

MILE POST 7 WEST RIDGE RAILROAD RELOCATION, DAM EXTENSIONS, AND STREAM
MITIGATION PROJECT ENVIRONMENTAL ASSESSMENT WORKSHEET (EAW)

RECORD OF DECISION – FINDING OF FACT 28.v
1991 Operational Plan

DNR Document Accessibility Acknowledgment

This document is available in alternative formats to individuals with disabilities by contacting Bill Johnson at 651-259-5126 (bill.johnson@state.mn.us) or Jill Townley at 651-259-5168 (jill.townley@state.mn.us).

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Cyprus Northshore Mining
An Affiliate of Cyprus Minerals Company

10 Outer Drive
Silver Bay, MN 55614
218-226-4125
Fax 218-226-3657



April 2, 1991

Mr. Donald Kriens
Division of Water Quality
Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, Minnesota 55155

Dear Mr, Kriens:

Enclosed is the Operational Plan for the handling and transport of tailings to the Mile Post 7 Tailings Disposal System for disposal. This Plan is intended to supplement the Operating Plan for the MP7 Tailings Basin prepared by Klohn Leonoff and submitted to the Agency on January 11, 1991. The Klohn Plan describes the necessary basin operating requirements to comply with the intent of Consensus Closure. The enclosed Plan addresses the additional operating procedures required under Part I.F.1.a. of State Disposal System Permit MNC040509 issued to Cyprus Northshore.

Sincerely,

Dennis M. Wagner
Environmental Engineer

DMW/mlb
Enclosure

cc: M. Katsoulus, DNR - St. Paul
A. Knoll, DNR - Hibbing
S. Dewar, DNR - Hibbing ✓

CYPRUS

INTRODUCTION

This Operational Plan, in the form of an "Operators Manual," describes the work that needs to be done during the course of normal daily tailings handling and disposal activities, as well as during adverse conditions, in order to assure continued compliance with Minnesota Pollution Control Agency, Department of Natural Resources and U.S. Corps of Engineers permit conditions.

The plan discusses responsibilities at various organizational levels and delineates who is in charge of making decisions regarding each activity.

DRY COBBING

The dry cobbing facility is a dry magnetic separation step in which minus 3/4-inch crude ore is magnetically separated to reject low-grade crude ore (dry cobber tailings) prior to the rod mill grinding. The dry cobbing facility consists of two crude ore continuous surge bins, two conveying systems, 12 cobbing lines with associated feeders, and baghouse dust collectors at tailings transfer points. The general operation of the dry cobbing facility is the responsibility of the Crushing and Concentrating Superintendent.

The Operations Supervisor monitors the operation of the dry cobbing system to assure that the operating variables of concentrate magnetic iron and tailings rejection rate are within prescribed limits. These limits are as follows:

<u>Operating Variables</u>	<u>Normal Operating Range</u>		
	<u>Maximum</u>	<u>Minimum</u>	<u>Normal</u>
Concentrate magnetic iron (%)	31	28	30
Tailings rejection rate %	30	10	Variable

During routine operation of the dry cobbing system, the primary controlling factor is the magnetic iron content of the dry cobber concentrate. The system is operated to provide an acceptable magnetic iron content feed to the concentrating circuit. The magnetic iron content of the dry cob concentrate is controlled by the Operations Supervisor by increasing dry cobber drum speed if the magnetic iron content is low and decreasing the drum speed if the magnetic iron content is high.

The secondary controlling factor in the dry cobbing system is the tailings rejection rate. During routine operation of the dry cobber system, there is no minimum or normal operating range. The Operations Supervisor monitors the dry cobbing system to assure that the tailings rejection rate does not exceed

30% of the dry cobber feed tonnage. If the tailings rejection rate reaches the 30 percent level and the dry cobber concentrate magnetic iron is below the minimum operating level of 28 percent, the dry cobber drum speed is held constant at 30 percent rejection until the concentrate magnetic iron return to operating levels. When the concentrate magnetic iron is back within the operating range, the dry cobber speed is adjusted accordingly.

Overall control of the dry cobbing system operating variables is accomplished through the use of a central control computer system. Coincidental to controlling the dry cobber system variables, this computer system also monitors drum speed, crushed ore feed and bin levels. If the dry cobber computer control equipment is disabled for any reason, backup manual control systems in the field enable monitoring and control of the process by the Operations Supervisor.

