Nobis
Engineering a Sustainable Future

EPA Region 1 RAC2 Contract No. EP-S1-06-03

July 19, 2011
Nobis Project No. 80024

Via Electronic Submittal

U.S. Environmental Protection Agency, Region 1
Attention: Mr. Ed Hathaway, Task Order Project Officer
5 Post Office Square, Suite 100
Boston, Massachusetts 02109-3919

Subject: Transmittal of the Final Remedial Investigation
Ely Copper Mine Superfund Site, Vershire, Vermont
Remedial Investigation / Feasibility Study
Task Order Number 0024-RI-CO-017L

Dear Mr. Hathaway:

Attached with this correspondence is the Final Remedial Investigation report for the Remedial Investigation / Feasibility Study at the Ely Copper Mine Superfund Site located in Vershire, Vermont.

Should you have any questions or comments, please contact me at (603) 724-6224, or by email at aboeckeler@nobisengineering.com.

Sincerely,

NOBIS ENGINEERING, INC.

Andrew J. Boeckeler, P.G.
Senior Project Manager

Enclosure

c: File 80024/NH

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Remedial Investigation

Ely Copper Mine Superfund Site
Vershire, Vermont

Remedial Investigation / Feasibility Study
EPA Task Order No. 0024-RI-CO-017L

REMEDIAL ACTION CONTRACT
No. EP-S1-06-03

FOR

US Environmental Protection Agency
Region 1

BY

Nobis Engineering, Inc.

Nobis Project No. 80024

July 2011

U.S. Environmental Protection Agency

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Nobis Project No. 80024

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Senior Project Manager

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ACRONYMS

ABA	Acid Base Accounting
ADL	Arthur D. Little, Inc.
AMD	Acid Mine Drainage
ARARs	Applicable or Relevant and Appropriate Requirements
ARD	Acid Rock Drainage
ATV	Acoustic Televiewer
AVS	Acid Volatile Sulfides
AWQC	Ambient Water Quality Criteria
BERA	Baseline Ecological Risk Assessment
Bgs	Below Ground Surface
CBRs	Critical Body Residues
CEC	Calculation Exchange Capacity
cfs	Cubic Feet per Second
CLP	Contract Laboratory Program
COCs	Contaminants of Concern
COPCs	Contaminants of Potential Concern
COPECS	Contaminants of Potential Ecological Concern
CRREL	U.S. Army Cold Regions Research and Engineering Laboratory
CSM	Conceptual Site Model
CTEs	Central Tendency Exposures
cy	Cubic Yards
DAS	Delivery of Analytical Services
DO	Dissolved Oxygen
DQO	Data Quality Objectives
EB-LR	Ely Brook – Lower Reach
EB-MR	Ely Brook – Middle Reach
EB-UR	Ely Brook – Upper Reach
EBOR	East Branch of the Ompompanoosuc River
EBT	Ely Brook Tributaries
EB-UR	Ely Brook – Upper Reach
EcoSSLs	Ecological Soil Screening Levels
EDD	Estimated Daily Dose

ACRONYMS (cont.)

EEQ	Ecological Effect Quotient
EF	Enrichment Features
ELCR	Excess Lifetime Cancer Risk
EPA	US Environmental Protection Agency
EPC	Exposure Point Concentration
EU	Exposure Units
FS	Feasibility Study
ft	Feet
gpm	gallons per minute
GW	Groundwater
HHRA	Human Health Risk Assessment
HI	Hazard Index
HPFM	Heat Pulse Flow Meter
HQ	Hazard Quotients
IEUBK	Integrated Exposure Uptake Biokinetic
ILCR	Incremental Lifetime Cancer Risks
IR	Incremental Risk
K	Hydraulic Conductivity
LWA	Lower Waste Area
MBs	Magnitude of Background Factors
MCL	Maximum Contaminant Level
mg/Kg	Milligrams per Kilogram
mi	Miles
mi^2	Square Miles
mmhos/cm	Milli-mhos per centimeter; unit for paste conductivity
NA	Not Available or Not Applicable
NCP	National Contingency Plan
NOBIS	Nobis Engineering, Inc.
NPL	National Priorities List
NRWQC	National Recommended Water Quality Criteria
OEME	Office of Environmental Measurement and Evaluation
ORB	Ore Roast Bed

ACRONYMS (cont.)

ORP	Oxidation Reduction Potential
OTV	Optical Televiewer
OU1	Operable Unit 1
PCBs	Poly-Chlorinated Biphenyls
PRGs	Preliminary Remediation Goals
QA/QC	Quality Assurance / Quality Control
RfDs	Reference Doses
RI	Remedial Investigation
RI/FS	Remedial Investigation / Feasibility Study
RMEs	Reasonable Maximum Exposures
ROD	Record of Decision
RQD	Rock Quality Determination
RSL	Regional Screening Level
SEM	Simultaneously Extracted Metals
SHB	Schoolhouse Brook
Site	Ely Mine Superfund Site
SLERA	Screening Level Environmental Risk Assessment
Solute	Simple 2 Dimensional Model for Solute Transport
SOW	Statement of Work
SP	Spontaneous Potential
SPLP	Synthetic Precipitation Leaching Procedure
SPR	Single Point Resistance
su	Standard Units
SVOCs	Semi-Volatile Organic Compounds
SW	Surface Water
SWPA	Surface Water Protection Act
TAL	Target Analyte List
Task Order	Task Order Number 0024-RI-CO-017L
T $CaCO_3$/1000t	Tons of calcium carbonate equivalent per 1000 tons of material
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TRVs	Toxicity Reference Valves

ACRONYMS (cont.)

TSS	Total Suspended Solids
UCL	Upper Confidence Limit
µg/dL	Micrograms per decaliter
µg/L	Micrograms per Liter
µm	Micrometer
µS/m	Micro Siemens per meter
URS	URS Corporation
U.S.	United States
USACE	US Army Corps of Engineers
USBOM	US Bureau of Mines
USDA	US Department of Agriculture
USGS	US Geological Survey
UWA	Upper Waste Area
VCMC	Vermont Copper Mining Company
VOCs	Volatile Organic Compounds
VTDEC	Vermont Department of Environmental Conservation
VTGWES	Vermont Groundwater Enforcement Standards
VTWQS	Vermont Water Quality Standards
WBOR	West Branch Ompompanoosuc River
WOE	Weight-of-Evidence
XRF	X-ray Fluorescence

ES EXECUTIVE SUMMARY

This Operable Unit 1 (OU1) Remedial Investigation (RI) Report documents the nature and extent of contamination for the Ely Mine Superfund Site located in Vershire, Vermont (hereafter referred to as the "Site"). See Figure ES-1 for the location of the Ely Mine. This RI Report was prepared by Nobis Engineering, Inc. (Nobis) for the United States Environmental Protection Agency (EPA) under Contract Number EP-S1-06-03, Task Order Number 0024-RI-CO-017L (Task Order). The work was performed in accordance with the September 27, 2007 EPA Statement of Work (SOW) and the Work Plan Amendment No. 4 dated July 28, 2010.

EPA creates operable units to allow areas of the Site that are ready for a cleanup action to move forward while allowing additional investigation of other areas. For the Ely Mine, the following operable units have been created:

- OU1 will include the waste rock, tailing, and roast beds along with the surface water, soil, and sediment for all areas of the Ely Brook Valley except the Smelter and Slag Areas and any underground shaft and adits. The OU1 areas are shown in Figure ES-2.

- Operable Unit 2 (OU2) includes all Site groundwater impacts, source zones related to the underground shafts and adits, soil and sediment impacts related to the Smoke Flue, Smelter, and Slag Areas, surface water and sediment impacts in SHB and the EBOR. The OU2 areas are shown in Figure ES-2.

The RI will present the information available for both OU1 and OU2. A supplemental RI will be performed to gather and present the additional data and information that is required to complete the OU2 RI.

The purpose of the RI is to: (1) determine the nature and extent of contamination in soil, sediment, groundwater, air, and surface water, both on the Site and in the surrounding areas, (2) evaluate the fate and transport of contaminants, and (3) assess human health and ecological risks. Overall, the RI has determined that contamination is largely the result of the activities associated with the extraction and processing of ore, along with the on-site disposal of waste rock and tailings. The ore extraction, processing, and waste disposal activities left behind tailings, waste rock and slag that have spread the constituents of the ore (particularly cobalt,

copper, and iron) over a large area, making them more accessible to human and ecological receptors than they were prior to mining activities. The ongoing migration of contaminants from the waste rock and tailings has caused the presence of contaminants in soil, sediment, surface water, and groundwater at concentrations that are above levels observed in background study areas, and at levels that could pose a threat to public health and the environment. A Site Sketch is shown in Figure ES-3, and Site study areas with demonstrated contaminant impacts are shown in Figure ES-4.

The RI, including the Human Health and Ecological Risk Assessments, also concluded the following:

- The leaching of metals from the waste rock and tailings is causing severe ecological impacts to the amphibians, benthic invertebrates, and fish in Ponds 4 and 5, Vernal Pool 1 (VP-1), Ely Brook, five tributaries of Ely Brook, and Schoolhouse Brook (SHB). The areas with severe ecological impacts associated with surface water within the Ely Brook Valley are shown on Figure ES-5. The areas with severe ecological impacts associated with surface water within SHB are shown on Figure ES-6.

- The sediments within Ponds 4 and 5, Ely Brook, five tributaries of Ely Brook, and within several depositional areas in SHB are also contributing to the severe ecological impacts observed at the Site. The areas with severe ecological impacts associated with sediments within the Ely Brook Valley are shown on Figure ES-5. The areas with severe ecological impacts associated with sediments within SHB are shown on Figure ES-6.

- Human contact with the surface water and sediments of the Ponds, Ely Brook, and SHB does not represent a threat to human health.

- Human contact with the mine waste and soil contaminated with cobalt, copper, and iron represents a potential health threat to people that may come into contact with these materials for 350 days per year. A potential threat would also exist for a construction worker or someone causing substantial disturbance of the mine waste and subsequently inhaling mine-contaminated particulate matter more than 60 days per year. The area where cobalt, copper, and iron concentrations in soil exceed the site-specific preliminary remediation goals (PRGs) is shown on Figure ES-7.

- Groundwater beneath and adjacent to the waste rock piles, tailings, and Slag Pile and Smelter Areas is contaminated and is not suitable for human consumption. The area where groundwater is contaminated above federal and state standards is shown on Figure ES-8.

- Limited recreational use of the Site does not represent a threat to human health.

SITE DESCRIPTION AND HISTORY

The Site is an abandoned copper mine located in Vershire, Orange County, Vermont. The Site encompasses approximately 350 acres along the south slope of Dwight Hill, to the north of SHB and South Vershire Road. The Site includes features such as waste rock and mine process waste piles, intact and collapsed adits and shafts, remnant foundations of former mine operation buildings, a 1,500-foot-long smoke flue, and over 3,000 linear feet (ft) of underground workings. Waste areas include former ore roast beds, waste rock piles, a tailings pile, a former smelter area, and a slag pile, all located within the watershed of Ely Brook (Figure ES-4). Ely Brook joins SHB at the southern margin of the Site. SHB flows eastward approximately 1.75 miles (mi) to its confluence with the East Branch of the Ompompanoosuc River (EBOR). A major eastern tributary to Ely Brook, Ely Brook Tributary 2 (EBT2), drains from a former reservoir and a series of ponds located east of the mine waste areas.

The Site lies within the Devonian Gile Mountain Formation, in which the primary ore minerals include pyrrhotite, chalcopyrite with minor sphalerite and pyrite (Slack, et al., 2001). The Site was added to the Superfund listing in September 2001 due to environmental impacts from acid rock drainage (ARD) on Ely Brook and SHB. The Site is also eligible for the National Register of Historic Places due to its historical aspects (Hathaway, et al., 2001).

The Ely Copper Mine is one of three major historic copper mines located within Besshi-type ore deposits that comprise the Vermont Copper Belt including the Elizabeth, Ely, and Pike Hill Mines within a 20 mi long area from south to north in the belt. The ore body was discovered in 1813 with significant mining activities beginning in 1853 by the Vermont Copper Mining Company (VCMC) and lasting until 1905 (PAL, 2005). Ore roasting at the ORB began concurrently with the initial construction of the smelter in 1867 to reduce the sulfur content of the

ore prior to smelting. Mine operations experienced a boom between 1872 and 1880, a period during which Ely Village expanded and the Town of Vershire grew to a population of about 1,900 in contrast to today's population of about 630 people. By 1876, sulfur fumes from the roast beds and smelter had eliminated the vegetation in the valley. A stone slab flue approximately ¼ mi long was built from the smelter up the eastern side of the valley with the intention of reducing fumes in the valley, but the flue reportedly never functioned effectively. By 1879 the smelter building was expanded to 24 furnaces and a length of 700 ft to accommodate ore from the Pike Hill Mines. During this time, the smelter slag pile was expanding south of the building toward SHB. Between 1883 and the close of the mine in 1905, ownership changed hands several times and production was sporadic. An attempt to rejuvenate copper production in 1900 was unsuccessful due to both the lack of ore at the 3,500-ft downdip limit of the mine and low copper prices. In 1905, equipment was stripped from the Site and buildings were sold, moved, or demolished. In 1917, a flotation mill was constructed in an attempt to recover copper from the mine dumps. The flotation mill operated for only a short period until the end of World War I, at which time the price of copper fell, closing the operation. In 1949-50, attempts were made to recover copper from the mine waste piles and 60,000 tons of waste rock/ore assayed at about 1% copper were transported to the Elizabeth Mine for processing. Since 1950, the Site has been used for timber management and recreational activities, including hunting, snowmobile riding, and horseback riding. The Site is often visited by those interested in the remnants of the mining activities or the Site geology. ATV tracks are observed on several of the waste piles.

SITE INVESTIGATIONS

Since 1998, a considerable amount of data has been generated as the result of various investigation programs conducted at the Site. EPA has retained the U.S. Army Corps of Engineers (USACE), the U.S. Geological Survey (USGS), URS Corporation (URS), and Nobis to perform work at the Site. Additional information has been contributed from studies performed by the State of Vermont. In 2002, the USACE, in cooperation with the USGS, completed a study of spring runoff from the Site to characterize the geochemical diversity of water sources in the Ely Brook Watershed, which included sampling from seeps in mine waste areas, Ely Brook and tributaries, SHB, and the EBOR. This study documented highly acidic and highly metal-laden runoff from the mine areas (Holmes, et al., 2002). Between 1998 and 2007, the USGS conducted sampling surveys and completed a series of studies at the Site, which included

sampling and analysis of the various solid mine waste materials and sediment to characterize the materials, assess their acid-generating potential, and assess their potential for leaching metals (Piatak, et al., 2004a; 2004b; 2007).

From 2005 through 2008, URS, in conjunction with the USACE and EPA, completed extensive field studies, including a habitat characterization study of the Site (URS, 2005; 2008). Field investigations included test pits, borings, monitoring well installations, and the collection of surface water and sediment (over 30 locations), surface and subsurface soil (over 150 locations), and groundwater samples (approximately 30 wells) from the Site (URS, 2008). URS evaluated surface and subsurface soil samples from waste areas and transition zones around waste areas, including off-site background soil metals concentrations. These data have been incorporated directly into the Remedial Investigation/Feasibility Study (RI/FS) analytical database for the Site.

In 2007, the Vermont Department of Environmental Conservation (VTDEC) completed an aquatic life use attainment assessment of Ely Brook, SHB, and the EBOR. The assessment included the evaluation of fish and macroinvertebrate community data, which indicated impairment for portions of SHB and Ely Brook likely related to runoff from the Site (VTDEC, 2007). In 2006 and 2007, the USGS, in conjunction with EPA, conducted a detailed characterization of surface water, sediment, porewater, and fish and macroinvertebrate communities in Ely Brook, SHB, and the EBOR in support of the Aquatic Baseline Ecological Risk Assessment for the Site (Aquatic BERA; Techlaw, 2008; Seal, et al., 2010). These studies included toxicity tests of surface water, sediment and porewater form each surface water reach.

In 2009, Nobis completed extensive supplemental field investigations to complete the RI. Investigations included sampling of surface/subsurface soil (over 80 samples), groundwater (2 rounds from over 40 wells), surface water (2 rounds over 30 locations, including 4 vernal pools), porewater (7 locations), sediment (16 locations) and small mammal and invertebrate biota sampling along 12 transects. Residential drinking water samples were also collected from 6 locations near the Site. Overburden, shallow, and deep bedrock well installations were completed, along with packer testing and borehole geophysical characterization of the deep bedrock at the Site (Nobis, 2010). Soil sampling included on-site laboratory X-ray fluorescence (XRF) analysis of over 340 soil samples from an extensive network of 26 sample transects. Sediment sampling of the Lower Reach of Ely Brook included detailed evaluation of three

sediment transects to assess the vertical distribution of waste rock sediment in the brook. Investigations included the collection of soil and sediment samples for geotechnical analyses to document the physical characteristics of waste materials and support the feasibility study evaluation of remedial options. Biota sampling to support the terrestrial BERA included 8 composite samples of invertebrates and 107 small mammals from 5 transects in select transition zone areas.

CONTAMINANT SOURCE AREAS

Waste material from over 100 years of mining activities can be found across the entire Site, from the mine entrances high on Dwight Hill to SHB. The major issue at the Ely Mine is ARD, which occurs when sulfide mineral-bearing rock and ore are exposed to oxidizing conditions through natural weathering processes. At the Site, ARD occurs in response to the oxidation of waste rock, waste ore, tailings, slag, and roasted ore. The contaminated water that flows from the underground adits and shafts is more commonly referred to as Acid Mine Drainage (AMD), which occurs when sulfide mineral-bearing rock and ore are exposed to oxygen and water, thereby creating a low-pH leachate (contaminated water percolating through the impacted soil and infiltrating the groundwater). At low pH, many of the metals that were bound in the ore and native soil become soluble and dissolve into the leachate. The leachate from the Site often contains elevated levels of aluminum, cadmium, cobalt, copper, iron, manganese, and zinc that are likely from the locally mined ore. Aluminum and manganese are also contributed by the leaching of metals in the native soil. In addition to the oxidation of the sulfide-bearing minerals, the cyclic formation and subsequent dissolution of evaporative metal salts on exposed waste ore and tailings also contributes to ARD at the Site. Metal salts form on the surfaces of the tailings and waste ore as metal-containing acidic moisture evaporates. The metals stored in these salts are dissolved and remobilized during subsequent rainfall events. This run-off is eventually conveyed to receiving streams, resulting in an increase in the waterway's metals concentration and load.

Metals associated with ARD at the Site have been detected at elevated concentrations in groundwater, surface water, soil, and sediment. ARD directly affects both groundwater and surface water quality at the Site by lowering the pH and contributing elevated concentrations of metals to these media. This also occurs at the outlet of the adits, where impacted mine waters discharge directly to the ground surface as AMD. In addition, the tailings, weathered waste ore,

roasted ore, and byproducts generated from the smelting process (i.e., slag) have been transported from the original areas of deposition by erosion and re-distributed nearby, causing elevated concentrations of metals in the soil adjacent to the waste areas. Some of these materials have been conveyed by overland flow, resulting in elevated concentrations of metals in sediment along these Site drainage ways, including: Ely Brook, four tributaries to Ely Brook, SHB, and the Ompompanoosuc River.

The RI divided the Site into several sub-areas that may be contributing contamination to the surface water, groundwater, or sediment. The sub-areas (shown in Figure ES-4) that fall within OU1 are the: Upper Waste Area (UWA); Lower Waste Area (LWA); Tailings Area; and Ore Roast Bed (ORB). The sub-areas within OU2 are the Smelter Area, the Smoke Flue, and the Slag Pile Area. In addition, due to the significant volume of mine waste present in the sediment of Ely Brook (Lower and Middle Reaches), this area is also considered a potential waste source. Evaluation of results from each of these areas has led to the following findings.

Operable Unit 1 Source Areas

UWA – The UWA covers an area of approximately 8.5 acres and is comprised of a series of terraced, overlapping mine waste rock piles of varying thickness in the upper portion of the Ely Brook Valley on the south side of Dwight Hill. The UWA sits just downslope of the Main Shaft for the underground workings. A series of 6 shafts and 2 adits are found within and adjacent to the UWA and a series of ponds (Pond 1 through Pond 5) define the downslope extent of the UWA. Figure ES-4 shows the UWA.

The UWA waste piles are up to 22 ft thick. Native soil underlies portions of the UWA, but some of the waste sits directly on bedrock. The primary limits of the UWA were defined by the physical presence of mine waste. This delineation generally coincides with areas where cobalt, copper, and iron exceed soil PRGs and contains about 73,000 cubic yards (cy) of mine waste. Groundwater extends into the lower portion of the piles, particularly during spring snowmelt and after periods of substantial rain. Water coming into contact with the mine waste creates an acidic leachate containing high levels of contamination that drains from the UWA into groundwater and several tributaries of Ely Brook (EBT2, EBT3, and EBT4). Average surface soil copper concentrations in the UWA are over 2.7 times greater than PRGs and 39 times greater than background maximums.

LWA – The LWA occupies approximately 6.4 acres of bare waste rock in the central portion of the Site, below the UWA and the foundation of the Former Flotation Mill, and between the ORB and Ely Brook. Figure ES-4 shows the LWA.

There are no distinct piles in the LWA. The waste material is relatively thin, typically on the order of 5 ft thick, in contrast to the thicker waste piles in the UWA. A relatively thin layer of native soil with variable thickness underlies the LWA. It is possible that some of the waste sits directly on or in close proximity to bedrock. The primary limits of the LWA were defined by the physical presence of mine waste. This delineation generally coincides with areas where cobalt, copper, and iron exceed soil PRGs and contains an estimated 29,000 cy of waste rock. Two major Site surface water features, the Ely Brook Tributaries 2 and 3 (EBT2 and EBT3), dissect and drain portions of the LWA. EBT3 merges into EBT2 prior to Ely Brook and the combined flow represents one of the most significant tributaries to Ely Brook. Groundwater extends well into the waste within the LWA. Water coming into contact with the mine waste creates an acidic leachate containing high levels of contamination that drains from the LWA into groundwater and several tributaries of Ely Brook (EBT2, EBT3, and EBT5). These tributaries run across the waste within the LWA. Average surface soil copper concentrations in the LWA are over 2.9 times greater than PRGs and 40 times greater than background maximums.

Tailings Area – The Tailings Area is located within the northwest portion of the LWA and encompasses approximately 0.7 acres. The tailings waste is a remnant of the operation of the Former Flotation Mill and are a fairly uniform fine sand/silt material produced from mined ore. There is no well defined tailing pile, but EBT3 has cut a channel that exposes this waste. A relatively continuous layer of glacial till approximately 10 ft thick is interpreted to underlie the Tailings Area, which may limit impact to groundwater beneath the tailings pile. Figure ES-4 shows the Tailings Area.

The primary limits of the Tailings Area were defined by the physical presence of tailings and contain about 3,600 cy of mine waste. Similar to the LWA, the Tailings Area is saturated with groundwater and portions of this waste source material form the watershed of EBT3. Water coming into contact with the tailings creates an acidic leachate containing high levels of contamination that drains from the Tailings Area into groundwater and EBT3. Average surface

soil copper concentrations in the Tailings Area are over 1.5 times greater than PRGs and 20 times greater than background maximums.

ORB – The ORB is located abutting the eastern margin of the access road, southeast of the LWA and covers a 2.2 acre area that is approximately 900 ft long and 200 ft wide. The ORB was the primary location for the roasting of ore excavated from the Ely Mine. Figure ES-4 shows the ORB.

The ORB waste is about 8 ft thick and contains approximately 10,330 cy of roasted ore. The western limit of the ORB is demarked by a high stone slab retaining wall. The sparsely vegetated ORB soils are distinguishable from soils in the adjacent LWA by the deep red color of the hematite-rich soil. A small tributary to Ely Brook, EBT1, crosses the roast beds and the access road at a location where the retaining wall has collapsed. An abandoned exploratory shaft is located along the northeast margin of the ORB. The roasted ore in this area still contains significant levels of metals, but the waste material does not produce acidic leachate and appears to be a much less significant source of contamination than the UWA, LWA, and Tailings Area. Average surface soil copper concentrations in the ORB are over 1.2 times greater than PRGs and 17 times greater than background maximums.

Ely Brook Lower and Middle Reaches – Ely Brook Lower Reach (EB-LR) and Middle Reach (EB-MR) contain significant accumulations of waste rock alluvium that has eroded from the UWA, LWA, and Tailings Area. The waste is up to 3.5 ft thick within the stream channel and portions of the floodplain. The estimated volume of waste material within the banks of EB-MR is 580 cy, encompassing an area of <0.5 acres. The estimated volume of waste material in EB-LR is 3,950 cy, encompassing an area of 2.5 acres. The waste rock alluvium within Ely Brook contains concentrations of cobalt, copper, and iron in exceedance of the PRGs and may be a contributing source to the surface water impacts. Figure ES-4 shows Ely Brook Lower and Middle Reaches.

Operable Unit 2 Source Areas

Smelter Area – The Smelter Area is located along the north Side of South Vershire Road and is flat with a vegetated area at the northwest portion, a barren waste rock area in the central portion, and an area of small waste rock and debris piles along the southwest margin. The

northern limit of the area is marked by a stone slab retaining wall and steep slope leading up to an access road. Several partially-buried stone-slab smelter bases are located along the central portion of the area marking the former location of the smelter building, which extended to the southeast beneath the existing road location. Figure ES-4 shows the Smelter Area.

Waste materials in the Smelter Area include waste rock, oxidized ore, slag, and building demolition debris estimated to range from 2 to 16 ft thick, with an estimated volume of 31,120 cy over an area of 3.8 acres. Similar to the UWA and LWA, the soil within the Smelter Area contains high levels of cobalt, copper, and iron. It is estimated that approximately half the thickness of waste material in the Smelter Area is groundwater-saturated. Groundwater results from downgradient wells in the Slag Pile Area show shallow overburden groundwater to be significantly impacted, which is likely in part due to the wastes beneath the Smelter Area. Average surface soil copper concentrations in the Smelter Area are over 2.4 times greater than PRGs and 33 times greater than background maximums.

Smoke Flue – The Smoke Flue is a unique feature of the Site, designed to convey sulfurous fumes away from the valley. It extends approximately 1500 ft northeast to the top of the adjacent hillside and is constructed of two parallel stone walls topped by flat schist slabs. There are no known significant quantities of waste material associated with the Smoke Flue. Based on its intended use, soils in the vicinity of the flue were sampled to determine if they were impacted by smelter exhausts. While levels of several metals were detected at concentrations above background levels, the smoke flue is not considered an area of significant contamination. The smoke flue is not believed to represent a threat to groundwater or surface water.

Slag Pile Area – The Slag Pile Area lies beneath South Vershire Road and extends south, where a south-facing exposure of the slag (approximately 10 ft high) reveals the glassy, slag material with slag pot impressions set back a short distance from SHB. The Slag Pile Area has an estimated volume of 25,000 cy of slag spread over an area of 4.2 acres and is up to 16 ft thick. The limit of slag on the north of South Vershire Road is not known and the slag is intermixed with the waste within the Smelter Area. Observations of slag material in the streambed and freshly exposed slag material along the southeastern most portion of the area (where the slag pile forms a portion of the stream bank) indicate that the slag is eroding into SHB. Testing performed by the USGS indicates that the slag has the potential to impact groundwater and surface water. Figure ES-4 shows the Slag Pile Area. Average surface soil

copper concentrations in the Slag Pile Area are over 4.3 times greater than PRGs and 60 times greater than background maximums.

SURFACE WATER AND SEDIMENT

Sampling of surface water between 2000 and 2009 has documented the extent of ARD impacts to Ely Brook (including its tributaries and Ponds), SHB, and the EBOR. Results are discussed in the sections below.

Ely Brook – Ely Brook is a first order stream and the primary drainage pathway from the Site. Its watershed encompasses approximately 0.42 square miles (mi^2) with the highest elevation above 1,350 ft, dropping over 380 ft from the headwater to its confluence with SHB at an elevation of 970 ft. The brook flows approximately 1 mi from its headwaters along the southern slope of Dwight Hill to the confluence with SHB (URS, 2008 and Seal, et al., 2010). As a result of the relatively steep topography in the Ely Brook Valley, flow in the brook and tributaries is very flashy and highly dependent on rainfall and snow melt events. Previous studies by Holmes, et al., (2002) and URS (2008) have shown the extreme flows resulting from spring runoff events and rain events. Typically, brook discharge recovers very quickly to base flow conditions.

Ely Brook is fed on the east by three significant tributary streams referred to as the EBT1, EBT2, and EBT4, as shown on Figure ES-4. Three tributaries, EBT1, EBT2, and EBT4, divide Ely Brook into three reaches referred to as the Upper, Middle, and Lower reaches. EBT3 merges with EBT2 and becomes EBT2 prior to reaching Ely Brook.

Ely Brook Headwaters – The Ely Brook Headwaters begin at the headwaters of Ely Brook and extends 1,800 ft in length to the confluence with tributary EBT4. This reach is characterized by a steep gradient with little sediment deposition and essentially no impact from Site sources. The biological assessment of the Upper Reach indicated good ecological health, suggesting that Ely Brook does have the potential to support aquatic life if mine-related impacts are abated. Surface water quality was generally good, with only a few instances of concentrations above water quality standards and those were found in unfiltered samples that may have contained particulate matter. Sediment and surface water concentrations in Ely Brook Headwaters were above background but below levels considered to be harmful to aquatic life.

Ely Brook Upper Reach – Ely Brook Upper Reach (EB-UR) begins at the confluence with tributary EBT4 and extends about 1,700 ft to the confluence with tributary EBT2. This reach has a moderate gradient and relatively low sediment deposition. The biological assessment of the Middle Reach indicated a severely impacted ecological community. The benthic community failed Vermont criteria for biological integrity. The benthic community contains 98% fewer organisms and suffered a 75% reduction in diversity as a result of the contamination from tributary EBT4. Testing of the sediments in the Upper Reach confirmed that they were toxic to aquatic life. Average Upper Reach surface water copper concentrations are 33 times greater than PRGs and 236 times greater than background maximum concentrations. Aluminum was also detected above PRGs in more than 20% of Upper Reach surface water samples. Average Upper Reach sediment copper concentrations are 9 times greater than PRGs and 27 times greater than background maximum concentrations.

EB-MR – The EB-MR begins at the confluence with tributary EBT2 and extends about 660 ft to the confluence with the southernmost Ely Brook Tributary, EBT1. This reach has a moderate gradient and relatively low sediment deposition below the confluence with EBT2. Average Middle Reach surface water copper concentrations are 143 times greater than PRGs and 1,024 times greater than background maximum concentrations. Aluminum, cadmium, copper, iron, and zinc were also detected above PRGs in more than 20% of Middle Reach surface water samples. Average Middle Reach sediment copper concentrations are 23 times greater than PRGs and 69 times greater than background maximum concentrations.

EB-LR – The EB-LR begins at the confluence with tributary EBT1 and extends about 1,200 ft to the confluence with SHB. This reach has a relatively low gradient, with significant sediment depositional areas, including waste rock, and a significantly broader floodplain area than the upper reaches. The Lower Reach floodplain area is broad in a portion of the stream that has low banks and a poorly-defined channel, resulting in a somewhat braided character to the stream. Along the lowermost section of the Lower Reach, which flows along the western margin of the Smelter Area, the channel is partially bermed on the eastern bank, in part with slag waste, as far down as South Vershire Road. This biological assessment of the Lower Reach also indicated a severely impacted ecological community and failed Vermont criteria for biological integrity. Similar to the Middle Reach, the Lower Reach contains 98% fewer organisms and suffered a 90% reduction in diversity as a result of the combined contamination from the Middle

Reach and tributary EBT2. Average Lower Reach surface water copper concentrations are 271 times greater than PRGs and 1,943 times greater than background maximum concentrations. Aluminum, cadmium, copper, iron, and zinc were also detected above PRGs in more than 20% of Lower Reach surface water samples. Average Lower Reach sediment copper concentrations are 15 times greater than PRGs and 45 times greater than background maximum concentrations.

Ely Brook Tributaries – Ely Brook is fed from the east by three significant tributary streams, EBT1, EBT2 (which also includes EBT3, EBT5, and the outflow from Ponds 1 through 5), and EBT4, as shown on Figure ES-4. Surface water metal concentrations in Ely Brook increase at each tributary confluence. The most significant increase in metal concentrations occurs at EBT2, with aluminum and iron increasing by a factor of 15, copper increasing by a factor of 6, and zinc increasing by a factor of 9.

EBT1 shows metal concentrations only slightly above criteria along the downstream margin of the ORB, with concentrations farther downstream at two orders of magnitude higher than above the access road. As a result of the disparity between concentrations at these two parts of EBT1, the high metal concentrations downstream are attributable to waste rock used along the roadbed. Average EBT1 surface water copper concentrations are 90 times greater than PRGs and 646 times greater than background maximum concentrations. Aluminum, cadmium, copper, iron, and zinc were also detected above PRGs in more than 20% of EBT1 surface water samples. Average EBT1 sediment copper concentrations are 10 times greater than PRGs and 29 times greater than background maximum concentrations.

Tributary EBT2, which includes EBT3, carries the majority of the metal and sulfate load from the waste pile areas to Ely Brook. ARD/AMD-impacted discharge from the Lower Adit and groundwater discharge along the eastern margin of Ponds 4 and 5 contribute to significant metals and sulfate loading of surface water in Pond 5 and to a lesser extent, Pond 4, both of which also drain to EBT2. Average EBT2 surface water copper concentrations are 423 times greater than PRGs and 3,032 times greater than background maximum concentrations. Aluminum, cadmium, chromium, copper, iron, nickel, and zinc were also detected above PRGs in more than 20% of EBT2 surface water samples. Average EBT2 sediment copper concentrations are 11 times greater than PRGs and 33 times greater than background maximum concentrations.

EBT3 emanates from the western portion of the UWA and merges with EBT2 prior to discharging to Ely Brook. Average EBT3 surface water copper concentrations are 880 times greater than PRGs and 6,304 times greater than background maximum concentrations. Aluminum, cadmium, chromium, copper, iron, nickel, and zinc were also detected above PRGs in more than 20% of EBT3 surface water samples. Average EBT3 sediment copper concentrations are 13 times greater than PRGs and 37 times greater than background maximum concentrations.

EBT4 receives water draining from Shaft No.4 and a seep at the base of the UWA. Average EBT4 surface water copper concentrations are 334 times greater than PRGs and 2,394 times greater than background maximum concentrations. Aluminum, cadmium, copper, mercury, and zinc were also detected above PRGs in more than 20% of EBT4 surface water samples. Average EBT4 sediment copper concentrations are 9 times greater than PRGs and 25 times greater than background maximum concentrations.

An estimate of the relative contribution of contamination from the tributaries was performed as part of the RI. EBT2 contributes about 92% of the load to Ely Brook, of which about 40% is attributed to the contribution from EBT3, which flows into EBT2 prior to joining Ely Brook. Meanwhile, EBT4 contributes less than 8% of the copper load to Ely Brook. Downstream of the EBT2 confluence, surface water metals concentrations are relatively stable to the confluence with SHB. This indicates that fluctuations in the copper load due to surface water mixing reactions, sorption, and dissolution from stream sediment, or groundwater discharge appear to be minor relative to these upstream tributaries. Sediment copper concentrations in EBT2, EBT3, EBT4, and Ponds 4 and 5 are above the PRG.

SHB – SHB originates south of Vershire Center and has a drainage area encompassing 9.7 mi^2. SHB drops approximately 886 ft from its headwaters to its confluence with the Ompompanoosuc River. Ely Brook joins SHB at the base of the Ely Brook valley, along the south side of South Vershire Road. Below the confluence, SHB forms the southern margin of the Site adjacent to the Slag Pile Area and flows an additional 1.75 mi before its confluence with the Ompompanoosuc River (Seal, et al., 2010). Stream reaches were described by USGS (2010) by flow characteristics and stream bottom composition within a majority of the stream.

Although SHB provides substantial dilution to the flow from Ely Brook, the entire reach of SHB from Ely Brook to the Ompompanoosuc failed Vermont criteria for biological integrity for both benthic organisms and fish. The biological assessment of SHB indicated a severely impacted ecological community. The stream segment directly below the confluence with Ely Brook contains 98% fewer organisms and also suffered a 75% reduction in diversity as a result of the contamination from the Ely Brook. While the biological quality remains poor for the entire reach to the Ompompanoosuc River, SHB does show some signs of recovery with the diversity at 50% of the level measured upstream of Ely Brook at the location just upstream of the confluence with the Ompompanoosuc River. Surface water concentrations of copper are substantially lower in SHB as compared to Ely Brook, but remain over 10 times greater than the water quality standards in the reach just below Ely Mine and remain 2-3 times the water quality standards just prior to the Ompompanoosuc River.

SHB Lower Reach has been defined to include sampling stations located from the EBOR confluence to a distance approximately 2,860 meters upstream. Average SHB Lower Reach surface water copper concentrations are 5.5 times greater than PRGs and 9.4 times greater than background maximum concentrations. No other metals were detected above PRGs in more than 20% of SHB Lower Reach surface water samples. Average SHB Lower Reach sediment copper concentrations are 1.6 times greater than PRGs and 9.9 times greater than background maximum concentrations.

SHB Upper Reach has been defined to include sampling stations located between 2,860 meters (measured from the EBOR confluence) and the Ely Brook confluence (at approximately 3,260 meters). Average SHB Upper Reach surface water copper concentrations are 16 times greater than PRGs and 27 times greater than background maximum concentrations. Aluminum was also detected above PRGs in more than 20% of SHB Upper Reach surface water samples. Average SHB Upper Reach sediment copper concentrations are 2.3 times greater than PRGs and 14 times greater than background maximum concentrations.

EBOR – The EBOR is one of two branches that meet to form the 23-mi long Ompompanoosuc River system whose drainage area encompasses 136 square miles (mi^2). The EBOR headwaters are located in the northwest corner of Vershire; the river then flows east and south into Thetford. The confluence of the EBOR and West Branch of the Ompompanoosuc River (WBOR) is just upstream of the Union Village Dam in Thetford, below which a USGS gauging

station is maintained. The Ompompanoosuc River then flows southeast to its confluence with the Connecticut River in Norwich, Vermont.

The substantial dilution that occurs when SHB flows into the Ompompanoosuc River appears to allow the biological communities to withstand the contaminant load from the Site. However, a decrease in the abundance and diversity in the biological communities is still observed after this point and the surface water still occasionally contains copper levels above water quality criteria. Overall, the biological quality remains good and the Ompompanoosuc meets Vermont biological criteria.

Average EBOR surface water copper concentrations are 2.4 times greater than PRGs and 4.2 times greater than background maximum concentrations. Aluminum was also detected above PRGs in more than 20% of EBOR surface water samples. Average EBOR sediment copper concentrations are 0.7 times greater than PRGs and 5.7 times greater than background maximum concentrations.

Vernal Pools – The surface water quality in four vernal pools was sampled during the RI program. Three of the vernal pools, designated VP-2, VP-3, and VP-4 are not impacted by Site contamination. The fourth, VP-1, was found to contain site-related contamination, particularly copper and iron at concentrations that present a threat to the health of aquatic organisms (amphibians) that use the vernal pool.

GROUNDWATER

ARD from the waste piles, tailings, and slag has mixed with the overburden groundwater in areas beneath and adjacent to the UWA, LWA, and Tailings Area source areas. The ORB does not appear to be impacting groundwater. The overall result is an area of groundwater that contains metals at levels exceeding federal and state criteria for groundwater and drinking water. Impacted shallow groundwater is generally confined to the area directly underlying or closely downgradient of UWA, LWA, and Smelter and Slag Pile Area footprints. Figure ES-8 shows the extent of the overburden and bedrock groundwater contamination. Aluminum, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, and zinc are the COCs in Site groundwater. Because the predominant flow path for water is towards Ely Book and SHB, only a limited area of contamination was found in the bedrock within the Ely

Brook Valley. The exception is the underground mine features, including the shafts and adits, which are likely contaminated. The contaminated groundwater from the UWA, LWA, and Tailings Area discharges to Ely Brook and contributes to the ecological impacts in the brook. The groundwater from the UWA and underground workings may also be a source of contamination to Ponds 4 and 5. In the Smelter Area and Slag Pile Area, groundwater within and immediately below the waste material and slag is impacted. Site groundwater impacts will be evaluated as part of the OU2 RI.

RESIDENTIAL DRINKING WATER

Groundwater samples collected from drinking water sources in the vicinity of the Site did not detect metals or geochemical parameter concentrations indicative of a potential impact from the Site.

HUMAN HEALTH RISK ASSESSMENT (HHRA) SUMMARY

Nobis prepared the HHRA of the Site for the USEPA (Nobis, 2011b). The HHRA presents a description of the risk assessment methods employed for the Site, as well as a summary of the results. The objective of the HHRA was to estimate potential current and future human health risks from the presence of contamination in the soil, groundwater, sediment, and surface water. The HHRA quantitatively evaluates non-cancer health hazards, cancer risks, and lead exposures.

Data from soil, sediment, groundwater, surface water, and fish tissue were evaluated to identify maximum analyte concentrations for comparison to screening level benchmarks to determine human health contaminants of potential concern (COPCs). With regard to soil, the entire Site was combined as a single exposure area because the potential for exposure and contaminant distribution patterns do not indicate any unique areas of potential exposure. For surface water, three exposure areas were considered: the on-site tributaries/Ponds/Ely Brook, SHB below the Ely Brook confluence and the EBOR below the SHB confluence. Potential risk from groundwater was evaluated for individual flow units, including, overburden, shallow bedrock, and deep bedrock. Off-site groundwater was evaluated separately using residential well sample results. Fish tissue data were used to assess potential risk in SHB and the EBOR.

Exposure scenarios are the assumptions used to define the potential use that may bring a person into contact with contamination. For the Ely Mine, the following exposure scenarios were considered:

- The potential risk to a person living on or adjacent to the Site and coming into contact with Site soil or indoor dust that originated as Site soil. The person was assumed to come into contact with the soil or dust for 350 days per year.

- The potential risk to a person installing a drinking water well in the contaminated groundwater at the Ely Mine Site and consuming 2 liters of water every day.

- The potential risk to a person visiting the Site 104 times per year and coming into contact with contaminated soil.

- The potential risk to a person visiting the Site 22 times per year and wading and/or swimming in Ely Brook or SHB.

- The potential risk to a person whose work activities would require disturbance of the mine waste and inhaling the dust 60 days per year.

The results presented above for the HHRA indicate the following:

For The OU1 Media and Areas

- Surface and subsurface soils in the OU1 area contain levels of cobalt, copper, and iron that could represent an unacceptable threat to human health for children residing on and near the Site and coming into contact with the contamination 350 days per year.

- Surface and subsurface soil in the OU1 area would not represent an unacceptable threat to human health for adults residing on and near the Site and coming into contact with the contamination 350 days per year.

- Human contact with the soil in the OU1 area under less frequent exposure scenarios (recreational activities) was not considered to represent an unacceptable threat to human health.

- Human contact with sediment and surface water as a result of recreational activities in the OU1 area were also not considered to represent an unacceptable threat to human health.

- An unacceptable risk was not found to be associated with a person working in the waste material in the OU1 area for up to 60 days per year. More frequent contact, however, would result in an unacceptable risk associated with the inhalation of manganese and aluminum dust. The aluminum and manganese concentrations in soil were not significantly different from those measured in background locations.

While OU1 does not address groundwater as a response area, it is recognized that the cleanup of OU1 waste areas may indirectly improve groundwater quality since those waste areas are significant sources of the groundwater contamination.

For The OU2 Media and Areas

- Overburden and shallow bedrock groundwater at the Site contain contaminants that would represent an unacceptable threat to human health if used as a source of drinking water. The contaminants that are found above levels that are considered acceptable for human ingestion include: aluminum, antimony, cadmium, cobalt, copper, iron, manganese, molybdenum, nickel, and zinc.

- Surface and subsurface soils in the OU2 source area (Smelter/Slag Area) contain levels of cobalt, copper, and iron that would represent an unacceptable threat to human health for children residing on and near the Site and coming into contact with the contamination 350 days per year.

- Human contact with the soil in the OU2 area under less frequent exposure scenarios (recreational activities) was not considered to represent an unacceptable threat to human health.

- Human contact with sediment, and surface water as a result of recreational activities in the OU2 area were also not considered to represent an unacceptable threat to human health.

- An unacceptable threat was not found to be associated with a person working in the waste material in the OU2 area for up to 60 days per year. More frequent contact, however, would result in an unacceptable threat associated with the inhalation of manganese and aluminum dust. The aluminum and manganese concentrations in soil were not significant different from background locations.

AQUATIC BERA SUMMARY

An aquatic BERA was performed on the aquatic habitats potentially affected by the Site. The major aquatic habitats at the Site consisted of:

- Ely Brook and its tributaries;

- Several small ponds (Ponds 1 to 5) which serve as the headwaters for Ely Brook Tributary 2 (EBT2) (note: Pond 1, the furthest upstream - and largest - of the five ponds, was used as a reference location because it was found to be unaffected by conditions at the Site);

- Vernal pools;

- SHB; and

- Ompompanoosuc River.

Results from toxicity tests on sediment, surface water, and porewater along with analysis of the benthic and fish communities provided multiple measurement endpoints to assess potential risk. The following seven types of measurement endpoints were used in the BERA:

- Comparison of the contaminants of potential ecological concern (COPECs) levels in sediment, porewater, and surface water samples to published sediment or surface water benchmarks.

- Assessment of the bioavailability of divalent metals in sediment samples by measuring the Acid Volatile Sulfides (AVS) and Simultaneously Extracted Metals (SEM).

- Performance of toxicity tests in the laboratory by exposing sensitive life stages of aquatic invertebrates and fish to sediment, porewater, and surface water samples from the waterways.

- Performance of toxicity tests in the ponds by exposing wood frog eggs and tadpoles kept in floating cages.

- Comparison of the COPECs levels in whole fish collected from the waterways to literature-derived Critical Body Residues (CBRs).

- Quantification of the structure and function of the benthic invertebrate community and fish community in the waterways.

- Use of food chain modeling to calculate an Estimated Daily Dose (EDD) to insectivorous and piscivorous wildlife receptors from exposure to surface water and aquatic biota (winged aquatic insects and fish); compare these EDDs to Toxicity Reference Values (TRVs) from the literature.

- The results of the Aquatic BERA are summarized below.

Location	Overall Risk Conclusion/Chemicals of Concern
Pond 2	Minor risk detected for water column invertebrates and amphibians due to elevated manganese concentrations in the water. No risk detected for the benthic invertebrate community.
Pond 3	Minor risk detected for benthic invertebrate community, water column invertebrates, and amphibians due to elevated manganese concentrations in the sediment and the water.
Pond 4	Severe risk detected for amphibians and minor risk detected for benthic invertebrate community due to elevated copper concentrations in the sediment.
Pond 5	Severe risk detected for benthic invertebrate community, water column invertebrates, and amphibians due to elevated copper concentrations in the sediment and the water.
Ely Brook and its tributaries	Severe risk detected for benthic invertebrate community and the fish community as a result of ARD.
Schoolhouse Brook	Severe risk detected for benthic invertebrate community and the fish community as a result of ARD being released from the OU1 source areas.

- The Aquatic BERA documented that severe ecological impacts have occurred as a result of the release of ARD with toxic levels of metals from the Site waste areas into the surface water and sediment within the OU1 area including: Ely Brook, the tributaries of Ely Brook, and Ponds 4 and 5. The upstream (reference) areas of the Ely Brook headwaters and Pond 1 supported healthy populations of benthic invertebrates, further documenting that the Site is a significant source of ecological impairment.

- The Aquatic BERA also documented that severe ecological impacts have occurred as a result of the release of ARD with toxic levels of metals from the OU1 waste areas into OU2 surface water and sediment. Specifically, this finding applies to SHB. The upstream (reference) areas of SHB supported healthy populations of benthic invertebrates and fish, further documenting that the Site is the source of observed ecological impairment downstream of the confluence with Ely Brook. OU2 will specifically address any ecological threats associated with the sediment within SHB and the Ompompanoosuc River as well as the final restoration of these surface waters.

TERRESTRIAL BERA

The Terrestrial BERA presents the ecological assessment for terrestrial habitats potentially affected by contaminants associated with historical mining operations at the Site. The objective

of the Terrestrial BERA was to describe the likelihood, nature, and severity of observed or potential adverse effects to ecological receptors resulting from their exposure to mining-related contaminants currently present at the Site. In addition to evaluating terrestrial risk, the assessment looks at potential risk to the four vernal pools identified within the study area that were not assessed as part of the Aquatic BERA (Techlaw, 2008). Four potential vernal pools/complexes were identified as VP-1 through VP-4.

Sampling and subsequent ecological risk analysis focused on determining the potential for significant adverse ecological effects in the vegetated areas that border the barren surface of the waste piles and any vernal pools located therein. Potential ecological receptors are outlined in the BERA. These include state or federally–listed threatened bat species, known as the Indiana bat and the Eastern Small-Footed bat, which use the mine openings to hibernate. The target communities and receptors selected to evaluate potential ecological impacts include terrestrial plants, soil invertebrates, herbivorous birds and mammals, invertivorous birds and mammals, carnivorous birds and mammals, and the aquatic and amphibian communities associated with the on-site vernal pools.

The conceptual site model (CSM) includes exposure pathways for plants (direct soil contact), soil invertebrates (ingestion and contact with soil), birds and mammals (soil ingestion and food), and vernal pool species (contact and ingestion with surface water and sediment). Assessment endpoints include the survival, growth, and reproduction of plants, invertebrates, mammals, birds, and aquatic/amphibious vernal pool species. Results from soil, biota (invertebrates and small mammals) and surface water samples were used for comparison to conservative screening benchmarks obtained from a variety of sources as part of a preliminary Screening Level Environmental Risk Assessment (SLERA), including Ecological Soil Screening Levels (EcoSSLs) and PRGs for soil, ambient water quality criteria and other published sources for surface water.

Ecological risks were assessed by comparing media concentrations to benchmark values and modeled exposure concentrations to TRVs. The following table summarizes the findings of this risk analysis.

Receptor Group	Overall Risk Conclusion/Contaminants of Concern for OU1
Terrestrial Plants	The barren areas of the Site represent a significant adverse impact to the plant community. The primary cause of the impact is the acidity of the soil and porewater. There is the potential for adverse impact to individual terrestrial plants as a result of the contaminant concentrations at the Site. The COPCs are copper and, to a lesser extent, zinc. The overall impact on the plant community outside the barren waste areas was not considered significant.
Soil Invertebrates	The barren areas of the Site represent a significant adverse impact to the soil invertebrate community. The primary cause of the impact is the acidity of the soil and porewater. There is the potential for adverse impact to individual soil invertebrates as a result of the contaminant concentrations at the Site. The COPCs are copper and, to a lesser extent, zinc. The overall impact on the soil invertebrate community outside the barren waste areas was not considered significant.
Herbivorous Birds	The Terrestrial BERA concluded that significant ecological impacts to this receptor were unlikely.
Invertivorous Birds	The Terrestrial BERA concluded that significant ecological impacts to this receptor were unlikely.
Carnivorous Birds	The Terrestrial BERA concluded that significant ecological impacts to this receptor were unlikely.
Herbivorous Mammals	The Terrestrial BERA concluded that significant ecological impacts to this receptor were unlikely.
Invertivorous Mammals	The Terrestrial BERA concluded that significant ecological impacts to this receptor were unlikely.
Carnivorous Mammals	The Terrestrial BERA concluded that significant ecological impacts to this receptor were unlikely.

The only significant terrestrial ecological threat in the OU1 area is the impairment of the plant and soil invertebrate communities in the barren areas of the Site. Although concentrations of metals detected in the vegetated (non-barren) areas at the Site were higher than plant and soil invertebrate benchmarks, field observations suggest that the toxicity of the Site material is substantially reduced when the waste is incorporated into a natural soil. Areas along the fringe of the barren waste areas have concentrations of metals comparable to the barren waste areas yet these areas support a plant community and soil invertebrates. Other factors, such as the highly acidic porewater and acid salts within the waste along with the absence of any organic matter to support vegetation are likely to be more significant factors in the absence of vegetation on the barren areas. When a soil horizon forms and provides organic matter, the plant community appears to be able to exist. As a result, a clear chemical-specific threat to the plant or soil invertebrate community is not identified for OU1 of the Site. The general Terrestrial BERA conclusion for OU1 is that the Site conditions, primarily the acidic waste material and

associated acid salts and porewater have created barren areas which represent a local, yet significant, ecological harm to the plant and soil invertebrate community resulting in a loss of the critical ecological support functions including nutrient cycling, habitat, food, and soil stabilization to limit erosion. The barren areas of the Site are generally consistent with the source areas shown in Figure ES-4.

No significant ecological risk was identified for the other terrestrial receptors within the OU1 area. The hazard quotients were generally low for the mammal and bird receptors. In addition, the biota sampling suggested that most metals (particularly selenium and zinc) were not accumulating in tissue. Only copper was detected at concentrations that were statistically different from reference biota tissue samples, although individual samples suggested that some accumulation of aluminum and iron may occur. OU2 will address the ecological risk associated with the vernal pools and the Smelter/Slag area as well as any ecological risk associated with the underground mining workings.

CONCLUSIONS

Based on the results of the RI program, including the human health and ecological risk assessments, the ongoing release of ARD from the Site is causing significant impacts to surface water, sediment, and groundwater. The most significant observations and conclusions derived from these studies are summarized below.

- An estimated 172,050 cy of waste rock, tailings, roasted ore, and slag related to historical mining activities contain metals that exceed site-specific soil criteria within the Ely Brook Valley at the Site. The UWA constitutes the largest volume of mine waste (73,000 cy), followed by the Smelter Area (31,120 cy), LWA (29,000 cy), Slag Pile Area (25,000 cy), ORB (10,330 cy) and the Tailings Area (3,600 cy). An estimated 8,318 cy of waste rock sediment is present within the impacted zones of Ely Brook and its tributaries and Ponds.

- Field XRF results from surface soil and sediment were used to refine the limits of mine waste areas. The relatively sharp copper concentration gradients observed in soil around the perimeter of mine waste areas allows for a high degree of confidence in

identifying soils above the site-specific criterion of 629 milligrams per kilogram (mg/kg) and correlates well with direct visual observations of mine waste and staining in soil.

- Three significant tributaries, EBT1, EBT2 (which includes EBT3), and EBT4, are responsible for the majority of contaminant transport from the waste areas to Ely Brook. Tributary EBT2 carries the greatest metals load, followed by EBT4, and EBT1.

- The UWA and LWA comprise the dominant source of metals loading and acidity to downstream surface water. The potential impact to surface water from the Tailings Area is masked by the impacts from the UWA and the LWA. Smelter slag is also a leachable source of metals that may impact SHB. In contrast, the ORB soil is not likely to have a significant impact on groundwater or surface water.

- The UWA waste rock piles are largely unsaturated, but mounding of groundwater above the glacial till during high flow periods may result in groundwater interaction with the lower-most portion of the piles. The high copper and acidity concentrations observed from seeps and monitoring wells confirm the significant impact these piles have on overburden and shallow bedrock groundwater in this area.

- Discharge of groundwater from the Main Adit, the Lower (Deep) Adit, and Shaft No.4 contribute to significant impacts to downgradient surface water. The Main Adit discharge is interpreted to represent the decant point for the water that resides within the open cavity created by the underground shafts and adits (mine pool).

- Waste sources in the LWA and Tailings Area are saturated with groundwater. As a result, overburden and shallow bedrock groundwater within the LWA mine waste footprint is impacted by ARD and metals. Downgradient migration of impacted groundwater is limited. The groundwater plume beneath the Tailings Area appears limited to the shallow overburden unit.

- Groundwater results from the ORB meet groundwater criteria. Surface water impacts observed downgradient of this area are interpreted to be attributable to waste rock fill along the access road nearby.

- Evaluation of metals loading to SHB from groundwater in the Smelter Area and the Slag Pile indicates that metals loading from Ely Brook is more than two orders of magnitude greater than that of the groundwater and therefore, likely masks any detectable contribution from groundwater. Furthermore, it is unclear as to whether groundwater discharge alone would result in an exceedance of the surface water criteria in SHB.

- Groundwater results do not show a significant impact to deep bedrock from surface mine waste sources.

- ARD-related discharges to surface water and sediment in Ely Brook below the confluence with EBT4 have resulted in severe impacts to the aquatic biota of Ely Brook and SHB. Ecological impacts to the EBOR appear to be insignificant based on the evaluation of multiple measurement endpoints discussed in the aquatic BERA.

1.0 INTRODUCTION

This Operable Unit 1 (OU1) Remedial Investigation (RI) Report documents the nature and extent of contamination for the Ely Mine Superfund Site located in Vershire, Vermont (hereafter referred to as the "Site"). This RI Report was prepared by Nobis Engineering, Inc. (Nobis) for the United States (U.S.) Environmental Protection Agency (EPA) under Contract Number EP-S1-06-03, Task Order Number 0024-RI-CO-017L (Task Order). The work was performed in accordance with the September 27, 2007 EPA Statement of Work (SOW) and the Work Plan Amendment No. 4 dated July 28, 2010.

1.1 Purpose

The purpose of the RI is to:

1. determine the nature and extent of contamination in soil, sediment, groundwater, air, and surface water, both on the Site and in the surrounding areas;
2. evaluate the fate and transport of contaminants; and
3. assess human health and ecological risks.

The RI will be used to support the Site remedy selection and Record of Decision (ROD).

1.2 Report Organization

Beyond the Executive Summary, the RI Report is organized as follows:

- Section 1.0 Introduction provides an overview of the RI objectives and report organization.

- Section 2.0 Site Background summarizes the Site setting and provides an overview of the geology of the Vermont Copper Belt with milestones of the mining history of the Site.

- Section 3.0 Site Investigations provides an overview of the studies completed at the Site between 2000 and 2009.

- Section 4.0 Data Quality Assessment and Limitations includes a summary of the results of data review and validation of recent laboratory data and limitations on use of data from older studies.

- Section 5.0 Site Characteristics includes a description of the Site physical characteristics, geology, hydrology, hydrogeology, meteorology, demographics and land use, and Site reuse and ecological assessments.

- Section 6.0 Nature and Extent of Contamination provides documentation of source area characteristics, and the distribution and trends of contaminants in air, soil, surface water, sediment, and groundwater.

- Section 7.0 Fate and Transport provides a discussion of contaminant characteristics, transport processes, release mechanisms, and contaminant migration trends.

- Section 8.0 Risk Assessment Summary provides an overview of the conclusions of human health and baseline ecological risk assessments completed for the Site.

- Section 9.0 References lists the principal references used as part of the remedial investigation data set, sources of independent interpretations of portions of the Site data and relevant references used to interpret the data.

2.0 SITE BACKGROUND

This Section provides a brief description of the Site, its general surroundings, pertinent historical facts regarding the mining history, and an overview of the study area's geology and hydrology as a context for subsequent sections discussing Site details.

2.1 Site Description and Setting

The Site is an abandoned copper mine located approximately 4 miles (mi) southeast of the village of Vershire Center, and approximately 1.5 mi northwest of the village of West Fairlee in Vershire, Orange County, Vermont (Figure 2-1). The Site encompasses approximately 350

acres along the south slope of Dwight Hill, to the north of Schoolhouse Brook (SHB) and South Vershire Road.

The Site is situated entirely within the watershed of Ely Brook, which flows south from headwaters on Dwight Hill to join SHB on the south side of South Vershire Road. Topographic relief at the Site is bounded between ground surface elevations of 1,600 feet (Dwight Hill) to 940 ft (SHB). SHB borders the southern margin of the Site adjacent to a smelter slag waste pile, and flows eastward approximately 1.75 mi to its confluence with the East Branch of the Ompompanoosuc River (EBOR). SHB and the EBOR are used for recreational purposes and contain fisheries.

Figure 2-2 depicts the Site topography and features. The Site landscape is a combination of barren or sparsely vegetated waste areas and patches of birch and evergreen trees. Figure 2-3 depicts the Site terrestrial covertypes and potential wetland areas. Waste areas include former ore roast beds, waste rock, tailings, a former smelter area, and a slag pile (Piatak, et al., 2004a; URS, 2004; PAL, 2005). Remnant features of the former mine include mine process waste rock piles, intact and collapsed adits and shafts, mine operation building foundations, a 1,400 foot long smoke flue, and over 3,000 linear feet (ft) of underground workings (largely flooded) that extend north of Dwight Hill. No buildings exist on the Site. The locations of structures associated with historic mining operations, including the former Main Shaft Hoist, the Westinghouse Hoist House, smelter buildings, and a World War I-era ore flotation separation mill, have been documented at the Site (PAL, 2005).

The main shaft and several adits leading to the underground workings are located along the steep, upper portion of this slope at the head of the valley, while the mine wastes are located within the more gently sloping, lower portions of the valley. North-south trending ridges to the west and east of the mine areas define two smaller upland valleys that merge into an open U-shaped valley that faces south-southwest defining the Ely Brook watershed. The headwaters of Ely Brook are located in the western tributary valley, northwest of the mine areas. The eastern tributary to Ely Brook drains from a former reservoir and a series of beaver ponds (Ponds 1 through 5) located east of the mine areas.

Specific study areas are defined at the Site based on their physical characteristics, relationship to historic mining operations at the Site, and/or contaminant characteristics and distribution.

These study areas are shown on Figure 2-4 and include the Upper Waste Area (UWA), Lower Waste Area (LWA), Tailings Area, Ore Roast Bed (ORB), the Smoke Flue, the Smelter Area, the Slag Pile Area, Ely Brook Lower Reach (EM-LR), Ely Brook Middle Reach (EB-MR), and Ely Brook Upper Reach (EB-UR), Ely Brook Tributaries (EBT) 1 through 5, Ponds 1 through 6, Vernal Pools 1 through 4, SHB, the EBOR, and the Underground Workings. A detailed description of the physical characteristics of each of these study areas is provided in Sections 5.4 and 5.5.

2.2 Site History

The Ely Copper Mine is one of three major historic copper mines that comprise the Vermont Copper Belt. The Vermont Copper Belt is reported to have supplied the largest metal production in New England from the late 1700s to 1958 derived primarily from the Elizabeth, Ely, and Pike Hill Mines within a 20-mi long area from south to north in the belt (Figure 2-5). Other smaller deposits known as the Cookeville, Orange, and Gove Deposits also occur within this belt. The ore bodies are stratiform massive sulfide deposits similar to those of the Besshi deposits in Japan and are believed to have formed as syngenetic-exhalative processes on the sea floor during the Silurian-Devonian periods. The primary ore minerals include pyrrhotite, chalcopyrite with minor sphalerite and pyrite (Slack, et al., 2001). The Elizabeth and Ely Mines lie within the Devonian Gile Mountain Formation, while the Pike Hill Mine lies within the Silurian Waits River Formation. The Ely Mine Site was added to the Superfund listing in September 2001 due to environmental impacts from acid rock drainage (ARD) on Ely Brook and SHB. The Site is also eligible for the National Register of Historic Places due to its historical aspects (Hathaway, et al., 2001). The history of mining activities at the Site is described in this Section. Since all three of the mines in the Vermont Copper Belt share a common ore deposit and there have been operational interactions between Ely and both the Elizabeth and Pike Hill Mines, a brief description of the Elizabeth and Pike Hill Mines is included below.

