

US EPA ARCHIVE DOCUMENT

Via Email and FedEx

December 10, 2007

Rebecca Harvey, Chief
Water Division
Underground Injection Control Branch
U.S. Environmental Protection Agency Region 5
77 West Jackson Boulevard
Mail Code: WN-16J
Chicago, IL 60604-3590

***Re: Kennecott Eagle Minerals Company (“KEMC”);
Marquette County, Michigan;
Underground Injection Wells***

Dear Ms. Harvey:

As you know, we have previously provided comments on behalf of our client, the Keweenaw Bay Indian Community (the “Community”), regarding discharges proposed by KEMC in connection with KEMC’s proposed metallic sulfide mine in Marquette County, Michigan, that are subject to the Underground Injection Control (“UIC”) regulations promulgated under the Safe Drinking Water Act (“SDWA”), 42 USC § 300f *et seq.* In my June 9, 2006 letter to you, I provided comments on behalf of the Community regarding the need for KEMC to obtain UIC permits for the three discharges identified in your March 31, 2006 letter to Jonathan C. Cherry of KEMC. Your March 31, 2006 letter requested that KEMC provide UIC inventory information for the following three Class V UIC wells proposed by KEMC: (i) treated water infiltration system (“TWIS”); (ii) mine backfill well; and (iii) large capacity septic system.

We understand, from documents obtained pursuant to a Freedom of Information Act request, that during a January 16, 2007 meeting with KEMC, EPA agreed to limit the inventory information to be provided by KEMC to only the TWIS and the large capacity septic system.¹ Subsequent to KEMC’s provision of the UIC inventory information, the U.S. Environmental

¹ February 2, 2007 letter from Jonathan C. Cherry to Jo Lynn Traub, Director, Water Division, EPA Region 5, transmitting UIC inventory sheets for the TWIS and large capacity septic system.

Rebecca Harvey
December 10, 2007
Page 2

Protection Agency (“EPA”) issued a “call-in” letter on March 22, 2007² requiring KEMC to obtain a Class V UIC permit for the TWIS before it begins construction of the TWIS. KEMC submitted an application for a Class V UIC permit for the TWIS to EPA by a letter dated April 20, 2007. In an April 16, 2007 letter, EPA notified KEMC that the large capacity septic system was authorized by rule and would not require a permit before construction and operation of the system may proceed.

As noted above, and for reasons that are unclear, EPA has not required KEMC to submit inventory information on the proposed underground injection of fluids and other materials into the mine, including those classified as injections into a mine backfill well. From discussions with EPA personnel, it appears that the delay in requiring inventory information (and thus considering the need for an individual permit) for the proposed injections into the mine may be based upon the belief that mine backfilling will not begin until well after the beginning, and maybe not until near the end, of KEMC’s mining activities. However, KEMC’s Mining Permit Application (“MPA”) submitted to MDEQ provides that mining production will begin in the second year of mine operation and that backfilling injections will begin relatively soon thereafter – after the third year of operation. Moreover, as indicated by data included in the KEMC MPA, the fluids contained in the mine backfill injection will constitute only a relatively small proportion of the total amount of fluids proposed to be discharged into the mine, a fact that may have been overlooked in evaluating the need for preconstruction submittal of the inventory information and the preconstruction need for one or more UIC permits for discharges into the mine.

The ore body planned to be mined by KEMC extends from approximately 1,000 feet below the surface up to a point where approximately 250 feet of rock will remain to support the surface. In order to reach the ore body, KEMC will construct an over 3,000-foot long tunnel, referred to as the “main decline,” beginning at the surface and sloping down through the bedrock that will end at a depth that is approximately in the middle of the ore body. Tunnels will spiral upwards and downwards from that point through the bedrock along the side of the ore body and connect to additional tunnels, called “drifts,” that will be used to access the ore body to be mined.³ The rock produced from this tunneling is referred to as “development rock” and will be stored on the surface in the “temporary development rock storage area” for use in backfilling mined-out areas. *See* MPA at 15.