It is the responsibility of the Operations Supervisor to monitor the dry cobber baghouse operating variables of differential pressure and blow pressure (normal operating range 80-90 psi). If these operating parameters are not within prescribed levels, the Operations Supervisor shall check the pulse air pressure supply to insure that it is sufficient to clean the bags, check the pulse air solenoid for failure, and/or remove the baghouse sub-compartment from service and inspect it. If repairs are required, the Operations Supervisor shall contact the Maintenance Department.

The Maintenance Superintendent is responsible for the maintenance of the baghouse dust collectors. The Car Dump and Fine Crusher Baghouse system is routinely inspected once per week by the Maintenance Supervisor for broken bags or bags that may have become unseated. All other baghouses are inspected on an approximately every two to three week schedule. During these inspections, the baghouses are also checked for mechanical operation and lubricated. While a collector is out of service for maintenance repair, the process equipment that it services shall be checked for visible dust emissions by the Operations Supervisor. If visible dust emissions are observed, the process equipment affected

shall be shut down until the baghouse repairs are completed. All maintenance and repair records shall be maintained by the Maintenance Superintendent.

Dry cobber tailings samples during periods of dam construction is the responsibility of the Supervisor Quality Control. The Quality Control Lab Technician is responsible for the collection and analysis of representative dry cobber tailings samples. The analyses shall include percent moisture and particle size distribution (3/4 inch to 200 mesh). The results of these analyses are recorded and reported to the Operations Supervisor for operational review. A portion of each sample shall be composited into a monthly sample and retained for the MPCA and/or DNR. This sample shall be discarded after six weeks if not requested by the MPCA or DNR. Currently, dry cobbed tailings are not being used for dam construction but are being used to cover fine tailings beaches. Sampling and analysis is not required.

All records of the dry cobbing operation are maintained by the Crushing and Concentrating Superintendent.

FILTERED TAILINGS

Belt filters dewater the coarse fraction of the rougher magnetic separator tailings. The tailings filtration system consists of 17 rougher tailings sumps, 17 rougher tailings cyclones, 17 tailings belt filters, and associated drop chutes and conveyors. The general operation of the belt filter system is the responsibility of the Crushing and Concentrating Superintendent.

It is the responsibility of the Operations Supervisor to monitor and adjust the control parameter (injection water) of the belt filter system to assure that the amount of fine tailings (minus 200 mesh) in the filtered tailings meets operating specifications. If the amount of minus 200 mesh material needs to be decreased, the Operations Supervisor must increase the injection water rate in the rougher tailings sump. In addition, the Operations Supervisor makes all other operations changes (set points, changes of filter media, etc.,) necessary to assure proper operation of the belt filter system. The Operations Supervisor monitors the belt filter operations for belt stoppage, belt alignment, filter cake thickness, plugged chutes and shuttle belt positions.

In the case of a rougher magnetic separator tailings sump pump failure, the feed to the section is automatically stopped. If the pump cannot be restarted immediately, the remaining equipment on the section shall be shut down by the Operations Supervisor until the pump is repaired. In the case of the failure of a belt filter system, the feed to the section on which the failure occurs is shut down. The Crushing and Concentrating Superintendent will shut down the section until the belt filter is operational.

The Maintenance Department Superintendent is responsible for the maintenance repair of the belt filter systems. The Maintenance Supervisor shall make all routine and non-routine maintenance repairs and inspections necessary to assure efficient operation of the belt filter systems. All maintenance and repair records shall be maintained by the Maintenance Superintendent.

The collection and analysis of daily tailings samples during periods of dam construction from the belt filter system is the responsibility of the Quality Control Supervisor. The Quality Control Lab Technician is responsible for the collection and analysis of tailings samples from the belt filter systems to determine particle size distribution and percent moisture. A portion of each belt filter sample shall be composited into a monthly sample and retained for the MPCA and/or DNR. This monthly composite sample is discarded after six weeks if not requested by the agencies. The results of these analyses shall be recorded and reported to the Operations Supervisor for operational review. Currently, belt filtered tailings are combined with dry cobbled tailings and used at the Basin to cover fine tailings beaches. Sampling and analysis is not required for this purpose.

