



UNIVERSITY OF MINNESOTA  
TWIN CITIES

School of Public Affairs  
Social Sciences Building  
Minneapolis, Minnesota 55455

November 8, 1972

Mr. F. Robert Edman  
Minnesota Resources Commission  
300 Capitol Square Building  
505 Cedar Street  
St. Paul, Minnesota 55101

Dear Bob:

As you requested, here is an outline of the copper-nickel study which we have been discussing. As you will note, the draft proposal which is enclosed is grossly incomplete in some very essential features. We do not feel that we can complete the proposal until (1) we have had a chance to go over the report from the Interagency Task Force that is considering this matter, and (2) we have some guidance from you as to the inclinations of MRC not only as to study design but also as to possible funding levels.

There are three parts to the enclosed draft: I. an Introduction, II. a rather long section setting forth an argument for attempting a comprehensive review of the implications of a copper-nickel industry, and III. a statement of the four basic questions that need examination together with an outline of what might be considered under each question.

Attached to the draft is a brief review of the development of the copper-nickel industry in Minnesota (put together from newspaper stories which have appeared over the past few years), a summary of the lease acreage that is involved to date (public lands only, we do not have data on private leases), and a brief comment on the interagency task force, and the copper-nickel symposium which was held in August.

As you can see from the study outline, a broad range of issues are involved in a study of this kind and it is clearly beyond the capacity of any one individual or even of a small group of individuals. What we would propose is that a grant be made to the All-University Council on Environmental Quality, that the Council assume responsibility for the study, and that it be conducted by a relatively small core staff that draws on expertise from the University at large and uses outside consultants when necessary. We would, of course, utilize graduate students to the fullest extent possible. There are many tasks that should be suitable for graduate student research and if the study is planned as a two-year effort it will be appropriate to involve such students. If it is much shorter than that it will be very difficult to involve students that are coupling this study

Mr. F. Robert Edman  
November 8, 1972  
Page 2

with their thesis research but it would, of course, still be possible to hire them as part-time staff.

I would see as output from the study a document, or set of documents, that set forth a description of the alternative means to supply copper and nickel, alternative developments suitable for Northeastern Minnesota, alternative means to exploit the copper-nickel resources, and the social, economic and environmental implications of these alternatives. It would not be my intent that the study make any recommendations but rather that it set forth, as completely as is possible, the implications of the various alternatives open to the State of Minnesota. Great pains would be taken to assure that the study report(s) be written so as to be meaningful to the non-technical reader and I would be sorely disappointed if the study participants did not make themselves available, not only at the conclusion of the study but also throughout the course of the work, to any group, whether public or private, that had interest in the topic.

I view this study not only as a comprehensive analysis of the questions poised by a potential copper-nickel industry, but also as a pilot effort at highly mission-oriented research designed to improve the information base on which major State decisions are made. It will be a very difficult task but one which I believe desperately needs attempting.

The level of funding that would be required is a difficult question. In the first place, we do not really know how many faculty members would be willing to work on the project and consider it a part of their usual University responsibilities. In the second place, we have never before attempted a study of this sort and so have no experience upon which to base our cost estimates. At present, I am thinking in terms of \$300,000 for the two year study and I don't think that I would even consider the undertaking at a funding level of less than \$200,000 for the two years.

It must be made clear that the intention is not to fund laboratory research on, for example, technical means to deal with the concentration and smelting of these ores. Nor would basic research be supported on the environmental effects of exposures to various pollutants. Rather, what is proposed is a major effort of review of existing information, studies of the systems that would be involved, and of integration and synthesis of existing information. It is possible that some basic economic analysis would be required but that probably cannot be determined in advance.

I look forward to your comments and suggestions.

