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Governor's Task Force on Mining and Minerals

RECOMMENDATIONS



Submitted to:

Governor Arne Carlson
Members of the Minnesota Legislature

January 1997

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The IRRRB wishes to acknowledge the contribution of its partners in the production of this report:

EVTAC

*Hibbing Taconite Company
Inland Steel Mining Company
LTV Steel Mining Company
National Steel Pellet Company
Northshore Mining Company
USX - Minnesota Ore Operations
United Steel Workers of America
Iron Mining Association of Minnesota
Department of Natural Resources - Minerals Division
Minnesota Pollution Control Agency
Minnesota Department of Revenue
Minnesota Department of Public Service
Minnesota Exploration Association
University of Minnesota
Natural Resources Research Institute
Minnesota Geological Survey
Minerals Coordinating Committee
Stockpiled Iron-Bearing Materials Working Group
Nonferrous Minerals Exploration Working Group
Range Association of Municipalities and Schools
St. Louis County
Gold & Manganese Resources Co.
Minnesota Iron & Steel Company
CAMAS America, Inc.
Minnesota Power
Industrial Lubricants Company
Meriden Engineering
Mesabi Radial Tire Company
Mesabi Powder Company
Taconite Production Tax Committee
Dimensioned Stone Partners
Other participants that we forgot to mention*

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EXECUTIVE SUMMARY

On November 26, 1996, the Governor's Task Force on Mining and Minerals, chaired by Iron Range Resources and Rehabilitation Board (IRRRB) Commissioner Jim Gustafson, issued recommendations on actions that should be taken to sustain and enhance Minnesota's mining industry. The task force, comprised of representatives of state agencies, education and research institutions, mining companies, mining suppliers, the United Steelworkers of America, local governments and environmental advocates, issued its fourth report in as many years to Governor Carlson and the Legislature in January 1997. Recommendations for 1996 are focused in four main areas: iron ore and taconite; copper, nickel, gold and other nonferrous minerals; sand, gravel and other industrial minerals; and environmental and land-use considerations. Many of these recommendations were actually conveyed to the task force from industry-government working groups that met this past summer and fall. A list of task force members is included on page 2 of this report.

Iron Ore and Taconite Opportunities

The task force recommended that approximately \$7 million be provided for taconite research during the next two years:

- approximately \$1 million per year for existing programs, including Iron Ore Cooperative Research, Environmental Cooperative Research and Mineral Diversification programs; a Permanent University Trust Fund program funded from state mineral leases; and
- \$5 million for a new program which will partner with taconite companies to demonstrate cost-saving, new technology at plant scale.

All programs are overseen by a state Minerals Coordinating Committee (MCC) chaired by the Minerals Division of the Minnesota Department of Natural Resources (DNR Minerals). Other MCC members include the Natural Resources Research Institute Minerals Branch (NRRI), Minnesota Geological Survey, University of Minnesota Department of Civil and Mining Engineering, Minnesota Pollution Control Agency, Environmental Protection Agency and the now-defunct U.S. Bureau of Mines.

The task force clarified its position regarding the mission and structure of the MCC, recommending that:

- the MCC remain a technical committee focused on mineral research rather than broad mineral policy issues; and
- the Legislature consider restructuring the MCC to replace the now-defunct Bureau of Mines with four additional representatives: one each from the taconite, nonferrous and industrial minerals industries and the commissioner of the IRRRB.

The task force also endorsed recommendations from the MCC to:

- support ongoing geologic mapping; and
- support ongoing mineral beneficiation studies that develop and prove techniques to process new minerals in an economic and environmentally sound manner.

In addition, the task force officially received the Taconite Production Tax Committee's January 1996 report, which studied all aspects of taconite production taxes and recommended eliminating the taconite production tax escalator and increasing the production tax rebate to the taconite companies for new equipment and plant improvements.

Copper, Nickel, Gold and Other Nonferrous Minerals Opportunities

The task force endorsed four recommendations designed to stimulate exploration and development of minerals other than iron. These ideas came from an exploration symposium co-sponsored by the IRRRB and the Minnesota Exploration Association:

- involve industry in the selection, development and peer review of publicly funded minerals research projects;
- make the exploration data at the Hibbing office of DNR Minerals more user friendly;
- create a new incentive program that provides \$100,000 per year from the IRRRB to match exploration company funds to encourage exploration drilling in the IRRRB service area; and
- prepare a promotional brochure to market Minnesota's nonferrous minerals to companies at the Canadian Prospector's and Developer's March 1997 Toronto conference and subsequent similar events.

Sand, Gravel and Other Industrial Minerals Opportunities

The task force recommended that:

- the state legislature assign a subcommittee to gather input from aggregate companies, construction contractors, state agencies, local governments, local citizens, environmental groups and other stakeholders to determine whether a state aggregate policy should be developed; and
- additional research be undertaken regarding the potential use of taconite tailings or other mining wastes as a partial replacement for sand, gravel and aggregate resources.

Environmental and Land-Use Opportunities

The task force recommended:

- funding be increased for the Cooperative Environmental Research program, which studies ways to insure that stable, hazard-free areas remain following the completion of mining activities;
- voluntary and legislative actions be taken to resolve problems arising out of the uncertainty of ownership of materials stockpiled during or as a result of iron ore mining; and
- the IRRRB work with mining companies and state and federal agencies and local governments to develop up-to-date topographic maps of the Mesabi mining district.

Finally, the task force recommended that the State of Minnesota:

- support the initiative to transfer the former U.S. Bureau of Mines Twin Cities Research Center to the University of Minnesota to foster minerals and environmental research at the NRRI's Coleraine Minerals Research Laboratory, including a timely review of possible re-use scenarios, as this is critical to the success of the initiative.

INTRODUCTION

The Governor's Task Force on Mining and Minerals, created in 1993 by Governor Arne Carlson, makes recommendations to the Governor and the Legislature on state policy related to mining and minerals issues, including taxation, royalties, regulations, economic and environmental issues, and research. The task force is comprised of business people who rely on the mining industry and representatives of the state's seven taconite producers, state agencies, education and research institutions, local governments, environmental advocates and the United Steelworkers of America. It is chaired by Jim Gustafson, Commissioner of the Iron Range Resources and Rehabilitation Board (IRRRB). The IRRRB is a state agency charged with the economic development of that portion of northeastern Minnesota established in law as the Taconite Tax Relief Area (TTRA). The TTRA includes the Mesabi, Vermilion and Cuyuna Iron Ranges, where iron mining has served as one of the pillars of the economy for the last century. It is defined by school district boundaries and encompasses all of Cook and Lake Counties, the greatest portion of St. Louis County, minus Duluth, and portions of Itasca, Crow Wing and Aitkin Counties.

Companies that mine taconite in Minnesota do not pay property taxes. Instead they pay a production tax on each ton of taconite pellets they produce each year; the taconite production tax rate is set at \$2.094 per ton for production year 1996. Minnesota taconite companies will pay approximately \$91 million in 1996 production taxes, 50% of which will be distributed in accordance with a statutory formula to cities, towns, school districts and counties located within the TTRA. 20.4 cents per ton, or approximately 10% of the total taxes levied, will be rebated to the taconite companies to help them fund the modernization of their plants and equipment; this

mechanism was established in 1992 to enhance the long-term viability of the state's taconite industry and is commonly referred to as the Investment Tax Credit. About 14% of 1996 production taxes will fund property tax relief for TTRA homeowners and roughly 26% will flow to the accounts administered by the IRRRB "to develop the remaining resources" of the TTRA.

The Governor's Task Force on Mining and Minerals issued reports in 1993, 94 and 95. In addition, an offshoot of the task force, the Taconite Production Tax Committee, issued a report in January 1996, recommending that:

- the Taconite Production Tax Escalator, a statutory provision that allows the tax to increase automatically each year based upon an index that reflects the performance of the economy as adjusted by inflation, be eliminated; and
- the Investment Tax Credit annually rebated to the taconite companies to help them fund the modernization of their plants and equipment be increased as total industry production increases, to a maximum of 31.4 cents per ton should total production reach 45 million tons. This increase was proposed to have come from taxes that otherwise would flow to the Northeast Minnesota Economic Protection Fund, commonly known as the 2002 Fund, a trust account created to further develop and diversify the economy of the TTRA.

