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# **Editorial Note**

Page 25 of this report has been updated since its submission to the State Executive Council to more fully explain the limitations on leasing state owned lands within the cores of the eighteen ecologically significant peatlands.

## EXECUTIVE SUMMARY

PURPOSE OF REPORT

STATUTORY AND CONSTITU-TIONAL DIRECTION, SUSTAINABLE DEVELOPMENT AND DEPARTMENT'S MISSION This report provides additional background information to questions regarding mineral managment raised at the January 30, 1991 State Executive Council meeting.

The report covers sustainable development; the state's mineral potential; the state metallic minerals leasing program; environmental studies, research and review; the regulatory permitting process; and economic impacts.

Minnesota Statutes, sec. 120.85, requires the commissioner of natural resources to "... secure the maximum long-term economic return from the school trust lands consistent with the fiduciary responsibilities imposed by the trust relationship established in the Minnesota Constitution, with sound natural resource conservation and management principles, and with other specific policy provided in state law."

The idea of "sustainable development," as put forth by the U.N. World Commission on Environment and Development, emphasizes the need to address environmental concerns at the same time as economic, trade, energy and agricultural needs, so that the needs of the present do not compromise the ability to meet those of the future.

The Department of Natural Resources' mission, as expressed in a January 1991 report, is to preserve, protect and enhance the state's natural resources to "benefit the environment, economy and quality of life of all Minnesotans, present and future."

Environmental concerns are an integral part of minerals management and are included in every mineral activity under the jurisdiction of the Department of Natural Resources.

Recycling is also an important aspect of minerals management; and although the amounts of recycling are increasing, mining will continue to be needed due to constraints of collection, impurities, and increased world demand.

# MINERAL POTENTIAL, MINERAL EXPLORATION, AND STATE FUNDING

The bedrock geology present in Minnesota is similar to certain areas in Canada, Australia, South Africa, U.S.S.R., South American and Scandinavia, where many ore deposits occur. The potential exists to find precious metals of gold, silver, platinum and palladium; base metals of copper, lead, zinc and nickel; and other metallic minerals such as chromium, titanium, cobalt and vanadium. Dimension stone and kaolin clay are also being explored for in the state.

Exploration or development of minerals has occurred in 59 of Minnesota's counties in the last 10 years. The valuable data collected is preserved and is available for exploration and sampling as well as for use in decisions on land management and environmental studies.

The state's mineral diversification program, funded by the Legislature for the last four years, seeks to diversify the state's mineral economy by cooperating on projects to improve competitiveness in the iron ore industry, to encourage the exploration for non-ferrous metallic minerals and expansion of industrial minerals production by increasing the knowledge of the geology of the state, and conducting research to ensure new mineral developments meet the highest environmental standards.

Private parties hold approximately 69% of the mineral rights in the state, the federal government owns approximately 7%, and the state owns about 24% of the mineral rights.

State owned mineral rights are managed by the Department of Natural Resources in trust for the schools; the university; local taxing districts, consisting of counties, cities and school districts; the state general fund; and other acquired land funds. Over eighty percent of the principal of the permanent school fund, which was valued at \$356 million in 1990, is from the revenues of state mineral leases and from certain previously dedicated mining taxes.

STATE'S OWNERSHIP OF MINERAL RIGHTS

# STATE METALLIC MINERALS LEASING PROGRAM

ENVIRON-MENTAL STUDIES AND RESEARCH State metallic minerals leases have been issued since 1966, with 99% being issued through public lease sale. As of April 1, 1991, there were 230 leases in effect covering 85,551 acres.

Notices on each lease sale are provided to the public, including major environmental organizations. Comments are invited during all stages of the lease sale, including the determination of lands to be offered and the review of lands bid upon.

An environmental screening process is conducted before lands are offered for lease to exclude some areas (e.g., in the proximity to the B.W.C.A.W.) and to offer some lands subject to certain features or use (e.g., wildlife management areas).

Bidders must show financial and technical capability to perform, with the department review including annual corporate reports, financial statements, and resumes of employees. Bid rates, which must equal or exceed a base royalty rate, are reviewed.

The department monitors exploration activities to ensure compliance with the requirements of the lease and the state's exploratory borings law.

Environmental studies have been an important and growing component of the Department's activities since the early 1970's. The 1979 Regional Copper-Nickel Study recommended that water quality studies be continued and reclamation rules be developed.

The Department has been conducting field and laboratory studies for many years to determine water quality impacts and methods to mitigate such impacts from mining of sulphide ores.

The 1990 Mining Simulation Project Report, a cooperative project between the environmental community, the exploration industry, the PCA and the DNR, identified several joint recommendations for change. Action has been taken on all issues, either through change in legislation, cooperative action between agencies for existing mining issues, or further discussion under the rulemaking process.

An environmental impact statement is mandatory for any new metallic minerals mine development. A scoping environmental assessment worksheet and the EIS will invite public The review will include participation and comment. environmental and socio-economic impacts and mitigation alternatives of a proposed mining project.

The Permit to Mine, issued by the Department of Natural REGULATORY Resources, identifies reclamation plans prior to mining, and will be required for any non-ferrous metallic minerals development. Under Minnesota Statutes, sec. 93.481, subd. 6, no such permit may be issued by the commissioner of natural resources until reclamation rules relating to non-ferrous metallic minerals mining are adopted.

ENVIRON-

PERMITTING

MENTAL REVIEW

> The revised draft of the non-ferrous metallic minerals reclamation rules are currently available for public comment through August 1, 1991. These rules also identify sites where a permit to mine is restricted or will not be issued regardless of ownership.

> Waste characterization will be required to allow the preoperational prediction of the quality of drainage from mining wastes. The permit to mine will specify design, operating, and reclamation requirements necessary for the protection of human health and the environment.

> Financial assurance, to insure mine site clean-up and reclamation upon termination of mining activity, will be required for all non-ferrous metallic minerals operations, in accordance with state law. Details on financial assurance requirements are contained in the draft reclamation rules. These rules and other state rules are patterned to accomplish the goals of proposed federal rules.

> Permits for water discharge will be required from the PCA, as well as water appropriation permits from the DNR. (The body of this report contains considerable more detail on the permitting process.)

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The taconite industry contributes over \$900 million annually to the state's economy. Over 1,280 Minnesota companies, which are located in the Twin Cities, Duluth and the mining area, supply the industry. Minnesota continues to produce about 70% of all iron used to make steel in the United States.

**ECONOMIC** 

**IMPACTS** 

Iron ore, in combination with the state's other mineral industries, including dimension and crushed stone, clay, sand and gravel, and peat, has a total annual production value of \$1.5 billion. Minnesota ranks 6th nationally in non-fuel mineral value.

Exploration companies spend \$10 to \$15 million annually to conduct their work, which generates about \$1.7 million annually in taxes.

Fiscal Year 1990 revenue from state mineral leases totaled \$2.58 million, and this is expected to increase to \$3.25 million for F.Y. 91, \$5.51 million for F.Y. 92, and \$4.89 million for F.Y.93, due to increased mining of state taconite and increasing royalty rates as taconite leases start entering their extended periods.

An example of economic impacts from a small, underground gold mine could include capital costs of \$51 million, annual operating costs of \$30 million, annual earnings of about \$8 million and employment of about 160 people. Annually, royalties from such a small underground gold deposit could be \$2.3 million; while royalties from an underground platinum deposit could be \$675,000, and royalties from an open pit copper-zinc-gold-silver deposit could be \$3.2 million.

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## I. INTRODUCTION

## What is the reason for this report?

At the January 30, 1991 meeting of the State Executive Council, the Division of Minerals provided a report and recommendations regarding the October 1990 state metallic minerals lease sale. Due to questions raised at the State Executive Council meeting, the division was requested to provide additional information on the state metallic minerals leasing program and related issues.

The questions raised at the January meeting went beyond the state metallic minerals leasing program, and touched on many aspects concerning metallic minerals exploration and potential development in the state. This report attempts to provide additional background information. It starts with a discussion of the theme of sustainable development. The next sections describe the state's mineral potential and the state metallic minerals leasing program. Subsequent sections discuss environmental review and research, the regulatory permitting process and economic impacts. The appendices include the state metallic minerals leasing rules and the March 18, 1991 draft of the non-ferrous metallic minerals reclamation rules.

## What are the statutory and constitutional duties of the Department in relation to state owned minerals?

Constitutional duties include the acceptance by the people of Minnesota of federal grants of land conditioned upon their use for the benefit of public schools of the state and grants of other federal land conditioned upon their use and support of a state university.<sup>1</sup> Minnesota Statutes, sec. 120.85, statutorily recognizes these constitutional requirements in the following policy statement:

"The legislature intends that it is the goal of the permanent school fund to secure the maximum long-term economic return from the school trust lands consistent with the fiduciary responsibilities imposed by the trust relationship established in the Minnesota Constitution, with sound natural resource conservation and management principles, and with other specific policy provided in state law."

#### What are the Department's mission and goals?

The mission of the Department of Natural Resources, based upon constitutional and statutory duties, is as follows:

"To preserve, protect and enhance Minnesota's natural resource heritage in order to benefit the environment, economy and quality of life of all

<sup>&</sup>lt;sup>1</sup> Act Authorizing a State Constitution, February 26, 1857, Sec. 5, paragraphs 1 and 2; Minnesota Constitution, Article 2, Section 1.

# Minnesotans, present and future."<sup>2</sup>

Inherent in this mission is the responsibility to manage state owned mineral rights for the benefit of the schools, local units of government and the public.

Minnesota's mineral policy is, therefore, found in the Minnesota Constitution and the laws of the state. This body of law has evolved over a century of mineral exploration and development. In summary, the mineral policy of the state encourages environmentally sound mineral exploration and mining.

## What is the Department's attitude towards environmental impacts?

The Department's and society's sensitivity and awareness of environmental impacts have changed in the last thirty years. Environmental concerns and potential impacts are considered prior to state mineral leasing activities. Through rulemaking procedures and research programs, the review of environmental impacts is an integral part of minerals management.

The basic mineral policy guidelines require the Department of Natural Resources to balance sometimes conflicting objectives. As a result of this balancing, the Department may agree with a proposal if development can occur and meet environmental standards. The Department will deny plans for a project if it cannot meet the state's environmental standards.

## Why is there an effort to encourage new mineral industries in the state?

The state previously looked at the decreasing natural iron ore deposits which were being exhausted during World War II. A long term commitment was made for the support of the experimental taconite process and the development of a taconite industry. (Taconite is a lower grade iron ore that requires extensive processing.) Tax law changes were made in 1941, taconite technology was developed in the 1950's, and an amendment to the state's constitution was adopted in 1964 limiting certain taconite taxes. (Another amendment to the state's constitution in 1964 limited taxation of persons engaged in the mining, production and beneficiation of copper, copper-nickel and nickel.)

By the early 1970's, the percentage of taconite shipped exceeded the percentage of natural iron ore shipped. In 1981, severe recession resulted in production cutbacks, permanent and temporary shutdowns and bankruptcies. A leaner, more efficient industry has now emerged. In 1990, taconite accounted for over 99% of the iron ore shipped from the state, and Minnesota continued to lead the nation in the production of iron ore. The current down turn in the economy is again resulting in cutbacks in the industry.

<sup>&</sup>lt;sup>2</sup> <u>Directions for Natural Resources, Challenges for the Decade</u>, Minnesota Department of Natural Resources, January 1991.

In 1987, the Minnesota Legislature continued planning for the future. It recognized a commitment to develop new mineral industries by adopting the following state policy:

"... to provide for the diversification of the state's mineral economy through long-term support of mineral exploration, evaluation, development, production, and commercialization." (Minnesota Statutes, sec. 93.001)

This policy was supported by the creation of a minerals coordinating committee among state and University of Minnesota agencies, and the development of a ten year plan for mineral diversification. Projects funded under this program include: development of technology to improve the metallurgical quality of the taconite pellet, geologic mapping to increase the knowledge of the state's minerals, and assessment of processing options for paper-grade kaolin clay. These projects are efforts to encourage the development of new mineral industries, which would create employment and business revenue to the state. These projects, if they result in development proposals, must go through the same environmental review process required of other projects.

# How does the public learn about mineral activities such as rulemaking, mineral lease sales and plans to develop a mine?

The state's rulemaking process requires public notices concerning solicitation of comments on drafts of rules and plans to adopt rules. In addition to publication in the <u>State Register</u>, notices are also sent by the DNR to state agencies, legislators, county officials, the exploration and mining industry, public interest groups and individuals. The administrative procedure law, which the Department follows, also provides that parties may register with an agency to receive any notices of rule hearings.

If a mineral deposit is discovered and a company plans to develop a mine, the public will learn of it through the public notices and meetings held under the environmental review process and the permitting process. In addition, the department would hold informal meetings in the community to answer questions and identify concerns.

## What is the idea of "sustainable development?"

The U.N. World Commission on Environment and Development, chaired by Gro Harlem Brundtland of Norway, directed attention to the concept of sustainable development. Their 1987 report, <u>Our Common Future</u>, emphasized the need to manage "environmental resources to ensure both sustainable human progress and human survival." The report defined "sustainable development" as follows:

"Humanity has the ability to make development sustainable - to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs." <sup>3</sup>

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<sup>&</sup>lt;sup>3</sup> The World Commission on Environment and Development, <u>Our Common Future</u>, (Oxford University Press, Oxford, 1987), p. 8.

## II. <u>SUSTAINABLE DEVELOPMENT</u>

#### What issues were addressed by the U.N. World Commission on Environment and Development?

<u>Our Common Future</u> discusses in detail the issues of world population growth, food needs, loss of species, energy needs, growth and efficiency of industry and urban settlement. In her forward to the report, Prime Minister Brundtland described the frame of reference of the commission's task as follows:

"When the terms of reference of our Commissioner were originally being discussed in 1982, there were those who wanted its considerations to be limited to "environmental issues" only. This would have been a grave mistake. The environment does not exist as a sphere separate from human actions, ambitions, and needs, and attempts to defend it in isolation from human concerns have given the very word "environment" a connotation of naivety in some political circles. The word "development" has also been narrowed down by some into a very limited focus, along the lines of "what poor nations should do to become richer," and thus again is automatically dismissed by many in the international arena as being a concern of specialists, of those involved in questions of "development assistance."

But the "environment" is where we all live; and "development" is what we all do in attempting to improve our lot within that abode. The two are inseparable. Further, development issues must be seen as crucial by the political leaders who feel that their countries have reached a plateau towards which other nations must strive. Many of the development paths of the industrialized nations are clearly unsustainable. And the development decisions of these countries, because of their great economic and political power, will have a profound effect upon the ability of all peoples to sustain human progress for generations to come.

Many critical survival issues are related to uneven development, poverty, and population growth. They all place unprecedented pressures on the planet's lands, waters, forests, and other natural resources, not least in the developing countries. The downward spiral of poverty and environmental degradation is a waste of opportunities and of resources. In particular, it is a waste of human resources. These links between poverty, inequality, and environmental degradation formed a major theme in our analysis and recommendations. What is needed now is a new era of economic growth - growth that is forceful and at the same time socially and environmentally sustainable." (emphasis added) (pages xi and xii) The Commission emphasied the same theme on page 1 of the report:

"... Our report, <u>Our Common Future</u>, is not a prediction of ever increasing environmental decay, poverty, and hardship in an ever more polluted world among ever decreasing resources. We see instead the possibility of a new era of economic growth, one that must be based on policies that sustain and expand the environmental resource base. And we believe such growth to be absolutely essential to relieve the great poverty that is deepening in much of the developing world."

## How have other nations approached the theme of sustainable development?

Canada established a National Task Force on Environment and Economy, with representatives from all sectors of society. The provinces have taken various steps to enact recommendations from the 1987 report prepared by the Canadian task force. For example, the Government of Manitoba established a Round Table on Environment and the Economy, and is preparing workbooks and holding workshops to finalize resource policies.<sup>4</sup>

Similarly, the government of the Netherlands has formulated a "National Environmental Policy Plan" for 1990-1994, which adopts reference to the U.N. report and comments favorably on the concept of development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

## How does the state's mineral program address the theme of sustainable development?

Since the beginning of the state metallic minerals leasing program in 1966, the Division of Minerals has sought to discharge the State of Minnesota's duty to generate income for the school trust and other state owned lands in a manner that protects the state's natural resources from unnecessary adverse impacts from mining these minerals. The environmental screening process prior to offering state lands, as well as the exclusion of some lands from leasing, is one facet of this duty.

Environmental studies relating to base and precious metal exploration and mining have been conducted since the early 1970's. Recommendations in those reports have been followed and changes made in procedures and laws. Action is currently being taken on a report completed in 1990 between state agencies, the exploration industry and the environmental community. Field and laboratory studies to determine water quality impacts and methods to mitigate such impacts were started over 11 years ago and continue to this day.

What about recycling as a source for minerals rather than developing new mines?

Metal recycling is a thriving business in the United States. Even though we are

<sup>&</sup>lt;sup>4</sup> Manitoba Round Table on Environment & Economy, <u>Workbook on Minerals</u>.

characterized as a throw away society, large percentages of scrap metals are used to make new products. Those metals which have high values, like platinum, or those that can be easily recovered, like lead, achieve recycling rates in the 50 percent range. Metals which are more dispersed in products, like copper, achieve lower recycling rates. Table No. 1, which is based on data collected by the U.S. Bureau of Mines, shows recycling of selected metals.

It is now recognized that there should be an even greater emphasis on recycling with higher targets for all metals. However, recycling will never replace the need for mining. Even in areas as mature as iron and steel, recycling the amount of scrap that can be used is constrained by collection costs and impurities. Many of today's products cannot be made wholly with recycled materials because of the problem of entrained impurities. Also, as the world's population grows, the demand for products will also grow, creating a further need for the products of mining.

Minerals	Apparent Consumption [in Year]	Apparent Consumption in 1989	Old Scrap as % of Apparent Consumption [in Year]	Old Scrap as % of Apparent Con- sumptionin 1989
Aluminum (1,000mt)	5,888 [1979]	4,959	10.4% [1979]	20.1%
Chromium (1,000mt)	277 [1983]	451	20.0% [1983]	22.0%
Copper (1,000mt)	2,433 [1979]	2,182	24.8% [1979]	24.9%
Gold (mt)*	159.3 [1979]	211.1	32.7% [1979]	17.5%
Iron and Steel (million st)	144.4 [1979]	49.4	39.8% [1979]	50.6%
Lead (1,000mt)	1,068 [1982]	1,249	50.6% [1982]	54.4%
Platinum & Palladium (kg)**	93,155 [1979]	101,570	10.3% [1979]	49.8%
Silver (mt)* .	4,062 [1979]	5,085	30.4% [1979]	14.5%
Tin (mt)	69,203 [1979]	47,592	31.1% [1979]	23.1%
Titanium*** (mt)	23,937 [1979]	24,927	0.8% [1979]	1.2%
Zinc(1,000mt)	1,051 [1984]	1,314	7.7% [1984]	8.9%

NOTES:

1 metric ton = 32,150.7 troy ounces.
1 kilogram = 32.1507 troy ounces.
Titanium sponge metal; average old scrap reclaimed.

SOURCE: U.S. Department of the Interior, Bureau of Mines, Minerals Commodity Summaries, various years.

Table No. 1

## III. MINNESOTA'S MINERAL POTENTIAL

#### What minerals are currently being explored for in Minnesota?

The bedrock geology determines what type of minerals might be present. Minnesota's bedrock is similar to certain areas in Canada, Australia, South Africa, U.S.S.R., South America, and Scandinavia, where many ore deposits occur. The following metals currently are exploration targets: precious metals of gold, silver, platinum, and palladium; base metals of copper, lead, zinc, and nickel; and other metallic metals such as chromium, titanium, cobalt, vanadium, and manganese.

Industrial minerals such as dimension stone, kaolin clay, and silica sand, are currently being produced in the state and there is on-going exploration for new sources. Other industrial minerals, such as diamonds, are believed to have potential here and are also exploration targets. Sand, gravel, and peat are important nonfuel minerals that are part of the state's economy. Finally, a geologic structure which runs through Minnesota called the Mid-Continent Rift, is a highly speculative potential source of oil and gas.

Map No. 2 shows areas of recent exploration in the state by commodity.

#### What do the terms "metallic minerals" and "non-ferrous metallic minerals" mean?

The term "metallic minerals" is a general term which includes all the minerals from which metals are produced. Examples of metallic minerals are gold, iron, copper and nickel. The term "non-ferrous metallic minerals" includes all the metallic minerals except minerals used to produce iron and steel.

The state metallic minerals lease excepts iron ore and taconite ore, which are leased separately. The state mineland reclamation law governs all metallic mining and most peat mining operations. The mineland reclamation rules are in effect for iron ore and taconite mining and peat mining. The reclamation rules for non-ferrous metallic minerals mining are in draft form, with public comments being accepted through August 1, 1991.

#### What are strategic minerals?

Strategic and critical materials are defined by the U.S. Department of Defense as materials that would be needed to supply the military, industrial and essential civilian needs of the United States during a national emergency, and are not found or produced in the United States in sufficient quantities to meet such needs. The following strategic and critical materials may exist in the state (The minerals shown in **bold** have the best potential to be found in Minnesota.): bauxite, asbestos, beryllium, **chromium**, **cobalt**, columbite-tantalite minerals, **copper**, diamond, **graphite**, lead, **manganese**, phlogopite mica, **nickel**, **platinum** 



This map has been drawn using information from "Geologic Map of Minnesota, Bedrock Geology," prepared by the Minnesota Geological Survey in 1976.

Map No. 2

group elements, quartz crystals, rutile, sapphire and ruby, silver, talc, tin, titanium, tungsten, vanadium and zinc.

#### Where are companies looking for metallic minerals resources?

With new geologic information, mineral exploration is being conducted throughout Minnesota. A considerable amount of metallic minerals exploration is taking place in areas of northeastern Minnesota because of favorable geology and thin glacial drift cover. Also, remote sensing (geophysics) has delineated favorable targets in areas of southwestern, central and northwestern Minnesota. These areas have been explored in the past, but because of limited bedrock exposure, progress has been slow. With the improvements in geophysical methods, high resolution aeromagnetic surveys by the Minnesota Geological Survey, and use of the DNR drill core library database, exploration is continuing in these areas.

Map No. 3 shows the counties where there has been mineral exploration drilling conducted for metallic minerals within the last ten years.

#### How do exploration companies proceed, and why do they look in the same areas over and over again?

The evaluation of mineral potential looks at the probability that a concentration of a usable, and hence valuable, mineral occurs in a given geologic terrane. This mineral concentration may or may not be economic based on constraints at the time of evaluation. In Minnesota, the determination of mineral potential is made by modelling the bedrock terranes and comparing them with similar terranes world-wide which contain known mineral deposits.

Exploration companies generally proceed as follows:

- Continuously review society's demand for mineral products by looking at raw materials prices, products purchased and forecasts.
- Select favorable geologic areas from around the world for minerals in demand where there is also a favorable political environment.
- Review all available data on the area to select an exploration program which could define a deposit.
- Starting with the exploration reconnaissance methods (airborne geophysical, geochemical or ground reconnaissance surveys), explore the area selected and select targets for more intensive and expensive exploration.
- Acquire or lease lands where geologically favorable targets called anomalies are located.



Map No. 3

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As exploration progresses, anomalies producing encouraging results are pursued by detailed geophysical, geochemical surveys, with a few selected for testing by drilling and/or trenching.

Exploration can reoccur in the same areas many times. Technical and philosophical reasons as well as historical discoveries reinforce this approach. One technical example could be an improvement in a remote sensing instrument to identify conductive base metals at a greater depth below surface. The common thread is often the presence nearby of small, uneconomic amounts of metal in the appropriate geologic environment. The driving force is always the presence of what is believed to be favorable bedrock geology.

#### How large would a metallic minerals mine be?

To put the size of these mines into perspective, they are more like the size of the larger gravel pit operations rather than taconite mines. There are at least four technical variables that determine the surface acreage required for a mine and impact profitability:

- 1) total tonnage of the ore zone, (examples are, one million tons of gold ore to 75 million tons of base metal ore);
- 2) open pit vs. underground mine method based on the depth and shape of the orebody;
- 3) method of tailing disposal, such as underground backfill vs. tailings ponds; and
- 4) actual mine site location and surface landscape.

In summary, such a mine may require about 100 to 1,000 acres, which is a fraction of the area needed for a taconite mine.<sup>5</sup>

Why are there so many mines across the border in Ontario and not in Minnesota? If there are mineral deposits in the state, why haven't they been found?

