

Elizabeth Mine Superfund Site

Response to Comments

Non-Time-Critical Removal Action (NTCRA)

Preface:

In March 2002, the U.S. EPA presented a Proposed Plan for a non-time-critical removal action (NTCRA) as an early cleanup of the Elizabeth Mine Superfund Site in Strafford and Thetford, Vermont. The Proposed Plan was based upon the data which had been collected during EPA's initial investigations at the Site from 2000-2001. All documents which were relied upon in the selection of the cleanup action presented in the Proposed Plan were placed in the Administrative Record, which is available for public review at the EPA Records Center, 1 Congress Street and the Norwich Public Library in Norwich, VT.

A 30-day comment period was held from March 15, 2002 to April 15, 2002. A public hearing was held on April 10, 2002.

EPA fully considered all of the comments that were submitted before selecting a response action to address contamination at the Site. This Responsiveness Summary documents EPA's response to those comments and is organized into the following sections:

- I. Overview of the Response Action Alternatives Considered in the Engineering Evaluation and Cost Analysis (EE/CA) and Proposed Plan, including the Preferred Alternative - This section briefly outlines the cleanup alternatives evaluated in the EE/CA and the Proposed Plan, including the EPA's preferred alternative.
- II. Site History and Background on Community Involvement and Concerns - This section provides a brief history of the site and an overview of community interests and concerns regarding the Site.
- III. Summary of Comments Received During the Public Comment Period - This section summarizes and provides EPA's response to the oral and written comments received during the comment period. Part I presents comments received from State and Federal Agencies, Local Officials, and State Representatives, and Part II presents the comments received from citizens, including the Elizabeth Mine Community Advisory Group (EMCAG).
- IV. Changes in Selected Cleanup Based on Public Comments - This section summarizes any changes that were made to the preferred cleanup presented in the Proposed Plan based upon EPA's consideration of the comments received during the public comment period.

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All of the original comments submitted during the comment period are included in the Administrative Record.

I. Overview of Response Alternatives Considered in the EE/CA and Proposed Plan

Using the information gathered during the preliminary investigations of the Site, including studies documenting the impacts to ecological receptors, the EPA identified several cleanup objectives for the Elizabeth Mine Superfund Site.

- Achieve VT Water Quality Standards (WQS) (chemical and biological) as well as other applicable standards for the West Branch of the Ompompanoosuc River (WBOR) by preventing or minimizing the discharge of water with mine-related metals contamination to Copperas Brook and the WBOR;
- Minimize erosion and transport of tailings or contaminated soil into the surface waters of Copperas Brook and the WBOR;
- Evaluate the stability of the waste piles (tailings, waste rock, and leach piles) and modify slope configurations (re-grading, covering, or buttressing) as necessary to provide for an acceptable level of long-term stability;
- Consider measures to minimize and, if possible, avoid an adverse effect on historic resources at the Site, as required by the National Historic Preservation Act (NHPA); and
- Comply with all applicable and relevant and appropriate federal and state standards (ARARS) while achieving these objectives.

EPA worked closely with the EMCAG to develop the list of alternatives presented in the EE/CA. An initial screening of alternatives was presented to the EMCAG in an Alternatives Analysis Report (AAR) released in April 2001. Based on the comments regarding the AAR, EPA developed the draft EE/CA which was released for review by the EMCAG and its technical consultants in September 2001. The alternatives evaluated in the final EE/CA result from the comments from VT ANR and the EMCAG regarding the AAR, and the draft EE/CA.

Five Alternatives were evaluated in the EE/CA. Each Alternative includes the following baseline items:

- Preservation of a portion of TP-3 to protect historic resources (up to 100%, exact amount to be determined during design);
- Diversion of surface water away from TP-1, TP-2 and TP-3;
- Collection and treatment of storm water runoff and drainage from TP-3 with passive treatment systems;
- Collection and treatment of drainage from the seeps at the toe of TP-1 with passive treatment systems;

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- Stabilization of the steep slope areas of TP-1 and TP-2 only as necessary to achieve acceptable long-term stability while maintaining the current tailing profile to the extent possible; and
- Backfilling/stabilization of the decant piping system beneath TP-1.

In addition to the common components of each of the cleanup alternatives listed above, the cleanup alternatives differ based on the cover system that would be installed over TP-1 and TP-2. Four different cover systems were developed for consideration in the EE/CA. Cleanup Alternatives 2B and 2C have the same multilayer cover system but differ because Alternative 2B involves the consolidation TP-2 onto TP-1 to reduce the size of the cover.

The five cleanup alternatives evaluated in the EE/CA are described below.

Alternative 2B (Geosynthetic Infiltration Barrier Cover System with TP-2 Removal)

Alternative 2B is designed to minimize the footprint of the cover system to reduce capital and maintenance costs. The cover system for Alternative 2B is an infiltration barrier that minimizes the amount of water and oxygen that would enter TP-1 and TP-2. This type of cover system should result in a significant decline in the flow at the seeps over time thereby minimizing the long-term treatment costs for the seeps of TP-1. In addition to the baseline items previously discussed, Alternative 2B includes:

- Consolidation of TP-2 onto TP-1;
- Consolidation of the portion of TP-3 (if any) designated for removal onto TP-1; and
- Placement of a multilayer infiltration barrier cover system over consolidated TP-1.

Capital costs for Alternative 2B range from: \$13.8 to \$16.7 million depending upon the percentage of TP-3 removed.

The maintenance costs for the cleanup will be the responsibility of the State of Vermont. The estimated annual costs to inspect, maintain, and sample range from \$82,000 - \$482,000 per year depending upon the percentage of TP-3 that is retained for treatment.

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Alternative 2C (Geosynthetic Infiltration Barrier Cover System)

Alternative 2C, like Alternative 2B, was designed to minimize the infiltration of water and oxygen into the tailings. Alternative 2C is EPA's selected alternative and is described in more detail in the Action Memorandum. In addition to the baseline items previously discussed, Alternative 2C includes:

- Consolidation of the portion of TP-3 (if any) designated for removal onto TP-1; and
- Placement of a multilayer infiltration barrier cover system over TP-1 and TP-2.

Capital costs for Alternative 2C range from: \$13.1 to \$16 million depending upon the percentage of TP-3 removed.

The maintenance costs for the cleanup will be the responsibility of the State of Vermont. The estimated annual costs to inspect, maintain, and sample range from \$90,000 - \$490,000 per year depending upon the percentage of TP-3 that is retained for treatment.

Alternative 3B (Evapotranspiration Soil Cover)

Alternative 3B is a soil cover of sufficient thickness to for allow the water retention, evaporation, and transpiration properties of a vegetated soil to minimize infiltration into the tailings. In addition to the baseline items previously discussed, Alternative 3B includes:

- Consolidation of the portion of TP-3 (if any) designated for removal onto TP-1; and
- Placement of a 42 inch thick soil cover over TP-1 and TP-2 to reduce infiltration by means of evaporation and plant use.

Capital cost for Alternative 3B range from: \$12.4 to \$15.6 million depending upon the percentage of TP-3 removed.

The maintenance costs for the cleanup will be the responsibility of the State of Vermont. The estimated annual costs to inspect, maintain, and sample range from \$110,000 - \$510,000 per year depending upon the percentage of TP-3 that is retained for treatment.

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Alternative 3C (Minimal Soil Cover)

Alternative 3C is designed to be the minimal soil cover. Alternative 3C would only slightly reduce infiltration of water and oxygen into the tailings beyond what is currently occurring.

In addition to the baseline items previously discussed, Alternative 3C includes:

- Consolidation of the portion of TP-3 (if any) designated for removal onto TP-1; and
- Placement of the six inches of soil over the surface of TP-1 and TP-2.

Capital costs for Alternative 3C range from: \$9.5 to \$12.3 million depending upon the percentage of TP-3 removed.

The maintenance costs for the cleanup will be the responsibility of the State of Vermont. The estimated annual costs to inspect, maintain, and sample range from \$132,000 - \$532,000 per year depending upon the percentage of TP-3 that is retained for treatment.

Alternative 3D (Hardpan Barrier Layer)

Alternative 3D includes a chemical cap formed by the reaction of the sulfides and carbonate to form a gypsum layer that will substantially reduce infiltration. In addition to the baseline items previously discussed, Alternative 3D includes:

- Consolidation of the portion of TP-3 (if any) designated for removal onto TP-1;
- Placing lime and/or crushed limestone on top of the tailings to form a chemical cap on TP-1 and TP-2;
- Placement of a drainage net beneath the soil to prevent ponding of water above the hardpan layer; and
- Placement of 18 inches of soil on top of the limestone to promote a long-term vegetative cover.

Capital costs for Alternative 3D range from: \$12.2 to \$15 million depending upon the percentage of TP-3 removed.

The maintenance costs for the cleanup will be the responsibility of the State of Vermont. The estimated annual costs to inspect, maintain, and sample range from \$90,000 - \$490,000 per year depending upon the percentage of TP-3 that is retained for treatment.

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Alternative Evaluation

All of the cleanup alternatives presented in the EE/CA and the Proposed Plan were evaluated in detail individually and then comparatively using three criteria: effectiveness, implementability, and cost. The results of the comparative analysis is summarized as follows:

- The cover system proposed for TP-1 and TP-2 is the only significant difference between these alternatives.
- The cover systems that are a component of Alternative 2B and 2C would be the most effective in reducing the infiltration of water into the tailings and thereby reducing the flow of acid mine drainage at the toe of TP-1.
- Alternatives 2B and 2C have the lowest long-term cost when capital costs and maintenance costs are combined.
- Alternatives 2B, 2C, and 3B are the only cleanup alternatives with a cover system that would comply with the VT Solid Waste Management Rule, after invoking a regulatory waiver for several of the standards. As a result, only 2B, 2C, and 3B were eligible for selection as the recommended cleanup alternative.

After comparing these alternatives and weighing the strengths and weaknesses, EPA recommended Alternative 2C as the best balance of public health and environmental protection considering cost, effectiveness, and implementability of each of the cleanup alternatives. The Action Memorandum documents the selection of Alternative 2C as the cleanup action.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

The Elizabeth Mine closed in 1958. The mine landscape is considered by many local residents to be an important reminder of the community's mining legacy. Many people in the area either worked at the mine, are related to former workers, or know people associated with the mine.

The environmental impacts at the Site were documented in studies performed by the Vermont Agency of Natural Resources (VTANR) in 1977 and 1990, U.S. Army Corps of Engineers (USACE) in 1984, United States Geological Survey (USGS) in 1998 and the Elizabeth Mine Study Group (EMSG) in 1999. The VTANR formally requested that EPA consider a cleanup action at the Site in the fall of 1999.

An initial meeting between EPA and a small group of local officials and residents was held during the fall of 1999. EPA held the first public information meeting in February 2000. This meeting was attended by over 200 individuals and substantial opposition was expressed to EPA's involvement at the Site. To address the community concerns and to serve as a focal point for discussion with EPA, the EMCAG was formed in April 2000. It consists of ten member organizations representing a cross section of the community. The EMCAG member organizations are:

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- Town Strafford Selectboard
- Town of Thetford Selectboard
- Elizabeth Mine Study Group (EMSG)
- Citizens for a Sensible Solution (CASS)
- Elizabeth Mine Survivors
- Adjacent Landowners and Residents
- Non-residential Landowners
- Thetford Conservation Commission
- Strafford Planning Commission
- Strafford Historical Society

EPA has met with the EMCAG almost monthly since April 2000. After six months of discussion regarding EPA involvement at the Site, the EMCAG unanimously agreed to support the process of placing the Elizabeth Mine on the National Priorities List (NPL). The Site was proposed for the NPL in December 2000 and finalized in June 2001.

Working with the EMCAG, EPA developed a process for extensive community involvement in shaping the cleanup at the Site. This process included the development of a series of reports for review by the EMCAG. The first report was a preliminary report of cleanup options, the Alternatives Analysis Report (AAR) (April 2001). A public meeting was held to discuss the various technical approaches for addressing mine waste. EPA provided the community with expert technical support through the Technical Outreach Services to Communities Program (TOSC). The TOSC program provided the community a mining expert from Montana Tech, a hydrogeology expert from Middlebury College, and public health experts from Tufts University. EPA received comment letters from the EMCAG, the Strafford Selectboard, VT ANR, and the TOSC experts regarding the AAR.

Comments regarding the AAR were used to develop the first draft Engineering Evaluation and Cost Analysis (EE/CA), released in September 2001. The first draft EE/CA was also reviewed by the EMCAG, its technical consultants, and the VT ANR. EPA provided a Technical Assistance Grant (TAG) to the community. The community retained the services of Dr. Richard Downer (formerly of UVM) and Dr. Sherwood Reed (a nationally known wetlands expert) to review the draft EE/CA. In November 2001, the EMCAG and TAG experts submitted comments to EPA regarding the draft EE/CA. The final EE/CA (March 2002) reflects the culmination of those comments and the ongoing dialogue between EPA and the community.

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Community Concerns:

The initial public response to EPA's involvement at the Site was quite negative. The community expressed a number of significant concerns regarding having the federal government implement a project that could disrupt community life. Many people were concerned that community members would be held liable for the cleanup. In addition, many individuals did not feel that the mine was causing a significant environmental impact beyond Copperas Brook (a small brook that was not valued by many people as a natural resource). There was a strong coalition of individuals interested in the preservation of the mine as a historic resource. Over the months of dialogue between the community and EPA, a wide range of concerns have been expressed regarding the Site and a potential cleanup. These concerns include the following:

- Many people are very concerned about the impact of truck traffic on the adjacent residents and small community. Local roads to the mine are not well suited for large volumes of truck traffic. Residents are particularly concerned about truck traffic going through the Village of South Strafford.
- Many residents of Gove Hill and Mine Road are concerned about property impacts, noise and dust impacts, as well as traffic safety.
- Many people want the cleanup to occur as soon as possible. They are opposed to any delay in the implementation of the cleanup. Concerns regarding the health of their children, environmental concerns, personal liability, property values, and potential for property sales are among the reasons for this position.
- Some people did not feel that the environmental impacts warrant a federal cleanup action of the scale and cost being discussed by EPA. They are split between those who advocate no cleanup and those seeking alternative solutions that would be less expensive.

