

Northshore Mining Company
Railroad Realignment and Tailings Basin Progression
Environmental Review and Permitting Summary

**Presentation to Minnesota Pollution Control Agency, Department of
Natural Resources, and US Army Corps of Engineers**

August 18, 2016

Agenda

1. Introductions
2. Purpose of Meeting
 - a. Leave today's meeting with an understanding of the following:
 - i. Project scope
 - ii. Resources needed by each agency
 - iii. Permitting and construction timelines
3. About Northshore Mining Company (handout)
 - a. Background
 - b. Operations
4. Project Scope
5. Tailings Basin Background
6. Anticipated Permitting Resources Needed from Agencies
7. Project Timeline (handout)
8. Open Discussion
9. Next Steps

About Northshore Mining Company (NSM)

Background

- Northshore Mining Company, (NSM), originally operated as Reserve Mining Company, became the first taconite processing facility in North America when it opened in 1956.
- In 1989, Cyprus Minerals purchased NSM from Reserve Mining Company.
- Cleveland-Cliffs Inc. (now Cliffs Natural Resources) became the sole owner of the property in 1994.
- Approximately 540 employees are employed by NSM.
- NSM has a total annual economic impact of \$252.5 million, which is significant to Northeastern Minnesota and the state as a whole as follows:
 - \$67.8 million annual payroll
 - \$171.5 million of local services and supplies purchased including energy
 - \$13.3 million paid in taxes
- NSM has a rated capacity of 6.0 million long tons per year (MLTPY) of pellets.
- As of January 1, 2015, the proven and probable ore reserves for NSM based on a 2016 four-furnace budget are presented in the following table:

Property	Cliffs Share	Proven		Probable		Total P&P		Saleable Product	
		Tonnage (long tons)	Grade (%Mag Fe)	Tonnage (long tons)	Grade (%Mag Fe)	Tonnage (long tons)	Grade (%Mag Fe)	Process Recovery	Product (DRY long tons)
Northshore Mines	100%	272.4	25.0	557.4	24.2	829.8	24.5	32.3%	268.4
Total		272.4	25.0	557.4	24.2	829.8	24.5	32.3%	268.4

Notes:

1. Tonnage amounts are in-situ material that have been rounded to the nearest 100,000.
2. Tonnage is reported in long tons equivalent to 2240 pounds
3. Mineral Reserves cutoff grade is 19% MagFe or when material is less than 30 Grind.
4. Mineral Reserves are Probable if the reserves are below Virginia Formation waste material.
5. Mineral Reserves are Probable if the average yearly MagFe is below 24.2 or the Grind is below 50.0 or mining is beyond 25 years.
6. Product is a standard BF grade pellet containing 66% Fe calculated from both proven and probable mineral reserves.
7. Saleable product is reported on a dry basis, shipped products contain 2% moisture
8. Tonnage estimate based on actual surveyed topography on January 1st, 2015.

- The updated economic analysis included a new pit optimization for NSM. The costs used in this study represent all mining, processing, transportation, and administrative costs (including the loading of pellets into lake freighters at Silver Bay, Minnesota).

- Relative to many other industries, the large scale of the iron mining industry and individual mines necessitates the need for long-term planning for future investments. Cliffs is evaluating investment opportunities, looking forward 50, 60, or even 100 years into the future for resources. If the regulatory process in the U.S. cannot accommodate operations with this kind of planning horizon, Cliffs and NSM will suffer in competitiveness with those who can.

Operations

- Open Pit mining by definition is a continuous earth moving activity. Taconite mining is large-scale and uses large shovels with 20-30 cubic yard buckets to load fleets of 240-ton capacity haul trucks to transport ore, overburden, and low iron-content rock. Ore processing equipment to crush, grind, concentrate, and pelletize ore is equally large-scale, and significant ancillary facilities and activities are needed to support these operations.
- NSM currently uses 5 pieces of large-scale loading equipment to load a fleet of 6 240-ton capacity haul trucks and 3 200-ton capacity haul trucks. Typically, 80,000 long tons/day (2240 lbs/long ton) of total material are moved and 48,000 long tons/day of ore are delivered to the ore processing plant in Silver Bay.
- Tailings are the byproduct of the iron ore concentrating process. NSM has the three following classifications of tailings:
 1. Plant aggregate -- sized similar to class 5 gravel
 - Plant aggregate and filter sands are transported by train to the Mile Post 7 (MP7) tailings basin and are used for construction of the dams.
 2. Filter sands -- a coarse sand
 - Filter sands can be segregated from the plant aggregate and placed on the dam faces to create a seal.
 3. Fine tailings -- similar in size to a talc powder
 - Fine tailings are pumped in a water slurry to the interior of the tailings basin for storage.
- The topography of the tailings basin results in the Northshore tailings basin gaining water from precipitation. The ponded water in the tailings basin is recycled back to the plant. Because it's a gaining system, ponded water is also discharged out of the system through an NPDES-permitted water treatment plant.
- Basin construction proceeds in conjunction with mining and ore processing operations.

