

Agency: PolyMet discharge would flow north to BWCA

Fundamental miscalculations in water model render EIS results invalid

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REGIONAL—For more than a decade, the Minnesota Department of Natural Resources, the U.S. Forest Service, and the U.S. Army Corps of Engineers have informed the public that potential contaminants from PolyMet's proposed NorthMet mine, near Hoyt Lakes, would flow south into the St. Louis River watershed.

It was a key issue for many environmentalists, who have been primarily focused on protecting water quality within the popular Boundary Waters Canoe Area Wilderness, located to the north of the proposed mine.

But documents obtained by the Timberjay through a Minnesota Government Data Practices Act request reveal that the lead agencies that have overseen the preparation of the environmental impact statement may well be wrong.

According to a June 18, 2015, letter from the Great Lakes Indian Fish and Wildlife Commission (GLIFWC), one of the cooperating agencies on the decades-long study, Barr Engineering, the PolyMet contractor that actually ran the water flow model used in the study, made fundamental miscalculations, rendering the results of this key element of the environmental study invalid. Barr works as a consultant for PolyMet, yet the lead agencies have relied heavily on its technical work throughout the environmental review process.

GLIFWC, which represents 11 Indian bands in Minnesota, Michigan, and Wisconsin, maintains its own scientific research staff. The agency, based in Odanah, Wis., is the only entity, other than Barr Engineering, which has actually run the MODFLOW model, a highly complex computer program for determining water flow through the environment.

The model's results were used to make a number of key predictions in the PolyMet EIS, including that any potential contaminant flow from the mine site would move south and away from the BWCAW.

But GLIFWC's Environmental Section Leader John Coleman, in his June letter, says his agency's own model run shows dramatically different results, and points to the primary contaminant flow running north, into the Peter Mitchell pits, a series of taconite pits operated by Northshore Mining, located high on the Laurentian Divide, near Babbitt. The pits, which sit about a mile north of the proposed PolyMet mine, currently discharge in several directions. Upon closure, however, all of the discharge is slated to enter Birch Lake, part of the Kawishiwi River, a major BWCAW watershed.

Coleman's six-page letter is detailed and highly technical, but parts of it help to explain the issue. "The existing Peter-Mitchell taconite mine pits on the north side of the PolyMet project area play a significant role in the groundwater hydrology of the project site," he writes. "It is not surprising that those taconite pits play a significant role in the local groundwater hydrology since they are positioned high in the local terrain, at times contain large volumes of water, and sit in relatively high conductivity bedrock. Because they play a dominant role in the local hydrology it is critical that they be correctly incorporated into the project hydrologic modeling."

Yet, according to GLIFWC, Barr got it wrong when it set the assumptions while calibrating the MODFLOW model, using water levels within the Peter Mitchell pits that were ten meters too high for

the time period in question. With the higher water levels used by Barr, the model predicted that—since water flows downhill— the higher the elevation of the water in the pits, the greater outward pressure and flow of that water towards lower terrain, such as the Partridge River, located just south of the Peter Mitchell pit and adjacent to the proposed PolyMet mine. But if the water level is assumed to be 33 feet lower, as GLIFWC officials maintain was the proper assumption, then the headwaters of the Partridge River would be higher in elevation than the water in the Peter Mitchell pits, and that would reverse the flow of water, and potential contaminants, according to Coleman.

“Because of this error, the calibration model has the local direction of groundwater flow 180 degrees reversed from the actual conditions during the calibration period,” states Coleman. Rather than pushing ground and surface water from the Laurentian Divide to the south, lower water levels in the Peter Mitchell pits would essentially move the continental divide to the south and incorporate much of the area surrounding the proposed PolyMet Mine into the Rainy River watershed.

According to Coleman, the water levels for the Peter Mitchell pits used by Barr when calibrating the water model were based on 1996 levels, of 493 meters, or 1,616 feet, which were among the highest levels ever recorded in the pits.

By contrast, the closure plan for the Peter Mitchell pits calls for an initial water level in the pits of just 396 meters, or 1,300 feet, (more than 300 feet lower than Barr’s assumption) which would have significant consequences for the expected flow of contaminants from PolyMet, according to Coleman. “This result indicates that the contaminant transport modeling, which assumes contaminant flow paths to the south and south-east, is incorrect because it is based on the incorrect assumption of 1996 era water levels in the taconite pits even during closure. Using the project model with the correct closure water elevations indicates that water flows to the north at closure,” wrote Coleman.

The current closure plan for PolyMet’s NorthMet mine, which would extract a sulfide ore body to produce a variety of metals, lists water surface elevations of 1,576 feet for the west pit and 1,592 feet for the east pit, both nearly three hundred feet above the planned water levels for the Peter Mitchell pits at closure. Coleman said he’s done additional analysis since the June 18 memo and it has left him “more convinced than ever off a northward contaminant flow.”