In 1996 the Legislature did increase the Investment Tax Credit to 20.4 cents per ton for production years 1996, 1997 and 1998. However, the Taconite Production Tax Escalator was allowed to take effect, capped at a maximum of 4 additional cents per ton, thereby increasing the taconite production tax to \$2.094 per ton for 1996 production.

The task force reconvened during the fall of 1996, meeting twice and issuing the recommendations which follow on November 26, 1996. A list of Task Force members is included on page 2 of this report.

RECOMMENDATIONS

The following recommendations are the result of meetings and ongoing dialogue between various working groups of private and public organizations that support the environmentally sound use of Minnesota's mineral resources to provide well-paid jobs and sustain the premium quality of life for which Minnesota is globally recognized. Minnesota's quality of life is based upon a tradition of environmental stewardship, and all of the working groups discussing the development of Minnesota's mineral resources agree that protection of Minnesota's environment must be an integral part of undertaking and sustaining such development. These working groups include:

- A group co-convened by the Minnesota Department of Natural Resources' Minerals Division (DNR Minerals) and the IRRRB to discuss opportunities related to iron ore and taconite
- A group co-convened by the Minnesota Exploration Association (MExA) and the IRRRB to discuss opportunities related to nonferrous minerals such as copper, nickel, gold, titanium, platinum and palladium
- The Minerals Coordinating Committee (MCC), a group created by the Legislature to plan and coordinate minerals research in Minnesota
- A group convened by DNR Minerals to find solutions to various problems associated with the uncertainty of ownership of materials stockpiled as a result of iron ore mining

- Smaller groups of private and public sector representatives concerned with specific issues or projects, including industrial minerals such as sand and gravel and dimension stone
- The Governor's Task Force on Mining and Minerals, which served as a coordinator for these working groups and individuals and a public forum to discuss and refine these recommendations and convey them to the Governor and Legislature

IRON ORE AND TACONITE OPPORTUNITIES

Iron mining-- first of high-grade natural iron ore and now of lower grade taconite that is beneficiated into a higher value product -- has been one of the economic mainstays of Minnesota, especially its northeastern region, for over one hundred years. The iron mining industry annually contributes more than \$1.3 billion to the state's economy and purchases goods and services from more than 200 communities throughout Minnesota, directly or indirectly providing jobs for over 20,000 people.

Minnesota's first taconite plant was built over forty years ago and even the newest Iron Range taconite plant uses technology that is at least twenty-five years old. The Minnesota taconite industry is also facing a long-term decline as its major customers, the integrated steel companies, battle scrap-based producers for steel market share. However, the industry has proved itself to be remarkably resilient over the past fifteen years. It has survived the collapse of the domestic steel industry in the early 1980's, restructuring and re-engineering as needed to lower the costs and improve the quality of its product in order to remain viable. However,

competitive pressures will force Minnesota plants to find new ways to cut costs and enhance the value of their product in the future, as well.

The State of Minnesota sponsors a number of research programs to assist the taconite industry and the development of other minerals:

- Department of Natural Resources/Iron Ore Cooperative Research
- Department of Natural Resources/Environmental Cooperative Research
- Minerals Coordinating Committee/Mineral Diversification
- Natural Resources Research Institute/Minnesota Technology, Inc.
- Natural Resources Research Institute/Permanent University Trust Fund Minerals Research Account
- IRRRB/Production Tax Rebate Account

Each program is aimed at a somewhat different research goal, and each is administered differently. The total amount of state funds currently available for minerals research is about \$1,600,000 per year excluding programs based on production taxes. The amount expended for taconite research is about \$1,000,000 per year. While it may look like the funding is disbursed in an inefficient way, the people most closely associated with minerals research for the taconite industry generally work in concert to identify the most important projects. Also, the distribution assures that a variety of thinking will be applied to project selection processes. For example, the Iron Ore Cooperative Research Program uses input from the taconite companies to select projects, and the Permanent University Trust Fund monies are allocated using advice from an advisory committee with substantial membership overlap with other committees. Therefore, funds usually are allocated to important efforts whatever the source.

The recommendations listed below are targeted specifically on research for the taconite industry, and will provide the basis for the MCC's 10-Year Plan and its FY 1998-99 budget submission to the Legislature. The major program areas should be stable for a longer period of time, but the specific projects undertaken will change annually. The recommendations were developed with the help of the taconite mining industry, the Iron Ore Cooperative Research Committee and persons familiar with the opportunities for enhancement of currently used technologies. As such they are not the work of one person or group, but a blending of many different concepts and ideas.

Future Taconite Research Programs

Much has changed during the last ten years, so recalibration of existing programs is needed. The Mineral Diversification Plan will evaluate what has been accomplished and set a course for the next few biennia. At a minimum the state should do the following:

- ***Maintain a flow of ideas through laboratory and pilot scale research - Iron Ore Cooperative Research, Environmental Cooperative Research, Mineral Diversification, Permanent University Fund and various other research programs totaling approximately \$1 million. The amounts allocated to this program per year are as follows:***

○ Iron Ore Cooperative Research	\$315,000
○ Iron Ore Cooperative Research Matching Funds	\$225,000
○ Environmental Cooperative Research	\$ 23,000
(Approximately 50 percent of available funding)	
○ Mineral Diversification	\$175,000

(Approximately 25 percent of available funding)

- Permanent University Trust Fund \$500,000

(Depends on income; current expectations are \$500,000 per year and this amount could grow to over \$1,000,000 in a decade)

Diversity is needed in this area in order to capture ideas from many sources and allow a variety of approaches. Company input is particularly important to maintain the vigor of the programs. Costs for individual research projects are usually below \$100,000.

- ***Develop a new program under which successful research projects can be tested at a plant scale. The value of this program should be tested with an initial appropriation of \$5,000,000 with an expected non-state match of the same amount.***

The NRRI and DNR have identified eleven technologies which should be tested at a plant scale. Since these are new technologies they are inherently riskier than the capital investments plants usually make. Also, the companies, in general, have limited amounts of capital available for the plants. This means that only the best ideas are funded, and risky projects are very difficult to fund. It is believed that a new program which would share the risk of commercial demonstration would accelerate the adoption of these new ideas. Costs for tests at this scale range from \$100,000 to \$10,000,000. A \$5,000,000 appropriation would provide a good start in this area.

- ***Create a new taconite flowsheet using ideas generated during the last decade. The cost of this program including pilot plant testing and process engineering would be \$500,000, an amount which would be spent over a three-year period.***

The newest plant on the Mesabi Range is twenty years old and the oldest is forty. A new taconite flowsheet would incorporate many innovations, e.g. column flotation, high pressure roll crushers, ported kilns, etc. At this point in time researchers do not have a good fix on the costs or productivity of such a plant. A project should be started to provide several alternative flowsheets together with material balances, energy requirements and capital costs. These flowsheets would be the models toward which the plants could evolve during the next 15 years and would therefore match up with plant modernization efforts. The flow sheets might also be the first step in construction of a new plant.

- ***Apply value-added technology to enhance the products of the taconite industry - costs included in Mineral Diversification.***

The steel industry is being impacted by the introduction of iron products which allow electric furnace operators to compete on a quality basis with integrated steel producers. This trend could have a negative effect on the state's taconite industry through a reduction in the demand for blast furnace pellets. However, this could be at least partially offset if value-added iron plants could be built in Minnesota. The search for direct reduced iron (DRI) processes that could benefit Minnesota has been ongoing since the early 1980's and several promising alternatives have been identified. This search should continue in an effort to find a technology or technologies which utilize Minnesota's unique combination of ore and energy sources to produce economically competitive DRI. The longer-term strategy should also emphasize a gathering of the financial and technical elements that will lead to construction of a plant in Minnesota. The major items which should be included in a value-added iron strategy include:

- Continued search for the owner/buyer/technology combination that will lead to construction of a DRI plant
- Effort which could lead to construction of a limestone/dolomite calcining plant in Minnesota
- Continued evaluation of DRI and other iron processes for applicability to Minnesota conditions
- Investigation of promising new ideas to use taconite concentrate and western subbituminous coal to produce DRI

The amount that should be allocated to this activity on a continuing basis is about \$50,000 per year with the potential for a larger amount when and if projects are identified. The amount listed above could be funded by using a portion of the Mineral Diversification account.

