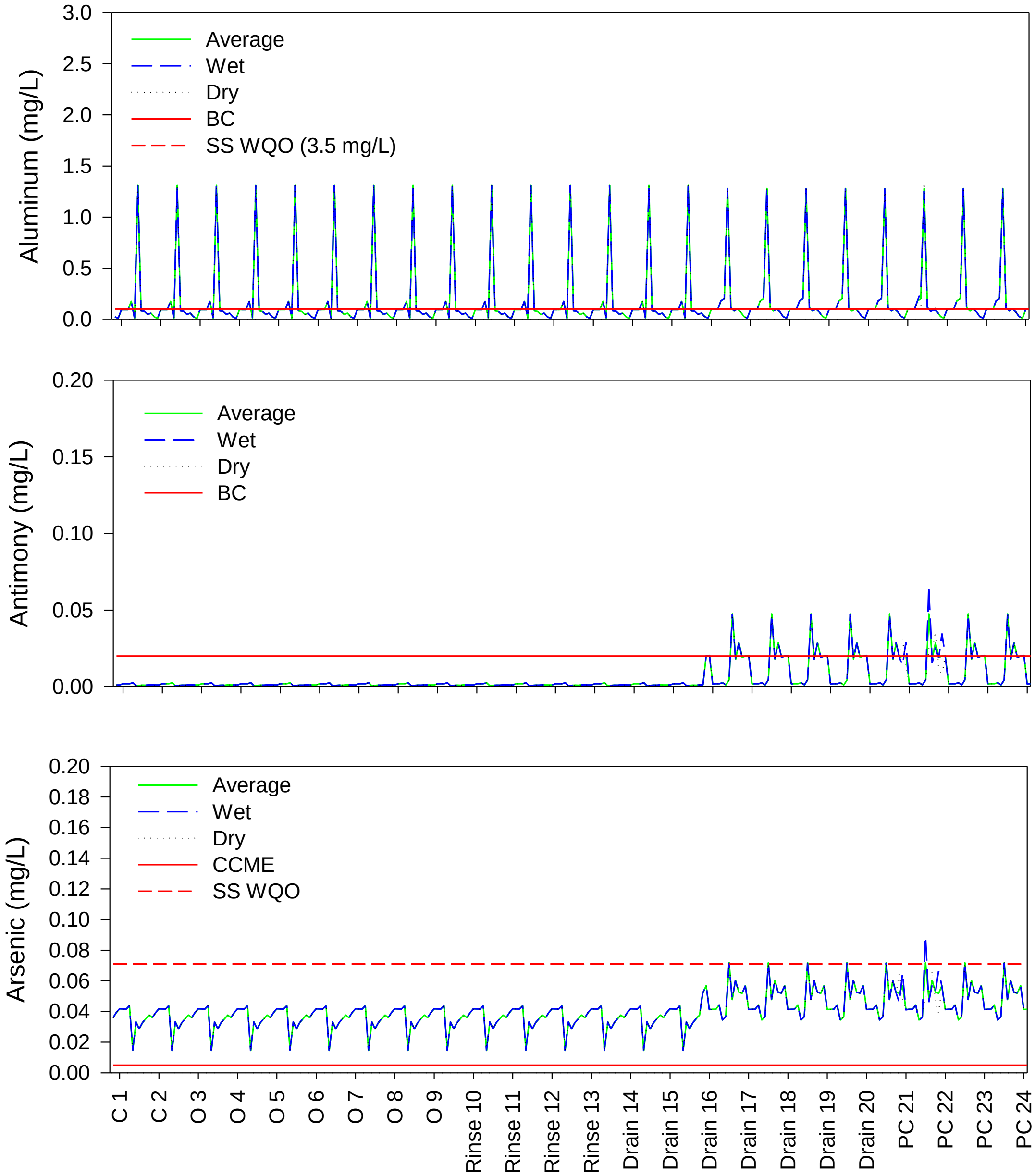


Figure 21: Predicted Concentrations of Parameters of Concern in Dublin Gulch (W71) below Eagle Pup Waste Rock Storage Area with a 10% Infiltration Cap for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*)