Sincerely yours,



Dean E. Abrahamson  
Chairman, All-University Council  
on Environmental Quality

DEA/mat  
Enc. cc: George Robb, John Borchert

DRAFT: COPPER-NICKEL PROPOSAL

## I. Introduction

Decisions have been, and are being, made which will probably bring a base metal industry to Minnesota. Such a prospect is often called both inevitable and imminent. The decision to encourage the development of this industry has already been made by the state; but other decisions, the final decisions which will result in the start-up of the industry, are still pending. This latter group of decisions rest primarily in the hands of private promoters and revolve around questions of economic feasibility. The State Department of Economic Development, local units of government, and some regional development associations have analyzed and advertised the anticipated benefits deriving from the presence of this industry. Notably absent from the decision-making process is any evidence that the possibility of excluding such an operation from the state was ever considered or that a careful and comprehensive study of potential alternatives or consequences was ever made.

The advent of this industry can be expected to have truly profound effects on the physical and social future of Minnesota. An official of the U.S. Department of the Interior has said that Northeast Minnesota and North Wisconsin are expected to become the largest copper and nickel producing region on the North American continent by the year 2000. Even if this comment is somewhat over-enthusiastic, hindsight focused on such an obvious and related example as the taconite industry should warn us that there will be serious effects generated by an undertaking of this kind and of this magnitude. Hindsight should also pointedly recommend

the value of an anticipatory, as opposed to a reactive, approach to technological development. Governor Anderson has said, "Our environmental problems are primarily a result of our continuous failure to take into account the full consequences of our actions." But this recognition has not engendered the comprehensive review implied in the governor's statement.

At the time of the most recent lease awards, local public interest groups raised concern about the impact of this industry. By this time, however, hundreds of leases covering hundreds of thousands of acres had already been awarded, leases which leave the option to mine at the discretion of the leaseholder. The private developers involved are said to have already spent more than five million dollars on drilling on state-owned land. So, to a large extent, the first and perhaps most important decisions have been made. And, of course, beyond all of this is activity under federal leases and, perhaps more significantly and less well-known, activity on privately-owned lands.

## II. Justification for a Comprehensive Study

In our highly ordered society, large scale change comes quickly and is dominated by technology. It is to the advantage of a state to anticipate the secondary implications of change so that adverse effects to society and the natural world can be avoided or minimized. Certainly, even under the most conducive circumstances, an exhaustive predictive capacity is beyond reach. On the other hand, our society should be able to grossly, but usefully, explore the implications of a given development. The appreciation of these implications will then allow

November 8, 1972

society to better direct development to its own needs and values.

At present, assessments of proposed developments are based upon the market criteria of private innovators or on judgments peculiar to the special interests of governmental agencies and professional groups. In each case, the point of view is narrow and self-interested, and the time interval of concern reflects the time scales natural to each institution's function.

Narrow bases of assessment necessarily ignore many substantial social interactions. In the easiest cases, external costs are quantifiable and their neglect can lead to demonstrable diseconomies. More commonly, the external costs defy quantification and are an uncertain loan taken from the accounts of health, property, and pattern of life. To quote economist Herman Daly,

"Externalities have become so important relative to internalities that monetary price calculations have become, if not blind, at least one-eyed guides; deficient in depth perception and less to be trusted than common sense."

In a society which acknowledges the existence of non-economic values, economics as a discipline for decision-making is inherently limited in its applicability. Aside from its descriptive shortcomings, the economic discipline operates on society in a fragmentary way that promises alienation. Thus, in terms of individual accountings, the benefits and detriments of a development often appear in quite separate ledgers. Benefits are anticipated by the innovator and by the consumer;

third party interests are generally ignored. The man who is neither promoter nor market has little weight in the ultimate calculus of decision.

In this asymmetrical situation, the self-interest of the innovator inevitably results in a promotional bias in which the benefits are regarded with an indelicate optimism, the detriments as the nob-goblins of small minds. The widespread belief that secondary effects are generally benign and certainly reversible is a dangerous complement of the above.

The premium value placed by our society on growth and innovation manifests itself in a promotional attitude towards technology. In the absence of any effective institution of contrary bias the promoter's influence has become the dominant, and hence, the characteristic influence in our society's attitude toward development. This situation deprives society of a complex appreciation of alternatives and implications.

