1997-98 SESSION COMMITTEE HEARING RECORDS

Committee Name:

Senate Committee on Agriculture and Environmental Resources (SC-AER)

Sample:

- Record of Comm. Proceedings
- 97hrAC-EdR_RCP_pt01a
- 97hrAC-EdR_RCP_pt01b
- 97hrAC-EdR_RCP_pt02

- Appointments ... Appt
-
- Clearinghouse Rules ... CRule
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- Committee Hearings ... CH
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- Committee Reports ... CR
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- Executive Sessions ... ES
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- Hearing Records ... HR
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- Miscellaneous ... Misc
- 97hr_SC-AER_Misc_pt03
- Record of Comm. Proceedings ... RCP
-

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January 12, 1998

Albert Ettinger
Environmental Law Policy Center
35 East Wacker Drive, Suite 1300
Chicago IL 60601-2208

Dear Albert,

Enclosed is the report on the preliminary assessment of the Environmental Impact Report (EIR) by the Crandon Mining Company. As you will undoubtedly conclude from the report, I consider this EIR totally inadequate as a description of the potential impacts of the proposed mine, or as a document upon which the people in Wisconsin can reasonably rely. Underlying that opinion are the following observations:

- The EIR is too often without basis in fundamentally needed site data.
- It is in error on some substantive issues and ignores others.
- It is internally inconsistent and contradictory.
- It is misleading.

While one expects the EIR to reflect the bias of the Crandon Mining Company in favor of the project, it should be a legitimate attempt to assess the likely impacts of the project. It is not. It is a promotional vehicle that shuns critical investigation, obfuscates the assessment of data that is available, and stretches credulity in its conclusions. It is also frequently simply wrong.

As it exists today, and it is a constantly moving target, the EIR assesses virtually zero impact. Hundreds of people will descend upon the woods and wetlands near Rice and Mole lakes, undertake major engineering and construction; excavate, digest, transport and/or dispose of 55 million tons of bedrock (much of it reactive); export billions of gallons of water; and, after the better part of three decades, dismantle the facilities and leave. At the height of this activity, the EIR predicts negligible, almost unmeasurable, impacts. When all is said and done, the EIR predicts no residual impacts. It is an assessment that is intuitively too optimistic. And, in this case, intuition is correct.

The impacts of mining will be greater than described in the EIR, and there will be permanent

impacts when mining is done. Relative to the EIR, the differences include:

- More ground water moves through the area and through the ore than is currently acknowledged.
- More ground water will have to be pumped.
- More adverse rock/water reaction will occur as a result of the mining activity.
- More water will contact the abandoned mine and waste disposal areas after reclamation.
- Ground water and surface water will be permanently adversely impacted by the project.

Unfortunately, while the data in the EIR permits one to establish that the impacts will be greater than described, the EIR is inadequate and/or too incomplete to permit one yet to assess how much greater the impacts will be.

Thank you for the opportunity to work with the Law Policy Center on this project. Please feel free to contact me if you have any questions, or if GHI can be of further assistance.

Sincerely,

Charles H. Norris

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Review and Preliminary Assessment of the Permit Application Materials for a Proposed Zinc- and Copper-Sulfide Mine near Crandon, Wisconsin

Prepared for

Environmental Law & Policy Center
35 E Wacker Drive, Suite 1300
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December, 1997

Introduction

In August 1997, Geo-Hydro, Inc. (GHI) contracted with the Environmental Law & Policy Center (ELPC) to review documents related to a proposed underground zinc- and copper-sulfide mine near Crandon, Wisconsin. Based upon the review, GHI would provide a preliminary assessment of the adequacy of the permit materials and the underlying geologic and hydrogeologic data, the potential impacts to ground-water and surface-water quantities and qualities, the ground-water model and related transport modeling (to the extent that this has yet been done), the overall consistency of the permit materials, and the sufficiency of the permit materials and processes to reach a valid permitting decision.

In the course of the review of these materials, GHI identified a number of deficiencies and difficulties with the permit application and data. Unlike many reviews, these deficiencies were less likely to be specific difficulties with one or another element of the proposed plan, than a general class of problem that is common across the permitting materials. For this reason, the report is organized along somewhat different lines, as is discussed below.

Organization of Report

This report provides the results of the review and preliminary assessment. The next section of this report, *Background*, briefly summarizes the geology and hydrogeology of the area around the proposed mine, summarizes important aspects of the mine waste handling plan, and identifies some of the key environmental concerns. The remainder of the report is organized into sections discussing deficiencies or problems, as opposed to sections dealing with individual physical elements of the mine, such as the tailings management areas (TMAs) or the underground excavation. Thus, the underground excavation or the TMAs may be discussed briefly in several sections, *apropos* each class of problem, rather than in individual single sections that are each devoted to one element. It is felt that

this structure will both emphasize the nature of the application-wide problems and reduce redundancy in this report.

Following the background section are sections entitled *Permit Application Materials and Documentation*, *Fundamental Data Sets*, *Errors and Inconsistencies*, *Oversights*, *Ground-Water Model*, and *Review and Permitting Process*. The final section offers some *Conclusions and Recommendations*. Additional observations of GHI have been incorporated into a letter from ELPC to William Tans and David Ballman dated September 18, 1997.

I. Background

A permit for the proposed mine is being sought by the Crandon Mining Company (CMC). CMC is a successor to, and a partially-owned subsidiary of, Exxon Corporation, which initially explored the property and first proposed the mine in the late 1970s. The mine will extract base metals from two tabular sulfide ore bodies, one that is predominantly zinc sulfide and one that is predominantly copper sulfide. These ore bodies are of Pre-Cambrian age and are part of a stratigraphic sequence of volcanic, volcano-clastic and sedimentary bedrock that has been tilted to a near-vertical orientation. The ore bodies have been extensively drilled using deviated borings that have characterized the Pre-Cambrian bedrock primarily north of the ore bodies. Less characterization is available for the bedrock south of the ore bodies.

The eroded and weathered top of the bedrock is covered predominantly by Wisconsinan (most recent) and to a lesser degree by pre-Wisconsinan glacial sediments. The glacial sediments are generally 50 feet to 75 feet thick over the ore body but can thicken to well more than 100 feet in the area. Borings into the glacial sediments in the immediate vicinity of the proposed mine document the complex stratigraphy typical of glacial deposits, with substantial interfingering of highly permeable outwash deposits and relatively impermeable tills. Significantly less stratigraphic detail is available away from the immediate mine locale. During the time period since the glaciers melted, the ground surface has developed an

integrated system of streams, lakes, and wetlands that locally feed and are fed by ground water. Both the ground-water system and the surface-water system at the site feed Lake Michigan and the Great Lakes Basin. Forested land dominates the area of the mine.

The ore bodies are oriented almost east-west and have a combined length of almost a mile. The combined thickness of the overlapping ore bodies is more than 400 feet, and the individual ore bodies average around 100 feet thick. The weathered equivalent of the ore bodies extends upward to a subcrop contact with glacial sediments and the ore bodies extend to depths more than 2200 feet below the subcrop.

The proposed mine raises a number of potentially significant environmental concerns. Direct contamination by mined metals is one concern. In addition to the primary ore metals, zinc and particularly copper, other metals of environmental concern that are found in these ore bodies include lead, arsenic, and cadmium. Another concern for the proposed mine is the generation of acid rock drainage, with the subsequent contamination of ground water and surface water. Ore and waste rock with significant concentrations of sulfide minerals generate sulfuric acid when they weather. (This mine will produce some 55 million tons of rock while recovering about two million tons of ore over a period of 28 years.) About half of the mine wastes are planned to be disposed of in the mine itself, and the remaining wastes are planned to be disposed of in four constructed TMAs. Each setting has the potential to generate acid rock drainage. An additional major concern is the impact of dewatering the mine on ground-water levels and quality, stream flows and water quality, wetlands, and water levels and quality in the lakes around the mine, and the subsequent impacts of those changes on the ecology and communities of the area. This concern extends to permanent changes of the hydrologic balance that will exist post-mining. Another concern is that the proposed operation of the plan will transfer the waste water from the mining operations and dewatering to the Wisconsin River, to preclude contaminating the Wolf River drainage. The volume of the transfer is not great relative to the total volume of the Wolf River at its mouth or to the Wisconsin River at the point of discharge. It is, however, great to the streams, lakes and wetlands at the headwaters of the Wolf River in the area of the mine including Mole Lake

and Rice Lake.

