Crandon Mine Project environmental impact statement: draft scoping document. 2001

U. S. Army Corps of Engineers
St. Paul, Minnesota: U. S. Army Corps of Engineers, St. Paul District, 2001

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Crandon Mine Project
Environmental Impact Statement

DRAFT

SCOPING DOCUMENT

March 2001

U.S. Army Corps of Engineers
St. Paul District
190 Fifth Street East
St. Paul, MN 55101-1638

Crandon Mine Project Environmental Impact Statement
Draft Scoping Document Response Form

Dear Reviewer: In addition to your comments on the Draft Scoping Document, your help is needed in prioritizing the Draft Scoping Document resource categories and important issues under each category. Your cooperation and involvement in this effort will assist the team preparing the Crandon Mine Project Environmental Impact Statement to focus on what is most important to you. The results from each response form will be tabulated and consolidated into one listing.

Please list your top five most important resource categories from 1 (top priority) to 5 (lower priority), and the top three issues in each resource category also in order of priority. Please use the resource categories listed in Table A-2, and the issues under each category listed in Table A-1 or enter issues not included in Table A-1.

Example:
Priority 1 Resource Category: Groundwater Hydrology
Priority 1 Issue: What impacts would occur on groundwater levels and associated shallow lakes from mine dewatering?
Priority 2 Issue: What would be the impact of the grouting plan in the worst-case analysis?
Priority 3 Issue: What impacts would occur on groundwater flow directions because of the SAS discharge?

Please submit this completed Response Form by April 27, 2001 to: District Engineer, St. Paul District, Corps of Engineers, 190 Fifth Street East, St. Paul, MN 55101-1638, ATTENTION: Jon K. Ahlness, Regulatory Branch

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Priority 1 Resource Category: _____

Priority 1 Issue: _____

Priority 2 Issue: _____

Priority 3 Issue: _____

Priority 2 Resource Category: _____

Priority 1 Issue: _____

Priority 2 Issue: _____

Priority 3 Issue: _____

Priority 3 Resource Category: _____

Priority 1 Issue: _____

Priority 2 Issue: _____

Priority 3 Issue: _____

Crandon Mine Project Environmental Impact Statement
Draft Scoping Document Response Form

Priority 4 Resource Category: _____

Priority 1 Issue: _____

Priority 2 Issue: _____

Priority 3 Issue: _____

Priority 5 Resource Category: _____

Priority 1 Issue: _____

Priority 2 Issue: _____

Priority 3 Issue: _____

Name: _____

Address: _____

_____

_____

_____

_____ Please check this space if you would like your name added to the Crandon Project mailing list.

US Army Corps of Engineers
St Paul District

Public Notice

APPLICANT: Nicolet Minerals Company

ISSUED: MAR 28 2001
EXPIRES: APR 27 2001

REFER TO: 94-01298-IP-DLB **SECTION:** 404 - Clean Water Act

NOTICE OF DRAFT SCOPING DOCUMENT AVAILABILITY

1. The District Engineer of the U.S. Army Corps of Engineers, St. Paul District, has determined that an Environmental Impact Statement (EIS) will be prepared as part of the Corps of Engineers public interest review for the permit application by Nicolet Minerals Company to discharge dredged and fill material into waters of the United States, including wetlands, in conjunction with the development and operation of the proposed Crandon Mine in Forest County, Wisconsin. This action is in accordance with Title 33 Code of Federal Regulations 325.2(a)(4) published November 13, 1986, in the Federal Register, Volume 51, Number 219.

2. On December 23, 1994, the U.S. Army Corps of Engineers issued a Public Notice of intent to hold public scoping meetings regarding the proposed Crandon Mine. Two public scoping meetings were conducted, one in Madison, Wisconsin on January 31, 1995, and the other in Crandon, Wisconsin on February 7, 1995. In addition, scoping meetings were conducted on the reservations of three Native American tribes.

3. Based upon comments received by the U.S. Army Corps of Engineers during and after the scoping meetings, a Draft Scoping Document has been prepared. A copy of the Draft Scoping Document and a Response Form are being mailed to people on the Crandon Project mailing list. In addition, the Draft Scoping Document and the Response Form can be accessed via the Internet at the U.S. Army Corps of Engineers, St. Paul District Crandon Project website at the following address:

http://www.mvp.usace.army.mil/project_info/info_papers/crandon/

This website will also be used to post future Crandon Project documents and updates.

4. The U.S. Army Corps of Engineers is requesting written comments on the Draft Scoping Document. All written comments and Response Forms should be sent to the St. Paul District. The record will be kept open for 30 days following the date of this Public Notice. All written comments will become part of the administrative record and will be made available for public examination.

5. Written comments should be addressed to the District Engineer, St. Paul District, Corps of Engineers, 190 Fifth Street East, St. Paul, Minnesota 55101-1638, ATTENTION: Jon K. Ahlness, Regulatory Branch. The telephone number for facsimile communications is 612-290-5330. The Email communications address is as follows:

jon.k.Ahlness@mvp02.usace.army.mil

FOR THE DISTRICT ENGINEER:

Robert J. Whiting
Chief, Regulatory Branch

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Chapter 1
Introduction

This chapter introduces the Crandon Mine Project Environmental Impact Statement (EIS) Scoping Document. It provides background information on the project and reasons an EIS was selected as the appropriate compliance document under the National Environmental Policy Act (NEPA), provides a summary of the Proposed Project and defines the scoping process.

1.1 Background

The Nicolet Minerals Company (the Applicant) owns the property containing the Crandon ore body located 6 miles south of the City of Crandon, Forest County, Wisconsin. Exxon Coal and Minerals Company discovered the Crandon ore deposit in the mid-1970's. In 1978, Exxon submitted to the Wisconsin Department of Natural Resources (WDNR) a Notice of Intent to collect data to support a mining permit application. That permit application was submitted to the WDNR in 1982, and the United States Army Corps of Engineers (USACE) subsequently determined that it had limited regulatory authority over the project. The WDNR prepared an EIS; the USACE determined that a Federal EIS was not required. In November 1986, the WDNR issued a final EIS; however, because of depressed mineral prices, Exxon withdrew its permit application.

In 1993 the Crandon Mining Company, a Wisconsin general partnership of subsidiaries of Exxon Coal and Minerals Company and Rio Algom Limited, was formed and re-initiated the project. The company was renamed the Nicolet Minerals Company (NMC) in January 1998, following Rio Algom Limited's purchase of 100 percent of the company.

In 1994 Crandon Mining Company submitted an application to the USACE for a Section 404 Permit under the Clean Water Act to discharge fill into wetlands in conjunction with developing and operating the mine.

1.2 Selection of Appropriate NEPA Compliance Document

The USACE filed a Public Notice on August 19, 1994 requesting comments on the development of a mine in the Crandon, Wisconsin area. This notice was in response to an application from Crandon Mining Company to discharge fill material in waters of the U.S., including wetlands to develop a mine and ancillary facilities to mine a mineral deposit known as the Crandon deposit.

The USACE received numerous comments and concerns on the proposed mine. Based on the analysis of the comments, it was determined that the proposed mining project could result in significant adverse impacts on the natural, cultural, and socioeconomic resources that exist in the vicinity of the proposed mine site. The USACE also has a Federal Trust Responsibility to the recognized Native American Tribes that may be affected by the proposed project.

The analysis, its Federal Trust Responsibilities, and revised USACE regulations since the 1980s led the USACE to decide that preparation of an EIS on the Crandon Mine Project was required under the terms of NEPA. The EIS process is the focal point of NEPA, which requires that an EIS must be prepared for all major federal actions significantly affecting the quality of the human environment. This decision was formalized in a decision memorandum dated September 16, 1994 and approved by Colonel James T. Scott, District Engineer, St. Paul District.

The USACE filed a Notice of Intent in the *Federal Register* (Vol. 59, No. 240, page 64652) on December 15, 1994 to prepare an EIS for the Crandon Mine Project. The USACE intention to conduct public scoping meetings was announced in the published Notice of Intent. Locations and times for the scoping meetings were to be published at a later date. The USACE identified itself as the lead federal agency in preparing the Crandon Mine Project EIS. The EIS will ensure that the USACE has the appropriate information and will carefully consider significant environmental impacts before making a decision about the Crandon Mine Project permit application under the Clean Water Act Section 404. The USACE issued a Public Notice of intent on December 23, 1994 to hold public scoping meetings. Two public scoping meetings were scheduled; one in Madison, Wisconsin and the other in Crandon, Wisconsin.

1.3 Definition of Environmental Impact Statement

An EIS is a written document required by NEPA to be prepared for "major federal actions significantly affecting the quality of the human environment." Major federal actions are defined in the regulations implementing NEPA as actions "with effects that may be major and which are potentially subject to Federal control and responsibility" (40 CFR 1508.18). An EIS describes the purpose and need for an action, any alternatives that were considered in detail (including no action), the nature of the environment to be affected, and the nature and significance of the environmental effects of a proposed action and alternatives. Mitigation measures must also be described for any effects determined by the agency to be significant under the standards set in the regulations.

1.4 Definition of Scoping

Scoping is the public involvement process required by the Council on Environmental Quality (CEQ) regulations to help federal agencies determine issues and alternatives that will be analyzed in the EIS. The scoping process provides the general public, organizations, Native American tribes, state and local governments and affected federal agencies an early opportunity to identify issues and concerns they believe should be studied in the preparation of an EIS. Scoping also provides mechanisms to focus the environmental analysis on important issues and concerns and identify issues and concerns of minor importance that require less discussion in the EIS.

An issue is a statement of concern about a potential impact that may result from implementing the proposed project. It also can be a statement proposing or suggesting a different or revised alternative way of implementing the proposed project. An issue needs to be stated as plainly and clearly as possible and must specifically identify the resource of concern and potential impact. Identified issues are used to develop impact topics for display and analysis in the EIS. Identification of data needs, concerns over models being used or parameters for those models, and concerns over how the EIS is being prepared or format of the EIS are not issues in terms of scoping.

1.5 Purpose and Need of Project

The Crandon Mine Project is needed to satisfy market demands for zinc, copper, and lead. The purpose of the project is to produce zinc, copper, and lead concentrates in an environmentally safe manner from Nicolet Minerals Company's private property.

1.6 Summary Description of the Proposed Project

The Crandon Mine Project, as proposed by NMC, would recover and process zinc/copper/lead ore from an identified underground reserve approximately 4,900 feet long, 100 feet wide, and approximately 2,200 feet deep,

located approximately 6 miles south-southwest of the City of Crandon, Wisconsin (see Map 1). Estimated project life of the Crandon Mine Project would be 35 years, including 28 years of mining, 3 years of pre-production and 4 years of reclamation. The estimated annual ore production would be 2 million tons, with total ore production estimated at 55 million tons. Approximately 750 workers would be employed during the mine construction and development phase, and approximately 400 to 500 workers would be employed during active mining operations.

Prior to and during mining, groundwater in the immediate vicinity of the mine would be collected and pumped from the Swamp Creek and Pickerel Creek watersheds to the surface. De-watering flows would be treated to meet applicable water quality standards, pumped through a pipeline, and discharged to a soil absorption system located on the north side of Swamp Creek (see Map 1). The soil absorption system (SAS) would return treated de-watering flows to the surface water and groundwater systems of the Swamp Creek watershed and groundwater basin. NMC currently plans to pressure grout areas over and around the proposed mine area to reduce groundwater inflows to the underground mine.

Access to the mine would be through vertical shafts and underground ramps. A central production shaft and two ventilation shafts are planned. The central production shaft would provide primary access for workers, general services, and hoisting of production ore. The eastern ventilation shaft would be used for hoisting of initial mine development waste rock and would serve as the primary fresh air intake. It also would be used as an alternate exit during operations. The western ventilation shaft would be used as the primary exhaust airway during operations.

Underground mining methods would be used. The mine would be developed primarily using mechanized blasthole open stoping with delayed backfill. Underground access ways first would be constructed in the non-mineralized bedrock adjacent to the ore body. The ore would then be recovered by the progressive removal of blocks of ore, creating underground openings called "stopes". During underground mining, a bedrock barrier pillar at least 100 feet thick would be maintained over the mining area to maintain surface stability. The ore would be hoisted to the surface where it would be milled (crushed and sized) and processed to recover zinc, lead, and copper concentrates. Water requirements for milling and processing operations would be supplied from mine dewatering sources and recycling of tailings water.