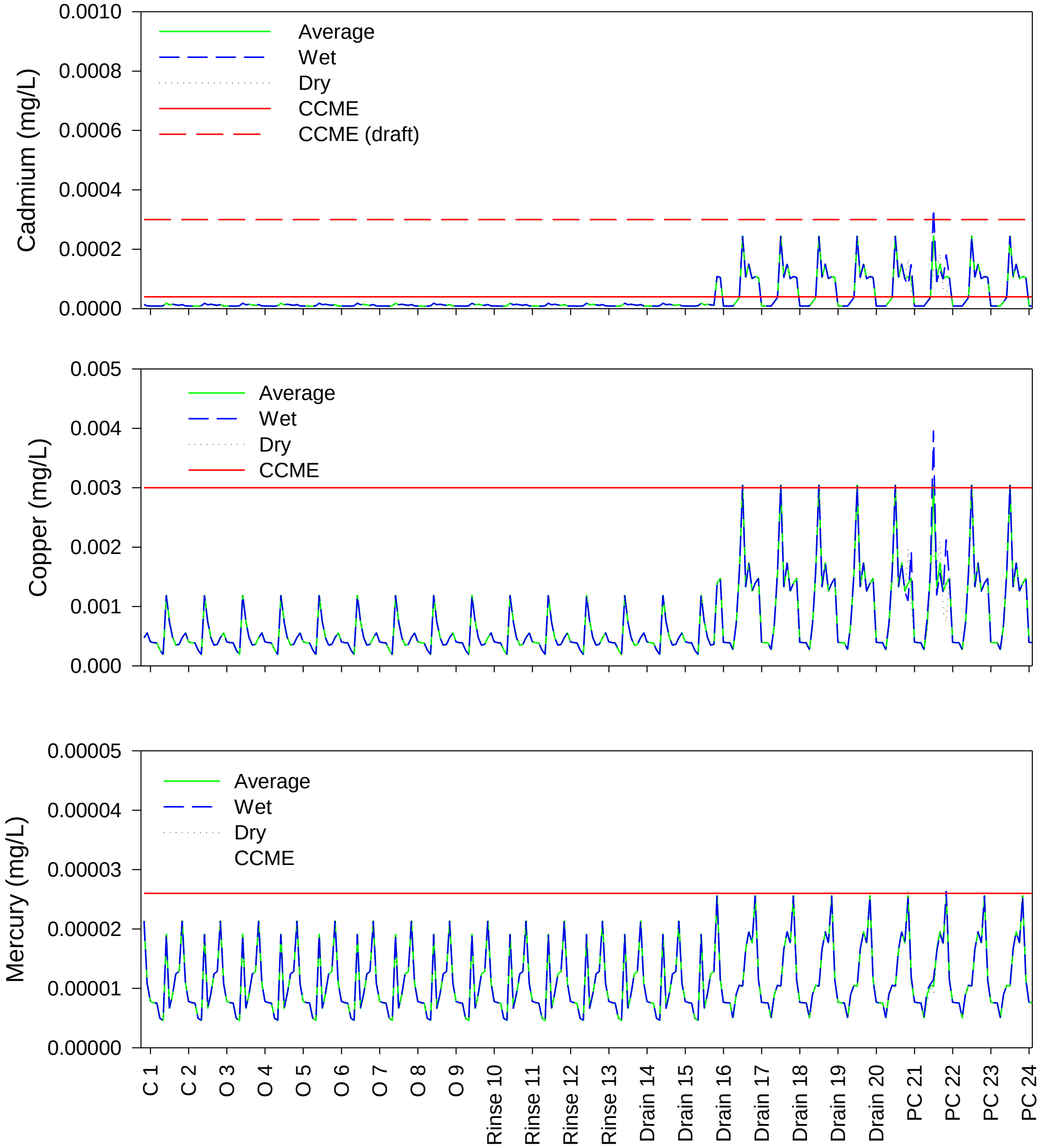
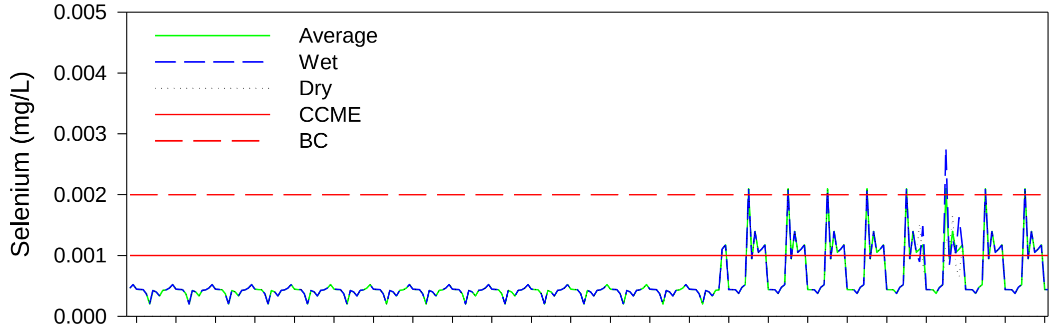


Figure 21: ***Continued.*** **Predicted Concentrations of Parameters of Concern in Dublin Gulch (W71) below Eagle Pup Waste Rock Storage Area with a 10% Infiltration Cap for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*)**



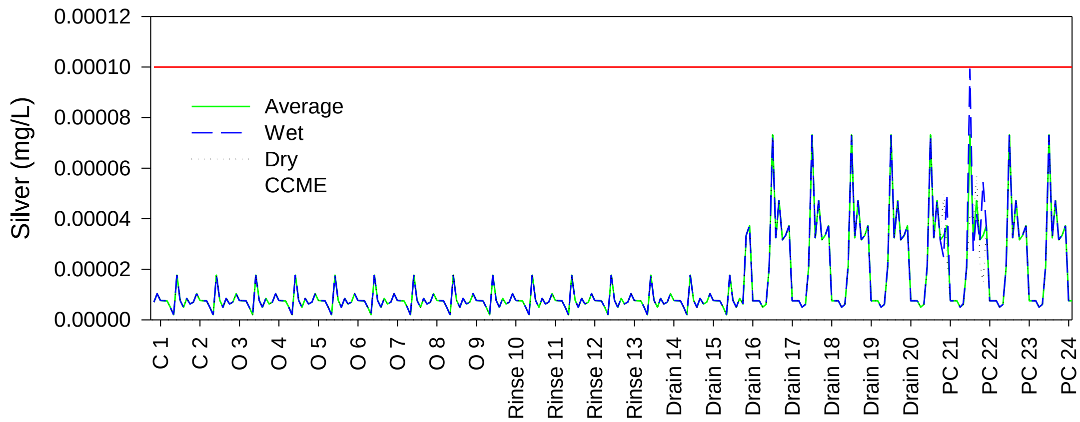


Figure 21: ***Continued.*** **Predicted Concentrations of Parameters of Concern in Dublin Gulch (W71) below Eagle Pup Waste Rock Storage Area with a 10% Infiltration Cap for Average, Wet, and Dry Years (*Average – green, Wet – blue, Dry – black*)**