All records of the tailings filtering operations are maintained by the Crushing and Concentrating Superintendent.

COARSE TAILINGS

The coarse tailings are the combined product of the dry cobber and belt filter tailings as produced by the Concentrator. During normal basin and plant operations and as specified by the MPCA, the dry cobber and belt filter tailings are delivered to the basin as the combined coarse tailings product at a ratio of approximately 75 percent dry cobber tailings to 25 percent belt filter tailings by weight with a silt content (minus 74 micron) of less than 5.8 percent. However, the materials may be and on occasion will be delivered separately for various phases of dam construction as required by the Mining Engineer.

Routine operation of the coarse tailings conveying system from the Concentrator to the railroad loadout bins is the general responsibility of the Crushing and Concentrating Superintendent. It is the responsibility of the Operations Supervisor to monitor the coarse tailings conveyor system for belt stoppage, belt alignment and plugged drop chutes. The Operations Supervisor shall monitor total tonnages for coarse tailings on the conveyors. The records of the coarse tailings mixtures produced and conveyed to the tailings loadout bins shall be maintained by the Crushing and Concentrating Superintendent.

The Material Handling Superintendent is responsible for the railroad loadout and transport of the coarse tailings to the Mile Post 7 Basin. Alarm indicators are provided at the local loadout bins console and at the Concentrator Control Room which alert the Operations Supervisor that the loadout bins are a level approaching full. Upon receiving an alarm condition, the Operations Supervisor shall contact the Material Handling Supervisor to obtain the arrival time of the next available train. If the projected train arrival is beyond the remaining capacity of the loading bins at the then present production rate, the production rate shall be altered by the Operations Supervisor to extend the bin capacity to the expected train arrival time. Automatic shutdown of the tailings processing and handling equipment, back through the dry cobbers, occurs when the loadout bins reach their maximum holding capacity.

After the rail cars are loaded, it is the responsibility of the Material Handling Supervisor to see that the surface of the coarse tailings are sprayed with water or a chemical stabilizer as necessary to minimize dust emissions during loading transportation and unloading operations. These wetting operations shall be controlled by the Material Handling Supervisor to avoid free draining of water from the railroad cars during transportation of the coarse tailings to the disposal systems as specified by the MPCA.

At the railroad loadout facility, all water draining from the railroad cars and the coarse tailings storage bins is collected and channeled from the loadout bin area into the plant runoff system. All surface water runoff in this area is diverted away from natural streams or water courses through the use of berms or culverts and incorporated into the plant drainage system.

The Material Handling Supervisor shall record the number of cars loaded, time of loading, loading bin used, number of cars dumped, and the dumping location at the Mile Post 7 Basin. The Material Handling Supervisor is responsible for the actual location at which each train is dumped.

In the event that a spill of coarse tailings occurs during the rail haul from the plant to Mile Post 7, the Material Handling Supervisor shall immediately notify the Material Handling Yard Supervisor, and the spill shall be cleaned up and loaded into rail cars using front end loaders or a rail mounted dragline. It is the responsibility of the Manager of Operations to notify the MPCA in the event of a coarse tailings spill.

The Material Handling Supervisor is responsible for the daily physical operation and supervision of the tailings basin. Technical control of operations is the responsibility of the Chief Mining Engineer.

The following general requirements apply to the handling and placement of coarse tailings by the Material Handling Department:

- All coarse tailings not used in the construction of dams or dikes or auxiliary structures, such as railroads will be used to cover fine tailings beaches within the basin.
- There shall be no stockpiling of coarse tailings at the plant.
- The coarse tailings material shall be wetted as required to maintain optimum compaction moisture and prevent emissions from the surface while it is being worked during dam construction and as measured by representative sampling at the disposal system.
- Coarse tailings areas shall, at the direction of the Material Handling Supervisor, be vegetated or treated with dust suppressants of such concentration and applied with such frequency that, except for emissions caused by extreme meteorological conditions, the visible emissions from these areas are essentially zero.
- All seepage and surface runoff from the dams shall be collected and returned to the basin, unless otherwise authorized by the MPCA.
- Construction of dams shall be conducted only in non-freezing weather and no fill shall be placed on frozen ground.
- Waters used for dam compaction and dust control within the basin catchment area shall be drawn from the seepage recovery system to the maximum extent possible. When water in the seepage recovery system

is low, water for dam compaction and dust control shall be drawn from the tailings basin. All coarse tailings disposal will be completed in accordance with the requirements of the "Consensus Closure Plan" and as detailed in Appendix I, "MP7 Tailings Operating Plan" dated January 24, 1990, by Klohn Leonoff Consulting Engineering.