The finely crushed waste rock material remaining after processing, called "tailings", would be contained in a water slurry and would be pumped through a pipeline to a lined surface Tailings Management Area (TMA) for permanent placement and disposal. Placement of tailings in the TMA would involve controlled distribution of the tailings slurry over the surface of the TMA to separate the tailings solids from the slurry and allow consolidation and drying of the tailings. In response to concerns regarding placement of potentially acid-producing pyritic materials in the TMA, NMC committed to modification of the ore processing circuit to separate pyritic materials from the process tailings before pumping the tailings to the TMA. The resulting pyrite concentrate would be mixed with cement, pumped underground to mined-out stopes, and used as backfill for the mined-out areas.

Mine surface facilities would include:

- Administrative and service buildings
- Headframes and hoist equipment for the central production shaft and eastern ventilation shaft
- Surface ventilation equipment installations
- Mine wastewater treatment plant, pipeline, reclaim water ponds; and soil absorption system
- Temporary waste rock storage area
- Pre-production ore storage area
- Ore concentration facility
- Tailings pipeline and tailings management area
- Backfill preparation area
- Explosives storage area

Associated surface facilities also would include a main access road, internal access roads, employee parking area, rail spur, electric power transmission lines and substation, natural gas pipeline, surface drainage control structures, storage areas, and other ancillary facilities.

During construction and active operations, construction disturbance, such as road cuts and pond embankments, and areas that are completed, such as portions of the TMA, would be stabilized and planted with temporary or permanent vegetation. Following completion of mining operations, dewatering operations would cease and mined and backfilled areas would be allowed to flood and mine openings would be sealed. In addition, surface facilities would be demolished or removed and associated surface disturbance areas would be stabilized and reclaimed.

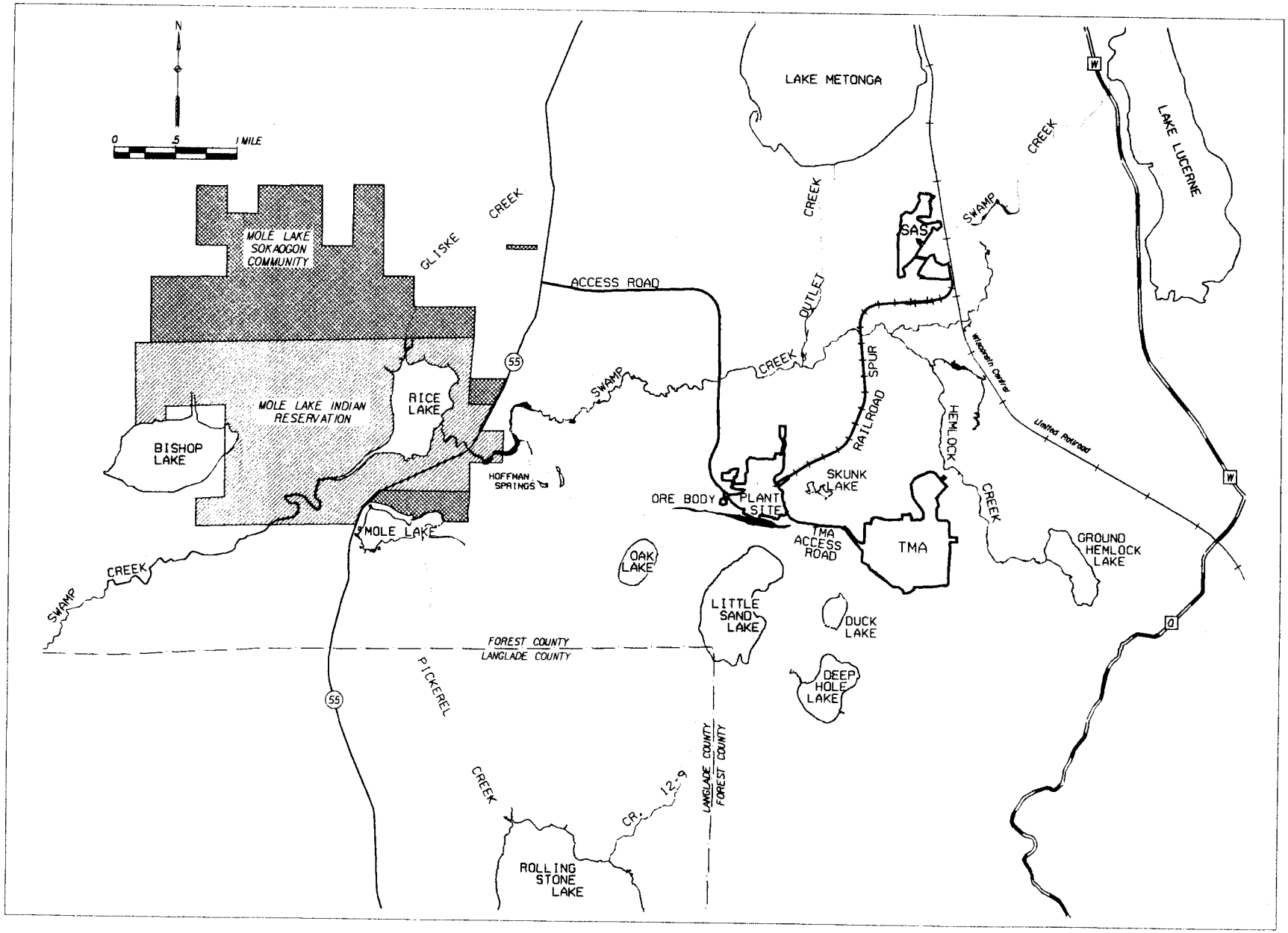
1.7 Project Changes Since Scoping was Initiated

The Crandon Mine Project has been changed by NMC since EIS scoping was initiated in 1995. The project description was changed in 1998 in response to comments and concerns received from the public and agencies. This section summarizes the primary changes NMC made to the proposed project in 1998.

The project description used in the 1995 scoping process did not include a grout blanket. In 1998, NMC added a plan for systematic grouting of the rock above the uppermost mining level to reduce groundwater inflow from the top of the underground mine workings. The grout blanket would reduce the potential draw-down of surface waters connected to groundwater in the area above and surrounding the mine. It would be installed from a drift or horizontal passage mined above the ore body and under the crown pillar about 260 feet below the ground surface. The 25-foot thick horizontal grout blanket would be developed by drilling holes in fan patterns at regular intervals from the grout drift and injecting grout through the holes in fractures in the rock as mine development progresses.

The project description used in the 1995 scoping process discussed storage of all tailings in the tailings management area. In 1998, NMC added a pyrite recovery circuit to the ore-processing plan to produce depyritized tailings and pyrite concentrate. Pyrite is a sulfide mineral contained in the ore that can generate acid drainage conditions when exposed to oxygen and water. The pyrite concentrate would be mixed with cement and returned to mined-out areas of the underground mine as a paste back-fill for permanent storage. Following re-flooding of the back-filled mine, the water would prevent oxygen from oxidizing the cemented pyrite concentrate. The depyritized tailings would be stored in the tailings management area and would reduce the risk of acid generation within the tailings. This change also would decrease the size of the tailings management area by approximately 30 percent because the cemented pyrite concentrate would be stored in the mine rather than in the tailings management area.

The project description used in the 1995 scoping process considered a pipeline to the Wisconsin River for discharging treated wastewater from the mining operation. In 1998, NMC proposed the soil absorption system (SAS) for treated wastewater discharge instead of the pipeline to the Wisconsin River. The in-ground SAS (see Map 1) would consist of six cells fed by pressure distribution pipes to discharge the treated wastewater into the groundwater. A treated wastewater discharge pipeline would be constructed in the proposed rail spur line corridor to convey the effluent from the advanced wastewater treatment plant to the SAS site north of Swamp Creek. The discharged water would flow into the Swamp Creek watershed and groundwater basin.



Map 1
Proposed Project Location

Chapter 2
Structure of the Scoping Process

This chapter describes the structure of the scoping process for the Crandon Mine Project Environmental Impact Statement (EIS). It provides the rationale used in selecting the scoping process; describes how scoping meetings were planned and how locations for scoping meetings were selected; identifies the notification processes used and meeting locations, dates and times; summarizes attendance at the meetings; and describes the process used to conduct scoping meetings.

2.1 Rationale Used in Selecting the Scoping Process

The key federal action is the decision to issue or deny an application for a 404 permit under the Clean Water Act. Based on this fact, the decision was to use the normal U.S. Army Corps of Engineers (USACE) permit information gathering and evaluation process for the EIS scoping process.

2.2 How Scoping Meetings Were Planned

The meetings were planned as public hearings. A USACE official acted as the hearings official and a court recorder was hired to record the proceedings verbatim. A short introduction was given by the hearing official and then those in attendance who had indicated a desire to speak were called. Speaker time limits were not set and each speaker was provided as much time as needed to present their remarks.

2.3 How Locations for Scoping Meetings Were Selected

Locations for the scoping meetings were selected based on public interest in the project, proximity to areas where the public may be most affected by potential project features, and adequacy of meeting facilities for the anticipated audience. One public meeting was held in Crandon, Wisconsin, which is 5 miles north of the project area. The second public meeting was held in Madison, Wisconsin, the state capital, where the majority of state agencies are located.

In addition to the two public meetings, tribal scoping meetings were held at each of the reservations of Native American tribes that potentially could be most affected by the project. Meetings were held at the Mole Lake Reservation for the Sokaogon-Chippewa Community; Menominee Reservation at Keshena, Wisconsin for the Menominee Indian Tribe of Wisconsin; Forest County Potatwatomi Community Tribal Offices near Crandon, Wisconsin; and Mille Lacs, Minnesota for the Great Lakes Indian Fish & Wildlife Commission and the 11 Chippewa tribes that retained in the Treaties of 1837 and 1842 usufructuary rights to hunt, fish, and gather in the ceded territory of Northern Wisconsin.

On November 15, 2000, the USACE conducted a meeting for the government agencies and Native American tribes most closely monitoring the EIS process to meet with the third party contractor (Montgomery Watson) that is working with the Corps to prepare the EIS. During the meeting, a number of scoping issues were raised.

2.4 Notification Processes Used

The USACE issued a Public Notice announcing the two public scoping meetings on December 23, 1994. This notice was mailed to an extensive mailing list. The mailing list is available from the St. Paul District, Corps of Engineers, Army Corps of Engineers Centre, 190 Fifth Street East, St. Paul, MN 55101-1638.

2.5 Meeting Dates, Locations, and Times

January 31, 1995
Madison Concourse Hotel, Madison, Wisconsin
3:00 to 7:48 pm

February 7, 1995
Crandon City Hall, Crandon, Wisconsin
Evening

March 29, 1995
Mole Lake Reservation, Mole Lake Wisconsin
12:00 noon to 7:30 pm

June 26, 1995
Forest County Potawatomi Community Tribal Office, Crandon, Wisconsin
10:00 am to 12:08 pm

June 26, 1995
St. Michael's Parish Hall, Keshena, Wisconsin
5:18 to 10:00 pm

April 4, 1996
Grand Casino Mille Lacs, Mille Lacs, Minnesota
11:30 am to 12:25 pm

November 15, 2000
Conference Room Farm Credit Services Building, St. Paul, Minnesota
9:00 am to 4:00 pm

2.6 Scoping Meeting Attendance

A number of formal and informal scoping meetings were held. Table 2-1 shows the number of persons attending each of the scoping meetings. Attendance was counted by names on the sign-in cards or attendance sheets. Attendance is not available (NA) for some of the meetings. The number of speakers at each of the formal meetings also is shown.

Table 2-1
Crandon Mine Project Scoping Meeting Attendance

Meeting Date	Meeting Location	Attendance	Number of Speakers
January 31, 1995	Madison, Wisconsin	171	36
February 7, 1995	Crandon, Wisconsin	130	37
March 29, 1995	Mole Lake Reservation	53	34
June 26, 1995	Menominee Reservation, Keshena, Wisconsin	60	31
June 26, 1995	Forest County Potatwatomi Tribe, Crandon, Wisconisn	NA	17
July 18, 1995	St. Paul, Minnesota	NA	NA
April 4 1996	Mille Lacs, Minnesota	NA	7
November 15, 2000	St. Paul Minnesota	24	NA

2.7 Process Used to Conduct Scoping Meetings

The scoping meetings were conducted as formal hearings. Everyone who attended the public scoping meetings was requested to fill out an attendance card and to indicate if they wanted to make a presentation. The attendance card also had space for the person to record any comments they wished to make. Attendance was not taken at all the tribal scoping meetings. Personnel from the St. Paul Office of the USACE acted as the hearing officer at each meeting. They made brief opening remarks at each of the meetings and then called on those who had indicated an interest in making a presentation. The remarks made by the attendees were recorded by a court reporter. The court reporter provided a transcript of the proceedings to the USACE.