Agencies respond

DNR officials, contacted by the Timberjay, note that GLIFWC’s water flow predictions represent new information, which is still being analyzed. “These technical discussions are a normal part of developing the final EIS, and the bands’ participation in the environmental review continues to be an important and appropriate part of the NorthMet EIS,” stated Barb Naramore, Assistant DNR Commissioner. Naramore said the lead agencies are “carefully considering the concerns about the potential for north flow of bedrock groundwater.” The co-lead agencies will continue to evaluate the new information, according to Naramore, and the issue will be addressed in the final EIS.

Yet in a June 22, 2015, draft memo, obtained by the Timberjay, the lead agencies provide a more detailed response to GLIFWC’s comments. They indicate that available information “supports a conceptual model whereby water from the proposed NorthMet pits would not flow into the Northshore pits.” The memo continues: “Site specific groundwater monitoring data and the measured lack of surface water effects near the dewatered Northshore pits are consistent with the conceptual model that downward leakage from surficial deposits into bedrock could create a groundwater mound. This would prevent the formation of a northward bedrock flowpath from the proposed NorthMet pits to the Northshore pits,” states the memo.

Coleman discounts that possibility. "There's no feasible mechanism for such a mound to form, naturally," he said.

The DNR memo goes on to acknowledge that GLIFWC's claims could well be accurate. The "agencies acknowledge that the data and the [model] do not definitively rule out the possibility of a northward bedrock flowpath..."

To address the concern, however, the lead agencies propose a bedrock water-level monitoring program, which they say would provide advance notice of any northward flow and water or contaminants. If such a flow is detected, the agencies say they would undertake "adaptive mitigation measures" to prevent the flow. "Existing monitoring data, in combination with a robust monitoring and adaptive management plan, will ensure with reasonable certainty that any potential northward bedrock groundwater flow from the proposed NorthMet pits to the Northshore pits would be addressed and prevented," states the memo.

Barr responds

In a July 7, 2015, technical memo on the subject, Barr Engineering staff acknowledge that the water levels they used for the Peter Mitchell pits came from a DNR report from 1996 and that water levels in the pit have changed over time. But while the information used in the model may not be accurate, they state it was the "available information at the time." That can be a legal escape hatch for agencies that prepare environmental impact statements when it later turns out that information used in their analysis was incorrect.

According to Barr, "the decision was made in the early stages of the MODFLOW modeling to not attempt to simulate changing conditions at Peter Mitchell given the conceptual model for the site." Barr officials also noted that the decision never came up in public comments on the draft EIS, released in 2009, or the SDEIS, released in 2013.

Barr also contends that the model was run "primarily to provide estimates of mine pit inflows (as opposed to simulating the hydraulic interaction—or lack thereof— between the Peter Mitchell Pits and surrounding surface water and groundwater), assessing alternate Peter Mitchell Pit elevations was not relevant."

Calls for new model run

While DNR officials say that GLIFWC's concerns will be addressed in the final EIS, which the agency expects to release late this year, that's not likely to satisfy GLIFWC officials, nor environmental groups.

"The co-lead agencies, if they expect to do a credible job, need to do a thorough independent re-running of this model," said Kathryn Hoffman, staff attorney for the Minnesota Center for Environmental Advocacy. "They can't just rely on PolyMet's consulting partner," she said. "The only other entity that's run it says it's flawed."

Coleman, in his June letter, also calls for re-running the model using updated information.

Of course, reconfiguring the MODFLOW model can't be done in isolation, since the model's predictions were used as the basis for other models, such as GoldSim, which predicts the flow of potential

contaminants. For the lead agencies, having to redo such fundamental work at this late stage could delay final completion for months, or possibly years.

Conflict of interest?

The dispute over the water modeling raises another troubling question about whether the lead agencies have conducted the required due diligence to insure independent verification of the results produced by Barr Engineering.

Federal law, which would apply to the U.S. Forest Service and the Army Corps of Engineers, co-lead agencies on the PolyMet project, requires lead agencies to "independently verify" the work of consultants they rely on to produce environmental studies. Yet none of the co-lead agencies has run the MODFLOW model on their own, and the only independent entity to do so has fundamentally challenged the accuracy of the work done by Barr.

Federal law also requires that any contractor hired to work on an EIS signs a disclosure form specifying that they have no financial or other interest in the outcome of the project. While the agencies haven't directly retained Barr, their study relies heavily on the work of the company and the company would appear to have a financial interest in approval of the project.

"I don't think there's any question in anyone's mind but that Barr will be assisting in the completion of this mine," said MCEA's Hoffman, who contends the situation presents at least the appearance of a conflict of interest.

DNR and Forest Service officials confirmed this week that they have no agreements with Barr that would prevent the company from continuing to work for PolyMet if the mine project is approved.

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