It is inevitable that the time scales of corporate and governmental function have become determinative in the assessment and expression of change. In effect, many relevant physical and social time scales are subordinated by the pre-eminence of political and economic power. This tends to preclude the effective evaluation of critical effects expressed in other different time frames. Thus, ultimate repair of land ravaged by surface mining, or the effects on Lake Superior of chronic dumping of taconite wastes, do not fall within the time horizons

of normal institutional considerations.

As significantly, the time periods required for implementation a development decision have become small compared with the time periods over which the effects of the effects will be manifest. Thus, the effects of occupational exposures to the silicone dusts associated with the taconite industry will be first expressed over the lifetimes of those exposed to those dusts.

When prompt recognition of effect does not occur, any unanticipated injury will necessarily shock the entire involved population or systems. This capacity to totally affect its social and physical situation compels a society to place a premium value on an attentive, appreciative foresight. Such foresight is not a functional part of our orthodox economics, our civil law, or the physiology of contemporary bureaucracies, all of which still reflect our society's affection for the freedom to make unrestrained decisions.

It is no longer in the best interest of our society to avoid a profound and equitable evaluation of the implications of its old and new technologies. It is further obvious that in a system growing more finite relative to our society's capabilities of technological effect, increasing energies of our society must be allocated to the political mechanisms which couple technology to the existing social and physical world. Technology has conferred upon our society a way of life. Much of what it has conferred is intimate to our values.

Society is now vaguely coming to realize that something must be done to assure that the gestalt of this way of life is acceptable and sustainable. If these expectations are to be realized, the isolation of pervasive decisions and the unrestrained bias toward promotion must be recognized as defects in the present relationship between society and technology.

Acknowledging these defects does not pass a moral judgment on those institutions or individuals expressive of the defect. The narrow decisional basis of institutions can be recognized as a natural consequence of our traditional belief in an unimpaired freedom of choice, coupled with the need for a simple procedure of judgment consistent with internal purpose. But appreciating this system of managerial prerogatives does not preclude a rational criticism that such a system leads to perverse externalities and contraproductive disregard for sectors or aspects of society which are complexly coupled to the technology in question by effects intrinsically disjoint from the given procedure of judgment. Thus, the special time intervals of intense interest in most present technological evaluations are an obvious derivative of the times natural to corporate and governmental function. It is evident that some effects attendant on technological change will evolve slowly or rapidly compared with the pace of institutional clocks. These effects thus appear uninteresting or subordinate to the corporate observer, although in the time frames of the affected sectors of society the perspective may differ.



Similarly, the promotional bias towards technology or development is accepted as a culturally consistent expression of an innovator's purpose. The criticism is that functioning without an appropriate conjugate it deprives society of an overall appreciation of alternatives and implications, and hence, in the largest sense, it is not beneficial without the juxtaposition of a knowledgeable voice speaking with potentially contrary bias.

### III. Discussion of Project

The proper time for a detailed analysis of the alternatives and implications of a copper-nickel industry would have been at some time before the first leases were awarded. But though that time is gone, the industry has not yet started up; there is still an opportunity to predict and prepare rather than to later observe and react. Furthermore, the analysis will be essentially the same; it is just that the question of whether or not to exclude copper-nickel mining from Minnesota is probably now moot.

A framework for this project may be constructed around four basic questions:

1. What factors would lead the state of Minnesota to consider exploiting its ore deposits?

Demand - What is the national and world demand picture for copper and nickel (past, present, projected)? What are these metals used for? What materials may be substituted

for them? Are these substitution trends?

Supply - How has past and present demand been met? How is it anticipated that future demand will be met? What is the world, national and state reserve and resource picture? What will be available and at what cost?

Local Political and Economic Factors - What would such an industry mean to the state and especially to northern Minnesota? What is the present employment situation? What implications are there for the Indian reservations and the BWCA both now and after the industry is well-established? Is there some alternative development which would meet the area's need?