2.8 How This Scoping Document Will Be Used

For a complex project such as the Crandon Mine Project EIS, it is important to define at the outset what specific environmental studies need to be reviewed or conducted before a decision is made. This document, based on oral and written input from Federal, State, local agencies, affected Native American tribes, and other interested persons, describes the scope of actions, alternatives, and issues to be studied in the Crandon Mine Project EIS. The team preparing the EIS will use the results contained in this document to assist them in focusing their analysis on the issues.

This scoping document is part of the public NEPA process for this project, and public comments will be solicited on the draft scoping document. Comments received during the comment period will be addressed in the final scoping document.

Chapter 3
Scope of the EIS

This chapter describes the scope of alternatives to the proposed action that will be addressed in the Crandon Mine Project Environmental Impact Statement (EIS). It presents the geographic scope of the analysis and briefly describes the No Action alternative, a project expansion alternative, and a project reduction alternative. The applicant's Proposed Project is described in Chapter 1, Section 1.6.

3.1 Geographic Scope of Analysis

The geographic scope of analysis varies by resource category. The preliminary determination of impact area of influence for each resource category will be expanded or reduced as necessary upon further impact analysis. The direct and indirect impacts of the project will be analyzed and traced to the point where they can no longer be identified or become insignificant. The geographic scope of analysis for vegetation, mineral resources, threatened and endangered species, and archaeological resources would be within the proposed mine project boundaries and associated transportation and utility corridors. The geographic scope of analysis for visual resources would include Spirit Hill, and the area within and immediately outside the proposed mine project boundaries. The geographic scope of analysis for surface water quality, surface water hydrology, aquatic ecology and fisheries, wild rice, would be within the Swamp Creek and Pickerel Creek drainage basins. The geographic scope of analysis for wetlands would be about 18.3 square miles including and surrounding the proposed mine site. The geographic scope of analysis for wildlife would be about 25 square miles including and surrounding the proposed mine site. The geographic scope of analysis for groundwater hydrology and quality, air quality, and noise would be about 45 square miles including and surrounding the proposed mine site. Noise and air quality analyses also would extend along travel corridors leading to and from the proposed mine site. The geographic scope of analysis for transportation would include the proposed mine site and travel corridors throughout northeast Wisconsin. The geographic scope of analysis for health and safety would include the proposed mine project boundaries, all the travel corridors in addition to any areas that are included in the socioeconomic impact analysis as well as other areas that may be impacted by some type of contaminants. The geographic scope of analysis for socioeconomics, environmental justice, and recreation would be Forest, Langlade, and Oneida counties. The geographic scope of analysis for Indian Trust Assets would include lands, waters, and related resources, used by Native American tribes, which could be adversely affected by the proposed mine project. These Native American tribes include the Sokaogon-Chippewa Tribe of the Mole Lake Reservation, Menominee Indian Tribe of Wisconsin, Forest County Potawatomi Community, and other Northern Wisconsin tribes. The geographic scope of analysis for traditional cultural properties will include any identified tradional cultural property that may be impacted by any direct or indirect impact of the proposed project. The geographic scope of analysis will be further refined as the impact area of analysis is determined for each resource.

3.2 Alternatives to be Addressed in the EIS

The following sections briefly describe the alternatives to the proposed action to be addressed in the EIS. Within each of the action alternatives, design alternatives consisting of alternate sites for proposed project facilities, alternate service routes, mine design and operation alternatives, alternate mitigation measures, and closure and post-mining use alternatives also will be addressed in the EIS.

3.2.1 No Action Alternative

The No Action alternative is the most probable future if the Clean Water Act Section 404 permit application is denied and no mine would be constructed and operated at the Forest County property owned by Nicolet Minerals Company (NMC).

3.2.2 Project Expansion Alternative

The project expansion alternative would involve extending the mine life because additional recoverable reserves of zinc/copper/lead ore could be discovered during the mining process. The additional recoverable reserves could include unknown extensions of the existing ore body, lower cutoff grades for known ore reserves, or future identification of a separate ore body in the general vicinity of the mine. This alternative would potentially require expanding the tailings management area to dispose of additional depyritized tailings plus disposal of waste rock not back-filled into the mine. The mine life would be extended beyond 35 years. Opening of a new mine(s) or expansion of the tailings management area would require obtaining additional permits.

3.2.3 Project Reduction Alternative

The project reduction alternative would involve reducing the mine life because recoverable reserves of zinc/copper/lead ore would not be of the magnitude currently projected. The decrease in recoverable reserves could occur during mining because of higher cutoff grades for known ore reserves, recovery of only the zinc ore (12 years of reserves), difficulties in recovering ore from high groundwater inflows, mechanical characteristics of the rock that prevent ore recovery, or ore concentrate production difficulties. The mine life would be less than 35 years.

Chapter 4
Scope of Issues to be Addressed in the EIS

This chapter describes the scope of issues to be addressed in the Crandon Mine Project Environmental Impact Statement (EIS). It describes the methodology used to analyze the scoping input, briefly describes the important issues of concern to the public, identifies other issues of concern to the public, and presents issues eliminated from further analysis.

4.1 Description of Methodology Used to Analyze Scoping Input

All information received by the U.S. Army Corps of Engineers (USACE) during the scoping process was reviewed in detail to identify issues to be considered during the preparation of the Environmental Impact Statement (EIS). This information was comprised of transcripts made at the public meetings held by the USACE, written letters (including form letters and cards) of comments to the USACE, and the public meeting summaries from the meetings held by the Wisconsin Department of Natural Resources (WDNR). Issues that met the criteria (see Chapter 1, Section 1.4 of this document) were identified and recorded. The resource category that the issue pertained to also was identified along with how many times the issue was raised. In some cases, the statements made by the commentor had to be interpreted and modified to clearly identify the issue. When possible, the issue was restated in the form of a question that could be answered in the EIS. In some cases, the issue dealt with several resource categories. In these cases the issue was repeated under each appropriate resource category. The next step was to review each issue and combine similar issues into one (see Table A-1 in Appendix A). The number of times each issue was raised under each resource category was counted and recorded. The number of issues raised under each resource category was tallied to determine the relative importance of each resource category to the public. Important or major public issues (see Section 4.2) were identified by reviewing the types of issues, the resources affected, the number of times an issue was raised, and best professional judgment. The number of issues raised in each resource category and best professional judgment determined the importance of resource categories (see Table A-2 in Appendix A).

4.2 Important Issues of Concern to the Public

4.2.1 Groundwater Hydrology

The groundwater hydrology resource includes issues about groundwater drawdown, discharge, recharge, and potential impacts of mitigation. Drawdown issues include the extent of the cone of depression from mine dewatering, changes in groundwater levels affecting shallow lakes and streams, potential impacts on private water supply wells, and how the groundwater flow directions could change. Discharge issues include interruption of groundwater supply to streams, lakes, and wetlands connected to the pre-mining water table. Recharge issues include applying treated mine wastewater through the proposed Soil Absorption System (SAS), changing groundwater flow directions at the SAS, recharge periods in the affected aquifer, and post-mining recovery of the re-flooded mine. Mitigation issues include the proposed grouting plan to control groundwater inflows, measures to protect private wells, and impacts of mitigation well pumping to supplement water levels in affected lakes.

4.2.2 Groundwater Quality

The groundwater quality resource includes issues about groundwater contamination, geochemistry, and mitigation. Contamination issues include spills or leaks from the Tailings Management Area (TMA), impacts on private wells, acid mine drainage and solute transport during and after mining, and potential release of chemicals, reagents, explosives, and petroleum products into the groundwater. Geochemistry issues include potential changes in groundwater quality from applying treated mine wastewater to the SAS, impacts of groundwater recharge through affected wetlands, and groundwater discharge from affected wetlands. Mitigation issues include impacts from grouting cement and supply of potable water if public and private wells become contaminated.

4.2.3 Wetlands

The wetlands resource includes issues about direct loss of wetlands, indirect impacts on wetlands, and mitigation. Direct loss issues include fill impacts on wetlands from constructing the TMA, roads, rail spur line, transmission lines, and other infrastructure. Indirect impact issues include wetland loss or reduced functions and values from groundwater drawdown, altered surface water flow patterns, contamination via surface water and/or groundwater pathways, introduction of exotic or invasive plants, particulate deposition, and flooding from the SAS. Mitigation issues include replacing lost and reduced wetland functions and values in an off-site location and different watershed, protection and maintenance of mitigation wetlands, and the fate of the wetlands mitigation property if it is not used for mitigation.

4.2.4 Surface Water Quality

The surface water quality resource includes issues about contamination, changes in the chemistry of natural waters, temperature, dissolved oxygen, sediments, treated mine wastewater, and mitigation. Contamination issues include spills of chemicals, reagents, and ore concentrates, release of soluble heavy metals and acid rock drainage from mine infrastructure, radioactivity, mercury release from on-site processing and off-site smelting, and particulate deposition. Natural water chemistry issues include changes caused by the SAS, impacts on surrounding lakes and streams, and loss of wetland filtering and cleansing functions. Temperature issues include potential warming of the Wolf River from decreased flow in springs and tributary streams, and temperature changes from treatment, conveyance and discharge of mine wastewater. Dissolved oxygen issues include potential decrease in Rolling Stone Lake and dissolved oxygen concentrations in waters receiving treated water discharges. Sediment issues include construction of roads and rail spur lines across creeks, storage and subsequent release of metal contaminated sediments in stream and lake bottoms, and release of asbestos fibers from waste rock and tailings. Treated mine wastewater issues include impacts of discharges on Swamp Creek and downstream resources. Mitigation issues include using pumped groundwater that is incompatible with surface water quality.

4.2.5 Surface Water Hydrology

The surface water hydrology resource includes issues about watersheds, stream and river flows, lakes, mine water discharges, erosion and sedimentation, and mitigation. Watershed issues include impacts on flows in the Swamp Creek, Pickerel Creek, Lily River, and Wolf River watersheds. Stream and river issues include changes in flows from groundwater drawdown, discharges from the SAS, and magnified impacts under flooding and drought conditions. Lake issues include changes in water levels and areas from groundwater drawdown, maintenance of Public Rights stages, and magnified impacts under drought conditions. Mine water discharge issues include impacts from the TMA, SAS, wastewater treatment system, and potential leaks in the pipeline. Erosion and sedimentation issues are focused on changes in shoreline erosion and sediment accretion rates. Mitigation issues include fluctuations in stream and lake levels from erratic mitigation water supply, and impacts on Swamp Creek from discharge of mitigation water.

4.2.6 Aquatic Resources

The aquatic resource includes issues about fish and aquatic ecosystems, the impacts of contaminants and changes in flows, and mitigation. Fish and aquatic ecosystem issues include impacts in area streams and lakes (Swamp Creek, Rice Lake, and other waters on and off the Mole Lake Reservation), and interjurisdictional fish species. Contaminant issues include indirect impacts on aquatic resources from chemical and reagent spills and/or leaks, acid rock drainage and bio-accumulation of heavy metals, treated mine wastewater effluent, and chlorine compounds. Flow-change issues include impacts on aquatic life from lowered and erratic streamflow. Mitigation issues include measures to mitigate potential loss of aquatic species in Creeks 12-09 and 11-04, Upper Pickerel Creek, and Martin Springs, measures to mitigate fish kills in Rolling Stone Lake from groundwater drawdown, and coordination of mitigation efforts with non-degradation standards in the Town of Ainsworth and Langlade County.

4.2.7 Socioeconomics

Socioeconomics includes issues about economics, industries, services, Native American communities, employment, population, housing and property, and tax revenue and expenditures. Economic issues include changes on community economics, boom and bust economy, impacts on county and northern Wisconsin economics, changes in wholesale and retail sales, impacts on small businesses and entrepreneurs, sustainable economics, and effects of contaminants on the economy. Industry issues include impacts on tourism from water pollution, noise, and changes in Wolf River flows, and impacts on the forestry, wood products, and agriculture industries. Service issues include demands on government, health services, social services, human services, roads, power, schools, law enforcement, fire protection, and solid waste disposal during and after the project. Native American community issues include impacts on social and economic systems, cultural, spiritual, well-being, and subsistence aspects of Native American life, racism in schools, loss or decline of wild rice production, and changes in utilities, housing, employment, and income during and after the project. Employment issues include changes in seasonal employment, competition with other businesses for skilled workers, and regional changes in non-urban employment. Housing and property issues include impacts on seasonal and year-round housing demand, changes in property values, effects on affordable housing as regional development occurs, and displacement of low- and moderate-income residents from homes and property, during and after the project. Tax revenue and expenditure issues include changes in government and school district taxes and spending, and true tax impacts from increased crime, welfare, social and health services, law enforcement, jails, and unemployment.