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III. SUMMARY OF PUBLIC COMMENTS AND RESPONSES

This Responsiveness Summary addresses comments pertaining to the Proposed Plan and EE/CA which were received by EPA during the comment period from March 15, 2002 to April 15, 2002. Written, email, and oral comments were received. All of the comments submitted as well as the transcript from the April 10, 2002 public hearing are included in the Administrative Record.

Overall Summary of the Public Reaction to the EPA's Preferred Alternative

The public reactions to the cleanup proposal were quite diverse. Opinions within the community range from fully supportive, partially supportive, to significantly opposed. The majority of the Elizabeth Mine Community Advisory Group (EMCAG), including the local selectboards and the expert advisors to the EMCAG/TAG group, state officials, the State Agency of Natural Resources, and several stakeholders groups with an interest in the ecological health of the area (particularly the river systems) were very supportive of the cleanup. Several adjacent property owners expressed concerns regarding long-term health impacts associated with exposure to the mine waste and property values advocated that the cleanup be implemented as soon as possible. Most of those who expressed qualified support were concerned with the overall cost and local impact (truck traffic and loss of historic resources) of the cleanup. Most of those opposed also felt the size and cost of the cleanup were too large given that the Site's impacts are ecological and that the cleanup goals are too stringent. Many individuals expressed a concern for the impact of the cleanup on the historic resources at the Site.

Due to the large number of comments for which a response is provided in this document, a summary of EPA's Response to the major comments is presented below:

Concerns regarding long-term health impacts and property values:

Long-term health impacts: The goal of EPA's remedial investigation and feasibility study (RI/FS) for the Elizabeth Mine is to fully evaluate the potential threat to human health and the environment that is a result of the hazardous substances at the Site. A preliminary evaluation of the surface water data, sediment data, currently used drinking water supplies, residential soil, and the waste material at the surface of the Site does not suggest a significant short term health threat from the Site. However, it is important to note that a final determination regarding any long-term health threats at the Site will be made as part of the RI/FS. Also, there is an area of groundwater containing cadmium and copper above the maximum contaminant levels (MCLs) specified by the federal Safe Drinking Water Act. This contamination was present in a residential well that is no longer in use. EPA considers a human health threat to exist when groundwater that is currently used or that may be used in the future as a water supply contains contamination above the MCL. Therefore, it is reasonable to state that Elizabeth Mine represents a threat to human health and the environment. EPA has consistently stated that the primary current threat at the Site is to the ecological receptors within the aquatic systems, downstream of the Site.

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Property values: EPA understands that the presence of a Superfund site can have a negative impact on property values and the ability to sell a property. EPA is willing to work with lenders and prospective purchasers to help them understand the Site and the EPA guidance and regulations that relate to property acquisition.

Concerns regarding the overall cost and truck traffic:

Truck traffic: EPA has repeatedly committed to making every effort to minimize the impact of the cleanup on the community. EPA will diligently search for soil material on the adjacent properties and will seek the owners' permission to develop a borrow pit. In addition, alternative routes, including temporary construction roads, will be considered during the design phase. To the extent that travel over public roads is necessary, EPA will coordinate with the local Selectboards and the EMCAG regarding traffic and road impact issues.

Cost: The cost of the cleanup is proportional to the size of the Site. Many comments objected to the high cost for the cover system for TP-1 and TP-2 and the maintenance costs for the passive treatment systems. The components of the cleanup upon which there is most agreement (erosion stabilization, surface water/groundwater diversion, pre-design studies, design) represent about \$3 - \$4 million of the total estimated \$13 - \$16 million for the entire project. Some comments advocated that these measures would significantly improve the quality of the West Branch without the need for the other components. The erosion stabilization and surface water/groundwater diversion would only reduce the quantity of water that enters TP-1/TP-2. These measures (erosion stabilization and surface water/groundwater diversion) would not address the contamination that is discharging from TP-3. Because TP-3 represents over 90% of the loading for aluminum, cobalt, copper, and zinc and about 25% - 50% of the iron and manganese, these measures (surface water/groundwater diversion and erosion stabilization alone) would not significantly improve the water quality in the WBOR on their own. A cleanup action for TP-3 is necessary to improve surface water quality in the WBOR. Removal of 80% of TP-3 plus the required treatment system for the remaining portions is estimated at \$6.2 million, whereas complete removal (and installation of a cover system over the material re-located to TP-1) without a treatment system is estimated at \$6 million. Since the USGS studies have demonstrated that all of waste in TP-3 can be expected to generate acid mine drainage, treatment of whatever portion of TP-3 remains must be assumed. The only way to minimize the maintenance costs is to remove 100% of TP-3. The total cost of an approach that includes erosion stabilization/surface water diversion/removal and removal and capping of 50%-80% of TP-3 along with treatment of the remaining portion of TP-3 is estimated at \$10.2 million.

The cover system for TP-1/TP-2 and the associated passive treatment system components represent the remaining \$6 million of the cleanup costs. The VT Solid Waste Management Rules require a cover on solid waste unless it is determined that a cover is not practical and that human health and the environment are adequately protected. EPA has determined that covering the portions of TP-3 targeted for historic preservation would not be practical given the steepness of the slopes and the historic significance of the material present at TP-3. However, to avoid

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covering or removing the waste material within TP-3, the VT Solid Waste Management Rules require the run-off from TP-3 be collected and treated in a manner that would result in equivalent protection. EPA has also determined that an infiltration barrier on the slopes of TP-1 and TP-2 would not be necessary if the design studies demonstrate that these areas do not contribute significantly to acid mine drainage generation. Based on the information currently available, EPA does not believe that there is a sufficient basis for a determination that the cover requirements for the non-slope areas of TP-1 and TP-2 are not practical and, therefore, the cover requirements contained in the VT Solid Waste Management Rules must be met. However, if the design studies demonstrate that the tailings are an effective barrier to infiltration such that they meet the performance requirements of the VT Solid Waste Management Rules, EPA will re-consider the need for the infiltration barrier. The net savings of removing the infiltration barrier, would be a reduction of an estimated at \$2 - \$3 million from the current estimate of \$6 million to install the infiltration barrier cover system. It is assumed that some type of soil cover would still be necessary to establish vegetation, stabilize the surface of the tailings and allow for re-use of the area.

Concern with ecological basis for cleanup and regulations that apply to the cleanup: EPA's mandate under Superfund is to protect human health and the environment. A site is not required to have a human health risk to qualify for a Superfund cleanup. EPA guidance "Ecological Risk Assessment and Risk Management Principles for Superfund Sites", OSWER Directive 9285.7-28P, October 1999 clearly states that in addition to protection of human health, Superfund's goal is to reduce ecological risks to levels that will result in the recovery and maintenance of healthy local populations and communities of biota. The primary risk at many mining sites is the impact of acid mine drainage on the ecological receptors.

The overall goal and objective for the cleanup action at the Elizabeth Mine is to achieve the restoration of the WBOR to a level similar to that immediately upstream of the section of the WBOR affected by the AMD from the mine. The studies performed by EPA and VTANR document that the section of the WBOR above the mine impact is of good quality with respect to the biological measures (fish and benthic invertebrates) and routinely meets numerical federal and state water quality standards for all constituents except aluminum. EPA will use the background level of aluminum as the cleanup goal for the NTCRA.

EPA has determined that the VT Solid Waste Management Rules, federal Clean Water Act, and the Vermont Water Quality Standards are the major regulations that apply to the cleanup. The tailings, waste rock, and heap leach piles meet the definition of a solid waste and are therefore subject to these regulations. As discussed previously, EPA has used the waiver provisions contained in the VT Solid Waste Management Rules to address concerns regarding the historic profile of the tailings and the preservation of TP-3. The Clean Water Act requires that surface water be restored to achieve its designated use. The Clean Water Act and VT Water Quality Standards apply to two aspects of the NTCRA. First, these two regulations support the general objective of restoring the WBOR to the upstream quality that meets VT Water Quality Standards. The goal is to achieve these standards for the entire section of the WBOR impacted by the mine.

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The discharge from TP-3 would need to be reduced by 95% - 97% to achieve Vermont Water Quality Standards for copper in the WBOR just below the confluence with Copperas Brook. The second application of these regulations occurs when the contaminated water at the Site is collected for treatment. The discharge from the treatment systems will be subject to the substantive requirements of the National Pollution Discharge Elimination System (NPDES) of the Clean Water Act. These regulations require that discharges meet the numerical and biological measures of the Clean Water Act and Vermont Water Quality Regulations within the receiving water for the discharge (Copperas Brook). However, if during the design phase, or subsequent to the initial operation of the pilot or full scale system, it appears that one or more criteria cannot be met, at least two options might be available. If the designated uses for the surface water (Copperas Brook or WBOR) can be shown to be achieved at alternate concentrations or levels of a given parameter based on, for example, toxicity testing and biological measures (benthic and fish surveys), EPA may support Vermont's adoption of a site specific water quality criterion. Alternatively, EPA may support Vermont's establishment of a lower use or subcategory of use and an associated less stringent criterion if the action is supported by a use attainability analysis. EPA would collaborate with Vermont to develop site specific water quality criteria or a use attainability analysis if such an approach is determined necessary to practically achieve the substantive NPDES requirements in implementing the NTCRA remedy.

While the requirements of the federal Clean Water Act are not popular with several individuals who provided comments on the cleanup proposal, EPA does not agree that violating or "bending" federal and state water quality regulations is an appropriate basis for compliance. From a cost perspective, there would not be significant additional costs incurred by the State of Vermont in operating and maintaining the passive treatment systems regarding compliance with the Clean Water Act NPDES criteria with respect to the discharge from TP-1. It is very likely that a cost effective treatment system can be designed and constructed to handle the residual drainage from TP-1, especially if the surface water/groundwater diversion and infiltration barrier over system have been installed to significantly reduce flow. The technology for pH adjustment and iron removal has been well proven at many coal sites in the eastern United States. Compliance with the Clean Water Act NPDES requirements has a more significant impact on the costs associated with the treatment of the discharge from TP-3. The very high concentrations of metals, including copper and aluminum may require a more maintenance intensive treatment system than originally envisioned for this portion Site. There is still substantial uncertainty whether passive treatment technologies are capable of achieving compliance with the Clean Water Act NPDES requirements that would apply to a discharge from TP-3. The only approach that is known to be capable of achieving the Clean Water Act NPDES discharge criteria for TP-3 would be complete removal of the TP-3 waste material. Ultimately any compliance problems with meeting NPDES or any other Applicable or Relevant and Appropriate Requirements (ARARS) may need to be addressed as part of the final remedial action for the Site, rather than through this NTCRA.

The key points of comments received pertaining to the cleanup proposal are presented in more detail in the text below.

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Summary of Comments from Federal and State Agencies, State Representatives, and Local Officials with Responses from EPA

Comment 1: The Selectboards of Strafford and Thetford (members of the EMCAG) each submitted comments and presented oral statements at the public hearing in support of the cleanup. The Strafford Selectboard highlighted the potential costs and technical challenges associated with the preservation of TP-3 as a major concern. The Strafford Selectboard also stressed the importance of completing the cleanup as soon as possible to reduce the impact of the Superfund status on the properties within and abutting the Site. The Thetford Selectboard expressed support for the complete removal of TP-3 given the anticipated expense for the maintenance of a treatment system to address any remaining portion of TP-3. The Strafford and Thetford Selectboards also indicated that truck traffic will be a significant concern and that the smaller secondary roads should be avoided, if possible.

EPA Response: EPA thanks the local officials for all the time and resources they have devoted in working with EPA and their support for the cleanup of the Site. The final decision with respect to TP-3 rests with the VT ANR (see Comment 3, below, from the VT ANR). TP-3 is the most significant source of contamination at the Site and removal and covering of this material would significantly reduce the long-term cost to the State of Vermont as well as improve the effectiveness of the cleanup. EPA will make every effort to minimize the volume of truck traffic in South Strafford Village, as well as on the secondary roads, including Mine Road and Gove Hill Road. These efforts will include attempting to obtain soil from properties adjacent to the mine and evaluating the possibility of a construction road directly off Route 132. The successful implementation of the cleanup will hopefully reduce the adverse effect of the Site contamination and associated Superfund status on the local properties.

Comment 2: The United States Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) provided comments in support of the proposed cleanup. USFWS advocated for the complete removal of TP-3 and placement of an impermeable cover on TP-1 and TP-2. NOAA and USFWS noted the possible impacts to Atlantic salmon as a further basis for the cleanup. Both NOAA and USFWS expressed concerns regarding the recent data that documents elevated copper concentrations in the sediments of the Ompompanoosuc River at the its confluence with the Connecticut River.

EPA Response: EPA appreciates the comment and is in agreement with the USFWS and NOAA regarding the significant ecological impacts that are a result of the mine discharge. EPA will further evaluate the ecological impacts of the sediments in the Ompompanoosuc River as part of the remedial investigation program.

Comment 3: The Vermont Agency of Natural Resources (VTANR) provided a statement at the

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public hearing and submitted a written copy of the statement in support of the proposed cleanup action. VTANR indicated that the primary objective of the cleanup is to restore the West Branch of the Ompompanoosuc River to Vermont Water Quality Standards. VTANR commented that EPA needs to continue to be responsive to community concerns regarding the cost of the cleanup, truck traffic, and historic preservation, as these issues are evaluated during the design of the cleanup. VTANR also stated that the final decision regarding the preservation of a portion of TP-3 will depend upon the revised cost estimate for maintenance that will be generated during design and the acceptance of these costs by the Vermont Legislature. VTANR requested that EPA use geotechnical data, modeling and structural design to determine if the tailings are stable in the current configuration and if the tailings are an effective barrier to infiltration.

