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Analysis: Kennecott Eagle Minerals Company Proposal For a Sulfide Nickel Mine in the U.P.

In the spring of 2006, the Kennecott Minerals Corp. submitted to the Michigan DEQ an application to open an underground nickel mine in the U.P.'s Yellow Dog Plains. The mine, called the Eagle Project by Kennecott, would be blasted underneath the headwaters of the Salmon Trout River into acid-generating sulfide ore. This application is the first application under Michigan's new non-ferrous mining laws and rules. Under the new rules, the DEQ accepted public comments on the application. The comments were overwhelmingly opposed to the mine, including the vast majority of comments from local (U.P.) residents. In January, 2007, the DEQ issued a draft decision to permit the mine and then set a schedule of public hearings and comment ending in April, 2007.

Suppression of Public Reports

That all changed on March 1, 2007. Earlier that week, the National Wildlife Federation notified DEQ Director Steve Chester that important reports critical of the mine had been developed by a DEQ consultant and then suppressed by DEQ staff working on the project. Director Chester investigated and then confirmed that the reports in fact existed, that they had not been disclosed in the public record, and that they contained highly important information critical of the mining application. The reports focused on the stability of the rock above the underground mine, the rock that would serve as the mine's roof, and concluded that the stability of the mining roof was uncertain. Yet these reports had been excluded from the public record.

The state's review was compromised. A sworn affidavit describes how DEQ staff suppressed the publicly funded technical reviews of the mine from the public. To supplement their in-house abilities, the DEQ had hired technical experts to evaluate the mine permit application. Their rock mechanics expert found that the section of the application that described the stability of the rock above the underground mine was very simplistic and did not reflect any knowledge of the last 20 years of rock mechanics research. The problem was important enough that the DEQ staff arranged a technical discussion between its own consultants and Kennecott's consultants. When the state's expert directly asked his counterpart how it was possible that Golder (KEMC's consulting firm) had produced such substandard work, he was told that these sections were not written by a geotechnical engineer. Instead these sections of the application had been prepared by a geologist, explaining the antiquated methods and out-of-date citations.

The deleted information in the reports was so important that Director Chester ordered that the draft decision to permit the mine be vacated and that the public hearings and comment period be postponed indefinitely. Director Chester also took the unusual – perhaps unprecedented – step of announcing that the DEQ would launch an independent investigation of its staff's handling of the critical reports, and would determine whether other important information had been kept from the public record.

The previously suppressed reports are now part of the public record; portions are excerpted below. This memorandum briefly outlines those and other problems, gaps, and inconsistencies in the Kennecott mining application, and the dangers those pose for the U.P.

A Different Kind of Mine

The proposed Eagle Mine is a different kind of mine from the mining operations currently conducted in Michigan, and it is drawing a different kind of response. U.P. residents are comfortable with the iron mining industry and they support it, but they are not supporting this mine. Powell Township, the closest community to the proposed site, is 90% opposed to the mine. Over 5,000 citizens of Marquette, a nearby mining town and the largest city in the U.P., are also opposed to this mine. Residents across the state are concerned as well—10,000 signatures have been collected from both peninsulas.

This unusual opposition is so intense because unlike the other mines across the state, this one is being dug into sulfide ores—ores that leach acid as soon as they come into contact with air, rain, or ground water. This mine would create millions of gallons of highly acidic wastewater, known as acid mine drainage, that eventually could run off into rivers and contaminate groundwater. Not only is acid mine drainage dangerous because it is highly acidic, it poses added risks because it contains heavy metals. This combination would have severely negative effects on any flora or fauna it encountered.

The higher level of risks from sulfide mining prompted the legislature to enact a new law and the DEQ to promulgate new rules to protect the state's lakes, streams and lands. The new mining law and regulations require that the DEQ reject any sulfide mining request unless the mining applicant demonstrates clearly that it will not "pollute, impair or destroy" land, air, water, or groundwater. To that end, the law requires that any mining applicant conduct extensive and rigorous testing and analysis to show upfront that the mine will operate safely and cleanly. If any pollution might migrate off the mine site, then the applicant must show upfront that the off-site "affected area" will be brought back to pre-mining conditions at the conclusion of the mining.