4.2.8 Health and Safety

Health and safety includes issues about Native Americans, local residents, and workers. Native American issues include health impacts from increases in inhaled and ingested contaminants, noise, traffic, toxic chemical and reagent spills, primary and secondary contact with contaminated water, electrical transmission lines, mental anguish, stress, and anxiety associated with the mining project. Local resident issues are almost the same as listed for Native Americans, except local residents may not have as much of a subsistence diet as potentially affected Native Americans and therefore would not be as susceptible to ingested contaminants. Worker issues include health and safety working in and around the mine site and potential disasters over the life of the mine.

4.2.9 Indian Trust Assets

Indian Trust Assets include on- and off-reservation issues about water, fishing, hunting, gathering, and other resources guaranteed by Treaty rights. Water issues include impacts on Native American reserved water rights, on the Wolf River, contamination of water from a leak or spill, and other Treaty rights related to water. Fishing issues include impacts on subsistence, harvest and ceremonial use of fish and other aquatic resources, contaminants affecting fish and other aquatic resources, and other Treaty rights related to fishing, fish and other

aquatic resources. Hunting issues include impacts on subsistence, harvest and ceremonial use of game animals, contaminants affecting game and other wildlife species, and other Treaty rights related to hunting and wildlife species. Gathering issues include impacts on subsistence, harvest and ceremonial use of wild rice, other plants, and medicines, contaminants affecting wild rice, other plants, and medicines, and other Treaty rights related to gathering wild rice, other plants, and medicines.

4.3 Other Issues of Concern to the Public

The following other issues of concern to the public were identified from the scoping input . The other issues summarized by resource category in the following subsections are derived from the issues presented in Appendix A, Table A-1. The importance of these issues may change as the EIS is being prepared.

4.3.1 Threatened and Endangered Species

Threatened and endangered species includes issues about federal and state listed plants, animals, and candidate threatened and endangered species. Plant issues include effects on state listed and potential federal listed plants from wetland alteration, trampling, and groundwater drawdown. Animal issues include effects on bald eagles and their habitat along the Wolf River and in Rice Lake, effects on endangered clam species, and effects on all listed species from wetland alteration. Candidate species issues include effects on federal candidate Category 1 threatened and endangered species.

4.3.2 Traditional Cultural Properties

Traditional cultural properties include issues about cultural places and properties, burial sites, plants, water, and the legacy and traditions of Native Americans. Cultural place and property issues include impacts on Rice Lake, Swamp Creek, other water bodies, Spirit Hill, other proposed traditional cultural properties located on NMC's private land and other off-reservation areas, and sites eligible for the National Register of Historic Places. Burial site issues include impacts on Spirit Hill and other traditional burial grounds in the immediate area of the proposed mine. Plant issues include loss or degradation of wild rice beds, cedar trees and other plants used for medicine, impacts on traditional medicine plants from airborne tailings and dust deposition, and changes in wetland flora caused by changes in groundwater quantity and quality. Water issues include impacts on Sokaogon-Chippewa ceremonial uses of water and water bodies within the Mole Lake Reservation. Native American legacy and tradition issues include impacts on cultural traditions, tribal cultural values, and the legacy of the Sokaogon-Chippewa Tribe.

4.3.3 Wild Rice

Wild rice includes issues about contaminants and geochemistry, harvesting, water levels, and development from population growth. Contaminant and geochemistry issues include impacts from water quality degradation, heavy metal accumulating in the wild rice, and changes in surface water geochemistry of Rice Lake and Swamp Creek. Harvesting issues include impacts on wild rice yield and harvesting by the Sokaogon-Chippewa Mole Lake Band. Water level issues include impacts from fluctuating water levels in Rice Lake on wild rice production and survival. Development issues include indirect impacts on wild rice from population growth and associated housing, road building, and other development occurring outside the boundaries of the Mole Lake Reservation.

4.3.4 Vegetation

Vegetation includes issues about forests, traditional medicinal plants, exotic species, and power and rail corridors. Forest issues include impacts on tree species from airborne tailings, dust deposition, and groundwater drawdown, impacts on forest habitat, and impacts on the Nicolet National Forest. Traditional medicinal plant issues include impacts from airborne tailings and dust deposition, and changes in plant habitat. Exotic species issues include impacts of introduced exotic plants on wild rice, other Tribal plant resources, and the forest ecosystem. Power and rail corridor issues include impacts on vegetation from constructing power transmission lines and the rail spur line, indirect impacts of expanding power generating facilities, contamination impacts from acute spills of ore concentrates, reagents and other chemicals along rail lines, and contamination impacts from chronic releases of dust along rail lines.

4.3.5 Wildlife

Wildlife includes issues about habitat, birds, mammals, insects, and amphibians. Habitat issues include direct and indirect impacts on wildlife habitat down-gradient from the project, construction and operation of the rail lines, lowered and erratic stream flows, and short-term demand for roads, houses, shops, schools, and other services. Bird issues include impacts from feeding on contaminated fish, ingesting water and spreading contaminants in the TMA, transmission lines, air traffic, noise, mercury, wetland loss effects on nesting, mining activities on migratory birds, and air quality impacts on birds of prey, waterfowl and their migration patterns, songbirds, and other birds. Mammal issues include impacts from noise, feeding on contaminated fish, mercury, transmission lines, and impacts on deer herds and their migration patterns, pine marten, porcupine, bobcat, fisher, otter, black bear, and their habitat. Insect issues include air quality impacts on bees, dragonflies, and other insects, and impacts on pollination. Amphibian issues include air quality impacts on turtles, frogs, and other amphibians.

4.3.6 Ecosystems

Ecosystem includes issues about the Wolf River, wetlands, and the total ecosystem. Issues include impacts on the Wolf River ecosystem, federal natural resources and the total ecosystem, physical/chemical/biological impacts on the ecosystem, and ecosystem impacts during the lapse of time between filling functioning wetlands and development of mitigation wetlands.

4.3.7 Air Quality

Air quality includes issues about particulates, chemical emissions, radioactivity, and air-shed re-designation. Particulate issues include impacts from dust, rail spur line construction and operation, the TMA and other ore and waste handling facilities, heavy metals, and burning of coal to produce electricity for the mine. Chemical emission issues include impacts from heavy metals causing acid rain, chemicals and reagents used in ore processing, and odors associated with the project. The radioactivity issue is focused on radioactivity impacts on air quality from the project. The air-shed re-designation issue is focused on impacts the mine would have on the Class I air re-designation over the Forest County Potawatomi Reservation.

4.3.8 Archaeological Resources

Archaeological resources includes issues about historic, cultural, and archaeological resources. Historic issues include impacts on National Register of Historic Places (NHRP) eligible sites located off the Mole Lake Reservation and/or on the NMC property, along transportation and utility corridors, and impacts from mine wastewater discharges and erosion. Cultural issues include cultural resource impacts on property controlled by NMC, on Native American burial sites within the Mole Lake Reservation, and along transportation and utility corridors, and impacts from mine wastewater discharges. Archaeology issues include impacts on property

controlled by NMC, on archaeological properties within the Mole Lake Reservation, along transportation and utility corridors, and on archaeologic resources from erosion.

4.3.9 Recreation

Recreation includes issues about the Wolf River, tourism, and water. Wolf River issues include impacts on its designation as an outstanding resource water and a Wild and Scenic River, fishing recreation, and protecting the state's investment in acquired shorelines and expenditures in trout populations. Tourism issues include impacts on regional tourism, and impacts from highway expansion resulting from the project. Water issues include indirect impacts on recreation from water quality degradation and groundwater drawdown affecting lake levels and stream flows.

4.3.10 Visual Resources

Visual resources includes issues about aesthetics and visual impacts. Aesthetic issues include impacts on the Wolf River, and impacts from mine development and night lighting. Visual impact issues are focused on changes the TMA and other mine facilities would have on local residents at Ground Hemlock Lake and the Mole Lake Reservation.

4.3.11 Environmental Justice

Environmental justice is focused on the potential for the mine to cause disproportionate risk to Native American Tribes in terms of demographic, geographic, economic, and human health and risk factors, cultural and ethnic differences, and historic and policy issues.

4.3.12 Noise

Noise issues include impacts on noise from mining activities, construction and operation of the rail spur line, pump stations, air vents and ventilation systems, and siting noise generators near sensitive receptors (private residences, schools, shops, and others).

4.3.13 Transportation

Transportation includes issues about rail, highway, and air transport systems. Rail transport issues include impacts from transporting hazardous materials, potential spills, increased rail traffic, and railroad/highway crossings. Highway and road issues include traffic congestion on the Mole lake Reservation, and upgrading and maintaining local forest and other roads. Air transport issues include impacts from air traffic and air space over the Mole Lake Reservation.

4.3.14 Mineral Resources

Mineral resource issues include impacts on existing mineral rights and claims, on ore bodies adjacent to the proposed mine site, and impacts from mining and processing unanticipated elements.

4.3.15 Land Use Plans and Conflicts

Land use plans and conflict issues include conformance of the project to Langlade County zoning ordinances and the Town of Ainsworth metallic mining regulations.

4.3.16 Cumulative Impacts

Cumulative impacts include issues about mining, ore processing, Native American tribes, and water. Mining issues include cumulative impacts of the project on mining across northern Wisconsin, increased exploration, supporting industries, and existing, planned and foreseeable mining activities. Ore processing issues include using NMC facilities at the Crandon mine for processing ore from other future mines, and smelting ore concentrates at an existing regional smelter. Native American tribe issues are focused on cumulative environmental impacts in the Chippewa ceded territory. Water issues include potential cumulative impacts on water quality in the Wolf River from discharges of treated mine wastewater and cumulative impacts from interrelated water projects in northern Wisconsin.

4.4 Issues Eliminated from Further Analysis

Some of the issues raised during the public scoping process have been eliminated from further analysis. These issues were eliminated because they were beyond the scope of the EIS or no longer apply because of changes made in the project by the applicant. The issues eliminated from further analysis (see Table A-3 in Appendix A) will not appear in the EIS.

APPENDIX A

Table A-1
Summary of Consolidated Issues
Crandon Mine Project EIS

Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Air Quality	What impacts would occur on air quality from development and operation of the mine?	42
Air Quality	What impacts would occur on air quality from dust released from on or off site?	8
Air Quality	Would there be odors associated with the mining and increased transportation use?	5
Air Quality	What would be the possibility of leakage of heavy metals causing acid rain?	5
Air Quality	What impacts would result from construction and operation of the railroad spur in terms of construction disturbance, railroad operations, and use of herbicides?	3
Air Quality	What impact would occur on air quality from the TMA and other ore and waste handling facilities?	3
Air Quality	What impact would occur on air quality from water evaporating from the tailings pond(s)?	2
Air Quality	What impact would occur on air quality from increased particulate matter emissions containing heavy metals?	2
Air Quality	What impact would occur on air quality from chemicals used in the ore processing?	2
Air Quality	What radioactivity impacts would occur on air quality from the mining activities?	2
Air Quality	What air quality impacts would the mine have on the Forest County Potawatomi Reservation given their pending Air Redesignation?	2
Air Quality	What impact would occur on air quality from increased use of coal to produce electricity for the mine?	1
Air Quality	What impacts would booster stations have on air quality?	1
Alternatives	Look at alternative locations of mining and TMA operations on lands that do not contain such valuable, numerous, and sensitive environmental resources	4
Alternatives	Look at the alternative of processing all the tailings into saleable products to reduce the amount of "salt cake" to be deposited in the tailings management area	3
Alternatives	The EIS should examine alternatives to the TMA, groundwater mitigation plan and surface water mitigation plan.	3
Alternatives	Would metal recycling and reduced use of metals be considered as an alternative?	3
Alternatives	What would be the feasibility of extracting all sulfide minerals from the ore and selling a concentrate for use elsewhere to avoid depositing pyrite minerals in the TMA?	2
Aquatic Resources	What fish and aquatic life impacts would occur in the Wolf River from Swamp Creek if it becomes polluted?	71
Aquatic Resources	What impacts would occur on fish in the streams and lakes on the Mole Lake Reservation and surrounding areas?	21

