EPA Signs Action Memorandum for Early Cleanup

U.S. Environmental Protection Agency (EPA)
Elizabeth Mine Superfund Site
Strafford, Vermont

Community Update # 4
September 2002

Introduction:

EPA proposed an early cleanup action for the Elizabeth Mine in March 2002. During the 30 day comment public comment period, EPA received numerous comments both in support of, and in opposition to, the proposed cleanup plan. After careful consideration of the comments received, EPA signed an Action Memorandum on September 3, 2002 to document the activities to be performed as part of the early cleanup. The cleanup plan presented in the Action Memorandum is the approach that EPA and Vermont Agency of Natural Resources (VTANR) find to provide the best balance of all of the factors relevant to the Site. A copy of the Action Memorandum and Response to Comments can be viewed at the Elizabeth Mine Information Repositories at the Norwich Public Library and the EPA Record Center.

The early cleanup action is being implemented as a Non-Time-Critical Removal Action (NTCRA). Once funding has been received, EPA will begin the process of performing the design for the NTCRA cleanup. Full scale construction activities are not anticipated to begin until 2004. Figure 1 shows a map of the Elizabeth Mine Superfund Site.

Early Cleanup Action (NTCRA):

The goal of the NTCRA will be to restore the section of the West Branch of the Ompompanoosuc River (WBOR) that has been contaminated by the Elizabeth Mine to a condition similar to that upstream of the mine impacts.

Elizabeth Mine Community Advisory Group (EMCAG)

EPA meets regularly with the EMCAG to discuss Site activities and receive feedback from the community. The next EMCAG meeting is scheduled for

7 p.m.
October 9, 2002
Newton School
South Strafford, VT

All meetings are open to the public. You may contact Cindy Cook at (802) 223-1330 if you have any questions regarding the EMCAG.

Studies by EPA and VTANR confirm that the WBOR immediately upstream of the Elizabeth Mine achieves the Vermont Water Quality Standards for the fish and benthic communities and generally meets the numerical Vermont Water Quality Standards. The levels of aluminum in the WBOR upstream of the Elizabeth Mine exceed the federal ambient water quality standards but do not appear to affect the aquatic community. EPA and VTANR, therefore, believe that it is both reasonable and achievable to restore the WBOR to the quality similar to that upstream of the Elizabeth Mine impact. EPA selected Alternative 2C from the Engineering Evaluation/Cost Analysis (EE/CA), as the early cleanup action.

The major components of Alternative 2C include:

1. Surface water and groundwater diversion ditches: Diversion ditches will be installed around the perimeter of three tailing piles (TP-1, TP-2, and TP-3) to intercept clean water and carry this water around the tailings. This will prevent clean water from coming into contact with the sulfide-bearing materials that cause the acid mine drainage (AMD). These trenches will be installed to a depth that will intercept shallow groundwater that may also be flowing into the tailings.

2. Slope Stabilization: Stabilization of the steep slopes of TP-1 and TP-2. Design studies will determine the extent to which the slopes of TP-1 and TP-2 require stabilization.

3. Infiltration barrier cover system; Installation of an infiltration barrier cover over TP-1 and TP-2. The cover will be designed to prevent water and oxygen from coming into contact with the tailings to minimize the AMD at the toe of TP-1. The cover is expected to have the following layers (top to bottom):

- Soil/Vegetation layer: This layer provides support for the vegetative cover, protects the barrier layers, and allows for the retention and use of water by vegetation. It will include approximately 6 inches of topsoil and 12 inches of additional soil material. EPA will try to minimize the thickness of this layer in a manner which will preserve the protectiveness of the remedy, while reducing the amount of fill material that will have to be trucked to the Site via local roads. Alternative cover materials, such as stone, will also be evaluated during design.

- Drainage layer: This layer allows for the drainage of water that flows through the soil layer and cannot flow past the barrier layer. A geosynthetic (engineered) drainage layer provides a conduit to carry water off the barrier layer without allowing the water to pond on top of the barrier layer.