Kennecott, in its application and public materials, has attempted to assure the state and local residents that it can meet the requirements of the law and avoid degrading the area: it would fill in the underground mine with concrete to stop the remaining sulfide ores from coming into contact with air and water and creating acid. Kennecott promises that the mine (under the Salmon Trout River) would be dug into stable rock that would not collapse. It claims it would isolate the sulfide ore waste rock it digs out of the mine to keep it from coming into contact with water. Kennecott denies that harmful levels of the acid, the air pollution, or the noise would migrate off the mine site and into surrounding forests, streams, and towns. But Kennecott's own

mining application contradicts the company's claims and demonstrates that the proposed mine would endanger the health of the region.

1. Backfilling would probably not prevent collapse and acid mine drainage.

Kennecott plans to backfill the stopes with cemented rock fill in hopes of limiting collapse and the formation of acid mine drainage. ("Stopes" are the large excavations left where ore has been removed from the earth.) This seems like a simple solution but in practice would not work. Originally, Kennecott only planned to fill in every other stope with cemented rock fill and the alternate stopes with loose rock. Although it has since agreed to backfill the upper levels all of the stopes, the planned measures still are not certain to prevent pollution and collapse of the mine's roof (crown pillar):

- Cemented rock fill is not impermeable, it is a loose mixture of rock and cement paste which will separate when dumped into the stopes and be permeable. It would *not* prevent the movement of water.

- Gaps in surface of the cement rock fill: The fill would not be uniform at the top; it would have dips and pockets that Kennecott plans to fill with grout to prevent exposure to air and water movement. Flooding a mine with water is a standard practice to prevent sulfide ores from oxidizing and creating acid mine drainage… and it has failed repeatedly when water movement occurs.

- Contaminated water: Kennecott, in its application, states that it plans to flood the mine shafts with water. Kennecott's own predictions show that the water in the re-flooded mine will not meet basic drinking water standards for nickel and copper.

- Acid-generating backfill: Kennecott plans to use acid-generating *waste sulfide rock* excavated from the mine to backfill some of the stopes. The backfill itself would generate acid mine drainage as it oxidized over time.

2. There is a very substantial danger of subsidence

The roof of the mine, known as the "crown pillar," lies directly beneath the Salmon Trout River. Kennecott's plans to avoid collapse of the crown pillar are faulty and unfounded. According to DEQ's own crown pillar expert:

> Therefore, the analysis techniques used to assess the Eagle crown-pillar stability do not reflect industry best practice. In addition, the hydrologic stability of the crown pillar has not been considered. Therefore, the conclusions made within the Eagle Project Mining Permit Application regarding crown pillar subsidence are not considered to be defensible.

And even after KEMC offered to leave a thicker crown pillar, the same expert retained by DEQ wrote:

> Due to the difficulties associated with determining the mechanical properties of a rock mass from limited drill core information, and the limitations of the rock mechanics analyses conducted thus far, an accurate assessment of the crown pillar subsidence and hydrologic stability cannot be made without further detailed field investigation and analysis.

This analysis mirrors what other experts' analyses have concluded. Specifically:

- No demonstration of stability: Kennecott's core samples of the stability of the crown pillar are not available to the public and are not in DEQ possession, according to DEQ officials. Assessing crown pillar stability without the core samples is like golfing in the dark.

- Kennecott did not do enough modeling to predict how the crown pillar will perform. It instead responded to the likelihood of crown pillar failure by increasing the proposed thickness of the crown pillar by 100 feet (bringing it to 300 feet), and the DEQ accepted that. However, Kennecott said that it would continue to explore the potential for mining portions of the upper ore body.