Table A-1
Summary of Consolidated Issues
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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Aquatic Resources	What impacts would occur on fish in surface waters contaminated by the mining operation or a toxic spill?	13
Aquatic Resources	What impacts would occur on aquatic life from lowered and erratic stream flow?	7
Aquatic Resources	What impacts would occur on the aquatic ecosystems in Swamp Creek and Rice Lake?	4
Aquatic Resources	What impacts would occur on spawning fish heading for Rice Lake from wastewater discharges below Rice Lake?	3
Aquatic Resources	What impacts would occur on aquatic organisms from bio-accumulation of heavy metals?	2
Aquatic Resources	What impacts would metal particles discharged as part of the total suspended solids have on the aquatic ecosystem?	1
Aquatic Resources	What impacts would chlorination used to oxidize cyanide compounds and potential formation of chlorinated organics from reaction of chlorine with organic compounds have on biota in Swamp Creek and the Wolf River?	1
Aquatic Resources	What impacts would occur on aquatic indicator species in lakes from bio-accumulation of heavy metals resulting from deposition of airborne contaminants?	1
Aquatic Resources	What impacts would organic chemicals used in ore processing and discharged as part of the treated effluent have on the aquatic ecosystem?	1
Aquatic Resources	What mitigation plans would be implemented to mitigate for the potential loss of aquatic habitat and fish in Creek 12-09, Creek 11-04, Upper Pickerel Creek, and Martin Springs and reduced dissolved oxygen levels in Rolling Stone Lake from the groundwater drawdown?	1
Aquatic Resources	How would aquatic resource mitigation efforts be coordinated with the current non-degradation standards in Ainsworth and Langlade County mining ordinances and regulations?	1
Aquatic Resources	What impacts would occur on interjurisdictional fish species?	1
Archaeological Resources	What impacts would occur on the Oak Lake Sites and other sites located off the Mole Lake Reservation that are eligible for listing on the National Register of Historic Places?	34
Archaeological Resources	What cultural, historical, and archaeological impacts would occur on property controlled by NMC?	7
Archaeological Resources	What construction expansion impacts would occur on known burial sites and state historical markers immediately adjacent to major highways, proposed rail spur line, and electrical transmission corridor upgraded to support the mine?	5
Archaeological Resources	What would be the impacts of mine water discharges on traditional burial and historical resources in the immediate area of the mine site?	2

Table A-1
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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Archaeological Resources	How would the proposed mine impact archaeological properties and burial sites located on the Mole Lake Reservation?	2
Archaeological Resources	What impacts would occur on archaeologic and historical resources from erosion?	1
Cumulative Impacts	What would be the impact of NMC's proposal on mining across Northern Wisconsin, focus on increased exploration, and potential extraction of smaller deposits to use Crandon facilities?	7
Cumulative Impacts	What would be the cumulative effects of the metallic mining activity and its supporting industries in northern Wisconsin?	6
Cumulative Impacts	What would be the impact of all known plans for mining in northern Wisconsin?	5
Cumulative Impacts	What would be the impacts on all resources from associated existing, planned and foreseeable activities in the area of the mine?	5
Cumulative Impacts	What potential cumulative impacts could occur on water quality in the Wolf River from regulated discharges of treated mine wastewater?	3
Cumulative Impacts	What cumulative impacts would result from interrelated water projects in the project area?	2
Cumulative Impacts	What would be the cumulative impacts on the environment in the Chippewa ceded territory?	2
Cumulative Impacts	What would be the cumulative impact of the project from smelting the ore concentrates at an existing regional smelter and how much would mercury levels increase at the smelter?	2
Ecosystem	What impacts would occur on federal natural resources?	320
Ecosystem	What effect would this project have on the total ecosystem?	28
Ecosystem	How would the Wolf River ecosystem and biological components be impacted and to what extent?	15
Ecosystem	What would be the extent of physical, chemical, and biological effects on the ecosystem including impacts on wild rice, trout, bald eagle, sturgeon, waterfowl, mussels, invertebrate, and other contaminant transport issues?	8
Ecosystem	What impacts would occur on the ecosystem during the lapse of time between filling of functioning wetlands and development of mitigation wetlands?	1
Environmental Justice	Would the mine project cause a disproportionate risk to Native American Tribes in terms of demographic, geographic, economic, and human health and risk factors, cultural and ethnic differences, and historical and policy issues?	12
Groundwater Hydrology	What impacts would occur on groundwater levels and associated shallow lakes from mine dewatering?	44

Table A-1
Summary of Consolidated Issues
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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Groundwater Hydrology	What impacts would occur on groundwater quantity in private wells in the surrounding area and locations such as, Town of Ainsworth, Appleton, and Mole Lake Reservation, from groundwater draw down?	37
Groundwater Hydrology	What impacts would occur on the aquifers associated with lakes and creeks such as Swamp Creek, Rice Lake, Deep Hole Lake, Pickerel Lake, Rolling Stone Lake, Lake Lucerne, Ground Hemlock Lake, and Mole Lake?	36
Groundwater Hydrology	How would water resources be protected and project-related impacts on water be prevented?	23
Groundwater Hydrology	What impacts would occur on groundwater quantity from development and operation of the tailings management area including a worst-case failure scenario?	21
Groundwater Hydrology	What impacts would mitigation wells and water pumping for surface water mitigation in lakes have on groundwater levels?	4
Groundwater Hydrology	What impacts would occur on groundwater flow from the injection of grouting cement?	3
Groundwater Hydrology	Would groundwater quantities affected by mining operations be magnified under drought conditions?	3
Groundwater Hydrology	What would be the impact of the grouting plan in the worst-case analysis?	2
Groundwater Hydrology	What would be the impact under worst-case permeability assumptions?	2
Groundwater Hydrology	What impacts would occur on groundwater hydrology if the total capacity of the Soil Absorption System is different than the quantity of water pumped from the mine?	2
Groundwater Hydrology	How would tailings backfill operations impact groundwater movement and rebound of the water table?	2
Groundwater Hydrology	What groundwater impacts would occur in the Pickerel Creek Basin and would they be mitigated by using a Soil Absorption System?	2
Groundwater Hydrology	What impacts would result from blasting materials and the noise, vibration, and fracturing resulting from blasting?	1
Groundwater Hydrology	What impacts would mine inactivity and mine closure have on the flow of mine-intercept water used for mitigation and groundwater levels affecting streams and lakes until groundwater reaches the post-mining equilibrium?	1
Groundwater Hydrology	What impacts would mine dewatering and groundwater drawdown have on recharge periods under prolonged drought, rapid spring snowmelt, unusually heavy rainfall, and average conditions over a 20 to 25 year period?	1
Groundwater Hydrology	What impacts would occur on groundwater flow directions because of the SAS discharge?	1

Table A-1
Summary of Consolidated Issues
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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Groundwater Hydrology	What would be the impact on public rights from the installation of mitigation wells that could enlarge and/or deepen the groundwater cone of depression?	1
Groundwater Hydrology	What impact would result from more water flowing into the mine than predicted, requiring the cone of depression to extend further than anticipated?	1
Groundwater Hydrology	What measures would be taken to prevent impacts on private wells?	1
Groundwater Quality	What impacts would occur on groundwater quality from development and operation (including a leak or spill) of the tailings management area?	57
Groundwater Quality	What groundwater quality impacts would occur over the long-term?	34
Groundwater Quality	What impacts would occur on groundwater quality in private wells in the surrounding area and locations such as, Town of Ainsworth, Appleton, and Mole Lake Reservation from groundwater draw down?	30
Groundwater Quality	What impacts would occur on groundwater quality from acid mine drainage and other solute transport after mine re-flooding?	11
Groundwater Quality	How would chemicals (including petroleum products) and any hazardous wastes be stored, handled, transported, and disposed of, what spill prevention response measures would be used, and what impacts could be associated with releases of these materials?	8
Groundwater Quality	What impacts would loss or change of wetlands have on the water quality (filtering and cleansing) of water entering the groundwater?	7
Groundwater Quality	What would be the impact on groundwater quality from injection of grouting cement?	4
Groundwater Quality	What would be the impact on groundwater quality from the SAS under a worst-case flow?	4
Groundwater Quality	What mitigation measures would be implemented to supply drinking water to the Mole Lake Reservation if wells become contaminated from the mine activities?	3
Groundwater Quality	What surface and ground water contaminants would result from equipment operations, explosives use, petroleum and hydraulic fluids, and other chemicals used on-site?	3
Groundwater Quality	What contamination impacts would occur on the Mole Lake Reservation aquifer by injection of chemicals in any one of the underground tunnels that would be filled with tailings or other mining debris?	3
Groundwater Quality	What radioactivity impacts would occur on groundwater quality from the mining activities?	1

Table A-1
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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Groundwater Quality	What impacts would 100 years of freeze and thaw, expansion and contraction, have on the TMA and how would freezing of the tailings affect the integrity of the liner and berms?	1
Groundwater Quality	How would other minerals found in the ore interact with the geo-membrane liner proposed to contain the waste rock and tailings?	1
Groundwater Quality	What synergistic impacts would all exposed minerals have on groundwater quality in a high sulfur and possibly oxygen-enriched environment?	1
Groundwater Quality	How would discovery of additional minerals in the mined ore affect groundwater quality?	1
Groundwater Quality	What impacts would occur on the quality of groundwater discharged by wetlands?	1
Groundwater Quality	What would be the impacts of confining waste rock and tailings to the TMA for eternity?	1
Health and Safety	What impacts would occur on Tribal members from living in a degraded and contaminated environment?	50
Health and Safety	What mental anguish, anxiety, and stress impacts would the mine have on tribal members from environmental degradation, relocation and TMA failure fears, health risks, and termination fears?	10
Health and Safety	What impacts would occur on the health, safety and welfare of the local people from development and operation of the mine?	10
Health and Safety	What would be the impact of noise on Wolf River users and inhabitants of the area?	7
Health and Safety	What health impacts such as learning ability impacts would occur on Sokaogon-Chippewa Tribe members and their children from ingesting dissolved metals through food and drink?	5
Health and Safety	What impacts would occur on health and safety from the storage and use of hazardous materials, (sodium cyanide, methyl isobutyl carbinol)?	4
Health and Safety	What potential safety impacts would the mine have on workers and the public within the mine site and surrounding the mine site?	4
Health and Safety	What would be the impact of likely disaster scenarios over the life of the mine?	4
Health and Safety	What public health impacts would occur on the non-Tribal residents living in the surrounding area?	4
Health and Safety	What public health and safety impacts would occur on the Sokaogon-Chippewa tribal members?	3
Health and Safety	What would be the impact on human health and safety from hazardous material spills due to a transportation accident?	3
Health and Safety	What radioactivity impacts would occur on public health from the mining activities?	3

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Health and Safety	What impacts would occur on Tribal members consuming fish that contain bio-accumulated heavy metals?	3
Health and Safety	What impacts would occur on health from decreased air quality resulting from increase in emissions especially heavy metals?	3
Health and Safety	What noise impacts would occur on the Sokaogon-Chippewa Tribe as people move into the area surrounding Mole Lake Reservation?	2
Health and Safety	What public health impacts would occur on the Sokaogon community from exposure to radioactive emissions generated from above ground and underground mining activities?	2
Health and Safety	What impacts would occur on human health as a result of mercury releases from the wetting and drying of wetland perimeters and lake shoreline?	1
Health and Safety	What impacts would occur on health and safety due to increased traffic counts?	1
Health and Safety	How would impacts on wild rice in Rice Lake affect the diet of the Sokaogan-Chippewa and other Chippewa tribes in the ceded territory?	1
Health and Safety	What secondary air quality impacts would occur on the Sokaogon-Chippewa Tribe as people move into the area surrounding Mole Lake Reservation?	1
Health and Safety	What public health impacts, such as cancer and related illnesses, would the electrical transmission lines have on local citizens?	1
Health and Safety	What public health impacts would occur on Sokaogon-Chippewa children from toxic spills and discharges of lead, nickel, and cadmium?	1
Health and Safety	What would be the public health risks associated with mining the lead deposits on the mine site?	1
Health and Safety	What air quality impacts would occur on Native Americans and others from smelting the ore concentrates at an off-site smelter such as the Copper Range Company?	1
Health and Safety	What air quality impacts would occur on residents of Ground Hemlock Lake?	1
Health and Safety	Would the Sokaogon-Chippewa and the Forest County Potawatomi tribes be susceptible to health impacts from the cumulative effects of heavy metals in the air, water, and animals ingested in their diet?	1
Health and Safety	How would the mining company assure that waters flowing into the Menominee Reservation are clean so the fish and game the tribal members gather for food is healthful and uncontaminated?	1
Indian Trust Assets	What impacts would the mine have on Indian Trust Assets?	393
Indian Trust Assets	How would Indian reserved water rights be impacted by the mine dewatering?	10