II. Permit Materials and Documentation

The primary set of materials available for review is the currently-evolving Environmental Impact Report (EIR) by Foth and Van Dyke. This document is not a finished report, nor is it a published draft report. Because of the permitting process that has evolved (discussed in a subsequent section below), the EIR is a continually changing work-in-progress. The version that was reviewed for this project was the one that is maintained by the United States Environmental Protection Agency, Region 5, Chicago, Illinois and included revisions through number 254, dated August 7, 1997. An obvious difficulty immediately emerges for a reviewer with such a document. One is attempting to review and assess a moving target, and one has little confidence that the version others may be reviewing is identical.

The fluid nature of the EIR is compounded by an on-going mutation of other documents incorporated into and repeatedly cited in the EIR. For example, the ground-water modeling report produced for Foth and Van Dyke by GeoTrans (now HSI-GeoTrans) is frequently cited in the EIR in support of conclusions of minimal impacts resulting from the proposed mine. These supporting citations have just been rendered moot by the decision to withdraw the model, change basic geologic definitions, recalibrate and rerun the model, and publish a new report.

A related difficulty with a committee-generated, evolving document is that contradictions, inconsistencies, and errors develop and are perpetuated. It then becomes a critical issue as to which portion of the document has the controlling language. An example can be found in attempting to understand the details of the design of the liner systems for the TMAs. The description of the liners that is presented in Volume 1, the narrative, differs from the description that exists in subsequent, appendixed documentation for the TMAs. The differences are not just in the detail, but in the actual materials and quantities of materials

proposed to be used. The reviewer is left with a document that describes two liner systems that are significantly different in their design and engineering, with no way of determining which, if either, will actually be constructed if the mine is approved.

An additional major difficulty exists with the permitting materials that hinders and slows the review process, and in some cases virtually prevents meaningful assessment. In many cases, critical supporting data for summary assertions provided in the primary narrative volumes are not provided except by citation to some other portion of the EIR. Tracing through the citations frequently leads to a pattern of multiply-nested references that make it difficult to find the defining data, in some cases never produce the defining data, sometimes produce data that do not support the assertion, and in one case closed back on the original paragraph in a meaningless loop.

Tracking through the EIR in an attempt to identify the foundation data is further complicated by the wholesale duplication of large blocks of text among the nested references. The gross footage of shelf space occupied by the EIR (at least 10 feet and growing) could easily be reduced by one-third if the gratuitous duplication of text, tables, and figures were eliminated and minimal editing were applied. Quite aside from the logistical and resource savings such reduction would produce, it would also permit more meaningful and less time-consuming reviews by third parties.

III. Fundamental Data Sets

Among the more disturbing elements in the permitting materials is the lack of fundamental data available from the site to serve characterization. It is even more surprising when one considers that the original work developing the mine application is almost two decades old. Efforts to characterize the impacts of mining at this site should not be handicapped by lack of fundamental background hydrologic, geologic, and meteorologic data, but they are. Many of

the critical data sets used in the evaluations are themselves modeled, extrapolated from non-site-specific data, or approximated due the failure to collect data on-site.

Meteorologic Data

Only one year of on-site meteorologic data is reported in the EIR; that from July, 1994 to June, 1995, and the precipitation data for that year is not complete. At this stage of the project, almost two decades of on-site meteorology could have been collected. Longer term, average data from Pelican Lake is used and discussed extensively as being representative of and relevant to site conditions. However, the appropriateness of the Pelican Lake data for extrapolation to the site cannot be made based upon the on-site data, and, in fact, the limited on-site data suggests there may be significant difference between the two locations. For example, the one year of data from the site showed precipitation only about half of the long-range reported precipitation for Pelican Lake, with no discussion as to the significance of this anomaly.

As with on-site meteorologic data, continuous long-term lake level measurements should be available. These could then be correlated with on-site long-term and discrete-event weather data to develop a site-specific understanding of the dynamic response of the local surface-water bodies to local weather. There are fundamental difficulties with site characterization when spill points on lakes are not known after two decades, and must be defined by consensus rather than observed with measurement.

Surface Water Data

It is clear that the area around the mine is one with a dynamic interaction among streams, lakes, wetlands and the ground water. The relationship among these elements of the hydrologic balance varies not only in space, but presumably in time. However, temporal variations in the balance have not been documented due to the failure to collect basic data. Continuous on-site weather data and long-term, continuous lake level data should be accompanied by continuous, year-round stream gaging. Long-term and synchronous flow measurements should be available from multiple reaches of Swamp, Hemlock, Hoffman, and

Upper Pickerel Creeks. Such data would permit evaluation of seasonal flow variations, temporal and spatial variations of base-flow, and detailed gain-loss studies. The results could then be correlated with the climatologic variations measured on-site, and site-specific data could be used to produce detailed, site-specific water balances. Such water balances could then be used to constrain a ground-water model. In contrast, the current ground-water model uses of precipitation recharge as a calibration parameter, rather than as an independent model constraint.

The data that were not collected are irretrievably lost. However, that loss does not justify continuing to neglect to collect these most basic of hydrologic data. Such data collection programs should be initiated immediately and the results integrated into the site evaluation.

Hydrogeologic Data

Geologic and hydrogeologic data from the immediate mine site are generally more complete, particularly for the glacial sediments. However, bedrock definition, particularly outside the ore bodies themselves, is limited. A first look at the site suggests ample data for the bedrock, but that initial impression does not hold up well. The EIR tabulates 272 bedrock wells with an aggregate footage of more than 100 miles. However, just as a report that occupies 10 feet of shelf space is not necessarily useful, 100 miles of hole does not mean the bedrock geology and hydrogeology are adequately understood.

An adequate understanding of the hydrogeologic properties of the bedrock, particularly at depth and south of the ore bodies, is handicapped by a lack of data. Of the 272 tabulated bedrock boreholes, only 13 were evaluated for hydraulic conductivity. Much of the conceptual understanding of bedrock hydrology is based upon the rough, qualitative estimates of Robert Rowe, an employee of Exxon, not on the measured values from even these 13 evaluated holes. Further, the limited number of physical measurements taken from boreholes do not strongly support Rowe's speculative estimates of conductivities. The interpretations of pumping tests that have been performed are non-unique and are strongly biased by assumptions of boundary conditions. Some type of assumptions are necessary due to the

departure of site conditions from ideal, theoretical conditions. However, alternative assumptions less favorable to the project, such as localized direct connections between the bedrock ore bodies and the glacial aquifers, have not been evaluated for the pumping test data. They should be.

Potentially useful temperature and water quality data were collected from a few bedrock borings. Under some conditions, such data could assist in an integrated understanding of the bedrock hydrogeology. However, none of the three data sets; water quality, temperature, and hydraulic properties, were collected from common wells. This oversight, along with the complicating geometric factors of deviated wells, makes integrating these data sets into a coherent understanding of bedrock hydrogeology problematic at best. Of the 272 tabulated bedrock borings, 31 are not listed as having been plugged. Some of these borings could be re-opened, entered, surveyed and geophysically logged. Each could then be fully evaluated for water chemistry, temperature distribution, and hydraulic properties. From such data, a more reliable understanding of the bedrock system could be developed.

IV. Errors and Inconsistencies

The preliminary review of the EIR and related documents identified a number of errors and/or inconsistencies in the observations or discussions. Certainly some of these problems are related to the continual evolution of the EIR document(s), rather than the publishing of a single, integrated, internally-consistent document. However, in some cases, the problems seem to originate with an inadequate or erroneous understanding of the technical concerns. A number of examples are described below.

The Crown Block

Among the supplemental documents to the EIR is a report that investigates the hydrologic integrity of the crown block. The crown block is the uppermost portion of bedrock that will be left in place above the mined void to keep the mine from caving through to the surface.

