MINELAND RECLAMATION

MINNESOTA'S PROGRAM

TACONITE, IRON ORE AND NONFERROUS MINERAL MINING

Minnesota Department of Natural Resources

Division of Minerals

April 1988

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1. OVERVIEW

OVERVIEW

The Minerals Division of the Minnesota Department of Natural Resources (DNR) provides for the management of 10 million acres of state-owned trust fund and tax-forfeited mineral rights, 3 million acres of state and county peatlands, and construction materials on the 3 million acres of additional state surface lands. State mineral ownership includes 18 % of the Mesabi Iron Range, about half of the 6 million acres of peatlands, and a large portion of the copper-nickel, titanium and manganese resources. Besides the known resources, the geology of Minnesota (see Geologic Map of Minnesota on page 1-3) also shows significant potential for gold, platinum, other precious metals, copper, zinc, other base metals, industrial minerals such as clay, silica sand, dimension stone, olivine, and construction commodities such as sand and gravel, and crushed stone (see Recent Exploration Acitivity by Commodity Map on page 1-4).

The Division's overall goals are to: 1) sustain the existing mining industry; 2) encourage mineral development; 3) provide equitable rental and royalty income for the trust funds and local taxing districts; 4) provide jobs for Minnesotans in mineral-related industries; and 5) control possible adverse environmental impacts from mining.

The Division's responsibilities include: serving as the permitting and enforcement authority for reclamation of mining operations; making land available for exploration and mining through mineral and peat leasing; implementation of the exploratory boring law; conducting environmental studies to ensure that environmental impacts of mining can be controlled; identifying state and county mineral ownership; providing environmental review for proposed leases and mining operations; and encouraging mineral development through support of cooperative industrial research, value-added processing and market development.

Since 1889 the state has been leasing its lands for exploration and mining of iron ore and taconite. Since 1966 the state has been leasing its lands for exploration and mining of copper, nickel, and associated minerals. Ten copper-nickel lease sales have been held resulting in the awarding of 2,127 leases covering 892,751 acres to 54 lessees.

As of November 1987, the following state mineral leases were in effect:

Lease Type	Lessees	Leases	Acres	Counties
Copper-Nickel/ Associated Minerals	26	598	242,988	Aitkin, Beltrami, Carlton, Itasca, Koochiching, Lake, Lake of the Woods, Roseau, St. Louis
Iron Ore/Taconite	10	119	9,795	Itasca, St. Louis
Peat	4	5	6,559	Carlton, St. Louis

Six taconite mines shipped ore during 1986 from state leased lands. The total production from state leased lands was 20,306,000 crude ore tons, and the $1,565,655 in royalty payments and the $28,400 in rental payments were distributed to the permanent school fund, the university fund, the general revenue fund and local taxing districts.

Rentals and royalties from state peat leases yielded $42,000 in 1986. This revenue was distributed to the permanent school fund, state forest fund, general revenue fund and local taxing districts.

The 1987 legislature set the policy for the state to provide for the diversification of the state's mineral economy through long-term support of mineral exploration, evaluation, development, production, and commercialization. The legislature also established a Minerals Coordinating Committee to plan for diversified mineral development. Members of the committee include directors of the DNR Minerals Division (chair), Minnesota Geological Survey (affiliated with the University of Minnesota, Minneapolis), Mineral Resources Research Center (affiliated with the University of Minnesota, Minneapolis), and Natural Resources Research Institute (affiliated with the University of Minnesota, Duluth).

Minerals Diversification is thus a coordinated effort between the Department of Natural Resources and the University to provide a foundation for expanding into new mineral areas statewide. Minnesota has tremendous potential for mineral development in all areas of the state. Traditionally, iron ore, taconite, and industrial minerals have dominated the mining economy of Minnesota. Recent declines in taconite demand have generated a need to diversify the mineral base and create a new value-added iron economy. The demand for industrial minerals has increased. The bedrock underlying much of Minnesota holds high potential for the occurrence of deposits of gold, silver, platinum, chrome, nickel, lead and zinc.

GEOLOGIC MAP OF MINNESOTA

THE GEOLOGIC TERRANES OF MINNESOTA

by Matt Walton

QUATERNARY (From the present to about 2 million years ago).

Much of the surface of Minnesota is covered by glacial drift, lake bed deposits, peat and alluvium. These deposits are not shown on the map of bedrock geology.

TERTIARY (From 2 million to 64 million years ago).

No Tertiary rocks have been identified in Minnesota.

MESOZOIC (From 64 million to 225 million years ago).

A long period of weathering and erosion in Minnesota was interrupted by brief invasions of the sea with deposition of a few hundred feet of sediments, mostly silt and clay, first during the Jurassic (J) in the far northeastern corner, then in the Cretaceous (K), spreading from the west over much of the State. Remnants and thin patches of these deposits remain and are a source of ceramic clay.

PALEOZOIC (From 225 million to 570 million years ago).

During the Cambrian (C), Ordovician (O) and Devonian (D) periods, southeastern and northwestern Minnesota subsided beneath the sea for long intervals of time. Fossiliferous marine sediments up to 500 meters (1,640 feet) thick accumulated. The resulting sandstones, dolomitic limestones and shales are sources of lime rock, silica, brick-clay and stone, and contain large groundwater resources.

PRECAMBRIAN (From 570 million to more than 3,800 million years ago).

There are five Precambrian terranes in Minnesota. From youngest to oldest these terranes are:

Terrane V (The Keweenawan rocks, formed about 1,100 million years ago). A major rift zone split the continent from Lake Superior down through eastern Minnesota and into southern Kansas. Basaltic magma welled up along the rift to form lava flows and intrusive bodies, including volcanic rocks (v), troctolitic gabbro and variants (t), anorthositic gabbro and variants (a), granitic differentiates (f), and basaltic dikes, sills and stocks (h). Clastic sediments (ss) were deposited in and near the rift zone as subsidence followed igneous activity. The gabbroic rocks contain copper-nickel and titanium-vanadium resources. From central Minnesota south the rift zone is concealed beneath Paleozoic rocks.

Terrane IV (The Sioux Quartzite, deposited between 1,400 million and 1,700 million years ago). Quartzitic sedimentary rocks (q), derived from regions to the north, occupy a large, shallow basin extending from south-central Minnesota westward and southward into adjoining states. Pipestone (catlinite) occurs in this terrane.

Terrane III (The Animikie Group and related older sedimentary rocks, deposited 1,800 million to 2,000 million years ago). Some volcanic rocks, abundant clastic rocks and rocks of chemical and biological origin accumulated in a subsiding basin that extended from east-central Minnesota north and east into Canada and upper Michigan. The resulting sedimentary rocks (qu, s) include quartzite, siltstone, iron-formation (if) and much graywacke and interbedded carbonaceous and pyritic black shale. About 1,700 million years ago the southeastern margin of the basin was folded and metamorphosed during an episode known as the Penokean orogeny. About 1,100 million years ago, the basin was spilt by the Keweenawan rift. The iron-formation is the host rock of the Cuyuna, Mesabi and Gunflint Iron Ranges.

Terrane II ("Superior Province," formed between 2,600 million and 2,700 million years ago). Within one relatively short period of intense geological activity in northern Minnesota and extending far into Canada, submarine and subaerial volcanic rocks and interbedded sedimentary rocks were deposited and then invaded by large intrusions of granitic rocks (Algoman granites) along northeast-trending belts. The resulting terrane of greenstone metavolcanics (mv), metasediments (ms), granitic rocks (gr) and migmatites (mi) ends abruptly in central Minnesota at a line or narrow zone along which three earthquakes have occurred in historic time. Much older rocks occur south of this line. The Soudan Iron Formation and other banded iron-formations occur in Terrane II in Minnesota. Major precious and base metal sulfide deposits occur in similar rocks in Canada.

Terrane I (Old gneisses formed 3,200 million to 3,800 million years ago and later igneous rocks formed about 2,600 million and 1,700 million years ago). Some of the oldest radiometric ages yet measured in terrestrial rocks come from strongly metamorphosed gneisses of unknown origin exposed in the Minnesota River Valley. These gneisses were invaded by "Algoman" granitic intrusions about 2,600 million years ago, and later, especially in east-central Minnesota, by "Penokean" granitic rocks about 1,700 million years ago. The famous granite building stones of Minnesota come from this terrane.

Miscellaneous Map
Series, Map M-24

GEOLOGIC MAP OF MINNESOTA

BEDROCK GEOLOGY

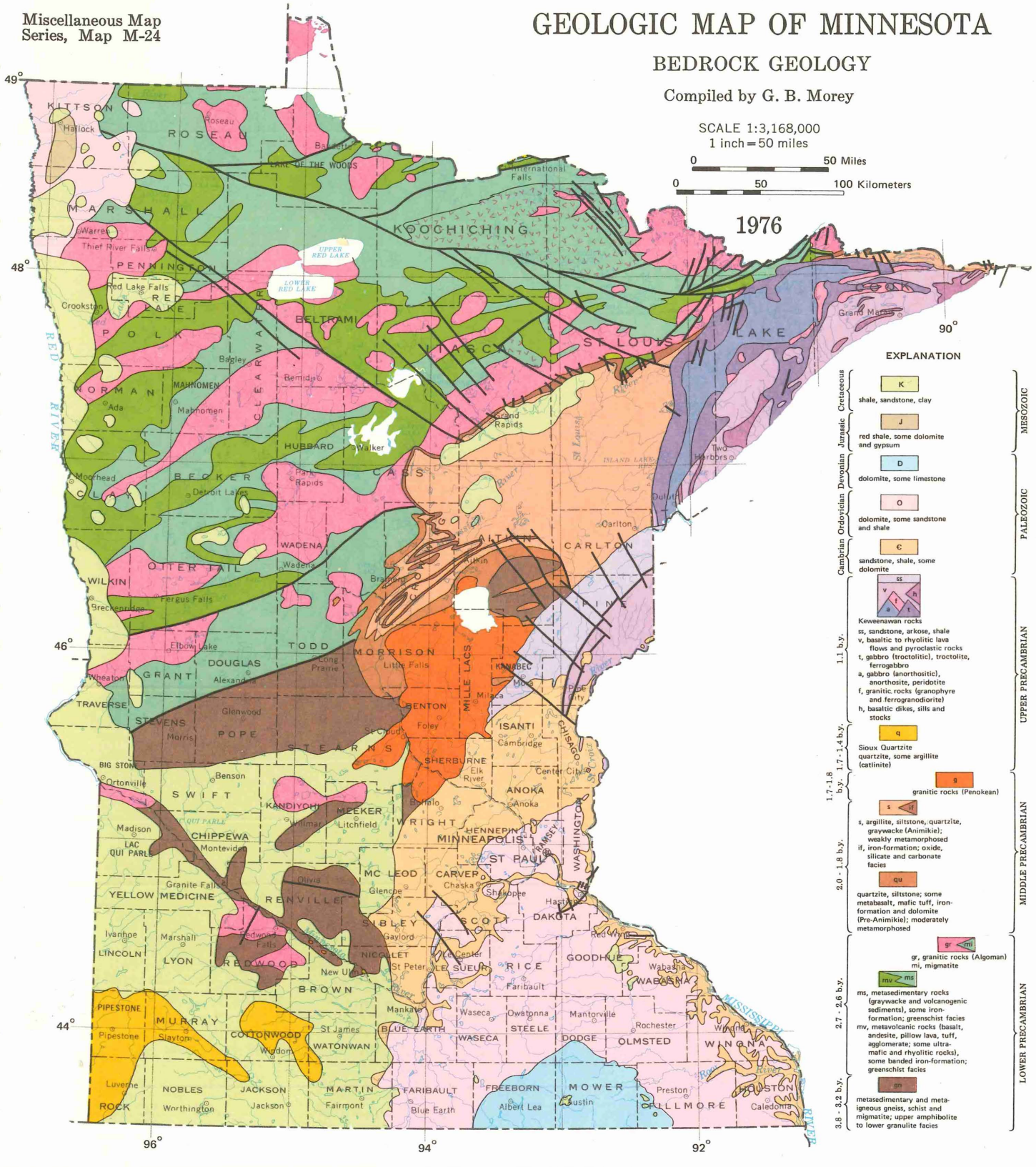
Compiled by G. B. Morey

SCALE 1:3,168,000
1 inch = 50 miles

0 50 Miles

0 50 100 Kilometers

1976



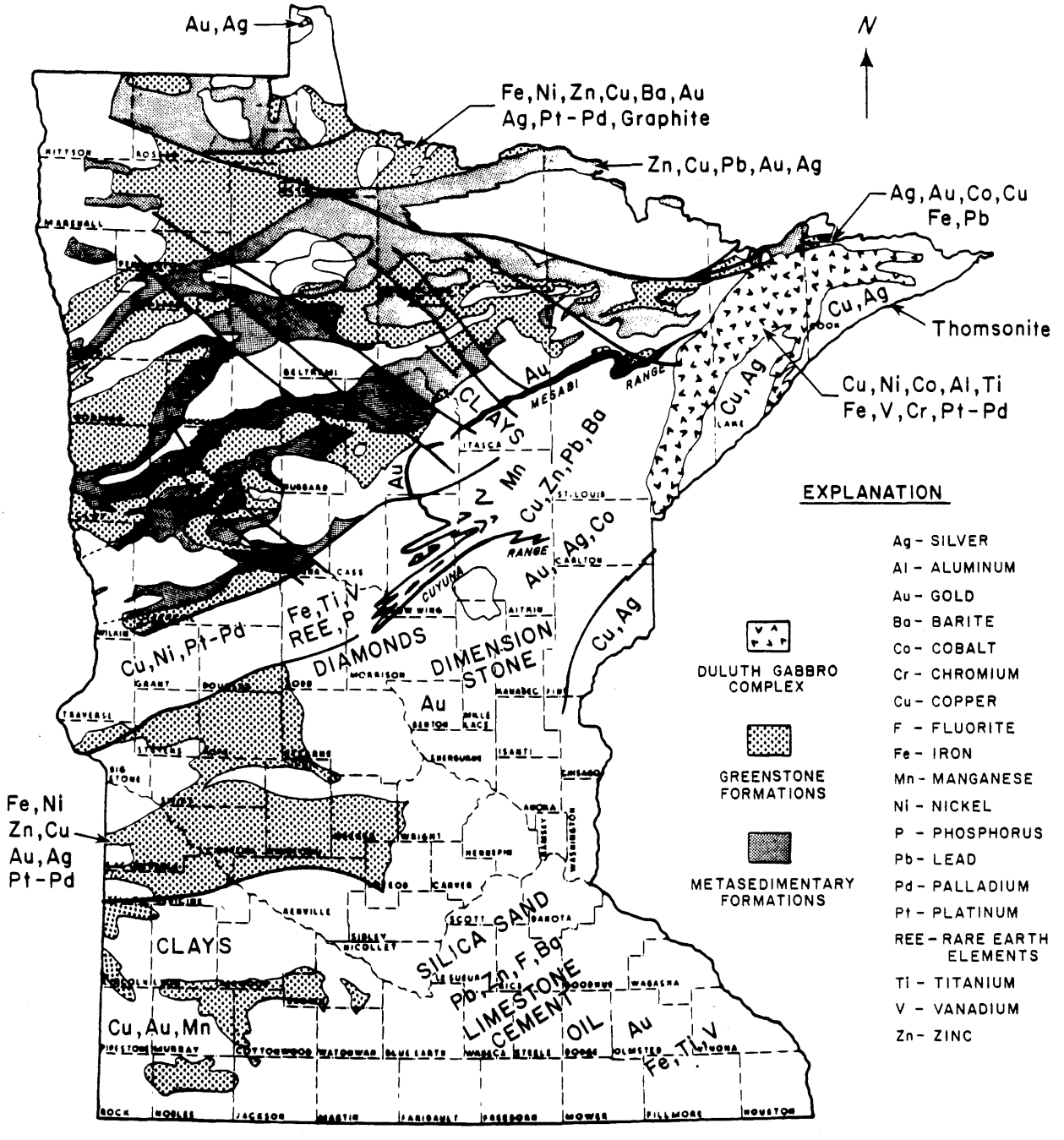
EXPLANATION

Cretaceous	K — shale, sandstone, clay	MESOZOIC
Jurassic	J — red shale, some dolomite and gypsum	
Devonian	D — dolomite, some limestone	PALEOZOIC
Ordovician	O — dolomite, some sandstone and shale	
Cambrian	€ — sandstone, shale, some dolomite	
1.1 b.y.	ss, v, t, h, a, f — Keweenawan rocks: ss, sandstone, arkose, shale; v, basaltic to rhyolitic lava flows and pyroclastic rocks; t, gabbro (troctolitic), troctolite, ferrogabbro; a, gabbro (anorthositic), anorthosite, peridotite; f, granitic rocks (granophyre and ferrogranodiorite); h, basaltic dikes, sills and stocks	UPPER PRECAMBRIAN
1.7 - 1.4 b.y.	q — Sioux Quartzite: quartzite, some argillite (catlinite)	
1.7 - 1.8 b.y.	g — granitic rocks (Penokean)	
2.0 - 1.8 b.y.	s, if — s, argillite, siltstone, quartzite, graywacke (Animikie); weakly metamorphosed if, iron-formation; oxide, silicate and carbonate facies	MIDDLE PRECAMBRIAN
	qu — quartzite, siltstone; some metabasalt, mafic tuff, iron-formation and dolomite (Pre-Animikie); moderately metamorphosed	
2.7 - 2.6 b.y.	gr, mi — gr, granitic rocks (Algoman) mi, migmatite	LOWER PRECAMBRIAN
	mv, ms — ms, metasedimentary rocks (graywacke and volcanogenic sediments), some iron-formation; greenschist facies mv, metavolcanic rocks (basalt, andesite, pillow lava, tuff, agglomerate; some ultramafic and rhyolitic rocks), some banded iron-formation; greenschist facies	
3.8 - 3.2 b.y.	gn — metasedimentary and metaigneous gneiss, schist and migmatite; upper amphibolite to lower granulite facies	

MINNESOTA GEOLOGICAL SURVEY - THE UNIVERSITY OF MINNESOTA

Matt Walton, Director

RECENT EXPLORATION ACTIVITY BY COMMODITY



2. MINELAND RECLAMATION PROGRAM

MINELAND RECLAMATION PROGRAM

The Minerals Division within the Department of Natural Resources has authority for establishing and enforcing rules relating to the reclamation of minelands. Within the Minerals Division, the Mineland Reclamation Unit carries out this charge. The following materials describe the program administered by the Mineland Reclamation Unit. The objectives of the program are to:

(1) reduce the environmental impacts of mining;
(2) ensure reclamation during and following completion of mining;
(3) conduct studies to determine effective reclamation techniques;
(4) provide for enforcement of the law; and
(5) ensure public review and input to the permitting process.

PROGRAM AUTHORITY

The Department's authority for regulating the mining and reclamation of metallic minerals is found in the Mineland Reclamation Act, Minnesota Statutes 93.44 -93.51. The Mineland Reclamation Act was enacted in 1969. It directed the Department to promulgate rules for mining. The following outline highlights the content of Minnesota Statutes 93.44-93.51. A copy of the entire law is contained in Appendix A.

93.44 DECLARATION OF POLICY

- "...it is hereby declared to be the policy of this state to control possible adverse environmental effects of mining, to preserve the natural resources, and to encourage the planning of future land utilization, while at the same time promoting the orderly development of mining, the encouragement of good mining practices, and the recognition and identification of the beneficial aspects of mining."

93.47 DUTIES AND AUTHORITIES OF COMMISSIONER

- The Commissioner may adopt rules pertaining to:

  a. mine waste disposal;
  b. all lands disturbed by mining; and
  c. permitting procedures.

- The rules shall substantially comply with or exceed any minimum mineland reclamation requirements which may be established pursuant to a federal mineland reclamation act.
- The Commissioner shall develop procedures that will identify areas or types of areas which, if mined, cannot be reclaimed with existing techniques to satisfy the rules promulgated. The Commissioner will not issue permits to mine such areas until a determination is made that technology is available to satisfy the rules.
- The Commissioner shall administer and enforce the rules and in doing so may:

  a. conduct investigations and inspections;
  b. enter upon any parts of the mining area; and
  c. conduct research or enter into contracts.

93.48 VARIANCES

- The Commissioner may modify or permit variance from established rules if it is determined that such modification or variance is consistent with the general welfare.

93.481 PERMIT TO MINE

- No person shall engage in mining for metallic minerals without first obtaining a permit to mine.
- Public hearings shall be held upon request.
- Permit is issued for life of mine.
- Permit may be modified, suspended and/or revoked.
- Permit may be assigned by Commissioner.

93.49 BOND OF OPERATOR

- The Commissioner shall require a bond or other security from an operator who:

  a. fails to take reclamation measures set forth in the permit;
  b. fails to comply with rules;
  c. fails to perform agreed upon research; or
  d. cannot demonstrate financial ability to comply with the rules.

93.51 PENALTIES FOR VIOLATION

- Failure to comply with statutes and rules promulgated thereunder can result in $1,000/day civil penalty.
- Convicted violations are a gross misdemeanor.
- The Attorney General may institute civil action in district court to preclude violation of rules.

IRON ORE AND TACONITE MINELAND RECLAMATION RULES

As directed by the Mineland Reclamation Act, the Department promulgated rules for the reclamation of iron ore and taconite mining in August 1980. The following outline highlights major topic areas addressed by the rules. Appendix B contains a copy of the rules.

GENERAL PROVISIONS

DEFINITIONS

- Terms defined

PURPOSE/POLICY

- To promote the orderly development of mining.

