Natural Resources Council of Maine
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February 11, 2013

Dear Chair Hilton and Members of the Land Use Planning Commission:

Please accept the following comments on behalf of the Natural Resources Council of Maine (NRCM) concerning the presentations of Robert Marvinney, Carol White and George Kendrick. I would be happy to come speak to the Commission on the mining issue on behalf of NRCM.

In general, NRCM disagrees with some of the points in each of the presentations and most of all with their tone, which strongly implied that the Commission should not be very worried about the environmental impacts of mining in Maine. All three presenters claimed that great improvements in mining science and technology lessen mining's dangers and implied that serious mining pollution is a thing of the past. Mr. Kendrick went so far as to state that LURC should "throw out all environmental concerns" when considering rezoning for mining and leave them to DEP.

NRCM urges LUPC not to do this. LUPC has the ability to protect important resources, such as outstanding fisheries and wildlife habitat and water supplies, during a zoning process in ways that DEP cannot. While DEP can deny a permit for a particular application that is not likely to meet existing standards, it cannot say that an area is too valuable to risk siting a mine. However, from its planning and zoning perspective, LUPC can find that an area is too valuable for mines. NRCM believes that LUPC must therefore consider environmental impacts associated with mining in any rezoning process. In fact, Maine Statute (12 MRSA §681) requires the Commission to "support and encourage Maine's natural resource-based economy and *strong environmental protections*" (emphasis added).

More specifically, NRCM urges the Commission to consider the following information as it develops new standards for rezoning for mining in the Unorganized Territories:

Maine has one of the largest sulfide deposits in the world and could have large open-pit mines in the future.

Dr. Marvinney strongly implied that mining operations were very likely to be small in Maine. However, Maine has one of the largest sulfide deposits in the world near Katahdin Iron Works[1]. Although this deposit is unlikely to be economical under current conditions, it is impossible to predict future metal prices. In addition, as Dr. Marvinney himself noted, much of Maine remains

[1]Lindley S. Hanson (Department of Geological Sciences, Salem State College; Maine Geological Survey) and Scott A. Sauchak (Integrated Geosciences). Fieldtrip Guide for the Summer Meeting of the Geological Society of Maine. 1991. P. 18. The volume of this deposit was estimated to be 200 million tons, roughly six times bigger than the Bald Mountain Deposit.

unexplored, so additional large deposits may exist. The Commission should not assume that mining operations in Maine will be small.

New, advanced technologies have not made mining environmentally benign.

Advocates for the mining industry claim they have developed new, advanced technologies that will solve mining's environmental problems. NRCM urges the Commission to be skeptical of this claim. The presenters provided no evidence of "new, advanced technologies". Geotextile liners of the sort Mr. Kendrick described have been around for decades as have reverse osmosis and acid- neutralizing water treatment systems. Mining companies' use of these technologies may be relatively new, but the technologies themselves are not.

These technologies are also expensive, and mining companies have been resistant to using them. For example, during the legislative debate surrounding LD 1853(the Maine Metallic Mineral Mining Act) last session, JD Irving tried to insert a provision into law to prohibit DEP from requiring the use of liners for waste rock piles, one of the key sources of acid and heavy metal pollution from mines. JD Irving's first draft of LD 1853 stated: "Rules adopted by the Department shall be performance-based to the extent feasible and may require liners beneath tailings impoundments, ore leaching facilities, and process solution ponds, but shall not require liners beneath any other portion of the mining area, including stockpiles". Although the Legislature did not pass this language, it is a strong indication that mining companies will seek to minimize liner use when possible.

Liners are also not foolproof. The liner for a part of the Beal Mount Mine in Montana leaked cyanide for years[2]. The Beal Mountain Mine -- a modest-sized, modern mine -- began operation in the late 1980s and closed in 1998 when its owner went bankrupt. So far, the federal government has spent about $10 million in taxpayer dollars cleaning up this site. The company's $6.6 million reclamation bond is also gone. Estimated additional cleanup costs range from $25 million to $200 million[3].

Reverse osmosis plants can be effective at removing heavy metals from wastewater, but they are expensive to build and maintain, and they use a lot of energy. As LUPC considers a rezoning request, the Commission should consider the consequences if mining companies fail to pay to treat wastewater for decades or even centuries after a mining project stops generating income. LUPC needs to consider this question carefully if mining companies say they will use treatment plants in perpetuity to mitigate the impacts of their operations.

[2] See the articles at http://mtstandard.com/news/local/beal-mountain-mine-reclamation-ongoing/article_4d60df92-5b1b-5a07-9d5f-deb0aceb9928.html and http://helenair.com/news/state-and-regional/cleanup-costs-mount-at-beal-mountain-mine-site/article_99b32fbe-351b-5fe6-9651-caeb10c14260.html.