EPA Response: EPA thanks the individuals at VTANR for their commitment to working with EPA and for their continued support for the cleanup of the Site. EPA agrees that restoration of the WBOR is the primary objective of the cleanup. Other objectives, including compliance with State and Federal law, and the minimization of the cleanup's impact on historic resources are also major factors in the selection and implementation of the cleanup. EPA will continue to work with VTANR and the community to address concerns regarding cost, truck traffic, and historic preservation. EPA will also collect the appropriate data and perform the analysis necessary to assess the quantity of water that infiltrates the tailings and to evaluate the stability of the slopes. EPA will minimize the re-grading of the slopes and will perform the necessary studies to provide VTANR with a revised estimate for the cost to maintain the portion of TP-3 designated for preservation.

Comment 4: State Representative Jim Masland included EPA in the distribution list for a series of email correspondences that occurred during the comment period. These messages have been included as comments regarding the cleanup. The overall opinion expressed in these messages is supportive of a cleanup at the Site. Representative Masland provides an insightful and factual explanation for a number of the major issues of controversy as part of this dialogue. A few points expressed in the messages that directly apply to the cleanup proposal are:

- Full implementation of the proposed cleanup should be assumed to be necessary, however, EPA should evaluate whether the cap selected for TP-1 and TP-2, as well as the treatment systems for TP-1 and TP-3, could be scaled back to reduce costs as a result of the information collected as part of the design;
- the concept of spending upwards of \$20,000,000 for this project is hard for many people to accept;
- truck traffic may have a significant short term impact to residents; mitigation of historic resources is necessary;
- removing all or most of TP-3 is an economic and environmental necessity;
- the goal of the cleanup is to restore the West Branch of the Ompompanoosuc River; and
- the Site activities must address the Vermont Water Quality Standards, Storm Water Rule, and Solid Waste Rule

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EPA Response: EPA appreciates the consensus building efforts undertaken by Representative Masland. EPA agrees that full implementation of the cleanup should be assumed unless the design studies clearly indicate that an alternative to the cover system or treatment system is equally protective, less expensive (capital and maintenance), reduces truck traffic, and is no more disruptive to the historic resources. EPA will collect the appropriate information to assess the cost and effectiveness of the treatment systems for TP-1 and TP-3 as well as the infiltration of water into the tailings of TP-1 and TP-2. While EPA understands the local reaction to an expenditure of this magnitude, the costs are proportional to the large size of the contaminated area (approximately 50 acres). EPA has committed to taking all reasonable measures to minimize the impacts associated with truck traffic and to mitigate the cleanup's impact on the historic resources. EPA also agrees with Representative Masland's perspective relative to TP-3. It should be noted that the most cost effective measure, from a long term operation and maintenance perspective, is the complete removal of TP-3 and the placement of that material under a cover located in TP-1. Removal of TP-3 would vastly reduce the impact of the most significant source of contamination at the site. EPA also agrees that the primary goal of the cleanup is the restoration of the West Branch of the Ompompanoosuc River and that the Vermont Water Quality Standards and the Solid Waste Management Rule are major factors in the design of the cleanup. EPA agrees that the federal Clean Water Act's storm water standards must be taken into account in managing run-off during construction.

Comment 5: The Thetford Conservation Commission, a member of the EMCAG, submitted comments in support of the cleanup. They expressed a preference for a cleanup design that reduces, wherever possible, any future operation and maintenance activities, and costs including removal of most or all of TP-3, diversion of the clean water away from the tailings and waste rock piles, and installation of a multi-layer cover system as an infiltration barrier. Concern was also expressed over human and environmental impacts of truck routes (current and alternative).

EPA Response: EPA agrees with the comments. EPA will fully assess truck traffic and seek an approach that minimizes impacts on humans and the environment.

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Summary of Comments from Individuals and Non-Governmental Organizations

Comment 1: The Elizabeth Mine Community Advisory Group (EMCAG) submitted a comment letter stating that the ten groups represented on the EMCAG all support some aspects of EPA's preferred alternative and eight of the ten groups support the preferred alternative in its entirety. Most of the EMCAG groups support the removal and capping of most or all of TP-3 and hope that creative preservation techniques for preserving a small part of this area *in situ* (including constructing a roof over a part of the heap leach piles) will be given careful consideration.

The groups represented by the EMCAG share an interest in cost containment. The EMCAG comment letter states that: "We understand that it is likely that the cover over TP-1 will be necessary to prevent the continued contamination of the West Branch of the Ompompanoosuc River (WBOR) — especially the manganese and iron. However, we very much appreciate the flexibility you have built in to the preferred alternative, and understand that the final decision as to whether or not a cover system is necessary -- and the configuration of the cover system -- will not be made until comprehensive modeling and bench scale testing has been conducted. Citizens for a Sensible Solution and the Strafford Planning Commission representatives support the removal and encapsulation of most of TP-3, surface water diversion, and erosion control. They expressed the hope that testing will demonstrate that the cover over TP-1 and the proposed water treatment systems will not be necessary. These two groups also believe that the cleanup goals are unrealistic, and that the state and EPA should develop a way to waive the Water Quality Standards and allow for a mixing zone in the WBOR. The EMCAG strongly supports your proposal to look for onsite sources of common borrow, so that traffic impacts to the community are minimized." The EMCAG letter included, as an attachment, comments from the EMCAG technical consultants Richard Downer and Woody Reed. The comments from the technical advisors are summarized below:

- Complete removal of TP-3 is necessary due to the technical concerns with the TP-3 treatment system;
- An impermeable cover on TP-1 is essential;
- Overall costs are reasonable with some minor comments regarding specific cost estimates;
- Significant design data collection and pilot studies are necessary;
- A reliable and cost effective passive treatment system is not possible for TP-3;
- The proposed treatment system for TP-3 will not function properly on a year round basis and has become increasing complex and costly;
- Consider delaying the treatment system for TP-1 until the full effect of the cover system is evaluated with the goal of no treatment, if water standards can be met;
- Large storage areas may be required for winter storage of the discharge from TP-3;
- A simple wetlands system could not handle the complex mixture of chemicals at the Site;

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- Winter will significantly impact wetland performance, especially manganese removal, a different manganese removal system is necessary;
- Consider using an Sulfate Reducing Bacteria System (SRB) as a component for both the TP-3 and TP-1 passive treatment system rather than a Successive Alkalinity Producing Systems (SAP) for TP-1 and a SRB for TP-3.
- Why are both an Anoxic Limestone Drain (ALD) and Successive Alkalinity Producing Systems (SAP) for TP-1?
- When does the ALD need replacement?
- Where are SAP residuals sent for disposal?
- Pilot testing is necessary given limited full scale applications of SRB; and
- EPA should not defer the TP-3 decision to the State of VT.

EPA Response: EPA thanks all of the members of the EMCAG and the Copperas Hill Coalition for their dedication and commitment to working with EPA, and recognizes that many EMCAG members have volunteered large amounts of time on this project. EPA agrees with the eight groups in support of the cleanup and the technical advisors that Alternative 2C represents the most appropriate cleanup approach. EPA will work with VTANR and the State Office of Historic Preservation to determine if a small portion of TP-3 may be preserved by some means that would achieve the cleanup goals at a significantly reduced cost. EPA will also continue to work with the community to minimize the impact associated with truck traffic. The design studies will more fully evaluate the type of cover and treatment system necessary to achieve the cleanup objectives.

EPA agrees with the remaining two member groups regarding the need to address TP-3, control erosion, and divert surface water. EPA does not agree with these two groups statement that the goals of the cleanup are unrealistic or that it is necessary to waive Vermont Water Quality Standards. The primary goal of the cleanup is to achieve VT Water Quality Standards for both numerical and biological measures in the WBOR. The studies performed by EPA and VTANR to date fully support the conclusion that restoration of the WBOR to a level of biological integrity equivalent to that upstream of the mine impacts (as measured at EPA location 7) is an achievable and reasonable goal. EPA recognizes that it is possible that the biological measures of success will be met even though the surface water concentrations are still above VT Water Quality Standards. If this situation were to occur, EPA will evaluate whether a further reduction in the concentration of the contaminants is necessary or if alternative numerical standards are acceptable under the federal and state water quality regulations.

EPA does not agree with the suggestion that Copperas Brook be considered a point source discharge (essentially a pipe) and that a mixing zone within the WBOR be established as part of the cleanup goals. Once again, the goal of the cleanup is the full recovery of the sections of the WBOR impacted by the Site. There is no reason to consider a mixing zone or an alternative cleanup goal at this time. The cleanup approach and general costs would

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not change significantly if Copperas Brook were considered a point source and a 200 foot mixing zone was allowed in the WBOR. Complete removal or partial removal and a highly effective passive treatment system would be required with respect to TP-3 to meet the cleanup goals for aluminum and copper in the WBOR. Also, it is not likely that the surface water diversion alone (as advocated by CASS and the Stafford Planning Commission) would reduce the level of iron from TP-1 enough to achieve the cleanup goals for iron to be met in the WBOR.

In addition to the general goal for restoration of the WBOR, EPA is required to comply with federal and state laws and regulations. As a result of the need to collect and treat the water from TP-3 and TP-1, EPA is required to comply with the substantive requirements of the Clean Water Act National Pollution Discharge Elimination System (NPDES). The discharge of treated water from the on-site systems must comply with the Clean Water Act NPDES and VT Water Quality Standards. The point of compliance for the discharge will be within Copperas Brook since that is the receiving water for the discharge. Copperas Brook is a Class B VT surface water, therefore, any discharge into Copperas Brook must comply with the Clean Water Act and Vermont Water Quality Standards. The discharge criteria will be established during the design after an assessment of factors including: hardness of the discharge; the flow level within Copperas Brook; the use of a mixing zone within Copperas Brook; and background concentrations for the contaminants of concern. Water quality standards are normally set based upon the low flow in the receiving water. Because the low flow for Copperas Brook would not provide significant dilution of the discharge and the discharge standards are likely to be applicable at the end of the discharge pipe for the passive treatment system.

EPA agrees with the Technical Advisors to the EMCAG that there are significant technical challenges associated with the design and implementation of a passive treatment system for TP-3. EPA is less concerned regarding the technical challenges associated with the design and implementation of a passive treatment system for TP-1 given the proven track record of the technologies available to add alkalinity and remove iron. EPA also agrees that a simple aerobic wetland system is not likely to be a successful approach to treat the run-off from TP-3. An aerobic wetland may be able to accomplish significant iron removal for the TP-1 seeps. EPA is aware of the limited full scale applications of the SRB technology and is committed to a design program that will include pilot testing to evaluate the appropriate combination of the passive treatment technologies to achieve the discharge criteria. Specific issues will include winter performance, long term maintenance costs, and overall treatment efficiencies. A large storage basin will be used to retain winter flows from either TP-1 or TP-3, or both, if cold weather performance of the systems is projected to be inadequate. EPA also agrees that the most effective technical approach is the removal of TP-3 and the placement of an infiltration barrier on TP-1 and TP-2.

EPA choose the SRB technology for TP-3 because of its potential for greater removal

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efficiencies for the primary metals of concern (aluminum, cobalt, copper, iron, and zinc). The SAP system was included as a potential component of the TP-1 passive treatment system due to a longer record of performance, ease of maintenance, and the expectation that it would be an appropriate technology for the iron/manganese mix in the seeps of TP-1. The selection of the final passive treatment system will be accomplished during the design phase. A SRB may be included as a treatment component for TP-1 if the SRB is determined to be more appropriate than a SAPs systems. Both the SRB or the SAPs could be eliminated as treatment components for TP-1 if the ALD/aerobic wetland system is shown to be effective. It is possible that the treatment system for TP-1 may be delayed to provide time to observe the flow and chemistry changes that result from the surface water diversion and cover system. Manganese removal will be a critical factor during the design and implementation.

EPA has not shifted the decision regarding TP-3 to the State of Vermont to avoid making the decision. At the beginning of EPA's involvement at the Site it was the request of the Governor of Vermont, the State Legislature, and the Secretary of VTANR, that EPA provide maximum local involvement and decision making for the cleanup. TP-3 represents the greatest challenge with respect to a consensus community approach. There is a strong consensus among EPA's technical consultants, a group of five independent mining remediation experts, and the EMCAG technical advisors that TP-3 is the most significant source of contamination at the Site and should be removed and covered. As part of the consultation process required by the National Historic Preservation Act and the desire to fully involve the community, EPA agreed to design and construct a treatment system for a portion of TP-3 (up to 100%) provided the State of Vermont was willing to accept full responsibility for the maintenance. At this point, the State of Vermont is still advocating partial preservation and, as a result, EPA has retained the treatment of TP-3 in the cleanup.

Comment 2: The Upper Valley River Subcommittee of the Connecticut River Joint Commission submitted a comment in support of the cleanup and stated that the 1997 Connecticut River Corridor Management Plan identified the acid mine drainage impacts documented in the Ompompanoosuc River watershed as the most notable Vermont tributary impairment (perhaps in the entire Connecticut River watershed). The Subcommittee also noted that it hopes that truck traffic impacts will be minimized and that historic resources will be extensively documented.

EPA Response: EPA agrees with the comment.

Comment 3: The Connecticut River Joint Commission expressed its support for the cleanup. The comment advocated preservation of a small portion of TP-3 with removal of the remainder. The CRJC noted that the Elizabeth Mine was identified as one of the top water pollution "hotspots" in the Connecticut River Watershed in 1996 and that elevated copper levels are found in the sediments at the confluence of the Ompompanoosuc River with the Connecticut River and as far as eight miles downstream of the confluence within the Connecticut River.

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EPA Response: EPA agrees with the comment and acknowledges the hard work and dedication of the Connecticut River Joint Commission, Upper Valley River Subcommittee, and the Elizabeth Mine Study Group in raising awareness of the impacts from the Site on the natural resources of the area and working to accomplish a cleanup of the Site.

Comment 4: EPA received a Petition to Support a Cleanup of the Elizabeth Mine signed by approximately 200 persons. The petition requests that EPA implement the proposed cleanup. The petition also states that the preservation of TP-3 places too large a financial burden on the State of Vermont.

EPA Response: EPA agrees with the comment.