SCOPE

- Permit for life of mine.
- Permit required before operations begin.
- Permit addresses all areas disturbed by mining activities.

RECLAMATION STANDARDS

SITING REQUIREMENTS

- General criteria for site selection: emphasizes the selection of sites that reduce air, water, and related impacts.
- Exclusion areas for mining: identifies sites where no mining can take place (e.g. Boundary Waters Canoe Area Wilderness) unless national emergency exists.
- Avoidance areas for mining: emphasis on avoiding natural resource areas (e.g. shorelands) if other prudent and feasible sites are available.

BUFFERS/BARRIERS

- Emphasis on use of natural terrain and setbacks to buffer mining activities from surrounding land uses.

IN-MINE DISPOSAL

- Emphasis on using abandoned pits or underground workings for waste material disposal to extent practicable

STOCKPILE DESIGN/CONSTRUCTION STANDARDS

- General criteria: emphasis on the management of runoff water quality and quantity through design considerations and separation of materials by grade and type.
- Standards for rock, lean ore, and coarse tailings stockpiles: maximum 40-foot lift height and minimum 30-foot bench width.
- Standards for overburden stockpiles and overburden portions of pit walls:

  stockpiles: 40 foot lift height maximum
  pit walls: 60 foot lift height maximum
  bench width: 30 foot minimum
  lift slope: 2.5:1 maximum

- Design, construction, and operation of a tailings basin: emphasis on management of basin to control water quality and air quality impacts through design, construction, and operation by professional engineers experienced in tailings facilities.
- Design, construction, and operation of ponds used for water quality treatment: emphasis on design by professional engineer and constructed and operated to prevent release of toxic materials.

VEGETATION REQUIREMENT

- Vegetation must be established on all areas disturbed by mining.
- 90% ground cover required in three growing seasons.
- 90% cover required in five seasons on southwest facing slopes.
- 10 years to establish vegetative community with characteristics of approved reference site.

BLASTING

- 130 decibel air overpressure off property standard.
- 1 inch/sec peak particle velocity off property standard.
- Require monitoring and blaster's log.

AIR POLLUTION

- Emphasis on controlling dust with water, chemical binders, vegetation or enclosure.

SUBSIDENCE

- Mining techniques shall be employed which prevent subsidence.
- In the event of actual or likely subsidence, ground control surveys shall be conducted.
- Subsided areas shall be contoured or filled to remove hazards and protect public health.

DEACTIVATION/RELEASE

- Plans and schedule for all deactivation activities required 2 years prior to deactivation of any mine facility.
- Mining area must be stable, non-polluting, free of hazards, and as maintenance-free as possible.
- Provision for continued maintenance must be approved.

PERMIT APPLICATIONS

- Documentation of financial ability to perform reclamation.
- Organizational structure of applicant.
- Evidence of insurance and authority to transact business in Minnesota.
- Environmental setting maps depicting bedrock geology, wetlands, water courses, lakes, watershed boundaries, groundwater conditions, forest types, soil type, surface and mineral ownership, sub-surface uses.
- Environmental setting analysis.
- Mining and reclamation maps.
- Mining and reclamation plans.

MINE OPERATING PLAN

- One to five-year plan providing information on mining and reclamation activities scheduled for the next one to five years.

ANNUAL REPORT

- Summary of mining and reclamation that took place during past year.

PLAN FOR DEACTIVATION

- Plan for the final deactivation and reclamation of any mining facility must be submitted 2 years prior to beginning of deactivation.

REQUEST FOR RELEASE

- Emphasis on identification of ownership of remaining structures and facilities and description of provisions for continued maintenance.

PROCEDURES AND ADMINSTRATIVE STANDARDS

- Application and publication of mining intent
- Determination of need for a public hearing
- Granting of permit
- Application for a variance from rule requirement
- Amendments to permit
- Cancellation of permit
- Revocation or modification of permit
- Suspension of permit
- Assignment of permit
- Hearing procedures

- Publicaion procedure
- Performance bonds
- Civil penalties
- Inspection of mining area

DRAFT
NONFERROUS METALLIC MINERAL MINELAND RECLAMATION RULES

In response to the great amount of interest shown by exploration companies in the state's base and precious metals, the Department is drafting rules for the mining and reclamation of metallic minerals other than iron ore and taconite under the authority of Minnesota Statutes 93.44-93.51 The following outline highlights major topic areas addressed by the draft rules.

GENERAL PROVISIONS

DEFINITIONS

- Terms defined

PURPOSE/POLICY

- Because of the unique character of each mining operation and the extreme diversity of their possible types and sizes, specific permit requirements shall be negotiated within the framework set forth by these rules. Permit terms and conditions negotiated shall fulfill goals described in these rules.

SCOPE

- Permit for life of mine.
- Permit required before mining operations begin.
- Permit addresses all areas disturbed by mining activities.
- Permit may be required for taking of bulk sample.

RECLAMATION STANDARDS

SITING REQUIREMENTS

- General criteria for site selection: emphasizes the selection of sites that reduce air, water, and related impacts.
- Exclusion areas for mining: identifies sites where no mining can take place (e.g. Boundary Waters Canoe Area Wilderness) unless national emergency exists.
- Avoidance areas for mining: emphasis on avoiding natural resource areas (e.g. shorelands) if other prudent and feasible sites are available.

IN-MINE DISPOSAL

- Emphasis on using abandoned pits or underground mines for waste disposal to the extent practicable.

BUFFERS

- Emphasis on use of natural terrain and setbacks to buffer mining activities from surrounding land uses.

DESIGN & CONSTRUCTION OF STOCKPILES

- General criteria:

  a. incorporate existing stockpiles to extent practicable

  b. incorporate stable design

  c. incorporate sediment control measures as necessary

  d. dominant flow paths after revegetation shall be stabilized using accepted practices

- Surface overburden stockpiles

  a. 40 foot lift height (maximum)

  b. 30 foot bench width (minimum)

  c. 2.5:1 slope between benches (maximum)

  d. benches sloped toward interior of stockpile

- Lean ore, waste rock, and leached ore stockpiles

  a. Developer will conduct a chemical/physical characterization of waste materials in order to project pH levels, metal, and reagent concentrations during and after operations.

  b. Stockpiles shall be designed, constructed, and reclaimed based on the above informationand site specific conditions.

  c. At a minimum, these stockpiles shall incorporate the following:
  40 foot lift heights (maximum)
  30 foot bench width (minimum)
  angle of repose between benches (maximum)

- Surface overburden portions of pitwalls

  a. 20 foot setback from ledge (minimum)

  b. 40-60 foot lift heights

  c. 2.5:1 sloped area between lifts (maximum)

  d. benches sloped into overburden

DESIGN, CONSTRUCTION AND OPERATION OF TAILINGS BASINS

- Developer will conduct a chemical/physical characterization of tailings to project pH levels, metals and reagent concentrations during and after operations.
- Tailings shall be placed in basins designed, constructed, and reclaimed based upon the above information and site specific conditions.
- At a minimum, these basins shall include the following:

  a. design, operation, and maintenance by registered professional engineer

  b. mitigate dust generation

  c. reduce seepage of water to maximum extent practicable

d. include a system to monitor seepage

DESIGN, CONSTRUCTION AND OPERATION OF HEAP AND DUMP LEACHING FACILITES

- Designed by registered professional engineer.
- Construction, operation and maintenance periodically reviewed by registered professional engineer.
- Heaps, dumps and all associated ponds and ditches shall be constructed and operated upon three-zone base foundation.
- Leaching system shall accommodate all runoff resulting from PMP.
- Heaps and dumps shall be neutralized before removal from system.

VEGETATION

- Vegetation shall be established on all areas disturbed by mining.
- 90% ground cover required in three growing seasons.
- 90% cover required in five seasons on southwest facing slopes.
- 10 years to establish vegetative community with characteristics of approved reference site.

AIR POLLUTION

- Emphasis on controlling dust with water, chemical binders, vegetation or enclosure.

BLASTING

- 130 decibel air overpressure off property standard.
- 1 inch/sec peak particle velocity off property standard.
- Require monitoring and blaster's log.

SUBSIDENCE

- Mining techniques shall be employed which prevent subsidence.
- In event of actual or likely subsidence, ground control surveys shall be conducted.
- Subsided areas shall be contoured or filled to remove hazards and protect public health.

DEACTIVATION AND RELEASE

- Plan and schedule for all deactivation activities required 2 years prior to deactivation of any mine facility.
- Mining area must be stable, non-polluting, free of hazards, and as maintenance-free as possible.
- Provisions for long-term continued maintenance must be approved.

PERMIT REQUIREMENTS

PERMIT APPLICATIONS

- Pre-application conference and site visit required.

- Documentation of financial ability to perform reclamation.
- Organizational structure of applicant.
- Evidence of insurance and authority to transact business in Minnesota.
- Environmental setting maps depicting bedrock geology, wetlands, water courses, lakes, watershed boundaries, groundwater conditions, past mining facilities, soil type, surface and mineral ownership, subsurface uses.
- Environmental setting analysis.
- Mining and reclamation maps depicting the status of mining the ore body, watershed modifications and construction,and reclamation of all mining facilities.
- Mining and reclamation plans including:

  a. distinction among ore and waste

  b. description of the ore beneficiating process (including chemical compostion, amount used, degradation and transport characteristics) for each reagent

  c. quantity of mine waste to be disposed

  d. location/dimension of disposal facility

  e. analysis of mine waste characteristics

  f. laboratory experiments describing dissolved solids release from mine waste and

  g. for mine wastes that are determined to adversely impact natural resources the following:

  1. particle size distribution
  2. chemical/mineralogical composition and surface area as a function of particle size
  3. dissolution experiments to describe effect of rock composition on dissolved solids release

ANNUAL REPORT

- Summary of mining and reclamation activities completed during the past year and planned for the upcoming year.
- Report due between March 1 and March 31 annually.

PLAN FOR DEACTIVATION

- A plan for the final deactivation and reclamation of any mining facility must be submitted 2 years prior to beginning of deactivation.

REQUEST FOR RELEASE

- Emphasis on identification of ownership of remaining structures and facilities and description of provisions for continued maintenance.

PROCEDURES AND ADMINISTRATIVE STANDARDS

- Application and publication of mining intent
- Determination of need for a public hearing
- Granting of permit
- Application for variance from rule requirement

- Amendments to permit
- Cancellation of permit
- Revocation or modification of permit
- Suspension of permit
- Assignment of permit
- Hearing procedures
- Publication procedures
- Performance bonds
- Civil penalties
- Inspection of mining area

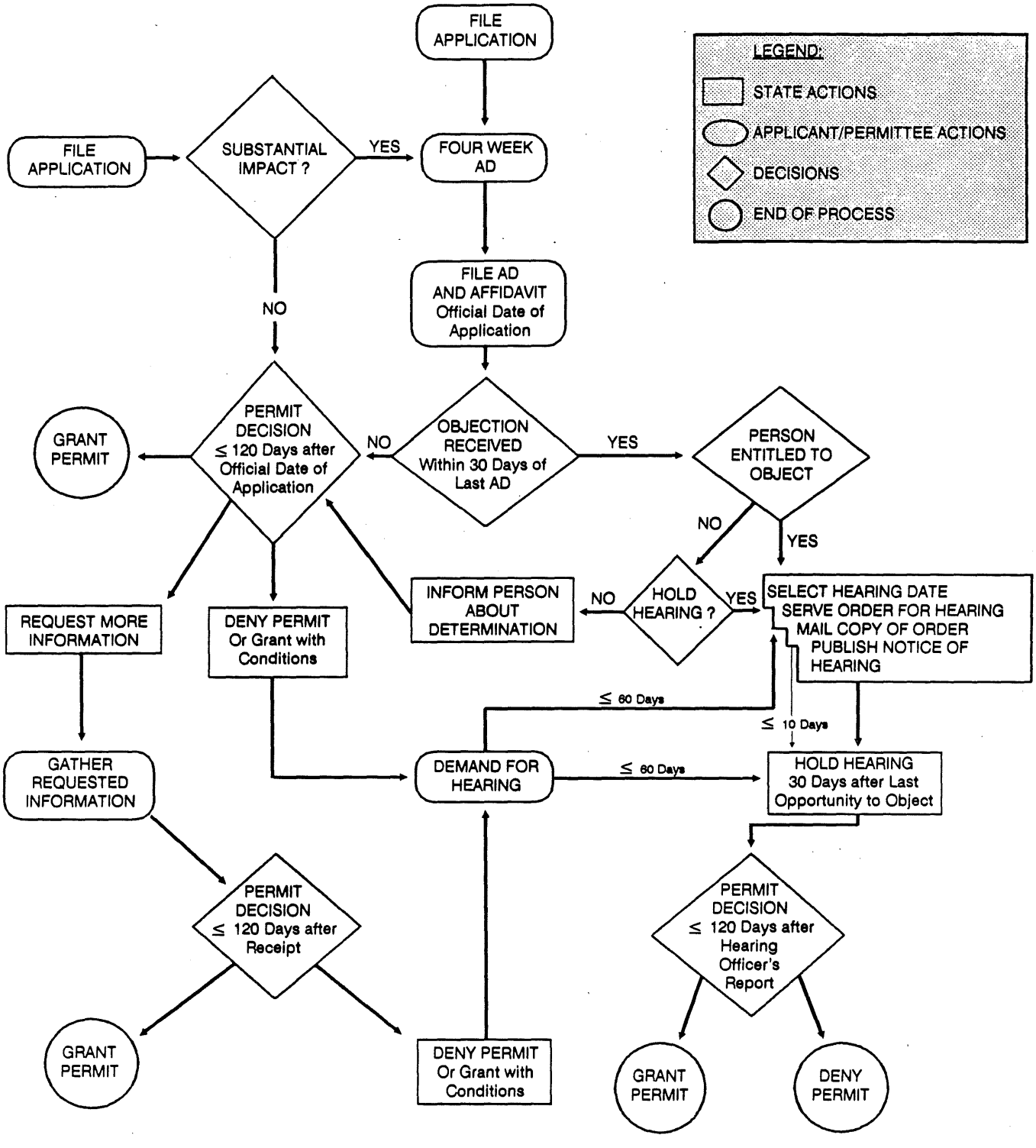
PERMITTING

Currently 19 metallic mining operations (8 taconite and 11 iron ore) are required to comply with the state's Mineland Reclamation Act. After permits are granted, the mining company must submit periodic operating plans and annual reports describing mining and reclamation activities and schedules. Before the closure of any mining facility, a deactivation plan must be submitted and approved by the Department. This plan must address:

(1) final reclamation activities;
(2) provide for maintenance as necessary; and
(3) provide for cleanup of structures, foundations, equipment, etc.

Permit to Mine application requirements are highlighted in the preceding rules summaries and discussed in detail in Appendix B. The adminstrative procedures for obtaining a permit to mine are outlined on page 2-14 and contain provisions for a public hearing. None of the Permits to Mine issued to date have necessitated a public hearing. The table on page 2-15 summarizes acres by facility type that are under permit, while the photographs on page 2-16 demonstrate the progressive reclamation of a tailings basin.

ADMINISTRATIVE PROCEDURES FOR OBTAINING A PERMIT TO MINE



Total acres of land under taconite mining permits and acres reclaimed by operators from August 1980 to December 1987.

OPERATOR	TAILINGS BASINS[1] acres	STOCKPILES acres	TOTAL[2] acres	Date Permit Issued
BUTLER TACONITE				
land under permit	8160	4566	12726	1/27/88
land reclaimed	947	61	1008	
EVELETH MINES				
land under permit	5240	2300	7540	8/16/83
land reclaimed	44	74	118	
HIBBING TACONITE				
land under permit	5400	2367	7767	6/6/86
land reclaimed	---	70	70	
INLAND STEEL				
land under permit	7440	1200	8640	11/15/82
land reclaimed	---	25	25	
NATIONAL STEEL				
land under permit	13120	5340	18461	3/14/86
land reclaimed	277	0	277	
RESERVE MINING CO.				
land under permit	3080	1590	4670	3/1/85
land reclaimed	45	6	51	
USX				
land under permit	12160	3484	15644	6/21/83
land reclaimed	31	70	101	
LTV (ERIE)				
land under permit	2440	4625	7065	pending
land reclaimed	---	208	208	
TOTALS				
land under permit	57040	25472	82513	
land reclaimed	1344	514	1858	

[1] "land reclaimed" numbers do not include temporary tailing vegetation
[2] total does not include overburden portion of pitwalls

PROGRESSIVE RECLAMATION ON TAILINGS BASINS

Unvegetated tailing

Newly vegetated tailing

Vegetation succession
10 years after planting

COMPLIANCE

The Department conducts an annual inspection of each mining property during the fall of the year. Prior to the inspection, each property is observed from the air to obtain an overall perspective of the current status of each operation. This information (along with the previous inspection reports) is used to direct the on-site inspection.

Following the inspection, an annual inspection report is prepared, individual operators are notified of inadequacies in reclamation activities, and all information is entered into computer files (see pages 2-18 through 2-25) to maintain an on-going record of the mining facility.

ANNUAL INSPECTION REPORTS

legend

COLUMN HEADING	DESCRIPTION
COMPANY	name of mining company
ID #	site identification no.
SITE TYPE	type of mining waste, e.g.; tailing, waste rock, surface overburden
SITE NAME	name commonly used to refer to a site
LEGAL TRS	legal description, township, range, section, forties
REFERENCE	where to find a map and site information
RECLM YEAR	year in which reclamation was initiated
3 OR 5 YR VEGETATION COMPLIANCE	a) year in which vegetation cover standard should be met, and b) whether it was complied with in that year or hence (indicated by yes or no)
ACRES	area of reclamation site in acres
LIFT	refers to stockpile construction; one of a series of raises spanning 30-40 vertical ft and consisting of a slope and bench area
ASPECT	direction in which a slope face is oriented
MAINTENANCE ACTIVITY	work such as erosion control, repair, reseeding or refertilizing, done after initial reclamation
10 YEAR VEGETATION COMPLIANCE	a) year in which the 10 year reference area standard applies, and b) indicates whether site has met this standard or not
RELEASE YEAR	year in which company is released from responsibility for a reclamation site
COMMENT	any brief, pertinent information noted about that site
RECORD UPDATE	date on which record was last updated

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RECLAMATION SITES

COMPANY	ID #	SITE TYPE	SITE NAME	RECLM YEAR	3 OR 5 YR VEGETATION COMPLIANCE	ACRES	LIFT	ASPECT	MAINTENANCE ACTIVITY
BUTLER	100001	OB	STAGE 1	82	85 YES	6.0			
	100002	OB	STKPL 80	86	89	38.0	1,2,3	N,NE	
	100003	OB	STKPL 83	86	89	17.0	1	TOP	
	100004	OB DTCH	OBRIEN	86	89,91	35.0		ALL	
	100005	OB DTCH	OXHIDE	86	89,91	2.0		NE,SW	
	100006	OB DTCH	PICKEREL	86	89,91	4.0		ALL	
	100007	TAIL	STAGE 1	82	85 NO	128.0			
	100008	TAIL	STAGE 1	83	86 NO	87.4			
	100009	TAIL	STAGE 1	84	87	153.0			
	100010	TAIL	STAGE 1	85	88	114.0			
	100011	TAIL	STAGE 2	85	88	58.0			
	100012	TAIL	STAGE 1	86	89	61.0			
	100013	TAIL	STAGE 1	86	89	78.5			
	100014	TAIL	ROADS	86	89	36.5			

COMPANY	ID #	SITE TYPE	REFERENCE MAP/RPT	10 YEAR VEGETATION COMPLIANCE	RELEASE YEAR	COMMENT	RECORD UPDATE
BUTLER	100001	OB	82 ANN RPT/MAP	92			04-17-87
	100002	OB	86 AN RPT/DEAC MP	96		SEE CLOSURE PLAN & 86 RPT.	04-17-87
	100003	OB	86 AN RPT/DEAC MP	96		LEVELED AND BURIED SCRAP	04-17-86
	100004	OB DTCH	86 AN RPT/DEAC MP	96		DRAINS OBRIEN AREA	04-17-87
	100005	OB DTCH	86 AN RPT/DEAC MP	96		1 DITCH, PIT WATER OUTLET	04-17-87
	100006	OB DTCH	86 AN RPT/DEAC MP	96		6 DTCHS CUT, E SIDE OF BASIN	04-17-87
	100007	TAIL	82 ANN RPT/MAP	92		COARSE AREAS NEED FERT.	04-17-87
	100008	TAIL	83 ANN RPT/MAP	93		COARSE AREAS NEED FERT.	04-17-87
	100009	TAIL	84 ANN RPT/MAP	94			04-17-87
	100010	TAIL	85 ANN RPT/MAP	95		SPRING AND FALL SDGS	04-17-87
	100011	TAIL	85 ANN RPT/MAP	95		SPRING AND FALL SDGS/SEE MAP	04-17-87
	100012	TAIL	86 AN RPT/DEAC MP	96		SPRING SDG, FINES. DEACT.	04-17-87
	100013	TAIL	86 AN RPT/DEAC MP	96		WINTER SDG, FINES. DEACT.	04-17-87
	100014	TAIL	86 AN RPT/DEAC MP	96		SPRING SDG. ROADS. DEACT.	04-17-87