[3] See http://www.waterboards.ca.gov/academy/courses/ard/day4/day4_sec2a_i_iii_bealmt_stillwater_phoenix_jk.pdf

Mining companies have understood the environmental consequences of their actions for a very long time.

Miners have known for decades or even centuries that mining sulfide ores produces acid drainage. As Mr. Kendrick noted during his presentation, this is "high school chemistry." Mining companies have also known for decades that mines cause serious environmental problems. USEPA states the following, for example, about the Iron Mountain Mine in California: "Acid mine drainage from Iron Mountain Mine killed 100,000 or more fish on separate occasions in 1955, 1963, and 1964; and at least 47,000 trout died during a one-week period in 1967".[4] People knew a long time ago that acid from mines was killing huge numbers of fish.

Even if, as was stated, mining companies have started to try to predict water quality impacts before commencing operations, they typically underestimate the water quality consequences of their operations. Mr. Kendrick described the Samatosum mine where the company underestimated the amount of acid their mine would generate. The mining company ended up having to install a water treatment plant that must operate in perpetuity after only three years of mining activity. This is the rule not the exception. A recent scientific review of 25 mines comparing predicted water quality impacts to actual water quality impacts stated the following:

> Of the 25 case study mines, 36% have developed acid drainage on site to date. Of these 9 mines, 8 (89%) predicted low acid drainage potential initially or had no information on acid drainage potential. The Greens Creek Mine in Alaska initially predicted moderate acid drainage potential but later predicted low potential for acid drainage for an additional waste rock disposal facility. Therefore, nearly all the mines that developed acid drainage either underestimated or ignored the potential for acid drainage in their EISs.
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> Of the 25 case study mines, 19 (76%) had mining-related exceedences in surface water or groundwater. However, nearly half of the mines with exceedences (8/19 or 42%) predicted low contaminant leaching potential in their EISs. The constituents that most often exceeded standards or that had increasing concentrations in groundwater or surface water included toxic heavy metals such as copper, cadmium, lead, mercury, nickel, or zinc (12/19 or 63% of mines),arsenic and sulfate (11/19 or 58% of mines for each) and cyanide (10/19 or 53% of mines)[5].

In considering potential impacts of mines during the rezoning process, the Commission should assume that adverse impacts on water quality will often be greater than predicted.

All of the "model" modern mines that Mr. Kendrick described have had water quality problems, and all will require long-term or even perpetual maintenance and water treatment.

According to a conversation I had with Mr. Kendrick after his presentation, the Flambeau Mine has violated water quality standards. It must truck the wastewater that accumulates in its "biofilter" (which is a fancy name for a constructed wetland or detention pond) off site to have it treated periodically. Similarly, it must also periodically remove and dispose of the sediments from this pond. If the mine does

[4] USEPA. 2006. Abandoned Mine Lands Case Study, Iron Mountain Mine. P. 6.
[5] James R. Kuipers et. al. 2006. Comparison of Predicted and Actual Water Quality at Hardrock Mines. Accessed at: http://pebblescience.org/pdfs/ComparisonsReportFinal.pdf

not perform these maintenance activities, contaminated water will overflow from the "biofilter" and escape the site.

Also, as noted above, the Samatosum mine generated more acid than predicted and must use an onsite wastewater plant and maintain a tailings[6] pond dam in perpetuity. Tailings pond dams sometimes break with significant consequences[7].

Likewise, the Greens Creek Mine in Alaska, which Mr. Kendrick also cited as a "model" mine, has a number of potentially serious and expensive environmental issues. A consulting firm recently conducted an audit of the mine on behalf of the Alaska Department of Natural Resources. The consulting firm identified a number of "highly significant" problems. It defined highly significant as: having an environmental impact; failing to have management systems that protect both the environment and the reputations of the company and permitting agency; or costing more than $5 million to fix. Problems fitting this definition included:

1. Seepage from an on-site tailings pond containing contaminants above water quality standards and discharging directly into Greens Creek.

2. Increased potential for contamination of storm water due to high concentrations from mine production rock or quarry materials used in construction of roads, dikes, and drainage structures.

3. Dust from the tailings facility may be contaminating surrounding soils, water, vegetation and biota. [8]

Thus, this "model mine" has water quality violations, and its owner did one of the things Mr. Kendrick implied modern mines no longer do: it used potentially acid-generating wasterock in the construction of roads, dikes, and drainage structures.

Heavy metal concentrations in water are naturally elevated in some parts of Maine, but mining operations will increase these levels.