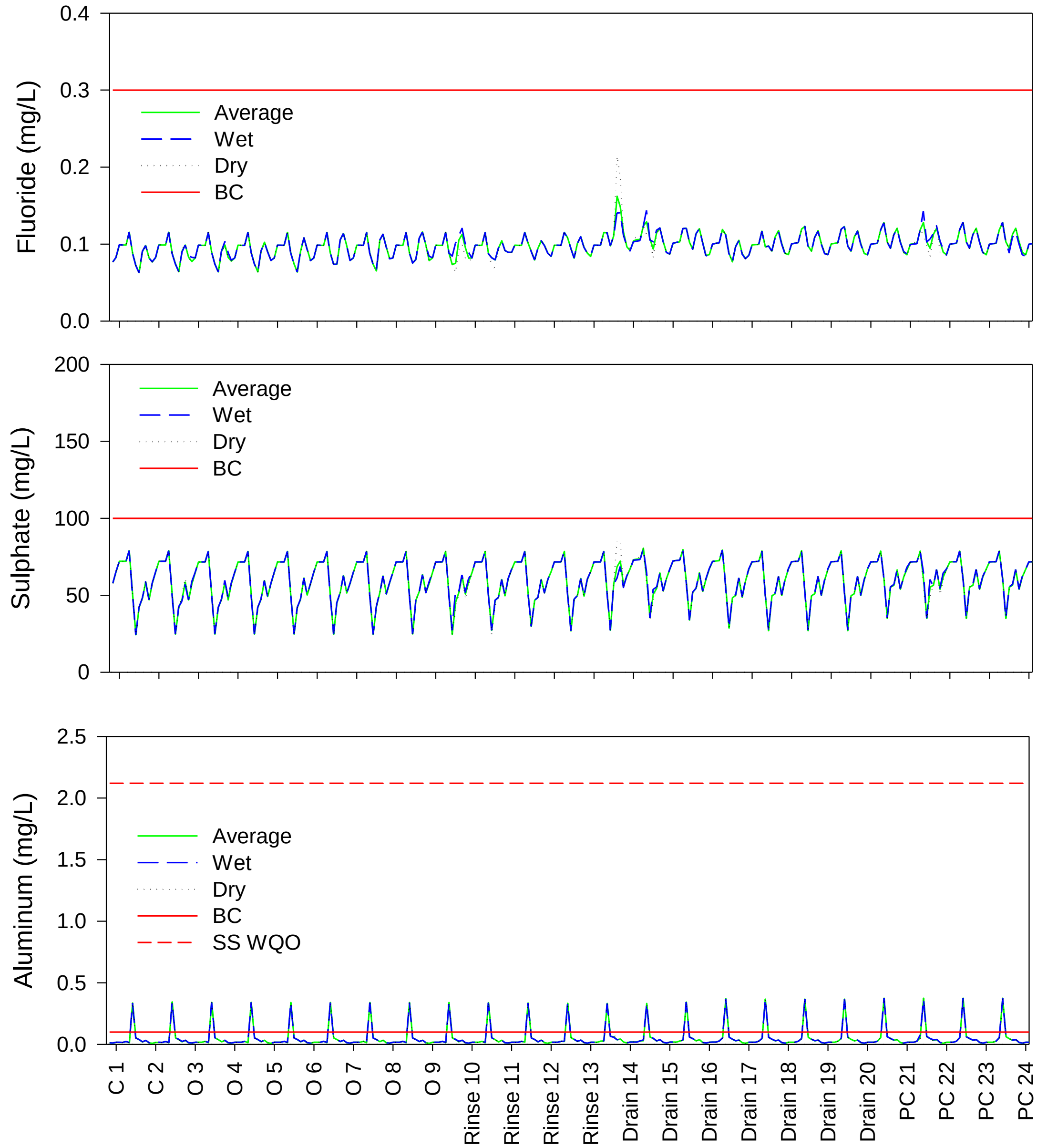


Figure 22: Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF and Eagle Pup Waste Rock Storage Area *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)*