- NSM's current basin footprint was established in 2005 with the first realignment of the West Ridge Railroad and construction of the Murphy's pond diversion ditch. The next movement of the West Ridge Railroad, this proposed project, will establish the final basin footprint.
- Due to its large size, basin dam construction occurs continually throughout the active life of the basin using coarse tailings from ore processing. However, once the entire footprint of the basin is established, no further progression of the basin footprint occurs. The basin merely increases in height throughout the remainder of its active life. Due to the large size of the basin and ground contours, covering the new portion of the basin's footprint with fine tailings will take several decades following commencement of construction.
- MP7 original construction (1975-1980),
Original basin/railroad configuration (1980-2005),
Current basin/railroad configuration (2005~2019), and
Final basin/railroad configuration (~2020-20XX)
- Long-term planning and permitting for basin construction and tailings deposition must occur well in advance of commencement of construction. Once environmental review and permitting are completed, a mining company must be able to rely on the associated permits for many years into the future. Because the material used for basin construction is associated with mine planning, mining, and ore processing, all aspects of the operation are closely intertwined throughout the life of the mine. A mining company must be able to predict with great certainty that it will have a place to dispose of the tailings when developing its mine plans, cash flows, and all associated activities.
- Impacts from most non-mining related projects occur very soon after permits are issued, and the impacts are typically a one-time, short-term occurrence (i.e. wetlands). Due to their large size, and continual earth moving nature, this is not the case for most mining projects and certainly not for taconite tailings basins.

Project Scope

NSM has initiated engineering design and environmental studies for the relocation of the West Ridge railroad at the MP7 tailings basin and the originally planned tailings basin progression. The project area encompasses approximately 1,200 acres and is located about 6 miles west of Silver Bay. Some of the project area consists of lands disturbed by past activities, including borrow pits and access roads.

There are two principal components to the project. First, the embankment that currently supports the existing railroad would be relocated approximately 4,000 feet to the northwest. The new embankment would become the dam defining the ultimate limit of the tailings basin along much of its length. Second, tailings deposition would progress to the northwest, per the original

tailings basin design. Tailings would be deposited into the basin for the remaining life of the operation, until ultimately reaching the proposed new railroad embankment.

NSM operates three dams to contain the tailings basin. Dam 1 is on the south side of the basin, Dam 2 is on the north side, and Dam 5 is on the east side. The dams are constructed using coarse tailings that are delivered to the basin via rail. As the tailings basin rises due to tailings deposition, the dams must be raised. In order to continue delivery of coarse tailings to the dams, the railroad must periodically be raised as well. Rather than make smaller, incremental changes to the diversion ditches and railroad, it is imperative that the proposed railroad raise will be the last for the tailings basin in order to serve the final dam construction and progression of tailings deposition.

NSM has hired Barr Engineering to engineer the railroad realignment as well as the basin dams. Preliminary designs have been completed to relocate the railroad to the far western extent of the basin at elevations that will allow rail service onto the dams until basin closure. The railroad will be located inside of the existing diversion ditches that were designed and constructed at the western limit of the tailings basin boundary.

Current information about tails size fractions, final basin design, and alterations to the original operation of the tailings basin due to unanticipated events such as the bankruptcy, require a 50-foot adjustment to the final dam crest design. That adjustment also requires an adjustment to the final Dam 1 alignment to maintain separation of the tailings storage and ash landfill space.

Tailings Basin – Background

Environmental Impact Statement

- On May 17, 1977 the US Corps of Engineers Environmental Impact Study was published in the Federal Register.
- The purpose of the EIS was to assess the environmental impacts associated with three interrelated proposals by Reserve Mining Company that required Department of the Army permits.
- Reserve proposed to install a heated water discharge structure in Lake Superior; to stabilize the tailings delta at Silver Bay with a mine rock dike; and to establish an on-land disposal site for taconite tailings (Mile Post 7).
- The EIS included the final analysis of environmental effects of the on-land disposal facility and the alternatives available.
- Basin capacity was designed to meet the life of mine ore reserves.
- The EIS addressed the following Adverse Environmental Effects (page iii of EIS):
 1. Construction and implementation of the on-land tailings disposal plan would result in the total loss of 9.7 miles of cold water streams with degradation of additional stream miles from siltation and channeling.