RECLAMATION SITES

COMPANY	ID #	SITE TYPE	SITE NAME	RECLM YEAR	3 OR 5 YR VEGETATION COMPLIANCE	ACRES	LIFT	ASPECT	MAINTENANCE ACTIVITY
EVELETH	130001	OB	AL-FAYAL	81	84N, 85Y	16.0	1,2	N	85 SLOPE EROSION REPAIR,OK
	130002	OB	NOISE BERM	81	84 YES	15.0	1	E	
	130003	OB	SPRUCE	81	84 YES	8.0	1,2	E	
	130004	OB	AL-FAYAL	82	85 YES	5.0	1,2	N	ROCK DWNSLP DTCHNG
	130005	OB	SPRUCE	82	85 YES	2.0	2	E	
	130006	OB	AL-FAYAL	83	86 YES	13.0	1,2,3	N	
	130007	OB	SPRUCE	83	86 YES	2.0	2,3	E,NE	
	130008	OB	TRIANGLE	83	86 YES	2.5			
	130009	OB	AL-FAYAL	84	87	1.0	4	N	
	130010	OB	SPRUCE	84	89	7.0	1,2,3	W	WASHOUT REPAIR 6/85
	130011	ROCK	SECT.7	83	86 YES	2.0	1		
	130012	ROCK	SECTION 7	84	87	1.0	1,3		
	130013	TAIL	SW DIKE	81	86 NO	16.0	1	W,SW	RESEED&FERT IN 83,86
	130014	TAIL	W DIKE	81	86 NO	12.0	1	W	RESEED & FERT 82,83,86
	130015	TAIL	W DIKE	83	88	3.0	2	W	RESEED & FERT 84,86
	130016	TAIL	W DIKE	84	89	13.0	2	W	RESEED & FERT IN 86

COMPANY	ID #	SITE TYPE	REFERENCE MAP/RPT	10 YEAR VEGETATION COMPLIANCE	RELEASE YEAR	COMMENT	RECORD UPDATE
EVELETH	130001	OB	83 ANN RPT/MAP	91		ENKAMAT TEST ON SLOPE 1	04-17-87
	130002	OB	83 ANN RPT/MAP	91		GOOD COVER. NO EROSION	04-17-87
	130003	OB	83 ANN RPT/MAP	91		GOOD COVER. NO EROSION	04-17-87
	130004	OB	83 ANN RPT/MAP	92		JP CONT. PLOTS	04-17-87
	130005	OB	83 ANN RPT MAP	92		GOOD COVER, NO EROSION	04-17-87
	130006	OB	83 ANN RPT/MAP	93			04-17-87
	130007	OB	83 ANN RPT/MAP	93		FALL SEEDING	04-17-87
	130008	OB	83 ANN RPT/MAP	93			04-17-87
	130009	OB	84 ANN RPT/MAP	94		FALL SEEDING	04-17-87
	130010	OB	84 ANN RPT/MAP	94		FALL SEEDING	04-17-87
	130011	ROCK	83 ANN RPT/MAP	93		JP SEED AND CONT. PLOTS	04-17-87
	130012	ROCK	84 ANN RPT/MAP	94		FALL SDG. 2 SEPARATE BENCHES	04-17-87
	130013	TAIL	83 ANN RPT/MAP	91		JP AND WILLOW PLOTS, 75% CVR	04-17-87
	130014	TAIL	83 ANN RPT/MAP	91		75-80% COVER, JP CONT PLOTS	04-17-87
	130015	TAIL	83 ANN RPT/MAP	93			04-17-87
	130016	TAIL	84 ANN RPT/MAP	94		3 a. FALL SDG. AMENDMNT PLOTS	04-17-87

RECLAMATION SITES

COMPANY	ID #	SITE TYPE	SITE NAME	RECLM YEAR	3 OR 5 YR VEGETATION COMPLIANCE	ACRES	LIFT	ASPECT	MAINTENANCE ACTIVITY
CLEV-CLIF	110001	TAIL	CANISTEO A	81	84 YES	50.0			
	110002	TAIL	CANISTEO B	82	85 NO	50.0			BARE AREA SEEDED FALL 85

COMPANY	ID #	SITE TYPE	REFERENCE MAP/RPT	10 YEAR VEGETATION COMPLIANCE	RELEASE YEAR	COMMENT	RECORD UPDATE
CLEV-CLIF	110001	TAIL		VAR		TEN YR STD HAS VARIANCE	04-17-87
	110002	TAIL		VAR		TEN YR STD HAS VARIANCE	04-17-87

RECLAMATION SITES

COMPANY	ID #	SITE TYPE	SITE NAME	RECLM YEAR	3 OR 5 YR VEGETATION COMPLIANCE	ACRES	LIFT	ASPECT	MAINTENANCE ACTIVITY
HIB TAC	140001	OB	STKPL 5002	81	86 YES	8.0	1	W,NW	
	140002	OB	STKPL 5003	81	86 YES	7.0	1	W	
	140004	OB	STKPL 5002	83	88	6.0	2	NW	
	140005	OB	STKPL 5002	84	89	22.0	2,3	NW,SE	
	140006	OB	STKPL 5004	84	87	5.0	1	N	RESEED & FERT IN 86
	140007	OB	STKPL 5002	85	88	4.5	1	E & S	S ASPECT IMPROVED IN 86
	140008	OB	STKPL 5004	85	88	2.5	1	N	
	140010	OB	STKPL 5002	86	89	15.0	2,3	N,NW,E	
	140003	PIT	N PIT WALL	81	86 YES	4.0	1	S	
	140009	PIT	N PIT WALL	85	90	2.0	1	S	RESEED & FERT IN 86

COMPANY	ID #	SITE TYPE	REFERENCE MAP/RPT	10 YEAR VEGETATION COMPLIANCE	RELEASE YEAR	COMMENT	RECORD UPDATE
HIB TAC	140001	OB	81-85 SUMMARY MP	91			04-17-87
	140002	OB	81-85 SUMMARY MP	91			04-17-87
	140004	OB	81-85 SUMMARY MP	93			04-17-87
	140005	OB	81-85 SUMMARY MP	94		TREES PLNTD IN 86 (5M)	04-17-87
	140006	OB	81-85 SUMMARY MP	94			04-17-87
	140007	OB	81-85 SUMMARY MP	95			04-17-87
	140008	OB	81-85 SUMMARY MP	95			04-17-87
	140010	OB	86 ANN RPT/MP	96			04-17-87
	140003	PIT	81-85 SUMMARY MP	91			04-17-87
	140009	PIT	81-85 SUMMARY MP	95			04-17-87

RECLAMATION SITES

COMPANY	ID #	SITE TYPE	SITE NAME	RECLM YEAR	3 OR 5 YR VEGETATION COMPLIANCE	ACRES	LIFT	ASPECT	MAINTENANCE ACTIVITY
INLAND	150001	OB	HAUL RDS	86	91	4.0	1	S	GULLEY REPAIR,86
	150002	OB	MAIN STKPL	86	91	1.5	2	S	
	150003	OB/CT	MAIN STKPL	83	88	8.0	1	W,NW	
	150004	OB/CT	MAIN STKPL	84	89	5.0	1,2	W	GULLEY RIP-RAPPED IN 86
	150005	OB/RK	MAIN STKPL	85	88	4.0	1	NW	
	150006	OB/RK	STKPL RAMP	85	88	2.0	1	NW	
	150007	PIT	MINORCA	82	85Y, 87	3.0	1	E,W	W SIDE RESEED/FERT IN 86
	150008	PIT	MINORCA	82	87	6.0	1	S	RESEED/FERT IN 83 & 84
	150009	PIT	MINORCA	86	91	2.5	1	W	

COMPANY	ID #	SITE TYPE	REFERENCE MAP/RPT	10 YEAR VEGETATION COMPLIANCE	RELEASE YEAR	COMMENT	RECORD UPDATE
INLAND	150001	OB	86 ANN RPT/MAP	96		DUMP & TAILING HAUL RDS	04-17-87
	150002	OB	86 ANN RPT/MAP	96			04-17-87
	150003	OB/CT	83 ANN RPT/MAP	93		RILLS. WLDLF TREE/SHRUB PLOTS	04-17-87
	150004	OB/CT	84 ANN RPT/MAP	94			04-17-87
	150005	OB/RK	85 ANN RPT/MAP	95			04-17-87
	150006	OB/RK	85 ANN RPT/MAP	95			04-17-87
	150007	PIT	84 ANN RPT/MAP	92		SOME EROSION. JP CONT PLOTS	02-06-87
	150008	PIT	83 ANN RPT/MAP	92		SOME EROSION. BL LOCUST PLOTS	04-17-87
	150009	PIT	86 ANN RPT/MAP	96			04-17-87

RECLAMATION SITES

COMPANY	ID #	SITE TYPE	SITE NAME	RECLM YEAR	3 OR 5 YR VEGETATION COMPLIANCE	ACRES	LIFT	ASPECT	MAINTENANCE ACTIVITY
LTV	160001	PLNT	MCKINLEY	84	87	20.0			
	160002	TAIL	MCKINLEY	82	85 YES	60.0			FERTILIZED WITH N IN 84

COMPANY	ID #	SITE TYPE	REFERENCE MAP/RPT	10 YEAR VEGETATION COMPLIANCE	RELEASE YEAR	COMMENT	RECORD UPDATE
LTV	160001	PLNT	83 & 85 ANN RPTS	94		DEAC EXT REQUEST THRU 88	04-17-87
	160002	TAIL	83 & 85 ANN RPTS	VAR		NAT ORE TAIL, NAT VEG	04-17-87

RECLAMATION SITES

COMPANY	ID #	SITE TYPE	SITE NAME	RECLM YEAR	3 OR 5 YR VEGETATION COMPLIANCE	ACRES	LIFT	ASPECT	MAINTENANCE ACTIVITY
NSPC	170001	TAIL	MAIN BASIN	82	85 NO	35.0			
	170002	TAIL	MAIN BASIN	84	87	60.0			
	170003	TAIL	MAIN BASIN	85	88	60.0			
	170004	TAIL	MAIN BASIN	86	89	46.0			

COMPANY	ID #	SITE TYPE	REFERENCE MAP/RPT	10 YEAR VEGETATION COMPLIANCE	RELEASE YEAR	COMMENT	RECORD UPDATE
NSPC	170001	TAIL	86 SUMMARY MAP	92		COARSE TAILS, NEED FERT	04-17-87
	170002	TAIL	86 SUMMARY MAP	94		COARSE TAILS	04-17-87
	170003	TAIL	86 SUMMARY MAP	95			04-17-87
	170004	TAIL	86 ANN RPT/MAP	96		COARSE TAILS	04-17-87

RECLAMATION SITES

COMPANY	ID #	SITE TYPE	SITE NAME	RECLM YEAR	3 OR 5 YR VEGETATION COMPLIANCE	ACRES	LIFT	ASPECT	MAINTENANCE ACTIVITY
RESERVE	180001	OB	MAIN ROAD	84	89	4.0	1	SE	
	180002	ROCK	N78W	84	87	2.0	TOP		

COMPANY	ID #	SITE TYPE	REFERENCE MAP/RPT	10 YEAR VEGETATION COMPLIANCE	RELEASE YEAR	COMMENT	RECORD UPDATE
RESERVE	180001	OB	84 ANN RPT/MAP	94		NEW ENTRANCE ROAD	04-17-87
	180002	ROCK	84 & 85 PROG RPTS	94		RESEARCH:OB VS "AS IS"	04-17-87

RECLAMATION SITES

COMPANY	ID #	SITE TYPE	SITE NAME	RECLM YEAR	3 OR 5 YR VEGETATION COMPLIANCE	ACRES	LIFT	ASPECT	MAINTENANCE ACTIVITY
RHUDE-FRY	190001	OB	OUTLT DTCH	83	86Y, 88	1.0		N,S	
	190002	PIT	RANA	85	88	3.0	1	N,NE	
	190003	PLANT	ARCTURUS	84	87	20.0			
	190004	TAIL	ARCTURUS	82	85 NO	70.0			GULLEY REPAIR 4/87

COMPANY	ID #	SITE TYPE	REFERENCE MAP/RPT	10 YEAR VEGETATION COMPLIANCE	RELEASE YEAR	COMMENT	RECORD UPDATE
RHUDE-FRY	190001	OB	83 PICS	93			04-17-87
	190002	PIT	83 ANN RPT/MAP	95		FALL SDG.	04-17-87
	190003	PLANT	84 ANN RPT	94		STILL NEEDS CLEANUP & RECL	04-17-87
	190004	TAIL	84 RPT. PICS	VAR		ACTIVE GULLYING,BARE AREAS	04-17-87

RECLAMATION SITES

COMPANY	ID #	SITE TYPE	SITE NAME	RECLM YEAR	3 OR 5 YR VEGETATION COMPLIANCE	ACRES	LIFT	ASPECT	MAINTENANCE ACTIVITY
USX	200001	OB	AA	81	86	16.0	1,2	S,SW	
	200002	OB	CC STKPL	81	84 YES	4.0	1	N	
	200003	OB	OBSERV DMP	81	84Y, 86Y	10.0	2	ALL	
	200004	OB	Q STKPL	81	84Y, 86Y	6.0	4,5	W,S,E	
	200005	OB	T STKPL	81	84Y, 86Y	5.0	2	S,E	
	200006	OB	N STKPL	82	87	14.0	2	S	
	200007	PLANT	S,ARCTURUS	83	86 NO	15.0			
	200008	ROCK	6019 DUMP	81	84 YES	4.0	1		
	200009	ROCK	6019 ROCK	82	85 YES	7.0	2,3		
	200010	ROCK	6039 DUMP	83	86 YES	2.0	1,2		
	200011	ROCK	6039 DUMP	84	87	2.0	3		
	200012	TAIL	CT EAST	86	89	31.0	1	E,NE	

COMPANY	ID #	SITE TYPE	REFERENCE MAP/RPT	10 YEAR VEGETATION COMPLIANCE	RELEASE YEAR	COMMENT	RECORD UPDATE
USX	200001	OB	82&84 SUMMARY MPS	91		SOME EROSION,SELF-STABILIZED	04-17-87
	200002	OB	82&84 SUMMARY MPS	91		STABLE, NO EROSION	04-17-87
	200003	OB	82&84 SUMMARY MPS	91		STABLE, NO EROSION	04-17-87
	200004	OB	82&84 SUMMARY MPS	91		PAST EROSION,HIGH STKPL-RUNOFF	04-17-87
	200005	OB	82&84 SUMMARY MPS	91		STABLE,NO APPARENT EROSION	02-17-87
	200006	OB	82&84 SUMMARY MPS	92		NO APPARENT EROSION	04-17-87
	200007	PLANT	?	93		NEEDS SEEDING AND CLEANUP	04-17-87
	200008	ROCK	82&84 SUMMARY MPS	91		JP SEEDED ALONG BENCH	04-17-87
	200009	ROCK	82&84 SUMMARY MPS	92		JP CONT AND SEED ON LIFT 3	04-17-87
	200010	ROCK	82&84 SUMMARY MPS	93		JP SEED ON 2ND LIFT	04-17-87
	200011	ROCK	84 ANN RPT/MAP	94		FALL SDG.	04-17-87
	200012	TAIL	86 ANN RPT/MAP	96		COARSE TAIL DIKE	04-17-87

MINELAND CLEANUP

The Department, in cooperation with the State Executive Council, has implemented a Mineland Cleanup Program. The objective of this program is to remove mine buildings, mining installations, and old equipment. This program has resulted in the elimination of many hazardous conditions from the landscape that did not come under the jurisdiction of the Mineland Reclamation Act.

COOPERATIVE RESEARCH

The effective implementation of a reclamation program requires a good understanding of cost effective reclamation techniques. This understanding must be shared by the regulators and the industry. Thus the Department conducts cooperative reclamation studies with all operators. These studies to date have been concentrated in two areas:

(1) species selection and fertilization trials for revegetation of tailings basins and rock stockpiles; and
(2) mitigation of impacts from the mining of nonferrous metallic minerals found in sulfide ores.

Summaries of this research follow on pages 2-28 to 2-39.

Summary of Research on Taconite Mining Impact and Mitigation

Introduction

In August 1980, Minnesota's "Rules Relating to Mineland Reclamation" (Chapter 6130) were enacted. These rules require taconite and iron mine operators to reclaim their post 1980 mining disturbances. Disturbances prior to 1980 do not require reclamation according to these rules. The goals of the vegetation standard are to establish vegetation to control erosion, prevent and control leaching of toxic substances, screen mining areas and provide wildlife habitat or other uses such as pasture or timberland. Vegetation requirements include establishing vegetation on most exposed mined lands, including surface overburden stockpiles, benches and tops of rock and lean ore stockpiles, tailings basins, surface overburden portions of pitwalls, and buffers and barriers. The establishment of vegetation is to be initiated during the first normal planting period when an area is no longer scheduled to be disturbed.

Taconite mines produce a large amount of waste (overburden, rock and tailing) taken from open pits. Pits and waste disposal areas take up a sizeable amount of land area. It is estimated that 85,300 acres have been disturbed by mining in northern Minnesota since the early 1900's. There is more inactive than active disturbed area; 53,800 and 31,500 acres, respectively. There is a total of 4,700 acres that have been vegetated since 1980 under the reclamation rules.

Active tailing basins are situated on 16,400 acres of land and represent more than 50% of the total active mining land area disturbance. Without vegetation, tailing basins are prone to wind and water erosion. Most of the revegetation work completed by the mining companies has been tailing basins. During the last six years, revegetation work on tailing have progressed at the rate of about 600 acres per year. Determinations made from mining company plans indicate that an additional 20,000 acres of basin capacity will be needed in the future.

Mine stockpiles and pit walls require slope shaping, revegetation and drainage. Pit wall reclamation has been limited because mining pit limits have yet to be reached in most instances. Inactive abandoned mine pits fill with water and hold a certain recreational appeal. The planting of vegetative barriers near the pit crest may help limit access to hazardous areas.[1] Stockpiles have been reclaimed at the rate of about 100 acres per year since 1980. Surface stockpiles and the surface portion of the pit walls may be susceptible to erosion depending upon the erosiveness of the material.

Objectives

To address the problems of revegetating and reclaiming mining disturbances. The immediate concerns are aimed at stabilizing sites from wind and water erosion. The long-term concerns consider adequate provisions for land uses such as wildlife or forestry.

Several vegetation studies were initiated since 1982 and have continued through the present. The specific objectives for these studies were to:

1. determine the physical and chemical mine soil characteristics,
2. identify species of vegetation which are adapted to the various types of mining disturbances,
3. monitor species survival, growth and production on revegetation research,
4. develop appropriate revegetation planting techniques,
5. make efficient fertilizer recommendations on sites which are nutrient poor,
6. select species which provide food and cover for wildlife, and
7. select method(s) for determining percent cover.

Vegetation Studies

Experimental programs for vegetating mined lands have been conducted by mining operators and the department. Experimental programs have often demonstrated that mined lands on the Mesabi Range can be seeded and planted to successfully establish vegetative communities with characteristics similar to those existing in the vicinity. Vegetation is relatively easy to establish on surface overburden (Borovsky, 1979). Vegetation also can be established on tailings, but with greater difficulty. Early investigation of tailing revegetation were mainly directed at tailing fertility analysis (Rost, 1965 and Blake, 1975) and species selection (Dickenson, 1972 and Place, 1975). Tailings are inherently infertile due to their inhospitable physical and chemical characteristics. Tailings require high rates of fertilizers and specially selected seed mixes to achieve some measure of vegetative success.

It may be difficult to establish vegetation on rock and lean ore (Hays, 1979). Generally, rock and lean ore are required to be covered with surface overburden to provide a suitable substrate for vegetation. Thus, a major technical difficulty could be inadequate quantities of surface overburden from stripping to cover the benches and tops of rock and lean ore stockpiles.[18]

Several vegetation studies have been initiated by this department since 1982. Progress reports and symposium publications [2,3,4,13] for these studies are available. Research has been summarized under three broad topics: tree and shrub planting, tailing fertility and percent cover.

Tree and Shrub Studies

Trees are an important vegetative component for future land uses such as forestry or wildlife. Forest cover provides protection against soil erosion and is valuable in watershed protection. Trees can also be used to screen mining areas from public view.

Trees and shrubs for reclamation can be established naturally or artificially. Successful use of natural forestation is probably limited to overburden. Forests can be established artificially through direct seeding or planting. Successful planting programs ordinarily involve five selection phases:

1. planting site,
2. tree species,
3. plant materials,
4. site preparation, and
5. cultural treatments.

Studies have been developed which examine various aspects of these selection phases.

Two studies were initiated at Inland on overburden sites. One study involved planting twenty species of trees and shrubs in combination with three spot site preparation treatments (scalping, herbicide and control).[5] Initial results indicate good survival for many species tried. There was no statistical difference (5% level) among spot treatments. In another study, black locust (Robinia pseudoacacia) was planted along the pit crest at Inland.[19] Locust is a thorny plant that may act as a barrier when mature. Initial results indicate good growth and vigor.

The National tailing basin is the site of three research plantings which are under annual review. One study examines the use of five species of willow (Salix) cuttings planted in tailing.[6] This study was a continuation of an earlier published cuttings study which only examined one species of willow.[3] Some preliminary results of the later work indicates that there was some differences in the survival and vigor between species. Also, there were no indications of any survival differences between length of cutting or depth of planting. In another study, fourteen species of wildlife trees and shrubs were planted in replicated plots on tailing.[7] Survival and vigor in combination with fertilizer pellet usage is being examined. Some preliminary results showed that good survival and vigor results can be achieved from red osier dogwood (Cornus stolonifera), caragana (Caragana arborescens) and sandcherry (Prunus pumila). The use of fertilizer pellets tended to increase the vigor rating of most species planted.