Table A-1
Summary of Consolidated Issues
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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Indian Trust Assets	What adverse impacts would occur on Tribal member's uses of the Wolf River?	5
Indian Trust Assets	What impacts would the mine have on treaty rights?	5
Indian Trust Assets	How would harvest resources be protected on federal and other lands impacted by the proposed mining project?	5
Indian Trust Assets	What are the impacts on Tribal uses of water and aquatic resources stemming from the proposed mine?	4
Indian Trust Assets	How would fishing and hunting rights protected by Treaty be impacted by the mining activities?	4
Indian Trust Assets	How would off-reservation harvest rights be protected on non-federal lands impacted by the proposed mining project?	3
Indian Trust Assets	What impacts would occur on fishing, hunting, and gathering plants and medicines off the Mole Lake Reservation?	3
Indian Trust Assets	What impacts would occur on Chippewa Treaty harvest rights in the ceded territory?	3
Indian Trust Assets	What impacts would loss of fisheries have on subsistence activities by Native Americans?	3
Indian Trust Assets	How would mitigation water discharged into Swamp Creek impact wild rice and native fish, two traditional Chippewa foods, in Rice Lake,	2
Indian Trust Assets	What impacts would occur on tribal resources from a spill of hazardous materials?	2
Indian Trust Assets	How would tribal harvest rights under the Voigt Decision be impacted in the Nicolet National Forest from loss of fish and wildlife by environmental degradation?	2
Indian Trust Assets	How would the cumulative effects of other existing and proposed mining operations impact Sokaogon-Chippewa treaty hunting and fishing rights?	2
Indian Trust Assets	What impacts would blasting at the mine site have on the Treaty resources?	1
Indian Trust Assets	What impacts would occur on Indian Trust Assets from failure of the TMA and/or its liner system?	1
Indian Trust Assets	What impacts would occur on affected trust lands including the Forest County Potawatomi Community of Wisconsin, Menominee Indian Tribe of Wisconsin, the Oneida Tribe of Indians of Wisconsin, the Sokaogon-Chippewa (Mole Lake) Community of Wisconsin, and the Stockbridge-Munsee Community of Wisconsin?	1
Indian Trust Assets	What impacts would occur on property rights for hunting, fishing, and gathering in the proposed project area for the Bad River, Red Cliff, Lac Courte Oreilles, Lac du Flambeau, St. Croix, Sokaogon-Chippewa (Mole Lake), and Lac Vieux Desert Indians in Wisconsin and Michigan?	1

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Land Use Plans and Conflicts	How would the project conform to the Langlade County zoning ordinances and the Town of Ainsworth metallic mining regulations?	1
Mineral Resources	What impacts would result from mining and processing unanticipated elements such as mercury, radium 226, uranium, vanadium, lead, molybdenum, titanium, cobalt, platinum, iron, nickel, tin, chromium, antimony, silver and gold?	2
Mineral Resources	What mineral resource impacts would occur on ore bodies adjacent to the proposed mine site?	1
Mineral Resources	What impacts would occur on existing mineral rights and claims?	1
Noise	What noise impacts would occur from the mining activities?	10
Noise	What impacts would result from construction and operation of the railroad spur on noise levels?	5
Noise	What noise impacts would be associated with pipeline pump stations, air vents and booster stations? How would they be sited in relation to private residences?	1
Project Description	Would complete reclamation of the mine be possible, including the sulfide waste?	11
Project Description	How long would the tailings remain reactive? What would be the life expectancy of the liner? What would be the freeze and thaw dynamics of the soils? What would happen in a worst-case scenario?	4
Project Description	What would be the worst-case scenario of failure of the tailings area?	4
Project Description	Would the EIS include a thorough analysis of the TMA's ability to meet compliance standards?	3
Project Description	What financial mechanism would be in place after mine closure to assure long-term maintenance of the TMA, and long-term treatment of any contaminated water, if required?	2
Project Description	What size of earthquake would cause failure of the TMA and what kind of impacts would occur from such failure?	2
Project Description	How would groundwater levels be monitored around the TMA, the project boundary, and outside of the project boundary?	2
Project Description	Would there be up-lifting capillary pressure on the water table from the pressure of the tailings with 18 feet between the bottom of the TMA and the top of the water table?	1
Project Description	How would freeze-thaw damage to the TMA liner be prevented considering that the frost depth can be 8 feet?	1
Project Description	What "state of the art" technology would be incorporated into the mine and how would it prevent the type of mining-impacts that have historically taken place?	1
Project Description	What is the demand for the zinc, copper, and lead ore in the Crandon deposit?	1

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Project Description	What direct and indirect impacts would occur from potential subsidence caused by groundwater drawdown and/or underground mining?	1
Project Description	How would groundwater quality be monitored around the TMA, the project boundary, and outside of the project boundary?	1
Project Description	Would pore water be removed from the re-flooded mine or would passageways, shafts, and working areas be filled?	1
Project Description	How would waste from radioactive hotspots in the ore body be treated and what impacts would potential radioactivity have?	1
Project Description	Would the cost of mine reclamation be covered by the mining company?	1
Project Description	What reclamation steps would be utilized to minimize the possibility of water and oxygen entering or leaving the TMA?	1
Project Description	How would wastewater flows be monitored for leakage and how much flow variance would be allowed before determining if there is a leak?	1
Project Description	What contingency plans would be followed if the TMA failed and caused contamination of water quality?	1
Project Description	What contingency plans would be in place to deal with contamination caused by acute spills and chronic releases of contaminants?	1
Project Description	What contingency plans would be in place to deal with a long-term shutdown of the water treatment facilities and failure or leakage of water from the reclaim pond and TMA?	1
Project Description	What guarantee can NMC provide that process water would not be discharged to surface waters?	1
Project Description	What impacts would occur from equipment left in the mine?	1
Project Description	What reagents and how much would be used in the flotation process for concentrating zinc, copper, lead, gold, silver, and what byproducts would go into solution in the TMA?	1
Recreation	How would sulfide mining at the headwaters of the Wolf River affect its designation as an outstanding resource water and a Wild and Scenic River?	60
Recreation	What impacts would the mine have on the Wolf River fishing tourist industry?	17
Recreation	What impacts on tourism would occur from the mining activity?	13
Recreation	What secondary impacts would occur on fishing, boating, drinking water, vacationing, hunting, and hiking associated with any degradation of water quality?	9
Recreation	What impacts would occur on recreationists from changes in streams and lakes resulting from groundwater draw down?	2

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Recreation	How would the state's investment of $65 million in acquired shorelines on 35 miles of the Wolf River in Langlade County and their expenditures in stocking and perpetuating the trout population be protected from degradation by mining?	1
Recreation	What would be the short- and long-term impacts on tourism in Forest, Oneida and Langlade counties from highway expansion related the mining project?	1
Short-Term, Long-Term	What would be the short-term, private benefits of NMC's proposal and its long-term public detriments?	7
Short-Term, Long-Term	What would be the long-term impacts of the project in perpetuity?	1
Socioeconomics	What would be the economic benefits from the mine development and operation?	31
Socioeconomics	What impacts would occur on community economics from the boom and bust economy associated with the mine?	27
Socioeconomics	What impacts would occur on the tourism industry from contamination on any part of Wolf River watershed?	17
Socioeconomics	What would be the long term and worst-case socioeconomic impacts?	15
Socioeconomics	What demands would occur on local services, government, roads, water, power, housing, schools, police and fire, social services resulting from increased population during the construction phase and operation phase?	12
Socioeconomics	What impacts would occur on crime, land use, property values and tourism economy?	11
Socioeconomics	What impacts would occur on property values from contamination of adjacent properties and the real estate disclosure law requiring the reporting of any toxics on real property or neighboring properties?	11
Socioeconomics	What socioeconomic impacts would occur on the Mole Lake Band of the Sokaogon-Chippewa Tribe from the development and operation of the mine?	8
Socioeconomics	What economic impacts would occur on Crandon, Mole Lake, and western Forest County?	8
Socioeconomics	What would be the socioeconomic, cultural, spiritual, and subsistence impacts on the Tribes?	6
Socioeconomics	What employment impacts would occur with the mine?	6
Socioeconomics	What secondary impacts would occur because of population growth related to the mine project?	5
Socioeconomics	What would be the impact on economic growth in the region?	5
Socioeconomics	What socioeconomic impacts would occur on the community from temporary shutdowns and early closure of the mine?	4

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Socioeconomics	What social impacts would occur on the Sokaogon-Chippewa Tribe as people move into the area surrounding Mole Lake Reservation?	3
Socioeconomics	What impacts would occur on local businesses from competition for skilled workers including licensed electricians, certified welders, and equipment operators?	3
Socioeconomics	What impacts would occur on regional economics from inadequate financial assurances to address disaster scenarios and other environmental, health and safety concerns?	3
Socioeconomics	What economic impacts would occur from recruiting employees from outside the immediate area?	3
Socioeconomics	What impacts would occur on the "well-being" of the Sokaogon-Chippewa Tribe?	3
Socioeconomics	What alienation impacts would occur on Sokaogon-Chippewa children from racism in schools and surrounding communities as the population increases?	2
Socioeconomics	What would be the socioeconomic impact of supplying and operating the equipment and concrete requirements associated with the grouting plan?	2
Socioeconomics	What economic impacts would occur on the Sokaogon-Chippewa Tribe from loss or decline of wild rice in Rice Lake caused by the mining activities?	2
Socioeconomics	What would be the total socioeconomic impact, including the costs of environmental cleanup of the mine, over the long-term?	2
Socioeconomics	What indirect impacts would occur on the owners of second homes and their property values during and after the mining project?	2
Socioeconomics	What effect would the mine have on people in the Nashville and Crandon areas?	2
Socioeconomics	What impacts would occur on the Mole Lake Reservation from having to install a central sewer system with a pond to treat the wastewater to meet increased demand for utilities?	1
Socioeconomics	How would noise from the mine impact the tourism industry?	1
Socioeconomics	What would be the technical, environmental, and socioeconomic impacts on the Town of Ainsworth and Langlade County?	1
Socioeconomics	What would be the economic impact of a "worst-case" environmental degradation problem in the event the mining company declares bankruptcy?	1
Socioeconomics	What impacts would the public perception of clean water and potential degradation of water quality have on tourism and recreation expenditures?	1

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Socioeconomics	What potential impact would a change in flow rates, caused by the mining project on tributary streams and the Wolf River or a delayed period of recharge, have on the tourism and recreation industry and associated property values?	1
Socioeconomics	How would employment within each sector of the economy in the non-urban counties of northern Wisconsin change over the life of the project and beyond?	1
Socioeconomics	How would retail and wholesale sales and commerce in the non-urban counties of northern Wisconsin change over the life of the project and beyond?	1
Socioeconomics	What impacts would occur on the number and size of businesses in the study area and northern Wisconsin during the project and following reclamation?	1
Socioeconomics	What impacts would occur on single entrepreneurs such as independent contractors, farmers, laborers, and small business owners?	1
Socioeconomics	How would the project affect hospitality-recreation-tourism sales in the non-urban counties of northern Wisconsin?	1
Socioeconomics	What indirect impacts would the project have on the tourism markets (Green Bay, Milwaukee, Madison, Chicago, Minneapolis, and St. Paul) that are the basis of the tourism industry in northern Wisconsin?	1
Socioeconomics	How would the project affect seasonal and year-round housing over the life of the mine and after reclamation?	1
Socioeconomics	What non-linear impacts would occur from rapid population influx on the economy and social disruption on the local culture, with potential increased rates of crime, mental illness, alcoholism, and child abuse and corresponding increased burden on public revenues and expenditures?	1
Socioeconomics	What true tax impacts would the project have from negative economic factors including crime, welfare, increased social services, law enforcement, jails, and unemployment?	1
Socioeconomics	What environmental impacts and costs would occur from population growth and new construction activity in terms of runoff, water pollution, and solid waste?	1
Socioeconomics	What would be the magnitude of change in health services, human services, and social services and the economic impact of each service during and after the mining project?	1
Socioeconomics	How would local government revenues and expenditures change over the life of the project and beyond?	1
Socioeconomics	How would school district expenditures change over the life of the project and after mine reclamation?	1
Socioeconomics	What are the housing build-out conditions for the area and how likely are they to be maintained following closure of the mine?	1