The Elizabeth Mine is the oldest and largest of the three primary mines in the Vermont Copper Belt, located on Copperas Hill in the towns of South Strafford and Thetford, Vermont and was discovered in 1793 with mineral production beginning in 1809. In 1949 and 1950, approximately 60,000 tons of material from the Ely Mine waste piles was brought to the Elizabeth Mine for processing. Remedial actions are ongoing at the Elizabeth Mine Site and results of recent studies completed to support evaluation and implementation of remedial alternatives at the mine

form the basis of comparison for Remedial Investigation/Feasibility Studies (RI/FS) at the Ely and Pike Hill Mine Sites. The deposit was mined until the early 1880s for pyrrhotite to produce copperas (iron sulfate). From the 1830s until the mine closed in 1958, copper was mined from chalcopyrite in the deposit. The Elizabeth Mine Site was listed as a Superfund Site in June 2001 due to environmental impacts from acid rock drainage (ARD) and acid mine drainage (AMD) from the Site on the West Branch of the Ompompanoosuc River (WBOR). The Elizabeth Mine is also eligible for the National Register of Historic Places due to its historical aspects (Hathaway, et al., 2001).

The Pike Hill Mine is located on Pike Hill in the Town of Corinth, Vermont and was discovered in 1845, after the Elizabeth and Ely deposits. The mines operated intermittently between 1846 and 1919 (Kierstead, 2001). In 1879, the ore processing plant was upgraded to enhance ore separation and ore shipment to the Ely Mine smelter until 1905. Operations at the Pike Hill Mine ceased in 1919, but were revisited during the late 1940s-early 1950s, as was the Ely Mine, when portions of waste rock piles were transported to the Elizabeth Mine mill for processing. The Pike Hill Copper Mine was placed on the EPA National Priorities List (NPL) in July 2004 due to the impacts of ARD on Pike Hill Brook. This Site is also eligible for the National Register of Historic Places due to its historical aspects (PAL, 2007).

A detailed account of the Site history and detailed documentation of industrial archaeological features on the Site and surrounding areas is presented in a report by the Public Archaeology Laboratory (PAL, 2005). An overview of the Site history is provided below. Table 2-1 provides a summary outlining the timeline of pertinent Site historical events and Site features. The Ely Cooper Mine ore body was discovered in 1813 and explored in the 1830s. Significant mine activities began in 1853 by the Vermont Copper Mining Company (VCMC) led by Thomas Pollard and lasted until 1905. In 1864, after a period of sporadic output of the mine due to the segmented and overlapping lens-like nature of the ore body, Smith Ely collaborated with Mr. Pollard to relocate the ore body and successfully boost production. In 1866, Tramway roads were built to carry ore down the valley, the main alignment of which is still apparent today. The Tram construction was immediately followed by the development of the ORB and the initial construction of the smelter in 1867. The roast bed area extended 900 ft, bounded by a stone wall on the west and serviced by an elevated trestle. Roasting the ore reduced the sulfur content prior to smelting. By 1868, four smelter furnaces were in operation. Mine operations experienced a boom between 1872 and 1880 when the Ely Village expanded and the Town of

Vershire grew to a population of about 1,900 in contrast to today's population of about 630 people. By 1876, sulfur fumes from the roast beds and smelter had eliminated the vegetation in the valley, and ore-roasting kilns were added to the smelter facility. In an attempt to mitigate the smelter fumes, a stone slab flue approximately ¼ mi long was built from the smelter up the eastern side of the valley, but reportedly never functioned effectively in transporting fumes away from the village. By 1877, the smelter building was 300 ft long with 14 furnaces, and was expanded in 1879 to a length of 700 ft with 24 furnaces to accommodate ore from the Pike Hill Mine. During this time the smelter slag pile was expanding south of the building toward SHB. Political events and falling copper prices in the early 1880s led to a worker revolt known as the Ely War in 1883 and collapse of the VCMC. Between 1883 and the close of the mine in 1905, ownership changed hands several times and production was sporadic.

In 1900, George Westinghouse upgraded mine equipment to rejuvenate copper production to support the Westinghouse Electric Company but was unsuccessful due to multiple factors including the lack of ore at the 3,500 ft downdip limit of the mine and low copper prices. In 1905, equipment was stripped from the Site by Mr. Westinghouse and buildings were sold, moved, or demolished. In 1917, the Ely-Copperfield Association of New York, NY attempted to recover copper from the mine dumps with construction of a flotation separation mill which operated for a short period until the end of World War I, when the price of copper fell, closing the operation. In 1949-50, attempts were made to recover copper from the mine waste piles and 60,000 tons of waste rock/ore assayed at about 1 percent (%) copper was transported to the Elizabeth Mine for processing. Prospect drilling was also completed in the mid-1950s by Appalachian Sulphides, Inc. Total copper output of the mine was estimated between 30 and 40 million pounds, making Ely Mine the largest copper-producing mine in the East and placing it among the top 10 producing mines in the country during the peak production period (between 1866 and 1881). Since 1950, the Site has been used for timber management and recreational activities, including hunting, snowmobile riding, and horseback riding. The Site is often visited by those interested in the remnants of the mining activities or the Site geology. All terrain vehicle tracks are observed on several of the waste piles.

2.3 Site Operable Units

EPA creates operable units to allow areas of the Site that are ready for a cleanup action to move forward while allowing additional investigation of other areas. For the Ely Mine, the following operable units have been created:

- Operable Unit 1 (OU1) includes the waste rock, tailing, and roast beds along with the surface water, soil, and sediment for all areas of the Ely Brook valley except the Smelter and Slag Areas and any underground shaft and adits. The OU1 areas are shown in Figure 2-6.

- Operable Unit 2 (OU2) includes all Site groundwater impacts, source zones related to the underground shafts and adits, soil and sediment impacts related to the Smoke Flue, Smelter, and Slag Areas, surface water and sediment impacts in SHB and the EBOR. The OU2 areas are shown in Figure 2-6.

This RI Report presents the information currently available for both OU1 and OU2. A supplemental RI will be prepared to present the additional information that will be collected to complete the OU2 RI.

3.0 SITE INVESTIGATIONS

A considerable amount of data has been generated as the result of various investigation programs conducted at the Site by EPA, the U.S. Army Corps of Engineers (USACE), the U.S. Geological Survey (USGS), the State of Vermont, and others. This section summarizes the investigations conducted including agency, dates, objectives, and types of media collected. A brief overview of some of these studies is included below. A summary of analytical samples collected by Nobis in 2009 is included in Table 3-1a through Table 3-1g. A summary of analytical samples collected by other investigators prior to 2009 is included in Table 3-2a through Table 3-2c.

A compilation of the geology and geochemistry of the massive sulfide ores in the Vermont Copper Belt, including results from a variety of geochemical studies of select samples of ore and host rocks, was used as a basis to evaluate the origin of the deposits and identify comparable analogues (Slack, et al., 2001). The USACE in cooperation with the USGS

completed a study of spring runoff from the Site to characterize the geochemical diversity of water sources in the Ely Brook Watershed by sampling Ely Brook and tributaries, SHB, the Ompompanoosuc River, and seeps from mine waste areas. This study documented highly acidic and highly metal laden runoff from the mine areas (Holmes, et al., 2002). In 2004 and 2007, the USGS completed a series of studies at the Site that included sampling and analysis of the various solid mine waste materials and sediment to characterize the materials, assess their acid-generating potential, and assess their potential for leaching metals. The studies also included comparisons to the wastes present at Elizabeth Mine located southwest of the Site (Piatak, et al., 2004a; 2007). A separate study of the geochemistry of the slag material deposited along South Vershire Road was also completed by the USGS in 2004. This study included evaluating slag material from the Site and comparing it to slags at other mine sites in North America assessing the secondary minerals formed on the slag, and assessing the potential leachability of metals from the slag (Piatak, et al., 2004b).

From 2005 through 2008, URS Corporation (URS) in conjunction with the USACE and EPA completed preliminary field sampling investigations in support of the Site RI/FS, including a habitat characterization study of the Site and surrounding area which describes the terrestrial habitats, potential wetland areas, and potential terrestrial receptors at the Site (URS, 2005). Information from this report was used as a basis to determine additional sampling in support of the terrestrial Baseline Ecological Risk Assessment (BERA) at the Site. In addition field sampling investigations were completed which included test pits and borings in waste areas, monitoring well installation, and the collection of surface water, sediment, surface and subsurface soil, and groundwater samples from the Site. One off-site residential groundwater sample was also collected as part of the investigation. These data have been incorporated directly into the analytical database for the RI/FS for use in completing risk assessments. A summary of the URS field investigations and results was prepared as a Phase 1A Remedial Investigation Report (URS, 2008) and is incorporated in the RI as Appendix A.

In 2007, the Vermont Department of Environmental Conservation (VTDEC) completed an aquatic life use attainment assessment of Ely Brook, SHB, and the Ompompanoosuc River in conjunction with ongoing USGS studies. The VTDEC assessment included an evaluation of fish and macroinvertebrate data which indicated impairment for portions of SHB and Ely Brook, likely related to runoff from the Site (VTDEC, 2007).

The aquatic BERA was completed by Techlaw (2008), incorporating results from sampling completed between 1998 and 2007, and included the extensive surface water and sediment sampling of the on-site and off-site surface water pathway by EPA and USGS in 2006 and 2007. The aquatic BERA included a detailed characterization of surface water and sediment quality, evaluation of fish and macroinvertebrate communities, and the toxicity of surface water, sediment, and porewater. The study included evaluation of the on-site Ponds, the main stem of Ely Brook, SHB below the Ely brook confluence, and the EBOR below the SHB confluence. The USGS also completed a review of existing Site data including the data used in the Aquatic BERA as part of a companion study to support the BERA (Seal, et al., 2010). The USGS study included a more in-depth evaluation of the nature and extent of ARD-related contamination and the relationship between surface water and sediment chemistry of the on-site tributaries, the Ponds, and Ely Brook. In addition, porewater chemistry was examined in relation to metal fluxes. Results of these studies are discussed in Section 8.

From 2008 through 2009, Nobis in conjunction with the EPA completed the field sampling investigations in support of the Site RI/FS for OU1. Site field investigations performed by Nobis included test pits and soil borings, overburden and bedrock monitoring well installations, bedrock borehole geophysical logging, and biota, surface water, sediment, soil (surface and subsurface), groundwater, and residential well sampling.

The objectives and rationale for the analytical program performed by Nobis is described in detail in the Conceptual Site Model Technical Memorandum (Nobis, 2009b, included as Appendix B of this RI) and the Quality Assurance Project Plan (QAPP) (Nobis, 2009a). A summary of the Nobis field investigations and results was prepared as a Data Evaluation Report (Nobis, 2010) and is incorporated in the RI as Appendix C. These Nobis reports includes detailed information regarding the data quality objectives, sampling and analysis rationale, analytical methods, sampling procedures, and field observations, as well as field screening and laboratory analytical results.

Information and data from the URS Phase IA Report and Nobis Data Evaluation Report was used as a basis for the performance of the Human Health Risk Assessment (HHRA) and Terrestrial BERA for OU1.

A summary of media-specific investigations is provided below.

3.1 Soil

Soil samples were collected at the Site between 1998 and 2009, with the majority of data collected between 2004 and 2009 during studies completed by USGS, URS, and Nobis. A summary of the various soil samples evaluated as part of this study is provided below.

3.1.1 Surface Soil

Surface soil investigations were conducted by the USGS (1998, 2000, 2001, and 2002), URS (2007), and Nobis (2009). For the purpose of this RI report, surface soils are those samples collected where the sampling depth was within 2 ft of ground surface. A description of each soil investigation completed is included below. Figure 3-1 illustrates the locations of the surface soil samples collected from the Site that were evaluated as part of this RI report. Results from surface soil investigations are discussed in Section 6.

The USGS conducted a surface soil investigation in 1998, which included the collection of 8 surface soil samples taken directly from waste materials throughout the Site. Samples were submitted for laboratory analysis of metals to assess the characteristics of the mine waste piles. In 2000, USGS collected soil samples from 4 locations including the flotation mill tailings, the LWA, and the Slag Pile Area to evaluate mine waste characteristics. Samples were submitted for laboratory analysis of metals, major oxides, sulfur, paste pH, paste conductivity, and alkalinity. In 2001, the USGS collected 4 composite surface soil samples targeting the UWA and the Slag Pile Area to further characterize mine waste material. Samples were submitted for laboratory analysis of metals, major oxides, sulfur, paste pH, paste conductivity, and alkalinity.

In 2002 the USGS collected surface soil samples from 13 locations from the UWA, the LWA, the ORB, Smelter Area, Slag Pile Area, and Smoke Flue to further characterize mine waste material and the potential impact of mining operations on Site soils. Most soil samples collected were composite samples to represent conditions across each waste area. However, grab samples were collected from the flotation mill tailings area to target the geochemical properties of this material. Samples were submitted for metals analyses.

URS conducted a surface soil investigation in 2007, which included the collection of 125 surface soil samples from all areas of the Site to evaluate the nature and extent of mine waste and the

potential impact of mining operations on Site soils. URS collected surface soil samples from waste areas, vegetated areas peripheral to the barren source areas (transition zones), and natural forested zones to evaluate Site conditions. The transition zones consist of the areas which surround known waste sources and can support vegetation. These areas are locally included within the waste area boundaries and have visual and analytical evidence of impact from historic mining activities. Samples collected from the natural forested areas beyond the transition zones exhibit concentrations of metals higher than those identified in the background soil samples, but lower than in transition zones. This investigation also included an evaluation of regional background soil conditions by collecting surface soil samples beyond the Site boundary from areas that exhibited similar geology and soil types; and areas that were not influenced by mining activities or other anthropogenic sources of metals other than regional atmospheric deposition (URS, 2008). Samples collected during this investigation were submitted for laboratory analysis of metals, and acid base accounting (ABA) parameters.

Nobis conducted a surface soil investigation in 2009 to supplement previously collected data and eliminate potential data gaps for the purpose of completing the Site characterization. During the investigation approximately 51 samples from 39 locations were submitted for laboratory analysis of target analyte list (TAL) metals. A select number of samples were also submitted for synthetic precipitation leaching procedure (SPLP) metals, ABA, paste pH, paste conductivity, total organic carbon (TOC), and cation exchange capacity (CEC).

Samples were collected throughout the Site including waste areas and forested areas surrounding the waste piles. Additional soil samples were collected for on-site laboratory X-ray fluorescence (XRF) analysis by the EPA mobile laboratory to evaluate the lateral extent of impact from mining operations as discussed in Section 3.1.3.

3.1.2 Subsurface Soil

Subsurface soil investigations were conducted by URS in 2007 and Nobis in 2009 (URS, 2008; Nobis, 2010). For the purpose of this RI report, subsurface soil samples include samples collected deeper than 2 ft below ground surface. Analytical results are discussed in Section 6. Figure 3-2 illustrates the locations of the subsurface soil samples collected from the Site that were evaluated as part of this RI report. A description of each investigation is included below.

URS conducted a subsurface soil investigation in 2007 to evaluate the vertical distribution of mine waste in known waste areas across the Site. The investigation included approximately 35 samples from 23 soil boring and test pit locations throughout the Site including the UWA, LWA, ORB, Smelter Area, and Slag Pile Area. Due to the historical significance of the Smelter Area, subsurface investigations were mostly limited to the area surrounding this waste material. Samples were submitted for laboratory analysis of TAL metals, with a subset being submitted for ABA analysis.

Nobis conducted a subsurface soil investigation at the Site in 2009. The purpose of the investigation was to further assess the vertical distribution of mine waste across the Site and supplement existing data from previous investigations in order to provide complete Site characterization. The investigation included the collection of approximately 30 samples from 10 soil borings (including 2 hand auger borings) at the Site. Additional subsurface samples were collected from 15 hand auger borings in Lower Ely Brook sediment as described in Section 3.3. Soil samples were submitted for TAL metals, ABA, paste pH and paste conductivity with a subset being submitted for SPLP metals.

3.1.3 On-Site XRF Analysis of Soil

Nobis conducted field screening of soil as part of surface soil investigation over a two week period in August 2009 using on-site XRF analysis performed by the EPA Region I Office of Environmental Measurement and Evaluation (OEME) Mobile Laboratory. The sampling program consisted of 349 samples collected at various locations around the Site and along 26 transects at the margins of waste source areas. The field XRF program was designed to assess the lateral extent of potential impact to the Site from historic mining operations with particular focus on the transitional zone between barren waste areas and the surrounding forested areas of the Site. The field XRF program also included three sample transects across Ely Brook Lower Reach (EB-LR) to assess the thickness of waste rock sediment present in the Ely Brook channel. Field screening included analysis for copper, iron, sulfur, selenium, and zinc. Figure 3-3 illustrates the locations of XRF field screening samples and transects. On-site XRF analytical results from this investigation are discussed in Section 6.

3.1.4 Geotechnical Sampling

In November of 2009, 12 bulk soil samples from waste piles were collected at the locations shown in Figure 3-4 to support the engineering evaluation of remedial options during the Feasibility Study (FS) for the Site. Soil samples were collected from the UWA, LWA, Tailings Area, ORB, and sediment from Lower Ely Brook to evaluate geotechnical properties of these materials.

Bulk soil samples were taken as grab samples cut using a shovel from locations across open areas within the central portion of each waste area. A field density test was performed on all samples prior to laboratory submission using a nuclear densometer in order to obtain the existing in-situ density of the loose unconsolidated materials. The samples were submitted for off-site delivery of analytical services (DAS) laboratory analysis of grain size (12 samples), specific gravity (3 samples), and Standard Proctor (compaction) Tests (6 samples). Additionally, in order to assess the stability of slopes that may be created during waste consolidation, direct shear tests were performed on 6 samples. A discussion of geotechnical sampling results is included in Section 5.1.3.

3.2 Surface Water

Since 2000, several studies have been completed to characterize various aspects of surface water impacts downgradient of the Site, relating to ARD from the Site. Surface water was sampled by Arthur D. Little, Inc. (ADL) (2000-2001), the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) (2002), URS (2004 and 2007), EPA (2005-2007), USGS (2006), and Nobis (2009). Results from CRREL, EPA, and URS investigations have been evaluated separately in previous reports and have been incorporated into the results tables in this report. Many of the same surface water and sediment locations were sampled by USGS, URS and Nobis using two different location numbering schemes. In those instances, the USGS location designations are referenced in figures, tables, and text for this report. The USGS designations are based on the distance measured from the stream mouth in meters along a stream reach. Location designations are cross-referenced in results tables and in Tables 3-1d and 3-2b. Where a sample location does not coincide with a USGS sample location, the unique URS or Nobis location number is used (e.g., SW-72). Surface water sample locations are shown on Figures 3-5 and 3-6. An overview of these studies is provided below. The surface water sampling results are discussed in Section 6.

ADL performed three surface water sampling rounds in 2000 collecting three discrete samples from two locations along the Ompompanoosuc River. The samples were submitted for laboratory analysis of total and dissolved metals, acidity, alkalinity, anions, cyanide, hardness, total suspended solids (TSS), total dissolved solids (TDS), and TOC. In 2001, ADL performed two surface water sampling rounds collecting 31 samples from 14 locations: along Ely Brook (three locations), EBT (one location), SHB (three locations), a SHB tributary (one location), and the Ompompanoosuc River (six locations). The samples were submitted for laboratory analysis of total and dissolved metals and hardness.

CRREL performed seven consecutive months (March through September) of surface water sampling in 2002 collecting samples from up to 26 locations: along Ely Brook (three locations), EBT (five locations), seeps to Ely Brook (12 locations), SHB (three locations), and the Ompompanoosuc River (three locations). The samples were submitted for laboratory analysis of total and dissolved metals and hardness.

URS performed two rounds of surface water sampling: one in 2004 and the second in 2007. In 2004, 34 samples were collected from 34 locations: along Ely Brook (nine locations), EBT (10 locations), seeps to Ely Brook (one location), SHB (eight locations), tributary to SHB (one location), Ompompanoosuc River (two locations), and tributaries to the Ompompanoosuc River (three locations). In 2007, 25 samples were collected at 25 locations: along Ely Brook (seven locations), EBT (seven locations), seeps to Ely Brook (eight locations), and SHB (three locations). Samples from both the 2004 and 2007 sampling events were submitted for laboratory analysis of TAL metals (total and dissolved), chloride, sulfate, carbonate, bicarbonate, hydroxide, sulfide, nitrate/nitrite, total acidity, alkalinity, total cyanide, TSS, TDS, and hardness.

USEPA performed surface water sampling in 2005, 2006, and 2007. In 2005, 18 samples were collected from nine locations: along Ely Brook (two locations), EBT (five locations), and SHB (two locations). The samples were submitted for laboratory analysis of total and dissolved metals. In 2006, 14 samples were collected from seven locations: along Ely Brook (one location), EBT (one location), and SHB (five locations). The samples were submitted for alkalinity, carbonate, bicarbonate, sulfide, nitrate/nitrite, TAL metals (total and dissolved), chloride, sulfate, and phosphate. In 2007, 14 samples were collected from seven locations:

along Ely Brook (one location), SHB (three locations), and the Ompompanoosuc River (three locations). The samples were submitted for laboratory analysis of TAL metals (total and dissolved).

USGS performed one round of surface water sampling in 2006, collecting 24 samples for laboratory analysis of total and dissolved metals and toxicity testing. Samples were collected from locations along Ely Brook (four samples), SHB (five samples), and the Ompompanoosuc River (three locations). Toxicity testing was completed in 2009 for the Aquatic Assessment of the Superfund Site.

In both July and November 2009, 35 surface water samples were collected by Nobis from 33 locations. The samples were submitted for laboratory analysis of TAL metals (total and dissolved), chloride, sulfate, carbonate, bicarbonate, hydroxide, sulfide, nitrate/nitrite, total acidity, alkalinity, total cyanide, TSS, TDS, and hardness. Surface water sampling details are summarized in Table 3-1d. Additionally, directly following sampling, surface water at each corresponding location was field screened for temperature, pH, conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP), and turbidity with the applicable meters. Results of surface water sampling are discussed in Section 6.

3.2.1 Vernal Pools

In August 2009, 5 vernal pool samples were collected by Nobis from 4 locations (VP-1 through VP-4) as shown in Figure 3-5. Surface water samples were collected at each location and submitted for laboratory analysis of TAL metals (total and dissolved), pH, conductivity, alkalinity, sulfate, chloride, and nitrate. The vernal pool results are discussed in Section 6.6.4.

3.3 Sediment

Sediment at the Site and downstream from the Site was sampled from Ely Brook, its tributaries, SHB and the Ompompanoosuc River by ADL (2000-2001), URS (2004 and 2007), EPA (Techlaw, 2008), USGS (1998 & 2006), and Nobis (2009). Most sediment locations coincide with surface water sample locations. At a select number of locations sediment porewater samples were collected in 2009 and evaluated by Nobis to assess a portion of the EB-UR and EB-MR (Nobis, 2010). In addition, porewater from select locations of Ely Brook and SHB were sampled and evaluated by Techlaw (2008) and USGS (2010) in conjunction with toxicity and

aquatic biota studies. Sediment and porewater sample locations are shown on Figures 3-5, 3-6, and 3-7. The sediment sampling results are discussed in Section 6. A summary of previous sampling events is provided below.

ADL performed one sediment sampling round in both 2000 and 2001. In 2000, 2 samples were collected from 2 locations along the Ompompanoosuc River and submitted for laboratory analysis of metals, TOC, % solids, and acid volatile sulfides (AVS). In 2001, 5 samples were collected from SHB (2 locations) and the Ompompanoosuc River (3 locations) and submitted for laboratory analysis of metals.

USGS performed 1 sediment sampling round in 1998 and 2 sediment sampling rounds in 2006. In 1998, five samples were collected from locations along Ely Brook (2 locations), tributaries to Ely Brook (1 location), and SHB (2 locations) and submitted for laboratory analysis of metals. In 2006, 14 samples were collected from locations along Ely Brook (5 locations), SHB (5 locations), and the Ompompanoosuc River (2 locations) including collocated sediment porewater samples at select locations. The samples were submitted for laboratory analysis of metals, AVS, simultaneously extracted metals (SEM), toxicity testing, and macroinvertebrate community assessment. These results are discussed in Section 8.

URS performed one sediment sampling round in both 2004 and 2007. In 2004, 106 samples were collected from locations along Ely Brook (nine locations), tributaries to Ely Brook (ten locations), Ely Brook seeps (one location), SHB (seven locations), tributaries to SHB (one location), the Ompompanoosuc River (two locations), and tributaries to the Ompompanoosuc River (three locations) and submitted for laboratory analysis of AVS, CEC, and metals. In 2007, 14 samples were collected from 13 locations: along Ely Brook (2 locations), Ely Brook seeps (five locations), and six unspecified locations and submitted for laboratory analysis of TAL metals and % moisture. Results from USGS samples and other studies collected prior to 2009 are presented with detailed interpretation in a recent USGS report (2010) and summarized in Section 8.

In August 2009, 17 sediment samples were collected by Nobis from 16 locations as shown in Figure 3-7. The samples were submitted for laboratory analysis of TAL metals, ABA, paste pH, paste conductivity, TOC, and grain size. In addition, one sediment sample was collected and submitted for laboratory analysis of SPLP metals. Sediment sampling details are summarized

in Table 3-1e. Additional sediment samples were analyzed by field laboratory XRF analysis along soil transects which crossed Ely Brook at three transect locations as shown on Figure 3-7. Along each transect, 6 locations were investigated to document the vertical and horizontal distribution of waste rock sediment within the EB-LR.

3.3.1 Sediment Porewater

EPA and USGS collected pore water from select locations along the EB-MR and EB-LR and SHB in conjunction with sediment sampling as part of two separate aquatic assessments. Results from these porewater sampling events are discussed in detail in Techlaw (2008) and USGS (2010). In August 2009, Nobis collected porewater samples from 7 locations along a portion of the EB-UR shown in Figure 3-5. The samples were submitted for laboratory analysis of TAL metals (total and dissolved), chloride, sulfate, sulfide, nitrate/nitrite, nitrogen, alkalinity, and total cyanide. These sediment porewater results are discussed in Section 6.

3.4 Overburden and Bedrock Characterization

In order to more fully characterize the hydrogeologic characteristics of the overburden and bedrock at the Site, slug tests were performed by URS and Nobis to estimate hydraulic conductivities of the groundwater flow units. In addition, borehole geophysical logging was completed on three deep bedrock wells to assess the hydrogeologic character of the deep bedrock at the Site. These activities are described below.

3.4.1 Hydraulic Conductivity Testing

Hydraulic conductivity testing was performed at the Site by URS (2007) and Nobis (2009) in 22 overburden and 14 shallow bedrock wells at the Site. The hydraulic characteristics of the deep bedrock were evaluated using packer testing described in Section 3.5.1. Slug tests were used to estimate the hydraulic conductivity of the three near surface flow units including the shallow overburden (fill/mine waste/alluvium), glacial till, and fractured bedrock. Results are discussed in Section 5.3.5.

3.4.2 Bedrock Borehole Geophysical Logging

To characterize the bedrock at the Site, borehole geophysical logging was completed by Nobis in 2009 in the three 150-ft deep bedrock wells MW-14D, MW-19D, and MW-20D. The geophysical logging suite included acoustic televiewer (ATV), optical televiewer (OTV), fluid temperature and resistivity, caliper, natural gamma, single-point resistance (SPR) and spontaneous potential (SP), and heat-pulse flow meter (HPFM) under pumping and non-pumping conditions. In addition to characterizing the intrinsic and hydraulic properties of the rock, results from these surveys were used to identify specific fracture intervals for further hydraulic testing and sampling to assess groundwater quality via packer testing. A summary of borehole observations and results from packer tests is presented in Section 5.3.4.

3.5 Groundwater

3.5.1 Groundwater Monitoring

Groundwater sampling has been completed at the Site during 5 sampling rounds between 2006 and 2009. URS installed 17 monitoring wells in 2006 and an additional 11 wells in 2007. URS completed groundwater sampling rounds from these wells in December 2006, June 2007, and November of 2007. In 2009, Nobis installed an additional 14 monitor wells to supplement the existing network including three deep bedrock wells. Nobis completed two rounds of groundwater sampling in August and November 2009 including existing wells. Packer test sampling of discrete fracture zones in the three deep bedrock wells was completed by Nobis in September 2009. The open hole interval of these wells was only sampled once, during the November 2009 round. Well locations are shown on Figure 3-2. The complete well network includes 20 shallow overburden wells, 4 deep overburden/glacial till wells, 15 shallow bedrock wells, and three deep bedrock wells. In addition, two bedrock boreholes of unknown depth, drilled in the 1940s by the U.S. Bureau of Mines (USBOM), (BOM-1 and BOM-3) were sampled along with the rest of the well network.

Groundwater sampling events were completed following the EPA low-flow sampling protocol. The samples were submitted for laboratory analysis of TAL metals (total and dissolved), total cyanide, sulfate, and hardness. In addition, most samples were also submitted for analysis of chloride, carbonate, bicarbonate, hydroxide, sulfide, nitrate/nitrite, nitrogen, total acidity, alkalinity, total cyanide, TSS, and TDS. In addition to the above analyses, 11 samples were

analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, and poly-chlorinated biphenyls (PCBs) during the November 2009 sampling round. Additionally, as part of the low-flow sampling protocol, field geochemical parameters were recorded for temperature, pH, conductivity, DO, ORP, and turbidity. Groundwater sample results are discussed in Section 6.

3.5.1.1 Bedrock Groundwater Packer Sampling

In September 2009, groundwater samples were collected by Nobis during packer testing of seven intervals in the three on-site deep bedrock wells. Deep bedrock well locations are displayed in Figure 3-2. The samples were submitted for laboratory analysis of TAL metals (total and dissolved). Bedrock groundwater packer sampling details are summarized in Table 3-1f. Samples were collected from three intervals in well MW-14D, two intervals in each of wells MW-19D and MW-20D. Due to the low number of water bearing fractures in each borehole, the number of samples that could be collected was limited. Results of the packer test analytical sampling are discussed in Section 6. Bedrock hydrogeologic characterization results from packer testing are discussed in Section 5.3.4.

3.5.2 Residential Well Sampling

In December 2007, URS collected one residential drinking water sample from a residence along Route 113, north of West Fairlee, approximately 1.5 mi east of the Site. In December 2009, residential drinking water samples were collected by Nobis from 6 locations as shown in Figure 3-8. Sampling of one of these residences was repeated in April 2010 to verify results from the December 2009 sample and to determine whether the lead that was detected in the initial sample was caused by a source in the pipes or boiler. Sample locations that were within approximately ½ mi from the Site were sampled to assess local groundwater quality relative to the Site and evaluate its potential impact on local drinking water. Drinking water samples were submitted for laboratory analysis of TAL metals (total and dissolved), chloride, sulfate, carbonate, bicarbonate, hydroxide, sulfide, nitrate/nitrite, nitrogen, total acidity, alkalinity, total cyanide, and hardness. Results are discussed in Section 6.7.

3.6 Biota

In September 2009, Avatar Environmental of West Chester, Pennsylvania, performed an ecological risk assessment of the Site. The assessment involved the collection of invertebrate and small mammal samples for laboratory analysis of select parameters. The following sections described the sampling performed at the Site.

3.6.1 Soil Invertebrates

Soil invertebrate sampling consisted of the collection of 8 composite samples by hand or sweep nets within the exposure areas located on Figure 3-9. Samples mostly consisted of varying species of crickets, grasshoppers, beetles, caterpillars, and spiders. Of the 8 samples, 6 were selected for off-site laboratory analysis of TAL metals and % moisture. Results of the soil invertebrate sampling are presented in the terrestrial baseline ecological risk assessment completed by Avatar (Nobis, 2011a). Conclusions are summarized in Section 8.

3.6.2 Small Mammals

Small mammal sampling consisted of the collection of 107 samples using mouse traps along 5 transects at the locations located on Figure 3-9. Of the 107 samples, 40 were selected for off-site laboratory analysis of TAL metals and % lipids. The types of mammals collected consisted of deer mice (24), woodland jumping mice (6), and short tailed shrew (10). Results are presented in the terrestrial baseline ecological risk assessment completed by Avatar (Nobis, 2011a). Conclusions are summarized in Section 8.

3.7 Air

Due to the non-volatile nature of the contaminants at the Site, the primary focus of investigation and sampling has been on the soil, surface water, and groundwater pathways. No air sampling has been conducted at the Site. The air pathway was assessed as part of the HHRA in consideration of the potential impact of wind-blown particulates that might affect human and ecological receptors that frequent the Site. The large barren areas of mine waste are prone to wind erosion, in particular the UWA and LWA, due to their larger open areas and the steeper topography of the UWA. However, relative to water erosion and transport, wind erosion is considered to have a very minor affect on the contaminant distribution at the Site.

4.0 DATA QUALITY ASSESSMENT AND LIMITATIONS

Data used to assess the nature and extent of contamination at the Site was collected by multiple agencies over a ten-year period. Each sampling effort completed by EPA, CRREL, USGS, URS, and Nobis was completed in accordance with event-specific project plans including quality assurance/quality control (QA/QC) sampling measures to assess the usability of analytical results. Data collected by URS and Nobis were subsequently validated and qualified as appropriate as part of data quality assessments for each project to evaluate whether the data acquired during the sampling events were suitable for use in assessing the current nature and extent of contamination at the Site. The assessments typically included:

- Review of the project data quality objectives DQOs and the sampling design.
- Review of sample collection logs.
- Review of the data validation.
- Correlation of data results to expected values and comparison with historical data results.

4.1 Data Quality Assessment

Based on assessments of the data completed by EPA, USGS, URS, and Nobis during each project, it was determined that the analytical data, as reported in published documents were considered complete and usable for this and subsequent reports except data noted as rejected which have been removed from the data tables. Results validated by URS (2008) and Nobis (2010) were qualified where necessary to indicate variability in sampling and/or laboratory procedures or non-homogeneity based on data review.

4.2 Data Limitations

Field sampling techniques, sample preparation, and handling methods for the collection of samples and analytical methods varied slightly between studies conducted at the Site. In general, industry standard practices were followed and for the most recent samples collected by EPA, URS, and Nobis, QA/QC and data validation procedures were implemented to ensure data usability. These variations were taken into consideration and where appropriate, only the most recent data was relied upon if inconsistencies in data trends were observed. In most

cases, historical data was found to be usable for the purpose of identifying the nature and extent of contamination. No other significant data limitations have been identified for the analytical data evaluated in this report.

During the field XRF program split samples were collected at a rate of approximately 15 % and submitted to a fixed laboratory to evaluate the accuracy of the on-site XRF lab results. Approximately 50 samples were submitted for off-site analysis of TAL metals to compare analytical results. Results from the off-site analysis were compared to the on-site XRF analysis by creating a scatter plot of the results and performing a regression analysis of the data. Copies of the scatter plots and regression curves are included in Appendix D. Results for copper concentrations show a strong correlation between the lab and XRF results for soil concentrations in the range of 600 milligrams per kilogram (mg/kg) or less with a correlation coefficient R2 of 0.89. In this range, the XRF results are typically lower than the laboratory results. Based on the scatter plot of selenium concentration results, a strong correlation occurs for the data set when qualified outliers are eliminated. The regression analysis indicates a correlation coefficient R2 of 0.93. Correlations between on-site XRF and laboratory results for the other analytes (iron, lead, and zinc) were not as strong. The correlation between field XRF and conventional off-site laboratory results for copper and selenium indicates that field XRF results can be used to delineate mine waste areas at the Site. Despite the fact that the XRF results are biased low, the relatively sharp copper concentration gradients observed in soil around the perimeter of mine waste areas allows for a high degree of confidence in identifying soils with copper concentrations well above background levels.

A comparison of total and dissolved metals in groundwater results showed good agreement, with some instances where dissolved sample results recorded a slightly higher concentration. This indicates that, overall, the quality of total metal samples was not affected by suspended solids or sample turbidity and are therefore representative of dissolved metal concentrations in the overburden groundwater.

5.0 SITE CHARACTERISTICS

The Site is characterized by 9 distinct waste source areas located within an approximately 350-acre area of the Site. These waste source areas include the UWA, LWA, ORB, EB-LR, and EB-MR, Tailings Area, the Smelter Area, the Slag Pile Area, and the Underground Workings.

Other Site study areas have been designated as waste impact areas and include: the EB-UR, EBT 1 through 5, Ponds 4 and 5, the Smoke Flue, SHB, and the EBOR. Additional features of the Site include the numerous open and collapsed adits and shafts, the Former Flotation Mill, and the remnant foundations of former Site buildings and equipment. Remnant features of the former mine are shown in Figure 2-2. Site waste source and impact areas are shown in Figure 2-4.

EPA determined that the Site should be divided into Operable Units (Figure 2-6). OU1 includes the UWA; LWA; Tailings Area; ORB, Ely Brook and its tributaries, and Pond 1 through Pond 6. OU2 includes the Smelter Area, Slag Pile Area, Smoke Flue, SHB, the underground workings, and all Site groundwater plumes. A more detailed discussion of the nature and extent of contamination in both OU1 and OU2 areas is provided in Section 6.

The following sections present a general description of Site physical features including:

- geologic setting;
- surface water hydrology;
- meteorology;
- demographics and land use;
- future use assessment;
- waste source area physical characteristics;
- impact area physical characteristics; and
- general conceptual hydrogeologic model.

5.1 Geology

Subsurface investigations conducted at the Site have included soil borings, test pits, hand auger borings, and well installations in overburden and bedrock. Boring logs are provided in reports by URS (2008) and Nobis (2010). In addition, borehole geophysical logging and packer testing and sampling were performed at three deep bedrock well locations which are discussed in Section 5.3.4.1. Geophysical logs from the bedrock borehole analysis are provided in the Nobis *Data Evaluation Report* (Nobis, 2010, included as Appendix C of this RI). Eight geologic cross-sections have been interpreted based on these subsurface data. The relative locations of these

cross-sections are shown in Figure 5-1 and the cross-sections and are included as A-A' through H-H', or Figures 5-2 through 5-9, respectively.

The surface soil of the Site includes a series of mine waste piles and former process areas with materials of varying characteristics. Due to extensive mining and processing activities at the Site, essentially all of the surface soil has been disturbed at some point in time. Investigations are focused on waste areas and the underlying overburden and bedrock geology to better characterize the nature, extent, transport mechanisms and migration pathways of contaminants in the waste materials.

The region was glaciated during the most recent, Late-Wisconsinan ice advancement approximately 13,000 years ago (URS, 2006; PAL, 2007). Outwash, glaciofluvial, and glaciolacustrine deposits were generated in the region as a result of the erosional processes caused by the advance and retreat of the glacier. Glacial till is the dominant overburden unit overlying bedrock in the Site region. Significant glaciofluvial and glaciolacustrine deposits, as well as recent alluvial deposits, are likely to be present at lower elevations (i.e., near major rivers, such as the Ompompanoosuc River). Small alluvial deposits derived from reworked natural and manmade soils at the Site are likely along the banks of tributary streams near the Site. The USDA classifies soils in the vicinity of the Site as Tunbridge-Woodstock-Buckland association, which is typical of soils formed in glacial till on upland terrain ranging from stony silty loam to very stony loam (PAL, 2005)

5.1.1 Overburden Soil

The undisturbed overburden encountered in the upper portions of the Ely Brook valley at the Site consists of glacial till overlying bedrock. In the lowermost portion of the valley, a sandy alluvial deposit overlies the glacial till locally. Soil overlying the till in the upper portion of the valley is typically reworked glacial or fluvial material locally mixed with waste rock. In waste areas, waste rock piles or partially processed ore or tailings comprise the uppermost portion of the overburden.

5.1.1.1 Alluvium

A thin alluvial deposit up to 4 ft thick was encountered immediately overlying the bedrock and overlain by approximately 6 ft of fill/waste material in the lower portion of the valley at location

MW-14A. The alluvium is a soft, gray-brown fine to medium sand with some silt and gravel. This deposit appears to be laterally discontinuous and likely represents channel deposits carved into the glacial till by postglacial streams.

5.1.1.2 Glacial Till

The glacial till encountered at the Site is typically a gray to olive brown, moderately dense, fine to medium sand with silt and gravel with variable thickness Bedrock was encountered at a shallow depth with 4 ft of alluvium overlain by 6 ft of fill/waste, with no dense till observed in the lower portion of the valley near well MW-14C. Meanwhile, glacial till up to 49 ft thick was reported in the lowermost portion of the valley beneath the slag pile (URS, 2008). The glacial till was observed up to 6 ft thick in the UWA, up to 12.5 ft thick in the tailings area, up to 5 ft thick in the LWA, and up to 4.5 ft thick beneath the ORB.

5.1.2 Bedrock

The Vermont Copper Belt lies within a group of Silurian-Devonian rocks comprising the western portion of the Connecticut Valley-Gaspe' Trough, which extends from Massachusetts to Quebec, Canada. Stratigraphic units in east-central Vermont include (from oldest to youngest) the Northfield Formation, Waits River Formation, Standing Pond Volcanics, and the Gile Mountain Formation (Slack, et al., 2001). The massive sulfide deposits of the Ely Mine lie within the Gile Mountain Formation of Devonian age. These rocks have been deformed during three stages of folding and amphibolite-grade metamorphism during the Devonian Acadian Orogeny.

The bedrock at the Site is exposed at many locations in the upper elevations of Dwight Hill and is composed primarily of siliciclastic metasedimentary rock (pelite and greywacke) representing a turbidite protolith, with minor mafic metavolcanic rocks (amphibolite). The main belt of the Gile Mountain rocks lies to the east of the Waits River Formation and is comprised primarily of metamorphosed siliciclastic rocks (graphitic pelite and quartzose granofels) representing a quartz-rich turbidite protolith. The amphibolites of the Standing Pond Volcanics occur typically along the contact between the Waits River and Gile Mountain Formations, and locally within the uppermost Waits River Formation, representing a suite of primarily thin metabasalts. The variations in the stratigraphic position of the Standing Pond Volcanics suggest that the contact between the Waits River and Gile Mountain Formations is time transgressive. The ore body at the Site had an elongated shape and extended over 3,000 ft inclined at approximately 25

degrees and formed along the crest of a fold in the bedrock layering along a trend of approximately N40E (Slack, et al., 2001). The mineralogy of the ore at the Site is dominated by pyrrhotite and chalcopyrite, with minor sphalerite and pyrite. The dominant minerals in the host rock are quartz, feldspar, and muscovite.

Boring logs from bedrock drilling completed by URS (2008) and Nobis (2010) were consistent with the lithology present in outcrops throughout the Site. Bedrock underlying the Site is consistent with the Gile Mountain Formation, a dark gray to black, muscovite-feldspar-quartz rich schist with generally low concentrations of disseminated sulfides and aluminous metamorphic minerals garnet and kyanite. Thin layers of amphibolite are common in outcrop although none were described from cores or drill cuttings. The primary structural fabric in the rock is a predominant foliation generally trending northwest, dipping 20-30 degrees to the northeast. A limited number of fractures were encountered in the bedrock boreholes as documented in the geophysical logs of the deep bedrock wells. The fractures encountered in the shallow bedrock tended to have the higher relative groundwater yield, although none of the wells intercepted water-bearing fractures that exceeded 2 to 3 gallons per minute (see packer test pump rate results in Table 5-1). Low Rock Quality Determination (RQD) values consistently observed by URS (2008) from cores in the shallow bedrock (less than 30 ft into bedrock) indicate that this portion of the bedrock is typically more fractured than the deeper bedrock (over 30 ft into bedrock). At locations MW-14 and MW-19, slabs of bedrock up to 5 ft thick were inferred near the base of the overburden during drilling (Nobis, 2010), and the uppermost 20 ft of the bedrock exhibited a fracture density significantly higher than the underlying deeper bedrock. Most water-bearing fractures encountered were oriented sub-parallel or orthogonal to the predominant foliation. During drilling of deep wells in 2009, the bedrock foliation fabric and associated rock-strength anisotropy influenced the borehole orientation, likely as a result of poor control of down pressure during drilling as indicated by moderate borehole inclinations from the vertical at depth. Invariably the deviation was directed toward the down-dip orientation of the foliation, which is the anticipated direction of lithologic weakness.

5.1.3 Geotechnical Properties

Nobis collected samples for geotechnical analysis during the 2009 field investigation to document the physical characteristics of waste materials to support the FS evaluation of remedial options. Soil samples were collected from the UWA, LWA, Tailings Area, ORB, and

sediment from Lower Ely Brook to evaluate geotechnical properties of these materials. Geotechnical soil sampling results are summarized in Table 5-2.

Based on the laboratory analytical results for grain size, the mine waste material consisted primarily of sand, lesser amounts of silt and clay, and lesser amounts of gravel-sized particles. Laboratory analytical results indicated that the % of sand-sized particles ranged from approximately 47.8 % to 73.7 %, percentages of silt- and clay-sized particles ranged from 7.2 % to 44.7 %, and percentages of gravel-sized particles ranged from 0.4 % to 33.4 % in the samples submitted.

Three samples were collected for specific gravity analysis from the UWA, the LWA, and within Ely Brook, downstream of the LWA. Laboratory analytical results for specific gravity ranged from approximately 2.75 to 2.79 in the three samples collected.

5.2 Surface Water Hydrology

5.2.1 Ely Brook, Tributaries, and Ponds

Ely Brook is a first order stream and the primary drainage pathway from the Site. Its watershed encompasses approximately 0.42 square miles (mi^2) with the highest elevation above 1,350 ft. Ely Brook descends over 380 ft from the headwater to its confluence with SHB at an elevation of 970 ft. The brook flows approximately 1 mi from its headwaters along the southern slope of Dwight Hill to the confluence with SHB (URS, 2008 and Seal, et al., 2010). Ely Brook is fed on the east by three significant tributary streams referred to as the EBT1, EBT2, and EBT4 that divide Ely Brook into four reaches referred to as the Ely Brook Headwaters, the EB-UR, EB-MR, and the EB-LR (Figure 2-4).

The Ely Brook Headwaters include the segment of Ely Brook located upstream of EB-1080M.

The EB-UR is defined as the segment of Ely Brook located between station EB-1080M (Figure 2-4 and Figure 3-5) and the confluence of Ely Brook and EBT2. It is approximately 1,700 ft in length and is characterized by a steep gradient, high-energy channel made up primarily of cobbles and boulders with little sediment deposition.

The EB-MR is defined as the segment of Ely Brook located between the confluence of Ely Brook and EBT2 and the confluence of Ely Brook and EBT1. It is approximately 660 ft in length and has a moderate gradient and relatively low sediment deposition below the confluence with EBT2.

The EB-LR is defined as the segment of Ely Brook located between the confluence of Ely Brook and EBT1 and the confluence of Ely Brook and SHB. It is approximately 1,200 ft in length and characteristically includes a relatively low gradient, with significant sediment depositional areas, including waste rock, and a significantly broader floodplain area than the upper reaches. A broad floodplain containing waste material has developed in the portion of the stream with low banks and a braided channel. The lowermost section is contained within a berm until Ely Brook flows under South Vershire Road in a culvert.

EBT1 drains an area along the eastern margin of the Site including the ORB, the access road, and a forested area south of the LWA. It is approximately 383 ft in length.

EBT2 is the largest EBT with a watershed area encompassing much of the UWA and LWA, the Lower Adit discharge, the Tailings Area, and the Ponds. The main stem of EBT2 is fed by discharge from the Pond 5 and is approximately 1,420 ft in length. EBT2 also has one significant contributing branch from the north identified as EBT3 and a small eastern tributary EBT5. EBT3 captures drainage from the western portion of the UWA (including discharge from at least three seeps EM-SEEP1, EM-SEEP18, and EM-SEEP2), the Tailings Area, and the western portion of the LWA. EBT3 is approximately 1,415 ft in length from the UWA to Ely Brook. EBT5 lies entirely within the LWA and is approximately 410 ft in length.

EBT4 drains a relatively limited area extending from Shaft No. 4 and the transition zone along the western portion of the UWA, in the vicinity of EM-SEEP-12 and EM-SEEP-19, and from a seep at location SW-79 draining from the base of the UWA. The EBT4 drainage is approximately 750 ft in length from the UWA to Ely Brook.

As a result of the relatively steep topography in the Ely Brook Valley, flow in Ely Brook and its tributaries increases rapidly in response to a rainfall and snow melt events. Following such events, the brook discharge recovers very quickly to base flow conditions. Previous studies (Holmes, et. al. 2002; URS, 2008) have shown the extreme flows resulting from snow melt and

rain events. The characterization of surface water impacts is discussed in detail in Section 6. A summary of estimated surface water flows based on observations during 2004, 2007, and 2009 is provided in Tables 5-3 and 5-4. These tables also include metal loading estimates that are discussed in Section 7.4.

5.2.2 SHB

SHB originates south of Vershire Center and has a drainage area encompassing 9.73 mi^2. SHB drops approximately 886 ft in elevation from its headwaters to its confluence with the Ompompanoosuc River (Figure 3-6). Ely Brook joins SHB at the base of the Ely Brook valley along the south side of South Vershire Road. Below the confluence, SHB forms the southern margin of the Site adjacent to the Slag Pile Area and flows 1.75 mi before its confluence with the Ompompanoosuc River (Seal, et al., 2010). USGS (2010) descriptions of stream reaches using flow characteristics and stream bottom composition show that a majority of the stream is characterized by cobble bottom with limited depositional areas for fine sediment to accumulate.

Because there is no USGS gauging station within the Ely Brook river basin, URS completed estimated discharge statistics for SHB at the Ely Brook and EBOR confluences. These estimates were calculated using watershed area ratios and data from a USGS gauging station on the East Orange Branch, which is located approximately 12 mi north of the Site in East Orange, Vermont. Select statistics showing average monthly and annual discharge, peak discharge, and flow duration for an eleven-year period can be found in a previous report by URS (2008).

5.2.3 EBOR

The EBOR is one of two main branches that meet to form the 23-mi long Ompompanoosuc River system, whose drainage area encompasses 136 mi^2 (Figure 3-6). The EBOR headwaters are located in the northwest corner of Vershire; the river then flows east and south respectively into Thetford. The confluence of the EBOR and the West Branch of the Ompompanoosuc River WBOR is just upstream of the Union Village Dam in Thetford. A USGS gauging station is maintained just below the dam. The Ompompanoosuc River then flows southeast to its confluence with the Connecticut River in Norwich, Vermont.

5.2.4 Vernal Pools

Four vernal pools were examined at the Site (VP-1 through VP-4, Figure 3-5) as part of the terrestrial BERA. Although a regulatory definition of a vernal pool for the State of Vermont was not identified, the Vermont Fish and Wildlife Department webpage (VTFW, 2009) provides a very general definition based primarily on hydrology. For the purposes of the BERA, vernal pools were defined as "small depressions" that appear to hold water for at least 2-3 months, that lack breeding fish populations and which support breeding of wood frogs or mole salamanders or contain fairy shrimp. Four potential vernal pools/complexes were identified at the Site based on this definition, as follows:

The Vernal Pool 1 Complex (VP-1) is located in the southeast end of the smelter area. The large pool was irregular in shape and approximately 45 m x 20 m with a heavy iron flocculation present throughout. Egg masses in the large pool appeared to be suffering a high mortality rate; neighboring small pools did not contain any egg masses, but a dead bullfrog was observed (Nobis, 2011a, Appendix A, Photo 1).

Vernal Pool 2 (VP-2) is a water filled swale approximately 200 m long located in a mature conifer forest. It contained 4 wood frog egg masses, 2 gray tree frog egg masses, and 2 spotted salamander egg masses. It is connected to an emergent wetland just north of it which contained 5 wood frog egg masses (Nobis, 2011a, Appendix A, Photo 2).

Vernal Pool 3 (VP-3) is a short, narrow water filled swale located in an open canopy deciduous forest and could be considered part of a small wetland complex. The ditch is approximately 5 m x 2 m and appears to an old excavated pit. It contained 2 wood frog egg masses. Water flows in and out of the pool, in which numerous mosquito larvae and midge larvae were observed (Nobis, 2011a, Appendix A, Photo 3).

Vernal Pool 4 (VP-4) is located in a mature deciduous forest stand with almost 100 % crown cover. The pool is adjacent to an extensive emergent wetland area (in which several wood frog egg masses were observed) that appears to part of the Ely Brook headwaters and is probably not impacted by mine-related activities. It is an oblong pool approximately 5 m x 2 m that contained 2 wood frog egg masses, 1 gray tree frog egg mass, and 2 spotted salamander egg masses (Nobis, 2011a, Appendix A, Photo 4).

5.3 Hydrogeology

The monitoring well network at the Site consists of a series of shallow and deep overburden wells paired with shallow bedrock wells, and, at three select well locations, deep bedrock wells. Two rounds of groundwater levels from the complete well network were recorded by Nobis during August and November of 2009. A summary of water level observations is provided in Table 5-5. Well locations are shown on Figure 3-2. Potentiometric surface maps were generated for the overburden and shallow bedrock flow units (Figures 5-10 and 5-11, respectively) based on observations by Nobis (2010) in August 2009. Due to the limited number of wells screened in deep overburden (glacial till) and deep bedrock, flow maps were not prepared for these flow units. Groundwater flow in each unit is discussed further below.

5.3.1 Shallow Overburden

Groundwater elevations from the August 2009 water-level round in overburden wells illustrate a pattern of groundwater flow mimicking the trend of the Ely Brook Valley. Groundwater contours in large part mimic the topographic contours, such that the flow is directed toward the tributary branches and main stem of Ely Brook (Figures 5-10 and 5-11). The average horizontal hydraulic gradient in the overburden ranges between approximately 0.15 in the upper portion of the valley (UWA) to 0.04 in the lower portion of the valley (LWA /Smelter/Slag Pile Area). The saturated thickness of overburden at the Site is highly variable, ranging from less than 10 ft to as much as 55 ft. Thickness generally increases with decreasing elevation, such that lower elevations typically have thicker saturated overburden areas (URS, 2008). The thickest section of saturated overburden lies beneath the Smelter/Slag Pile Area near the Ely Brook confluence with SHB. Based on observations from test pits completed by URS in 2007, the overburden is interpreted to be largely unsaturated along the steep uppermost slopes of the valley above the UWA (URS, 2008).

Hydrographs for three representative well clusters from locations MW-5, MW-4, and MW-1 in the uppermost, middle, and lowermost portions of the Ely Brook valley are included as Figure 5-12. Each well cluster shows the same general pattern of water level fluctuation. Over the 4 years of water level monitoring at the Site, the highest water table elevations were observed in April 2008 and the lowest in September 2007 with a maximum observed monitoring well fluctuation (i.e., range of measured values) equal to 5.54 ft observed in overburden well MW-2A.

Vertical gradients calculated for well pairs are shown in Table 5-5. In general, vertical gradients between the overburden and shallow bedrock are directed downward with the exception of location MW-7 near the headwaters of Ely Brook and the 3 locations (MW-10, MW-1, and MW-2) in the downstream portions of the Ely and SHB Valleys, where consistent upward gradients are observed. Location MW-7 is proximal to Ely Brook and a headwater wetland area indicative of a groundwater discharge area. Upward gradients in the lower portion of the Ely Brook Valley and wells adjacent to SHB are consistent with groundwater discharge conditions in these areas. Vertical gradients within the overburden were monitored at 3 locations (MW-1, MW-2, and MW-5) where alluvium, mine waste, or fill overlies glacial till. At location MW-5 there is a consistent upward gradient between glacial till and the overlying fill. In the Slag Pile Area, the vertical gradient at location MW-1 is variably upward or downward while at location MW-2 a consistent downward gradient is observed between the slag and till. MW-10B is screened in glacial till near the bottom of a steep slope. Well MW-5A is screened in a permeable reworked till/waste rock soil near a tributary branch draining the UWA, underlain by an undisturbed glacial till layer.

5.3.2 Deep Overburden

The deep overburden at the Site is defined by the glacial till unit where it is overlain by a more permeable reworked till, alluvium and/or waste rock, slag, roasted ore, or tailings. Four wells (MW-1B, MW-2B, MW-10B, and MW-5B) are screened in this unit and designated with the letter “B” on Figure 5-10. Three of the deep overburden wells (MW-1B, MW-2B, and MW-10B) are located within the lower portion of the Ely Brook and SHB Valleys where the overburden is thickest, up to 69 ft, and locally overlain by up to 9 ft of alluvial deposits. Glacial till is generally less than 10 ft thick in the higher valley elevations, where it forms a laterally discontinuous layer between the bedrock and alluvium or waste rock. In some waste areas in the lower elevations, this unit may significantly limit the downward migration of contamination in groundwater. In addition, consistently upward vertical gradients, observed between the shallow bedrock and overburden within the Slag Pile Area, indicate that bedrock groundwater is not likely to be impacted by the slag.

5.3.3 Shallow Bedrock

Fifteen shallow bedrock wells exist at the Site, typically screened within the uppermost 15-20 ft of the bedrock and designated by a “C” on Figure 5-11. Two of these shallow bedrock wells,

MW-5C and MW-09C, are screened over 40 ft into the bedrock, and represent a more intermediate bedrock depth interval than the other shallow bedrock wells. In general, the yields of the shallow bedrock wells are relatively low (less than 1 gallon per minute [gpm]) based on packer testing completed by URS (2008). RQD values logged at 5 ft intervals by URS were considerably lower (RQD 0-50 %) in the shallow bedrock than that observed in the deeper bedrock (RQD 75-95 %; URS, 2008). This is indicative of a higher density of open fractures and higher hydraulic conductivity in the shallow bedrock than in the deeper bedrock zone. The horizontal gradients and direction of flow in the shallow bedrock strongly mimic that of the overburden flow units (Figures 5-11 and 5-10, respectively). As previously discussed, the observed vertical gradients between shallow bedrock and overburden are typically downward with the exception of the local discharge areas in the Ely Brook headwater at MW-7C and at the bottom of the Ely Brook Valley at its confluence with SHB. The lack of upward gradients between shallow bedrock and overburden along the Ely Brook Valley suggests that Ely Brook is fed primarily from overburden discharge near the stream. Water levels in shallow bedrock wells MW-3C and MW-7C showed the largest range with up to 7 ft of head fluctuation between 2006 and 2009. Well MW-10C was observed to be a flowing well between December 2007 and May 2008, but not flowing during the 2009 monitoring efforts. The 2009 monitoring efforts did, however, show the well to be artesian with a consistently upward gradient.

5.3.4 Deep Bedrock

Three 150-ft deep bedrock open-hole wells (MW-14D, MW-19D, and MW-20D) were installed by Nobis in 2009. Borehole geophysical logs including a full suite of parameters, as discussed in Section 5.3.4.1, were obtained from these wells. In general, the deep bedrock at the Site was found to be very competent, with few, relatively isolated, water-bearing fractures encountered. Typically, these fractures yielded less than 2 gpm. The dominant lithology encountered is consistent with surface outcrops of the Gile Mountain Formation-foliated kyanite-garnet-muscovite-feldspar-quartz schist with little variation observed in cuttings. Fresh, disseminated iron sulfide (pyrite) or thin stringers of sulfide mineralization were commonly observed over wide borehole intervals. No significantly concentrated mineralized zones were encountered. Observations from the boreholes indicate relatively low yield and low fracture density with orientations subparallel and perpendicular to the foliation in the rock. The groundwater elevation data from the three well triplets show variation in the vertical hydraulic gradients along the axis of the Ely Brook Valley. At well location MW-19D, near the head of the valley, a

moderate upward gradient is observed between the deep bedrock and the shallow bedrock which is likely the result of the large recharge area and steep topography in the upper portions of Dwight Hill. At location MW-20D, in the central portion of the valley below the LWA, a strong downward vertical gradient exists between the shallow bedrock and deep bedrock, likely as a result of the relatively low fracture density of the bedrock and a limited hydraulic connection between the shallow and deep bedrock zones. There is also a relatively strong downward gradient between the shallow overburden and shallow bedrock at this location, which along with the thin saturated overburden thickness in this area suggests that shallow groundwater may be "perched" relative to the deep bedrock. It should be noted that the observed water level in low-yielding bedrock wells may reflect the head in a single low-yielding fracture that intersects that borehole. Meanwhile, the observed water level in the case of a long, open borehole interval may reflect a composite head from several water-bearing fractures. At location MW-14D, a moderate upward hydraulic gradient is observed between the shallow and deep bedrock zones and is attributable to the well's location in the lowermost portion of the Ely Brook Valley near the discharge area and the confluence of Ely Brook and SHB. Observations at this location are consistent with the upward gradients observed in shallow bedrock wells along SHB (MW-1C and MW-2C) which exhibit upward gradients with respect to the paired overburden wells. These upward gradients may limit the potential impact to deep bedrock groundwater from surface sources. Deep bedrock wells were installed relatively recently, and have therefore only been monitored for a short time. To date, observed water levels in these wells have shown a more limited range of head fluctuation (+/- 0.8 ft) than observed water levels in the overburden and shallow bedrock over the same period of time.

5.3.4.1 Borehole Geophysics and Packer Testing

In order to adequately characterize the bedrock at the Site, borehole geophysical logging was completed in 2009 by Nobis in the three 150-ft deep, open-hole bedrock wells MW-14D, MW-19D, and MW-20D. The geophysical logging suite included ATV, OTV, fluid temperature and resistivity, caliper, natural gamma, SPR and SP, and HPFM under pumping and non-pumping conditions. A brief summary of borehole observations is provided in Table 5-6. The geophysical logs are provided in the 2010 Data Evaluation Report (Nobis, 2010, included in this RI as Appendix C). In addition to characterizing the intrinsic and hydraulic properties of the rock, results from these surveys were used to identify specific fracture intervals for further

hydraulic testing and sampling, with the ultimate goal of assessing groundwater quality via packer testing. A summary of observations from packer tests is included in Table 5-1.

Results from Well MW-14D (located in the lower portion of the valley) show one isolated transmissive fracture at 102 ft below ground surface (bgs) which is most evident in the caliper and SPR, as well as the OTV and ATV logs. Additional potentially water-bearing fractures were observed at 53 ft, 73 ft, and 88 ft bgs with generally weak signatures on the logs. Results from packer testing in these zones showed measurable yield (estimated between 2.5 gallons per minute (gpm) to 3 gpm) only in the interval that included the fracture at 102 ft bgs, with the remaining zones purged dry at a rate less than 2 gpm. Structural information from the ATV/OTV log indicates that the dominant foliation in the rock strikes approximately north-south with an easterly dip between 30 and 40 degrees. The water-bearing fracture and the majority of potential water-bearing fractures observed are oriented to N65W, 50SW. Water quality results of groundwater from the three zones tested did not detect copper or other parameters that would indicate a potential impact from surface sources.

The borehole logs from Well MW-19D (located near the top of the UWA) identified two transmissive zones at 43 ft and 75 ft bgs which are clearly noted on the caliper and ATV/OTV log. Results from the HPFM testing showed that the fracture at 43 ft bgs was responsible for the majority of flow during pumping although the fracture at 75 ft bgs appears more significant on the ATV/OTV/caliper due to its steep dip orientation, which creates a longer intercept interval in the borehole. Four zones were hydraulically tested and sampled during packer testing, including the two zones described above. The zone at 43 ft bgs had an estimated yield of approximately 2 gpm while the estimated yield of the fracture at 75 ft bgs was close to 1 gpm. The other two intervals tested purged dry during testing. Structural data from the ATV/OTV logs indicate that the dominant foliation is oriented to approximately N25W, 25NE with a significant degree of variation likely due to broad folding of this fabric. The fractures at 43 ft and 75 ft bgs have estimated orientations of N75W, 45SW and N48E, 82NW, respectively. Water quality results of groundwater from the fracture at 43 ft bgs detected a copper concentration of 8,380 micrograms per liter (µg/L) while the test interval at 75 ft bgs detected a copper concentration of 1,050 µg/L. In addition, concentrations of aluminum, cadmium, manganese, nickel, zinc, acidity, and sulfate were elevated in correlation with the shallower wells at this location. It is uncertain whether the lower interval (75 ft bgs) test result was influenced by leakage from the packer, but the high metal concentration detected from 43 ft bgs suggests a connection between this

fracture and the shallow overburden/shallow bedrock groundwater which also contains high metal concentrations as a result of the overlying waste rock material in this area. The orientation of these fractures and their limited yield suggests that the water quality observed in MW-19D is not influenced by the mine pool present in the underground workings.