At the Butler tailing basin, a tree planting study was initiated which will evaluate the survival and vigor of four species of conifers.[8] Two native species, jack pine (Pinus banksiana) and red pine (Pinus resinosa); and two western species, ponderosa pine (Pinus ponderosa) and Rocky Mountain juniper (Juniperus stopulorum) were planted in five replicated plots. After one growing season, survival results showed that all four species had good survival (above 80%), although vigor was rated as only fair.

A research study involving the direct seeding of jack pine in combination with fertilizer treatments were established on seven different rock dump sites.[4] Results indicate germination and survival differences due to variation in competition and microsites.

Tailing Fertility Studies

In order to assess the fertility of tailing, a survey was conducted of all the taconite tailing disposal areas.[14] The tailing basin area was estimated for each basin. Composite samples of coarse and fine tailing were taken from each basin and the chemical and physical properties tested. The results of this survey indicated differences and similarities between basins. It was also made clear that some properties may need to be modified by the use of amendments to make adequate revegetation possible.

Two field fertilization experiments were conducted at the Butler tailing basin. One study involved vegetating and testing various fertilizers and rates in combination with mulching.[9] Vegetative production results from plots indicated the best production from the higher rates of nitrogen and phosphorus with mulch. In another study, surface applied fertilizers were applied at various combinations to plots in an area of unsatisfactory vegetative cover.[10] Initial cover was estimated at 70%; these initial cover measurements will be compared to future measurements to determine the utility of increasing cover by this maintenance technique.

Optimum fertilizer rate recommendations can be made more efficiently through growth chamber or greenhouse studies. Two growth chamber studies have been completed which have examined various rates of fertilizers mixed with coarse taconite tailings. Diammonium phosphate produced more brome (Bromus inermis) and alfalfa (Medicago sativa) than monoammonium phosphate.[11] Low rates of sulfur increased production of brome if it was used in combination with nitrogen and phosphorus.[12]

Two studies involving vegetation establishment on tailings were funded by U.S. Steel. One study examined fine tailings[16] and the other coarse tailings.[17] Results from these studies have suggested rates of fertilizers and seed mixes to be used on these tailing.

Percent Cover Study

The percent cover study was initiated to develop techniques to best assess percent vegetative cover of reclaimed mined areas according to standards outlined in the Rules Relating to Mineland Reclamation.[15] Four standard techniques were utilized: visual estimate, cover class, point-quadrat using a point-frame, and point-quadrat using a crosswire sighting tube. For our purposes, a modified cover class method of assessing vegetative cover was deemed the best, based on an evaluation of accuracy, precision and efficiency of the methods. The study was continued in 1987 with the purpose being evaluation of the actual cover standards outlined in the rules as they pertain to coarse taconite tailing areas. Coarse tailing are the most difficult to revegetate, and perhaps a lower standard of cover will be acceptable.

References

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Summary of Research on Nonferrous Metal Mining Impact and Mitigation

Introduction

The Duluth Complex, located in northeastern Minnesota, is a massive gabbroic intrusion containing low grade copper and nickel sulfides (Listerud and Meineke, 1977). These deposits represent one of the largest known copper and nickel resources in the U. S. (Kingston et al., 1970; Minnesota Environmental Quality Board, 1980). The development of this resource could produce a number of environmental impacts, some of which could be due to leachate generation (Johnson and Lieberman, 1979). One of the principal sources of leachate could be lean ore and waste rock stockpiles (Thingvold et al., 1979). Copper and nickel concentrations as high as 1.7 and 40 mg/L, respectively, have been observed in leachate generated by Duluth Gabbro waste rock stockpiles at the Dunka Mine, near Babbitt, Minnesota (Eger et al., 1981a). Copper and nickel background concentrations in undisturbed streams of the area are both approximately 0.001 mg/L (Thingvold et al., 1979). These trace metals have been shown to cause adverse biological impacts at aqueous concentrations less than 10 ug/L (Lind et al., 1978).

Development of the Duluth Complex copper-nickel deposits would require extensive open pit mining which, based on conceptual mining models, could produce an estimated 4 to 10 square km of waste rock stockpiles, depending on the stripping ratio and stockpile height (Veith, 1978; Sturgess, 1981). The estimated volume of drainage generated by stockpiles of this size would be 1.5 to 3.8 billion liters in a year of average precipitation (Hewett, 1980). If this drainage were similar in quality to that observed at the Dunka site, it could have an undesireable impact on the environment.

Background

When metal sulfide minerals are exposed to the oxidizing conditions present in waste rock stockpiles, mine walls, and tailings basins, sulfide is oxidized and the associated metals (Fe, Cu, Ni, Co, Zn) are released (Nelson, 1978; Garrels and Christ, 1965; Sato, 1960a, 1960b):

$$MeS(s) + 2O_2 = Me^{2+}(aq) + SO_4^{2-}(aq) \quad (1)$$

The rate of oxidation is proportional to the available sulfide surface area (Nelson, 1978; Sato and Mooney, 1960; Sato, 1960a, 1960b), and dissolved oxygen concentration (Nelson, 1978; Dobrokhotov and Maiorova, 1962; McKay and Halpern, 1958), with only a slight dependence on pH (Nelson, 1978; Majima and Peters, 1977).

Reactions subsequent to the sulfide dissolution affect the net chemical release to the environment. The transport of a given component in the environment is the net result of release to solution by dissolution and removal from solution by precipitation, coprecipitation, exchange reactions, and adsorption. The release of iron from sulfide minerals leads to the formation of iron oxyhyroxide minerals (Sung and Morgan, 1980; Nelson, 1978) and the generation of acid:

$$2FeS(s) + 3H_2O + 9/2\,O_2 = FeOOH(s) + 4H^+(aq) + 2SO_4^{2-}(aq) \quad (2)$$

The acid that is generated can be consumed by the dissolution of the silicate minerals (Holdren and Berner, 1979) present in the rock:

$$CaAl_2Si_2O_8(s) + 2H^+(aq) + H_2O = Ca^{2+}(aq) + Al_2Si_2O_5(OH)_4(s) \quad (3)$$

The balance between the rates of acid generation and acid consumption determines the drainage pH. An excess of acid generation also elevates trace metal release, since trace metal concentrations increase as pH decreases. Other aspects of solution composition also affect trace metal transport, as well as the chemistry of the released component, and the chemical character and surface area of solid surfaces present.

Chemical release is also affected by the amount of water percolating through the stockpile, which is dependent on the input volume and subsequent flow routing. Precipitation is an everpresent input, but surface water and groundwater can also contribute under certain conditions. The water input will be incorporated as storage or discharged as evapotranspiration, surface runoff, subsurface stormflow (or interflow) and baseflow (Hewett, 1980).

Mitigation attempts at other operations in the United States have focused on reducing contaminant release from the stockpile and removing contaminants from the drainage. Physical barriers have been used to reduce input of water and oxygen to the stockpile (Doyle, 1976; Grim and Hill, 1974). The most widely used barrier is a vegetated soil cover (Grim and Hill, 1974). A second function of such barriers would be to restrict the access of oxygen to the piles and thereby reduce the rate of sulfide oxidation. Addition of alkalinity (Ladwig et al., 1985) and bactericides (Erickson et al., 1985; certain bacteria catalyze iron sulfide oxidation, increasing the rate of acid production) to stockpiles have been employed to reduce the release of acid from coal mining wastes, as has wetland treatment (Kleinmann, 1985).

Objectives

To address the potential problems of trace metal and acid release from stockpiles at future copper-nickel operations and the immediate concerns at the Erie Mining Company Dunka Site, several studies were conducted. These studies were initiated in 1976 and have continued through the present.

The objectives of the leachate studies were to

1. identify mining components which are potential contaminant sources,
2. identify potential contaminants,
3. assess the toxicity of the contaminants,
4. quantify the release of individual contaminants from stockpiles,
5. determine mechanisms of release,
6. determine the factors controlling release,
7. determine the environmental pathways of the released contaminants,
8. determine methods of mitigating contaminant release, and
9. develop techniques for evaluating the potential leaching impact of mining generated solids.

Regional Copper-Nickel Study

The Regional Copper-Nickel Study was formed in response to public concerns for the environmental impact of copper-nickel mining. The investigations conducted included operational scale field studies at the Erie Mining Company Dunka Mine (an active iron ore operation), pilot scale field studies at the AMAX/Kennecott exploration site, monitoring of a bulk sample site, as well as laboratory experiments. The earliest reports focused on the impact of potential copper-nickel operation (Thingvold et al., 1979), and addressed the hydrology (Hewett, 1980) and chemistry of stockpiles. The early laboratory studies (Lapakko, 1980; Eisenreich et al., 1977a, 1977b) investigated the kinetics and mechanisms of gabbro dissolution as well as trace metal equilibria. The findings of the early field monitoring, the laboratory experiments, and chemical equilibrium computer models were compiled in a comprehensive report (Eger and Lapakko, 1980c), and summarized in shorter papers presenting the chemical mechanisms of leaching (Lapakko and Eger, 1980a, 1980b).

LTV Steel Mining Company Dunka Site (previously Erie Mining Company)

The quantity and quality of waste rock and lean ore stockpile drainage were investigated at the LTV Steel Mining Company Dunka Site, a full scale open pit taconite operation near Babbitt, Minnesota. The open pit intersects the geological contact between the Duluth Complex and the iron formation, and removal of gabbro from the Duluth Complex was required to mine the underlying iron ore. The gabbro, which contains metal sulfide minerals, has been stockpiled on the site.

The stockpiles containing gabbro exceed 50 million tons in mass and cover an area of 320 acres. Total flow from the watershed is about 500 million gallons per year, with a mass load of over one ton of nickel into Bob Bay on Birch Lake. The majority of the flow passes through Unnamed Creek. The most recent and comprehensive report (Eger et al., 1981b) presented the results of monitoring from 1976 to 1980, but ear-

lier reports are available (Eger and Lapakko, 1980a; Eger et al., 1977). After 1980 the monitoring was conducted by Erie.

Over the period from 1976 to 1980 (Eger et al., 1981b), greater than 95% of all leachate samples had pH values between 6.0 and 8.5, but values as low as 4.5 were reported. Concentrations of trace metals (Cu, Ni, Co, Zn) exceeded ambient levels by 10 to 10,000 times. Copper and nickel concentrations exceeded the 48 hr LC50 for Daphnia pulicaria, while nickel concentrations also exceeded the 96 hr LC50 for the fathead minnow. (The LC50 is the concentration at which is lethal to 50 percent of the test organisms, for the designated time interval.) Nickel contributed more than 90% of the trace metal load, and its removal by natural processes was less than 40%. Consequently, in the absence of mitigative measures, nickel concentrations will be elevated downstream from gabbro stockpiles. Concentrations of calcium, magnesium, and sulfate in the stockpile drainage were also elevated, but these parameters are of lesser environmental impact than the trace metals. Indeed, these parameters can reduce the toxic effects of trace metals.

Individual studies at the Erie site have focused on the transport of trace metals leached from the stockpiles through a white cedar swamp (Eger et al., 1980), Unnamed Creek (Eger and Lapakko, 1980b), and Bob Bay (Lapakko and Eger, 1981b; Strudell et al., 1984). The Seep 3 stockpile drainage flows through a white cedar swamp prior to entering Unnamed Creek. From July 1976 through August 1977, average nickel and copper concentrations were 17.9 and 0.62 mg/L. The runoff moved across the surface and through the upper 30 cm of the peat. Travel times through the swamp were estimated to be about 50 days for flow across the surface and 250 days for flow through the upper 30 cm of peat. Analysis of water quality and peat samples indicated that at least 30% of the nickel and essentially 100% of the copper was being removed from the drainage by peat sequestration. Maximum trace metal concentrations in the peat, as determined by acid digestion, were 0.64% nickel and 0.36% copper. Information on the kinetics, mechanisms, and capacities of metal sequestration by peat has also been collected and is presented in the form of literature reviews (Lapakko et al., 1986; Otterson, 1978).

The field study on trace metal transport through Unnamed Creek was augmented by chemical equilibrium computer modeling (Eger and Lapakko, 1980b). The studies indicated that nickel transport was greater than that of copper in both the bog (10-70% vs. 1-14%) and the creek (60-100% vs 26-51%). Aqueous and solid phase analyses indicated that metal removal resulted from adsorption onto peat, organic stream sediments, and mineral sediments. Computer results were consistent with field results and further suggested that zinc would behave similar to nickel and cobalt similar to copper.

The transport of trace metals through Bob Bay was investigated in 1976-1977 and again in 1983. The initial study (Lapakko and Eger, 1981b) indicated that concentrations of SO_4, Ni, Ca, Mg, Cl, Cu, and alkalinity in the bay were higher than the regional average concentrations and decreased with distance from the point of input. Elevated metal concentrations were also observed in the sediments, as well as plant and clam tissue. Nickel removal, based on sediment composition and sedimentation rate, ranged from 3 to 34 ug/cm^2-yr. Rates based on water quality data were 2 to 8 times as high.

The elevated concentrations were restricted to a narrow density flow along the bottom of the bay (Strudell et al., 1984). This flow occupied less than five percent of the bay volume during the 1983 study. The metal concentrations were higher than those observed in the previous study, due largely to higher input concentrations from the mining watershed. In this study, no nickel removal from the density flow was observed during the one to three days required for flow to pass through Bob Bay. The nickel concentrations did decrease but, based on concentrations of conservative parameters, this decrease was due to dilution.

The Minerals Division is presently involved in developing and implementing a program to mitigate trace metal release at the Dunka site. This program was imposed on the Erie Mining Company by the Minnesota Pollution Control Agency. The studies planned will examine the mitigative potential of low permeability stockpile caps, the addition of alkalinity to stockpiles and/or stockpile drainage, and wetland treatment. Optimization of vegetation to limit infiltration will also be considered for this site. Monitoring will be continued to provide a complete description of the trace metal sources within the Unnamed Creek watershed. The necessary information includes drainage quality, annual quantity, mass release, and maximum flow rates.

AMAX/Kennecott Exploration Site Leaching and Revegetation Studies

Six test stockpiles containing 820 to 1300 metric tons of low grade copper-nickel material were constructed in 1977. For runoff collection, each pile is underlain by an impervious Hypalon liner which is sloped toward a 15.2 cm perforated plastic pipe. The runoff collected flows to a common sump and is subsequently pumped to settling basins. In 1982 approximately 40% of test pile FL4 was removed for use in another study of stockpile reclamation techniques. The most recent and comprehensive report on the leaching and revegetation studies (Eger and Lapakko, 1985) was published in 1985, although additional progress reports (Eger et al., 1981a, 1980, 1979) and symposium publications (Eger et al., 1981, 1980) are available.

The following conclusions have been drawn based on this small scale field monitoring program.

1. Trace metal concentrations in leachate from test piles containing low grade sulfide mineralization exceeded concentrations in undisturbed streams of the area by as much as five orders of magnitude.

2. Trace metal concentrations and mass release rates increased with time and the iron sulfide content of the stockpile.

3. A critical iron sulfide content appears to occur at approximately 1.1 weight pct FeS (0.6 pct total sulfur) in the bulk rock. Rock of similar mineralogy and particle size distribution which contains more than this critical amount would generate acidic leachate.

4. Only through long term studies can the influence of time and environmental processes be adequately measured. Predictions based on data from the first years of this study would have underestimated trace metal release rates by as much as two orders of magnitude.

5. Covering piles with topsoil (18 cm) or a combination of sandy till (30 cm) over coarse sand (28 cm), and establishing vegetation on these piles reduced drainage volume and therefore mass release, by 30 to 50 pct.

6. Reclamation treatments were effective in reducing the drainage volume and mass release, but did not improve leachate quality. Concentrations of trace metals in the leachate are at least one to three orders of magnitude greater than proposed EPA effluent guidelines for mining discharge.

7. Additional small scale tests are planned to evaluate the effectiveness of lime stabilization, bactericide application, and low permeability soil covers on further reducing trace metal mass release from stockpiled material.

Other Passive Treatment (USBM studies)

The second phase of an experimental program funded by the U.S. Bureau of Mines was also conducted at the AMAX/Kennecott site. This two phase program examined the feasibility of removing trace metals (Cu, Ni, Co, Zn) from stockpile drainage using readily available materials in low cost, low maintenance systems. The results of the entire program are presented in a final report (Lapakko et al., 1986a), but synopses of various research segments are presented in several symposium proceedings cited in the following paragraphs.

Before experiments were initiated a literature review was conducted on the trace metal removal abilities of several solids (Lapakko et al., 1986b). The first experimental phase was a laboratory screening program using: 1) batch experiments to screen wood chips, peat, till, tailings, zeolite, lime and sponge iron; and 2) column experiments to select the most promising materials for field trials. Based on the laboratory results (Lapakko and Eger, 1983, 1981a) low sulfide tailings were chosen for the phase two field testing.

The field tests utilized both treatment beds and joint disposal bins. In the saturated and unsaturated flow tailings treatment beds, the mass nickel removal decreased in the order Ni, Cu, Zn, and Co; the removal

efficiency (percent removal), however, decreased in the order Cu, Zn, Co, with percent nickel removal being the least (Lapakko et al., 1983). A model was developed to describe the output flow at a given distance as a function of the input flow. In the first year of the joint disposal study (Eger et al.,1984), total discharge from waste rock was reduced 34 percent by the addition of tailings and 66 percent by tailings followed by revegetation. The associated reductions in trace metal mass release were 73 and 87 percent, respectively. The flow reduction decreased in subsequent years. The drainage from the bins incorporating tailings had lower trace metal concentrations and higher pH than the drainage from the controls. These tests are continuing.

Predicting Drainage Quality and Evaluating Mitigation Procedures

The variation of drainage quality with solid phase composition was initially examined in batch reactor and column tests (Lapakko, 1980). Subsequently, an experimental technique was designed for determining the quality of drainage generated by mining wastes and evaluating the effectiveness of treatment techniques in mitigating contaminant release. This technique was used to examine the effect of solid phase sulfur content on the quality of drainage generated by leaching of Duluth Complex solids (Lapakko, 1987). The sulfur content of these samples ranged from 0.47 to 2.57 percent, with typical copper and nickel ranges of 0.13-0.23% and 0.05-0.09%, respectively. Samples containing 0.9% sulfur produced drainage pH as low as 4.25, while samples of lower sulfur content produced drainage in the neutral range. Additional samples must be examined to verify the initial results and to examine other variables of solid composition.

This experimental technique is also being used to evaluate mitigation procedures. At present, the feasibility of adding low cost alkaline solids to stockpiled rock is being examined. Such additions may increase pH and reduce trace metal concentrations in stockpile drainage. Other mitigation techniques, such as the addition of bactericide, may also be examined using this experimental technique.

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PROGRAM RESOURCES

The Department believes that an interdisciplinary staff can best address all aspects of mining and reclamation. This section identifies the professional staff positions of the reclamation program.

Staff

- Mining Engineer (1)
- Chemical Engineer (1)
- Environmental Engineer (1)
- Geotechnical Engineer (1)
- Hydrologists (2)
- Forester (1)
- Soil Scientists (2)
- Biologist (1)
- Technician (1)
- Limnologist (1)
- Recreation Planner (1)
- Students (variable)
- Part-time staff (variable)

Facilities

- Professional staff located in St. Paul and Hibbing Offices
- Hibbing office: maintains a chemistry laboratory containing most water quality analytical instrumentation including an atomic absorption spectrophotometer with graphite furnace. The laboratory also contains a growth chamber (Conviron CMP 3023) for plant and fertilization trials.
- AMAX site: Abandoned Kennecott exploration site where sulfide stockpile leaching field studies are conducted. Contains a small wet laboratory.

3. PERMITS REQUIRED FOR MINING

STATE AND FEDERAL PERMITS REQUIRED FOR MINING

In addition to the Department of Natural Resources, there are other state and federal authorities that require permits from mining operations. The following identifies these other permits and authorities. The list does not include local permits or ordinances.

Department of Natural Resources - Minerals Division

Permit to Mine

- control adverse environmental effects of mining and provide for reclamation and good mining practices

Department of Natural Resources - Waters Division

Water Appropriation Permit

- conserve and utilize the water resources of the state in the public interest

Work in the Beds of Protected Waters Permit

- minimize adverse environmental effects, preserve water resources and provide for future land and water use

Dam Safety Permit

- ensure safe construction of tailings basin dams

Minnesota Pollution Control Agency

NPDES Permit

- permit disposal systems discharging sewage, industrial waste or other waste into navigable waters or their tributaries

SDS Permit

- provide minimum standards and criteria for design, location, installation, use and maintenance of industrial waste disposal systems

Air Emission Facility Permit

- provide for installation, operation, modification or reconstruction of an air emission facility

Indirect Source Permit

- control emissions of pollutants (for which there are state standards) resulting from mobile activity attracted to indirect source

Construction and Operation of Liquid Storage Facility/Site Permit

- prevent the escape or movement of substances or solutions from storage facilties which would result in pollution of any state waters

Solid Waste Facility Permit

- regulate construction, operation and closure of intermediate or final solid waste disposal site or facility

Hazardous Waste Permit

- regulate hazardous waste disposal

Minnesota Department of Health

Water Wells and Exploratory Boring Permit

- license explorers with Commissioner of Health and regulate abandonment of borings

U. S. Forest Service

Special Use Permit

- obtain access to Forest Service land for exploration

U. S. Army Corps of Engineers

Section 404 Dredge and Fill Permit

- regulate the discharge of dredged or fill material into wetlands

4. INTERAGENCY COOPERATION

MEMORANDUM OF AGREEMENT

BETWEEN THE

MINNESOTA POLLUTION CONTROL AGENCY AND THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES FOR ESTABLISHING PROCEDURES FOR COOPERATIVE INVOLVEMENT IN THE REGULATION OF MINING INDUSTRIES IN MINNESOTA

With numerous agencies regulating the mining industry in Minnesota, it is important that there be a good understanding of individual roles and permitting authorities to minimize duplication of effort and streamline the regulatory process for the industry as well as the agencies. A Memorandum of Agreement (MOA) was developed between the Minnesota Department of Natural Resources and the Minnesota Pollution Control Agency in order to expedite and make the permitting process more efficient.

