



**DECLARATION FOR THE
EXPLANATION OF SIGNIFICANT DIFFERENCES
ELIZABETH MINE SUPERFUND SITE
STRAFFORD, VERMONT
SEPTEMBER 2008**

Site Name and Location

The Elizabeth Mine Superfund Site is located in the towns of Strafford and Thetford, Orange County, Vermont.

Lead Agency

United States Environmental Protection Agency

Support Agency

Vermont Department of Environmental Conservation

Statement of Purpose

This decision document sets forth the basis for the determination to issue the attached Explanation of Significant Differences (ESD) for the Elizabeth Mine Superfund Site. The U.S. Environmental Protection Agency (EPA) developed this decision document after consulting with the Vermont Department of Environmental Conservation (Vermont DEC), and Vermont DEC's letter of concurrence is provided as Attachment A to this ESD.

Statutory Basis for Issuance of the ESD

Pursuant to Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9617(c), and the National Contingency Plan (NCP) rule at 40 C.F.R. § 300.435(c)(2)(i), if EPA determines that the remedial action being undertaken at a site differs significantly from the Record of Decision (ROD) for that site, EPA shall publish an explanation of the significant differences and the reasons such changes are being made. According to 40 C.F.R. § 300.435(c)(2)(i), and EPA guidance (Office of Solid Waste and Emergency Response (OSWER) Directive 9200.1-23-P, July 1999), an Explanation of Significant Differences, rather than a ROD amendment, is appropriate where the adjustments being made to the ROD are significant but do not fundamentally alter the remedy with respect to scope, performance or cost. EPA has determined that the adjustments to the ROD provided in this ESD are significant but do not fundamentally alter the overall remedy for the Elizabeth Mine Superfund Site with respect to scope, performance, or cost. Therefore, this ESD is being properly issued.

In accordance with Section 117(d) of CERCLA, 42 U.S.C. § 9617(d), and the NCP at 40 C.F.R. §§ 300.435(c)(2)(i)(A) and 300.825(a)(2), this ESD will be available for public review at the EPA Records Center in Boston, Massachusetts and the public information repository located at the Norwich Public Library, Vermont. The ESD will also be available at Vermont DEC's offices in Waterbury, Vermont.

Background

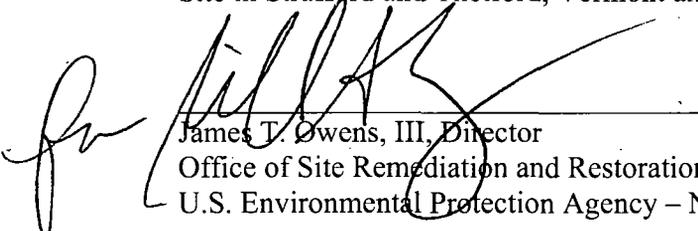
In September 2002, EPA signed an Action Memorandum to initiate a Non-Time Critical Removal Action (NTCRA) at the Elizabeth Mine. In 2006, EPA completed the Remedial Investigation and Feasibility Study and signed a Record of Decision in September 2006. The Copperas Factories were one of five areas targeted for remediation in the September 2006 Record of Decision. One component of the Remedial Action identified in the ROD was the in-place covering of the lead contaminated soil in the Copperas Factories area. The Remedial Design for the Copperas Factories component of the Remedial Action was completed in July 2008. As part of the Remedial Design, a historic resource expert reviewed the Site conditions and provided advice regarding the optimal cleanup strategy to comply with the National Historic Preservation Act (NHPA) 16 U.S.C. § 470 et seq.. This advice identified the potential need to relocate some quantity of lead contaminated soil further away from the Copperas Factories and dispose of it elsewhere on Site.

Overview of the ESD

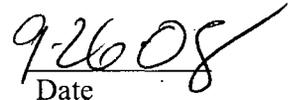
This ESD documents that EPA may move some of the lead contaminated soil from the Copperas Factories onto either Tailing Pile 1 (TP-1) or Tailing Pile 2 (TP-2). The material is being consolidated within one Area of Contamination (AOC). In the event that the lead contaminated soil to be moved, after testing, exceeds the criteria established for designation as a hazardous waste, the lead contaminated soil would be stabilized such that, after testing, it no longer exceeded the criteria. The change to the remedy is being proposed to more fully comply with the requirements of the National Historic Preservation Act (NHPA) which requires that the lead federal agency minimize the impact of the cleanup on historic features.

Declaration

For the foregoing reasons and as explained herein, by my signature below, I approve the issuance of an Explanation of Significant Differences for the Elizabeth Mine Superfund Site in Strafford and Thetford, Vermont and the changes stated therein.



James T. Owens, III, Director
Office of Site Remediation and Restoration
U.S. Environmental Protection Agency – New England


Date

**EXPLANATION OF SIGNIFICANT DIFFERENCES
ELIZABETH MINE SUPERFUND SITE
STRAFFORD, VERMONT
SEPTEMBER 2008**

Site Name: Elizabeth Mine Superfund Site
Site Location: Strafford and Thetford, Orange County, Vermont
Lead Agency: United States Environmental Protection Agency (EPA)
Support Agency: Vermont Department of Environmental Conservation (Vermont DEC)

I. INTRODUCTION

This Explanation of Significant Differences (ESD) is being issued for the Elizabeth Mine Superfund Site to address differences between the remedy that was set forth in the Record of Decision (ROD) for the Site on September 28, 2006 and a proposed revised remedial action being undertaken which will better protect historic resources at the Site. EPA is required to publish this ESD by Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9617(c), and the National Contingency Plan (NCP) at 40 C.F.R. § 300.435(c)(2)(i).

This ESD documents that EPA may move some of the lead contaminated soil from the Copperas Factories onto either Tailing Pile 1 (TP-1) or Tailing Pile 2 (TP-2). The material is being consolidated within one Area of Contamination (AOC). In the event that the lead contaminated soil, after testing, exceeds the criteria established for designation as a hazardous waste, the lead contaminated soil would be stabilized such that, after testing, it no longer exceeds the criteria. The change to the remedy is being proposed to more fully comply with the requirements of the National Historic Preservation Act (NHPA) 16 U.S.C. § 470 et seq., which requires that the lead federal agency minimize the impact of the cleanup on historic features.

The basis for these decisions is outlined below.

In accordance with CERCLA §117(d), 42 U.S.C. § 9617(d), and the NCP at 40 C.F.R. §§300.435(c)(2)(i)(A) and 300.825(a)(2), this ESD and its supporting documents will be made available for public inspection and will be added to the Administrative Record for the Site. The Administrative Record is available for public review at the EPA Region 1 Records Center in Boston, Massachusetts, and the repository located at the Norwich Public Library, at the addresses listed below:

EPA Region 1 Records Center
One Congress Street, Suite 1100
Boston, Massachusetts 02114-2023
By appointment only: 617-918-1440

Norwich Public Library
368 Main St.
Norwich, VT 05055
802-649-1184

The ESD is also available at Vermont DEC's offices in Waterbury, Vermont.

II. SITE HISTORY, CONTAMINATION, AND THE SELECTED REMEDY

The Elizabeth Mine Site (the Site) is an abandoned copper and copperas (iron sulfate) mine located in the towns of Strafford and Thetford, Vermont (Figure 1). The Site is in the general vicinity of Copperas Hill and constitutes the largest mining complex of the Vermont Copper Belt. The Site encompasses approximately 970 acres south of Vermont Route 132 along the West Branch of the Ompompanoosuc River (WBOR) between Sargent Brook and Lord Brook and consists of numerous parcels.

Primary physical features associated with the mine are depicted on Figure 2 and include the following.