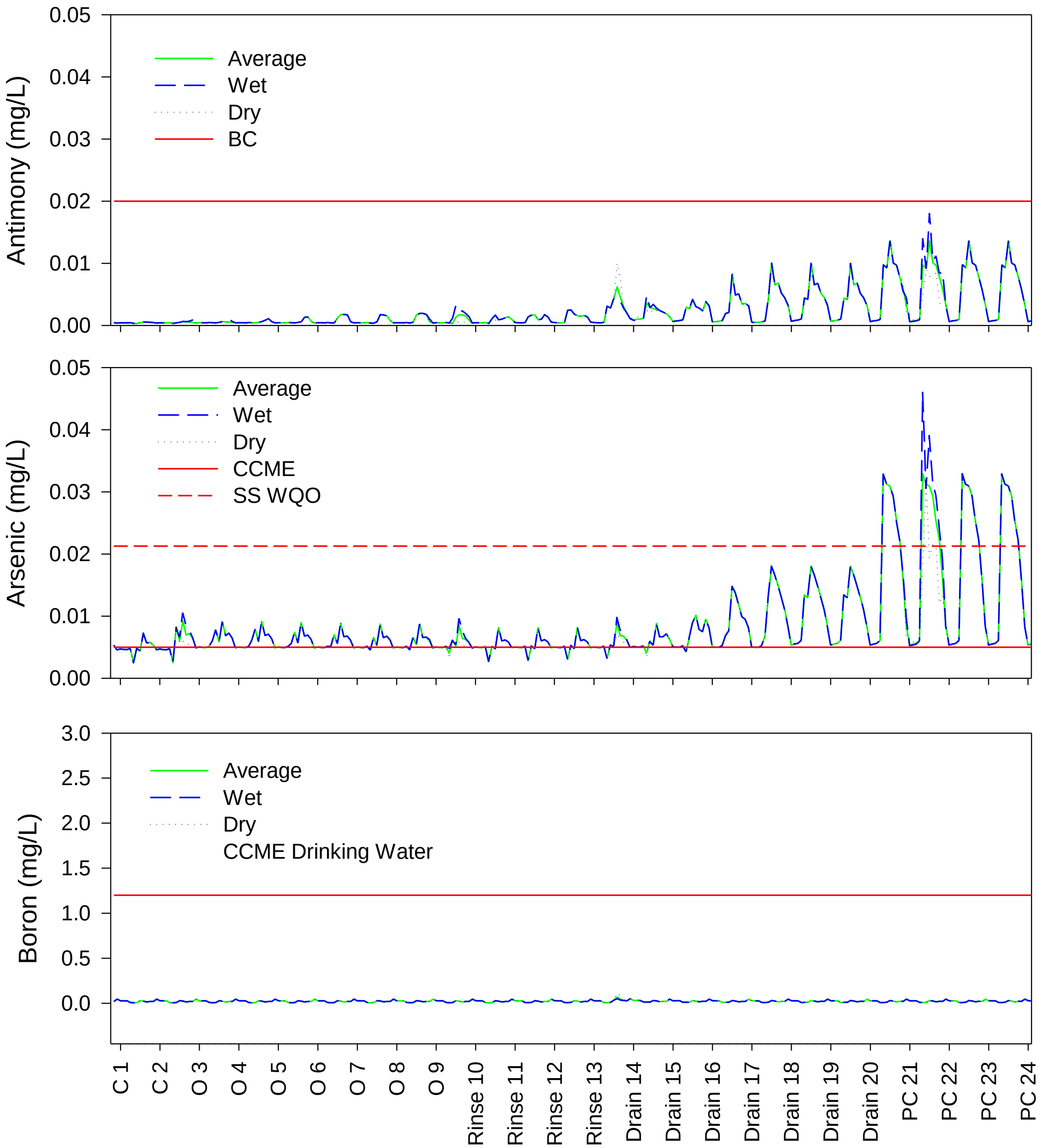


Figure 22: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF and Eagle Pup Waste Rock Storage Area *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)***