2. What technological means are available for such exploration?

Detailed Characterization of the Resource - What is the extent, grade and location of the deposits? What substances are present in commercial concentrations? What substances, whether or not present in commercial concentrations, are present in any quantity which might be, or lead to, environmental problems?

Available Technologies - What options are available for mining, concentrating, smelting and refining? What is the state-of-the-art and on the horizon? What are the transportation implications?

3. What impacts are associated with the exploitation?

Impact on the Physical Environment - What is the present state of the natural environment of northern Minnesota? What impact would the various technological options have on the environment?

Social and Economic Impacts - What effect would the industry have on unemployment? Who are the unemployed of the area and are they suited for the work that would be available? How would this industry affect others, such as tourism and forestry? What economic benefits would be bestowed on local business? How would population be affected? What effects would these be related to the relocation of people, the building or expansion of towns and the need for increased public services?

4. What institutional arrangements would be needed to cope with such exploitation?

This is essentially the question the inter-agency task force was asked to deal with.

This is intended only to give a very general idea of the developments to date based on newspaper articles from the Twin Cities' papers. It must be emphasized that this is incomplete.

- 1899 deposits known to exist in Minnesota
- 1950 federal authority established for mineral leasing in Superior National Forest
- 1 1 local prospector made substantial finds near Ely--sold rights to INCO in 1951 or 1952
- 1952 INCO did first mapping in area
- 1956 INCO filed for federal leases
- 1959 State proposed leasing regulations - not adopted
- 1966 Je -federal leases granted to INCO in Superior National forest-49,000 acres  
 S. Udall: US needs copper and nickel, Minnesota needs employment  
 H. Blatnik: expectations-investment of \$70-80 million, 1500 jobs, production, to begin "in a few years".  
 -State Dept. Conservation set 7.15.66 for hearing on proposed regulations governing mining - regulations favorable to development of State owned land is expected to be speedily approved by the State Executive Council. expectations: investment of \$50-100 million over 2-5 years expenditure by INCO to date (exploration and property acquisition) \$1.2 million
- Jy -INCO expects to start construction in about 1 year  
 -mining company representatives say that proposed royalty rates too high (about 2x federal rates on leases to INCO).  
 -State Commissioner of Conservation Wayne Olson said that State recognized its responsibility to set rates that would attract industry
- Nv -lower royalty rates approved
- Dc -State received 617 bids by 17 firms on offer to lease 132,550 acres  
 -State awarded 267 mining units, to 13 firms, covering 87,635 acres.  
 prior to awarding, INCO warned that the contemplated \$80-100 million operation might be stymied unless the State rejects bids for lease lands adjacent to INCO properties--mine and mill to "be under way in a year". One high bid rescinded after INCO's objection.
- 1967 Fb -State preparing a tax plan to cover copper-nickel--INCO warns that without a tax break, its \$100 million project, with a payroll in excess of 1000, and which they had planned to start by the end of the year, would be delayed--on the other hand, if the economic climate were right, INCO may build a refinery here too.
- Ap -Ely anticipates boom - tax legislation could cause bust. Ely excited about INCO operation worth over \$100 million. INCO's office in Ely is taking job applications from unemployed miners.  
 -N.E. Minn. Development Association: Cu-Ni will bring 4,000 jobs within the next 4-5 years.
- summer -INCO drilled test shaft
- Nv -issue of mining in the BWCA raised
- 1968 Aug -second State lease sale--awarded: 130 leases covering 58,235 acres
- Dec -third State lease sale--awarded: 238 leases covering 88,082 acres
- 1969 BWCA - St. Clair squabble beginning over exploration in the BWCA  
 Isaac Walton League suit to block such exploration
- 1970 Je -Fourth State lease sale--1740 mining units on 656,523 acres (230,916 new acres) offered - 301 bids received -- awarded: 199 leases covering 92,510 acres
- 1971 Sep -Three negotiated leases awarded covering 800 acres
- Dec -Fifth State lease sale: 71 leases awarded to 5 firms on 35,647 acres
- 1972 Jan -Gov. Anderson orders study of State's ability to deal with potential effects of copper-nickel mining. Interagency task force established. Mineral Subcommittee of the Natural Resources Advisory Council expanded.