- Three open rock cuts (referred to as the North Open Cut, South Open Cut, and the South Mine).
- Two pit lakes (located within the South Open Cut and the South Mine).
- Two tailing dams, designated tailing pile 1 (TP-1) and tailing pile 2 (TP-2), which consist of approximately 34 acres of water-deposited tailing (e.g., fine sand and silt).
- A waste rock/heap leach pile, designated tailing pile 3 (TP-3), which consists of approximately 13 acres of mine waste and residual heap leach piles.
- A waste rock and waste ore pile, designated TP-4, which consists of an area that is less than one acre.
- A series of World War II (WWII)-era mine support buildings, which formerly housed the flotation mill and support operations.
- Subterranean mine workings (referred to as the Underground Workings) that extend approximately 8,000 feet in an approximately north-south orientation from south of the North Open Cut to areas north of the WBOR.
- The foundations and associated debris scattered associated with the former Copperas Factories used to produce copperas.

Other physical mine features include numerous adits, shafts, and vents that interconnect with the Underground Workings, the remains of historic (pre-WWII) mine processing areas, structures, and waste areas (e.g., smelter sites, roast beds).

The former Copperas Factories are situated east of TP-3 adjacent to Copperas Brook and Mine Road. The remains of the former Copperas Factories include two stone foundations and debris scatter areas associated with the former copperas processing operations. The foundations, identified in the Site historic resource documentation as the Upper and Lower Copperas Factories, formerly housed evaporators, crystallizers, and packaging operations which were in operation during the early and mid 1800s prior to the shift in mine extraction from copperas to copper. Copperas processing reportedly included evaporation using lead-lined vats. The Upper Copperas Factory foundation is located along the downgradient side of TP-3 adjacent to Copperas Brook. The Lower Copperas Factory is located further downslope from TP-3 and south of Copperas Brook. The Upper Copperas Factory was reportedly 267 feet long and 94 feet

wide during its largest recorded configuration in 1827 and 1842. A 1870s account provided dimensions for the lower structure as approximately 120 feet long by 75 feet wide. The factories and surrounding area downslope of the TP-3 waste piles were identified in the ROD as containing elevated levels of lead in the surficial soils. Figures 3 and 4 show the location of the Copperas Factories and the associated areas that will be subject to the NTCRA (TP-1, TP-2, and TP-3).

Based on findings from the pre- and post-ROD field sampling, the elevated lead concentrations in this area are located in close proximity to the Copperas Factories and there is no indication of transport of significant concentrations of lead to other locations or media within the watershed. Figure 5 shows the locations where lead contamination was detected above the cleanup levels.

Because the Upper Copperas Factory is located within the TP-3 limit of waste identified for removal, the lead removal associated with these features must consider both the high acid generating potential waste ore and the elevated lead content. Mixing of these materials and subsequent placement in a manner consistent with only lead closure requirements (i.e., isolation using a 2-foot soil cover) may result in the long-term generation of acid rock drainage (ARD) through infiltration, as well as the potential for lead mobilization through the generation of acidic pore water. For this reason, based on the acid-base accounting characteristics of the waste ore, neutralization of the lead-containing soil that is mixed with acidic waste ore may be necessary. In the event that neutralization of the waste is deemed to be required by EPA, lime will be added and mixed into the wastes at a rate not less than 20 percent by volume. Additional treatment of the lead-contaminated soils may be necessary if they are to be consolidated in either the TP-1 or TP-2 area. Treatment would be required if testing, using the Toxicity Characteristic Leaching Procedure (TCLP) test required under the hazardous waste regulations, shows that the lead-contaminated soil exceeds hazardous waste criteria. Treatment will meet applicable standards under these regulations and, after treatment, the treated soil will no longer be regulated as hazardous waste. Once all lead-impacted soil to be consolidated with TP-1 or TP-2 has been rendered non-hazardous, it may be consolidated within the TP-1 or TP-2 portion of the AOC since it will not trigger treatment or land-disposal restrictions.

In general, analytical results indicate that soil degradation due to mining activities within the Copperas Factories areas is restricted to the foundations and immediately surrounding areas. Soil containing elevated lead concentrations exceeding the human health-based criteria was detected in samples collected near the Copperas Factory foundations as shown in Figure 4. Lead concentrations in these soils also exceed risk-based effects levels for some wildlife populations. The lead is likely related to lead-lined vessels used during copperas production. Although the Remedial Investigation identified contamination from TP-3 in the groundwater, surface water, and sediments adjacent to and downgradient of the Copperas Factories, the Remedial Investigation did not identify lead impacted groundwater, surface water, or sediment quality downgradient of the Copperas Factories area.

III. BASIS FOR THIS ESD

The Copperas Factories remediation involves a combination of in-place covering of lead-impacted material with possibility of some excavation and consolidation of lead-impacted material within TP-1 or TP-2. All lead contaminated soil above 400 mg/kg will have a 2-foot thick cover over the waste to isolate the wastes from direct contact, in accordance with the September 2006 ROD.

The CF-4 alternative selected in the ROD specified that soil contaminated with lead above the cleanup level would be covered in-place or consolidated within the Copperas Factories footprint and covered with 2 feet of soil or stone. The in-place cover option was selected as the alternative most consistent with the requirement of the NHPA. The review of the design by the historic preservation experts revealed that some quantity of lead contaminated soil may need re-location outside the Copperas Factories footprint to achieve the optimal compliance with the historic preservation objectives. Specifically, the historic preservation concept would require minimizing any areas where fill would substantially alter the landscape. As a result, the design includes the option for soil to be excavated, relocated, and covered onsite, within the defined AOC for the NTCRA/RA. The specific location will be on the surface of either TP-1 or TP-2. In addition, the design requires testing of the soil to determine if it would qualify as a hazardous waste, and if so, pre-treatment of the soil to render it non-hazardous prior to final placement. The elimination of the characteristics of a hazardous waste will allow for the cover system on TP-1 and TP-2 to remain a solid waste closure cover system, rather than a hazardous waste closure cover system. The Remedial Design includes ARAR tables and other requirements associated with the excavation, relocation, and on-site covering of the lead contaminated soil, which were included as part of the CF-2 alternative in the Feasibility Study. Treatment/Stabilization allows the contaminated soil to pass the TCLP and be regulated as solid waste, rather than hazardous waste.

The design evaluation performed by the NHPA expert consultant identified the following historic preservation criteria for the Copperas Factories:

- **Do not over-restore the factory sites:** The overall design philosophy should be to maintain the existing first impression of the visual approach to the exposed Copperas Factory foundations and their appearance as abandoned ruins.
- **Maintain existing topography:** Ideally, remove contaminated soil from the top of the walls and from below the walls and replace with clean material to match the existing grade. Where the elevation of existing soil is uneven against the bottom of the walls, approximate the uneven elevation with the fresh material. Do not alter surface grades within the proximity of the foundation walls.
- **Promote stability of stone walls:** Remove the small tree stumps in the middle of the foundations and cut the large tree stumps level, allowing a little bit of crown fill on the top and access to the historic structure. Do not remove tree stumps close to the inside or outside of the walls as that may destabilize the walls; cut those stumps level. As a precautionary step, the external stone foundations could be "wrapped" with geotextile and slightly tensioned cables for the duration of the work and then removed. Should

individual stones start to shift, they would be held in place. The barrier would also minimize incidental contact and make an obvious visual barrier. Loose stones found during excavation or dislodged during construction can be placed back on the walls.

- **Historic Data Recovery:** Historic data recovery will be performed in support of the closure design with the findings incorporated into the design and construction as warranted.
- **Design Components:**
 - **Backfill Design:** Materials should be selected of uniform texture and consistency. Provisions should be made to ensure soils drain well, as water freeze/thaw cycles can damage the old walls. Keeping water away from and drained from fill will help preserve the foundations.
 - **Choice of Materials:** Choose capping and soil stabilization materials that will not detract from the formal elements of the existing stone wall (i.e. avoid large-diameter stone riprap).
 - **Geotextiles:** Use of geotextiles should be considering as a marker layer and physical barrier between in-situ soils and backfill. Furthermore, geotextiles can provide additional strength to wall/fill by tending to hold materials together so they act as more of a unit. Geotextiles might be used against the stone foundation where soil is removed (on the inside or outside) and replaced with fill. This will give added strength and if individual stones in the wall start to shift, they will encounter the resistance of the fabric backed by the fill rather than straight fill.
- ***In-Situ* Artifact Preservation:** Cast iron stanchions, rails, plates, plumbing, furnace parts, etc. should be removed and deposited in an artifact repository or preserved in-situ, if possible, prior to commencement of work.
- **Equipment Selection:** Construction equipment should be selected to minimize direct contact, vibration, and earth pressure. Smaller equipment with an adequate reach should be utilized when working close to the walls.
- **Site Supervision:** Supervisors should be cognizant of the sensitivity of the historic foundations and be closely engaged with all facets of the site work. Equipment operators should be highly skilled, experienced, and attentive.