- ***The task force recommends that the State of Minnesota support the initiative to transfer the U.S. Bureau of Mines Twin Cities Research Center to the University of Minnesota to foster minerals and environmental research at the NRRI's Coleraine Minerals Research Laboratory.***

When the federal government abolished the U.S. Bureau of Mines (USBM), a great resource for minerals research associated with Minnesota's mining industry was lost. Therefore, parties concerned with retaining Minnesota's capacity to conduct minerals research developed an initiative to transfer former USBM Twin Cities Research Center personnel and equipment to NRRI's Coleraine laboratory. The state's exploration of possible re-use scenarios on a timely basis is critical for the success of the initiative.

Desired Outcomes

- ***State supported research on taconite technology should lead to:***
 - An economically viable taconite industry
 - Job creation that goes beyond mining and processing through creation of value-added and/or support industries
 - Maintenance of a skills base to support current and future minerals industries
 - Transfer of past and current research into the plants
 - Demonstration of environmentally sound reclamation techniques which create potential for future land use

Strategy for the Minerals Coordinating Committee

- ***The Governor's Task Force on Mining and Minerals takes this opportunity to clarify its position regarding the mission and structure of the MCC.***

Currently the MCC allocates the Mineral Diversification funds and advises and coordinates the other programs. The MCC was established in Minnesota Laws, Chapter 93.002, which states:

- The mineral coordinating committee is established to plan for diversified mineral development.

The current membership consists of the Department of Natural Resources Minerals Division, Natural Resources Research Institute Minerals Branch, Minnesota Geological Survey, University of Minnesota Department of Civil Engineering, Minnesota Pollution Control Agency, Environmental Protection Agency and the now-defunct U.S. Bureau of Mines. In order to

complete its mission, the coordinating committee was required to prepare and adopt a ten-year plan which includes a strategy to:

- (1) increase the knowledge of the state's mineral potential;
- (2) stimulate development of mineral resources in the state; and
- (3) promote basic minerals research.

All of the work of the MCC is to be consistent with the legislative policy in Minnesota Laws, Chapter 93.001, which states:

- It is the policy of the state to provide for the diversification of the state's mineral economy through long-term support of mineral exploration, evaluation, environmental research, development, production and commercialization.

It is clear from the statutes that the MCC is to use its appropriations to perform research and produce information that will lead to development of the state's mineral resources. While some have suggested that the MCC should expand its role, it is the consensus of the Governor's Task Force on Mining and Minerals that the MCC should remain a technical committee that focuses on minerals research rather than broader mineral policy issues, as other groups like the task force exist to represent a wide range of interests and to make policy recommendations. The current members of the MCC concur with this approach.

- *It also has been suggested that the membership of the MCC be expanded, and the Governor's Task Force on Mining and Minerals basically concurs with the recommendation of the Nonferrous Minerals Exploration Symposium that the now-defunct U.S. Bureau of Mines be replaced with representatives of the minerals*

industry. The task force also recommends that a representative of the IRRRB be added. The membership of the MCC would then be expanded as follows:

- one representative of the taconite industry
- one representative of the nonferrous minerals industry
- one representative of the industrial minerals industry
- the commissioner of the IRRRB

The topics explained above (and the Environmental Cooperative Research program explained in the ENVIRONMENTAL AND LAND USE section of this report) represent a blend of existing programs and new ideas. Each is discussed in greater detail in the appendix to this report. The total budget request for the FY 1998-99 Biennium is expected to be \$7,170,000, which is an increase of \$5,700,000 over the appropriation level in the current biennium. However, most of the increase is in a one-time appropriation for the plant demonstration program.

Much of the research completed in the last ten years has led to significant improvements in taconite processing. During this period techniques have been developed which bring companies together to undertake work to benefit the taconite industry as a whole. It's believed that these cooperative efforts can be successful well into the future.

COPPER, NICKEL, GOLD AND OTHER NONFERROUS MINERALS OPPORTUNITIES

On July 31, 1996, at the joint invitation of the IRRRB and MExA, a group of thirty-four representatives of industry, research organizations, state government agencies and other parties attended a Nonferrous Minerals Exploration Symposium. The goal of this symposium was to

identify processes and strategies that, if adopted, would substantially increase the probability of the development of an economically significant and environmentally responsible nonferrous and precious metals mining industry in Minnesota.

A 1992 study by the School of Business and Economics for the University of Minnesota-Duluth indicated that a single, medium-sized nonferrous mining development could create over 350 direct and indirect jobs, provide more than \$160 million over 14 years to the local economy and contribute more than \$37 million in local and state taxes over the same period. (See Table 1 from that study which is included in the appendix to this report.)

Recommendations resulting from the July 1996 Exploration Symposium were subsequently reviewed, refined and amplified through discussions between representatives of the IRRRB, MExA and the MCC. The first recommendation which follows was ultimately incorporated into the task force's recommendation to expand the MCC membership to include representatives of the minerals industry and the IRRRB.

- ***Industry should be involved in the selection, development and peer review of publicly funded projects aimed at enhancing the opportunity for mineral development in the state.***

To assure fuller involvement, the statute establishing the Mineral Diversification program should be amended to include representatives of industry. In this way, the minerals industry can provide input to minerals research in a proactive rather than a reactive manner.

- ***The exploration data at the Hibbing office of the MN DNR Minerals Division should be put in user friendly form.***

This wealth of one hundred years of data contains much valuable information but is not well catalogued or easily accessible. If readily available, this information, particularly the airborne electromagnetic (EM) surveys, can provide the basis for a number of potentially successful exploration programs.

DNR Minerals should retain the services of an outside expert to provide direction on the most efficient and user accessible way to catalogue the data and organize these files. To expedite the process, IRRRB proposes to organize and support an exploration data advisory committee of knowledgeable specialists to assist DNR Minerals in developing a request for proposals from information experts, to recommend a work plan and budget, and to monitor the process.

Additional mineral and geologic data exists within company files as a result of private exploration efforts in the past in Minnesota. The exploration data advisory committee should explore opportunities to acquire this data (especially airborne EM surveys) and include it in the Hibbing DNR files, as well.

- ***Incentive programs should be developed for nonferrous minerals exploration which would increase the probability of developing a new mineral industry in Minnesota.***

As one new major incentive, IRRRB proposes to institute a program of matching funds for exploratory (but not development or delineation) drilling in the IRRRB service area, the Taconite Tax Relief Area. IRRRB proposes to make available up to \$100,000 per year to match up to 40% of direct drilling costs, including overburden sampling (but not to exceed a match of \$20,000 per drill hole) for exploratory drilling by exploration groups certified as eligible for leasing of state mineral rights by DNR Minerals.

For holes drilled on non-state land, the expectation is that the explorer will submit the same geologic and exploration data to the state that is submitted for state mineral leases.

The IRRRB and MExA will review other incentive programs in Canada and elsewhere in order to select and recommend other potentially effective programs.

- ***Exploration in Minnesota should be promoted to a targeted audience of exploration companies.***

This promotion should focus on the favorable geologic terrain of Minnesota, the 130 year history of mining in Minnesota, the wealth of geological data available, the favorable leasing rules for state lands, the IRRRB drilling incentive and the favorable tax, regulatory and business climate for mining in the state.

The IRRRB and MExA, working with the MCC, should collaborate to produce a professionally prepared marketing document by March 1997 for recruitment efforts at the Canadian Prospectors and Developers 1997 Toronto trade show and subsequent similar events.

- ***The task force believes that ongoing geologic mapping is important to support exploration activities and that the MCC should ensure that geologic maps prepared by the State reflect the appropriate scale of data that will enhance the effectiveness of mineral exploration.***

It has been noted by the exploration community that information such as alteration, mineralization and specific textures and structures related to ore deposits have not generally been portrayed on geologic maps published by the agencies, although available in agency files. The availability of this type of information at 1:24000 or 1:62500 scale will help considerably in target selection and subsequent exploration efforts. This data may be best made available as data

layers in GIS format so that it can be accessed easily by explorers but would not need to be included on all final published maps produced by the agencies.