Favorable geology, as well as political and economic incentives have encouraged exploration and development of mineral deposits in Ontario. Geologically, Ontario has a greater amount of bedrock outcrop and thinner overburden cover in terranes with mineral deposit potential than Minnesota. This results in easier and less costly exploration. Historically, the majority of gold mine camps (clusters of individual mines) in Ontario were found early in this century by prospectors looking at outcrops.

Politically, the Ontario government has extensively invested to support the exploration industry through work performed by the Ministry of Mines and through tax and other financial incentives. Further, the Crown (the government) owns over 87% of the land in

<sup>&</sup>lt;sup>5</sup> <u>The Report on the Mining Simulation Report: Appendices to the Final Report</u>, by Ernest K. Lehmann and Associates, Inc., Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, and Project Environment Foundation, (January 1990).

Ontario, which eases efforts to manage the mineral rights and make land available to private exploration companies.

Perhaps the single most important answer is the high cost and time private industry must invest to find a deposit. It has been reported that discovery of a single gold deposit in Australia costs an average of A\$30-50 million (1988), and 8-10 years of work. Similarly, for market economy countries such as Canada, 103 gold discoveries from 1946-85 were estimated to cost C\$23 million each, and that has risen to C\$37 million now.

## What happens with information gathered by exploration companies?

The exploration industry gathers information in the form of geological, geophysical and geochemical data and bedrock drill cores. These materials are turned over to the DNR-Minerals Division, Hibbing office upon the termination of state and private mineral leases. Data and drill cores are organized by geographic location and entered into the existing drill core library system at Hibbing. These materials are extremely valuable and are available to everyone for examination and sampling.

## What is the state doing to encourage environmentally sound mineral development in Minnesota?

The Mineral Diversification Plan prepared by the Minnesota Minerals Coordinating Committee has identified the following objectives in the long term goal of diversifying the state's mineral economy:

- To improve the competitiveness of the iron ore industry
- To encourage exploration and development of non-ferrous metallic minerals
- To enhance and expand Minnesota's industrial minerals production
- To ensure that new mineral development meets the highest environmental quality standards <sup>6</sup>

Projects to meet these objectives have been undertaken by the Minnesota Geological Survey, the Mineral Resources Research Center, the Natural Resources Research Institute and the Department of Natural Resources based on funding provided by the Legislature starting in fiscal year 1988. Mineral management projects being conducted include environmental research on mitigating potential impacts from mining and mineral ownership research. Many of the iron ore projects focus on improving the metallurgical quality of Minnesota pellets and achieving lower silica content pellets. The non-ferrous metallic minerals projects are in the areas of gathering geologic data to improve knowledge of Minnesota geology and

<sup>&</sup>lt;sup>6</sup> <u>Minnesota Mineral Diversification: an Interim Status Report</u>, Minnesota Minerals Coordinating Committee, February 1990.

metallic minerals potential, the acquisition and storage of minerals information to aid future exploration, and mineral processing research. The industrial minerals projects assess regional resources for dimension stone and carbonate, the processing options related to producing paper-grade kaolin clay, and marketing of the state's horticultural peat resources.

# IV. THE STATE METALLIC MINERALS LEASING PROGRAM

## **Ownership of Mineral Rights**

#### How many acres of mineral rights does the state own?

While the federal, state and local governments own some surface and mineral rights in Minnesota, the vast amount of both interests remain privately held. Nevertheless, the State of Minnesota is the largest single owner of mineral rights in the state, owning approximately 24% (12 million acres) of such mineral rights. Also, as shown on Map No. 4, the state owned mineral rights are concentrated mainly in the northern half of the state.

## How did the state acquire ownership of mineral rights?

The first lands owned by the state are commonly known as "trust fund lands" and were granted to the state directly from the federal government upon certain conditions as to their use and benefit. These conveyances included the mineral rights in the land. The trust fund lands include school lands, swamp lands, internal improvement lands and university lands.

The state acquires land through forfeiture for non-payment of general real estate taxes. The state also acquires mineral rights through forfeitures under the severed minerals interest law. Title to tax forfeited lands and tax forfeited minerals are held in the name of the state in trust for the local taxing districts.

Another type of land acquired through tax forfeiture is known as consolidated conservation area land. By a series of legislative acts between 1929 and 1933, the state assumed payment of drainage ditch bonds that had been issued by seven northern counties, with the bonds facing default. In return for assumption of the bonds, the state received title to tax forfeited lands in areas defined by the law.<sup>7</sup>

The state has purchased certain lands from the federal government. The state also acquires or is given lands for parks, forest purposes, fish and wildlife management, public accesses and other public projects. The state also reserved mineral rights with the sale of land acquired by the State Bureau of Rural Credit through foreclosure of mortgage loans issued to farmers in the 1920's.

The state has followed a policy of reserving mineral rights when it sells land for many decades. However, many state lands, including trust fund lands, were sold before the

 $<sup>^{7}</sup>$  In 1984 the Minnesota Legislature amended the laws so that there will be no additional consolidated conservation area lands acquired through tax forfeiture. All lands forfeiting since May 3, 1984, in consolidated conservation areas, are classified as tax forfeited lands. (Minnesota Statutes, sec. 84A.57)



Map No. 4

enactment of laws requiring such mineral reservations. Thus, while the acreage of mineral rights owned by the state is higher than the surface acres owned by the state, the acreage of mineral rights owned by the state is not as high as the amounts of lands originally owned by the state.

The apportionment of the approximately 12 million acres of mineral rights owned by the state is as follows: 3.4 million acres are trust fund lands, 1.6 million acres are consolidated conservation area lands, .6 million are rural credit mineral rights and acquired lands, and 6 million acres are tax forfeited minerals and tax forfeited lands.

## Who receives the money from leasing state owned mineral rights?

The Department of Natural Resources manages the mineral rights in trust fund lands, the beds of navigable waters, tax forfeited lands, consolidated conservation area lands, other acquired lands and tax forfeited severed mineral interests. The revenue derived from leasing is distributed to various funds based on the land types.

Revenue from the school, swampland and internal improvement trust lands is credited to the permanent school fund that was established by the state constitution. Revenue from university trust land is credited to the permanent university fund that was established by the Territorial Act and recognized by the state constitution. The principals of these funds are inviolate. The net interest and dividends from the permanent school fund are distributed to the school districts throughout the state; and the net interest and dividends from the permanent university fund are distributed to the university.

Over 80% of the principal of the permanent school fund, which was valued at \$ 356 million in 1990, is from revenues from state mineral leases and from certain previously dedicated mining taxes. (The Department of Natural Resources does not receive any of its operations or management costs from the permanent school fund for the administration of mineral rights of permanent school lands.)

Eighty percent of the revenue from leasing of tax forfeited lands and tax forfeited severed mineral interests are returned to the counties in which the leased lands and mineral rights lie and twenty percent is deposited in the state's general fund. The eighty percent is distributed 3/9 to the county, 2/9 to the town or city and 4/9 to the school district.

Fifty percent of the revenue from consolidated conservation area lands is distributed to the counties in which the leased lands and minerals lie, and fifty percent is credited to the general fund of the state. For other acquired lands, the specific distribution will vary by land type.

## Basic Procedures for Issuing State Leases

#### How long has the state been issuing leases for metallic minerals?

The state metallic minerals leasing program started in 1966. There were six lease sales held from 1966 through 1973. After completion of the regional copper-nickel study by the State Planning Agency, public lease sales have been held on a regular basis since 1982. See Table No. 2 for a historical overview of the leasing program.

Although provision is made for negotiating leases under certain limited circumstances, 99% of all metallic leases issued to-date have been through public lease sale.

#### How is the lease sale commenced?

The first step in the process, which occurs at least eight months prior to the opening of bids, is a letter sent to those parties on the Division of Minerals' mailing list that have expressed interest in hearing about a lease sale. The parties are informed of the opportunity to submit a list of areas they would like the department to consider offering at the next lease sale. In accordance with Minnesota Statutes, sec. 13.793, the areas submitted are confidential information for a period of three years from the lease sale date.

The state then makes a determination as to whether there is sufficient interest in a lease sale. If the response is in the affirmative, the department then prepares a map showing the outside boundaries of the general areas under consideration for the lease sale. The area identified is based upon environmental considerations, areas requested, and areas of interest due to recent research. The area identified does not generally include all areas requested.

#### How does the public and other interested parties learn of the plans for a public lease sale?

The department publishes a **notice of intent to hold a lease sale** at least 90 days in advance of the bid opening. The notice is published in the <u>State Register</u>, the <u>EOB Monitor</u>, and the <u>DNR News</u>, which is a weekly release of information to newspapers in the state. The notice is also published in a mining journal and a mining newspaper. The notice informs the reader that a map of the general area for the sale is available for review.

The notice and the map are sent to many parties, including DNR staff, commissioners of state agencies, legislators, county officials and the exploration industry. The notice and map are also sent to public interest groups and individuals who have requested they receive notice of such sales. Included in the list of legislators are all those who represent the districts covering areas being offered at lease sales. The county officials include the auditor, land commissioner and chair of county board for all the counties included in a lease sale area.

The list of public interest groups and individuals totals over 125 parties. The major

#### HISTORICAL OVERVIEW OF STATE'S METALLIC MINERALS LEASING PROGRAM

- 1948 Discovery of copper-nickel southeast of Ely.
- 1950- International Nickel Company began exploration on federal lands; Bear Creek Mining 1960 Company began exploration on private lands. State began working on lease rules and held public hearing, but did not come to agreement on lease rules. Company interest declined.
- 1966 Renewed company interest in the 1960's. State completed copper, nickel, and associated mineral leasing rules. Rules adopted through hearing process, with approval of State Executive Council, after changes made in proposed rules based on testimony.
- 1966- Six state public lease sales held (Duluth Gabbro Complex and Greenstone formations). 1973

3.8 million acres offered for leasing; of which 2.1 million acres offered for leasing for first time; 1,044 leases issued covering 425,313 acres; leases in Beltrami, Cook, Itasca, Koochiching, Lake, Lake of the Woods, Marshall, Roseau and St. Louis counties.

1974 Regional study begun by Environmental Quality Council on potential social, environmental and economic impacts associated with copper-nickel mining. Study covered limited portion of Duluth Gabbro Complex.

EQC imposed a moratorium on acceptance of any site-specific environmental impact statements on any copper-nickel mining development proposal prior to completion of study. Due to the study, DNR decided to not hold lease sales until the study was completed.

- 1979 Regional Copper-Nickel Study completed; five volume, 36 chapter report issued.
- 1982 State copper, nickel, and associated minerals leasing rules amended to address possibility of high-grade mineral deposit.
- 1982 Seventh public lease sale held, first since 1973.
- 1986 Administrative procedure commenced to amend state copper, nickel, and associated minerals leasing rules.
- 1987 DNR participated in joint committee to review existing tax structure. Mining tax laws amended by Legislature. Repealed ad valorem tax on in situ metallic minerals ore; repealed occupation tax and replaced with tax calculated in same manner as state's corporate income tax; and enacted new net proceeds tax of 2%.
- 1988 State leasing rules amended to include: simplification and reduction in royalty rates, subtraction of base smelter treatment charges and smelter losses from value of ore before calculation of royalty due, modifications in performance requirements, and addition of partial deferral of royalties during first years of mining. Also, lease name changed to "metallic minerals."
- 1982- Eight public lease sales held: 1990

9.8 million acres offered for leasing; of which 1.36 million acres were offered for the first time; 1,437 leases issued covering 607,649 acres; leases in Aitkin, Beltrami, Carlton, Itasca, Koochiching, Lake, Lake of the Woods, Marshall, Norman, Pine, Roseau and St. Louis counties.

TOTAL REVENUE RECEIVED 1966 - JUNE 1990: \$4.03 MILLION

Under this program, the state has offered a total of 3.5 million acres of land for leasing. The program has resulted in the leasing of 1,032,962 acres. As of April 1, 1991, there are 230 leases in effect covering 85,551 acres.

Table No. 2

environmental groups in the state are on this list, as well as individuals active in the environmental community. This list also includes other local or state organizations who want to know about such activities.

### What actions follow the notice of intent to hold a lease sale?

During the three to five months following the notice of intent to hold a public lease sale, the department assembles data on the state's ownership of mineral rights in the area under consideration, as well as conducting an environmental screening. (See the next section for more details on the environmental screening process.)

Comments are received during this period of time from many parties and the department encourages people to provide information on areas being considered for leasing. Representatives of organizations and individuals will call, write letters and come in and talk to staff about particular concerns. Conversations take place at all levels of the department's structure; many issues are discussed with the commissioner and his immediate staff.

As a result of this review, some lands are omitted from lease sale, some lands are offered with the exception of a certain feature, and some lands are offered for lease subject to a certain feature, use or condition. There are no state lands offered outside the area included in the public notice.

## How does the public and other interested parties learn about the sale date and the actual lands being offered?

The exact day of the lease sale, which is the day the bids are opened, is published at least 30 days in advance. In addition to the publications used for the notice of intent to hold a lease sale, notice is published for three consecutive weeks in a legal newspaper published for each county in which lands being offered are located. All parties sent the notice of intent to hold the lease sale are sent the copy of this notice, and the notice is also published in the <u>State Register</u>, the <u>EOB Monitor</u> and the <u>DNR News</u> (the weekly release of information to newspapers in the state).

At least 30 days before the lease sale date, the department will have prepared a mining unit book, which lists the exact legal descriptions of the lands being offered at the lease sale. The mining unit book will be available for purchase from the St. Paul office and will be available for inspection in the St. Paul and Hibbing offices of the Division of Minerals.

#### How are bids submitted?

A separate bid is required for each mining unit, as identified in the mining unit book. The commissioner of natural resources designates the land that makes up each mining unit, and the units usually vary in size from 40 to 640 acres.

Bids must be submitted on application and bid forms and in bid envelopes obtained from

the department. There are specified rental rates and a base royalty rate in the state lease. The bids submitted are an additional royalty rate above the base royalty rate. All sealed bids submitted to the commissioner are preserved unopened until the date and time of the lease sale.

### What happens at the bid opening?

At the time specified in the notice, the bids are opened before the commissioner or the commissioner's representative and at least one member of the State Executive Council as designated by the council. After the bids are publicly announced, the bid opening is completed. No leases are awarded at the time of the bid opening.

#### What does the department do to review the bids and bidders?

The department reviews the bids and bidders for compliance with the bidding requirements. Bid rates are reviewed to determine if they are reasonable based on existing economic and geologic knowledge. The department also determines if the bidders are financially and technically competent to perform under the state lease.

The department typically requests updated financial information from all bidders. If a party has never bid before in the state, the department will also request information on the party's technical expertise. The type of information reviewed includes: annual corporate reports, financial statements, stock market listings, resumes of officers and the employees who will be working in the state, and exploration and mining company directories. Background checks may also be made by contacting government officials in other states or countries.

The tracts bid on are reviewed once again to make sure that no features of environmental concern have been overlooked. Comments from parties who have followed the sale are also considered before recommendations are made to the executive council for the awarding of leases.

#### What are the roles of the commissioner of natural resources and the state executive council for issuing leases?

Within a month or two after the bid opening, the department will present its recommendations to the state executive council. The leases are awarded by the commissioner with the approval of the state executive council to the highest bidder.

No bid for less than the base royalty rates can be accepted and the state may reject any or all bids. The department has often recommended deferring action on the awarding of leases pending further review of a bidder's technical and financial capability to perform under the lease. The department has recommended deletions of tracts from a mining unit or the addition of a special condition to address environmental concerns before a lease was awarded. The department has also recommended the rejection of bids due to noncompliance with bidding requirements or for failure of the bidder to show technical and

## financial capability to perform.

## Are there any further actions to inform the public about the mineral leases?

For many years after leases have been awarded by the State Executive Council, staff from the Division of Minerals attend many meetings to inform people of the results and to answer questions. These meetings include county board meetings, Superior and Chippewa National Forest staff meetings, and regional meetings within the department.

#### When are negotiated leases issued?

Negotiated leases may be issued only where the commissioner finds it impractical to hold a public lease sale on a mining unit because of its location (proximity of adjacent land held by an exploration company in relation to geologic knowledge), size (small acreage) or extent of the minerals in the unit (undivided fractional interests). The royalty bid rate is negotiated and is part of the recommendations made to the executive council. The state executive council must approve the issuance of negotiated leases.

#### How many acres have been leased and how long are state leases held?

Under this leasing program, the state has offered a total of 3.5 million acres of land for leasing, The program has resulted in the leasing of 1,032,962 acres. (This leased acreage figure adds in those acres that have been leased more than once.) As of April 1, 1991, there are 230 state metallic minerals leases in effect covering 85,551 acres. These leases are located in the counties of: Aitkin, Beltrami, Carlton, Itasca, Koochiching, Lake, Lake of the Woods and St. Louis.

Although state leases have a term of 50 years, they are usually held for a three to five year period and then terminated by the lessee. As shown in Table No. 3, approximately 6% of the leases issued in 1982 remain in effect, 12% of the leases issued in 1985 remain in effect, and 33% of the leases issued in 1988 remain in effect. All leases issued prior to 1982 have been terminated.

# A summary of the provisions of the state lease and the state lease form are included in the appendices of this report.

# Environmental Screening of Lands Prior to Offering

## What is the environmental screening process?

During the period between the publication of the notice of intent to hold a lease sale and the publication of the mining unit book, the Department collects and reviews input from various parties concerning the existing use of tracts within the general area under consideration. Parties providing information include: state agencies, such as the Pollution



Table No. 3

Control Agency and the Minnesota Historical Society, as well as units within the Department of Natural Resources; other governmental units, such as the Voyageurs National Park; and environmental organizations, such as Sierra Club and Project Environment Foundation.

This review, which is commonly referred to as the environmental screening process, will result in the exclusion of some lands from the lease sale, some lands being offered with the exception of a certain feature, and some lands being offered for lease subject to a certain feature, use or condition.

## What types of land are excluded from mineral leasing?

In accordance with state laws adopted by the Minnesota Legislature, state owned lands located within the following areas are excluded from mineral leasing:

- Boundary Waters Canoe Area Wilderness (BWCAW)
- Voyageurs National Park
- Upper Mississippi River Headwaters Corridor.

The no net loss wetlands legislation adopted by the 1991 Minnesota Legislature limits leasing of state owned lands located within the cores of the eighteen ecologically significant peatlands classified as peatland scientific and natural areas. The legislation prohibits:

"... exploratory boring or other exploration or removal of ... metallic minerals which would significantly modify or alter the peatland water levels or flows, peatland water chemistry, plant or animal species or communities, or natural features of the peatland scientific and natural areas, except in the event of a national emergency declared by Congress."<sup>8</sup>

State lands located within the following areas are not offered for leasing at a public lease sale:

- Within 1/4 mile of the B.W.C.A.W., plus additional lands located in small watershed areas which flow directly into the B.W.C.A.W. or located within principal recreational entrances and travel corridors entering the B.W.C.A.W. [The Department has adopted a commissioner's operational order and prepared a map showing these lands. The map is titled, "Minnesota Department of Natural Resources, B.W.C.A.W. Mineral Management Corridor.]
- Within 1/4 mile of Voyageurs National Park

<sup>&</sup>lt;sup>8</sup> Laws of Minnesota 1991, Chapter 354, Art. 8, Sec. 1, Subd. 5 (a)(3), to be codified as Minn. Stat. sec. 84.034, subd. 5 (a)(3).

- Beds of all meandered waters (lakes and rivers), plus beds of lakes greater than ten acres, plus beds of major rivers
- Islands
- State Parks (possible exceptions are Tower-Soudan State Park and Hill Annex State Park, which were established due to association with mining)
- Scientific and Natural Areas
- Setback areas of the Black Bay Management Area (Koochiching County)
- North Shore Lake Superior Orientation Zone.

Under very limited situations, the state may consider a negotiated lease in some of these areas not offered at a public lease sale if exploration on adjacent leased land justifies continuing exploration onto these lands. An example of this situation is the negotiated lease, issued to BHP-Utah International Inc. in October of 1989, that covered a portion of Shagawa Lake near Ely, Minnesota. Several special conditions were added to this lease to deal with specific concerns raised by the public at the public meeting conducted during completion of the discretionary environmental assessment worksheet on this project.

What types of lands are offered subject to special conditions?

State lands located within the following areas are offered subject to a certain feature or use:

- Designated trout streams
- State canoe and boating routes
- State trails
- Wildlife management areas
- Acquired wildlife management lands
- Natural heritage sites
- Watersheds of all eighteen ecologically significant peatlands
- Historic and archaeological sites
- Recreation sites
- Black Bay Management Area (if lands not excluded)
- Adjacent to lakes that are part of the Pollution Control Agency's acid rain study
- Areas of particular concern, for example, on the shore of the Rainy River, in the Birch Lake area of St. Louis County, or within a mile of Voyageurs National Park.

The Division of Minerals is preparing a map showing many of these areas of exclusion and special conditions.

### Inspection and Monitoring of Activities Conducted Under a State Lease

#### How does the state lessee learn about the requirements of the state lease?

When the lease is awarded, every lessee is provided a copy of the lease and a "checklist" which explains the requirements of the state lease and the state law for conducting exploration work. Additional requirements are imposed for those leases containing special "subject to" conditions. For example, if a lease is "subject to the Taconite Trail," the lessee must review plans with the DNR Trails and Waterways Coordinator, and if a lease is "subject to a designated trout stream," the lessee must review plans with the DNR Area Fisheries Manager to establish protective measures.

Who reviews the activities of the state lessee?

Prior to performing any ground exploration activity, the lessee must notify the Hibbing office of the Division of Minerals, which reviews information on all plans to conduct exploration work on state leased land. If the state owns the surface, the lessee must contact DNR or county managers prior to conducting activities. If the surface is privately or federally owned, the lessee must contact the private owners or the federal government. If the lease contains a special condition, the lessee is informed of the appropriate surface managers that they must contact to discuss plans and receive exploration approval.

#### What exploration activities are reviewed by the DNR staff?

The first exploration activity is usually geologic reconnaissance. This type of activity is very non-intrusive and non-disruptive, and mainly consists of parties walking through the area to look for and obtain small samples of exposed bedrock. Geochemical surveys, which involve taking small samples of soil, stream sediments and vegetation, may also be conducted. The state does not usually conduct an inspection at this stage.

The next step of exploration activity is generally geophysical surveys. This type of work includes walking across the land with hand-held instruments to help define and measure

anomalies (unusual physical properties of the bedrock). Geophysical surveys often require the establishment of a survey grid, which may require minimal amounts of brushing of vegetation and small trees. Whether an inspection is conducted at this stage is dependent on the extent of the grid lines, the amount of brushing and access preparation.

If results are encouraging, the lessee will use a drill rig to bore a hole through the glacial overburden and several hundred feet of the bedrock. All parties conducting exploratory boring on any land in the state must first provide notice to the DNR and the Department of Health. The exploratory borings law, and the rules adopted under the laws, contain requirements for filling the bore holes to protect the state's groundwater and the filing of reports on the drilling activities.

All drill hole sites on state leased land are inspected at least once. Inspections are conducted to verify locations, determine lease compliance, and monitor for site clean-up.

# What inspection and monitoring activities would occur if exploration and testing on state leased land encouraged further work?

If interesting mineralization is found, a lessee would decide whether further actions should be taken to identify the possibility of a commercial deposit of ore. Activities undertaken could include test pitting, bulk sampling, sinking test shafts and conducting underground drifting. Most of these activities would require state permits and completion of an environmental assessment worksheet. If a decision was made to proceed toward development of a mine, an environmental impact statement would be prepared. (Environmental review and permitting responsibilities are described in the following two sections of this report.)

The commissioner of natural resources, under the terms of the state mineral lease, must approve all surface and underground use. Historically, this approval requires detailed plans, environmental monitoring, environmental impact mitigation and environmental research (such as waste characterization studies) related to the specific deposit being explored.

Mining activities would be reviewed by the Division of Minerals' geologists, engineers and reclamation staff to verify types and locations of activities, values of materials encountered, types of mitigation techniques employed, and permit compliance. The division's engineers would maintain a continual inspection of the property to verify tonnages, grades and royalty values that accrue to the state's benefit. Staff from other state agencies would also be monitoring and inspecting to ensure compliance with water, air and other permits.