IV. DESCRIPTION OF SIGNIFICANT DIFFERENCES

The only change in the selected remedy is the inclusion of an option to consolidate some portion of the lead contaminated soil in TP-1 or TP-2. The lead contaminated soil would also be tested to determine if it exceeds criteria that would be characteristic of a hazardous waste and then, if hazardous, treated to allow the material to be considered a solid waste.

Change in Expected Outcomes

The only change in expected outcome is that the remedy will have less adverse impact on the historic features at the Site. All other expected outcomes remain unchanged.

V. Support Agency Comments

Vermont DEC participated with EPA in developing the changes to the selected remedy described herein and concurs with these changes as provided in Attachment A. The Vermont State Historic Preservation Officer (SHPO) has also reviewed the proposed changes and concurs with this ESD.

VI. Statutory Determinations

EPA believes that the remedy as adjusted herein remains protective of human health and the environment and satisfies the requirements in Section 121 of CERCLA. The changes made in this ESD have not changed the remedial action objectives for the Site. Rather, the modifications to the remedy described herein will allow the remedy to be implemented in a manner that is more compliance with one of the major ARARs for this action.

VII. Public Participation Compliance

In accordance with Section 117(d) with CERCLA and Section 300.825(a) of the NCP, this ESD will become part of the Site's Administrative Record which is available for public review at the locations identified in the introduction to this document. As required by NCP section 300.435(c)(2)(i)(B), EPA will publish a notice of availability and a brief description of this ESD in a major local newspaper of general circulation following the signing of this ESD.

ATTACHMENT A

Vermont DEC Concurrence Letter

ATTACHMENT B

Figures

ATTACHMENT C

ARAR Tables

ATTACHMENT A
Vermont DEC Concurrence Letter



Vermont Department of Environmental Conservation

Commissioner's Office

103 South Main Street, 1 South

[phone] 802-241-3808

Waterbury, VT 05671-0401

[fax] 802-244-5141

Agency of Natural Resources

September 26, 2008

James T. Owens, Director
Office of Remediation and Restoration
US EPA Region I
1 Congress Street, Suite 1100
Boston, MA 02114-2023

Subject: September 2008 Explanation of Significant Difference for Copperas Factories at the Elizabeth Mine Superfund Site Strafford/Thetford, Vermont (State Site #77-0186)

Dear Mr. Owens:

We concur with the September 2008 Explanation of Significant Differences (ESD) proposed by EPA to modify the remedy for the Copperas Factories from what was described in the 2006 EPA Record of Decision (ROD).

The remedial alternative selected in the ROD for the copperas factory area specified that soil contaminated with lead above the cleanup level would be covered in-place or consolidated within the copperas factories footprint and covered with 2 feet of soil or stone. We agree that this proposed ESD is a minor modification to the remedy in the ROD that allows for an option of re-locating lead contaminated soil, if necessary, onto TP-1 or TP-2 for eventual placement beneath the TP-1 and TP-2 solid waste cap. With this option, the remedy can better achieve optimal compliance with the historic preservation objectives for the copperas factories.

Please do not hesitate to contact me or John Schmeltzer of my staff if you need additional information or clarification on our response to the ESD.

Sincerely,

A handwritten signature in cursive script that reads "Laura Q. Pelosi".

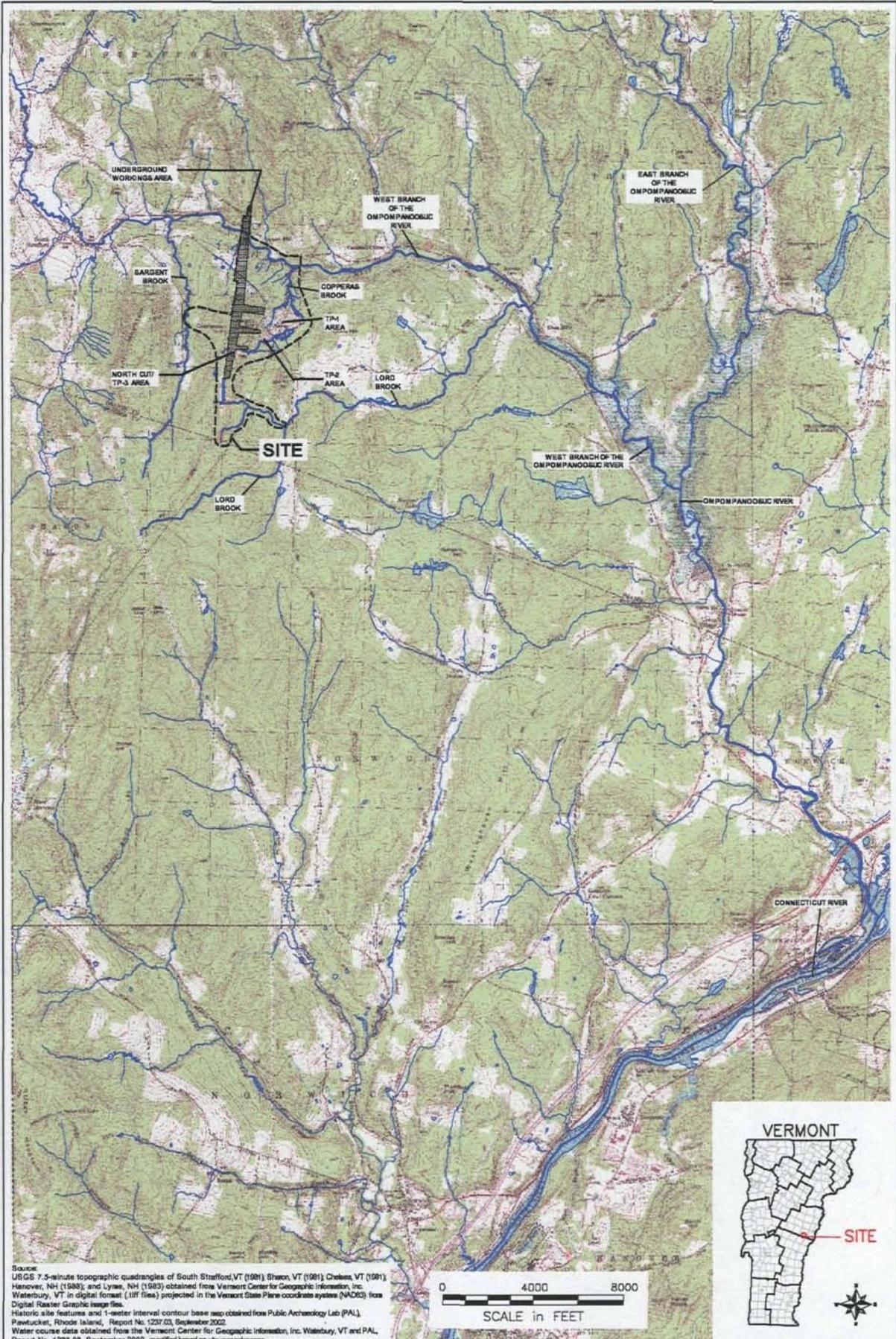
Laura Q. Pelosi
Commissioner

LQP/JS/ltr

Cc: Mary Jane O'Donnell, EPA
Ed Hathaway, EPA
John Schmeltzer, VT DEC

ATTACHMENT B
Figures

P:\Project\SURFACE_13\Map\364591\07_06\FIN\FIN\figure\M_BASE.dwg, FIG 1 SITE LOCUS, 9/18/2008 11:27:27 AM



Source:
 USGS 7.5-minute topographic quadrangles of South Stratford, VT (1981), Strawn, VT (1981), Chelsea, VT (1981),
 Hanover, NH (1988); and Lyrae, NH (1983) obtained from Vermont Center for Geographic Information, Inc.
 Waterbury, VT in digital format (.tif files) projected in the Vermont State Plane coordinate system (NAD83) from
 Digital Raster Graphic image files.
 Historic site features and 1-meter interval contour base map obtained from Public Archaeology Lab (PAL),
 Pawtucket, Rhode Island, Report No. 1237.03, September 2002.
 Water course data obtained from the Vermont Center for Geographic Information, Inc. Waterbury, VT and PAL,
 Report No. 1237.03, September 2002, modified based on site reconnaissance.