Results from well MW-20D (located between the LWA and the ORB in the middle portion of the valley) indicate that two potentially transmissive fractures are present. The upper fracture is at 38 ft bgs at a shallow depth below the casing. The lower fracture is at 89 ft bgs as indicated most clearly by the caliper log. Additional relatively minor fractures were observed at depths of 54 ft and 105 ft bgs as noted on the logs. Measurable groundwater flow was observed from the fracture at 89 ft bgs by the HPFM testing during pumping conditions. These results are weakly mimicked by a subtle variation in the SPR signature. Five zones were hydraulically tested; all of these pumped dry at rates less than 2 gpm. The upper zone at 38 ft did not appear to have a measurable yield. The lower fracture at 89 ft has an estimated yield of about 2 gpm. Structural data from the ATV/OTV log indicates that the dominant foliation in the bedrock at this location is oriented to approximately N15E, 30SE. The fractures observed at 38 ft and 89 ft bgs are oriented to N42W, 50SW and N32W, 22SW, respectively. Water quality tests of groundwater from the 38 ft and 89 ft bgs intervals did not detect copper or other parameters that would indicate a potential impact from surface mine waste sources.

In general, results from geophysical logging and packer testing of the deep bedrock indicate a very limited frequency of water-bearing fractures. The few fractures encountered were of very low yield. Only one location, MW-19D, showed an impact from the overlying waste material, detected at 43 ft and 75 ft bgs. The fractures observed to have measurable yields were typically oriented at a high angle to the dominant foliation in the bedrock, whether northeast or northwest trending. The lack of water-bearing fractures oriented subparallel to the dominant bedrock foliation is likely the result of the pervasive nature and relatively low angle of dip of this fabric.

5.3.5 Hydraulic Conductivity

Slug tests were performed by URS and Nobis on monitor wells to estimate hydraulic conductivity values for the overburden and shallow bedrock flow units. Results are summarized in Table 5-7. The average hydraulic conductivity (K) observed for the shallow overburden was 4.3×10^{-4} centimeters per second (cm/sec). This average value does not include the estimated K

value for the slag measured in well MW-02A, which was two orders of magnitude higher at 6.2×10^{-2} cm/sec. The average hydraulic conductivity of the glacial till was 1.8×10^{-4} cm/sec. The average hydraulic conductivity for the shallow bedrock was observed to be 4.3×10^{-4} cm/sec. These results document the slightly lower conductivity of the glacial till, which locally may impede groundwater flow between the shallow overburden and bedrock. The shallow bedrock wells showed a wide range of hydraulic conductivities resulting from the greater variability of the number and yield of water-bearing fractures between locations, but the average K value is comparable to that of the shallow overburden. Based on horizontal gradients observed at the Site and the average hydraulic conductivity estimates, and assuming effective porosities of 25 % for shallow overburden and 15 % for till and shallow fractured bedrock, average seepage velocities range from 0.19 ft/day to 0.73 ft/day in shallow overburden, 0.14 ft/day to 0.51 ft/day in glacial till, and 0.33 ft/day to 1.2 ft/day in shallow bedrock. The higher values represent flow in the steeper portions of the valley (UWA) and the lower values represent flow in the lower elevations of the valley (LWA/Smelter/Slag Pile Area). In contrast, the K value estimated for the slag results in a seepage velocity within the Slag Pile Area on the order of 46 ft/day, assuming an effective porosity similar to the shallow bedrock. Due to the uncertainty associated with estimating very high hydraulic conductivities from slug tests, this value is suspect. Groundwater flow through the Slag Pile Area is discussed further in Sections 5.4.7 and 6.5.8.4.

5.4 Waste Source Areas

Nine distinct waste source areas are defined at the Site based on their physical characteristics and relationship to historic mining operations at the Site. These waste source areas are shown on Figure 2-4 and include the UWA, LWA, Tailings Area, ORB, EB-LR, EB-MR, the Smelter Area, the Slag Pile Area, and the Underground Workings. Site waste source areas are distinguished from impact areas based on their significance and volume as an origin of ARD/AMD and metals contamination in environmental media. Without remedial actions to address these contaminant waste sources, restoration through natural attenuation would not occur within a reasonable time-frame, resulting in unacceptable long-term risks to human health or the environment.

Subsurface conditions in the following waste source descriptions are illustrated in a series of geologic cross-sections designated A-A' through H-H' (Figures 5-2 through 5-9, respectively). The locations of these cross-sections are shown in Figure 5-1.

5.4.1 UWA

The UWA is comprised of a series of terraced, overlapping mine waste rock piles of varying thickness covering an area of approximately 8.5 acres located along the upper portion of the Ely Brook Valley along the south slope of Dwight Hill. This portion of the Site also includes the upper mine openings and development rock in addition to the waste rock piles.

The piles extend downslope from the Main Shaft to the Burleigh Shaft. They contain a mixture of barren country rock (from development of the mine openings) and ore-bearing rock, which has undergone varying degrees of hand-cobbing and sorting to remove the majority of the ore prior to being transported downslope for more processing. As a result, material remaining in these piles contains some small percentage of residual copper-rich ore material, or what otherwise would be considered low-grade ore. Along with the barren country rock, these waste rock piles contain a significant amount of pyrrhotite, which reportedly comprised a considerable part of the ore body but was not a desirable part of the refined ore. Much of the acid-generating source of the waste rock is derived from this discarded pyrrhotite.

Cross-sections A-A' and B-B' (Figures 5-2 and 5-3, respectively) illustrate subsurface conditions in the UWA. These sections trend north-south subparallel to groundwater flow and illustrate the variable thickness of the waste rock and the terraced distribution of mine wastes from the mining processes to allow for road access to other areas of the piles. Maximum waste rock thicknesses of up to 22 ft were observed on the southern and downslope edge of the UWA (Pile 9, Figure 2-2) (URS, 2008, included in this RI as Appendix A).

The UWA waste consists of poorly sorted partially hand-cobbed ore material from sand to cobble size with varying amounts of weathered ore cobbles intermixed. The UWA appear to contain a considerable amount of boulder sized material as evidenced by a pile of boulders along the western margin of this area reportedly segregated during a brief ore reclamation effort in the early 1940s (PAL, 2005). The surface topography of the piles has been modified since mining activities had ceased in 1905 by erosion and post-mining era scavenging of the piles

during the World War II Era. The waste rock material weathers readily to release sulfate and metals that form salt encrustations and secondary minerals which play an important role in the interaction between surface water in the form of snow melt, precipitation, and seeps; these processes can result in downstream environmental impacts.

A series of groundwater seeps punctuates the southwestern slopes of the piles. Upslope from the main portion of the piles are 6 shafts and 2 adits including the Main Shaft and the Main Adit which were the principal access routes to the underground workings. Additional underground workings not connected to the Main Shaft include the Burleigh Shaft located south of the main waste rock piles, abandoned Shaft No.4 west of the piles, the collapsed 1850 Pollard Adit B within the central portion of the piles, and the Lower Adit (Deep Adit), located southeast of the Burleigh Shaft. Below the Lower Adit is a steep pile of boulder-sized development rock excavated from the adit with a footprint of approximately ¾ acre. This material does not contain the high volume of finer sand to gravel size material found in the waste rock piles. A series of beaver ponds numbered 1 through 5 define the downslope extent of the UWA, southeast of the Lower Adit.

The UWA waste rock piles were initially subdivided by number as Piles 4, 6, 7, 8, and 9 by PAL and similarly referenced in a USGS study of the pile composition (Figure 2-2) (Piatak, et al., 2004a). The upper workings occupy the steep slope between the Main Shaft and the barren waste rock piles. This slope includes collapsed adits, shafts, and small waste rock piles. Pile 4, the northernmost lobe of the UWA, consists of a steep, barren circular area north of well location MW-19 (Figure 3-2). This pile was reportedly partially removed for processing at Elizabeth Mine in 1949-50, leaving a surface veneer of waste rock. Waste Rock Piles 6, 7, 8, and 9 comprised the greatest volume of waste rock of the UWA and are located south and southeast of Waste Rock Pile 4. These piles occupy the northeast, southeast, northwest and southwest quadrants of the UWA divided by an east-west spur road along the base of the upper pile terrace, adjacent to well location MW-18A (Figure 3-2) and the north-south oriented former Tramway (Figure 2-2). They consist of largely barren, terraced piles of oxidized ore and orange-stained soil. Piles 6 and 7 are similar to Pile 4 in that they represent a remnant of the original pile after the 1949-1950 removal activities. Piles 8 and 9 are reported to retain their original topography and contain features which include the remains of a truck-loading ramp and retaining walls, and a groundwater seep which may correspond with a collapsed adit.

The former Tramway consists of a narrow barren swath descending from the base of the UWA approximately 200 meters south to the World War I Flotation Mill foundation (Figure 2-2). In 2001, USGS sampled and compared metal compositions of the numbered piles in this area. Results showed considerable similarity in the copper composition and acid-generating characteristics between the piles (Piatak, et al., 2004a). However, the historical record of waste rock processing along with visual inspection of the surface of the piles and subsurface borings documents the variable thickness, volume and particle size within and between piles relating to their long and variable history. In addition, two separate piles of relatively barren development rock are associated with the Lower Adit and Shaft No. 4 and are included in the UWA. The Lower Adit development rock pile occupies an area of approximately ¾ acre, with an estimated volume of 12,140 cubic yards (cy). Additional waste rock characterization data from the UWA are discussed in Section 6.

Based on the observed vertical and lateral extent of waste rock or soil impacts over an approximate 8.5 acres, the UWA contains an estimated 73,000 cy of mine waste, not including the Lower Adit development rock pile.

In the northernmost portion of the UWA, waste rock surrounding and downslope of mine shafts exist as a thin veneer overlying bedrock with no glacial till. As a result of the thin overburden and steep terrain in this area, the overburden soil is largely unsaturated, with the water table residing within or along the bedrock surface. Observations from test pits indicate that the bottom foot of waste rock may be periodically saturated in this area.

Water levels measured in shallow overburden well MW-19A, within the main portion of the UWA, showed a groundwater fluctuation of +/-3.5 ft from Summer to Fall suggesting that the lowermost 1 ft of the waste rock pile in this area was periodically saturated with groundwater during that time. Downslope of well cluster MW-19 and within the main portion of the UWA, a thin, and likely discontinuous, glacial till layer exists below the waste rock. Although the water table resides largely along the upper surface of the till layer in this area, water level data from MW-18A during Summer and Fall 2009 indicate that the bottom 1 ft of waste rock becomes periodically saturated. More significant mounding of groundwater may occur during high flow periods, resulting in a greater thickness of saturated waste rock.

Cross-sections A-A' and B-B' (Figures 5-2 and 5-3) illustrate the thin veneer of waste material present in the southernmost UWA downgradient from the piles. Waste in this transition zone is likely present as a result of erosion and downgradient surface water transport.

Cross-section B-B' shows that the 1861 Pollard Adit (Main Adit) is a discharge point for the underground workings of the mine and a recharge source for overburden groundwater in this area of the UWA. Cross-section B-B' also illustrates the locations of tributaries EBT2 and EBT3 which are fed by seeps. There are at least 4 seeps that flow over the top of unsaturated waste rock material. The seeps associated with the UWA appear to emerge where the top of the glacial till is at a very shallow depth. This is consistent with water table observations indicating that the till beneath the waste rock is saturated due to its relatively lower hydraulic conductivity in comparison to the overlying waste rock. It is anticipated that during high flow periods such as during Spring snow melt and periods of high rainfall, the thickness of saturated waste rock at the base of the piles may be somewhat greater than currently observed due to mounding of groundwater on top of the glacial till.

Seeps emerge where the top of the till or bedrock is near the surface, such as along the breaks in slope, along terraces and at the base of the piles. The relatively high silt and clay-sized secondary mineral content (including jarosite and goethite) of the weathered waste rock at the surface of the pile locally results in low permeability soil and tributary flows from the seeps over the waste rock. Discharge from the Main Adit provides a localized influx of groundwater beneath the UWA which may reemerge, in part, downslope at seeps. Groundwater flow from seeps within and along the base of the waste rock piles contains significant metal and sulfate loading, which is transported to Ely Brook by tributaries EBT2 and EBT3.

5.4.2 LWA

The LWA encompasses a 6 acre barren, open area in the central portion of the Site, with a moderate surface slope down to Ely Brook, which forms the western boundary of the area. Waste rock in the LWA is generally less than 10 ft thick and is dissected by shallow erosion gullies. The southern limit of the LWA is defined by an area of slightly higher elevation than the adjacent waste area with a dense growth of coniferous trees. In addition, along Ely Brook, a stone retaining wall forms the lowermost margin separating the LWA from Ely Brook.

The northern margin of the area is marked by the foundation and remnant soil pile of the Former Flotation Mill. Adjacent to the southwest of the mill is the low-lying Tailings Area, which is traversed by the access road and encompasses approximately 0.7 acres. The two major tributaries to Ely brook, EBT2 and EBT3, traverse the LWA. An abandoned exploration shaft is located to the northeast of the access road in the vicinity of the former Pond 6, which was destroyed in 2007 as a result of spring flooding. Similar to the UWA, the material in this area consists of poorly sorted partially hand-cobbed ore material from sand to cobble size with varying amounts of weathered ore cobbles intermixed. The LWA does not appear to contain a considerable amount of boulder sized material found in the UWA. The waste rock material weathers readily to release sulfate and metals that form salt encrustations and secondary minerals which play an important role in the interaction between surface water in the form of snow melt, precipitation, and seeps; these processes can result in downstream environmental impacts.

Subsurface investigations in the LWA have included soil borings, test pits, and monitoring well installations conducted by URS and Nobis to confirm the characteristics and thickness of waste rock and native overburden soils. These investigations documented the presence of non-stratified waste of variable thicknesses ranging from 4 to 7.5 ft, with up to 12.5 ft of glacial till underlying waste rock. Cross-sections C-C' and D-D' (Figures 5-4 and 5-5) illustrate the relationship between the mines waste, overburden, bedrock, and groundwater within the LWA.

As indicated in these sections, the LWA is a relatively uniform layer of waste rock, generally less than 10 ft thick. The till in this area is relatively thin and may be discontinuous. A layer of alluvium overlies the till in the central portion of the valley and a thin veneer of LWA waste rock overlaps the Tailings Area south of the access road. A thin veneer of waste rock also exists in the wooded area to the west of the waste piles.

The LWA occupies a portion of the Ely Brook Valley where tributaries and the main stem of Ely Brook merge (Figure 2-2). As a result, this area represents a significant groundwater discharge area with a relatively shallow water table, as evidenced by multiple seeps scattered through the western portion of the pile. The LWA is also bisected by three tributaries to Ely Brook (EBT2, EBT3, and EBT5), This topographic setting results in shallow overburden groundwater conditions, as demonstrated in the central portion of the LWA by water levels in MW-21A (Figure 3-2) where at least 4.5 ft of waste rock is saturated with groundwater, with little water

table fluctuation observed between the Summer and Fall of 2009. Observations from soil borings, test pits, and monitoring wells in the LWA indicate that a significant portion of waste rock in this area lies within the water table.

5.4.3 Tailings Area

A relatively small area of fine flotation tailings encompassing approximately 0.7 acre is located immediately southwest and downslope of the Former Flotation Mill with a thickness of up to 8 ft. There is no defined pile for the Tailings Area (Figure 2-4). EBT3 has cut a channel through the Tailings Area which exposes the tailing. Importantly, due to its finer grain size (45 % silt and clay sized material), the tailings are generally less permeable than the waste rock material. The lower permeability combined with the saturated nature of the tailings results in limited oxidation below the surface, as evidenced by the presence of black anoxic tailings below 2 ft. Although the tailings represent a small area and are less permeable, they contain significantly higher copper concentrations and have a generally higher acid-generating potential due to their higher pyrrhotite content resulting from the flotation process in comparison to waste rock.

The geologic cross-section C-C' and D-D' (Figures 5-4 and 5-5, respectively) illustrate the relationship between the waste, overburden, bedrock, and groundwater within the Tailings Area. Cross-section C-C' shows that the tailings overlie a relatively continuous layer of glacial till approximately 10 ft thick. Observations from MW-22A (Figure 3-2) indicate that essentially all of the tailings material is saturated with groundwater, which flows through the pile and discharges to tributary EBT3. Water table fluctuations observed between the Summer and Fall of 2009 in MW-22A are minor.

5.4.4 ORB

The ORB is a sparsely vegetated and generally flat-lying area approximately 900 ft long and 200 ft wide, located southeast of the LWA and encompassing approximately 2.2 acres. The western limit of the ORB is demarked by a high stone-slab retaining wall. The eastern margin of the ORB is delineated by the adjacent forested hillside, which slopes upward to the east. The ORB waste is distinguishable from the LWA to the north by the deep red color of its hematite-rich, fine to medium grained soil up to 8 ft in thickness.

Waste material in the ORB includes remnant piles of partially-roasted ore that remained onsite after closure of the mine operations. The partially-processed ore, which was stockpiled in this area for roasting, was typically layered with coarser material toward the bottom and finer material toward the top in order to enhance the roasting process, thereby lowering the sulfur content of the ore prior to transport to the smelter (PAL, 2005). Roasting oxidized the ore, increasing the hematite (iron oxide) content of the material and resulting in the observed dark reddish brown soil color (Piatak, et al., 2004a). The roasting process has significantly reduced the sulfur content of these soils, which has in turn reduced the acid-generating potential of this material.

A small tributary, EBT1, crosses the roast beds and the access road at a location where the retaining wall has collapsed. An abandoned exploratory shaft is located along the northeast margin of the ORB area (Figures 2-2 and 2-4).

The geologic cross-section E-E'' (Figure 5-6) illustrates the relationship between the waste, overburden, bedrock, and groundwater within the ORB. The overburden monitoring well MW-23A (Figure 3-2) was installed in the proximity of an intermittent tributary that transects the area. The observed thickness of the roast bed material at this location was 8 feet, underlain by 6.5 feet of gray glacial till. Water level data from well MW-23A indicates that the glacial till is saturated with minor water table fluctuation between Summer and Fall 2009. At high water table levels, the phreatic zone lies above the till, saturating the lowermost 1 ft of ORB waste in the eastern portion of the roasted ore soil layer.

5.4.5 EB-LR and EB-MR

Both the EB-LR and EB-MR contain alluvium composed of eroded waste rock. Even in the absence of upgradient contaminant sources, these sediments would contribute acidity and metals contamination to Ely Brook and SHB and, therefore, these portions of Ely Brook are considered distinct waste sources. The waste rock and sediments located to the east of the EB-MR channel are contiguous with the LWA and are, therefore, included in the LWA delineation. The EB-MR source area is defined as the stream channel itself as well as the limit of waste alluvium located to the west of the channel. The EB-LR has significant waste alluvium deposition, including a broad floodplain with low banks and a braided channel (Figure 2-4).

5.4.6 Smelter Area

The Smelter Area lies at the southern margin of the Site along the north side of South Vershire Road and encompasses an area of 3.8 acres. The area is a barren waste rock area with small waste rock and debris piles along the southwest margin of the area. A small vegetated area containing a vernal pool is located along the northwest portion of the smelter area. The northern limit of the area is marked by a stone-slab retaining wall and steep slope leading up to an access road. Several partially buried stone-slab smelter bases are located along the central portion of the area marking the former location of the smelter building, which extended to the southeast beneath the existing road location. The Smoke Flue extends from the Smelter Area approximately 1500 ft northeast to the top of the adjacent hillside.

The Smelter Area is located at the bottom of the Ely Brook Valley adjacent to SHB in an area where bedrock groundwater shows moderate to strong upward gradients (Figure 2-4). The smelter wastes are underlain by a thin alluvium and a thick glacial till as illustrated in cross-section G-G' (Figure 5-8). Based on observations from monitoring wells, bedrock groundwater in the Smelter Area shows moderate to strong upward gradients. The majority of the shallow groundwater from this area is directed toward SHB, although groundwater along the western portion of the area is directed toward Ely Brook. Based on subsurface borings and test pits performed in the Smelter Area, as much as 5 ft of mixed debris, fill, waste rock, and slag are saturated by groundwater.

5.4.7 Slag Pile Area

The Slag Pile Area encompasses an area of approximately 3.8 acres located at the bottom of the Ely Brook Valley between the Smelter Area and SHB (Figure 2-4). The Slag Pile Area is characterized by deposits of debris and slag waste from the former smelting operations up to 18 ft thick (URS, 2008). At one time, the slag deposit was described as being 600 ft long, 400 ft wide, and an average of 15 ft deep; it had grown so large that the road to the mine had to be rerouted (PAL, 2005).

The glassy slag material appears similar to a volcanic lava flow, with hemispherical outlines of the slag pots used to deposit the slag in a semi-molten state resulting in a semi-fused mass of slag built up along the bank of SHB. The exposed face of the pile extends north to the confluence with Ely Brook, and south to a retaining wall where talus from the slag exposure

impinges on the northern bank of SHB. Slag is also found along the eastern bank of Ely Brook and along the access road at the western end of the Smelter Area. The limit of slag to the north of South Vershire road is not known; however, limited subsurface excavations have revealed overlap between the Slag Pile Area and the Smelter Area. The Slag Pile Area is believed to extend to the north beneath South Vershire Road likely up to the foundation of the former smelter building (PAL, 2005). Observations of several cobbles and boulders of slag material in the stream bed and freshly exposed slag material along the southeastern-most portion of the Slag Pile Area where it forms the north bank of the stream indicate that the slag is eroding into SHB, most likely during high flow periods. The exposed portions of the Slag Pile Area upstream, which are farther from the brook, are less likely to contribute significant volumes of slag to the brook under base flow conditions. However, the steep face of the exposure resulting from reported past quarrying activity has reduced the stability of the outcrop face as evidenced by talus material collecting at the base of the slope. This material is likely to be transported downstream during high flow events.

The slag wastes are underlain by a thin alluvium and a thick glacial till as illustrated in cross-section G-G' (Figure 5-8). Based on observations from monitoring wells, bedrock groundwater in the Slag Pile Area shows moderate to strong upward gradients. The majority of the shallow groundwater from this area is directed toward SHB, although groundwater along the western portion of the area is directed toward Ely Brook. Subsurface borings and test pits indicate that as much as 5 ft of slag wastes are saturated by groundwater.

5.4.8 Underground Workings

The extent of the underground workings of the Ely Mine has been estimated by based on historical records (White and Eric, 1944). The locations of the mine openings and related surface features have been mapped by PAL and are shown in Figure 2-2 (PAL, 2005). The surface projections of the mine workings underlying the Site and extending beyond the North side of Dwight Hill are estimated on Figure 2-2 based on cross-sections of the ore zone compiled by White and Eric (1944). The mine extends beneath the northeast slope of Dwight Hill, such that the workings lie between 500 ft and 1,500 ft below the ground surface beyond the peak of Dwight Hill.

There are approximately 12 shafts, adits, vents or other openings that have been identified on maps of the Site (PAL, 2005). Many of these may not be accessible or have collapsed, and some may have never intersected the mine. The Main Shaft of the mine is the uppermost opening located along the steep slope above the UWA at an elevation of approximately 1,375 ft. It represents the surface opening of the primary mine shaft where the ore was extracted at the Site. From this point, the underground workings that followed the ore body extend approximately 3,000 ft northward and descend some 1,500 ft vertically along a trend of N40E at an inclination averaging about 25 degrees over the length of the mine. There are no known mine openings north of the Main Shaft. Based on observations from the 1943 survey by the U.S. Bureau of Mines, and anecdotal evidence provided by spelunkers visiting the mine, the flooded level of the mine is estimated at 1,275 ft (White and Eric, 1944; PAL, 2005).

The Main Adit is located farther downslope to the southeast along the steep slope above the UWA. This adit was the primary haulage for ore from the mine. The Main Shaft is filled with groundwater up to the level of the Main Adit which serves as the decant point for the mine pool. Mine shafts and adits farther downslope of the Main Adit, such as the Pollard Adit B, the Burleigh Shaft, and the Lower Adit (Deep Adit) are not known to intercept the Main Shaft but are important historical landmarks, as well as avenues of groundwater discharge. Below the UWA, the Lower Adit (Deep Adit) extends beneath the UWA but does not intersect the Main Shaft. It is interpreted to be a source of mine drainage to the surface. The Burleigh Shaft is located at the base of the UWA just west of the former Tramway and is interpreted to connect with the Lower Adit (White and Eric, 1944). Two additional abandoned exploratory shafts are located in the eastern part of the LWA, southeast of the access road junction (Pond 6 location), and along the eastern margin of the Ore Road Bed Area.

5.5 Waste Impact Areas

Twelve waste impact areas have been defined at the Site and include: EB-UR, EBT1 through EBT5, Ponds 4 and 5, VP-1, the Smoke Flue, SHB, and the EBOR. Waste impact areas are those zones that have received contamination from upgradient waste sources, resulting in some degree of impacts that may require response actions. However, the nature and extent of contamination and volume of environmental media requiring cleanup is much less substantial than waste source areas.

5.5.1 EB-UR

Eleven surface water and sediment waste impact areas have been defined at the Site and include: the EB-UR, EBT1 through EBT5, Ponds 4 and 5, VP-1, SHB, and the EBOR. Additional information regarding the physical and hydrologic characteristics of the surface water and sediment impact areas is provided in Section 5.2 (Surface Water Hydrology). The Smoke Flue represents a soil waste impact area. The twelve surface water, sediment, and soil waste impact areas are shown on Figure 2-4 and their general relationship to Site waste source areas is described below. The EB-UR receives discharge from the UWA via EBT4 that discharges to the EB-MR just upstream of station EB-770M (Figure 3-5).

5.5.2 Ely Brook Tributaries and Ponds

Ely Brook is fed from the east by three significant tributary streams, EBT1, EBT2 (which also includes EBT3, EBT5, and the outflow from Ponds 1 through 5), and EBT4 (Figure 2-4). Ely Brook also receives discharge from the UWA and LWA overburden and bedrock groundwater plumes.

EBT1 is a relatively minor tributary, receiving upgradient discharge from the ORB source area. EBT2 is the only surface water drainage for the LWA, receiving upgradient discharge from that source area as well as the UWA (via EBT3), the Tailings Area (via EBT3), the Lower Adit of the Underground Workings (via an unnamed, intermittent tributary), and Ponds 4 and 5. EBT3 originates from the UWA, receiving upgradient discharge for that source area as well as the Tailing Area and the northwestern portion of the LWA. EBT4 receives upgradient discharge from Shaft No.4 of the Underground Workings as well as a seep at the base of the UWA. EBT5 receives upgradient discharge from the LWA.

5.5.3 SHB and the EBOR

SHB is the point of discharge for Ely Brook, the Slag Pile waste sediment, and the Smelter and Slag Pile Area overburden groundwater plume and, therefore, receives upgradient discharge from all Site source areas (Figure 2-4). As the ultimate discharge point for SHB, EBOR is also potentially impacted by all Site source areas.

5.5.4 Smoke Flue

The Smoke Flue is a unique feature of the Site and consists of a linear alignment of two parallel stone walls connected by overlying slabs of stone to form a flue that extends approximately 1,500 ft from the former smelter building, upslope to the northeast to the top of the hillside adjacent to the former location of the smelter building (Figures 2-2 and 2-4). The flue was reportedly used unsuccessfully to try to direct exhaust from the smelter operations away from the valley. It was reported to be ineffective. An 80-foot high lead-lined, wooden stack once existed at the top of the flue, although no remnants of this have been found. Although there are no known significant quantities of waste material associated with the flue, based on its intended use, soils in the vicinity of the flue were sampled to determine if they were impacted by smelter exhausts.

5.6 Meteorology

A meteorological monitoring station was maintained by URS at Ely Mine between April 2007 and March 2008 (URS, 2008). A regional monitoring station is located at the Union Village Dam, located on the WBOR south of the Site. Data from the two stations were compared by URS and it was found that rainfall amounts on-site could vary significantly from that measured at the Union Village Dam station. During the 1-year meteorological monitoring period at the Site, a maximum temperature of 88.6°F and a minimum temperature of -20.69°F were recorded. The average daily temperature over the monitoring period was 48°F. Average monthly temperatures from the Site monitoring station are presented in the URS Phase 1A RI Report (URS, 2008, Table 3-1, included in this RI as Appendix A).

Local wind conditions are influenced primarily by the topography and as a result, winds generally blow north to south, parallel to the valley. Area winds include prevailing westerlies and localized wind currents. Localized low-pressure storms are produced by the interaction of the westerlies causing potentially wide variation in precipitation amounts across the region. Monthly precipitation totals do not vary widely throughout the year and most precipitation is produced by frontal systems. URS recorded rainfall events of up to 1.95 inches within a 24-hour period during the year of monitoring. Similarly, the monitoring station at the Union Village dam recorded significant snowfall events (i.e., greater than 4 inches) during this period as well. A summary of meteorological monitoring data from URS and the Union Village dam monitoring station are provided in the URS Phase 1A RI Report (2008).

5.7 Demographics and Land Use

The Ely Mine Site is located in a Town of Vershire, Orange County, Vermont with a population of approximately 630 people (Town of Vershire website, 2000 Census). The Site is located in a rural, sparsely populated area of the town accessed by South Vershire Road, approximately 1.5 mi northwest of the Village of West Fairlee. West Fairlee has a population of about 730 people (city-data.com, 2009 survey). Less than 100 people are estimated to live within a 1 mi radius of the Site. The nearest residents are located approximately ¼ mi east of the Site along Beanville Road. The Site and surrounding area is forested with the exception of open areas that are occupied by mine waste rock piles. The Site is currently privately owned. The land is undeveloped and generally undisturbed since the cessation of mining activities. The current land use of the Site is limited to management for commercial timber harvest. There are no residents or buildings on the Site, though remnants of historic structures remain. The Site is also frequented for limited recreational use by off-road vehicles, hunters, hikers, and spelunkers.

5.8 Reuse Assessment

Based on a review of the Vershire Town Plan, adopted in 2006, land use areas in the Town were divided into three main categories: the Village Center, Open Space, and Rural Residential. The Site is located in the Rural Residential District, where primary development for permanent residences is limited to main roadways. The residents surveyed for the plan overwhelmingly indicated that significant development should be limited to the Village Center in order to preserve the rural character of the Town. The plan emphasizes the preservation of the areas outside the Village Center for forestry-related activities such as timber harvesting. As a result, uses of the Site and surrounding area subsequent to remedial actions will likely remain as they are today, with timber harvesting from the surrounding forested land being the primary land use. Furthermore, the steep topography, rural location, stable population, and lack of utilities in the vicinity of the Site will limit significant future development. Neither communication between EPA and local officials nor the Vershire Town Plan indicates any specific, significant plans for targeted development of the Site (Pers. Comm., Ed Hathaway, 2010). While a potential future secondary use, such as solar energy generation, might be considered in the open space areas on the Site, the proximity to surface-water streams in the central portion of the valley may limit such development. Restoration of the Site is more likely to attract users in the local population

that are primarily interested in the Site's history, and as such, might engage in passive recreational activities like walking, hiking, horseback riding, spelunking, or all terrain vehicle use.

5.9 Habitat Assessment

URS completed a detailed habitat characterization at the Site in 2005 (URS, 2005). The study involved a thorough evaluation of the area within the property boundary, including the underground workings, mine waste areas, and surrounding forested areas. Details of the vegetation types and distribution were mapped and the locations of potential wetland areas were identified. These results are shown in Figure 2-3.

5.10 Conceptual Hydrogeologic Model

The conceptual model of site-wide groundwater flow is illustrated in groundwater flow maps (Figures 5-10 and 5-11) and cross-section H-H' (Figure 5-9), which represent flow conditions for August 2009. Due to the moderate slopes at the Site, natural soil overlying bedrock is relatively thin (less than 10 ft) and as such has a limited capacity to store groundwater. The majority of the natural soil overburden in the upper part of the Ely Brook valley is glacial till with a relatively low hydraulic conductivity. The till beneath waste areas is typically saturated by groundwater. The waste materials overlying the till are generally more permeable and only locally saturated with groundwater in the lowermost portions of the piles. A thicker alluvial deposit overlies the till in the lower part of the valley in the Smelter/Slag Pile Areas. Groundwater in the bedrock is largely stored in open fractures. The shallow bedrock (upper 20 ft) at the Site appears to have a hydraulic conductivity similar to the overburden and based on groundwater sample results from two well clusters (MW-19 and MW-21) is locally impacted by groundwater in the overlying waste rock and overburden soil. Observations from packer tests and geophysical logging of the deep bedrock boreholes suggest that the deeper bedrock has a relatively low density of significant water-bearing fractures. The flooded underground workings form a unique reservoir of groundwater which is an important consideration in interpreting the subsurface hydrology of the northern portion of the Site. When projected along observed strike and dip (i.e., through borehole geophysical logging), fractures observed in MW-19 do not intersect the underground workings. Therefore, the detected impact in this well is attributed to a surface waste source and not believed to be an impact related to groundwater from the underground working mine pool. However, results from analyses of groundwater discharge from three mine openings (Main Adit,

Lower Adit, and Shaft No 4) confirm that water from the underground workings does have an impact on the surface water quality at the Site.

The upper slope of Dwight Hill, above the UWA, is an area of groundwater recharge such that precipitation will tend to infiltrate downward through the overburden and into the bedrock. However, significant volumes of overland flow are directed to the lower portions of the valley during large rain storms and snow melt events, due to the steep topography, thin overburden, and limited infiltration capacity of the bedrock. In areas overlying the underground workings, groundwater may be intercepted and flow through the open areas of the mine reaching the mine pool level. The mine pool surface elevation documented in White and Eric (1944) is consistent with the elevation of the Main Adit. Observed groundwater discharge from the Main Adit is most likely regulating the elevation of the top of the mine pool, such that the hydraulic head of groundwater in bedrock in the vicinity of the mine is maintained at this level. As a result, bedrock groundwater at shallow depths near the mine may migrate toward the mine pool during periods of significant recharge.

On the south side of Dwight Hill, shallow groundwater flows south and southwest beneath the UWA where locally the lowermost 1 ft of the waste rock was observed to be periodically saturated due to slight mounding of groundwater above the glacial till. A greater degree of mounding is anticipated in the waste rock piles during high flow periods such as Spring snow melt and high precipitation periods. At the downslope margin of the piles, impacted overburden groundwater discharges to form surface seeps and tributary streams leading to Ely Brook. Further downslope, the LWA Pile and Tailings Pile have significant saturated thicknesses as a result of the coalescence of shallow groundwater and tributary streams converging on Ely Brook. These piles lie within an area of groundwater discharge, where slope gradients are somewhat gentler, and multiple groundwater seeps occur. The base flow of the seeps, tributary streams, and Ely Brook are being fed by the discharge of groundwater from the shallow overburden, and to a lesser extent, shallow bedrock groundwater moving through the overburden, except in the lowermost portions of the Ely Brook and SHB Valleys where thicker, less permeable, glacial till inhibit such flow.

Groundwater data indicates that the mine waste piles significantly impact shallow groundwater locally and more directly affect the quality of overland flow in the Ely Brook Valley. The discharge of shallow groundwater and upward bedrock groundwater gradients in the lower

portions of the valley preclude the potential impact to deeper groundwater in those areas. Results from on-site monitoring wells indicate a localized impact to the uppermost 20 ft of shallow bedrock groundwater beneath the UWA and LWA. Results from residential drinking water sources near the Site do not indicate any impact to deep bedrock groundwater from surface mine waste source areas at the Site.

6.0 NATURE AND EXTENT OF CONTAMINATION

The following sections describe the distribution and observed trends of contamination relating to mine waste sources at the Site, and groundwater, surface water and sediment downgradient of these sources. The nature and extent of waste sources are defined and the level of impact to downgradient groundwater, surface water, and sediment is assessed.

This Section will describe the following subjects in the order shown below:

- OU1 Contaminants of Concern (COCs) and proposed Preliminary Remediation Goals (PRGs);
- background COCs concentrations;
- a summary of Site-wide soil, groundwater, surface water, and sediment contamination; and
- a discussion of the nature and extent of contamination in each Site source or impact area.

6.1 COCs

In addition to the physical delineation of the sulfide waste rock and tailings, the RI used Site specific criteria to refine the extent of contamination. The criteria used to define the extent of the waste areas evolved throughout the RI. Early evaluations by URS and Nobis relied upon default literature criteria, regulatory criteria, and the criteria used at the Elizabeth Mine to define the extent of the contamination. With the completion of the human health and ecological risk assessment as part of the RI, site specific criteria could be developed for the contaminants most associated with the potential for human health and ecologic risk. Table 6-1 shows the contaminants that were identified as OU1 contaminants of potential concern (COPCs) in the HHRA or contaminants of potential ecological concern (COPECs) in the aquatic and terrestrial BERAs. The COPCs and COPECs were then reduced to a set COCs based on the outcome of the risk assessments. The OU1 COCs are presented in Table 6-2.

The HHRA did indicate an unacceptable threat was present for aluminum and manganese dust inhalation resulting from frequent contact (greater than 60 days per year) with Site soil. However, as the statistical summaries for Site soil included below indicate, the aluminum and manganese concentrations in soil were not significantly different from background locations and these compounds were not selected as COCs.

Aluminum in Soils

Waste or Impact Area	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding RSL	RSL (mg/Kg)	Background Max
Background	7,878	12,000	9,635	16/16	9	7,700	12,000
On-Site Vegetated Forest (i.e., Natural Forest)							
Site-Wide	15,981	100,000	20,069	40/40	31	7,700	12,000
Transition Zones							
UWA	12,365	27,800	15,928	17/17	11	7,700	12,000
LWA	13,150	27,900	16,413	16/16	11	7,700	12,000
ORB	5,227	8,050	NA	3/3	1	7,700	12,000
EB-UR	22,500	22,500	NA	1/1	1	7,700	12,000
EB-MR	5,910	5,910	NA	1/1	1	7,700	12,000
EB-LR	13,091	41,900	19,238	11/11	7	7,700	12,000
Smoke Flue	13,567	24,500	NA	6/6	5	7,700	12,000
Smelter	20,425	26,400	NA	4/4	4	7,700	12,000
Barren Zones							
UWA	9,966	24,600	11,067	86/86	46	7,700	12,000
LWA	9,199	28,500	10,587	52/52	29	7,700	12,000
Tailing	11,951	18,600	15,171	10/10	7	7,700	12,000
ORB	9,006	19,000	10,801	28/28	13	7,700	12,000
Smoke Flue	18,336	32,700	23,523	11/11	9	7,700	12,000
Smelter	8,687	24,000	9,820	49/49	29	7,700	12,000
Slag	8,689	14,000	9,899	18/18	11	7,700	12,000

Note:

1. RSL = Regional Screening Level (May 2010).
2. UCL = Upper Confidence Limit
3. NA = Not Applicable

Manganese in Soils

Waste or Impact Area	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding RSL	RSL (mg/Kg)	Background Max
Background	1,340	7,800	2,276	16/16	11	180	7,800
On-Site Vegetated Forest (i.e., Natural Forest)							
Site-Wide	499	2,170	623	40/40	28	180	7,800
Transition Zones							
UWA	312	1,600	477	17/17	7	180	7,800
LWA	319	991	437	16/16	10	180	7,800
ORB	128	217	NA	3/3	1	180	7,800
EB-UR	322	322	NA	1/1	1	180	7,800
EB-MR	139	139	NA	1/1	0	180	7,800
EB-LR	290	717	404	11/11	8	180	7,800
Smoke Flue	276	810	NA	6/6	2	180	7,800
Smelter	173	237	NA	4/4	2	180	7,800
Barren Zones							
UWA	358	1,620	425	102/102	47	180	7,800
LWA	331	2,420	453	56/56	14	180	7,800
Tailing	692	2,520	1,126	13/13	7	180	7,800
ORB	499	8,380	970	30/30	11	180	7,800
Smoke Flue	249	750	351	12/12	5	180	7,800
Smelter	316	1,300	374	52/52	35	180	7,800
Slag	571	2,000	744	24/24	21	180	7,800

6.2 PRGs

PRGs for OU1 have been proposed based on current regulatory standards for surface water and groundwater, as well as site-specific criteria for soil, sediment, and surface water and groundwater COCs without current regularity criteria. The OU1 PRGs are presented in Table 6-3 and will be used throughout the remainder of the RI to help define the nature and extent of contamination.

Human-health risk based PRGs were developed for COCs in specific media that posed health risks in excess of the National Contingency Plan (NCP) risk management limits, as identified from the results of the HHRA (Nobis, 2011b). A summary of the HHRA is provided in Section 8.0.

PRGs are based on one of the following benchmarks:

- a risk-based COC concentration that is back-calculated from the site-specific exposure scenarios at a target de minimis risk level for excess lifetime cancer risk (ELCR) of 1×10^{-6} and/or a Hazard Index (HI) of 1;
- applicable or relevant and appropriate requirements (ARARs); or
- background concentrations.

Based on the defined areas and media for OU1 and the outcome of the HHRA, Aquatic BERA, and Terrestrial BERA, PRGs were developed for the following environmental media:

- soil and waste in the OU1 area based on the potential threat to human health under a residential exposure scenario;
- surface water to protect ecological receptors with Ely Brook, its tributaries, and Ponds 4 and 5; and
- sediment to protect ecological receptors with Ely Brook, its tributaries, and Ponds 4 and 5.

The soil PRGs are risk-based concentrations resulting in HI less than 1.0. Copper and iron both target the gastrointestinal system; therefore, the PRG for each of these metals is set at a concentration where the HI would be less than 1.0 with an exposure to either or both of the metals, resulting in PRG concentrations of 629 mg/kg and 44,800 mg/kg, respectively. Cobalt targets the thyroid and is the only metal in the Site COCs which targets that specific organ. The PRG for cobalt is set at a concentration of 24 mg/kg, where the HI would be less than 1.0 with an exposure to a child or an adult. Based on the finding of the Terrestrial BERA, significant threats were not identified for exposure to soil COCs and soil PRGs were not developed for ecological receptors. A summary of the BERAs is provided in Section 8.0.

Copper is the sole sediment PRG and set at an aquatic risk-based concentration of 149 mg/kg. There were no identified human health risks associated with sediment COPCs.

Surface water PRGs are generally derived from the Vermont Water Quality Standards (VTWQS) for Class B water and the National Recommended Water Quality Standards (NRWQC). Copper is the only metal that required an ecological risk-based surface water PRG equal to a

concentration of 8.6 µg/L. There were no identified human health risks associated with surface water COPCs.

The HHRA also identified potential threat to human health under a residential exposure scenario for groundwater consumption. Although PRGs for OU2 will be finalized during the RI/FS for that OU, site-specific clean-up criteria for aluminum, cobalt, copper, iron, and zinc in groundwater were estimated to address human health risks. Other overburden and bedrock groundwater clean-up criteria shown in Table 6-3 are a combination of current ARARs (i.e., Maximum Contaminant Levels (MCLs) or Vermont Groundwater Enforcement Standards (VTGWES)).

During the November 2009 sampling round conducted by Nobis, groundwater samples from eight shallow overburden wells and two deep bedrock wells were collected and analyzed for organic compounds to assess whether any organic substances that might have been used to process ore are present in groundwater at the Site. The SVOC bis(2-ethyhexyl)phthalate was detected at a low concentration in wells MW-22A and MW-19D from widely separate areas and was the only organic compound detected in these wells. The maximum detected concentration of this compound was 7.5 µg/L in well MW-19D exceeding the groundwater criterion of 6 µg/L. Bis(2-ethyhexyl)phthalate is commonly associated with oils and plastics and is also a common contaminant associated with surgical gloves used by the field team, although a site-related source cannot be ruled out.

Low concentrations of three pesticide compounds (DDD, DDE, and DDT) and one PCB (Aroclor-1248) were detected in the sample from deep bedrock well MW-20D. The detected PCB concentration of 0.48J µg/L is below the criterion of 0.5 µg/L for this compound. There are no established criteria for these pesticides in groundwater. There were no known sources of PCB contamination at the Ely Mine. Pesticides and PCBs are not typically mobile in groundwater. A review of the sample field parameters indicates an elevated turbidity in the sample which indicates the sample may not be representative of bedrock groundwater.

To better assess this presence of these organic constituents a supplemental round of groundwater sampling was performed by Nobis in December 2010. No PCB contamination was detected in the December 2010 sampling event. The data confirmed that the detection of PCBs was an anomalous event. Bis(2-ethyhexyl)phthalate was detected at three well locations in the December 2010 sampling event. Locations MW-02A, MW-11A, and MW-20A contained 13

ug/L, 11ug/L, and 4.8 ug/L, respectively. Bis(2-ethyhexyl)phthalate was not detected at these locations in the previous sampling event. In addition, bis(2-ethyhexyl)phthalate was not detected in the two locations (MW-19D and MW-22A) where bis(2-ethyhexyl)phthalate was detected in 2009. The infrequent and sporadic detections strongly suggest that bis(2-ethyhexyl)phthalate was introduced during the sampling or analysis activities and is not a Site COC. The results of this sampling are included in Appendix E.

Based on these observations and results, organic compounds are not considered COCs in groundwater at this Site.

6.3 Background

Due to the numerous environmental investigations and sampling agencies that have performed work at the Site, many data sets have been collected outside the influence of the former mine activities. Some of these data sets were collected at distant locations from each other, for example surface water and sediment background samples taken from upstream locations in Ely Brook, SHB, the EBOR, and a tributary of the EBOR (ORT1). Table 6-4 is a summary of all background samples used in the RI. Background sample locations are shown in Figure 6-1 (On-Site Background) and Figure 6-2 (Off-Site Background). A statistical summary of COC data for the combined background locations for each media is included as Table 6-5 and the individual statistics for each of the background study areas by media is included in the text below.

6.3.1 Soil

Background metal samples were collected beyond the Site boundary from an area north of Dwight Hill (Figure 6-2) which exhibited similar geology and soil types and has not been influenced by mining activities or other anthropogenic sources of metals other than regional atmospheric deposition (URS, 2008). A statistical summary of background soil COC results is shown in the table below. TAL metals results for all surface soil samples, including background samples are presented in Table 6-6. TAL metals results for all subsurface soil samples are presented in Table 6-7. Laboratory analytical results of background samples showed concentrations of COCs metals below the PRGs.

Background Soil

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max
Cobalt	7	16	8.5	16/16	0	24	16
Copper	15	45	19	16/16	0	629	45
Iron	13,830	31,000	17,442	16/16	0	44,800	31,000

6.3.2 Sediment

Sediment samples used to establish background conditions were collected by various agencies between 2004 and 2006. Background sediment samples were collected in several areas located upstream of known areas of mining activity impacts, and include: the Ely Brook headwaters north of the UWA, SHB upstream of the confluence with Ely Brook, EBOR upstream of the confluence with SHB, and an unnamed tributary to the EBOR (ORT1). A statistical summary of background sediment COC results from each of these study areas is shown in the tables below. TAL metals results for all sediment samples, including background samples are presented in Table 6-8.

Ely Brook – Background Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max
Copper	34	50	NA	3/3	0	149	50

SHB – Background Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max
Copper	10	24	12	13/13	0	149	24

EBOR – Background Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	6	17	10	6/7	0	149	17

ORT1 – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	16	27	20	9/9	0	149	17

6.3.3 Surface Water

Surface water samples used to establish background conditions were collected by various agencies between 2000 and 2007. Background surface water samples were collected in several areas located upstream of known areas of mining activity impacts, and include: the Ely Brook headwaters north of the UWA, SHB upstream of the confluence with Ely Brook, EBOR upstream of the confluence with SHB, and ORT1. A statistical summary of background surface water COC results from each of these study areas is shown in the tables below. Geochemical parameter results for all surface water samples, including background samples are presented in Table 6-9. TAL metals results for all surface water samples, including background samples are presented in Table 6-10. Graphs showing the influence of stream-river confluences on surface water concentrations are shown in Figures 6-3 and 6-4.

Ely Brook – Background Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	164	240	NA	1/1	1	87	240
Cadmium	0.5	0.5	NA	0/1	0	1.1	0.5
Chromium	0.4	0.62	NA	1/1	0	11	0.62
Copper	0.8	1.2	NA	1/1	0	8.6	1.2
Iron	1,343	2,000	NA	1/1	1	1,000	2,000
Lead	0.2	0.36	NA	1/1	0	3.2	0.36
Mercury	0.1	0.1	NA	0/1	0	0.012	0.1
Nickel	1.5	2.3	NA	1/1	0	52	2.3
Selenium	0.5	0.5	NA	0/1	0	5	0.5
Silver	0.04	0.05	NA	1/1	0	3.2	0.05
Zinc	2.9	3.35	NA	1/1	0	106	3.35

	Min (su)	Max (su)	Ave (su)
pH	7.7	7.7	7.7

Note:
Su = standard units.

SHB – Background Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	109	1,300	192	20/23	7	87	1,300
Cadmium	1	2.5	1.3	3/23	0	1.1	2.5
Chromium	2	5	3.0	7/23	0	11	5
Copper	2	5	2.8	17/23	0	8.6	5
Iron	107	1,300	188	20/23	1	1000	1,300
Lead	8	25	12	9/23	0	3.2	25
Mercury	0.2	2.5	0.53	0/12	0	0.012	2.5
Nickel	2	20	3.8	13/23	0	52	20
Selenium	0.7	2.5	0.97	1/23	0	5	2.5
Silver	0.4	2.5	0.55	0/23	0	3.2	2.5
Zinc	25	432.5	52	20/23	1	106	432.5

	Min (su)	Max (su)	Ave (su)
pH	6.4	6.4	6.4

EBOR – Background Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	82	710	153	14/14	6	87	710
Cadmium	1	2.5	1.7	0/14	0	1.1	2.5
Chromium	2	5	3.4	2/14	0	11	5
Copper	2	5	3.4	9/14	0	8.6	5
Iron	83	650	147	13/14	0	1000	650
Lead	11	25	16	8/14	0	3.2	25
Mercury	0.5	2.5	NA	0/5	0	0.012	2.5
Nickel	2	5	3.4	7/14	0	52	5
Selenium	0.3	1.7	0.57	1/14	0	5	1.7
Silver	0.4	2.5	0.69	4/14	0	3.2	2.5
Zinc	9	43	15	13/14	0	106	43

	Min (su)	Max (su)	Ave (su)
pH	8.0	8.1	8.1

ORT1 – Background Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	96	160	NA	3/3	2	87	160
Cadmium	0.5	0.5	NA	0/3	0	1.1	0.5
Chromium	0.20	0.25	NA	3/3	0	11	0.25
Copper	0.5	0.65	NA	0/3	0	8.6	0.65
Iron	25	25	NA	0/3	0	1000	25
Lead	0.4	0.5	NA	1/3	0	3.2	0.5
Mercury	0.1	0.1	NA	0/3	0	0.012	0.1
Nickel	0.6	0.71	NA	3/3	0	52	0.71
Selenium	0.5	0.5	NA	0/3	0	5	0.5
Silver	0.05	0.05	NA	0/3	0	3.2	0.05
Zinc	13	25.7	NA	3/3	0	106	25.7

	Min (su)	Max (su)	Ave (su)
pH	6.4	6.4	6.4

Background surface water samples for SHB were collected upstream of the confluence of SHB and Ely Brook with pH values ranging from 7.42 Standard Units (su) to 8.2 su.

Background surface water samples for the EBOR were collected from locations upstream of the confluence of SHB and the EBOR. Five samples exceeded Ambient Water Quality Criteria (AWQC) for total aluminum with values ranging from 98.5 µg/L to 390 µg/L and one sample exceeded surface water criterion for alkalinity with a value of 87,560 µg/L. Additional regional background samples were collected from the unnamed tributary of the EBOR that drains to the north side of Dwight Hill and an unnamed tributary of SHB downstream of the Slag Pile Area. At these locations, pH values ranged from 6.4 su to 8.1 su. Three samples exceeded surface water criteria including total aluminum and alkalinity with concentrations ranging up to 160 µg/L and 70,000 µg/L, respectively.

As a result, it is apparent that the unimpacted surface waters in the vicinity of the Site are highly alkaline, with high aluminum concentrations, generally low iron concentrations, and very low copper concentrations. The contrast in chemistry between unimpacted surface water and on-site surface water impacted by ARD/AMD results in considerable variability in surface water chemistry downstream of tributary confluences where they are naturally mixed.

6.3.4 Groundwater

Two wells, MW-7A and MW-7C, are located upgradient of waste source areas and do not appear to be significantly affected by waste sources at the Site. These results were used as a basis of comparison to provide a benchmark for the order of magnitude affects of the Site waste sources on groundwater at the Site. These wells will also serve as useful reference points for groundwater quality monitoring during future remedial actions.

Background – Shallow Overburden Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	125	290	NA	2/4	0	1,248	290
	T	565	2,000	NA	2/4	1	1,248	2000
Cadmium	D	1	2.5	NA	0/4	0	5	2.5
	T	1	2.5	NA	0/4	0	5	2.5
Chromium	D	4	5	NA	2/4	0	100	5
	T	4	6.1	NA	2/4	0	100	6.1
Cobalt	D	13	25	NA	1/4	0	5	25
	T	13	25	NA	1/4	0	5	25
Copper	D	8	12.5	NA	1/4	0	588	12.5
	T	9	12.5	NA	1/4	0	588	12.5
Iron	D	109	310	NA	1/4	0	556	310
	T	581	2,200	NA	3/4	1	556	2,200
Lead	D	3	5	NA	1/4	0	15	5
	T	3	5	NA	0/4	0	15	5
Manganese	D	20	43.6	NA	3/4	0	300	43.6
	T	33	85.6	NA	3/4	0	300	85.6
Molybdenum	D	1	2.5	NA	0/4	0	40	2.5
	T	1	2.5	NA	0/4	0	40	2.5
Nickel	D	12	20	NA	2/4	0	100	20
	T	12	20	NA	2/4	0	100	20
Zinc	D	18	30	NA	1/4	0	465	30
	T	64	175.1	NA	1/4	0	465	175.1

	Min (su)	Max (su)	Ave (su)
pH	6.4	6.6	6.5

Note:
“T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Background – Shallow Bedrock Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	145	330	NA	1/4	0	1,248	330
	T	1,121	3,700	NA	4/4	1	1,248	3700
Cadmium	D	1	2.5	NA	0/4	0	5	2.5
	T	1	2.5	NA	0/4	0	5	2.5
Chromium	D	3	5	NA	1/4	0	100	5
	T	4	5	NA	2/4	0	100	5
Cobalt	D	13	25	NA	1/4	0	5	25
	T	14	25	NA	1/4	1	5	25
Copper	D	8	12.5	NA	1/4	0	588	12.5
	T	10	12.5	NA	1/4	0	588	12.5
Iron	D	71	180	NA	2/4	0	556	180
	T	711	2,400	NA	4/4	1	556	2,400
Lead	D	3	5	NA	1/4	0	15	5
	T	4	5	NA	1/4	0	15	5
Manganese	D	11	19.1	NA	3/4	0	300	19.1
	T	38	123.2	NA	4/4	0	300	123.2
Molybdenum	D	1	2.5	NA	0/4	0	40	2.5
	T	1	2.5	NA	0/4	0	40	2.5
Nickel	D	2	4	NA	4/4	0	100	4
	T	7	20	NA	3/4	0	100	20
Zinc	D	11	30	NA	1/4	0	465	30
	T	27	30	NA	1/4	0	465	30

	Min (su)	Max (su)	Ave (su)
pH	6.4	7.4	6.9

Note:

1. “T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

6.4 Site-Wide Contaminant Overview

Waste material from over 100 years of mining activities can be found across the entire Site, from the mine entrances high on Dwight Hill to SHB. Although the sulfide bearing ore zone containing minerals was present prior to the mining activities at the Ely Mine, the sulfide was likely only exposed in a few outcrops that limited the surface area. The mining activities preferentially removed the sulfide ore from the bedrock. The breaking of the rock into small

boulders and cobbles created much greater surface area while the placement of that material on the ground surface enabled water and oxygen to have prolonged contact with the sulfide material. The result is ARD, which occurs when sulfide mineral-bearing rock and ore are exposed to oxygen and water, thereby creating a low-pH leachate (contaminated water percolating through the impacted soil and infiltrating the groundwater). At low pH, many of the metals that were bound in the ore and native soil become soluble and dissolve into the leachate. The leachate from the Site often contains elevated levels of aluminum, cadmium, cobalt, copper, iron, manganese, and zinc that are likely from the locally mined ore. Aluminum and manganese are also contributed by the leaching of metals in the native soil. In addition to the oxidation of the sulfide-bearing minerals, the cyclic formation and subsequent dissolution of evaporative metal salts on exposed waste ore and tailings also contributes to ARD at the Site. Metal salts form on the surfaces of the tailings and waste ore as metal-containing acidic moisture evaporates. The metals stored in these salts are dissolved and remobilized during subsequent rainfall events. This run-off is eventually conveyed to receiving streams, resulting in an increase in the waterway's metals concentration and load.

Metals associated with ARD at the Site have been detected at elevated concentrations in soil, sediment, surface water, and groundwater. In addition, the tailings, weathered waste ore, roasted ore, and byproducts generated from the smelting process (i.e., slag) have been transported from the original areas of deposition by erosion and re-distributed nearby, causing elevated concentrations of metals in the soil adjacent to the waste areas. Some of these materials have been conveyed by overland flow, resulting in elevated concentrations of metals in sediment in Site surface water drainages, including: Ely Brook and several of its tributaries, SHB, and the Ompompanoosuc River.

6.4.1 Site-Wide Soil

Nobis and URS performed field investigations to delineate the overall boundaries of the combined waste areas. Concentrations of the soil COCs (copper, cobalt, and iron) were used to delineate Site waste sources and impacted areas. In general, the concentrations of soil COCs exceed soil PRGs within exposed mine waste areas. Although some vegetated areas adjacent to exposed mine wastes also exhibit soil COC exceedances, metals concentrations decline rapidly beyond mine waste areas to concentrations below PRGs. The close correlation of soil PRG exceedances to exposed mine waste is depicted in Figure 6-5. Copper concentrations

remain above background levels for several hundred ft beyond the edge of the waste areas, suggesting that historic mining operations at the Site has influenced an area larger than the waste areas. Figures 6-6, 6-7, and 6-8 illustrate the distribution of cobalt, copper, and iron in surface soils across the Site and the limits of waste source areas based on site-specific PRGs. These figures illustrate that COC concentrations in soil are generally more than an order of magnitude lower in soil beyond the waste source boundaries.

6.4.2 Site-Wide Surface Water and Sediment

Site surface water represents both the most significant receptor of site-related ARD and metals contamination, as well as the most significant contaminant transport pathway. Surface water and groundwater impacted by waste sources discharge high metal, sulfate, and particulate concentrations to Ely Brook and its tributaries (i.e., EBT1 through EBT5). Ely Brook in turn discharges impacted surface water and sediment to SHB. SHB is also directly impacted by erosion of slag into the stream and discharge of metals in groundwater flowing through the slag. SHB transports impacted sediment and surface water to the EBOR where contaminant levels are sufficiently diluted to levels below PRGs. Surface water geochemical characteristics are illustrated in Figures 6-11 and 6-12 (on-site study areas) and Figure 6-13 (off-site study areas). Exceedances of surface water PRGs are illustrated in Figures 6-14 and 6-15 (on-site study areas) and Figure 6-16 (off-site study areas). Exceedances of vernal pool surface water and porewater PRGs are illustrated in Figure 6-17.

When compared to background concentrations, surface water copper impacts are 2-3 orders of magnitude greater than other COCs and, therefore, provide the most distinct indication of surface water impacts. Copper concentrations in impacted on-site surface water (i.e., EB-UR, EB-MR, EB-LR, EBT1 through EBT5, Ponds 4, 5, and 6) range from 28 to 9,456 times greater than the maximum concentration observed in background samples, with an average concentration 2,363 times greater than background maximum.

Sediment sampling has confirmed that significant volumes of waste rock sediment are present in EB-LR. Due to their close proximity, the LWA and the Tailings Area are likely the largest contributors of sediment to the EB-LR. Ponds 4 and 5 along tributary EBT2 have been impacted primarily by ARD and metals contaminated surface water discharging from the Lower Adit, as well as potentially from groundwater impacted from upgradient sources. Copper

concentrations in impacted on-site sediments (i.e., EB-UR, EB-MR, and EB-LR, Ely, EBT1 through EBT5, and Ponds 4, 5, and 6) range from 24 to 89 (EB-MR) times greater than the maximum concentration observed in background samples, with an average concentration 56 times greater than background maximum. Copper PRG exceedances in sediment are illustrated in Figure 6-9 (on-site study areas) and Figure 6-10 (off-site study areas).

6.4.3 Site-Wide Groundwater

Groundwater plays an important role in transporting Site contaminants from mine waste source areas to nearby surface water. Mine waste piles interact to different degrees with groundwater and local geology/hydrogeology determines the level of impact each waste source has on downgradient surface water at the Site. Geologic cross-sections drawn through each waste source area provide a reference for understanding the relationship between waste sources and groundwater sample results (Figures 5-1 through 5-9).

6.4.3.1 Overburden Groundwater

Groundwater samples were collected from 24 on-site overburden monitoring wells during five sampling events between December 2006 and November 2009 to evaluate potential impacts to the overburden aquifer beneath the Site from historic mining operations. Figure 3-2 illustrates the locations of the on-site monitoring well network. Groundwater samples were collected for geochemical parameters, total and dissolved TAL metals, and a select number of wells were sampled for organic parameters during the November 2009 sampling event. Results were compared to site-specific delineation criteria, which included the lower value of either the VTWQS or the EPA Primary Drinking Water Standards as shown in Table 6-3. In addition, risk-based values developed as part of the HHRA for the Site were used for evaluation of aluminum, cobalt, and iron concentrations in groundwater which do not have established MCLs.

Eleven metals exceeded groundwater criteria in total metal samples including aluminum, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, and thallium. The frequency of exceedance observed in overburden groundwater is manganese > cobalt > copper > zinc > aluminum > iron > cadmium > nickel >> chromium > lead > molybdenum. There were no organic compound impacts to overburden groundwater. The maximum detected concentrations of COCs in bedrock are generally observed within the UWA (MW-18A), Slag Pile Area (MW-01A), and LWA (MW-21A).

The six metals cadmium, cobalt, copper, iron, manganese, and nickel are the primary COCs in groundwater as they were detected in total and dissolved metals samples from several individual wells over repeated sampling rounds at concentrations exceeding criteria. Tables 6-11 6-12, 6-14, and Appendix E summarize overburden groundwater results. Overburden groundwater geochemical characteristics are illustrated in Figure 6-18. Overburden groundwater metals PRG exceedances are presented in Figure 6-19.

In general, groundwater in shallow overburden underlying waste areas impacted by ARD is characterized by low pH (<5 su), high acidity (>40 mg/L), low alkalinity (<80 mg/L), high sulfate concentrations (>140 mg/L), and high specific conductance values (>200 µS/m). Conversely, overburden groundwater from reference wells beyond the waste area footprints or from glacial till beneath waste areas is characterized by near neutral pH, very low acidity, moderate to high alkalinity, and low sulfate concentrations. One significant exception to this characterization is the shallow groundwater beneath the ORB, which has near-neutral pH, non-detect acidity, moderate alkalinity, and low sulfate concentrations (as a result of the low residual sulfur concentrations in the overlying roasted ore waste).

Based on the magnitude of copper concentrations in overburden groundwater, the UWA appears to have the greatest impact on overburden groundwater, followed by the Slag Pile Area, LWA, ORB, and Tailings Area. Considering the relatively larger area of the LWA, the total impact of this area on overburden groundwater at the Site is comparable to the impact from the UWA. There were no metal exceedances in overburden groundwater within the ORB, although copper concentrations were somewhat elevated compared to reference wells. In addition, metal exceedances in the Tailings Area were limited to cadmium and manganese.

