



[Letter to Exxon Minerals Company about groundwater standards, compliance boundaries, and contingency Plans for the Crandon Project, Forest County]. April 29, 1986

Wible, Lyman F.

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State of Wisconsin

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R. Rauharter
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DEPARTMENT OF NATURAL RESOURCES

Carroll D. Besadny
Secretary

BOX 7921
MADISON, WISCONSIN 53707

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April 29, 1986

IN REPLY REFER TO: 4400

Mr. Barry J. Hansen, Permitting Manager
Exxon Minerals Company
P.O. Box 813
Rhineland, WI 54501

RE: Groundwater Standards, Compliance Boundaries, and Contingency
Plans; Exxon Minerals Company Crandon Project; Forest County

Dear Mr. Hansen:

The purpose of this letter is to transmit the Department's proposed compliance boundaries and groundwater standards to be applied to several facilities in the Exxon Minerals Company Crandon Project. At this time, we believe it is also appropriate to convey the Department's proposed intervention boundaries and to request additional detail on facility contingency plans.

Pursuant to s. NR 182.075(1), the Department is required to propose compliance boundaries and associated groundwater standards for facilities regulated under NR 182 no later than 180 days prior to the hearing required under s. 144.836, Stats. Additionally, NR 132.17(9) requires that "any mine site permitted pursuant to this chapter shall be designed, constructed, maintained, operated and reclaimed in such a manner so as to protect groundwater quality and quantity in accordance with the standards of NR 182." By definition, a mine site includes all facilities associated with the mining operation. Mining projects have been exempted from regulation under NR 140. Thus, all facilities associated with this project must address the groundwater protection requirements of NR 182.075. For this project, this includes the mine, the mill, the Mine Refuse Disposal Facility (MRDF), and the Reclaim Ponds, as well as the Mine Waste Disposal Facility (MWDF).

This letter will address groundwater standards requirements for all of these facilities. For specific details applicable to each facility, you should contact the appropriate Department unit directly. For the MWDF and the MRDF, this is the Residuals Management and Land Disposal Section. For the mine and mill, this is the Mine Reclamation Section. For the Reclaim Ponds, this is the Industrial Wastewater Section.

A few definitions should be cleared up before addressing the specifics of NR 182.075.

Specific references in NR 182.075 are to a mining waste site. When discussing the application of NR 182.075 to another facility (i.e., the MRDF, for example), any reference to or requirement of a mining waste site, waste site, site, etc. should be taken to apply to the specific facility being analyzed.

The fill area or limits of waste filling will be the crest of the interior lined sideslopes of the MWDF, MRDF, and Reclaim Ponds.

The outer perimeter will be the exterior toe of confining dikes around the MWDF, the MRDF and the Reclaim Ponds, not including perimeter roads or fences. Since much of the perimeter of the Reclaim Ponds is defined in these locations by cuts into natural ground surfaces, the outer perimeter will also be defined by the crest of the cut sideslope. The outer perimeter of the mine will be taken to be the vertical projection to ground surface of the widest extent of all mine workings, including openings which extend beyond the orebody proper. The mine and associated workings will be treated as a single unit, as it is not practical to separately address the individual components such as shafts, galleries, sumps, and backfilled stopes. The mill will also be treated as a single unit for the same reason. The mill outer perimeter will be taken to coincide with the limits of construction, excluding any extensions along the access road, railroad, haul road, explosives storage bunker, or ventilation raise corridors.

Groundwater Quality Standards

A single list of groundwater quality standards will be applied to all project facilities. Code sections relevant to groundwater standards and parameters are:

1. NR 182.075(1)(a)1. requires, at no less than 180 days prior to the master hearing, that the Department identify groundwater quality standards for substances reasonably expected to have an adverse impact on groundwater quality due to the facility operations.
2. NR 182.075(1)(a)2.a. establishes use of primary and secondary maximum contaminant levels (MCL's) and establishes procedures for setting standards more stringent than MCL's.
3. NR 182.075(1)(a)2.b. establishes use of the existing groundwater baseline concentrations where it exceeds published MCL's.
4. NR 182.075(1)(a)2.c. provides for standards for substances which are toxic to humans, but which have not been promulgated as MCL's.
5. NR 182.075(1)(a)2.d. provides for standards for other substances as needed for groundwater standards.

6. NR 182.075(1)(a)3. establishes use of an operational monitoring program for developing standards in the future if the monitoring program identifies other substances to be of concern.