Because the bedrock is an aquifer, it will be necessary for KEMC to continuously dewater the mine in order to prevent it from flooding. Due to the nature of rock involved, the

² Prior to this date, EPA had already informed KEMC in a January 31, 2007 letter from Ms. Traub that the TWIS would require a UIC permit based upon public information on file with the Michigan Department of Environmental Quality (“MDEQ”).

³ See Exhibit A, Illustration 4-2 of the MPA, for a three-dimensional illustration of the tunneling and ore body.

Rebecca Harvey
December 10, 2007
Page 3

acidic mine dewatering water will be heavily contaminated with numerous metals and other chemicals and KEMC proposes to construct a multi-stage wastewater treatment plant to treat the water before injecting it into the upper aquifer through the TWIS.

Backfilling will begin early in the mine's operation and is an integral component of the mining plan because mining of the ore body will be performed in multiple vertical slices proceeding from the bottom of the ore body upward. The cemented backfill will be needed to provide a base upon which to mine upward through the ore body and will form the walls of the secondary stopes after the primary stopes are mined out. According to the MPA, "the entire project development from construction through operations and closure is expected to take approximately 11 years depending on ore production rates." MPA at 10.

KEMC proposes at least three underground discharges into the mine that are subject to the UIC regulations: (i) discharge of 124 gallons per minute ("gpm") (i.e., 65,174,400 gallons per year) of contaminated "utility" water; (ii) cemented and other mine backfill; and (iii) post mining operation injection of water into the mine workings to accelerate flooding of the mine. Fluids in these injections will mix with the groundwater in the bedrock aquifer, an underground source of drinking water ("USDW"),⁴ surrounding the mine. While KEMC does not clearly state in the MPA when the "utility" water discharge will begin, it is apparent that such discharge will begin during mine construction activities and much sooner than either of the other two discharges.

EPA's failure to require KEMC to submit inventory information for the injections into the mine, and only require it for the TWIS and the large capacity septic system, is even more perplexing when one considers that the chemical composition of the TWIS and sanitary discharges is far more predictable than the other proposed injections into the mine. As explained below, EPA should require KEMC to submit inventory information and apply for and obtain Class V UIC well permits for each of these injections **before** KEMC may begin mine construction. EPA's decision to require inventory information and UIC permit applications by KEMC for any of these discharges at any time other than before KEMC begins construction runs the serious risk of being too late to prevent the harm to USDWs protected by the SDWA's UIC

⁴ USDW is defined by the UIC regulations as follows:

Underground source of drinking water (USDW) means an aquifer or its portion:

- (a)(1) Which supplies any public water system; or
- (2) Which contains a sufficient quantity of ground water to supply a public water system; and
 - (i) Currently supplies drinking water for human consumption; or
 - (ii) Contains fewer than 10,000 mg/l total dissolved solids; and
- (b) Which is not an exempted aquifer.

40 CFR § 144.3.

EPA's March 22, 2007 "call in" letter for the TWIS evidences EPA's determination that the aquifer(s) in the vicinity KEMC's proposed mine are USDWs as defined under the UIC regulations.

Rebecca Harvey
December 10, 2007
Page 4

program because these regulated discharges are integrally related to the initial construction and operation of the mine.

I. “Utility” Water Discharges Into The Mine Will Violate 40 CFR § 144.82(a)(1).

Attached as Exhibit B are Figures 4-18A and 4-18B from the KEMC MPA and which provide a water balance for the mine.⁵ The water balance shows that up to eight (8) gallons per minute (“gpm”) of partially treated mine contact wastewater (water that has passed through only the first stage of treatment – the clarifier and filtration stage) will be utilized for the cemented mine backfill. The water balance further shows, however, that 124 gpm (over 65 million gallons per year) of the same partially treated water, potentially containing all of the dissolved metals and other contaminants that were present before the clarifier/filtration treatment stage, will be discharged underground back into the mine as “utility” water. It is important to note that the “utility” water will not be made up of only mine dewatering water. The other sources of contaminated water that will be included in the partially treated mine contact water discharged as “utility” water include: (i) truck wash contact water; (ii) ore crusher contact water; (iii) main operations area storm water runoff; (iv) coarse ore storage area water; and (v) temporary development rock storage area water. *See* Exhibit B.