Exceedances of groundwater criteria in overburden groundwater result in the delineation of one overburden plume extending from upgradient sources in the UWA through downgradient sources in the LWA and Ely Brook.

6.4.3.2 Bedrock Groundwater

Groundwater samples were collected from the on-site bedrock monitoring well network during five rounds between 2006 and 2009 to evaluate potential impacts to the shallow and deep

bedrock aquifer beneath the Site from historic mining operations. Fifteen shallow bedrock wells and 5 deep bedrock wells were sampled during this period (Figure 3-2), including packer sampling from individual zones tested within each of three deep bedrock wells MW-14D, MW-19D, and MW-20D installed by Nobis in 2009. Other deep bedrock wells include two exploration borings drilled by the USBOM, wells BOM-1 and BOM-2. Groundwater samples were collected for geochemical parameters, total and dissolved TAL metals, and a select number of wells were sampled for organic parameters during the November 2009 sampling event. Bedrock analytical groundwater results are presented in Tables 6-11, 6-12, 6-13, 6-14, and Appendix E. Bedrock groundwater geochemical characteristics are illustrated in Figure 6-20. Bedrock groundwater metals PRG exceedances are presented in Figure 6-21.

Results from bedrock wells detected eleven metals above criteria, including aluminum, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, and zinc. Aluminum, cobalt, iron, manganese, copper, and zinc were the most frequent metals detected above criteria in bedrock groundwater. The frequency of exceedance observed in bedrock groundwater is aluminum > cobalt > iron > manganese > copper > zinc >> cadmium >> molybdenum > chromium > lead > nickel. No organic COCs were identified at the Site. The maximum detected concentrations of COCs in bedrock are generally observed within the UWA (MW-19C) or LWA (MW-21C). Of the 20 bedrock wells analyzed as part of the RI, only 4 wells (BOM-3, MW-12C, MW-19C, and MW-21C) consistently indicated impacts from ARD. Impacted wells or bedrock zones are generally located in the shallow bedrock within or immediately downgradient of waste source areas and areas where overburden groundwater is also impacted.

Exceedances of groundwater criteria in bedrock result in the delineation of three bedrock plumes. One plume originates from the UWA and extends downgradient to MW-12C and Ponds 4 and 5, one plume originates from the LWA and is confined to the LWA footprint, and another plume extends over the western region of the Smelter and Slag Pile Areas.

6.5 Waste Source Areas

The following discussion will be organized by presenting the nature and extent of contamination of each waste source and impact area. There are nine major mine waste source areas on the Site including the UWA, LWA, Tailings Area, ORB, EB-LR, EB-MR, the Smelter Area, the Slag

Pile Area, and the Underground Workings. Other study areas have been designated as waste impact areas and include: the EB-UR, Ely Brook Tributaries 1 through 5, Ponds 4 and 5, the Smoke Flue, SHB, and the EBOR. Waste impact areas are discussed in detail in Section 6.6. Site waste source and impact areas are shown in Figure 2-4.

Site waste source areas are distinguished from impact areas based on their significance and volume as an origin of ARD/AMD and metals contamination in environmental media. Without remedial actions to address these contaminant waste sources, restoration through natural attenuation would not be occur within a reasonable time-frame, resulting in unacceptable long-term risks to human health or the environment.

The following discussion presents an examination and statistical comparison of soil, sediment, surface water, and groundwater COC results in each waste source or impact area, preceding in general from the upgradient to downgradient zones. This is followed by a discussion of the extent of source contamination of impacts.

The degree of mine-related impacts to soil, sediment, surface water, and groundwater is evaluated in the subsequent waste source and impact area discussions by comparing the observed COCs concentrations and pH conditions (for surface water and groundwater) to background values. This comparison assumes that an observed concentration or pH condition generally equivalent to background values indicates that a sample location or study area has not been impacted by Site-related contamination, while an observed concentration or pH condition greater than background may indicate some degree of Site-related contamination. To facilitate this evaluation of the site-related impacts, and to provide a quantification of the degree of impact in areas exhibiting concentrations or pH conditions greater than background, magnitude of background factors (MB) have been calculated for Site COCs in soil, sediment, surface water, and groundwater study areas. Media-specific MBs have been calculated by dividing the study area COC concentrations by the maximum background COC concentration. These resulting MBs for each study area are summarized in Tables 6-15 through 6-18.

These results demonstrate that source area contamination results in a copper MB consistently 1-3 orders higher in magnitude than other metals. This indicates that waste source impacts are most clearly discernible based on copper MBs. A summary of the copper MBs for the study areas and media is included below.

Study Area Copper Magnitude of Background Factors

Study Area	Surface Soil	Sub Soil	SED	SW	OV GW	BR GW
On-Site Waste Source or Impact Areas						
UWA	38	18			378	193
LWA	40	259			607	71
Tailing Area	21	273			6.1	
ORB	17	19		8.0	15	0.5
EB-UR			27	242		
EB-MR			69	2,231		
EB-LR			45	1,761	2.6	0.9
EBT1			29	633		
EBT2			33	4,679		
EBT3			37	11,511		
EBT4			25	2,187		
EBT5			58	25		
Ponds 4, 5, and 6			33	317		
VP-1				132		
Ponds 1, 2, and 3			1.5	5.0		
VP-2, VP-3, and VP-4				2.3		
Smelter Area	33	30			200	0.7
Slag Pile Area	60	33				
On-Site Transition Zones						
UWA	8.2					
LWA	3.4	22				
ORB	11					
EB-UR	1.4					
EB-MR	3.3					
EB-LR	18				0.6	
Smelter Area	7.7					
On-Site Transition Zones (cont.)						
Smoke Flue	1.7					
Natural Forest	6.2					
Off-Site						
SHB Upper Reach			14	28		
SHB Lower Reach			10	9.5		
EBOR			5.7	4.2		

Note:

1. "GW" = groundwater, "OV" = overburden, "BR" = bedrock, "SED" = sediment, "SW" = surface water, "Sub" = subsurface.

6.5.1 UWA

The UWA includes a series of overlapping waste rock piles located along the upper portion of the Ely Brook Valley along the south slope of Dwight Hill in a position upgradient and upslope of all other source and impact areas (Figure 2-4). It is comprised of a series of terraced, overlapping mine waste rock piles of varying thickness covering an area of approximately 8.5 acres. A detailed description of the physical characteristics of the UWA is provided in Section 5.

6.5.1.1 Surface Soil

Off-site laboratory results from 94 surface soil samples from 58 locations across the UWA were evaluated as part of the combined soil database for the Site. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis from both the non-vegetated portion of the waste rock piles ("barren area") and the surrounding transitional vegetation zone ("transition zone") that exists between barren areas and healthy, vegetated forest. Soil XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all surface soil TAL metals are provided in Table 6-6. A statistical summary of UWA surface soil COC results is shown in the tables below. These data result in surface soil copper MBs equal to 38 in the barren area and 8.2 in the transition zone.

UWA Surface Soil (Barren Source Area)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	27	325	36	86/86	22	24	16
Copper	1,731	12,000	2,160	86/86	54	629	45
Iron	97,740	456,000	110,939	86/86	59	44,800	31,000

UWA Surface Soil (Transition Zone)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	12	18.7	14	17/17	0	24	16
Copper	368	940	476	17/17	3	629	45
Iron	39,041	160,000	53,781	17/17	5	44,800	31,000

Analyses for paste pH, paste conductivity, ABA, and SPLP metals were also conducted to evaluate the characteristics of the material in the UWA. These analyses evaluated the material's potential for acid generation or neutralization and the potential for metals leaching. Soil sample paste pH, paste conductivity, and ABA results are presented in Table 6-20. SPLP results and comparisons to surface water and groundwater criteria are presented in Table 6-21. Copper concentrations correlate inversely with paste pH and ABA results in waste rock samples exceeding approximately 300 mg/Kg copper, which is consistent with the high acid-generating potential of the sulfide ore waste. Copper concentrations in glacial till soil samples do not correlate well with ABA results as this soil tends to have acid neutralizing capacity despite locally elevated copper concentrations. Results from SPLP testing of surface soil samples in the UWA confirm that moderately high levels of metals, including aluminum, cadmium, copper, iron, manganese, nickel, and zinc, are leached from waste rock in this area.

6.5.1.2 Subsurface Soil

Subsurface soil samples have been collected in the UWA from soil borings, monitoring wells, and test pit locations during work conducted by USGS, URS, and Nobis to confirm the characteristics and thickness of waste rock and native overburden soils (Figure 3-2). These investigations documented the presence of non-stratified waste of variable thicknesses. Maximum waste rock thicknesses of up to 22 ft were observed on the southern portion of Pile 9 (Figure 2-2). Cross-sections A-A' and B-B' (Figures 5-2 and 5-3, respectively) trend across the UWA and illustrate subsurface conditions in this area of the Site.

Soil XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all UWA

subsurface soil TAL metals are provided in Table 6-7. A statistical summary of UWA subsurface soil COC results is shown in the tables below. These ranges of COCs concentrations in subsurface soils are consistent with observations from surface soil samples (Piatak, et al., 2004a). Lower metal concentrations were observed in native soil underlying the waste rock. These data result in subsurface soil copper MBs equal to 18 in the UWA barren areas.

UWA – Subsurface Soil (Barren Source Area)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	41	193	64	16/16	8	24	16
Copper	814	4,250	1,267	16/16	5	629	45
Iron	71,113	190,000	92,422	16/16	10	44,800	31,000

Results show paste pH values of subsurface waste rock to be generally less than 4 units with ABA values less than zero indicating the acid-generating potential of this material (see Table 6-20). Results from SPLP testing of subsurface waste rock confirm that the waste rock is susceptible to leaching moderately high levels of metals, including aluminum, copper, manganese, selenium, silver, and zinc (Table 6-21).

6.5.1.3 Extent of Source Contamination

A combination of analytical laboratory samples and field XRF samples were used to delineate the extent of COCs contamination in the UWA. The extent of soil impacts in the UWA is shown in Figure 6-5 and is based primarily on exceedances of the COCs cobalt, copper, and iron. Figure 6-5 also incorporates XRF field screening copper results that were used to provide confirmation of the boundary delineation in areas where analytical data was limited. Individual figures depicting cobalt, copper, and iron exceedances are shown in Figures 6-6, 6-7, and 6-8, respectively.

All surface soil samples collected directly from the barren mine waste areas in the UWA contained concentrations of COCs above PRGs. Results from five surface soil samples (TR-09C, TR-09D, TZ-36, TQ-06, and TP-15-TP) indicate copper impacts extending into the partially vegetated transition zone to the west and southwest from the upper piles between the

upper courses of EBT3 and EBT4. This impact may be related to erosion of the piles upslope of this area and impact from historic transport of waste material along the access road.

Numerous other samples collected from locations directly along the barren area to transition zone boundary contained concentrations of COCs below PRGs (e.g., TR-07C, TZ-40, SS-35, SS-36, SS-33, TZ-34, TL-04, and TZ-31). These data demonstrate that COCs impacts in the UWA correspond closely to this distinct and visible boundary and support a delineation of the UWA impact boundary directly along this boundary where data are limited. This delineation is also supported by copper XRF field screening results from transects TQ, TP, TN, TT, and TU below the PRG.

The northern UWA boundary is delineated by analytical results and visual observations, including the presence of several small waste rock piles scattered through the transition zone directly south of the Main Shaft openings. The southern portion of the UWA extends to the south along (and including) the former Tramway (currently an access road), a development rock pile, and the lower adit. The historic use of the Tramway for ore transport, in conjunction with waste rock observed during the installation of the MW-5 well triplet, indicates waste rock was historically used as fill in this area. The boundary in this area was determined based primarily on visual observations, historical features, and the copper XRF field screening results from transects TL, TN, TW, and TX.

COCs impacts were observed in soil samples collected directly adjacent to an intermittent tributary which drains from the Lower Adit to Pond 5, suggesting that runoff from the UWA may be impacting this drainage. Concentrations of metals exhibit a sharp decline to the northeast of the development rock pile and beyond the banks of the tributary. Although no samples were analyzed in the area between transect TL and Pond 4, the soil boring log from the well MW-12C identified up to 2 ft of yellow-red stained soil fill in this area indicating a potential waste source (URS, 2008).

Observations of the lateral and vertical limits of waste, defined by surface soil, boring, and test pits, indicate the UWA extends over an area of 8.5 acres and includes an estimated 73,000 cy of waste rock.

6.5.1.4 Groundwater

Groundwater samples have been collected from several wells in the UWA during work conducted by URS and Nobis (Figure 3-2). These include:

- shallow overburden wells: MW-05A, MW-06A, MW-08A, MW-09A, MW-13A, MW-18A, and MW-19A;
- deep overburden well: MW-05B;
- shallow bedrock wells: MW-05C, MW-06C, MW-09C, MW-12C, MW-19C; and
- deep bedrock wells: BOM-01, BOM-03, and MW-19 D.

Groundwater geochemical parameter results are provided in Table 6-11 and laboratory analytical results for TAL metals are provided in Table 6-12. Deep bedrock packer sampling laboratory analytical results for TAL metals are provided in Table 6-13. Statistical summaries of the groundwater COC results for overburden, shallow bedrock, and deep bedrock are shown in the tables below. These data result in the following groundwater copper MBs:

Aquifer	Copper MB
UWA Shallow Overburden	752
UWA Deep Overburden	3.0
UWA Shallow Bedrock	126
UWA Deep Bedrock	259

UWA Shallow Overburden Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	15,243	62,366	20,107	19/25	17	1,248	290
	T	16,491	64,456	21,492	21/25	18	1,248	2,000
Cadmium	D	10	36.8	13.0	19/25	18	5	2.5
	T	10	36.5	13.0	18/25	17	5	2.5
Chromium	D	4	9.9	5.0	11/25	0	100	5
	T	19	365	44.0	17/25	1	100	6.1
Cobalt	D	188	665	239	20/25	18	5	25
	T	187	668	238	20/25	18	5	25
Copper	D	9,334	49,117	12,805	21/25	18	588	12.5
	T	9,405	49,581	12,957	22/25	18	588	12.5
Iron	D	295	4,900	626	17/25	1	556	310
	T	1,105	9,600	1,869	22/25	7	556	2,200
Manganese	D	1,369	3,461	1,692	25/25	19	300	43.6
	T	1,365	3,506	1,692	25/25	19	300	85.6
Molybdenum	D	2	2.5	2.3	2/25	0	40	2.5
	T	4	52.4	7.4	4/25	1	40	2.5
Nickel	D	90	385	118	23/25	12	100	20
	T	97	402	131	23/25	1	100	20
Zinc	D	1,132	3,797	1,452	20/25	17	465	30
	T	1,140	3,867	1,466	20/25	17	465	175

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	4.0	7.1	5.2	6.5

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Based on these data, the UWA shallow overburden plume is characterized by exceedances of 10 metals, as well as significant variability in pH from acidic to neutral conditions. The most significant exceedances were observed for copper (MB = 752) and zinc (MB = 16).

UWA – Deep Overburden Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	138	360	NA	2/5	0	1,248	290
	T	2,758	13,000	NA	2/5	1	1,248	2,000
Cobalt	D	17	25	NA	2/5	1	5	25
	T	22	30.8	NA	2/5	1	5	25
Iron	D	607	1,340	NA	5/5	2	556	310
	T	3,528	15,000	NA	5/5	3	556	2,200
Manganese	D	2,056	4,033	NA	5/5	4	300	43.6
	T	1,897	4,026	NA	5/5	5	300	85.6

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	7.0	7.2	7.1	6.5

Based on these data, the UWA deep overburden plume is characterized by exceedances of 4 metals, as well as stable and neutral pH conditions. The most significant exceedances were observed for manganese (MB = 22) and copper (MB = 3).

UWA – Shallow Bedrock Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	766	6,660	1,498	9/16	3	1,248	330
	T	1,066	7,680	1,961	10/16	3	1,248	3,700
Cadmium	D	2	6.2	2.9	8/16	2	5	2.5
	T	2	5.8	2.8	6/16	2	5	2.5
Cobalt	D	39	164	60	10/16	6	5	25
	T	39	164	60	9/16	6	5	25
Copper	D	1,516	10,000	2,948	12/16	5	588	12.5
	T	1,572	10,600	3,067	11/16	5	588	12.5
Iron	D	83	210	106	9/16	0	556	180
	T	170	900	269	12/16	1	556	2,400
Manganese	D	265	1150	426	14/16	6	300	19.1
	T	265	1140	424	14/16	6	300	123
Molybdenum	D	11	77.1	21.0	4/16	2	40	2.5
	T	12	78.5	22.0	5/16	2	40	2.5

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Zinc	D	181	615	287	14/16	5	465	30
	T	200	627	300	11/16	5	465	30

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	5.9	8.3	7.0	6.9

Based on these data, the UWA shallow bedrock plume is characterized by exceedances of 8 metals, as well as significant variability in pH from slightly acidic to basic conditions. The most significant exceedances were observed for copper (MB = 126) and zinc (MB = 6.7).

UWA – Deep Bedrock Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	1,955	6,900	NA	7/9	3	1,248	330
	T	43,434	360,000	NA	8/9	7	1,248	3,700
Cadmium	D	3	8.2	NA	5/9	2	5	2.5
	T	3	9	NA	6/9	2	5	2.5
Chromium	D	4	5	NA	3/9	0	100	5
	T	26	172	NA	8/9	1	100	5
Cobalt	D	63	149	NA	7/9	5	5	25
	T	67	153	NA	8/9	7	5	25
Copper	D	2,372	8,380	NA	8/9	5	588	12.5
	T	3,242	9,950	NA	7/9	5	588	12.5
Iron	D	1,362	4,007	NA	8/9	5	556	180
	T	40,171	310,000	NA	9/9	7	556	2,400
Lead	D	4	5	NA	2/9	0	15	5
	T	7	27.2	NA	5/9	1	15	5
Manganese	D	587	1,439	NA	9/9	5	300	19.1
	T	747	1,781	NA	9/9	6	300	123
Nickel	D	38	88.3	NA	9/9	0	100	4
	T	52	125	NA	9/9	1	100	20
Zinc	D	452	1,084	NA	8/9	5	465	30
	T	483	1,234	NA	7/9	5	465	30

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
	Min (su)	Max (su)	Ave (su)	Background Min (su)			
pH	4.7	8.9	7.7	6.9			

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Based on these data, the UWA shallow bedrock plume is characterized by exceedances of the ten 10 metals shown in the table above, as well as significant variability in pH from acidic to basic conditions. The most significant exceedances were observed for copper (MB = 259), iron (MB = 17), and zinc (MB = 16).

The geologic cross-section A-A' and B-B' (Figures 5-2 and 5-3, respectively) illustrate the relationship between the mines waste, overburden, bedrock, and groundwater within the UWA.

Observations from test pits and monitoring well data indicate that the bottom foot of waste rock in the UWA may be periodically saturated with acidic groundwater. This condition results in the leaching and mobilization of metals from waste rock to overburden and shallow bedrock groundwater, causing the formation of an overburden and bedrock ARD and metals plumes. The estimated extents of the overburden and bedrock groundwater COCs plumes are depicted in Figures 6-19 and 6-21, respectively. The estimated delineation of these plumes is based on the observations and conclusions described below.

Significant copper concentrations are observed in the overburden-bedrock well triplet MW-19A, C, and D. More significant mounding of groundwater may occur during high flow periods, resulting in a greater thickness of saturated waste rock. As a result, the shallow overburden and shallow bedrock groundwater in this area is significantly impacted within the footprint of the piles.

The high metal concentrations observed in well MW-9A and downgradient well MW-12C may indicate that an overburden-shallow bedrock groundwater plume extends from the UWA to the downgradient Ponds 4 and 5. However, the high groundwater metal concentrations observed in MW-12C may also be related to fill containing waste rock at that location.

Two shallow bedrock wells located approximately 190 ft downgradient of the UWA waste piles (MW-5C and MW-9C) do not contain COC exceedances. However, these wells are screened 40 ft to 50 ft into bedrock and, therefore, impacts within the upper 15-20 ft of bedrock cannot be ruled out in these areas. Based on the lack of metal exceedances in groundwater from downgradient monitor wells MW-06A/C and MW-13A, a significant groundwater plume is not interpreted between Shaft No.4 and Ely Brook.

Along the narrow corridor of waste rock/fill of the former Tramway, between the UWA, the Development Rock Pile, and Former Flotation Mill, overburden groundwater is impacted as indicated by the high metal concentrations in groundwater from well MW-5A. Water level data indicates that up to 8 ft of the waste rock/fill above the glacial till is saturated with groundwater. Importantly, the dense layer of till (over 10 ft thick at this location) beneath the waste rock/fill provides a barrier to downward migration of impacted groundwater, as indicated by the significantly lower metal and sulfate concentrations observed from well MW-5B. The overburden groundwater plume in this area overlaps with the plume from the upgradient waste pile and, in turn, extends south to overlap with overburden groundwater impacts underlying the Development Rock Pile and Former Flotation Mill areas.

Discharge from the Lower Adit drains groundwater from beneath the UWA and flows south to discharge directly to Pond 5. Due to its continual flow, this AMD represents a significant impact to the Pond. High metal concentrations in groundwater from nearby shallow bedrock well MW-12C show that shallow bedrock groundwater discharge to Ponds 4 and 5 is also a significant pathway of contaminant migration. Estimates of copper loading from groundwater at this location are discussed further in Section 7 and in the URS Phase 1A Report (URS, 2008).

6.5.2 LWA

The LWA includes an area of barren waste rock that lies east of the Ely Brook, south of the Former Flotation Mill and northwest of the ORB (Figure 2-4). The main Site access road passes through the central portion of the area. The Tailings Area is located within the LWA but is described as a separate source area due to its unique origin and waste characteristics. A more detailed description of the physical characteristics of the LWA is provided in Section 5.4.2.

6.5.2.1 Surface Soil

Fixed laboratory analytical results from 52 surface soil samples taken at 48 locations across the LWA were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis from barren areas, transition zones, and healthy, vegetated locations.

Soil XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all LWA surface soil TAL metals are provided in Table 6-6. A statistical summary of LWA surface soil COC results is shown in the tables below. These data result in surface soil copper MBs equal to 40 in the LWA barren area and 3.4 in the LWA transition zone.

LWA – Surface Soil (Barren Source Area)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	17	200	24	52/52	6	24	16
Copper	1,811	23,000	2,586	52/52	37	629	45
Iron	86,400	196,000	100,423	52/52	35	44,800	31,000

The highest concentrations of copper were detected in a surface soil sample collected from the waste material southwest of MW-21A, near the confluence of EBT2 and EBT3. Similar to surface soil in the UWA, concentrations of iron correlate strongly with the elevated levels of copper which are observed in waste areas.

LWA – Surface Soil (Transition Zone)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	9	18	12	12/12	0	24	16
Copper	155	292	201	12/12	0	629	45
Iron	18,582	33,500	23,316	12/12	0	44,800	31,000

Surface soil samples collected from transition zone areas exhibited lower concentrations of all metals compounds identified. The highest concentrations of Site contaminants identified in transition zones were detected in samples collected from the forested area to the west of the access road to the UWA along XRF transect TO at sample location TO-5.

Analyses for paste pH, paste conductivity, ABA, and SPLP metals were conducted to evaluate the potential for acid generation or neutralization, and leachability of metals from the mine waste. Results for pH, paste conductivity, and ABA are presented in Table 6-20 and SPLP results are presented in Table 6-21. Copper concentrations appear to correlate inversely with paste pH and ABA values in those waste rock samples exceeding approximately 300 mg/Kg copper, consistent with the acid-generating potential of these wastes. Paste pH concentrations of waste rock are generally less than 4 su and ABA values are negative, signifying its acid-generating potential. Results for glacial till samples (i.e., deep overburden) are variable. This variability may be due to a higher acid-neutralizing capacity within the till despite locally elevated copper concentrations.

6.5.2.2 Subsurface Soil

Subsurface investigations in the LWA have included soil borings, test pits, and monitoring well installations conducted by URS and Nobis to confirm the characteristics and thickness of waste rock and native overburden soils (Figure 3-2). These investigations documented the presence of non-stratified waste of variable thicknesses ranging from 4 ft to 7.5 ft, with up to 12.5 ft of glacial till underlying waste rock. Cross-sections C-C' and D-D' (Figures 5-4 and 5-5, respectively) illustrate subsurface conditions in the LWA.

Soil XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all LWA subsurface soil TAL metals are provided in Table 6-7. A statistical summary of LWA subsurface soil COC results from both the barren waste area and transition zone is shown in the tables below. These data result in subsurface soil copper MBs equal to 259 in the LWA barren area and 22 in the transition zone.

LWA – Subsurface Soil (Barren Source Area)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	366	1,500	NA	6/6	3	24	16
Copper	11,663	36,000	NA	6/6	4	629	45
Iron	113,250	191,000	NA	6/6	4	44,800	31,000

LWA – Subsurface Soil (Transition Zone)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	36	78.3	NA	4/4	2	24	16
Copper	996	2,230	NA	4/4	2	629	45
Iron	31,275	55,100	NA	4/4	1	44,800	31,000

6.5.2.3 Extent of Source Contamination

A combination of analytical laboratory samples and field XRF samples were used to delineate the extent of COCs contamination in the LWA. The extent of soil impacts in the LWA is shown in Figure 6-5 and is based primarily on exceedances of the COCs (cobalt, copper, and iron). Figure 6-5 also incorporates XRF field screening copper results that were used to provide confirmation of the boundary delineation in areas where analytical data was limited. Individual figures depicting cobalt, copper, and iron exceedances are shown in Figures 6-6, 6-7, and 6-8, respectively.

All surface soil samples collected directly from the barren mine waste areas in the LWA contained concentrations of COCs above PRGs. Results from two surface soil samples (NF-09 and MW-20A) indicate surface and subsurface (to 5.5 ft) COCs impacts extending into the vegetated transition zone to south of the LWA between the main access road and Ely Brook. Along the eastern margin of the LWA, COC exceedances were observed extending to EBT5, up to 70 ft east into the vegetated transition zone (SS-27, TR-05C, TR-05D, TZ-26, and XRF transect TJ).

Numerous other samples collected from locations directly along the barren area to transition zone boundary contained concentrations of COCs below PRGs (e.g., TI-03, TR-04B, SS-21, SS-17, TZ-23, SS-23, and SS-25). These data demonstrate that COCs impacts in the LWA correspond closely to this distinct and visible boundary and support a delineation of the LWA impact boundary directly along this boundary where data are limited. This delineation is also supported by copper XRF field screening results from transects TH, TI, and TJ below the PRG.

One overburden/shallow bedrock well pair (MW-21A/C) was installed in the central portion of the LWA, immediately upstream of the confluence of EBT2 and EBT3. Waste rock at this location was observed to have a thickness of 6 ft, underlain by 5 ft of dense glacial till overlying bedrock. The waste rock copper concentration at this location was 6,160 mg/kg, in contrast to the underlying glacial till with copper concentrations in the range of 150 mg/kg to 300 mg/kg. Paste pH and ABA values from waste in this area are comparable to the tailings material, indicating a relatively high acid-generating potential. SPLP results of waste rock material from this location are comparable to values observed in the UWA, but relatively low considering the high copper concentration and high acid-generating potential of this material.

Observations of the lateral and vertical limits of waste, defined by surface soil, boring, and test pits, indicate the LWA extends over an area of 6.4 acres and includes an estimated 29,000 cy of waste rock.

6.5.2.4 Groundwater

Groundwater samples have been collected from several wells in the LWA during work conducted by URS and Nobis (Figure 3-2). These include:

- shallow overburden wells: MW-04A, MW-17A, MW-20A, MW-21A;
- shallow bedrock wells: MW-04C, MW-20C, MW-21C; and
- deep bedrock wells: MW-20D.

Groundwater geochemical parameter results are provided in Table 6-11 and laboratory analytical results for TAL metals are provided in Table 6-12. Deep bedrock packer sampling laboratory analytical results for TAL metals are provided in Table 6-13. Statistical summaries of

the groundwater COC results for overburden, shallow bedrock, and deep bedrock are shown in the tables below. These data result in the following groundwater copper MBs:

Aquifer	Copper MB
LWA Shallow Overburden	607
LWA Shallow Bedrock	142
LWA Deep Bedrock	0.8

LWA – Shallow Overburden Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	15,991	32,818	22,036	10/12	1	1,248	290
	T	18,238	36,000	24,690	11/12	1	1,248	2,000
Cadmium	D	10	22.4	14.0	9/12	8	5	2.5
	T	10	17.2	13.0	10/12	9	5	2.5
Cobalt	D	201	315	258	10/12	1	5	25
	T	200	318	256	10/12	1	5	25
Copper	D	7,343	11,600	9,311	10/12	1	588	12.5
	T	7,585	12,400	9,714	10/12	1	588	12.5
Iron	D	28,269	90,678	49,903	9/12	4	556	310
	T	29,740	85,401	50,574	11/12	7	556	2,200
Manganese	D	1,379	2,540	1,873	12/12	1	300	43.6
	T	1,398	2,645	1,905	12/12	1	300	85.6
Nickel	D	78	135	98.0	10/12	4	100	20
	T	81	191	105	10/12	3	100	20
Zinc	D	1,067	2,290	1,517	11/12	9	465	30
	T	1,082	2,310	1,517	10/12	9	465	175

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	4.3	5.2	4.8	6.5

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Based on these data, the LWA shallow overburden plume is characterized by exceedances of the 8 metals shown in the table above, as well as stable and acidic pH conditions. The most significant exceedances were observed for copper (MB = 607), manganese (MB = 16), and iron (MB = 14).

LWA – Shallow Bedrock Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	3,763	20,254	NA	5/8	2	1,248	330
	T	4,385	21,910	NA	4/8	2	1,248	3,700
Cadmium	D	4	15	NA	4/8	2	5	2.5
	T	4	13	NA	5/8	2	5	2.5
Cobalt	D	69	261	NA	5/8	2	5	25
	T	71	267	NA	4/8	3	5	25
Copper	D	1,607	7,285	NA	7/8	2	588	12.5
	T	1,774	7,936	NA	7/8	2	588	12.5
Iron	D	16,470	73,679	NA	7/8	2	556	180
	T	17,991	76,524	NA	6/8	2	556	2,400
Manganese	D	753	2,470	NA	8/8	4	300	19.1
	T	845	3,000	NA	8/8	4	300	123
Zinc	D	415	1,920	NA	7/8	2	465	30
	T	436	1,902	NA	6/8	2	465	30

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	6.8	8.1	7.5	6.9

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Based on these data, the LWA shallow bedrock plume is characterized by exceedances of the 7 metals shown in the table above, as well as stable pH ranging from neutral to slightly basic conditions. The most significant exceedances were observed for copper (MB = 142) and zinc (MB = 14.5).

LWA – Deep Bedrock Groundwater

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	10.6	10.6	10.6	6.9

No COC exceedances were observed in the LWA deep bedrock, although basic pH conditions were observed that are generally outside the measured range of other Site wells.

Cross-sections C-C' and D-D' (Figures 5-4 and 5-5) illustrate the relationship between the mine waste, overburden, bedrock, and groundwater within the LWA. The estimated extent of the overburden and bedrock groundwater COC plumes is depicted in Figures 6-19 and 6-21, respectively. The estimated delineation of these plumes is based on the observations and conclusions described below.

The LWA occupies a portion of the Ely Brook Valley where tributaries and the main stem of Ely Brook merge. As a result, this area represents a significant groundwater discharge area with a relatively shallow water table, as evidenced by multiple seeps scattered though the western portion of the pile. Observations from soil borings, test pits, and monitoring wells in the LWA indicate that a significant portion of waste rock in this area lies within the water table.

Metals results from shallow bedrock well MW-21C groundwater indicate that, at least locally, there is contaminant migration between the overburden and bedrock, and that groundwater in the upper 15 ft to 20 ft of bedrock is impacted by the waste rock pile. Water level data from well pair MW-21A/C confirm the downward, vertical groundwater gradient between the overburden and shallow bedrock. This may result from the absence of glacial till underlying waste rock in this area. However, the downgradient migration of impacted groundwater is generally limited by the proximity of the waste rock pile to Ely Brook, which is a discharge point for shallow overburden groundwater. As a result of the proximity of the LWA to Ely Brook and the tributaries EBT2, EBT2, and EBT5, the lateral migration of the shallow groundwater plume beyond the waste rock footprint is limited by hydraulic controls. LWA results from overburden well MW-20A indicate a significant metal impact in the area south of the LWA, between the access road and Ely Brook. This may be attributed to waste rock used as fill along the access road. As a result, shallow overburden groundwater between the LWA and EBT1 is included in the interpreted plume area for the LWA as shown on Figure 6-19.

6.5.3 Tailings Area

The Tailings Area is located adjacent to the Former Flotation Mill foundation extending south from the mill and west of the access road, and is almost entirely enclosed within the LWA

(Figure 2-4). It is distinguished separately from the LWA based on its unique origin and waste characteristics. A more detailed description of the physical characteristics of the Tailings Area is provided in Section 5.0.

6.5.3.1 Surface Soil

Off-site laboratory results from 8 surface soil samples from 7 locations across the Tailings Area were evaluated as part of the combined soil database for the Site. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis.

Soil XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all Tailings Area surface soil TAL metals are provided in Table 6-6. A statistical summary of Tailings Area surface soil COCs results is shown in the tables below. These data result in subsurface soil copper MBs equal to 21 in the Tailings Area.

Tailings Area – Surface Soil (Barren Source Area)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	15	25.3	NA	8/8	2	24	16
Copper	924	2,240	NA	8/8	4	629	45
Iron	68,238	160,000	NA	8/8	3	44,800	31,000

Results from SPLP testing of Tailings Area surface soil indicate that copper is leachable from these materials at an order of magnitude higher than any of the other waste materials at the Site.

Based on evaluations conducted by the USGS, the unoxidized flotation-mill tailings have the highest potential to produce metal-laden, acidic water (Piatak, et al, 2004a). The results of tailings paste pH, paste conductivity, and ABA analyses were among the most extreme observed at the Site indicating that the unoxidized flotation-mill tailings have the highest potential to produce metal-laden, acidic water (Piatak, et al., 2004a).

6.5.3.2 Subsurface Soil

Subsurface soil samples have been collected in the Tailings Area from soil borings, test pits, and one monitoring well installation during work conducted by USGS, URS, and Nobis to confirm the characteristics and thickness of waste rock and native overburden soils (Figure 3-2). Tailing thickness observed in borings advanced in this area ranged from 4 ft to 7.5 ft with up to 12.5 ft of glacial till underlying the tailings. The observed tailing waste is distinctly more fine-grained (sand to silt-sized) than waste rock observed in the UWA and LWA. Cross-sections C-C' and D-D' (Figures 5-4 and 5-5) illustrate subsurface conditions within the Tailings Area.

Laboratory analytical results for all Tailings Area subsurface TAL metals are provided in Table 6-7. A statistical summary of Tailings Area subsurface soil COCs results is shown in the tables below. These data result in subsurface soil copper MBs equal to 273 in the Tailings Area barren areas.

Tailings Area – Subsurface Soil (Barren Source Area)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	423	1,040	NA	5/5	5	24	16
Copper	12,268	25,600	NA	5/5	5	629	45
Iron	130,300	190,000	NA	5/5	5	44,800	31,000

The highest concentration of copper detected in the Tailings Area was identified in a sample collected by the USGS in 2002 from the Former Flotation Mill at a concentration of 25,600 mg/kg. This sample was collected from the black, unoxidized, pyrrhotite-rich layer present within the tailings in this area of the waste pile.

6.5.3.3 Extent of Source Contamination

A combination of analytical laboratory samples and field XRF samples were used to delineate the extent of COCs contamination in the Tailings Area. The extent of soil impacts in the Tailings Area is shown in Figure 6-5 and is based primarily on exceedances of the COCs (cobalt,

copper, and iron). Figure 6-5 also incorporates XRF field screening copper results that were used to provide confirmation of the boundary delineation in areas where analytical data was limited. Individual figures depicting cobalt, copper, and iron exceedances are shown in Figures 6-6, 6-7, and 6-8, respectively.

All surface soil samples collected directly from the barren mine waste areas in the Tailings Area contained concentrations of COCs above PRGs. Based primarily on observations from location MW-22A, the tailings material is limited in its extent to the east and west, but extends approximately 300 ft to the south of the Former Flotation Mill. The southern portion of the tailings pile is overlain by the LWA pile. This phenomenon is likely the result of World War II era activities which may have relocated waste rock during reprocessing activities, which included upgrading the access road to the UWA. The western limit of the tailings is not well delineated, but is constrained by TP15 and XRF transect TI.

Copper concentrations in the tailings at location MW-22A ranged from 4,530 mg/kg to 19,300 mg/kg, while concentrations in the underlying till did not exceed PRGs, indicating that the vertical migration of water from tailings to underlying native till has not resulted in COCs impacts.

Observations of the lateral and vertical limits of waste, defined by surface soil, boring, and test pits, indicate the Tailings Area extends over an area of 0.7 acres and contains an estimated volume of 3,600 cy of tailings.

6.5.3.4 Groundwater

Groundwater samples have been collected from one shallow overburden well (MW-22A) in the Tailings Area during work conducted by Nobis (Figure 3-2).

Groundwater geochemical parameter results are provided in Table 6-11 and laboratory analytical results for TAL metals are provided in Table 6-12. Statistical summaries of the groundwater COCs results for the Tailings Area shallow overburden (MW-22A) are shown in the tables below. These data result in the following groundwater MBs:

Parameter	Copper MB
Tailings Area Copper	6.1
Tailings Area Iron	29
Tailings Area Manganese	22
Tailings Area Aluminum	6.0

Tailings Area – Shallow Overburden Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	12,102	15,483	NA	2/2	2	1,248	290
	T	12,050	15,029	NA	2/2	2	1,248	2,000
Cadmium	D	4	5.8	NA	2/2	1	5	2.5
	T	2	2.9	NA	2/2	0	5	2.5
Cobalt	D	41	45.4	NA	2/2	2	5	25
	T	40	44	NA	2/2	2	5	25
Iron	D	65,513	72,225	NA	2/2	2	556	310
	T	64,186	69,372	NA	2/2	2	556	2,200
Manganese	D	1,988	2,166	NA	2/2	2	300	43.6
	T	1,907	2,053	NA	2/2	2	300	85.6

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	3.5	4.0	3.8	6.5

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Based on these data, the Tailings Area overburden plume is characterized by exceedances of the 5 metals shown in the table above, as well as stable but highly acidic pH conditions. The most significant exceedances were observed for iron (MB = 29) and manganese (MB = 22).

The geologic cross-section C-C' and D-D' (Figures 5-4 and 5-5, respectively) illustrate the relationship between the mines waste, overburden, bedrock, and groundwater within the Tailings Area. The estimated extent of the overburden groundwater COCs plumes is depicted in Figure 6-19. There is no bedrock data available in the Tailings Area. Based on the overlapping nature of the LWA waste rock with the Tailings Area, the LWA and Tailings Area overburden plume are inferred to be laterally and vertically contiguous. The estimated

delineation of this plume in the Tailings Area is based on the observations and conclusions described below.

Sample results from well MW-22A, which is screened below the tailings, indicated relatively low copper concentrations in groundwater, although other COC exceedances are observed, most notably iron (MB = 601). Although there is no bedrock groundwater data available for the Tailings Area, it is likely the underlying glacial till and proximity of the tailings to a groundwater discharge would be to limit the downward migration of impacted groundwater.

6.5.4 ORB

The ORB is located immediately south of the LWA, to the east of the access road, in an area approximately 180 ft wide and 900 ft long (Figure 2-4). A detailed description of the physical characteristics of the ORB is provided in Section 5.4.4.

6.5.4.1 Surface Soil

Laboratory analytical results from 23 surface soil samples taken at 14 locations across the ORB were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis from barren areas, transition zones, and healthy, vegetated locations. Soil XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all ORB surface soil TAL metals are provided in Table 6-6. A statistical summary of ORB surface soil COCs results is shown in the tables below. These data result in surface soil copper MBs equal to 17 in the ORB barren area and 11 in the ORB transition zone.

ORB – Surface Soil (Barren Source Area)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	15	50	19	23/23	4	24	16
Copper	783	2,200	1,016	23/23	8	629	45
Iron	64,914	196,000	84,554	23/23	12	44,800	31,000

ORB – Surface Soil (Transition Zone)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	8	13.5	NA	3/3	0	24	16
Copper	508	1,350	NA	3/3	1	629	45
Iron	37,067	89,000	NA	3/3	1	44,800	31,000

Analyses for paste pH, paste conductivity, ABA, and SPLP metals were conducted to evaluate the characteristics of the material in the ORB. These analyses evaluated the material's potential for acid generation or neutralization and the potential for metals to be leached. Paste pH, paste conductivity, and ABA results are presented in Table 6-20 and SPLP results are present in Table 6-21. Paste pH, paste conductivity, and ABA results indicate that the material present in the ORB is primarily non-acid-generating. Paste pH values for most samples collected from the ORB were greater than 4 su with positive ABA results indicating an acid neutralizing potential for the material. However, one sample collected in the vicinity of MW-23A identified paste pH at 3.9 su with an ABA result of approximately -38 t $CaCO_3$/1000t, indicating that a limited volume of material in the ORB may have acid-generating potential. Results from SPLP testing of surface soil samples in the ORB indicate a relatively low susceptibility for metals, including aluminum and copper, to be leached from this waste area.

The acid-generating potential and leachability of ORB waste is generally an order of magnitude less than other Site waste source areas. For example, samples from the UWA and LWA each exhibited ABA values less than -200 t$CaCO_3$/1000t and paste pH values below 3 su, in contrast to the values measured in the ORB and discussed above.

6.5.4.2 Subsurface Soil

Subsurface investigations by Nobis and URS in the ORB have included five soil borings and/or monitoring well installations (Figure 3-2). The results of these borings indicated that the ORB waste thickness ranges from 2 to 8 ft. Cross-section E-E' (Figure 5-6) traverses from west to east, starting in the forested area between Lower Ely Brook and the access road, and then crossing the ORB. This cross-section illustrates the relationship between waste material and

the large retaining wall. Based on the subsurface investigations conducted in this area, the material behind the retaining wall consists of waste material and reworked fill resting atop the native till formation. Based on surface and subsurface observations, the estimated volume of waste material in the ORB is 10,330 cy, covering a surface area of approximately 2.2 acres.

Soil XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all ORB subsurface TAL metals are provided in Table 6-7. A statistical summary of ORB subsurface soil COCs results is shown in the tables below. These data result in subsurface soil copper MBs equal to 19 in the UWA barren areas.

ORB – Subsurface Soil (Barren Source Area)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	18	28	NA	7/7	1	24	16
Copper	847	1,800	NA	7/7	4	629	45
Iron	60,686	130,000	NA	7/7	3	44,800	31,000

The overburden monitoring well MW-23A was installed in the vicinity of EBT1, an intermittent tributary that transects the area. The observed thickness of the ORB material at this location was 8 ft, underlain by 6.5 ft of gray glacial till. Water levels observed in this well indicate that the lowermost 1 ft of the ORB material is saturated with groundwater in this area, with only minor water table fluctuation observed between the summer and fall of 2009. Copper concentrations detected in the ORB at this location ranged from 156 mg/kg to 517 mg/kg, with the underlying till having a concentration in the same range at 466 mg/kg. These concentrations are significantly lower than those observed in other areas of the Site.

Paste pH, paste conductivity, and ABA results from the subsurface ORB material were similar to the underlying glacial till, suggesting that the roast bed soils are not acid-generating. Paste pH values from subsurface soils are greater than 5.5 su, and ABA results are positive, ranging from approximately 27 to 36 t $CaCO_3$/1000t. SPLP analysis of the surface and subsurface soil in the

ORB shows that the metals aluminum and copper may be susceptible to leaching from this area but at relatively low concentrations that are not likely to significantly impact groundwater or surface water.

6.5.4.3 Extent of Source Contamination

A combination of analytical laboratory samples and field XRF samples were used to delineate the extent of COCs contamination in the ORB. The extent of soil impacts in the ORB is shown in Figure 6-5. This delineation is based on exceedances of the COCs (cobalt, copper, and iron) as well as visual observations of the deep red, hematite-rich ore roast waste that is characteristic of the ORB, and clearly distinguishable from the LWA waste rock to the north and non-waste soils located to the east and underlying the ORB. Figure 6-5 also incorporates XRF field screening copper results that were used to provide confirmation of the boundary delineation in areas where analytical data was limited. Individual figures depicting cobalt, copper, and iron exceedances are shown in Figures 6-6, 6-7, and 6-8, respectively.

Two surface soil XRF screening transects were performed in the ORB (TG and TY). Results along TG, located east of the ORB, revealed transition zone copper concentrations below the PRG extending approximately 175 ft east of the ORB boundary. Results along TY, located within the southern portion of the ORB, identified copper concentrations ranging from 292 mg/kg to 1,969 mg/kg, with a general decrease in concentration toward the south. The decrease in the concentrations of metals also correlates with an increase in vegetation.

The eastern boundary of the ORB is delineated based on surface soil samples collected within the eastern ORB transition zone (SS-23, SS-22, SS-19, and SS-15) that contained concentrations of COCs below PRGs. This delineation is also supported by copper XRF field screening results from transect TG below the PRG. The southern and northern boundaries of the ORB are based on visual observations of ore roast waste in surface soils. The western boundary of the ORB is delineated by the physical boundary of a stone retaining wall. Based on historic information of the former mine operations, this wall represents the constructed limit of the ORB (PAL, 2005). The results of subsurface investigations indicate that the ORB waste thickness ranges from 2 to 8 ft.

Based on these surface and subsurface observations, the estimated volume of waste material in the ORB is 10,330 cy encompassing approximately 2.2 acres.

6.5.4.4 Groundwater

Groundwater samples have been collected from several wells in the ORB during work conducted by URS and Nobis (Figure 3-2). These include:

- shallow overburden wells: MW-23A
- shallow bedrock wells: MW-03C

Groundwater geochemical parameter results are provided in Table 6-11 and laboratory analytical results for TAL metals are provided in Table 6-12. Statistical summaries of the ORB groundwater COCs results for shallow overburden and shallow bedrock are shown in the tables below. These data result in the following groundwater copper MBs:

Aquifer	Copper MB
ORB Shallow Overburden	14.9
ORB Shallow Bedrock	0.5

ORB Shallow Overburden Groundwater

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	5.1	5.4	5.2	6.5

ORB Shallow Bedrock Groundwater

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	8.2	9.4	8.8	6.9

Based on these data, detected metal concentrations in groundwater within this area are well below groundwater criteria and no metals groundwater plumes are present within the ORB. The overburden groundwater is characterized by stable and acidic conditions, while the overburden shallow bedrock groundwater is characterized by variable and basic conditions.

The overburden monitoring well MW-23A was installed in the proximity of an intermittent tributary that transects the area. The observed thickness of the roast bed material at this location was 8 ft, underlain by 6.5 ft of gray glacial till. Water level data from well MW-23A indicates that the glacial till is saturated and the water table fluctuates above the till to a level that likely only partially saturates the eastern portion of the roasted ore soil layer (cross-section E-E', Figure 5-6). However, due to the low acid-generating potential of this soil, mobilization of metals to groundwater appears to be limited in this area, as evidenced by the relatively low copper groundwater MBs in contrast to concentrations in the waste rock piles elsewhere on the Site (i.e., the UWA and LWA). Results from solute transport modeling of potential downgradient groundwater impacts from the ORB are provided in Section 7.0.

6.5.5 EB-MR

The EB-MR is defined as the segment of Ely Brook located between the confluence of Ely Brook and EBT2 and the confluence of Ely Brook and EBT1, (Figures 2-4 and 3-5). It has a moderate gradient and relatively low sediment deposition within the channel below the confluence with EBT2.

6.5.5.1 Surface Soil

One transition zone surface soil sample (SS-12) was collected in the EB-MR (Figure 3-1). Soil XRF field screening results for the EB-MR are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all surface soil TAL metals are provided in Table 6-6 and a statistical summary of the EB-MR surface soil COCs results is shown in the tables below. These data result in a surface soil copper MBs equal to 3.3.

EB-MR – Surface Soil (Transition Zone)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	5.8	5.8	NA	1/1	0	24	16
Copper	149	149	NA	1/1	0	629	45
Iron	9,760	9,760	NA	1/1	0	44,800	31,000

Analyses for paste pH, paste conductivity, ABA, and SPLP metals did not indicate the potential for acid generation or neutralization, and leachability of metals in the EB-MR transition zone soils in the vicinity of SS-12. Results for pH, paste conductivity, and ABA are presented in Table 6-20 and SPLP results are presented in Table 6-21.

6.5.5.2 Sediment

Fixed laboratory analytical results from 27 sediment samples taken at 16 locations across the EB-MR were evaluated. Samples were collected during Site investigations conducted by URS and Nobis. Sediment XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all sediment TAL metals are provided in Table 6-8 and a statistical summary of the EB-MR sediment COCs results is shown in the tables below. These data result in a sediment copper MB of 72.

EB-MR – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	3,457	11,000	4,491	22/22	22	149	50

Analyses for paste pH, paste conductivity, and ABA were conducted to evaluate the potential for acid generation or neutralization from the EB-MR sediments. Results for pH, paste conductivity, and ABA are presented in Table 6-20 and SPLP results are presented in Table 6-21. These

results show paste pH concentrations generally less than 4 and negative ABA values, signifying the acid-generating potential of the EB-MR sediments.

These results, as well as visual observations of the alluvium present in depositional areas of the channel, indicate the sediment in the EB-MR is composed primarily of eroded waste rock. This waste rock alluvium acts as a source of acidity and metals contamination to Ely Brook surface water.

6.5.5.3 Extent of Source Contamination

A combination of analytical laboratory and field XRF sediment samples were used to delineate the extent of COC contamination in the EB-MR, as shown in Figure 6-9. This delineation is based entirely on copper exceedances. Copper sediment concentrations increase 3- to 4-fold below the EBT2 confluence, exceeding the PRG in every sediment sample analyzed, with concentrations of up to 11,000J mg/kg.

XRF field screening was utilized in an effort to delineate the vertical and lateral extent of the waste within the EB-MR (Table 6-19). This investigation included one transect (TF) completed across the stream channel and adjacent floodplain. The sample collection included hand augured borings within the stream channel to estimate the depth profile of waste sediment deposition. These XRF results confirmed that the extent of waste to the west is tightly constrained by the limits of the stream channel. Conversely, up to eight inches of waste material were observed in the floodplain approximately 30 ft to the east of the channel. The central portion of the channel contained waste material up to 3.5 ft thick.

Observations of the lateral and vertical limits of waste defined by surface sediments and hand-augered borings indicate the EB-MR contains an estimated 580 cy of waste rock alluvium.

6.5.5.4 Surface Water

Fixed laboratory analytical results from 18 surface water samples taken at 6 locations across the EB-MR were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis.

Laboratory analytical results for all surface water TAL metals are provided in Table 6-10 and a statistical summary for surface water COCs that exceeded PRGs in the EB-MR are shown in the table below. These data result in surface water copper MBs equal to 2,230.

EB-MR – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	10,140	34,000	14,372	18/18	18	87	240
Cadmium	4.6	18	6.7	16/18	14	1.1	0.5
Chromium	8.3	32	12	18/18	4	11	0.62
Copper	2,677	7,540	3,414	18/18	18	8.6	1.2
Iron	19,305	74,900	29,303	18/18	18	1,000	2,000
Nickel	42	148	61	18/18	3	52	2.3
Zinc	745	2,630	1,061	18/18	18	106	3.35

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	4.1	4.6	4.2	7.7

Based on these data, EB-MR surface water is characterized by exceedances of the 6 metals shown in the table above (excluding nickel that exceeded PRGs in less than 17% of samples collected), as well as acidic pH conditions. Surface water exceedances were observed in every sample collected from the EB-MR. The most significant exceedances were observed for copper (MB = 1,024) and zinc (MB = 82).

6.5.6 EB-LR

The EB-LR is defined as the segment of Ely Brook located between the confluence of Ely Brook and EBT1 and the confluence of Ely Brook and SHB (Figures 2-4 and 3-5). It is characterized by a relatively low gradient braided channel with sediment depositional areas containing waste rock alluvium within well defined floodplain. The lowermost section is contained within a berm until Ely Brook flows under South Vershire Road through a culvert.

6.5.6.1 Surface Soil

Eleven transition zone surface soil samples were collected in the EB-LR (Figure 3-1). Soil XRF field screening results for the EB-LR are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all surface soil TAL metals are provided in Table 6-6 and a statistical summary of the EB-LR surface soil COC results is shown in the tables below. These data result in a surface soil copper MB equal to 18.

EB-LR – Surface Soil (Transition Zone)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	34	160	63	11/11	2	24	16
Copper	812	2,900	1,317	11/11	4	629	45
Iron	44,200	130,000	65,821	11/11	3	44,800	31,000

Two transition zone surface soil samples were analyzed for paste pH, paste conductivity, and ABA. These results did not indicate the potential for acid generation or neutralization in the EB-LR transition zone soils. Results for pH, paste conductivity, and ABA are presented in Table 6-20.

6.5.6.2 Sediment

Fixed laboratory analytical results from 35 sediment samples taken at 29 locations across the EB-LR were evaluated. Samples were collected during Site investigations conducted by USEPA, USGS, URS, and Nobis. Sediment XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all sediment TAL metals are provided in Table 6-8 and a statistical summary of EB-LR sediment COC results is shown in the tables below. These data result in a sediment copper MB of 45.

EB-LR – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	2,243	7,120	2,773	35/35	35	149	50

Analyses for paste pH, paste conductivity, and ABA were conducted to evaluate the potential for acid generation or neutralization from EB-LR sediments. Results for pH, paste conductivity, and ABA are presented in Table 6-20. Paste pH values are below 3 su directly downgradient from the LWA and approximately 4 su farther downgradient. ABA values for sediment samples were negative, indicating that the waste material present within the EB-LR is acid-generating.

These results, as well as visual observations of the alluvium present in depositional areas of the channel, indicate the sediment in the EB-LR is composed primarily of eroded waste rock. This waste rock alluvium acts as a source of acidity and metals contamination to Ely Brook surface water.

6.5.6.3 Extent of Source Contamination

A combination of analytical laboratory and field XRF sediment samples were used to delineate the extent of COC contamination in the EB-LR, as shown in Figure 6-9. This delineation is based entirely on copper exceedances. All sediment samples collected from the EB-LR contained copper concentrations exceeding the PRG.

XRF field screening was utilized in an effort to delineate the vertical and lateral extent of the waste within the EB-LR (Table 6-19). This investigation included three transects (TE, TD, and TA) completed across the stream channel and adjacent floodplain. The sample collection included hand augured borings within the stream channel to estimate the depth profile of waste sediment deposition. These XRF results confirmed that the extent of waste to the west is tightly constrained by the limits of the stream channel. Conversely, up to eight inches of waste material were observed in the floodplain approximately 30 ft to the east of the channel. The central portion of the channel contained waste material up to 3.5 ft thick.

In transect TE, less than 6 inches of waste material mixed with soil were observed in the floodplain/transition zones to the east and west of the stream bed with relatively low copper concentrations ranging from 126 mg/kg to 435 mg/kg. Up to 3 ft of sediment waste material were observed in the channel with copper concentrations up to 4,835 mg/kg.

In transect TD, 2 to 6 inches of waste sediment were also observed in the floodplain and up to 2 ft of waste sediment were observed within in the stream channel itself. Waste material to the east of Ely Brook is limited in lateral extent to within 10 ft of the channel bank due to the steep slope leading up to the access road. Copper concentrations up to 6,175 mg/kg were reported in sediment waste within the channel. Floodplain soil copper concentrations were less than 350 mg/kg. Cross-section F-F' (Figure 5-7) is along transect TD and illustrates the relative thickness of waste and overburden deposits across EB-LR.

One soil XRF transect, TA, was completed in the floodplain area west of Ely Brook in the western portion of the Smelter Area. The stream channel in this area is relatively narrow and appears to be confined by manmade banks. Copper concentrations in floodplain soil within 70 ft of the stream channel range from 957 mg/kg to 1,558 mg/kg. Beyond this, to the west, soil copper concentrations range from 51 mg/kg to 505 mg/kg, indicating a transition zone extending over 350 ft from Ely Brook in this area.

Soil borings SB-A and SB-B were advanced within the Ely Brook channel to evaluate the thickness of waste material between transects. Hand auger SB-A was advanced in the sediment upstream from the USGS weir installed in Ely Brook. Visual observations identified at least 1.5 ft of waste material in this portion of Ely Brook. Copper concentrations ranged from 474 mg/kg to 1,969 mg/kg, with the highest concentrations identified from 1.0 ft to 1.5 ft below the stream channel. Hand auger SB-B was advanced within the Ely Brook Channel between TD and TE. Visual observations identified approximately 1 ft of waste material present in this area. Copper concentrations at SB-B ranged from approximately 315 mg/kg to 1,473 mg/kg.

The EB-LR contains significant accumulations of waste material (up to 3.5 ft thick) within the stream channel and portions of the floodplain. Observations of the lateral and vertical limits of waste defined by surface sediments and hand-augered borings indicate the EB-LR contains an estimated 3,950 cy of waste rock (based on an average of a 2 ft thickness) alluvium, covering 2.5 acres of stream channel and floodplain.

A combination of analytical laboratory samples and field XRF samples were used to delineate the extent of COC contamination in the EB-LR transition zone soils, as shown in Figure 6-5. This delineation is based primarily on exceedances of the COCs cobalt, copper, and iron. Figure 6-5 also incorporates XRF field screening copper results from the transects TE, TD, and TA that were extended from the Ely Brook channel and floodplain into the transition zone which provide confirmation of the impact area where analytical data was limited. Individual figures depicting cobalt, copper, and iron exceedances are shown in Figures 6-6, 6-7, and 6-8, respectively.

Exceedances of soil PRGs were observed at three sample locations in the transition zone, NF-05 (cobalt and copper), SS-11 (copper and iron), and TA-14 (copper). These sample locations are generally separated by other non-exceedance XRF sample results, indicating that these impacts are not laterally continuous with other EB-LR sources. Because these sample locations are disconnected from other waste sources, these exceedances result in the delineation of two soil impact hot-spots located west of the EB-LR.

6.5.6.4 Surface Water

Fixed laboratory analytical results from 60 surface water samples taken at 8 locations across the EB-LR were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis.

Laboratory analytical results for all the EB-LR surface water TAL metals are provided in Table 6-10. A statistical summary for surface water COCs that exceeded PRGs in the EB-LR is shown in the table below. These data result in a surface water copper MB equal to 1,943 in the EB-LR.

EB-LR – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	6038	34,000	7,449	60/60	59	87	240
Cadmium	3	18	4.0	58/60	52	1.1	0.5
Chromium	5	32	6.4	58/60	4	11	0.62
Copper	2331	7,540	2599	60/60	6	8.6	1.2
Iron	9361	74,900	12644	60/60	59	1000	2,000
Mercury	0.2	2.5	0.38	2/19	2	0.012	0.1
Nickel	28	148	34.0	60/60	3	52	2.3
Zinc	457	2,630	563	60/60	58	106	3.35

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	3.2	4.5	4.2	7.7

Based on these data, EB-LR surface water is characterized by exceedances of the 5 metals shown in the table above (excluding chromium, mercury, and nickel that exceeded PRGs in less than 7% of samples collected), as well as highly acidic and variable pH conditions. Surface water exceedances were observed in every sample collected from the EB-LR. The most significant exceedances were observed for copper (MB = 1,943) and zinc (MB = 136).

6.5.6.5 Groundwater

Groundwater samples have been collected from several wells in the vicinity of the EB-LR during work conducted by URS and Nobis (Figure 3-2). These include:

- shallow overburden well: MW-14A;
- shallow bedrock wells: MW-14C; and
- deep bedrock well: MW-14D.

Groundwater geochemical parameter results are provided in Table 6-11 and laboratory analytical results for TAL metals are provided in Table 6-12. Deep bedrock packer sampling laboratory analytical results for TAL metals are provided in Table 6-13. Statistical summaries of the groundwater COC results for compounds that exceeded PRGs in the EB-LR are shown in the tables below. These data result in the following groundwater copper MBs:

Aquifer	Copper MB
EB-LR Shallow Overburden	2.6
EB-LR Shallow Bedrock	1.0
EB-LR Deep Bedrock	0.8
Ely Brook Transitional Zone Shallow Overburden	0.6

EB-LR – Shallow Overburden Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Cobalt	D	4	5.9	NA	3/3	1	5	25
	T	18	25	NA	1/3	1	5	25

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	6.4	6.4	6.4	6.5

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

EB-LR – Shallow Bedrock Groundwater

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	7.6	7.8	7.7	6.9

Based on these data, detected metal concentrations in the overburden and shallow bedrock groundwater within this area are generally well below groundwater criteria. Cobalt was detected in MW-14A at 5.4 µg/L during its first round of sampling in 2007 but this well has been sampled two subsequent times and no additional exceedances have been observed. Based on these results, no metals groundwater plumes are delineated within the EB-LR overburden and shallow bedrock. The overburden and bedrock groundwater is characterized by essentially stable and near-neutral pH conditions.

EB-LR – Deep Bedrock Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Chromium	D	5	5	NA	0/4	0	100	5
	T	34	132	NA	4/4	1	100	5
Iron	D	1,208	4,640	NA	2/4	1	556	180
	T	2,184	4,275	NA	4/4	4	556	2,400
Zinc	D	151	512	NA	3/4	1	465	30
	T	104	192	NA	4/4	0	465	30

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	6.8	8.0	7.4	6.9

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Based on these data, the EB-LR deep bedrock plume is characterized by exceedances of chromium, iron, and zinc, as well as stable neutral to basic pH conditions. The most significant exceedance was observed for chromium (MB = 7). The delineation of the deep bedrock plume is shown in Figure 6-21.

Along the EB-LR, waste rock alluvium up to 3-4 thick has been deposited in the channel and floodplain. This waste is essentially saturated (cross-section F-F', Figure 5-7). However, because Ely Brook is a gaining stream (i.e., groundwater discharges to surface water in this area of the Site), the EB-LR waste source has a limited impact on overburden and bedrock groundwater, as indicated by the groundwater metals results.

Also included in this section is a discussion of groundwater results from two transitional zone to forested zone shallow overburden monitoring wells, MW015A and MW-16A. Although these wells do not lie within the boundaries of an Ely Brook source zone, they are most proximal to the Ely Brook source areas and have been grouped together to provide a more robust statistical evaluation of transition zone overburden located to the west of Ely Brook in an area that is relatively unimpacted by waste sources.

Ely Brook Transitional Zone – Shallow Overburden Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	103	170	NA	1/6	0	1,248	290
	T	356	1,700	NA	3/6	1	1,248	2,000
Iron	D	71	200	NA	1/6	0	556	310
	T	383	1,900	NA	4/6	1	556	2,200
Manganese	D	202	696	NA	6/6	1	300	43.6
	T	260	801	NA	6/6	1	300	85.6

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	7.5	7.6	7.6	6.5

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Based on these data, overburden groundwater flowing into Ely Brook from the western transitional zone is characterized by exceedances of aluminum, iron, and manganese, as well as stable neutral to basic pH conditions. Although aluminum and iron exceed the PRGs in greater than 50% of the samples collected, the average and maximum concentrations are below the maximum concentrations observed in background groundwater. The most significant exceedances were observed for manganese (MB = 3). Given the lack of upgradient data in the vicinity of MW-15A and MW-16, it is not clear what potential manganese sources may be present that are impacting these wells. Manganese generally does not appear to be a metal directly related to the mine waste and is not an identified COC in mine waste rock. The elevated manganese concentrations detected are likely the result of regional soil and geological conditions. Based on this conclusion these wells are not included in the mine-related overburden plumes delineation shown in Figure 6-19.