FINE TAILINGS

Fine tailings operations consist of clarifying equipment on the delta, the tailings pipeline system, and fine tailings disposal at the Mile Post 7 Basin. The operation of the tailings clarification systems on the delta and the pipeline system between the plant and the Mile Post 7 tailings disposal system is the responsibility of the Crushing and Concentrating Superintendent. The disposal of fine tailings at the Mile Post 7 tailings basin is the general responsibility of the Material Handling Superintendent.

Tailings Clarifiers

The fine tailings delta operations consist of two launder systems and four 400 foot diameter tailings clarifiers. The East Concentrator Tailings Launder System feeds tailings into Clarifiers 1 East and 2 East, and the West Concentrator Tailings Launder System feeds tailings into Clarifiers 1 West and 2 West. A drivehouse located at the center of each clarifier encloses the clarifier rake drive mechanism and houses four variable speed slurry pumps.

It is the responsibility of the Operations Supervisor to monitor the tailings clarifier operations to assure that the operating variables of tailings slurry density and flowrate are within prescribed limits. The limits for these variables are as follows:

<u>Operating Variable</u>	<u>Normal Operating Range</u>			<u>Low Limit Alarm</u>
	<u>Maximum</u>	<u>Minimum</u>	<u>Normal</u>	
Tailings slurry flowrate	1,000	0	Variable	200-250
Tailings slurry density	2.0	1.0	1.6	None

During routine operation of the fine tailings clarifiers, the primary controlling variable is the tailings slurry density. The normal operating density of 1.6 is maintained by the Operations Supervisor by

increasing pump speed if the density is above the normal level and decreasing pump speed if the density is below the normal level.

Overall control of the tailings clarifier operating variables is accomplished through the use of a central control computer system. Coincidental to controlling the tailings clarifier operating variables, the computer system also monitors reclaim water rates, rake torque, overflow turbidity and flocculent addition rate.

In the event a clarifier must be shut down, all mill sections discharging tailings to the launder feeding the affected clarifier are shut down. The decision to shut down a clarifier is the responsibility of the Crushing and Concentrating Superintendent. When a clarifier must be shut down, it is the responsibility of the Operations Supervisor to operate it until the underflow density has been reduced to a level that precludes the possibility of the clarifier plugging. The Maintenance Supervisor is responsible for installing a bulkhead in the launder to isolate the clarifier. If a clarifier underflow system becomes plugged and necessitates draining, the tailings level in the clarifier is pumped down into the pipeline system and the underflow system cleaned out using high pressure hoses.

All records of the tailings clarifier operations are maintained by the Crushing and Concentrating Superintendent.

Tailings Pipeline

The general operation of the tailings pipeline is the responsibility of the Crushing and Concentrating Superintendent. Two parallel pumping systems, one serving as standby, transport fine tailings to the basin. Switching to the standby system requires switching pumping systems at Pumphouse 1 and Pumphouse 2. Each pumphouse system has three stages of pumping.

It is the responsibility of the Operations Supervisor to monitor the tailings pipeline operating variables of sump and standpipe levels and pump speed to assure that they are within prescribed operating limits.

These limits are as follows:

<u>Operating Variables</u>	<u>Normal Operating Range</u>			<u>Alarms</u>	
	<u>Maximum</u>	<u>Minimum</u>	<u>Normal</u>	<u>High Level</u>	<u>Low Level</u>
Tailings sump level (Pumphouse #1) feet	14	10	12	16.5	5
Tailings standpipe level (Pumphouse #2) feet	40	30	35	50	20
Tailings slurry flowrate (gpm)	15,000	6,000 - 7,000	Set Point	± -500 of set point	

During routine pipeline operation, the primary controlling variables of sump and standpipe levels are controlled by the Operations Supervisor by increasing or decreasing the tailings slurry flowrate to maintain the normal operating levels in the sump at Pumphouse #1 and the standpipe at Pumphouse #2. If these levels are low, tailings slurry flowrate is increased and if high, the flowrate is decreased. If the sumps are low and sufficient flowrate cannot be obtained from the clarifiers, the Operations Supervisor adds makeup water from the mill water reservoir to maintain proper sump and standpipe levels.