### V. <u>ENVIRONMENTAL STUDIES, RESEARCH AND REVIEW</u>

### ENVIRONMENTAL STUDIES AND RESEARCH

#### What environmental studies have been conducted?

In June of 1972, the Department of Natural Resources issued a report titled, <u>Possible Environmental Impact of Base Metal Mining in Minnesota</u>. The report reviewed advantages, disadvantages, and possible utilization of different mining and processing methods. The report included information on environmental factors that must be considered prior to conducting base metal mining.

In 1972, the Governor established an inter-agency task force of representatives from the Department of Natural Resources, the Pollution Control Agency, the State Planning Agency, the Department of Economic Development, the Department of Health, and the Department of Labor and Industry. An advisory subcommittee, with representatives, from citizens' groups, mining companies, local government and the Natural Resources Advisory Council, also worked with the task force and numerous public meetings were conducted.

In January of 1973, this task force issued its report titled, <u>Inter-Agency Task Force Report</u> of Base Metal Mining Impacts. The report provided background information on discovery, mining and processing of base metals within the state. Included within this report was information on environmental considerations during various mining phases, potential economic impacts and socio-economic impacts. The report recommended adoption of reclamation laws and amendment of the severed minerals law, both of which occurred. Recommendations for changes in the procedures for holding state metallic minerals lease sales were adopted by the DNR. Better coordination between the agencies was recommended, and this issue has again been addressed in the last few years.

#### What were the results of the Regional Copper-Nickel Study that was prepared in the 1970's?

The Environmental Quality Council (renamed the Environmental Quality Board), initiated in 1974 a regional study regarding the potential social, environmental, and economic impacts associated with copper-nickel mining. The study covered a portion of the Duluth Gabbro Complex in St. Louis County. This \$4.3 million study was completed in 1979, with a five volume, 36 chapter report submitted to the EQB. In addition, 180 technical reports, environmental monitoring data, and sample collections were compiled.

In response to this report, the EQB asked a technical advisory committee to review the study and the adequacy of state policies and programs. The committee's response focused on four major issues: air quality, water resources, energy and social and fiscal resources. Several of the recommendations concerned tax policies, which have since been amended. There were several recommendations concerning smelter siting in the state. (It is now not

expected that a traditional type of smelter would be proposed for construction in this state.) The technical advisory committee recommended that water quality studies be continued and that reclamation rules be developed prior to the issuance of permits for mine development.

### What action has the Department taken to address the potential water quality impacts?

The exploratory borings law<sup>9</sup>, enacted by the Minnesota Legislature in 1980, regulates drilling on any land in the state for metallic minerals, petroleum and kaolin clay. One of the principal purposes of this legislation is to protect against groundwater contamination from the drilling of exploration holes. This law, and the rules adopted by the Department of Health (DOH), require the driller to fill the drill hole upon abandonment. Reports must be submitted to the DNR and DOH and state staff inspect the drill holes.

In anticipation of the discovery of an economic deposit of nonferrous metallic minerals resources in Minnesota and the development of reclamation rules, the Department of Natural Resources has undertaken a number of studies to determine impacts associated with mining of sulfide ores. The studies include investigation of mitigation techniques to resolve or eliminate impacts. A major environmental issue associated with mining of precious or base metals is the sulfides in the host rock which can cause acid mine drainage and the release of metals (such as copper, nickel, zinc or cobalt) to the environment.

Starting with the initial work undertaken by the Regional Copper-Nickel Study, the Division of Minerals' reclamation section has been conducting additional field and laboratory studies for the past 11 years. Under this study program, the following topics have been addressed:

- 1) quantification of drainage water quality, quantity, and chemical mass release from sulfide mine wastes;
- 2) description of how sulfide-bearing mine wastes dissolve and transport in the environment;
- 3) prediction of the quality of drainage from mining wastes that may be generated by future mining operations; and
- 4) assessment of low-cost, low-maintenance systems for mitigating acid mine drainage.

### What have been the results of the water quality studies?

These water characterization studies identified a critical iron sulfide content for the Duluth Complex rock that was examined. Covering of stockpiled rock and revegetation has been observed to reduce impacts 30% to 50%. Other mitigation techniques include stockpile capping, addition of alkaline material and the use of modified wetlands, can significantly reduce metal release. New studies being initiated by the Department, as well as by the U.S.

<sup>&</sup>lt;sup>9</sup> The exploratory borings law is now codified in Minnesota Statutes 1990, Chapter 103I.

Bureau of Mines and Canadian government, show promise of offering additional control of impacts from mine waste.

### What is the Mining Simulation Project?

The Mining Simulation Project arose out of discussions at a Minnesota Minerals Forum, convened by the Blandin Foundation in September of 1987. A cooperative study was undertaken by representatives of the environmental community, the mining industry, the Pollution Control Agency (PCA) and the Department of Natural Resources.

The purpose of the Mining Simulation Project was to identify and resolve environmental issues associated with nonferrous metallic minerals mining before there was a request for permits for such a development. The report examined regulatory activities and permitting procedures. Three hypothetical mining developments, sited in environmentally sensitive areas, were models used for the project. The report by the four parties was completed in January of 1990.

#### What actions have been taken since the Mining Simulation Project report?

The following issues and actions were identified in this report:

- 1) The report recognized that there are no known instances of ground water contamination from exploratory drilling in the state, but recommended a further review of drilling additives by the Department of Health. Legislation adopted by the 1991 Legislature will authorize the DOH to adopt rules on additives.
- 2) The Mining Simulation Project report recommended that when a mining proposal is submitted, the DNR and PCA establish an environmental review and permitting team and have early involvement from local government, the public and special interest groups. In 1987, the DNR and PCA entered into a memorandum of agreement that established procedures for coordinating mining regulatory activities and resolving mining-related environmental problems. Included in the procedures are plans to involve local governments and the public.
- 3) To aid in resolving land use conflicts, the report recommended that the state's environmental review rules be amended to require a cost/benefit analysis based on an inventory of all costs and benefits, including those that are not quantifiable in dollar terms. Independent of the Mining Simulation Project, the Environmental Quality Board is currently reviewing the state's environmental review process for possible changes.
- 4) The Mining Simulation Project Report also recognized that water quality and quantity impacts need to be minimized by base-line monitoring, characterization of mine wastes, determination of receiving water criteria, determination of

operating procedures and mitigative measures. The report concluded that existing rules and the draft reclamation rules address these issues.

- 5) The report concluded that current regulations appear sufficient to handle air quality concerns.
- 6) A joint mine closure plan was recommended so that agencies coordinate early in the process. Under the 1987 Memorandum of Agreement, the DNR and PCA are working together to mitigate environmental concerns at the Dunka mine operated by LTV Steel Mining Company.
- 7) The report recommended that there must the assurance of the companies' financial ability to meet regulatory obligations. The state's mineland reclamation law was amended by the 1990 Legislature to require financial assurance, and the reclamation rules drafted for non-ferrous metallic minerals are addressing the need for financial assurance.

### Environmental Review

Generally, what is the environmental review process for a new mine?

Before a new metallic mining operation can be initiated in the state, the project must undergo environmental review. This review takes the form of a mandatory Environmental Impact Statement (EIS). The DNR, as the Responsible Government Unit, is the lead agency for the preparation of this EIS.

In order to ensure that the EIS does address all relevant issues, a scoping Environmental Assessment Worksheet (scoping EAW) is first prepared. In this scoping process, all land-use, environmental, and socio-economic issues are to be identified for evaluation by the EIS document. A comprehensive and well-thought-out scoping EAW can help ensure that the EIS will address all relevant issues in a timely manner.

The EIS identifies impacts from the proposed project and alternatives to the proposed project. Once the EIS is finalized, the agencies decide the terms of their permits and whether to grant or deny such permits.

#### How will the public learn about plans to develop a mine and how will they be able to participate?

If a company discovers a commercial deposit and decides to move to the development stage, whether they are on state owned or privately owned land, there will be many opportunities for the public to learn of plans and to participate in the process. The environmental review process provides for comment and input from the public. The department's reclamation rules provide for public notice of an application for a permit to mine and the opportunity to request a hearing. Other permits from state agencies also provide public notices and varying means by which to request a public hearing.

Beyond the administrative procedures, plans to develop a mine will become common knowledge through the general media. There will be newspaper articles and reports in the news programs of radio and television.

#### Will the department hold meetings in the local community?

In addition to the meetings required by law and rule, the department will hold or participate in informal meetings in the community to answer questions and identify concerns. For example, the department attended a public meeting in Ely to discuss the mineral exploration process when BHP-Utah International Inc. obtained a special use permit from St. Louis County to conduct drilling in Morse Township. When the department was reviewing the proposal for a negotiated metallic minerals lease covering part of the bed of Shagawa Lake, a discretionary EAW was prepared. The EAW and the public meeting the department held in Ely generated comments and issues. The identified concerns were addressed through special conditions being added to the lease and the drilling procedures. After drilling was completed on the ice of Shagawa Lake, the department held another public meeting in Ely to show the results of our inspections and answer questions from the public.

The citizens of this state have the right to obtain information directly from state employees, and the department is committed to communicating and discussing issues with them.

### VI. <u>REGULATORY PERMITTING PROCESS</u>

### What types of permits are required to develop a mine?

A Permit to Mine must be obtained from the Division of Minerals of the DNR. This permit specifies the limitations and conditions imposed on the mining operation, including a mining plan and reclamation program. A Water Appropriation Permit, to withdraw water from surface or ground water, and a Protected Waters Permit, to change the course, current or cross-section of protected waters, would be required from the Division of Waters of the DNR.

The Pollution Control Agency (PCA) is responsible for the National Pollutant Discharge Elimination System Permit, for discharging into the waters of the state from a point source. A State Disposal System Permit, for construction, installation or operation of a disposal system, would be needed from the PCA. This agency is also responsible for air emission permits that would be required for a mining operation.

Any work affecting navigable waters or discharging into waters of the United States will require permits from the U.S. Army Corps of Engineers. In addition, there usually are county zoning permits required, as well as other state and federal permits. (The time frame and steps to obtain these permits are outlined on the chart titled, "Environmental Review and Permitting Structure," which is contained in <u>The Report on the Mining Simulation</u> <u>Project.</u>)

### Mineland Reclamation Permit

### What is the state's mineland reclamation program?

Minnesota, noted for its strong regulatory program, was one of the first states to draft and enforce comprehensive mineland reclamation laws. These regulations have been in place and have required Permits to Mine from all natural ore and taconite operators since 1980.

State law requires that before mining of non-ferrous minerals can take place, the DNR must promulgate rules for mining and reclamation of these minerals. These rules also identify areas where mining is excluded and areas where mining is restricted.

Results from the previously described studies by the DNR, as well as other institutions' studies, have been incorporated into the department's March 18, 1991 <u>Draft Non-ferrous</u> <u>Metallic Mineral Mineland Reclamation Rules</u>. The public comment period for this draft is open until August 1, 1991.

### A copy of the Draft Rules is contained in the appendices of this report.

After receiving comments on the draft rules, it is the department's intention to prepare a hearing draft that will be used in the rule adoption process. It is expected that the rule adoption process will take approximately one year after the hearing draft rules are completed.

#### How can the public participate in the rulemaking process?

Notices of intent to solicit outside opinion and notices of intent to adopt rules are sent to public interest groups, individuals, DNR staff, commissioners of state agencies, legislators, county officials, and the exploration industry. The administrative procedure law also provides that parties may register with an agency to receive any notices of rule hearings.

The state's administrative procedure process encourages public involvement. The division normally has one or two periods in which opinions are solicited during the rule drafting stage. The administrative procedure act authorizes the agency to hold a public hearing on the adoption of rules. If the agency provides notice of intent to adopt rules without a public hearing, the agency will still need to hold a public hearing if 25 or more persons request a public hearing within the 30 day comment period.

The department amended the state metallic minerals leasing rules in 1982 and 1988. There were notices of intent to solicit outside opinion on both occasions. A public hearing was not held for the adoption of either of these amendments, with no requests submitted for a public hearing. This was at least in part due to extensive comment periods and the several meetings conducted to discuss drafts with interest parties.

The department held a public hearing during its adoption of reclamation rules for iron ore and taconite mining. The department is currently soliciting outside opinion through August 1, 1991, regarding reclamation rules for non-ferrous metallic minerals mining, and the department plans to hold a public hearing on the adoption of these reclamation rules.

#### How will the reclamation permit to mine aid in the protection of human health and the environment?

The permit to mine requires an exhaustive plan as part of the permit application. A critical component to the draft reclamation rules for non-ferrous mining is the requirement of the developer to characterize the mine waste that will be generated. Waste characterization will allow the pre-operational prediction of the quality of drainage from mining wastes and enable informed decisions to be made on other requirements of the rules including the siting, mining, construction, and reclamation of mining facilities. Thus, prior to the initiation of any mining activities, the operator must receive a permit specifying all design, operating, and reclamation requirements necessary for the protection of human health and the environment.

#### How can the state be assured there will be environmental protection should there be financial failure of the operator?

The Mineland Reclamation Act requires the commissioner to "require a bond or other security or other financial assurance" for all mining operations. The purpose of this requirement is to provide a source of monies to the commissioner should the operator not comply with permit requirements for the reclamation (including closure and post-closure care) of the mining operation. The draft rules require the operator to determine the reclamation and closure costs associated with the premature closure of the mining facilities on a yearly basis. This amount of money must then be provided by an instrument of financial assurance (e.g. bond, letter of credit, insurance, corporate guarantees, etc.) that will be available to the commissioner should the operator not comply with permit requirements. The draft rules also allow the commissioner to require financial assurance for any corrective action required of the permittee to correct design, operational, and reclamation failures or non-compliance.

#### What is the relationship between the state's regulatory program and proposed federal regulations for mine waste?

The U.S. Environmental Protection Agency (EPA) is investigating procedures to regulate the disposal of all mining wastes. Future rules will be adopted under the Subtitle D authority of the EPA's Resource Conservation and Recovery Act (RCRA). STRAWMAN II is the current draft of what the EPA's future mine waste disposal regulations may contain. STRAWMAN II contemplates a state-run mining waste program in which states would submit a mine waste management plan for EPA's approval. This plan must identify how a state would coordinate existing regulatory programs and how the states would meet the federal minimum mine waste disposal standards. For a state to obtain EPA approval and, thus, program primacy, its mine waste disposal plan would need to meet federal minimum criteria for the following: surface water, ground water, air quality, and soil performance standards; design and operating standards; monitoring and verification requirements; public participation; and financial assurance.

A preliminary review of the DNR's and PCA's mining regulatory programs in the context of EPA's STRAWMAN II requirements indicate that the state's rules are patterned to accomplish the goals of STRAWMAN II. As the administrative procedure process continues, modifications will be made to the draft reclamation rules to reflect changes made in the proposed federal regulations.

### Other Permits from State Agencies

### What other DNR permits are required for mining?

Most mining operations require substantial amounts of water for processing and also need to discharge water to keep active underground mine workings and open pits dry. The DNR Division of Waters is responsible for regulating water quantity impacts through the Protected Waters and Appropriation Permit program. These permits typically focus on mitigation of water volume impacts through either engineering design or site decisions.

Precious metal mining operations typically do not use large quantities of water, nor do they affect large areas of land, which result in large-scale watershed alterations. For this reason, water use and watershed alteration issues are not expected to be as great as they are with taconite mining.

#### What data will be needed to define terms of water permits?

Proposed watershed alterations or water appropriation will likely require the gathering of pre-operation baseline data. Pre-operational data needs normally focus on characterization of seasonal climatologic and hydrologic aspects of the area to be mined or site-specific hydraulic conditions. Sufficient data is needed to properly assess operational impacts and guide post-operational closure plans. For example, pre-operational characterization of potentially affected ground water and surface water resources will be essential for proper facility siting and design, operational impact evaluation, and post-operational closure design.

Operational data needs (permit requirements) normally include monitoring volumes and timing of water appropriated, efficiency, erosion control success associated with miscellaneous Protected Waters Permits, and parameters necessary for the evaluation of the safety of dams. The direct effects on nearby ground water and surface water resources may also have to be monitored, and contingency plans developed to deal with potential problems.

Operational downstream water quantity impacts may be mitigated through distribution or timing of release of water from dewatering. Post-operational downstream water shortages caused by mining may require temporary, supplemental pumping as mitigation until pit or mine water levels stabilize.

Operational and post-operational dam safety is a major concern, requiring extensive engineering design, monitoring, and detailed reclamation planning. Perpetual postoperational maintenance and monitoring may be necessary as long as the dam is subject to dam safety rules. Conceptual plans for both anticipated and premature closing must be submitted with the dam safety permit application.

### What permits are required by the PCA for mining in Minnesota?

The Minnesota Pollution Control Agency has permitting authority over point and non-point source discharges. In this capacity, they set ambient air and water quality standards that must be met by the mining industry. In addition, they establish discharge standards from point sources. Both of these activities are addressed through the EPA's National Pollutant Discharge Elimination System (NPDES) permit program which is implemented in the state by the PCA.

All waste disposal systems such as tailing basins and stockpiles require a permit. Any waste disposal systems that include direct discharges to surface waters of the state must be permitted by PCA prior to construction under the NPDES and State Disposal System (SDS) programs. Facilities which do not discharge or discharge only to ground water must be permitted by PCA under the SDS program, again, prior to construction. PCA must also approve plans and specifications for all other waste disposal systems prior to permitting, as well as other systems which have the potential to pollute the air or the waters of the state.

#### What data is needed to define terms of PCA's permits?

The PCA requires at least one year of baseline water quality data prior to writing of permits. Parameters that would be sampled are established by PCA based on experience at similar sites, waste characterization studies, and other considerations. The sources, fates, mobility, behavior, and toxicity of all contaminants must be reported to PCA so that mass-loading estimates can be made for permits and for nondegradation analysis purposes and to ensure that all discharges meet toxicity and/or water quality standards.

Adequate pre-operational and upstream monitoring allows the PCA to set accurate permit limits. Monitoring must continue after the site is closed until it is clear that closure has been successful and financial surety can be released.

#### How long does environmental review and permitting take?

As described earlier, the environmental review process for a new mine will include the preparation of a scoping Environmental Assessment Worksheet and an Environmental Impact Statement. The preparation of these two documents, including public review and meetings, will take at least 1.5 years. The permitting processes of the various regulatory agencies can take approximately this length of time and possibly longer if contested case hearings are required. If these two activities (environmental review and permitting) were run in series, it would take a minimum of 3 years to complete.

Although permits cannot and should not be granted before the environmental review process is completed, it is reasonable to start the permitting procedures in parallel with the environmental review process. These two distinct programs directed at accomplishing different purposes will each be most effective if they have access to data and information developed by the other. For example, analysis of impacts by the EIS can best be done using information on mine waste characterization obtained through the permitting procedure. On the other hand, the permitting process will work most effectively if it has available information on land use issues developed by the EIS document.

### VII. ECONOMIC IMPACTS

#### MINING AND EXPLORATION REVENUE

#### What is the economic impact to the state's economy from the taconite industry?

In 1990, taconite accounted for over 99% of the iron ore shipped from the state. Minnesota continued to lead the nation in the production of iron ore, with an estimated value of 1.34 billion. The taconite industry annually contributes over \$900 million to the state's economy.<sup>10</sup>

Although overall state-wide employment impacts are low, as of 1990 the taconite mining industry directly employs about 6,500 people. Approximately 1,280 Minnesota companies supply the taconite industry. About 600 companies are located in the mining area, about 280 are located in Duluth and about 400 in the Twin Cities. If the taconite industry was shutdown, it is estimated that a total of 20,000 jobs would be lost.<sup>11</sup>

#### What is the economic impact to the state from other mineral industries?

Minnesota is headquarters to the world's largest granite producer. Estimated mineral production value for the dimension stone industry is \$21 million for 1990. The crushed stone, sand and gravel, clay and peat industries have a production value of \$139 million. The total mineral production for 1990, including iron ore/taconite, was estimated at \$1.5 billion, with this ranking Minnesota sixth in the nation in non-fuel mineral value.<sup>12</sup> If value added processing which takes place in Minnesota were added to these figures, the total value would be significantly higher.

#### What is the economic impact from mineral exploration?

During the last eight years, there have been between 20 and 30 companies exploring for metallic minerals in any given year. Recently, there has been active exploration for dimension stone, kaolin clay, silica sand and taconite.

<sup>10</sup> <u>Minneapolis Star and Tribune</u>, February 1, 1991, p, 38w. This article quotes statistics released by Al France, Director of the Lake Superior Industrial Bureau in Duluth.

<sup>11</sup> <u>Governor's Blue Ribbon Commission on Mining: Final Report and</u> <u>Recommendations</u>, Minnesota Department of Revenue, January 1991, p. 6. The 20,000 job impact is reported from a 1989 study prepared by Jerrold M. Peterson for the University of Minnesota, Duluth. The statistics on the number of companies are from Al France.

<sup>12</sup> <u>The Mineral Industry of Minnesota in 1990</u>, U.S. Department of Interior, Bureau of Mines.

These exploration companies are spending a total of between \$10 to \$15 million a year to conduct their activities. The expenditures include purchase of local services (e.g., hotels, restaurants, gas stations), local employment, and rental of office space. This activity also generates approximately \$1.7 million annually in taxes.

#### What revenues does the state receive from its mineral leasing program?

For fiscal year 1990, the state received \$2.58 million in revenue from its state mineral leases. This revenue includes rental and royalty payments from the state iron ore/taconite leases, rental payments from the state metallic minerals leases and rental and royalty payments from the state peat leases. Estimated annual revenues for fiscal years 1991 through 1993 are projected to increase from \$3.2 million to \$4.9 million due to heavier mining of state taconite and to increased royalty rates under state taconite leases as they start entering into their extended period.

Tables No. 4, 5 and 6 show the revenue received for all lease types during the last ten years, estimated annual revenue for all lease types for fiscal years 1991-1993, and annual rental received under the state metallic minerals leasing program.

### Revenue from a New Mine

#### How has the DNR studied possible economic impacts from a gold mine?

As discussed previously in this report, there is the potential for discovery of gold resources in the state. In anticipation of a gold discovery, a preliminary economic study of gold mining in northern Minnesota has been completed. This study covers the most essential aspects of mineral resource development: mining and milling engineering, economic feasibility (returns to investment), and economic impact analysis.

For study purposes, mine models were constructed to make use of existing engineering data and current mining technology. Estimates of development and production costs, both capital and operating, were made by the U.S. Bureau of Mines. A 75-sector input-output system (called "IPASS"), developed by the University of Minnesota, was used to evaluate the likely economic impacts of gold mining on the state's economy.

#### What were the assumptions used for the economic study?

Two potentially feasible mining systems for the mining of gold in northern Minnesota are open-pit and underground (longhole-stoping) methods. Open-pit mining is most economic for deposits near the surface, while underground mining is necessary for deep deposits. Milling is assumed to be by flotation/cyanide leaching.

Within each mining system, five mining/milling capacities were considered, varying from 500

#### Minnesota Department of Natural Resources Division of Minerals

#### STATE MINERALS LEASES

### ANNUAL REVENUE FOR ALL LEASE TYPES FISCAL YEARS 1980-1990 BY LAND CLASS

Ficent	Sahaal	Imin	Forfeited		State			Total
Year	<u> </u>	<u> </u>	<u> </u>	<u>C.C.A.</u>	& L.U.P.	Volstead	<u>Other</u> *	Revenue
1980	2,151,294	78,397	1,057,655	0	7,829	0	0	3,295,175
1981	3,109,231	75,602	428,426	0	6,441	0	0	3,619,700
1982	2,228,134	68,208	861,043	0	2,166	0	0	3,159,551
1983	988,832	68,012	148,871	53,684	311	257	0	1,259,967
1984	1,153,167	69,340	702,578	30,015	407	61	0	1,955,568
1985	1,715,209	77,803	925,015	89,527	10,200	4,028	0	2,821,782
1986	1,981,105	64,266	933,726	76,502	30,071	3,494	292	3,089,456
1987	649,171	47,645	1,088,303	56,046	10,219	2,395	56	1,853,835
1988	1,302,494	148,150	928.649	46,364	15,308	2,735	602	2,444,302
1989	1,494,545	243,497	1,179,700	86,485	12,691	4,070	2,136	3,023,124
1990	1,650,977	219,559	627,488	48,223	29,705	3,559	181	2,579,692
Total	18,424,159	1,160,479	8,881,454	486,846	125,348	20,599	3,267	29,102,152

\* Other mineral classes include: Game & Fish, General, Rural Credit and D.O.T.