6.5.7 Smelter Area

The Smelter Area lies at the southern margin of the Site along the north side of South Vershire Road and encompasses an area of 3.8 acres. The area is a barren waste rock area with small waste rock and debris piles along the southwest margin of the area (Figure 2-4). A detailed description of the physical characteristics of the Smelter Area is provided in Section 5.4.6.

6.5.7.1 Surface Soil

Off-site laboratory results from 44 surface soil samples from 26 locations across the Smelter Area were evaluated as part of the combined soil database for the Site. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis from both the non-vegetated portion of the waste rock piles ("barren area") and the surrounding transitional vegetation zone ("transition zone") that exists between barren areas and healthy, vegetated forest. Soil XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all surface soil TAL metals are provided in Table 6-6 and a statistical summary of Smelter Area surface soil COC results is shown in the tables below. These data result in surface soil copper MBs equal to 33 in the barren area and 7.7 in the transition zone.

Smelter Area – Surface Soil (Barren Source Area)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	65	716	99	44/44	23	24	16
Copper	1,501	6,800	1,871	44/44	30	629	45
Iron	70,375	410,000	92,370	44/44	19	44,800	31,000

Smelter Area – Surface Soil (Transition Zone)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	12	16	NA	4/4	0	24	16
Copper	346	494	NA	4/4	0	629	45
Iron	29,150	34,000	NA	4/4	0	44,800	31,000

Analyses for SPLP metals were also conducted to evaluate the susceptibility of metals leaching from the waste material present in the Smelter Area. These data are summarized in Table 6-21

and confirm that relatively low levels of metals, including the COC copper are potentially leached from Smelter Area wastes.

6.5.7.2 Subsurface Soil

Subsurface investigations in the Smelter Area have included 13 test pits and installed 4 monitoring wells installations conducted by URS within the western portion of this area (Figure 3-2). Cross-section G-G' and H-H' (Figures 5-8 and 5-9, respectively) illustrate subsurface conditions in the Smelter Area.

Soil XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all subsurface soil TAL metals are provided in Table 6-7 and a statistical summary of Smelter Area subsurface soil COC results from barren waste areas is shown in the tables below. These data result in a subsurface soil copper MB equal to 30.

Smelter Area – Subsurface Soil (Barren Source Area)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	32	85	NA	8/8	3	24	16
Copper	1,346	3,400	NA	8/8	6	629	45
Iron	39,250	120,000	NA	8/8	2	44,800	31,000

6.5.7.3 Extent of Source Contamination

A combination of analytical laboratory samples and field XRF samples were used to delineate the extent of COC contamination in the Smelter Area. The extent of soil impacts in the Smelter Area is shown in Figure 6-5 and is based primarily on exceedances of the COCs (cobalt, copper, and iron). Figure 6-5 also incorporates XRF field screening copper results that were used to provide confirmation of the boundary delineation in areas where analytical data was limited. Individual figures depicting cobalt, copper, and iron exceedances are shown in Figures 6-6, 6-7, and 6-8, respectively.

Concentrations of copper in samples collected throughout the barren areas were relatively consistent ranging between 1,000 mg/kg and 3,000 mg/kg at almost all locations. A limited group of laboratory and XRF screening surface soil samples were collected along the retaining wall to the northeast of the former smelter building. These results show copper concentrations in the range of 122 mg/kg to 804 mg/kg in this transition zone. These transects indicate that historic mining operations did not result in a significant impact to the area upslope of the retaining wall and that the extent of contamination closely mirrors the barren and orange-stained soil areas within the Smelter Area.

Field XRF analysis of surface soil was completed from transects (TB and TS) along an upslope from the retaining wall to the north of the former smelter building to investigate the potential for lead impacts related to the smelter operation. One anomalous result from a sample immediately adjacent to the access road reported a lead concentration of 41 % by weight, which is likely the result of a piece of elemental lead in the sample. Other lead concentrations in the samples collected along TB were in the range of 11 mg/kg to 40 mg/kg. Based on the anomalous nature of the detection and the XRF screening results, there does not appear to be a significant source of lead contamination in this area.

Although investigations have been limited in the footprint of the former smelter building due to the historic significance of remnant artifacts, observations indicate that the thickness of the waste ranges from approximately 2 to 16 ft. The thickest areas of waste are located to the south, toward South Vershire Road and the Slag Pile Area. Slag is associated with smelting operations and is present with other waste rock throughout the Smelter Area. Although no subsurface explorations have been conducted under South Vershire Road, slag is inferred to extend beneath the road from the Slag Pile Area into the western portion of the Smelter Area.

Based on the lateral limit of the Smelter Area and the limited subsurface data available, the volume of waste material in this area is estimated at 31,120 cy, covering a surface area of 3.8 acres.

6.5.7.4 Groundwater

Groundwater samples have been collected from several wells in the Smelter Area during work conducted by URS and Nobis (Figure 3-2). These include:

- deep overburden transition zone well MW-10B;
- shallow bedrock transition zone well MW-10C;
- shallow overburden well: MW-11A; and
- shallow bedrock well: MW-11C.

Groundwater geochemical parameter results are provided in Table 6-11 and laboratory analytical results for TAL metals are provided in Table 6-12. Statistical summaries of the groundwater COC results for compounds that exceeded PRGs for overburden and bedrock in the Smelter Area are shown in the tables below. These data result in the following groundwater copper MBs:

Aquifer	Copper MB
Smelter Area Transition Zone Deep Overburden	4.3
Smelter Area Transition Zone Shallow Bedrock	0.9
Smelter Area Shallow Overburden	2.3
Smelter Area Shallow Bedrock	0.9

Smelter Area – Deep Overburden Groundwater (Transition Zone)

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Cobalt	D	20	25	34	1/3	1	5	25
	T	21	25	33	1/3	1	5	25
Manganese	D	103	300	391	3/3	0	300	43.6
	T	109	318	414	3/3	1	300	85.6
Nickel	D	73	200	258	2/3	1	100	20
	T	77	229	299	3/3	1	100	20
Zinc	D	168	492	640	3/3	1	465	30
	T	195	570	743	3/3	1	465	175

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	4.21	6.08	7.25	6.5

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Based on these data, the Smelter Area transition zone overburden plume in the vicinity of MW-10B is characterized by exceedances of 4 metals, as well as variable pH conditions ranging from acidic to mildly acidic. The most significant exceedances were observed for nickel (MB = 11). The delineation of the overburden plume is shown in Figure 6-19.

Smelter Area – Shallow Bedrock Groundwater (Transition Zone)

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Molybdenum	D	35	92.2	118.8	3/3	1	40	2.5
	T	36	92.7	118.8	3/3	1	40	2.5

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	5.4	8.0	6.7	6.5

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Based on these data, the Smelter Area transition zone bedrock plume in the vicinity of MW-10C is characterized by exceedances of molybdenum, as well as variable pH conditions ranging from acidic to mildly basic. The delineation of the bedrock plume is shown in Figure 6-21.

Smelter Area – Shallow Overburden Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Cobalt	D	13	19.7	23	3/3	3	5	25
	T	13	19.6	23	3/3	3	5	25
Iron	D	13,198	22,200	32,491	3/3	2	556	310
	T	13,647	23,900	34,035	3/3	2	556	2,200
Manganese	D	2,475	2,894	3,649	3/3	3	300	43.6
	T	2,493	3,020	3,792	3/3	3	300	85.6

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	5.5	6.3	5.9	6.5

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Based on these data, the Smelter Area overburden plume in the vicinity of MW-11A is characterized by exceedances of cobalt, iron, and manganese, as well as stable and acidic to near-neutral pH conditions. The most significant exceedances were observed for manganese (MB = 35). The delineation of the overburden plume is shown in Figure 6-19.

Approximately 12.5 ft of fill material was identified in MW-11A, consisting of re-worked alluvium, till, and waste material. Groundwater elevation data indicate that approximately 9 ft to 10 ft of the fill material at MW-11A and approximately 6 ft of slag waste are saturated with groundwater in these areas. Based on this information it is likely that approximately half of the waste material in the Smelter Area is groundwater-saturated, with very little seasonal fluctuation observed.

Smelter Area – Shallow Bedrock Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	90	100	119	1/3	0	1,248	290
	T	956	2,600	3,357	2/3	1	1,248	2,000
Iron	D	63	90	102	1/3	0	556	310
	T	1,103	2,800	3,600	3/3	1	556	2,200

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	5.46	7.54	6.5	6.5

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Based on these data, the Smelter Area bedrock plume in the vicinity of MW-11C is characterized by exceedances of aluminum and iron, as well as variable pH conditions ranging from acidic to near neutral. The most significant exceedances were observed for manganese (MB = 29). The delineation of the bedrock plume is shown in Figure 6-21.

6.5.8 Slag Pile Area

The Slag Pile Area encompasses an area of approximately 3.8 acres located at the bottom of the Ely Brook Valley between the Smelter Area and SHB (Figure 2-4) and is characterized by deposits of debris and slag waste from the former smelting operations up to 18 ft thick. A detailed description of the physical characteristics of the Slag Pile is provided in Section 5.0.

6.5.8.1 Surface Soil

Fixed laboratory analytical results from 24 surface soil samples taken at 13 locations across the Slag Pile Area were evaluated. Samples were collected during Site investigations conducted by the USGS and URS. Soil XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all surface soil TAL metals are provided in Table 6-6 and a statistical summary of Slag Pile Area

surface soil COC results is shown in the tables below. These data result in a surface soil copper MB equal to 60 in the Slag Pile Area barren areas.

Slag Pile – Area Surface Soil

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	110	431	157	24/24	16	24	16
Copper	2,697	14,000	3,900	24/24	16	629	45
Iron	114,342	421,000	163,852	24/24	11	44,800	31,000

SPLP data collected from the Slag Pile Area are summarized in Table 6-21. The slag and secondary minerals associated with weathering of the slag are described in detail by Piatak, et al. (2004b), including an evaluation of the potential leachability of the slag. Although relatively infrequent, blue and white precipitates are evident on the outcrop face, indicating that leaching of the slag is occurring. Results from SPLP testing of surface soil samples in the Slag Pile Area indicate that relatively low levels of metals, including antimony, cadmium, copper, iron, lead, and zinc, are potentially leached from this waste area.

6.5.8.2 Subsurface Soil

Subsurface investigations in the LWA have included test pits and monitoring well installations conducted by URS. These investigations documented the presence of non-stratified waste of variable thicknesses ranging from 1 ft to 16 ft. The thickest areas of slag waste are located to the south along South Vershire Road in the area of the MW-01 well cluster. Overburden monitoring well MW-2A identified approximately 16 ft of slag waste material above approximately 4 ft of alluvium and 49 ft of glacial till. Cross-section G-G' and H-H' (Figures 5-8 and 5-9, respectively) illustrate subsurface conditions in the Slag Pile Area.

Laboratory analytical results for TAL metals from 2 subsurface soil samples collected in the Slag Pile Area are provided in Table 6-7 and a statistical summary of these COC results is shown in the table below. These data result in a subsurface soil copper MB equal to 23.

Slag Pile – Area Subsurface Soil

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	48	85	NA	2/2	1	24	16
Copper	1,035	1,300	NA	2/2	2	629	45
Iron	26,000	34,000	NA	2/2	0	44,800	31,000

6.5.8.3 Extent of Source Contamination

Analytical laboratory samples and field observations from surface soils and subsurface explorations were used to delineate the extent of waste in the Slag Pile Area. The highest concentrations of copper were detected in samples collected directly from the slag material, specifically, the inner core of the slag pot skull. The samples collected from the slag material also consistently exhibited concentrations of cobalt and iron above PRGs.

The extent of soil impacts in the Slag Pile Area is shown in Figure 6-5 and is based primarily on exceedances of the COCs (cobalt, copper, and iron). Individual figures depicting cobalt, copper, and iron exceedances are shown in Figures 6-6, 6-7, and 6-8, respectively. The southern and southwestern extent of the Slag Pile is primarily bound by SHB as evidenced by slag material in the brook, the absence of slag on the southern bank, and analytical results from sample NF-02. Similar to observations made in other waste areas at the Site, samples collected from the areas surrounding the slag waste exhibited concentrations typically an order of magnitude lower than those in the waste source area, with no copper exceedances.

Observations of the lateral and vertical limits of waste defined by surface soil, boring and test pits indicate the Slag Pile Area extends over an area of 4.2 acres and includes an estimated 25,000 cy of waste rock.

6.5.8.4 Groundwater

Groundwater samples have been collected from several wells in the Slag Pile Area during work conducted by URS and Nobis (Figure 3-2). These include:

- shallow overburden wells: MW-01A and MW-02A;
- deep overburden well: MW-01B and MW-02B; and
- shallow bedrock wells: MW-01C and MW-02C.

Groundwater geochemical parameter results are provided in Table 6-11 and laboratory analytical results for TAL metals are provided in Table 6-12. Statistical summaries of the groundwater COC results for compounds that exceeded PRGs for overburden, shallow bedrock, and deep bedrock in the Slag Pile Area are shown in the tables below. These data result in the following groundwater copper MBs:

Aquifer	Copper MB
Slag Pile Shallow Overburden	499
Slag Pile Deep Overburden	20
Slag Pile Shallow Bedrock	0.6

Slag Pile – Shallow Overburden Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	2,072	4,570	3,193	7/8	4	1,248	290
	T	2,288	4,680	3,342	7/8	5	1,248	2,000
Cadmium	D	3	5.2	3.8	6/8	1	5	2.5
	T	3	6	4.5	8/8	1	5	2.5
Cobalt	D	176	263.3	218	8/8	8	5	25
	T	189	306	237	8/8	8	5	25
Copper	D	5,726	23,199	10,587	8/8	7	588	12.5
	T	6,237	27,795	11,984	8/8	7	588	12.5
Iron	D	3,054	10,000	5,362	7/8	5	556	310
	T	4,318	13,000	7,456	8/8	5	556	2,200
Manganese	D	722	1,292	900	8/8	8	300	43.6
	T	735	1,299	916	8/8	8	300	85.6

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Zinc	D	1,103	1,724	1,374	8/8	8	465	30
	T	1,188	1,951	1,535	8/8	8	465	175

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	2.58	5.77	4.2	6.5

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Based on these data, the Slag Pile Area shallow overburden plume is characterized by exceedances of the 7 metals shown in the table above, as well as highly variable pH conditions, ranging from extremely acidic (MW-01A) to mildly acidic. The most significant exceedances were observed for the copper (MB = 35). The delineation of the Slag Pile Area overburden plume is shown in Figure 6-19.

Slag Pile Deep Overburden Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	73	100	89	3/9	0	1,248	290
	T	17,037	150,000	47,944	7/9	1	1,248	2,000
Chromium	D	2	5	3.9	4/9	0	100	5
	T	35	290	94.2	4/9	1	100	6.1
Cobalt	D	11	25	19	3/9	0	5	25
	T	22	96.2	41	4/9	1	5	25
Copper	D	6	13	8	7/9	0	588	12.5
	T	256	2,230	715	7/9	1	588	12.5
Iron	D	163	340	232	7/9	0	556	310
	T	22,966	200,000	64,118	9/9	5	556	2,200
Lead	D	2	5	3.9	0/9	0	15	5
	T	8	52.2	18.5	3/9	1	15	5
Manganese	D	48	125	71	9/9	0	300	43.6
	T	441	3,488	1,149	9/9	1	300	85.6

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Nickel	D	8	20	14	6/9	0	100	20
	T	29	177	64	5/9	1	100	20
Zinc	D	12	30	20	1/9	0	465	30
	T	120	937	310	2/9	1	465	175

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	5.8	8.4	7.1	6.5

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Although 9 metals have been observed to exceed PRGs in the Slag Pile Area deep overburden groundwater, only iron has been detected above PRGs more than once in 9 sampling events. Based on these data, the Slag Pile Area deep overburden plume is characterized by iron exceedances (MB = 35), as well as highly variable pH conditions, ranging from mildly acidic to mildly basic. The most significant exceedances were observed for iron (MB = 91).

Groundwater results from well clusters MW-1 and MW-2, located within the slag indicate high metals concentrations that result in a significant impact to shallow overburden groundwater in contact with these waste materials, and a significant potential impact to SHB. Results from wells screened in the underlying glacial till indicate that the contaminant plume does not penetrate significantly into the till. As a result the plume is largely contained within the waste and underlying thin alluvium layer. Due to the proximity of the waste areas to SHB and Ely Brook, the lateral migration of the contaminant plume is limited by the streams. A portion of the overburden plume at the southern limit of the Slag Pile is likely to extend some short distance downstream along the streambed prior to surface discharge. The potential metal loading and resultant impact to SHB from groundwater discharge in this area is discussed further in Section 7.0.

Slag Pile – Shallow Bedrock Groundwater

Parameter		Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	D	80	100	95	2/9	0	1,248	290
	T	1,793	11,000	3,922	7/9	3	1,248	2,000
Iron	D	131	540	223	7/9	0	556	310
	T	3,205	22,000	7,435	8/9	3	556	2,200
Lead	D	2	5	3.6	0/9	0	15	5
	T	5	15.3	7.6	6/9	1	15	5

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	6.6	8.6	7.6	6.5

Note:

1. "T" = total metals fraction, "D" = dissolved metals fraction (<45 um).

Although aluminum, iron, and lead have been observed to exceed PRGs in the Slag Pile Area shallow bedrock groundwater, only aluminum and iron have been detected above PRGs more than once in 9 sampling events. Based on these data, the Slag Pile Area deep overburden plume is characterized by aluminum (MB = 5.5) and iron exceedances (MB = 10), as well as variable pH conditions, ranging from slightly acidic to basic. The Slag Pile Area bedrock plume delineation is shown in Figure 6-21.

6.5.9 Underground Workings

Due to the limited access to the mine, samples of water have not been collected directly from the mine pool. Recent inspection of the mine openings indicates that groundwater cascades into the Main Adit and drains from this adit, downslope toward the UWA. It is likely that this point represents the decant point from the mine, controlling the water level in the main shaft of the mine. Water draining this adit was sampled twice (SW-49 or EM-SEEP20) during 2009 and contained dissolved copper concentrations from 1,499 µg/L to 1,850 µg/L, with a pH ranging from 3.2 su to 3.5 su (Tables 6-9 and 6-10; and Figures 6-12 and 6-14). Water draining two additional mine openings, Shaft No. 4 (SW-77) and the Lower (Deep) Adit (SW-45 or EM-SEEP 16), contained maximum dissolved copper concentrations of 811 µg/L and 11,200 µg/L, respectively, with minimum pH values of 3.9 su and 3.3 su, respectively (Tables 6-9 and 6-10;

and Figures 6-12 and 6-14). The lower pH and higher copper concentrations observed at seeps (up to 8,010 µg/L at EM-SEEP17) at the base of the waste rock piles in comparison to upgradient groundwater represented by the Main Adit discharge suggests that the UWA interacts significantly with groundwater and results in a considerable contribution to the metal load and acidity of the surface water downstream. Results from additional seeps draining from and over the UWA suggest that the metal and acid generating character of the Main Adit discharge alone is less significant than the contribution of the waste rock in the piles.

The discharge from the Lower Adit (SW-45 or EM-SEEP16) does not significantly interact with waste material, yet has a low pH and high copper concentration. This is likely the result of the adit intercepting groundwater that has interacted with the UWA (exemplified by the surface seep at EM-SEEP15). Discharge from the Lower Adit flows directly into Pond 5, where it mixes with more alkaline water from the upper ponds, significantly altering the surface water chemistry and the apparent precipitation/remobilization of metals.

The discharge from Shaft No.4 contains considerably lower copper concentrations than the surface water farther downstream. Based on the relative surface water copper concentrations, the seep at Location SW-79 at the base of the UWA appears to contribute significantly greater metal loading to EBT4 and the EB-UR than the discharge from this shaft. However, copper loading estimates calculated by URS (2008) of up to 0.45 pounds per day (lbs/day) from the tributary branch downstream of the shaft indicate that surface debris in the vicinity of this shaft or road fill above the shaft may be contributing to the metal load.

6.6 Waste Impact Areas

Twelve study areas have been designated as waste impact areas and include: the EB-UR, EBT1 through EBT5, Ponds 4 and 5, VP-1, the Smoke Flue, SHB, and the EBOR. Waste impact areas are shown in Figure 2-4.

Site waste impact areas are distinguished from source areas based on the significance and volume of ARD/AMD and metals contamination present in environmental media. Impact areas are those zones that have received contamination from upgradient waste sources, resulting in demonstrated impacts that may require remediation. However, the volume of media requiring cleanup is much less significant than waste source areas. In the absence of continued

contaminant migration from waste source areas, the Site impact areas would be expected to recover through natural attenuate, although the time frame for this recovery may still result in unacceptable short-term risks to human health or the environment.

6.6.1 EB-UR

The EB-UR is defined as the segment of Ely Brook located between station EB-1080M and the confluence of Ely Brook and EBT2 (Figures 2-4 and 3-5). It receives discharge from the UWA via EBT4 just upstream of station EB-770M.

6.6.1.1 Sediment

Fixed laboratory analytical results from 20 sediment samples taken at 16 locations across the EB-UR were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all sediment TAL metals are provided in Table 6-8 and a statistical summary of EB-UR sediment COC results is shown in the table below. These data result in a sediment copper MB equal to 27.

EB-UR – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	1,358	5,320	1,951	20/20	15	149	50

Fifteen of 16 sediment locations in the EB-UR exhibited copper PRG exceedances. The extent of sediment impacts in Ely Brook is delineated by copper concentrations below PRGs at station EB-1080M. Slight increases in copper concentrations occur in the EB-UR downstream of Location SED-57C, and may be likely attributable to runoff from the main access road. It is likely that this access road has been historically maintained using available on-site materials including waste rock. The distribution of sediment COC exceedances in Ely Brook is shown in Figure 6-9.

Analyses for paste pH, paste conductivity, and ABA were conducted for 2 EB-UR sediment samples (SD-64 and SD-65) to evaluate the potential for acid generation or neutralization from EB-UR sediments. These results are presented in Table 6-20. Although paste pH values were above 6 su, ABA values were slightly negative. These results indicate that the waste material present within the EB-UR are relatively neutral/nonacid-generating.

Between EBT4 and EBT2, sediment copper concentrations in the EB-UR increase significantly from 1,230 mg/kg to 5,320 mg/kg. This increase is likely due the mixing of alkaline surface water from the Ely Brook Headwaters with acidic and copper/iron/sulfate enriched water from EBT4, resulting in the precipitation of hydrous aluminum and iron precipitates, which scavenge copper and other base metals.

6.6.1.2 Surface Water

Fixed laboratory analytical results from 27 surface water samples taken at 8 locations across the EB-UR were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. Laboratory analytical results for all surface water TAL metals are provided in Table 6-10 and a statistical summary for surface water COCs that exceeded PRGs in the EB-UR are shown in the table below. These data result in a surface water copper MB equal to 242 in the EB-UR.

EB-UR – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	465	17,900	1,244	23/27	11	87	240
Cadmium	1.0	8.5	1.5	17/27	1	1.1	0.5
Copper	290	8,070	642	25/27	15	8.6	1.2
Iron	155	6,660	443	16/27	1	1000	2,000
Mercury	0.35	2.5	0.65	1/19	1	0.012	0.1
Nickel	5.4	71.1	8.7	25/26	1	52	2.3
Zinc	44	1,060	89	27/27	3	106	3.35

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	6.3	7.2	6.7	7.7

Based on these data, the EB-UR surface water is characterized by exceedances of aluminum, copper, and zinc (excluding cadmium, iron, mercury, and nickel which exceeded PRGs in less than 6% of samples), as well as stable pH conditions ranging from slightly acidic to neutral. Surface water exceedances were observed at every surface water station in the EB-UR. The most significant exceedances were observed at EB-610M, located approximately 220 ft upstream of the EBT2 confluence (copper MB = 242 and zinc MB = 316). The extent of copper surface water impacts in the EB-UR is shown in Figure 6-15.

6.6.1.3 Porewater

Sediment porewater was sampled by Nobis in 2009 to assess the potential sources of metals between the EB-UR and EBT4. Laboratory analytical results for porewater TAL metals are included in Table 6-22 and summarized in Figure 6-17. Copper was detected slightly above its PRG in each total metal sample collected along the EB-UR. Iron exceeded its PRG in only one sample.

Results from the pore water sample PW-1, which is immediately below the confluence of the EB-UR and EBT4, showed only copper slightly above its PRG in the total metals sample and below PRGs in the dissolved metals sample. These concentrations are an order of magnitude lower than concentrations detected in the EB-UR at the adjacent surface water station EB-770M. The low porewater metal concentrations detected below the confluence could result from limited mixing with surface water; removal of metals from porewater by adsorption onto sediment; or the influx of groundwater with low metal concentrations.

6.6.2 EBT1

EBT1 is a relatively minor tributary, which drains an area along the eastern margin of the Site. It receives upgradient discharge from the ORB source area.

6.6.2.1 Sediment

Fixed laboratory analytical results from 6 sediment samples taken at 5 locations across EBT1 were evaluated. Samples were collected during Site investigations conducted by the USGS and URS. Laboratory analytical results for all sediment TAL metals are provided in Table 6-8, and a

statistical summary of EBT1 sediment COC results is shown in the table below. These data result in a sediment copper MB equal to 27.

EBT1 – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	1,460	3,100	2,199	6/6	6	149	50

All sediment locations in EBT1 exhibited copper PRG exceedances. The distribution of sediment COC exceedances EBT1 is shown in Figure 6-9.

6.6.2.2 Surface Water

Fixed laboratory analytical results from 15 surface water samples taken at 5 locations across EBT1 were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. Laboratory analytical results for all surface water TAL metals are provided in Table 6-10 and a statistical summary for surface water COCs that exceeded PRGs in EBT1 are shown in the table below. These data result in a surface water copper MB equal to 633 in EBT1.

EBT1 – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	932	3,660	1,568	11/15	7	87	240
Cadmium	1.2	2.9	1.6	9/15	6	1.1	0.5
Copper	759	3,520	1,306	15/15	13	8.6	1.2
Iron	327	1,600	531	15/15	3	1000	2,000
Zinc	61	258	98	12/15	6	106	3.35
	Min (su)	**Max (su)**	**Ave (su)**	**Background Min (su)**			
pH	3.8	6.5	5.7	7.7			

Based on these data, the EBT1 surface water is characterized by exceedances of the 5 metals shown in the table above, as well as highly variable pH conditions ranging from highly acidic to near neutral. Surface water exceedances were observed at 4 out of 5 surface water stations in EBT1. The most significant exceedances were observed at EBT1-32M, located approximately 20 ft upstream of the Ely Brook confluence (copper MB = 2,933). The extent of copper surface water impacts in the EBT1 is shown in Figure 6-15.

Waste rock in the ORB, where EBT1 originates, has shown little or no acid-generating potential. Therefore, the surface water impacts demonstrated by these data may be attributed to EBT1 sediment derived from the erosion of other waste rock that is inferred to be present between the ORB and Ely Brook. This waste rock originates from the access road where it may have been historically used as road fill to repair periodic washouts.

6.6.3 EBT2

EBT2 is the largest of the Ely Brook tributaries with a watershed area encompassing much of the UWA and LWA, the Lower Adit discharge, the Tailings Area, and the Ponds. The main stem of EBT2 is fed by discharge from Pond 5.

6.6.3.1 Sediment

Fixed laboratory analytical results from 15 sediment samples taken at 15 locations across EBT2 were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. Laboratory analytical results for all sediment TAL metals are provided in Table 6-8 and a statistical summary of EBT2 sediment COC results is shown in the table below. These data result in a sediment copper MB equal to 33.

EBT2 – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	1,658	4,000	2,134	15/15	15	149	50

All sediment locations in EBT2 exhibited copper PRG exceedances. The distribution of sediment COC exceedances in EBT2 is shown in Figure 6-9. The most significant exceedances (copper MB = 80) were observed in stations located where EBT2 bisects the LWA (SED-14).

6.6.3.2 Surface Water

Fixed laboratory analytical results from approximately 69 surface water samples taken at 26 locations across EBT2 were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. Laboratory analytical results for all surface water TAL metals are provided in Table 6-10 and a statistical summary for surface water COCs that exceeded PRGs in EBT2 are shown in the table below. These data result in a surface water copper MB equal to 4,679 in EBT2.

EBT2 – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	9,806	103,590	12,676	67/69	61	87	240
Cadmium	7.6	55.8	9.8	65/68	55	1.1	0.5
Chromium	8.7	125	12	46/69	10	11	0.62
Copper	5,615	33,178	7,034	68/68	63	8.6	1.2
Iron	12,674	199,000	19,482	67/69	42	1000	2,000
Lead	10.0	50	13	56/64	2	3.2	0.36
Mercury	0.10	0.2	0.11	6/44	6	0.012	0.1
Nickel	47	308	60	62/63	18	52	2.3
Selenium	1.9	17.5	2.6	39/68	2	5	0.5
Zinc	829	8,192	1,060	69/69	62	106	3.35

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	2.8	6.2	3.8	7.7

Based on these data, the EBT2 surface water is characterized by exceedances of 7 metals as shown in the table above (excluding lead, mercury, and selenium that exceeded PRGs in less than 14% of samples collected), as well as highly variable pH conditions ranging from extremely acidic to mildly acidic. Surface water exceedances were observed at every EBT2 location. The

most significant exceedances were observed at EM-SEEP15, located at the base of the UWA (copper MB = 27,648). Overall, these results demonstrate that EBT2 is a significant contributor of ARD and metals contamination to Ely Brook. The extent of copper surface water impacts in EBT2 is shown in Figure 6-14.

6.6.4 EBT3

EBT3 is a contributing branch to EBT2 and captures drainage from the western portion of the UWA, the Tailings Area, and the western portion of the LWA.

6.6.4.1 Sediment

Fixed laboratory analytical results from 9 sediment samples taken at 9 locations across EBT3 were evaluated. Samples were collected during Site investigations conducted by the USGS and URS. Laboratory analytical results for all sediment TAL metals are provided in Table 6-8 and a statistical summary of EBT3 sediment COC results is shown in the table below. These data result in sediment copper MBs equal to 37.

EBT3 – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	1,856	3,100	2,472	9/9	8	149	50

All sediment locations in EBT3 exhibited copper PRG exceedances, with concentrations similar to those found in waste rock. The distribution of sediment COC exceedances in Ely Brook tributaries is shown in Figure 6-9. The most significant exceedance (copper MB = 62) was observed within the LWA just upstream of the confluence with EBT2 (SED-30). It is noted that there was no distinct change in sediment composition where EBT3 bisected the Tailings Area.

6.6.4.2 Surface Water

Fixed laboratory analytical results from approximately 42 surface water samples taken at 13 locations across EBT3 were evaluated. Samples were collected during Site investigations

conducted by the USGS, URS, and Nobis. Laboratory analytical results for all surface water TAL metals are provided in Table 6-10 and a statistical summary for surface water COCs that exceeded PRGs in EBT3 are shown in the table below. These data result in a surface water copper MB equal to 11,511 in EBT3.

EBT3 – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	32,011	200,000	40,495	42/42	42	87	240
Cadmium	10	29	12	40/42	40	1.1	0.5
Chromium	17	130	24	41/42	15	11	0.62
Copper	13,813	91,800	18,738	42/42	41	8.6	1.2
Iron	19,025	100,000	25,254	42/42	39	1,000	2,000
Mercury	0.10	0.2	0.11	5/29	5	0.012	0.1
Nickel	113	456	141	37/37	31	52	2.3
Selenium	2.8	17.5	3.9	32/42	2	5	0.5
Zinc	1,294	2,980	1,465	42/42	42	106	3.35

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	2.8	4.0	3.3	7.7

Based on these data, the EBT3 surface water is characterized by exceedances of 7 metals as shown in the table above (excluding mercury and selenium that exceeded PRGs in less than 20% of samples collected), as well as generally stable and extremely acidic pH conditions. Surface water exceedances were observed at every EBT3 location. Consistently high metal concentrations are detected along the length of EBT3 and no discernable increases occur as the tributary flows across the Tailing Area and LWA. The lack of an increasing metals trend in the lower segment of EBT3 suggests that surface water interaction with waste rock and tailings in these source areas do not greatly increase the observed metal concentrations in EBT3. The most significant exceedances in EBT3 were observed at EM-SEEP1, located at mid-slope in the western portion of the UWA (copper MB = 76,500). Overall, these results demonstrate that EBT3 is a significant contributor of ARD and metals contamination to Ely Brook. The extent of copper surface water impacts in the EBT3 is shown in Figure 6-15.

6.6.5 EBT4

EBT4 drains a relatively limited area extending from Shaft No. 4 and the transition zone along the western portion of the UWA.

6.6.5.1 Sediment

Fixed laboratory analytical results from 11 sediment samples taken at 6 locations across EBT4 were evaluated. Samples were collected during Site investigations conducted by the USGS and URS. Laboratory analytical results for all sediment TAL metals are provided in Table 6-8 and a statistical summary of EBT4 sediment COC results is shown in the table below. These data result in a sediment copper MB equal to 25.

EBT4 – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	1,271	2,200	1,634	8/8	8	149	50

All sediment locations in EBT4 exhibited copper PRG exceedances. The distribution of sediment COC exceedances in EBT4 is shown in Figure 6-9. The most significant exceedance (copper MB = 44) was observed approximately 300 ft downstream of Shaft No. 4 (SED-55).

6.6.5.2 Surface Water

Fixed laboratory analytical results from approximately 19 surface water samples taken at 6 locations across EBT4 were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. Laboratory analytical results for all surface water TAL metals are provided in Table 6-10 and a statistical summary for surface water COCs that exceeded PRGs in EBT4 are shown in the table below. These data result in a surface water copper MB equal to 2.188 in EBT4.

EBT4 – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	4,754	16,900	6,451	19/19	19	87	240
Cadmium	2.3	5	2.9	19/19	16	1.1	0.5
Copper	2,625	7,240	3,435	19/19	19	8.6	1.2
Iron	165	1,250	285	14/19	2	1,000	2,000
Mercury	0.10	0.2	0.11	5/18	5	0.012	0.1
Nickel	26	75.6	35	14/14	2	52	2.3
Zinc	268	605	324	19/19	16	106	3.35

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	3.1	7.0	4.5	7.7

Based on these data, the EBT4 surface water is characterized by exceedances of 5 metals as shown in the table above (excluding iron and nickel that exceeded PRGs in less than 15% of samples collected), as well as highly variable pH conditions ranging from extremely acidic to neutral. Surface water exceedances were observed at every EBT4 location. The most significant exceedances in EBT4 were observed at SW-79, located at the base of the western portion of the UWA (copper MB = 6,033). Although not as significant as the impacts observed in EBT2 and EBT3, these results demonstrate that EBT4 is a major source of ARD and metals contamination to Ely Brook. The extent of copper surface water impacts in the EBT4 is shown in Figure 6-15.

6.6.5.3 Porewater

Sediment porewater was sampled to assess the potential sources of metals between EBT4 and the EB-UR. Laboratory analytical results for TAL metals in for all porewater samples are included in Table 6-22 and summarized in Figure 6-17. EBT4 porewater results showed PRG exceedances of aluminum, cadmium, copper, iron, and zinc, with concentration up to 2 orders of magnitude greater than porewater concentrations observed in the EB-UR. Porewater metal concentrations along EBT4 were similar to EBT4 surface water results indicating good communication between the porewater and surface water.

6.6.6 EBT5

EBT5 is a small eastern tributary to EBT2.

6.6.6.1 Sediment

Fixed laboratory analytical results from 3 sediment samples taken at 3 locations across EBT5 were evaluated. Samples were collected during Site investigations conducted by the USGS and URS. Laboratory analytical results for all sediment TAL metals are provided in Table 6-8 and a statistical summary of EBT5 sediment COC results is shown in the table below. These data result in a sediment copper MB equal to 58.

EBT5 – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	2,879	5,210	7,208	3/3	2	149	50

Two of 3 sediment locations in EBT5 exhibited copper PRG exceedances. The distribution of sediment COC exceedances in EBT5 is shown in Figure 6-9. The most significant exceedance (copper MB = 104) was observed approximately 60 ft upstream of the boundary with the LWA (SD-73).

6.6.6.2 Surface Water

Fixed laboratory analytical results from 11 surface water samples taken at 4 locations across EBT5 were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. Laboratory analytical results for all surface water TAL metals are provided in Table 6-10 and a statistical summary for surface water COCs that exceeded PRGs in EBT5 are shown in the table below. These data result in a surface water copper MB equal to 25 in EBT5.

EBT5 – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	196	2,352	490	7/11	1	87	240
Copper	30	66	41	11/11	9	8.6	1.2
Iron	286	3,672	751	10/11	1	1000	2,000
Lead	6.1	50	15	4/11	1	3.2	0.36

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	6.5	6.9	6.7	7.7

Based on these data, EBT5 surface water is characterized by exceedances of copper (excluding aluminum, iron and lead that exceeded PRGs in only 9 % of samples collected), as well as stable and near neutral pH conditions. Surface water exceedances were observed in all EBT5 locations with generally similar degrees of impact (e.g., copper MBs = 25 to 48). The extent of copper surface water impacts in EBT5 is shown in Figure 6-14.

6.6.7 Ponds

A series of beaver ponds forms the surface water drainage for the southeastern margin of the UWA and are the headwaters for the northeastern portion of the Ely Brook drainage and EBT2. The ponds are designated from the upgradient pond to the downgradient pond as Pond 1 through 6.

6.6.7.1 Ponds 1, 2, and 3

Ponds 1, 2, and 3 are essentially unimpacted. The results of sediment and surface water samples from these water bodies are summarized below.

6.6.7.1.1 Sediment

Fixed laboratory analytical results from 5 sediment samples taken at 5 locations within Ponds 1, 2, and 3 were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. Laboratory analytical results for all sediment TAL metals are provided

in Table 6-8 and a statistical summary of COC results for Ponds 1, 2, and 3 is shown in the table below. These data result in a sediment copper MB equal to 1.5.

Ponds 1, 2, and 3 – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	77	88	93	5/5	0	149	50

No sediment sample results exceeded the copper PRG. The distribution of sediment copper in the ponds is shown in Figure 6-9.

Analyses for paste pH, paste conductivity, and ABA were conducted for 2 sediment samples (SD-69 [Pond 3] and SD-70 [Pond 2]) to evaluate the potential for acid generation or neutralization. These results are presented in Table 6-20 and demonstrate the non-acid-generating potential of the Ponds 1, 2, and 3 sediments.

6.6.7.1.2 Surface Water

Fixed laboratory analytical results from 12 surface water samples taken at 3 locations within Ponds 1, 2, and 3 were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. Laboratory analytical results for all surface water TAL metals are provided in Table 6-10 and a statistical summary for surface water COCs that exceeded PRGs in Ponds 1, 2, and 3 are shown in the table below. The distribution or surface water metals exceedances is shown in Figure 6-14. Although PRG exceedances for aluminum (Pond 1), iron (Pond 2 and 3), and silver (Pond 3) were observed, they were low-level and occurred in less than 9 % of the samples collected. Copper was not observed to exceed the PRG. Based on these results, these water bodies are not considered impacted by mine-related contamination.

Ponds 1, 2, and 3 – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	73	413	136	6/12	1	87	240
Iron	397	1,240	619	11/12	2	1000	2,000
Silver	3.3	5.5	4.2	1/12	1	3.2	0.05
	Min (su)	**Max (su)**	**Ave (su)**	**Background Min (su)**			
pH	6.0	7.8	7.2	7.7			

Surface water in Ponds 1, 2, and 3 is characterized by infrequent and low-level PRG exceedances for aluminum, iron, and silver, as well as variable, near neutral pH conditions. Aluminum and silver exceeded PRGs in less than 8 % of samples collected, while iron exceeded in less than 17 % of samples. Although PRG exceedances were observed, both the average and maximum concentrations of these metals were below background levels. Based on these data, Ponds, 1, 2, and 3 do not appear to be impacted by Site waste sources.

6.6.7.2 Pond 4, Pond 5, and Pond 6

Ponds 4 and 5 receive outfall from Pond 3 and are located along the main stem of EBT2 outside the limits of the LWA. Pond 5 also receives discharge from an intermittent tributary draining the Lower Adit (i.e., the UWA). Pond 6 was reportedly destroyed during a spring flood event in 2007 and is no longer within the EBT2 drainage. It currently exists within the limits of the LWA as a small depression at the location of a former exploratory shaft surrounded by a small circle of trees (see Figure 2-4).

6.6.7.2.1 Sediment

Fixed laboratory analytical results from 6 sediment samples taken at 6 locations within Ponds 4, 5, and 6. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. Laboratory analytical results for all sediment TAL metals are provided in Table 6-8 and a statistical summary of COC results is shown in the table below. These data result in a sediment copper MB of 33.

Ponds 4, 5, and 6 – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	1,653	3,540	2,782	6/6	6	149	50

All sediment locations in Ponds 4, 5, and 6 exhibited copper PRG exceedances. The distribution of sediment COC exceedances in the ponds is shown in Figure 6-9. The most significant exceedance (copper MB = 71) was observed in Pond 5.

Pond 4 sediment concentrations show exceedances for copper and demonstrate a 3- to 5-fold increase from upstream results in Ponds 1-3. A sediment sample collected from a small intermittent tributary on the north side of Pond 4 (Location SD-71) also contained copper at concentrations exceeding the PRG, indicating ARD impacts upstream of identified Site sources in EBT2 and Ponds 4, 5, and 6. This exceedance may be attributable to runoff from the UWA during spring snow melt or periodic storm water discharge. Pond 5 sediment shows slightly higher copper concentrations than Pond 4. Two sediment samples (SD-45C and SD-42C) collected from the tributary that drains discharge from the Lower Adit to Pond 5 also contained PRG exceedances (copper MB = 28). It is noted that these samples were included in the statistical summary for EBT2. Based on these results, the Lower Adit is inferred to be the primary source of ARD impacts to Pond 5.

Analyses for paste pH, paste conductivity, and ABA were conducted for 2 sediment samples (SD-67 [Pond 5] and SD-68 [Pond 4]) to evaluate the potential for acid generation or neutralization from pond sediments and these results are presented in Table 6-20. The pond sediment samples display paste pH and ABA values that indicate low or non-acid-generating potential, suggesting that direct deposition of waste rock from upslope areas has not significantly impacted the pond's acidity.

6.6.7.2.2 Surface Water

Fixed laboratory analytical results from 18 surface water samples taken at 4 locations within Ponds 4, 5, and 6 were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. Laboratory analytical results for all surface water

TAL metals are provided in Table 6-10 and a statistical summary for surface water COCs that exceeded PRGs is shown in the table below. These data result in a surface water copper MB equal to 317 in Ponds 4, 5, and 6.

Ponds 4, 5, and 6 – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	403	3,490	756	9/18	3	87	240
Cadmium	3	6	3.6	6/18	2	1.1	0.5
Copper	380	1,890	616	16/18	15	8.6	1.2
Zinc	98	378	147	16/18	6	106	3.35

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	4.3	7.8	5.5	7.7

Based on these data, the surface water in Ponds 4, 5, and 6 is characterized by exceedances of aluminum, copper, and zinc (excluding cadmium that exceeded PRGs in less than 12 % of samples collected), as well as highly variable pH conditions ranging from acidic to mildly basic. Surface water exceedances were observed at every location in Ponds 4, 5, and 6. The most significant exceedances were observed in Pond 6 (EM-POND6) (copper MB = 1,575). The most significant exceedances observed in Pond 4 and 5 were at station EM-POND5 (copper MB = 558). These results demonstrate surface water ARD and metals impacts in EBT2 at locations upstream of LWA wastes, indicating the downgradient transport of UWA contaminants via overland surface water runoff, Lower Adit discharge, or groundwater plume migration. The extent of copper surface water impacts in Ponds 4, 5, and 6 is shown in Figure 6-14.

6.6.8 Vernal Pools

Surface water samples were collected by Nobis from 4 vernal pools identified at the Site as shown on Figure 6-17. Laboratory analytical results for vernal pool surface water TAL metals are provided in Table 6-17. These results demonstrate metal concentrations below PRGs at three of the locations, VP-2, VP-3, and VP-4 and above PRGs at location VP-1 in the Smelter Area. A statistical summary for vernal pool surface water COCs that exceeded PRGs is shown in the table below. These data result in a surface water copper MB equal to 132.

Vernal Pool – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Copper	158	171	NA	1/1	1	8.6	1.2
Iron	744	1,070	NA	1/1	1	1000	2,000

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	6.3	6.3	6.3	7.7

Based on these data, VP-1 surface water is characterized by exceedances of copper and iron, as well near neutral pH conditions. The high copper and iron concentrations likely result from the interaction between runoff and surface waste rock which is prevalent across much of the Smelter Area, including the access road upgradient of this vernal pool. The significance of these results is discussed in more detail in the terrestrial BERA (Nobis, 2011a).

6.6.9 Smoke Flue

The Smoke Flue extends approximately 1500 ft northeast from the former smelter and was used to vent smoke from the smelter, resulting in the potential for particulate emission impacts.

6.6.9.1 Surface Soil

Fixed laboratory analytical results from 12 surface soil samples taken at 7 locations across the Smoke Flue exhaust stack area (i.e., the emission area) were evaluated. An additional 6 surface soil samples were collected at 6 locations from the transitional zone located along the length of the flue between the former smelter and exhaust stack. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. Soil XRF field screening results are provided in Table 6-19 and a detailed description and evaluation of the XRF soil field screening investigation is included in the Nobis Data Evaluation Report (Appendix C of this RI, Section 5.0). Laboratory analytical results for all surface soil TAL metals are provided in Table 6-6 and a statistical summary of the Smoke Flue surface soil COC results is shown in the tables below. These data result in a surface soil copper MB equal to 0.8 in the Smoke Flue exhaust area and 1.7 in the transition zone.

Smoke Flue – Surface Soil

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	8	14.8	11	12/12	0	24	16
Copper	37	98	49	12/12	0	629	45
Iron	26,100	52,000	32,581	12/12	1	44,800	31,000

Smoke Flue – Surface Soil (Transition Zone)

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Cobalt	9	12	NA	6/6	0	24	16
Copper	77	150	NA	6/6	0	629	45
Iron	18,083	29,500	NA	6/6	0	44,800	31,000

Results from SPLP testing of surface soil samples in the Smoke Flue indicate that relatively low levels of metals, including aluminum and lead are potentially leached from this area. Table 6-21 presents all of the SPLP data collected from the Site.

Two perpendicular surface soil transects were analyzed by field XRF at the top of the smoke flue to further assess the potential for lead contamination resulting from historical use of the flue. XRF sample locations and results for copper are shown on Figure 6-5. Copper and lead XRF concentrations were generally less than 100 mg/kg. One anomalous lead XRF result of 1,153 mg/kg was observed immediately adjacent to the opening at the end of the flue, at the approximate location of the former chimney. The underlying soil at this location (> 1 ft) contained 20 mg/kg lead. Lead concentrations did not show any obvious trend with distance from the flue. While copper XRF concentrations generally did not show any significant variation with depth, lead concentrations in surface soil were approximately two times greater than concentrations observed in deeper soil (> 1 ft). These results suggest a surface source for the detected lead concentrations. Results from three laboratory split samples showed the same trend and correlated well with concentrations measured in field XRF samples. Laboratory

analytical soil samples collected by URS from this area in 2007 resulted in lead detections of approximately 620 mg/kg and 680 mg/kg, while sampling conducted by Nobis did not detect lead above 65 mg/kg in any of the other samples collected from the areas surrounding the Smoke Flue. Based on the above results, lead concentrations in surface soil in the vicinity of the former flue chimney may be elevated.

Exceedances of COC PRGs were only observed in 1 out of 12 samples (iron in 02Ely13, MB = 1.7) and, therefore, the Smoke Flue is inferred to be unimpacted by waste source COCs.

6.6.9.2 Subsurface Soil

No subsurface investigations have been conducted in the area of the former smoke flue.

6.6.9.3 Groundwater

Due to the limited extent and low concentrations of shallow soil contamination associated with the Smoke Flue it is unlikely that groundwater has been significantly impacted in the Smoke Flue Area. Field observations do not indicate the presence of seeps or any direct interaction between surface soil and groundwater in this area. As a result, no groundwater monitoring wells have been installed in the Smoke Flue area.

6.6.10 SHB

SHB is the point of discharge for Ely Brook, erosional sediments from the Slag Pile Area waste, and the Smelter and Slag Pile Area overburden groundwater plume. Therefore, SHB receives upgradient discharge from all Site source areas. For the purposes of the following discussion, SHB has been divided into two regions based on their downgradient distance from Site waste sources (i.e., Ely Brook discharge). SHB Upper Reach includes sampling locations between stations SB-2860 and SB-3260 (Figures 3-6 and 6-13). SHB Lower Reach includes sampling locations between the confluence of SHB and the EBOR and downstream of SHB station SB-3260 (Figures 3-6 and 6-13).

6.6.10.1 Sediment

For SHB Upper Reach, fixed laboratory analytical results from 22 sediment samples taken at 22 locations were evaluated. Samples were collected during Site investigations conducted by USEPA, USGS, URS, and Nobis. Laboratory analytical results for all sediment TAL metals are provided in Table 6-8 and a statistical summary of SHB Upper Reach sediment COC results is shown in the table below. These data result in a sediment copper MB of 14. The distribution of sediment COC exceedances in SHB Upper Reach is shown in Figures 6-9 and 6-10.

SHB Upper Reach – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	336	1,390	447	22/22	19	149	24

For SHB Lower Reach, fixed laboratory analytical results from 15 sediment samples taken at 11 locations were evaluated. Samples were collected during Site investigations conducted by USEPA, USGS, and URS. Laboratory analytical results for all sediment TAL metals are provided in Table 6-8 and a statistical summary of SHB Lower Reach sediment COC results is shown in the table below. These data result in a sediment copper MB of 10. The distribution of sediment COC exceedances in SHB Lower Reach is shown in Figure 6-10.

SHB Lower Reach – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	237	540	279	15/15	15	149	24

The maximum concentrations of copper in SHB sediments is observed at SB-3260 (copper MB = 58), which is essentially the confluence of SHB and Ely Brook. Within a short distance downstream of this confluence, metal concentrations decrease significantly; however, sediment copper concentrations in the range of 220 mg/kg to 540 mg/kg persist to the confluence with the EBOR. The rapid decline in metal concentrations downstream of the SHB-Ely Brook confluence

is consistent with observations of iron precipitates on sediment at the confluence, which are interpreted to result from mixing of the alkaline water of SHB with acidic, metal-rich water of Ely Brook. It is noted that an increase in sediment copper, manganese, and zinc concentrations is observed in isolated samples at the downstream limit of the Slag Pile Area and may be attributable to erosion of slag from the Slag Pile Area adjacent to those locations.

Analyses for paste pH, paste conductivity, and ABA were conducted for 2 SHB Upper Reach sediment samples located within approximately 400 ft downstream of the Ely Brook confluence (SD-58 and SD-59) to evaluate the potential for acid generation or neutralization from Upper Reach sediments. These results are presented in Table 6-20 and show near neutral pH and ABA values up to 15.67 $tCaCO_3$/1000t, indicating a positive net neutralizing potential. These data indicate that the SHB sediment provides buffering capacity to the surface water and sediment load discharged from Ely Brook and the Slag Pile Area.

Based on these observed PRG exceedances, sediment in SHB is impacted by Site waste sources for the entire reach downstream of the Ely Brook confluence.

6.6.10.2 Surface Water

Fixed laboratory analytical results from 60 surface water samples taken at 11 locations within SHB Upper Reach were evaluated. Samples were collected during Site investigations conducted by the USGS, URS, and Nobis. Laboratory analytical results for all surface water TAL metals are provided in Table 6-10 and a statistical summary for surface water COCs that exceeded PRGs in SHB Upper Reach is shown in the table below. These data result in a surface water copper MB equal to 118. The distribution of metals in SHB surface water is shown in Figures 6-15 and 6-16.

SHB Upper Reach – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	362	2,000	429	58/60	53	87	1,300
Cadmium	1.1	2.5	1.4	41/60	1	1.1	2.5
Copper	142	1,100	168	60/60	60	8.6	5
Iron	428	2,400	515	59/60	4	1,000	1,300

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Mercury	0.18	2.5	0.34	4/22	4	0.012	2.5
Selenium	2.0	17.5	3.0	6/60	1	5	2.5
Zinc	29	150	32	60/60	1	106	433

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	7.4	8.1	7.7	7.4

Based on these data, the surface water in SHB Upper Reach is characterized by exceedances of aluminum and copper (excluding other metals that exceeded PRGs in less than 7 % of samples collected and mercury which is not a Site-related contaminant), as well as stable pH conditions ranging from neutral to mildly basic. Exceedances of the copper PRG were observed at every sampling location in SHB Upper Reach. When compared to concentrations observed in the EB-LR, concentrations of aluminum and iron in SHB Upper Reach are reduced by a factor of 3 times and copper concentrations are reduced by a factor of 7.

The most significant metals exceedances (i.e., aluminum, copper, and iron) were observed at station SB-3245M, located within 20 feet downstream of the confluence of Ely Brook and SHB (copper MB = 917). Within 400 meters downstream of station SB-3245, maximum surface water copper concentrations decline to 110 µg/L (copper MB = 92).

Samples collected between SB-3260M and SB-3020M show a peak in concentrations of most metals immediately below the Ely Brook confluence, with a decreasing trend along the reach adjacent to the Slag Pile Area. Surface water results do not demonstrate a significant impact from the Slag Pile Area, although any impact could be masked by the Ely Brook discharge. The potential impact of groundwater discharge from the Slag Pile Area is discussed further in Section 7.0.

Fixed laboratory analytical results from 23 surface water samples taken at 10 locations within SHB Lower Reach were evaluated. Samples were collected during Site investigations conducted by the USGS and URS. Laboratory analytical results for all surface water TAL metals are provided in Table 6-10 and a statistical summary for surface water COCs that exceeded PRGs

is shown in the table below. These data result in a surface water copper MB equal to 33. The distribution of metals in SHB Lower Reach surface water is shown in Figure 6-16.

SHB Lower Reach – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	177	1,200	247	23/23	19	87	1,300
Copper	47	208	62	23/23	22	8.6	5
Iron	165	1,400	253	22/23	1	1,000	1,300
Lead	9.9	25	14	13/23	1	3.2	25
Mercury	0.61	2.5	1.2	2/10	2	0.012	2.5
	Min (su)	**Max (su)**	**Ave (su)**	**Background Min (su)**			
pH	6.6	8.3	7.9	7.4			

Based on these data, the surface water in SHB Lower Reach is characterized by exceedances of aluminum and copper (excluding other metals that exceeded PRGs in less than 5 % of samples collected and mercury which is not a Site-related contaminant), as well as generally stable pH conditions ranging from near neutral to mildly basic. Exceedances of the copper PRG were observed at every sampling location in SHB Lower Reach. The most significant exceedance was observed at station SB-540M, located within approximately 2,720 meters downstream of the confluence of Ely Brook and SHB (copper MB = 173). Copper exceedances were observed downstream to the confluence of SHB and the EBOR. No copper exceedances were observed in the SHB background locations above the Ely Brook confluence.

These results demonstrate Site-related metals impacts to surface water in both the Upper and Lower Reach of SHB as far downstream as the EBOR confluence, where copper MBs range between 34 and 47 are observed.

6.6.11 EBOR

The EBOR is the point of discharge for SHB and, therefore, has the potential to receive sediment and surface water from all Site source areas.

6.6.11.1 Sediment

For the EBOR station located below the SHB confluence (referred in the following discussion as EBOR, as opposed to locations upstream of the confluence that are referred to as EBOR background, as discussed in Section 6.3.2), fixed laboratory analytical results from 13 sediment samples taken at 11 locations were evaluated. Samples were collected during Site investigations conducted by USEPA, USGS, and URS. Laboratory analytical results for sediment TAL metals are provided in Table 6-8 and a statistical summary of EBOR sediment COC results is shown in the table below. These data result in a sediment copper MB of 6. The distribution of sediment COC exceedances in the EBOR is shown in Figure 6-10.

EBOR – Sediment

Parameter	Ave (mg/Kg)	Max (mg/Kg)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (mg/Kg)	Background Max (mg/Kg)
Copper	97	260	135	13/13	3	149	17

The maximum concentrations of copper in EBOR sediments is observed at OR-23630M (copper MB = 15), which is essentially the confluence of SHB and the EBOR. There are no observed copper exceedances downstream of this location. It is noted that the next downstream sediment station is located approximately 430 meters from the SHB confluence. At this location (OR-23200M) a three-fold reduction in sediment copper concentrations relative to the SHB confluence is observed (copper MB = 4.5).

Based on these observed PRG exceedances, sediment impacts in the EBOR appear limited to the immediate area of the SHB confluence.

6.6.11.2 Surface Water

Fixed laboratory analytical results from 64 surface water samples taken at 14 locations within the EBOR were evaluated. Samples were collected during Site investigations conducted by the USGS and URS. Laboratory analytical results for all surface water TAL metals are provided in Table 6-10 and a statistical summary for surface water COCs that exceeded PRGs is shown in

the table below. These data result in a surface water copper MB equal to 18. The distribution of metals in EBAR surface water is shown in Figure 6-16.

EBOR – Surface Water

Parameter	Ave (µg/L)	Max (µg/L)	95% UCL	Detection Frequency	Samples Exceeding PRG	PRG (µg/L)	Background Max (µg/L)
Aluminum	135	820	163	62/64	47	87	240
Copper	21	67	25	62/64	42	8.6	1.2
Mercury	0.24	2.5	0.45	6/25	6	0.012	0.1
Selenium	1.7	17.5	2.5	4/64	1	5	0.5
Zinc	31	3,100	86	63/64	1	106	3.35

	Min (su)	Max (su)	Ave (su)	Background Min (su)
pH	7.0	8.2	7.2	8.0

Based on these data, the surface water in the EBOR is characterized by exceedances of aluminum and copper (excluding other metals that exceeded PRGs in less than 2 % of samples collected and mercury which is not a Site-related contaminant), as well as generally stable pH conditions ranging from neutral to mildly basic. Exceedances of the aluminum or copper PRGs were observed at every sampling location in the EBOR. Copper exceedances were observed in 7 of 17 EBOR sample stations. The most significant copper exceedance was observed at station OR-22450M, located within approximately 1,180 meters downstream of the confluence of Ely Brook and SHB (copper MB = 56). Copper exceedances were observed as far downstream as OR-8350M (copper MB = 11). This station is the most downgradient station sampled during the Site investigations and is located approximately 9.5 miles downstream of the confluence of Ely Brook and SHB. Although these results suggest Site-related metals impacts to EBOR surface water extending over 9 miles downstream of the SHB confluence, copper exceedances were not observed in 4 other samples collected at this station. Consistent copper exceedances (67 % of samples collected) extended downstream to OR-11850M, approximately 7.3 miles downstream of the SHB confluence. Copper exceedances were not observed in the EBOR upstream of the SHB confluence (EBOR background). Aluminum was observed to exceed PRGs in 43 % of the EBOR background surface water samples. It is noted that the zinc exceedance of 3,100 ug/L observed at OR-11850 is significantly higher than all

other upstream samples located below the SHB confluence and should, therefore, be considered suspect.

6.7 Residential Drinking Water

Residential well sampling was conducted by URS in December 2007 and by Nobis in December 2009 to evaluate impacts to local drinking water supply wells from the historic mining operations at the Site. Figure 3-8 illustrates the locations of the residential wells sampled. Of the 7 wells sampled, well construction information was available for only 4 wells. These were drilled bedrock wells with total depths between 200 ft and 430 ft. Available information on other drinking water wells in the West Fairlee/Vershire area indicates bedrock well depths ranging from 175 ft to 600 ft. Residential well sampling TAL metal results are summarized in Table 6-24. A discussion of the analytical results is included below.

6.7.1 TAL Metals

One residential drinking water sample was collected by URS in December 2007 from the nearest residence from the Site. The sample was analyzed for total and dissolved TAL metals, cyanide, geochemical and field parameters. No metals were detected above criteria, and no acidity was detected in the sample. Drinking water samples were collected from six residential wells by Nobis in 2009 and analyzed for total and dissolved TAL metals, cyanide, geochemical and field parameters. Total lead was the only analyte detected above its criterion at concentrations of 32.4 µg/L and 16 µg/L, identified in sample M11LT065 in the primary and duplicate samples, respectively. To confirm this anomalous result, this residence was subsequently re-sampled in April 2010 for total metals from a tap closer to the well head to rule out effects from the piping system, with results shown in Table 6-24. This confirmation sampling did not detect lead or other metals above criteria, and as such the original lead detection is not considered to be Site-related. Based on results from residential well sampling, detected metal concentrations and geochemical parameters did not indicate potential impact from on-site sources.

7.0 FATE AND TRANSPORT

7.1 Contaminant Characteristics

The primary COCs at the Site are metals, which are present to varying degrees in the on-site sources and in downgradient groundwater, surface water, and sediment. The list of COCs for the Site are shown in Table 6-3. The physical properties of these metals vary considerably, and the aqueous geochemistry of these metals as they relate to acid rock drainage is complex. The solubility and reactivity of many of these metals are sensitive to pH, alkalinity, and other parameters to varying degrees. As described by Seal, et al. (2001, 2010), the oxidation and hydrolysis of iron is important in the acid-generation process, and iron, aluminum, and manganese can play an important role in controlling the transport and sequestering of base metals. Metals are typically considered conservative contaminants in the environment because they are stable and persistent and do not volatilize (excepting mercury) or break down unlike many organic contaminants. As such, they may be transported with limited retardation through groundwater or surface water, and variations in their concentration in solution may be explained through dilution, sorption or precipitation and mass balance evaluation. The bioaccumulation potential and toxicity characteristics of these metals, particularly copper, are discussed in the risk characterization studies of the Site including the HHRA, terrestrial BERA, and aquatic BERA (Nobis, 2011b; Nobis, 2011a; Techlaw, 2008).

7.2 Transport Process

The mechanisms of contaminant migration, transport pathways, and media potentially affected by the Site contamination are discussed in the following sections.

7.2.1 Release Mechanisms

There are four primary mechanisms that can release and transport contaminants at the Site: Overland flow of surface water, leaching into groundwater, discharge of groundwater to surface water, and wind erosion. The primary release mechanism at the Site is a result of surface water contact with waste source materials, which occurs during precipitation events or snow melt events. As a result of the water-waste interaction, contaminants in the mine waste are released and these constituents or the soil itself are transported to other areas on-site and off-site via surface drainage features. Precipitation, snow melt, surface water, and groundwater that come

into contact with iron sulfide ore minerals (predominantly pyrrhotite) in the waste rock/tailings result in oxidation and leaching of the ore and host rock through a series of chemical reactions that define the primary mechanism by which ARD is generated at the Site (see Seal, et al., 2001; Hammarstrom, et al., 2001; Lapakko, 2002). The primary reactions are summarized as follows:

Increased sulfate and acidity are indicative of the oxidation of iron sulfide ore by-products such as pyrite and pyrrhotite. With the availability of iron and oxygen, reactions that release ferric hydroxide, sulfate, and acid (equation 1) occur. Furthermore, pH ranging from 3.5 su to 4 su provides optimal conditions for iron-based chemical reactions (Lapakko, 2002). Similarly, Seal, et al., (2001) agree that under low pH conditions, like those observed in the UWA and the LWA, ferric iron can assist in oxidation, generating high amounts of acid as described by the equation below.

$$FeS_{1-x}S + (8-2x)\ Fe^{3+} + 4H_2O \rightarrow (9-3x)\ Fe^{2+} + SO_4^{2-} + 8H^+ \qquad (1)$$

The resultant low pH of drainage from these sources carries significant concentrations of elements (iron, aluminum, and manganese) and base metals (copper, zinc, and cadmium) that along with high acidity and high sulfate concentrations impact the surface waters downstream from the Site.