DESCRIPTION

The Minnesota Pollution Control Agency (PCA) and the Minnesota Department of Natural Resources (DNR) each have major authorities and responsibilities for the regulation of metallic mineral and peat mining activities in the state. These authorities and responsibilities frequently overlap, resulting in duplication of work effort.

PURPOSE AND OBJECTIVES

To promote efficiency, reduce duplication of work efforts, and improve communications, this Memorandum of Agreement (MOA) between the PCA and the DNR establishes procedures for coordinating regulatory and non-regulatory functions for mining activities. It also identifies authorities and establishes procedures to be followed by the PCA and the DNR.

IMPLEMENTATION

The MOA shall be implemented by each agency's mutual acceptance of the designated areas of responsibility defined in the Authorities and General Provision sections of the MOA, and the coordinating procedures and activities of an Interagency Coordinating Committee (ICC) defined in the Specific Provisions section of this MOA.

AUTHORITIES

Nothing in this MOA shall be construed as altering the statutory authorities of the PCA or the DNR.

1) The PCA is mandated to enforce state laws and regulations addressing air and water pollution, solid and hazardous waste disposal, and noise control. As such, the PCA is recognized as the lead agency for:

- identification and evaluation of air quality impacts,
- solid and hazardous waste disposal and management,
- noise control and abatement,

- establishment and enforcement of effluent limitations, water quality standards, and compliance monitoring,
- regulation of groundwater quality and surface water quality point and non-point source pollution,
- implementation of EPA's CERCLA program and the state's MERLA program.

2) The DNR is mandated to enforce state laws and regulations addressing mineland reclamation, alteration of protected waters, water appropriations, and dam safety. As such, the DNR is recognized as the lead agency for:

- reclamation of lands disturbed by mining after August 1980, including the siting, design, construction, operation and deactivation of all mining facilities,
- mining activities affecting the alteration of protected waters (coordination of these activities covered under protected waters Cooperative Agreement dated October, 1984).
- mining activities affecting the quantity aspects of the taking or disposing of water,
- mining activities associated with the location, construction materials, operation and ultimate safety of dams,
- serving as the Responsible Government Unit for the environmental review of mining projects.

GENERAL PROVISIONS

It is mutally agreed that:

1) The PCA and DNR shall coordinate regulatory activities, so as to not duplicate or contradict requirements of either agency or deviate from the lead roles outlined in the AUTHORITIES section.

2) The PCA and DNR shall cooperatively identify and resolve mining-related environmental problems of mutual concern, including, but not limited to, those associated with new proposals, reclamation matters, violations of permit provisions, air or water quality standards violations, and monitoring results.

3) Where compliance monitoring or other reliable information shows that air quality standards or water quality effluent limitations or standards have been violated and remedial action may affect the terms or conditions of both agencies' permits, the DNR and PCA shall meet to resolve changes in their permitting requirements.

4) The PCA and DNR shall exchange and utilize, to the extent practical, all resource information, including permit applications, associated with environmental impact evaluation and mining proposals.

5) Additional agreements will be developed where needed, in the form of an addendum to this agreement, or memoranda/letters referencing this agreement.

6) The PCA and DNR shall use the attached RESPONSE DIAGRAM for interagency environmental review and regulatory coordination of new industry proposals.

SPECIFIC PROVISIONS

The PCA and DNR shall form an Interagency Coordinating Committee (ICC), comprised of the following representatives:

PCA Division of Water Quality - Permits Unit Supervisor
PCA Office of Planning and Review - Resource Development Coordinator
DNR Minerals Division - Mineland Reclamation Mananger
DNR Waters Division - Mining Hydrologist

The ICC shall be responsible for:

1) Keeping each agency's management and staff informed of pertinent mining development issues or problems.

2) Coordinating and/or supplying input to the environmental review process for mining proposals.

3) Coordinating all inter- and intra-agency permitting matters for mining.

4) Coordinating review and input of new mining-related rules or regulations.

5) Coordinating indentification and resolution of any mining-related environmental problems of mutual concern, including, but not limited to, those associated with new proposals, reclamation matters, violations of permit provisions, air or water quality standards violations, and monitoring results.

6) Coordinating PCA and DNR regulatory programs so as to minimize duplicative requirements, particularly with respect to non-point source pollution and mineland reclamation.

7) Initiate the involvement of appropriate technical, administrative, or managerial staff.

8) Coordinating PCA and DNR involvement associated with actions proposed by other federal, state and local governmental units associated with mining.

The ICC members shall meet no less than quarterly to discuss matters of joint agency interest. Matters requiring more immediate attention shall be dealt with on an as-needed basis.

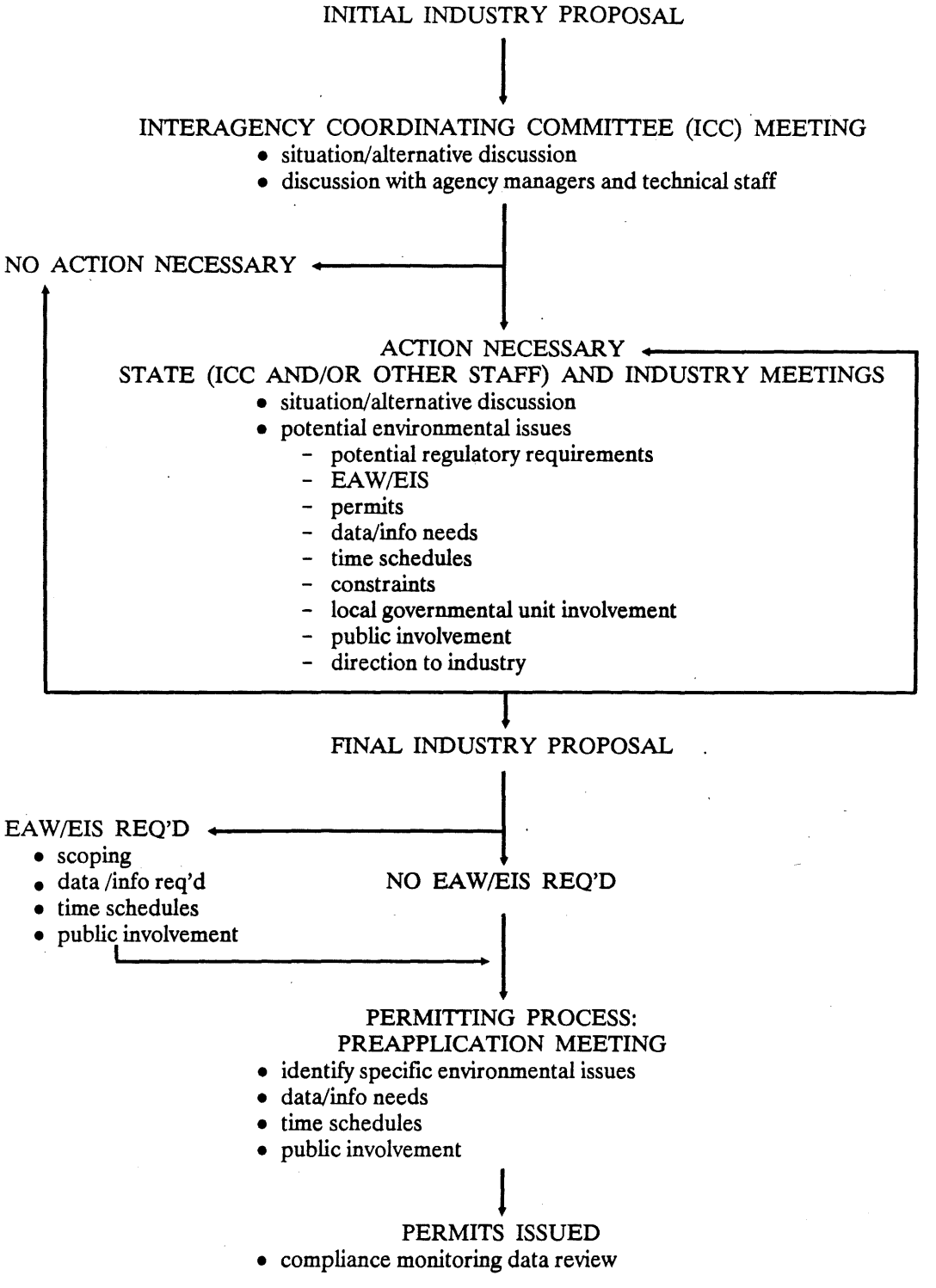
MODIFICATION, TERMINATION AND EXPIRATION

This Agreement shall become effective upon the signature of both parties and shall remain effective until modified or terminated. This Agreement may be amended or reissued upon the written mutual agreement of both of the parties. This agreement shall be amended to include the state's administration of the EPA's proposed Subtitle D Mining Waste Program upon the EPA's promulgation of rules and guidelines for Subtitle D.

The DNR or the PCA may cancel this agreement by written notification to the other party. Termination shall occur thirty days after written notification is received. Termination may occur earlier by the mutual agreement of both parties

Signed on September 21, 1987 by the Commissioner of the Department of Natural Resources and the Commissioner of the Pollution Control Agency.

RESPONSE DIAGRAM



NONFERROUS MINERAL STRATEGIC PLANNING PROJECT

Such factors as: (1) the considerably increased industry exploration activity in the northern counties; (2) indicators found in state-sponsored geological surveys; and, (3) major gold finds in similar geological formations in Canada, have combined in recent years to give strong indications that one or more major discoveries of nonferrous minerals may occur in Minnesota in the near future.

While the state has regulated iron mining for many years, nonferrous mineral mining and ore processing may involve processes and reagents which have considerably different environmental impacts than those associated with the iron ore industry. Further, the industry regards as crucial the expeditious handling of environmental review and permitting, since lengthy delays can be accompanied by changes in world economics which can make mine development unfeasible. The MPCA and DNR have noted the industry's interest and optimism regarding a nonferrous discovery in the near term, and intend to be prepared to act quickly if and when it occurs.

The Nonferrous Strategic Planning Project (see flow diagram page 4-6) will be implemented in 1988 to develop knowledge and expertise within the agencies regarding the processes and reagents used elsewhere to mine and refine nonferrous mineral commodities, the waste streams and effluents which result, and the regulatory practices of other states. Simulated development scenarios will then be analyzed to determine what kinds of information and technical data will be required for the agencies' permitting and environmental review processes. Completion of the project, in cooperation with industry and the environmental community, will result in a streamlined permitting and environmental review process for any new nonferrous mineral development.

NONFERROUS MINERAL STRATEGIC PLANNING

DEVELOP UNDERSTANDING OF REGULATORY PROGRAMS (Industry/Project Environment)

Seminar/discussion format where DNR/PCA present overview of regulatory programs affecting mining

MINING PROPOSAL DEVELOPED (Industry/Project Environment)

Five Mining Proposals:

- 1000 T/day, U.G. Gold with cyanide vat leaching
- 2000 T/day, U.G. Cu/Zn, Ag, conc. on site, shipped to smelter
- 2000 T/day, O.P. Cu/Zn, Ag, conc. on site, shipped to smelter
- 300 T/day, Pt/Pd, U.G.
- 100 T/day, gold, O.P.

DEVELOP UNDERSTANDING OF NEW MINING INDUSTRY (MDNR/MPCA)

Site visits to active gold mines

- Hemlo, Canada
- Homestake, South Dakota
- Wharf Resources, South Dakota
- Other?

IDENTIFY ISSUES ASSOCIATED WITH MINING PROPOSALS (MDNR/MPCA)

Based upon the selected mining proposals, issues would be identified by the MPCA/DNR. These issues would fall into the following broad categories:

- Environmental Issues
- Policy Issues
- Scheduling Issues
- Social/Economic Issues

DEVELOP PROCEDURES/GUIDLINES FOR ISSUE RESOLUTION (DNR/PCA/Industry)

Issue identification would be followed by the development of methods or procedures to resolve issues. This includes the following activities:

- Identification of basic data needs and data priorities
- Guidelines for standardization of data development
- Identification of research directions for environmental controls/reclamation
- Development of generic monitoring plans/schedules
- Development of guidelines for determining necessary water quality standards
- Development of leadership roles/responsibilities
  - DNR
  - MPCA
  - Local units of government
  - Federal
  - Other state government
- Identification of scheduling guidelines for:
  - Environmental Review
  - Permitting

GUIDLINE FOR PERMITTING & ENVIRONMENTAL REVIEW (MDNR/MPCA)

Information and guidelines developed in Step III would be published for distribution to industry and government agencies

5. MINNESOTA ENVIRONMENTAL POLICY ACT

MINNESOTA ENVIRONMENTAL POLICY ACT

The Minnesota Environmental Policy Act (MEPA) requires that an environmental assessment be conducted for all new mining operations. The following information is taken from rules promulgated under MEPA which specifically address mining.

PURPOSE

The Minnesota Environmental Policy Act (MEPA) recognizes that the restoration and maintenance of environmental quality is critically important to our welfare. The act also recognizes that human activity has a profound and often adverse impact on the environment.

The first step in achieving a more harmonious relationship between human activity and the environment is understanding the impact which a proposed project will have on the environment. The purpose of MEPA is to aid in providing that understanding through the preparation and public review of environmental documents.

Environmental documents contain information which addresses the significant environmental issues of a proposed action. This information is available to governmental units and citizens early in the decision making process.

Environmental documents will not be used to justify a decision, nor will indications of adverse environmental effects necessarily require that a project be disapproved. Environmental documents shall be used as guides in issuing, amending, and denying permits and carrying out other responsibilities of governmental units to avoid or minimize adverse environmental effects and to restore and enhance environmental quality.

OBJECTIVES

Provide usable information to the project proposer, governmental decision makers and the public concerning the primary environmental effects of a proposed project.

- Provide the public with systematic access to decision makers, which will help to maintain public awareness of environmental concerns and encourage accountability in public and private decision making.
- Delegate authority and responsibility for environmental review to the governmental unit most closely involved in the project.
- Reduce delay and uncertainty in the environmental review process.
- Eliminate duplication.

MANDATORY EAW CATEGORIES

The Environmental Assessment Worksheet (EAW) is designed to rapidly assess the environmental effects that may be associated with the proposed project and to aid in the determination of whether an Environmental Impact Statement (EIS) is needed. Once the EAW is complete and available for review, there is a 30 day comment period. Within 15 days after the comment period, the responsible governmental unit (RGU) must decide whether there is need for an EIS. If no EIS is needed, the project can proceed to the permitting stage. If an EIS is needed, the EAW is used as a scoping document to identify the issues to be addressed in the EIS.

For metallic mineral mining and processing, an EAW must be prepared for projects that meet or exceed the following threshold.

- Mineral deposit evaluation of metallic mineral deposits other than natural iron ore and taconite. The DNR shall be the RGU.
- Expansion of a stockpile, tailings basin, or mine by 320 or more acres. The DNR shall be the RGU.
- Expansion of a metallic mineral plant processing facility that is capable of increasing production by 25 percent per year or more, provided that increase is in excess of 1,000,000 tons per year in the case of facilities for processing natural iron ore or taconite. The DNR shall be the RGU.
- The appropriation of surface water or groundwater in an amount exceeding 30 million gallons per month or 2 million gallons per day. The DNR shall be the RGU.
- The creation of an impoundment of 160 acres or more. The DNR shall be the RGU.
- The diversion of channelization of a designated trout stream or natural watercourse. The DNR shall be the RGU.
- Projects that will change or diminish the course, current or cross section of a protected water or protected wetland. The DNR shall be the RGU.
- The construction of any facility that produces more than 100 tons of air emissions per year. The PCA shall be the RGU.

MANDATORY EIS CATEGORIES

For metallic mineral mining and processing, an EIS must be prepared for projects that meet or exceed the following thresholds.

- Mineral deposit evaluation involving the extraction of 1,000 tons or more of material that is of interest to the proposer. The DNR shall be the RGU.
- Construction of a new facility for mining metallic minerals or for the disposal of tailings from a metallic mineral mine. The DNR shall be the RGU.
- Construction of a new metallic mineral processing facility. The DNR shall be the RGU.

APPENDIX A.

MINNESOTA STATUTES 93.44 - 93.50

MINNESOTA STATUTES

MINELAND RECLAMATION ACT

An act relating to mining;
including peat within the provisions of
mineland reclamation laws;

93.44 DECLARATION OF POLICY.

In recognition of the effects of mining upon the environment, it is hereby declared to be the policy of this state to provide for the reclamation of certain lands hereafter subjected to the mining of metallic minerals or peat where such reclamation is necessary, both in the interest of the general welfare and as an exercise of the police power of the state, to control possible adverse environmental effects of mining, to preserve the natural resources, and to encourage the planning of future land utilization, while at the same time promoting the orderly development of mining, the encouragement of good mining practices, and the recognition and identification of the beneficial aspects of mining.

93.45 IRON RANGE TRAIL; ESTABLISHMENT, COMMISSIONER'S DUTIES.

Subdivision 1. In recognition of the unique combination of cultural, geological, industrial, historical, recreational, and scenic characteristics of Minnesota's iron ranges, an "Iron Range Trail" is hereby established on the Vermillion, Mesabi, and Cuyuna iron ranges and at related points on Lake Superior. The commissioner of natural resources shall establish, develop, and maintain the trail, and related places of interest under his jurisdiction and control, for the purposes specified in this subdivision. The trail need not be continuous between or within ranges and related points, but shall be developed as a coordinated unit and for multiple use. The commissioner, in cooperation with other state agencies, local governments, and private organizations and individuals shall mark and, where necessary, interpret places of cultural, geological, industrial, historical, recreational, and scenic interest. In cooperation with state and local road authorities, local governments, and private organizations and individuals, the commissioner also shall mark access, where available, to these places of interest from public roads and highways.

Subd. 2. The commissioner may acquire by gift or purchase necessary trail easements and related interest in and across lands not under his jurisdiction and control. The commissioner also may enter into contracts, leases, or other agreements with the operator or the owner of active or inactive mine areas and with the person having the right of possession thereof for the use and development of these areas for iron range trail purposes. The commissioner may develop, maintain, and operate such areas or may enter into contracts with third parties for the development, maintenance, or operation of the areas. If the commissioner enters into such a contract with a third party, the contract shall provide that the operator, owner and any person entitled to possession or control of the area shall be held harmless and indemnified by the third party from and against any and all claims for injuries or damage to person or property, from such use or development. Nothing in this section prohibits a person from asserting any claim for alleged damages brought pursuant to sections 3.732 or 3.736.

93.46 DEFINITIONS.

Subdivision 1. For the purposes of sections 93.46 to 93.51, the terms defined in this section have the meanings given to them.

Subd. 2. "Mining area" or "Area subjected to mining" means any area of land from which material is hereafter removed in connection with the production or extraction of metallic minerals or peat, the lands upon which material from such mining is hereafter deposited, the lands upon which beneficiating plants and auxiliary facilities are hereafter located, the lands upon which the water reservoirs used in the mining process are hereafter located, and auxiliary lands which are hereafter used or intended to be used in a particular mining operation.

Subd. 3. "Mine waste" means any material, including but not limited to surface overburden, rock, lean ore, or tailings which in the process of mining and beneficiation has been removed from the earth and stored elsewhere on the surface.

Subd. 4. [Repealed, 1973 c 526 s 8]

Subd. 5. "Department" means the department of natural resources.

Subd. 6. "Operator" means any owner or lessee of mineral rights or peat rights engaged in or preparing to engage in mining operations with respect thereto.

Subd. 7. "Person" includes firms, partnerships, corporations, and other groups.

Subd. 8. "Commissioner" means the commissioner of natural resources.

93.461 PEAT INCLUDED IN MINELAND RECLAMATION.

Sections 93.46 to 93.51 apply to peat in the same manner as to metallic minerals, to the greatest extent practicable, with the following exceptions:

(a) For the purposes of sections 93.46 to 93.51, "peat mining" means the removal of peat for commercial purposes, including activities associated with the removal. "Peat mining" does not include removal of peat which is incidental to the harvesting of an agricultural or horticultural crop, or to mining of a metallic mineral that is subject to a mineland reclamation rule and a permit to mine.

(b) No permit to mine peat is required under section 93.481 until 180 days after the effective date of rules promulgated to regulate peat mining and reclamation. The rules shall be adopted by July 1, 1985.

(c) No permit is required for a peat mining operation of 40 acres or less, unless the commissioner determines that there is potential for significant environmental effects which may result from the peat mining operation. A person intending to engage in or carry on a peat mining operation of 40 acres or less, if the intended operation involves removal of more than 1,000 tons of air-dried peat per year, shall notify the commissioner in writing before beginning any mining, specifying the legal description of the tract to be mined and the mining methods to be used. Within 20 days after receipt of written notice of intent to mine such a tract, or after receiving additional information requested, the commissioner shall notify the person of his decision to require, or not to require, a permit.

93.47 DUTIES AND AUTHORITY OF COMMISSIONER.

Subdivision 1. The commissioner shall conduct a comprehensive study and survey in order to determine, consistent with the declared policy of sections 93.44 to 93.51, the extent to which regulation of mining areas is necessary in the interest of the general welfare.