Overall control of the tailings pipeline operating variables is accomplished by the use of a central control computer system. Coincidental to controlling the tailings pipeline operating variables, the computer system also monitors Dart valve positions, makeup water rate, density, pumphouse inlet and discharge pressures, and line pressures.

Under normal pipeline start up procedure, it is the responsibility of the Operations Supervisor to start the pipeline with makeup water to insure the system is operable and leak-free prior to the introduction of tailings into the line. The automatic start up sequence is monitored by the Operations Supervisor.

In the event that the central control computer is not functioning, a manual backup control system shall be used to start up, operate and/or shut down the pipeline system. This manual control system is operated under the supervision of the Operations Supervisor.

It is the responsibility of Concentrator operating personnel to inspect the tailings and return water pipelines from the plant to the basin on a routine basis. This inspection shall include:

- Visual inspection of the active tailings pipe for damage and/or leaks.
- Visual inspection of the inactive tailings pipe for damage and availability status.
- Inspection of Pumphouse 2 facilities for leaks at pumps, valves, seals, etc.
- Inspection of the emergency catch basins and ditches along the line.
- Inspection of the general condition of the access road, looking for water spots and/or slumps which may indicate problems with the buried reclaimed water line.

Routine inspection reports shall be made after each inspection to the Crushing and Concentrating Superintendent, the Maintenance Superintendent and Material Handling Superintendent. Emergency conditions, such as damage or leaks, shall be immediately reported by radio to the Operations Supervisor for appropriate remedial action.

Normal pipeline shutdown is the responsibility of the Operations Supervisor. The pipeline pumps are shut down in sequence by the Operations Supervisor and the pipeline drained. When necessary, it is the responsibility of the Operations Supervisor to switch from one pipeline to the other. The second pipeline

system shall be started on makeup water as in a normal start up. When the pipeline start up conditions are met, the tailings flow shall be diverted to the second line.

Normally, a shutdown sequence drains the entire line from the Basin through Pumphouse 2, down to Pumphouse 1 and into the tailings clarifier. Wintertime pipeline temperatures may indicate that the line could freeze in the four hour period required to drain the line. In those cases, the pipeline between Pumphouse 2 and the Basin shall be drained into the storage basin located at Pumphouse 2. The line between Pumphouse 1 and 2 shall continue to be drained into the clarifiers. This procedure reduces the period required to drain the lines by about two hours.

In the event of a rupture, the pipeline is shut down. The clarifiers are automatically switched to the recycle mode until the standby system can be started by the Operations Supervisor.

Normally, the entire line drains back to the clarifiers. However, if conditions indicate that the rupture has occurred between Pumphouse 1 and Pumphouse 2, that portion of the line between Pumphouse 2 and the Basin shall be drained at the direction of the Operations Supervisor into the emergency catch basin adjacent to Pumphouse 2. Reclaim from this basin is the responsibility of the Concentrator Supervisor and shall be by use of a portable pump, assisted by jetting water from hoses as necessary and this reclaimed material shall be returned to the standpipe of the operating pumping system and transported to the tailings basin.

In the event of a rupture on the pipeline, the Material Handling Supervisor shall immediately take the necessary steps to contain any spilled tailings (i.e., construction of temporary containment dikes or berms) and initiate cleanup of the spilled tailings by means appropriate to the size of the spill. These cleanup methods will vary from hand shovel to front end loader scraper type operations. All cleaned up

tailings and tailings contaminated soils will be transported to the tailings basin for disposal. The MPCA shall be notified in the event of a tailings pipeline rupture.

All fine tailings disposal will be completed in accordance with the requirements of the "Consensus Closure Plan" and as detailed in Appendix I, "MP7 Tailings Operating Plan" dated January 24, 1990, by Kohn Leonoff Consulting Engineers and the immediate future (2-3 years), in a manner that will essentially fill cells 1 and 4. Semi-annual ultrasonic pipeline thickness monitoring shall be conducted to assure detection of pipeline sections with excess wear. The results of this monitoring will be reported to the MPCA.