URS
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 Fax: 207.876.7885
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PROJECT NO:	30459045
DRAWN:	PS
APPROVED:	JCC
DATE:	SEPT 2008
FILE NO.:	EM_BASE

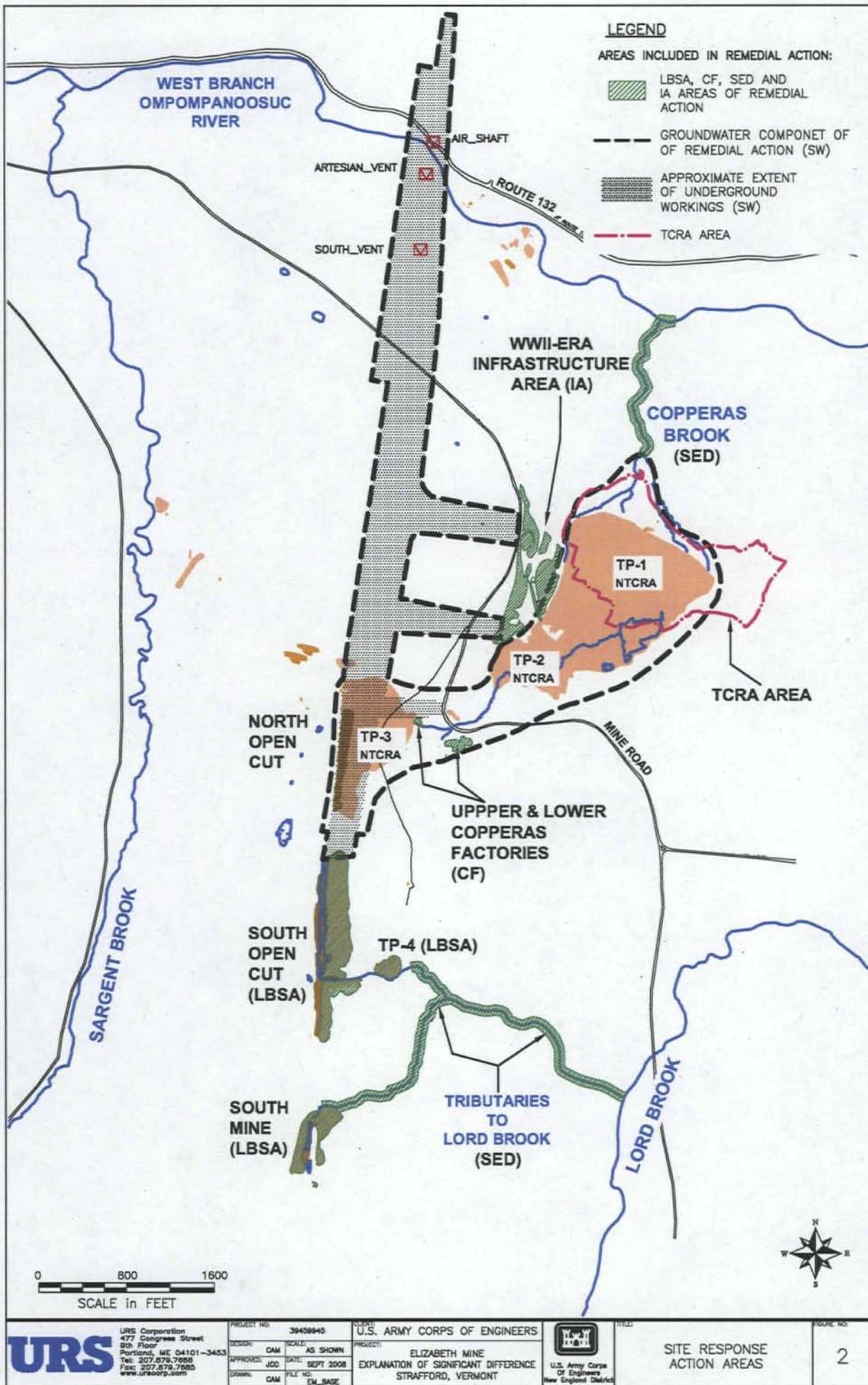
U.S. ARMY CORPS OF ENGINEERS
 PROJECT:
 ELIZABETH MINE
 EXPLANATION OF SIGNIFICANT DIFFERENCE
 STRAFFORD, VERMONT



TITLE:
SITE LOCATION

FIGURE NO:
1

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URS Corporation
477 Congress Street
9th Floor
Portland, ME 04101-3453
Tel: 207.579.7800
Fax: 207.579.7880
www.urscorp.com

PROJECT NO: 39459945
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APPROVED: JOC DATE: SEPT 2008
DRAWN: CAM FILE NO: EM_BASE

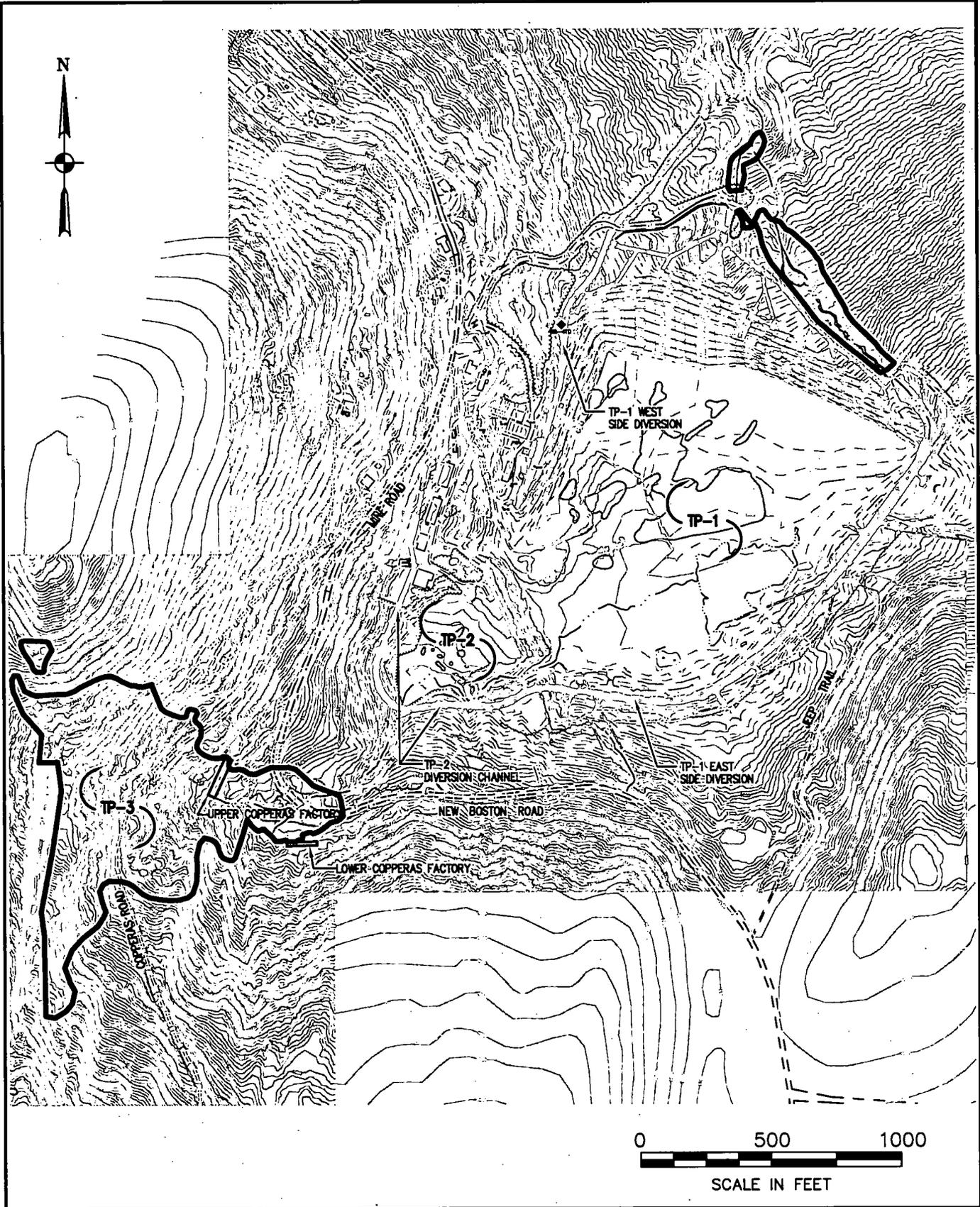
CLIENT: U.S. ARMY CORPS OF ENGINEERS
PROJECT: ELIZABETH MINE
EXPLANATION OF SIGNIFICANT DIFFERENCE
STRAFFORD, VERMONT