- Barrier layer: This layer prevents water and oxygen from flowing into the tailings. The top barrier will be a geomembrane. During design, the need for a second barrier layer will be evaluated. If determined necessary, the second barrier layer would be a geosynthetic clay liner. During design, EPA will also evaluate the need for a barrier layer on the steep slopes. If design studies indicate that an equivalent level of erosion stabilization and infiltration reduction can be achieved using an alternative cover configuration, EPA will be consider using an alternative cover (simple soil cover or stone cover) design to preserve the profile of the slopes of TP-1 and TP-2.

- The cover system will have a final grade to promote drainage off the cover and prevent ponding on the primary barrier layer.

Based on the results of the upcoming design activities, the components of the infiltration barrier could be significantly modified. For example, if it is determined that the tailings of TP-1 and TP-2 meet the performance standards in the Vermont Solid Waste Management Rule as an infiltration barrier, then the installation of a geomembrane or a geosynthetic clay layer may not be necessary.

4. Collection and treatment of the seeps along the toe of TP-1: A collection system will be designed to capture the seeps that discharge AMD along the toe of TP-1. This water will be treated using a combination of aerobic and anaerobic biological treatment systems. The treatment system concept for TP-1 includes:

- Holding ponds to stabilize flow;
- Anoxic limestone channels to neutralize acidity;
- Anaerobic bioreactors (either Successive Alkalinity Producing Systems (SAPs), Sulfate Reducing Bacteria (SRBs) or both) to further neutralize acidity and reduce metal concentrations using organic material and limestone; and
- Aerobic wetlands to remove additional metals in an open water wetland.

A series of design studies will be performed to optimize the treatment system. The design may determine that some of the components above are not necessary or that some phasing of the implementation of the treatment system is appropriate to provide time to evaluate long-term flow after installation of the cap. The effluent from the treatment system will be designed to comply with the federal Clean Water Act and the State of Vermont Water Quality Standards.

5. Preservation of a portion of tailing pile 3 (TP-3). The State Historic Preservation Officer (SHPO) and VT ANR have advocated for the preservation of a portion of TP-3 if technically and economically feasible. If a portion of TP-3 is preserved, then no cover or substantial regrading will occur within the preserved area. Some limited work may be performed to minimize the erosion in the area. Because the maintenance costs associated with the preservation of TP-3 will be paid for by the State of Vermont, EPA has deferred to the State for a determination regarding the amount of TP-3 to be preserved. Three preservation options were presented in the EE/CA. VT ANR has informed EPA that only partial preservation or no preservation are viable options given the cost for the treatment system required for full preservation. Prior to the completion of the design for the NTCRA, EPA will present the VT ANR with a refined estimate of the costs to maintain a passive treatment system for TP-3. At that time, EPA will request a final determination regarding the amount, if any, of TP-3 to be preserved.

6. Collection and treatment of run-off from TP-3: If a portion of TP-3 is preserved, then the flow from the preserved area of TP-3 will be collected in an interceptor trench installed along the edge of the waste rock and heap leach piles. This water will be treated using a combination of aerobic and anaerobic bioloigcal systems. The current treatment system concept includes:

- Holding ponds to stabilize flow;
- A lime application system (Semi-Active Alkalinity Dosing System) and settling basin for initial treatment;
- Anaerobic bioreactors (either Successive Alkalinity Producing Systems (SAPs), Sulfate Reducing Bacteria (SRBs) or both) to neutralize acidity and reduce metal concentrations using organic material and limestone; and
- Aerobic wetlands to remove additional metals in a open water wetland.

A series of design studies will be performed to optimize the treatment system. The effluent from the treatment system will be designed to comply with the federal Clean Water Act and the State of Vermont Water Quality Standards.

Capital Cost of NTCRA:

The approximate capital cost for Alternative 2C ranges from $14 million if 50% of TP-3 is left in place to $16 million for complete excavation of TP-3.