Comment 5: The Elizabeth Mine Study Group (EMSG), a member of the EMCAG, provided oral testimony and written comments in support of the cleanup. The EMSG supported the preservation of non-polluting portions of the Site, minimization of the impacts of truck traffic, and the minimization of the State's long-term costs. The EMSG advocated a cleanup that results in the state's water quality standards being met and which requires little in the way of long term operation and maintenance activities at the Site.

EPA Response: EPA agrees with the comment. The least costly approach with respect to maintenance is to remove and cap TP-3 and cover TP-1 and TP-2 with an infiltration barrier to minimize flow at the seeps.

Comment 6: The Strafford Historical Society, a member of the EMCAG, commented that as much as TP-3 as possible should be preserved and if preservation was not possible, then the maximum amount of historic mitigation should be implemented.

EPA Response: EPA will work with VTANR to define the amount of TP-3 that will be preserved. The amount of mitigation will be defined in the Memorandum of Agreement between EPA, the State Historic Preservation Officer (SHPO) and other consulting parties.

Comment 7: The Elizabeth Mine Survivors, a member of the EMCAG, provided oral testimony in support of the cleanup. They noted that the evaluations of human health impacts associated with the mine are inconclusive and requested that the cleanup be comprehensive and that it be completed as soon as possible. The Survivors also requested the complete removal of TP-3.

EPA Response: EPA agrees that the cleanup should be implemented as soon as possible and that removal of TP-3 may be a necessary part of a cost effective cleanup. EPA has worked with the Survivors for two years to assess the potential impacts of the mine on the

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water, soil, dust, and air. One residence was vacated due to poor water quality and septic issues. The water supplies for the other residences have been of acceptable quality. Elevated lead was found within one home and elevated copper and iron were found in one yard. EPA must complete the investigation of the Site as well as the Human Health Risk Assessment before making a definitive statement with respect to the threat to human health at the Site. The location of several families with small children adjacent to the mine will require a very careful and thorough assessment of potential threats to human health as part of the Human Health Risk Assessment for the Site.

Comment 8: Citizens for a Sensible Solutions (CASS), an EMCAG group, provided written comments and oral testimony in opposition to the proposed cleanup. CASS's comments stated that:

- the State of Vermont is requiring that pristine water, better than background, come from the mine site;
- that the incredible strict standards are making the cleanup too expensive;
- that setting the standard to be meeting the quality upstream of the mine 500 feet into the WBOR below Copperas Brook would be reasonable and save money;
- EPA is held hostage to the State's demand for meeting water quality standards in the entire WBOR;
- the Site is one of the oldest and most historic mining sites in the country;
- the project is without the usual checks and balances originally intended in the law;
- Elizabeth Mine should not be a Superfund site given the absence of a threat to human health;
- flawed Hazard Ranking Document;
- property owners are pushing for a large cleanup to improve property values;
- flawed community advisory board;
- the lack of an environmental impact statement or cost benefit may result in the project causing more harm than good; and
- a letter from a USGS scientist to VTANR supports their position. CASS also stated in its comments that its members agree with the EPA cleanup proposal except the treatment systems for TP-1 and TP-3 and the cover system for TP-1 and TP-2. CASS advocated the removal of the medium and high sulfide areas of TP-3 with preservation of a two acre portion of the copperas heap leach piles. CASS also submitted three petitions (each signed by approximately 200 persons) which CASS believes support their positions.

EPA Response: EPA acknowledges the historical significance of the Site and made a significant investment in evaluating the historic resources at the Site and consulting with the community. The cleanup minimizes the impact on historic resources to the extent possible. EPA also acknowledges CASS's support for the surface water diversion, erosion controls, removal of TP-3 (80% removal), and stabilization of the slopes. EPA, however, does not agree with the other positions presented in testimony and writing. EPA is the lead agency for the project, which means it is the Agency's statutory obligation to select and

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implement the cleanup remedy at the Site, with consultation with the State, the local community and other interested parties. EPA believes that the EMCAG has made a valued contribution to the process and that the comments received by EPA during the comment period confirm that the EMCAG represents the broad range of community interests at the Site. It is reasonable for those most impacted by the mine and the associated EPA activities to be well represented on a community advisory group such as the EMCAG. The inclusion of two groups of adjacent residential landowners along with non-residential landowners on the EMCAG is appropriate. It is also reasonable for the landowners to seek an improvement in the quality of the environment in their land and adjacent land. EMCAG representation includes three special interest groups (EMSG, CASS, and the Strafford Historical Society) along with four groups representing local government. Overall, the EMCAG has been very effective at representing local concerns. EPA has made technical resources available to the EMCAG to provide an independent expert opinion regarding EPA's reports and activities. EPA has worked closely with the community and the State to develop the cleanup approach and define the parameters for the cleanup. The Superfund Program did not include a requirement for PRPs to perform the work as a "check and balance" regarding EPA's decisions, rather, Congress made a decision that those who benefitted from the pollution should be held responsible. If a viable PRP were to be implementing the cleanup, EPA would require the same set of cleanup standards and it is unlikely that a PRP would successfully argue that the Clean Water Act, Vermont Water Quality Standards, and the Vermont Solid Waste Management Act do not apply to the cleanup.

The Superfund process includes an assessment of costs as one of the evaluation criteria, as well as an assessment of the short term impacts from the cleanup. The estimated total truck volume for the project is a significant increase in volume of traffic for a quiet country road and EPA is committed to working with the community to minimize traffic impacts. However, the level of truck traffic associated with the cleanup is not likely to have any measurable long term health impacts nor would the level of truck traffic and other activities associated with the cleanup result in a decision not to implement a cleanup. The short-term impacts associated with truck traffic must be balanced against the prospect of significant ongoing contamination of the WBOR that would violate federal and state water quality standards for approximately 2000 years, based on preliminary estimates of the long-term capacity of the tailings to generate acid mine drainage. EPA fully expects to obtain much of the soil material from property adjacent to the Site which will substantially reduce any impacts. EPA will work closely with local selectboards and the VT Agency of Transportation to address any road or bridge impacts associated with the cleanup.

The USGS scientist frequently quoted by CASS is a member of the EPA technical team for the Site. He has submitted comments regarding the EE/CA and proposed cleanup and fully supports the complete removal of TP-3 along with the placement of an infiltration barrier

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over TP-1 and TP-3. He has submitted a comment to EPA that his initial concerns in 1999 have been satisfactorily addressed by EPA as part of the development of the EE/CA and remedial investigation.

The Elizabeth Mine is a reasonable candidate for the National Priorities List. The Superfund law was passed to protect public health and the environment. EPA has a Superfund program management goal of reducing the risk to ecological receptors to levels that will result in the recovery and maintenance of healthy local populations and communities of biota. Many of the mining sites across the country are primarily ecological threats. While there may not be a human health threat from consumption of fish, there is contaminated groundwater adjacent to TP-3 that is unfit for use as a water supply. One residence was re-located as a result of contaminated groundwater. The water in Copperas Brook contains manganese, iron, cadmium, and copper well above concentrations considered acceptable for human ingestion as a water supply. EPA will be evaluating the potential threats to human health under a future water supply scenario as part of the overall remedial investigation and feasibility study. The statements from EPA to date regarding human health impacts are limited to a finding of no immediate threat to human health that would prohibit individuals from visiting the Site or require the re-location of the adjacent residences.

The allegation by CASS that the State of Vermont is holding EPA hostage or is causing EPA to implement regulations with which EPA does not agree is highly inaccurate. In fact, when the EPA, State of Vermont, and EMCAG identified the few areas where the technical requirements of the Vermont Solid Waste Management Rule conflicted with the objective for preservation of TP-3 or minimizing regrading to reduce cost, EPA and VT ANR worked to develop a process for waiving these requirements while meeting the overall technical intent of the VTSWMR. EPA's proposed NTCRA is completely compliant with CERCLA and the National Contingency Plan (NCP), which set the federal standards for EPA implementing cleanup actions at the Site. Coordination with the State is a component of this process and has been integral in addressing a number of compliance issues with required federal and state standards.

The goal of the cleanup and the federal and state laws applicable to the Site do not require that only allow "pristine" water be discharged from the Site. The goal of the cleanup is to restore the WBOR to upstream conditions and to eliminate the discharge of water to the WBOR that is toxic to aquatic life or above water quality standards. This goal is not "incredibly strict" and is consistent with the standard that is set for numerous projects across the nation. A point of compliance 500 feet down the WBOR from Copperas Brook would not be consistent with state or federal standards. Vermont Water Quality Standards only allow for a 200 foot mixing zone from the point of discharge, which would be within Copperas Brook. It would not be practical for EPA to extend the discharge pipe (as the associated point of compliance) for the treatment system almost 2000 feet to allow for a

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mixing zone in the WBOR.

EPA will fully consider the upstream (background) levels of naturally occurring constituents when it sets target cleanup levels. Data collected to date suggest that aluminum is the only constituent that is consistently above federal standards upstream of the mine. The table below shows that cobalt, copper, iron, and zinc are consistently below the federal and state quality criteria upstream of the mine. Iron was detected barely (1%) above the iron water quality criteria at its maximum value upstream. Aluminum was detected above the federal water quality criteria in the upstream water (there is not a VT water quality criteria for aluminum). EPA has set the cleanup target for aluminum at the upstream concentration. The cleanup targets for copper and zinc are hardness dependent. The iron level is set at 1,000 ug/l. Cleanup targets for cobalt and manganese will not be established for the early cleanup (NTCRA), however, the final cleanup decision for the Site will establish the acceptable long-term surface water concentration for these metals.

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Table 1 Cleanup targets

Contaminant (ug/l)	Range of concentrations in Copperas Brook just prior to WBOR (Station 6)		Range of concentrations in WBOR (Station 11)		Range of concentrations in WBOR above mine Background (Station 7)		WBOR target values for cleanup (zinc and copper are hardness adjusted)		Copperas Brook target values for cleanup (zinc and copper are hardness adjusted)	
	mean	max	mean	max	mean	max	AAC	MAC	AAC	MAC
hardness (mg/l)	691	1878	255	491	108	138	255	255	691	691
Aluminum	8,490	14,800	4,040	11,900	233	870	233	870	233	870
Cobalt	109	215	20	41	1.3	1.9	-----	-----	-----	-----
Copper	3,160	6,800	528	1,290	6.3	24	26	43	62	110
Iron	92,800	219,000	31,000	53,100	314	1010	1000		1000	
Manganese	1,850	4,560	638	1,010	34	131	-----	-----	-----	-----
Zinc	903	1,990	186	390	10	17	234	259	545	602

Table Notes:

- Mean denotes the arithmetic average concentration detected at that location during the EPA sampling events.
- Max denotes the maximum concentration detected at that location during the EPA sampling events.
- MAC is the **Acute Criteria or Maximum Allowable Concentration (MAC)**: the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) **once every three years** without deleterious effects.
- AAC is the **Chronic Criteria or Average Allowable Concentration (AAC)**: the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4 days) **once every three years** without deleterious effects.

The CASS statements regarding cost reduction dramatically oversimplify the scope of the problem, the size of the Site, and the cost significance of applying the water quality standards at Copperas Brook. EPA believes the cost of the cleanup is appropriate given the large scale of the Site (almost 50 acres) and the nature of the contamination. EPA considered a short list of the more cost effective technologies in the EE/CA. These technologies were developed after the extensive evaluation of alternatives considered in the Alternative Analysis Report and the comments from the VT ANR and EMCAG that fully

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supported the short list of alternatives developed for consideration in the EE/CA. Alternatives that were not financially practical, such as complete removal of the tailings to permanently solve the problem at a cost of over \$100 million dollars where not included in the EE/CA. EPA is committed to working to optimize the cleanup's effectiveness and further reduce costs. Finding adjacent sources of cover material would greatly reduce both truck traffic and cost. When the full cost of the project is considered (short term capital plus long term maintenance), the most expensive components of the cleanup are the maintenance of the passive treatment systems and the cover system for TP-1 and TP-2. The long-term maintenance costs of the project would decrease dramatically if TP-3 were removed. EPA agrees with the assessment of Dr. Reed, technical advisor for the EMCAG, that removal of TP-3 and placing an infiltration barrier over TP-1 and TP-2 is the most cost effective approach to addressing the impacts from the Site. The data collected by the USGS clearly shows that treatment of TP-3 would be required if any portion of the material remains. If it is assumed that at least 80% of TP-3 will be removed and placed under a cover system on TP-1, then the additional cost to place an infiltration barrier over the entire area of TP-1 and TP-2 is about \$3 million more than to place a simple soil cover over that same area. Spending \$3 million in capital costs to minimize long-term (perpetual) treatment costs and comply with the VTSWMR is not excessive. The cost estimates prepared by EPA for treatment of the discharge from TP-3 are based upon input from a number of technical experts and included reasonable assumptions. The complex mixture of acidity and metals found in the run-off of TP-3 does not lend itself to treatment with an aerobic wetland system. Some type of anaerobic system would be required along with the associated maintenance costs. It is possible that such a small percentage of TP-3 could be preserved provided that the maintenance costs are acceptable to the State.

In summary, EPA has considered the issues raised in the comments submitted by CASS. While EPA agrees with CASS that removal of most of TP-3, diversion of surface water, and erosion control are critical elements of the cleanup, EPA does not agree that a successful cleanup can be implemented without either complete removal of TP-3 or some level of treatment in addition to aerobic wetlands to treat contamination from the remaining portion of TP-3. Good engineering and science indicate that the infiltration barrier over TP-1 and TP-2 is appropriate to reduce long-term costs and minimize the source of acid mine drainage at the toe of TP-1. Finally, the project goals are both reasonable and achievable and full consideration has been given to the background conditions.