- *The State of Minnesota should ensure that exploration should be supplemented by mineral beneficiation studies to establish the viability of economic extraction processes for minerals such as copper, nickel, titanium and vanadium and that provisions to do so be included in the updated Mineral Diversification Plan.*

Concentration tests to determine whether production of a commercial concentrate is economically feasible are an intrinsic part of the evaluation of low grade ores. Proven reserves of copper, nickel, titanium and vanadium exist in Minnesota and extraction will require complex technology that has not been fully developed and proven.

Beneficiation technologies of these ores will help develop the treatment technology required and help maintain and expand interest in additional field exploration.

SAND, GRAVEL AND OTHER INDUSTRIAL MINERALS OPPORTUNITIES

- *The State of Minnesota should assess Minnesota's aggregate needs and resources and with the input of various stakeholders determine whether there is a need for a state aggregate policy. If such a need is indicated, a legislative initiative to develop such a policy should be pursued.*

Background: The principal industrial mineral mined and used in Minnesota is aggregate, either in the form of sand and gravel or crushed stone. This construction material is a necessary component in roads, bridges, houses, commercial and industrial buildings. It also has a myriad of other uses ranging from decorative stone to ballast for railroad tracks. Aggregate consumption

in Minnesota exceeds the national per capita consumption and is at least ten tons per person, based on estimates provided by the U.S. Geological Survey and the voluntary aggregate tax collected in twenty-three counties. Aggregate is produced in all eighty-seven counties and over 5,500 sites have been mined at one time or another. Even including reuse, aggregate is a necessary part of a sustainable economy and it is becoming scarcer and more expensive.

Historically aggregate has been a local issue. Counties, townships and municipalities generally have the responsibility for zoning and issuance of conditional use permits. Finding post mining uses for sand and gravel pits has generally been determined by local real estate trends. Most gravel pits are relatively small and are used only intermittently, so there has been no overriding reason for state monitoring of the resource in the past. The state has certain mandates which relate to the air and water quality, wetlands conservation, environmental review, and management of state-owned lands. The Metropolitan Council has responsibility for aggregate inventory in the seven county metropolitan area and the DNR has responsibility for aggregate inventory in the balance of the state. Other than that, local control of the resource is the current state policy.

Future Outlook: In the future, aggregate issues will affect larger areas. Not all regions of the state will be affected evenly, but it is clear that rural areas will be asked to supply material for urban and suburban growth. Aggregate demand will grow even though almost all of the concrete and bituminous material torn up during construction is recycled. The issues which appear most important are:

- Resource depletion through mining and urban development with the latter being the most important. At the present time local planning allows aggregate resources to be covered by commercial and residential development.
- Aggregate is vital to maintenance and construction of the state's infrastructure and aggregate consumption is tied to a high standard of living and quality of life.
- Suburban growth is occurring rapidly in all areas of the state and gravel mining is an unwelcome neighbor in many places.
- Larger volumes of material are being moved longer distances to supply the demand generated by suburban growth. For example, aggregate is now being moved from Moose Lake and Granite Falls to the Twin Cities.
- No state-wide standards exist for reclamation and not all companies support good reclamation practices.
- Technical expertise to guide mining practices is usually not available in units of government.
- Aggregate inventories are lacking in critical areas of the state, since funding for geological mapping of the resource has been scarce.
- Aggregate shortages are already being felt in some places in the state, a notable example is Highway 61 north of Duluth.

What should be done now: While aggregate issues are important, they are not at a crisis state. The issues are, however, real and their impact will be felt in more rapid increases in the costs of construction. The state has time to assess the situation and act according to the assessment. The first step should be to establish a legislative committee to assimilate the inputs

of all stakeholders, i.e. counties, cities, construction contractors, aggregate companies, the Department of Transportation, local citizens groups, environmental groups, etc. to determine the range of opinion on the need for a state-wide aggregate policy. If the need is indicated, a state-wide policy and its accompanying legislation could be developed. However, before any action is taken in this area, the Governor and the Legislature should indicate their support for an aggregate initiative.

- ***Additional research should be undertaken regarding the use of taconite tailings or other mining wastes as a replacement for sand, gravel and aggregate resources.***

Research, potentially including market studies, should be undertaken to further investigate the potential of using taconite tailings and other mine wastes -- the disposal of which results in land-use challenges and additional production costs -- as a replacement for increasingly more expensive and less accessible supplies of sand, gravel and aggregate resources.

ENVIRONMENTAL AND LAND-USE OPPORTUNITIES

- ***The State of Minnesota should continue environmental research to insure that stable, hazard-free areas remain after mining is over - at least \$100,000 per year should be allocated for such research.***

Mining is an intensive, but interim, use of the landscape. As such, it should not be done at the expense of leaving a degraded environment and landscape for future generations. Proper environmental control, along with mining and reclamation plans that anticipate post-mining land-use needs, will help sustain this important industry in Minnesota. In order to assist the mining and exploration industry in addressing these long-term environmental and land-use issues the Department of Natural Resources, with funding support from the Minnesota Legislature, has

initiated a Cooperative Environmental Research Program. One of the major goals of the program is development of low-cost reclamation techniques. Typical research projects are co-sponsored by industry, other units of government, or federal agencies and are directed at resolving problems that will help protect the environment and sustain the industry. The amount allocated to this topic for the taconite industry should be in the range of \$100,000 plus any non-state match requirement. This amount will allow full utilization of the recently completed reclamation research site in Hibbing.

- *Voluntary and legislative actions should be taken to resolve problems arising out of uncertainty of ownership of materials stockpiled during or as a result of iron ore mining.*

A group composed of representatives of state and local government, fee and stockpile owners, and mining industry representatives has been meeting to identify solutions for problems arising out of uncertainty of ownership of materials stockpiled during or as a result of iron ore mining. Tax forfeitures of real estate near many of the former mining sites on the iron ranges have created a situation in which it can be very difficult to determine current ownership of stockpiled materials located on the tax forfeited real estate. Stockpiled materials may or may not be owned separately and apart from the fee title to the surface of the real property, depending on the intent of the person who extracted the material from the ground. The uncertainty of stockpile ownership impacts local land-use management decision making.

The group identified a voluntary action to resolve some situations and reached consensus that a legislative solution should also be proposed. The voluntary action proposed is an affidavit,

that may be filed in the county's land records, showing that the private owners have relinquished any ownership of the stockpiled materials.

The proposed legislative solution would consolidate ownership of the stockpiles with ownership of the surface. This consolidation would be achieved by:

- A change in definition to clearly include stockpiles as part of the real estate for tax purposes. The result of this change would be that future tax forfeitures of real property would include forfeiture of the stockpile located on the property.
 - For privately-owned stockpiles currently located on tax forfeited land, provision for the stockpile owners to either pay a tax to maintain ownership or allow their interest to forfeit. The tax would be only on privately owned stockpiles located on tax forfeited land. If the stockpile interest forfeits, the stockpile ownership is consolidated with the surface ownership.
 - Protection of stockpile owners' rights for those owners who want to retain ownership will be ensured by improving the procedures for the owners to learn about pending forfeitures before they occur so that they can be sure that real estate taxes are paid.
- ***Maps detailing the topography of mined lands should be updated to better support reclamation and land-use decision making.***

The topographic maps and digital elevation models that portray the Mesabi iron mining district are based on aerial photography flown in 1947. At the time that they were produced, the maps represented the newest wave of post-World-War-II topographic techniques and the federal

government used its new method on the Mesabi iron range even before it worked on many of the nation's urban areas.

However, today much of the landscape in the district is different than what is shown on the maps. A valid, publicly available elevation surface no longer exists for more than 150 square miles of the Mesabi district's physical landscape altered due to changes that have occurred or continue to occur due to natural ore or taconite mining.

From a minerals standpoint, the inability to display the present-day landscape is a problem because users of topographic maps such communities, agencies, public recreationists, private enterprise and emergency responders no longer have a reliable base map to use when forming opinions about the landscape and no longer have a convenient picture upon which to communicate those opinions to others. This effects trail planning, haul road and resource development planning, land-use and community planning, surface and ground water modeling and allocation of erosion control assets.

The Governor's Task Force on Mining and Minerals recognizes the importance of an accurate portrayal of the mined landscape and recommends that the IRRRB be encouraged to convene a collaborative effort of federal, state, local and private concerns to develop a publicly available, up-to-date topographic surface for the Mesabi district.