Areas representing background or off-site conditions are characterized by high alkalinity and calcium concentrations and relatively neutral pH conditions. These areas are likely undergoing neutralization as described in reactions 2 and 3 below (Lapakko, 2002).

$$CaCO_3(s) + H^+(aq) = HCO_3^-(aq) + Ca^{2+}(aq) \qquad (2)$$

$$CaCO_3(s) + 2H^+(aq) = H_2CO_3(aq) + Ca^{2+}(aq) \qquad (3)$$

Calcium or magnesium carbonate binds with available hydrogen cations producing carbonate and carbonic acid and available calcium cations (Lapakko, 2002). The mixing of the acidic and alkaline water results in partial neutralization of the ARD and precipitation of metals. Precipitates are dominated by ferric iron and aluminum oxyhydroxides, as observed in the EB-MR and EB-LR, below the confluence with SHB, and within Ponds 4 and 5. Base metal

concentrations observed below these mixing points typically display a slight decrease in base metal loads due to the efficiency at which theses precipitates can scavenge metals such as copper, zinc, and other base metals out of the water. This mechanism produces the hardpans and precipitates observed in the EB-MR and EB-LR (Hammerstrom, et al., 2001). The oxidation of dissolved ferrous iron at seeps produces similar hard pans at some seep locations as well.

Water erosion of surface waste materials is evidenced by deep rills cut into the slopes of the UWA and LWA and the accumulation of significant volumes of waste rock in the sediment lining the tributaries and Ely Brook. These observations confirm that mass transport of potentially acid- and metal-generating materials is an important and very active release mechanism at this Site.

Based on results from on-site monitoring wells, groundwater impacts are largely restricted to shallow depths including the overburden and locally shallow bedrock. Due to the generally low hydraulic conductivity of the natural overburden materials underlying the Site, deep groundwater recharge is limited in most waste areas of the Site. Groundwater that is impacted by Site sources tends to remain in the shallow overburden and is only transported short horizontal distances to the nearest surface water pathway. This is evidenced by the extensive network of seeps and tributaries that dissect the waste areas that ultimately discharge to Ely Brook. As a result, shallow groundwater is a significant pathway for release of Site contaminants to surface water flowing through shallow overburden and shallow bedrock.

Groundwater from the Main Adit, Lower Adit and Shaft No.4 represents direct discharge of contaminated groundwater impacted by the interaction between groundwater and the underground mine workings referred to as AMD. The Main Adit is the only known discharge point connected to the underground mine pool and is believed to represent the decant point controlling the water level in the mine. However, it is likely that the chemistry of this discharge is significantly affected by groundwater percolating into the adit from above, rather than the water comprising the deep mine pool. The limited yield and relatively low number of water-bearing deep bedrock fractures encountered during recent exploration efforts indicates that with the exception of these mine openings, contaminated groundwater is not likely to be transported significant distances via the deep bedrock.

Due to the barren to poorly-vegetated nature of mine waste piles, wind transport of particulates has the potential to spread these materials beyond the footprint of the piles. As a result, surface soil, sediment, surface water, and groundwater at the Site and proximal to the Site could be impacted directly or indirectly by this mechanism. Considering the heavily forested areas surrounding the waste piles, and the relative infrequency of high wind events during dry periods, the impact of wind-transported contamination beyond the waste areas is not considered to be significant.

7.3 Contaminant Migration

The following section summarizes significant aspects of the CSM as it relates to contaminant migration through the various media on-site and downgradient of the Site.

7.3.1 Air

Due to the nonvolatile nature of the contaminants at the Site, the primary focus of the investigation and sampling has been on the soil, surface water, and groundwater pathways. The air pathway was assessed as part of the HHRA in consideration of the potential impact of wind-blown particulates that might affect human and ecological receptors that frequent the Site. The large barren areas of mine waste, in particular the UWA and LWA, are prone to wind erosion due to their larger open areas and, in the case of the UWA, the steeper topography. However, relative to water erosion and transport, wind erosion is considered to have a very minor affect on contaminant migration at the Site, as described in Section 7.2.1. In addition, the RI confirmed that the concentration gradient is very steep, strongly suggesting a very limited transport of contamination by wind erosion.

7.3.2 Soil

The major source areas which contribute to soil metals contamination at the Site are the UWA, the Tailings Area, LWA, ORB, Smelter Area, and the Slag Pile Area. Each of these areas has essentially no vegetative cover overlying the main body of waste, which results in a high potential for erosion by water, and direct human or ecological contact. The lateral and vertical limits of the areas where soil metals concentrations have exceeded criteria have been defined for each area and estimated volumes have been previously discussed. The material characteristics vary between waste areas, and this variation results in varying degrees of impact

to downgradient soil, surface water, sediment, and groundwater. The chemical characteristics of the waste rock material comprising the UWA and LWA are similar. Erosion of the UWA along the western margin has contributed to an expanded area of surface soil impact in that area. Below the main portion of the UWA a narrow corridor of waste rock extends along the former Tramway down to the Former Flotation Mill location. Below the Lower Adit, to the east of the Development Rock Pile there is an area of impacted surface soil upgradient to the north of Ponds 4 and 5 and extending southwest to the LWA.

Within the LWA, the footprint of the area is constrained on the west by Ely Brook, where significant surface erosion of these piles is contributing to waste rock sediment deposition in the EB-LR. Along the northeastern margin of the area, beyond the tree line, is a small area of surface soil impact, upgradient of the main pile area, which is likely due to historical mine-related activities.

The footprint of the Tailings Area is relatively small and overlaps with a portion of the LWA but the high metals concentrations and high acid-generating potential of the tailings results in a significant contribution to surface water and sediment impacts downgradient within EBT3 and Ely Brook. Tributary EBT3 transects the Tailings Area and is contributing to erosion of this area.

The ORB soil differs in character from the other waste rock areas in that it has little or no acid-generating potential, although metals concentrations are above site-specific criteria. Along the 900 ft length of the beds, the limits of the impacted soil are well-defined and constrained largely by the stone retaining wall on the west edge, with the exception of the location where EBT1 crosses the roast beds. Due to the collapse of the wall, a small volume of ORB soil has been transported downslope; however, the impact of this soil is relatively minor in comparison to that of the waste rock road fill used to maintain the access road at this location. The only other area where minor surface erosion of the ORB is occurring is the northernmost portion, beyond the limit of the stone wall, such that material may migrate, downslope, and overlap onto the LWA.

The Smelter Area soil is comprised of a variety of fill, waste rock, slag and other material remnants from the Smelter. Due to the flat grade of this portion of the Site, erosion is not occurring in any significant way. Similar to the other waste areas, there are no limitations to direct contact with soil.

The Slag Pile Area is unique in character from the other mine wastes at the Site due to its relatively low acid-generating potential and low sulfate composition relative to waste rock. However, metals concentrations are well above site-specific criteria. The location of the pile immediately adjacent to SHB results in a high potential for erosion of slag into the brook especially during flooding events. The southeastern most portion of the Slag Pile Area forms a cut bank of the brook, and is actively eroding slag into the brook. In addition, the steep topography of the south face of the pile resulting from recent quarrying of the material, has caused an active spalling of material within the floodplain of the brook.

7.3.3 Surface Water and Sediment

The surface water pathway is the most significant receptor of site-related contamination, where impacted surface waters and groundwater discharge high metals, sulfate, and particulate concentrations to Ely Brook tributaries and Ely Brook, which in turn discharges surface water and sediment to SHB. SHB is also directly impacted by erosion of slag into the stream and discharge of metals in groundwater flowing through the slag. SHB transports impacted sediment and surface water to the EBOR where contaminant levels are sufficiently reduced to levels below criteria largely by dilution. Each of the tributaries and ponds east of Ely Brook are a significant transport pathway for contaminants from the UWA, LWA, and the Tailings Area.

Sediment sampling has confirmed the significant volume of waste rock sediment in the EB-LR. The observed exceedances of sediment PRGs in Ely Brook and SHB Upper Reach demonstrate that this waste alluvium is a significant source of ecological impact to these surface water zones. This waste alluvium is transported and deposited during high flow events to downgradient depositional areas in the SHB Lower Reach and the EBOR. This process, as well as the generally continuous mobilization and transport of surface water metals from Site sources, results in downstream impacts in SHB Lower Reach and the EBOR.

7.3.3.1 Ely Brook Tributaries and Ponds

The primary contaminant transport characteristics of sediment and surface water from each on-site tributary reach are summarized below.

EBT4 Drainage

EBT4 receives water draining from the abandoned exploration Shaft No.4 and from UWA seeps. It has an average sediment copper MB = 25 and surface water copper MB = 2,187. Concentrations of metals, sulfate, and pH within EBT4 are more strongly influenced by the very high concentrations draining from location SW-79 which are slightly diluted downstream by water from Shaft No.4. Below the confluence with Ely Brook, concentrations of metals and sulfate decrease by an order of magnitude upon mixing with the unimpacted alkaline water of the EB-UR which buffers the ARD from EBT4.

Sediment from EBT4 shows consistent copper PRG exceedances with maximum concentrations up to 2,200 mg/kg (MB = 44). EBT4 metals concentrations and ABA results are consistent with waste rock material.

EBT2 Drainage

Tributary EBT2 receives discharge from a wide area of the Ely Brook Valley, including the Ponds, and seeps upgradient of the LWA, in addition to seeps and direct discharge from the LWA. Each of the components of the EBT2 drainage contaminant transport system is described below.

Tributary EBT3 receives runoff and sediment eroding from the western portion of the UWA, including discharge from at least three UWA seeps. Ultimately, this tributary flows through the Tailings Area adjacent to the Flotation Mill before its confluence with EBT2. EBT3 has relatively consistent pH values ranging from 2.23 to 3.6 su, and generally includes the most acidic surface water observed at the Site. The consistently high metals concentrations detected along the length of EBT3 confirm that contact between EBT3 and the Tailings Area and the LWA does not significantly increase the observed metals concentrations. Based on these results and average sediment copper MB = 37 and surface water copper MB = 11,511, EBT3 discharges the most impacted surface water observed at the Site.

EBT3 sediment samples exceeded copper PRGs in all samples with a maximum concentration of 3,100 mg/kg (MB = 62), similar to waste rock. Sediment metal concentrations maintain a similar magnitude from the seeps down to the confluence. There is not a distinct change in sediment composition below the Tailing Pile Area. These sediment results indicate that the

tributary channel between the UWA and the Tailing Pile is lined with waste rock sediment, as is the lower portion of the tributary where it flows over tailing or waste rock.

EBT5 drains an area south of the Beaver Ponds and east of the LWA and ORB along the historic channel of the stream that once drained the valley now occupied by the Ponds. Surface water samples collected from SW-72 during November 2009 contain COC concentrations that are approximately an order of magnitude greater than samples collected during the previous round at this location. This increase is attributed to the higher stream flows observed during the Fall round. In comparison to EBT2, metals concentrations and overall flow in EBT5 are relatively low. As a result, EBT5 does not have a significant influence on the chemistry of EBT2.

Sediment samples from EBT5 showed maximum copper concentrations of 5,200 mg/kg (MB = 104). These results suggest that the former channel and Pond 6 were likely in direct contact with waste rock along a portion of the northeast part of the LWA.

Surface water samples collected from Pond 5 and to a lesser extent, Pond 4, show a significant increase in contaminants when compared to Ponds 1 through 3. Copper concentrations increase by a factor of 10 between Ponds 4 and 5. These increases are attributable to a combination of ARD-impacted surface water runoff and groundwater discharge from the UWA, primarily from the Lower Adit and the UWA via an unnamed tributary that exists between the Lower Adit and Pond 5 (see Figure 3-5). Water draining from the Lower Adit (Seeps EM-SEEP8 and EM-SEEP16) is inferred to originate to some degree from overburden and shallow bedrock groundwater that has been impacted by contaminated infiltration from the UWA. Ponds 4 and 5 along tributary EBT2 have been impacted primarily by discharge of impacted water from the Lower Adit and discharge of groundwater impacted from upgradient sources.

No sediment impacts are observed in Pond 1, Pond 2, and Pond 3. Sediment in Ponds 4 and 5 show copper concentrations exceeding PRGs with a maximum concentration of 3,050 mg/kg (MB = 61). A sediment sample collected from a small intermittent tributary on the north side of Pond 4 (Location SD-71) also contained copper exceeding the PRG with a concentrations of 584 (MB = 12). These results indicate that the observed impact to Pond 4 originates from ARD sources in the UWA. Pond 5 sediment shows slightly higher copper concentrations in comparison to Pond 4, with maximum concentrations of 3,540 (MB = 71). Two sediment samples collected from the tributary that drains discharge from the Lower Adit directly to Pond 5

contained copper PRG exceedances with maximum concentrations of 1,400 mg/kg (MB = 28). In addition, iron concentrations were up to 130,000 mg/kg, equaling a 2-fold increase in sediment iron concentrations from Pond 4 to Pond 5. These results indicate that the observed impacts to Pond 5 originate from the Lower Adit. Some additional impacts in Pond 5 would result from the downstream transport of surface water and sediment contamination from the Pond 4 discharge.

Sediment impacts in Pond 4 and Pond 5 result primarily from the mixing of metals laden acidic waters (originating from UWA groundwater plumes and Lower Adit surface water discharge) with the upgradient alkaline surface water (originating from Pond 3 discharge). An increase in surface water pH conditions occurs in this mixing zone that results in the formation of hydrous aluminum precipitates. The aluminum precipitate in turn scavenges base metals from the impacted surface water, resulting in sediment metals deposition and copper PRG exceedances in Pond 4 and Pond 5.

Downstream of Pond 5, EBT2 shows relatively stable metals concentrations. However, during periods in the Spring and Fall, increases in aluminum, copper, and iron concentrations do occur. Based on the relative similarity between the copper concentrations in EBT2 between Pond 5 and its confluence with EBT3, the metals impact to this surface water from direct contact with surface materials of the LWA appears to be limited (Figure 6-3). However, sulfate concentrations across this reach appear to increase significantly with a corresponding decrease in pH. Concentrations of nearly all geochemical parameters increased at the confluence of EBT2 and EBT3 as a result of the relatively higher concentration of ARD in EBT3.

Sediment samples within the main stem of EBT2 directly below the Pond 5 discharge, shows copper PRG exceedances with maximum concentrations of 1,600 mg/kg (MB = 32). These concentrations are distinctly lower than concentrations observed in EBT2 sediment taken within the LWA where the channel is in direct contact with waste rock. For example, results from location EBT2-58M (within the LWA) show a copper concentration of 4,000 mg/kg (MB = 80), consistent with waste rock. Downstream of the confluence of EBT2 with EBT3, copper concentrations are only slightly lower with a maximum concentrations of 2,900 mg/kg (MB = 58).

EBT1 Drainage

EBT1 is a potential source of ARD generated from the east side of the ORB and waste rock located between the ORB and Ely Brook. No surface water metals were detected above PRGs at SW-84, located at the eastern margin of the ORB. Results from soil and groundwater analyses in this area do not indicate a significant acid generating potential or metals leachability for the ORB soil.

In EBT1 just upstream of the Ely Brook confluence (EBT1-10M), aluminum, cadmium, copper, iron, and zinc were detected above PRGs at concentrations approximately two orders of magnitude higher than concentrations observed in surface water above the Site access road. These results suggest that the low pH and metals exceedances observed in EBT1 may be attributable to waste rock used along the road bed. The road at this location has been repeatedly washed out by EBT1 and likely restored using waste rock over the recent past. Some of this eroded material is deposited as sediment along the channel of EBT1.

Sediment from EBT1 shows consistent copper PRG exceedances of copper with maximum concentrations up to 3,100 mg/kg (MB = 29). Metal concentrations and ABA results are consistent with waste rock material. Surface soils below the access road, north and south of this tributary, are not known to have been significant depositional areas for waste rock. The ORB is upgradient of this tributary, but the ore roast wastes do not display the acid-generation characteristics of waste rock. These results support the conclusion that repeated washouts and repairs of the access road using on-site waste rock material is the likely source of the acid-generating sediment in EBT1.

7.3.3.2 Ely Brook

Surface water PRG exceedances are observed in EB-UR, EB-MR; and EB-LR. Metals exceeding PRGs include aluminum, cadmium, chromium, copper, iron, mercury, and zinc (Figure 6-15). Generally, metal concentrations in Ely Brook increase at each tributary confluence with the most significant increase occurring at tributary EBT2 (at location EB-530M) with metals such as aluminum and iron increasing by a factor of 15, copper increasing by a factor of 6, and zinc increasing by a factor of 9. Tributary EBT2, which includes EBT3, carries the majority of the metal and sulfate load from the UWA, LWA, and Tailings Area to Ely Brook

(Figure 6-3). Metals concentrations remain high throughout the EB-MR and EB-LR down to the confluence with SHB.

Maximum concentrations of copper have three significant peaks and two significant depressions throughout Ely Brook. Above the confluence with EBT4, maximum concentrations are generally below PRGs. Just downstream of the confluence with EBT4, concentrations increase to a maximum value of 1,040 µg/L and then taper off to a maximum value of 178 µg/L just upstream of the confluence with EBT2 (EB-560M). The drop in copper concentrations is likely due to precipitation of aluminum and ferric iron which scavenge copper and other base metals from solution. Another copper peak occurs at EB-530M, just downstream of the confluence with EBT2, where the maximum detected copper concentration is 1,370 µg/L. From this point downstream to EB-90M, copper concentrations remain relatively consistent.

Metals in the main channels downstream of the tributaries are undergoing processes of buffering, dilution, and precipitation. Loading rates were calculated by Nobis (Table 5-3), URS (Table 5-4), and USGS (Seal, et al., 2010). The USGS found that aluminum hydrolysis and manganese oxidation and hydrolysis were likely explanations for removal of more than 50 percent of the total and dissolved metals loads in the Lower Reach. Loading rates calculated by Nobis generally corroborates this analysis. URS attributes a decrease in metals loads from the tributaries to Ely Brook during the spring to dilution, buffering, and attenuation. URS also noted that elevated total metals concentrations are influenced, in part, by suspended solids during high flow events such as major storm or Spring runoff events.

Sediment porewater sampling from the Upper Reach of Ely Brook demonstrated copper concentrations slightly above the PRG, while results from porewater samples along EBT4 showed PRG exceedances of aluminum, cadmium, copper, iron, and zinc with concentrations up to 2 orders of magnitude greater than the Upper Reach porewater. The low porewater metals concentrations detected in the Upper Reach could result from limited mixing with surface water; removal of metals from porewater by adsorption onto sediment; or the influx of groundwater with low metals concentrations.

Within EB-UR, pH conditions are relatively neutral. Alkalinity in the Upper Reach of Ely Brook buffers waters entering the brook from the tributaries farther downstream, as evidenced by the distinct drops in metals concentrations and increase in pH observed at the confluence with

EBT4 and EBT2 relative to the tributary concentrations. Geochemical parameters undergo drastic changes below the EBT2 confluence, including a decrease in alkalinity concentrations by two orders of magnitude, pH decreases from neutral ranges to acidic ranges, and sulfate increases by an order of magnitude. These results, in addition to the observations of precipitates coating sediment at the confluence locations, indicate that chemical reactions between iron, water, and oxygen occur over the EB-MR and EB-LR, releasing iron hydroxide, sulfate, and acid.

Sediment copper concentrations in the Upper Reach are below the PRG at EB-1430M (the defined boundary between the Upper Reach and the Ely Brook Headwaters). Immediately downstream of the confluence with EBT4, which includes discharge from Shaft No.4 and runoff from the western portion of the UWA, sediment copper concentrations increase significantly from 1,230 mg/kg (MB = 25) immediately below the EBT4 confluence to 5,320 mg/kg (MB = 106) immediately upstream of the confluence with EBT2. The increase in copper concentrations is likely due to precipitation of hydrous aluminum and iron precipitates which scavenge copper and other base metals as a result of the mixing of alkaline surface water from the Upper Reach with acidic and copper/iron/sulfate enriched water from EBT4.

EB-MR and EB-LR are characterized by significant sediment impacts, with maximum concentrations of 11,000 mg/kg (MB = 220) and 7,120 mg/kg (MB = 142). Sediment copper concentrations increase 3- to 4-fold below the EBT2. There is no significant trend or change in sediment copper concentrations between the EBT2 confluence and the SHB confluence. Discharge from EBT1 does not result in a measurable effect in Ely Brook sediment concentrations. Sediment paste pH, paste conductivity, and ABA results demonstrates the high acid-generating potential of the Lower and Middle Reach sediments, with paste pH as low as 3.29 su, paste conductivity up to 1258 umhos/cm, and ABA values as low as -66.01 $tCaCO_3$/1000t. Discharge of waste rock alluvium from the UWA and LWA via EBT2 and EBT3 are the likely primary sources, as is direct erosion of the lowermost portion of the LWA by Ely Brook, as confirmed by the erosion gullies evident in that area.

7.3.3.3 SHB and the EBOR

Surface water copper concentrations in SHB Upper Reach directly below the Ely Brook confluence range between 142 µg/L to 1,100 µg/L, with an average of 137 µg/L (MB =28). In

comparison, SHB background copper concentrations observed directly upstream of the Ely Brook confluence, are between 2 µg/L to 5 µg/L. With increased downstream distance away from the Ely Brook confluence, average surface water copper concentrations decrease to 47 µg/L in SHB Lower Reach (MB = 9.5) and 21 µg/L in the EBOR (MB = 4.2). Based on these results, it is apparent that Ely Brook contributes to significant ARD impacts to SHB.

Based on a review of results from the SHB Upper Reach adjacent to the Slag Pile Area, there is no detectable increase in metal concentrations or change in geochemical parameters that can be attributed to groundwater discharge from the Slag Pile Area. After evaluating metal loading from groundwater, it is apparent that the loading from such discharge would be over an order of magnitude less than that from Ely Brook, and is likely masked by the mixing zone of the Ely Brook discharge.

Although the magnitude of ARD impacts in SHB and EBOR sediment is somewhat less than observed in surface water, the same trend is evident, with declines in sediment copper MBs from 14 in SHB Upper Reach to 10 in the Lower Reach and to 6 in the EBOR. Sediment metals results from SHB and the EBOR suggest that the native sediment load in these streams provides sufficient alkalinity and dilution to buffer the acid-generating characteristics that are typical of waste rock. Based on the relatively low level of impact to sediment observed in SHB and EBOR (in contrast to the impact to on-site sediment) it is likely that the sediment impact in these streams would dissipate in the absence of a continual discharge of waste rock sediment or ARD-related precipitates.

No copper PRG exceedances were detected in SHB sediment samples collected upstream of the Ely Brook confluence. Immediately below the confluence with Ely Brook, concentrations of copper exceed the PRG with maximum concentrations of 1,390 mg/kg (MB = 28). Within a short distance downstream of the confluence, SHB metal concentrations decrease significantly with copper concentrations as low as 220 mg/kg, (MB = 4). This is consistent with observations of iron precipitates on sediment at the confluence, which are interpreted to result from mixing of the alkaline water of SHB with metals laden and acidic surface water of Ely Brook. Sediment copper concentrations in the range of 220 to 540 mg/kg persist down to the confluence with the EBOR, with most results closer to the lower limit of that range. Paste pH, paste conductivity, and ABA results from sediment within approximately 400 ft downstream of the Ely Brook confluence exhibit near neutral pH and ABA values up to 15.67 $tCaCO_3$/1000t, indicating a

positive net neutralizing potential. Unlike the sediment of Ely Brook, sediment in SHB provides a significant buffer to the surface water and sediment load discharged from Ely Brook and the Slag Pile Area. Based on these results, sediment in SHB is impacted by the Site for the entire reach downstream from the Ely Brook confluence.

Results from the EBOR sediment station located upstream of SHB are similar to unimpacted sediment from SHB, with a maximum copper concentration of 17 mg/kg and no PRG exceedances. At the SHB confluence, EBOR sediment copper concentrations exceeded the PRG in 2 of 5 samples with a maximum concentration of 260 mg/kg (MB = 5). Copper did not exceed the PRG downstream of the SHB confluence with the exception of an isolated exceedance at 153 mg/kg from the most distal location, OR-8350M, which was not replicated in subsequent sampling rounds. The relative similarity of the maximum copper concentration at the confluence with that of the SHB sediment immediately upstream of that location suggests that results may be influenced by the limited amount of sediment mixing between the two streams at that location, and not affected significantly by precipitation resulting from mixing of the surface waters. As a result, the impact from the Site on sediment in EBOR is limited to a portion of the mixing zone immediately downstream of the confluence with SHB.

7.3.3.4 Surface Water Metals Loading

Loading estimates calculated by URS (2008) and Nobis based on measured flows and metals concentrations upstream and downstream of all the major on-site tributary confluence points were reviewed to assess the relative contaminant impact to surface water from the various source areas via the tributaries leading to Ely Brook. Nobis (2010) and URS (2008) estimates of flow and loading are included in Tables 5-3 and 5-4. These include instantaneous load estimates for November 2004, May 2007, August 2009, and November 2009. Load estimates were examined for the confluences of each of the tributaries with Ely Brook, the confluence of EBT2 and EBT3, and the confluence of EBT2 and EBT5. It is noted that some discrepancies result between flow and loading estimates above and below these confluences, indicating that caution should be exercised in the use of these instantaneous results. However, they are presented here to illustrate the relative impacts of the various tributaries. Based on the calculations presented by URS in May 2007 during the higher springtime flows, EBT4 has approximately one-third the flow of the EB-UR, contributing a copper load of up to 1 lb/day to the unimpacted EB-UR. During low flow periods, the copper load of EBT4 is approximately 0.4

lb/day. Tributary EBT3 had an estimated copper load of approximately 9 lbs/day immediately upstream of the EBT2 confluence and a flow about 15% of the flow of EBT2. This loading is derived largely from seeps discharging from the UWA, but with some contribution from the Tailings Area, and groundwater discharge from the LWA. Copper loads from EBT2 above the EBT3 confluence range from 1.2 lbs/day during low flows up to 12.9 lbs/day during spring flows. The estimated copper load below the EBT2-EBT3 confluence was somewhat lower, in the range of 3.7 lbs/day to 7.8 lbs/day, suggesting that the upstream estimate of EBT2 flow was also high. Below the confluence with Ely Brook and EBT2, copper load estimates were between 1.5 and 11.3 lbs/day, corresponding to low and high flows, respectively. Estimated flows indicate that EBT2 at its discharge has on the order of 1 to 3 times the volumetric flow of the EB-MR seasonally. EBT5 contributes a modest flow to EBT2, with little copper loading. The copper load from EBT1 is estimated at less than 0.2 lbs/day, as a result of the very low relative flow of this tributary. Based on these data, copper loads from Ely Brook to SHB range from 2 lbs/day to 11.5 lbs/day, with the higher loads occurring during higher springtime flows. Peak copper loading from Ely Brook could be as much as 4 times this amount over short intervals, as documented by Holmes, et al., (2002) during a 24-hour spring runoff event that resulted in copper loading of up to 45 lbs/day.

Tributary EBT4 contributes less than 8% of the copper load to Ely Brook, with the remainder primarily due to discharge from EBT2 and EBT3 in an approximately 3:2 ratio. Based on the relative magnitude of surface water copper loading estimates, tributary EBT2 contributes the greatest load to Ely Brook. The majority of the load to EBT2 is derived from the LWA through a combination of direct contact of the surface water with the waste rock and groundwater discharge to the tributary. A small portion of the loading is also derived, in part, from the eastern portion of the UWA and Lower Adit discharge. Although the measured flow of EBT3 is lower than that of EBT2, EBT3 still contributes a significant portion of the load to Ely Brook, albeit less than that of EBT2, as a result of the relatively higher metals concentrations in surface water in this tributary derived primarily from the UWA. Downstream of the EBT2 confluence, fluctuations of the copper load due to surface water mixing reactions, sorption, and dissolution from stream sediment, or groundwater discharge appear to be minor relative to these upstream tributaries, as indicated by the relatively stable surface water metals concentrations measured from this point to the confluence with SHB.

7.3.4 Groundwater

Based on results from shallow overburden monitoring well samples collected upgradient and beyond the footprint of the mine waste areas, groundwater in the vicinity of the Site contains very low base metal concentrations that are generally below reporting limits. Impacted shallow groundwater is generally confined to the area directly underlying or closely downgradient of waste source areas footprints.

In order to estimate the extent of plume migration related to waste source areas, a simple two-dimensional analytical model (Solute™) for solute transport was applied to the UWA, LWA, and ORB areas. The model assumes advective transport without retardation treating the contaminant as a conservative tracer to estimate downgradient concentrations. Without considering the potential chemical interaction of the groundwater with downgradient soil or bedrock, results would tend to overestimate the distance of plume migration. The results of Solute™ modeling are described below in relation to the plumes associated with specific waste source areas. Input and output parameters and results are provided in Appendix F.

7.3.4.1 UWA Plumes

In the UWA, groundwater interaction waste rock is limited but does have a significant impact on overburden groundwater in the underlying glacial till and shallow bedrock as evidenced by high groundwater metal and sulfate concentrations. This impacted groundwater feeds seeps from multiple locations along the base of the piles and along slope breaks within the pile area (Figures 6-11, 6-12, 6-18, and 6-19). A relatively thin veneer of waste rock exists on the steep slope above well location MW-19A, lying directly on top of the bedrock (cross-section A-A', Figure 5-2). In this region, the shallow bedrock is a more significant pathway for downgradient plume transport due to strong downward vertical hydraulic gradient, as indicated by high copper concentrations and low pH detected in MW-19C. Although the shallow bedrock in the UWA is impacted, the relatively low number of water-bearing fractures in the deeper bedrock limits the downward migration of this plume. Two UWA areas where groundwater discharges directly to surface water were examined using solute transport modeling to determine the relative potential impact from contaminants in groundwater. These included the area between well cluster MW-9A/C and the Ponds, and the area between well cluster MW-19A/C/D and MW-13A to Ely Brook.

Along the northwest margins of Ponds 4 and 5, data from overburden well MW-18A and shallow bedrock well MW-12C indicate that metals concentrations in groundwater may be significantly impacting surface water in these two ponds. Estimates of groundwater metals loading by URS indicate a significant copper load from groundwater (0.12 lbs/day) in the vicinity of these ponds. The source of the impacted groundwater is likely a combination of surface waste rock sources adjacent to the Ponds, acidic discharge from the Lower Adit, and possibly impacted groundwater from the UWA. Surface water discharge during base flow periods is limited to the tributary draining the Lower Adit, which directly impacts Pond 5. There is limited surface water seepage into Pond 4 from the north during low flow periods and as a result, shallow bedrock groundwater discharging to Pond 4 likely contributes a greater influence on the water quality at the that location than periodic surface water discharge.

Solute™ model input and output parameters and results are provided in Appendix F (UWRPA Run 1 and Run 2). For the eastern area below MW-9A, one model run was performed assuming overburden transport (alluvium) and a second run assuming shallow bedrock transport using the same maximum observed concentration of copper of 10,400 µg/L. Results of the model predicts that groundwater copper concentrations in the vicinity of well MW-12C would be on the order of 1200 µg/L with no significant difference between the bedrock and overburden concentrations. The observed maximum concentration in MW-12C is 1,920 µg/L. As a result of the relatively close comparison between these concentrations, a plume extending from the UWA (Piles 6 and 7) to the Ponds cannot be ruled out. However, the presence of waste rock fill at the MW-12C location may obscure a potential plume from an upgradient source. Considering the assumptions of the model, and likelihood of chemical interaction between groundwater and soil, a significantly lower contribution of impact to the Ponds may be attributable to the UWA than the waste rock sources closer to the Ponds such as surface soil at MW-12C or the Lower Adit discharge. As a result, the overburden and bedrock plumes from the UWA shown on Figures 6-19 and 6-21 include this area.

Two model runs for the area southwest of the UWA assumed an initial copper concentration equal to the maximum concentration observed in MW-19A of 14,500 µg/L and transport through the overburden (till) and shallow bedrock. Model results predict a groundwater copper concentration on the order of 720 µg/L in the overburden and 900 µg/L in bedrock at a distance equal to the location of well MW-13A, upgradient of Ely Brook. The maximum detected concentration of copper from this well was 11 µg/L, which indicates that the groundwater plume

associated with the UWA does not extend to this area and is not contributing impact directly to the EB-UR. Alternately, the lack of impact observed at MW-13A may indicate that the plume lies east of this location. As a result, the estimated extent of the plume downgradient of the UWA lies east of this well with a lateral extent following the course of EBT3 as shown on Figures 6-19 and 6-21.

Based on the solute transport modeling results, a shallow plume extending from the UWA may account for the high copper concentrations observed in shallow bedrock adjacent to Pond 4. Groundwater along the Tramway and access roads where waste rock was used as fill will also impact shallow overburden groundwater locally, as evidenced by well MW-5A. Results from overburden and bedrock wells upgradient of Ponds 4 and 5 indicate migration of groundwater, which is impacted by a plume from the UWA and discharge from the Lower Adit.

7.3.4.2 LWA Plumes

The LWA and Tailings Area are directly adjacent to discharge areas within the central portion of the valley, and shallow groundwater within the footprint of these areas, discharges directly to surface water, which limits downgradient impact to groundwater (Figures 6-19 and 6-21). Groundwater samples collected below waste sources in these areas indicates that the impact to groundwater within the waste footprint is largely limited to shallow overburden (see MW-22A and 4C). Locally however, shallow bedrock is a pathway for contaminant migration via groundwater, as indicated by measurements in well MW-21C.

Solute™ transport modeling was applied to the area centered on well MW-20A, located between the access road and Ely Brook, north of EBT1 (not within a waste area) (LWRPA Run 1; Appendix F). The high groundwater copper concentration observed in this well is believed to be related to waste rock used as road fill and not the roast bed soil. One model run was performed to assess whether the high copper concentration observed in well MW-20A could have a significant impact on Ely Brook. The maximum copper concentration observed in MW-20A is 9,685 µg/L. The model predicts a groundwater copper concentration of approximately 1,490 µg/L at Ely Brook, exceeding the groundwater PRG. This would likely result in an unacceptable impact to the brook. This value is also within the range of copper concentrations observed in EBT1 surface water, which also suggests that groundwater discharging to that tributary is impacted in this area.

The Tailings Area is the smallest Site waste source area in extent and volume. However, the high copper concentrations and acid-generating potential of the tailings, and its location within the water table and drainage of EBT3 result in a considerable potential for groundwater and surface water impacts (cross-section C-C', Figure 5-4). The shallow overburden well MW-22A, which is screened at the base and below the tailings layer, shows exceedances for cadmium, cobalt, iron, and manganese, with elevated acidity and sulfate concentrations but relatively low copper concentrations. The low copper concentrations in this well suggest that the contaminant plume does not significantly penetrate the underlying glacial till but rather migrates laterally toward EBT3. As a result of the proximity of the tailings area to EBT3, the lateral extent of the contaminant plume remains within the footprint of the tailings area and overlaps with the groundwater plume from the adjacent LWA Pile.

7.3.4.3 ORB Plumes

In the ORB, only a limited volume of the roast bed soil comes into contact with groundwater and the low-leachability potential of this soil, as demonstrated by SPLP results, and is also confirmed by the absence of groundwater metals exceedances from well MW-23A (Figure 6-19).

The potential impact to Ely Brook from observed groundwater copper concentrations in the ORB was examined using Solute™ modeling (Appendix F, RB Run1). The maximum copper concentration detected from Well MW-23A of 197 µg/L was used as the source concentration and flow through the overburden (alluvium) was assumed. The model predicts a groundwater copper concentration at Ely Brook attributable to the ORB soil as equal to 25 µg/L. This concentration is 2 orders of magnitude below the groundwater criterion and would not contribute a significant impact to Ely Brook. These results support the conclusion that elevated copper concentrations in the LWA well MW-20A are likely related to impact from the access road fill and are not interpreted as related to plumes from the ORB.

7.3.4.4 Slag Pile Area Plumes

Within the Smelter/Slag Pile Area, groundwater migrates directly toward the adjacent surface water in Ely Brook and SHB (Figures 5-10 and 5-11). Data from the overburden monitoring well clusters MW-1 and MW-2 indicate high concentrations of copper in groundwater within the saturated portion of the slag directly adjacent to the inferred point of overburden discharge in

SHB. The potential for the slag waste to contribute metals impacts to groundwater is demonstrated by USGS leachability studies and SPLP results. It is likely that the groundwater plume from the slag area extends a short distance downstream along the bed of the brook as it is diluted by deeper groundwater discharging upward.

In order to examine the potential metals load contribution from groundwater flowing through the Slag Pile Area to the Brook, the stratigraphy surrounding the pile must be considered. Observations from these borings indicate a relatively thin saturated slag thickness, on average about 3.5 ft in the central portion of the pile. The underlying alluvium was observed to be up to 4 ft thick overlying a very thick till unit. Based on hydraulic conductivity estimates from slug tests, the hydraulic conductivity (K) of the slag is two orders of magnitude greater than the alluvium and the alluvium K value is typically within an order of magnitude of that of the underlying glacial till. Test pits completed by URS downgradient of the Slag Pile Area, adjacent to the bank of SHB, showed that the slag is approximately 1 ft thick, and underlain by at least 5 ft of alluvium (URS, 2008). At the time the test pits were excavated, the slag and upper 4 ft of alluvium were unsaturated. Based on these observations, it appears that the rate of groundwater discharge from the area beneath the Slag Pile Area to the brook is being controlled by the alluvium. However, URS had previously estimated the copper loading from the Slag Pile Area at approximately 0.19 lbs/day. This estimate assumed that discharge was based on the hydraulic conductivity of the slag rather than alluvium, which would result in an overestimate of the load. Revised calculations (included in Appendix G) that incorporate the lower K value for the alluvium resulted in a copper load of 0.017 lbs/day. This value includes groundwater sample results for the 2009 sampling events by Nobis, which showed significantly higher copper concentrations than previously reported by URS (URS, 2008).

To assess the potential impact to SHB surface water, additional calculations were performed (also included in Appendix G) estimating the change in surface water copper concentrations, which might be attributable to groundwater discharge from the Slag Pile Area. A mean annual flow of 10.9 cubic feet per second (cfs) was estimated by URS for SHB based on watershed proportionment (URS, 2008). Results show that the estimated increase in copper concentration would be on the order of 0.3 µg/L. The same calculation using the K value for the slag would estimate an increase on the order of 45 µg/L copper. Results from surface water data collected from SHB Upper Reach to date are consistent with the lower end of this range, as no systematic increase in copper concentrations has been observed over this reach. However, due to

uncertainty associated with hydraulic conductivity estimates, other assumptions used to complete the estimate, and the likelihood that surface water discharge from Ely Brook masks the copper loading due to groundwater from this area, it is not possible to conclude whether the surface water criterion for copper would be met in the absence of the Ely Brook loading. In comparison to Ely Brook, the copper loading associated with groundwater discharge from the Slag Pile Area is more than two orders of magnitude lower (0.017 lbs/day vs. 3.6 lbs/day for Ely Brook; URS, 2008).

8.0 RISK ASSESSMENT SUMMARY

A HHRA and BERA have been prepared in conjunction with the RI (Nobis, 2011a and 2011b, Techlaw, 2008). Separate BERAs were completed for the aquatic receptors and the terrestrial receptors. These documents were completed prior to the designation of the OUs and address the entire Site area, except for the Underground Mine Workings. The sections below outline the assessment approaches used and the current understanding of the human health and ecological risks at the Site.

8.1 HHRA Summary

A HHRA for the Site was prepared in 2010 by Nobis. This section presents a description of the risk assessment methods employed for the Site, as well as a summary of the results. The objective of the HHRA was to estimate potential current and future human health risks from the presence of contamination in the soil, groundwater, sediment, and surface water assuming baseline conditions. The HHRA was performed in accordance with national and regional USEPA risk assessment guidelines (EPA, 2001).

The HHRA focused on those human populations that are most likely to be exposed to the potentially contaminated Site media, currently and/or in the future. These potentially exposed populations include:

- Current/future recreational visitors (adolescent and adult) – soil exposure to the recreational visitors was based on riding all-terrain vehicles (ATVs), since this is a common recreational activity at the Site that could result in an intensive level of soil contact. The ATV-riding exposure was based on conservative assumptions that cover the potential exposure associated with other, less-intensive soil contact activities. It was

assumed that the recreational visitors would come into contact with the on-site piles and the surface soil surrounding the Site. Therefore, the incidental soil ingestion, the dermal contact and absorption, and the inhalation pathways were evaluated for these receptors.

- Current/future swimmers/waders (adolescent and adult) – the swimmers/waders were assumed to come into contact with the surface water and sediment while engaging in recreational activities in Ely Brook and the downstream water bodies. Ely Brook is not sufficiently deep to support swimming. As a result, the incidental ingestion and the dermal contact and absorption pathways were evaluated for these receptors.

- Current/future residents (young child and adult) – The current residential exposure was based on the presence of abutting residences that could result in a frequency and duration of exposure similar to that of an on-site residence. Since the current residential exposure is based on the conditions of nearby residences, it was assumed that they would not be using contaminated groundwater from the Site. The current residents were assumed to come into contact with the surface soil only (and not subsurface soil). It is possible that the Site could be used for residential purposes in the future. Future residents were assumed to come into contact with the surface and subsurface soil as a result of soil mixing during future excavation and construction activities. Therefore, incidental soil ingestion, the dermal contact and absorption, and the inhalation pathways were evaluated for residential receptors. The future residential exposure scenario assumes that future residents would be using the groundwater underlying the Site, and therefore, would be exposed through the ingestion and showering/bathing exposure routes.

- Future construction workers (adult) – the Site may undergo some type of construction activity at some point in the future, which may result in contact with surface and subsurface soil (top 10 feet assumed). Therefore, the incidental soil ingestion, the dermal contact and absorption, and the inhalation pathways were evaluated for these future receptors. The duration of intensive contact with the Site soil during construction activities such as excavation is expected to be short.

Risk (cancer and non-cancer) was calculated for the COPCs identified in each exposure media. The COPCs were selected using USEPA's risk-based Regional Screening Levels (RSLs). The COPCs identified in all exposure media are listed in Table 6-1.

The HHRA was conducted using an exposure point concentration (EPC) for each COPC. Each EPC represents the concentration of a COPC to which a receptor was assumed to be continuously exposed while in contact with an environmental medium. For soil, sediment, and surface water exposure, the EPC was generally defined as the 95 percent upper confidence limit (UCL) of the mean concentration and was calculated using USEPA's ProUCL software (Version 4.00.05, USEPA 2010 a, b, c). For groundwater, the EPC was defined by the maximum detected concentration for each COPC from the available wells. EPCs were derived for each groundwater COPC in the three water-bearing units on Site (overburden, shallow bedrock, and deep bedrock). In addition, EPCs were derived for the off-site residential groundwater.

Health risks were calculated as follows:

- Incremental lifetime cancer risks (ILCR) were calculated for the carcinogenic COPCs using USEPA-approved cancer slope factors and unit risk factors. The calculated cancer risks were evaluated against the USEPA acceptable risk range of $1E^{-06}$ (one in a million) to $1E^{-04}$ (one in ten thousand).

- Non-cancer hazard quotients (HQs) and hazard indices (HIs) were calculated for all COPCs using USEPA-approved reference doses (RfDs) and reference concentrations. The calculated HQs/HIs were evaluated against a non-cancer benchmark of one, such that a value greater than one represents possible adverse health effects. The calculated HQs/HIs were grouped by the specific target organ effects associated with each COPC.

- Lead exposure was evaluated using the lead uptake model developed by USEPA. This model, the Integrated Exposure Uptake Biokinetic (IEUBK) model, estimates the blood lead levels that could result from lead exposure. The blood lead levels estimated by the model were compared to the threshold level of 10 micrograms per deciliter (µg/dL), which is the level identified by multiple agencies as being protective of sensitive populations, including neonates, infants, and young children. USEPA prescribes that

95 percent of the potentially exposed population should have blood lead levels that do not exceed 10 µg/dL.

A summary of the HHRA risks are discussed below.

8.1.1 Soil Exposure

The ILCRs calculated for potential exposure to Site soil were within or less than USEPA's cancer risk range. The non-cancer HIs were greater than one for current and future child residents, with cobalt and iron as the primary contributors to the total HIs. The target-organ-specific HIs for gastrointestinal effects (due to copper and iron) and thyroid effects (due to cobalt) were greater than one. The aggregate HI was greater than one for future construction workers; however, no individual COPC HI exceeded one. The total HI for the nervous system was 1.1 (aluminum, manganese, and mercury). The HIs for the recreational visitors were less than one. Exposures to lead in Site soil did not exceed USEPA's target level of concern for all soil exposure scenarios.

8.1.2 Sediment and Surface Water Exposure

The ILCRs calculated for potential exposure to sediment and surface water were less than USEPA's cancer risk range. The non-cancer HIs were less than the non-cancer benchmark of one. Exposures to lead in sediment and surface water did not exceed USEPA's target level of concern.

8.1.3 Groundwater Exposure

The ILCR from exposure to the overburden groundwater was at the upper end of USEPA's acceptable cancer risk range. This was due solely to arsenic exposure at a concentration that is below the federal Safe Drinking Water standard of 10 µg/L. The ILCRs for the other water-bearing units were within USEPA's acceptable cancer risk range. Non-cancer HIs were greater than one for exposure to Site groundwater. In each case, cobalt was the primary contributor to the groundwater HIs followed by copper. Target specific HIs greater than one are presented in the table below, segregated by water-bearing units.

Overburden	Shallow Bedrock	Deep Bedrock
Nervous system (aluminum, manganese)	Nervous system (aluminum, manganese)	Nervous system (manganese)
Skin (arsenic)	Skin (arsenic)	Thyroid (cobalt)
Thyroid (cobalt)	Thyroid (cobalt)	Gastrointestinal (copper, iron)
Gastrointestinal (copper, iron)	Gastrointestinal (copper, iron)	
Kidney (cadmium, molybdenum)	Kidney (cadmium, molybdenum)	
Systemic toxicity (nickel)	Blood (antimony, zinc)	

The HIs based on exposure to the residential wells were less than one. Exposures to lead in Site groundwater did not exceed USEPA's target level of concern.

8.1.4 HHRA Conclusions

The results presented above for the HHRA indicate the following:

8.1.4.1 OU1 Media and Areas

- Surface and subsurface soils in the OU1 area contain levels of cobalt, copper, and iron that could represent an unacceptable threat to human health for children residing on and near the Site and coming into contact with the contamination 350 days per year.

- Surface and subsurface soil in the OU1 area would not represent an unacceptable threat to human health for adults residing on and near the Site and coming into contact with the contamination 350 days per year.

- Human contact with the soil in the OU1 area under less frequent exposure scenarios (recreational activities) was not considered to represent an unacceptable threat to human health.

- Human contact with sediment and surface water as a result of recreational activities in the OU1 area were also not considered to represent an unacceptable threat to human health.

- An unacceptable risk was not found to be associated with a person working in the waste material in the OU1 area for up to 60 days per year. More frequent contact, however, would result in an unacceptable risk associated with the inhalation of manganese and aluminum dust. The aluminum and manganese concentrations in soil were not significantly different from those measured in background locations.

While OU1 does not address groundwater as a response area, it is recognized that the cleanup of OU1 waste areas may indirectly improve groundwater quality since those waste areas are significant sources of the groundwater contamination.

8.1.4.2 OU2 Media and Areas

- Overburden and shallow bedrock groundwater at the Site contain contaminants that would represent an unacceptable threat to human health if used as a source of drinking water. The contaminants that are found above levels that are considered acceptable for human ingestion include: aluminum, antimony, cadmium, cobalt, copper, iron, manganese, molybdenum, nickel, and zinc.

- Surface and subsurface soils in the OU2 source area (Smelter/Slag Area) contain levels of cobalt, copper, and iron that would represent an unacceptable threat to human health for children residing on and near the Site and coming into contact with the contamination 350 days per year.

- Human contact with the soil in the OU2 area under less frequent exposure scenarios (recreational activities) was not considered to represent an unacceptable threat to human health.

- Human contact with sediment, and surface water as a result of recreational activities in the OU2 area were also not considered to represent an unacceptable threat to human health.

- An unacceptable threat was not found to be associated with a person working in the waste material in the OU2 area for up to 60 days per year. More frequent contact, however, would result in an unacceptable threat associated with the inhalation of

manganese and aluminum dust. The aluminum and manganese concentrations in soil were not significant different from background locations.

8.2 Aquatic BERA Summary

An Aquatic BERA was completed by USEPA in 2008 assessing the impact of Site sources on the downstream surface water receptors in the vicinity of the Site (Techlaw, 2008). The Aquatic BERA was performed on the aquatic habitats potentially affected by the Site. The major aquatic habitats at the Site consisted of several small ponds (Ponds 2 to 5) located on the east branch of Ely Brook (note: Pond 1, the furthest upstream and largest of the five ponds, was used as a reference location), and the main stem of Ely Brook itself. Several other Ely Brook tributaries had surface water high in acidity and metals but were too small and/or ephemeral to be considered viable aquatic habitats. The major off-Site aquatic habitats consisted of SHB Upper Reach and Lower Reach, and the EBOR downstream of the confluence with SHB.

Results from toxicity tests on sediment, surface water, and porewater along with analysis of the benthic and fish communities provided multiple measurement endpoints to assess potential risk. Data collected prior to 2008 were used to define the nature and extent of contamination, and a Screening Level Ecological Risk Assessment (SLERA) was conducted to identify COPECs for each media. Appropriate toxicity benchmarks were identified for comparison with sample and test results to assess the potential for ecological risk to invertebrates, fish, amphibians, birds, and mammals that utilize surface waters in the vicinity of the Site. Table 6-1 lists the COPECs identified in the Aquatic BERA. The following seven types of measurement endpoints were used in the Aquatic BERA:

- Comparison of the COPEC levels in sediment, porewater, and surface water samples to published sediment or surface water benchmarks.

- Assessment of the bioavailability of divalent metals in sediment samples by measuring the AVS and SEM.

- Performance of toxicity tests in the laboratory by exposing sensitive life stages of aquatic invertebrates and fish to sediment, porewater, and surface water samples from the waterways.

- Performance of toxicity tests in the ponds by exposing wood frog eggs and tadpoles kept in floating cages.

- Comparison of the COPEC levels in whole fish collected from the waterways to literature-derived Critical Body Residues (CBRs).

- Quantification of the structure and function of the benthic invertebrate community and fish community in the waterways.

- Use of food chain modeling to calculate an Estimated Daily Dose (EDD) to insectivorous and piscivorous wildlife receptors from exposure to surface water and aquatic biota (winged aquatic insects and fish); compare these EDDs to Toxicity Reference Values (TRVs) from the literature.

The Aquatic BERA considered four exposure units (EUs) and their respective reference EUs and included: Ponds 2 through 5 and the Ely Brook main stem (within OU1) and SHB Upper Reach and Lower Reach, and the EBOR below the SHB confluence (within OU2). EU-wide Central Tendency Exposures (CTEs) were calculated based on arithmetic means, and Reasonable Maximum Exposures (RMEs) were calculated based either on the COPEC-specific 95th percentile UCL or the maximum concentration.

Where appropriate, the potential for ecological risk was determined based on HQs. An HQ was calculated for each COPEC by dividing an exposure or dose by a corresponding toxicity value (i.e., published benchmarks, CBRs, or TRVs). Statistics were also used to determine the presence of risk as identified by the toxicity tests and community surveys.

During risk characterization, all HQ-derived risks at the OU1 waterways were compared to their corresponding risk at the reference EU by calculating an incremental risk (IR). The IR was obtained by subtracting the reference risk from the Site risk. The presence of risk was deemed unrelated to past Site activities if the reference risk exceeded the Site risk. This approach allowed for a more thorough and accurate assessment of Site-related impacts by factoring in reference COPEC levels.

The results of the Aquatic BERA are summarized below:

Location	Overall Risk Conclusion/Chemicals of Concern
Pond 2	Minor risk detected for water column invertebrates and amphibians due to elevated manganese concentrations in the water. No risk detected for the benthic invertebrate community.
Pond 3	Minor risk detected for benthic invertebrate community, water column invertebrates, and amphibians due to elevated manganese concentrations in the sediment and the water.
Pond 4	Severe risk detected for amphibians and minor risk detected for benthic invertebrate community due to elevated copper concentrations in the sediment.
Pond 5	Severe risk detected for benthic invertebrate community, water column invertebrates, and amphibians due to elevated copper concentrations in the sediment and the water.
Ely Brook and its tributaries	Severe risk detected for benthic invertebrate community and the fish community as a result of ARD.
Schoolhouse Brook	Severe risk detected for benthic invertebrate community and the fish community as a result of ARD being released from the OU1 source areas.

The Aquatic BERA documented that severe ecological impacts have occurred as a result of the release of ARD with toxic levels of metals from the Site waste areas into the surface water and sediment within the OU1 area including: Ely Brook, the tributaries of Ely Brook, and Ponds 4 and 5. The upstream (reference) areas of the Ely Brook headwaters and Pond 1 supported healthy populations of benthic invertebrates, further documenting that the Site is a significant source of ecological impairment.

The Aquatic BERA also documented that severe ecological impacts have occurred as a result of the release of ARD with toxic levels of metals from the OU1 waste areas into OU2 surface water and sediment. Specifically, this finding applies to SHB. The upstream (reference) areas of SHB supported healthy populations of benthic invertebrates and fish, further documenting that the Site is the source of observed ecological impairment downstream of the confluence with Ely Brook. OU2 will specifically address any ecological threats associated with the sediment within SHB and the Ompompanoosuc River as well as the final restoration of these surface waters.

8.3 Terrestrial Ecological Risk Assessment Summary

A Terrestrial BERA was performed as part of the RI. The objective of the Terrestrial BERA was to evaluate the risk of ecological harm associated with Site-related contaminants, which consist only of metals. The Terrestrial BERA process at the Site follows the USEPA's (1997) *Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments*. The Terrestrial BERA considered eight assessment endpoints to evaluate risk in terrestrial exposure areas and two assessment endpoints to evaluate risk in the vernal pools.

8.3.1 Exposure Assessment and Effects Assessment

Assessment and measurement endpoints were evaluated for one terrestrial exposure area and 4 vernal pools as shown in the table below:

Receptor	Representative Species	Assessment Endpoint	Measurement Endpoint
Terrestrial Plants	NA	Plant growth, yield, or germination	Ecological effects quotient based on COPEC soil concentration comparison with the most sensitive soil-based ecological benchmark.
Invertebrates	NA	Growth, reproduction, or activity	
Herbivorous Mammals	Deer Mouse	Survival, growth, or reproduction	
Invertivorous Mammals	Short-tailed Shrew	Survival, growth, or reproduction	
Carnivorous Mammals	Mink	Survival, growth, or reproduction	
Herbivorous Birds	Song Sparrow	Survival, growth, or reproduction	
Omnivorous Birds	American Robin	Survival, growth, or reproduction	
Carnivorous Birds	American Kestrel	Survival, growth, or reproduction	
VP Aquatic Life	NA	Survival, growth, or reproduction	Comparison of surface water chemistry with freshwater benchmark values.
VP Reptiles/ Amphibians	NA	Survival, growth, or reproduction	

Note:
NA = not applicable.

Both RMEs and CTEs were considered when assessing and characterizing risk. CTEs represent the most likely concentration to which a population of receptors would be exposed. In general, RME EPCs were based on UCLs recommended by ProUCL, with the exception of

EPCs for soil invertebrates, where the maximum detected concentrations were used due to small data set sizes. CTE EPCs for all media were based on the average (arithmetic mean) concentration using the whole sample quantification limit for non-detects.

Pathways that were evaluated included direct contact with surface soil for terrestrial plants and invertebrates; ingestion of dietary items and incidental ingestion of surface soil for wildlife receptors; and direct contact with surface water for aquatic life and reptiles/amphibians.

8.3.2 Risk Characterization

Risk characterization involves the integration of exposure and effects data to determine the potential for adverse effects. A weight-of-evidence (WOE) approach was used to make conclusions regarding risk of harm for assessment endpoints. First, measurement endpoints were each assigned a weight based on how closely they represent the assessment endpoint.

The second step of the WOE approach evaluated the magnitude of response in the measurement endpoint, considering two questions:

- Does the measurement endpoint indicate the presence of risk (possible, unlikely, or undetermined)?
- Is the response low or high?

Specifically, likelihood and magnitude of response determinations were made for each COPEC within an endpoint. Criteria for determining evidence of harm and magnitude of response for all lines of evidence are provided below.

Sample-by-sample Comparisons with Soil Screening Values:

- If ≤ 10% of the detected Site concentrations have ecological effect quotients (EEQ) > 10, “Risk?” = “Unlikely.”

- If the COPEC concentrations at the Site are greater than background concentrations, >10% of the detected Site concentrations have EEQs >1, and >10% of the detected background concentrations exceeded the benchmark, “Risk?” = “Undetermined.”

- If the COPEC concentrations at the Site are greater than background concentrations, ≤ 10% of the detected background concentrations exceeded the benchmark, and ≥ 10% of the detected Site concentrations was greater than the benchmark value, "Risk?" = "Possible."

  - If "Risk" was noted as "Possible," and < 10% of the EEQs greater than one were > 10, "Magnitude" = "Low;" else "Magnitude" = "High."

Estimated Daily Intake Comparisons with TRVs:

An "Interpretive Ecological Risk Matrix" was developed. A general matrix is as follows:

RME Case	CTE Case	Population Risk?	Magnitude	Confidence
N≤1 & L≤1	N≤1 & L≤1	Unlikely	---	High
N>1 & L≤1	N≤1 & L≤1	Unlikely	---	Moderate
N>1 & L>1	N≤1 & L≤1	Undetermined	---	Low
N>1 & L≤1	N>1 & L≤1	Undetermined	---	Low
N>1 & L>1	N>1 & L≤1	Possible	Low	Moderate
N>1 & L>1	N>1 & L>1	Possible	If RME Case EEQs < 5 then "Low," else "High"	High

Notes:
N = an EEQ based on dividing an exposure by its appropriate no-effect benchmark
L = an EEQ based on dividing an exposure by its appropriate effect benchmark

In addition, it is important to note that "unlikely" indicates that *population-level* effects are unlikely to the receptors represented by the measurement endpoint and that "possible" indicates that there is a potential for adverse *population-level* effects to the receptors represented by the measurement endpoint. The confidence rating was assigned using professional judgment based on the combination of the RME and CTE case results. For example, if EEQs for a COPEC did not exceed one under any circumstance, it is assumed that there is a high level of confidence in stating that population risks are "unlikely." The confidence rating was employed in the risk conclusions.

Vernal Pool Water Concentration Comparisons with National Recommended Water Quality Criteria (NRWQC):

- If the concentration was less than the chronic value, “Risk?” = “Unlikely.”
- If the concentration was greater than the chronic value, “Risk?” = “Possible.”

    - If “Risk” was noted as “Possible,” and the concentration was less than the acute value, “Magnitude” = “Low;” else, “Magnitude” = “High.”

Note that undetermined is not a possibility for these comparisons.

Vernal Pool Water Concentration Comparisons with Herptile Toxicity Values:

- If the concentration was less than the toxicity value, “Risk?” = “Unlikely.”
- If the concentration was greater than the toxicity value, “Risk?” = “Possible.”

    - If “Risk” was noted as “Possible,” and the EEQ was <10, “Magnitude” = “Low;” else “Magnitude” = “High.”

Note that undetermined is not a possibility for these comparisons.

The third step of the WOE process evaluated the degree of concurrence among measurement endpoints by plotting the output of the endpoint weighting and magnitude of response on a matrix for all measurement endpoints per assessment endpoint. Because only one or two measurement endpoints were evaluated per assessment endpoint, all of the endpoints evaluated were presented on one matrix (Nobis, 2011a: Table 4-19), allowing easy visual examination of agreements or divergences among the endpoints.

When evaluating concurrence among measurement endpoints, there is an examination of the agreement or lack thereof among measurement endpoints as they relate to a specific assessment endpoint. Logical connection, interdependence, and correlations among measurement endpoints need to be considered.

Agreement between different lines of evidence increases confidence in the conclusions derived in the risk estimation. When lines of evidence disagree, it is important to distinguish between

true inconsistencies and those related to uncertainty and variability associated with each measurement endpoint. The evaluation process involves more than just listing the evidence that supports or refutes the risk estimate. The Terrestrial BERA presents in detail the considerations and interpretations involved in evaluating all lines of evidence. As with assigning qualitative significance ratings to the measurement endpoints, professional judgment is required when evaluating the various results and conflicting lines of evidence.

8.3.3 Terrestrial Baseline Ecological Risk Assessment Conclusions

Risk levels identified in the Terrestrial BERA are summarized in the following text.

Sampling and subsequent ecological risk analysis focused on determining the potential for significant adverse ecological effects in the vegetated areas that border these barren areas and any vernal pools located therein. The following table summarizes the findings of this risk analysis.

Receptor Group	Overall Risk Conclusion/Chemicals of Concern for OU1
Terrestrial Plants	The barren areas of the Site represent a significant adverse impact to the plant community. The primary cause of the impact is the acidity of the soil and porewater. There is the potential for adverse impact to individual terrestrial plants as a result of the contaminant concentrations at the Site. The COPCs are copper and, to a lesser extent, zinc. The overall impact on the plant community outside the barren waste areas was not considered significant.
Soil Invertebrates	The barren areas of the Site represent a significant adverse impact to the soil invertebrate community. The primary cause of the impact is the acidity of the soil and porewater. There is the potential for adverse impact to individual soil invertebrates as a result of the contaminant concentrations at the Site. The COPCs are copper and, to a lesser extent, zinc. The overall impact on the soil invertebrate community outside the barren waste areas was not considered significant
Herbivorous Birds	The Terrestrial BERA concluded that significant ecological impacts to this receptor were unlikely.
Invertivorous Birds	The Terrestrial BERA concluded that significant ecological impacts to this receptor were unlikely.
Carnivorous Birds	The Terrestrial BERA concluded that significant ecological impacts to this receptor were unlikely.
Herbivorous Mammals	The Terrestrial BERA concluded that significant ecological impacts to this receptor were unlikely.
Invertivorous Mammals	The Terrestrial BERA concluded that significant ecological impacts to this receptor were unlikely.

Receptor Group	Overall Risk Conclusion/Chemicals of Concern for OU1
Carnivorous Mammals	The Terrestrial BERA concluded that significant ecological impacts to this receptor were unlikely.

The only significant terrestrial ecological threat in the OU1 area is the impairment of the plant and soil invertebrate communities in the barren areas of the Site. Although concentrations of metals detected in the vegetated (non-barren) areas at the Site were higher than plant and soil invertebrate benchmarks, field observations suggest that the toxicity of the Site material is substantially reduced when the waste is incorporated into a natural soil. Areas along the fringe of the barren waste areas have concentrations of metals comparable to the barren waste areas yet these areas support a plant community and soil invertebrates. Other factors, such as the highly acidic porewater and acid salts within the waste along with the absence of any organic matter to support vegetation are likely to be more significant factors in the absence of vegetation on the barren areas. When a soil horizon forms and provides organic matter, the plant community appears to be able to exist. As a result, a clear chemical-specific threat to the plant or soil invertebrate community is not identified for OU1 of the Site. The general Terrestrial BERA conclusion for OU1 is that the Site conditions, primarily the acidic waste material and associated acid salts and porewater have created barren areas which represent a local, yet significant, ecological harm to the plant and soil invertebrate community resulting in a loss of the critical ecological support functions including nutrient cycling, habitat, food, and soil stabilization to limit erosion.

No significant ecological risk was identified for the other terrestrial receptors within the OU1 area. The HQs were generally low for the mammal and bird receptors. In addition, the biota sampling suggested that most metals (particularly selenium and zinc) were not accumulating in tissue. Only copper was detected at concentrations that were statistically different from reference biota tissue samples, although individual samples suggested that some accumulation of aluminum and iron may occur. OU2 will address the ecological risk associated with the vernal pools and the Slag Pile and Smelter Areas as well as any ecological risk associated with the underground workings.