COPPER-NICKEL LEASE SUMMARY

<u>ACREAGE OFFERED</u>				
<u>GABBRO</u>	<u>GREENSTONE</u>	<u>SALE DATE</u>	<u>LEASES AWARDED</u>	<u>GROSS ACREAGE</u>
132,550		12.20.66	267	87,635
	424,000	8.15.68	130	58,235
	327,000	12.11.68	238	88,082
	230,916*	6.30.70	199	92,510
	800	9.30.71	3	800
154,131**	637,268**	12.14.71	71	35,647
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
T 286,681	1,619,984	5 sales (9.30.71 leases were negotiated)	908	362,909

\* includes only new acreage offered - total offering was 656,523  
 \*\* includes only new acreage offered -

STATUS: as of 7.1.72

LEASES IN EFFECT

	<u>NUMBER</u>	<u>GROSS ACREAGE</u>
GABBRO	39	10,581
GREENSTONE	133	65,742
	<hr/>	<hr/>
	172	75,323

At the time of the most recent lease awards, the Minnesota Public Interest Research Group (MPIRG) and Minnesota Environmental Concern Citizen's Association (MECCA) voiced concern over the potential impact of this industry. The expression of public concern prompted the formation of an interagency task force at the state level whose task it is to assess the state's capability to deal with the industry. Governor Anderson's charge to the task force reads as follows (in part): "... to research the capacity of the state to deal with the many ramifications of the entire copper-nickel mining process: exploration, mining, concentration, extraction, and product transportation." This charge is broad within the rather narrow limits defined by assuming the presence of the industry. The task force has been operating under severe time and resource constraints, but their report is expected to be presented to the Environmental Quality Council by the end of November.

At the University of Minnesota, a number of faculty members have expressed interest in the copper-nickel mining issue. Some are involved in developing mining technology, others in defining the resource or the environment, and still others have broad interest in the overall impact the industry will have. During the past school year a few meetings of interested people were held. The All-University Council on Environmental Quality was responsible for coordinating these meetings and has also monitored the activities of the inter-agency task force. Further, the All-U CEQ has supported research which involves water sampling and vegetation mapping in the area where it is thought the first mining will occur.

As indicated above, various citizens groups have expressed interest

in this issue and have people monitoring activities. A suit by the Izaak Walton League to prevent prospecting in the BWCA is still pending in Federal District Court.

On August 26, 1972, most of the above mentioned parties and representatives of the industry and local governmental units met for a full day of talks and discussion. It is anticipated that the proceedings of this "Copper-Nickel Symposium" will be published by the end of this year.

Steve.

SYMPOSIUM ON COPPER-NICKEL MINING

August 26, 1972  
University of Minnesota  
Northstar Ballroom, Student Center  
St. Paul Campus

PROGRAM

A.M.

8:00 Registration, 2nd Floor, Student Center.

8:30 INTRODUCTION AND WELCOMING ADDRESS:

Robert L. Herbst, Commissioner,  
Minnesota Department of Natural Resources

Charles E. Carson, Deputy Executive Director  
Minnesota Pollution Control Agency

SESSION A: POTENTIAL COPPER-NICKEL MINING IN MINNESOTA:

Presiding: Eugene Gero, Director,  
Division of Water, Soils and Minerals,  
Minnesota Department of Natural Resources

9:00 "Geology and Potential for Copper-Nickel Mining  
Deposits in Northern Minnesota"  
Dr. Paul K. Sims, Director,  
Minnesota Geological Survey

9:20 "Environmental Effects of Exploration for Copper-  
Nickel in Minnesota"  
James Mancuso, Manager of Exploration,  
Western District,  
Humble Oil and Refining Co.