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Socioeconomics	What are the projected changes in affordable housing in the area as regional development occurs in conjunction with mining construction and operations?	1
Socioeconomics	What socioeconomic impacts would occur on home prices from the expected level of new home construction?	1
Socioeconomics	What would be the level of displacement of current low- and moderate-income residents because of escalating land and housing prices over the life of the mine?	1
Socioeconomics	How would employment, income, and housing for affected Native American communities change over the life of the project and beyond?	1
Socioeconomics	What impact would the project have on the quality and quantity of resources and their subsequent influence on the economy?	1
Socioeconomics	How would the regional, county, and local land market, values, and uses change over the life of the project and after reclamation?	1
Socioeconomics	How would the project affect seasonal employment in northern Wisconsin during and after mining?	1
Socioeconomics	Would the mine be conducive to building a sustainable economy in the local communities?	1
Socioeconomics	What would be the magnitude of impacts on the forestry and wood products, agriculture, and tourism industries in northern Wisconsin during and after the mining project?	1
Socioeconomics	What impacts would occur from potential population gains and housing demands in the towns of Langlade, Wolf River, Evergreen, Ainsworth, Price, Polar, Norwood, Parrish, Enterprise, Schoepke, Laona, Wabeno, and Freedom, and in the villages of White Lake and Elcho?	1
Socioeconomics	What intangible impacts would occur on people, their culture and community as rapid changes take place?	1
Socioeconomics	How would the mine affect the quality of life for those people living in the immediate area of the mine?	1
Socioeconomics	How would Town of Ainsworth revenues from forest crops be affected by changes in air quality, water quality and groundwater drawdown?	1
Socioeconomics	What would be the economic impact of sulfates and other contaminants in the groundwater on humans and animals?	1
Surface Water Hydrology	What would be the impacts of the mine on waterfalls in the Wolf River?	31
Surface Water Hydrology	What impacts would occur on lakes and streams from groundwater draw down?	30
Surface Water Hydrology	How would water resources be protected and project-related impacts to water be prevented?	18

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Surface Water Hydrology	What impacts would occur on surface water resources from the development of the TMA including a worst-case failure?	15
Surface Water Hydrology	What impacts would occur on entire Wolf River watershed all the way to Lake Winnebago?	14
Surface Water Hydrology	What impacts would occur on the Swamp Creek-Rice Lake watershed?	8
Surface Water Hydrology	What impacts would occur on Swamp Creek from discharging mitigation water at a specific point rather than throughout the present zone of discharge?	5
Surface Water Hydrology	What would be the impact of groundwater draw down of lakes on ability to maintain Public Rights stages?	4
Surface Water Hydrology	What impacts would occur on surface waters from the SAS under a worst-case flow?	3
Surface Water Hydrology	What impacts would occur on hydrology in the Swamp Creek, Pickerel Creek, and Lily River watersheds?	3
Surface Water Hydrology	Would surface water quantities affected by mining operations be magnified under drought conditions?	3
Surface Water Hydrology	What surface water impacts would occur on Ground Hemlock Lake from operation of the TMA?	3
Surface Water Hydrology	What impacts would occur on Wolf River flooding problems from mine operation?	2
Surface Water Hydrology	What impacts would occur on surface area of affected lakes?	2
Surface Water Hydrology	What impacts would mine dewatering and groundwater drawdown have on flow rates of tributary streams and the Wolf River under prolonged drought, rapid spring snowmelt, unusually heavy rainfall, and average conditions over a 20 to 25 year period?	2
Surface Water Hydrology	How would Duck Lake and Sand Lake be impacted by the mine water discharges?	1
Surface Water Hydrology	What impacts would occur on receiving waters from using mitigation water that has an erratic supply and would result in large fluctuations in lake levels and stream flows?	1
Surface Water Hydrology	What impacts would disruption of natural hydrologic processes have on shoreline erosion and sediment accretion rates?	1
Surface Water Hydrology	How would the proposed pipeline be kept from freezing so serious leaks would not develop during severe winter temperatures?	1
Surface Water Quality	What would be the short- and long-term impacts on the Wolf River and Fox River from surface water contamination associated with the mining?	112
Surface Water Quality	What impacts would occur on area streams and lakes from a leak in the TMA liner or a failure of the TMA?	56
Surface Water Quality	What impacts would occur on water quality from acid mine drainage?	26

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Surface Water Quality	What impacts would occur on the mine site complex and surrounding areas from toxic contamination, and how long would the impacts occur?	16
Surface Water Quality	What is the impact on adjacent water quality in Outlet Creek, Swamp Creek and Rice Lake from the Soil Absorption System (SAS) including a worst-case flow?	15
Surface Water Quality	What would be the potential contamination of Little Sand Lake, Pickerel Lake, Rolling Stone Lake, and Rice Lake by seepage from the mine waste disposal system?	14
Surface Water Quality	What impacts would occur on water resources from a hazardous material spill caused by a transportation accident or other uncontrolled toxic release?	13
Surface Water Quality	What would be the impact on water quality on Pickerel Lake, the Fox River and Wolf River systems, and the USACE locks caused by water quality contamination from mine operations?	13
Surface Water Quality	What would be the total flux of potential contaminants through downstream aquatic systems over time, including acidification, heavy metals, organics, bio-accumulation/bio-concentration, and other contaminant transport issues?	12
Surface Water Quality	What water quality impacts would occur on the 650-acre Rice Lake, Duck Lake or Sand Lake?	8
Surface Water Quality	What water quality impacts would occur on and off the Mole Lake Reservation from discharges of pollutants from the mining activities?	8
Surface Water Quality	What impacts would occur on Swamp Creek from heavy metals?	8
Surface Water Quality	What impacts would result from construction and operation of the railroad spur in terms of construction disturbance, railroad operations, and use of herbicides?	4
Surface Water Quality	What radioactivity impacts would occur on surface water quality from the mining activities?	3
Surface Water Quality	What impacts would loss of wetlands have on the water quality (filtering and cleansing) of water entering the Mole Lake Reservation?	3
Surface Water Quality	What impacts would occur on water quality from wetland changes along Swamp Creek and Pickerel Creek?	3
Surface Water Quality	What would be the impact on water quality from air emissions containing heavy metals, even if standards are met?	3
Surface Water Quality	What would be the impact on geochemistry of lake water from changes in lake stage and introduction of foreign mitigation water?	2
Surface Water Quality	What would be the impact of eventual water warming in the Wolf River caused by dewatered or decreased flow in feeder springs and streams?	2

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Surface Water Quality	What would be the impact of mine wastewater on water quality in Langlade, Evergreen, and Wolf River townships?	1
Surface Water Quality	What impacts would occur on Rolling Stone Lake from low dissolved oxygen?	1
Surface Water Quality	What impacts would occur from accumulating mercury in the on-site ore processing and off-site smelting?	1
Surface Water Quality	What kind of changes in pH would occur in surface waters?	1
Surface Water Quality	What potential impacts would occur on Devil's Lake from air emissions?	1
Surface Water Quality	What impacts would occur from contaminants trapped and stored in stream-bottom and lake-bottom sediments that are subsequently released?	1
Surface Water Quality	What is the potential impact of asbestos fibers in the waste rock and tailings that could be deposited in the TMA?	1
Surface Water Quality	What impacts would temporary storage of high sulfur content waste rock at the mine surface have on water quality?	1
Surface Water Quality	What would be the potential for oxidation of tailings and leachate, and how would resulting acid formation affect water quality?	1
Surface Water Quality	What impacts would occur from using pumped mitigation water that has inadequate or incompatible quality with surface waters?	1
Surface Water Quality	What contamination impacts would chronic releases of dust from rail cars have on streams, lakes, and the Wolf River, along rail lines?	1
Surface Water Quality	What contamination impacts would acute spills of ore concentrates, processing reagents, and other chemicals have on streams, lakes, and the Wolf River along rail lines?	1
Surface Water Quality	How would potential mining and processing of other elements affect the water treatment plant discharges and downstream resources?	1
Surface Water Quality	How would other minerals found in the ore react once exposed to biological organisms such as bacteria and migratory birds?	1
Surface Water Quality	How would discharges of treated wastewater affect the dissolved oxygen content of receiving waters?	1
Surface Water Quality	What impacts would occur on water quality from discharging treated wastewater into Swamp Creek?	1
Threatened and Endangered Species	What impacts would occur on threatened and endangered species from development and operation of the mine?	335
Threatened and Endangered Species	What impacts would occur on state listed and potential Federal listed plants?	5
Threatened and Endangered Species	What impacts would occur on listed species from wetland alteration?	3

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Threatened and Endangered Species	What impacts would occur on endangered plant species from trampling of the forest floor and pumping large quantities of water from the groundwater aquifer?	1
Threatened and Endangered Species	What effects would occur on endangered clam species?	1
Threatened and Endangered Species	What effects resulting from mine discharges would occur on bald eagles and their habitat along the Wolf River and Rice Lake?	1
Threatened and Endangered Species	What impacts would the proposed project have on federal candidate threatened and endangered species?	1
Traditional Cultural Properties	What would be the impacts on the cultural tradition of Native American people?	66
Traditional Cultural Properties	What impacts would loss or degradation of the wild rice in Rice Lake have on the culture and tradition of the tribal members?	13
Traditional Cultural Properties	What impacts would occur on Spirit Hill where Sokaogon-Chippewa relatives are buried and how would burial sites be protected?	6
Traditional Cultural Properties	What impacts would occur on cedar trees used for medicine?	3
Traditional Cultural Properties	What would be the impacts of mine water discharges on traditional burial and historical resources in the immediate area of the mine site?	3
Traditional Cultural Properties	How would the legacy of the Sokaogon-Chippewa Tribe be impacted by the mining operation?	3
Traditional Cultural Properties	What impacts would occur on traditional cultural properties located on NMC's private land and other off-reservation areas?	3
Traditional Cultural Properties	What air quality impacts would occur on traditional medicine plants from airborne tailings and dust deposition?	2
Traditional Cultural Properties	What impacts would occur on Sokaogon-Chippewa ceremonial uses of water?	2
Traditional Cultural Properties	What is the impact on tribal cultural values from a change in wetland flora caused by a change in groundwater quantity and quality?	1
Traditional Cultural Properties	What impacts would occur on traditional cultural properties such as wild rice beds, water bodies, and mountaintops within the boundaries of the Mole Lake Reservation?	1
Traditional Cultural Properties	What impacts would the project have on proposed traditional cultural properties and sites eligible for National Register of Historic Places (Swamp Creek and Rice Lake)?	1
Transportation	What impacts would occur from the transporting hazardous materials (i.e., sodium cyanide, methyl isobutyl carbinol) and potential spills?	12

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Transportation	What traffic congestion impacts would occur on the Sokaogon-Chippewa Tribe as people move into the area surrounding Mole Lake Reservation?	2
Transportation	Who would pay for the upgrading and maintaining local forest and other roads?	2
Transportation	What air traffic impacts would occur from the proposed mining activities?	1
Transportation	What air space impacts would occur from air traffic over the Mole Lake Reservation?	1
Transportation	What impacts would occur from increased rail traffic?	1
Vegetation	What impacts would occur on plant species and their habitat from the mining activities?	35
Vegetation	What air quality impacts would occur on cedar, sugar maple, birch, oak, balsam, spruce, and tamarack trees from airborne tailings and dust deposition?	3
Vegetation	What air quality impacts would occur on traditional medicine plants from airborne tailings and dust deposition?	3
Vegetation	How would the Nicolet National Forest be impacted by the mine activities?	2
Vegetation	What impacts would result from construction of any required power transmission lines and expansion of power generation facilities and how will they be addressed?	2
Vegetation	What impacts would result from construction and operation of the railroad spur in terms of construction disturbance, railroad operations, and use of herbicides?	2
Vegetation	What impacts would occur on the environment from the introduction of exotic species brought in by mine-related transportation?	1
Vegetation	What impacts would the introduction of exotic species have on wild rice and other Tribal plant resources?	1
Vegetation	What contamination impacts would acute spills of ore concentrates, processing reagents, and other chemicals have on vegetation along rail lines?	1
Vegetation	What impacts would dewatering have on timber species since water may be unavailable to the root zones?	1
Vegetation	What contamination impacts would chronic releases of dust from rail cars have on vegetation along rail lines?	1
Visual Resources	What impacts would occur on aesthetics of the Wolf River, which is a Wild and Scenic River?	324
Visual Resources	What impacts would occur on aesthetic resources from mine development?	4
Visual Resources	What would be the impacts on aesthetics from night lighting at the mine?	1