Subd. 2. In determining the extent and type of regulation required, the commissioner shall give due consideration to the effects of mining upon the following: (a) environment; (b) the future utilization of the land upon completion of mining; and (c) the wise utilization and protection of the natural resources including but not limited to the control of erosion, the prevention of land or rock slides, and air and water pollution. The commissioner also shall give due consideration to (a) the future and economic effect of such regulations upon the mine operators and landowners, the surrounding communities, and the state of Minnesota; (b) the effect upon employment in the state; (c) the effect upon the future mining and development of metallic minerals owned by the state of Minnesota and others, and the revenues received therefrom; and (d) the practical problems of the mine operators and mineral owners including, but not limited to, slope gradients as achieved by good mining or soil stabilization practices.

Subd. 3. Upon completion of his study and survey and consistent with the declared policy of sections 93.44 to 93.51, the commissioner, pursuant to chapter 14, may adopt rules and regulations pertaining to that portion of mining operations conducted subsequent to the effective date of such rules and regulations and subject to the provisions of any rights existing pursuant to any permit, license, lease or other valid existing authorization issued by the commissioner, the Pollution Control Agency or any other governmental entity, or their predecessors in office, and subject to any applicable mine safety laws or regulations now existing or hereafter adopted, in regard to the following: (a) Mine waste disposal, (b) mining areas, including but not limited to plant facilities and equipment and (c) permits to mine, as required by section 93.481. To the greatest extent possible, within the authority possessed by the commissioner, the rules so promulgated shall substantially comply with or exceed any minimum mineland reclamation requirements which may be established pursuant to a federal mineland reclamation act. The rules so promulgated also shall conform with any state and local land use planning program; provided further the commissioner shall develop procedures that will identify areas or types of areas which, if mined, cannot be reclaimed with existing techniques to satisfy the rules and regulations promulgated under this subdivision, and the commissioner will not issue permits to mine such areas until the commissioner determines technology is available to satisfy the rules and regulations so promulgated.

Subd. 4. The commissioner shall administer and enforce sections 93.44 to 93.51 and the rules and regulations adopted pursuant hereto. In so doing he may (a) conduct such investigations and inspections as he deems necessary for the proper administration of sections 93.44 to 93.51; (b) enter upon any parts of the mining areas in connection with any such investigation and inspection without liability to the operator or landowner provided that reasonable prior notice of his intention to do so shall have been given the operator or landowner; (c) conduct such research or enter into contracts related to mining areas and the reclamation thereof as may be necessary to carry out the provisions of sections 93.46 to 93.50.

Subd. 5. For the purpose of information and to assist the commissioner in the proper enforcement of the rules and regulations promulgated under sections 93.44 to 93.51 each operator shall within 120 days of May 28, 1969, file with the commissioner a plan map in such form as shall be determined by the commissioner showing all existing mining areas or areas subjected to mining by said operator. Annually thereafter, on or before the 15th day of March, and until the operator's reclamation or restoration plan is approved pursuant to section 93.481, he shall file a plan map in similar form showing any changes made during the preceding calendar year and the mining area which he anticipates will be subjected to mining during the current calendar year. After approval of a permit to mine, the commissioner may periodically at such times as he deems necessary require additional reclamation or restoration information or plans from the operator.

93.48 VARIANCE.

The commissioner may, upon application by the landowner or mine operator, modify or permit variance from the established rules and regulations adopted hereunder if he shall determine that such modification or variance is consistent with the general welfare.

93.481 PERMIT TO MINE.

Subdivision 1. Prohibition against mining without a permit; application for a permit. Except as provided in this subdivision, after June 30, 1975, no person shall engage in or carry out a mining operation for metallic minerals within the state unless the person has first obtained a permit to mine from the commissioner. Any person engaging in or carrying out a mining operation as of the effective date of the rules promulgated under section 93.47 shall apply for a permit to mine within 180 days after the effective date of such rules. Any such existing mining operation may continue during the pendency of the application for the permit to mine. The person applying for a permit shall apply on forms prescribed by the commissioner and shall submit such information as the commissioner may require, including but not limited to the following:

(a) A proposed plan for the reclamation or restoration, or both, of any mining area affected by mining operations to be conducted on and after the date on which permits are required for mining under this section;

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

(c) A bond which may be required pursuant to section 93.49; and

(d) A copy of the applicant's advertisement of the ownership, location, and boundaries of the proposed mining area and reclamation or restoration operations, which advertisement shall be published in a legal newspaper in the locality of the proposed site at least once a week for four successive weeks before the application is filed.

Subd. 2. Commissioner's review; hearing; burden of proof. Within 120 days after receiving the application, or after receiving additional information requested, or after holding a hearing as provided in this section, the commissioner shall grant the permit applied for, with or without modifications or conditions, or deny the application. If written objections to the proprosed application are filed with the commissioner within 30 days after the last publication required pursuant to this section, by any person owning property which will be affected by the proposed operation or by any federal, state, or local governmental agency having responsibilities affected by the proposed operations, a public hearing shall be held by the commissioner in the locality of the proposed operations within 30 days of receipt of such written objections and after appropriate notice and publication of the date, time, and location of the hearing. The com-

missioner shall determine that the reclamation or restoration planned for the operation complies with lawful requirements and can be accomplished under available technology and that a proposed reclamation or restoration technique is practical and workable under available technology.

Subd. 3. Term of permit; amendment. A permit issued by the commissioner pursuant to this section shall be granted for the term determined necessary by the commissioner for the completion of the proposed mining operation, including reclamation or restoration. A permit may be amended upon written application to the commissioner. If the commissioner determines that the proposed amendment constitutes a substantial change to the permit, the person applying for the amendment shall publish notice in the same manner as for a new permit, and a hearing shall be held if written objections are received in the same manner as for a new permit. An amendment may be granted by the commissioner if he determines that lawful requirements have been met.

Subd. 4. Revocation, modification, suspension. A permit is irrevocable during its term except as follows:

(a) The permittee has not commenced substantial construction of plant facilities or actual mining and reclamation or restoration operations covered by the permit within three years of issuance of the permit;

(b) A permit may be cancelled at the request or with the consent of the permittee upon such conditions as the commissioner determines necessary for the protection of the public interests;

(c) Subject to the rights of the permittee to contest the commissioner's action under sections 14.57 to 14.59 and related sections, a permit may be modified or revoked by the commissioner in case of any breach of the terms or conditions thereof or in case of violation of law pertaining thereto by the permittee, his agents, or servants, or in case the commissioner finds such modification or cancellation necessary to protect the public health or safety, or to protect the public interests in lands or waters against injury resulting in any manner or to any extent not expressly authorized by the permit, or to prevent injury to persons or property resulting in any manner or to any extent not so authorized, upon at least 30 days' written notice to the permittee, stating the grounds of the proposed modification or revocation or providing a reasonable time of not less than 15 days in which to take corrective action and giving the permittee an opportunity to be heard thereon;

(d) By written order to the permittee the commissioner may forthwith suspend operations under a permit if he finds it necessary in an emergency to protect the public health or safety or to protect public interests in lands or waters against imminent danger of substantial injury in any manner or to any extent not expressly authorized by the permit, or to protect persons or property against such danger, and may require the permittee to take any measures necessary to prevent or remedy such injury. No suspension order under this clause shall be in effect more than 30 days from the date thereof without giving the permittee at least ten days' written notice of the order and an opportunity to be heard thereon.

Subd. 5. Assignment. A permit may not be assigned or otherwise transferred without the written approval of the commissioner.

Subd. 6. Reclamation rules required before issuance of a permit to mine. Except for taconite and iron ore mining permits, no permit to mine metallic minerals may be issued by the commissioner until rules relating to reclamation of metallic mineral minelands have been amended, or new rules adopted, under sections 93.44 to 93.51 and in the manner provided in chapter 14, for the reclamation of minelands of the class for which the permit application is submitted. This section does not apply to metallic minerals which are mined incidentally to the mining of a mineral included in any mineland reclamation rule and covered by the permit to mine which has been issued for the mining project.

93.49 BOND OF OPERATOR.

The commissioner shall require a bond or other security or assurance satisfactory to the commissioner from an operator who (a) fails to take reclamation measures set forth in the permit or any amendment thereto, (b) fails to comply with rules and regulations promulgated by the commissioner pursuant to section 93.47, or (c) fails to perform research which may be agreed upon by the permittee and the commissioner or required by sections 93.44 to 93.51, in regard to reclamation of mining areas under the control of the operator. The commissioner also may require a bond, security, or other assurance from an operator if the commissioner has reasonable doubts as to the operator's financial ability to comply with the rules and regulations relative to actions required to be taken after the completion of such mining operations or

any phase thereof. The commissioner shall review annually the need for and extent of each operator's bond under this section.

93.50 APPEAL.

Any person aggrieved by any order, ruling, or decision of the commissioner may appeal such order, ruling, or decision in the manner provided in chapter 14.

93.51 PENALTIES FOR VIOLATION.

Subdivision 1. If any person fails to comply with any provision of sections 93.44 to 93.51, or any rules or regulations promulgated pursuant to these sections, or any permit condition required by these sections or the rules or regulations, for a period of 15 days after notice of such failure, or the expiration of time for corrective action as provided for in section 93.481, subdivision 4, such person shall be liable for a civil penalty of not more than $1,000 for each and every day of the continuance of such failure. The commissioner may assess and collect any such penalty.

Subd. 2. Any person who knowingly and willfully violates or refuses to comply with any regulation, decision, order or ruling of the commissioner shall upon conviction be guilty of a gross misdemeanor. At the request of the commissioner, the attorney general may institute a civil action in a district court of the state for a restraining order or injunction or other appropriate remedy to prevent or preclude a violation of the terms and conditions of any rules or regulations promulgated hereunder. The district court of the state of Minnesota in which district the mining operation affected is conducted shall have jurisdiction to issue such order or injunction or to provide other appropriate remedies.

APPENDIX B.

IRON ORE AND TACONITE MINELAND RECLAMATION RULES (CHAPTER 6130)

IRON ORE AND TACONITE MINELAND RECLAMATION RULES

DEPARTMENT OF NATURAL RESOURCES

CHAPTER 6130
DEPARTMENT OF NATURAL RESOURCES
MINELAND RECLAMATION RULES
GENERAL PROVISIONS

6130.0100 DEFINITIONS.

Subpart 1. Acceptable research. "Acceptable research" means research that is site related, is reasonably designed for the purpose of demonstrating that the goals contained in part 6130.2000 can be achieved, is no larger than necessary to adequately demonstrate the proposed measures, and includes, for comparison, the standards specified in parts 6130.2400, item A; 6130.2500; 6130.2700, item A; and 6130.2900, which the proposed measures are intended to replace.

Subp. 2. Auxiliary facilities. "Auxiliary facilities" means all permittee-owned stationary physical property used in a mining operation, including: power plants and associated facilities; transmission lines; pipelines; roads; railroads; docks and associated facilities; borrow areas and leased borrow areas and associated facilities; blasting agent and fuel production or preparation facilities; and parking areas, shops, offices, buildings, structures, and storage facilities located within the area where mining is conducted. This does not include common carrier transportation facilities.

Subp. 3. Beneficiating plants. "Beneficiating plants" means all metallic mineral processing plants, such as crushers, mills, concentrators, agglomerating and sintering facilities, smelters, refineries, and other metal-making facilities.

Subp. 4. Commissioner. "Commissioner" means the commissioner of natural resources, or any duly authorized representative.

Subp. 5. Deactivation. "Deactivation" means the process of finally terminating and reclaiming any specific portion of a mining operation. Deactivation begins when, as prescribed in the permit to mine, all mining activities and uses have ceased and there will be no renewed use or activity by the permittee.

Subp. 6. Hereafter. "Hereafter" means after the effective date of these rules.

Subp. 7. Mine waste. "Mine waste" means any material, such as surface overburden, rock, lean ore, leach spoils or tailings which in the process of mining and beneficiation has been removed from the earth and stored elsewhere on the surface.

Subp. 8. Mining. "Mining" means the process of removing, stockpiling, processing, storing, transporting (excluding use of common carriers and public transportation systems), and reclaiming any material in connection with the commercial production of metallic minerals. This includes exploration activities such as the taking of large bulk samples.

Subp. 9. Mining area or area subjected to mining. "Mining area" or "area subjected to mining" means any area of land from which material is hereafter removed in connection with the production or extraction of metallic minerals, the lands upon which material from such mining is hereafter deposited, the lands upon which beneficiation plants and auxiliary facilities are hereafter located, lands upon which the water reservoirs used in the mining process are hereafter located, and auxiliary lands which are hereafter used or intended to be used in a particular mining operation.

Subp. 10. Mining operation. "Mining operation" means all of a mining project without regard to political, administrative, or ownership boundaries, which includes all of the facilities used in "mining" as defined in subpart 8.

Subp. 11. Natural resources. "Natural resources" means all mineral, animal, plant, air, water, land, timber, soil, quietude, recreational, historical, scenic, and aesthetic resources.

Subp. 12. Operator. "Operator" means any owner or lessee of mineral rights engaged in or preparing to engage in a mining operation.

Subp. 13. Permit to mine. "Permit to mine" means legal approval given by the commissioner to conduct a mining operation or a scram mining operation.

Subp. 14. Reclamation. "Reclamation" means the successful accomplishment of the goals in parts 6130.1000 to 6130.4100.

Subp. 15. Reference area. "Reference area" means a vegetated land unit which is designated for comparatively measuring reclamation vegetation success.

Subp. 16. Scram mining operation. "Scram mining operation" means a mining operation which produces natural iron ore or natural iron ore concentrates as defined by Minnesota Statutes, section 93.20, subdivisions 12 to 17, from previously developed stockpiles, tailings basins, underground mine workings, or open pits, which involves no more than 80 acres of land not previously affected by mining. Greater areas shall be allowed if the operator can demonstrate that impacts would be substantially the same as other scram operations. "Lands not previously affected by mining" means lands upon which mine wastes have not been deposited and lands from which materials have not been removed in connection with the production or extraction of metallic minerals.

Subp. 17. Stockpile. "Stockpile" means an accumulation of mine waste. It does not include tailings, basins, fossil fuel, finished product, or surge piles.

6130.0200 PURPOSE AND POLICY.

The purpose of parts 6130.0100 to 6130.6300 is to implement Minnesota Statutes, section 93.44 to 93.51 in order to control possible adverse environmental effects of mining, to preserve the natural resources, and to encourage the planning of future land utilization, while at the same time promoting the orderly development of mining, the encouragement of good mining practices, and the recognition and identification of the beneficial aspects of mining.

6130.0300 SCOPE.

Subpart 1. Persons currently engaged in metallic mining. Any person engaged in metallic mining shall apply for a mining permit or a scram mining permit within 180 days of the effective date of parts 6130.0100 to 6130.6300.

Subp. 2. Permits before commencement of operations. Any person hereafter intending to conduct a new mining operation or reactivate an inactive mining operation shall obtain a mining permit or a scram mining permit prior to commencing operations.

Subp. 3. Term of mining permit. The term of a mining permit shall be the period determined necessary by the commissioner for the completion of the proposed mining operation, based on information provided pursuant to part 6130.4300.

Subp. 4. Term of scram mining permit. The term of a scram mining permit shall not exceed five years.

Subp. 5. Iron as predominant extract in mining operations. These parts apply to metallic mining operations from which iron is the predominant metal extracted:

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

B. the following portions of existing mining operations:

(1) any portion of such operation which is hereafter created or used, provided that the siting requirements shall not apply to that portion already constructed;

(2) all of any existing tailings basin, settling pond or water reservoir (including dams, dikes, deltas, beaches, seepage control structures, and water control devices) where any portion thereof is hereafter used for the deposition of tailings or sediment or for water storage; provided that the siting requirements shall not apply; and

(3) all existing permittee-owned power plants and associated facilities, transmission lines, pipelines, docks and associated facilities, and railroads shall comply only with the deactivation, reporting, and procedural requirements of parts 6130.4100, 6130.4200 to 6130.4700, and 6130.5400.

Subp. 6. Waiver. When part of any mining area is included in the mining and reclamation plans of two or more persons who are not copermittees, that portion of the reclamation requirements which is the responsibility of the persons who first performs the mining may be waived by the commissioner provided:

A. subsequent disturbance by another operator is scheduled, according to such operator's permit to mine;

B. the operator who will perform subsequent mining presents plans, and accepts responsibility for the performance of any necessary reclamation which may be incurred as a result of the previous mining operation; and

C. no significant environmental damage is likely to occur as a result of the waiver.

Subp. 7. Effect on other rules, statutes, or ordinances. Nothing in these parts waives the requirements of any other applicable rules of the Department of Natural Resources or any other agency or governmental unit or of any other applicable statute or ordinance.

Subp. 8. Conflict in rules. Where these parts conflict with other applicable statutes, rules, and ordinances, the most restrictive provision shall apply.

Subp. 9. Other rights. Subject to Minnesota Statutes, section 93.47, subdivision 3, these parts shall be subject to any rights existing pursuant to any permit, license, lease, or other valid existing authorization issued by the commissioner, the Minnesota Pollution Control Agency, or any other governmental entity or their predecessors office.

6130.0400 SEVERABILITY.

If any provision of these parts is held invalid, such invalidity shall not affect any other provision of the rules which can be given effect without the invalid provision, and to this end the provisions of these parts are declared to be severable.

TACONITE AND IRON ORE RECLAMATION STANDARDS

6130.1000 SITING GOALS.

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

6130.1100 GENERAL CRITERIA FOR SITE SELECTIONS.

Portions of a mining operation for which there is flexibility in site selections, such as stockpiles, tailings basins, water reservoirs, processing plants, offices, interconnecting roadways and auxiliary facilities, shall be sited so that:

A. impacts on the public due to wind erosion, noise, and air emissions are minimized;

B. potential injury to life, property, and natural resources due to dam or slope failure is minimized;

C. major modifications of watersheds, including diversions of surface water and alterations of groundwater levels are minimized;

D. runoff and seepage can be managed to minimize environmental effects;

E. spilled material resulting from pipeline rupture or emergency release can be contained and controlled;

F. former mining areas are used in preference to areas undisturbed by mining; and

G. conflicts with natural resource sites identified by the commissioner such as those listed in V 21 Natural Resources Sites, Minesite Data Manual, Minnesota Department of Natural Resources are minimized.

6130.1200 EXCLUSION AREAS FOR MINING.

No mining shall be conducted within any of the following areas unless the commissioner determines that a state or national emergency exists which would require the exploitation of the mineral resources within such areas:

A. On and within one-fourth mile of:

(1) the Boundary Waters Canoe Area, as defined in chapter 6140;

(2) state or national wilderness areas;

(3) state or national parks and national monuments, except where such areas are established as a result of their association with mining.

B. Within a national, wild, scenic, or recreational river district or within one-fourth mile of a national wild, scenic, or recreational river (whichever is greater); and within a designated state land use district or within one-fourth mile of any state wild, scenic, or recreational river (whichever is greater), however, underground mining may be permitted to the extent consistent with the governing Wild and Scenic Rivers Act and the rules promulgated thereunder.

C. On sites designated in the state Registry of Historic Sites or National Register of Historic Places, except where such areas are established as a result of their association with mining, and on designated state scientific or natural areas.

D. Within 300 feet of any state designated trout stream, any river listed in Minnesota Statutes, section 85.32, subdivision 1, and the Redwood, Yellow Medicine, Chippewa, Bois de Sioux, Red River of the North, Roseau, Rainy, Vermilion, Kawishiwi, and Pigeon rivers.

E. Within 400 feet of any natural watercourse located within the area defined by the federal Shipsted-Newton-Nolan Act, United States Code, title 16, sections 577 to 577b.

F. Within any lake greater than 80 acres in size and any stream trout lake designated by the commissioner.

G. Within that area adjacent to the north shore of Lake Superior classified as the lake orientation zone in the DNR report North Shore Characterization Study. However, within this zone existing processing and by-product disposal shall be allowed at Silver Bay. The storage and transshipment of product and fuel, and docks and associated facilities shall be allowed at Duluth, Two Harbors, Silver Bay, and Taconite Harbor. The removal of ore by underground mining within this zone may be permitted subject to conditions prescribed by the commissioner when such mining can be conducted in a manner consistent with these parts.

H. Within the following setback areas containing dwellings, buildings, roads, or facilities which are in existence prior to the issuance of a permit to mine:

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

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

I. Within any area except federal areas added to the categories listed in part 6130.1200 which is designated hereafter but prior to the issuance of a permit to mine involving such area provided that such designation is made by a process which includes a public hearing.

6130.1300 AVOIDANCE AREAS FOR MINING.

When there is a feasible and prudent alternative, no mining shall be conducted within the following areas:

A. Within any national wildlife refuge or waterfowl production area, state wildlife management area or on lands designated as national natural landmarks or national trails or any state designated trail listed in Minnesota Statutes, section 85.015.

B. Within any shorelands defined in Minnesota Statutes, section 105.485, subdivision 2 for which county or municipal shoreland management ordinances have been established in compliance with Minnesota Statutes, section 105.485.

C. Within that area near the north shore of Lake Superior classified as the transition zone in the DNR report North Shore Characterization Study.

D. Within any area added to the categories listed in this part which is designated hereafter but prior to the issuance of a permit to mine involving such area.

6130.1400 IN-MINE DISPOSAL.

Subpart 1. Goals. Mining shall be conducted to maximize use of past, present, and future mining areas so as to minimize the amount of land disturbed by mining and reduce the loss of non-mineral resources.