One of the concerns expressed in review of the EIR was whether the hydraulic conductivity of the crown block would increase beyond the pre-mine condition in response to the stress put on the crown block by mine excavation. There are at least two errors in the assessment that was performed. First, the calculations were made assuming the mine was a complete void, a condition that will never exist. This assumption greatly increases the lateral stresses on the crown block relative to the actual condition. Such an assumption may be conservative with respect to the possibility of structural failure of the crown block from compressive stress, but it is not conservative with respect to hydraulic properties. The modeled condition and increased lateral stress would tend to close any existing fractures relative to the true, anticipated condition. The second error was in considering increased leakage only from fractures that experience tension as a result of the imposed stress field. Increased leakage could also be expected from any fracture that experienced a decrease in lateral stress. A simple reduction in stress can permit a fracture to expand; absolute tension is not required. In combination, the current analysis may well erroneously minimize the likelihood that the crown block will transmit significantly greater volumes of water through the mined area than currently move through the unmined ore body.

Post-Mining Conditions

The permit application materials both state and imply that at some point in the future, the mine site will return to its pre-mining condition. It will not. There can be no return to the pre-mining condition. It is true that after mining has ceased and reclamation has been completed, the site will eventually approach a post-mining, post-reclamation, dynamic steady-state condition. However, this post-mining condition will never be the pre-mining condition. The following are but some of the differences that will exist:

- The TMAs will produce a depression in the water table beneath them so long as their liners remain intact. When the TMA liners fail, the topography at the TMA site will be higher and the post-mining ground-water mound will likely be higher than in the pre-mining ground-water mound.

- Once the TMA liners are no longer are effective, the water quality beneath and downgradient of the TMAs will be different post-mining from pre-mining.

- More than 25 million tons of rock will have been permanently removed from the ore bodies, and the tailings that are replaced will have different hydraulic and chemical properties than the pre-mine ore. The magnitude and rate of flow through the volume now occupied by the ore bodies will be different post-mining and pre-mining and the chemistry will also be different. Except for the unique combinations presented by the applicant, those differences would be expected to reflect greater flow rates and increased contact of potentially reactive ground water with mine wastes.

Depending upon the magnitude of these permanent ground-water changes, there may be permanent changes to the surface water systems. It is a disservice to the public to discuss, or to permit to be discussed, the concept of a return to the pre-mining condition. The objective of the EIR should, in part, be to document what the changes are, not to imply that there are no changes.

Present Ground-water Flow through the Bedrock

Bedrock hydrographs, the temperature data and the bedrock water quality show that there is now a significant ground water flux through the ore body and surrounding bedrock. The bedrock water quality data show significantly different water quality at different positions and different depths. The saline, high chloride water that is observed in some wells at depth is what would be expected in a bedrock system with little or no flow or ground-water circulation. Diffusion would quickly equilibrate concentrations in such a system of little or no flow. The persistence of fresh water at depth can be explained best by postulating an active flow system that circulates water from the overlying glacial aquifers at rates readily sufficient to overcome diffusion from the saline water.

The discussions of the nested bedrock hydrographs erroneously interpret a low vertical gradient as indicative of low flow. The flow is the product of the gradient and the hydraulic

conductivity, not solely of one or the other (this is the fundamental relationship described in Darcy's Law). The discussions also overlook the clear seasonal head variations that are observed on some of the deeper hydrographs. These variations show that not only does water move into and from the ore bodies, but it does so on a seasonal basis at a higher rate than envisioned or described in the EIR.

Sequence of Mining Operations

The discussions of the sequencing of use of the TMAs indicates that the ore bodies will be mined sequentially, with the zinc ore being mined first and the copper ore being mined second. The discussions of ore processes appear to confirm the TMA discussions of sequential mining of the two ore types. Sequential mining is inconsistent with the diagrammatic cross-sections which show both ores being mined by the end of four years. It is also inconsistent with the discussions of top-to-bottom mining with water levels being permitted to rise as mining progresses upward, with a single drainage of the total mine. If the ore bodies are mined sequentially, as indicated in the TMA and processing discussions, then the mine will have to be pumped down twice.

The second dewatering will not be dominated by native ground water, as was the first pump-down, but also by leachate drainage from the initial round of tailings disposed in the stopes of the first round of mining. Further, the once-flooded processing wastes will again be subject to oxygen attack both from the mine atmosphere and from the reflooding of the mine with oxygen-bearing water. The second episode of drawdown is a scenario that is not evaluated in either the ground water modeling or in the discussions of the mine-disposed processing wastes as a potential contaminant source term.

Stockpiling of Mined Wastes prior to TMA Construction

The discussion of the initial activity and development of the mine describes how there will be an initial stockpiling of ore and waste rock at the surface. The reason for this is that the first TMA and the ore processing facility will still be under construction. Since these materials will have the potential to form acid rock drainage, they will be stored on lined pads and run-

off will be directed toward a settling basin. The basin is sized to hold a volume of water from a 25-year 24-hour storm event. The EIR says that water from this basin "will either be pumped to the TMA for use in ore processing or to the water treatment plant." Unfortunately, the entire reason for storing these materials on the pads is that the facilities described are still under construction. It does not appear that there is a means of treating the run-off from these stockpiles for the duration of the time that they will exist.

Low Permeability Isolation of the Ore Bodies

The current EIR makes repeated statements emphasizing that there is no documented area where outwash sands are directly in contact with non-saprolitic weathered bedrock. An interpretation of the pumping test for the saprolite is generated using the assumption that there is everywhere a low-permeability barrier between the glacial aquifers and the weathered bedrock. The EIR interpretation emphasizes Rowe's qualitative estimates of the distribution and magnitude of bedrock permeability. The EIR interpretation chooses to overlook another part of Rowe's work, which maps an area where he feels outwash sands are directly in contact with permeable bedrock.

Between the original EIR and the current EIR, the estimated drawdown to individual lakes due to pumping to dewater the proposed mine decreased from feet to inches or less. The current projections of virtually non-existent drawdown in the lakes are from a ground-water model that has been withdrawn for re-parameterization and re-calibration. It is conceivable that, upon rebuilding the model, the current EIR will also project multi-feet drawdowns in nearby lakes. Such a projection is unlikely, however, so long as the current re-modeling considers only the revisionist interpretation of a universally present layer of low conductivity between the shallow and deep systems, and refuses to evaluate the presence of localized contact between the outwash aquifers and the fractured ore body, such as those described by Rowe.

V. Oversights

Laboratory Wastes

The preponderance of wastes in the TMAs will be the fine fraction of the tailings, some 22 million tons. Considerable discussion is devoted to arguing that these wastes will not react sufficiently, or at sufficient rates, to create an environmental hazard. The validity of those arguments will certainly be subject to some dispute. However, in assessing the behavior of the wastes in the TMAs, the potential risks of the wastes that will be generated by the laboratory to be constructed on the site are not evaluated. Although these wastes are relatively a minor component to the waste stream, they are not an insignificant waste stream themselves. Over the course of the life of the mine, the laboratory is projected to produce more than a half million pounds of waste. The composition of such a waste stream should be evaluated, particularly for constituents that are not part of the tailings waste stream, particularly with respect to compatibility with other waste streams and for compatibility with the containment systems.

Sanitary Wastes

Sanitary water from the mine facilities will be circulated to the TMAs and will produce a significant total mass of wastes. Acid rock drainage is primarily produced by oxidation of sulfide minerals. This process can occur inorganically, but the higher rates that produce environmentally damaging conditions frequently result from biological enhancement of the oxidation process. One might normally expect the biological component to be held somewhat in check in the tailings-pond setting due to lack of essential nutrients. However, circulating sanitary water into the TMAs could provide the necessary nutrients for the bacteria, greatly increasing the rates of acid generation. The impact of supplying nutrients should be carefully evaluated for both the active and closed TMAs.

Evaluations of TMA Performance

The performance of the TMA in containing potential contamination was evaluated in part by considering the disintegration of the bottom liner of the TMA. The exercise showed basically no incremental impact with the loss of the bottom liner. This is an example of a hypothetical change selected for evaluation where it can be anticipated that virtually no impact will occur;

it is a meaningless change, as well as an unlikely one. If one assumes that both the top and bottom liners can be constructed to specification, it is absolutely clear that the top liner will fail before the bottom liner. The clay in the bottom liner has virtually no agents except leachate chemistry and cation exchange to act against it, whereas the top liner also has biologic, anthropomorphic, and climatic agents to act against it. A meaningful test would have been to model the TMAs as topless tubs subject to recharge, filling, and overflow. Such testing could evaluate height of the fluid mound, the depth of circulation, the rate of circulation, oxygen transport occurring with circulation, and the composition of the overflow liquid. Fate and transport modeling could then be performed for the ground water under the TMAs after impact from the overflow.