- The Athens Mine was never considered by KEMC or DEQ: The Athens Mine, only 23 miles from the Eagle Mine site, subsided even with a 1,750 foot thick crown pillar. Again, DEQ's crown pillar expert emphasized the need to rely on regional subsidence information, particularly when faced with the challenge of mining underneath a river. But KEMC (and initially DEQ) ignored this warning.

- Similar concerns by DEQ consultants were suppressed by the DEQ: David Sainsbury, a consultant hired by the DEQ's contractor, documented his concerns in a 24-page report submitted to the DEQ last year. But the DEQ deleted that report, kept it out of the public record, withheld it from Freedom of Information Act requests, and asked Dr. Sainsbury to retract it. Dr. Sainsbury's revised report, a 3-page conclusory memo that avoided any reference to the earlier report, was then entered into the public record. When confronted with the existence of the detailed report with its negative findings, the DEQ top leadership unearthed it, placed it in the record, and vacated their preliminary decision to permit the mine.

3. The mine would be a substantial source of air pollution.

An enormous source of air pollution will be a 50-foot tall stack that exhausts the entire mine, yet contains no air pollution controls. This mine vent would release at least 20 tons per year of dust containing sulfides and metals and is only 300 feet from the Salmon Trout River. These emissions would travel many miles, coating plants and water, as well as wildlife and people, with toxic dust. This would be bad enough in an urban area; in the pristine McCormack Wilderness

and Salmon Trout River, the damage would be severe. DEQ staff has failed to address warnings from the Michigan DNR about the impacts of this wide-spread pollution on flora and fauna.

4. Acid-mine drainage is likely to migrate off-site.

Acid mine drainage is very likely to spread beyond the borders of the mine site. The most probable sources of contamination are as follows:

- Ore dust from truck transport: The trucks are covered, but leak dust and rock. A good example of this is the Red Dog mine in Alaska: the foliage all along the road from the mine is dead because of the dust.

- The re-flooded mine: The top of mine is level with the aquifer closest to the ground surface that connects with the Salmon Trout River, vastly increasing the likelihood that the river will become contaminated with acid mine drainage.

- Dust and metals from the exhaust stack: The air pollution plume encompasses the Salmon Trout River, the Yellow Dog River, and extends over Lake Superior.

5. Kennecott and the DEQ have ignored off-site impacts.

Kennecott describes the affected area as the mining site itself, but does not analyze potential offsite effects as the law requires. It claims any impacts of the mine would be negligible offsite.

- Noise: The impacts of noise are addressed in their entirety in two short paragraphs in the application. The application acknowledges that there will be loud noises from the mining and crushing operations, but then concludes without any support that "there are no sensitive noise receptors" in the area and so the noise will have no impact. Neither Kennecott nor the DEQ has done any investigation on the impacts of off-site noise on the area's wildlife, tourism and recreation, all of which are sensitive to noise.

- Air: There has been inadequate analysis of how air pollution would spread beyond the fence line of the site.

- Water: The mine proposal assumes all best-case scenarios and claims there would not be any impacts. Kennecott does not even consider potential impacts or the remediation those impacts would require. As discussed above, the acid mine drainage is very likely to migrate off-site.

- Transport: No analysis has been done of the impact 80 ore truck trips a day would have on one or two roads in the region; there is no mention of the effect acid dust from the trucks would have on roadsides.

6. There is no plan to return the area affected to the mine to pre-mine conditions, which is a basic requirement of the law.

The law says that Kennecott must remediate any damage from the mine in the affected area outside of the mine site to pre-mining conditions. But Kennecott claims that there is no affected area outside the mine site, so this part does not apply. In its initial decision, the DEQ agreed with Kennecott. But Kennecott's argument falls apart when one considers air, noise, water pollution, and transportation impacts. Kennecott's own data indicate that there will be offsite impacts. Before receiving a permit, Kennecott must present an ironclad plan to return the offsite area to pre-mining conditions. It has not even attempted to do so. And the DEQ has yet to require them to meet this requirement of the law.