Subp. 2. Requirements. Requirements:

A. The commissioner may require in-mine disposal of mine waste.

B. Mining methods and schedules shall be used which provide areas for waste disposal at the earliest opportunity.

C. The commissioner will consider factors such as the following to determine the extent to which in-mine disposal shall be required:

(1) the ease of reclamation;
(2) pollution potential;
(3) public safety and welfare;
(4) natural resource preservation;
(5) land use demands;
(6) ownership of the minerals;
(7) mineral resource values; and
(8) physical and economic feasibility.

D. Mine waste which is placed within an open pit mine below the ultimate pit water elevation shall be exempted from the requirements of parts 6130.2000 to 6130.3600. These shall be designed and constructed to prevent adverse environmental effects.

6130.1500 BUFFERS AND BARRIERS.

Subpart 1. Goals. A mining operation shall be designed, constructed, and maintained so that the operation is compatible with surrounding nonmining uses.

Subp. 2. Requirements. Requirements:

A. Naturally existing terrain and vegetation, or vegetated mine waste which appear similar to natural terrain shall be used to minimize problems such as: noise, dust, and chemical air pollutants, view, mine traffic, access, and erosion.

B. Buffering shall be implemented prior to beginning operations in a portion of a mining area that needs buffering.

C. Buffers may be constructed within the setback areas described in part 6130.1200, item H provided their primary purpose fulfills part 6130.1500.

6130.2000 GOALS OF SLOPING AND LANDFORM DESIGN.

Landforms shall be designed and constructed to complement nearby natural terrain, minimize adverse water quality and quantity effects on receiving waters, enhance the survival and propagation of vegetation, be structurally sound, control erosion, promote early completion and progressive reclamation, and encourage the prompt conversion from mining to an approved subsequent use.

6130.2100 STOCKPILE DESIGN AND CONSTRUCTION STANDARDS.

All stockpiles shall be designed and constructed according to the following standards:

A. Existing stockpiles shall be incorporated or extended to the extent possible.

B. Water shall be drained away from the top of any stockpile in a manner which will not adversely affect the structural stability of the stockpile and will minimize erosion.

C. All runoff and drainage control measures shall be designed to withstand a 100-year frequency, 24-hour duration storm as developed using good hydraulic and hydrologic practices.

D. If runoff from stockpiles has caused or is likely to cause violations of water quality standards, the runoff shall be collected and held in a settling basin until it meets, or is treated to meet, effluent limitations.

E. Runoff or drainage controls shall be designed by a qualified person proficient in hydrologic analysis and water channel design.

F. When a water quality problem has occurred or is likely to result from leaching of stockpiled material, the commissioner shall require one or more of the following based on the type of material and the nature and location of the problem:

(1) the design of a monitoring system and the monitoring of water quality;
(2) the construction of an impermeable base pad to isolate the stockpile from the groundwater;
(3) the construction of a permeable base pad containing soil material capable of absorbing and holding the toxic materials in the leachates;
(4) the diversion of surface waters around and away from the stockpile;

(5) covering of stockpiles to minimize the infiltration of precipitation;
(6) the use of internal layers of soil or other material to hold the toxic materials in the leachate;
(7) the use of material which controls pH of the leachate; and
(8) the collection and treatment of leachate.

6130.2200 MANAGEMENT OF RUNOFF.

Mining areas shall be managed so that watershed modifications are minimized. Runoff from these areas shall be discharged without injury to life, property, and natural resources. Upon deactivation, any runoff from drainage areas altered by mining shall be discharged into receiving waters within the same watershed as existed before mining. When conditions do not allow discharge into the premining watershed, runoff shall be discharged at locations, and in volumes and rates which can be accepted by the receiving waters without injury to life, property, and natural resources.

6130.2300 EXAMINATION BY ENGINEER.

When mine waste is deposited on areas with unstable foundations such as peat, muskeg, bedded lacustrian deposits, fault zones, and areas above underground mine workings, an engineer shall examine the foundation and design the landforms to be stable.

6130.2400 STANDARDS FOR ROCK, LEAN ORE, AND COARSE TAILINGS STOCKPILES.

Rock, lean ore, and coarse tailings stockpiles, unless they are an integral part of a tailings impoundment, shall be designed and constructed according to either of the following standards:

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

(1) no lift shall exceed 30 feet in height;

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

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

(4) benches shall be designed and constructed to control runoff;

(5) when vegetation is required pursuant to part 6130.3600, subpart 2, item D, the sloped areas between benches shall be prepared to support vegetation; and

(6) when the sloped area between benches is covered with surface overburden and vegetated, lifts may be raised to a maximum of 40 feet.

B. Based upon acceptable research the commissioner shall approve other measures which satisfy parts 6130.2000 to 6130.3000.

6130.2500 SURFACE OVERBURDEN.

A minimum of two feet of surface overburden shall be placed upon the completed portions of each bench and top of any rock, lean ore, or coarse tailing stockpile and upon other portions of such stockpiles for which vegetation has been required or approved. Based upon acceptable research the commissioner shall approve other measures which satisfy part 6130.2000.

6130.2600 SPECIAL TREATMENT OF STOCKPILES WITH RAPIDLY DECOMPOSING MATERIALS.

Rock, lean ore, or coarse tailings stockpiles consisting of rapidly decomposable material which is susceptible to wind or water erosion or highly erodable soils shall receive treatment such as:

A. covering with less erodable material;
B. shortening or flattening the slopes; and
C. vegetating the slopes.

6130.2700 STANDARDS FOR SURFACE OVERBURDEN STOCKPILE DESIGN AND CONSTRUCTION.

Surface overburden stockpiles shall be designed and constructed according to either of the following standards:

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

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

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

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

(4) Benches shall be sloped toward the interior to control runoff. They shall be large enough to handle runoff water until it can be infiltrated into the stockpile, or a drainage control system shall be constructed to remove water consistent with part 6130.2100, items B and C.

(5) Rock, lean ore, or coarse tailings shall not be used to cover surface overburden stockpiles in order to avoid compliance with sloping and vegetation requirements. This shall not preclude the abutting of rock, lean ore, or coarse tailings stockpiles with surface overburden stockpiles, or the placement of rock, lean ore, or coarse tailing lifts atop surface overburden pads or lifts.

B. Based upon acceptable research the commissioner shall approve other measures which satisfy part 6130.2000.

6130.2800 SEPARATION OF MATERIALS IN STOCKPILES.

Iron formation and Duluth complex formation materials of varying grades and types shall be segregated within the same stockpile or placed in separate stockpiles. Materials which require different means of beneficiation shall not be commingled.

6130.2900 STANDARDS FOR DESIGN AND CONSTRUCTION OF SURFACE OVERBURDEN PORTIONS OF PITWALLS.

Surface overburden portions of pitwalls shall be designed and constructed to either of the following standards:

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

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

(2) lift heights shall range from 40 to 60 feet and shall be selected based on the need to protect public safety; the location of the pitwall in relation to the surrounding land uses; the soil types and their erosion characteristics; the variability of overburden thickness; and the potential uses of the pit following mining;

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

(4) benches shall be sloped into the overburden to control runoff. They shall be large enough to handle runoff water until it can infiltrate into the slope, or a drainage control system shall be constructed to remove water consistent with part 6130.2100, items B and C.

B. Based upon acceptable research the commissioner shall approve other measures which satisfy part 6130.2000.

6130.3000 DESIGN, CONSTRUCTION, AND OPERATION OF TAILINGS BASINS.

Tailings basins shall be designed, constructed, and operated according to the following:

A. The storage of tailings within an approved site shall be maximized while meeting part 6130.2000.

B. A means of draining the pond area and managing runoff shall be provided consistent with part 6130.2200.

C. During the mining operation dust generation shall be minimized by maximizing the area of permanently reclaimed tailings. The remaining active tailings areas shall be covered with water to the maximum extent possible and beach areas shall be temporarily stabilized consistent with part 6130.3700.

D. Tailings basins shall be designed by registered professional engineers proficient in geotechnical and other aspects of design, construction, operation, and maintenance of tailings basins. The construction, operation, and maintenance of basins shall be periodically reviewed by such engineers to ensure compliance with the design.

6130.3500 GOALS OF VEGETATIONS.

Vegetation shall be established to control erosion, prevent and control leaching of toxic substances, screen mining areas from noncompatible uses, and provide wildlife habitat or other uses such as pasture or timber land.

6130.3600 VEGETATION REQUIREMENTS.

Subpart 1. Location of vegetation. Vegetation shall be established on the following:

A. surface overburden stockpiles;

B. exposed soils along diversion channels and roads;

C. cuts, pits, trenches, and other areas disturbed during the process of obtaining borrow materials or bulk samples, except those entirely included in larger mining landforms;

D. benches and tops of rock and lean ore stockpiles;

E.. tailings basins;

F. dikes and dams;

G. exposed soils adjacent to water reservoirs;

H. areas exposed or disturbed during deactivation procedures such as building sites, parking lots, pipeline routes, storage areas, transmission routes, and roads not used for subsequent access;

I. surface overburden portions of pitwalls;

J. buffers and barriers; and

K. subsided areas not permanently covered by water.

Subp. 2. Other vegetative measures. Other vegetative measures shall be undertaken, as necessary, to:

A. control access to pits and other hazardous areas, for safety purposes;

B. Control wind erosion, provide buffering and enhance the establishment of approved specific subsequent uses, through the development of plant communities with specific density and composition;

C. control dust on temporarily inactive tailings basins to which the non-vegetative methods prescribed pursuant to part 6130.3700 are not being applied;

D. provide aesthetic and compatible areas on rock, lean ore, and coarse tailings stockpile slopes, within one-fourth mile of residential and designated public use areas, except designated trails; and

E. control the quality of water which would otherwise contact rapidly decomposable material or material subject to leaching.

Subp. 3. Timing and techniques of vegetation establishment. The establishment of vegetation shall be initiated during the first normal planting period following the point when according to the permit to mine, a surface, structure, facility, or element is no longer scheduled to be disturbed or used in a manner that would interfere with the establishment and maintenance of vegetation, or after it has otherwise been required, using techniques such as grading, disking, or chisel plowing to reduce compaction, seeding or planting, fertilizing, mulching, and irrigating.

Subp. 4. Vegetation standards. The following standards apply to the areas listed in subpart 1:

A. After three growing seasons following the point when according to the permit to mine, a surface, structure, facility, or element is no longer scheduled to be disturbed or used in a manner that would interfere with establishment and maintenance of vegetation, a 90 percent ground cover, consisting of living vegetation and its litter, shall exist on all areas, except slopes which primarily face south and west. Such sloped areas shall attain the 90 percent ground cover requirement within five growing seasons following the point when initiation of vegetation is required. Where this standard is not met, or where unvegetated rills or gullies more than nine inches deep form and erosion is occurring, the surface shall be repaired and replanted during the next normal planting period.

B. Within ten growing seasons after the point when according to the permit to mine, a surface, structure, facility, or element is no longer scheduled to be disturbed or used in a manner that would interfere with the establishment and maintenance of vegetation, an area shall have a vegetative community

with characteristics similar to those in an approved reference area. The vegetation on a reference area may be either planted or naturally occurring. For the purpose of controlling erosion, it shall be self-sustaining, regenerating, or a stage in a recognized vegetation succession which provides wildlife habitat or other uses such as pasture or timber land. Reference areas must be representative of the site conditions and possible uses which might exist on mining landforms. No release pursuant to parts 6130.3800 and 6130.3900 shall be granted until the area has such characteristics.

6130.3700 AIR POLLUTION.

Subpart 1. Goal. Mining shall be managed to control avoidable dust.

Subp. 2. Requirement. Avoidable dust shall be controlled by techniques such as water spray, chemical binders, anchored mulches, vegetation, and enclosure and containment.

6130.3800 GOALS OF BLASTING.

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

6130.3900 BLASTING REQUIREMENTS.

Subpart 1. Air overpressure standards. Air overpressure standards:

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

B. All open pit blasts shall be monitored by the operator. Monitoring stations shall be located adjacent to the nearest structure located on lands not owned or controlled by the permittee, and where the commissioner deems necessary to investigate complaints. Scram operators are not required to conduct air overpressure monitoring except as required for complaint investigation.

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

(1) date and time of blast;
(2) type of explosive used;
(3) ignition layout with locations of blast holes and time intervals of delay;
(4) pounds of explosives per each delay of eight milliseconds or more;
(5) total pounds of explosives;
(6) type of material blasted;
(7) monitoring locations and results of monitoring when conducted;
(8) meteorological conditions, including temperature inversions, wind speed, and directions as can be determined from the U.S. Weather Bureau, and ground-based observations;
(9) directional orientation of free faces of bench to be blasted; and
(10) other information which the commissioner finds necessary to determine if the standards of this part and part 6130.3800 are achieved.

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

E. Blasting shall take place only during daylight hours unless a hazardous condition requires blasting at another time.

Subp. 2. Ground vibration control. Ground vibration control:

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

B. The permittee shall either:

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

(2) utilize the scale distance formula $W = (d/60)^2$ where: W = the charge weight per delay (eight milliseconds or more), and d = the distance (in feet) from the blast to the nearest structure located on lands not owned or controlled by the permittee to determine the weight of allowable explosive per decay.

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

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

Subp. 3. Retention of monitoring data. All monitoring data collected shall be saved for a period of six years and made available to the commissioner upon request.

6130.4000 SUBSIDENCE AND OTHER SURFACE DISPLACEMENT.

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

Subp. 2. Requirements. Techniques shall be employed which prevent slumping and heaving.

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

After subsidence has ceased, affected areas shall be contoured or filled to remove hazards, and where necessary to protect public health and safety or natural resources, a drainage system shall be established in a manner consistent with part 6130.2200.

6130.4100 DEACTIVATION AND RELEASE.

Subpart 1. Goal. The mining area shall be deactivated so that it is nonpolluting, is stable, is free of hazards, minimizes the need for fencing, has current land use and future land use potential which recognizes the needs of the surrounding area, and is maintenance free to the maximum extent possible.

Subp. 2. Requirements. Requirements:

A. At least two years prior to deactivation of any portion of the mining area, proposed subsequent uses shall be presented to the commissioner for approval, pursuant to part 6130.5000. The proposed uses shall be selected based on:

(1) compatibility of adjacent uses;
(2) the needs of the area;
(3) the productivity of the site;
(4) projected land use trends;
(5) public health and safety;
(6) pollution of air and water; and
(7) compatibility with local land use plans and plans of the surface owners.

B. The mining area shall be managed during deactivation to achieve the approved subsequent uses.

C. Within one year after deactivation begins, or within such longer period which may reasonably be necessary to accomplish these activities, debris and mobile equipment which will not be used for reclamation shall be removed from the area being deactivated.

D. Within three years after deactivation begins, or within such longer period which may reasonably be necessary to accomplish these activities the following shall be accomplished:

(1) removal of roads, parking areas, and storage pads except those the commissioner deems necessary for access;

(2) permittee-owned power plants and associated facilities (except public utilities), transmission lines, pipelines, docks and associated facilities, and railroads (except common carrier transportation facilities) shall be removed or provisions made for continued subsequent use in accordance with an approved deactivation plan pursuant to part 6130.5400; and

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

E. Exposed underground mine workings shall be promptly sealed as approved by the commissioner and the county mine inspector.

F. Within three years after deactivation of an open pit begins, the following shall be accomplished:

(1) establishment of at least one safe access to the bottom of the pit;

(2) construction of fences for safety where required by the commissioner or the county mine inspector; and

(3) where open pits contain materials which may become a water quality problem due to leaching, the commissioner shall require one or more of the following:

(a) monitoring pit water quality;
(b) removing or covering leachable material;
(c) grouting leachable areas;
(d) rapid filling of the pit with water;
(e) using material to control pH or other toxic materials in the pit water;
(f) treating the water discharged from the pit; and
(g) continuing maintenance after deactivation.

G. Within three years after deactivation of a tailings or settling basin begins, or within such longer period which may reasonably be necessary for the accomplishment of these activities, the permittee shall in a manner consistent with part 6130.2200:

(1) drain surface water from the basin unless the commissioner permits or requires the retention of water in specific areas within the basin for water storage, wildlife habitat, or other purposes;

(2) shape and contour the surface to ensure permanent drainage away from the interior of the basin in a manner which will not result in erosion or adversely affect structural stability, and to maximize topographic relief; and

(3) make provisions for the continued maintenance of all dams and overflow or seepage control structures.

H. Within three years after the commencement of deactivation of a reservoir, or within such longer period which may reasonably be necessary to accomplish these activities, the permittee shall in a manner consistent with part 6130.2200:

(1) drain the reservoir and reintegrate the area into the natural watershed, pursuant to item G; or

(2) make provisions for the continued maintenance of all dams and overflow or seepage control structures.

When continued maintenance is necessary after deactivation, pursuant to parts 6130.1000 to 6130.4100, and as a condition for release pursuant to part 6130.4700, operating plans, schedules, and funding arrangements for providing the maintenance shall be submitted to the commissioner.

PERMIT REQUIREMENTS

6130.4200 PERMIT TO MINE METALLIC MINERALS.

Subpart 1. In general. No person shall carry out a mining operation for metallic minerals in this state without first obtaining a permit to mine from the commissioner. Where two or more persons are or will be engaged in a mining operation, all such persons shall join in the application and the permit to mine shall be issued on a joint basis. Where a person is or will be engaged in only a portion of the operation, that person need only be a joint permittee in the portion in which that person is participating.

Subp. 2. Mines in operation on effective date of rules. A person conducting a mining operation on the effective date of these rules, who applied for a permit to mine within 180 days, after that date, may continue to conduct such operation during the pendency of the application.

Subp. 3. Application contents. Applications shall include, pursuant to part 6130.4300: documents, organizational data, environmental setting maps, environmental setting analysis, mining and reclamation maps, mining and reclamation plan, and operating plan covering the current or immediate upcoming planning period.

Subp. 4. Mine with life of five years or less. If the life of the mine will be five years or less, the application and deactivation plan may be combined, pursuant to part 6130.4600.

Subp. 5. Information required after permit issued. After receiving a permit to mine, the permittee shall provide the commissioner with the following, pursuant to parts 6130.4400 to 6130.4700: operating plans for succeeding years of operation, annual reports, a deactivation plan, and a request for release.

Subp. 6. Combined documents. When the submittal dates for annual reports and operating plans correspond, they may be combined into one document.

6130.4300 PERMIT APPLICATIONS.

Subpart 1. In general. An application for a permit to mine shall be submitted in duplicate by the applicant to the commissioner in the form hereby prescribed.

An application for a mining permit shall include all information pursuant to this part. An application for a scram mining permit shall include all information, pursuant to subparts 2, 3, 6, and 7.

Subp. 2. Documents. The following documents are required:

A. a certificate or evidence of insurance, as required in Minnesota Statutes, section 93.481, subdivision 1, clause (b);

B. the notice and affidavit of publication, pursuant to part 6130.4800, subpart 1:

C. if the applicant is a foreign corporation, as defined by Minnesota Statutes, sections 300.02 and 303.02, a certified copy of the certificate of authority to transact business in the state of Minnesota; and

D. financial and income statements from all applicants for the previous three years, consisting of annual reports or, if annual reports are not available, a similar statement describing financial capability to perform reclamation obligations.

Subp. 3. Organizational data. The following organizational data are required:

A. the post office address of the applicant;

B. the general organizational structure of the applicant, any parent companies, owners, principal stockholders, partners, and joint venturers;

C. any managing agents or subsidiaries which are or may be involved in the mining operation; and D. organizational relationships between or among joint applicants.

Subp. 4. Environmental setting maps. The commissioner shall make available to the applicant, at the applicant's expense, copies of all relevant publication information in his possession for the applicant's use in preparing environmental setting submissions. The applicant shall submit the following information on overlays to 7-1/2 minute USGS quadrangle or other maps of the same scale delineating the mining area. maps shall include such adjacent lands as required by the commissioner, to show the areas directly or indirectly affected by the mining operation. Overlays shall include:

A. Bedrock geology, including the general shape of orebody and known or inferred reserves and resources within and adjacent to the mine area. Appropriate cross-sections which show the horizontal and vertical relationships shall also be included.

B. Water basins, water courses, and wetlands which are or could be affected by the mining operation.

C. Boundaries of watersheds which are or could be affected by the mining operation.

D. Details of ground water conditions based on best available information and exploratory drill holes.

E. Natural resource sites identified by the commissioner, such as those listed in Minesite Data Manual, V21 Natural Resources Sites, Minnesota Department of Natural Resources.

F. A forest inventory, including species, density, size class, and height

G. A soil inventory including soil type, extent, and thickness.

H. Past mining facilities including stockpiles, tailings basins, mines, and processing plants.

I. Surface ownership of record within the mining area, and severed mineral ownership as set forth in verified statements pursuant to Minnesota Statutes, section 93.52 or in an order or decree pursuant to Minnesota Statutes, section 93.55, Subdivision 2, filed in the county recorder's office with respect to severed mineral interests in parts of the mining area which will be excavated or covered with mine wastes. An owner's agent may be identified in place of the owner. No error in the designation of surface or mineral ownership shall affect the validity of the application. This requirement shall not apply to lands occupied by existing railroads not located in mine or plant areas.

K. Exclusion, avoidance, and setback areas, pursuant to parts 6130.1000 to 6130.1300.

Subp. 5. Environmental setting analysis. Based on the environmental setting data submitted pursuant to subpart 4, the applicant shall provide the commissioner with an environmental analysis including:

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

B. an explanation of the basis for siting those parts of operation which will be developed hereafter, including a description of the positive and negative aspects of all sites considered, and how the selected site will aid in the attainment of the reclamation goals.