Post-Removal Site Control (PRSC):

Long-term maintenance of the cap and treatment systems will be necessary to maintain the effectiveness of the cleanup. The State of Vermont will be responsible for all PRSC activities including: mowing and erosion repairs for the cover system, cleaning the diversion ditches, sampling and maintaining the treatment systems, and periodic replacement of portions of the treatment systems.

The expected cost to the State of Vermont varies considerably, depending upon the percentage of TP-3 preserved. The annual cost to maintain the cover and treatment system for TP-1 and TP-2 alone would be approximately $90,000. The estimated cost to treat TP-3, assuming that 20 - 50% of TP-3 is preserved, ranges from $153,000 to $200,000 per year. A more refined cost estimate for operation and maintenance, particularly of the treatment systems, will be developed during the design.

Evaluation of Cleanup Plan during Design:

EPA will consider several key factors during the design of the early cleanup: the stability of the tailings and cover system; minimization of erosion; reduction of AMD; historic preservation; and potential future use of the site. In addition, EPA will continue to evaluate whether adjustments to the cleanup approach can be made to:

·Reduce traffic volume required to implement the cleanup;

·Reduce the cost of the cleanup;

·Preservation portions of TP-3 without the need for treatment; and

·Achieve the requirements of the Vermont Solid Waste Management Rule and reduce flow at the seeps of TP-1 without an infiltration barrier over TP-1 and TP-2.

EPA will continue to work with the EMCAG to address the community's concerns and make adjustments to the cleanup plan. However, any adjustments to the cleanup plan must lead to the attainment cleanup goals and comply with federal and state legal requirements.

Schedule:

The schedule for the NTCRA is dependent upon the availability of funding for the project. If funding for the project is received in early 2003, then the pre-design studies should be completed within one year and construction could begin in 2004 and continue into 2006. The most likely sequence of events is as follows:

1. Develop the project plans for the pre-design studies that will assess: the infiltration of water into the tailings; the stability of the tailings, waste rock, and heap leach piles; the availability of material suitable for the cover adjacent to the Site; the acid generating potential of the various materials within TP-3; and the treatment components for the treatment systems.

2. Implement treatability studies (bench scale, pilot scale, and full scale) of the treatment technologies.

3. Develop a Design (design basis report, specifications, and drawings) for the cleanup.

4. Construct the surface water/groundwater diversion, erosion control, and any slope stabilization measures.

5. Complete the work for TP-3 (treatment and/or partial/complete removal) at the same time or subsequent to the surface water/groundwater diversion.

6. Construct the cover system for TP-1 and TP-2 once the design studies have confirmed the need for the cover system and after the surface water/groundwater diversion and TP-3 work is complete.

Other Site Activities:

EPA will continue with the investigation of the other potential source areas of the Site with the goal of completing the Site characterization by the end of 2003. This will allow for a cleanup decision regarding the other source areas in 2004.

This fall, contractors working for EPA and the USACE will:

- Continue the historic resource mapping and assessment of the Site;
- Drill about 35 borings and excavate ten test pits to determine the subsurface conditions in the waste material and soil at the Site;
- Install nine monitoring wells in some of the borings to assess water quality and hydrogeologic conditions;
- Monitor chemistry and hydrogeologic parameters for groundwater within the underground workings;
- Continue sampling surface water, sediments, and residential wells; and
- Continue to monitor the surface water flow rates from the mine features and Copperas Brook.

If you have questions or concerns about the Elizabeth Mine Superfund Site, please contact:

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For More Information About the Elizabeth Mine:

Visit the EPA website for the Elizabeth Mine at: **epa.gov/region1/superfund** then type "Elizabeth Mine" in the Find New England Sites box, then click on "go". The web site contains the text files for major reports, fact sheets, and a summary of the Site. A paper copy of the reports, fact sheets, and other Site information can be found at the information repositories at the Norwich Public Library and the EPA Record Center.