Response to Comments

on

Department of Environmental Conservation
Draft Waste Management Permit No. 2020DB0002

&

Department of Natural Resources
Draft Plan of Operations Approval (F20209852POOA)

&

Department of Natural Resources
Draft Reclamation Plan Approval No. (F20209852RPA)

Fairbanks Gold Mining Inc.
Fort Knox Mine

Public Noticed February 14, 2020 – March 16, 2020

FINAL

March 25, 2020

Introduction

Public notice start: February 14, 2020

Public notice end: March 16, 2020

The Fort Knox Mine is an open pit gold mine located 15 air miles northeast of Fairbanks, Alaska in the Fish Creek drainage. Mine operations are conducted by Fairbanks Gold Mining Inc. (FGMI), a wholly owned subsidiary of Kinross Gold USA Inc. The project area encompasses about 8,711 acres of State and private land, including about 5,828 acres under the Millsite Lease ADL 414960. FGMI applied for renewal of the following state authorizations: the mine's Waste Management Permit, Plan of Operations, and Reclamation and Closure Plan.

This document summarizes and addresses comments received on Alaska Department of Environmental Conservation (DEC), draft Waste Management Permit (WMP) No. 2020DB0002, Alaska Department of Natural Resources (DNR), draft Plan of Operations Approval (POOA) No. F20209852POOA, and DNR, draft Reclamation Plan Approval (RPA) No. F20209852RPA. The WMP regulates the containment and disposal of mine tailings, waste rock, wastewater, and other mine-related wastes at the Fort Knox Mine, the POOA regulates mining activities on State land, and the RPA regulates activities associated with the reclamation and closure of the mine.

Substantive comments concerning requirements of the DEC's WMP permit and the DNR's POOA and RPA and the State's responses are contained in the following pages. The State did not respond to comments outside the scope or beyond regulatory authority of these permits. There was a change made to the draft WMP resulting from a comment received during the public notice period that is reflected in the final WMP. There were also some minor changes made to the draft permits after public notice to correct typographical and grammatical errors, formatting, and to clarify information. Minor changes to the permits are not detailed in this document.

Comment Overview

The State received comments from one party, Dave Chambers representing the Center for Science in Public Participation. Permit-specific comments on the draft DEC permit and draft DNR approvals and the State's responses to those comments are contained in the following table.

Comment No.	Comment Summary	Agency Response
1	The WMP would benefit from a figure showing the locations of the interceptor and monitoring wells.	Figure 2-1 in the *Fort Knox Gold Mine Monitoring Plan* (August 2019), which is adopted by reference into the WMP, shows the locations of the interceptor and monitoring wells. Based on this comment, that figure has been added to the final WMP.
2	It is most unusual to have different monitoring limits for adjacent wells, MW-5 vs. MW-7, so some explanation is warranted.	Differing background data are the entire basis for the differences between well triggers. No change was made to the permit as a result of this comment.
3	The Upper Tolerance Limits (triggers) for the groundwater wells (MW-5, MW-6, and MW-7) listed in Table 1 of the draft WMP are in excess of background. The triggers for MW-7 for antimony, chloride and nitrate exceed EPA human health guidelines.	The triggers for MW-5, MW-6, and MW-7 are based solely on pre-facility background data. The triggers were calculated to identify a statistically significant increase over the background conditions. Background data were used to calculate what constitutes a statistically significant increase in concentration. Regarding how those data are interpreted, DEC used the same prescribed statistical analysis on each data set. That's done to account for annual seasonal fluctuations in water quality. It's a simple calculation using the mean plus the standard deviation times a multiplier. See the attachment for greater detail. No change was made to the permit as a result of this comment.
4	It would be prudent to require periodic contemporary surface water monitoring at some point upstream of the Water Supply Reservoir, just to make sure that downgradient surface water quality is protected.	Locations of downgradient surface water monitoring sites are indicated in Figure 2-1 of the *Fort Knox Gold Mine Monitoring Plan* (August 2019) and the final WMP. There are four downgradient surface water sites labeled Upper Wetlands, Lower Wetlands, Water Supply Reservoir, and Fresh Water Seepage. As required by the monitoring plan through the WMP, quarterly monitoring at the four downgradient surface water sites for a prescribed set of parameters must be conducted. Additionally, the limits in the Alaska Pollutant Discharge Elimination System permit are designed such that nothing harmful, based on Alaska Water Quality Standards, leaves the end of the discharge pipe. Therefore, discharged effluent assures protection of all beneficial uses in downgradient receiving water. No change was made to the permit as a result of this comment.