The waste characterization data and mill process descriptions contained in various project documents provide sufficient basis for proposing groundwater quality standards and indicate what substances are likely to have groundwater effects. Future research may show that items used in comparatively minor volumes and which may end up in the MWDF, MRDF, mine, etc. may have groundwater effects of concern. Consequently, even though no monitoring may be presently required for some parameters for which standards are identified, you should be aware that the Department reserves the right to require environmental monitoring as it believes necessary during the baseline phase or during the construction, operation and closure phases of the project. Furthermore, the Department reserves the right to evaluate the specific groundwater quality standards that may be applied to new facilities or revised designs of existing facilities on this project.

Groundwater standards for pesticides listed as MCL's and for radioactive parameters will be established, to be consistent with NR 140.10. The Department recognizes that these particular substances will not likely be of concern on this project and may not require monitoring for them beyond the baseline monitoring required in NR 182.075(1)(d)5. Other parameters not listed as MCL's but which do have toxicity effects are included due to their possible future presence as a consequence of spills, processing leaks, or reagent or chemical decomposition effects.

Existing information indicates that there is no need to alter any potential groundwater standards due to high background levels (NR 182.075(1)(a)2.b). Nor will any non-MCL non-toxic substances be listed as part of proposed groundwater standards at this time (NR 182.075(1)(a)2.d).

We wish to emphasize that definition of a list of substances as groundwater standards for this project does not limit the Department's intention to use physical measurements, such as water levels, gradients and volumes, and analyses for indicator or other trace substances to evaluate project facility performance. A groundwater standards list does not define an effective environmental monitoring program, and site evaluation will include use of lysimeters, headwells, sumps, and leak detection systems as well as direct sampling of groundwater by monitoring wells.

The Department review of the project monitoring program will be addressed in a separate response to the proposed monitoring plan required under NR 132.06(3)(d) and NR 132.11. Additional detail will be contained in the feasibility study and plan of operation approval letters for the MWDF and the MRDF and in the final engineering plan approval letter for the Reclaim Ponds. You should be aware that Exxon Minerals Company will have to formally request an exemption if it does not want to be required to perform analyses for organic chemicals in the baseline monitoring program required in NR 182.075(1)(d)5.

Proposed groundwater standards for this project are identical to the standards applied statewide to all facilities regulated under NR 140. Substances are listed in groups for convenience, due to historical associations or chemical behavior patterns.

<u>Inorganic Primary MCL's</u>	<u>Standard (mg/l)</u>
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium	0.05
Fluoride	2.2
Lead	0.05
Mercury	0.002
Nitrate + Nitrite as N	10.0
Selenium	0.01
Silver	0.05
<u>Secondary MCL's</u>	<u>Standard (mg/l unless noted otherwise)</u>
Chloride	250
Color	15 color units
Copper	1.0
Foaming Agents (MBAS)	0.5
Iron	0.30
Manganese	0.05
Odor	3 (threshold odor #)
Sulfate	250
Total Dissolved Solids (TDS)	500
Zinc	5
<u>Organic Chemical Primary MCL's</u>	<u>Standard (ug/l)</u>
Endrin	0.20
Lindane	0.02
Methoxychlor	100
Toxaphene	0.0007
2,4-Dichlorphenoxyacetic Acid	100
2,4,5-Trichlorphenoxypropionic Acid	10
<u>Radioactivity MCL's</u>	<u>Standard (pCi/l)</u>
Radium ²²⁶ + Radium ²²⁸	5
Gross Alpha Particle Activity	15

<u>Other Toxic Substances</u>	<u>Standard (ug/l)</u>
Aldicarb	10.0
Benzene	0.67
Carbofuran	50.0
Carbon Tetrachloride	5.0
Cyanide	460
1,2-Dibromoethane	0.01
1,2-Dibromo-3-chloropropane (DBCP)	0.05
p-Dichlorobenzene	750
1,2-Dichloroethane	0.50
1,1-Dichloroethylene	0.24
Dinoseb	13
Methylene Chloride	150
Simazine	2150
Tetrachloroethylene	1.0
Toluene	343
1,1,1-Trichloroethane	200
1,1,2-Trichloroethane	0.6
Trichloroethylene	1.8
Vinyl Chloride	0.015
Xylene	620

Compliance Boundaries

Separate compliance boundaries will be established for each facility required to comply with NR 182.075, i.e., the MWDF, the MRDF, the Reclaim Ponds, the mine and the mill. Limits of waste filling and outer perimeters were defined previously. Due to the various facility locations, compliance boundaries will overlap in several instances. Site design and monitoring of each facility will be required to include measures to define the correct source, if groundwater sampling indicates potential violations of groundwater standards.