It's estimated that a minimum of approximately \$150,000 will needed to develop a five-foot contour map of the Mesabi district. An alternative would be to completely revise the thirty-five topographic maps that portray the Mesabi district and publish them in paper and digital form on a cost-shared basis with the federal government. This alternative would require approximately \$335,000 from federal sources, matched by an equal amount from local sources.

APPENDIX

IRON ORE AND TACONITE OPPORTUNITIES

Taconite Research Program Options

TECHNOLOGICAL RESEARCH - CURRENTLY IDENTIFIED RESEARCH ISSUES

Mining

Over the last several years gains in efficiency in mining were due largely to increasing equipment size and high-grading of the ore bodies. Lately there has been more interest in rock fragmentation and its effect on downstream processes. The taconite companies have indicated that the following items deserve more attention:

- Micro-geology as an aid to ore characterization
- Development of an ore characterization method to estimate liberation
- Development of a new magnetic susceptibility meter
- Rock mechanics and mechanical properties to provide a better basis for blast design
- Elimination of oversize material
- Improved blasting techniques to eliminate the need for secondary breakage of materials
- Development of methods for in-pit stockpiling of low-grade materials and tailings
- Optimization of blasting energy to reduce downstream grinding costs

It is believed that considerable improvement can be made in mining techniques.

However, research on mining methods is usually quite expensive and time consuming.

Concentration

The heart of the taconite process lies in the plants' ability to recover almost all of the magnetic iron oxides from the silica/silicate matrix at reasonable cost. Several of the plants are currently limited by their ability to produce concentrate. Also, concentration requires large amounts of electricity to power the crushing, grinding, separation and pumping equipment. All of the plants are interested in finding ways to increase throughput and/or save energy in concentration. The topics which have been listed for consideration include:

- Development of models for ore blending
- Crude ore imaging for particle size analysis
- Implementation of new grinding methods, e.g. high pressure roll crushers, rod mill/ball mill conversion, Vertimill and Vibramatic mills for fine grinding, etc.
- Improved classification techniques, e.g. density classification, cyclo-wash and combination of technologies, etc.
- Improvements in magnetic separation, e.g. top fed wet magnetic cobbles, matrix magnetic separation, etc.
- Demagnetizing the feed for selected unit operations, e.g. flotation, hydro separation
- Magnetically assisted flotation
- Application of gravity separation, e.g. column jigs and centrifugal separation, etc.
- Particle size measurement in process streams
- Closed circuit process control for liberation

- Flotation improvements, e.g. pre-classification, demagnetization or conditioner feed, magnet assisted flotation, etc.
- Improved on-line analysis for silica (gangue materials)

The list of topics suitable for investigation is very long and the cost savings in this area could be quite impressive. Therefore, one can expect that a large proportion of the available research funding will be allocated to concentration topics.

Pelletizing

The pelletizing lines at taconite plants are large consumers of energy, because of the high temperatures required by the process. Pelletizing is an area where gains can be expected through better control of pellet oxidation, heat distribution and heat recovery. Process control and modeling could also be important as a way to improve operations. The research topics which have been mentioned by plant personnel include:

- Development of an improved moisture meter
- Improved control of balling drums and disks
- Determining the impact of water chemistry, flux materials, and flotation reagents on filtering and balling
- Elimination of slag build up in pelletizing machines
- Air and/or oxygen enrichment in kilns to reduce energy consumption and improve pellet quality
- Improvements in cooler operation to increase machine throughput
- Process optimization through modeling

- Better pellet metallurgy to improve softening and melting characteristics, increase reducibility, or reduce low temperature breakdown
- Development of cost-effective techniques for reducing particulates, NO_x and SO_x emissions
- Switching flux materials from limestone/dolomite to calcined pebble lime/dolomite

Process Control and Modeling

Process control techniques in the taconite industry are not very sophisticated because the plants were built before some of the newer control ideas were developed. Also, adequate sensors are lacking in many critical areas, e.g. filter cake moisture, fine particle size, slurry density, bin levels, slurry interface levels, etc. The materials processed by the industry defy most of the available sensor technologies, and the market is not large enough for a significant investment by manufacturers. However, the taconite companies believe that much can be gained by installation of better sensors which will allow the use of better control systems. The new control systems will likely be based on better models of the processes which can be run interactively on-line with the process control elements. Development of sensors will require a type of research skill that is not currently available at Minnesota minerals laboratories. It is an area where cooperation with companies like Honeywell, 3M or Johnson Controls may be warranted. Some of the ideas which have been promoted for this area are listed below:

- Induration furnace modeling using computational fluid dynamics
- Application of neural networks or fuzzy logic to control of taconite operations

- Creation of simulation subroutines specific to taconite operations for inclusion in modeling packages like JK SimMet
- Development of faster and more accurate analysis methods for silica
- Development of better sensors for moisture, flow, interface levels, tramp iron, densities, particle sizes, machine openings, temperatures, etc.

Commercial Demonstration

Over the last decade the state's taconite research activity has generated many successful projects and several have become standard plant operations. In general the projects which have moved forward are those with little risk or the potential for a large economic benefit. While the success rate has been good, many programs have not been moved forward into the plants because their demonstration entails either high cost or relatively high risk. In many cases the evidence needed to support the capital investment is not available. The problem becomes somewhat circular; the technologies are not tested because plant scale evidence of economic benefit is lacking and the evidence is lacking because plant scale tests have not been performed. Also, the plants have many more projects than can be undertaken with available capital, so only the absolute highest priority projects are funded. Another issue which acts to slow the adoption of newer technology relates to current work rules. The plants must resolve the differences between a commercial demonstration of a new technology and installation of conventional technology. The former case requires much more oversight by the inventors, sampling and analysis of the feed and discharge streams, equipment modification etc. It may be that commercial demonstrations will require work rule agreements on a case-by-case basis, i.e. specific projects with specific work rules.

Several of the projects listed in the table on the following page have the potential to generate significant benefit for the plants. However, these projections are based only on research or pilot plant results. Commercial demonstrations, if they are conducted, will determine the real value of the projects. Until then, these will remain as new, untried technologies with high potential and high risk. A few examples can demonstrate the problem:

- The use of high pressure roll crushing has been estimated to save about \$1.90 per ton of pellets. If that level of savings can be obtained, the machines will pay for themselves in three years. However, the plants currently only have capital sufficient for maintenance and projects which will pay off in less than one year.
- The operators of one plant believe that a ported kiln will be the key factor in a series of changes that could lead to a 10 percent increase in pelletizing capacity.
- Pebble lime can be used both as a binder and a flux material eliminating the addition of bentonite clay. This change should reduce silica level in the pellets, the energy requirement for pelletizing, and emission levels.
- Rod mill feed cobbing would remove material from the circuit that could never make grade. The result would be a significant reduction in energy requirements per ton of concentrate produced.
- In-pit magnetic cobbing of taconite ore would remove material that should not be processed, thereby saving transportation and grinding costs. More tons of raw ore would have to be mined to meet production requirements, but overall costs would be lower and the cobbled material might be used for construction materials.

- The Vertimill has been tested at a pilot scale and has been shown to perform well on screen oversize material which is typically higher in silica and more difficult to liberate.
- Improved fragmentation will eliminate or reduce the production of car-sized boulders in the mine. Rocks of that size are very difficult to handle and expensive to break into smaller, more manageable pieces.

Each of the technologies listed below could have a significant impact on the taconite industry and thus on competition and employment.

PROJECT	ESTIMATED COST	PROBABILITY OF SUCCESS	
		TECHNICAL	ECONOMIC
High Pressure Roller Press Crushing	\$10,500,000	High	High
Use of Pebble Lime for Fluxed Pellets	\$1,500,000	High	Moderate
Density Classification of Concentrate	\$500,000	High	High
Rod Mill Feed Cobbing - Dry	\$1,500,000	High	High
Rod Mill Feed Cobbing - Wet	\$1,000,000	High	High
Conversion of Rod Mills to Ball Mills	\$3,000,000	High	Moderate
In-Pit Magnetic Cobbing of Ore	\$1,000,000	High	High
Porting of Existing Pelletizing Kiln	\$2,250,000	Moderate	Moderate
Installation of Column Flotation	\$100,000 ea.	High	High
Installation of a Vertimill Grinding Unit	\$1,000,000	High	High
Use of a Kinematics Vibratory Mill	-NA-	High	Moderate
Improved Crude Ore Fragmentation	\$250,000	High/Mod.	Moderate

An appropriation of \$5,000,000 which could be used as a match against non-state funds would provide a good start to this program, and at the same time generate significant cost savings for the industry. State funds would be used to cover the additional risk of the first commercial demonstration of a new technology.