TITLE: SITE RESPONSE ACTION AREAS

FIGURE NO: 2

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 Portland, ME 04101
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 www.urscorp.com

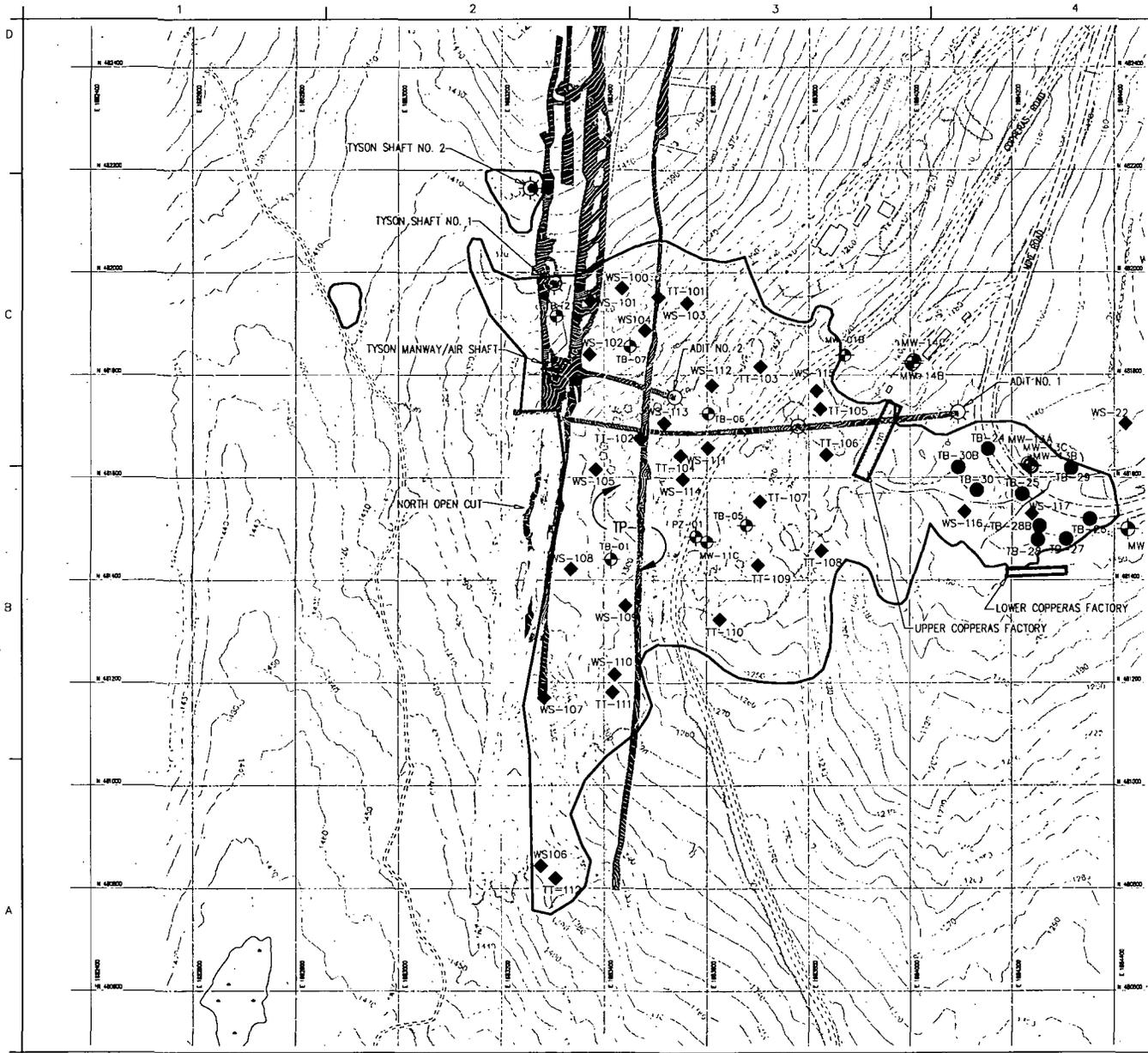
SCALE: 1" = 500'
 DATE: SEPT 2008
 FILE NO: NtcraClosure
 DESIGN: DWA
 APPROVED: JCC
 DRAWING: CAM

CLIENT: U.S. ARMY CORPS OF ENGINEERS
 PROJECT: ELIZABETH MINE
 EXPLANATION OF SIGNIFICANT DIFFERENCE
 STRAFFORD, VERMONT
 PROJECT NO: 39459945

TITLE: LOCATION OF COPPERAS
 FACTORIES AND NTCRA

FIGURE NO.: 3

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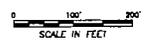


GENERAL NOTES

1. BASE TOPOGRAPHIC MAP PROVIDED BY U.S. ARMY CORPS OF ENGINEERS (USACE). SOLID LINES INDICATE AERIAL PHOTOGRAPHIC TOPOGRAPHY. DASHED LINES ARE GROUND SURVEYED TOPOGRAPHY.
2. HORIZONTAL COORDINATE SYSTEM PRESENTED ON DRAWINGS IS BASED ON VERMONT STATE PLANE COORDINATES.
3. EXISTING CONDITIONS AS OF DECEMBER 2008.
4. TEST PITS AND MONITORING WELL LOCATIONS ARE SHOWN FOR INFORMATIONAL PURPOSES. ASSOCIATED BORING AND TEST PIT LOGS HAVE BEEN ISSUED AS PART OF PRIOR SUBMISSIONS TO USACE.
5. LOCATION AND ORIENTATION OF UNDERGROUND MINE WORKINGS SHOWN ON THIS PLAN ARE BASED ON VERMONT COPPER CO., INC. MAPS AND DRAWINGS DATED AUGUST 1949 AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. LOCATION AND EXTENT SHOWN ON PLAN MAY NOT REFLECT ACTUAL CONDITIONS.