BASIN RECLAIM WATER SYSTEM

The Concentrator Supervisor is responsible for the reclaim water system. The amount of water reclaimed from the Basin is controlled by two vertical turbine pumps in a floating pumphouse located in the free water pool. The reclaim water is returned to the plant for reuse in the process. The reclaim pumps pump directly to a tank located at the maximum elevation of the reclaim water line. Level controls in the tank call for water and turn the pumps on when water is required and shut the pumps off when the tank is full. It is the responsibility of the Material Handling Supervisor to check the pumps and tank a minimum of once per shift when the system is in operation and once per week when the system is on standby.

The withdrawal rate of water from the tank will be controlled by a valve on the reclaim water lines located near the mill water reservoir. Operation of this valve is the responsibility of the Operations Supervisor.

In the event of a rupture in the reclaim water pipeline, it is the responsibility of Technical Services to pinpoint the location of the rupture. When the location of the rupture has been determined, it is the responsibility of the Material Handling Supervisor to uncover the area of rupture utilizing the necessary equipment (dozers, backhoes, etc.). As soon as the rupture has been located and uncovered, it is the responsibility of the Operations Supervisor to shut down the reclaim water pipeline to minimize potential impacts to area surface waters. It is the responsibility of the Maintenance Supervisor to perform the necessary repairs, (replace pipe sections, repair welds, etc.) to the line to assure correction of the problem.

SEEPAGE RECOVERY OPERATIONS

The level of the water within each of the seepage recovery ponds is controlled by vertical turbine pumps located in a pumphouse beside each pond. Operation of the pumps is intermittent and controlled by level fluctuations in the pond.

It is the responsibility of the Material Handling Department to check the systems daily during periods of steady operation and weekly during periods of light operation.

Dust Mitigation - Chemical Stabilization

It is the responsibility of the Material Handling Supervisor to monitor all dust mitigation measures at the Basin and plant facility.

While tailings surfaces are being actively worked, they shall be wetted in such a manner as to control fugitive dust emissions.

During periods of dam construction, some tailings surface areas will be temporarily inactive and undistributed for varying lengths of time. These areas will be treated to control dust emissions as follows:

As work ceases in an area, the surface shall be sprayed with water to maintain essentially zero visible emissions.

If an area is to remain inactive for longer than three (3) months, it shall be sprayed with a 1:25 Coherex-water mixture at a rate of 0.25 gallons per square yard.

When tailings used in dam construction are finally placed and are to be no longer disturbed by future activity, they shall be treated as follows:

As work is completed in the area, the tailings surface shall be watered to thoroughly soak the surface immediately prior to seeding. After seeding, Coherex shall be applied at a rate of 0.25 gallons per square yard of 1:25 Coherex-water mixture.

In accordance with the "Consensus Closure Plan", fine tailings, during the next three-four years of operation, will be spigotted from Dams 1 and 2 in a manner that will form tailings beaches extending out into Cells 1 and 4 and essentially fill the cells. After the beaches are formed they will be covered as soon as practical with approximately three feet of coarse tailings to prevent fugitive emissions. In the interim, the beaches will be treated as follows to control emissions:

- Keep the water level in Cells 1 and 4 as high as possible to limit the exposed beach area.
- Keep the elevation of the beaches above the water at a minimum to enhance capillary action to keep the fine tailings surface damp.
- Treat beaches with dust suppressants as required for short term control.
- Vegetate beaches where possible for long term control.

A Material Handling Supervisor shall make daily inspections of all access and haul roads to assure that dusting problems do not exist. If mitigation measures are required, he shall immediately have the road surface treated with 1:8 Coherex-water mixture at a rate of 0.5 gallons per square yard.

Parking areas and existing exposed gravel and tailings surfaces in the plant area shall be stabilized as required to prevent traffic and wind erosion of dust from these areas:

Plant parking areas shall be treated with one application of 1:8 Coherex at a rate of 0.5 gallons per square yard as required.

Undistributed exposed gravel and tailings surfaces in the plant shall be sprayed with 1:25 Coherex-water at a rate of 0.25 gallons per square yard as required to control emissions. Where possible, these areas shall be stabilized with vegetation.