Creation of a New Taconite Flowsheet

Many of the technologies studied in the last decade might be used to create a very different overall taconite processing flowsheet. Some of those are the same items as were listed in the previous section, i.e., technologies which could be tested individually at a commercial scale in existing plants. However, many of the technologies studied offer greater benefits when taken together to form a new flowsheet. These combinations cannot be easily tested in existing plants, but can be tested at a pilot scale. The goal of this program would be to join the technologies studied in the past into combinations which should result in lower costs and higher quality. This would be done by using the output of one technological innovation as the input to another. The data generated by joint testing of these technologies will be used to estimate material and energy balances and capital and operating costs of the new flowsheet. This data could be used as the basis for the design of a new plant. It is more likely, however, that the data will be used as a model to guide the evolution and/or modernization of the existing plants. The unit operations which will be considered include at least the following:

Mining

- Improved or controlled primary fragmentation
- Digital image analysis for size distribution at the primary crusher
- In-pit scalping of oversize material and conveying of undersize material

- In-pit crushing and out-pit conveying
- In-pit magnetic cobbing of lean ore

Crushing

- High pressure roller press technology
- Improved tertiary crushing - MP1000
- Water flush crushing
- Impact crushing - Barmac
- Coarse cobbing at three or six inches
- Primary milling and concentration
- Rod mill feed magnetic cobbing
- Conversion of rod mills to ball mills
- Closure of the primary ball mill with 20 mesh screens
- Top fed wet magnetic separation

Fine Grinding

- Closure of secondary ball mills with:
 - Derrick fine screens
 - Density classification, e.g. CFS Classifier
 - Hydro cyclones with hydrowash
 - Conventional hydrocyclones
- New fine grinding mills
 - Vertimill for screen oversize, flotation froth product, etc.
 - General Kinematics Vibradrum

Concentration

- Conventional flotation
- Flotation in a magnetic field
- Column flotation
 - Conventional
 - Yang packed column
- Fine concentrate gravity separation
 - Centrifugal concentrator - Falcon
 - Yang column jig
- Matrix magnetic separation

Pelletizing

- Use of pebble lime/dolomite for binder and flux materials
- Use of organic binders
- Slurry and green ball preheating
- Use of ported kiln for quality improvement
- Elimination of slag build up
- Corrosion reduction

Instrumentation

- Improved sensors for density, flow, particle size, and chemistry
- Model based control of grinding circuits
- Model based control of pelletizing plants

A reasonably sized program for the next biennium would require about \$500,000 for pilot plant testing, sampling and analysis, and process engineering.

Environmental Cooperative Research

Reclamation research for the taconite industry will become an even more important topic when alternative future land uses are considered. At the present time two taconite mining areas, Butler Taconite and Dunka Road, have been closed. These mines will slowly fill with water affecting the hydrology of the surrounding area. Since the closed mines are not being pumped some streams and lakes will receive less pure ground water than previously and this may have an effect on downstream water quality. Everything considered, the hydrology of the Mesabi range and future state policy on uses of closed mines is an important topic that deserves consideration now. Some of the other items targeted for long-term evaluation are:

- Construction of wetlands on tailings basin soils to compensate for wetland values destroyed by mining
- In-pit or surface storage of waste rock and/or tailings
- Reduction of air emissions through process changes or enhancements
- Use of municipal solid waste (MSW) as a soil amendment for revegetation or as a fuel for pelletizing
- Silviculture on lands previously used for mining
- Planning for development of future recreational opportunities using abandoned mining land

Projects in this area typically last for many years as the impact of actions taken require longer observation. This work tends to be expensive in the early years, but costs taper off as monitoring takes over from construction. An appropriation of about \$100,000 per year, with a significant non-state match requirement, would fund all of the anticipated work for many years.

COPPER, NICKEL, GOLD AND OTHER NONFERROUS

MINERALS OPPORTUNITIES

Background

The development of a sound, viable and environmentally responsible nonferrous minerals industry can have a substantial positive impact on job opportunities and the economic health of Minnesota.

A 1992 study by the School of Business and Economics of the University of Minnesota-Duluth indicated that a single, medium-sized nonferrous mining development could create over 350 direct and indirect jobs, provide more than \$160 million over 14 years to the local economy, and contribute more than \$37 million in local and state taxes over the same period. (See Table 1 from that study, attached as Exhibit I.)

Because of the substantial benefits to be derived from fostering new mining development, the July 31, 1996, Exploration Symposium was organized by the co-conveners to examine what steps could be taken to facilitate the discovery and development of an environmentally acceptable and responsible nonferrous minerals industry in Minnesota -- in addition to the rather extensive policy initiatives that have already been undertaken.

In establishing the symposium, the co-conveners noted that during the past ten years, the State of Minnesota has made important steps to improve its climate for nonferrous minerals

exploration and mining. In 1987, the legislature passed a nonferrous mining tax law that made Minnesota competitive with other states. In 1993, rules were adopted by the state that set forth realistic mineland reclamation guidelines for nonferrous mines.

In 1988 and 1995, the Minnesota Department of Natural Resources revised the lease for the state's mineral lands (almost 50% of the area of northern Minnesota) to terms more comparable to private and other government leases, including a new provision for lease by application for many tracts.

Also, in 1987, the state began a program of investing in research to aid in the discovery and development of nonferrous minerals, to improve the economics of the taconite industry and to aid the industrial minerals industry. This program, called Mineral Diversification, is completing its first 10 years in 1997 and is scheduled for review and possible restructuring.

To date, there are no operating or planned nonferrous mines as a result of these efforts. In part, this reflects a national decline in mineral exploration. The revisions of the state mineral lease rules and the new mine permitting rules are fairly recent events which may not yet have shown their full benefit. However, although some institutional improvements are still desirable, most of the policy initiatives needed to encourage the industry have been enacted.

The question remains: are there technical areas where the state can appropriately act to foster environmentally sound exploration and development? With the Mineral Diversification Plan scheduled for review and the uncertainty of future funding, the co-conveners believed it to be timely for the mineral industry to become active participants in planning the future of this program. Since these efforts have yet to result in the discovery and imminent development of a nonferrous orebody, it seemed appropriate to look at how these funds have been spent and to

make recommendations from the point of view of the exploration community and the mining industry. The co-conveners believed that although the exploration community is the primary customer for the product of this work, its input into project evaluation has been irregular and reactive to proposed projects. The exploration community should instead help government agencies and research institutions conceptualize and develop projects that better promote the shared goal of mineral development.

Exploration Symposium

Accordingly the Symposium was convened with the following goals:

- Define the role of industry in project selection and oversight
- Describe desired outcomes and measurements of success
- Describe collateral benefits of technical programs
- Recommend a level of legislative funding

After opening remarks by Commissioner Gustafson and Ernest Lehmann, DNR Minerals Division Director Brice reviewed the history and outlook for the Mineral Diversification program and Dr. Henk Dahlberg of the DNR discussed the mineral potential of Minnesota. These presentations were followed by two panel discussions of industry and agency representatives discussing industry needs and closer industry/agency cooperation. A list of attendees is attached as Exhibit 2.

At the conclusion of the meeting, the general recommendations discussed in the first section of this report were identified. These were amplified and supplemented in later discussions between MExA, IRRRB and the Minerals Coordinating Committee.

Conclusions

The Exploration Symposium identified a number of actions that can be taken to facilitate discoveries of economic nonferrous mineral deposits in Minnesota.

Development of such deposits in an environmentally sound manner will have a substantial beneficial effect on the economy of northern Minnesota by creating jobs, economic activity and sources of tax revenue.

The state and its relevant agencies should take the steps outlined in the recommendations to increase the probability of discovery of economic mineral deposits.

Industry should cooperate fully and actively in this process.