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Comment 9: Three petitions were submitted to EPA by the CASS group. It should be noted that two of the petitions preceded the development of the EE/CA and request for comments. Each petition is signed by approximately 200 person. The key issues in the petitions are:

- The March 2002 petition requests that VTANR set a revised goal for the cleanup and that EPA review the classification and scale back the present \$15/20 million plan involving extensive bulldozing and thousands of truckloads of capping material coming through town since EPA studies have not found any evidence of such a threat (to human health) and EPA now considers it simply an “ecologically based cleanup”.
- The 2001 (May/June) petition requests that the cost and impact be proportional to the small rural community in which it will be carried out and the modest environmental benefits to be gained; the two hundred year history of this nationally important site, which is an important part of our community’s history and identity, should be respected and preserved; and truck traffic through our historic villages should be avoided and truck traffic into the Site should be held to an absolute minimum
- The March 2000 petition states three reasons for the signatories concern with the project: the tailings pile has been in existence for over 50 years, and no claims it presents a threat to anyone’s health; the movement of thousands of truckloads of sealant, sand and cover soil will have a massive impact on our community-on roads, traffic, and daily life-and no study has been done of its effects on these and neighboring communities; and most importantly, the Site should be evaluated and treated as an abandoned mine, similar to abandoned mines elsewhere in the country, and not treated as if it were a hazardous waste “Superfund” site.

EPA Response: EPA appreciates the perspective shared by the signatories to the petitions regarding the cost of the cleanup and the truck traffic. The cost is a function of the size and complexity. A large site, like the Elizabeth Mine, is inherently expensive to cleanup. The cleanup action requires measures to abate the release of acid mine drainage from over 2 million cubic yards of contaminated material spread over 50 acres. The USGS has estimated that it would require natural processes over 2000 years before the waste material at the Site ceases to generate acid mine drainage. The EPA plan will stop the acid mine drainage impacts within several years.

EPA will continue to evaluate ways to reduces costs and trucking impacts. EPA will seek to obtain soil material from adjacent properties. EPA is very sensitive to the historic resources at the Site. EPA has fully considered the project’s impacts to historic resources and will perform mitigation activities with respect to these resources.

EPA does not agree that there is need for a revised cleanup goal. Restoration of the WBOR and compliance with federal and state laws and regulations are reasonable and achievable goals for the project. EPA and VT ANR have made it clear throughout their involvement at the Site that the ecological impacts were the primary concern. The Approval Memorandum signed in February 2000 authorized the preparation of an

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Engineering Evaluation and Cost Analysis (EE/CA) that identified the threat to the aquatic receptors as the primary basis for a cleanup action. EPA has been proceeding with the concept that while significant threats to human health may be identified later during the remedial investigation process, ecological risk is the basis for EPA's cleanup actions at the Site and through this NTCRA.

EPA agrees that the Site should be evaluated and treated as an abandoned mine. EPA has performed numerous removal actions at mining site across the U.S. and many were implemented with ecological threats as the primary basis. EPA has retained consultants with substantial experience in the remediation of mine waste. EPA also sought the input of five independent consultants with substantial experience in treating mine waste and from nationally recognized experts at the USGS and U.S Department of Energy (DOE). All of these experts reviewed the EE/CA and concurred with EPA's general approach as presented with the EE/CA. EPA believes the cleanup approach selected is consistent with the closure of an abandoned mine.

Comment 10: A scientist from Johnson State College performing research at the Site submitted a comment in support of the cleanup. The scientist cited data documenting the accumulation of metals in algae in the West Branch of the Ompompanoosuc River as well as an alteration of the algae species in the WBOR due to contaminant impacts.

EPA Response: EPA agrees with the comment and acknowledges the important contribution of this research to the understanding of the impact of the Site on the local environment.

Comment 11: An adjacent landowner commented in favor of the NTCRA if could be accomplished quickly. If the NTCRA could not be implemented quickly, then the commentor preferred that no action be taken. The commentor also indicated a strong opposition to the preservation of TP-3.

EPA Response: EPA intends to implement the NTCRA as quickly as possible. EPA will not know whether there is sufficient funding to begin the NTCRA until the fiscal year 2003 budget is approved. It is possible that partial funding or no funding will be provided for this project in 2003. To terminate the NTCRA if initial funding is not provided would only transfer the NTCRA cleanup actions to the remedial action cleanup that will be proposed in several years. It is extremely unlikely that EPA would abandon its intent to address the contamination at the Site. The comment regarding TP-3 is noted.

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Comment 12: One commentor wanted to know if toxic gas levels had been evaluated to provide a basis for evaluating future land use.

EPA Response: EPA has performed limited ambient air monitoring at the Site. The most likely emission issues at the Site would be the transport of particulate matter (dust) from the exposed waste rock and tailings and the subsequent ingestion of these particles by visitors and adjacent residents. This issue will be evaluated in the Human Health Risk Assessment that will be completed as part of the remedial investigation and feasibility study. EPA will certainly evaluate the appropriate risk pathways based upon the future potential use at the Site prior to releasing the Site for redevelopment.

Comment 13: One commentor was adamant that there be no cost to the Town of Thetford as a result of the cleanup.

EPA Response: The Superfund law does not require local communities (who are not found to be responsible parties) to pay any of the cleanup costs. The Superfund law was designed to make the responsible parties pay for a cleanup action. Since EPA has not identified any entities capable of financing or implementing the cleanup, EPA will pay 100% of the cost associated with the Site investigations and removal actions and 90% of the cost associated with any remedial actions. The State pays 10% of the capital cost of a remedial action and 100% of the maintenance cost for removal or remedial actions. There may be some costs to local communities associated with the coordination relating to the cleanup, however, none of the actual cleanup or maintenance costs will be paid by either Strafford or Thetford.

Comment 14: One commentor questioned whether EPA considered backfilling of the mine with the waste rock and tailings.

EPA Response: EPA did evaluate the viability of backfilling of the open cuts and mine shafts. Placing the material in the mine would not eliminate the acid mine drainage unless these areas were sealed to prevent water and oxygen from coming into contact with the mine waste. This would be very challenging, especially in the underground workings. In addition, the open cuts and underground workings are part of the historic resources at the Site and EPA has worked to minimize the impact of the cleanup on historic resources at the Site.

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Comment 15: One commentor stated that the cleanup should be accomplished as completely as current technology allows in as little time as is needed to do the job correctly. The commentor also noted that monetary compensation should be provided to towns for impacts to road and bridges and TP-3 should be removed completely due to cost and complication associated with long-term maintenance.

EPA Response: EPA agrees with the initial statement. The issue of TP-3 is clearly a challenge. The area has the most significant source of pollution and is the most significant historic resource. Absent historic preservation concerns, EPA would completely remove and cover this material. In consideration of the value of the historic resource, however, EPA has agreed to design a treatment system to treat any discharge from any portion of TP-3 that the State of Vermont targets for preservation. The consequence to the State of Vermont is that VTANR will be responsible for 100% of the Site operation and maintenance costs. A final determination regarding TP-3 will be made once EPA provides a revised cost estimate along with an assessment of the effectiveness of the treatment systems. EPA will work to minimize the impact of truck traffic and will seek alternative routes, including the development of a construction road across 132 to avoid the use of South Strafford Village. EPA will also make reasonable repairs to roads for damage that resulted from the EPA activities. EPA will also work to implement the cleanup as cost effectively as possible.

Comment 16: One couple commented that the Site should be cleaned up, the area is an attractive nuisance, noted concerns with truck routes, requested that EPA consider an alternative route using a new bridge across Route 132 close to the Site, and further noted the potential for Site re-use if the cleanup is done well.

EPA Response: EPA will do its part to reduce the hazards at the Site resulting from hazardous substances. The local communities and landowners must address hazards that result from the physical features at the Site. EPA appreciates the insight regarding the alternative truck routes and possibility of an alternate crossing of the WBOR closer to the Site to substantially reduce truck traffic on Mine Road and in South Strafford. EPA will look at all alternatives that minimize the impact of truck traffic including the development of adjacent soil borrow areas and alternative truck routes. The re-use potential comment is noted.

Comment 17: A written comment and oral testimony were submitted in favor of the cleanup and requested a exhibit regarding the Site (possibly including local videography) be developed and placed at the Morrill Homestead.

EPA Response: Thank you for the support. The historic preservation mitigation activities have yet to be established, however, the suggestion will be strongly considered. EPA plans

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to provide additional opportunities for public input in the development of the mitigation activities.

Comment 18: A comment in support of the cleanup expressed misgivings about the cost of the cleanup and stressed that the story of the Site be told in a creative and sensible way. The commentor noted that they supported the re-location and covering of TP-3.

EPA Response: EPA will work diligently to implement the cleanup as cost effectively as possible. EPA agrees that the story regarding the historic resources needs to be preserved. Documentation of the Site will be part of any historic preservation mitigation program developed by EPA. Comment regarding TP-3 is noted.

Comment 19: A comment noted that the cleanup is the final chapter in the story of the mine. The commentor supported the cleanup and stressed the importance of significant historic mitigation to tell the mine story.

EPA Response: EPA agrees that the cleanup is the final chapter of the operation of the mine. EPA is committed to developing a value added historic mitigation program in cooperation with the SHPO and local community.

Comment 20: A comment in support of the cleanup from an EMCAG member noted that EPA should consider all possible means to lessen the construction and traffic impacts to neighbors and residents near the Site and that the costs associated with the preservation of TP-3 are too high to justify the treatment system proposed.

EPA Response: EPA agrees with the comment and will try to minimize the construction and traffic impacts to the neighbors and residents near the Site. EPA will work with the State of Vermont to balance historic preservation with the costs associated with the treatment of the discharge from any areas targeted for preservation.

Comment 21: A comment in support of the cleanup noted that all of TP-3 should be removed except for a small portion that might be placed under a standing structure. The commentor also noted that: the open cuts and standing structures should be preserved; truck traffic should be addressed as soon as possible; and that EPA should not bend the water quality rules. The commentor also questioned the fate of the water discharging from the air vent.

EPA Response: The comments in support of the cleanup are noted. The selected cleanup will be implemented to minimize any impact to the north open cut or the standing structures. The south open cut may be evaluated as a quarry for stone needed as part of the cleanup, to support efforts to reduce truck traffic. EPA agrees that neither federal or state water quality standards should be “bent” as part of the cleanup. EPA plans to design

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and implement the cleanup to meet all applicable and relevant and appropriate federal and State standards, as required by the Superfund law. EPA will evaluate the impacts caused by the discharge from the air vent as part of the remedial investigation and feasibility study for the Site. A cleanup decision regarding the air vent will be made at a later date.

Comment 22: A comment in support of the cleanup advocated the removal of TP-3 along with the appropriate documentation (photographic and otherwise) of the mining landscape and the possible display of a small quantity of tailings. The commentor was also highly supportive of the membrane cap for TP-1 and TP-2 and requested that EPA use a high quality, long-lasting, membrane.

EPA Response: The comments in support of the cleanup are noted. EPA agrees that appropriate mitigation for the impacts to the historic landscape would include good photo documentation. The preservation of a small portion of the tailings is a good suggestion that will be included in the mitigation evaluation. EPA agrees with the commentor regarding the importance of a high quality membrane with long-term durability.

Comment 23: A comment in support of the cleanup noted that the cost of saving TP-3 is not acceptable and that future use of the Site should be considered as part of the cleanup.

EPA Response: The comment in support of the cleanup is noted. EPA agrees that the future use of the Site should be strongly considered. The property is currently in private ownership and any discussion regarding future use must include the property owners and respect their ownership rights. However, given the substantial local interest in the Site, it is reasonable to consider the possibility of a future public use. EPA provided the Towns of Strafford and Thetford with a Redevelopment Initiative Grant to hire a consultant to evaluate future use of the property and provide EPA with information regarding possible future uses to consider in the design of the cleanup. In a 2002 survey of both towns, the majority of the survey respondents preferred conservation, interpretation and education, and recreation as the future use of the Site. EPA's goal will be to design a cleanup that balances the regulatory requirements and appropriate engineering standards while optimizing the potential for future use.

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Comment 24: A comment in support of the cleanup advocated the removal of the high sulfide areas of TP-3 and the reclamation (covering) of any portion of TP-3 that remains after the removal of the high sulfide areas. The commentor also noted that there may be better examples of mining history in the area to preserve (for example, the Ely stone flue) and that an interactive display with picture, rock and material specimens would be a better way to preserve the history. The commentor also supported the cap on TP-1 and TP-2 to reduce infiltration.

EPA Response: Comment in support of the cleanup is noted. EPA agrees that the high sulfide areas of TP-3 are a major source of contamination. If a successful treatment configuration cannot be developed to treat all of the TP-3 discharge or if the State of Vermont finds that the cost for treating all or a portion of TP-3 to be unacceptable, then EPA will remove up to 100% of TP-3, consolidate the material on top of TP-1/TP-2, and cover that material with a membrane. EPA agrees that there are many options to consider in developing a historic mitigation plan for the Site. EPA relies upon the State Historic Preservation Officer for guidance regarding the prioritization of the local historic resources.

Comment 25: A comment in support of the cleanup noted that the cost of preserving TP-3 is too high and that EPA cleanup the entire Site.

EPA Response: Comment in support of the cleanup is noted. EPA agrees that a thorough and complete cleanup of the Site should be accomplished. The National Historic Preservation Act requires that EPA consider the impacts of the cleanup on the historic resources and avoid impacts, if possible. The current cleanup proposal fully reflects that requirement in that EPA has developed a series of cleanup approaches that would avoid impact to extent possible while still meeting the cleanup objectives. EPA is committed to a cleanup that fully protects public health and the environment. Cleanup options for the entire Site are currently being evaluated within the ongoing remedial investigation and feasibility study. EPA will issue its final cleanup plan for the entire Site, after consulting with the State and receiving additional public comment, in a Record of Decision that is schedule for completion in 2004/2005.

Comment 26: A comment in support of the cleanup advocated complete removal of TP-3 and that EPA should also address the contamination in Lord Brook.

EPA Response: Comment in support of the cleanup is noted. EPA will complete a characterization of the contamination of Lord Brook and will develop cleanup solutions for this areas as part of the remedial investigation and feasibility study which is expected to be completed in 2004.

Comment 27: A comment in support of the cleanup advocated for the most permanent lowest

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maintenance solution possible. The commentor advocated for the preservation of the open cuts.