TMA Monitoring

There is a related problem with the monitoring that is proposed for the TMAs. The TMAs are being proposed for construction over the crest of a domal ground-water recharge area. Construction of the impermeable cells there will rob the crest of the recharge area of a portion of its recharge. This is observed in the results of the ground-water model, with a circular closed low on the top of the overall recharge mound. The effect that is created on the water table is a ground-water crater surrounded by a ground-water rim. This rim and crater geometry functions as a lens that focuses all recharge within the area of the rim downward. Any leakage downward from the overlying TMA cells will not migrate laterally away from the cells, but rather will be driven downward by the ground-water gradient pattern created by the cells themselves. The monitoring wells discussed in the EIR would not be able to detect a leak, were one to occur, unless this flow pattern is identified, appreciated and planned for.

Non-mining Deterioration of Ground Water

One of the most serious oversights in the discussions of potential environmental impacts in the EIR is the failure to note that the simple act of drawing down the water table or changing the saturation profile in soils above the water table will create ground-water contamination. Sulfate, total dissolved solids, and metals (particularly arsenic) contamination of ground

water, particularly in forested terrains in humid climates and in areas with recharging wetlands, can be expected solely by creating a ground-water decline.

In areas like the permit area, a strongly reduced zone develops in the soil profile that accumulates sulfur stored as sulfide minerals. Decreasing the water table (or dropping the saturation profile) brings oxygen into contact with these sulfide minerals, essentially producing *in situ* acid drainage. In areas of carbonate-bearing tills (as only some at this site are), the acid is usually quickly neutralized, but in doing so the total dissolved solid content increases, and sulfide-derived metals can remain in solution or in suspension as colloids. Examples of this phenomenon are common around domestic wells and excavations (e.g. landfills) throughout the Midwest. Sulfate levels can exceed both the primary and secondary drinking water standards.

Without spilling a drop of process water and while perfectly containing all tailings waste leachates, CMC can, and likely will, produce significant ground water contamination just by creating the cone of depression. The ground water that would be impacted in this manner feeds the surface water system of lakes and streams as base flow. The contaminated ground water would damage the water quality of these lakes and streams, and ultimately increase the pollutant load to the Wolf River and Lake Michigan.

VI. Ground-Water Model

The current ground-water model is not adequate to provide a foundation for the EIR. More significantly, the changes underway for the model are not going to be adequate to permit it to be used for such a foundation. There have been a sufficient number of criticisms of the ground-water model that it has been withdrawn to be re-parameterized and re-calibrated. There is little need to reiterate the inadequacies that have been described by others. There are, however, problems with the current modeling effort that go beyond the points that have been discussed to date. Unless major, at present undiscussed changes are made to the model,

the redesigned model will still be inadequate.

The model will still have convergence problems and it will still be unduly sensitive to initial conditions. This is because the model violates fundamental physical properties of ground-water flow systems that must be adhered to when constructing a model, and that are ignored in the present (and presumably redefined) model. The equations solved by MODFLOW describe ground-water flow only if the three principle axes of the hydraulic-conductivity tensor are coincident with the orthogonal dimensions of the model. MODFLOW permits a modeler to input deviations from this requirement, but when doing so, one must be prudent. Deviations beyond about 5 degrees generally produce unacceptable, unreliable results. The Crandon model disregards the restriction by wrapping horizontal model layers vertically down one side of the ore bodies and back up the other side. Until these violations are corrected, the model cannot perform properly, nor can the results be relied upon.

There are also ill-conceived boundary conditions that preclude the present model from being able to simulate adequately either the mined condition or the post-mining condition, and quite probably the pre-mining condition. In particular, the full depth of the ore bodies and the mined-out volume are not represented in the model. The post-mining flow through the mine cannot be evaluated if the mined volume, at least, is not represented. None of the discussions about the model to date suggests that these boundary conditions are under consideration for change.

VII. Review and Permitting Process

The process by which this EIR is being constructed is problematic. The process is not one of regulatory review, so much as it is one of consensus negotiations. CMC is not submitting an EIR to the Wisconsin Department of Natural Resources (WDNR) for regulatory approval. Rather, it is co-authoring the EIR with WDNR, through a series of negotiated changes at many, many steps along the way. Once the consensus wordings of the hundreds of

incremental changes have been agreed to, WDNR will be asked to pass regulatory judgement on the project. It is not clear that there is any possibility that approval will be anything but automatic, since some form of consensus will have already been reached on all points.

An example of how this process can warp the results is observable in the recent decision to withdraw the ground-water model. Among the changes that are being considered for the redesigned model is the introduction of an anisotropy (preferred direction of flow) into the horizontal conductivity field. In responding to comments on the existing model and discussing this change, HSI-GeoTrans made the observation that they had always felt an anisotropy was present, but didn't simulate one in deference to WDNR's preferences.

In effect, the model designated by HSI-GeoTrans as the best engineering judgement (BEJ) case, we now discover, was not their best engineering judgement. The BEJ model run is presumably to be used to design the mine pumping requirements, to design the pipeline capacity requirements, to predict the environmental impacts and guide mitigation, and to design and locate the needed monitoring program. This was a model believed by the contractor to be technically flawed. But, it was still presented as the BEJ, apparently because it was believed sellable to WDNR. The finely integrated interactions between WDNR and CMC made it impossible to distinguish with confidence between where CMC and its contractors are providing the best technical effort, and where they are merely providing the technical effort best directed toward meeting approval of WDNR.

Conclusions and Recommendations

Even on the basis of a preliminary review and assessment, the proposed sulfide ore mine near Crandon, Wisconsin cannot be justified under the present EIR. The document is internally inconsistent at numerous, non-trivial points. It contains significant errors on points of technical importance. Discussions of important problems and environmental impacts are omitted. There is not at present a workable ground-water model for the site, and without major changes that are not yet under discussion, there will not be one in the near future.

Baseline data for the critical interactions between the ground- and surface-water systems have simply not been collected. This deficiency is despite a twenty-year history by Exxon or its affiliates at the site and in the permitting process. It is a deficiency that can be eliminated only by instituting the data collection programs, and this is not being done.

Unfortunately, in spite of all the problems that are found with the proposed mine and with the permitting documents, there is every reason to believe that the EIR will be accepted and the permit application will eventually be approved because of the current review process. It is recommended that WDNR be encouraged to move away from a position of co-author and toward a more traditional position of objective regulator.

The present EIR document is so complex and intertwined, that independent third party review and truthing will be difficult without a significant investment of resources and time. However, that review and truthing must be done by someone, and at present it appears WDNR will not be doing it. Until it is done, there will be no effective way to refute misrepresentations or misunderstandings by the applicant, who will be able to always find something, somewhere, in the existing document, to support any desired position, valid or not.

At present it would appear that to develop an adequate understanding of the impacts of the mine, independent ground-water modeling will be required. CMC's contracted model is currently judged to be inadequate, and is undergoing revision. However, criticisms that have surfaced against the model to date do not yet address other critical deficiencies. It is not clear whether the contractor's model will ever be able to adequately access the site impacts. It is clear, however, that the evaluation of the environmental impacts of this proposed project will require adequate, defendable ground-water modeling.

It is equally clear that unless the model is based upon real, site-specific data regarding climate, stream flows, lake levels, and interrelated responses among these environmental indicators, the modeling will be of limited applicability, regardless of the technical competence with which it is done. Years of such data collection may be necessary before the

input to the model is sufficiently defined to provide adequate projections of impacts to the site. This data collection should begin immediately.

MEMORANDUM

Date: February 5, 1998
To: Caryl Terrell, Legislative Coordinator-Sierra Club John Muir Chapter
From: Dave Blouin, Mining committee chair
Re: Revision of Chapter NR 182-Order SW-21-97 (B)

The rule revision is now scheduled for a 2/11/98 hearing by the Senate Ag. and Environment committee. The following is the summary of our concerns about the revised rule as it is currently drafted. The current version of the rule (version B) was passed by the N.R. Board in December after the mining industry domintated-Metallic Mining Council filtered out the public's concerns from the spring hearings. Despite the Department's rhetoric, the rule is no improvement on the existing code.