2. Uncollected seepage from the disposal area would carry precipitable solids and possibly fibers into the groundwater.
 3. About 5,850 acres of terrestrial habitat would be destroyed along with most of the wildlife using this habitat, which was classified as moderate quality for game species.
 4. About 4,420 acres of public land would be used along with 3.9 miles of state designated recreational trails and 8.1 miles of nondesignated recreational trails. The recreational value of nearby park and recreation areas could be diminished.
 5. There would be particulate and fiber emissions from the basin, constituting a health risk to the residents of the area.
 6. There would be an increase in noise levels surrounding the disposal site but no structures exist in the area that would be affected.
 7. Energy in form of hydrocarbon fuels would continue to be expended in the production of iron ore.
 8. The productivity of the land in the basin would be destroyed and could not be fully restored even with reclamation after end of project.
- The EIS covered the dry cobbing, flotation, screening, concentrate filtering, tailings filtering, tailings transport system, rail transport of cobbled and filtered tailings, pipeline transport and return water to the plant, the tailings dams, tailings pipeline, tailings basin, seepage collection, stream diversions, railroad spur and the access road construction.
 - Topography of proposed basin area was such that a natural valley would contain the tailings with five dams. The dams were required to close the valley and bridge the gaps in the ridges forming the valley.
 - Seepage through or under the dams would be collected by the seepage recovery facilities and returned to the pond. This remains the practice today.
 - The ultimate dam crest was estimated to measure at a height of 1315' – sufficient to store all of the fine tailings, all of the coarse tails not used in dam construction and all of the surplus water that is expected to accumulate for the life of mine.

Permitting

- On August 23, 1977, the Minnesota DNR issued all department-required permits for Mile Post 7
- On April 28, 1978, the MPCA issued its permit for construction and operation of a disposal system (Mile Post 7).
- Between September 1977 and June 1981, the US Corps of Engineers issued 21 permits for the construction of the Mile Post 7 tailings basin.

Design and Operation

- The Mile Post 7 Tailings Disposal Basin was constructed in the late 1970's by Reserve Mining Company. Construction of the facility occurred after extensive litigation and public hearings, which resulted in extremely restrictive construction and operation requirements.

These requirements were unprecedented in the construction of similar facilities in Northeastern Minnesota or in Michigan. However because of unforeseen conditions which occurred after operations commenced, the original design and operations were altered over the years with the approval of both the MPCA and DNR.

- The original design and operation of MP7 were designed to maximize the control of discharge to the air and water of amphibole minerals associated with Reserve Mining's taconite ore and included the following:
 1. Containment structures (dams) were built with downstream construction methods utilizing coarse tailings (plant aggregate) and included a glacial till/clay core to minimize the potential for seepage through the dams.
 2. Disposal of all tailings not used for dam and dike construction was to be under water within the disposal facility.
 3. The basin was designed to operate as a totally closed system with no discharge.
 4. All surface runoff and seepage from the basin area was to be collected in seepage recovery ponds and returned to the basin under the premise that downstream construction over the life of the facility would continue to introduce fine particulates to these waters.
 5. Implementation of an extensive air, surface water and ground water quality monitoring program that was designed to measure the impacts of the operation of MP7 basin.
 6. A very important point, which was subsequently altered by the construction and operation of a water treatment plant, was that the plan recirculated basin water to the plant so that there was no discharge.

Milestones & Permitting Highlights

- In 1980, the construction of the basin and fine tailings pipeline was completed, and fine tailings disposal at the basin commenced.
- In 1984, an MPCA Permit was issued to Reserve Mining Company to construct a water treatment facility and to discharge treated water to the Beaver River. The water treatment plant (four filters) was constructed in 1984 and 1985.
- In 1986, Reserve Mining Company ceased operation.
- In 1988, a Consensus Closure Plan was developed by consulting firm Klohn Leonof. The Consensus Closure Plan was tailored for short-term operation of the basin.
- In August 1989, Cyprus Minerals purchased the facility and reactivated operations in 1990, consistent with the requirements of the Consensus Closure Plan. At that time, an operating plan for the five year period was developed that provided for the filling of cells 1 and 4. A decision to proceed with further operations was not necessary until year 4.5 of the operating plan.