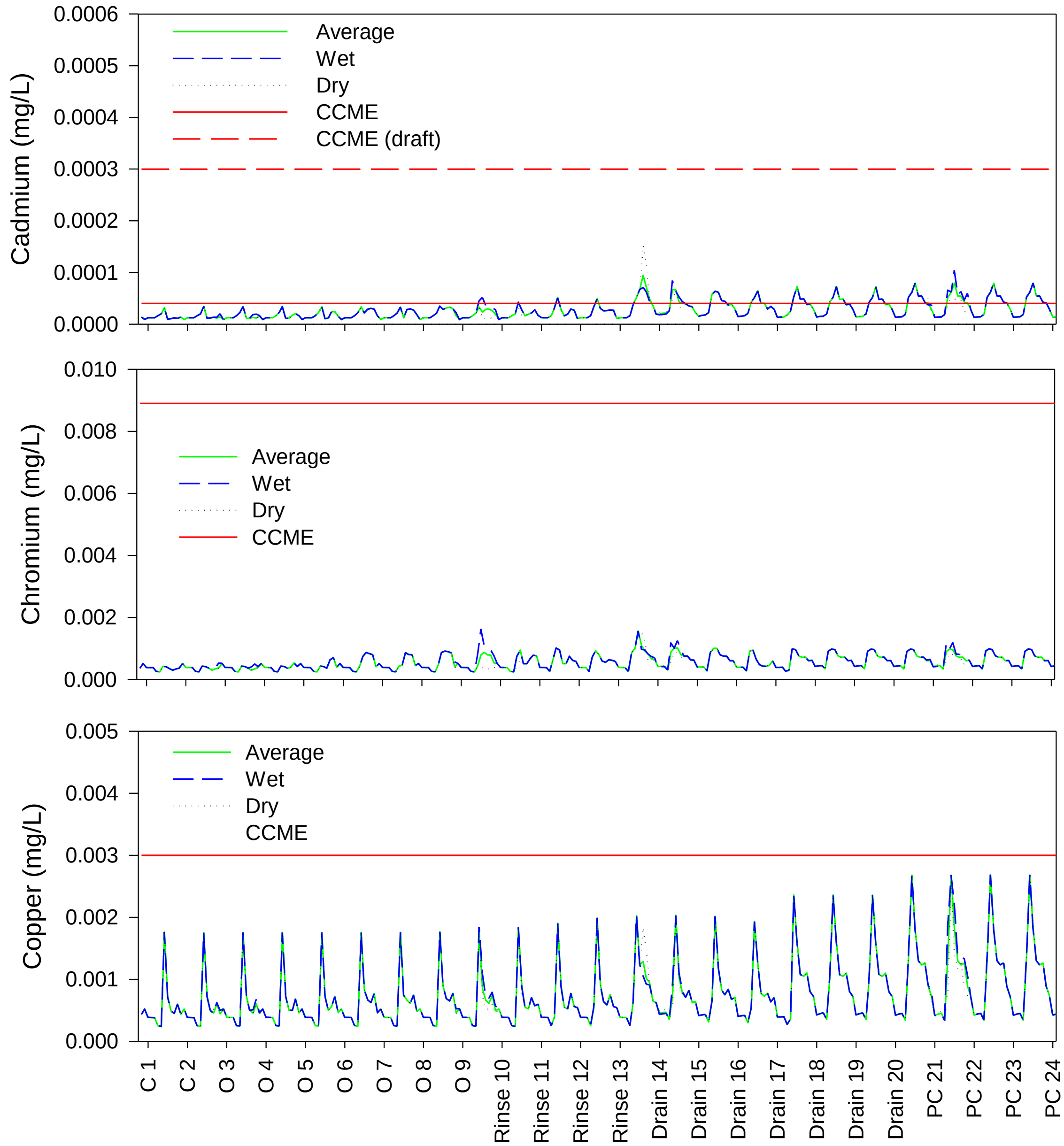


Figure 22: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF and Eagle Pup Waste Rock Storage Area *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)***

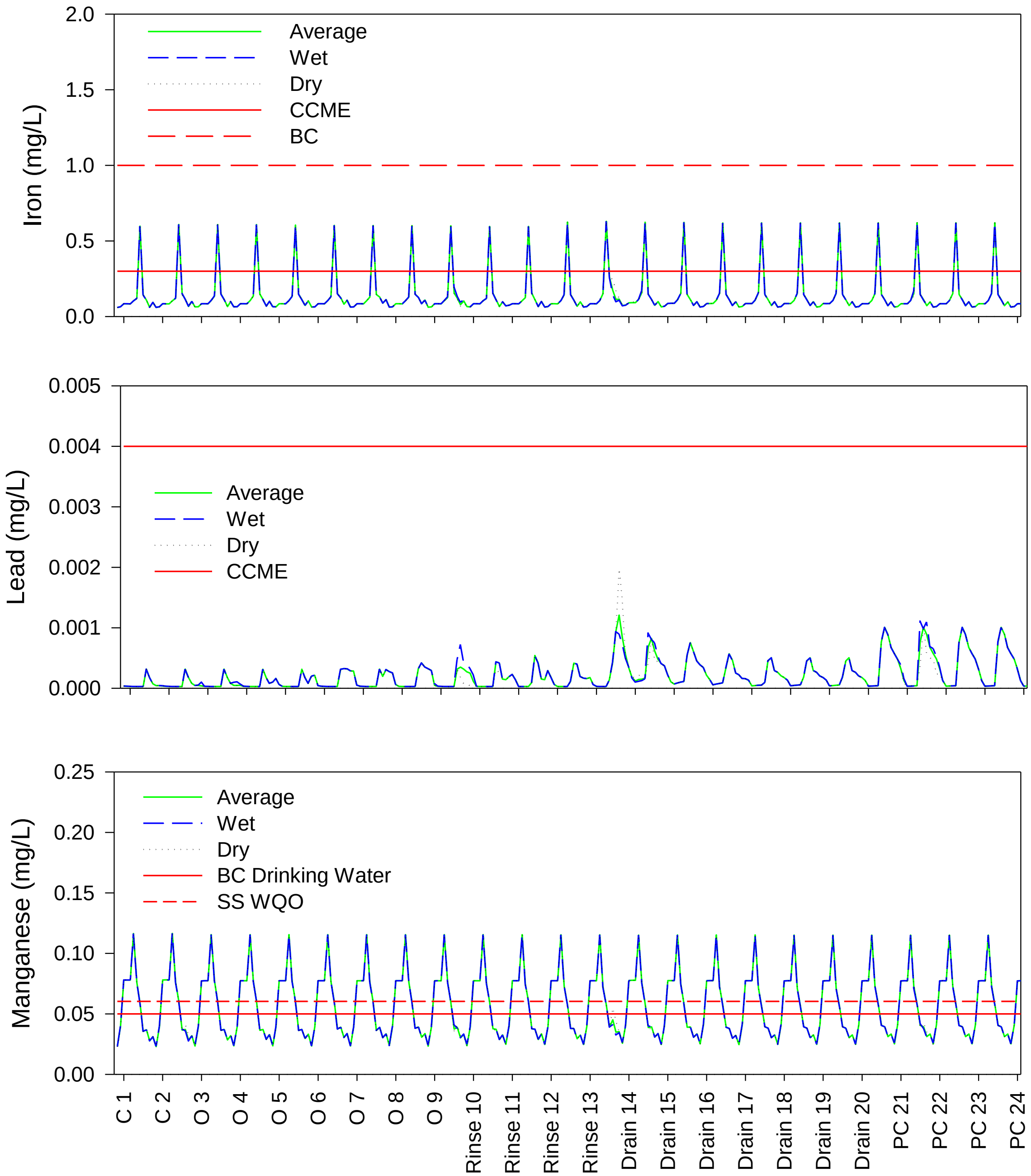


Figure 22: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF and Eagle Pup Waste Rock Storage Area *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)***