Exhibit 1
Table 1
Summary of Economic Impacts to the County¹

New Jobs

Direct jobs	235
Indirect jobs	<u>117.5</u>
Total new jobs	352.5

Impact on the County Economy over 14 Years

Direct and indirect expenditure by the operator	\$ 65,541,476
Purchases by employees	67,642,058
Increase in the county economy	<u>29,431,564</u>
Total impact on the county	\$162,615,098

Taxes and Royalties Paid to State and County over 14 Years

Income and sales tax paid by direct and indirect new employment	\$10,011,475
New proceeds tax paid by operator ²	2,153,000
State income tax paid by operator	2,280,000
Property tax paid by operator	<u>1,012,000</u>
State and county taxes paid of 14 years	15,456,475
Royalties paid to state and county ³	<u>21,936,000</u>
Total tax and royalty income to state and county over 14 years	\$37,392,475

¹ All dollars in this report are in constant 1991 dollars.

² For those deposits within the taconite relief areas this tax is distributed the same as the taconite tax. For deposits located elsewhere the tax is paid into the general fund.

³ The model assumes that the deposit is located on county owned tax forfeit mineral lands. In this case, the royalty is distributed 20% to the state and 80% to the county. The county's share is apportioned 3/9 to the county, 2/9 to the town or city and 4/9 to the schools.

Exhibit 2

Nonferrous Minerals Exploration Symposium Attendees

Wednesday, July 31, 1996

Ironworld Discovery Center - Mineland Reclamation Growth Chamber Classroom

Dr. Rod Bleifuss Natural Resources Research Institute	Dr. Bill Brice Department of Natural Resources	Mr. Richard Buchheit Eveleth Fee Office Inc.
Mr. Val Chandler Minnesota Geological Survey	Mr. Jeffrey Clark Cominco American Inc.	Mr. Liam Clarke Blandin Foundation
Mr. Richard Cote Rio Algom Exploration Inc.	Dr. Henk Dahlberg DNR - Minerals Division	Mr. Dan England Eveleth Fee Office Inc.
Mr. Wayne Golly Minnesota Pollution Control Agency -Northeast Office	Ms. Barb Grove Gold & Manganese Resources Company	Commissioner Jim Gustafson Co-Chair IRRRB
Mr. Keith Hamre Arrowhead Regional Development Commission	Mr. Steve Hauck Natural Resources Research Institute	Mr. Dentley Haugesag Minnesota Department of Trade and Economic Development
Mr. Pete Heltunen USX Corporation	Mr. Dennis Hendricks USX Corporation	Mr. Dick Heuscham Private Individual
Mr. Louis Hill Pacific Rim Equipment	Mr. Brian Hiti IRRRB	Mr. Rodney Ikola R.J. Ikola & Assoc. Inc.
Ms. Lee Jensen UMD Center for Economic Development	Dr. Thys Johnson Natural Resources Research Institute	Mr. Ernest Lehmann, Co-Chair North Central Mineral Ventures Inc.
Mr. David Meineke Meriden Engineering Company	Mr. Eric Norberg Minnesota Power	Ms. Margie Ritter Rainy River Energy Corp.
Ms. Pamela Sarvela Minnesota Power	Mr. Tom Schmucker Department of Revenue	Dr. David Southwick Minnesota Geological Survey
Mr. Randy Studier Minnesota Technology, Inc.	Mr. Ray Svatos IRRRB Mineland Reclamation	Mr. Bill Ulland American Shield Company
Mr. Marty Vadis DNR Minerals Division		

ENVIRONMENTAL AND LAND-USE OPPORTUNITIES

The working group studying solutions to various problems associated with the uncertainty of ownership of materials stockpiled as a result of iron ore mining proposes the following:

Draft Legislative Language

A bill for an act

relating to natural resources; clarifying ownership of and authorizing the sale of stockpiled metallic minerals material; providing for the taxation of stockpiled metallic minerals material; amending Minnesota Statutes 1996, sections 93.41; 282.01, subdivision 8; and 282.04, subdivision 1; proposing coding for new law in Minnesota Statutes, chapter 273.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

Section 1. An amendment to Minnesota Statutes, section 93.41, is amended to read:

93.41 [STATE-OWNED IRON-BEARING MATERIALS.]

Subdivision 1. [USE FOR ROAD CONSTRUCTION AND OTHER PURPOSES.] In case the commissioner of natural resources shall determine that any paint rock, taconite, or other iron-bearing material belonging to the state ~~and containing not more than 45 percent dried iron by analysis~~ is needed and suitable for use in the construction or maintenance of any road, tailings basin, settling basin, dike, dam, bank fill, or other works on public or private property, and that such use would be in the best interests of the public, the commissioner may authorize the disposal of such material therefor as herein after provided.

Subd. 2. [MATERIALS SUBJECT TO STATE IRON ORE MINING LEASE.] If such material is subject to an existing state iron ore mining lease or located on property subject to an existing state iron ore mining lease, the commissioner, by written agreement with the holder of the lease, may authorize the use of the material for any purpose specified in subdivision 1 that will facilitate the mining and disposal of the iron ore therein on such terms as the commissioner may prescribe consistent with the interests of the state, or may authorize the holder of the lease to dispose of the material otherwise for any purpose specified in subdivision 1 upon payment of an amount therefor equivalent to the royalty that would be payable under the terms of the lease if the material were shipped or otherwise disposed of as iron ore, but not less than the applicable minimum rate prescribed by section 93.20.

Subd. 3. [ISSUANCE OF LEASES, ROYALTIES.] If such material, whether in the ground or in stockpile, is not subject to an existing lease, the commissioner may issue leases for the taking and removal thereof for the purposes specified in subdivision 1 in like manner as provided by section 92.50 for leases for the taking and removal of sand, gravel, and other materials specified in said section, and subject to all the provisions thereof, so far as applicable. ~~provided, that the amount payable for such material shall be at least equivalent to the minimum royalty that would be payable therefor under the provisions of section 93.20.~~

Subd. 4. [SALE OF STOCKPILED IRON BEARING MATERIAL IN PLACE.] If such material is in stockpile and is not subject to an existing lease, the commissioner may sell stockpiled iron-bearing material in place. The sale must be to a person holding an interest in the surface of the property upon which the stockpile is located or to a person holding an interest in publicly or privately owned stockpiled iron-bearing material located in the same stockpile.

**Sec. 2. [273.1655] [TAXATION AND FORFEITURE OF STOCKPILED
METALLIC MINERALS MATERIAL.]**

Subdivision 1. [DEFINITION.] “Stockpiled metallic minerals material” for the purposes of this section, means any material, such as surface overburden, rock, lean ore, or tailings which in the process of iron ore or taconite mining, or other metallic minerals mining, or in the process of beneficiation, has been removed from the ground and deposited elsewhere on the surface in the process of iron ore, taconite, or other metallic minerals mining, or in the process of beneficiation.

Subd. 2. [PURPOSE.] The purpose of this section is to clarify the ownership of stockpiled metallic minerals material in this State. Depending on the intent of the person who extracted the material from the ground, stockpiled metallic minerals material may or may not be owned separately and apart from the fee title to the surface of the real property. The legislature finds that the uncertainty of ownership of stockpiled metallic minerals material located on real property which becomes tax forfeited has created a burden on the public owner of the surface of the real property and an impediment to productive management or use of a public resource.

Subd. 3. [TAXATION AND FORFEITURE.] (a) From and after the effective date of this section, for purposes of taxation, the definition of “real property,” as contained in Minnesota Statutes, section 272.03, subdivision 1, includes stockpiled metallic minerals material. Nothing in this subdivision shall be construed to subject stockpiled metallic minerals material to the general property tax when the stockpiled metallic minerals material is exempt from the general property tax pursuant to section 298.015 or 298.25.

(b) If the surface of the real property forfeits for delinquent taxes, stockpiled metallic minerals material located on the real property forfeits with the surface of the property.

Subd. 4. [PRIOR FORFEITURE.] Stockpiled metallic minerals material located on real property that forfeited prior to the effective date of this section or forfeits due to a judgement for delinquent taxes issued prior to the effective date of this section shall be assessed and taxed as real property. The tax applies only to stockpiled metallic minerals material located on real property that remains in the ownership of the state or a political subdivision of the state. The tax shall be based on the market value of the rental of the property for storage of stockpiled metallic minerals material.