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Table 2-1
Timeline Summary of Historical Milestone Events and Site Features
Ely Copper Mine Superfund Site
Vershire, Vermont

Event/Location	Period of Activity	Description
Discovery	1813	Gossan discovered by Richardson Family, used for dye.
Vershire Coper Manufacturing Co.	1830s	Isaac Tyson, Jr. sporadically worked the deposit
Sporadic Prospecting	1840s	Pliny Dwight controlled the land
Vermont Copper Mining Company	1853-1883	Began large scale working of the deposit led by Thomas Pollard
Rittler Map/Report	1859	Documentation for Vermont Copper Mining Company (VCMC) of mine related features and associated buildings.
Smith Ely Era	1864-1883	Smith Ely became president of VCMC
Vermont Copper Company of NY	1882	Francis Cazin and Ely-Goddard took control of the mine
The "Ely War"	1883	VCMC worker revolt and company collapse
Mine Decline	1883-1899	Mine ownership changed hands multiple times
Westinghouse Era	1900-1905	Modernization of smelting process, little production
End of Underground Mining	1905	Site buildings and equipment were sold, and property was stripped
Ely-Copperfield Assoc NY, NY	1917-18	Flotation Mill constructed to reprocess 19,000 tons of mine waste piles. Mill shut down at end of WWI
World War II Era	1942-1950	Assay of mine dumps. 1949-50, 60,000 tons of waste ore transported to Elizabeth Mine yielding 1.2 million pounds of copper
Appalachian Sulphides, Inc	mid-1950s	Prospect drill holes completed
Copper Mine Production	mid-1850s-1918	Peak production from 1870s-1880s. 30-40 million pounds total production
Main Shaft	1881-1905	Primary shaft hoist access
Main Adit (1861 Adit)	1861-1905	Main haulageway
Upper Workings and Development Rock	1820s-1861	Includes Tyson 1834/Pollard1854 Adit, Shaft II, 1850s/1860s Pollard Shaft and Adit
Upper Waste Pile 4	1820s-1861	Low grade ore
Upper Waste Piles 6, 7, 8, and 9	1861-1905	Low grade ore, 1949-50 loading platform, 1861 Adit spur road
Shaft No 4	Late 1800s	Collapsed entrance, development rock pile remains
Burleigh Shaft	1870s-1880s	Shaft entrance remains partially collapsed.
Deep Adit	1850s-1860s	Collapsed entrance, development rock pile remains
World War I Era Flotation Mill	1917-1918	Foundations, walls, floor slabs remain
Washhouse	1850s-1880s	Schist slab foundation remains in Lower Waste Pile Area
Ore Roast Beds	1867-1905	Schist slab retaining wall, 900 ft of oxidized low grade ore, collapsed shaft
Smelter Building	1867-1905	Tramway embankment, retaining wall, furnace bases, bldg nearly 1,000 ft long, refined pig copper.
Smoke Flue	1877	Schist slab flue, stack footing remain
Slag Pile	1867-1905	Smelter Slag pot skull layers remain
Reservoir (Pond 1)	1882?-pre-1902	Earthen/rubble dam on the east branch of Ely Brook. Possibly Westinghouse Era

Table 3-1a
Surface Soil Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top of Sample Interval (ft bgs)	Bottom of Sample Interval (ft bgs)	Sample Type	Acid/Base Accounting	AES Total Metals	MS Total Metals	Total Organic Carbon	Paste Conductivity	Paste pH	SPLP Metals	SPLP Mercury	Cation Exchange Capacity
SS-01	SS-01X-090209AX	Smelter	9/2/2009	0	0.5	Field Sample		X	X						
SS-01	SS-01X-090209BX	Smelter	9/2/2009	0.5	2	Field Sample		X	X						
SS-02	SS-02X-090209AX	Smelter-TZ	9/2/2009	0	0.5	Field Sample		X	X						
SS-02	SS-02X-090209BX	Smelter-TZ	9/2/2009	0.5	1.5	Field Sample		X	X						
SS-03	SS-03X-090209AX	Smelter-TZ	9/2/2009	0	0.5	Field Sample		X	X						
SS-03	SS-03X-090209BX	Smelter-TZ	9/2/2009	0.5	2	Field Sample		X	X						
SS-04	SS-04X-090209AX	Smoke Flue-TZ	9/2/2009	0	0.5	Field Sample		X	X						
SS-04	SS-04X-090209BX	Smoke Flue-TZ	9/2/2009	0.5	2	Field Sample		X	X						
SS-05	SS-05X-090209AX	Smoke Flue	9/2/2009	0	0.3	Field Sample		X	X						
SS-05	SS-05X-090209BX	Smoke Flue	9/2/2009	0.3	2	Field Sample		X	X						
SS-06	SS-06X-090209AX	Smoke Flue	9/2/2009	0	0.5	Field Sample		X	X						
SS-06	SS-06X-090209BX	Smoke Flue	9/2/2009	0.5	2	Field Sample		X	X						
SS-07	SS-07X-090209AX	Smoke Flue	9/2/2009	0	0.5	Field Sample		X	X						
SS-07	SS-07X-090209BX	Smoke Flue	9/2/2009	0.5	2	Field Sample		X	X						
SS-08	SS-08X-090209AD	Smelter	9/2/2009	0	2	Field Duplicate				X	X	X			X
SS-08	SS-08X-090209AX	Smelter	9/2/2009	0	2	Field Sample		X	X	X	X	X			X
SS-09	SS-09X-090209AX	Natural Forest	9/2/2009	0	1	Field Sample		X	X	X	X	X			X
SS-10	SS-10X-090309AX	EB-LR-TZ	9/3/2009	0	0.5	Field Sample	X	X	X		X	X			
SS-11	SS-11X-090309AX	EB-LR-TZ	9/3/2009	0	0.5	Field Sample	X	X	X		X	X			
SS-12	SS-12X-090309AX	EB-MR-TZ	9/3/2009	0	0.5	Field Sample	X	X	X		X	X			
SS-13	SS-13X-082809AX	ORB	8/28/2009	0	0.3	Field Sample		X	X	X	X	X			X
SS-14	SS-14X-083109AX	ORB-TZ	8/31/2009	0	0.2	Field Sample		X	X	X	X	X			X
SS-15	SS-15X-083109AX	ORB-TZ	8/31/2009	0	0.2	Field Sample		X	X		X	X			X
SS-16	SS-16X-090309AX	Natural Forest	9/3/2009	0	0.5	Field Sample	X	X	X		X	X			X
SS-17	SS-17X-083109AX	LWA-TZ	8/31/2009	0	0.3	Field Sample		X	X	X	X	X			X
SS-18	SS-18X-082709AX	ORB	8/27/2009	0	1	Field Sample		X	X		X	X			X
SS-19	SS-19X-082709AX	ORB	8/27/2009	0	1	Field Sample		X	X	X	X	X			X
SS-20	SS-20X-083109AX	LWA-TZ	8/31/2009	0	0.2	Field Sample		X	X		X	X			X

Table 3-1a
Surface Soil Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top of Sample Interval (ft bgs)	Bottom of Sample Interval (ft bgs)	Sample Type	Acid/Base Accounting	AES Total Metals	MS Total Metals	Total Organic Carbon	Paste Conductivity	Paste pH	SPLP Metals	SPLP Mercury	Cation Exchange Capacity
SS-20	SS-20X-083109BX	LWA-TZ	8/31/2009	0.2	1.5	Field Sample		X	X						
SS-21	SS-21X-083109AX	LWA-TZ	8/31/2009	0	0.2	Field Sample		X	X	X	X	X			X
SS-22	SS-22X-082709AX	LWA-TZ	8/27/2009	0	1	Field Sample		X	X		X	X			X
SS-23	SS-23X-082709AX	LWA-TZ	8/27/2009	0	1	Field Sample		X	X	X	X	X			X
SS-24	SS-24X-083109AX	Natural Forest	8/31/2009	0	0.2	Field Sample		X	X		X	X			X
SS-25	SS-25X-082709AX	LWA-TZ	8/27/2009	0	1	Field Sample		X	X		X	X			X
SS-26	SS-26X-083109AX	Natural Forest	8/31/2009	0	0.3	Field Sample		X	X		X	X			X
SS-27	SS-27X-082609AX	LWA	8/26/2009	0	1	Field Sample		X	X	X	X	X			X
SS-27	SS-27X-082609BX	LWA	8/26/2009	1	2	Field Sample		X	X						
SS-28	SS-28X-083109AX	Natural Forest	8/31/2009	0	1	Field Sample		X	X		X	X			X
SS-29	SS-29X-083109AX	LWA-TZ	8/31/2009	0	0.3	Field Sample		X	X	X	X	X			X
SS-30	SS-30X-083109AD	LWA	8/31/2009	0	2	Field Duplicate		X	X						
SS-30	SS-30X-083109AX	LWA	8/31/2009	0	2	Field Sample	X	X	X		X	X			
SS-31	SS-31X-083109AX	UWA-TZ	8/31/2009	0	2	Field Sample	X				X	X			
SS-32	SS-32X-083109AX	UWA-TZ	8/31/2009	0	2	Field Sample	X	X	X		X	X			
SS-33	SS-33X-083109AX	UWA-TZ	8/31/2009	0	2	Field Sample	X	X	X		X	X			
SS-34	SS-34X-082609AX	UWA-TZ	8/26/2009	0	2	Field Sample	X	X	X		X	X			
SS-35	SS-35X-082609AX	UWA-TZ	8/26/2009	0	2	Field Sample	X	X	X		X	X			
SS-36	SS-36X-082609AX	UWA-TZ	8/26/2009	0	2	Field Sample	X	X	X		X	X			
SS-37	SS-37X-082609AD	UWA	8/26/2009	0	2	Field Duplicate	X	X	X		X	X			
SS-37	SS-37X-082609AX	UWA	8/26/2009	0	2	Field Sample	X	X	X		X	X	X	X	
SS-38	SS-38X-082609AX	UWA	8/26/2009	0	2	Field Sample	X	X	X		X	X			
SS-39	SS-39X-082609AX	UWA	8/26/2009	0	2	Field Sample	X	X	X		X	X			
TA	TA-04X-082409AX	EB-LR-TZ	8/24/2009	0	1	Field Sample		X	X						
TA	TA-14X-082409AX	EB-LR-TZ	8/24/2009	0	1	Field Sample		X	X						
TC	TC-03X-082609AX	Smoke Flue	8/26/2009	0	1	Field Sample		X	X						
TF	TF-02X-090109AX	ORB-TZ	9/1/2009	0	2	Field Sample		X	X						
TF	TF-17X-090109AX	EB-LR-TZ	9/1/2009	0	2	Field Sample		X	X						

Table 3-1a
Surface Soil Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top of Sample Interval (ft bgs)	Bottom of Sample Interval (ft bgs)	Sample Type	Acid/Base Accounting	AES Total Metals	MS Total Metals	Total Organic Carbon	Paste Conductivity	Paste pH	SPLP Metals	SPLP Mercury	Cation Exchange Capacity
TG	TG-02X-082409AX	ORB	8/24/2009	0	1	Field Sample		X	X						
TH	TH-01X-082509AX	LWA	8/25/2009	0	1	Field Sample		X	X						
TI	TI-03X-082509AX	EB-UR-TZ	8/25/2009	0	1	Field Sample		X	X						
TK	TK-01X-082509AX	LWA	8/25/2009	0	1	Field Sample		X	X						
TL	TL-04X-082509AX	LWA	8/25/2009	0	1	Field Sample		X	X						
TN	TN-02X-082509AD	UWA	8/25/2009	0	1	Field Duplicate		X	X						
TN	TN-02X-082509AX	UWA	8/25/2009	0	1	Field Sample		X	X						
TO	TO-05X-082709AX	LWA	8/27/2009	0	1	Field Sample		X	X						
TP	TP-10X-082709AX	UWA	8/27/2009	0	1	Field Sample		X	X						
TQ	TQ-06X-082609AX	UWA	8/26/2009	0	1	Field Sample		X	X						
TQ	TQ-16X-082609AX	UWA	8/26/2009	0	1	Field Sample		X	X						

Notes:
ft bgs = feet below ground surface
MS = Mass Spectroscopy
AES = Atomic Emission Spectroscopy
SPLP = Synthetic Precipitation Leaching Procedure
TZ = Transition Zone
EB-LR = Ely Brook Lower Reach
EB-MR = Ely Brook Middle Reach
ORB = Ore Roast Bed
LWA = Lower Waste Area
UWA = Upper Waste Area

Table 3-1b
Subsurface Soil and Test Pit Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top of Sample Interval (ft bgs)	Bottom of Sample Interval (ft bgs)	Sample Type	Acid/Base Accounting	AES Total Metals	MS Total Metals	Paste Conductivity	Paste pH	SPLP Metals	SPLP Mercury
MW-17A	MW-17A-073009AX	LWA-TZ	7/30/2009	0	2	Field Sample	X	X	X	X	X		
MW-17A	MW-17A-073009BX	LWA-TZ	7/30/2009	2	2.6	Field Sample	X	X	X	X	X		
MW-18A	MW-18A-080309AD	UWA	8/3/2009	2	4	Field Duplicate	X			X	X	X	X
MW-18A	MW-18A-080309AX	UWA	8/3/2009	2	4	Field Sample	X	X	X	X	X	X	X
MW-18A	MW-18A-080309BD	UWA	8/3/2009	4	6	Field Duplicate		X	X				
MW-18A	MW-18A-080309BX	UWA	8/3/2009	4	6	Field Sample	X	X	X	X	X		
MW-18A	MW-18A-080309CX	UWA	8/3/2009	4	6	Field Sample	X	X	X	X	X		
MW-19A	MW-19A-072109AX	UWA	7/21/2009	2	6	Field Sample	X	X	X	X	X		
MW-19A	MW-19A-072109BX	UWA	7/21/2009	6	8	Field Sample	X	X	X	X	X		
MW-19A	MW-19A-072109CX	UWA	7/21/2009	8	12.9	Field Sample	X	X	X	X	X		
MW-20A	MW-20A-072909AX	LWA-TZ	7/29/2009	2	2.4	Field Sample	X	X	X	X	X		
MW-20A	MW-20A-072909BX	LWA-TZ	7/29/2009	2.4	4	Field Sample	X	X	X	X	X		
MW-20A	MW-20A-072909CX	LWA-TZ	7/29/2009	4	5.5	Field Sample	X	X	X	X	X		
MW-20A	MW-20A-083109AX	LWA-TZ	8/31/2009	0	2	Field Sample	X	X	X	X	X		
MW-21A	MW-21A-072809AX	LWA	7/28/2009	2	4	Field Sample	X	X	X	X	X		
MW-21A	MW-21A-072809BX	LWA	7/28/2009	4	6	Field Sample	X	X	X	X	X		
MW-21A	MW-21A-072809CD	LWA	7/28/2009	6	10	Field Duplicate	X	X	X	X	X		
MW-21A	MW-21A-072809CX	LWA	7/28/2009	6	10	Field Sample	X	X	X	X	X		
MW-21A	MW-21A-083109AX	LWA	8/31/2009	0	2	Field Sample	X	X	X	X	X	X	X
MW-22A	MW-22A-072909AX	Tailing	7/29/2009	2	4	Field Sample	X	X	X	X	X		
MW-22A	MW-22A-072909BX	Tailing	7/29/2009	7.1	8.2	Field Sample	X	X	X	X	X		
MW-22A	MW-22A-072909CX	Tailing	7/29/2009	8.2	11.5	Field Sample	X	X	X	X	X		
MW-22A	MW-22A-083109AX	Tailing	8/31/2009	0	2	Field Sample	X	X	X	X	X		
MW-23A	MW-23A-070809AX	ORB	7/8/2009	0	2	Field Sample	X	X	X	X	X	X	X
MW-23A	MW-23A-070809BX	ORB	7/8/2009	6	8	Field Sample	X	X	X	X	X		
MW-23A	MW-23A-070809CX	ORB	7/8/2009	8	10	Field Sample	X	X	X	X	X		
MW-23A	MW-23A-083109AX	ORB	8/31/2009	0	2	Field Sample	X	X	X		X		
SB-09	SB-09X-073009AD	Tailing	7/30/2009	2.2	3	Field Duplicate						X	X

Table 3-1b
Subsurface Soil and Test Pit Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top of Sample Interval (ft bgs)	Bottom of Sample Interval (ft bgs)	Sample Type	Acid/Base Accounting	AES Total Metals	MS Total Metals	Paste Conductivity	Paste pH	SPLP Metals	SPLP Mercury
SB-09	SB-09X-073009AX	Tailing	7/30/2009	2.2	3	Field Sample	X	X	X	X	X	X	X
SB-09	SB-09X-073009BX	Tailing	7/30/2009	3	6	Field Sample	X	X	X	X	X		
SB-09	SB-09X-073009CX	Tailing	7/30/2009	8	10	Field Sample	X	X	X	X	X		
TP-15	TP-15X-073009AD	UWA	7/30/2009	0	1	Field Duplicate	X	X	X	X	X		
TP-15	TP-15X-073009AX	UWA	7/30/2009	0	1	Field Sample	X	X	X	X	X		
TP-15	TP-15X-073009BX	UWA	7/30/2009	1	2	Field Sample	X	X	X	X	X	X	X
TP-15	TP-15X-073009BD	UWA	7/30/2009	1	2	Field Duplicate						X	X
TP-15	TP-15X-073009CX	UWA	7/30/2009	2	3	Field Sample	X	X	X	X	X		
TP-16	TP-16X-080309AX	LWA	8/3/2009	0	1	Field Sample	X	X	X	X	X		
TP-16	TP-16X-080309BX	LWA	8/3/2009	1	2	Field Sample	X	X	X	X	X		
TP-16	TP-16X-080309CX	LWA	8/3/2009	2	5	Field Sample	X	X	X	X	X		

Notes:
ft bgs = feet below ground surface
MS = Mass Spectroscopy
AES = Atomic Emission Spectroscopy
SPLP = Synthetic Precipitation Leaching Procedure
TZ = Transition Zone
ORB = Ore Roast Bed
LWA = Lower Waste Area
UWA = Upper Waste Area

Table 3-1c
Soil Geotechnical Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top of Sample Interval (ft bgs)	Bottom of Sample Interval (ft bgs)	Sample Type	Grain Size	Specific Gravity	Standard Proctor Test	Shear Tests
GT-P04	GT-P04-110409AX	UWA	11/4/2009	0	1	Field Sample	X			
GT-P07	GT-P07-110409AX	UWA	11/4/2009	0	1	Field Sample	X		X	X
GT-P07	GT-P07-110409AX	UWA	11/4/2009	0	1	Field Duplicate	X			
GT-P08	GT-P08-110409AX	UWA	11/4/2009	0	1	Field Sample	X	X	X	X
GT-P08	GT-P08-110409BX	UWA	11/4/2009	0	1	Field Duplicate	X		X	X
GT-P09	GT-P09-110409BX	UWA	11/4/2009	0	1	Field Sample	X			
GT-P11	GT-P11-110409AX	LWA	11/4/2009	0	1	Field Sample	X	X	X	X
GT-P11	GT-P11-110409BX	LWA	11/4/2009	0	1	Field Sample	X		X	X
GT-P12	GT-P12-110409AX	LWA	11/4/2009	0	1	Field Sample	X			
GT-EBS	GT-EBS-110409AX	EB-LR	11/4/2009	0	1	Field Sample	X	X	X	X
GT-FM1	GT-FM1-110409AX	Tailings	11/4/2009	0	1	Field Sample	X			
GT-RB1	GT-RB1-110409AX	ORB	11/4/2009	0	1	Field Sample	X			

Notes:
ft bgs = feet below ground surface

Table 3-1d
Surface Water and Vernal Pool Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	USGS Location ID	Nobis Sample ID	Study Area	Sample Date	Sample Type	Alkalinity	Specific Conductivity	pH	Total Dissolved Solids	Total Suspended Solids	Chloride, Sulfate	Total Acidity	Nitrite + Nitrate	Sulfide	AES Dissolved Metals	AES Total Metals	MS Dissolved Metals	MS Total Metals
SW-04	SB-3020M	SW-04-111909AF	SHB-UR	11/19/2009	Field Sample										X		X	
SW-04	SB-3020M	SW-04-111909AX	SHB-UR	11/18/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-04	SB-3020M	SW-04X-080709AX	SHB-UR	8/7/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-09	EB-30M	SW-09-111809AF	EB-LR	11/19/2009	Field Sample										X		X	
SW-09	EB-30M	SW-09-111909AX	EB-LR	11/19/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-09	EB-30M	SW-09X-080709AX	EB-LR	8/7/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-12	EB-530M	SW-12-111809AF	EB-MR	11/18/2009	Field Sample										X		X	
SW-12	EB-530M	SW-12-111809AX	EB-MR	11/18/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-12	EB-530M	SW-12X-080609AX	EB-MR	8/6/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-13	EB-560M	SW-13-111809AF	EB-UR	11/18/2009	Field Sample										X		X	
SW-13	EB-560M	SW-13-111809AX	EB-UR	11/18/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-13	EB-560M	SW-13X-080609AX	EB-UR	8/6/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-17	EB-815M	SW-17-111709AF	EB-UR	11/17/2009	Field Sample										X		X	
SW-17	EB-815M	SW-17-111709AX	EB-UR	11/17/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-17	EB-815M	SW-17X-080409AX	EB-UR	8/4/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-29	EBT4-25M	SW-29-111709AF	EBT4	11/17/2009	Field Sample										X		X	
SW-29	EBT4-25M	SW-29-111709AX	EBT4	11/17/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-29	EBT4-25M	SW-29X-080409AX	EBT4	8/4/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-32	EBT2-7M	SW-32-111809AF	EBT2	11/18/2009	Field Sample										X		X	
SW-32	EBT2-7M	SW-32-111809AX	EBT2	11/18/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-32	EBT2-7M	SW-32X-080609AX	EBT2	8/6/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-34	EBT1-10M	SW-34-111809AF	EBT1	11/18/2009	Field Sample										X		X	
SW-34	EBT1-10M	SW-34-111809AX	EBT1	11/18/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-34	EBT1-10M	SW-34X-080609AX	EBT1	8/6/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-35	EM-SEEP13	SW-35X-080609AX	ORB	8/6/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-36	EBT1-110M	SW-36-111809AF	EBT1	11/18/2009	Field Sample										X		X	
SW-36	EBT1-110M	SW-36-111809AX	EBT1	11/18/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-38	SB-3290M	SW-38-111909AF	SHB-Background	11/19/2009	Field Sample										X		X	
SW-38	SB-3290M	SW-38-111909AX	SHB-Background	11/19/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-38	SB-3290M	SW-38X-080709AX	SHB-Background	8/7/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-40	EB-770M	SW-40-111709AF	EB-UR	11/17/2009	Field Sample										X		X	
SW-40	EB-770M	SW-40-111709AX	EB-UR	11/17/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-40	EB-770M	SW-40X-080409AX	EB-UR	8/4/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-41	EBT2-255M	SW-41-111709AF	EBT2	11/17/2009	Field Sample										X		X	

Table 3-1d
Surface Water and Vernal Pool Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	USGS Location ID	Nobis Sample ID	Study Area	Sample Date	Sample Type	Alkalinity	Specific Conductivity	pH	Total Dissolved Solids	Total Suspended Solids	Chloride, Sulfate	Total Acidity	Nitrite + Nitrate	Sulfide	AES Dissolved Metals	AES Total Metals	MS Dissolved Metals	MS Total Metals
SW-41	EBT2-255M	SW-41-111709AX	EBT2	11/17/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-41	EBT2-255M	SW-41X-080409AX	EBT2	8/4/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-42	EM-SEEP14	SW-42-111709AF	EBT2	11/17/2009	Field Sample										X		X	
SW-42	EM-SEEP14	SW-42-111709AX	EBT2	11/17/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-42	EM-SEEP14	SW-42X-080409AX	EBT2	8/4/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-43	EM-SEEP15	SW-43-120209AF	EBT2	12/2/2009	Field Sample										X		X	
SW-43	EM-SEEP15	SW-43-120209AX	EBT2	12/2/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-43	EM-SEEP15	SW-43X-080509AX	EBT2	8/5/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-45	EM-SEEP16	SW-45-111709AD	EBT2	11/17/2009	Field Duplicate	X			X	X	X	X	X	X		X		X
SW-45	EM-SEEP16	SW-45-111709AF	EBT2	11/17/2009	Field Sample										X		X	
SW-45	EM-SEEP16	SW-45-111709AG	EBT2	11/17/2009	Field Duplicate										X		X	
SW-45	EM-SEEP16	SW-45-111709AX	EBT2	11/17/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-45	EM-SEEP16	SW-45X-080509AX	EBT2	8/5/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-46	EM-SEEP17	SW-46-111609AF	EBT3	11/17/2009	Field Sample										X		X	
SW-46	EM-SEEP17	SW-46-111609AX	EBT3	11/17/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-46	EM-SEEP17	SW-46X-080509AX	EBT3	8/5/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-47	EM-SEEP18	SW-47-111609-AF	EBT3	11/16/2009	Field Sample										X		X	
SW-47	EM-SEEP18	SW-47-111609-AX	EBT3	11/16/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-47	EM-SEEP18	SW-47X-080509AX	EBT3	8/5/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-48	EM-SEEP19	SW-48-111609AF	EBT4	11/16/2009	Field Sample										X		X	
SW-48	EM-SEEP19	SW-48-111609AX	EBT4	11/16/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-48	EM-SEEP19	SW-48X-080509AX	EBT4	8/5/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-49	EM-SEEP20	SW-49-111609AF	EBT2	11/16/2009	Field Sample										X		X	
SW-49	EM-SEEP20	SW-49-111609AX	EBT2	11/16/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-49	EM-SEEP20	SW-49X-080509AX	EBT2	8/5/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-51	EBT5-60M	SW-51-111809AF	EBT5	11/18/2009	Field Sample										X		X	
SW-51	EBT5-60M	SW-51-111809AX	EBT5	11/18/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-51	EBT5-60M	SW-51X-080409AX	EBT5	8/4/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-71	--	SW-71-111709AF	EBT2	11/17/2009	Field Sample										X		X	
SW-71	--	SW-71-111709AX	EBT2	11/17/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-71	--	SW-71X-080409AX	EBT2	8/4/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-72	--	SW-72-111809AF	EBT5	11/18/2009	Field Sample										X		X	
SW-72	--	SW-72-111809AX	EBT5	11/18/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-72	--	SW-72X-080609AX	EBT5	8/6/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 3-1d
Surface Water and Vernal Pool Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	USGS Location ID	Nobis Sample ID	Study Area	Sample Date	Sample Type	Alkalinity	Specific Conductivity	pH	Total Dissolved Solids	Total Suspended Solids	Chloride, Sulfate	Total Acidity	Nitrite + Nitrate	Sulfide	AES Dissolved Metals	AES Total Metals	MS Dissolved Metals	MS Total Metals
SW-73	--	SW-73-111809AF	EBT5	11/18/2009	Field Sample										X		X	
SW-73	--	SW-73-111809AX	EBT5	11/18/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-73	--	SW-73X-080409AX	EBT5	8/4/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-75	--	SW-75-111609AF	EBT2	11/16/2009	Field Sample										X		X	
SW-75	--	SW-75-111609AX	EBT2	11/16/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-75	--	SW-75X-080509AD	EBT2	8/5/2009	Field Duplicate	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-75	--	SW-75X-080509AX	EBT2	8/5/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-76	--	SW-76X-080509AD	EBT2	8/5/2009	Field Duplicate										X			
SW-76	--	SW-76X-080509AX	EBT2	8/5/2009	Field Sample	X	X	X	X	X	X	X	X	X		X	X	X
SW-77	--	SW-77-111609AF	EBT4	11/16/2009	Field Sample										X		X	
SW-77	--	SW-77-111609AX	EBT4	11/16/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-77	--	SW-77X-080509AX	EBT4	8/5/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-78	--	SW-78-111609AF	EBT3	11/16/2009	Field Sample										X		X	
SW-78	--	SW-78-111609AX	EBT3	11/16/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-78	--	SW-78X-080509AD	EBT3	8/5/2009	Field Duplicate	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-78	--	SW-78X-080509AX	EBT3	8/5/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-79	--	SW-79-111609AF	EBT4	11/16/2009	Field Sample										X		X	
SW-79	--	SW-79-111609AX	EBT4	11/16/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-79	--	SW-79X-080609AX	EBT4	8/6/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-80	--	SW-80-111609AF	EBT4	11/16/2009	Field Sample										X		X	
SW-80	--	SW-80-111609AX	EBT4	11/16/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-80	--	SW-80X-080509AX	EBT4	8/5/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-81	--	SW-81-111709AF	EBT3	11/17/2009	Field Sample										X		X	
SW-81	--	SW-81-111709AX	EBT3	11/17/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-81	--	SW-81X-080509AX	EBT3	8/5/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-82	--	SW-82-111709AF	EBT3	11/17/2009	Field Sample										X		X	
SW-82	--	SW-82-111709AX	EBT3	11/17/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-82	--	SW-82X-080409AX	EBT3	8/4/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-83	--	SW-83-111809AD	EBT3	11/18/2009	Field Duplicate	X			X	X	X	X	X	X		X		X
SW-83	--	SW-83-111809AF	EBT3	11/18/2009	Field Sample										X		X	
SW-83	--	SW-83-111809AG	EBT3	11/18/2009	Field Duplicate										X		X	
SW-83	--	SW-83-111809AX	EBT3	11/18/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-83	--	SW-83X-080609AX	EBT3	8/6/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
SW-84	--	SW-84-111809AF	EBT1	11/18/2009	Field Sample										X		X	

Table 3-1d
Surface Water and Vernal Pool Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	USGS Location ID	Nobis Sample ID	Study Area	Sample Date	Sample Type	Alkalinity	Specific Conductivity	pH	Total Dissolved Solids	Total Suspended Solids	Chloride, Sulfate	Total Acidity	Nitrite + Nitrate	Sulfide	AES Dissolved Metals	AES Total Metals	MS Dissolved Metals	MS Total Metals
SW-84	--	SW-84-111809AX	EBT1	11/18/2009	Field Sample	X			X	X	X	X	X	X		X		X
SW-84	--	SW-84X-080609AX	EBT1	8/6/2009	Field Sample	X	X	X	X	X	X	X	X	X	X	X	X	X
VP-1	--	VP-01X-072909AX	VP-1	7/29/2009	Field Sample	X	X				X	X	X		X	X	X	X
VP-2	--	VP-02X-072809AX	VP-2,3,4	7/28/2009	Field Sample	X	X				X	X	X		X	X	X	X
VP-3	--	VP-03X-072809AD	VP-2,3,4	7/28/2009	Field Duplicate	X	X				X	X	X		X	X	X	X
VP-3	--	VP-03X-072809AX	VP-2,3,4	7/28/2009	Field Sample	X	X				X	X	X		X	X	X	X
VP-4	--	VP-04X-072809AX	VP-2,3,4	7/28/2009	Field Sample	X	X				X	X	X		X	X	X	X

Notes:
-- = Samples do not have a corresponding USGS ID
MS = Mass Spectroscopy
AES = Atomic Emission Spectroscopy
SHB-UR = Schoolhouse Brook Upper Reach
EB-LR = Ely Brook Lower Reach
EB-MR = Ely Brook Middle Reach
EB-UR = Ely Brook Upper Reach
EBT = Ely Brook Tributary (designated by number)
ORB = Ore Roast Bed
VP = Vernal Pool (designated by number)

Table 3-1e
Sediment Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Sample Type	Acid/Base Accounting	AES Total Metals	MS Total Metals	Total Organic Carbon	Paste Conductivity	Paste pH	SPLP Metals	SPLP Mercury
SD-58	SD-58X-080709AX	SHB-UR	8/7/2009	Field Sample	X	X	X	X	X	X		
SD-59	SD-59X-080709AX	SHB-UR	8/7/2009	Field Sample	X	X	X	X	X	X		
SD-60	SD-60X-080709AX	EB-LR	8/7/2009	Field Sample	X	X	X	X	X	X		
SD-61	SD-61X-080709AD	EB-LR	8/7/2009	Field Duplicate	X	X	X	X	X	X		
SD-61	SD-61X-080709AX	EB-LR	8/7/2009	Field Sample	X	X	X	X	X	X		
TD	TD-03X-082809-AX	EB-LR	8/28/2009	Field Sample		X	X					
TD	TD-05X-082809-DX	EB-LR	8/28/2009	Field Sample		X	X					
TE	TE-09X-090109AX	EB-LR	9/1/2009	Field Sample		X	X					
TE	TE-12X-090109BX	EB-LR	9/1/2009	Field Sample		X	X					
TE	TE-15X-090109CX	EB-LR	9/2/2009	Field Sample		X	X					
TF	TF-11X-090209AX	EB-LR	9/2/2009	Field Sample			X					
TF	TF-11X-090909AX	EB-LR	9/2/2009	Field Sample		X						
TF	TF-13X-090209BX	EB-LR	9/2/2009	Field Sample			X					
TF	TF-13X-090909BX	EB-LR	9/2/2009	Field Sample		X						
SD-62	SD-62X-080709AX	EB-MR	8/7/2009	Field Sample	X	X	X	X	X	X		
SD-63	SD-63X-080709AX	EB-MR	8/7/2009	Field Sample	X	X	X	X	X	X		
SD-64	SD-64X-080709AX	EB-UR	8/7/2009	Field Sample	X	X	X	X	X	X		
SD-65	SD-65X-080609AX	EB-UR	8/6/2009	Field Sample	X	X	X	X	X	X		
SD-66	SD-66X-080609AX	EBT2	8/6/2009	Field Sample	X	X	X	X	X	X		
SD-67	SD-67X-080609AX	Pond5	8/6/2009	Field Sample	X	X	X	X	X	X		
SD-68	SD-68X-080609AX	Pond4	8/6/2009	Field Sample	X	X	X	X	X	X		
SD-69	SD-69X-080709AX	Pond1,2,3	8/7/2009	Field Sample	X	X	X	X	X	X		
SD-70	SD-70X-080609AX	Pond1,2,3	8/6/2009	Field Sample	X	X	X	X	X	X		
SD-71	SD-71X-080609AX	Pond4	8/6/2009	Field Sample	X	X	X	X	X	X		
SD-72	SD-72X-080609AX	EBT5	8/6/2009	Field Sample	X	X	X	X	X	X		
SD-73	SD-73X-080609AX	EBT5	8/6/2009	Field Sample	X	X	X	X	X	X	X	X

Notes:
ft bgs = feet below ground surface
MS = Mass Spectroscopy
AES = Atomic Emission Spectroscopy
SPLP = Synthetic Precipitation Leaching Procedure
SHB-UR = Schoolhouse Brook Upper Reach
EB-LR = Ely Brook Lower Reach
EB-MR = Ely Brook Middle Reach
EB-UR = Ely Brook Upper Reach
EBT = Ely Brook Tributary (designated by number)
ORB = Ore Roast Bed

Table 3-1f
Groundwater and Porewater Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Sample Type	Alkalinity	Chloride, Sulfate	Total Acidity	Nitrite + Nitrate	Sulfide	AES Dissolved Metals	AES Total Metals	MS Dissolve d Metals	MS Total Metals	PCB Aroclors	SVOCs	Pesticides	Trace VOCs
BM-01	BM-01-120109AF	UWA	12/1/2009	Field Sample						X		X					
BM-01	BM-01-120109AX	UWA	12/1/2009	Field Sample		X					X		X				
BM-01	BM-01X-081809AX	UWA	8/18/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-01A	MW-01A-081009AX	Smelter/Slag	8/10/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-01A	MW-01A-112009AF	Smelter/Slag	11/20/2009	Field Sample						X		X					
MW-01A	MW-01A-112009AX	Smelter/Slag	11/20/2009	Field Sample		X					X		X				
MW-01B	MW-01B-081009AX	Smelter/Slag	8/10/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-01B	MW-01B-112009AF	Smelter/Slag	11/20/2009	Field Sample						X		X					
MW-01B	MW-01B-112009AX	Smelter/Slag	11/20/2009	Field Sample		X					X		X				
MW-01C	MW-01C-081209AX	Smelter/Slag	8/12/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-01C	MW-01C-112309AF	Smelter/Slag	11/23/2009	Field Sample						X		X					
MW-01C	MW-01C-112309AX	Smelter/Slag	11/23/2009	Field Sample		X					X		X				
MW-02A	MW-02A-081009AX	Smelter/Slag	8/10/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-02A	MW-02A-113009AF	Smelter/Slag	11/30/2009	Field Sample						X		X					
MW-02A	MW-02A-113009AX	Smelter/Slag	11/30/2009	Field Sample		X					X		X	X	X	X	X
MW-02B	MW-02B-081009AX	Smelter/Slag	8/10/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-02B	MW-02B-112009AF	Smelter/Slag	11/20/2009	Field Sample						X		X					
MW-02B	MW-02B-112009AX	Smelter/Slag	11/20/2009	Field Sample		X					X		X				
MW-02C	MW-02C-081209AX	Smelter/Slag	8/12/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-02C	MW-02C-112009AF	Smelter/Slag	11/20/2009	Field Sample						X		X					
MW-02C	MW-02C-112009AX	Smelter/Slag	11/20/2009	Field Sample		X					X		X				
MW-03C	MW-03C-081109AX	ORB	8/11/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-03C	MW-03C-112309AF	ORB	11/23/2009	Field Sample						X		X					
MW-03C	MW-03C-112309AX	ORB	11/23/2009	Field Sample		X					X		X				
MW-04A	MW-04A-081209AX	LWA	8/13/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-04A	MW-04A-112409AF	LWA	11/24/2009	Field Sample						X		X					
MW-04A	MW-04A-112409AX	LWA	11/24/2009	Field Sample		X					X		X				
MW-04C	MW-04C-081209AX	LWA	8/12/2009	Field Sample	X	X	X	X	X	X	X	X	X				

Table 3-1f
Groundwater and Porewater Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Sample Type	Alkalinity	Chloride, Sulfate	Total Acidity	Nitrite + Nitrate	Sulfide	AES Dissolved Metals	AES Total Metals	MS Dissolve d Metals	MS Total Metals	PCB Aroclors	SVOCs	Pesticides	Trace VOCs
MW-04C	MW-04C-112409AF	LWA	11/24/2009	Field Sample						X		X					
MW-04C	MW-04C-112409AX	LWA	11/24/2009	Field Sample		X					X		X				
MW-05A	MW-05A-081109AX	UWA	8/11/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-05A	MW-05A-120109AD	UWA	12/1/2009	Field Duplicate		X					X		X	X	X	X	X
MW-05A	MW-05A-120109AF	UWA	12/1/2009	Field Sample						X		X					
MW-05A	MW-05A-120109AG	UWA	12/1/2009	Field Duplicate						X		X					
MW-05A	MW-05A-120109AX	UWA	12/1/2009	Field Sample		X					X		X	X	X	X	X
MW-05B	MW-05B-081209AD	UWA	8/12/2009	Field Duplicate	X	X	X	X	X	X	X	X	X				
MW-05B	MW-05B-081209AX	UWA	8/12/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-05B	MW-05B-112409AF	UWA	11/24/2009	Field Sample						X		X					
MW-05B	MW-05B-112409AX	UWA	11/24/2009	Field Sample		X					X		X				
MW-05C	MW-05C-081309AX	UWA	8/13/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-05C	MW-05C-112509AF	UWA	11/25/2009	Field Sample						X		X					
MW-05C	MW-05C-112509AX	UWA	11/25/2009	Field Sample		X					X		X				
MW-06A	MW-06A-081209AX	UWA	8/12/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-06A	MW-06A-112509AF	UWA	11/25/2009	Field Sample						X		X					
MW-06A	MW-06A-112509AX	UWA	11/25/2009	Field Sample		X					X		X				
MW-06C	MW-06C-081209AX	UWA	8/12/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-06C	MW-06C-112509AF	UWA	11/25/2009	Field Sample						X		X					
MW-06C	MW-06C-112509AX	UWA	11/25/2009	Field Sample		X					X		X				
MW-07A	MW-07A-081209AX	Background	8/12/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-07A	MW-07A-112509AF	Background	11/25/2009	Field Sample						X		X					
MW-07A	MW-07A-112509AX	Background	11/25/2009	Field Sample		X					X		X				
MW-07C	MW-07C-081209AX	Background	8/12/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-07C	MW-07C-112509AF	Background	11/25/2009	Field Sample						X		X					
MW-07C	MW-07C-112509AX	Background	11/25/2009	Field Sample		X					X		X				
MW-08A	MW-08A-081109AX	UWA	8/11/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-08A	MW-08A-112409AD	UWA	11/24/2009	Field Duplicate		X					X		X				

Table 3-1f
Groundwater and Porewater Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Sample Type	Alkalinity	Chloride, Sulfate	Total Acidity	Nitrite + Nitrate	Sulfide	AES Dissolved Metals	AES Total Metals	MS Dissolve d Metals	MS Total Metals	PCB Aroclors	SVOCs	Pesticides	Trace VOCs
MW-08A	MW-08A-112409AF	UWA	11/24/2009	Field Sample						X		X					
MW-08A	MW-08A-112409AG	UWA	11/24/2009	Field Duplicate						X		X					
MW-08A	MW-08A-112409AX	UWA	11/24/2009	Field Sample		X					X		X				
MW-09A	MW-09A-081209AX	UWA	8/12/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-09A	MW-09A-120209AF	UWA	12/2/2009	Field Sample						X		X					
MW-09A	MW-09A-120209AX	UWA	12/2/2009	Field Sample		X					X		X	X	X	X	X
MW-09C	MW-09C-081309AX	UWA	8/13/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-09C	MW-09C-112409AF	UWA	11/24/2009	Field Sample						X		X					
MW-09C	MW-09C-112409AX	UWA	11/24/2009	Field Sample		X					X		X				
MW-10B	MW-10B-081109AX	Smelter/Slag	8/11/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-10B	MW-10B-112309AF	Smelter/Slag	11/23/2009	Field Sample						X		X					
MW-10B	MW-10B-112309AX	Smelter/Slag	11/23/2009	Field Sample		X					X		X				
MW-10C	MW-10C-081109AX	Smelter/Slag	8/11/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-10C	MW-10C-112309AF	Smelter/Slag	11/23/2009	Field Sample						X		X					
MW-10C	MW-10C-112309AX	Smelter/Slag	11/23/2009	Field Sample		X					X		X				
MW-11A	MW-11A-081109AX	Smelter/Slag	8/11/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-11A	MW-11A-120109AF	Smelter/Slag	12/1/2009	Field Sample						X		X					
MW-11A	MW-11A-120109AX	Smelter/Slag	12/1/2009	Field Sample		X					X		X	X	X	X	X
MW-11C	MW-11C-081109AX	Smelter/Slag	8/11/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-11C	MW-11C-112309AF	Smelter/Slag	11/23/2009	Field Sample						X		X					
MW-11C	MW-11C-112309AX	Smelter/Slag	11/23/2009	Field Sample		X					X		X				
MW-12C	MW-12C-081109AX	UWA	8/11/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-12C	MW-12C-112409AF	UWA	11/24/2009	Field Sample						X		X					
MW-12C	MW-12C-112409AX	UWA	11/24/2009	Field Sample		X					X		X				
MW-13A	MW-13A-081209AX	UWA	8/12/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-13A	MW-13A-112409AF	UWA	11/24/2009	Field Sample						X		X					
MW-13A	MW-13A-112409AX	UWA	11/24/2009	Field Sample		X					X		X				
MW-14A	MW-14A-081109AX	EB-LR	8/11/2009	Field Sample	X	X	X	X	X	X	X	X	X				

Table 3-1f
Groundwater and Porewater Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Sample Type	Alkalinity	Chloride, Sulfate	Total Acidity	Nitrite + Nitrate	Sulfide	AES Dissolved Metals	AES Total Metals	MS Dissolve d Metals	MS Total Metals	PCB Aroclors	SVOCs	Pesticides	Trace VOCs
MW-14A	MW-14A-112309AF	EB-LR	11/23/2009	Field Sample						X		X					
MW-14A	MW-14A-112309AX	EB-LR	11/23/2009	Field Sample		X					X		X				
MW-14C	MW-14C-081309AX	EB-LR	8/13/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-14C	MW-14C-112309AF	EB-LR	11/23/2009	Field Sample						X		X					
MW-14C	MW-14C-112309AX	EB-LR	11/23/2009	Field Sample		X					X		X				
MW-14D	MW-14D-091709AX	EB-LR	9/17/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-14D	MW-14D-091809AX	EB-LR	9/18/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-14D	MW-14D-091809BX	EB-LR	9/18/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-14D	MW-14D-120109AF	EB-LR	12/1/2009	Field Sample						X		X					
MW-14D	MW-14D-120109AX	EB-LR	12/1/2009	Field Sample		X					X		X				
MW-15A	MW-15A-081309AX	EB-TZ	8/13/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-15A	MW-15A-112409AF	EB-TZ	11/24/2009	Field Sample						X		X					
MW-15A	MW-15A-112409AX	EB-TZ	11/24/2009	Field Sample		X					X		X				
MW-16A	MW-16A-081309AX	EB-TZ	8/13/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-16A	MW-16A-112409AF	EB-TZ	11/24/2009	Field Sample						X		X					
MW-16A	MW-16A-112409AX	EB-TZ	11/24/2009	Field Sample		X					X		X				
MW-17A	MW-17A-081409AX	LWA	8/14/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-17A	MW-17A-112409AF	LWA	11/24/2009	Field Sample						X		X					
MW-17A	MW-17A-112409AX	LWA	11/24/2009	Field Sample		X					X		X				
MW-18A	MW-18A-081409AX	UWA	8/14/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-18A	MW-18A-113009AF	UWA	12/1/2009	Field Sample						X		X					
MW-18A	MW-18A-120109AX	UWA	12/1/2009	Field Sample		X					X		X				
MW-19A	MW-19A-081409AX	UWA	8/14/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-19A	MW-19A-113009AF	UWA	11/30/2009	Field Sample						X		X					
MW-19A	MW-19A-113009AX	UWA	11/30/2009	Field Sample		X					X		X	X	X	X	X
MW-19C	MW-19C-081409AX	UWA	8/14/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-19C	MW-19C-112509AF	UWA	11/25/2009	Field Sample						X		X					
MW-19C	MW-19C-112509AX	UWA	11/25/2009	Field Sample		X					X		X				

Table 3-1f
Groundwater and Porewater Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Sample Type	Alkalinity	Chloride, Sulfate	Total Acidity	Nitrite + Nitrate	Sulfide	AES Dissolved Metals	AES Total Metals	MS Dissolve d Metals	MS Total Metals	PCB Aroclors	SVOCs	Pesticides	Trace VOCs
MW-19D	MW-19D-091509AD	UWA	9/15/2009	Field Duplicate	X	X	X	X	X	X	X	X	X				
MW-19D	MW-19D-091509AX	UWA	9/15/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-19D	MW-19D-091509BX	UWA	9/15/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-19D	MW-19D-120209AF	UWA	12/2/2009	Field Sample						X		X					
MW-19D	MW-19D-120209AX	UWA	12/2/2009	Field Sample		X					X		X	X	X	X	X
MW-20A	MW-20A-081409AX	LWA	8/14/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-20A	MW-20A-120109AF	LWA	12/1/2009	Field Sample						X		X					
MW-20A	MW-20A-120109AX	LWA	12/1/2009	Field Sample		X					X		X	X	X	X	X
MW-20C	MW-20C-081309AX	LWA	8/13/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-20C	MW-20C-112309AF	LWA	11/23/2009	Field Sample						X		X					
MW-20C	MW-20C-112309AX	LWA	11/23/2009	Field Sample		X					X		X				
MW-20D	MW-20D-091609AX	LWA	9/16/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-20D	MW-20D-091709AX	LWA	9/17/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-20D	MW-20D-120209AF	LWA	12/2/2009	Field Sample						X		X					
MW-20D	MW-20D-120209AX	LWA	12/2/2009	Field Sample		X					X		X	X	X	X	X
MW-21A	MW-21A-081309AD	LWA	8/13/2009	Field Duplicate	X	X	X	X	X	X	X	X	X				
MW-21A	MW-21A-081309AX	LWA	8/13/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-21A	MW-21A-113009AD	LWA	11/30/2009	Field Duplicate		X					X		X				
MW-21A	MW-21A-113009AF	LWA	11/30/2009	Field Sample						X		X					
MW-21A	MW-21A-113009AG	LWA	11/30/2009	Field Duplicate						X		X					
MW-21A	MW-21A-113009AX	LWA	11/30/2009	Field Sample		X					X		X	X	X	X	X
MW-21C	MW-21C-081409AX	LWA	8/14/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-21C	MW-21C-112409AF	LWA	11/24/2009	Field Sample						X		X					
MW-21C	MW-21C-112409AX	LWA	11/24/2009	Field Sample		X					X		X				
MW-22A	MW-22A-081309AX	Tailing	8/13/2009	Field Sample	X	X	X	X	X	X	X	X	X				
MW-22A	MW-22A-113009AF	Tailing	11/30/2009	Field Sample						X		X					
MW-22A	MW-22A-113009AX	Tailing	11/30/2009	Field Sample		X					X		X	X	X	X	X
MW-23A	MW-23A-081309AX	ORB	8/13/2009	Field Sample	X	X	X	X	X	X	X	X	X				

Table 3-1f
Groundwater and Porewater Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Sample Type	Alkalinity	Chloride, Sulfate	Total Acidity	Nitrite + Nitrate	Sulfide	AES Dissolved Metals	AES Total Metals	MS Dissolve d Metals	MS Total Metals	PCB Aroclors	SVOCs	Pesticides	Trace VOCs
MW-23A	MW-23A-112309AF	ORB	11/23/2009	Field Sample						X		X					
MW-23A	MW-23A-112309AX	ORB	11/23/2009	Field Sample		X					X		X				
PW-01	PW-01X-081709AX	EB-UR	8/17/2009	Field Sample	X	X	X	X	X	X	X	X	X				
PW-02	PW-02X-081809AX	EB-UR	8/18/2009	Field Sample	X	X	X	X	X	X	X	X	X				
PW-03	PW-03X-081809AX	EB-UR	8/18/2009	Field Sample	X	X	X	X	X	X	X	X	X				
PW-04	PW-04X-081809AX	EB-UR	8/18/2009	Field Sample	X	X	X	X	X	X	X	X	X				
PW-05	PW-05X-081709AX	EBT4	8/17/2009	Field Sample	X	X	X	X	X	X	X	X	X				
PW-06	PW-06X-081809AX	EBT4	8/18/2009	Field Sample	X	X	X	X	X	X	X	X	X				
PW-07	PW-07X-081909AD	EBT4	8/19/2009	Field Duplicate	X	X	X	X	X	X	X	X	X				
PW-07	PW-07X-081909AX	EBT4	8/19/2009	Field Sample	X	X	X	X	X	X	X	X	X				

Notes:
PCB = polychlorinated biphenyl
VOC = volatile organic compound
SVOC = semivolatile organic compound
MS = Mass Spectroscopy
AES = Atomic Emission Spectroscopy
SPLP = Synthetic Precipitation Leaching Procedure
UWA = Upper Waste Area
ORB = Ore Roast Bed
LWA = Lower Waste Area
EB-LR = Ely Brook Lower Reach
EB-UR = Ely Brook Upper Reach
TZ = Transition Zone
EBT = Ely Brook Tributary (designated by number)

Table 3-1g
Residential Drinking Water Analytical Sample Summary for Samples Collected by Nobis
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Sample Type	Alkalinity	Chloride, Sulfate	Total Acidity	Nitrite + Nitrate	Sulfide	AES Dissolved Metals	AES Total Metals	MS Dissolved Metals	MS Total Metals
M11LT064	M11LT064-120709AX	Residential	12/7/2009	Field Sample	X	X	X	X	X		X		X
M11LT064	M11LT064-120710AF	Residential	12/7/2009	Field Sample						X		X	
M11LT065	M11LT065-1207090AD	Residential	12/7/2009	Field Duplicate	X	X	X	X	X		X		X
M11LT065	M11LT065-120709AF	Residential	12/7/2009	Field Sample						X		X	
M11LT065	M11LT065-120709AG	Residential	12/7/2009	Field Duplicate						X		X	
M11LT065	M11LT065-120709AX	Residential	12/7/2009	Field Sample	X	X	X	X	X		X		X
M11LT065	M11LT065-041910AX	Residential	4/19/2010	Field Sample							X		X
M11LT19.0	M11LT19.0-120809AX	Residential	12/8/2009	Field Sample	X	X	X	X	X		X		X
M11LT19.0	M11LT19.0-120810AF	Residential	12/8/2009	Field Sample						X		X	
M11LT55.1	M11LT55.1-120709AF	Residential	12/7/2009	Field Sample						X		X	
M11LT55.1	M11LT55.1-120709AX	Residential	12/7/2009	Field Sample	X	X	X	X	X		X		X
M11LT60.0	M11LT60.0-120709AX	Residential	12/7/2009	Field Sample	X	X	X	X	X		X		X
M11LT60.0	M11LT60.0-120710AF	Residential	12/7/2009	Field Sample						X		X	
M11LT63.0	M11LT63.0-120709AX	Residential	12/7/2009	Field Sample	X	X	X	X	X		X		X
M11LT63.0	M11LT63.0-120710AF	Residential	12/7/2009	Field Sample						X		X	

Notes:
MS = Mass Spectroscopy
AES = Atomic Emission Spectroscopy

Table 3-2a
Soil Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top	Bottom	Sample Type	ABA	Geochem	Metals	Oxides	SPLP TAL Metals	TAL Metals
00JH34	00JH34	Smelter Area	10/16/2000	0	0	Field Sample	X	X	X	X		X
00JH34	00JH34 (DIW)	Smelter Area	10/16/2000	0	0	Field Sample					X	
00JH34	00JH34 (ESP)	Smelter Area	10/16/2000	0	0	Field Sample					X	
00JH38	00JH38	Smelter Area	10/16/2000	0	0	Field Sample	X	X	X	X		X
00JH38	00JH38 (DIW)	Smelter Area	10/16/2000	0	0	Field Sample					X	
00JH38	00JH38 (ESP)	Smelter Area	10/16/2000	0	0	Field Sample					X	
01JH31A	01JH31A	LWA	11/10/2001	0	0	Field Sample	X	X	X	X		X
01JH31A	01JH31A (DIW)	LWA	11/10/2001	0	0	Field Sample					X	
01JH31A	01JH31A (ESP)	LWA	11/10/2001	0	0	Field Sample					X	
01JH31B	01JH31B	LWA	11/10/2001	0	0	Field Sample	X	X	X	X		X
01JH31B	01JH31B (DIW)	LWA	11/10/2001	0	0	Field Sample					X	
01JH31B	01JH31B (ESP)	LWA	11/10/2001	0	0	Field Sample					X	
01JH34A-B	01JH34	Smelter Area	11/10/2001	0	0	Composite	X	X	X	X		X
01JH34A-B	01JH34 (ESP)	Smelter Area	11/10/2001	0	0	Composite					X	
01JH34A-B	01JH34 (DIW)	Smelter Area	11/10/2001	0	0	Field Sample					X	
01JH37	01JH37 CORE	Smelter Area	11/10/2001	0	0	Field Sample	X	X	X			X
01JH37	01JH37 RIND	Smelter Area	11/10/2001	0	0	Field Sample	X	X	X			X
02ELY10A-B	02Ely 10A	LWA	10/08/2002	0	0	Composite		X	X		X	X
02ELY10A-B	02Ely 10B	LWA	10/08/2002	0.82	0.82	Composite		X	X		X	X
02ELY11	02Ely 11	Smelter Area	10/08/2002	0	0	Composite		X	X		X	X
02ELY12	02Ely 12	Smelter Area	10/08/2002	0	0	Composite		X	X		X	X
02ELY12	02Ely 12 DUP	Smelter Area	10/08/2002	0	0	Field Duplicate		X	X		X	X
02ELY13	02Ely 13	Smoke Flue	10/08/2002	0	0	Composite		X	X		X	X
02ELY1A	02Ely 1A	UWA	10/08/2002	0	0	Composite		X	X		X	X
02ELY1A	02Ely 1B	UWA	10/08/2002	0.82	0.82	Composite		X	X		X	X
02ELY2A-B	02Ely 2A	UWA	10/08/2002	0	0	Composite		X	X		X	X
02ELY2A-B	02Ely 2A DUP	UWA	10/08/2002	0	0	Field Duplicate		X	X		X	X
02ELY2A-B	02Ely 2B	UWA	10/08/2002	0.82	0.82	Composite		X	X		X	X
02ELY3	02Ely 3	UWA	10/08/2002	0	0	Composite		X	X		X	X
02ELY4A-B	02Ely 4A	UWA	10/08/2002	0	0	Composite		X	X		X	X
02ELY4A-B	02Ely 4B	UWA	10/08/2002	0.82	0.82	Composite		X	X		X	X

Table 3-2a
Soil Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top	Bottom	Sample Type	ABA	Geochem	Metals	Oxides	SPLP TAL Metals	TAL Metals
02ELY5A-B	02Ely 5A	UWA	10/08/2002	0	0	Composite		X	X		X	X
02ELY5A-B	02Ely 5B	UWA	10/08/2002	0.82	0.82	Composite		X	X		X	X
02ELY6A-B	02Ely 6A	UWA	10/08/2002	0	0	Composite		X	X		X	X
02ELY6A-B	02Ely 6B	UWA	10/08/2002	0.82	0.82	Composite		X	X		X	X
02ELY6A-B	02Ely 6B DUP	UWA	10/08/2002	0.82	0.82	Field Duplicate		X	X		X	X
02ELY7A-B	02Ely 7A	LWA	10/08/2002	0	0	Composite		X	X		X	X
02ELY7A-B	02Ely 9A (Dup of 02Ely07A	LWA	10/08/2002	0	0	Field Duplicate		X	X		X	X
02ELY7A-B	02Ely 7B	LWA	10/08/2002	0.82	0.82	Composite		X	X		X	X
02ELY7A-B	02Ely 9B (Dup of 02Ely07B	LWA	10/08/2002	0.82	0.82	Field Duplicate		X	X		X	X
02ELY8A-B-C	02Ely 8A	LWA	10/08/2002	0	0	Field Sample		X	X		X	X
02ELY8A-B-C	02Ely 8B	LWA	10/08/2002	1.15	1.57	Field Sample		X	X		X	X
02ELY8A-B-C	02Ely 8C	LWA	10/08/2002	2.33	2.99	Field Sample		X	X		X	X
BK-07A	ELY-SS-BK-07A (0-3)	Background	10/16/2007	0	0.25	Field Sample						X
BK-07B	ELY-SS-BK-07B (0-3)	Background	10/16/2007	0	0.25	Field Sample						X
BK-07C	ELY-SS-BK-07C (0-4)	Background	10/16/2007	0	0.33	Field Sample						X
BK-08A	ELY-SS-BK-08A (0-10)	Background	10/16/2007	0	0.83	Field Sample						X
BK-08B	ELY-SS-BK-08B (0-7)	Background	10/16/2007	0	0.58	Field Sample						X
BK-08C	ELY-SS-BK-08C (0-12)	Background	10/16/2007	0	1	Field Sample						X
BK-10A	ELY-SS-BK-10A (0-6)	Background	10/16/2007	0	0.5	Field Sample						X
BK-10B	ELY-SS-BK-10B (0-1)	Background	10/16/2007	0	0.08	Field Sample						X
BK-10C	ELY-SS-BK-10C (0-6) DUP	Background	10/16/2007	0	0.5	Field Duplicate						X
BK-10C	ELY-SS-BK-10C (0-6)	Background	10/16/2007	0	0.5	Field Sample						X
BK-14A	ELY-SS-BK-14A (0-1)	Background	10/16/2007	0	0.08	Field Sample						X
BK-14B	ELY-SS-BK-14B (0-8)	Background	10/16/2007	0	0.67	Field Sample						X
BK-14C	ELY-SS-BK-14C (0-1)	Background	10/16/2007	0	0.08	Field Sample						X
BK-15A	ELY-SS-BK-15A (0-2)	Background	10/16/2007	0	0.17	Field Sample						X
BK-15B	ELY-SS-BK-15B (0-0.5)	Background	10/16/2007	0	0.04	Field Sample						X
BK-15C	ELY-SS-BK-15C (0-2.5)	Background	10/16/2007	0	0.21	Field Sample						X
ELY00JH22	Ely00JH22	LWA	06/27/2000	0	0	Composite		X	X			X
ELY00JH24	Ely00JH24	LWA	06/27/2000	0	0	Composite		X	X			X
ELY00JH24	Ely00JH24 DUP	LWA	06/27/2000	0	0	Field Duplicate		X	X			X

Table 3-2a
Soil Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top	Bottom	Sample Type	ABA	Geochem	Metals	Oxides	SPLP TAL Metals	TAL Metals
ES-4_OCHRE	ES-4	UWA	10/08/2002	0	0	Field Sample		X	X		X	X
NF-01	ELY-SS-NF-01 (0-2)	Smelter Area	10/16/2007	0	0.17	Field Sample						X
NF-01	ELY-SS-NF-01 (2-7)	Smelter Area	10/16/2007	0.17	0.58	Field Sample						X
NF-02	ELY-SS-NF-02 (0-8)	Smelter Area	10/16/2007	0	0.67	Field Sample						X
NF-03	ELY-SS-NF-03 (0-4)	Smelter Area	10/16/2007	0	0.33	Field Sample						X
NF-03	ELY-SS-NF-03 (4-12)	Smelter Area	10/16/2007	0.33	1	Field Sample						X
NF-04	ELY-SS-NF-04 (0-4) DUP	Smoke Flue	10/16/2007	0	0.33	Field Duplicate						X
NF-04	ELY-SS-NF-04 (0-4)	Smoke Flue	10/16/2007	0	0.33	Field Sample						X
NF-04	ELY-SS-NF-04 (4-10) DUP	Smoke Flue	10/16/2007	0.33	0.83	Field Duplicate						X
NF-04	ELY-SS-NF-04 (4-10)	Smoke Flue	10/16/2007	0.33	0.83	Field Sample						X
NF-05	ELY-SS-NF-05 (0-3)	LWA	10/16/2007	0	0.25	Field Sample						X
NF-05	ELY-SS-NF-05 (3-11)	LWA	10/16/2007	0.25	0.92	Field Sample						X
NF-06	ELY-SS-NF-06 (0-3)	LWA	10/16/2007	0	0.25	Field Sample						X
NF-06	ELY-SS-NF-06 (3-12)	LWA	10/16/2007	0.25	1	Field Sample						X
NF-07	ELY-SS-NF-07 (0-2)	LWA	10/17/2007	0	0.17	Field Sample						X
NF-07	ELY-SS-NF-07 (2-8)	LWA	10/17/2007	0.17	0.67	Field Sample						X
NF-08	ELY-SS-NF-08 (0-2)	LWA	10/16/2007	0	0.17	Field Sample						X
NF-08	ELY-SS-NF-08 (2-11)	LWA	10/16/2007	0.17	0.92	Field Sample						X
NF-09	ELY-SS-NF-09 (0-1.5)	LWA	10/17/2007	0	0.13	Field Sample						X
NF-09	ELY-SS-NF-09 (1.5-12)	LWA	10/17/2007	0.13	1	Field Sample						X
NF-10	ELY-SS-NF-10 (0-4)	LWA	10/16/2007	0	0.33	Field Sample						X
NF-10	ELY-SS-NF-10 (4-12)	LWA	10/16/2007	0.33	1	Field Sample						X
NF-11	ELY-SS-NF-11 (0-3)	LWA	10/16/2007	0	0.25	Field Sample						X
NF-11	ELY-SS-NF-11 (3-9)	LWA	10/16/2007	0.25	0.75	Field Sample						X
NF-12	ELY-SS-NF-12 (0-2)	LWA	10/19/2007	0	0.17	Field Sample						X
NF-12	ELY-SS-NF-12 (2-9)	LWA	10/19/2007	0.17	0.75	Field Sample						X
NF-13	ELY-SS-NF-13 (0-2.5)	LWA	10/19/2007	0	0.21	Field Sample						X
NF-13	ELY-SS-NF-13 (2.5-12)	LWA	10/19/2007	0.21	1	Field Sample						X
NF-14	ELY-SS-NF-14 (0-3)	UWA	10/18/2007	0	0.25	Field Sample						X
NF-14	ELY-SS-NF-14 (3-12)	UWA	10/18/2007	0.25	1	Field Sample						X
NF-15	ELY-SS-NF-15 (0-2)	UWA	10/18/2007	0	0.17	Field Sample						X