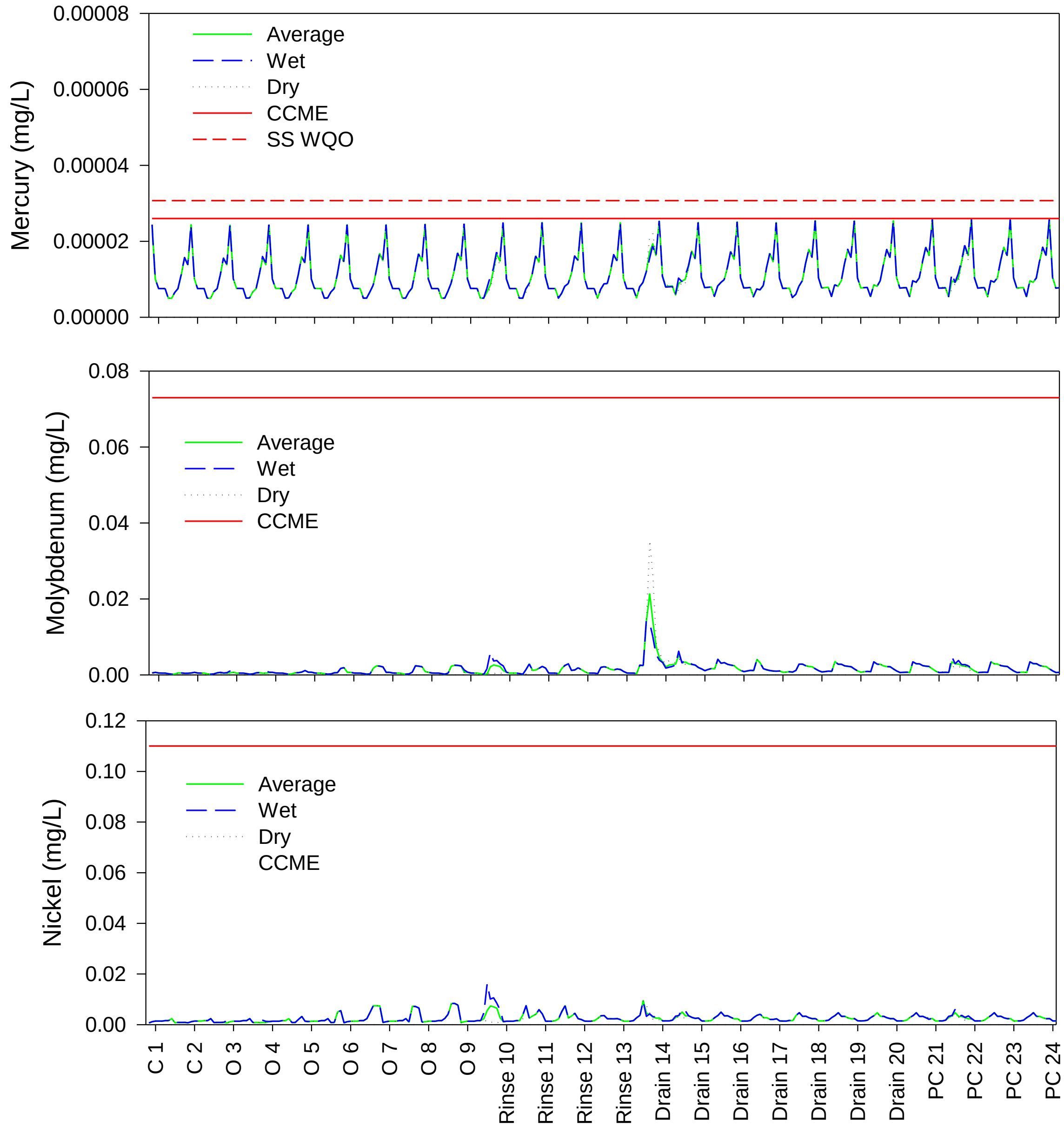


Figure 22: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF and Eagle Pup Waste Rock Storage Area *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)***