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Table No. 4

#### Minnesota Department of Natural Resources Division of Minerals

#### STATE MINERALS LEASES

### ESTIMATED ANNUAL REVENUE FOR ALL LEASE TYPES FISCAL YEARS 1991-1993 BY LAND CLASS

Fiscal Year	School Trust	Univ. Trust	Forfeited Lands and Minerals	<u>C.C.A.</u>	State Forest <u>&amp; L.U.P.</u>	Special Advanced Royalty	Total <u>Revenue</u>
1991	1,462,900	227,800	1,213,200	40,800	34,400	268,600	3,247,700
1992	1,831,400	2,125,400	1,137,100	39,000	27,800	344,900	5,505,600
1993	1,453,100	1,900,100	1,132,200	31,800	27,700	344,900	4,889,800
Total	4,747,400	4,253,300	3,482,500	111,600	89,900	958,400	13,643,100

#### Notes on Calculating Estimates:

- 1) These are best estimates based on planned production for iron ore and peat. However, market conditions and the general economy could change these estimates.
- 2) It is very difficult to estimate future lease terminations for metallic minerals leases as well as determining where lands will be leased in the future. Thus, it is difficult to estimate the amount of revenue from tax-forfeited lands in a particular county.
- 3) The estimate for fiscal year 1991 covers three quarters and two months of revenue and an estimate for an additional month.
- 4) The above estimates do not include any interest from the taconite iron ore special advance royalty account. For example, interest in the amount of \$415,834, was received in fiscal year 1991. (This payment is shown in the Department of Finance's report for fiscal year 1990, since it was paid out of fiscal year 1990 monies.)

Table No. 5

### Minnesota Department of Natural Resources Division of Minerals

### STATE METALLIC MINERALS LEASES

### ANNUAL REVENUE BY LAND CLASS

			Forfeited		State			
Fiscal	School	Univ.	Lands and		Forest			Total
Year	Trust	Trust	<u>Minerals</u>	C.C.A.	& L.U.P.	Volstead	<u>Other</u>	Revenue
				-			•	
1967	33,156	303	48,899	0	2,778	0	0	85,137
1968	12,154	86	14,657	0	715	0	0	27,612
1969	60,249	285	104,435	65,876	1,888	3,081	0	235,814
1970	34,546	186	48,959	10,935	1,904	515	0	97,045
1971	74,086	184	106,510	86,789	328	1,745	0	269,642
1972	34,805	60	40,103	33,327	81	569	0	108,946
1973	18,408	0	18,091	10,369	0	0	0	46,869
1974	19,295	126	38,142	16,255	2,893	0	0	76,711
1975	13,024	0	11,974	33,101	931	519	0	59,548
1976	15,912	Ó	31,143	3,018	2,765	145	0	52,983
1977	55,435	Ō	25,035	- Ó	1,212	0	0	81,682
1978	102,170	Ō	24,109	0	0	0	0	126,280
1979	82.838	Ó	22,660	Ö	0	0	0	105,498
1980	76.699	Ó	24.446	0	0	0	0	101,145
1981	21,860	Ō	6.045	Ō	Ō	Ó	Ó	27,905
1982	131.016	Ō	38,888	Ō	Ō	Ó	0	169,905
1983	142.412	712	88,176	53.684	311	257	Ó	285,552
1984	111,459	150	57.361	30.015	74	61	0	199,120
1985	110,443	1.375	95,610	89.527	826	4.028	Ó	301.810
1986	108.620	1.406	116.519	76.502	968	3.494	292	307,801
1987	57.403	1.312	80.093	56.046	576	2.395	56	197,882
1988	86,148	2,195	159.889	46.364	1.630	2.735	602	299.563
1989	130.083	2,913	207.987	86.485	773	4.070	2.136	434.447
1990	-89.857	508	195,225	48,223	574	3.559	181	338,128
					2.7			
Total	1,622,077	11,801	1,604,958	746,517	27,173	21,227	3,268	4,037,022

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Table No. 6

short tons to 10,000 short tons of ore per day. Each mining capacity requires a different level of initial capital investment and operating costs. Accordingly, initial capital investment, depending on the mining method and operation's size, can vary from \$18 million to \$214 million (in current dollars). Annual operating costs, likewise, may vary between \$9 million and \$179 million.

For each scenario, regardless of mining capacity, the models assume two years of exploration and three years of development before any gold production can take place.

#### What would be the economic impacts from a gold mine?

If and when gold is discovered in Minnesota, the state can expect to have significant economic benefits in the forms of income, employment, and taxes generated. The primary (or direct) and secondary (or indirect) benefits tabulated in Table No. 7 are the results of the IPASS model simulations for hypothetical gold mining operations. They are shown as *changes* in the state's gross output, earnings, and employment *in the second year of each phase* compared with 1988, the "baseline" year when no gold industry exists.

The data<sup>13</sup> show that all three phases, exploration, development and production, generate positive changes in the state's economy. The gains in gross output and earnings could be even larger but for constraints on capital and labor. The IPASS system assumes that projects compete for labor and capital, and that supplies of each are relatively inflexible in the short term. Therefore the change in Gross Output shown in Table No. 7 is less than operating costs, since some of the labor and capital needed for mining will be pulled from other sectors of the economy, e.g. retailing. However, the changes are positive, which shows that a gold mining operation will generate more gross output than would occur through "baseline"-type growth.

### What amounts of royalties might one expect from metallic minerals mines?

Royalties paid to the owners of mineral rights are subject to negotiation, if privately held, or bidding if state owned lands. The annual projected royalty income from three cases studied in the Mining Simulation Project are shown below. The report used an average royalty rate of five percent net smelter return.

Mine Type	Annual Royalty
Underground platinum deposit Open pit copper-zinc-gold-silver deposit	\$ 675,000 3.200.000
Underground gold deposit	2,300,000

<sup>&</sup>lt;sup>13</sup> This data is from the mimeograph titled <u>The Economic Feasibility of Gold Resource</u> <u>Development in Northeastern Minnesota</u>, by the Minnesota Department of Natural Resources, Division of Minerals, 1989.

# SELECTED ECONOMIC IMPACTS (PRIMARY & SECONDARY) OF GOLD MINING IN MINNESOTA (All Values in current dollars) .........

	ESTIMATED CHANGES RELATIVE TO BASELINE YEAR (1988)								
	GROSS OUTPUT (thousand \$)		EARNINGS (thousand \$)			EMPI (number	OYMENT of worke	rs)	
	Direct	Indirect	Total	Direct	Indirect	Total	Direct In	ndirect I	otal
SCENARIO I: Open-pit Mining Method (1) Will Capacity: 1,000 STD Capital costs: \$26.3 million Annual Operating Costs: \$13.5 million									
Exploration (1989-90) Mine Development (1991-93) Mine Production (1994-96)	0 0 6,873	2,651 6,165 5,453	2,651 6,165 12,327	504 1,364 3,307	1,203 1,754 1,872	1,707 3,118 5,178	8 20 69	29 55 42	37 75 111
(2) Mill Capacity: 5,000 STD Capital costs: \$58.5 million Annual Operating Costs: \$31.0 million									
Exploration (1989-90) Mine Development (1991-93) Mine Production (1994-96)	19,423	6,514 15,125 21,298	6,514 15,125 40,721	1,135 3,341 7,010	2,064 4,356 7,639	3,198 7,697 14,649	18 49 147	70 134 177	88 183 324
SCENARIO 11: Underground Wining Hethod		•••••	********			• • • • • • •			*****
(1) Hill Capacity: 1,000 STD Capital costs: \$51.3 million Annual Operating Costs: \$30.6 million									
Exploration (1989-90) Mine Development (1991-93) Mine Production (1994-96)	0 0 12,646	1,878 18,562 2,010	1,878 18,562 14,656	504 3,068 7,768	586 5,705 132	1,089 8,773 7,899	8 45 162	21 170 15	29 215 177
(2) Hill Capacity: 5,000 STD Capital costs: \$141.6 million Annual Operating Costs: \$101.8 million									
Exploration (1989-90) Mine Development (1991-93) Mine Production (1994-96)	56,568	5,276 51,955 54,311	5,276 51,955 110,879	946 8,181 20,221	1,670 16,151 19,113	2,615 24,332 39,334	15 120 423	57 463 447	72 583 870

NOTES: STD: Short Tons per Day (1) Assumptions: Hill capacity is 50% of mining capacity (ore and waste); based on 360-day-per-year operations. (2) Capital and operating costs are for both mining and milling. (3) Changes in output, eernings, and employment are estimated for the second year of each phase. (4) "Current" values reflect an implicit inflation rate of 4% per ennum, which is approximately the annual average change in the CNP price index (fixed-weights) over the last 60 years. SOURCE: Mn-DNR/Minerals Div., "The Economic Feasibility of Gold Resource Development in Northeastern Minnesota", mimeograph (Saint Paul, 1989).

5/23/91

Table No. 7

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# APPENDICES

A - C

### METALLIC MINERALS LEASING RULES (MINNESOTA RULES, PARTS 6125.0100-.0700) SUMMARY OF LEASE PROVISIONS

NAME OF LEASE	Metallic Minerals	RENTAL	First 2 years + unexpired portion of year lease is issued - \$1.00/acre/year
MINERALS EXCEPTED	Iron ores, taconite ores, coal, oil, gas, and other liquid or gaseous		Next 3 years - \$3.00/acre/year
FROM LEASE	hydrocarbon substances (unless associated mineral products)		Second 5 years - \$8.00/acre/year
	- /		Thereafter - \$25.00/acre/year
FEES	Mining Unit Book - \$25		
	Lease Fee - \$100 Negotiated Lease Fee - \$100		-rental for current year credits against royalties due for current year
	0		-previous rentals in excess of \$8.00 per acre credit against current royalties
ADMINIS-	-bids accepted up to 4:30 p.m. of day		,
TRATIVE PROCEDURES	before day of opening		-state may cancel after 20 years or 35 years if lessee has not paid \$100,000 in royalty in one calendar year by end of 20th year or 35 years from specified
	-open bids before commissioner and		mine area
	at least one member of executive		
	council as designated by the council		
	-provision for drawing to resolve tie bids		

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Weight of metals recovered in mill concentrate x Market Price	ROYALTY	= (BID RATE	+ BASE RATEJ X VALUE
-from that total subtract smelter charges		BID RATE = _	%
-adjust on basis of metals actually sold		BASE RATE va	ries with value of ore mined:
-identifies when deemed sold		VALUE	BASE RATE
-provision for determination of value if sold		v <u>&lt;</u> \$75	3 1/2%
on basis other than as fully-refined metal		\$75 < <u>v</u> < \$150	3 1/2% + .015% for each dollar increase in value above \$75
-identifies specific listings of Cu, Ni, Au, Ag, Pb & Zn market prices		\$150 <v<u>&lt; \$225</v<u>	3 1/2% + .015% for each dollar increase in value above \$75 + .02% for each dollar increase in value above \$150
-sources for market prices is as quoted in Metals Week	-	v> \$225	3 1/2% + .015% for each dollar increase in value above \$75 + .02% for each dollar increase in value above \$150 + .025% for each dollar increase in value above \$225
		-values of \$75, \$ Commodities for	150, and \$225 subject to quarterly escalation by PPI - All rmula

-base royalty rate capped to not exceed 20% of value

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#### DEFERRAL

-discretionary -up to 50% of royalties only -up to 5 years or 1/2 mine life -bears 8% interest

VALUE

Examples of Royalty Calculation:

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(1) If v = $ 65.00, then the base rate = 3.5%
(2) If v = $125.66, then
Base Rate = .035 + [.00015 \times (v-75.00)]
            = .035 + [.00015 \times (125.66-75.00)]
            = .035 + [.00015 \times 50.66]
            = .035 + .007599
            = .042599
            = 4.2599%
(3) If v = $200.00, then
Base Rate = .035 + [.00015 \times (v-75.00)] + [.0002 \times (v-150.00)]
            = .035 + [.00015 \times (200.00-75.00)] + [.0002 \times (200.00-150.00)]
            = .035 + [.00015 \times 125.00] + [.0002 \times 50.00]
            = .035 + .01875 + .01
            = .06375
            = 6.375%
(4) If v = $250.00, then
Base Rate = .035 + [.00015 \times (v-75.00)] + [.0002 \times (v-150.00)] +
                       [.00025 x (v-225.00)]
            = .035 + [.00015 \times (250.00-75.00)] + [.0002 \times (250.00-150.00)]
                    + [.00025 x (250.00-225.00)]
            = .035 + [.00015 \times 175.00] + [.0002 \times 100.00] +
                       [.00025 x 25.00]
           = .035 + .02625 + .02 + .00625
            = .0875
            = 8.75%
```

ASSUME: 1) \$100 = value of metallic minerals contained in mill concentrate and there are no smelter charges; then royalty due the state on each ton of crude ore is:

<u>0% bid</u>	<u>1.5% bid</u>
\$3.88*	\$5.38*

\*If material is recovered and sold on a basis other than for the purpose of recovering and selling the fullyrefined metallic minerals, and the commissioner agrees to a value of \$100, then these numbers would apply to that material also.

ASSUME: 2) \$100 = value of metallic minerals contained in mill concentrate and \$37 is deducted for smelter charges, then royalty due the state on each ton of crude ore is:

<u>0% bid</u> <u>1.5% bid</u> \$2.21 \$3.15 (3.5% of \$63) (5% of \$63)

# STATE METALLIC MINERALS LEASE RULES

# **Overview of Lease Rules**

Minnesota Rules, parts 6125.0100-.0700 govern the issuance of state leases covering state-owned land for metallic minerals exploration and development. (The term "copper, nickel and associated minerals" rather than "metallic minerals" was used prior to the 1988 amendments to the rules.)

Minnesota Rules, parts 6125.0100-.0700 were adopted by the Commissioner of Natural Resources and approved by the State Executive Council on November 8, 1966. Amendments to the rules, to add a special royalty rate provision, were approved by the State Executive Council on June 22, 1982 and adopted by the Commissioner of Natural Resources on July 2, 1982.

The Department of Natural Resources has worked on amendments to the rules since the fall of 1986. The process has included extensive study, meetings, drafts of proposed changes, notices and the opportunity for a formal public hearing. Amendments to the rules were approved by the State Executive Council on March 2, 1988 and adopted by the Commissioner of Natural Resources on March 18, 1988. The amendments to the rules became effective May 23, 1988.

The lease rules describe the procedures for the issuance of leases and contain the lease form.

### Index to the Lease Rules

Public lease sale procedures:	. 6125.0500
Negotiated lease procedures:	. 6125.0600
Lease form:6125.0700	
Assignment and agreements:	. 6125.0700, par. 34
Minerals covered by lease:	. 6125.0700, pars. 2, 3, 4 & 33
Performance requirements:	. 6125.0700, par. 29
Purpose of lease:	. 6125.0700, par. 3
Rental rates:	. 6125.0700, par. 6
Reports:	. 6125.0700, pars. 15 & 16
Royalty:	. 6125.0700, pars. 8 & 9
Base royalty rate	. 6125.0700, par. 8a-8c
Calculation of value of ore	. 6125.0700, par. 9
Deferral of royalty	. 6125.0700, par. 8d
Market prices of metals	. 6125.0700, par. 9f
Smelter charges deduction	. 6125.0700, par. 9e
Termination of lease:	. 6125.0700, pars. 28 & 30

### PERMITS AND LEASES FOR METALLIC MINERALS,

### EXCEPT IRON ORES AND TACONITE ORES

#### 6125.0100 PURPOSE.

The purpose of parts 6125.0100 to 6125.0700 is to promote and regulate prospecting for, mining, and removing ores that are primarily valuable for their metallic minerals content, and the rules hereunder shall be construed to carry out that purpose.

#### 6125.0200 DEFINITIONS.

Subpart 1. Scope of terms. For purposes of parts 6125.0100 to 6125.0700, the following words have the meanings given them.

Subp. 1a. Associated mineral products. "Associated mineral products" means those intermingled or associated materials and substances recovered from each ton of crude ore mined from the mining unit that are excluded from the definition of metallic minerals.

Subp. 2. Commissioner. "Commissioner" means the commissioner of natural resources of the state of Minnesota, or the commissioner's designated representative.

Subp. 2a. Metallic minerals. "Metallic minerals," whether singular or plural, means any mineral substances of a metalliferous nature, except iron ores and taconite ores.

Subp. 3. Mining unit. "Mining unit" means the land and water area designated as such by the commissioner, wherein the state owns an interest in the minerals and mineral rights.

Subp. 4. Ton. "Ton" means 2,000 pounds avoirdupois after removal of all free moisture from the material weighed, by drying at 212 degrees Fahrenheit.

Subp. 5. Troy ounce. "Troy ounce" means a unit of mass equal to 480 grains or 31.1035 grams or 1.0971 avoirdupois ounces.

#### 6125.0300 PERMITS.

The first two years of any lease issued under parts 6125.0100 to 6125.0700 is considered the prospecting permit, and no permit to prospect for metallic minerals shall be issued separately or independently from the lease, provided that nothing in this part shall restrict mining operations authorized by the lease.

#### 6125.0400 LEASES.

The commissioner, with the approval of the state executive council, shall adopt rules for the issuance of leases to prospect for, mine, and remove metallic minerals on lands where an interest in the minerals is owned by the state, including trust fund lands, land forfeited for nonpayment of taxes and held in trust by the state, lands where severed mineral interests have forfeited under Minnesota Statutes, section 93.55, lands where severed mineral interests have been otherwise acquired, the beds of public waters, and lands otherwise acquired that have been designated by the commissioner as mining units. Each lease shall cover one mining unit. No lease shall be issued for a term longer than 50 years.

#### 6125.0500 PUBLIC SALE OF LEASES.

Subpart 1. Time, place, and notice. Except as otherwise expressly provided by law, or as otherwise provided in part 6125.0600, leases to prospect for, mine, and remove metallic minerals owned by the state shall be issued only upon public sale authorized by the commissioner.

The public sale of leases shall be held at such times and places as may be designated by the commissioner. The commissioner shall give public notice of each sale by publication for three successive weeks in a qualified newspaper that has its known office of issue in the county seats of the counties in which the mining units to be leased are located. If no qualified newspaper has its known office of issue in the county seat of a particular county, then notice must be published in the qualified newspaper designated as the publisher of the official proceedings of the county board of that county. The first publication shall be at least 30 days before the date of sale. Like notice may be published in not to exceed two additional newspapers and two trade magazines as the commissioner may direct. Each notice shall contain the following information:

A. time and place of holding the sale;

B. the place or places where the list of mining units to be offered for sale will be available for purchase or inspection, and where application and bid forms may be obtained; and

C. such other information as the commissioner may direct.

Subp. 2. Mining unit books. Those interested in bidding may obtain a mining unit book by making application to the commissioner, accompanied by a check or money order, payable to the state treasurer, in the sum of \$25 as a fee for a mining unit book. Unit books will be available for inspection at the Hibbing and Saint Paul offices of the Division of Minerals.

Subp. 3. Lease application and bid. Each application and bid shall be submitted on a form obtained from the commissioner and shall cover only one mining unit, as designated in the mining unit book. The royalty rate offered in the bid shall be designated by inserting a figure in the blank space in the following clause of the bid form: "The royalty rates bid herein to be paid to the state per ton of crude ore for the metallic minerals and associated mineral products recovered from the ores mined from the mining unit shall be the sum of the base rate, as described in part 6125.0700, paragraph 8, and an additional bid rate of \_\_\_\_\_ percent of the value of the metallic minerals and associated mineral products recovered in the mill concentrate."

The application and bid, together with a certified check, cashier's check, or bank money order, payable to the state treasurer in the sum of \$100, shall be submitted in a bid envelope obtained from the commissioner. Each sealed bid envelope shall be enclosed in another envelope and shall be delivered in person or by mail to the commissioner at Saint Paul, Minnesota. Bids may be submitted at any time before 4:30 p.m., Saint Paul, Minnesota time, on the last business day before the day specified for the opening of the bids, and no bids submitted after that time shall be considered. Upon receipt, the commissioner shall endorse upon each sealed bid envelope the exact time of presentation and preserve the same, unopened in the commissioner's office.

At the time specified, the commissioner, together with at least one member of the state executive council as designated by the council, shall then publicly open the bids and announce the amount of each bid separately. Leases shall be awarded by the commissioner, with the approval of the state executive council, to the highest bidder for the respective mining units, but no bids shall be accepted that do not equal or exceed the base royalty rates in part 6125.0700. The right is reserved to the state, through the executive council, to reject any or all bids. Tie bids will be resolved by the commissioner, with the approval of the state executive council, by the random drawing of the name of one tied bidder from a pool comprised of the names of all the tied bidders. Upon the award of

a lease, the certified check submitted with the bid shall be deposited with the state treasurer as a fee for the lease. All bids not accepted shall become void, and the checks accompanying the bids shall be returned to the respective bidders.

#### 6125.0600 NEGOTIATED LEASES.

When the commissioner finds that it is impractical to hold a public sale on any mining unit because of its location or size or the extent of the state's interest in the minerals and that the best interests of the state will be served, the commissioner, with the approval of the executive council, may, without holding a public sale, issue a lease to any qualified applicant to prospect for, mine, and remove metallic minerals. Application shall be in a form and shall contain information as the commissioner may prescribe. The applicant shall submit with the application a certified check, cashier's check, or bank money order, payable to the state treasurer in the sum of \$100. The leases so issued shall be in the form set forth in part 6125.0700, with such additional terms and conditions consistent with the lease as may be agreed upon. The rental and royalty rates agreed upon shall be not less than those prescribed in part 6125.0700.

No lease shall be issued under this part for the removal of metallic minerals from any mining unit for which notice of public sale has been published, until the public sale has been held.

#### 6125.0700 FORM OF LEASE.

The form of lease for prospecting for, mining, and removing metallic minerals belonging to the state shall consist of the following provisions, with insertions, changes, or additions as may be necessary to incorporate the royalty rates and other particulars applicable to each lease as may be authorized under parts 6125.0100 to 6125.0700:

This lease agreement is entered into on the \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_. The parties to this lease are the State of Minnesota, called the state, and called the lessee.

1. Term; description of mining unit. The state, in consideration of the sum of Dollars, paid by the lessee, being the rental provided in this lease for the unexpired portion of the current calendar year and for the next succeeding two (2) calendar years, the receipt whereof is hereby acknowledged, and in further consideration of the covenants and conditions of this lease to be performed by the lessee, agrees to lease to the lessee for a term of \_\_\_\_\_\_ (\_\_\_) years beginning the \_\_\_\_\_\_

day of \_\_\_\_\_\_, 19\_\_\_, the following-described mining unit, situated in the county of \_\_\_\_\_\_, in the State of Minnesota:

2. Definitions. For the purposes of this lease, the following words have the meanings given them:

a. "Associated mineral products" means those intermingled or associated materials and substances recovered from each ton of crude ore mined from the mining unit that are excluded from the definition of metallic minerals.

b. "Commissioner" means the commissioner of natural resources of the state of Minnesota, or the commissioner's designated representative.

c. "Metallic minerals," whether singular or plural, means any mineral substances of a metalliferous nature, except iron ores and taconite ores.

d. "Ton" means 2,000 pounds avoirdupois after removal of all free moisture from the material weighed, by drying at 212 degrees Fahrenheit.

e. "Troy ounce" means a unit of mass equal to 480 grains or 31.1035 grams or 1.0971 avoirdupois ounces.

3. Purpose of lease. The mining unit is leased to the lessee for the purpose of prospecting for, mining and removing ores primarily valuable for their metallic minerals content that are found on or in the mining unit.

The lessee has the right to construct or make buildings, excavations, openings, ditches, drains, railroads, roads, and other improvements on the mining unit as necessary or suitable for those purposes. The lessee has the right to mill and concentrate the ore so mined, either upon the mining unit or elsewhere, but the right to mill and concentrate does not include the right to reduce or smelt ore upon the mining unit without an agreement between the lessee and the commissioner, authorizing that use of the surface of the land and providing for the necessary protection of life and property. The lessee may contract with others for doing any work authorized or required under this lease, or for the use of the mining unit or any part of it for the purposes of the lease, but no contract of this type relieves the lessee from any duty, obligation, or liability under the lease. No such contract providing for shipping, handling, or removal of ore-bearing material becomes effective for any purpose until three executed duplicates of the contract have been filed with the commissioner.

4. State's right to lease iron ores, taconite ores, coal, oil, gas, and other liquid or gaseous hydrocarbon substances. The state reserves the right to lease or grant to other persons or corporations the right to explore for, mine, remove, and beneficiate iron ores, taconite ores, coal, oil, gas, and other liquid or gaseous hydrocarbon substances, that are located in the mining unit. The state agrees that any permit or lease granted by it to any person or corporation to explore for, develop, mine, or dispose of the iron ores, taconite ores, coal, oil, gas, and other liquid or gaseous hydrocarbon substances shall contain a provision that the permittee or lessee shall exercise those rights so as not to cause any unnecessary or unreasonable injury or hindrance to the operations of the lessee of this lease in the exploration for, or the development, mining, or removal of metallic minerals other than iron ores, taconite ores, coal, oil, gas, and other liquid or gaseous hydrocarbon substances covered by that permit or lease. The lessee of this lease agrees that it will exercise the rights granted to it by this lease in such manner as not to cause any unnecessary or unreasonable injury or hindrance to the operations of any permittee or lessee of the state in the exploration for, or the development, mining, or removal of iron ores, taconite ores, coal, oil, gas, and other liquid or gaseous hydrocarbon substances.

5. State's right to lease surface and sell timber. The state reserves the right to sell and dispose of all the timber upon the mining unit without hindrance from the lessee and according to the law now or hereafter governing the sale of timber on state lands, and reserves to the state and to the purchaser of the timber, and their agents, the right at all times to enter the mining unit, and to cut and remove timber from it according to the terms of the purchaser's contract with the state. The timber purchaser shall not unduly interfere with the prospecting or mining operations. The state further reserves the right to grant leases, permits, or licenses to any portion of the surface of the mining unit to any person, partnership, corporation, or other association under the authority of Minnesota Statutes, section 92.50, or other applicable laws, after consultation with lessee. The surface leases, permits, or licenses shall not unduly interfere with the prospecting or mining operations conducted on the mining unit.

6. Annual rental. The lessee agrees to pay to the state rental for the mining unit at the rate of one dollar per acre of land and water area included in the mining unit, per calendar year, payable in advance, for the unexpired portion of the current calendar year from the effective date of this lease and for the next succeeding two calendar years; and after that time at the rate of three dollars per acre per calendar year, payable quarterly for the three succeeding calendar years; and after that time at the rate of eight dollars per acre per calendar year, payable quarterly for the five succeeding calendar years; and after that time at the rate of eight dollars per acre per calendar year, payable quarterly for the five succeeding calendar years; and after that time at the rate of \$25 per acre per calendar year, payable quarterly for the remainder of the term of this lease.

The mining unit may include state-owned minerals under water, in trust fund lands, in acquired lands, in lands forfeited for taxes, and in lands in which severed mineral interests have forfeited for failure to comply with registration laws, or have been otherwise acquired. Any amount paid for rental, at the time of payment, shall be allocated to the proper fund as determined by the mineral ownership.

Any amount paid for rental accrued for any calendar year must be credited on any royalty that may become due for ore removed under this lease during the same calendar year but no further, and only to the extent that the rental was paid or deposited into the particular fund to which the royalty for the ore is due. Any amount paid for royalty in excess of the credit during that year must be credited on rental, if any, subsequently accruing for that year but no further, and only to the extent that the royalty was paid or deposited into the particular fund to which the rental is due. However, any amount paid for rental in excess of eight dollars per acre for any previous calendar year may be credited on any royalty that may become due for ore removed under this lease during the current calendar year in excess of any credits for current rental, but only to the extent that the rental was paid or deposited into the particular fund for which the royalty is due.

Rental payments must be made on May 20, August 20, November 20, and February 20 for the previous calendar quarters. The first calendar quarter is the first three calendar months of the year, and so on.

Upon surrender of any part or parts of the mining unit by lessee under this lease, the annual rental payment may be discontinued as to those parts for all subsequent calendar years; however, the rentals paid on the parts surrendered must not be credited on any royalties due for ore removed from that part of the mining unit which remains under lease.

Where the state owns only a fractional undivided interest in the minerals in any portion of the mining unit, only that fractional part of the rentals and royalties established in this lease shall be paid for that portion.

If at any time during the term of this lease it is determined in a proper proceeding that the state does not own the minerals in a part of the area included in the mining unit, the commissioner shall delete from the description of the mining unit the part not owned by the state, and only if that determination is made prior to the fifth anniversary date of this lease is the lessee entitled to a refund, or in the case of tax forfeited minerals to receive credit on future payments due the same fund, for payments made to the state on that part prior to the determination. If the commissioner deems it necessary, additional time to make the determination may be granted.

7. Tonnage for royalty purposes. Royalty must be computed on the dry weight of the crude ore. The dry weight of the crude ore shall be calculated from natural crude ore weights and moisture percentages from samples taken at the time the crude ore is weighed.

8. Royalty.

a. The royalty to be paid to the state by the lessee for the metallic minerals and associated mineral products recovered from each ton of ore mined from the mining unit is the sum of the base rate described in this paragraph and an additional bid rate of \_\_\_\_\_ percent multiplied by the value of the metallic minerals and associated mineral products recovered in the mill concentrate from each ton of dried crude ore.

b. The base rate must not be less than 3-1/2 percent nor more than 20 percent and varies with the value of the metallic minerals and associated mineral products recovered from each ton of ore mined from the mining unit. The base rate must be calculated as provided in clauses (1) to (4):

(1) If the value of the metallic minerals and associated mineral products recovered in the mill concentrate is equal to or less than \$75, the base rate is 3-1/2 percent.

(2) If the value of the metallic minerals and associated mineral products recovered in the mill concentrate is greater than \$75 but less than or equal to \$150, the base rate is 3-1/2 percent plus an additional 0.015 percent for each dollar increase in value above \$75.

(3) If the value of the metallic minerals and associated mineral products recovered in the mill concentrate is greater than \$150 but less than or equal to \$225, the base rate is 3-1/2 percent, plus an additional 0.015 percent for each dollar increase in value above \$75, plus a further additional 0.02 percent for each dollar increase in value above \$150.

(4) If the value of the metallic minerals and associated mineral products recovered in the mill concentrate is greater than \$225, the base rate is 3-1/2 percent, plus an additional 0.015 percent for each dollar increase in value above \$75, plus a further additional 0.02 percent for each dollar increase in value above \$150, plus a further additional 0.025 percent for each dollar increase in value above \$225.

In computing the base rate, there must be no rounding before calculating the total royalty due. The values of \$75, \$150, and \$225, as used above, must be escalated each calendar quarter in accordance with the formula set forth in paragraph c.

For example, assume the value (v) of metallic minerals and associated mineral products recovered in the mill concentrate from a ton of dried crude ore was \$100. The base rate would be calculated as follows:

Base rate =  $.035 + (.00015 \times [v - 75])$ =  $.035 + (.00015 \times [100 - 75])$ =  $.035 + (.00015 \times 25)$ = .035 + .00375= .03875= 3.875 percent

If the value (v) of the metallic minerals and associated mineral products recovered in the mill concentrate from a ton of dried crude ore was \$250, then the base rate would be calculated as follows:

Base rate = 
$$.035 + (.00015 \times [v - 75]) + (.0002 \times [v - 150]) + (.00025 \times [v - 225])$$
  
=  $.035 + (.00015 \times [250 - 75]) + (.0002 \times [250 - 150]) + (.00025 \times [250 - 225])$   
=  $.035 + (.00015 \times 175) + (.0002 \times 100) + (.00025 \times 25)$   
=  $.035 + .02625 + .02 + .00625$   
=  $.0875$   
=  $8.75$  percent

c. The values of \$75, \$150, and \$225 as used in the base rate must be increased each calendar quarter as follows:

If the unadjusted Producer Price Index for All Commodities (1967 equals 100), as originally published (unrevised) by the Bureau of Labor Statistics of the United States Department of Labor, or any succeeding federal government agency publishing the Index, in the monthly publication titled Producer Price Indexes, for the first month in the calendar quarter for which royalty payment is to be made, exceeds 310.5, which was the level of the index for August 1987 (hereinafter called the "Base Index"), an additional amount, computed in the manner hereinafter provided, must be added to the values of \$75, \$150, and \$225 to be used in the base rate for the calculation of the royalty to be paid by the lessee on the ore removed from the mining unit during any quarter.

The increase in the values of \$75, \$150, and \$225 must be computed by multiplying each value by a fraction, the denominator of which is the Base Index and the numerator of which is equal to the amount by which the Producer Price Index for All Commodities for the first month of the calendar quarter in question exceeds the Base Index. The resulting products must be carried to two decimal places and then rounded to the nearest whole dollar.

For example, the Base Index under this lease is 310.5 and if the Producer Price Index for All Commodities for January 1990 was 325.5, the increase in the values of \$75, \$150, and \$225 would be computed as follows:

> \$75 x (325.5 - 310.5) = \$3.62, rounded to \$4.00 \$150 x (325.5 - 310.5) = \$7.24, rounded to \$7.00 310.5 \$225 x (325.5 - 310.5) = \$10.86, rounded to \$11.00 310.5

The indexed values to be used in the calculation of the base rate that would be used in the calculation of royalty payable on the metallic minerals and associated mineral products recovered during the first calendar quarter of 1990 would be:

\$ 75	+	\$4	=	\$79
\$150	÷	\$7	-	<b>\$</b> 157
\$225	+	\$11	-	\$236

If some period other than 1967 is used as a base of 100 in determining the Producer Price Index for All Commodities, for the purposes of this lease provision the index must be adjusted so as to be in correct relationship to the 1967 base. In the event the index is not published by any federal agency, the index to be used as previously provided must be the index independently published, which, after necessary adjustments, if any, provides the most reasonable substitute for the Producer Price Index for All Commodities during any period after August 1987, it being intended to substitute an index that most accurately reflects fluctuations in the prices of commodities in the all commodities index in the manner presently reported by the Producer Price Index for All Commodities (1967 equals 100), published by the Bureau of Labor Statistics of the United States Department of Labor.

The values of \$75, \$150, and \$225 as used in the base rate must never be less than the minimum values prescribed in paragraph 8b of this lease.

d. The lessee may apply to the commissioner and the commissioner may grant the lessee a partial deferral of the lessee's obligation to pay royalties under this lease. Up to 50 percent of royalties due and payable less any credits against royalties as provided in paragraph 6, may be deferred by the commissioner. Any deferral granted applies only to the royalties due and payable during the first consecutive years, up to a maximum of the first five consecutive years, beginning with the first year that any royalties are due and payable under this lease, or to royalties due and payable during the first one-half of the expected operational life of the first mine established under this lease in the mining unit, whichever is less.

The amount of royalties deferred for each calendar quarter as provided above, plus interest at the rate of eight percent per year, becomes finally due and payable on the future date that is determined by adding the total number of years of deferral granted under this section to the date on which royalties would have been due and payable had there been no deferral.

The commissioner in considering the lessee's application for deferral of royalties may consider factors including, but not limited to, the expected operational life of the mine producing the royalties, the express purposes for which the money deferred is proposed to be used by the lessee, the cash flow analysis of the mine, the amount of either the capital invested or to be invested, or both, by the lessee in exploration and mining operations under this lease, and the technical and financial capabilities of the lessee.

9. Value of metallic minerals and associated mineral products.

a. The value of metallic minerals and associated mineral products recovered in the mill concentrate from each ton of dried crude ore must be determined monthly as follows: Multiply the total pounds respectively of each metal and associated mineral product recovered during the month in the mill concentrate from the mining unit, by the average market price per pound respectively for that month of each fully refined metal and of each associated mineral product. Subtract from that total, the smelter charges, as later defined in this lease, to obtain the value of each metallic mineral and each associated mineral product. Add the values thus obtained for each metallic mineral and each associated mineral product for the month, and divide the sum by the total number of tons of dried crude ore from the mining unit concentrated in the mill during the month, to obtain the value of the metallic minerals and associated mineral products recovered from each ton of dried crude ore. The value must be carried to four decimal places and rounded to the nearest one-hundredth of a dollar.

b. When metallic minerals and associated mineral products recovered during the month in the mill concentrate are sold during the same month, only those metallic minerals and associated mineral products recovered from that concentrate that are actually paid for by the smelter, refiner, or other purchaser must be valued as part of the metallic minerals and associated mineral products recovered during the month. When metallic minerals and associated mineral products recovered during the month are not sold during the same month, the value of the metallic minerals and associated mineral products recovered during the month are not sold during the month must be adjusted, if necessary, at the time they are sold to reflect the market price at the time of sale, and to reflect any metallic minerals and associated mineral products recovered in a concentrate that are not actually paid for by a smelter, refiner, or other purchaser. Any prior payment of royalty that becomes an overpayment of royalty as a result of the adjustment of value under this paragraph is a credit against future royalty payments due under this lease.

c. Metallic minerals and associated mineral products sold by the lessee to a nonaffiliate shall be deemed sold at the time the metallic minerals and associated mineral products are delivered to the nonaffiliate. Metallic minerals and associated mineral products sold or transferred by lessee to an affiliate shall be deemed sold by lessee at the time of delivery to the affiliate and value must be calculated on the basis of the market prices at the time of the deemed sale of the metallic minerals and of the associated mineral products sold or transferred to the affiliate. Metallic minerals and associated mineral products retained by the lessee for its own internal use and consumption shall be deemed sold when they are removed from the mining unit and value must be calculated on the basis of the market prices at the time of the removal of the metallic minerals and of the associated mineral products retained for internal use and consumption. For the purpose of this lease "affiliate" means the lessee, or any business entity that is effectively owned or controlled directly or indirectly by the lessee or that directly or indirectly effectively owns or controls the lessee, or any business entity operated by or that operates the lessee.

d. If material is recovered and sold on a basis other than for the purpose of recovering the fully refined metals and the associated mineral products contained in the material, such as the recovery and sale of titanium dioxide for paint pigment uses, then the value of the material recovered and sold, for royalty calculation purposes, is subject to agreement between the commissioner and the lessee.

e. "Smelter charges" means the base smelter treatment charge assessed by the smelter for treating each ton of the mill concentrate plus the smelter losses that are deducted from the assay or market values to arrive at the gross payment to the lessee for each of the metallic minerals and associated mineral products paid for by the smelter. Smelter charges do not include the following: mining or milling, or similar beneficiation costs or charges; refinery losses; refinery charges; penalties for impurities; freight and transportation charges either to or from the mill, concentrator, smelter, or refinery; weighing and sampling charges; handling charges; selling charges; taxes of any kind; processing charges; or any other charges, other than the base smelter treatment charge and smelter losses, assessed by the smelter or purchaser of the metallic minerals or associated mineral products. If the mill concentrate is treated at a smelter owned by, or directly or indirectly effectively controlled by, the lessee or its affiliate, or that the lessee or its affiliate operates or manages, then the smelter charges allowed are equal to the smelter charges that the smelter would assess or charge an unaffiliated third party desiring to have a substantially similar mill concentrate treated at the smelter. If the smelter owned by, operated by, or effectively controlled by the lessee or its affiliate does not provide smelter treatment services to unaffiliated third parties, then the smelter charges allowed are equal to the mean of the smelter charges assessed and charged for substantially similar mill concentrates in smelter contracts between unaffiliated parties. If any metallic minerals or associated mineral products produced under this lease from the mining unit are sold, or otherwise disposed of, without smelter treatment, as, for example, in the production of gold dore, then no deduction for smelter charges, nor any other charges, is allowed in the computation of the value of the metallic minerals and associated mineral products recovered in the mill concentrate. If the state disagrees as to the smelter charges, the lessee has the burden of proof of substantiating the smelter charges.