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Visual Resources	What visual impacts would the TMA and other mine facilities have on residents of Ground Hemlock Lake?	1
Wetlands	What impacts would occur on wetlands?	320
Wetlands	What impacts would occur on wetlands from groundwater draw down?	44
Wetlands	What impacts would occur on wetlands from filling them to develop and operate the mine and from any associated infrastructure construction?	34
Wetlands	What would be the impact of TMA construction and operation on wetlands loss?	18
Wetlands	What would be the total wetland loss, functional values and replacement?	9
Wetlands	What impacts would occur on wetlands from acids and heavy metals entering the groundwater?	8
Wetlands	What indirect or secondary impacts would occur on wetlands as a result of the mining project?	7
Wetlands	What impacts would occur on wetlands from degradation of water quality?	6
Wetlands	What impacts would occur on wetlands from mitigation of different functions than those in wetlands directly and indirectly affected by the mine project?	4
Wetlands	What impacts would occur on wetlands upstream from the Mole Lake Reservation?	3
Wetlands	What impacts would result from construction of any required power transmission lines and expansion of power generation facilities and how will they be addressed?	3
Wetlands	What impacts would result from construction and operation of the railroad spur in terms of construction disturbance, railroad operations, and use of herbicides?	3
Wetlands	What would be the impact on wetlands from altered drainage patterns?	3
Wetlands	What impacts would occur on wetland habitats from the SAS because of groundwater mounding in uplands and flooding of existing wetlands?	3
Wetlands	What impacts would occur on wetlands from introduction of invasive and or exotic species from wetlands alteration?	2
Wetlands	What assurances are there that the mitigation wetlands would be protected and maintained after they are re-established?	2
Wetlands	What impacts would the mitigation wetlands have on the region since they are in a different watershed and different ceded territory?	2
Wetlands	What impacts would mitigation wells and water pumping for surface water mitigation in lakes have on wetlands?	2
Wetlands	What would be the impact on wetlands from erosion and dust?	1

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Wetlands	What impacts would occur on cedar swamps as wetlands are drained and water tables drop over the life of the proposed mine?	1
Wetlands	What would be the cumulative impacts on wetlands and the ecosystem within the mine site?	1
Wetlands	What would be the fate of the wetlands mitigation property if NMC does not use it for mitigation? Would it revert back to wetlands on its own?	1
Wetlands	What contamination impacts would acute spills of ore concentrates, processing reagents, and other chemicals have on wetlands along rail lines?	1
Wetlands	What contamination impacts would chronic releases of dust from rail cars have on wetlands along rail lines?	1
Wetlands	How would treated mine water discharged into wetlands affect the wetland functions and values?	1
Wetlands	What impacts would occur on wetland flora and fauna from mine dewatering and associated decreases in groundwater fluxes into wetlands?	1
Wetlands	Would the mitigation wetlands provide the same functions and values as wetlands that would be impacted along Swamp Creek and other areas of the project?	1
Wetlands	How would potential mining and processing of other elements affect the wetlands that could be filled?	1
Wetlands	What impacts would occur on the project area from implementing the off-site wetland mitigation?	1
Wetlands	What impacts would dewatering have on cedar swamps since water may be unavailable to the root zones?	1
Wetlands	What kind of plant and animal species live in potentially affected wetlands and what would be their fate if the mining occurs?	1
Wild Rice	What impacts would occur on wild rice from water quality degradation?	50
Wild Rice	What impacts would occur on wild rice in Rice Lake from leachates contaminating the wild rice beds and the materials that are to be handled in the tailings management ponds?	17
Wild Rice	What would be the impacts on the harvesting of wild rice by the Mole Lake People?	9
Wild Rice	What impacts would potential fluctuating water levels in Rice Lake have on wild rice production and survival?	5
Wild Rice	What impacts would occur on the wild rice from development occurring outside of the Mole Lake Reservation boundaries?	1
Wild Rice	How much heavy metal would accumulate in the fruit of the wild rice stalk?	1

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Resource Discipline	Issue or Concern About Resource	No. Times Issue Identified
Wild Rice	What impacts would occur on wild rice from changes in surface water geochemistry of Rice Lake and Swamp Creek?	1
Wildlife	What impacts would occur on wildlife and their habitats at the mine and down gradient?	49
Wildlife	What impacts would occur on birds and other wildlife from ingesting water in the TMA?	6
Wildlife	What impacts would occur on wildlife from transmission lines?	4
Wildlife	How would eagle and osprey nesting and range be impacted by air traffic and mine activity?	3
Wildlife	What air quality impacts would occur on waterfowl and their migration patterns from airborne tailings and dust deposition?	3
Wildlife	What air quality impacts would occur on birds of prey, songbirds, and ruby-throated hummingbird from airborne tailings and dust deposition?	3
Wildlife	What impacts would occur on deer herds and their migration patterns?	2
Wildlife	What impacts would occur on porcupine, bobcat, fisher, otter, and blackbear and their habitat?	2
Wildlife	What impacts would result from construction and operation of the railroad spur in terms of construction disturbance, railroad operations, and use of herbicides?	2
Wildlife	What would be the impact of increased noise levels on wildlife?	2
Wildlife	What air quality impacts would occur on turtles and frogs from airborne tailings and dust deposition?	2
Wildlife	What air quality impacts would occur on dragonflies, bees and pollination from airborne tailings and dust deposition?	2
Wildlife	What impacts would the proposed mining project have on bald eagles and other birds protected under the Migratory Bird Treaty Act?	2
Wildlife	What impacts would occur on wildlife from lowered and erratic stream flow?	1
Wildlife	What impact would occur on biota as a result of mercury releases from the wetting and drying of wetland perimeters and lake shoreline?	1
Wildlife	How would a dramatic increase in civilian population around the Mole Lake Reservation impact the deer herds?	1
Wildlife	What impacts would occur on pine marten habitat and range?	1
Wildlife	What indirect impacts would occur on wildlife habitat and wildlife from short-term demand for roads, houses, shops, schools, and other services?	1
Wildlife	What impacts would waterfowl and other birds have on spreading contaminants in the TMA?	1
Wildlife	What would be the impacts on nesting birds from wetlands loss?	1
Wildlife	What bio-accumulation impacts would occur on predator species that feed on fish contaminated with pollutants discharged by the project?	1

Table A-2
Ranking of Resource Issues
Crandon Mine Project EIS

Resource Category	Number of Issues Identified	Description of Top Issue
Wetlands	486	What impacts would occur on wetlands?
Indian Trust Assets	450	What impacts would the mine have on Indian Trust Assets?
Ecosystem	372	What impacts would occur on federal natural resources?
Threatened and Endangered Species	347	What impacts would occur on threatened and endangered species from development and operation of the mine?
Surface Water Quality	337	What would be the short- and long-term impacts on the Wolf River and Fox River from surface water contamination associated with the mining?
Visual Resources	330	What impacts would occur on aesthetics of the Wolf River, which is a Wild and Scenic River?
Socioeconomics	242	What would be the economic benefits from the mine development and operation?
Groundwater Hydrology	188	What impacts would occur on groundwater levels and associated shallow lakes from mine dewatering?
Groundwater Quality	171	What impacts would occur on groundwater quality from development and operation (including a leak or spill) of the tailings management area?
Surface Water Hydrology	147	What would be the impacts of the mine on waterfalls in the Wolf River?
Aquatic Resources	128	What fish and aquatic life impacts would occur in the Wolf River from Swamp Creek if it becomes polluted?
Health and Safety	128	What impacts would occur on Tribal members from living in a degraded and contaminated environment?
Traditional Cultural Properties	104	What would be the impacts on the cultural tradition of Native American people?
Recreation	103	How would sulfide mining at the headwaters of the Wolf River affect its designation as an outstanding resource water and a Wild and Scenic River?
Wildlife	90	What impacts would occur on wildlife and their habitats at the mine and down gradient?
Wild Rice	84	What impacts would occur on wild rice from water quality degradation?
Air Quality	78	What impacts would occur on air quality from development and operation of the mine?

Table A-2
Ranking of Resource Issues
Crandon Mine Project EIS

Resource Category	Number of Issues Identified	Description of Top Issue
Vegetation	52	What impacts would occur on plant species and their habitat from the mining activities?
Archaeological Resources	51	What impacts would occur on the Oak Lake Sites and other sites located off the Mole Lake Reservation that are eligible for listing on the National Register of Historic Places?
Cumulative Impacts	32	What would be the impact of NMC's proposal on mining across Northern Wisconsin, focus on increased exploration, and potential extraction of smaller deposits to use Crandon facilities?
Transportation	19	What impacts would occur from the transporting hazardous materials (i.e., sodium cyanide, methyl isobutyl carbinol) and potential spills?
Noise	16	What noise impacts would occur from the mining activities?
Environmental Justice	12	Would the mine project cause a disproportionate risk to Native American Tribes in terms of demographic, geographic, economic, and human health and risk factors, cultural and ethnic differences, and historical and policy issues?
Mineral Resources	4	What impacts would result from mining and processing unanticipated elements such as mercury, radium 226, uranium, vanadium, lead, molybdenum, titanium, cobalt, platinum, iron, nickel, tin, chromium, antimony, silver and gold?
Land Use Plans and Conflicts	1	How would the project conform to the Langlade County zoning ordinances and the Town of Ainsworth metallic mining regulations?

Note: In addition to issues raised on resource categories, issues also were raised on several other parts of the EIS. These were: alternatives (15 issues); project description (45 issues); and short-term vs long-term (8 issues).

Table A-3
Issues Eliminated From Further Analysis
Crandon Mine Project EIS

Issue or Concern	Reason For Elimination
What is the status of the pipeline alternative to the Wisconsin River?	No longer under consideration by the applicant. This feature has been replaced by the Soil Absorption System.
Look at a North Woods-wide assessment of the economics of no mining.	This issue is beyond the scope of this EIS.
Would forecasts for zinc and copper demand be factored into the economic analysis and examination of alternatives?	This issue is beyond the scope of the EIS and benefit cost analysis is not required under the Council of Environmental Quality (CEQ) regulations.
Could development of the mine be delayed until new technologies are developed to control groundwater impacts?	This alternative does not meet CEQ requirements that alternatives have to be feasible and reasonable.
Would alternatives to the mine be researched and compared to the proposed mine on a cost-benefit basis?	This issue is beyond the scope of the EIS and benefit cost analysis is not required under CEQ regulations.
How would a discharge to the Wisconsin River affect three rare dragonflies found below Hat Rapids Dam?	No longer under consideration by the applicant.
What impacts would reduced flow in the Wolf River watershed have on trout populations from discharging water to the Wisconsin River?	No longer under consideration by the applicant.
How would depressed zinc prices affect the feasibility and viability of the Crandon Mine?	This issue is beyond the scope of the EIS and benefit cost analysis is not required under CEQ regulations.
What is the market and economic analysis for zinc and copper?	This issue is beyond the scope of the EIS and benefit cost analysis is not required under CEQ regulations.
What would be the value of the proposed project compared to the value of preserving the natural resources of northern Wisconsin?	This issue is beyond the scope of the EIS and benefit cost analysis is not required under CEQ regulations.
What would be the secondary impacts on the mine on tourism and residential populations under a North Woods-wide economic assessment?	This issue is beyond the scope of this EIS.
What impacts would occur from an interbasin transfer of water (Wolf River to the Wisconsin River)?	No longer under consideration by the applicant.
How would a leak be found along the 38-mile pipeline especially if it is in sandy soils or wetlands?	No longer under consideration by the applicant.
How much, if any, leakage would be allowed from the pipe before the system would have to be shut down?	No longer under consideration by the applicant.
If pipeline had to be shut down, would the wastewater treatment plant have the capacity to handle the storage of untreated wastewater? What if there is excess water?	No longer under consideration by the applicant.
What impacts would the proposed waste load have on the Wisconsin River?	No longer under consideration by the applicant.
What would be in the treated discharge water and how would it impact the existing condition of the Wisconsin River water and bottom structure?	No longer under consideration by the applicant.

Table A-3
Issues Eliminated From Further Analysis
Crandon Mine Project EIS

Issue or Concern	Reason For Elimination
What impacts would occur on each dam impoundment on the Wisconsin River downstream of Hat Rapids Dam as a result of discharged pollutants?	No longer under consideration by the applicant.
How much mercury would be discharged into the Wisconsin River in the treated mine wastewater?	No longer under consideration by the applicant.
What temperature impacts would occur from treated wastewater traveling 38 miles in an underground pipe to the Wisconsin River?	No longer under consideration by the applicant.
What impacts would occur from discharge of treated wastewater during high runoff (flooding) conditions on the Wisconsin River?	No longer under consideration by the applicant.
What impact would transporting live organisms via the pipeline from one watershed (Wolf River) to another (Wisconsin River) have on disrupting the natural balance in each watershed?	No longer under consideration by the applicant.
What impact would the discharge to the Wisconsin River have on sediment quality? Would the micro-particles discharged in suspension increase turbidity in the Wisconsin River? Would the sediment be re-suspended?	No longer under consideration by the applicant.
How far down the Wisconsin River would metals discharged from the wastewater outfall be transported?	No longer under consideration by the applicant.
What impacts would occur from drawdowns in Nokomis, Willow, Jersey and Spirit reservoirs to flush additional contaminants and BOD resulting from this project as has happened for the paper mills?	These impacts would not occur because the pipeline to the Wisconsin River is no longer under consideration by the applicant.