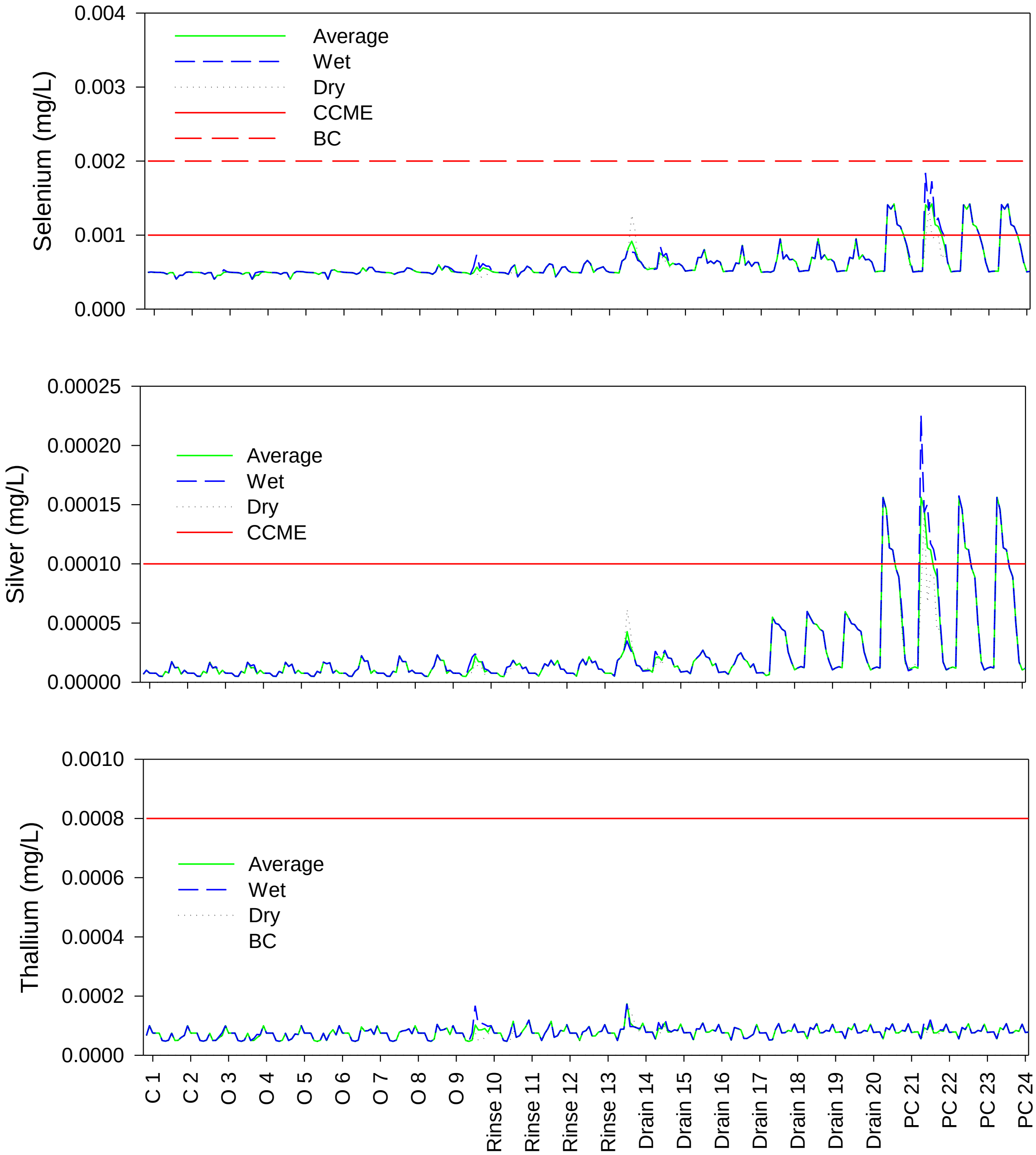


Figure 22: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF and Eagle Pup Waste Rock Storage Area *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)***

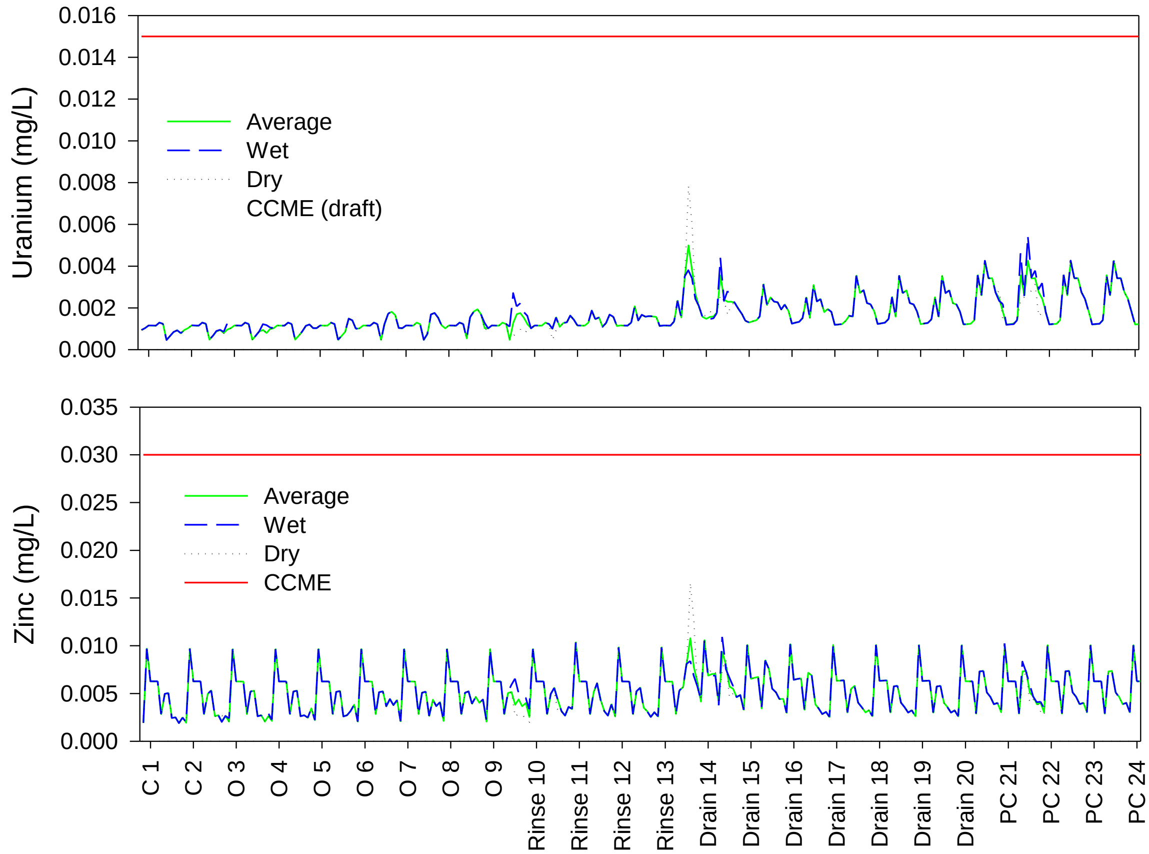


Figure 22: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF and Eagle Pup Waste Rock Storage Area *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)***