f. The average market price of copper per pound for each month is that quoted for MW US Producer Cathode (MW US PROD CATH), as reported in Metals Week. The average market price of nickel per pound for each month is that quoted for New York Dealer Cathode (NY DEALER CATH), as reported in Metals Week. The average market price of gold per troy ounce for each month is that quoted for the London Final, as reported in Metals Week. The average market price of silver per troy ounce for each month is that quoted for Handy & Harman, as reported in Metals Week. The average market price of zinc per pound for each month is that quoted for MW US High Grade (MW US HG), as reported in Metals Week. The average market price of lead per pound for each month is that quoted for North American Producer Low (NA PRODUCER L), as reported in Metals Week. The average market price of other metallic minerals and of associated mineral products per pound for each month shall be that quoted for their usual and customary shipping quantities, f.o.b. the usual and customary place of shipment, United States import duty (if any) included, as reported in Metals Week. If Metals Week does not or ceases to report an average monthly market price for any metallic mineral or associated mineral product, then the average monthly market price of that metallic mineral or associated mineral product is the arithmetic average of the daily market prices for the metallic mineral or associated mineral product for that month as reported in Metals Week. If Metals Week or its successors cease to furnish such quotations, or its quotations cease to be recognized in the trade, or a particular metallic mineral or associated mineral product is not listed, then the quotations of such other source as the parties may agree upon shall govern.

10. Commingled ores. The lessee has the right to commingle ore from the mining unit with other ore, either in the mine, in stockpile, in the mill, or in the smelter, but the ores must be kept entirely separate and distinct until their quantities and metal and mineral contents have been separately measured and determined. Ratios of concentration, percent mill recoveries, and any other factors necessary for determining the beneficiating amenability of the commingled ores, the allocation of values and the royalties, must be separately measured and determined by methods approved by the commissioner and shall be reported on a monthly basis. "Ratio of concentration" means the dry weight of the crude ore divided by the dry weight of the concentrate derived from the crude ore. "Percent mill recovery" means the dry weight of the metal in the concentrate divided by the dry weight of the metal in the crude ore, expressed as a percent.

11. Quarterly payment on ore removed. The lessee agrees to pay to the state, on or before May 20, August 20, November 20, and February 20 in each year during the period this lease continues in force, royalty at the rates specified in paragraph 8 for all of the ore removed from the mining unit during the previous calendar quarter. The lessee also agrees to pay to the state on or before May 20 of each year all royalty due and payable as a result of the adjustment to value of the metal-lic minerals and associated mineral products sold during the previous calendar year as provided for in paragraph 9b.

The lesse is liable for payment of royalty when due on all ore removed from the mining unit for concentration elsewhere or for any other purpose, from the actual time of removal; and if the royalty due on the ore is not determined and accounted for as provided by the next royalty payment date, the commissioner may determine the royalty by any method as the commissioner deems appropriate and consistent with the royalty rates set forth in this lease. Any amount paid for royalty must be allocated to the proper fund as determined by the mineral ownership.

12. Lessee to transmit statement of ore removed and royalty due. The lessee shall transmit to the commissioner with each royalty payment an exact and truthful statement of the tonnage and royalty value of the ore mined and removed from the mining unit during each of the three months for which the payment is made, and the amount of royalty due on the ore, separated as to the various state fund ownerships. The lessee shall provide for all the operations required for these determinations except as otherwise specified.

13. Weighing. The methods of obtaining the weights used to determine tonnage for the calculation of royalty, or to determine other weights required by the state, are subject to the approval of the commissioner.

14. Sampling. Samples for royalty purposes must be taken of the ores and their products at places and intervals subject to the approval of the commissioner. A portion of each sample or composite sample must be delivered to the commissioner unless, by mutual agreement, it has been decided that certain of such portions are not needed by the state. Except as otherwise permitted by the commissioner, all ore mined from this mining unit must be sampled and its weight determined before being commingled with any other ores.

Each royalty sample must be analyzed at the expense of the lessee by competent chemists or assayers approved in writing by the commissioner. The elements in the royalty sample for which analytical determinations will be made are subject to agreement between the commissioner and the lessee.

15. Monthly reports. Except as otherwise permitted by the commissioner, the lessee shall transmit within 30 days after the end of each calendar month, statements for that calendar month in the form the commissioner may require, covering the tonnages and analyses of the following: all material mined from the mining unit, all material milled from the mining unit, all material stockpiled from the mining unit, all concentrates produced from the mining unit, all material mined from any source and commingled with material from the mining unit, all commingled material concentrated, all commingled material stockpiled, all commingled concentrates produced during that calendar month, and such other information as may reasonably be required by the commissioner for the purpose of verifying the amount of royalty due.

The weight of ore as set forth in the monthly statements shall prima facie be binding as between the parties, but the state has the right to sample the ore, check the analyses, and inspect, review and test the correctness of the methods, books, records and accounts of the lessee in sampling, analyzing, recording, and reporting the weights, and to inspect, review, and test the correctness of the weights and scales and other equipment used in measuring the amount of ore, it being understood that any errors in these reports, when ascertained, shall be corrected.

16. Additional monthly and annual reports to be furnished by lessee; exploration; mine samples required. Except as otherwise permitted by the commissioner, in addition to other reports or statements required in this lease, the lessee shall furnish the following:

a. Copies of all exploration data, including, but not limited to, all logs and drill hole records; all maps and coordinates showing drill holes, geophysical grids, geochemical and geologic sampling, trenching, and survey data; all chemical and analytical data and information; all laboratory test data; all geophysical, geochemical, and geologic records; all results of mine and metallurgical testings; and all periodic mine maps, analyses maps, cross-sections, and development plans. All material required under this subparagraph must be available to the commissioner, or the commissioner's representative, at all reasonable times. Copies must be submitted annually to the commissioner when the data is in the form customarily prepared for permanent record of the operations on the mining unit. Material available to and furnished to the commissioner under this subparagraph and subparagraph b. shall be considered confidential during the life of this lease or any extension of it.

b. At least a quarter-portion of all exploration samples, and when requested by the commissioner in writing, a quarter-portion of mine or mill samples. In the event that the lessee requires certain exploration samples in their entirety, the commissioner or the commissioner's representative may waive the requirement for a quarter-portion of such exploration samples, provided that the lessee grants the state an opportunity to examine and classify such samples before they are crushed or processed.

c. A monthly report showing the estimated weights and analyses of all materials stockpiled, including lean ore, waste and tailings, and divided as to property of origin and deposition.

d. Certified copies of smelter statements, schedules, agreements, and settlement sheets or receipts from sales involving materials produced from this mining unit showing the product sold and factors relevant to the calculation of royalties.

e. Not later than March 1 of each year during the term of this lease, a summary statement of the tonnage of all ore mined and all ore milled from the premises and all ore materials placed in or removed from stockpile during the previous calendar year, divided as to the property of origin and the disposition of the ore materials and showing such analyses of them as the commissioner may require.

17. How remittances and reports are to be transmitted. All remittances by the lessee under this lease must be made payable to the state treasurer. All such remittances and all reports, notices and documents required under this lease must be transmitted to the commissioner through the director of the division of minerals at Saint Paul, Minnesota.

18. State inspection; inspectors at plants and mines. The commissioner may at all reasonable times enter the mining unit and any other premises used or operated by the lessee in connection with the operation of the mining unit, inspect the operations conducted under this lease, and conduct such engineering and sampling procedures and other investigations as the commissioner may require, not unreasonably hindering or interrupting the operations of the lessee.

The lessee shall provide, upon written request of the commissioner, a suitable room in the dry or wash house or in some other suitable place on the mining unit or elsewhere when necessary, with water, light, and heat, all without cost to the state, for the use of state inspectors. The room must be at least equal in size and equipment to that customarily furnished for the use of the mine engineer.

Whenever royalties or rentals due the state are required to be distributed to more than one fund, or when ore from the mining unit is commingled with other ore, or when ore from the mining unit is concentrated at the same plant as other ore, the commissioner may appoint special inspectors as the commissioner considers necessary to insure proper accounting and protect the interests of the state. The lessee shall reimburse the state monthly for the cost of this inspection service upon notification by the commissioner.

19. Removal of ore for experimental purposes. Notwithstanding paragraph 11, upon written application of the lessee, the commissioner may authorize the removal of ore from the mining unit for experimental purposes without payment of royalty; and it is further understood that the removal of samples obtained by drilling, trenching, or testpitting, for the purposes of exploration, is not subject to the payment of royalty.

20. Stockpiled materials. All materials mined and not shipped from the mining unit remain the property of the state and shall be stockpiled only in such manner and on such sites as may be authorized by the commissioner in writing. When, however, the commissioner agrees that substantially all minerals of value have been extracted from the mill tailings, the material may be used for stope filling on the mining unit or elsewhere, and the tailings material used shall be considered abandoned, and title to the material shall revert to the mineral owners of the property in which it is deposited.

21. Reversion of title on land conveyed to the state for stockpiling purposes. When the commissioner determines that it is necessary and that the interests of the state will be fully protected, the lessee may convey land to the state upon the condition that it be used for the storage of ore or other materials having present or potential value belonging to the state, and that the state's interest in the land terminates and title reverts to the lessee when the land is no longer needed or used for that purpose. No consideration shall be paid for the conveyance unless authorized by law.

22. Cross-mining rights. The lessee is hereby granted the right to mine and remove any ores from the mining unit through any shafts, openings, or pits that may be made upon adjoining and nearby premises controlled by the lessee; and the lessee may, if it so desires, use the mining unit and any shafts, openings, pits, made on it for the mining or removal of any ores from adjoining or nearby premises, not, however, preventing or interfering with the mining or removal of ore from said mining unit. The ores taken from the mining unit must at all times be kept entirely separate and distinct from any other ores until measured and sampled as provided in this lease so that the rights of the lessor are at all times preserved and protected. The lessor recognizes the rights and liens of the owners of any nearby or adjoining premises in any ores mined from them and transported through the mining unit.

23. Lessee's obligations under state and federal laws and regulations. The provisions of this lease are subject to all applicable state and federal statutes, orders, rules and regulations, and all operations under this lease shall be conducted in conformity with them. No interference, diversion, use
or appropriation of any waters over which the commissioner or any other state agency has jurisdiction, may be undertaken unless authorized in writing by the commissioner or the state agency.

24. Operations to be conducted in accordance with good mining and metallurgical engineering. The lessee shall advise the commissioner when exploration drilling, trenching, or testpitting on the mining unit is about to begin. The lessee shall open, use, and work the mine or mines on the mining unit and conduct metallurgical operations in such manner only as is usual and customary in skillful and proper mining and milling operations in accordance with the requirements, methods, and practices of good mining and metallurgical engineering, and in such manner as not to cause any unnecessary loss of minerals, or unusual permanent injury to the mining unit. Surface lands owned by the state in the mining unit are not to be cleared or used for construction or stockpiling purposes until the plan for such use has been approved by the commissioner. The surface use of the mining unit must be conducted in such manner as to prevent or reduce scarring and erosion of the land and pollution of air and water.

25. Lessee's obligation for damages. It is understood and agreed that in case any interest in the land or minerals covered by this lease is owned by anyone other than the state, this lease shall not be construed as authorizing any invasion of or trespass upon such other interest. The lessee is obligated to save the state harmless from all damages or losses caused directly or indirectly by operations under this lease, whether to land, timber, minerals, growing crops, or buildings, or to any person or other property, including damages suffered by that other owner of the surface or mineral rights, and the state shall not be liable for them.

26. Lessee to pay all taxes. The lessee agrees to pay when due all taxes, general and specific, personal and real that may be assessed against the mining unit and the improvements made on it, and the ore materials in it or mined from it, and any personal property on the mining unit owned, used, or controlled by the lessee. This covenant does not apply to taxes assessed against any part of the mining unit as a result of any other lease granted by the state to other parties. The cancellation, termination, or expiration of this lease does not relieve the lessee of the obligation to pay taxes assessed during the continuance of the lease, even though such taxes may be due or payable after the cancellation, termination, or expiration date.

27. State lien for unpaid sums due. The state reserves and shall at all times have a lien upon all ore mined from the mining unit, all ore concentrated from it, smelter returns due the lessee for the ore, and all improvements made under this lease for any sums not paid when due.

28. Lessee's right to terminate lease. The lessee may at any time deliver to the commissioner written notice of intention to terminate this lease, and this lease shall terminate 60 days after the delivery unless the notice is revoked by the lessee by further written notice delivered to the commissioner before the expiration of 60 days. On December 31 following the tenth anniversary date of this lease, and on any succeeding December 31, the lessee may surrender its rights and privileges granted in this lease on any governmental descriptions or on beds of public waters included in the mining unit, by giving the lessor written notice of its intention so to do at least 60 days before the date of such surrender. All sums due to the state under this lease up to the effective date of termination must be paid by the lessee.

29. Lessor's right to cancel lease upon lessee's failure to meet production requirements. The state may cancel this lease as provided in paragraph 30 if the lessee has not met both of the following conditions by the end of the 20th full calendar year of this lease:

(a) The lessee must be actively engaged in mining ore under this lease from:

i. the mining unit;

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of any obligation or liability resulting from the occupancy of the mining unit unless the lessee has wholly vacated the mining unit prior to the expiration of that period and has notified the commissioner thereof in writing.

32. Recovery of expenses. If it is necessary for the state to incur expenses by court action or otherwise for the ejectment of the lessee, or removal from the leased premises of the lessee's property, or recovery of rent or royalties, or for any other remedy of the state under this lease, and the state prevails in the court action or otherwise, then the lessee shall pay to the state all expenses, including attorney's fees, thus incurred by the state.

33. Mining of minerals other than metallic minerals. If any ore found on or in the mining unit is primarily valuable for other than its metallic minerals content, the terms and conditions upon which the ore may be mined or products recovered from it shall be as may be agreed upon by the lessee and the commissioner and approved by the state executive council. This provision does not apply to iron ores, taconite ores, coal, oil, gas, and other liquid or gaseous hydrocarbon substances.

34. Agreements, assignments, or contracts. All assignments, agreements, or contracts affecting this lease must be made in writing and signed by all parties thereto, witnessed by two witnesses, properly acknowledged and must contain the post office addresses of all parties thereto, and when so executed must be presented in quadruplicate to the commissioner for record. No such instrument is valid until approved in writing by the commissioner and approved as to form and execution by the attorney general. No assignment or other agreement relieves the lessee of any obligation or liability imposed by this lease, and all assignees, sublessees, and subcontractors are also liable for all obligations or liabilities imposed by this lease.

35. Lease binding on assignees and successors. The covenants, terms, and conditions of this lease run with the land and extend to and bind all assignees and other successors in interest of the lessee.

36. Notices. For the purposes of this lease, the addresses of the parties are as follows, unless changed by written notice to all parties: For the state -- Commissioner of Natural Resources, State of Minnesota, 500 Lafayette Road, Saint Paul, Minnesota 55155-4037; for the lessee --



# DEPARTMENT OF NATURAL RESOURCES

500 LAFAYETTE ROAD . ST. PAUL, MINNESOTA . 55155-40\_45\_

JNR INFORMATION (612) 296-6157

## **Department of Natural Resources**

**Minerals Division** 

Notice of Intent to Solicit Outside Opinion Regarding Proposed Adoption of Rules Relating to Nonferrous Metallic Mineral Mineland Reclamation

Notice is hereby given that the Minnesota Department of Natural Resources is seeking information or opinions from sources outside the agency in preparing to promulgate rules relating to the reclamation of nonferrous metallic mineral minelands. The promulgation of these rules is authorized by Minnesota Statutes section 93.481, subdivision 6, which requires the department to either adopt new rules, or amend existing rules relating to mineland reclamation, before a permit to mine metallic minerals, other than taconite and iron ore, can be issued.

The Minnesota Department of Natural Resources requests information and comments concerning the subject matter of draft rules. Interested or affected persons or groups may submit statements of information or comment orally or in writing. Written statements, or requests for copies of the draft rules, shall be addressed to:

> Julie Jordan Department of Natural Resources Division of Minerals P.O. Box 567 Hibbing, Minnesota 55746

Oral statements will be received during regular business hours over the telephone at (218) 262-6767 and in person at the above address.

August All statements of information and comments shall be accepted until May 1, 1991. Any written material received by the Minnesota Department of Natural Resources shall become part of the record in the event that the rules are promulgated.

William C. Brice, Director Division of Minerals

# D R A F T - March 18, 1991

## MINNESOTA DEPARTMENT OF NATURAL RESOURCES

## NONFERROUS METALLIC MINERAL MINELAND RECLAMATION RULES

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## D R A F T RULES - 3/18/91

### GENERAL PROVISIONS

#### 6132.0100 DEFINITIONS.

Subpart 1. Acceptable research. "Acceptable research" means research approved by the commissioner that is site related and is reasonably designed for the purpose of demonstrating that the goals contained in these rules can be achieved.

Subp. 2. Adversely impact natural resources. "Adversely impact natural resources" means an unacceptable level of impact on the natural resources as determined by the commissioner based upon an evaluation which considers the value of the resource and the degree of impact.

Subp. 3. Auxiliary facilities. "Auxiliary facilities" means all permittee-owned stationary physical property used in a mining operation, including but not limited to: power plants and associated facilities; transmission lines; pipelines; roads; railroads; docks and associated facilities; borrow areas and leased borrow areas and associated facilities; blasting agent and fuel production or preparation facilities; and parking areas, shops, offices, buildings, structures, and storage facilities located within the area where mining is conducted. This does not include common carrier transportation facilities.

Subp. 4. Beneficiating plants. "Beneficiating plants" means all metallic mineral processing plants, such as crushers, mills, concentrators, agglomerating facilities, smelters, refineries, and other metal-producing facilities.

Subp. 5. Closure. "Closure" means the process of terminating and completing final steps in reclaiming any specific portion of a mining operation. Closure begins when, as prescribed in the permit to mine, there will be no renewed use or activity by the permittee.

Subp. 6. Commissioner. "Commissioner" means the commissioner of natural resources, or the commissioner's designated representative.

Subp. 7. Goals. "Goals" mean reclamation targets of achievement toward which the specific requirements of the rules are directed.

Subp. 8. Heap and dump leaching. "Heap and dump leaching" means a hydrometallurgical process which extracts metals from broken rock piles, called heaps or dumps, by application of leaching solutions.

Subp. 9. Heap and dump leaching facilities. "Heap and dump leaching facilities" means all landforms, structures, equipment, and material which contact, process, contain, or confine leaching solutions associated with the hydrometallurgical processing of dumps and heaps.

Subp. 10. Hereafter. "Hereafter" means after the effective date of these rules.

Subp. 11. In-situ leaching. "In-situ leaching" means a hydrometallurgical process which extracts metals from rock formations that have not been removed from the ground, using leaching solutions that are applied to and collected from wells and/or mine workings which have been developed within the metal bearing rock formations.

Subp. 12. Leached ore. "Leached ore" means the rock mass which remains after metals have been removed by dump leaching or heap leaching.

Subp. 13. Leaching solutions. "Leaching solutions" means hydrometallurgical processing fluids which extract metals from mineralized rock.

Subp. 14. Lean ore. "Lean ore" means rock, containing metallic mineralization, which is not profitable to process using technologies that exist at the mining operation.

Subp. 15. Metallic mineral. "Metallic mineral"means a naturally formed chemical, element, or compound having a definite chemical composition and, usually, a characteristic crystal form, from which a metal or metals can be extracted by metallurgical processes.

Subp. 17. Mine waste. "Mine waste" means any material, such as surface overburden, rock, lean ore, leached ore or tailings that in the process of mining and beneficiation has been exposed or removed from the earth.

Subp. 18. Mining. "Mining" means the process of removing, stockpiling, processing, storing, transporting (excluding use of common carriers and public transportation systems), and reclaiming any material in connection with the commercial production of metallic minerals.

Subp. 19. Mining area or area subjected to mining. "Mining area" or "area subjected to mining" means any area of land from which material is hereafter removed in connection with the production or extraction of metallic minerals, the lands upon which material from such mining is hereafter deposited, the lands upon which beneficiating plants, heap and dump leaching facilities, and auxiliary facilities are hereafter located, lands upon which the water reservoirs used in the mining process are hereafter located, and auxiliary lands that are hereafter used or intended to be used in a particular mining operation.

Subp. 20. Mining operation. "Mining operation" means all of a mining project without regard to political, administrative, or ownership boundaries, which includes all of the facilities used in "mining" as defined in subpart 17.

Subp. 21. Natural resources. "Natural resources" means all mineral, animal, botanical, air, water, land, timber, soil, quietude, recreational, historical, scenic, and aesthetic resources in accordance with Minn. Stat. 116B.02, subd. 4.

Subp. 22. Nonferrous metallic mineral. "Nonferrous metallic mineral" means a metallic mineral from which iron is not the predominant metal extracted.

Subp. 23. Passive reclamation methods. "Passive reclamation methods" means techniques or practices which require minimal maintenance in order to sustain reclamation.

Subp. 24. Permit to mine. "Permit to mine" means legal approval issued by the commissioner to conduct a mining operation.

Subp. 25. Person. "Person" includes firms, partnerships, corporations, and other groups.

Subp. 26. Post closure maintenance. "Post closure maintenance" means any activities that may be required to sustain reclamation after cessation of a mining operation.

Subp. 27. Progressive reclamation. "Progressive reclamation" means mining in a manner which creates areas that can be reclaimed as soon after initiation of the operation as practical and as continuously as practical throughout the life of the operation.

Subp. 28. Reactive mine waste. "Reactive mine waste" means waste that are shown through characterization studies to release substances that adversely impact natural resources.

Subp. 29. Reclamation. "Reclamation" means the activities which successfully accomplish the requirements of parts 6132.2000 to 6132.3300.

Subp. 30. Reference area. "Reference area" means a vegetated land unit which is approved by the commissioner for comparatively measuring reclamation vegetation success.

Subp. 31. Storage pile. "Storage pile" means a landform used for the disposal of material generated during mining, such as surface overburden, rock, lean ore, and leached ore. It does not include tailings basins, fossil fuel, finished product, or surge piles.

Subp. 32. Surface overburden. "Surface overburden" means naturally occurring unconsolidated material overlying bedrock, consisting of broken rock fragments and/or organic by-products.

Subp. 33. Tailings. "Tailings" means waste by-products of mineral beneficiating processes other than heap and dump leaching, consisting of rock particles, which have usually undergone crushing and grinding, from which the profitable mineralization has been separated using technologies that exist at the mining operation.

Subp. 34. Waste rock. "Waste rock" means rock that may or may not contain metallic mineralization, but which is not profitable to process using known technologies.

#### 6132.0200 PURPOSE AND POLICY.

The purpose of parts 6132.0100 to 6132.5100 is to implement Minnesota Statutes, section 93.44 to 93.51 in order to control possible adverse environmental effects of nonferrous metallic mineral mining, to preserve the natural resources, and to encourage the planning of future land utilization, while at the same time promoting the orderly development of nonferrous metallic mineral mining, the encouragement of good mining practices, and the recognition and identification of the beneficial aspects of nonferrous metallic mineral mining.

In order to accomplish the purposes of these rules, it is the policy of the Department of Natural Resources to ensure that the mining area is left in a condition that minimizes the need for maintenance. This is accomplished by these rules through the use of passive reclamation methods that maximize physical, chemical and biological stabilization of areas disturbed by mining, as opposed to the use of ongoing active treatment technologies.

Because of the unique character of each mining operation and the extreme diversity of the possible types and sizes of operations, specific permit requirements shall be established within the framework set forth by parts 6132.0100 to 6132.5100. Permit terms and conditions shall be directed toward attaining the goals described in these parts.

#### 6132.0300 SCOPE.

Subpart 1. Permit required. No person shall conduct a mining operation for nonferrous metallic minerals in this state without first obtaining a permit to mine from the commissioner.

Subp. 2. Joint applications. When two or more persons are or will be engaged in a mining operation, all such persons shall join in the application, and the permit to mine shall be issued on a joint basis. When a person is or will be engaged in only a portion of the mining operation, that person need only be a joint permittee in the portion in which that person is participating.

Subp. 3. Term of permit to mine. The term of a permit to mine shall be the period determined necessary by the commissioner for the completion of the proposed mining operation including post closure maintenance, based on information provided pursuant to part 6132.1100.

Subp. 4. Applicability. These parts apply to nonferrous metallic mineral mining operations, except where iron is the predominant metal extracted, as follows:

A. To all portions of any mining operation initiated hereafter, including new operations and reactivated inactive operations; and

B. Until such time as adequate studies are completed to determine the extent to which regulation may be necessary and rules are promulgated, no permit to mine shall be issued under these parts to a mining operation which includes:

(1) the mining of radioactive ores for the commercial production of uranium, thorium, or any other material which is determined by the Nuclear Regulatory Commission to be essential to the production of fissionable materials; or

(2) in-situ leaching as part of the beneficiating process.

Subp. 5. Other rules, statutes, or ordinances. Nothing in these rules waives the requirements of any other applicable rules, statutes, or ordinances of any other agency or government unit.

#### PERMIT REQUIREMENTS

#### 6132.1000 MINE WASTE CHARACTERIZATION.

Subpart 1. Mine waste characterization conference. Persons intending to submit an application for a permit to mine shall meet with the commissioner to outline mine waste characterization studies that must be completed prior to the submission of a permit application.

Subp. 2. Mine waste characterization study. Mine waste shall be characterized prior to the preparation of an application for a permit to mine. The characterization shall be based upon chemical, physical, and mineralogical analyses of material generated by exploration, pre-production sampling and process testing.

A. The mine waste characterization shall include:

- (1) chemical analysis of mine waste;
- (2) mineralogical analysis of mine waste; and
- (3) laboratory experiments describing dissolved solids release from mine waste.

B. For reagents associated with tailings or leached ore materials, the following information shall be provided:

- (1) chemical composition;
- (2) mass of chemical used;
- (3) degradation and transport characteristics; and

(4) affects on mineral dissolution as measured in part 6132.1000, subp. 2., item A., subitem (3) and/or item C., subitem (3).

C. Based on the results of the analyses above, the commissioner may require additional mine waste analyses including but not limited to the following:

- (1) particle size distribution;
- (2) chemical composition and mineralogical composition as a function of surface

area; and

(3) laboratory dissolution experiments to describe the effect of rock composition, in particular, acid-producing and acid-consuming mineral content, on acid generation and dissolved solids release.

Subp. 3. Results of study. The results of the mine waste characterization study shall be considered a portion of the permit to mine and must be presented to the commissioner at the following times:

A. prior to the preparation of an application for a permit to mine as required in part 6132.1000, subp. 2;

B. upon submission of an application for a permit to mine pursuant to part 6132.1100, subp. 5, item A; and