LEGEND

- TP-3 EXCAVATION LIMIT
- APPROXIMATE LOCATION OF UNDERGROUND MINE WORKINGS
- TEST PIT
- MONITORING WELL
- TEST BORING
- STONE WALL
- COPPERAS BROOK
- TREELINE
- ADIT PORTAL, LOCATION APPROXIMATE
- SHAFT/MANWAY, LOCATION APPROXIMATE
- UNPAVED ROAD
- EXISTING BUILDINGS
- TEMPORARY BENCHMARK



USACE
US Army Corps of Engineers
New England District

URS
NEW ENGLAND DISTRICT
CONCORD, MASSACHUSETTS

ELIZABETH MINE
EXPLANATION OF
SIGNIFICANT DIFFERENCE
STRAFFORD, VT

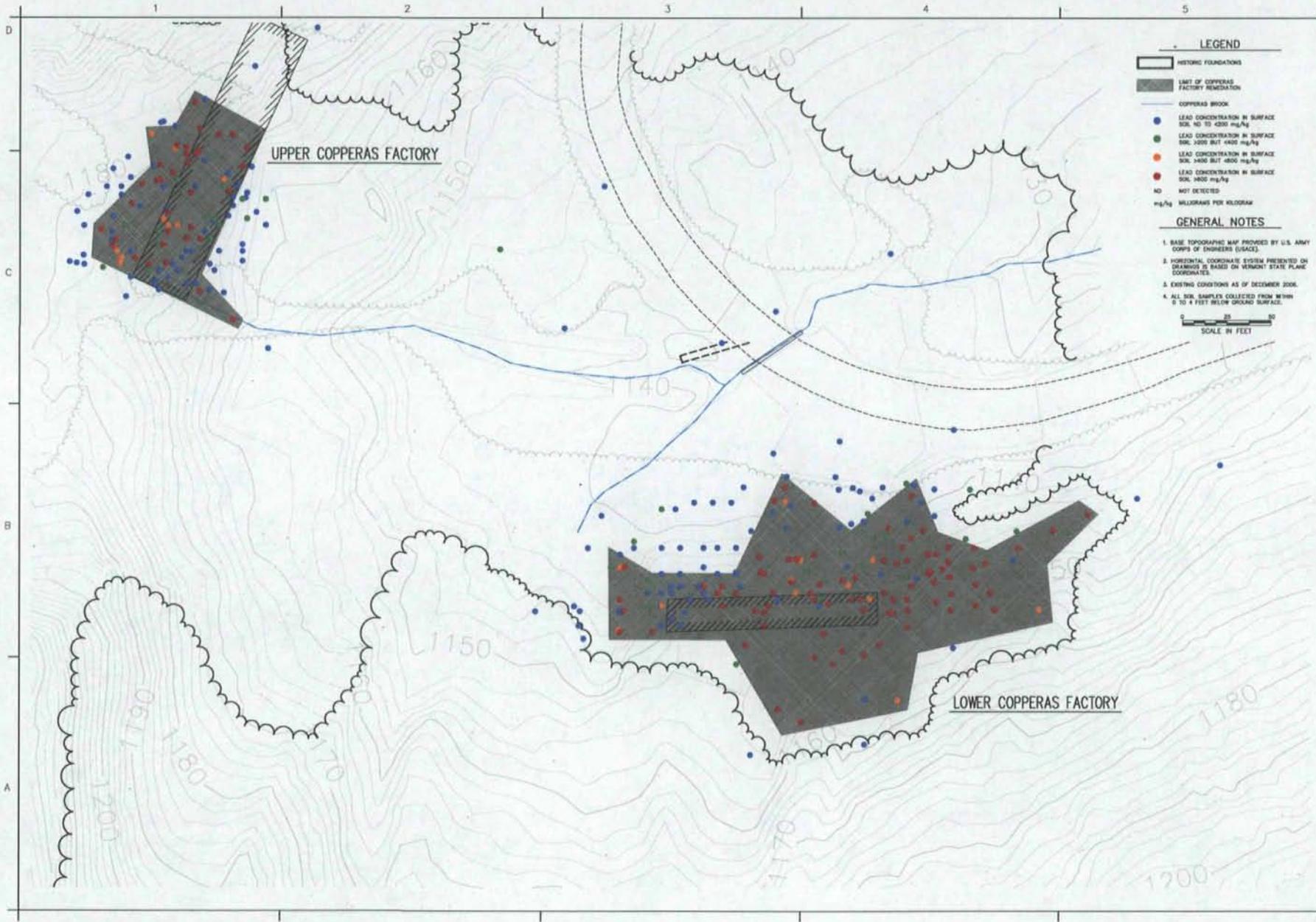
NO.	DESCRIPTION	DATE	BY	CHK'D BY

Prepared by: JAC	Date: 2/27/2008	Checked by: JAC	Date: 3/10/08	Project #: 12/07
Reviewed by: JAC				
Submitted by: URS CORPORATION				

**LOCATION OF COPPERAS
FACTORIES AND TP-3**

Figure:
4

Phase: project/USACE-ELIZABETH-MINE-STRAITFORD-VT/Design/CDM Closure/fig. E50-5, 9/16/2008 3:06:08 PM



LEGEND

- HISTORIC FOUNDATIONS
- LIMIT OF COPPERAS FACTORY REMEDIATION
- COPPERAS BROOK
- LEAD CONCENTRATION IN SURFACE SOIL 10 TO 4500 mg/kg
- LEAD CONCENTRATION IN SURFACE SOIL 2000 BUT 4000 mg/kg
- LEAD CONCENTRATION IN SURFACE SOIL 2000 BUT 4000 mg/kg
- LEAD CONCENTRATION IN SURFACE SOIL 1000 mg/kg
- NO NOT DETECTED

mg/kg MILLIGRAMS PER KILOGRAM

GENERAL NOTES

1. BASE TOPOGRAPHIC MAP PROVIDED BY U.S. ARMY CORPS OF ENGINEERS (USACE).
2. HORIZONTAL COORDINATE SYSTEM PRESENTED ON DRAWING IS BASED ON VERMONT STATE PLANE COORDINATES.
3. EXISTING CONDITIONS AS OF DECEMBER 2006.
4. ALL SOIL SAMPLES COLLECTED FROM WITHIN 0 TO 4 FEET BELOW GROUND SURFACE.

SCALE IN FEET

 U.S. Army Corps of Engineers New England District	
USACE NEW ENGLAND DISTRICT CONCORD, MASSACHUSETTS	
ELIZABETH MINE EXPLANATION OF SIGNIFICANT DIFFERENCE STRAITSFORD, VT	
Checked By: _____ Date: _____	Date: _____ Checked By: _____
Date: _____ Checked By: _____	Date: _____ Checked By: _____
Date: _____ Checked By: _____	Date: _____ Checked By: _____
Date: _____ Checked By: _____	Date: _____ Checked By: _____
LOCATION OF LEAD CONTAMINATED SOIL AT COPPERAS FACTORIES	
FIGURE: 5	

ATTACHMENT C
MODIFIED ALTERNATIVE CF-4 ARARS TABLES FOR SEPTEMBER 2008 ESD

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	Action Taken to Comply with ARARs
CHEMICAL-SPECIFIC ARARS			
STATE ARARs - None			
FEDERAL ARARs			
EPA Residential Risk Based Concentrations (RBCs) (Region III) and Preliminary Remediation Goal (PRGs) (Region IX) – Residential	To Be Considered	RBCs and PRGs provide criteria for evaluation of chemical concentrations in residential soil samples.	The covering of the lead contaminated soil or the excavation, potential treatment, and disposal of treated soil at either TP-1 or TP-2 will address all the contact risks identified.
EPA Risk Reference Doses (RfDs)	To Be Considered	Risk reference doses (RfDs) are estimates of daily exposure levels that are unlikely to cause significant adverse non-carcinogenic health effects over a lifetime.	The covering of the lead contaminated soil or the excavation, potential treatment, and disposal of treated soil at either TP-1 or TP-2 will address all the contact risks identified.
EPA Carcinogen Assessment Group, Cancer Slope Factors (CSFs)	To Be Considered	CSFs are used to compute the incremental cancer risk from exposure to contaminants and represent the most up-to-date information on cancer risk from EPA's Carcinogen Assessment Group.	The covering of the lead contaminated soil or the excavation, potential treatment, and disposal of treated soil at either TP-1 or TP-2 will address all the contact risks identified.
<i>Memorandum: OSWER Directive: Clarification to the 1994 Revised Interim Soil Lead (Pb) Guidance for CERCLA Sites and RCRA Corrective Action Facilities, EPA/540/F-98-030, August 1998</i>	To Be Considered	This directive clarifies the existing 1994 Revised Interim Soil Lead Guidance for CERCLA Sites (OSWER Directive 9355.4-12) to promote national consistency in decision-making at CERCLA lead sites across the country.	The covering of the lead contaminated soil or the excavation, potential treatment, and disposal of treated soil at either TP-1 or TP-2 will address all the contact risks identified.
Guidelines for Carcinogen Risk Assessment EPA/630/P-03/001F (March 2005)	To Be Considered	Provides guidance on conducting risk assessments involving carcinogens.	This guidance will be used by EPA to evaluate all risk assessments on carcinogenicity conducted in the future at the Site.
Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens EPA/630/R-03/003F (March 2005)	To Be Considered	Provides guidance on conducting risk assessments for child exposure to carcinogens.	This guidance will be used to evaluate all child risk from exposure to carcinogens at the Site.