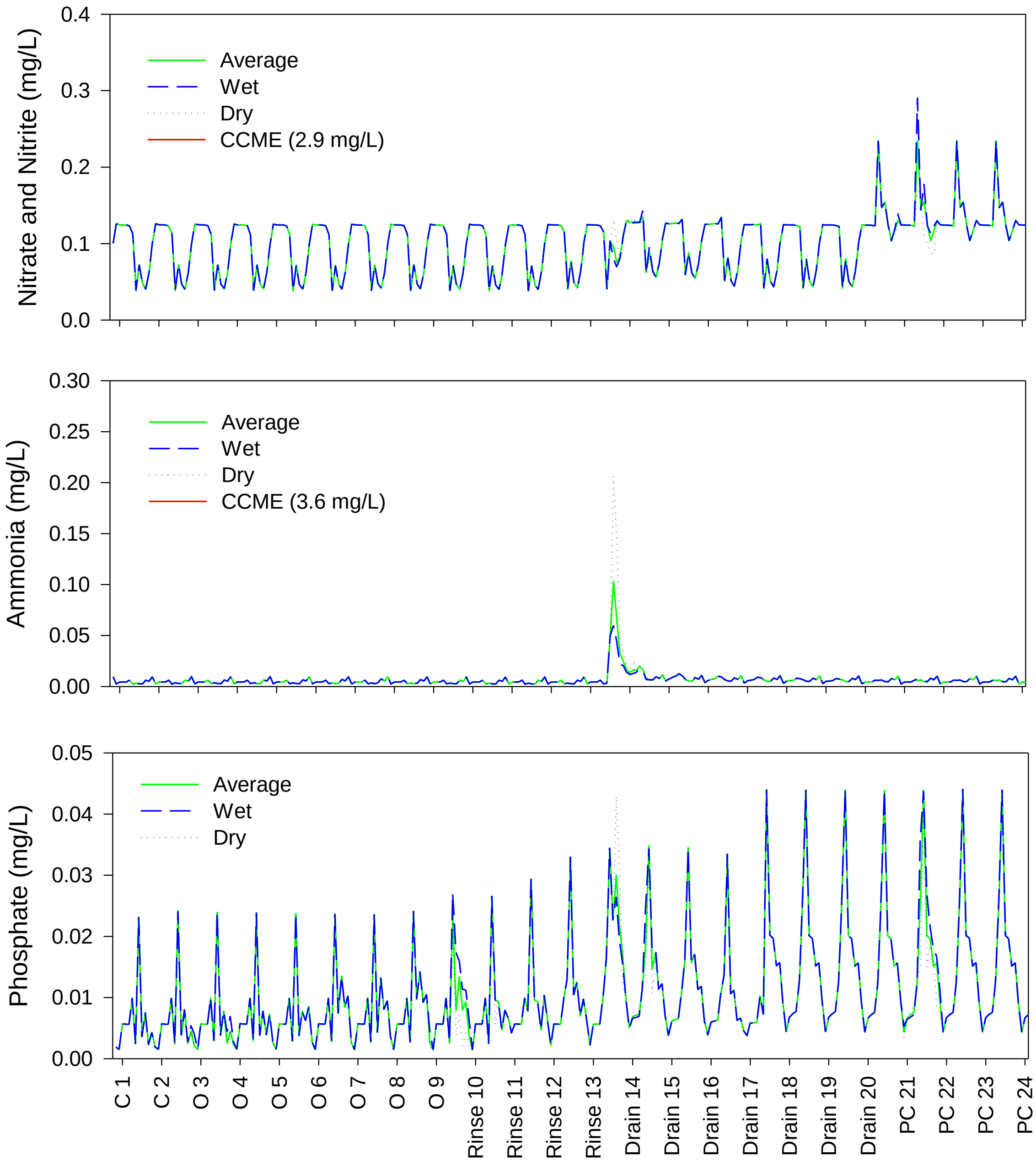


Figure 22: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF and Eagle Pup Waste Rock Storage Area *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)***

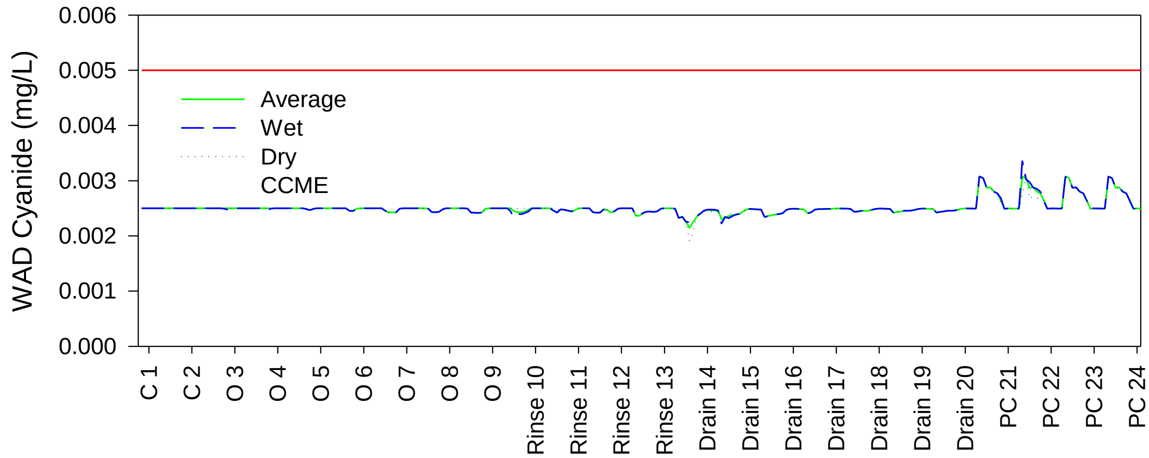


Figure 22: ***Continued.*** **Predicted Concentrations of Metals and Nutrients in Haggart Creek (W29) below Eagle Creek and Platinum Gulch Waste Rock Storage Area during all Project Phases using 10% Infiltration Cap on HLF and Eagle Pup Waste Rock Storage Area *(C=Construction, O=Operations, Rinse and Drain=Closure, PC=Post-closure)***