C. throughout the life of the operation as part of the annual report, pursuant to part 6132.1300, subp. 2., item D.

#### 6132.1100 PERMIT APPLICATIONS.

Subpart 1. Preapplication conferences and site visits. Prior to the preparation of an application for a permit to mine, persons intending to submit an application shall meet with the commissioner for preapplication conferences and site visits. The purpose is to provide direction on the preparation of an application for a permit to mine, to discuss the results of the mine waste characterization study, and to review the proposed mining operation.

Subp. 2. Application. An application for a permit to mine shall be submitted in duplicate by the applicant to the commissioner.

Subp. 3. Documents. To comply with statutory requirements, the applicant shall submit:

A. an advertisement and affidavit of publication, pursuant to part 6132.4000, subp 1. and part 6132.4700;

B. a copy of the certificate of authority to transact business in the state of Minnesota if the applicant is a foreign corporation, as defined by Minn. Stat., secs. 300.02 and 303.02;

C. a certificate issued by an insurance company authorized to do business in the United States pursuant to Minn. Stat., sec. 93.481, subd. 1, clause (b), confirming that the applicant has a public liability insurance policy in force for the mining operation for which the permit is sought or evidence that the applicant has satisfied other state or federal self-insurance requirements, to provide personal injury and property damage protection in an amount adequate to compensate any persons who might be damaged as a result of the mining operation or any reclamation or restoration connected with the operation; and

D. documents relating to financial assurance pursuant to part 6132.1200.

Subp. 4. Organizational structure. The applicant shall submit the following information on organizational structure:

A. the post office address of the applicant;

B. the organizational structure of the applicant including but not limited to parent companies, owners, principal stockholders, partners, and joint venturers;

C. any managing agents or subsidiaries which are or may be involved in the mining operation; and

D. organizational relationships between or among joint applicants.

Subp. 5. Environmental setting. To describe the environmental setting of the proposed mining area, the applicant shall submit:

A. A copy of any environmental reports prepared relative to the mining operation.

B. Environmental setting maps prepared as overlays to 7-1/2 minute United State Geological Survey quadrangle maps or other maps of the same scale delineating the mining area and

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such adjacent lands as required by the commissioner to show the areas directly or indirectly affected by mining. The following information as it exists at the time of application shall be submitted on these overlays:

(1) bedrock geology, including the general shape of the orebody and appropriate cross-sections which show the horizontal and vertical relationships;

by mining;

(2) water basins, water courses, and wetlands which are or could be affected

(3) boundaries of watersheds which are or could be affected by mining;

(4) identification and description of all known aquifers which are or could be affected by mining;

(5) a soil inventory including soil type, extent, and thickness;

(6) past mining facilities including storage piles, tailings basins, mines, and

beneficiating plants;

(7) all known subsurface uses, such as pipelines and cables;

(8) areas identified in the siting section of these rules, part 6132.2000; and

(9) surface ownership of record within the mining area, and severed mineral ownership as set forth in verified statements pursuant to Minn. Stat., sec. 93.52 or in an order or decree pursuant to Minn. Stat., sec. 93.55, subd. 2, filed in the county recorder's office with respect to severed mineral interests in parts of the mining area which will be excavated or covered with mine wastes. An owner's agent may be identified in place of the owner. No error in the designation of surface or mineral ownership shall affect the validity of the application.

Subp. 6. Mining and reclamation plan. This plan shall be based upon discussions between the applicant and the commissioner at the preapplication conference and upon results from the mine waste characterization study. The mining and reclamation plan shall describe:

A. the operating life of the mine, including the rate of mining and anticipated changes in that rate, and the factors used to determine the minable reserves and changes which would expand or diminish such reserves;

B. the mining activities to be conducted including:

(1) the types, amounts, sequence, and schedule for mining the orebody and storage piling materials, including the distinctions among ore, lean ore, and waste rock; a discussion of in-mine disposal; and the mine waste characterization study results; and

(2) the ore beneficiating process, including a discussion of the type and amount of any chemicals to be added and the types, amounts, sequence, schedule, and means of tailings disposal; and

C. the engineering design, methods, sequence, and schedules of reclamation including closure and post closure maintenance which address the goals and meet the requirements of parts 6132.2000 to 6132.3300, including anticipated reclamation research.

Subp. 7. Mining and reclamation maps. The applicant shall submit maps and crosssections containing all features normally found on a USGS quadrangle map, at a scale which is normally used by the operator for mine planning purposes, which:

the mine;

wastes; and

A. define the shape and extent of the orebody that will support the operating life of

B. identify all known and inferred mineral reserves which are located within the mining area but which have not been included as part of the mining plan;

C. identify lands proposed for use as vegetative reference areas;

D. depict the detailed drainage patterns for waters which may contact reactive mine

E. depict at intervals during mining, approved by the commissioner based upon the pre-application conference, the status of:

(1) mining the ore body;

(2) watershed and hydrogeologic modifications; and

(3) construction (including shape, extent, and content) and reclamation (including contouring, covering, temporary stabilization, vegetation, closure, and post closure maintenance) of each: storage pile, tailings basin, mine, reservoir, dam, diversion channel, drainage control, settling basin, heap and dump leaching facility, and auxiliary facility.

Subp. 8. First year of operation. A detailed plan for the activities contemplated during the first year of operation shall be submitted as part of the permit application. The plan shall include all of the information required by part 6132.1300, subparts 3 - 6.

#### 6132.1200 FINANCIAL ASSURANCE.

Subpart 1. Purpose. The purpose of financial assurance is to ensure that there is a source of funds to be utilized by the commissioner if the permittee fails to perform:

A. reclamation activities including closure and post closure maintenance that would need to be completed in the event of a cessation of operations; and/or

B. corrective action as required by the commissioner in the event of non-compliance with design and operating criteria contained in the permit to mine.

Subp. 2. Reclamation cost estimates. Persons intending to conduct a mining operation shall submit, as part of the application for a permit to mine, a written cost estimate to implement the contingency reclamation plan, pursuant to part 6132.1300, subp. 4, including closure and post closure maintenance activities, that would need to be accomplished in the event of a cessation of operations within the first calendar year of operations.

A. The permittee shall annually adjust the reclamation cost estimate pursuant to part 6132.1300, subp. 4.

B. Cost estimates shall be based upon the following:

(1) current dollar value at the time of the estimate; and

(2) the cost of hiring a third party to conduct reclamation activities including closure and post closure maintenance activities.

C. For estimating purposes, no salvage value attributed to the sale of wastes, facility

C. For estimating purposes, no salvage value attributed to the sale of wastes, facility structures, equipment, land, or other assets, shall be used to offset projected reclamation costs.

Subp. 3. Corrective action cost estimates. When the commissioner determines that a corrective action plan is required pursuant to part 6132.3200, subp. 2, item B, subitem (2), the permittee shall submit a written cost estimate for the corrective action prior to implementation.

A. The permittee shall annually adjust cost estimates for corrective action undertaken according to an approved corrective action plan pursuant to part 6132.1300, subp. 5.

B. Cost estimates shall be based upon the following:

- (1) current dollar value at the time of the estimate; and
- (2) the cost of hiring a third party to conduct corrective action activities.

Subp. 4. Management of financial assurance. Financial assurance shall be managed according to the following:

A. Financial assurances in the amount equal to the reclamation cost estimate pursuant to part 6132.1200, subp. 2 shall:

(1) be submitted to the commissioner for approval prior to the issuance of a permit to mine and prior to the granting of an amendment to the permit;

(2) be continuously maintained by the permittee, and

(3) be annually adjusted as follows:

(a) if the new cost estimate approved by the commissioner is greater than the amount of the existing financial assurance, the permittee shall provide additional financial assurance in an amount equal to the increase; or

(b) if the new cost estimate approved by the commissioner is less than the amount of existing financial assurance, the permittee shall be released from maintaining financial assurance in an amount equal to the decrease.

B. Financial assurances in the amount equal to the corrective action cost estimate pursuant to part 6132.1200, subp. 3 shall:

(1) be submitted to the commissioner for approval as part of the corrective action cost estimate pursuant to part 6132.1200, subp. 3;

(2) be continuously maintained by the permittee until the commissioner determines it is no longer necessary; and

(3) be annually adjusted as follows:

(a) if the new cost estimate approved by the commissioner is greater than the amount of the existing financial assurance, the permittee shall provide additional financial assurance in an amount equal to the increase; or

(b) if the new cost estimate approved by the commissioner is less than the amount of existing financial assurance, the permittee shall be released from maintaining financial assurance in an amount equal to the decrease.

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C. Financial assurances shall consist of one or more of the financing mechanisms described in part 6132.1200, subp. 5.

D. The commissioner shall release the permittee from the responsibility to maintain financial assurance when the commissioner determines, through inspection of the mining area, that:

(1) all reclamation activities have been completed pursuant to this part, and the permit to mine;

(2) conditions necessitating post closure maintenance no longer exist and are not likely to reoccur; and

(3) corrective actions have been successfully accomplished.

Subp. 5. Allowable financing mechanisms. Mechanisms used to provide financial assurance for reclamation or corrective action shall meet the following criteria.

A. Assurance of funds sufficient to cover the costs estimated pursuant to part 6132.1200, subparts 2. and 3.

B. Assurance that the funds will be available to the commissioner as and when needed for reclamation.

C. Fully valid, binding, and enforceable under state and federal law.

D. Not affected or dischargeable through bankruptcy.

E. All terms and conditions of the financing mechanism shall be approved by the commissioner.

F. Financing mechanisms may include, but are not limited to, trust funds, surety bonds (payment and performance), letters of credit, insurance, financial test, and corporate guarantee.

G. Insurance pools or other such mechanisms, established by persons conducting mining operations, may be used as financial assurance. Such financing mechanisms shall establish a funding source, meet all requirements of this part, and be approved by the commissioner.

H. A financing mechanism may be canceled by the permittee, upon approval of the commissioner, only after it is replaced by an alternate mechanism, or after the permittee is released from financial assurance in accordance with part 6132.1200, subp. 4, item D.

I. A financing mechanism may be canceled by the provider of the mechanism only after it has been replaced by an alternative mechanism acceptable to the commissioner.

J. If the permit to mine is assigned, pursuant to part 6132.4500, the new permittee shall be in compliance with the requirements of part 6132.1200 prior to the commissioner's approval of the assignment. Upon the assignee's demonstration of compliance with this part, the former permittee shall be released from the requirements of this part.

Subp. 6. Failure to comply. The commissioner may take one or more of the following actions in the event of failure to comply with any portion of this part:

A. Deny the permit to mine.

B. Suspend the permit to mine pursuant to part 6132.5000.

C. Assess civil penalties pursuant to part 6132.4900.

D. Initiate the process of revocation or modification pursuant to part 6132.4800.

E. Cancel the permit pursuant to part 6132.4300.

#### 6132.1300 ANNUAL REPORT.

Subpart 1. Purpose. The purpose of the annual report is to describe actual mining and reclamation completed during the past year, the mining and reclamation activities planned for the upcoming year, and a contingency reclamation plan to be implemented in the event of a cessation of operations in the upcoming year. The permittee shall submit to the commissioner, in duplicate, an annual report by March 31st of each year.

Subp. 2. Preceding calendar year. For the preceding calendar year, the report shall include:

A. a description of actual mining activities;

B. a description of actual reclamation activities and any corrective actions;

C. a description of the status of ongoing post-closure maintenance activities;

D. a discussion of how these activities differ in scope and schedule from the approved mining and reclamation plan pursuant to part 6132.1100, supb. 6.;

E. a characterization of new rock types or formations encountered during mining that have not been previously characterized pursuant to part 6132.1000, subp. 2.; and

F. a discussion of any changes in ownership or organizational structure of the permittee.

Subp. 3. Upcoming calendar year. For the upcoming calendar year, the report shall include:

- A. the anticipated rate of mining;
- B. the anticipated mining activities including:
  - (1) the types, amounts, and schedule for mining the orebody; and

(2) changes in the beneficiating process, including a discussion of the type and amount of any chemicals to be added and their effect, if any, on the types, amount, and means of waste disposal;

C. the anticipated reclamation including methods, schedules, and research;

D. notification of intent to close a mining area or portion thereof;

E. a discussion of how anticipated activities will differ in scope and schedule from the approved mining and reclamation plan pursuant to part 6132.1100, subp. 6.;

F. evidence that the liability insurance policy submitted with the permit application pursuant to part 6132.1100, subp. 3, item C. is in force, or that self-insurance requirements are being met; and

G. a discussion of anticipated changes in ownership and organizational structure of

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the permittee.

Subp. 4. Contingency reclamation plan. A contingency reclamation plan including closure and post closure maintenance shall be submitted with the annual report to identify reclamation activities that would be needed in the event of a cessation of operations in the upcoming calendar year. The plan shall include the following:

A. methods, sequence, and schedule of reclamation that address the goals and meet the requirements of parts 6132.2000 to 6132.3300;

B. maps and cross sections at a scale approved by the commissioner that depict the construction (including shape, extent, and content) and reclamation (including contouring, covering, vegetation, closure, and post closure maintenance) of each area affected by mining; and

C. cost estimates and financial mechanisms pursuant to part 6132.1200 necessary to implement the contingency reclamation plan in the event of a cessation of operations in the upcoming calendar year.

Subp. 5. Corrective action for upcoming calendar year. When a corrective action plan has been required pursuant to part 6132.3200, subp. 2, the report shall include:

A. a description of actual corrective action conducted in the preceding calendar year;

B. a description of anticipated corrective action for the upcoming calendar year; and

C. a corrective action cost estimate for the upcoming year pursuant to part 6132.1200,

subp. 3.

Subp. 6. Maps. For the preceding and upcoming year, the report shall contain a map in the form prescribed by part 6132.1100, subp. 7. which depicts the status of mining, construction, reclamation including closure and post closure maintenance, and watershed modifications.

#### 6132.1400 REQUEST FOR RELEASE FROM PERMIT.

Subpart 1. Purpose. The purpose of the request for release is to provide the commissioner with information on the final reclamation status of the mining area, or a specific portion thereof. The request shall be submitted by the permittee when the permittee has concluded that all reclamation has been satisfactorily accomplished and that release from the permit or portion thereof should be granted.

Subp. 2. Contents. The request for release shall include the following:

A. a declaration by the permittee of how each portion of the mining area for which a release is requested has been made to comply with the requirements of parts 6132.2000 to 6132.3300 and the permit to mine;

B. identification of:

(1) the ownership of the mining area;

(2) all remaining structures and facilities; and

(3) all locations at which post closure maintenance is necessary;

C. a discussion of all areas excluded from release because of the necessity to conduct post closure maintenance, pursuant to part 6132.3300, subp. 2, item G.;

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D. a copy of the record filed in the county recorder's office advising future owners of the mining area that it has been used for the purpose of mining; and

E. a map in the form prescribed by part 6132.1100, subp. 7., which depicts the following:

(1) the location and status of all mining landforms and facilities created or used during the mining operation;

(2) the areas for which release is being requested;

(3) the areas on which post closure maintenance is being conducted;

(4) the final topography of all mining landforms;

(5) the location, type, and extent of vegetation which has been established pursuant to part 6132.2800;

(6) the existing and ultimate anticipated level of open pit and underground mine water, and the year in which the ultimate level is expected to be reached;

(7) the locations of the safe accesses to the bottom of an open pit;

(8) the location of all sealed access points to underground mine workings; and

(9) the location of fences and other access barriers.

### **RECLAMATION STANDARDS**

6132.2000 SITING.

Subpart 1. Goals. Mining shall be conducted on sites that minimize adverse impacts on natural resources and the public. Separations shall be maintained between mining areas and adjacent conflicting land uses. All sites shall incorporate setbacks or separations which are needed to comply with air, water, and noise pollution standards; local land use regulations; and requirements of other appropriate authorities.

Subp. 2. Mining excluded. Except as may be allowed in accordance with state and federal laws, no mining shall be conducted within the following:

A. The Boundary Waters Canoe Area Wilderness, as legally described in Volume 45, No. 67, of the Federal Register for April 4, 1980, with state restrictions specified in Minn. Stat., sec. 84.523, subd. 3.

B. Voyageurs National Park, with state restrictions specified in Minn. Stat., sec. 84B.03, subd. 1.

,

C. State Wilderness Areas, with restrictions specified in Minn. Stat., sec. 86A.05, subd.

6.

D. Within Agassiz and Tamarac National Wilderness Areas, and Pipestone and Grand Portage National Monuments.

E. Within state scientific and natural areas.

F. Within a state park, except where such a park has been established as a result of its association with mining.

G. Within any area except federal areas added to the categories listed in part 6132.2000, subp. 2. that is designated hereafter, but prior to the issuance of a permit to mine involving such area, provided that such designation is made by a process which includes a public hearing.

Subp. 3. Surface disturbance prohibited. No mining activities that disturb the surface shall be allowed within the following:

A. Within specified recreational corridors and lands adjacent to the Boundary Waters Canoe Area Wilderness, which are identified on the Department of Natural Resources map entitled, "Minnesota Department of Natural Resources B.W.C.A.W. Mineral Management Corridor," dated February 1991.

B. Within 1/4 mile of Voyageurs National Park.

C. Within 1/4 mile of state wilderness areas.

D. Within 1/4 mile of Agassiz and Tamarac National Wilderness Areas, and Pipestone and Grand Portage National Monuments.

E. Within 1/4 mile of state scientific and natural areas.

F. Within 1/4 mile of state parks, except surface disturbance shall be allowed when

such a park has been established as a result of its association with mining.

G. On sites designated in the National Register of Historic Places, except surface disturbance shall be allowed when such places have been established as a result of their association with mining.

H. On sites designated in the State Registry of Historic Places, except surface disturbance shall be allowed when such sites have been established as a result of their association with mining.

I. Within national wild, scenic, or recreational river districts of a national wild, scenic, or recreational river, and within the areas identified by the document, "A Management Plan for the Upper Mississippi River," produced by the Mississippi Headwaters Board, dated January 1981, except underground mining may be permitted in accordance with the management plans developed for specific national wild, scenic, or recreational river districts.

J. Within designated state land use districts, of a state wild, scenic, or recreational river, except underground mining may be permitted in accordance with the Wild and Scenic Rivers Act and the rules promulgated thereunder.

K. Within the area along the north shore of Lake Superior identified in the document entitled, "North Shore Management Plan," produced by the North Shore Management Board, dated December 1988.

L. On the following areas, provided they are in existence before the issuance of a permit to mine:

(1) Within 500 feet of an occupied dwelling, public school, church, public institution, or county or municipal park, unless allowed by the owner; and

(2) Within 100 feet of a cemetery, or the outside right-of-way line of any public roadway, except where mine access or haul roads cross such right-of-way.

M. Within peatlands identified as proposed state scientific and natural areas in the Department of Natural Resources report, entitled "Protection of Ecologically Significant Peatlands in Minnesota," dated November 1984.

N. Within peatlands identified as peatland scientific protection areas in the Department of Natural Resources report, entitled "Protection of Ecologically Significant Peatlands in Minnesota," dated November 1984. Except that up to 1500 surface acres may be utilized for mining purposes provided the permittee acquires and donates to the state two acres of ecologically significant peatland for each acre of peatland scientific protection area disturbed, and mining effects are mitigated.

O. In and within 1/4 mile of calcareous fens identified in part 7050.0180, subp. 6b.

P. Within any area except federal areas added to the categories listed in part 6132.2000, subp. 3. that is designated hereafter but prior to the issuance of a permit to mine involving such area provided that such designation is made by a process which includes a public hearing.

Subp. 4. Mining restricted. Mining shall be conducted in the following areas only if there is no prudent and feasible siting alternative. If mining is proposed, the commissioner shall base siting approval decisions on the specific characteristics and qualities of the natural resources for which the area has been designated, and the potential impacts that are likely to result. Mining shall be allowed only if there will be either no adverse impacts on the natural resources, or provisions acceptable to the commissioner are proposed to either mitigate adverse effects, or replace, reroute, or in some other manner reclaim the affected natural resources.

A. Within a national wildlife refuge, a national waterfowl production area, or on a national trail.

B. Within a state wildlife management area, or on a state designated trail either listed in Minn. Stat., sec. 85.015 or acquired under the authority of Minn. Stat., sec. 84.029, subd. 2.

C. In peatlands identified as peatland watershed protection areas in the Department of Natural Resources report, entitled "Protection of Ecologically Significant Peatlands in Minnesota," dated November 1984.

D. Within waters identified in the public waters inventory, conducted pursuant to Minn. Stat., sec 103G.201, hwich have not been created or substantially altered in size by human activities, and within the adjoining shorelands, as defined pursuant to Minn. Stat., sec. 103F.205, subd. 4. of such unaltered waters.

E. Within any area except federal areas added to the categories listed in part 6132.2000, subp. 4., that is designated hereafter, but prior to the issuance of a permit to mine involving such area, provided that such designation is made by a process which includes a public hearing.

#### 6132.2100 IN-MINE DISPOSAL.

Subpart 1. Goals. Mining shall be conducted to maximize use of in-mine disposal so as to minimize the amount of land disturbed by mining.

Subp. 2. Requirements. Requirements:

A. In-mine disposal of mine waste shall be incorporated into the mining and reclamation plan to the extent practicable based on an evaluation of the following factors:

- (1) public health and safety;
- (2) impacts on natural resources;
- (3) land use demands;
- (4) ownership of the minerals;
- (5) mineral resource values; and
- (6) physical and economic feasibility.

B. The commissioner may exempt mine waste, which is placed within an open pit mine below the ultimate pit water elevation or in underground mine workings, from sloping, benching and vegetation requirements, provided the commissioner determines that the mine waste is non-reactive based on the mine waste characterization study, pursuant to part 6132.1000.

#### 6132.2200 BUFFERS.

Subpart 1. Goals. In areas adjacent to occupied dwellings or towns, mining operations shall be designed, constructed, and maintained so that the operation is compatible with surrounding non-mining uses.

#### Subp. 2. Requirements. Requirements:

A. Naturally existing terrain and vegetation, or vegetated berms shall be used to diminish impacts resulting from: noise, dust, view, and access.

B. Buffers shall be constructed prior to beginning operations and may be located within the areas described in part 6132.2000, subp. 3, item H.

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#### 6132.2300 REACTIVE MINE WASTE.

Subpart 1. Goals. Reactive mine waste shall be mined, disposed, and reclaimed to minimize release of substances that adversely impact natural resources.

Subp. 2. Requirements. Requirements:

A. Chemical and physical characterization of mine waste shall be conducted prior to the submission of an application for a permit to mine and continuously thereafter during the process of mining, pursuant to part 6132.1000.

B. A reactive mine waste storage facility shall be designed by professional engineers registered in Minnesota proficient in the design, construction, operation, and reclamation of facilities for the storage of reactive mine waste, to meet either of the following:

(1) modify the physical or chemical characteristics of the mine waste to the extent that the waste is no longer reactive; or

(2) permanently prevent substantially all water from contacting the mine waste and provide for the collection and disposal in compliance with federal and state standards of any remaining residual waters that come into contact with such mine waste.

C. The reactive mine waste storage facility design shall:

(1) describe all materials, construction and operating performance specifications and limitations, which must be maintained to ensure protection of natural resources;

(2) include a schedule for inspection of the reactive mine waste storage facility construction, operation, and reclamation including closure and post closure maintenance, by the design engineers, to ensure compliance with the design; and

(3) identify monitoring locations to ensure compliance with the design.

D. The commissioner may allow variance from any specific reclamation requirements of parts 6132.2100 to 6132.2200 and parts 6132.2400 to 6132.2800, if their use would inhibit designs necessary to meet the requirements of part 6132.2300.

#### 6132.2400 OVERBURDEN PORTION OF PITWALLS.

Subpart 1. Goals. The overburden portion of pitwalls shall be designed, developed and reclaimed to be structurally sound and promote progressive reclamation.

Subp. 2. Requirements. Surface overburden portions of pitwalls shall be designed and constructed to the following standards:

A. The final slopes shall consist of benches and lifts as follows:

(1) The toe of the surface overburden portion shall be set back at least 20 feet from the crest of the rock portion of the pitwall;

(2) Lift heights shall be no higher than 60 feet and shall be selected based on the need to protect public safety; the location of the pitwall in relation to the surrounding land uses; the soil types and their erosion characteristics; the variability of overburden thickness; and the potential uses of the pit following mining;

(3) The sloped area between benches shall be no steeper than 2.5:1; and

(4) Benches shall be sloped into the overburden to control runoff. Runoff waters shall either be temporarily stored on benches or removed by drainage control structures.

B. When acceptable research demonstrates that the goals are satisfied, the commissioner shall approve other measures which satisfy part 6132.2400, subp. 1.

#### 6132.2500 STORAGE PILE DESIGN.

Subpart 1. Goals. Storage piles shall be designed and constructed to minimize hydrologic impacts, enhance the survival and propagation of vegetation, be structurally sound, control erosion, and promote progressive reclamation.

Subp. 2. Requirements. Requirements:

A. All storage piles shall be designed and constructed according to the following standards:

(1) When mine waste is deposited on areas with unstable foundations such as peat, muskeg, bedded lacustrian deposits, karst topography, fault zones, and areas above or within mine, a professional engineer, registered in Minnesota and proficient in the design, construction and operation, and reclamation of facilities on unstable foundations shall examine the foundation and design the storage piles.

(2) Practices such as the use of vegetated buffer strips, hay bale dikes, silt fences or settling basins shall be used to control erosion.

(3) Rills or gullies shall be observed to determine dominant runoff flow paths which shall be stabilized to control runoff.

(4) When surface overburden is generated, it shall be placed in layers upon the completed tops and benches of lean ore and waste rock storage piles to enhance reclamation potential.

(5) If no completed tops or benches are available, or if such sites are not within economic haul distances of surface stripping activities, surface overburden storage piles shall be created so that the final exterior slopes shall consist of benches and lifts as follows:

(a) No lift shall exceed 40 feet in height;

(b) No bench width shall be less than 30 feet wide, measured from the crest of the lower lift to the toe of the next lift;

(c) The sloped area between benches shall be no steeper than 2.5:1; and

(d) Benches shall be sloped toward the interior to control runoff. Runoff waters shall either be temporarily stored on benches or removed by drainage control structures.

B. Lean ore and waste rock shall not be used to cover surface overburden storage piles in order to avoid compliance with sloping and vegetation requirements. This shall not preclude the abutting of lean ore or waste rock storage piles with surface overburden storage piles or the placement of lean ore or waste rock lifts atop surface overburden pads or lifts.

C. The final exterior slopes of lean ore, waste rock, and leached ore storage piles shall consist of benches and lifts as follows:

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(1) No lift shall exceed 40 feet in height;

(2) No bench shall be less than 30 feet, measured from the crest of the lower lift to the toe of the next lift;

and

(3) The sloped area between benches shall be no steeper than the angle of repose;

(4) When vegetation is required pursuant to part 6132.2800, subp 2, item A, subitem (13), the sloped areas between benches shall be prepared to support vegetation.

D. Based upon acceptable research the commissioner shall approve other measures which satisfy part 6132.2500, subp. 1.

#### 6132.2600 TAILINGS BASINS.

Subpart 1. Goals. Tailings basin shall be designed, constructed, and operated to be structurally sound, control air emissions, minimize hydrologic impacts, promote progressive reclamation, and enhance the survival and propagation of vegetation.

Subp. 2. Requirements. Requirements:

A. Tailings basins shall be designed by professional engineers, registered in Minnesota, who are proficient in the design, construction, operation, and reclamation of tailings basins.

B. The tailings basin design shall:

(1) Provide rationale for site selection, with regard to dam safety and characteristics of the site which could affect, or could be effected by the tailings basin.

(2) Describe all materials, construction, and operating performance specifications and limitations which must be maintained to ensure protection of natural resources.

(3) Ensure that precipitation events do not result in overtopping the basin.

(4) Describe the specific steps which must be taken to achieve reclamation on tailings and dam surfaces.

