Climax Molybdenum
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July 26, 2022

Via Email

Mr. Peter Hays
Division of Reclamation Mining and Safety
1313 Sherman St., Rm. 215
Denver, CO 80203

RE: Henderson Mine POC Well MNGW-1 Low pH Status Update Response to DRMS, Climax Molybdenum, Henderson Mine, Permit No. M-1977-342

Dear Mr. Hays:

Climax Molybdenum Company (CMC) is submitting this response to the May 27, 2022 DRMS request to provide a detailed description of the additional evaluations that are planned for summer 2022 regarding the Low pH measurements at Mine POC well MNGW-1. The initial DRMS comments from October 25, 2021 and Henderson's May 11, 2022 response are also included for ease of reference.

DRMS Comment:
On May 11, 2022, Henderson Mine responded to the Division's comments date October 25, 2021 on the report *Henderson Mine Point of Compliance Well MNGW-1 Low pH Status Update*. Below are additional questions that should be addressed.

1. Please provide an explanation why there were so few (8 in total) pH exceedances between June 1995 and June 2011 compared to June 2011 to present (Figure 7, Ajax and Clear Creek Associates 2021). The Division recognizes the increase sampling frequency however there is a trend of rarely exceeding the standard to consistently exceeding the standard. What can account for this change at the site?

Henderson Response:
In response to this question, Henderson conducted additional graphical analyses of MNGW-1 and No Name Gulch (NNG) sampling results. Attachment A.1 shows the period of record for MNGW-1 and NNG. The NNG water chemistry data set is limited to sporadic measurements prior to 2013. Henderson conducted pH surveys at multiple locations in the upper and lower reaches of NNG in 2013 and 2017. Attachment A.2 is a graph that plots pH measurements in NNG with distance from the top of the drainage. The graph shows that the pH in all locations along NNG in 2017 was lower than in 2013; however, with only two periods of data, it is not possible to determine a potential trend or cause. Henderson believes that additional data, such as supplemental sampling surveys along NNG, are needed to better evaluate any trends and understand the factor(s) causing the pH levels measured in NNG and MNGW-1. The two datasets between 2013 and 2017 support the idea that ambient acidic conditions have exhausted an existing alkaline buffer capacity supplied by surrounding rock and soil. Henderson's analysis of NNG and MNGW-1 will continue with additional evaluations that are planned for summer 2022. The results and our analysis will be presented in a future submittal.

DRMS Response:

1. Please provide a detailed description of the additional evaluations that are planned for summer 2022.

Henderson Response:
To further investigate the relationship between the naturally acidic conditions of NNG and MNGW-1, Henderson proposes the following monitoring and evaluations:

A. Henderson will conduct transect sampling along NNG that mirrors the sampling completed in August 2013 and 2017 (Figure 1). Data from the 2013 and 2017 transect monitoring were presented in the May 11, 2022, response which highlighted an apparent shift in pH along NNG. An August 2022 monitoring event will be conducted to further evaluate pH along NNG and MNGW-1.
B. During past transects, Henderson observed what is believed to be manganocrete and/or ferricrete deposits within the NNG drainage. The presence of these minerals in the deposits, if confirmed, would indicate a long-term existence of acid-rock drainage (ARD) conditions in NNG. This would further support the interpretation that ARD conditions existed in this system well before mine development and facility construction. This summer Henderson will conduct a field reconnaissance evaluation to identify and possibly sample manganocrete and/or ferricrete in NNG.

DRMS Response:

2. The operator needs to provide a timeline for when the data from the summer evaluation and possible mitigation alternatives are to be submitted to the Division for review.

Henderson Response:
The objective of this summer's evaluation is to determine whether mitigation efforts are necessary. Henderson will consider the findings from the additional summer evaluations and suggest follow-up action items by March 31, 2023.

Figure 1

If you have any questions regarding this submittal, please contact me at (970) 433-0894.

Sincerely,

Ben Bates
Environmental Engineer II
Climax Molybdenum Company
Henderson Operations

cc (via email)
M. Hamarat, Climax
G. Niggeler, Climax