Subd. 5. [EXCEPTIONS; TAX LAWS.] (a) The tax imposed pursuant to this section shall not be imposed on the following:

(1) stockpiled metallic minerals material valued and taxed under other laws relating to the taxation of minerals, gas, coal, oil, or other similar interests;

(2) stockpiled metallic minerals material that is exempt from taxation pursuant to constitutional or related statutory provisions; or

(3) stockpiled metallic minerals material that is owned by the state.

(b) All the laws for the enforcement of taxes on real property shall apply to the tax imposed pursuant to this section on stockpiled metallic minerals material.

Subd. 6. [FEE OWNER.] For the purposes of section 276.041, the owner of stockpiled metallic minerals material is a fee owner.

Sec. 3. Minnesota Statutes 1996, section 282.01, subdivision 8, is amended to read:

Subd. 8. [MINERALS IN TAX-FORFEITED LAND AND TAX-FORFEITED STOCKPILED METALLIC MINERALS MATERIAL SUBJECT TO MINING; PROCEDURES.] In case the commissioner of natural resources shall notify the county auditor of any county in writing that the minerals in any tax-forfeited land or tax-forfeited stockpiled metallic minerals material belonging to the state and located on tax-forfeited land in such county have been designated as a mining unit as provided by law, or that such minerals or tax-forfeited stockpiled metallic minerals material are subject to a mining permit or lease issued therefor as provided by law, the surface of such tax-forfeited land shall be subject to disposal and use for mining purposes pursuant to such designation, permit, or lease, and shall be withheld from sale or lease by the county auditor until the commissioner shall notify the county auditor that such land has been removed from the list of mining units or that any mining permit or lease theretofore issued thereon is no longer in force; provided, that the surface of such tax-forfeited land may be leased by the county auditor as provided by law, with the written approval of the commissioner, subject to disposal and use for mining purposes as herein provided and to any special conditions relating thereto that the commissioner may prescribe, also subject to cancellation for mining purposes on three months written notice from the commissioner to the county auditor.

Sec. 4. Minnesota Statutes, section 282.04, subdivision 1, is amended to read:

Subdivision 1. [TIMBER SALES; LAND LEASES AND USES.] (a) The county auditor may sell timber upon any tract that may be approved by the natural resources commissioner. Such sale of timber shall be made for cash at not less than the appraised value determined by the county board to the highest bidder after not less than one week's published notice in an official paper within the county. Any timber offered at such public sale and not sold may thereafter be sold at private sale by the county auditor at not less than the appraised value thereof, until such time as the county board may withdraw such timber from sale. The appraised value of the timber and the forestry practices to be followed in the cutting of said timber shall be approved by the commissioner of natural resources.

(b) Payment of the full sale price of all timber sold on tax-forfeited lands shall be made in cash at the time of the timber sale, except in the case of oral or sealed bid auction sales, the down payment shall be no less than 15 percent of the appraised value, and the balance shall be paid prior to entry. In the case of auction sales that are partitioned and sold as a single sale with predetermined cutting blocks, the down payment shall be no less than 15 percent of the appraised price of the entire timber sale which may be held until the satisfactory completion of the sale or applied in whole or in part to the final cutting block. The value of each separate block must be paid in full before any cutting may begin in that block. With the permission of the county administrator the purchaser may enter unpaid blocks and cut necessary timber incidental to developing logging roads as may be needed to log other blocks provided that no timber may be removed from an unpaid block until separately scaled and paid for.

(c) The county board may require final settlement on the basis of a scale of cut products.

Any parcels of land from which timber is to be sold by scale of cut products shall be so designated in the published notice of sale above mentioned, in which case the notice shall contain a description of such parcels, a statement of the estimated quantity of each species of timber thereon and the appraised price of each specie of timber for 1,000 feet, per cord or per piece, as the case may be. In such cases any bids offered over and above the appraised prices shall be by percentage, the percent bid to be added to the appraised price of each of the different species of timber advertised on the land. The purchaser of timber from such parcels shall pay in cash at the time of sale at the rate bid for all of the timber shown in the notice of sale as estimated to be standing on the land, and in addition shall pay at the same rate for any additional amounts which the final scale shows to have been cut or was available for cutting on the land at the time of sale under the terms of such sale. Where the final scale of cut products shows that less timber was cut or was available for cutting under terms of such sale than was originally paid for, the excess payment shall be refunded from the forfeited tax sale fund upon the claim of the purchaser, to be audited and allowed by the county board as in case of other claims against the county. No timber, except hardwood pulpwood, may be removed from such parcels of land or other designated landings until scaled by a person or persons designated by the county board and approved by the commissioner of natural resources. Landings other than the parcel of land from which timber is cut may be designated for scaling by the county board by written agreement with the purchaser of the timber. The county board may, by written agreement with the purchaser and with a consumer designated by the purchaser when the timber is sold by the county auditor, and with the approval of the commissioner of natural resources, accept the consumer's scale of cut

products delivered at the consumer's landing. No timber shall be removed until fully paid for in cash. Small amounts of timber not exceeding \$3,000 in appraised valuation may be sold for not less than the full appraised value at private sale to individual persons without first publishing notice of sale or calling for bids, provided that in case of such sale involving a total appraised value of more than \$200 the sale shall be made subject to final settlement on the basis of a scale of cut products in the manner above provided and not more than two such sales, directly or indirectly to any individual shall be in effect at one time.

(d) As directed by the county board, the county auditor may lease tax-forfeited land to individuals, corporations or organized subdivisions of the state at public or private vendue, and at such prices and under such terms as the county board may prescribe, for use as cottage and camp sites and for agricultural purposes and for the purpose of taking and removing of hay, stumpage, sand, gravel, clay, rock, marl, and black dirt therefrom, and for garden sites and other temporary uses provided that no leases shall be for a period to exceed ten years; provided, further that any leases involving a consideration of more than \$1,500 per year, except to an organized subdivision of the state shall first be offered at public sale in the manner provided herein for sale of timber. Upon the sale of any such leased land, it shall remain subject to the lease for not to exceed one year from the beginning of the term of the lease. Any rent paid by the lessee for the portion of the term cut off by such cancellation shall be refunded from the forfeited tax sale fund upon the claim of the lessee, to be audited and allowed by the county board as in case of other claims against the county.

(e) As directed by the county board, the county auditor may lease tax-forfeited land to individuals, corporations or organized subdivisions of the state at public or private vendue, at

such prices and under such terms as the county board may prescribe, for the purpose of taking and removing for use for road construction and other purposes any tax-forfeited stockpiled iron-bearing material belonging to the state. The county auditor must determine that the material is needed and suitable for use in the construction or maintenance of a road, tailings basin, settling basin, dike, dam, bank fill, or other works on public or private property, and that such use would be in the best interests of the public. No lease shall exceed ten years. The use of any stockpile for these purposes must first be approved by the commissioner of natural resources. The request shall be deemed approved unless the requesting county is notified to the contrary by the commissioner of natural resources within six months after receipt of a request for approval for use of a stockpile. Once use of a stockpile has been approved, the county may continue to lease it for these purposes until approval is withdrawn by the commissioner of natural resources.

(f) The county auditor, with the approval of the county board is authorized to grant permits, licenses, and leases to tax-forfeited lands for the depositing of stripping, lean ores, tailings, or waste products from mines or ore milling plants, upon such conditions and for such consideration and for such period of time, not exceeding 15 years, as the county board may determine; said permits, licenses, or leases to be subject to approval by the commissioner of natural resources.

(g) Any person who removes any timber from tax-forfeited land before said timber has been scaled and fully paid for as provided in this subdivision is guilty of a misdemeanor.

(h) The county auditor may, with the approval of the county board, and without first offering at public sale, grant leases, for a term not exceeding 25 years, for the removal of peat from tax-forfeited lands upon such terms and conditions as the county board may prescribe. Any

lease for the removal of peat from tax-forfeited lands must first be reviewed and approved by the commissioner of natural resources if the lease covers 320 or more acres. No lease for the removal of peat shall be made by the county auditor pursuant to this section without first holding a public hearing on the auditor's intention to lease. One printed notice in a legal newspaper in the county at least ten days before the hearing, and posted notice in the courthouse at least 20 days before the hearing shall be given of the hearing.