A Material Handling Supervisor shall make routine inspections of plant areas to assure that dusting problems do not exist. If in his inspections, he notes that a treated area has been disturbed, he shall immediately have the area retreated with the proper application of stabilizer as outlined previously.

The tailings delta has been stabilized with the establishment of vegetative cover. The tailings delta will be treated with chemical stabilizers as required to prevent fugitive dust emissions from unvegetated access roads. Stabilization procedures to be followed will be similar to those for the stabilization and vegetation of all finally placed tailings used in dam construction.

Vegetation of Exposed Coarse Tailings

Vegetation and reclamation of work areas will be the responsibility of the Material Handling Superintendent with technical assistance from Technical Services.

Through an extensive vegetation research program, plant varieties, planting techniques and fertilizer application rates have been developed to successfully vegetate tailings surfaces in the Mile Post 7 vegetation program.

The following grasses and legumes were found acceptable for vegetating tailings:

Smooth Lincoln Bromegrass
Kentucky 31 Tail Fescue
Orchardgrass
Reed Canary Grass
Perennial Ryegrass
Redtop

Crested Wheatgrass
Intermediate Wheatgrass
Western Wheatgrass
Vernal Alfalfa
Birdsfoot Trefoil
Yellow Sweet Clover

At the present time our planned vegetation program is as follows:

When tailings areas become available for planting, the surface shall be watered to thoroughly soak the surface immediately prior to seeding. The surface shall then be scarified.

The area to be seeded shall be fertilized with a dry commercial fertilizer, 10-10-10 (10% nitrogen, 10% phosphorus and 10% potash) at a rate of 500 pounds per acre.

After the fertilizer has been applied it shall be incorporated into the top one to two inches of the tailings surface by dragging the area with the spring teeth of a roller-harrow, or equivalent equipment.

The seeds of the various plant varieties used in the vegetation program will be premixed and the mixture blended prior to seeding. The seed mixture used in the vegetation program will consist of 13 percent birdsfoot trefoil, 24 percent vernal alfalfa, two percent redtop, 19 percent intermediate wheatgrass, 11 percent reed canary grass, 11 percent orchardgrass and 21 percent Kentucky 31 fescue. The actual

variety weights in the mixture will be determined by Technical Services based on germination and purity data.

After the seed mixture is prepared it shall be applied at a rate of 30 pounds per acre.

After seeding, the serrated rollers of a roller harrow shall be used to compact the seeded tailings surface. The direction of the rollers shall be generally parallel with the contour of the lifts.

Vegetation established in the spring and early summer requires additional fertilizer in the first growing season. The rate of the second application shall be 500 pounds of 10-10-10 per acre dry commercial fertilizer broadcast as a top dressing. The time of fertilization shall be determined by Technical Services based on soil test results. Vegetation established in late summer or fall does not require fertilization a second time during its first growing season.

Fertilization of vegetation during the second growing season shall be done once in the spring and again in mid-summer. The rate and grade and times will be determined from soil and plant testing, and observations by Technical Services.

Technical Services will be responsible for checking nutrient requirements, effectiveness of growth and estimate of ground cover as it relates to the necessity of remedial action or additional reseeding.

REPORTING REQUIREMENTS

The Manager of Operations is responsible to provide adequate control of the operations, and to notify the Minnesota Pollution Control Agency and Department of Natural Resources immediately upon discovery, and within 10 days in writing, of any unusual or unexpected conditions discovered during operation of the facility which differ significantly from those presented in the approved operational plan, and to develop corrective action.

The Manager of Operations is responsible to report immediately to the Minnesota Pollution Control Agency and Department of Natural Resources any non-compliance with permit conditions or limitations which may cause a nuisance or health hazard, or have substantial environmental effects, and all unauthorized discharges, accidental or otherwise, of tailings, oil, or other toxic or hazardous substances; and take such action as may be reasonable to minimize or abate pollution of the air and waters of the State. This shall be followed by written explanation.

All sampling analytical records and monitoring data obtained pursuant to the Mile Post 7 tailings disposal operation shall be retained for a period of five (5) years. All original recordings from any continuous monitoring instrumentation and any calibration maintenance records will also be retained for a period of five (5) years. These retention periods shall be automatically extended during the course of any legal or administrative proceedings related to this permit or when so required by the Agency or the Director.