Attached as Exhibit C is Table 1-1, entitled “Wastewater Flows and Pollutant Concentrations,” which is contained in KEMC’s Class V permit application for the TWIS. The column in Table 1-1 labeled “Filtered Clarifier Effluent” lists the concentrations of contaminants that will be contained in the “utility” water that will be discharged into the mine at a rate of 124 gpm. The same contaminated water will also be used for the cemented mine backfill.

The data provided by KEMC in Table 1-1 show that the “utility” water proposed to be discharged into the mine will violate the prohibition in 40 CFR § 144.82(a)(1) of injecting a fluid containing a contaminant into a USDW in excess of “the primary drinking water standards under 40 CFR part 141 [(e.g., a maximum contaminant level (“MCL”)) or] other health based standards....”⁶ Comparison of the levels of contaminants in the “utility” water proposed to be discharged into the mine with the MCLs for such contaminants demonstrates that the “utility” water discharge will exceed the MCLs for antimony, arsenic, cadmium and thallium. In addition, although no MCL has been established for the following contaminants, the levels of boron, manganese and nickel in the “utility” water discharge will exceed the lifetime health advisory level published by the EPA Office of Water in the 2006 Edition of the Drinking Water Standards and Health Advisories (EPA 822-R-06-013). The proposed discharge also will exceed

⁵ These figures are also included in KEMC’s Class V permit application for the TWIS.

⁶ At 63 Fed. Reg. 40604 (July 29, 1998), EPA explained the meaning of “other health based standards” as follows: “Because primary MCLs may not exist for some pollutants released in industrial wells, UIC Program Directors would have discretion to require the injectate to meet other appropriate health-based limits, as needed to protect USDWs for these other contaminants.”

Rebecca Harvey
December 10, 2007
Page 5

the residential drinking water cleanup criteria promulgated by MDEQ under Part 201 (Environmental Remediation) of the Michigan Natural Resources and Environmental Protection Act, MCL § 324.20101 *et seq.*, for the following contaminants: antimony, arsenic, boron, cadmium, chloride, cobalt, lead, nickel, nitrogen as ammonia, sodium, thallium and vanadium. The EPA Office of Water health advisory levels and Part 201 residential drinking water cleanup criteria are indisputably “other health based standards” as the term is used in 40 CFR § 144.82(a)(1).⁷ Therefore, the underground “utility” water discharge proposed by KEMC will violate 40 CFR § 144.82(a)(1) for multiple contaminants.

KEMC’s MPA is vague in describing the uses for which 124 gpm of the contaminated “utility” water will be discharged into the mine, indicating only that it will be utilized by “drilling equipment and underground dust control equipment, etc.” MPA at 42. Although KEMC does not identify in the MPA exactly when this underground discharge will begin, it is apparent that it will begin during mine construction activities because drilling will begin immediately with construction of the main decline and high capacity sump pumps will be required as soon as tunneling advances below the water table. In any event, the discharge will begin no later than the beginning of mining production, based upon the two types of uses described in the MPA.

Requiring KEMC to obtain a Class V UIC well permit for discharge of the “utility” water into the mine prior to construction of the mine is entirely consistent with EPA’s determination that KEMC must obtain a Class V UIC well permit for the TWIS before constructing the TWIS. Both discharges will begin to occur at approximately the same time and early in the operation of the mine. Discharge of the partially treated “utility” water may begin well before discharges from the TWIS, depending on the source of water used by KEMC for drilling during initial construction of the mine. Moreover, the water to be discharged from the TWIS, for which EPA is requiring KEMC to obtain a Class V permit, will have undergone a substantially higher level of treatment than the “utility” water that will be discharged underground into the mine.