Subp. 6. Mining and reclamation maps. The applicant shall submit maps and cross-sections containing all features normally found on a USGS quadrangle map, at a scale which is normally used by the operator for the mine planning purposes, which:

A. define the shape and extent of the orebody which will support the operating life of the mine;

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

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

D. depict the detailed drainage patterns for waters which may contact leachable materials; and

E. depict at appropriate intervals, approved by the commissioner, the status of:

(1) mining the ore body;

(2) watershed modifications (including changes in the boundaries, diversions, disposition of surface water flows, and runoff);

(3) construction (including shape, extent, and content) and reclamation (including contouring, dust control, temporary stabilization, vegetation, and deactivation) of each: stockpile, tailings basin, mine, reservoir, dam, diversion channel, drainage control, settling basin, and auxiliary facilities.

Subp. 7. Mining and reclamation plan. This plan shall describe:

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

B. the mining activities to be conducted, including:

(1) the types, amounts, sequence, and schedule for mining the orebody and stockpiling materials, including the distinctions among ore, lean ore, and waste rock; a discussion of in-mine disposal; and the physical and chemical character of mine waste; and

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

C. the methods, sequence, and schedules of reclamation which address the goals and meet the requirements of parts 6130.1000 to 6130.4100, including anticipated reclamation research.

6130.4400 MINE OPERATING PLAN.

The permittee shall submit to the commissioner in duplicate an operating plan covering a forthcoming period, which does not exceed five years in length. The operating plan shall consist of the plans normally prepared for the mining operation which shall include the following:

A. any changes in the rate of mining or minable reserves pursuant to part 6130.4300, subpart 7, item A;

B. the mining activities pursuant to part 6130.4300, subpart 7, item B;

C. the reclamation activities pursuant to part 6130.4300, subpart 7, item C; and

D. a map in the form prescribed by part 6130.4300, subpart 6, which depicts the status of mining, construction, reclamation, and watershed modifications pursuant to part 6130.4300, subpart 6, item E.

Subsequent plans shall be submitted 90 days before the end of the prior plan.

6130.4500 ANNUAL MINING REPORT.

The permittee shall submit for the previous year an annual report to the commissioner in duplicate on or before January 31 of each year. The report shall detail:

A. annual financial and income statements for the preceding fiscal year pursuant to part 6130.4300, subpart 2, item D;

B. the actual rate of mining and the remaining minable reserves pursuant to part 6130.4300, subpart 7, item A and consistent with part 6130.4400, item A;

C. the actual mining activities pursuant to part 6130.4300, subpart 7, item B, and consistent with part 6130.4400, item B;

D. the actual reclamation activities pursuant to part 6130.4300, subpart 7, item C and consistent with part 6130.4400, item C; and

E. a map in the form prescribed by part 6130.4300, subpart 6, which depicts the status of mining, construction, reclamation, and watershed modifications pursuant to part 6130.4300, subpart 6, item E.

6130.4600 PLAN FOR DEACTIVATION.

Subpart 1. The permittee shall submit to the commissioner, in duplicate, a deactivation plan at least two years prior to beginning deactivation for any portion of the mining area. This plan shall replace the operating plan for the portion to be deactivated and shall contain:

A. plans, designs, specifications, and supporting data for reclamation activities which comply with parts 6130.1000 to 6130.4100;

B. a reclamation compliance schedule; and

C. a discussion of how the land will be managed until the permittee requests release pursuant to part 6130.5400.

Subp. 2. Review of Deactivation Plan. The commissioner shall review the deactivation plan to determine if it complies with the requirements of the permit to mine and these rules, in the same manner as if the commissioner had received an application for an amendment pursuant to part 6130.5000.

6130.4700 REQUEST FOR RELEASE.

Subpart 1. Proceedings. A proceeding to release the permittee from responsibility on any portion of a deactivated mining area is commenced when the permittee submits to the commissioner, in duplicate, a request for release. This request shall include the following:

A. certification of compliance with the applicable sections of these rules, the approved deactivation plans, and the permit to mine;

B. a detailed description of provisions for continued maintenance;

C. identification of the ownership of the mining area and all remaining structures and facilities; and

D. a map in the form prescribed by part 6130.4300, subpart 6, which depicts the following:

(1) the final topography;

(2) the postmining drainage system including the amounts and locations of discharge to receiving waters;

(3) the extent and type of vegetation;

(4) the existing and expected level of pit water and the year in which this level will be reached;

(5) the location of the safe access to the bottom of the pit;

(6) the location of fences and other access barriers; and

(7) the areal extent and (as applicable) the height, depth, and physical and chemical characteristics of each stockpile, tailings basin, mine, reservoir, dam, diversion channel, drainage control structure, settling basin, and the location of all auxiliary facilities within the mining area.

PROCEDURES AND AMINISTRATIVE STANDARDS

6130.4800 PROCEDURES FOR OBTAINING A PERMIT TO MINE.

Subpart 1. Application and publication. The process for requesting a permit to mine is commenced by submitting an application to the commissioner pursuant to parts 6130.1000 to 6130.4700. After the commissioner determines the application is complete, the applicant shall publish an advertisement as required by part 6130.5700. Within seven days after the last date of publication, the applicant shall submit to the commissioner a copy of the advertisement and an affidavit from the printer verifying publication. The application shall then be considered filed.

Subp. 2. Determination with hearing. Determination with hearing:

A. Written objections and a request for a hearing may be filed with the commissioner according to provisions of Minnesota Statutes, section 93.481, subdivision 2.

B. Within ten days after the receipt of the objections, the commissioner shall determine whether the person filing the objection is entitled to object. If the objections were filed by a person entitled to object, the commissioner shall:

(1) Select a hearing date which shall be no more than 30 days after the last date of opportunity to object.

(2) Serve an order for hearing in the form and manner required by the provisions of part 1400.5600, except those in part 1400.5600, subpart 3 which shall not apply. In no event shall such an order be served less than 20 days prior to the hearing.

(3) Mail a copy of the order for hearing to all persons who filed objections and all local units of government in which all or a part of the operation is located.

(4) Publish notice of subject, time, date, and place of the hearing at least once prior to the hearing in a newspaper which must be both a legal newspaper, within the meaning of Minnesota Statutes, section 331.02, and circulated in the locality of the proposed mining operation.

If the objections were filed by a person not entitled to object, the commissioner shall notify him in writing by mail of such determination giving reasons therefore.

C. The commissioner may hold a hearing on the proposed application without receipt of objections if he deems it necessary to protect public health, safety, and welfare.

D. Within 120 days after the close of the hearing record, or 90 days after service of the hearing examiner's report whichever comes later, the commissioner shall grant the permit to mine with or without modifications or conditions or deny the permit to mine stating reasons therefore.

Subp. 3. Determination without hearing. Determination without hearing:

A. If, within 30 days after the last publication required by part 6130.5700, no objections to an application are received from persons entitled to object, the commissioner within 120 days, may without hearing process the application in accordance with the following:

(1) grant the permit to mine with or without modifications or conditions;

(2) deny the permit to mine stating reasons therefore; or

(3) request in writing that the applicant provide additional information.

B. If the commissioner has made a request for additional information within 120 days after receiving such information, the commissioner shall grant the permit to mine with or without modifications or conditions or deny the permit to mine stating reasons therefore.

Subp. 4. Hearing upon demand of applicant. Hearing upon demand of applicant:

A. If the commissioner processes the application without a hearing, the applicant may, within 30 days after mailed notice of the commissioner's order on the application, file with the commissioner a demand for hearing pursuant to Minnesota Statutes, chapter 14. The application shall thereupon be fully heard on notice.

B. Within 120 days after the close of the hearing record or 90 days after service of the hearing examiner's report, whichever comes later, the commissioner shall grant the permit to mine with or without modifications or conditions or deny the permit to mine stating reasons therefore.

Subp. 5. Review of operating plan. After granting the permit to mine, the commissioner shall review the operating plan required by part 6130.4400, to determine if it complies with the provisions of the permit to mine and these rules. Upon completion of this review, the commissioner shall inform the permittee regarding compliance of the plan with the permit to mine and these parts.

6130.4900 VARIANCES.

Subpart 1. Application for variance. A proceeding for requesting a variance from these rules is commenced when the permit applicant or permittee files an application for a variance with the commissioner. The application shall include information necessary for the commissioner to determine that the proposed variance is consistent with the general welfare and the goals of these rules.

Subp. 2. Determination by commissioner. Within 30 days after receipt of the application, the commissioner shall determine whether the proposed variance constitutes a substantial change from the requirements of these parts.

If the commissioner determines that a substantial change would result, the applicant shall follow the procedures for permit to mine applications, as set forth in part 6130.4800.

If the commissioner determines that there would be no substantial change the commissioner shall without a hearing allow the variance with or without additional terms or conditions which are consistent with these parts, or deny the applications stating reasons therefore.

Subp. 3. Demand for a hearing. If the commissioner processes the application without a hearing, pursuant to subpart 2, the applicant may file with the commissioner a demand for hearing on the decision pursuant to part 6130.4800, subpart 4.

Subp. 4. Simultaneous filing of applications. Applications for variance from these rules may be filed simultaneously with an application for a permit to mine, provided that the advertisement contains all information required for applications for permits to mine and for variance.

6130.5000 AMENDMENTS TO PERMIT TO MINE.

Subpart 1. Application for amendment. A proceeding for requesting an amendment of a permit to mine is commenced when the permittee files an application for an amendment with the commissioner. The application shall include information necessary for the commissioner to determine that the proposed amendment meets the lawful requirements and these rules.

Subp. 2. Determination by commissioner. Within 30 days after receipt of the application, the commissioner shall determine whether the proposed amendment constitutes a substantial change in the permit to mine.

If the commissioner determines that a substantial change would occur, the applicant shall follow the procedures for permit to mine applications, as set forth in part 6130.4800.

If the commissioner determines that there would be no substantial change, the commissioner shall without a hearing allow the amendment with or without additional terms or conditions which are consistent with these rules, or deny the applications stating reasons therefore.

Subp. 3. Demand for hearing. If the commissioner processes the application without a hearing pursuant to subpart 2, the applicant may file with the commissioner a demand for hearing on the decision pursuant to part 6130.4800, subpart 4.

6130.5100 CANCELLATION OF PERMIT.

Subpart 1. Cancellation at the request of permittee. A proceeding to cancel a permit to mine at the request of the permittee is commenced when a permittee files a written request with the commissioner. The request shall identify the permittee and give reasons for the cancellation.

Within 30 days after the receipt of a request, the commissioner shall determine whether cancellation would have a significant adverse effect on any public interest relating to the goals of these parts.

If the commissioner determines that cancellation shall have such adverse effect the permittee shall publish an advertisement pursuant to part 6130.5700 and the commissioner shall proceed as if he had received an application for a permit to mine, pursuant to part 6130.4800, had been received.

If the commissioner determines that the cancellation shall not have such adverse effect, the permit may be cancelled with or without conditions.

Subp. 2. Cancellation with consent of permittee. A proceeding to cancel a permit to mine with the consent of the permittee is commenced when the commissioner serves the permittee with written request giving reasons for the cancellation.

If no reply or an affirmative reply is filed with the commissioner within 30 days, procedures pursuant to subpart 1 shall be commenced except that the commissioner shall publish an advertisement pursuant to part 6130.5700.

If a negative reply is filed with the commissioner within 30 days, the permit to mine will continue in effect or a proceeding to revoke the permit to mine pursuant to part 6130.5200 shall be commenced.

6130.5500 ASSIGNMENT OF PERMIT TO MINE.

Pursuant to Minnesota Statutes, section 93.481, subdivision 5, the commissioner shall allow the assignment of a permit to mine only if the commissioner determines that the assignee will perform all outstanding obligations of the act, these parts, and the permit to mine.

6130.5200 REVOCATION OR MODIFICATION OF PERMIT TO MINE.

The commissioner may revoke a permit to mine or modify any of its terms or conditions, pursuant to Minnesota Statutes, section 93.481, subdivision 4. A permittee shall not be considered to have commenced substantial construction of plant facilities unless erection of the primary plant facilities has begun. Planning, securing capital, purchasing land and materials, and otherwise preparing for construction are not sufficient.

Subpart 1. Commencement of proceedings. A proceeding to revoke or modify a permit to mine, to require a performance bond, or to assess a civil penalty shall be commenced by serving upon the permittee:

A. a notice and order for hearing in the form and manner pursuant to part 1400.5600,

B. a proposed order revoking or modifying the permit to mine, requiring a performance bond, or assessing a civil penalty; and

C. a statement of the measures, if any, required to correct the situation and the time available therefore.

If conditions that provided the grounds for such an action are corrected to the commissioner's satisfaction, within a period, established by the commissioner, of not less than 15 days after the notice, or as appropriate, approved measures are taken to ensure that such conditions do not reoccur, the proceedings shall be cancelled.

Subp. 2. Hearing prior to determination. Hearing prior to determination:

A. The commissioner shall hold a hearing prior to the determination to revoke or modify a permit to mine, require a performance bond, or assess a civil penalty if, within 15 days after commencement of the proceeding, any permittee serves an answer on the commissioner and all other parties. If an answer is served, the commissioner, without further notice, shall hold the hearing at the time and place specified in the order for hearing. No hearing shall be held less than 30 days after commencement of the proceeding.

An answer shall contain the following: a written statement of the defenses to each violation alleged in the order for hearing, and a specific admission, denial, or explanation of each fact alleged in the order for hearing, or, if the permittee is without knowledge thereof, a statement to that effect.

Allegations of a complaint not thus answered shall be deemed to have been admitted.

B. If an answer contains an admission to an alleged fact no hearing shall be held on that fact and the allegation shall prevail.

C. Failure of a permittee to serve an answer, pursuant to subpart 2, item A or to appear at the hearing shall be deemed to constitute a waiver of a hearing on the allegations of the order for hearing and the contents of the proposed order. Such waiver authorizes the commissioner, without further notice to the permittee and without proceeding further with the hearing, to adopt the proposed order, or that much as is applicable if the proposed order is in the alternative or if there have been correction measures attempted. Said order shall be his final decision on the matter.

D. If the permittee appears at the hearing the commissioner, in reaching a final decision, shall not be bound by the proposed order.

6130.5600 HEARING PROCEDURES.

Procedures pursuant to parts 1400.5100 to 1400.8500, shall apply to any contested case hearing under these parts, except as otherwise provided in Minnesota Statutes, sections 93.44 to 93.51 and these parts.

6130.5700 PUBLICATION.

When an advertisement is required, it shall be published once each week for four successive weeks in a legal newspaper, pursuant to Minnesota Statutes, section 331.02, which is circulated in the locality of the proposed mining operation. This advertisement shall contain:

A. A statement and map indicating the locations and boundaries of the mining area.

B. The names of all surface owners of record within the mining area, and severed mineral ownership as set forth in verified statements pursuant to Minnesota Statutes, section 93.52 or in an order or decree pursuant to Minnesota Statutes, section 93.55, subdivision 2, filed in the county recorder's office with respect to severed mineral interests in parts of the mining area which will be excavated or covered with mine wastes. An owner's agent may be identified in place of the owner. No error in the designation of surface or mineral ownership shall affect the validity of the publication. This requirement shall not apply to lands occupied by existing railroads not located in mine or plant areas.

C. The schedule for accomplishing what is being proposed.

D. A notice of the deadline date for filing objections.

E. The following information:

(1) If application is made for a permit to mine, a description of the proposed mining operation including the general kinds of reclamation or restoration measures to be undertaken pursuant to the reclamation plan;

(2) If an amendment to a permit to mine is requested, a description of the purpose and nature of the proposed amendment;

(3) If a cancellation of a permit to mine is requested, an explanation of the request for cancellation and the consequences of allowing such a request; or

(4) If a variance from these rules is requested, a description of the purpose and nature of the requested variance and a description of the proposed alternative means which will be used to meet the goals and comply with the requirements of these parts.

6130.5900 REVOCATION OR MODIFICATION OF PERMIT TO MINE.

The commissioner may revoke a permit to mine or modify any of its terms or conditions, pursuant to Minnesota Statutes, section 93.481, subdivision 4. A permittee shall not be considered to have commenced substantial construction of plant facilities unless erection of the primary plant facilities has begun. Planning, securing capital, purchasing land and materials, and otherwise preparing for construction are not sufficient.

6130.6000 PERFORMANCE BONDS.

Subpart 1. Need for bond. At any time during the pendency of a permit application, during the mining operation, or following the completion of mining but prior to the release of the permittee, the commissioner:

A. shall require the operator to furnish a performance bond if the commissioner determines the the operator has failed to:

(1) perform any part of a reclamation measure required by the permit to mine or any amendment or modification thereto;

(2) comply with a provision of these parts; or

(3) perform any research required, pursuant to Minnesota Statutes, sections 93.44 to 93.51; or

B. may require the operator to furnish a performance bond if there is reasonable doubt that the operator will be financially able to comply with the requirements of the permit to mine or these parts.

Subp. 2. Amount of bond. The amount of a performance bond shall be determined by the commissioner and shall be equal to the estimated cost, to the Department of Natural Resources, of satisfactorily accomplishing reclamation of all lands disturbed and unreclaimed up to the date of annual bond review.

Subp. 3. Conditions of bond. A performance bond required pursuant to this part shall be conditioned upon the performance by the operator within a time period established by the commissioner of all actions necessary to correct the deficiency or noncompliance for which reason the bond is required. For the purpose of the bond "performance" shall mean the accomplishment as determined by the commissioner of all actions required under the bond. The bond shall also provide that the surety or his successors or assigns are not released in any way from liability thereunder by any amendment of the terms or conditions of the permit to mine; provided that, regardless of amendment, the surety shall be liable for no more than the amount specified in the bond. The need for and amount of all bonds shall be reviewed annually.

Subp. 4. Other security and assurance. Whenever an operator is required to furnish a performance bond pursuant to this part, he may, in lieu thereof:

A. Submit as security to the commissioner for deposit with the state treasurer, assignable bonds or notes of the United States in a sum equal, at their par value, to the amount of the required performance bond.

B. Give a lien against a real or personal property as its wholesale value in lieu of a bond. Such property must remain in the state for the duration of the agreement and be managed and repaired by the permittee as necessary to maintain its value. Failure to maintain value shall allow the commissioner to modify or revoke the permit to mine, or to require bonds or notes to be deposited as a replacement bond. The commissioner shall accept such property as assurance if it is determined, by the commissioner, that no other liens exist on said property; the wholesale value is adequate to cover reclamation costs; and sufficient market exists, such that, the sale of said property can occur rapidly.

C. Submit other security or assurances as may be acceptable to the commissioner.

The permittee shall submit an agreement authorizing the commissioner to collect or sell the bonds, notes, property, or other security or assurance so submitted or deposited, upon the same conditions as would constitute a default under a performance bond. The acceptance of United States bonds, notes, a lien on property, or other security or assurance, in lieu of a performance bond, shall have the same force and effect as if a performance bond has been furnished.

Subp. 5. Return of security or assurance to permittee. When it is determined during the annual bond review that such security is no longer necessary, any bonds, notes, lien, or other security or assurance deposited pursuant to part 6130.6200 shall be returned to the permittee.

Subp. 6. Access to mining areas after forfeiture. Upon forfeiture of a bond the permittee shall allow access to the commissioner and his designated contractors into all mining areas for the purpose of reclaiming all lands disturbed and unreclaimed.

6130.6100 CIVIL PENALTIES.

Subpart 1. Amount. If any person violates any provision of Minnesota Statutes, sections 93.44 to 93.51, these parts, or any permit to mine issued thereunder, the commissioner may order imposition of a civil penalty of not more than $1,000 per day for each violation of each provision or the same provision in more than one portion of the mining area.

Subp. 2. Determining the amount. In determining the amount of a penalty, the commissioner shall consider the severity of the violation, the need to deter future violations, and the magnitude of potential or actual gains resulting from the violation.

Subp. 3. Collection. The commissioner shall collect any assessed civil penalty in the same manner as any other debt owed the state.

6130.6200 SUSPENSION OF PERMIT.

The commissioner may suspend all or any part of a permit to mine pursuant to Minnesota Statutes, section 93.481, subdivision 4. Any suspension ordered pursuant to this part shall be for such period and upon such terms as the commissioner deeems appropriate to correct the conditions which necessitated suspension.

6130.6300 INSPECTION OF MINING AREA.

The permittee shall allow the commissioner to inspect all mining operations and records needed to monitor compliance with the permit to mine and these parts, after reasonable prior notice.

Subp. 2. Review of Request for Release. The commissioner shall review the request and determine if all terms and conditions of applicable sections of these rules, the permit to mine, and the approved deactivation plan have been satisfied; and that it is not necessary to defer such release until other portions of the mining area have been deactivated.

Within 270 days after receipt of the request the commissioner shall release the permittee with or without modifications or conditions, or deny the request stating reasons therefore.

Subp. 5. Granting of a variance. The commissioner shall grant a variance from the requirements of these parts upon application by a permit applicant or permittee, if it is determined that:

A. a variance is consistent with the general welfare and general purpose of these parts;

B. by reason of exceptional circumstances, the strict enforcement of the reclamation requirements would cause undue hardship or strict conformity with the requirements of these rules would be unreasonable or not feasible; and

C. acceptable alternative means of accomplishing the goals, pursuant to parts 6130.1000 to 6130.4100, have been provided by the permit applicant or permittee.

Subp. 6. Conditional granting. The commissioner shall grant a variance upon such conditions as shall be necessary for the prevention, control, or correction of adverse environmental effects, consistent with the requirements of these parts and Minnesota Statutes.