- In October 1994, Cleveland-Cliffs (now Cliffs Natural Resources) purchased the NSM facility and decided to continue operations beyond the consensus closure plan. In addition, NSM was proposing a new basin operating plan.
- MPCA and DNR approved NSM's plans to continue operations utilizing upstream construction methods instead of the Reserve-proposed downstream construction. The new operating plan included upstream dam construction with a cut-off trench or seal of fine tailings, distribution of fine tailings throughout the basin including Cells 2-3 and the progressive raising of dams by upstream construction methods. Basin operations have proceeded in this manner since the plan was approved in the summer of 1997.
- In August 2005, NSM received USACE permit 2005-2628-TWP that approved a 160-acre progression of the basin, the continued construction of dams, a road raise, the relocation of the railroad upslope to the west and the relocation of a diversion ditch. This permit expires December 21, 2030.
- The 2005 USACE Permit Decision Document directly and indirectly references the 1977 EIS in several locations as follows:
 1. Page 1: "A public notice describing the project and its location is attached. However, the applicant has stated that the use of the word expansion in the public notice has caused some confusion. Several Department of the Army permits were issued in the late 1970's authorizing the discharge of fill material for the entire tailings basin, and associated dikes and diversion structures. Three of the permits included current ongoing activities required for continued use of the basin. In particular, permit 76-412B authorized fill for the construction of Dam Number 1, permit 76-413B authorized fill for the construction of Dam Number 2, and permit 76-422 authorized the deposit of tailings in the Milepost 7 tailings basin. No compensatory mitigation was included as a condition of any of these permits. After they were issued, the above permits were renewed several times, but have recently expired. The current application is to consolidate the permits, and authorize continued use and expansion of the active portion of the previously authorized tailings disposal area for the next 25 years of operation of the tailings basin. **The footprint of the tailings basin at the end of the 25-year span would still not encompass the entire previously authorized fill area.**"
 2. Page 3: "The Corps has determined that since the requested authorization is within the footprint of the previously authorized tailings basin area, and since an EIS was prepared for the initial tailings basin project, and EIS will not be required."
 3. Page 6: "The proposed action is the permitting of the next phase of development of the applicant's previously authorized tailings disposal basin. Due to the size of the area required for tailings disposal, and the prevalence of wetlands in the area, the applicant has not been able to design a project which would avoid or minimize wetland impacts."
 4. Page 8: "The area of the proposed project is located within the previously authorized Mile Post 7 Tailings Basin Disposal Area. Due to landform, cost, and the use of coarse tailings for its construction, the tailings basin is being constructed

- incrementally. The current phase of development is immediately adjacent to the active tailings disposal area.”
5. Page 10: Water Quality: “The project includes only the development of the next phase of the previously permitted Milepost 7 Tailings Disposal basin project. Water discharges from the site should not change from current levels.”
 6. Page 11: “The Corps agrees that mining in general has, and is, resulting in cumulative effects. However, the Corps has determined that, in this instance, the current project includes only the next phase of the applicant’s tailings basin development, and since an EIS was previously completed for the entire tailings basin project, an EIS for this phase of the development is not warranted.”
 7. Page 17: “Finding of No Significant Impact: Having reviewed the information provided by the applicant, the comments submitted by interested parties, and the environmental assessment contained in this document, I find that this permit action will not have a significant impact on the quality of the human environment. Therefore, an environmental impact statement will not be required.”
- June 6, 2006 Letter from Robert Whiting of USACE: “All areas within the tailings basin dikes up to an elevation of 1252 feet were permitted by various DOA permits prior to the issuance of DOA permit 2005-2628-TWP. DOA permit 2005-2628-TWP authorized the discharge of fill materials in the wetlands between elevation 1252 and the limits identified in DOA Permit 2005-2628-TWP. Appropriate compensatory mitigation has been provided for all of the wetlands permitted to be filled by these permits.”
 - The MP7 water treatment plant expanded from 4 to 6 filters in October 2007.

Anticipated Permitting Resources Needed from Agencies

Minnesota Department of Natural Resources

- Permit to Mine Amendment
 - PTM boundary – slight alteration to accommodate curvature of railroad
 - Updated final crest design for Dams 1, 2 and 5 (+50’)
- WCA permit
 - For impact of wetlands associated with the realignment of the existing railroad and tailings disposal.
 - Mitigation will be required, and Cliffs is moving forward with a plan to secure the needed wetland credits in advance of construction to satisfy the WCA requirements.
- Dam Safety Permit and/or MP7 5-Year Operating Plan (2014-2018)
 - Amend 5-Year Operating Plan to reflect construction plans
 - Revise final crest design for Dams 1, 2 and 5
 - Potential extension of Dam 1 around Landfill

- Potential for two additional dams on NW side of basin
- Water Appropriations Permit
 - No amendments anticipated

Minnesota Pollution Control Agency

- NPDES/SDS Permit
 - Permit amendment for new NPDES permit boundary
 - Expanding excavations, construction, progression all need approvals (may be addressed through the revised 5-Year Operating Plan instead)
- Solid Waste Permits
 - Landfill Permit Amendment for the extension of Dam 1 around ash landfill
 - Work with MPCA to determine best course of action for Permit by Rule site(s)
- Air Permit
 - No amendment anticipated
- Construction Stormwater Permit
 - Permits may be needed ---unknown until final design is complete
- 401 Certification
 - Project will need USACE 404 Permit, requiring 401 Certification

Unites States Army Corps of Engineers

- Section 404 Wetland Permit
 - Delineation and TEP are complete – DNR/USACE concurred
 - Jurisdictional Determination underway