Both Ms. White and Dr. Marvinney repeatedly stated that some areas in Maine have naturally high arsenic concentrations in groundwater and surface water. Although groundwater naturally flows through some ore bodies and picks up heavy metals that may then flow into surface water, mining will do many things to increase this process. Blasting will fracture buried rock allowing greater contact with ground and surface water, thereby increasing metals leaching. Digging up underground ores and exposing them to rain and the atmosphere will also increase acid generation and metal leaching. Grinding up ores into small particles, a key part of the ore refining process, greatly increases surface to volume ratio of the material leading to increased potential for leaching of toxic metals and acid generation.

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[6] Tailings are the very fine-grained waste material leftover from the process of concentrating met ores. Tailings are typically stored near mines in constructed waste ponds or in existing natural ponds or wetlands. Tailings typically contain hazardous quantities of heavy metals and generate acid when exposed to air and water.

[7] See, for example, http://en.wikipedia.org/wiki/2000_Baia_Mare_cyanide_spill for a description of a European tailings dam that failed.

[8] See SKR Consulting's Environmental Audit of the Greens Creek Mine, Executive Summary, P. Tables A-1 and A-2. Accessed at http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/pdf/gcaudit2009ex.pdf.

Naturally elevated levels of contaminants in groundwater can be a serious problem. This is particularly true for arsenic in Maine, where some people have levels of arsenic in their well water that increases their risk of cancer. However, the natural presence of arsenic in the ground or surface water should not serve as a justification for allowing mining in the vicinity. Just the opposite: if levels are already high, extra scrutiny is required because mining is extremely likely to make the problem worse.

Mining companies frequently overstate the economic and employment benefits of mining.

A good example of this is the Black Hawk Mine in Blue Hill. The owner of this mine claimed it would operate for 10 to 20 years and employ 200 to 300 people. Instead, the mine operated for five years employing around 100 people[9]. Although the mine closed in 1977, cleanup operations to stabilize the site concluded in 2008, more than 30 years later, and groundwater in the area of the site is unfit for drinking. The cap and liner on the site require maintenance in perpetuity.

Similarly the Samatosum and Flambeau mines Mr. Kendrick described both operated for only three and four years respectively but will require maintenance and wastewater treatment in perpetuity.

The Commission should consider that employment at mining sites is often very short-term and subject to boom and bust cycles, but the toxic waste that remains is always a long-term problem.

The Commission should not rezone areas for mining near population centers, public or private drinking water sources, or valuable fish and wildlife resources

Chair Hilton asked Carol White if there were anyplace she would not put a mine. When pressed, Ms. White responded that it would not be a good idea to put mines near population centers, public or private drinking water sources, or wetlands and waterbodies that are significant for wildlife habitat or recreational values. NRCM strongly agrees with this. As NRCM stated in its initial comments on the Commission's proposed rule changes, the Commission should identify resources within an 8-mile radius of a proposed mining site because of the potential for mining contamination to travel long distances once it enters groundwater and surface water.

Conclusion

NRCM strongly urges the Commission to consider environmental impacts in developing new rezoning criteria for mining. Even modern mines become permanent waste management problems and are similar to other types of hazardous waste sites, such as Superfund sites. The Commission also needs to consider whether the long term environmental problems associated with any mining operation, even smaller ones such as the Flambeau Mine, are worth taking on given the short-term employment mines often offer. The boom and bust nature of mining and

[9] Representative Ralph Chapman. 2012. Testimony before the Environment and Natural Resources Committee of the Maine Legislature on LD 1853, An Act To Improve Environmental Oversight and Streamline Permitting for Mining in Maine. March 30.

the degradation of the environment it leaves behind led one economist at the University of Montana to state the following about mining in New Mexico:

> In New Mexico in 2000, mineral extraction jobs paid $50,000 per year whereas the average wage and salary job paid $28,000. Given these high wages, one would expect communities that rely heavily on mineral extraction to be unusually prosperous. That, in general, is not the case. Across the United States, mining communities, instead, are noted for high levels of unemployment, slow rates of growth of income and employment, high poverty rates, and stagnant or declining populations. In fact, our historic mining regions have become synonymous with persistent poverty, not prosperity[10].

I request the opportunity to address the Commission orally to ensure that the Commission members and staff receive multiple perspectives on issues raised by mineral mining. Thus far, the Commission has heard only from the state's geologist and two presenters who are heavily involved in the mining industry. NRCM believes the information provided has not been balanced and needs to be augmented by the perspective of someone representing public, environmental and conservation interests.

Thank you for the opportunity to comment on this very important issue.

Sincerely,

Nick Bennett
Staff Scientist

[10] Thomas Michael Power. "The Economic Anomaly of Mining," in Chapter Three of *Mining in New Mexico: The Environment, Water, Economics, and Sustainable Development*, L. Greer Price, et al., editors. New Mexico Bureau of Geology and Mineral Resources, New Mexico Institute of Mining and Technology, 2005. P. 96. Accessed at http://geoinfo.nmt.edu/publications/decisionmakers/2005/DM_2005_Ch3.pdf