EPA Response: Comment in support of the cleanup noted. EPA has developed a range of options that attempt to balance historic preservation and maintenance costs. EPA will rely upon the State of Vermont to determine the level of maintenance costs that would be acceptable. Clearly, the most permanent, lowest maintenance solution would be to consolidate all of the waste rock, and heap leach piles of TP-3 onto TP-1/TP-2 and install a cap over the material.

Comment 28: A comment in support of the cleanup advocated the complete removal of TP-3 citing that there are other mechanisms to preserve the history of the Site.

EPA Response: Comment in support of the cleanup is noted. EPA agrees that there are many options for the preservation and mitigation of the historic resources at the Site. EPA intends to work with the community and the State Historic Preservation Officer to develop a Memorandum of Agreement that will include the activities to mitigate the impacts of the cleanup.

Comment 29: A comment submitted in support of the cleanup noted that preservation of TP-3 represented too great a financial burden on the State of Vermont.

EPA Response: Comment in support of the cleanup noted. EPA has provided the State of Vermont the opportunity to determine what level of preservation is acceptable given the expected costs.

Comment 30: A comment submitted in support of the cleanup noted that all of the tailing piles should be cleaned up as fully as is possible.

EPA Response: Comment in support of the cleanup is noted. EPA agrees that the cleanup must be fully protective of public health and the environment. All of the tailing piles will be addressed either through capping or the installation of passive treatment systems.

Comment 31: A comment submitted in support of the cleanup noted that the cleanup should be designed to minimize future costs and maintenance.

EPA Response: Comment in support of the cleanup noted. EPA has developed a range of options that attempt to balance historic preservation and maintenance costs. EPA will rely upon the State of Vermont to determine the level of maintenance costs that would be acceptable. Clearly, the most permanent, lowest maintenance solution would be to consolidate all of the waste rock, and heap leach piles of TP-3 onto TP-1/TP-2 and install a cap over the material.

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Comment 32: A comment in support of the cleanup noted that Option 1 -100% preservation of TP-3 should be selected with a final decision regarding TP-3 made after evaluating the success of the TP-1 and TP-2 cleanup.

EPA Response: Comment in support of the cleanup noted. As previously discussed, EPA has provided the State of VT with several options with respect to the preservation of TP-3. The State of Vermont must balance the budgetary implications of preservation with the value of the historic resource. It is not likely that the TP-1 and TP-2 cover system portion of the cleanup will be implemented first, because TP-3 is the most significant source of contamination at the Site. Complete cleanup of TP-1 and TP-2 would reduce the iron and manganese loading substantially but would accomplish very little with respect to aluminum, cobalt, copper, and zinc. Also, the pH of Copperas Brook would remain very low if TP-3 were to remain intact.

Comment 33: A comment in support of the cleanup advocated the complete removal of TP-3.

EPA Response: Comment in support of the cleanup noted. EPA has developed a range of options that attempt to balance historic preservation and maintenance costs. EPA will rely upon the State of Vermont to determine the level of maintenance costs that would be acceptable. Clearly, the most permanent, lowest maintenance solution would be to consolidate all of the waste rock, and heap leach piles of TP-3 onto TP-1/TP-2 and install a cap over the material.

Comment 34: A comment was submitted in support of the cleanup.

EPA Response: Comment noted.

Comment 35: A comment was submitted in support of the cleanup.

EPA Response: Comment noted.

Comment 36: A comment in support of the cleanup advocated the complete removal of TP-3. The comment also requested that the final land use be pasture or woodland.

EPA Response: Comment in support of the cleanup noted. EPA has developed a range of options that attempt to balance historic preservation and maintenance costs. EPA will rely upon the State of Vermont to determine the level of maintenance costs that would be acceptable. Clearly, the most permanent, lowest maintenance solution would be to consolidate all of the waste rock and heap leach piles of TP-3 onto TP-1/TP-2 and install a cap over the material. EPA will work with the community to design the cleanup so that it is as compatible with future use(s) as is practical.

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Comment 37: A comment in support of the cleanup advocated the complete removal of TP-3.

EPA Response: Comment in support of the cleanup noted. EPA has developed a range of options that attempt to balance historic preservation and maintenance costs. EPA will rely upon the State of Vermont to determine the level of maintenance costs that would be acceptable. Clearly, the most permanent, lowest maintenance solution would be to consolidate all of the waste rock and heap leach piles of TP-3 onto TP-1/TP-2 and install a cap over the material.

Comment 38: A comment in support of the cleanup advocated the complete removal of TP-3.

EPA Response: Comment in support of the cleanup noted. EPA has developed a range of options that attempt to balance historic preservation and maintenance costs. EPA will rely upon the State of Vermont to determine the level of maintenance costs that would be acceptable. Clearly, the most permanent, lowest maintenance solution would be to consolidate all of the waste rock and heap leach piles of TP-3 onto TP-1/TP-2 and install a cap over the material.

Comment 39: A comment was submitted in support of the cleanup.

EPA Response: Comment noted.

Comment 40: A comment was submitted containing a position statement and background information from the Elizabeth Mine Study Group (a member group of the EMCAG) in support of the cleanup.

EPA Response: Comment noted.

Comment 41: A comment was submitted questioning the type of soil material that was intended for use on the cap and specifically questioning if sewage sludge from waste water treatment facilities, paper sludge from paper mills, crumb rubber from old tires or any other possible sources of contamination would be considered for use.

EPA Response: While there has been some interest expressed by local residents in exploring the use of alternative and/or recycled materials at the Site, EPA plans to use native materials for the soil layers of the cap. Biosolids (waste water sludge), short paper fiber (paper mill sludge) and crumb rubber are not under consideration for use at the Site. EPA would like to identify a material source as close to the Site as possible to reduce truck traffic. There may be some local organic material needed for the passive treatment systems and to enrich the topsoil. EPA plans to provide the EMCAG with a full opportunity to review and comment on the design for the cleanup. Any proposal for alternative materials

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would be presented to the EMCAG for consideration.

Comment 42: A comment and oral testimony were submitted in opposition to the cleanup stating that the project is: ill conceived; that there no basis for the \$400,000 maintenance cost estimate; and that the project will make things worse.

EPA Response: EPA does not agree with the comment. The need for a cleanup action to address the contamination was well established by the work performed prior to EPA's involvement by both the VT ANR and the Elizabeth Mine Study Group. The studies implemented by EPA confirmed the need for a cleanup action. The original basis for the project, as documented by the EPA Approval Memorandum, was the impact to ecological receptors and potential human threats from dust from the Site. The EE/CA also documented potential risks from contaminated groundwater. The EPA Site Team has clearly stated from the beginning that the early cleanup project is predicated upon a threat to the aquatic receptors. The \$400,000 year estimate for operation and maintenance represents the upper end of the range of estimated costs for treating the run-off assuming 100% preservation of TP-3 and that the sludge generated by the treatment system would be shipped as a liquid hazardous waste. The lower end of the operation and maintenance costs (assuming the 100% preservation option) was estimated at \$254,000 and assumed that the treatment system sludge could be shipped as a non-hazardous solid waste. One of the independent estimates submitted to EPA suggested that the annual maintenance costs to greatly exceed the \$400,000 amount.

The cost estimates were based upon a peer review by several national experts in the field of passive treatment technologies. These cost estimates were developed to provide the State of Vermont with a "not likely to be exceeded" estimate so the State could evaluate the potential impact of the maintenance obligation on the state's budget. It is critical that the State of Vermont understand the financial ramification of preserving an area that will be, if left untreated, a major continuing source of contamination.

There is no basis for the contention that the cleanup would result in making the situation at the Site worse than the current conditions. Erosion control measures and retention ponds would be used to address storm water flows. The tailings have been estimated to contain enough acid generating potential for the acid mine drainage to continue for 2000 years. If left uncontrolled there is a possibility that the decant system will fail resulting in a catastrophic failure. Good construction practices can avoid significant problems whereas an uncontrolled site has no mechanism for controlling a significant release of contamination.

Comment 43: A comment was submitted that contained an alternative cleanup proposal developed by a member group of the EMCAG (CASS) that would replace the selected cleanup with the following:

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1. allow all of the proposed EPA plan to proceed under Removal authority except the treatment pools and capping the tops of TP-1 and TP-2.
2. Remove all the high sulfide areas of TP-3 and encapsulate the waste either in the gully of TP-2 or on a small footprint on top of TP-1. This would leave only the most processed, least toxic, most historic copperas area of TP-3. Given its smaller size and the fact that all the hot spots would be removed it would be quite possible that treatment of what remains at TP-3 could be accomplished with passive wetlands without the treatment cells.
3. Put off the decision on what type of cover would be needed on top of TP-1 and TP-2 until the Remedial phase. This would allow time after the diversion of water from the piles and the stabilization and erosion control on the sides to see how much effect rainwater is actually having on the site.” It is suggested that this approach would solve 80% to 90% of the problem.

EPA Response: All of the issues identified in this comment were discussed as part of the development of the EE/CA and during consultation with the EMCAG.

Response to item 1: EPA agrees that it is appropriate to proceed with the cleanup under Removal authority, which is the course of action being taken through this NTCRA.

Response to item 2: The issue of TP-3 is a significant challenge. The area is both the most significant source of pollution and most significant historic resource. Absent historic preservation concerns, EPA would completely remove and cover this material. In consideration of the value of the historic resource, EPA has agreed to design a treatment system to treat discharges from any portion of TP-3 that the State of Vermont targets for preservation. The consequence to the State of Vermont is that VT ANR will be responsible for 100% of the operation and maintenance costs. The cleanup decision allows for a final determination regarding TP-3 to be made during the design phase of the cleanup after EPA provides the State of Vermont with a revised cost estimate along with an assessment of the effectiveness of the passive treatment systems. The flexibility included in the selected cleanup action with respect to TP-3 is based on the recognition that preservation of even a moderate percentage of TP-3 (greater than 10% - 20%) would result in a treatment system that may be beyond the means of the State of VT to finance the required long-term maintenance. EPA agrees that there would be a benefit from removing the high sulfide areas of TP-3 and that preservation of only a small area of TP-3 could significantly reduce maintenance costs. To better evaluate this possibility, EPA plans to further delineate the TP-3 area as part of the design activities for the NTCRA. However, it should be noted that the initial USGS evaluation of TP-3 suggests that the copperas heap leach piles have the potential to discharge significant concentrations of contaminants. Treatment of the run-off from TP-3 would be necessary even if a small portion were preserved, unless an alternative approach that isolates the material from contact with water (enclosure in a structure or solidification with grout) were to be practical from a cost and historic preservation perspective. The national passive treatment experts retained by EPA

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to review the project and the technical expert hired by the TAG group, Copperas Hill Coalition, to support the EMCAG all agreed that passive aerobic wetlands would not be capable of treating the run-off from TP-3. The discharge from TP-3 is highly acidic and the major contaminants of concern at TP-3 include aluminum, cobalt, copper, iron, manganese, and zinc. Aerobic wetlands are reported to be very effective with respect to iron and may reduce the concentration of manganese, but would only have minimal effect on the other contaminants. In addition, the aerobic wetlands would not significantly reduce the acidity of the run-off from TP-3. An example of the use of aerobic wetlands exists at the Site today. The discharge from TP-3 is exposed to the atmosphere as it flows from TP-3 to TP-1 which allows for the addition of oxygen. The discharge from TP-3 is also attenuated in a small pond on top of TP-1. This is similar to an aerobic wetland which also retains the water to add oxygen and settle solids. The sampling of the water from the outlet of the pond on TP-1 reveals that, after accounting for dilution from non-impacted water, very little treatment is accomplished by the addition of oxygen or the settling of the solids. The EPA selected cleanup has addressed this issue by first neutralizing the acidity of the water then using an anaerobic process to achieve a significant reduction in the contaminants. There is a role for an aerobic wetland to treat TP-3. Once the other treatment components have neutralized the acidity of the water, and removed the aluminum, cadmium, cobalt, copper, and zinc, the aerobic wetland portion of the system would serve a polishing step to remove any remaining iron and manganese, reduce biological oxygen demand and solids that discharge from the anaerobic wetlands, and to add oxygen.

Response to item 3: EPA intends to perform design studies that will better define the infiltration into the tailings of TP-1 and TP-2. A model will be developed that could estimate the effect of the surface water/shallow groundwater diversion independent of the cap. This modeling will avoid the substantial project delays that would occur if the cover system decision was delayed until field measurements were made to determine the impact of the surface water diversions. Assuming that EPA begins the design work in late 2002, surface water diversion would not be installed until 2003 (probably 2004). At least 2 years would be necessary to monitor the Site to evaluate the changes in flow from TP-1 and TP-2 that are a result of the surface water diversion. This would delay a decision regarding the installation of the cover system until 2006. At that time, the design would need to be finalized and, if determined to be necessary, installation of the cover system would not occur until 2007 or 2008 with completion in 2009 or 2010.

Under the approach that EPA intends to implement for the Site, if it is determined that a cap is not necessary to achieve the flow reduction in the seeps of TP-1 and TP-2 necessary to achieve the water quality objectives, then EPA would be willing to re-consider the installation of this component of the cleanup. It must be noted that the Vermont Solid Waste Management Rule will require some type of cover over TP-1 and TP-2. In addition, the design studies would need to conclude that infiltration into the tailings does not significantly contribute to the flow at the seeps and that the tailings are an effective barrier

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to infiltration. When the associated costs of removing and capping the material from TP-3, the erosion control, slope stabilization, soil cover over TP-1/TP-2, and surface drainage control activities are fully considered, the savings that would be experienced if the infiltration barrier over TP-1/TP-2 is removed is approximately \$2 million. Alternatively, if all of TP-3 were removed and the infiltration barrier cover system along with the surface water diversion result in the elimination of the need for treatment of the flow from either TP-3 or TP-1/TP-2, then approximately \$1.5 - \$2 million in short term construction costs would be eliminated as well as reducing the maintenance costs to less than \$50,000/year. This would add up to a reduction of \$100,000 - \$200,000 per year for the State of Vermont. As pointed out by the technical consultants to the EMCAG, the most cost effective approach in the long-term is clearly the complete removal of TP-3 and the installation of a system that essentially eliminates the contact between the tailings and water.