Code sections relevant to compliance boundary definition are:

1. NR 182.075(1)(a)1. requires that the Department propose a single compliance boundary for each facility no less than 180 days prior to the master hearing associated with the project.
2. NR 182.075(1)(b) defines a maximum compliance boundary distance and criteria which can be used to modify it.

MWDF: The compliance boundary for the MWDF is proposed to be 1200 feet from the outer perimeter of the site. Separate compliance boundaries will not be established for each individual cell, as these are integral subunits of the facility.

The constructed perimeter of the site (i.e., toe of the exterior dike slopes) may vary from the locations in the plans due to the use of shallower side

slopes, disposal of excess soil, modifications for slope stabilization and erosion control, or placement and removal of soil stockpiles, and may be masked by revegetation. The outer perimeter is also not defined in the slope area between the MWDF and the Reclaim Ponds. You should be aware the Exxon will be required to define a configuration for the outer perimeter of the site based on design slopes in the MWDF plan of operation. This configuration will be the standard reference line for defining the compliance boundary regardless of the actual constructed location of the toe of the exterior slopes.

The status of property ownership around the MWDF must be clarified no later than the submittal of the MWDF plan of operation. If non-Exxon property within 1200 feet of the site is not owned or leased by Exxon through the long-term care period, the compliance boundary will be defined by the property line. You should also note that the maximum extent of the compliance boundary west of the site will be limited by the ordinary high water mark of Duck Lake.

MRDF: The compliance boundary for the MRDF is proposed to be 150 feet from the limits of waste filling. This compliance boundary reduction is proposed for the following reasons:

1. The site is located in an area of sandy soils with a moderately deep (greater than 50 feet) unsaturated zone. It will likely take a number of years for contaminants to reach the groundwater table, even in a situation of total site failure. Detection of groundwater effects thus may be delayed until well into the completion of site filling.
2. Leachate characteristics of the landfilled waste will have some differences from MWDF leachate. However, there will be sufficient similarities in the major parameters such that the effects of MWDF and MRDF leachate will not be separable at significant distances from the site (i.e., 1200 feet).
3. Seepage of leachate from the MRDF, in the case of site failure, is likely to be small in relation to flow in the groundwater system. Thus, even total site failure may not result in an enforceable condition at the larger boundary setback.
4. The direction of flow of groundwater below the MRDF is an extension of flow patterns below the MWDF. Thus, at rather short distances, groundwater affected by the MRDF could easily be masked by MWDF seepage, or, alternatively, may imply MWDF failure where none occurs.

This reduced compliance boundary is necessary to assure that the Department has the ability to respond to groundwater contamination in a timely manner. The specific distance is proposed to be 150 feet from the limits of waste filling and was selected in part to be consistent with landfill design management zone dimensions contained in NR 140.22(5)(a).

Reclaim Ponds: The compliance boundary for the Reclaim Ponds is proposed to be 100 feet from the limits of waste filling for the reasons addressed in the

section above for the MRDF. It should be further noted that MWDF leachate quality is expected to be nearly identical to quality of water held in Reclaim Pond Cell B. Thus, evaluation of leakage and preservation of Department regulatory authority close to the site is necessary to assure effective and timely remedial action, should any be necessary. The dimension of 100 feet from the limits of wastefilling was selected in part to be consistent with the design management zone dimensions in NR 140.22(5)(a).

Mine: The compliance boundary for the mine is proposed to be 1200 feet from the outer perimeter of the mine.

Mill: The compliance boundary for the mill is proposed to 100 feet from the mill outer perimeter. The compliance boundary reduction is proposed for the following reasons:

1. The mill is located in an area of sandy soils with a moderately deep (greater than 50 feet) unsaturated zone. This zone will increase in depth during mine dewatering. Detection of groundwater effects or increased concentrations in the unsaturated zone may be difficult, even in cases of uncontrolled facility leakage.
2. The mill will have a number of potential sources of contaminants, including the ore and concentrate storage and thickening areas, vehicle servicing and fueling points, runoff and water storage lagoons, water treatment facilities, and various types of mill equipment. Transport of concentrates, waste rock, fuels, and other materials may result in some spillage on roads and grounds between specifically identified potential contaminant sources. Careless maintenance may allow seepage of contaminants to occur where none would be ordinarily expected.
3. Groundwater flow during mill operation should be toward the mine. However, after site closure, eventual groundwater flow patterns will approach pre-mining conditions. Contaminants contained in the unsaturated zone may enter the groundwater table and migrate away from the site vicinity.