ATTACHMENT

7/8/16

SETTING TRIGGERS TO DETERMINE A STATISTICALLY SIGNIFICANT INCREASE FOR GROUNDWATER CONSTITUENTS

This guidance is intended to simplify ,clarify, and add consistency to determining if there is a statistically significant increase over background values in monitoring wells down gradient of operating “zero discharge” facilities in accordance with 18 AAC 60.830.

Steps for establishing “triggers” that initiate corrective action based on down gradient monitoring wells at “zero discharge” facilities such as tailings ponds and other potential sources of contamination:

1. Baseline data
   - 1.1. Collect all baseline data from down gradient wells. Data is considered baseline until wastes are placed in the impoundment.
   - 1.2. For each parameter at each well, the data set ought to span at least two years and contain at least 20 measurements.
   - 1.3. For each parameter, calculate the average and the standard deviation of the data set for each well. In doing this, replace non-detect readings with 0.5 times the Method Detection Limit (MDL).
   - 1.4. Calculate the tolerance interval at 95% probability and 95% coverage. Calculating the tolerance interval is a very simple process. The only statistical analysis that is required is calculating the mean ($\bar{x}$) and standard deviation (s) of the background data set. The upper limit of the tolerance interval (UTL) is then calculated as

$$UTL = \bar{x} + (s)(K)$$

   The value K is determined from the attached table and is based on the number of data points and the desired probability and coverage.

2. Pond water quality (actual impounded water quality)
   - 2.1. Calculate the averages of current water quality data for each parameter in the pond in the same manner as step 1.2.
   - 2.2. Search for maximum contrasts between impounded and monitoring well water chemistry. Select those parameters where the average concentration in the pond is significantly greater than in the wells considering both the magnitude and proportion of the differences.
   - 2.3. Select the parameters in the pond that are unique to the process, even if they are non-detect in the wells. Potassium, sodium, nitrogen, copper, TDS, sulfates, and WAD cyanide could be typical examples.

3. Choose trigger parameters and concentrations
   - 3.1. Choose the analytical parameters for each well based on being significantly higher in the pond or unique to the process from steps 2.2 and 2.3 above.
   - 3.2. For each analytical parameter in each well, establish the trigger for corrective action as the 95% upper tolerance interval even when that limit is less than the water quality standard. When the minimum level of quantification for a test method (ML) is greater than the tolerance interval, use the ML as the trigger level. Otherwise, use the tolerance interval as the trigger. This establishes statistically significant increase thresholds indicating leakage from the impoundment.

4. Implement the triggers in a permit, certification, or approval
   - 4.1. Revise the monitoring plan and associated reporting to focus on the selected suite of trigger parameters. Additional parameters will still be required for determining hardness, doing Piper plots, collecting field measurements, or for other reasons.
   - 4.2. If a well water sample exceeds the trigger concentration, it indicates a statistically significant increase, and the corrective action section of the permit must be initiated.

5. Another statistical method may be chosen in accordance with 18 AAC 60.830.

Tolerance Factors (K) for One-Sided Normal Tolerance Intervals
With 95% Probability Level and 95% Coverage
(From USEPA "Statistical Analysis of Monitoring Data, Interim Final Guidance", April 1989)