In summary, EPA has expressed an intent to develop a design that seeks to balance the historic preservation of TP-3 with environmental protection and cost. At this point, it is critical that the EPA and the State of Vermont resolve the level of maintenance cost that the State of Vermont can afford. This will establish the amount of TP-3 that can be preserved. EPA will evaluate whether a reduced maintenance cost would be experienced if only the copperas heap leach piles remain. The cleanup decision assumes the installation of an infiltration barrier unless the design studies provide compelling evidence that there would be no benefit from the infiltration barrier.

Comment 44: A comment was submitted requesting the Site be removed from the Superfund list and that a solution more consistent with the scope of the problem be implemented.

EPA Response: EPA believes that the ecological impacts and more limited potential human health impacts from this Site clearly qualify the Site for inclusion on the Superfund list. EPA has not completed the studies to determine if a human health risk is present at the Site. Sites can only be removed from the Superfund list after all necessary cleanup activities have been implemented and the comprehensive investigation of the site is complete. While no one is currently drinking contaminated groundwater, one residence adjacent to TP-3 was found to have water unsuitable for human consumption as a result of mine impacts. The water supply at this location contained cadmium levels up to five times the maximum contaminant level (MCL) defined by the federal Safe Drinking Water Act. The water also contained copper at twelve times the MCL and manganese at levels above the threshold value that EPA considered acceptable. The residents moved from this location and that water supply is not currently in use. As a result, it can be concluded that TP-3 represents a threat to human health and the environment. EPA also believes that the cleanup solution presented in the Action Memorandum is consistent with the scope of the problem. Almost 50 acres is generating acid mine drainage and the problem is impacting five miles of the WBOR. The acid mine drainage problem is expected to continue for many

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hundreds of years into the future. The concept of isolating the tailings, waste rock, and heap leach piles from water and oxygen is the standard practice in the mine industry. Innovative treatment solutions have been included for use as part of the cleanup. Finally, EPA will continue to evaluate the cleanup as more information is collected as part of the design with the goal of implementing the most cost effective approach that complies with federal and state regulations as well as the goal of achieving the restoration of the WBOR.

Comment 45: A comment was submitted stating that the cleanup is “overblown and overfunded” and that the limited Superfund money be spent on real hazardous problems.

EPA Response: EPA does not agree that the cleanup is overblown and it is certainly not overfunded given that no funding has been approved at this time. The proposed budget is reasonable considering the size and scope of the contamination. The ecological impacts at the Site do justify a Superfund response under Superfund law. The Superfund law was developed to protect human health and the environment, not just human health. EPA has not completed the studies to determine if a human health risk is present at the Site, however, it must be noted that one residence was found to have water unsuitable for human consumption as a result of mine impacts. The water supply at this location contained cadmium levels up to five times the maximum contaminant level (MCL) defined by the federal Safe Drinking Water Act. The water also contained copper at twelve times the MCL and manganese at levels above the threshold value that EPA considers acceptable. Therefore, it can be concluded that TP-3 represents a threat to human health and the environment.

Cleanup funding is distributed on a national level to allow the EPA senior managers to evaluate issues pertaining to the hazards at the Site and the available budget to determine how much funding will be provided in a given year for a particular Site. EPA does consider Sites with a current human health threat to be the highest priority.

Comment 46: A comment was submitted requesting that EPA “forget the whole thing”.

EPA Response: Comment noted, however, given the risks identified from the Site, response actions under Superfund will continue to be pursued.

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Comment 47: A comment was submitted expressing opposition to the cleanup and suggesting that nature will cure the problem.

EPA Response: Comment in opposition to the cleanup noted. While there has been significant re-vegetation of the area since the end of the mining activities, revegetation alone will not significantly reduce the contamination that is discharging from the Site. The Site has the potential to generate acid mine drainage for an estimated 2000 years. It would be wonderful if nature could restore the WBOR, however, the years of industrial activity have created an un-natural setting that exposes large quantities of acid producing material containing metals that overwhelm the ability of the natural system to mitigate the impact.

Comment 48: A comment was submitted expressing opposition to the cleanup due to the potential impacts on the historic resources at the Site. The comment also advocated for thorough data recovery if TP-3 is removed.

EPA Response: Comment in opposition to the cleanup noted. EPA is sympathetic to those concerned about the impacts of the cleanup on the historic resources at the Site. EPA has followed the requirements of the National Historic Preservation Act in developing the cleanup proposal. The consultation meetings have helped EPA to fully consider the potential direct and indirect impacts to historic resources. EPA considers the selected cleanup to represent the best balance of environmental restoration and historic preservation given the activities necessary to protect the environment and comply with other federal and state regulations. Historic mitigation activities will be specified in a Memorandum of Agreement between EPA and the Vermont Historic Preservation Officer. The comments regarding data recovery will be considered in developing the mitigation program.

Comment 49: A comment was submitted detailing the numerous historic features that may be impacted by the cleanup.

EPA Response: EPA appreciates the identification of those features of concern. EPA is working with experts in the fields to identify those features that may be impacted by the cleanup. EPA plans to continue to consult with the local experts regarding the Orange County Copper mines.

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Comment 50: A comment was submitted in opposition to the cleanup stating that “the Elizabeth Mine is not such a toxic site as we were lead to believe” and that the site does not justify the high priority the EPA has given, the expenditure of 15 to 20 million dollars, nor should the State of Vermont participate in a project that will leave it responsible for the operation and maintenance costs in the future.

EPA Response: Comment in opposition to the cleanup noted. It is unclear what the basis for the statement that the Site is “not as toxic as we were lead to believe”. From the initial meetings with the community, the EPA project team has been open with respect to the ecological impacts being the most significant threats that have been identified at the Site. EPA has not ruled out the possibility of human health threats given the contamination in the groundwater adjacent to TP-3 and the need to fully evaluate long-term exposure to the tailings, waste rock, and heap leach piles. The Superfund listing package, which was released nine months after EPA began working with the community identified the potential for contamination in fish tissue as a concern that supported listing. This was a hypothetical concern and will be addressed as part of the comprehensive site investigation. EPA does believe that the Site deserves the attention that has been focused on the Site. The cost of the cleanup is a function of the size of the Site, the nature of the problem, and the federal and state regulations that set the cleanup standards. EPA will work to minimize the cost of the cleanup as part of the design. The State of Vermont will be required to perform the Site maintenance. As has been stated previously, the most cost effective approach for the State of Vermont would be to advocate the complete removal of TP-3 which eliminates the need for the maintenance of the TP-3 treatment system and to further advocate for the best infiltration barrier/diversion system possible to eliminate the need for the TP-1/TP-2 treatment system. If the treatment systems are eliminated then the only remaining maintenance would be to mow the cover system and repair any future deterioration of the cover from erosion or other causes.

Comment 51: A comment and oral testimony were submitted detailing the following concerns with the cleanup proposal: (1) Demonstrated historical values of the mine site are not being honored; (2) Water quality goals are confused and ill defined. The commentor further argues that EPA should allow dilution of the contamination to be the solution and not to rely upon the complex and expensive treatment systems that are relatively untested and will be rendered inoperative by freezing; (3) Investigative goals and procedures are not even mentioned in EPA’s Proposed Plan; (4) The Alternative Plans presented by EPA are different in some respects from those previously discussed in public; and (5) There is no indication of how a staged activity would be carried forward.

EPA Response Item 1: The cleanup proposal, the EE/CA, and the other supporting documentation for the Site clearly show respect for the historic resources as the Site as well as EPA’s compliance with the National Historic Preservation Act. EPA will collect design information to determine the optimal profile for TP-1 and TP-2 to balance historic

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preservation, cost, infiltration reduction, and stability. There are no viable options to the mitigation of the acid mine generation at TP-3 that have been identified other than treatment of the discharge or removal of the acid generating material. The direct application of biocides or neutralization material (lime) would not be cost effective or implementable for TP-3. These technologies would require substantial disturbance of the historic resources to achieve adequate mixing with the waste material, the biocides may require collection and treatment to avoid downstream impacts from the run-off, and these technologies have not been proven to be effective for long time periods. EPA had the EE/CA reviewed by a team of experts with substantial experience in mining remediation. No viable alternative for the remediation of TP-3 was identified as a result of this review, and only options presented in the EE/CA were proposed for TP-1 and TP-2. The technical experts for the EMCAG came to the same conclusion as EPA with respect to the range of alternatives available. While a number of commentors insist that there is a way to address the problems at the Site for a minimal expense, EPA is not aware of such a technology. EPA will remain open to alternative technologies that comply with the federal and state standards.

EPA response to Item 2: EPA has been clear from the inception of the discussions with the EMCAG that the goal of the cleanup is to restore the WBOR to Vermont Water Quality Standards. As documented previously in the Response to Comment 8, it is very reasonable to expect the cleanup to achieve the numerical and biological Vermont Water Quality Standards in the WBOR. The background level of aluminum in surface water exceed the federal recommended water quality criteria. For the cleanup, the target cleanup level for aluminum in the WBOR will be set at the background concentration. Since the WBOR complies with Vermont Water Quality Standards for biological and numerical criteria at location 7, just upstream of the mine impacts, the goal of achieving Vermont Water Quality Standards is the same as setting the goal at achieving the same quality as upstream. It should be noted that the benthic community does not recover to a level comparable with that found upstream until Union Village Dam. EPA agrees that the best approach would be to reduce reliance on the innovative treatment technologies by removing the majority or all of TP-3. If sufficient quantity of TP-3 is removed then the run-off from TP-3 could be stored in the holding pond during the winter. Winter conditions would not be an issue with respect to treatment effectiveness of the passive treatment system if the discharge from TP-3 could be stored in a retention basin during the winter.

EPA Response to Item 3: EPA clearly identified the need for pre-design and design information as part of the cleanup. The standard practice at all EPA Superfund sites is to identify the cleanup plan for public comment through a Proposed Plan and then finalize the cleanup plan during design. This cleanup is somewhat unique in that EPA has provided in this NTCRA for the consideration of multiple options for the cleanup during the design phase. The current plan is to collect the pre-design and design data and design the cleanup

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consistent with the concept outlines in the cleanup decision. It is not the intent of the Proposed Plan to specify the data gathering activities or specific tests and methods that will be implemented as part of pre-design and design.

EPA Response to Item 4: The EE/CA represents the culmination of two years of dialogue with the EMCAG and the community. The basic components of the cleanup had been presented to the community more than six months prior to the comment period. The EMCAG and its technical experts reviewed and commented on the Alternative Analysis Report released in April 2001 and the draft EE/CA released in September 2001. EPA used the comments on these Reports as well as the expert technical review to develop the final EE/CA which was released in March 2002.

EPA Response to Item 5: EPA did not specify the sequencing of the cleanup for several reasons. The sequencing will be determined by the level of funding provided, the timing of the design work, and the outcome of the design studies. It may be possible to implement the entire cleanup over a two-three year period or it may become apparent that a more phased/staggered implementation is appropriate. Once the available funding is known, the results of the pre-design studies and design will be used to determine the construction sequencing.

Comment 52: A comment was submitted that opposed the scale of the cleanup and noted the following: the site is being reclaimed by vegetation; unrealistic goal of water quality with no mixing zone; more complete analysis of alternatives is necessary; EPA has not objectively evaluated the conclusions and recommendations of Mr. Dick McGaw; need an objective evaluation of the environmental impact of the cleanup; more gradual and deliberate cleanup approach; and why is the government willing to spend \$20 million on the process here.

EPA Response: Comment in opposition noted. The portions of the Site covered with organic material or soil have become vegetated. However, that cover and vegetation does not meet the performance requirements for an infiltration reducing cover. The goal of the cleanup is to restore the WBOR. It would not be appropriate under applicable water quality standards to utilize Copperas Brook merely as a discharge channel and start the mixing zone within the WBOR. The discharge from any treatment system must comply with federal and state discharge standards. EPA has performed a rigorous evaluation of the alternatives and does not agree that any further evaluation would be productive or appropriate.

The document prepared by Dick McGaw was not submitted as part of the comment on the Proposed Plan. EPA has reviewed the document and had it evaluated by highly experienced geotechnical engineers and mining experts. The report contained several inaccurate statements. Most of the report's suggestions had been previously considered by EPA and those with merit were already anticipated as issues to address during the design.

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The evaluation process for each alternative includes an evaluation of short term impacts. The cleanup will increase truck traffic and cause a period of inconvenience for the local residents. These impacts do not warrant a re-evaluation of the cleanup. Every cleanup has some short term impacts and it is not reasonable to expect an inconvenience-free cleanup. EPA will make every effort to minimize the impacts of the cleanup on the community, including seeking alternative travel routes and developing a source of material on-site. EPA is open to alternative phasing strategies for the cleanup depending upon the outcome of the pre-design and design studies. EPA is willing to invest in the funding necessary to protect the public health and the environment and bring the Site into compliance with federal and state standards. EPA will continue to evaluate measures to minimize costs during the design.

Comment 53: A comment was submitted in opposition to the cleanup noting that there are much better uses for the money, the site should not be on the National Priorities List, nature will fix the problem, and the volume of uncertainties associated with the Site do not allow for a cleanup decision at this time.

EPA Response: Comment in opposition to the cleanup noted. EPA believes that the Site does belong on the National Priorities List (NPL). The NPL is the list of all sites that are eligible for a remedial cleanup under Superfund. Superfund was enacted by Congress to protect public health and the environment. The fact that the Site is not a current health risk does not preclude Superfund involvement. Many of the Superfund cleanup actions at mining sites across the nation are primarily driven by ecological impacts. It is clear that the problem will not be solved by nature in a reasonable time frame. The USGS has estimated that the tailings and waste rock have the acid generating potential to last for about 2,000 years. The presence of vegetation on TP-1 is a result of the placement of soil by the landowner not natural reclamation. The current cover on TP-1 and TP-2 is not considered adequate with respect to the performance objective of preventing infiltration into the tailings.