1) Due in part to the fact that hazardous and toxic waste materials will be placed into the waste dump and mine itself, a 0-foot compliance boundary (same as a new hazardous waste dump under NR 140) should be recommended. While the mining industry is exempt from RCRA, the federal hazardous waste regulations, Wisconsin has the discretion to set stricter standards. The high sulfide wastes hold the potential to produce acid mine drainage for hundreds or even thousands of years. The proposed waste dump near Mole Lake is the largest in state history. For all these reasons, mining wastes should be treated with standards stricter than for other industries, not less strictly. The revised rule retains the 1200-foot "pollution zone" around the mine waste dump and backfilled mine itself. The total area of groundwater legally allowed to be polluted to Maximum Contaminant Levels (MCL) is unchanged by this rule; it left in place special treatment for the mining industry. Note the disparity between mining dumps and other waste facilities under NR 140.22. DNR's justification for the huge disparity rests on the fact that miners must use modeling to predict environmental impacts. This is a rather weak excuse. Miners use modeling because they cause huge ground and surface water impacts above and beyond the impacts caused by the tremendous amounts of wastes created. Moreover, the contaminant modeling used to predict where contaminant plumes will go is extremely unreliable.

2) Not only does the revised rule retain special treatment for miners in the form of the 1200-foot pollution zone, the revision removed the Department's ability to set site-specific groundwater standards in favor of the prescriptive NR 140 standards that are indexed to federal drinking water standards or MCL's. See NR 182.075 (2) (a)(2); this portion of the rule allowed DNR to set more stringent groundwater standards. The DNR must be allowed to exercise discretion and set groundwater standards stricter than the Maximum Contaminant Levels; NR 182.075(2)(a)(2) should be retained. Frankly, I don't understand why DNR would allow itself to be handcuffed this way. From the miner's point of view, this rule has a wonderful inverse ratio; the cleaner the background quality of the receiving groundwater, the more pollution that can be dumped into it.

3) Should the intervention boundary concept be retained, 150 feet from the edge of the wastes (not the edge of the impoundment), must be the maximum allowed. Additionally, amended NR 182.08 (2)(e)9, now requires the applicant for a mining permit to demonstrate why it is not technically and economically feasible to achieve the preventive action limit at the edge of the 1200-foot pollution zone, if the predictive modeling shows that this problem is likely. This requirement should be removed in favor of language requiring an applicant to change its design plans to ensure that this problem does not take place.

4) The revised rule should be amended to require that the miner's wastewater and sludge storage and treatment ponds be subject to NR 140.22 (3)(d) as other industrial ponds are. The revised rule gives the miners more special treatment by failing to apply the NR 140 requirements of a 100-foot Design Management zone to mine site wastewater ponds and instead leaves in place the existing 150-foot zone from NR 182.075. This loophole is retained in the revision despite the claim that this rule revision brings mining under the same rules as other industry.

5) The contingency plan described in NR 182.075(1s)(a) should be required to be submitted with the Feasibility Report/Plan of Operation as described in NR 182.08. The adequacy of any contingency plan must be reviewed as early in the process as possible.

6) The revised rule should now be reprinted with the changes handed down by the metallic mining council and sent back out to public hearing. The mining industry-dominated advisory council, with DNR assistance, amended the rule significantly after the rule went to public hearing. The rule should have gone out for public hearing before the NR Board took it up in December. Instead, the rule was revised, passed quickly over our strong objections, and falsely advertised as making the mining industry live up to the same standards as others. Nothing like a little DNR double speak to liven things up.

lished by the department at each facility, practice or activity under sub. (3).

(d) Every point at which groundwater is monitored to determine if a preventive action limit or enforcement standard has been attained or exceeded for sites identified under s. NR 140.22 (2) (c).

(2) COMPLIANCE. (a) The point of standards application to determine if a preventive action limit has been attained or exceeded is any point at which groundwater is monitored.

(b) The point of standards application to determine whether an enforcement standard has been attained or exceeded shall be the following locations:

1. Any point of present groundwater use;

2. Any point beyond the boundary of the property on which the facility, practice or activity is located;

3. Any point within the property boundaries beyond the 3 dimensional design management zone if one is established by the department at each facility, practice or activity under sub. (3).

Note: The boundary beyond which the enforcement standards apply is the closer of the property boundary or the design management zone boundary to the waste boundary for the facility, practice or activity.

(c) For discharges, releases, sites or facilities regulated under s. 144.76, 144.442, 144.64 (2m) or 144.735, Stats., or s. NR 600.07, for which a design management zone has not been established in sub. (3), Table 4, the point of standards application shall be every point at which groundwater is monitored to determine if a preventive action limit or enforcement standard has been attained or exceeded.

(3) DESIGN MANAGEMENT ZONE. (a) The design management zone for facilities, practices or activities subject to regulation by the department shall be an area enclosed by vertical boundaries which extend from the land surface downward through all saturated geological formations. The design management zone shall extend horizontally beyond the waste boundary to the distance indicated in Table 4 for the specific type of facility, practice or activity. The waste boundary shall be the outermost limit at which waste from a facility, practice or activity has been stored, applied or disposed of, or permitted or approved for storage, application or disposal. For hazardous waste facilities regulated under ss. 144.60 to 144.74, Stats., the waste boundary shall include the horizontal space taken up by any liner, dike or other barrier to contain waste.

(b) In issuing or reissuing a permit, license or approval, the department may consider an expansion or reduction of the design management zone at a regulated or proposed facility, practice or activity by a horizontal distance not to exceed 50% of the distance listed in Table 4.

(c) The department shall consider the following factors in determining whether to expand or reduce the design management zone:

1. Nature, thickness and permeability of unconsolidated materials, including topography;

2. Nature and permeability of bedrock;

3. Groundwater depth, flow direction and velocity;

4. Waste volume, waste type and characteristics, including waste loading;

5. Contaminant mobility;

6. Distances to property boundary and surface waters;

7. Engineering design of the facility, practice or activity;

8. Life span of the facility, practice or activity;

9. Present and anticipated uses of land and groundwater; and

10. Potential abatement options if an enforcement standard is exceeded.

(d) The design management zone may not be expanded or reduced unless it has been demonstrated to the satisfaction of the department that the preventive action limits and enforcement standards will be met at the adjusted design management zone. The design management zone may not be expanded unless it has been demonstrated to the satisfaction of the department that the preventive action limits and enforcement standards cannot be met at the design management zone specified in Table 4.

Table 4

Type of Facility, Practice or Activity	*Horizontal Distances for the Design Management Zone*
Land disposal systems regulated under ch. 144 or 147, Stats.	250 feet
Wastewater and sludge storage or treatment lagoons regulated under ch. 144 or 147, Stats.	100 feet
Solid waste disposal facilities regulated under ss. 144.43 to 144.47, Stats., which have feasibility reports approved after October 1, 1985.	150 feet
All other solid waste disposal facilities regulated under ss. 144.43 to 144.47, Stats.	300 feet
Hazardous waste disposal facilities, waste piles, landfills and surface impoundments subject to regulation under s. NR 635.16	300 feet
Hazardous waste disposal facilities, waste piles, landfills and surface impoundments subject to regulation under ss. NR 635.05 to 635.15.	0 feet