9:40 "Technology for Pollution-Free Processing of Minnesota  
Copper-Nickel Ore"  
J. B. Rosenbaum, Research Director,  
Metallurgical Research Center,  
U. S. Bureau of Mines,  
Salt Lake City

Western District map  
Minerals Dept.  
Humble Oil & Refining Co.  
Denver, Colo. 80202



A. M.

10:00 Coffee Break.

SESSION B: EFFECT OF COPPER-NICKEL MINING ON THE NATURAL ENVIRONMENT:

Presiding: Dr. A. Maria Ahmed, Research Director,  
Minnesota Public Interest Research Group

10:20 "Water Pollution - A Red Entry in the Mining Ledger"  
Nels Conroy, Regional Biologist,  
Ontario Water Resources Commission,  
The Ministry of Environment,  
Sault Ste. Marie, Canada

10:40 "Effects of Smelting Operations on the Natural Environment"  
Dr. Arnold Silvennoinen, Professor,  
Department of Geology,  
University of Montana,  
Missoula, Montana

11:00 "Shebandowan, Canada: A Case Study of a Mining Development"  
Dr. L. S. Renzoni, Vice President,  
International Nickel Co., Inc.

PANEL DISCUSSION: Presiding: Eugene Gere

11:30 - All Morning Speakers.

12:15

P. M.

LUNCHEON

12:15 - Introduction: Don Way, Executive Secretary,  
Governor's Environmental Quality Council,  
State of Minnesota

1:30

Key Note Speaker: Professor Gunther Schramm,  
School of Natural Resources, University of  
Michigan, Ann Arbor, Michigan

on

"Economic and Social Issues of Alternative Resource Allocations"

SESSION C: SOCIAL AND TECHNOLOGICAL IMPACT OF COPPER-NICKEL MINING:

Presiding: Joseph Sizer, Director,  
Environmental Planning,  
Minnesota State Planning Agency

P. M.

- 1:40 "A Look at Mining the Duluth-Gabbro Complex and the Application of Underground Metal and Non-Metallic Mine Health and Safety Standards"  
Richard Vik, Acting Technical Assistant,  
U. S. Bureau of Mines, Duluth, Minnesota
- 2:00 "A Case for Picking your Smelter in Public"  
Dr. Dean Abrahamson, Associate Professor,  
School of Public Affairs, and Director, Center  
for the Study of the Physical Environment,  
University of Minnesota
- 2:20 "The Natural Ecosystem Values of the Boundary  
Waters Canoe Area in the Gabbro-Contact Region"  
Dr. Hiron Heinselman, Plant Ecologist,  
North Central Forest Experiment Station,  
U. S. Forest Service, St. Paul, Minnesota
- 2:40 "What Copper-Nickel Mining Means to the Local  
Community"  
John Grahek, M.D., Mayor, Ely, Minnesota

3:00 Coffee Break.

SESSION D: LEGISLATIVE AND REGULATORY ASPECTS OF COPPER-NICKEL MINING:

- Presiding: Will Hartfeldt, Legal Chairman,  
Sierra Club, Northstar Chapter
- 3:20 "Environmental and Regulatory Aspects of Copper-Nickel Mining"  
Grant J. Merritt, Executive Director,  
Minnesota Pollution Control Agency
- 3:40 "Survey of Minnesota Laws and Regulations  
Relating to Copper-Nickel Mining"  
Philip Olfelt, Assistant Attorney General,  
State of Minnesota
- 4:00 "Regulations: The Public is Thought to Possess  
No Expertise About the Public Interest"  
John Herman, Staff Attorney,  
Minnesota Public Interest Research Group

PANEL DISCUSSION:

Presiding: Will Hartfeldt

4:30 - All Afternoon Speakers.

5:30

-XXX-

SPONSORING ORGANIZATIONS:

State Agencies:

Department of Natural Resources

State Planning Agency

Minnesota Pollution Control Agency

Citizen Organizations:

Minnesota Public Interest Research Group (MPIRG)

Minnesota Committee for Environmental Information  
(MCEI)

Sierra Club, Northstar Chapter

Minnesota Environmental Control Citizen's  
Association (MECCA)

Izaak Walton League