The reduced compliance boundary distance is necessary to ensure Department regulatory control within a reasonable timeframe. Due to the presence of multiple water, sludge, concentrate and backfill facilities on the site, the specific distance of 100 feet was selected in part to be consistent with the lagoon design management zone dimensions in NR 140.22(5)(a).

Intervention Boundaries

Separate intervention boundaries will be established for each facility required to comply with NR 182.075, i.e., the MWDF, the MRDF, the Reclaim Ponds, the mine, and the mill. The code section relevant to intervention boundary definition is NR 182.075(1)(c)3., which requires that the Department establish such a boundary between the outer perimeter of a facility and its compliance boundary.

It should be noted that several code sections refer to intervention but tie it to environmental monitoring data and predictions of future effects at the compliance boundary. No specific function is assigned in the code to the intervention boundary itself.

At this time, the Department is proposing to establish the intervention boundary at the outer perimeter of each facility. The Department further proposes to require formal evaluation of facility performance, including use of data from all lysimeters, leak detection devices, wells and well nests, and construction and operational records at such time as an exceedance (measured or interpolated) of a groundwater quality standard occurs at the intervention boundary. Should this evaluation result in a prediction of a future violation of the groundwater standards at the compliance boundary, a remedial action plan will be required to be developed and implemented.

Contingency Plans

A contingency plan has to be defined by the applicant for each facility required to comply with NR 182.075. Code sections relevant to contingency plans include:

1. NR 182.075(1)(c)1. requires that an applicant submit a contingency plan at the master hearing which specifies remedial actions and intervention in response to groundwater data.
2. NR 182.075(1)(c)2. and NR 182.075(1)(d)3. requires intervention in the event of environmental monitoring evidence which indicates present or future violations of groundwater standards at the compliance boundary.
3. NR 182.08(2)(f) requires development of a contingency plan to "prevent or minimize human health or environmental damage in the event of an accidental or emergency discharge or other condition not anticipated in the feasibility report which does not comply with the license conditions or other applicable standards".
4. NR 182.09(2)(d) requires that a more detailed contingency plan be included in the plan of operation that is based on the feasibility report information and includes reference to use of spill plans, emergency responses, and reporting requirements.
5. NR 182.13(2)(g) requires notification of the Department, analyses of data and situations, and implementation of the contingency plan as necessary, if analysis of groundwater samples indicates change in quality significantly different from either baseline or background.
6. NR 182.14(2)(a) and (b) require that a facility owner comply with certain notification requirements upon responding to any action addressed by a contingency plan.

All project facilities shall address items 1 through 4 above. The MRDF and the MWDF can address 3 and 4 separately, as both are required to submit both a feasibility study and a plan of operation. Other facilities shall address item 4 directly in accordance with NR 182.075(1)(d)3., since they lack the feasibility study requirement. Items 5 and 6 pertain only to the MWDF, although they could easily be applied to all facilities due to the general nature of their contents.

Exxon is required to develop contingency plans for the MWDF, the MRDF, the Reclaim Ponds, the mine and the mill. To date, such a plan has only been developed for the MWDF, although several aspects applicable to several other facilities have been addressed for other purposes in the mine plan risk assessment. The contingency plan for the MWDF should be revised and contingency plans for the other facilities developed in accordance with the following guidelines. The contingency plans should address short-term and long-term events.

Short-term events can be categorized as spills, accidents, pipeline or dike breaks, fuel spills, rain or dust storms, and other rapid occurrences. These are typically fast-acting and are often rapidly repairable or responded to, and should have limited effect on the environment if corrected quickly. Such activities are notable more for their impact on human beings and cultural effects rather than on the natural environment. The potential for groundwater contamination can be reduced if responded to quickly. It is typical in industrial projects to provide appropriate immediate response training and equipment and to develop detailed plans in advance for rapid application to short-term events.

Long-term events can be categorized as requiring extensive data gathering and investigations prior to developing a specific and (often) highly engineered plan for correction. This category includes groundwater contamination and geotechnical problems, which are typically slower acting (often over many years) and continuous and require unique data sources, locations, and instrumentation in order to develop a solution. Corrective measures may require long time periods, complex construction efforts, and much greater expense than is typically expended on short-term environmental responses.