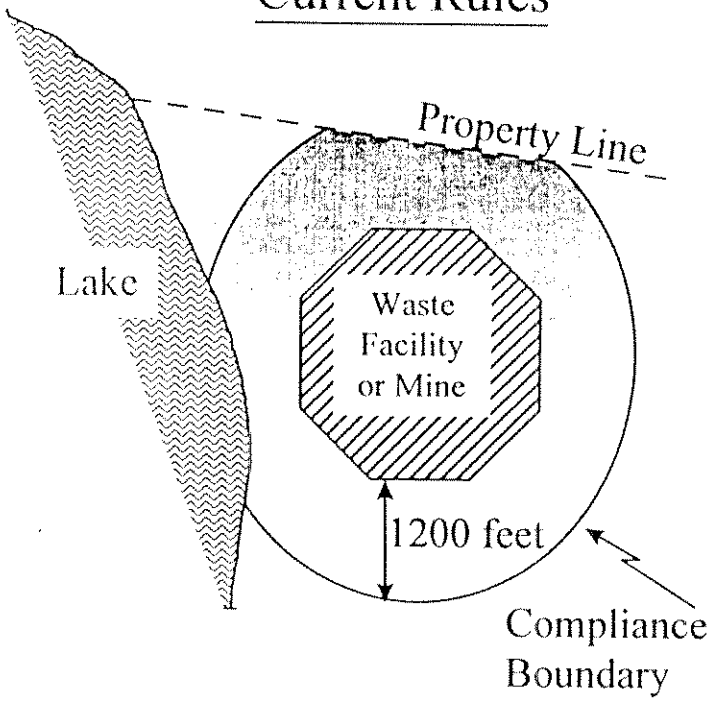
History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (1) (b), Register, October, 1988, No. 394, eff. 11-1-88; am. (4) and table 4, Register, January, 1992, No. 433, eff. 2-1-92; am. (1), cr. (1) (d), renum. (2) to (5) to be (2) (a), (b), (c) and (3) and am. (2) (b) 3., Register, March, 1994, No. 459, eff. 4-1-94.

NR 140.24 Responses when a preventive action limit is attained or exceeded. (1) NOTIFICATION AND ASSESSMENT. If the concentration of a substance, including indicator parameters, in groundwater attains or exceeds a preventive action limit at a point of standards application as described in s. NR 140.22 (2):

(a) The owner or operator of the facility, practice or activity shall notify the department in writing when monitoring data is submitted that a preventive action limit has been attained or exceeded in accordance with any deadlines in applicable statutes, rules, permits or plan approvals. Where no deadlines are imposed, the owner or operator shall notify the department as soon as practical after the results are received. When the results of any private well sampling exceed a preventive action limit, the owner

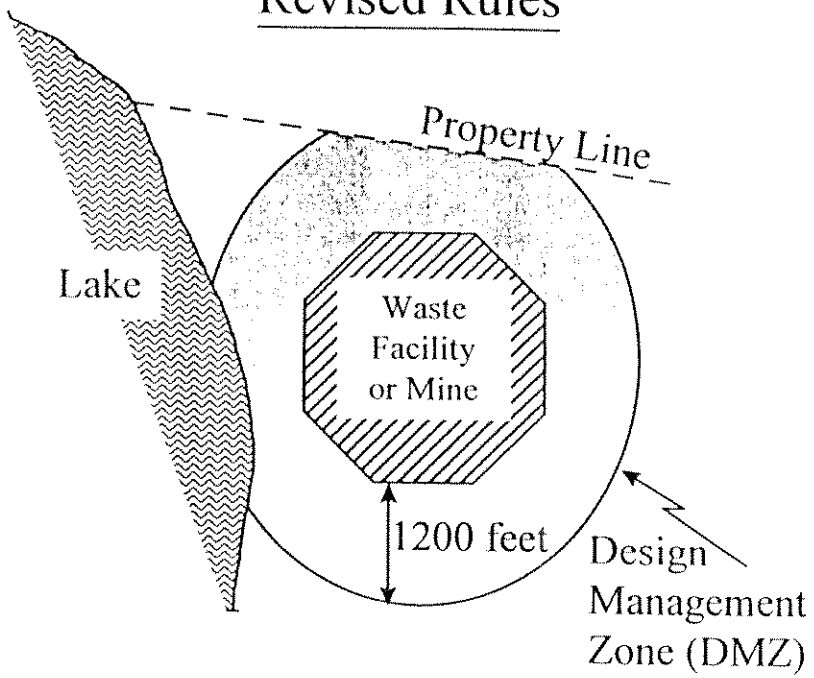
Groundwater Permitting Criteria for Mines and Mining Waste Facilities

Current Rules



Applicant must demonstrate ability to comply with MCLs at the Compliance Boundary.

Revised Rules



Applicant must demonstrate ability to comply with PALs at the DMZ, unless it is not technically or economically feasible. If a PAL exemption is requested, the applicant must demonstrate compliance with the ES at the DMZ.

Maximum Contaminant Level (MCL) ≈ Enforcement Standard (ES)

Preventive Action Limit (PAL) = 10-50% of ES, depending on nature of risk

UW sociologist a doubter on mine

Sees boom-and-bust future at Crandon

By Ron Seely
Environment reporter

The Crandon Mining Co. has emphasized the boom and downplayed the bust that may accompany the construction of an underground zinc and copper mine in northeastern Wisconsin, according to a UW-Madison sociologist.

Bill Freudenberg, a professor in the rural sociology department, takes exception to the rosy economic picture drawn by Crandon Mining Co. in a report he will present to the state Department of Natural Resources later this month. The DNR contracted with Freudenberg and other UW-Madison researchers to evaluate the economic impacts of the proposed mine.

"If I were in their shoes — that is the people of Crandon — I wouldn't believe the numbers coming from Crandon Mining Co.'s predictions," Freudenberg said Tuesday.

Freudenberg said he collected more than 200 studies of mining towns and found that most of the studies showed few long-term economic benefits from mines.

"There were more findings of bad things happening than good," Freudenberg said. "There were way more studies where there were findings of increases in unemployment . . . The news is not always as good as you might hope."

In a report it provided the DNR as part of its permit application, Crandon Mining Co. said the mine will bring 720 long-term mining and mine-related jobs to Forest, Oneida and Langlade counties. In addition, the company said local communities stand to gain about $72 million in tax payments from the mine as well as $43 million that will be spent for goods and services during the three years of construction. An average of $1.2 million more will be spent each year during the mine's 28 years of operation, the company estimated.

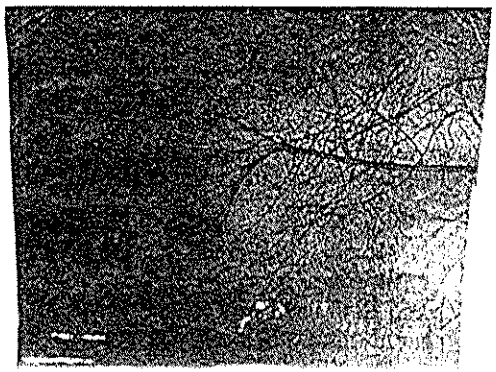
But Freudenberg said the company's analysis fails to consider the volatility of the world-wide market for zinc and copper, the primary minerals expected to be mined. He cited zinc prices as an example. Zinc, he said was 30 cents per pound in January of 1986, 90 cents per pound in January 1989 and 50 cents per pound in the middle of 1991.

"That kind of volatility is more the rule than the exception," Freudenberg said.

As a result, Freudenberg said operation of the proposed mine is likely to fluctuate or "flicker" depending on the price of zinc and copper. He said that when the market is good, the mine will be operating and when the market is down, the mine will close or slow down and miners will be out of work. That, he said, is the case with other mines he has studied.

Please see MINE, Page 2

ved to be cause



most population or neighbor-
ds, haven't received funds re-
tly, meet needs in the Park and
n Space Plan, or serve the eld-
, disabled and minorities.

en house set for
nmuter rail study

n open house regarding the
e County commuter rail feasi-
y study is scheduled from 5 to
m. Thursday at the Dane
ty Exposition Center.
he study will examine poten-
outes, ridership and costs of a
nuter rail system.

BRIEF

NDERSON, Russell, 11 a.m., Olson-
ter-Cress Funeral Home, Stoughton.
JTSCH, Steffi, 3 p.m., Cress Funeral
3610 Speedway Road.
VERS, Gladys M., 1 p.m., Gardens of
Rest
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electronically stored court records were rejected unanimously Tuesday by the Wisconsin Supreme Court.

James Friedman, an attorney representing the Wisconsin Newspaper Association, the Wisconsin Broadcasters Association and the Freedom of Information Council, told the court the changes proposed by lower court officials would weaken the state open records law.

The proposed changes included blocking public access to records

Mine

Continued from Page 1B

over the past 20 years.

"When the mine is operating, those are the best paying jobs around," Freudenberg said. "But the problem is that often the mine isn't operating."