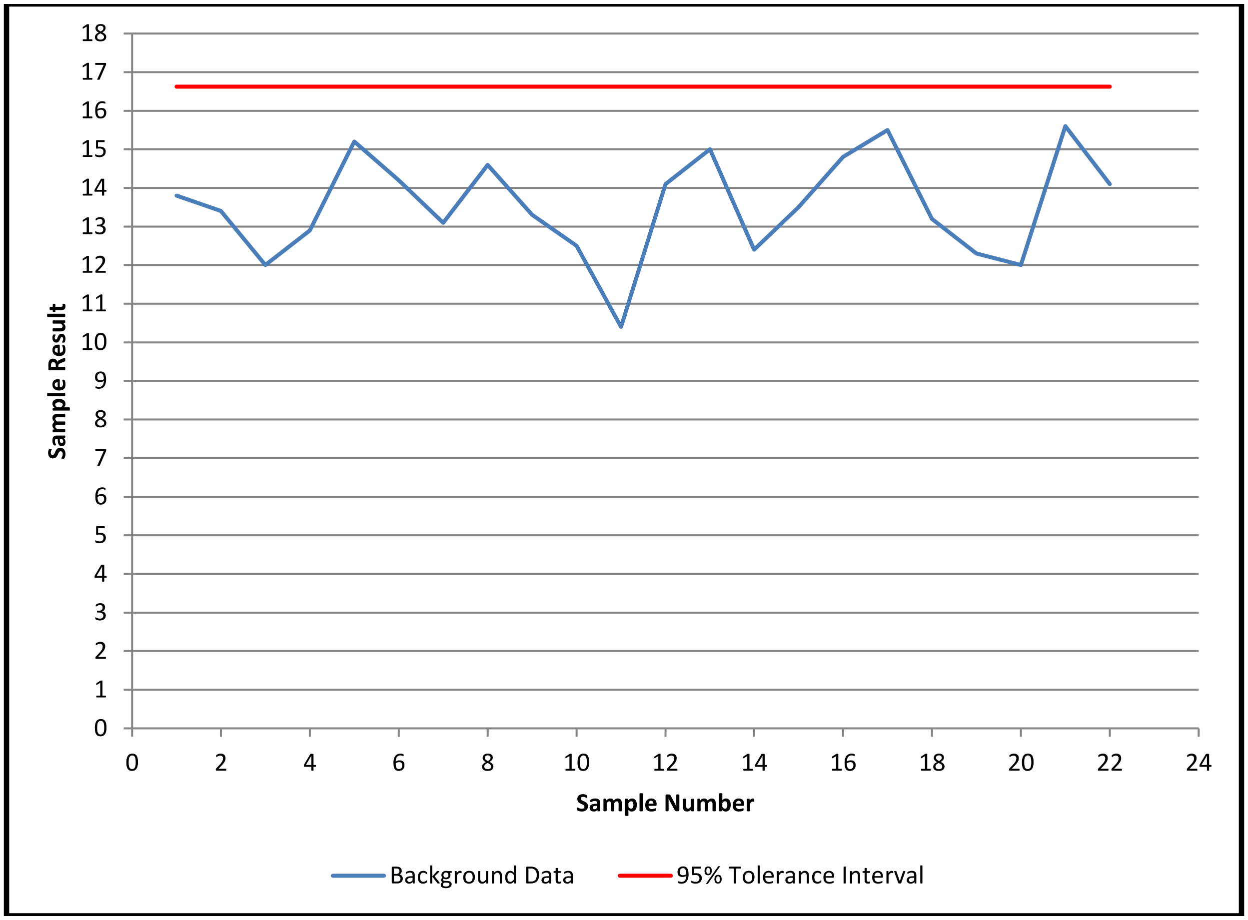
n	K	n	K
3	7.655	150	1.868
4	5.145	175	1.850
5	4.202	200	1.836
6	3.707	225	1.824
7	3.399	250	1.814
8	3.188	275	1.806
9	3.031	300	1.799
10	2.911	325	1.792
11	2.815	350	1.787
12	2.736	375	1.782
13	2.670	400	1.777
14	2.614	425	1.773
15	2.566	450	1.769
16	2.523	475	1.766
17	2.486	500	1.763
18	2.543	525	1.760
19	2.423	550	1.757
20	2.396	575	1.754
21	2.371	600	1.752
22	2.350	625	1.750
23	2.329	650	1.748
24	2.309	675	1.746
25	2.292	700	1.744
30	2.220	725	1.742
35	2.166	750	1.740
40	2.126	775	1.739
45	2.092	800	1.737
50	2.065	825	1.736
55	2.036	850	1.734
60	2.017	875	1.733
65	2.000	900	1.732
70	1.986	925	1.731
75	1.972	950	1.729
100	1.924	975	1.728
125	1.891	1000	1.727

Sources:

(a) For sample sizes ≤ 50: Lieberman, Gerald F., 1958. "Tables for One-sided Statistical Tolerance Limits." *Industrial Quality Control*, Vol. XIV, No. 10.

(b) For sample sizes > 50: K values were calculated from large sample approximation.

Upper Tolerance Limit versus Sample Measurements



Sample Data Set (n = 22)

Sample No.	Result	Sample No.	Result	Sample No.	Result	Sample No.	Result
1	13.8	7	13.1	13	15.0	19	12.3
2	13.4	8	14.6	14	12.4	20	12.0
3	12.0	9	13.3	15	13.5	21	15.6
4	12.9	10	12.5	16	14.8	22	14.1
5	15.2	11	10.4	17	15.5		
6	14.2	12	14.1	18	13.2		