Contingency plan sections for short-term events should emphasize identification of actions which may be termed spills, emergencies or accidental or emergency discharges. Spill substance identification and characterization, clean-up methods, waste disposal, response-type equipment and composition, time requirements, and reporting requirements should be addressed in sufficient detail for the Department to evaluate their likely effectiveness. While final details may have to be deferred to finalization of the facility construction and operation plans, sufficient detail must be included in order to demonstrate response effectiveness.

The contingency plan for long-term events for each facility (pertinent primarily to groundwater contamination concerns with each facility) should mirror the evaluation and response procedures contained in NR 140.24 and 140.26. Emphasis should be placed on periodic data collection and evaluation, periodic revision and rerunning of the groundwater model with updated data, periodic assessment of facility operation and effectiveness, and use of lysimeter and other seepage evaluation tools in addition to groundwater monitoring wells to assess future groundwater effects at the compliance boundary or to compare facility performance to expected performance.

The contingency plan must have flexibility to incorporate and use monitoring and assessment technology as it becomes available. In addition, potential remedial action measures should include reference not only to existing technology available in the technical literature, but include the potential to utilize new technology as it becomes available and is demonstrated in solid and hazardous waste clean-up efforts.

It should be noted that neither the MWDF Feasibility Study Chapter 9.3.6 or the Mine Plan Chapter 5 are detailed enough to serve as contingency plans for this project. A particular weakness is the lack of formally designated transfer of data, evaluations, and recommendations for future action to the Department and recognition of the range of responses and requirements which the Department may find appropriate (see Table 5 of NR 140.24(4)). Department staff are also concerned that the example for remedial actions cited in the MWDF Feasibility Study Chapter 9.3.6 may be technically inappropriate or misleading in their general applicability. Historically, remedial actions at solid waste disposal sites have been based on site-specific data which have often led to unique solutions. The purpose of the contingency plan for long-term effects should be to collect pertinent data to identify a problem and to use the best solution for the problem once it is identified.

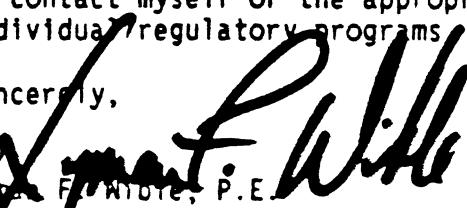
In order for the Department to adequately review contingency plan elements for regulatory decisions and hearing presentations, the contingency plan for each facility should be prepared and submitted to the Department no later than June 30, 1986. These contingency plans must identify and address both short-term and long-term events with the level of detail and appropriate procedures for each category. More specific details and content should be developed with Department technical input. I suggest that you contact Department regulatory program staff directly in the near future to set up conference calls or meetings on facilities required to comply with NR 182.075 contingency plan requirements.

One additional issue is the groundwater quantity requirements of NR 182.075(2), which are applicable to all of the facilities required to comply with NR 182.075. With the information currently available, it is likely that impacts on groundwater quantity will only occur due to mine dewatering and due to groundwater withdrawals associated with water supply and surface water mitigation efforts. Those effects are currently being evaluated by the Department as part of the review of project high capacity well approval applications. It is the Department's opinion that submittal of information to satisfy the high capacity well approval requirements will also satisfy the requirements of NR 182.075(2).

In summary, this letter is intended to fulfill the Department's requirement to propose groundwater standards and compliance boundaries and is an appropriate mechanism to address intervention boundaries and contingency plan elements. If you wish to propose alternative groundwater standards or compliance boundaries, these must be submitted to the Department no later than 90 days before the master hearing, as required in NR 182.075(1)(a)1.

If you have any questions concerning issues raised in this letter, feel free to contact myself or the appropriate assigned technical staff in the individual regulatory programs.

Sincerely,


Lynn F. Wible, P.E.

Administrator

Division of Environmental Standards

RPG:p1/63300

cc: Gordon Reinke - SW/3	Terry McKnight - NCD
Rick Schuff - SW/3	Gary Kulibert - NCD
Paul Didier - SW/3	Ken Markart - Antigo
Mike Witt/Ken Wiesner - WW/2	Wally Arts - DOJ
Robert Krill/Roger Gerhardt - WS/2	David Beckwith - Foley & Lardner
Linda Bochert - ADM/5	Kevin Lyons - Cooke & Franke
Robert Ramharter - EA/6	Gene Linehan - Linehan Law Offices
Kevin Kessler - WR/2	Archie Wilson - NCD
Chuck Hammer - LC/5	Earl Charlton - Charlton & Esser
Joseph Reed - Menominee Tribal Planning Office	
Donald Zuidmulder - Cohen, Zuidmulder, Gazely & Appel, Ltd.	