Don Moe, technical and permitting manager for Crandon Mining Co., disagreed with Freudenberg's analysis and said the company did consider the volatility of the market in its economic forecasts.

Moe said the company did forecasts for a range of metal prices and then used an average employment figure over the anticipated 28-year life of the mine. The company estimated that employment will peak at the height of construction and then level off to an average of 402 employees during the 28 years of operation, Moe said.

Moe added that the company doesn't anticipate shutting down during times of low mineral prices, as Freudenberg suggested. Instead, Moe said, the mine is being designed to operate so efficiently that it will be able to stay open during those down times.

"This is being designed as a low-cost operation," Moe said. "That way we can continue operating even with a depressed mineral market. That's not done at a lot of other operations."

The proposal, unlike the open records law, would have prohibited public access to electronic records that identify witnesses who

WISCONSIN

MILWAUKEE JOURNAL SENTINEL — STATE EDITION

Geologist says firm plays down mine risks

Crandon Mining Co. report criticized as just 'a promotional vehicle'

By Don Behm
of the Journal Sentinel staff

Madison — The Crandon Mining Co. misled the public and state environmental regulators by underestimating the environmental effects of its proposed underground zinc and copper mine in Forest County, a Colorado geologist said Thursday at the state Capitol.

Charles Norris, president of Geo-Hydro Inc., described the mining company's environmental impact report filed with the state as "a promotional vehicle" that does not adequately describe the potential effects.

The consulting firm was hired by the Chicago-based Environmental Law and Policy Center of the Midwest to review the mining company's report. A summary of the geologist's comments, but no technical support documents, was released Thursday at a news conference.

The release was timed to influence next week's state Assembly vote on a proposed metal-ore mining moratorium bill, said Carl Zichella, Midwest regional director of the Sierra Club.

"Exxon's analysis is lean on fact and long on speculation," Zichella said. "According to them, no matter what they do nothing bad will happen to our drinking water, lakes, rivers and wetlands. It's preposterous."

At the news conference, Norris said that it might be possible to design an environmentally safe mine at that location.

"But you can't assess this proposed mine's impact with the report that exists today," he said.

A mining company official challenged Norris to submit his complete analysis to the state Department of Natural Resources for peer review.

"These are his opinions after reading our report, which is in progress," said Don Moe, technical and permitting manager for the company. "And his assessment should be made to stand up to the same scrutiny as our analysis."

Crandon Mining Co. is seeking state and federal permits to excavate 55 million tons of zinc and copper ore from a deposit 5 miles south

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From page 1

of Crandon and 2 miles east of the Mole Lake Chippewa Reservation. The company is a Wisconsin partnership formed by Exxon Coal and Minerals Co., of Houston, and Rio Algom Ltd., of Toronto.

Norris based much of his analysis on the company's initial ground-water flow report, which was withdrawn last year following DNR criticisms. He acknowledged the company had agreed to revise this critical piece of the impact report but said the new ground-water analysis would again be inadequate.

Moe responded that the DNR already had forced basic changes in the ground-water study and that the revised analysis would not be completed until later this month.

Under the proposed mining moratorium bill, the DNR could not approve permits for a metal-ore mine unless the agency could meet two criteria: one, that a mine in a similar ore body had operated for 10 years without polluting the environment; two, that a mine in a similar ore body had been closed for at least 10 years without polluting the environment. The Senate passed the bill last year.

Mining opponents urged legislators to include the reference to a similar ore body in the bill because the Crandon Mining Co. proposes to mine a sulfide ore body. Sulfuric acid would be created when waste rock is exposed to oxygen in air or water.

Opponents fear the acid could seep into ground water and contaminate streams and lakes.

The company, however, says it has proposed several measures to prevent the acid from forming. For one, it would add limestone, a buffering compound, to the waste rock.

FRIDAY, January 16, 1998

DANE COUNTY'S AFTERNOON NEWSPAPER

The Capital Times

MADISON, WISCONSIN HOME FINAL THURSDAY, JANUARY 15, 1998

Report by mine company blasted

By Matt Pommer
The Capital Times

A hydrogeologist today labeled as "misleading, internally inconsistent and contradictory" an environmental impact report prepared by the Crandon Mining Co.

The firm is seeking state permits to operate a large zinc and copper sulfide mine near Crandon.

Next week the Assembly will take up a Senate-passed mining moratorium bill that would at least slow development of the mine.

The new criticism was issued today by Charles Norris of Denver, who had been retained by critics of the proposed mine. Norris said while the firm's impact report should reflect its bias, "it should be a legitimate attempt to assess the likely impacts of the project."

"It is not. It is a promotional vehicle that shuns critical investigations, obfuscates the assessment of data that is available, and stretches credulity in its conclusions. It is also frequently wrong," said Norris.

He made his statement and issued an 18-page report this morning at a news conference at the State Capitol. Also participating were officers of the Sierra Club and the Environmental Law Policy Foundation, and former state Senate Majority Leader Joe Strohl, who represented the Menominee Nation.

"As it exists today, the EIR assesses virtually zero impact," Norris said, in contrast to what he said would be the reality.

"Hundreds of people will descend upon

See MINE, Back Page

Mine

Continued from Page 1A

the woods and wetlands near Rice and Mole lakes, undertake major engineering and construction, excavate, digest, transport and/or dispose of 55 million tons of bedrock, export billions of gallons of water, and, after the better part of three decades, dismantle facilities and leave," Norris said.

"At the height of this activity, the EIR predicts negligible, almost unmeasurable, impacts. When all is said and done, the EIR predicts no residual impacts."

Carl Zichella, Midwest director of the Sierra Club, said Norris' comments reinforce the need for Assembly approval of the mining moratorium bill.

That measure would require proof that such a mine has operated successfully for 20 years without environmental damage.

Zichella said the new report "shows that Exxon," a partner with Rio Algom in the Crandon Mining Co., "is coddling the books and the DNR is not being as tough on them as they should be."

Opposition to Clearinghouse Rule 97-057
NR 182, Groundwater Rule for Metallic Mining
Feb. 11, 1998
by Caryl Terrell, Legislative Coordinator, John Muir Chapter-Sierra Club

1. Why rule and such strong public concern?
-petition by legislators to evaluate how groundwater quality is regulated at mining sites.
-public concerns about drawdown, chemical transport and extensive pollution zone/DMZ
-handout -- diagram from DNR rule package -- large area in DMZ/pollution zone and no real change from existing rule, just name changes

2. Wisconsin's Groundwater Protection Act is very clear. Note sentence deleted by proposed rule at "NR 182.075 (1) Groundwater Quality. The policy of the state of Wisconsin is to prevent degradation of natural groundwater quality. Recognizing that some human activities have and will impact groundwater, the state management practices must maximize protection of this resources by minimizing those impacts. All land disposal sites...."
This rule does not protect groundwater.

3. This rule does not treat mining facilities in a manner similar to other industries. Read from NR 140.23 (3) Design Management Zone Table 4 (handout) [300 ft grandfathered landfills, 150 ft DMZ for new solid waste landfills; 300 ft for grandfathered hazardous waste facilities; zero ft DMZ for new hazardous waste facitilies] This rule should be equivalent to regulations for new hazardous waste facilities, i.e. zero ft. DMZ

4. Why does DNR say they need the 1200 ft DMZ? For Groundwater Modeling with its conservative assumptions. Modeling is a tool. Modeling is not a silver bullet. The DNR still has not accepted the company's groundwater model. If the model is flawed, garbage in, garbage out. The Sierra Club hired Chuck Norris of Geo-Hyrdo, Inc. of Denver CO to review the company's groundwater model. His initial report found many problems with assumptions in the model and concluded that significantly more water would pass through the site than the model predicted.
This rule places all groundwater protection in one basket--modeling. We can do better than that. Monitoring at the edge of the waste and edge of the facility will provide valuable information to protect groundwater. DNR should use modeling and monitoring.