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	Action Taken to Comply with ARARs
LOCATION-SPECIFIC ARARs			
STATE ARARs			
<p>Vermont Wetlands Act, 10 VSA § 905; Vermont Wetland Rules (Nat. Res. Brd., Water Res. P. 12-004-056)</p>	<p>Applicable</p>	<p>These standards establish criteria for delineating Class One and Class Two wetlands, which are considered significant wetlands, and set forth allowed and conditional uses for these wetlands. The uses must not have undue adverse impacts on the significant functions of the wetland. Class Three wetlands are defined, but are not protected under these rules (they are addressed under Title 10 V.S.A. Chapter 151, below)</p>	<p>No Class One or Class Two wetlands are present in the area to be impacted by these alternatives. Only Class Three wetlands are located in the area of this alternative. Alternative CF-4 would have an unavoidable undue adverse impact on Class Three wetlands in the vicinity of the upper and lower Copperas Factories and portions of Copperas Brook between TP-3 and Mine Road.</p>
<p>Vermont's Land Use and Development Law (Act 250), 10 VSA Chapter 151</p>	<p>Applicable</p>	<p>Issues to be addressed in assessing compliance with Act 250 include substantive environmental and facility siting requirements associated with:</p> <ul style="list-style-type: none"> • will not result in undue water and air pollution (including construction-related dust) (criterion 1); • protection of headwaters (criterion 1(A)); • will meet all standards for disposal of wastes (criterion 1(B)); • floodways (criterion 1(D)); • streams (criterion 1(E)); • impact on state-regulated wetlands (Class One, Two, and Three; (criterion 1(G)); • erosion control (criterion 4); and • impact on historic sites (criterion 8(A)). 	<p>Alternative CF-4 will be designed to minimize impacts on the regulated criterion, including wetlands, erosion control and dust mitigation, and historic sites as appropriate. The EPA has determined that unavoidable impacts to wetlands, streams, headwaters, floodways, and historic resources are necessary to abate the threat from lead-impacted soil. Measures will be taken to protect historic resources, including potentially disposing of some of the contaminated soil at TP-1 and TP-2, to maintain the current topography of the site and minimize disturbance to historic resources.</p>

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	Action Taken to Comply with ARARs
Vermont Regulation of Stream Flow, 10, V.S.A. Chapter 41	Applicable	Regulates and permits activities in streams to protect against damage to fish life, prevent creation of flood hazards, and protect from damaging the rights of riparian owners.	Alternative CF-4 will be designed to minimize the impact of the cleanup on Upper Copperas Brook.
FEDERAL ARARs			
Protection of Wetlands (Executive Order 11990), 40 Part 6, App. A	Applicable	<p>Prohibits activities that adversely affect a federally-regulated wetland unless there is no practicable alternative and the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use.</p> <p>Avoid, to the extent possible, the long- and short-term adverse effects associated with destruction, occupancy and modification of wetlands.</p>	<p>The EPA has determined that unavoidable impacts to the federally regulated wetlands would occur to abate the public health threat from the soil impacted with lead. A wetlands delineation would be implemented as a component of the design for Alternative CF-4. The design and implementation of Alternative CF-4 includes all practicable measures to minimize harm to wetlands and restore wetland impacted by the implementation of the alternative. The EPA has identified CF-4 as the least damaging practicable alternative.</p> <p>EPA sought public comment regarding the disturbance of federal-regulated wetlands and receive no comments opposing the proposed temporary disturbance of wetland resources.</p>

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	Action Taken to Comply with ARARs
Clean Water Act, Sec. 404 (33 USC § 1344); 40 CFR 230 and 33 CFR 320-330)	Applicable	Prohibits the discharge of dredge or fill material into a federally-regulated aquatic ecosystem, if a practicable alternative with lesser effects is available. Any alternative selected that may dredge or fill a wetland area would need to comply with the 404(b) guidelines. A finding that No Practicable Alternative was available and that the general prohibitions in 40 C.F.R. 230.10 and the factual determinations of 40 C.F.R. 230.11 would need to be completed for any alternative that may dredge and fill a water of the U.S.	Alternative CF-4 may involve limited disturbance and dredging or filling of the wetland and Copperas Brook adjacent to the Copperas Factories. The implementation would use best management practices (BMPs) to minimize the impacts of the cleanup, particularly on downstream surface water resources. The EPA has identified CF-4 as the least damaging practicable alternative.
Fish and Wildlife Coordination Act; 16 USC 661-666; 16 USC 2901, 40 CFR Part 6.302(g)	Applicable	Consultation with the U.S. Fish and Wildlife Service and appropriate state wildlife agency is required for modification of endangered or threatened species habitat and/or body of water to develop measures to prevent, mitigate, or compensate for the loss of fish and wildlife.	The EPA will consult with the U.S. Fish and Wildlife Service regarding endangered species and federal wetlands issues within Alternative CF-4.
Floodplain Management, Executive Order 11988, 6, App. A	Applicable	Federal agencies are required to avoid, whenever possible, impacts associated with the occupancy and modification of a floodplain. Promotes the preservation and restoration of floodplains so their natural and beneficial value can be realized.	Remedial activities along Copperas Brook will not cause increased flooding of downstream floodplains.
National Historic Preservation Act (NHPA); 16 USC 470 <i>et seq.</i> ; 36 CFR Part 800	Applicable	Section 106 of the NHPA of 1966, as amended (16 USC 470f), requires EPA to take into account the effect of all of its actions on historic properties. In consultation with the State Historic Preservation Officer (SHPO), the EPA has determined the Elizabeth Mine Site eligible for the National Register. The consultation is to identify potential adverse effects on historic properties and seek ways to avoid, minimize or mitigate any such effects on historic properties.	The EPA has determined that unavoidable adverse impacts will occur to historic resources at the Site. Alternative CF-4 would result in the disturbance of the location of the former Copperas Factories. Measures will be taken to protect historic resources, including potentially disposing of some of the contaminated soil at TP-1 and TP-2, to maintain the current topography of the site and minimize disturbance to historic resources. The exposed stone remnants of the buildings would be left intact, if possible. The removal and consolidation of lead-contaminated soil and restoration of the disturbed area may also impact some of the timber within Copperas Brook. The EPA will consult with the SHPO and the community regarding the loss of historic resources.

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	Action Taken to Comply with ARARs
Archeological and Historic Preservation Act, 16 USC 469 <i>et seq.</i> ; 36 CFR Part 65	Applicable	This standard requires that, whenever any federal agency finds or is made aware that its activity in connection with any construction project or federally licensed project, activity, or program may cause irreparable loss or destruction of significant scientific, pre-historical, historical, or archeological data such agency shall undertake the recovery, protection, and preservation of such data or notify the Secretary of the Interior. The undertaking could include a preliminary survey (or other investigation as needed) and analysis and publication of the reports resulting from such investigation.	A data recovery plan will be developed as part of the design for this alternative to document historic resources that will be disturbed. Data recovery would occur prior to excavation.
ACTION-SPECIFIC ARARs			
STATE ARARs			
Vermont Waste Management Act, 10 VSA Chapter 159, and Hazardous Waste Management Regulations, Env. Prot. R. Ch. 7	Relevant and Appropriate - Applicable to activities that handle hazardous waste	Establishes requirements for the identification and management of hazardous waste. These regulations apply to the soil contaminated with lead. Incorporates requirements of the federal Resource Conservation and Recovery Act regulations 40 CFR 264. Since the lead was released into the soil prior to 1900, the requirements are relevant and appropriate, rather than applicable, for waste left in place.	Lead has not been found in the groundwater or sediments near the Copperas Factories; therefore, only closure and post closure requirements that prevent direct human contact with the lead are relevant and appropriate. Long-term monitoring of the area to determine that the covered lead does not pose a future risk to human health or the environment is required. Alternative CF-4 would potentially consolidate the lead-impacted soil, that would be treated prior to disposal, within the AOC (TP-1 or TP-2) and not trigger treatment or land-disposal restrictions. Treatment will meet applicable standards under these regulations and treated soil will no longer be regulated as hazardous waste.
Vermont Stormwater Management Act, 10 VSA § 1263 and § 1264; Vermont Stormwater Management Rule, ENV. Prot. R. Ch. 18]	Applicable	Construction activities that create more than one acre of impervious surface, including roads, must implement measures to address the storm-water discharges from the impervious surfaces.	Alternative CF-4 would include measures to comply with these requirements through the design of measures to mitigate the release of stormwater from impervious surfaces.