II. Mine Backfill Well Operations Should Be Permitted Before Mine Construction Begins.

While the nature of some mining operations may be such that mine backfilling injection will only occur after the cessation of ore extraction operations, the backfilling injection is an integral component of KEMC’s process for mining the ore body in this case.⁸ As noted above, KEMC’s MPA states that production mining will begin in the second year of operation and that backfilling will begin after the third year (i.e., approximately 1.5 years after mining starts), with

⁷ MCL § 324.20120a(3) directs the Michigan Department of Environmental to “develop cleanup criteria ... based on generic human health risk assessment assumptions....”

⁸ As identified in your March 31, 2006 letter, KEMC’s mine backfilling operations will be regulated as a Class V UIC well. *See also* 40 CFR § 144.81(8).

Rebecca Harvey
December 10, 2007
Page 6

a total of approximately eight years of active mining expected. Moreover, the water used in the cemented backfill will be the same contaminated water that will exceed both primary drinking water standards and other health-based standards in violation of 40 CFR § 144.82(a)(1) that will be discharged into the mine as “utility” water.

The cemented backfill will also contain contaminants other than those in the “utility” water. The KEMC MPA indicates that the development rock aggregate used in the backfill for the primary stopes will be cemented with a 50:50 mixture of cement and Class C fly ash, the latter of which is known to typically contain a number of leachable metals. *See, e.g.*, MPA at 43. The fly ash will not be the only source of leachable contaminants within the mine backfill. The development rock, which also contains acid-producing sulfides, will be subject to weathering while it is stored on the surface. KEMC’s MPA describes the extensive precautions that KEMC will take to prevent the development rock leachate produced by such weathering from causing soil and groundwater contamination during storage before it is utilized in the backfill. *See, e.g.*, MPA at 53 – 55. However, once incorporated into the backfill, the weathered development rock will be free to leach contaminants into USDWs. In addition, KEMC vaguely indicates in the MPA an intent to dispose of other contaminated materials, including wastewater treatment byproducts such as reverse osmosis concentrate, by incorporating them into the mine backfill material. *See, e.g.*, MPA at 31 – 32. At the end of mining operations, KEMC intends to incorporate all sorts of demolition and other debris into the mine backfill, including, for example: (i) components of the temporary development rock storage area, such as the water collection drainage layer, geomembrane liners, geotextiles and geosynthetic clay liner; (ii) potentially contaminated fines from the contact water basins; (iii) building foundations and slabs; and (iv) piping, ore handling systems, ventilation systems, electrical and other utility equipment and components of the dewatering system. *See, e.g.*, MPA at 72 – 78. The vague descriptions in the MPA of the possible contents of the mine backfill injection provide all the more reason why KEMC should be required to submit inventory information for this injection at this time.

As discussed above, backfilling will begin early in the mine’s operation and is an integral component of the mining plan because mining of the ore body will be performed in multiple vertical slices proceeding from the bottom of the ore body upward. Therefore, EPA should determine at this time what requirements are appropriate in a UIC permit for the mine backfill well instead of at a later date when mining operations dependent on the backfilling operation are already well underway and are likely incapable of being altered. Accordingly, EPA should require KEMC to provide both the inventory information and to obtain a UIC permit for the mine backfilling operations before construction of the mine begins.