EPA believes that there was more than adequate information available to make both a cleanup decision and for the public to have a meaningful opportunity to comment. The parameters of the cleanup were fairly well defined by the VT Solid Waste Management Rule and good engineering practice with respect to mine remediation. The fundamental premise of most mine remediation is that source control is the primary mechanism for cleanup with treatment as the default for the residual flow after source control. That is the approach that EPA has proposed for TP-1/TP-2. The VT Solid Waste Management Rule requires that EPA cover the waste material where practical. A regulatory waiver from the cover requirements of the VT Solid Waste Management Rules has been invoked for TP-3 due to the presence of the significant historic resources and based upon the determination that the run-off from any portion of TP-3 that remains without a cover will be adequately collected and treated to achieve an equivalent level of performance as a cover system.

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Innovative treatment technologies will be used to address the run-off from any areas of TP-3 that are preserved. The specific details of the cleanup will be developed during the design phase. EPA will continue to involve the EMCAG in the project by providing an opportunity to review the design documents.

Comment 54: A comment in opposition to the cleanup noted that: the river above the point of mine groundwater entry has high aluminum and does not meet water cleanup standards, a health hazard must exist for Superfund listing, and that are other sites are in need of the money.

EPA Response: Comment in opposition to the cleanup noted. The WBOR above the mine impacts contains concentrations of aluminum above recommended federal water criteria. However, there is no Vermont Water Quality numerical standard for aluminum. What is critical to note is that the WBOR at the location upstream of the mine impacts is of high quality with respect to the benthic and fish communities. As a result, it is likely that the aluminum concentrations found upstream of the mine are not having an adverse effect on the aquatic system. EPA will use the background level of aluminum as the target cleanup level. It should be noted that the aluminum concentrations in the WBOR below the mine impact are, on average, ten times higher than the upstream background levels. The data collected to date shows that impact of the mine on the WBOR. The data collected that demonstrates the high quality of the WBOR upstream of the mine demonstrates that the WBOR has the potential to achieve this quality in the section impacted by the mine once the contaminated mine discharge is removed.

The fact that the Site is not a current health risk does not preclude Superfund involvement. Superfund was enacted by Congress to protect public health and the environment. Many of the Superfund cleanup actions at mining sites across the nation are primarily driven by ecological impacts. Cleanup funding is distributed on a national level to allow the EPA senior managers to evaluate issues pertaining to the hazards at the Site and the available budget. This permits EPA to determine how much funding will be provided in a given year for a particular Site. EPA does consider sites with a current human health threat to be the highest priority for cleanup action.

Comment 55: A comment was submitted in support of a phased approach to the cleanup. The comment advocated the elimination of the primary source (TP-3) of pollution and then assessment of the extent of the remaining problem. The commentator suggested using an aerobic wetland to treat TP-3 and if that does not work placing the material in the North Open Cut and to delay the implementation of the cap until the remedial phase.

EPA Response: EPA agrees that is critical to address the primary source of the pollution (TP-3) as early as possible. The core activities to accomplish a significant reduction of the contamination entering the WBOR are the removal and/or treatment of TP-3 and the diversion of surface water and shallow groundwater around TP-1/TP-2. Complete removal

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would be the preferable environmental approach. Partial removal and treatment of the remainder attempts to strike a balance between historic preservation and the cleanup. Unfortunately, an aerobic wetland would not be an effective way to neutralize pH and to remove the aluminum, copper, cobalt, and zinc. Some type of neutralization and aerobic treatment is necessary to treat the water from TP-3. EPA will perform design studies to model the amount of infiltration that enters the tailings and the contribution that tailings will make to the problem after the surface water/shallow groundwater diversion is installed. If the tailings are causing an insignificant contribution to the seeps, EPA will reconsider the need for an infiltration barrier subject to the requirements of the VT Solid Waste Management Rules. Placing the TP-3 material in the North Open Cut is unlikely to be acceptable given the historic significance of the North Open Cut. The cap system for TP-1 and TP-2 has been retained in the NTCRA so that it may be implemented once the design is complete and funding is available. As previously stated in this document, EPA will re-evaluate the type of cover system required to comply with federal and state standards if the design indicates that the surface of TP-1 is not contributing to the flow at the seeps of TP-1.

Comment 56: A comment was made that there are no applicable or appropriate regulations to guide the cleanup plan and that the plan should be limited to diverting runoff from the site and controlling erosion.

EPA Response: EPA disagrees with the comment. There are a well defined set of regulatory objectives for the cleanup. The federal and state water quality regulations set an expectation that the waters of the U.S. and the State be restored to water quality standards. The VT Solid Waste Management Rules define mine waste that represents a threat to human health or the environment as a regulated solid waste. As a result, the performance standards within the VT Solid Waste Management Rules apply to any cleanup action involving the waste rock, heap leach piles, or tailings. The waiver provision within the VT Solid Waste Management Rules has been used to address several of the concerns raised by the community regarding the preservation of TP-3 and the configuration of the cover system on TP-1. EPA does not agree that an initial action that includes only the diversion of runoff and erosion control would be an appropriate scope for the NTCRA. The selected NTCRA includes all components contained within the cleanup Proposal.

Comment 57: A comment was submitted stressing the historical importance of the Site and advocating that National Register Criteria B should have been included as a basis for the National Register eligibility determination. Other comments included were: allow the historic preservation experts to determine the final configuration of TP-3 once the VT ANR has determine the amount that could be preserved; possibility of *in-situ* treatments for TP-3; need for thorough data recovery and to minimize the impacts of the cleanup on the historic resources; minimize the grading of TP-1; relax the Solid Waste Regulations; allow for a mixing zone in the WBOR; the vent pipe should be addressed sooner if an ecological cleanup is really important; possibility of endangered species;

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removal of the metal bearing solids from the passive wetlands periodically and placement on-site.

EPA Response: EPA recognizes the historic importance of the Site and has fully considered the impact of the cleanup on the historic resources as well as ways to reduce the impacts to the historic resources. The current cleanup proposal reflects the best balance of historic preservation and environmental protection. While the early historical report suggested that all four of the National Register Criteria should be applied to the determination of eligibility, EPA determined that Criteria A and C were most representative of the factors that contributed to the eligibility. EPA will continue to work with the historic preservation experts to determine the configuration of TP-3 once a decision has been made by the State of Vermont regarding maintenance.

EPA has considered numerous technologies to treat the acid mine drainage at TP-3. *In-situ* techniques involve either biocides which would need to be mixed into the waste material or grout that would be injected into the waste through numerous well points. The impact of either application on the waste piles would be substantial. Biocides would need to be applied in a closed system where all of the water was collected and then treated to remove the biocides. The grout injection would be very expensive given the pore space of a 12 acre waste pile. EPA agrees that construction activities should be managed to minimize the impact on the historic resources to the extent practical. The mitigation activities will be specified in a memorandum of agreement. The comments regarding data recovery will be considered in developing the mitigation program. EPA will also work to design a cleanup that minimizes truck traffic and maintains the slope on TP-1 and TP-2 to the extent possible. EPA does not, however, agree that it should “relax” the Solid Waste regulations or allow for a mixing zone in the WBOR. The cleanup should be held to the standards presented in those regulations. The air vent will be addressed as part of the remedial investigation. A cleanup response for the air vent discharge was not included in the NTCRA because the extent of the impact from the air vent is not well defined. While the discharge from the air vent is not aesthetically pleasing, the impacts appear to be quite local. The WBOR immediately below the air vent achieves the biological standards of the VT Water Quality Standards. The lack of a significant biological impact immediately adjacent to the air vent as opposed to a severe impact extending one mile below the Copperas Brook discharge is the basis for waiting to gather more information before making a final decision with respect to the air vent. Biologists for EPA contractors, EPA, and the USFWS have visited the Site and the only unresolved issue is whether the Indiana bat is present in the shafts of the North Open Cut. The Government will continue, as part of the RI/FS process, to evaluate whether any endangered bats utilize the Site. In regards to the final comment, periodic removal and on-site disposal are options that will be considered as part of the management of any solids from the passive treatment systems.

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Comment 58: A comment was submitted expressing a concern that a significant rain event during the cleanup operations could make the situation worse.

EPA Response: The design and implementation of the cleanup will include measures to address erosion of the exposed tailings during a storm event. This is a risk that can be managed during construction through the use of best management practices. EPA has fully considered the potential impacts of the cleanup and does not agree that the risk of an erosion/storm water control measure failing which could result in some acidic drainage entering the WBOR is greater than the benefit that will result from the cleanup. Significant erosion of the waste rock and heap leach piles is currently occurring at the Site. In addition, with the cleanup action, the WBOR will remain severely impacted for 1 mile and degraded below biological VT Water Quality Standards for 5 miles well into the future. There is also a chance that the current uncontrolled conditions at the Site could result in unoxidized tailings being exposed due to the ongoing erosion of the tailings or as a result of the failure of the decant system.

Comment 59: A comment was made at the public hearing in support the cleanup and urging EPA and VT ANR to move forward.

EPA Response: Comment noted.

Comment 60: A comment was made at the public hearing expressing concern that EPA contractors will not be obligated to meet any agreements made between EPA and the local communities.

EPA Response: EPA will ensure that all contractors working at the Site are responsive to any agreements between EPA and the local communities.

Comment 61: A comment was made at the public hearing in opposition to the cleanup and expressed an opinion that the Site should not be a Superfund site.

EPA Response: Comment noted. EPA disagrees and has discussed this matter in previous comments.

Comment 62: A comment was made presenting the result of a local informal poll regarding the public opinion regarding the cleanup. The commentor reported 117 persons responded to the poll and that 30% of the respondents supported the EPA proposal, 35% opposed the EPA proposal, and 29% favored a modified version of the EPA proposal that deferred the installation of the cover system on TP-1/TP-2 and passive treatment systems.

EPA Response: Comment noted.

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Comment 63. Oral testimony was received in support of the cleanup and advocating complete removal of TP-3.

EPA Response: Comment noted.

Comment 64: Oral testimony was received that identified the following comments: the Site was originally treated like a hazardous waste landfill; the cap and water treatment systems are too expensive and that the initial cleanup should involve surface water diversion, erosion control, and removal of most (or all) of TP-3; and the goal for the project should remain to achieve upstream water quality in the WBOR below the mine and not focus on the cleanup of Copperas Brook.

EPA Response: EPA's initial concept for the cleanup of the Site was that measures were necessary to prevent the infiltration of water into the waste material. Since its inception, EPA has brought considerable mining expertise into the project. This experience is reflected in the EE/CA and the selected cleanup. The mining experts confirmed that the basic approach for mine waste is similar to the approach used for other waste piles, except the intent is to prevent both water and oxygen from coming into contact with the waste. The reviews by the mining experts confirms that the selected cleanup approach is an appropriate response to address acid mine drainage. In addition, the VT Solid Waste Management Rules define mine waste as solid waste and subject mine waste to the performance requirements of the Rules. The cost of the cover system for TP-1 and TP-2 is a function of the large area that must be covered. As previously stated, if the design studies demonstrate that the tailings are not a source of contaminated water that contributes to the water quality violations in the WBOR, then EPA will re-consider the need for the infiltration barrier cover system. If the design confirms that the seeps at the toe of TP-1 will continue to impact the WBOR even after the diversion of the surface water and shallow groundwater, then the installation of an infiltration barrier cap is the most cost effective approach to reducing long-term maintenance costs and achieving the VT Water Quality Standards in the WBOR. EPA agrees that the diversion of surface water and shallow groundwater, erosion stabilization, and the removal and encapsulation of all of TP-3 would accomplish a greater than 90% reduction in aluminum, cobalt, copper, and zinc loading to the WBOR and a reduction of over 50% of the iron and manganese. EPA agrees that the project goal for the NTCRA is to restore the WBOR to the biological condition measured at the upstream reference location at EPA sample station 7. The analytical results, fish surveys and benthic surveys for EPA sample station 7 demonstrate that the quality of the WBOR entering the stretch with the mine impacts achieves the VT Water Quality Standards based upon both biological and numerical criteria and that the moderately elevated aluminum levels do not have an adverse effect on the biota. As a point source discharge, the discharge from the treatment systems must comply with the Clean Water Act NPDES and VT Water Quality Standards within a mixing zone of no longer than 200 feet from the discharge point. As a result of the Clean Water Act NPDES and VT Water Quality Standards, a compliance point within Copperas Brook may be

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established with respect to the discharge of waste water from any treatment facilities installed as part of the cleanup.

Comment 65: Oral testimony was received in opposition to the cleanup.

EPA Response: Comment noted.

Comment 66: Oral testimony was received in support of the cleanup.

EPA Response: Comment noted.

Comment 67: Oral testimony was received in opposition to the cleanup. The commentator noted concerns regarding diesel emissions, ground pit drainage, erosion, dust creation, and noise. The commentator also noted that the cover system would require maintenance in perpetuity and that other solutions were not considered because they were not guaranteed to solve the problem.

EPA Response: There would some increase in diesel emissions as well as some dust and noise from the truck traffic to implement the cleanup. These short term impacts are not sufficient to avoid the cleanup of the acid mine drainage that is expected to continue for 2000 years if left unabated. Best management practices will be implemented during any construction activities to minimize the release of tailings from the Site. Currently, there are no erosion control measures in place and as a result, there has been significant erosion of the waste piles and heap leach pile at TP-3 over the past few years. In addition, failure of the TP-1 underdrain could result in tremendous erosion. EPA agrees that an infiltration barrier cover system requires maintenance to prevent deep rooted species from damaging the barrier layer. There is no practical means to eliminate the acid generating potential of this waste and even the “passive treatment” systems require annual maintenance. If sufficient soil is available from a property adjacent to the Site, making truck volume less of an issue for the residents, then an alternative cover design that includes a much thicker soil cover and a biotic barrier of stone over the membrane could be evaluated. It has been proposed that such a cover may be allowed to re-establish the natural vegetation with little or no maintenance. The thick soil cover combined with stone biotic barrier limit the penetration of roots from the surface vegetation thereby eliminating the need to restrict the type of vegetation on the cover (eliminating the need to periodically mow the cover).

Comment 68: A comment was submitted in support of the cleanup.

EPA Response: Comment noted.

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