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	Action Taken to Comply with ARARs
Vermont Water Pollution Control Act, 10 VSA Chapter 47; Vermont Water Quality Standards, Ch. 1, 2, and 3 and Appendix C and D; and Vermont National Pollutant Discharge Elimination System (NPDES) Regulations Ch. 13 (Nat. Res. Brd., Water Res. P. 12-004-052)	Applicable	Establishes water quality standards for surface waters and applies to alternatives that call for monitoring surface water bodies on and off of the site. The regulations stipulate requirements for discharges to surface waters, compliance with NPDES standards, and meeting stormwater management requirements.	The implementation would use best management practices (BMPs) to minimize the impacts of the cleanup, particularly on downstream surface water resources. Upon completion of the remedial action and NTCRA will result in compliance with water quality standards at the point of compliance.
Vermont Air Pollution Control Act, 10 VSA Chapter 23 and Air Pollution Control Regulations, Env. Prot. R. Ch. 5	Relevant and Appropriate	10 VSA Chapter 23 establishes authority for a coordinated statewide program of air pollution prevention, abatement and control. Chapter 5 of the EPR lists prohibited activities affecting air quality and establishes primary and secondary ambient air quality standards for sulfur oxides, particulate matter, carbon monoxide, ozone, nitrogen dioxide, and lead. The secondary standard for particulate matter is 150 micrograms per cubic meter, 24 hour average, not to be exceeded more than once per year.	The design for Alternative CF-4 would include requirements to comply with the particulate matter and sulfur oxide requirements, in particular, from excavating, treating, and disposing of contaminated soil at TP-1 or TP-2.
The Vermont Standards and Specifications for Erosion Prevention and Sediment Control 2006	To Be Considered	A compilation of information from various sources released by the Vermont Department of Environmental Conservation for use in developing the erosion prevention and sediment control plans required for construction-related stormwater discharge permitting.	The manual will be used as guidance in the development of the Erosion Prevention and Sediment Control Plan to comply with the federal and state stormwater and sediment regulations.
FEDERAL ARARs			
Clean Water Act – Stormwater Requirements for Construction Sites; 40 CFR 122.26	Applicable	Applicable to construction activity including clearing, grading and excavation, except operations that result in the disturbance of less than one acre of total land area.	Construction activities and long-term maintenance will use best management practices to comply with these requirements.

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	Action Taken to Comply with ARARs
Clean Water Act , Section 402, 33 USC 1342 and National Pollutant Discharge Elimination System regulations, 40 CFR Part 122 – 125, 131	Applicable	These regulations contain discharge limitations, monitoring requirements and best management practices for discharges into navigable waters, i.e., surface waters.	The implementation would use best management practices (BMPs) to minimize the impacts of the cleanup, particularly on downstream surface water resources. Upon completion of the remedial action and NTCRA will result in compliance with water quality standards at the point of compliance.
Resource, Conservation and Recovery Act, 42 USC §§ 6901-6992; 40 CFR Part 264	Relevant and Appropriate	Vermont is delegated to implement these standards through its Hazardous Waste Management Regulations (see above).	Lead has not been found in the groundwater or sediments near the Copperas Factories; therefore, only closure and post-closure requirements that prevent direct human contact with the lead are relevant and appropriate. Long-term monitoring of the area to determine that the covered lead does not pose a future risk to human health or the environment is required. Alternative CF-4 would potentially consolidate the lead-impacted soil, that would be treated prior to disposal, within the AOC (TP-1 or TP-2) and not trigger treatment or land-disposal restrictions. Treatment will meet applicable standards under these regulations and treated soil will no longer be regulated as hazardous waste.

ATTACHMENT C
MODIFIED ALTERNATIVE CF-2 ACTION SPECIFIC ARARS TABLES FOR SEPTEMBER 2008 ESD

REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	Action Taken to Comply with ARARs
<p>Vermont Hazardous Waste Management Act, 10 VSA Chapter 159, and Hazardous Waste Management Regulations, Env. Prot. R. Ch. 7</p> <p>(from CF-2 alternative in the ROD)</p>	<p>Relevant and Appropriate - Applicable to activities that handle and treat hazardous waste</p>	<p>Establishes requirements for the identification and management of hazardous waste. These regulations apply to the soil contaminated with lead exceeding characteristic hazardous waste standards. Incorporates requirements of the federal Resource Conservation and Recovery Act regulations 40 CFR 264.</p> <p>Since the lead was released into the soil prior to 1900, the requirements are relevant and appropriate rather than applicable for waste left in place. The contaminated soil will be managed within one Area of Contamination (AOC) that includes the Copperas Factories, TP-1 and TP-2.</p>	<p>Lead has not been found in the groundwater or sediments near the Copperas Factories, therefore only the requirements that would apply would be to prevent direct human contact with the lead. Any excavation and relocation of material to TP-1 or TP-2 would include stabilization of any lead-impacted soil that is consolidated and cover at TP-1 to allow the contaminated soil to pass the Toxicity Characteristic Leaching Procedure (TCLP) test. Therefore, the stabilized soils will no longer be hazardous waste under these standards.</p>
<p>Vermont Solid Waste Management Rules (VTSWMR), Env. Prot. R. Ch. 6</p> <p>(from CF-2 alternative in the ROD)</p>	<p>Relevant and Appropriate</p>	<p>The VTSWMR establishes the closure and post-closure performance standards that are relevant and appropriate to the remedial action. That is, all facilities subject to closure requirements must be closed in a manner that:</p> <ul style="list-style-type: none"> (a) Minimizes the need for further maintenance related to the waste facility; and (b) Controls, minimizes, or eliminates, to the extent necessary to prevent threats to public health and safety and the environment, including post-closure emission or discharge of waste, waste constituents, leachate, contaminated runoff, and/or waste decomposition products to the groundwater or surface waters or the atmosphere. <p>Since the lead was released into the soil prior to 1900, the requirements are relevant and appropriate rather than applicable for waste left in place. The contaminated soil will be managed within one Area of Contamination (AOC) that includes the Copperas Factories, TP-1 and TP-2.</p>	<p>The closure/post-closure requirements of VTSWMR, Chapters 13 and 10, would be relevant and appropriate to the capping of solid waste at the TP-1 and TP-2 areas. Stabilization prior to disposal will permit the treated lead contaminated soil to meet solid waste standards, prior to disposal in TP-1 or TP- 2.</p>

ATTACHMENT C
ARAR Tables

<p>Resource, Conservation and Recovery Act, 42 USC §§ 6901-6992; 40 CFR Part 264 (from CF-2 alternative the ROD)</p>	<p>Relevant and Appropriate</p>	<p>Vermont is delegated to implement these standards through its Hazardous Waste Management Regulations (see above).</p>	<p>Lead has not been found in the groundwater or sediments near the Copperas Factories, therefore only the requirements that would apply would be to prevent direct human contact with the lead. Stabilization of any lead-impacted soil that is consolidated and cover at TP-1 or TP-2 to allow the contaminated soil to pass the TCLP test and be regulated as solid waste, rather than hazardous waste, under these standards.</p>
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