III. KEMC Acknowledges That The Mine Flooding Injection Wells May Result In USDW Contamination.

The final injection identified in the KEMC MPA subject to the UIC requirements will occur when KEMC injects water into the mine workings in order to accelerate flooding of the mine. The potential for this activity to contaminate USDWs is acknowledged by KEMC in the

Rebecca Harvey
December 10, 2007
Page 7

MPA by its plans to leave the wastewater treatment plant in place to treat the contaminated groundwater that likely will result from the flooding. As stated in the MPA:

As a contingency plan, KEMC will leave the WWTP and associated infrastructure in place for five years after reflooding is complete. If monitoring indicates there is the potential for upward migration of mining related constituents associated with the underground openings, KEMC will pump water out of the upper bedrock workings, treat it at the WWTP and recirculate the treated water back into the upper bedrock workings. This process of flushing the upper bedrock workings with clean water will continue for a period of several years until water quality conditions in the upper workings are protective of groundwater in the regional aquifer. Note this is not a perpetual care contingency.

MPA at 77.

Moreover, note that KEMC does not propose to treat the contamination that will arise in the lower portion of the mine, but proposes to treat only the contamination arising the upper portion of the mine. That is, KEMC does not intend to treat contamination occurring in the majority of the vertical elevation of the mine – i.e., the levels from 143 to 335 meters. MPA at 78 and Figure 7-2.

On October 17, 2007, the Community, National Wildlife Federation and the Huron Mountain Club submitted extensive comments to MDEQ on KEMC's mine and other permit applications (the "Comments"). A copy of the Comments was also provided to EPA. Included in the Comments is a detailed analysis of KEMC's gross underestimation of the level of contamination that will result from the mine flooding injection. Attached as Exhibit D is an excerpt from the Comments that discusses the contamination that will leach from the mine backfill materials and remaining rock and ore upon flooding of the mine. Also attached as Exhibit E is a report prepared by Stratus Consulting, entitled "Geochemical Review and Water Quality Predictions for the Eagle Project, Michigan" ("Stratus Report"), upon which the attached excerpt of the Comments is based. The Stratus Report concludes that concentrations of sulfate, nickel, total dissolved solids, aluminum, beryllium, cadmium, cobalt, copper, iron, lead and manganese in the flooded mine will exceed water quality standards. It is undeniable that the contaminated water in the flooded mine will interact with the USDW.

Given the very significant danger for contamination that is even acknowledged by KEMC from the mine flooding injection, as with the other proposed injections, EPA should require KEMC to both submit inventory information and obtain a UIC permit for this injection before the mine is constructed, and not at a later time at or near the end of mine operations when it may be too late to impose environmentally protective requirements on the proposed injection.

Rebecca Harvey
December 10, 2007
Page 8

IV. Conclusion

There are at least three underground injections proposed by KEMC subject to the UIC regulations for which EPA has not required KEMC to submit inventory information, much less, and more importantly, required KEMC to obtain a UIC permit **before** constructing KEMC's proposed mine in order to engage in such underground injections. The reasons for EPA to do so are no different than those stated by EPA in the "call in" letter requiring KEMC to obtain a Class V UIC permit for the TWIS. As stated in the "call in" letter, EPA should require KEMC to apply for and obtain permits for the injections discussed above in order to provide for: (i) monitoring of injectate and groundwater; (ii) notification of upset conditions; (iii) notification of malfunctions that may endanger the USDW; and (iv) provision of financial assurance. The permits should include stringent terms and conditions to ensure compliance with monitoring, reporting, operation, corrective action and the implementation of appropriate remedial measures if compliance is not maintained or a USDW is contaminated. For the reasons discussed above, EPA should require KEMC to comply with both the inventory and permit application requirements for all three injections discussed above before construction of the mine may begin.

Please call me if you have any questions. We would appreciate being apprised of your decision in this regard. In the event EPA decides that it is not necessary for KEMC to submit inventory information and apply for and obtain UIC permits for any of the injections discussed above before construction of the mine may begin, the Community requests consultation with EPA concerning such decision(s).

Very truly yours,

HONIGMAN MILLER SCHWARTZ AND COHN LLP

By: _____


Joseph M. Polito

Encl.

c: John R. Baker, Esq.
Ross Micham
Robert L. Thompson, Esq.