(5) Include a schedule for inspection of the tailing basin's construction, operation, and reclamation including closure and post closure maintenance, by the design engineers, to ensure compliance with the design.

(6) Identify monitoring locations to ensure compliance with the design.

C. During the mining operation, dust generation shall be mitigated by maximizing progressive reclamation or controlled by the application of dust suppression techniques pursuant to part 6132.2900, subp. 2.

#### 6132.2700 HEAP AND DUMP LEACHING FACILITIES.

Subpart 1. Goals. Heap and dump leaching facilities shall be designed and constructed to be structurally sound, minimize hydrologic impacts, minimize the release of substances that adversely impact natural resources, and promote progressive reclamation.

Subp. 2. Requirements. Requirements:

A. Heap and dump leaching facilities shall be designed by professional engineers, registered in Minnesota proficient in the design, construction, operation, neutralization, detoxification, and reclamation of heap and dump leaching facilities.

B. The heap and dump leaching facility design shall:

(1) Provide rationale for site selection with regard to characteristics of the site which could affect, or be effected by the heap and dump leaching facilities.

(2) Ensure that only neutralized leaching solutions will be released to the environment.

(3) Include at least one means of detecting and retrieving leaching solutions which might be released in the event of leakage.

(4) Describe all materials, construction, and operating performance specifications and limitations which must be maintained to ensure protection of natural resources.

(5) Ensure that precipitation events do not result in overtopping any remaining ponds.

(6) Describe the specific steps which must be taken to achieve neutralization, detoxification, and reclamation of leached ore and sediments which may form within ponds.

(7) Include a schedule for inspection of the facilities' construction, operation, and reclamation including closure and post closure maintenance, by the design engineers, to ensure compliance with the design.

(8) Identify monitoring locations to ensure compliance with the design.

C. Leached ore shall be reclaimed according to the requirements in parts 6132.2300 or 6132.2500 based on the results of mine waste characterization studies.

#### 6132.2800 VEGETATION.

Subpart 1. Goals. Vegetation shall be established to control erosion, screen mining areas from noncompatible uses, and provide wildlife habitat or other uses such as pasture or timber land.

Subp. 2. Requirements. Requirements:

A. Vegetation shall be established on the following:

- (1) surface overburden storage piles;
- (2) exposed soils along diversion channels and roads;

(3) cuts, pits, trenches, and other areas disturbed during the process of obtaining borrow materials, except those entirely included in larger mining landforms;

- (4) benches and tops of lean ore, waste rock, and leached ore storage piles;
- (5) tailings basins;

(6) heap and dump leaching facilities;

(7) dikes and dams;

(8) exposed soils adjacent to water reservoirs;

(9) areas exposed or disturbed through the activities associated with the reclamation of building sites, parking lots, pipeline routes, storage areas, transmission routes, and roads not used for subsequent access;

(10) surface overburden portions of pitwalls;

(11) buffers;

(12) subsided areas not permanently covered by water; and

(13) lean ore, waste rock, and leached ore storage pile slopes, within one-fourth mile of residential and designated public use areas, except designated trails.

B. The establishment of vegetation shall be initiated during the first normal planting period following the point when according to the permit to mine, a surface, structure, facility, or element is no longer scheduled to be disturbed or used in a manner that would interfere with the establishment and maintenance of vegetation, or after it has otherwise been required, using techniques such as grading, disking, or chisel plowing to reduce compaction, seeding or planting, fertilizing, mulching, and irrigating.

C. The following standards apply to the areas listed in subp. 2, item A:

(1) After three growing seasons following initiation of vegetation, a 90 percent ground cover within a 90 percent statistical confidence interval, consisting of living vegetation and its litter, shall exist on all areas, except slopes which primarily face south and west. Such sloped areas shall attain the 90 percent ground cover requirement within five growing seasons following the point when initiation of vegetation is required. Where this standard is not met, or where unvegetated rills or gullies more than nine inches deep form and erosion is occurring, the surface shall be repaired and replanted during the next normal planting period.

(2) Within ten growing seasons following initiation of vegetation, an area shall have a vegetative community with characteristics similar to those of an approved reference area. The vegetation on a reference area may be either planted or naturally occurring. For the purpose of controlling erosion, it shall be self-sustaining, regenerating, or a stage in a recognized vegetation succession which provides wildlife habitat or other uses such as pasture or timber land. Reference areas must be representative of the site conditions and possible uses which might exist on mining landforms. No release pursuant to part 6132.4400 shall be granted until the area has such characteristics.

#### 6132.2900 DUST SUPPRESSION.

Subpart 1. Goal. Areas disturbed by mining shall be managed to control dust.

Subp. 2. Requirement. Dust shall be controlled by techniques approved by the commissioner such as water spray, chemical binders, anchored mulches, vegetation, and enclosure and containment.

### 6132.3000 AIR OVERPRESSURE AND GROUND VIBRATIONS FROM BLASTING.

Subpart 1. Goal. Effects of air overpressure and ground vibrations from production blasts shall be kept at levels which will not be injurious to human health or welfare and property outside mining areas.

Subp. 2. Requirements. Requirements:

A. Air overpressure standards:

(1) Air overpressure on lands not owned or controlled by the permittee shall not exceed 130 decibels as measured on a linear peak scale, sensitive to a frequency band ranging from six cycles per second to 200 cycles per second.

(2) All open pit blasts shall be monitored by the operator. Monitoring stations shall be located adjacent to the nearest structure located on lands not owned or controlled by the permittee, and where the commissioner deems necessary to investigate complaints.

(3) All open pit mining operators shall keep a blaster's log of production blasts for a period of at least six years containing the following:

- (a) date and time of blast;
- (b) type of explosive used;

(c) ignition layout with locations of blast holes and time intervals of delay;

(d) pounds of explosives per each delay of eight milliseconds or more;

(e) total pounds of explosives;

(f) type of material blasted;

(g) monitoring locations and results of monitoring when conducted;

(h) meteorological conditions, including temperature inversions, wind speed, and directions as can be determined from the U.S. Weather Bureau, and ground-based observations;

(i) directional orientation of free faces of bench to be blasted; and

(j) other information which the commissioner finds necessary to determine if the standards of part 6132.3000, subp. 1. and 2. are achieved.

(4) If a focusing condition is detected which could cause the blast to adversely affect populated areas, blasting shall be postponed until the condition is no longer present.

(5) Blasting in open pits shall take place only during daylight hours unless a hazardous condition requires blasting at another time.

B. Ground vibration control:

(1) The maximum peak particle velocity from blasting shall not exceed one inch per second at the location of any structure located on lands not owned or controlled by the permittee.

(2) The permittee shall either:

(a) monitor production blasts for peak particle velocity using a seismograph capable of measuring three mutually perpendicular peak particle velocities, with the peak particle velocity being the largest of these measurements; or

(b) utilize the scale distance formula  $W = (d/60)^2$  where:

W = the charge weight per delay (eight milliseconds or more), and

d = the distance (in feet) from the blast to the nearest structure located on lands not owned or controlled by the permittee to determine the weight of allowable explosive per decay.

(3) when the monitoring is chosen, or complaints are received, seismic measurements shall be conducted adjacent to the nearest structure located on lands not owned or controlled by the permittee and where the commissioner deems necessary to investigate complaints.

(4) In the event of a complaint or when ground vibrations have or are likely to exceed the one inch per second standard, the commissioner shall require permittees using underground mining methods to maintain a blaster's log for the purpose of assessing ground vibration control.

C. All monitoring data collected shall be made available to the commissioner upon request.

#### 6132.3100 SUBSIDENCE.

Subpart 1. Goal. Mining shall be conducted in a manner which will prevent or mitigate hazardous conditions which result from subsidence.

Subp. 2. Requirements. Requirements:

A. Mining techniques shall be used which prevent subsidence to the extent practicable.

B. In the event of actual or likely subsidence the permittee shall establish ground control survey locations and conduct surveys to document the extent of ground movement.

C. Areas affected by subsidence shall be contoured or filled to protect public health and safety or natural resources.

#### 6132.3200 CORRECTIVE ACTION.

Subpart 1. Goal. Upon the observation of violations of the permit to mine, immediate actions shall be taken to correct the violation.

Subp. 2. Requirements. Requirements.

A. When the permittee is aware that requirements of parts 6132.2000 - 6132.3300 are not being met, or if facilities constructed are not in compliance with the permit to mine, the permittee shall immediately notify the commissioner.

B. Upon notification, or observation, of violations of these rules or conditions not meeting the permit to mine, the commissioner shall order the permittee to:

(1) immediately take corrective action; or

(2) submit a corrective action plan for the commissioner's approval prior to proceeding with corrective action that includes:

(a) cause for failure to comply;

(b) methods, sequence, and schedule of corrective action activities that will result in compliance with the permit to mine;

(c) corrective action cost estimates pursuant to part 6132.1200, subp. 3; and

(d) maps and cross sections at an appropriate scale.

C. When there is an immediate threat to human safety or natural resources resulting from the mining operation, the permittee shall take immediate corrective action and report to the commissioner.

D. The commissioner may take one or more of the following actions in the event of failure to comply with any portion of this part:

(1) Suspend the permit to mine purusant to part 6132.5000.

(2) Assess civil penalties pursuant to part 6132.4900.

(3) Initiate the process of revocation or modification pursuant to part 6132.4800.

(4) Cancel the permit pursuant to part 6132.4300.

#### 6132.3300 CLOSURE AND POST CLOSURE MAINTENANCE.

Subpart 1. Goal. The mining area shall be closed so that it is stable, free of hazards, minimizes hydrologic impacts, minimizes the release of substances that adversely impact natural resources, and is maintenance-free to the extent practicable.

Subp. 2. Requirements. Requirements:

A. Accesses to underground mines shall be promptly sealed as approved by the commissioner and the county mine inspector.

B. Within six months after closure of a mine begins, the following shall be accomplished:

(1) provide at least one safe access to the bottom of an open pit; and

(2) construction of fences or other access barriers for safety pursuant to Minn. Stat. 180, Mine Inspectors.

C. Within one year after closure begins, or within such longer period as approved by the commissioner, debris and mobile equipment which will not be used for reclamation shall be removed from the area being closed.

D. Within three years after closure begins, or within such longer period as approved by the commissioner, the following shall be accomplished:

(1) roads, parking areas, and storage pads except those the commissioner deems necessary for access shall be removed;

(2) permittee-owned power plants and associated facilities (except public utilities), transmission lines, pipelines, docks and associated facilities, and railroads (except common carrier transportation facilities) shall be removed or provisions made for continued subsequent use; and

(3) all other equipment, facilities, and structures shall be removed and foundations razed and covered with a minimum of two feet of surface overburden.

E. Within three years after the commencement of closure of basins constructed for the purpose of mining or processing, or within such longer period as approved by the commissioner, the permittee shall drain such basins and reintegrate the area into the natural watershed.

F. If, following closure, continued compliance with the requirements of parts 6132.2000 to 6132.3300 cannot be achieved without continued maintenance of facilities, the permittee shall:

(1) implement post closure maintenance techniques designed to ensure that the requirements of parts 6132.2000 to 6132.3300 will continue to be met following closure;

(2) identify specifically how, when, and by whom the active techniques will be conducted or managed;

(3) identify performance levels or limitations, which would have to be achieved before the techniques could be considered successful; and

(4) provide for financial assurance pursuant to part 6132.1200, subd. 1, item A.

G. No release from the permit to mine pursuant to part 6132.1400 shall be granted for those portions of the mining area that require post closure maintenance.

#### ADMINISTRATIVE PROCEDURES

#### 6132.4000 PROCEDURES FOR OBTAINING A PERMIT TO MINE.

Subpart 1. Application and publication. The process for requesting a permit to mine is commenced by holding a preapplication conference and site visit pursuant to 6132.1100 subp. 1., followed by the submission of an application to the commissioner pursuant to parts 6132.1000 to 6132.1500. After the commissioner determines the application is complete, the applicant shall publish an advertisement as required by part 6132.4700. Within seven days after the last date of publication, the applicant shall submit to the commissioner a copy of the advertisement and an affidavit from the printer verifying publication. The application shall then be considered filed.

Subp. 2. Objection to the issuance of a permit to mine. Objection related to a proposed mining operation may be filed with the commissioner pursuant to Minn. Statutes 93.44 - 93.51.

A. Written objections to a proposed mining operation may be filed with the commissioner no later than 30 days following the last date of publication of an applicant's newspaper advertisement, required pursuant to part 6132.4700.

B. A person submitting an objection to the commissioner shall include the following information:

(1) a statement of the person's interest in the permit application;

(2) a statement of the action that the person wishes taken by the commissioner, including specific references to applicable sections of Minn. Stat. 93.44 - 93.51, parts 6132.0100 - 6132.5100, or the permit application; and

(3) the reasons supporting the person's position, stated with sufficient specificity as to allow the commissioner to investigate the merits of the person's position.

C. Within ten days after the receipt of the objection, the commissioner shall determine whether the person filing the objection meets one of the following criteria:

(1) owns property which will be affected by the proposed operation;

(2) is a federal, state, or local governmental agency having responsibilities affected by the proposed operation; or

(3) raises a material issue of fact, relating to the proposed operation, for which the commissioner has jurisdiction pursuant to Minn. Stat. 93.44 -93.51.

D. If objections were filed by a person meeting the requirements of part 6132.4000, subp. 2, item C., the commissioner shall attempt to resolve the issue by:

(1) allowing the applicant to modify the operation to the mutual satisfaction of the objector and the commissioner, provided that any substantial modification to the operation may necessitate republication of the applicant's newspaper advertisement, with an explanation of the proposed modification; or

(2) proceeding with a hearing pursuant to part 6132.4000, subp. 3.

E. If objections were filed by a person not meeting the requirements of part

6132.4000, subp. 2, item C., the commissioner shall inform the person of that fact, stating reasons therefor, and proceed with processing the application as if no objection had been received.

Subp. 3. Determination with hearing. Hearings shall be held by the commissioner in accordance with the following provisions:

A. The commissioner shall conduct a hearing if:

(1) objections are received by a person meeting the requirements of part 6132.4000, subp. 2, item C. and the commissioner is unable to resolve the issue to the satisfaction of the objector and the applicant, pursuant to part 6132.4000, subp. 2, item D, subitem (1); or

(2) the commissioner determines a hearing is necessary to address matters of public health, safety, and welfare.

B. To conduct a hearing, the commissioner shall:

(1) select a hearing date which shall be no more than 30 days after the last date of opportunity to object;

(2) serve an order for hearing in the form and manner required by the provisions of part 1400.5600, except those in part 1400.5600, subp. 3, which do not apply. In no event shall such an order be served less than 20 days prior to the hearing;

(3) mail a copy of the order for hearing to all persons who filed objections and all local units of government in which all or a part of the operation is located; and

(4) publish notice of subject, time, date, and place of the hearing at least once prior to the hearing in a newspaper which must be both a qualified newspaper, within the meaning of Minn. Stat., sec. 331A.02, and circulated in the locality of the proposed mining operation.

C. Within 120 days after the close of the hearing record, or 90 days after service of the hearing examiner's report whichever comes later, the commissioner shall grant the permit with or without modifications or conditions or deny the permit stating reasons therefore.

Subp. 4. Determination without hearing. The commissioner shall process the permit without a hearing in accordance with the following:

A. No hearing shall be required if within 30 days following the last date of publication of the applicant's newspaper advertisement:

(1) no objections were filed;

(2) objections were filed, but the person objecting did not meet the requirement of part 6132.4000, subp. 2, item C;

(3) objections were filed but were resolved pursuant to part 6132.4000, supb.

2, item D; and

(4) the commissioner determines that the proposed operation will not impact public health, safety, and welfare.

B. Within 120 days after the last date upon which a person can object to the proposed mining operation, the commissioner shall process the application in accordance with the following:

(1) grant the permit with or without modifications or conditions; or

(2) deny the permit stating reasons therefore.

Subp. 5. Hearing upon demand of applicant. Hearing upon demand of applicant:

A. If the commissioner processes the application without a hearing, the applicant may, within 30 days after mailed notice of the commissioner's order on the application, file with the commissioner a demand for hearing pursuant to Minn. Stat., chapter 14. The application shall thereupon be fully heard on notice.

B. Within 120 days after the close of the hearing record or 90 days after service of the hearing examiner's report, whichever comes later, the commissioner shall grant the permit to mine with or without modifications or conditions or deny the permit to mine stating reasons therefore.

Subp. 6. Review of annual report. Each year following the granting of the permit to mine, the commissioner shall review the annual report required pursuant to part 6132.1300 to determine whether it complies with the provisions of the permit to mine. Upon completion of this review, the commissioner shall inform the permittee of the compliance determination.

A. If the annual report complies, the commissioner shall direct the permittee to implement the reclamation plan proposed for the upcoming year.

B. If the annual report does not comply, the commissioner shall:

(1) require the permittee to prepare an explanation of why the report does not comply with the permit to mine, and what is proposed to achieve compliance;

(2) direct the permittee to take corrective action, pursuant to part 6132.3200, which address the violations, deficiencies, or inadequacies that are reported to have occurred during the past year; or

(3) require the permittee to develop a new plan for activities to be conducted during the upcoming year, which will comply with the permit to mine.

6132.4100 VARIANCES.

Subpart 1. Application for variance. A proceeding for requesting a variance from these rules is commenced when the permit applicant or permittee files an application for a variance with the commissioner. The application shall include information necessary for the commissioner to determine that the proposed variance is consistent with the general public welfare and the goals of these rules.

Subp. 2. Determination by commissioner. Within 30 days after receipt of the application, the commissioner shall determine whether the proposed variance constitutes a substantial change from the requirements of these parts.

If the commissioner determines that a substantial change would result, the applicant shall follow the procedures for permit to mine applications, as set forth in part 6132.4000.

If the commissioner determines that there would be no substantial change, the commissioner shall without a hearing allow the variance with or without additional terms or conditions that are consistent with these parts, or deny the application stating reasons therefore.

Subp. 3. Demand for a hearing. If the commissioner processes the application without a hearing pursuant to part 6132.4100, subp. 2., the applicant may file with the commissioner a demand for hearing on the decision pursuant to part 6132.4000, subp. 5.

Subp. 4. Simultaneous filing of applications. Applications for variance from these rules may be filed simultaneously with an application for a permit to mine, provided that the advertisement contains all information required for applications for permits to mine and for variance.

Subp. 5. Granting of a variance. The commissioner shall grant a variance from the requirements of these parts upon application by a permit applicant or permittee, if it is determined that:

and

A. a variance is consistent with the general public welfare and goals of these parts;

B. acceptable alternative means of accomplishing the goals, pursuant to parts 6132.1000 to 6132.3300, have been provided by the permit applicant or permittee.

Subp. 6. Conditional granting. The commissioner shall grant a variance upon such conditions as shall be necessary for the prevention, control, or correction of adverse impacts on natural resources, consistent with the requirements of these parts and state law.

#### 6132.4200 AMENDMENTS.

Subpart 1. Application for amendment. A proceeding for requesting an amendment of a permit to mine is commenced when the permittee files an application for an amendment with the commissioner. The application shall include such information as the commissioner shall require in order to determine that the proposed amendment meets the requirements of these rules and state law.

Subp. 2. Determination by commissioner. Within 30 days after receipt of the application, the commissioner shall determine whether the proposed amendment constitutes a substantial change in the permit to mine.

If the commissioner determines that a substantial change would occur, the applicant shall follow the procedures for obtaining permit to mine applications, as set forth in part 6132.4000.

If the commissioner determines that there would be no substantial change, the commissioner shall without a hearing allow the amendment with or without additional terms or conditions that are consistent with these rules, or deny the application stating reasons therefore.

Subp. 3. Demand for hearing. If the commissioner processes the application without a hearing pursuant to part 6132.4200, subp. 2., the applicant may file with the commissioner a demand for hearing on the decision pursuant to part 6132.4000, subp. 5.

#### 6132.4300 CANCELLATION.

Subpart 1. Cancellation at the request of permittee. A proceeding to cancel a permit to mine at the request of the permittee is commenced when a permittee files a written request with the commissioner. The request shall identify the permittee and give reasons for the requested cancellation.

Within 30 days after the receipt of a request, the commissioner shall determine whether cancellation would have a significant adverse effect on any public interest relating to the goals of these parts.

If the commissioner determines that cancellation shall have such adverse effect the permittee shall publish an advertisement pursuant to part 6132.4700, and the commissioner shall proceed as if an application for obtaining a permit to mine, pursuant to part 6132.4000, had been received.

If the commissioner determines that the cancellation shall not have such adverse effect, the

permit may be cancelled with or without conditions.

Subp. 2. Cancellation with consent of permittee. A proceeding to cancel a permit to mine with the consent of the permittee is commenced when the commissioner serves the permittee with written request giving reasons for the cancellation.

If no reply or an affirmative reply is filed with the commissioner within 30 days, procedures pursuant to part 6132.4300, subp. 1. shall be commenced except that the commissioner shall publish an advertisement pursuant to part 6132.4700.

If a negative reply is filed with the commissioner within 30 days, the permit to mine will continue in effect or a proceeding to revoke the permit to mine pursuant to part 6132.4800 shall be commenced.

#### 6132.4400 RELEASE OF PERMITTEE.

Subpart 1. Procedure. The procedure to release the permittee from responsibility on any reclaimed portion of the mining area is commenced when the permittee submits a request for release, pursuant to part 6132.1400. The request for release shall be processed in the same manner as if the commissioner had received an application for an amendment to the permit to mine, pursuant to part 6132.4200.

Subp. 2. Review. The commissioner shall review the request for release and determine:

A. Whether all terms and conditions of these sections, and the permit to mine have been satisfied.

B. Whether it is necessary to defer such release until other portions of the mining area have been reclaimed.

Subp. 3. Release. Within 60 days after receipt of the request, the commissioner shall release the permittee with or without conditions, or deny the request stating reasons therefore.

Subp. 4. Post closure maintenance. No release from a permit to mine shall be approved, for any portion of the mining area requiring post closure maintenance, until the necessity for such maintenance ceases.

#### 6132.4500 ASSIGNMENT.

Pursuant to Minn. Stat., sec. 93.481, subd. 5., the commissioner shall allow the assignment of a permit to mine only if the commissioner determines that the assignee will perform all outstanding obligations of state law, these parts, and the permit to mine.

#### 6132.4600 HEARING PROCEDURES.

Procedures established by parts 1400.5100 to 1400.8500 shall apply to any contested case hearing under these parts, except as otherwise provided in Minn. Stat., secs. 93.44 to 93.51 and these parts.

#### 6132.4700 PUBLICATION.

When an advertisement is required, relating to the issuance, amendment, or cancellation of a permit to mine; relating to a variance from these rules; or relating to a release from a permit to mine, it shall be published once each week for four successive weeks in a qualified newspaper, pursuant to

Minn. Stat., sec. 331A.02, that is circulated in the locality of the proposed mining operation. Such advertisement shall contain:

A. A statement and map indicating the locations and boundaries of the mining area.

B. The names of all surface owners of record within the mining area, and severed mineral ownership as set forth in verified statements pursuant to Minn. Stat., sec. 93.52 or in an order or decree pursuant to Minn. Stat., sec. 93.55, subd. 2, filed in the county recorder's office with respect to severed mineral interests in parts of the mining area which will be excavated or covered with mine wastes. An owner's agent may be identified in place of the owner. No error in the designation of surface or mineral ownership as filed in the county recorder's office shall affect the validity of the publication.

C. The schedule for accomplishing what is being proposed.

D. A notice of the deadline date for filing objections.

E. The following information:

(1) If application is made for a permit to mine, a description of the proposed mining operation including the general kinds of reclamation or restoration measures to be undertaken pursuant to the reclamation plan;

(2) If an amendment to a permit to mine is requested, a description of the purpose and nature of the proposed amendment;

(3) If a cancellation of a permit to mine is requested, an explanation of the request for cancellation and the consequences of allowing such a request; or

(4) If a variance from these rules is requested, a description of the purpose and nature of the requested variance and a description of the proposed alternative means which will be used to meet the goals and comply with the requirements of these parts.

(5) If a release from the permit to mine is requested, a description of the status of reclamation that has been performed, a discussion of any planned subsequent uses for the land, and identification of how the land is intended to be managed.

#### 6132.4800 REVOCATION OR MODIFICATION.

The commissioner may revoke a permit to mine or modify any of its terms or conditions, pursuant to Minn. Stat., section 93.481, subd. 4. A permittee shall not be considered to have commenced substantial construction of plant facilities unless erection of the primary plant facilities has begun. Planning, securing capital, purchasing land and materials, and otherwise preparing for construction are not deemed to be commencement of substantial construction.

Subpart 1. Commencement of proceedings. A proceeding to revoke or modify a permit to mine, to require financial assurance, or to assess a civil penalty shall be commenced by serving upon the permittee:

A. a notice and order for hearing in the form and manner pursuant to part 1400.5600,

B. a proposed order revoking or modifying the permit to mine, requiring financial assurance, or assessing a civil penalty; and

C. a statement of the measures, if any, required to correct the situation and the time
available therefore.

If conditions that provided the grounds for such an action are corrected to the commissioner's satisfaction within a period established by the commissioner and if measures approved by the commissioner are taken to ensure that such conditions do not recur, the proceedings shall be cancelled.

Subp. 2. Hearing prior to determination. Hearing prior to determination:

A. The commissioner shall hold a hearing prior to the determination to revoke or modify a permit to mine, require financial assurance, or assess a civil penalty if, within 15 days after commencement of the proceeding, any permittee serves an answer on the commissioner and all other parties. If an answer is served, the commissioner, without further notice, shall hold the hearing at the time and place specified in the order for hearing. No hearing shall be held less than 30 days after commencement of the proceeding.

An answer shall contain the following: a written statement of the defenses to each violation alleged in the order for hearing, and a specific admission, denial, or explanation of each fact alleged in the order for hearing, or, if the permittee is without knowledge thereof, a statement to that effect.

Allegations of a complaint not thus answered shall be deemed to have been admitted.

B. If an answer contains an admission to an alleged fact no hearing shall be held on that fact and the allegation shall prevail.

C. Failure of a permittee to serve an answer, pursuant to part 6132.4800, subp. 2., item A or to appear at the hearing shall be deemed to constitute a waiver of a hearing on the allegations of the order for hearing and the contents of the proposed order. Such waiver authorizes the commissioner, without further notice to the permittee and without proceeding further with the hearing, to adopt the proposed order, or that much as is applicable if the proposed order is in the alternative or if there have been correction measures attempted. Said order shall be the final decision on the matter.

D. If the permittee appears at the hearing the commissioner, in reaching a final decision, shall not be bound by the proposed order.

## 6132.4900 CIVIL PENALTIES.

Subpart 1. Amount. If any person violates any provision of Minn. Stat., sections 93.44 to 93.51, these parts, or any permit to mine issued thereunder, the commissioner may order imposition of a civil penalty of not more than \$1,000 per day for each violation of each provision or the same provision in more than one portion of the mining area.

Subp. 2. Determining the amount. In determining the amount of a penalty, the commissioner shall consider the severity of the violation, the need to deter future violations, and the magnitude of potential or actual gains resulting from the violation.

Subp. 3. Collection. The commissioner shall collect any assessed civil penalty in the same manner as any other debt owed the state.

## 6132.5000 SUSPENSION.

The commissioner may suspend all or any part of a permit to mine pursuant to Minn. Stat., sec. 93.481, subd. 4. Any suspension ordered pursuant to this part shall be for such period and upon such terms as the commissioner deems appropriate to correct the conditions which necessitated suspension.

## 6132.5100 INSPECTION OF MINING AREA.

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The permittee shall allow the commissioner to inspect all mining operations and records needed to monitor compliance with the permit to mine and these parts, after reasonable prior notice.