5. It is also important when the decision on DMZ size is made.
(a) We are discussing this rule in the abstract and trying to come up with a uniform rule. But every mine site is different and the Wolf River Crandon mine site is very unique.
(b) The proposed rule also restricts to a new 50% cap on the amount of DMZ size reduction the Department is allowed to consider.
Please remember that the existing rule provides that this decision about DMZ and monitoring is made during the Master Hearing when there is a wealth of information specific to the mine site and given under oath and subject to cross-examination. This rule limits the range of decisions that the most knowledgeable person with decision-making authority--the administrative law judge--can make.

The proposed rule takes several steps backward. We urge this committee to reject this rule or alternatively direct DNR to make the following changes: make DMZ zero feet (the same as other new hazardous waste facilities) and remove the waiver provision.

[illegible] this package to John [illegible]

Th you, Cindy

Romanski, Randy
From: Knutson, Tryg
Sent: Wednesday, February 25, 1998 6:01 PM
To: Romanski, Randy
Subject: FW: Groundwater Rules Changes

Thought you'd enjoy hearing from Ted....----------
From: Ted Miner(SMTP:miner@spacestar.com)
Sent: Wednesday, February 25, 1998 1:25 PM
To: Sen.Clausing
Cc: Mining Folks
Subject: Fw: Groundwater Rules Changes

I have just received the following e-mail. I am concerned with the current exemptions for the mining industry. I hope you will push to make them as responsible as any other citizen or organization.

Thank you for your help!

-----Original Message-----
From: ResEnergy@aol.com <ResEnergy@aol.com>
To: belgoff@cuttingedge.net <belgoff@cuttingedge.net>; Dowat.Kim@mayo.edu <Dowat.Kim@mayo.edu>; wisc-eco@igc.org <wisc-eco@igc.org>; wfantle@eau.net <wfantle@eau.net>; stargal@spacestar.net <stargal@spacestar.net>; gedicks@mail.uwlax.edu <gedicks@mail.uwlax.edu>; jkariger@cuttingedge.net <jkariger@cuttingedge.net>; miner@spacestar.net <miner@spacestar.net>; Sen.Moen@legis.state.wi.us <Sen.Moen@legis.state.wi.us>; michele@shopperstopper.com <michele@shopperstopper.com>; lpaloski@hotmail.com <lpaloski@hotmail.com>; Steve.Perala@legis.state.wi.us <Steve.Perala@legis.state.wi.us>; ecowise@mail.newnorth.net <ecowise@mail.newnorth.net>; decade@itis.com <decade@itis.com>; Goblinfern@aol.com <Goblinfern@aol.com>
Date: Tuesday, February 24, 1998 5:08 PM
Subject: Groundwater Rules Changes

Mining Groundwater Rules Revisions
Now Before Senate and Assembly
Environmental Resources Committees

While most of Wisconsin has been focusing on the progress of the Mining Moratorium Bill, the Metallic Mining Council and the Natural Resources Board
has introduced major modifications of the metallic mining groundwater rules which fail to bring the mining industry standards in line with those of other
industries and do not provide adequate protection of our natural resources. Whether these rules become the law of the land is in the hands of four Senators: Alice Clausing (D) Menomonie, Alan Lasee (R) De Pere, Robert Wirch
(D) Kenosha and David Zien (R) Eau Claire and the Senate Environment Committee
Chaired by Marc Duff. Unless three of these four Senators or a majority of the

members of the Assembly committee reject these rules changes in the next couple of weeks and send them back to the Natural Resources Board, our state's already compromised groundwater rules will be further eroded. There will be no opportunity to debate these measures on the floor of either the Senate or the Assembly. This is our last shot at amending these rules changes!

The following is a outline of some of the problems with these rules changes:

The radically revised changes in Ch. NR 182 are a reaction to the testimony presented at the May 1997 hearings that overwhelmingly declared that the renamed 1,200 foot compliance boundary (now called the "Design Management Zone") was insufficient and insisted that mine waste facilities meet the same environmental requirements as landfills and other hazardous storage facilities; namely the application of strict groundwater standards at either a 150 foot or, preferably, a zero clearance testing limit.

The rules change, drafted by the mining company-dominated Metallic Mining Council and approved by the Natural Resources Board without revision, has no resemblance to the original rules offered for public comment and do not reflect any of the suggestions made at the public hearings.

Communities directly and immediately effected by these rules changes were not informed of Natural Resource Board actions despite having requested to be so informed.

It is untrue that these rules changes bring mining groundwater quality standards into compliance with all other industries and landfill regulations.

The proposed standards are, in fact, at least eight times as lax with regard to where groundwater standards are imposed and even this criteria is far from mandatory. If one considers the area or volume of soil and groundwater which may be contaminated, this differential is even much greater. The proposed revision leaves the 1,200 foot DMZ (not the requested 150 foot boundary) in place as where groundwater standards are applied and significant groundwater pollution cannot occur.

Simply changing the computer model of groundwater migration meets the DNR requirements for mandatory remedial action. NR 182.075(1s)(b)2 states:

If subsequent monitoring results are consistent with updated predictive modeling projections indicate that the groundwater standards will not be attained or exceeded at the design management zone, the department may determine that no additional response is necessary.

Present state-of-the-art technology cannot accurately predict when acid mine drainage will occur or how it will migrate:

Mine-rock piles are complex hydrogeologic systems. As a result, the current

knowledge of their physical and chemical hydrogeology is too limited to permit
accurate predictions of water chemistry through time based on detailed simulations of their internal processes. *1

The DNR claims they need a 1,200 ft DMZ for their computer model to work despite the fact that there is no evidence to indicate that is so. There is
also no reason why this same 1,200 foot boundary must be maintained for enforcement purposes.

There is no adequate criteria for how long are these water samples are to be
monitored after the mine closes. Proposed creation of an irrevocable trust with a minimal per-ton contribution from the mining companies is a good start,
but it does shift the burden of long-term care to the State. The tailings will not self-neutralize or become inert; they have no half-life. As long as
the containment facility exists, the potential for the system to fail allowing
oxygen and water to reach the tailings persists. Do we really grasp the meaning of the concept "perpetual responsibility?"

NR 182.08 (2)(e)9 allows the mining company to continue operations despite
obvious groundwater pollution if it can show that "..it is not technically and
economically feasible to achieve the preventative action limit."

Where does this 150 foot boundary start? At the border of the 220 acre actual waste pile, at the 350 acre border or some other arbitrary "facilities
border?" Why should there be any unmonitored zone?

The EPA is seriously considering revoking the Bevill Amendment wherein they
granted the mining industry an exemption from classification as "Toxic Wastes"
despite the fact that chemically and physically they often meet that criteria.
*2 A toxic waste facility has a zero clearance standard for exceeding of groundwater standards and has no exemption for economic or technical unfeasibility.

The draft environmental impact statement for the Flambeau mine states: The monitoring plan for groundwater quality includes 3 locations during long-
term care period. No monitoring within the backfilled pit is proposed. This
density of sampling points may not detect unexpected problems with facilities'
performance or migration of contaminants into the groundwater...Monitoring within the backfill would provide data on the chemical reactions within the pit and on flow of groundwater over and through the backfill. This information may be necessary to determine if any unexpected releases of contaminants from the pit are occurring *3

Although the DNR may require such further testing at any particular mine, they chose not to do so in the case of the Flambeau Mine, and it is the responsibility of our elected officials to craft rules requiring

protections
to adequate standards. The only justification for not proposing more stringent standards is that the mining company and the DNR don't want to know
when the system is failing?
These are purely cosmetic rules change were crafted by the DNR in close coordination with the mining companies and unanimously passed by the Natural
Resources Board despite the obvious lack of popular support, opportunity for
public input and adequate concern for safeguards for our groundwater. Both the
Assembly and Senate Agriculture and Environment Committees should reject these
rules changes and demand that the DNR fulfill their responsibility to protect
our resources with meaningful safeguards and truly bring mining water quality
standards at least in line with waste lagoons and municipal waste facilities.

1 Assessing the Risk of ARD and An Empirical Technique for Predicting the Chemistry of Water Seeping From Mine-Rock Piles, The International Land Reclamation and Mine Drainage Conference and Third International Conference on
the Abatement of Acidic Drainage 1994

2 Risks Posed by Bevill Wastes, Environmental Protection Agency 1997.

3 Draft Environmental Impact Statement Flambeau Mining Inc.—Copper Mine Ladysmith, Wisconsin, September 1989, p71.

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