Table 3-2a
Soil Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top	Bottom	Sample Type	ABA	Geochem	Metals	Oxides	SPLP TAL Metals	TAL Metals
NF-15	ELY-SS-NF-15 (2-5)	UWA	10/18/2007	0.17	0.42	Field Sample						X
NF-16	ELY-SS-NF-16 (0-1)	UWA	10/18/2007	0	0.08	Field Sample						X
NF-16	ELY-SS-NF-16 (1-12)	UWA	10/18/2007	0.08	1	Field Sample						X
NF-17	ELY-SS-NF-17 (0-4)	UWA	10/18/2007	0	0.33	Field Sample						X
NF-17	ELY-SS-NF-17 (4-10)	UWA	10/18/2007	0.33	0.83	Field Sample						X
SA-01	ELY-SS-SA-01 (0-2)	Smelter Area	10/16/2007	0	0.17	Field Sample						X
SA-02	ELY-SS-SA-02 (0-3) DUP	Smelter Area	10/16/2007	0	0.25	Field Duplicate						X
SA-02	ELY-SS-SA-02 (0-3)	Smelter Area	10/16/2007	0	0.25	Field Sample						X
SA-03	ELY-SS-SA-03 (0-6)	Smelter Area	10/15/2007	0	0.5	Field Sample						X
SA-04	ELY-SS-SA-04 (0-6)	Smelter Area	10/15/2007	0	0.5	Field Sample						X
SA-05	ELY-SS-SA-05 (0-6)	Smelter Area	10/15/2007	0	0.5	Field Sample						X
SA-06	ELY-SS-SA-06 (0-6)	Smelter Area	10/15/2007	0	0.5	Field Sample						X
SA-07	ELY-SS-SA-07 (0-6)	Smelter Area	10/15/2007	0	0.5	Field Sample						X
SA-08	ELY-SS-SA-08 (0-6)	Smelter Area	10/15/2007	0	0.5	Field Sample						X
SA-09	ELY-SS-SA-09 (0-4)	Smelter Area	10/15/2007	0	0.33	Field Sample						X
SA-14	ELY-SS-SA-14 (0-6)	LWA	10/17/2007	0	0.5	Field Sample						X
SA-15	ELY-SS-SA-15 (0-6) DUP	LWA	10/17/2007	0	0.5	Field Duplicate						X
SA-15	ELY-SS-SA-15 (0-6)	LWA	10/17/2007	0	0.5	Field Sample						X
SA-16	ELY-SS-SA-16 (0-6)	LWA	10/17/2007	0	0.5	Field Sample						X
SA-17	ELY-SS-SA-17 (0-6)	LWA	10/16/2007	0	0.5	Field Sample						X
SA-18	ELY-SS-SA-18 (0-6)	LWA	10/17/2007	0	0.5	Field Sample						X
SA-19	ELY-SS-SA-19 (0-6)	LWA	10/16/2007	0	0.5	Field Sample						X
SA-20	ELY-SS-SA-20 (0-6)	LWA	10/17/2007	0	0.5	Field Sample						X
SA-21	ELY-SS-SA-21 (0-6)	LWA	10/17/2007	0	0.5	Field Sample						X
SA-22	ELY-SS-SA-22 (0-6)	LWA	10/17/2007	0	0.5	Field Sample						X
SA-23	ELY-SS-SA-23 (0-6)	LWA	10/19/2007	0	0.5	Field Sample						X
SA-24	ELY-SS-SA-24 (0-6) DUP	UWA	10/18/2007	0	0.5	Field Duplicate						X
SA-24	ELY-SS-SA-24 (0-6)	UWA	10/18/2007	0	0.5	Field Sample						X
SA-25	ELY-SS-SA-25 (0-6)	UWA	10/18/2007	0	0.5	Field Sample						X
SA-26	ELY-SS-SA-26 (0-6)	UWA	10/18/2007	0	0.5	Field Sample						X
SA-27	ELY-SS-SA-27 (0-6)	UWA	10/18/2007	0	0.5	Field Sample						X

Table 3-2a
Soil Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top	Bottom	Sample Type	ABA	Geochem	Metals	Oxides	SPLP TAL Metals	TAL Metals
SA-28	ELY-SS-SA-28 (0-6)	UWA	10/18/2007	0	0.5	Field Sample						X
SA-29	ELY-SS-SA-29 (0-6)	UWA	10/18/2007	0	0.5	Field Sample						X
SA-30	ELY-SS-SA-30 (0-6)	UWA	10/18/2007	0	0.5	Field Sample						X
SA-31	ELY-SS-SA-31 (0-6)	UWA	10/18/2007	0	0.5	Field Sample						X
SB-01	ELY-QC-3	LWA	12/05/2006	0	4	Field Duplicate					X	
SB-01	ELY-SB-1 (0-4)	LWA	12/05/2006	0	4	Field Sample	X				X	X
SB-01	ELY-SB-1 (4.5-5.6)	LWA	12/05/2006	4.5	5.6	Field Sample	X					X
SB-01_02_03	ELY-SB-1_2_3	LWA	12/07/2006	0	0	Field Sample	X					
SB-02	ELY-SB-2 (0-4)	LWA	12/03/2006	0	4	Field Sample	X					X
SB-02	ELY-SB-2 (6-10)	LWA	12/03/2006	6	10	Field Sample	X					X
SB-03	ELY-QC-1	LWA	12/03/2006	0	4	Field Duplicate	X					
SB-03	ELY-QC-2	LWA	12/03/2006	0	4	Field Duplicate						X
SB-03	ELY-SB-3 (0-4)	LWA	12/03/2006	0	4	Field Sample	X					X
SB-03	ELY-SB-3 (4.5-8)	LWA	12/03/2006	4.5	8	Field Sample	X					X
SB-04	ELY-SB-4 (8-10.6)	UWA	12/02/2006	8	10.6	Field Sample	X					X
SB-05	ELY-SB-5 (8-12)	UWA	11/30/2006	8	12	Field Sample	X					X
SB-05	ELY-SB-5 (16-18)	UWA	11/30/2006	16	18	Field Sample	X					X
SB-06	ELY-SB-6 (0-2)	UWA	12/02/2006	0	2	Field Sample	X					X
SB-06	ELY-SB-6 (2-4)	UWA	12/02/2006	2	4	Field Sample	X					X
SB-07	ELY-SB-7 (6-12)	UWA	12/01/2006	6	12	Field Sample	X					X
SB-07	ELY-SB-7 (22-24)	UWA	12/01/2006	22	24	Field Sample	X					X
SB-07	ELY-SB-7 (27-30)	UWA	12/01/2006	27	30	Field Sample	X					X
SB-07_08	ELY-SB-7_8	UWA	12/07/2006	0	0	Field Sample	X					
SB-08	ELY-SB-8 (0-6)	UWA	12/01/2006	0	6	Field Sample	X					X
SB-08	ELY-SB-8 (6-10)	UWA	12/01/2006	6	10	Field Sample	X					X
TP-01	ELY-TP1 (4-5)	Smelter Area	05/14/2007	4	5	Field Sample	X					X
TP-02B	ELY-TP2B (2-3)	Smelter Area	05/14/2007	2	3	Field Sample	X					X
TP-03A	ELY-TP3A (1.5-2.5)	Smelter Area	05/14/2007	1.5	2.5	Field Sample	X					X
TP-03B	ELY-TP3B (2-3)	Smelter Area	05/14/2007	2	3	Field Sample	X					X
TP-04A	ELY-TP4A (2-3)	LWA	05/14/2007	2	3	Field Sample	X				X	X
TP-06	ELY-TP6 (3-4)	LWA	05/14/2007	3	4	Field Sample	X					X

Table 3-2a
Soil Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top	Bottom	Sample Type	ABA	Geochem	Metals	Oxides	SPLP TAL Metals	TAL Metals
TP-07A	ELY-TP7A (4-5)	LWA	05/14/2007	4	5	Field Sample	X					X
TP-08	ELY-TPQS1	UWA	05/14/2007	2	3	Field Duplicate	X				X	X
TP-08	ELY-TP8 (2-3)	UWA	05/14/2007	2	3	Field Sample	X				X	X
TP-09	ELY-TP9 (3-4)	UWA	05/14/2007	3	4	Field Sample	X					X
TP-10	ELY-TP10 (7-9)	UWA	05/14/2007	7	9	Field Sample	X					X
TP-100	ELY-TP-100 (4-6)	Smelter Area	10/05/2007	4	6	Field Sample						X
TP-103	ELY-TP-103 (1-2)	Smelter Area	10/05/2007	1	2	Field Sample					X	X
TP-104	ELY-TP-104 (0-1) DUP	Smelter Area	10/05/2007	0	1	Field Duplicate	X					
TP-104	ELY-TP-104 (0-1)	Smelter Area	10/05/2007	0	1	Field Sample	X					X
TP-104	ELY-TP-104 (2-3)	Smelter Area	10/05/2007	2	3	Field Sample					X	X
TP-106	ELY-TP-106 (2-3) DUP	Smelter Area	10/05/2007	2	3	Field Duplicate					X	X
TP-106	ELY-TP-106 (2-3)	Smelter Area	10/05/2007	2	3	Field Sample					X	X
TP-108	ELY-TP-108 (1-2)	Smelter Area	10/05/2007	1	2	Field Sample	X				X	X
TP-109	ELY-TP-109 (0-1)	Smelter Area	10/05/2007	0	1	Field Sample	X				X	X
TP-11	ELY-TP11 (4-6)	UWA	05/14/2007	4	6	Field Sample	X					X
TR-01A	ELY-SS-TR-01A (0-1)	Smelter Area	10/15/2007	0	0.08	Field Sample						X
TR-01A	ELY-SS-TR-01A (1-8)	Smelter Area	10/15/2007	0.08	0.67	Field Sample						X
TR-01B	ELY-SS-TR-01B (0-1.5)	Smelter Area	10/15/2007	0	0.13	Field Sample						X
TR-01B	ELY-SS-TR-01B (1.5-8)	Smelter Area	10/15/2007	0.13	0.67	Field Sample						X
TR-01C	ELY-SS-TR-01C (0-2)	Smelter Area	10/15/2007	0	0.17	Field Sample						X
TR-01C	ELY-SS-TR-01C (2-11)	Smelter Area	10/15/2007	0.17	0.92	Field Sample						X
TR-01D	ELY-SS-TR-01D (0-0.5)	Smelter Area	10/15/2007	0	0.04	Field Sample						X
TR-01D	ELY-SS-TR-01D (0.5-10)	Smelter Area	10/15/2007	0.04	0.83	Field Sample						X
TR-02A	ELY-SS-TR-02A (0-1.5)	Smelter Area	10/15/2007	0	0.13	Field Sample						X
TR-02A	ELY-SS-TR-02A (1.5-11)	Smelter Area	10/15/2007	0.13	0.92	Field Sample						X
TR-02B	ELY-SS-TR-02B (0-4)	Smelter Area	10/15/2007	0	0.33	Field Sample						X
TR-02B	ELY-SS-TR-02B (4-11)	Smelter Area	10/15/2007	0.33	0.92	Field Sample						X
TR-02C	ELY-SS-TR-02C (0-3)	Smelter Area	10/15/2007	0	0.25	Field Sample						X
TR-02C	ELY-SS-TR-02C (3-12)	Smelter Area	10/15/2007	0.25	1	Field Sample						X
TR-02D	ELY-SS-TR-02D(0-2) DUP	Smelter Area	10/15/2007	0	0.17	Field Duplicate						X
TR-02D	ELY-SS-TR-02D (0-2)	Smelter Area	10/15/2007	0	0.17	Field Sample						X

Table 3-2a
Soil Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top	Bottom	Sample Type	ABA	Geochem	Metals	Oxides	SPLP TAL Metals	TAL Metals
TR-02D	ELY-SS-TR-02D (2-12) DUP	Smelter Area	10/15/2007	0.17	1	Field Duplicate						X
TR-02D	ELY-SS-TR-02D (2-12)	Smelter Area	10/15/2007	0.17	1	Field Sample						X
TR-03A	ELY-SS-TR-03A (0-0.5)	LWA	10/17/2007	0	0.04	Field Sample						X
TR-03A	ELY-SS-TR-03A (0.5-12)	LWA	10/17/2007	0.04	1	Field Sample						X
TR-03B	ELY-SS-TR-03B (0-2)	LWA	10/17/2007	0	0.17	Field Sample						X
TR-03B	ELY-SS-TR-03B (2-12)	LWA	10/17/2007	0.17	1	Field Sample						X
TR-03C	ELY-SS-TR-03C (0-3)	LWA	10/17/2007	0	0.25	Field Sample						X
TR-03C	ELY-SS-TR-03C (3-12)	LWA	10/17/2007	0.25	1	Field Sample						X
TR-04A	ELY-SS-TR-04A (0-1)	LWA	10/17/2007	0	0.08	Field Sample						X
TR-04A	ELY-SS-TR-04A (1-12)	LWA	10/17/2007	0.08	1	Field Sample						X
TR-04B	ELY-SS-TR-04B (0-1.5)	LWA	10/17/2007	0	0.13	Field Sample						X
TR-04B	ELY-SS-TR-04B (1.5-12)	LWA	10/17/2007	0.13	1	Field Sample						X
TR-04C	ELY-SS-TR-04C (0-3)	LWA	10/17/2007	0	0.25	Field Sample						X
TR-04C	ELY-SS-TR-04C (3-6)	LWA	10/17/2007	0.25	0.5	Field Sample						X
TR-05A	ELY-SS-TR-05A (0-2.5)	LWA	10/17/2007	0	0.21	Field Sample						X
TR-05A	ELY-SS-TR-05A (2.5-9)	LWA	10/17/2007	0.21	0.75	Field Sample						X
TR-05B	ELY-SS-TR-05B (0-1)	LWA	10/17/2007	0	0.08	Field Sample						X
TR-05B	ELY-SS-TR-05B (1-7)	LWA	10/17/2007	0.08	0.58	Field Sample						X
TR-05C	ELY-SS-TR-05C (0-1)	LWA	10/17/2007	0	0.08	Field Sample						X
TR-05C	ELY-SS-TR-05C (1-12)	LWA	10/17/2007	0.08	1	Field Sample						X
TR-05D	ELY-SS-TR-05D (0-3)	LWA	10/17/2007	0	0.25	Field Sample						X
TR-05D	ELY-SS-TR-05D (3-12)	LWA	10/17/2007	0.25	1	Field Sample						X
TR-06A	ELY-SS-TR-06A (0-1)	LWA	10/19/2007	0	0.08	Field Sample						X
TR-06A	ELY-SS-TR-06A (1-12)	LWA	10/19/2007	0.08	1	Field Sample						X
TR-06B	ELY-SS-TR-06B (0-3)	LWA	10/19/2007	0	0.25	Field Sample						X
TR-06B	ELY-SS-TR-06B (3-7)	LWA	10/19/2007	0.25	0.58	Field Sample						X
TR-06C	ELY-SS-TR-06C (0-3)	LWA	10/19/2007	0	0.25	Field Sample						X
TR-06C	ELY-SS-TR-06C (3-12)	LWA	10/19/2007	0.25	1	Field Sample						X
TR-07A	ELY-SS-TR-07A (0-1)	UWA	10/18/2007	0	0.08	Field Sample						X
TR-07A	ELY-SS-TR-07A (1-8)	UWA	10/18/2007	0.08	0.67	Field Sample						X
TR-07B	ELY-SS-TR-07B (0-2)	UWA	10/18/2007	0	0.17	Field Sample						X

Table 3-2a
Soil Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top	Bottom	Sample Type	ABA	Geochem	Metals	Oxides	SPLP TAL Metals	TAL Metals
TR-07B	ELY-SS-TR-07B (2-8)	UWA	10/18/2007	0.17	0.67	Field Sample						X
TR-07C	ELY-SS-TR-07C (0-2)	UWA	10/18/2007	0	0.17	Field Sample						X
TR-07C	ELY-SS-TR-07C (2-12)	UWA	10/18/2007	0.17	1	Field Sample						X
TR-07D	ELY-SS-TR-07D (0-2)	UWA	10/18/2007	0	0.17	Field Sample						X
TR-07D	ELY-SS-TR-07D (2-9)	UWA	10/18/2007	0.17	0.75	Field Sample						X
TR-08A	ELY-SS-TR-08A (0-0.5) DUP	UWA	10/18/2007	0	0.04	Field Duplicate						X
TR-08A	ELY-SS-TR-08A (0-0.5)	UWA	10/18/2007	0	0.04	Field Sample						X
TR-08A	ELY-SS-TR-08A (0.5-12)DUP	UWA	10/18/2007	0.04	1	Field Duplicate						X
TR-08A	ELY-SS-TR-08A (0.5-12)	UWA	10/18/2007	0.04	1	Field Sample						X
TR-08B	ELY-SS-TR-08B (0-3) DUP	UWA	10/18/2007	0	0.25	Field Duplicate						X
TR-08B	ELY-SS-TR-08B (0-3)	UWA	10/18/2007	0	0.25	Field Sample						X
TR-08B	ELY-SS-TR-08B (3-8) DUP	UWA	10/18/2007	0.25	0.67	Field Duplicate						X
TR-08B	ELY-SS-TR-08B (3-8)	UWA	10/18/2007	0.25	0.67	Field Sample						X
TR-08C	ELY-SS-TR-08C (0-5) DUP	UWA	10/18/2007	0	0.42	Field Duplicate						X
TR-08C	ELY-SS-TR-08C (0-5)	UWA	10/18/2007	0	0.42	Field Sample						X
TR-08C	ELY-SS-TR-08C (5-12) DUP	UWA	10/18/2007	0.42	1	Field Duplicate						X
TR-08C	ELY-SS-TR-08C (5-12)	UWA	10/18/2007	0.42	1	Field Sample						X
TR-08D	ELY-SS-TR-08D (0-2) DUP	UWA	10/18/2007	0	0.17	Field Duplicate						X
TR-08D	ELY-SS-TR-08D (0-2)	UWA	10/18/2007	0	0.17	Field Sample						X
TR-08D	ELY-SS-TR-08D (2-12) DUP	UWA	10/18/2007	0.17	1	Field Duplicate						X
TR-08D	ELY-SS-TR-08D (2-12)	UWA	10/18/2007	0.17	1	Field Sample						X
TR-09A	ELY-SS-TR-09A (0-2.5)	UWA	10/18/2007	0	0.21	Field Sample						X
TR-09A	ELY-SS-TR-09A (2.5-12)	UWA	10/18/2007	0.21	1	Field Sample						X
TR-09B	ELY-SS-TR-09B (0-2)	UWA	10/18/2007	0	0.17	Field Sample						X
TR-09B	ELY-SS-TR-09B (2-5)	UWA	10/18/2007	0.17	0.42	Field Sample						X
TR-09C	ELY-SS-TR-09C (0-1.5)	UWA	10/18/2007	0	0.13	Field Sample						X
TR-09C	ELY-SS-TR-09C (1.5-8)	UWA	10/18/2007	0.13	0.67	Field Sample						X
TR-09D	ELY-SS-TR-09D (0-3)	UWA	10/18/2007	0	0.25	Field Sample						X
TR-09D	ELY-SS-TR-09D (3-12)	UWA	10/18/2007	0.25	1	Field Sample						X
TZ-01	ELY-SS-TZ-01 (0-1.5)	Smelter Area	10/16/2007	0	0.13	Field Sample						X
TZ-01	ELY-SS-TZ-01 (1.5-8)	Smelter Area	10/16/2007	0.13	0.67	Field Sample						X

Table 3-2a
Soil Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top	Bottom	Sample Type	ABA	Geochem	Metals	Oxides	SPLP TAL Metals	TAL Metals
TZ-02	ELY-SS-TZ-02 (0-1.5)	Smelter Area	10/16/2007	0	0.13	Field Sample						X
TZ-02	ELY-SS-TZ-02 (1.5-6)	Smelter Area	10/16/2007	0.13	0.5	Field Sample						X
TZ-04	ELY-SS-TZ-04 (0-2) DUP	Smelter Area	10/16/2007	0	0.17	Field Duplicate						X
TZ-04	ELY-SS-TZ-04 (0-2)	Smelter Area	10/16/2007	0	0.17	Field Sample						X
TZ-04	ELY-SS-TZ-04 (2-6) DUP	Smelter Area	10/16/2007	0.17	0.5	Field Duplicate						X
TZ-04	ELY-SS-TZ-04 (2-6)	Smelter Area	10/16/2007	0.17	0.5	Field Sample						X
TZ-05	ELY-SS-TZ-05 (0-1)	Smelter Area	10/16/2007	0	0.08	Field Sample						X
TZ-05	ELY-SS-TZ-05 (1-8)	Smelter Area	10/16/2007	0.08	0.67	Field Sample						X
TZ-05	ELY-SS-TZ-05 (0-1)	Smelter Area	10/23/2007	0	0.08	Field Sample						X
TZ-05	ELY-SS-TZ-05 (1-8)	Smelter Area	10/23/2007	0.08	0.67	Field Sample						X
TZ-06	ELY-SS-TZ-06 (0-1)	Smelter Area	10/16/2007	0	0.08	Field Sample						X
TZ-06	ELY-SS-TZ-06 (1-12)	Smelter Area	10/16/2007	0.08	1	Field Sample						X
TZ-07	ELY-SS-TZ-07 (0-1.5)	Smelter Area	10/16/2007	0	0.13	Field Sample						X
TZ-07	ELY-SS-TZ-07 (1.5-6.5)	Smelter Area	10/16/2007	0.13	0.54	Field Sample						X
TZ-08	ELY-SS-TZ-08 (0-0.5)	Smelter Area	10/16/2007	0	0.04	Field Sample						X
TZ-08	ELY-SS-TZ-08 (0.5-10)	Smelter Area	10/16/2007	0.04	0.83	Field Sample						X
TZ-09	ELY-SS-TZ-09 (0-0.5)	Smelter Area	10/18/2007	0	0.04	Field Sample						X
TZ-09	ELY-SS-TZ-09 (0.5-12)	Smelter Area	10/18/2007	0.04	1	Field Sample						X
TZ-10	ELY-SS-TZ-10 (0-1)	Smelter Area	10/15/2007	0	0.08	Field Sample						X
TZ-10	ELY-SS-TZ-10 (1-10)	Smelter Area	10/15/2007	0.08	0.83	Field Sample						X
TZ-11	ELY-SS-TZ-11 (0-1)	Smelter Area	10/15/2007	0	0.08	Field Sample						X
TZ-11	ELY-SS-TZ-11 (1-5.5)	Smelter Area	10/15/2007	0.08	0.46	Field Sample						X
TZ-12	ELY-SS-TZ-12 (0-3)	Smelter Area	10/18/2007	0	0.25	Field Sample						X
TZ-12	ELY-SS-TZ-12 (3-8)	Smelter Area	10/18/2007	0.25	0.67	Field Sample						X
TZ-15	ELY-SS-TZ-15 (0-3.5)	LWA	10/17/2007	0	0.29	Field Sample						X
TZ-15	ELY-SS-TZ-15 (3.5-12)	LWA	10/17/2007	0.29	1	Field Sample						X
TZ-17	ELY-SS-TZ-17 (0-0.5)	LWA	10/17/2007	0	0.04	Field Sample						X
TZ-17	ELY-SS-TZ-17 (0.5-12)	LWA	10/17/2007	0.04	1	Field Sample						X
TZ-18	ELY-SS-TZ-18 (0-.5)	LWA	10/17/2007	0	0.04	Field Sample						X
TZ-18	ELY-SS-TZ-18 (.5-12)	LWA	10/17/2007	0.04	1	Field Sample						X
TZ-19	ELY-SS-TZ-19 (0-.5)	LWA	10/17/2007	0	0.04	Field Sample						X

Table 3-2a
Soil Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top	Bottom	Sample Type	ABA	Geochem	Metals	Oxides	SPLP TAL Metals	TAL Metals
TZ-19	ELY-SS-TZ-19 (.5-12)	LWA	10/17/2007	0.04	1	Field Sample						X
TZ-23	ELY-SS-TZ-23 (0-2.5)	LWA	10/17/2007	0	0.21	Field Sample						X
TZ-23	ELY-SS-TZ-23 (2.5-12)	LWA	10/17/2007	0.21	1	Field Sample						X
TZ-24	ELY-SS-TZ-24 (0-1)	LWA	10/17/2007	0	0.08	Field Sample						X
TZ-24	ELY-SS-TZ-24 (1-12)	LWA	10/17/2007	0.08	1	Field Sample						X
TZ-25	ELY-SS-TZ-25 (0-3)	LWA	10/17/2007	0	0.25	Field Sample						X
TZ-25	ELY-SS-TZ-25 (3-11)	LWA	10/17/2007	0.25	0.92	Field Sample						X
TZ-26	ELY-SS-TZ-26 (0-1.5)	LWA	10/17/2007	0	0.13	Field Sample						X
TZ-26	ELY-SS-TZ-26 (1.5-12)	LWA	10/17/2007	0.13	1	Field Sample						X
TZ-27	ELY-SS-TZ-27 (0-2.5)	LWA	10/16/2007	0	0.21	Field Sample						X
TZ-27	ELY-SS-TZ-27 (2.5-8)	LWA	10/16/2007	0.21	0.67	Field Sample						X
TZ-28	ELY-SS-TZ-28 (0-0.5)	LWA	10/19/2007	0	0.04	Field Sample						X
TZ-28	ELY-SS-TZ-28 (0.5-9)	LWA	10/19/2007	0.04	0.75	Field Sample						X
TZ-29	ELY-SS-TZ-29 (0-1)	LWA	10/19/2007	0	0.08	Field Sample						X
TZ-29	ELY-SS-TZ-29 (1-9)	LWA	10/19/2007	0.08	0.75	Field Sample						X
TZ-30	ELY-SS-TZ-30 (0-0.5)	LWA	10/19/2007	0	0.04	Field Sample						X
TZ-30	ELY-SS-TZ-30 (0.5-12)	LWA	10/19/2007	0.04	1	Field Sample						X
TZ-31	ELY-SS-TZ-31 (0-3)	LWA	10/19/2007	0	0.25	Field Sample						X
TZ-31	ELY-SS-TZ-31 (3-9)	LWA	10/19/2007	0.25	0.75	Field Sample						X
TZ-32	ELY-SS-TZ-32 (0-2)	LWA	10/19/2007	0	0.17	Field Sample						X
TZ-32	ELY-SS-TZ-32 (2-9)	LWA	10/19/2007	0.17	0.75	Field Sample						X
TZ-33	ELY-SS-TZ-33 (0-2)	LWA	10/18/2007	0	0.17	Field Sample						X
TZ-33	ELY-SS-TZ-33 (2-12)	LWA	10/18/2007	0.17	1	Field Sample						X
TZ-34	ELY-SS-TZ-34 (0-2.5)	UWA	10/18/2007	0	0.21	Field Sample						X
TZ-34	ELY-SS-TZ-34 (2.5-8)	UWA	10/18/2007	0.21	0.67	Field Sample						X
TZ-35	ELY-SS-TZ-35 (0-2)	UWA	10/18/2007	0	0.17	Field Sample						X
TZ-35	ELY-SS-TZ-35 (2-9)	UWA	10/18/2007	0.17	0.75	Field Sample						X
TZ-36	ELY-SS-TZ-36 (0-1.5)	UWA	10/18/2007	0	0.13	Field Sample						X
TZ-36	ELY-SS-TZ-36 (1.5-9)	UWA	10/18/2007	0.13	0.75	Field Sample						X
TZ-37	ELY-SS-TZ-37 (0-2)	UWA	10/18/2007	0	0.17	Field Sample						X
TZ-37	ELY-SS-TZ-37 (2-12)	UWA	10/18/2007	0.17	1	Field Sample						X

Table 3-2a
Soil Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Top	Bottom	Sample Type	ABA	Geochem	Metals	Oxides	SPLP TAL Metals	TAL Metals
TZ-38	ELY-SS-TZ-38 (0-0.5)	UWA	10/18/2007	0	0.04	Field Sample						X
TZ-38	ELY-SS-TZ-38 (0.5-7)	UWA	10/18/2007	0.04	0.58	Field Sample						X
TZ-39	ELY-SS-TZ-39 (0-3)	UWA	10/18/2007	0	0.25	Field Sample						X
TZ-39	ELY-SS-TZ-39 (3-8)	UWA	10/18/2007	0.25	0.67	Field Sample						X
TZ-40	ELY-SS-TZ-40 (0-2)	UWA	10/18/2007	0	0.17	Field Sample						X
TZ-40	ELY-SS-TZ-40 (2-10)	UWA	10/18/2007	0.17	0.83	Field Sample						X
TZ-41	ELY-SS-TZ-41 (0-1.5)	UWA	10/18/2007	0	0.13	Field Sample						X
TZ-41	ELY-SS-TZ-41 (1.5-11)	UWA	10/18/2007	0.13	0.92	Field Sample						X
TZ-42	ELY-SS-TZ-42 (0-2)	Smoke Flue	10/17/2007	0	0.17	Field Sample						X
TZ-42	ELY-SS-TZ-42 (2-12)	Smoke Flue	10/17/2007	0.17	1	Field Sample						X
TZ-43	ELY-SS-TZ-43 (0-2.5)	Smoke Flue	10/17/2007	0	0.21	Field Sample						X
TZ-43	ELY-SS-TZ-43 (2.5-11)	Smoke Flue	10/17/2007	0.21	0.92	Field Sample						X
TZ-44	ELY-SS-TZ-44 (0-3)	Smoke Flue	10/17/2007	0	0.25	Field Sample						X
TZ-44	ELY-SS-TZ-44 (3-12)	Smoke Flue	10/17/2007	0.25	1	Field Sample						X
TZ-45	ELY-SS-TZ-45 (0-2)	Smoke Flue	10/17/2007	0	0.17	Field Sample						X
TZ-45	ELY-SS-TZ-45 (2-12)	Smoke Flue	10/17/2007	0.17	1	Field Sample						X

Notes:
Top/Bottom = sample depth in feet below ground surface.
ABA = acid-base accounting analysis.
SPLP = Synthetic Precipitation Leaching Protocol
TAL = Target Analyte List
Geochem = conventional soil chemistry
UWA = Upper waste area
LWA = Lower waste area

Table 3-2b
Surface Water Analytical Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

USGS Loc ID	Sample ID	Study Area	Sample Date	Geochem	Field Par	Tl TAL Metal	Dis TAL Metal
EB-1030M	SW-18	EB-UR	11/02/2004	X	X	X	X
EB-1080M	EB-1	EB-UR	04/02/2002	X		X	X
EB-1080M	EB-1	EB-UR	04/11/2002	X		X	X
EB-1080M	EB-1	EB-UR	05/21/2002	X		X	X
EB-1080M	EB-1	EB-UR	06/20/2002	X		X	X
EB-1080M	EB-1	EB-UR	07/24/2002	X		X	X
EB-1080M	SW-EB-1A	EB-UR	08/23/2006	X	X	X	X
EB-1430M	SW-20	EB-Background	11/03/2004	X	X	X	X
EB-15M	EB-6	EB-LR	03/28/2002	X		X	X
EB-15M	EB-6	EB-LR	03/31/2002	X		X	X
EB-15M	EB-6	EB-LR	04/02/2002	X	X	X	
EB-15M	EB-6	EB-LR	04/03/2002	X	X	X	
EB-15M	EB-6	EB-LR	04/10/2002	X		X	X
EB-15M	EB-6	EB-LR	05/21/2002	X		X	X
EB-15M	EB-6	EB-LR	06/20/2002	X		X	X
EB-15M	EB-6	EB-LR	07/24/2002	X		X	X
EB-15M	EB-6	EB-LR	08/20/2002	X		X	X
EB-15M	EB-6	EB-LR	09/19/2002	X		X	X
EB-210M	SW-10	EB-LR	11/03/2004	X	X	X	X
EB-30M	SW-09	EB-LR	11/03/2004	X	X	X	X
EB-30M	SW-09	EB-LR	05/02/2007	X	X	X	X
EB-30M	SW-09	EB-LR	05/02/2007	X		X	X
EB-325M	SW-39	EB-LR	05/02/2007	X	X	X	X
EB-405M	SW-33	EB-LR	11/03/2004	X	X	X	X
EB-405M	SW-33	EB-LR	05/02/2007	X	X	X	X
EB-440M	LOC-59	EB-LR	05/03/2001			X	
EB-440M	SW-11	EB-LR	11/03/2004	X	X	X	X
EB-465M	EB-5	EB-LR	04/02/2002	X		X	X
EB-465M	EB-5	EB-LR	04/11/2002	X		X	X
EB-465M	EB-5	EB-LR	05/21/2002	X		X	X
EB-465M	EB-5	EB-LR	06/20/2002	X		X	X
EB-465M	EB-5	EB-LR	06/20/2002	X		X	X
EB-465M	EB-5	EB-LR	07/24/2002	X		X	X
EB-465M	EB-5	EB-LR	08/20/2002	X		X	X
EB-465M	EB-5	EB-LR	09/19/2002	X		X	X
EB-515M	EB5	EB-LR	10/05/2005			X	X
EB-515M	EB5	EB-LR	05/22/2006			X	X
EB-530M	SW-12	EB-LR	11/01/2004	X	X	X	X
EB-530M	SW-12	EB-LR	05/02/2007	X	X	X	X
EB-560M	SW-13	EB-MR	11/01/2004	X	X	X	X
EB-560M	SW-13	EB-MR	05/02/2007	X	X	X	X
EB-600M	SW-EB-3A	EB-MR	08/23/2006	X	X	X	X
EB-610M	LOC-57	EB-MR	05/03/2001			X	
EB-770M	SW-EB-2A	EB-MR	08/23/2006	X	X	X	X
EB-770M	SW-40	EB-MR	05/02/2007	X	X	X	X
EB-815M	SW-17	EB-UR	11/02/2004	X	X	X	X

Table 3-2b
Surface Water Analytical Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

USGS Loc ID	Sample ID	Study Area	Sample Date	Geochem	Field Par	Tl TAL Metal	Dis TAL Metal
EB-815M	SW-17	EB-UR	05/02/2007	X	X	X	X
EB-90M	LOC-49	EB-LR	05/03/2001			X	
EB-90M	LOC-49	EB-LR	05/03/2001			X	
EB-90M	LOC-49	EB-LR	09/05/2001	X		X	X
EB-90M	EB7	EB-LR	10/05/2005			X	X
EB-90M	EB7	EB-LR	10/05/2005			X	X
EB-90M	EB7	EB-LR	05/22/2006			X	X
EB-90M	EB7	EB-LR	05/22/2006			X	X
EB-90M	EB7	EB-LR	06/19/2006	X	X	X	X
EB-90M	EB7	EB-LR	06/23/2006			X	
EB-90M	SW-EB-4A	EB-LR	08/23/2006	X	X	X	X
EB-90M	EB7	EB-LR	04/11/2007			X	X
EBT1-105M	EB-7	EBT1	04/08/2002	X		X	X
EBT1-105M	EB-7	EBT1	04/08/2002	X		X	X
EBT1-105M	EB-7	EBT1	04/11/2002	X		X	X
EBT1-10M	SW-34	EBT1	11/02/2004	X	X	X	X
EBT1-10M	SW-34	EBT1	05/02/2007	X	X	X	X
EBT1-110M	SW-36	EBT1	11/03/2004	X	X	X	X
EBT1-32M	EB6	EBT1	10/05/2005			X	X
EBT1-32M	EB6	EBT1	05/22/2006			X	X
EBT2-120M	EB4	EBT2	10/05/2005			X	X
EBT2-120M	EB4	EBT2	05/22/2006			X	X
EBT2-185M	SW-37	EBT2	11/02/2004	X	X	X	X
EBT2-23M	SW-31	EBT2	11/01/2004	X	X	X	X
EBT2-245M	EBT2-245M	EBT2	06/19/2006	X	X	X	X
EBT2-245M	EBT2-245M	EBT2	06/23/2006			X	
EBT2-255M	SW-41	EBT2	05/03/2007	X	X	X	X
EBT2-265M	EB-2	EBT2	04/02/2002	X		X	X
EBT2-265M	EB-2	EBT2	04/11/2002	X		X	X
EBT2-265M	EB-2	EBT2	05/21/2002	X		X	X
EBT2-315M	SW-16	EBT2	11/03/2004	X	X	X	X
EBT2-383M	EB-2A	EBT2	05/21/2002	X		X	X
EBT2-383M	EB-2A	EBT2	06/20/2002	X		X	X
EBT2-383M	EB-2A	EBT2	07/24/2002	X		X	X
EBT2-383M	EB-2A	EBT2	08/20/2002	X		X	X
EBT2-383M	EB-2A	EBT2	09/19/2002	X		X	X
EBT2-430M	SW-21	EBT2	11/03/2004	X	X	X	X
EBT2-430M	SW-21	EBT2	11/03/2004	X		X	X
EBT2-55M	EB3	EBT2	10/05/2005			X	X
EBT2-55M	EB3	EBT2	05/22/2006			X	X
EBT2-58M	SW-14	EBT2	11/01/2004	X	X	X	X
EBT2-58M	SW-14	EBT2	05/02/2007	X	X	X	X
EBT2-67M	LOC-58	EBT2	05/03/2001			X	
EBT2-78M	EB-3	EBT2	04/02/2002	X		X	X
EBT2-78M	EB-3	EBT2	04/11/2002	X		X	X
EBT2-78M	EB-3	EBT2	04/11/2002	X		X	X

Table 3-2b
Surface Water Analytical Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

USGS Loc ID	Sample ID	Study Area	Sample Date	Geochem	Field Par	Tl TAL Metal	Dis TAL Metal
EBT2-78M	EB-3	EBT2	05/21/2002	X		X	X
EBT2-78M	EB-3	EBT2	06/20/2002	X		X	X
EBT2-78M	EB-3	EBT2	07/24/2002	X		X	X
EBT2-78M	EB-3	EBT2	09/19/2002	X		X	X
EBT2-7M	SW-32	EBT2	11/01/2004	X	X	X	X
EBT2-7M	SW-32	EBT2	05/02/2007	X	X	X	X
EBT3-120M	EB2	EBT3	10/05/2005			X	X
EBT3-120M	EB2	EBT3	05/22/2006			X	X
EBT3-180M	EB1	EBT3	10/05/2005			X	X
EBT3-180M	EB1	EBT3	05/22/2006			X	X
EBT3-60M	SW-30	EBT3	11/01/2004	X	X	X	X
EBT3-60M	SW-30	EBT3	05/02/2007	X	X	X	X
EBT3-84M	EB-4	EBT3	04/02/2002	X		X	X
EBT3-84M	EB-4	EBT3	04/11/2002	X		X	X
EBT3-84M	EB-4	EBT3	05/21/2002	X		X	X
EBT3-84M	EB-4	EBT3	06/20/2002	X		X	X
EBT3-84M	EB-4	EBT3	07/24/2002	X		X	X
EBT3-84M	EB-4	EBT3	08/20/2002	X		X	X
EBT3-84M	EB-4	EBT3	09/19/2002	X		X	X
EBT4-25M	SW-29	EBT4	11/02/2004	X	X	X	X
EBT4-25M	SW-29	EBT4	05/02/2007	X	X	X	X
EBT5-60M	SW-51	EBT5	05/02/2007	X	X	X	X
EM-POND1	SW-POND-1	Pond1	09/19/2006	X	X	X	X
EM-POND1	SW-POND-1	Pond1	05/02/2007		X		X
EM-POND1	SW-POND-1	Pond1	05/10/2007		X		X
EM-POND1	SW-POND-1	Pond1	05/21/2007		X		X
EM-POND1	SW-POND-1	Pond1	05/28/2007		X		X
EM-POND1	SW-POND-1	Pond1	06/04/2007		X		X
EM-POND1	SW-POND-1	Pond1	06/11/2007		X		X
EM-POND2	SW-POND-2	Pond2	09/19/2006	X	X	X	X
EM-POND3	SW-POND-3	Pond3	09/19/2006	X	X	X	X
EM-POND4	SW-POND-4	Pond4	06/19/2006	X	X	X	X
EM-POND4	SW-POND-4	Pond4	06/23/2006	X	X	X	X
EM-POND4	SW-POND-4	Pond4	09/19/2006	X	X	X	X
EM-POND4	SW-POND-4	Pond4	05/02/2007		X		X
EM-POND4	SW-POND-4	Pond4	05/10/2007		X		X
EM-POND4	SW-POND-4	Pond4	05/21/2007		X		X
EM-POND4	SW-POND-4	Pond4	05/28/2007		X		X
EM-POND4	SW-POND-4	Pond4	06/04/2007		X		X
EM-POND4	SW-POND-4	Pond4	06/11/2007		X		X
EM-POND5	SW-POND-5	Pond5	09/19/2006	X	X	X	X
EM-POND5	SW-POND-5	Pond5	05/02/2007		X		X
EM-POND5	SW-POND-5	Pond5	05/10/2007		X		X
EM-POND5	SW-POND-5	Pond5	05/21/2007		X		X
EM-POND6	SW-POND-6	Pond6	09/19/2006	X	X	X	X
EM-SEEP1	ES-1	EBT3	04/04/2002	X		X	X

Table 3-2b
Surface Water Analytical Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

USGS Loc ID	Sample ID	Study Area	Sample Date	Geochem	Field Par	Tl TAL Metal	Dis TAL Metal
EM-SEEP1	ES-1	EBT3	04/11/2002	X		X	X
EM-SEEP10	ES-10	EBT2	04/08/2002	X		X	X
EM-SEEP10	ES-10	EBT2	04/11/2002	X		X	X
EM-SEEP11	ES-11	EBT2	04/08/2002	X		X	X
EM-SEEP12	ES-12	EBT4	04/11/2002	X		X	X
EM-SEEP13	SW-35	EBT1	11/03/2004	X	X	X	X
EM-SEEP14	SW-42	EBT2	05/03/2007	X	X	X	X
EM-SEEP15	SW-43	EBT2	05/03/2007	X	X	X	X
EM-SEEP16	SW-45	EBT2	05/03/2007	X	X	X	X
EM-SEEP17	SW-46	EBT3	05/03/2007	X	X	X	X
EM-SEEP18	SW-47	EBT3	05/03/2007	X	X	X	X
EM-SEEP19	SW-48	EBT4	05/03/2007	X	X	X	X
EM-SEEP2	ES-2	EBT3	04/04/2002	X		X	X
EM-SEEP2	ES-2	EBT3	04/11/2002	X		X	X
EM-SEEP20	SW-49	EBT2	05/02/2007	X	X	X	X
EM-SEEP21	SW-52	EBT3	05/02/2007	X	X	X	X
EM-SEEP3	ES-3	EBT2	04/04/2002	X		X	X
EM-SEEP4	ES-4	EBT2	04/04/2002	X		X	X
EM-SEEP5	ES-5	EBT2	04/04/2002	X		X	X
EM-SEEP6	ES-6	EBT2	04/08/2002	X		X	X
EM-SEEP7	ES-7	EBT2	04/08/2002	X		X	X
EM-SEEP8	ES-8	EBT2	04/08/2002	X		X	X
EM-SEEP9	ES-9	EBT3	04/08/2002	X		X	X
EM-SEEP9	ES-9	EBT3	04/11/2002	X		X	X
OR-11800M	OM14	EBOR	04/09/2007			X	X
OR-11850M	LOC-35	EBOR	05/08/2000	X		X	X
OR-11850M	LOC-35	EBOR	07/19/2000	X		X	X
OR-11850M	LOC-35	EBOR	05/01/2001			X	
OR-11850M	LOC-35	EBOR	09/05/2001	X		X	X
OR-15000M	OR-3	EBOR	03/31/2002	X		X	X
OR-15000M	OR-3	EBOR	04/10/2002	X		X	X
OR-15000M	OR-3	EBOR	05/21/2002	X		X	X
OR-15000M	OR-3	EBOR	06/20/2002	X		X	X
OR-15000M	OR-3	EBOR	07/24/2002	X		X	X
OR-15000M	OR-3	EBOR	08/20/2002	X		X	X
OR-15000M	OR-3	EBOR	09/19/2002	X		X	X
OR-15200M	LOC-56	EBOR	05/03/2001			X	
OR-15200M	LOC-56	EBOR	09/10/2001	X		X	X
OR-17400M	LOC-55	EBOR	09/10/2001	X		X	X
OR-19150M	LOC-54	EBOR	05/03/2001			X	
OR-19150M	LOC-54	EBOR	09/10/2001	X		X	X
OR-19560M	OM13	EBOR	04/09/2007			X	X
OR-22390M	OM12	EBOR	04/09/2007			X	X
OR-22450M	OR-2	EBOR	03/29/2002	X		X	X
OR-22450M	OR-2	EBOR	03/31/2002	X		X	X
OR-22450M	OR-2	EBOR	04/02/2002	X	X	X	

Table 3-2b
Surface Water Analytical Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

USGS Loc ID	Sample ID	Study Area	Sample Date	Geochem	Field Par	Tl TAL Metal	Dis TAL Metal
OR-22450M	OR-2	EBOR	04/03/2002	X	X	X	
OR-22450M	OR-2	EBOR	04/10/2002	X		X	X
OR-22450M	OR-2	EBOR	05/21/2002	X		X	
OR-22450M	OR-2	EBOR	06/20/2002	X		X	X
OR-22450M	OR-2	EBOR	07/24/2002	X		X	X
OR-22450M	OR-2	EBOR	08/20/2002	X		X	X
OR-22450M	OR-2	EBOR	09/19/2002	X		X	X
OR-23200M	SW-OR-3A	EBOR	08/21/2006	X	X	X	X
OR-23630M	SW-28	EBOR	11/04/2004	X	X	X	X
OR-23630M	SW-OR-2A	EBOR	08/21/2006	X	X	X	X
OR-23650M	SW-26	EBOR-Background	11/04/2004	X	X	X	X
OR-24050M	SW-OR-1A	EBOR-Background	08/21/2006	X	X	X	X
OR-24150M	OR-1	EBOR-Background	03/29/2002	X		X	X
OR-24150M	OR-1	EBOR-Background	03/31/2002	X		X	X
OR-24150M	OR-1	EBOR-Background	04/10/2002	X		X	X
OR-24150M	OR-1	EBOR-Background	05/21/2002	X		X	X
OR-24150M	OR-1	EBOR-Background	06/20/2002	X		X	X
OR-24150M	OR-1	EBOR-Background	07/24/2002	X		X	X
OR-24150M	OR-1	EBOR-Background	08/20/2002	X		X	X
OR-24150M	OR-1	EBOR-Background	09/19/2002	X		X	X
OR-24500M	LOC-53	EBOR-Background	05/03/2001			X	
OR-24500M	LOC-53	EBOR-Background	09/10/2001	X		X	X
OR-8350M	LOC-45	EBOR	07/06/2000	X		X	
OR-8350M	LOC-45	EBOR	09/20/2000	X		X	X
OR-8350M	LOC-45	EBOR	05/02/2001			X	
OR-8350M	LOC-45	EBOR	05/02/2001			X	
OR-8350M	LOC-45	EBOR	09/05/2001	X		X	X
ORT-1080M	SW-24	ORT1	11/02/2004	X	X	X	X
ORT-1150M	SW-23	ORT1	11/02/2004	X	X	X	X
ORT-1190M	SW-22	ORT1	11/02/2004	X	X	X	X
SB-1140M	LOC-52	SHB-LR	05/03/2001			X	
SB-1140M	LOC-52	SHB-LR	09/10/2001	X		X	X
SB-1360M	SW-01	SHB-LR	11/03/2004	X	X	X	X
SB-1360M	SW-01	SHB-LR	11/03/2004	X		X	X
SB-1360M	SW-SB-4A	SHB-LR	08/23/2006	X	X	X	X
SB-140M	SW-SB-5A	SHB-LR	08/21/2006	X	X	X	X
SB-20M	SW-27	SHB-LR	11/04/2004	X	X	X	X
SB-20M	SB-20M	SHB-LR	06/19/2006	X	X	X	X
SB-20M	SB-20M	SHB-LR	06/23/2006	X	X	X	X
SB-2400M	SW-SB-3A	SHB-LR	08/22/2006	X	X	X	X
SB-2860M	SB-2860M	SHB-LR	06/19/2006	X	X	X	X
SB-2860M	SB-2860M	SHB-LR	06/23/2006	X	X	X	X
SB-2900M	SW-02	SHB-LR	11/04/2004	X	X	X	X
SB-2920M	SW-03	SHB-LR	11/04/2004	X	X	X	X
SB-2940M	SB-2	SHB-LR	03/28/2002	X		X	X
SB-2940M	SB-2	SHB-LR	03/31/2002	X		X	X

Table 3-2b
Surface Water Analytical Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

USGS Loc ID	Sample ID	Study Area	Sample Date	Geochem	Field Par	Tl TAL Metal	Dis TAL Metal
SB-2940M	SB-2	SHB-LR	04/02/2002	X	X	X	
SB-2940M	SB-2	SHB-LR	04/03/2002	X	X	X	
SB-2940M	SB-2	SHB-LR	04/10/2002	X		X	X
SB-2940M	SB-2	SHB-LR	05/21/2002	X		X	X
SB-2940M	SB-2	SHB-LR	06/20/2002	X		X	X
SB-2940M	SB-2	SHB-LR	07/24/2002	X		X	X
SB-2940M	SB-2	SHB-LR	08/20/2002	X		X	X
SB-2940M	SB-2	SHB-LR	09/19/2002	X		X	X
SB-2960M	LOC-51	SHB-LR	05/03/2001			X	
SB-2960M	LOC-51	SHB-LR	09/10/2001	X		X	X
SB-3020M	SW-04	SHB-UR	11/04/2004	X	X	X	X
SB-3020M	SW-04	SHB-UR	05/02/2007	X	X	X	X
SB-3020M	SW-04	SHB-UR	05/02/2007	X		X	X
SB-3100M	SB9	SHB-UR	10/05/2005			X	X
SB-3100M	SB9	SHB-UR	05/22/2006			X	X
SB-3100M	SB9	SHB-UR	06/19/2006	X	X	X	X
SB-3100M	SB9	SHB-UR	06/23/2006	X	X	X	X
SB-3100M	SB9	SHB-UR	04/11/2007			X	X
SB-3125M	SW-05	SHB-UR	11/04/2004	X	X	X	X
SB-3125M	SW-SB-2A	SHB-UR	08/22/2006	X	X	X	X
SB-3125M	SW-SB-2A	SHB-UR	08/22/2006	X	X	X	X
SB-3245M	SB-3245M	SHB-UR	06/19/2006	X	X	X	X
SB-3245M	SB-3245M	SHB-UR	06/23/2006	X	X	X	X
SB-3250M	SW-06	SHB-UR	11/04/2004	X	X	X	X
SB-3250M	SW-06	SHB-UR	05/02/2007	X	X	X	X
SB-3255M	SB8	SHB-UR	10/05/2005			X	X
SB-3255M	SB8	SHB-UR	05/22/2006			X	X
SB-3255M	SB8	SHB-UR	04/11/2007			X	X
SB-3255M	SB8	SHB-UR	04/11/2007			X	X
SB-3290M	SB-1	SHB-Background	03/28/2002	X		X	X
SB-3290M	SB-1	SHB-Background	03/31/2002	X		X	X
SB-3290M	SB-1	SHB-Background	04/10/2002	X		X	X
SB-3290M	SB-1	SHB-Background	05/21/2002	X		X	X
SB-3290M	SB-1	SHB-Background	06/20/2002	X		X	X
SB-3290M	SB-1	SHB-Background	07/24/2002	X		X	X
SB-3290M	SB-1	SHB-Background	08/20/2002	X		X	X
SB-3290M	SB-1	SHB-Background	09/19/2002	X		X	X
SB-3290M	SW-38	SHB-Background	05/03/2007	X	X	X	X
SB-3300M	LOC-48	SHB-Background	05/03/2001			X	
SB-3300M	LOC-48	SHB-Background	09/05/2001	X		X	X
SB-3510M	SW-07	SHB-Background	11/04/2004	X	X	X	X
SB-35M	SB11	SHB-LR	04/11/2007			X	X
SB-3670M	SB-3670M	SHB-Background	06/19/2006	X	X	X	X
SB-3670M	SB-3670M	SHB-Background	06/23/2006	X	X	X	X
SB-3670M	SW-SB-1A	SHB-Background	08/22/2006	X	X	X	X
SB-540M	SB-3	SHB-LR	03/29/2002	X		X	X

Table 3-2b
Surface Water Analytical Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

USGS Loc ID	Sample ID	Study Area	Sample Date	Geochem	Field Par	Tl TAL Metal	Dis TAL Metal
SB-540M	SB-3	SHB-LR	03/31/2002	X		X	X
SB-540M	SB-3	SHB-LR	04/10/2002	X		X	X
SB-540M	SB-3	SHB-LR	05/21/2002	X		X	X
SB-540M	SB-3	SHB-LR	06/20/2002	X		X	X
SB-540M	SB-3	SHB-LR	07/24/2002	X		X	X
SB-540M	SB-3	SHB-LR	08/20/2002	X		X	X
SB-540M	SB-3	SHB-LR	08/20/2002	X		X	X
SB-540M	SB-3	SHB-LR	09/19/2002	X		X	X
SBT1-57M	LOC-50	SBT1	05/03/2001			X	
SBT1-57M	LOC-50	SBT1	09/10/2001	X		X	X
SBT1-6M	SW-25	SBT1	11/04/2004	X	X	X	X

Notes:
Geochem = conventional aqueous geochemical parameters
Tl/Dis = total or dissolved total analyte list metals analysis
Geochem = conventional aqueous geochemical parameters
EB-LR = Ely Brook Lower Reach
EB-MR = Ely Brook Middle Reach
EB-UR = Ely Brook Upper Reach
EBT = Ely Brook Tributary [designated by number]
SHB = Schoolhouse Brook Upper Reach
SHB-LR = Schoolhouse Brook Lower Reach
EBOR = East Branch of the Ompomponoosuc River
SBT = tributary to Schoolhouse Brook [designated by number]
ORT = tributary to EBOR [designated by number]

Table 3-2c
Sediment Analytical Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Depth	AVS/SEM	CEC	Geochem	Grain Size	TAL Metals
EB-1430M	SED-20A	EB-Background	11/03/2004	0.25		X			X
EB-1430M	SED-20C	EB-Background	11/03/2004	0.25	X	X			X
EB-1430M	SED-20D	EB-Background	11/03/2004	0.25		X			X
EB-1030M	SED-18A	EB-UR	11/02/2004	0.25		X			X
EB-1030M	SED-18C	EB-UR	11/02/2004	0.25	X	X			X
EB-1030M	SED-18D	EB-UR	11/02/2004	0.25		X			X
EB-1030M	SED-18E	EB-UR	11/02/2004	0.25		X			X
EB-1080M	EB-1080M	EB-UR	06/20/2006	0					X
EB-1080M	SED-EB-1B	EB-UR	08/23/2006	0.5	X		X	X	X
EB-560M	SED-13A	EB-UR	11/01/2004	0.25		X			X
EB-560M	SED-13C	EB-UR	11/01/2004	0.25	X	X			X
EB-600M	SED-EB-3B	EB-UR	08/23/2006	0.5	X		X	X	X
EB-770M	SED-40C	EB-UR	10/23/2007	0.25			X		X
EB-770M	SED-EB-2B	EB-UR	08/23/2006	0.5			X		X
EB-770M	SED-EB-2B	EB-UR	08/23/2006	0.5	X		X	X	X
EB-815M	SED-17C	EB-UR	11/02/2004	0.25		X			X
EB-815M	SED-17C	EB-UR	11/02/2004	0.25	X	X			X
EB-815M	SED-17C	EB-UR	10/23/2007	0.25			X		X
EB-865M	EB-865M	EB-UR	06/20/2006	0					X
SED-57C	SED-57C	EB-UR	10/23/2007	0.25			X		X
EB-405M	SED-33A	EB-MR	11/03/2004	0.25		X			X
EB-405M	SED-33C	EB-MR	11/03/2004	0.25		X			X
EB-405M	SED-33C	EB-MR	11/03/2004	0.25	X	X			X
EB-405M	SED-33D	EB-MR	11/03/2004	0.25		X			X
EB-405M	SED-33E	EB-MR	11/03/2004	0.25		X			X
EB-440M	SED-11A	EB-MR	11/03/2004	0.25		X			X
EB-440M	SED-11C	EB-MR	11/03/2004	0.25	X	X			X
EB-440M	SED-11D	EB-MR	11/03/2004	0.25		X			X
EB-440M	SED-11E	EB-MR	11/03/2004	0.25		X			X
EB-515M	EB-515M	EB-MR	06/20/2006	0					X
EB-530M	SED-12A	EB-MR	11/01/2004	0.25		X			X
EB-530M	SED-12C	EB-MR	11/01/2004	0.25	X	X			X
EB-530M	SED-12D	EB-MR	11/01/2004	0.25		X			X
EB-530M	SED-12E	EB-MR	11/01/2004	0.25		X			X
TZ-20	ELY-SS-TZ-20 (0-1)	EB-MR	10/17/2007	0-0.08					X
TZ-20	ELY-SS-TZ-20 (1-12)	EB-MR	10/17/2007	0.08-1					X
TZ-21	ELY-SS-TZ-21 (0-5)	EB-MR	10/17/2007	0-0.42					X
TZ-21	ELY-SS-TZ-21 (5-12)	EB-MR	10/17/2007	0.42-1					X
TZ-22	ELY-SS-TZ-22 (0-2)	EB-MR	10/17/2007	0-0.17					X
TZ-22	ELY-SS-TZ-22 (2-10)	EB-MR	10/17/2007	0.17-0.83					X
EB-190M	EB-190M	EB-LR	06/20/2006	0					X
EB-20M	SED-EB	EB-LR	08/23/2006	0.5			X		X
EB-210M	SED-10A	EB-LR	11/03/2004	0.25		X			X
EB-210M	SED-10B	EB-LR	11/03/2004	0.25		X			X
EB-210M	SED-10C	EB-LR	11/03/2004	0.25	X	X			X

Table 3-2c
Sediment Analytical Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Depth	AVS/SEM	CEC	Geochem	Grain Size	TAL Metals
EB-210M	SED-10D	EB-LR	11/03/2004	0.25		X			X
EB-210M	SED-10E	EB-LR	11/03/2004	0.25		X			X
EB-30M	SED-09A	EB-LR	11/03/2004	0.25		X			X
EB-30M	SED-09B	EB-LR	11/03/2004	0.25		X			X
EB-30M	SED-09C	EB-LR	11/03/2004	0.25	X	X			X
EB-30M	SED-09C	EB-LR	11/03/2004	0.25	X	X			X
EB-30M	SED-09D	EB-LR	11/03/2004	0.25		X			X
EB-30M	SED-09E	EB-LR	11/03/2004	0.25		X			X
EB-90M	SED-EB-4B	EB-LR	08/23/2006	0.5			X		X
EB-90M	SED-EB-4B	EB-LR	08/23/2006	0.5	X		X	X	X
SA-10	ELY-SS-SA-10 (0-6)	EB-LR	10/17/2007	0-0.5					X
SA-11	ELY-SS-SA-11 (0-6)	EB-LR	10/17/2007	0-0.6					X
SA-12	ELY-SS-SA-12 (0-6) DUP	EB-LR	10/17/2007	0-0.7					X
SA-12	ELY-SS-SA-12 (0-6)	EB-LR	10/17/2007	0-0.8					X
SA-13	ELY-SS-SA-13 (0-6)	EB-LR	10/17/2007	0-0.9					X
TR-03A	ELY-SS-TR-03A (0-0.5)	EB-LR	10/17/2007	0-0.04					X
TR-03A	ELY-SS-TR-03A (0.5-12)	EB-LR	10/17/2007	0.04-1					X
TR-03B	ELY-SS-TR-03B (0-2)	EB-LR	10/17/2007	0-0.17					X
TR-03B	ELY-SS-TR-03B (2-12)	EB-LR	10/17/2007	0.17-1					X
TZ-13	ELY-SS-TZ-13 (0-4)	EB-LR	10/17/2007	0-0.33					X
TZ-13	ELY-SS-TZ-13 (4-12)	EB-LR	10/17/2007	0.33-1					X
TZ-14	ELY-SS-TZ-14 (0-4)	EB-LR	10/17/2007	0-0.33					X
TZ-14	ELY-SS-TZ-14 (4-12)	EB-LR	10/17/2007	0.33-1					X
TZ-16	ELY-SS-TZ-16 (0-4)	EB-LR	10/17/2007	0-0.33					X
TZ-16	ELY-SS-TZ-16 (4-12)	EB-LR	10/17/2007	0.33-1					X
EBT1-10M	SED-34A	EBT1	11/02/2004	0.25		X			X
EBT1-10M	SED-34C	EBT1	11/02/2004	0.25	X	X			X
EBT1-10M	SED-34D	EBT1	11/02/2004	0.25		X			X
EBT1-110M	SED-36C	EBT1	11/03/2004	0.25		X			X
EBT1-110M	SED-36C	EBT1	11/03/2004	0.25	X	X			X
EM-SEEP13	SED-35C	EBT1	11/03/2004	0.25	X	X			X
EBT2-185M	SED-37C	EBT2	11/02/2004	0.25	X	X			X
EBT2-23M	SED-31A	EBT2	11/01/2004	0.25		X			X
EBT2-23M	SED-31B	EBT2	11/01/2004	0.25		X			X
EBT2-23M	SED-31C	EBT2	11/01/2004	0.25	X	X			X
EBT2-23M	SED-31D	EBT2	11/01/2004	0.25		X			X
EBT2-315M	SED-16C	EBT2	11/03/2004	0.25	X	X			X
EBT2-430M	SED-21C	EBT2	11/03/2004	0.25		X			X
EBT2-430M	SED-21C	EBT2	11/03/2004	0.25	X	X			X
EBT2-58M	SED-14A	EBT2	11/01/2004	0.25		X			X
EBT2-58M	SED-14C	EBT2	11/01/2004	0.25	X	X			X
EBT2-58M	SED-14D	EBT2	11/01/2004	0.25		X			X
EBT2-7M	SED-32A	EBT2	11/01/2004	0.25		X			X
EBT2-7M	SED-32C	EBT2	11/01/2004	0.25	X	X			X
EBT2-7M	SED-32D	EBT2	11/01/2004	0.25		X			X

Table 3-2c
Sediment Analytical Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Depth	AVS/SEM	CEC	Geochem	Grain Size	TAL Metals
EM-SEEP14	SED-42C	EBT2	10/23/2007	0.25			X		X
EM-SEEP16	SED-45C	EBT2	10/23/2007	0.25			X		X
EBT3-60M	SED-30A	EBT3	11/01/2004	0.25		X			X
EBT3-60M	SED-30B	EBT3	11/01/2004	0.25		X			X
EBT3-60M	SED-30C	EBT3	11/01/2004	0.25	X	X			X
EBT3-60M	SED-30D	EBT3	11/01/2004	0.25		X			X
EM-SEEP17	SED-46C	EBT3	10/23/2007	0.25			X		X
EM-SEEP18	SED-47C	EBT3	10/23/2007	0.25			X		X
SED-53C	SED-53C	EBT3	10/23/2007	0.25			X		X
SED-54C	SED-54C	EBT3	10/23/2007	0.25			X		X
EBT4-25M	SED-29A	EBT4	11/02/2004	0.25		X			X
EBT4-25M	SED-29C	EBT4	11/02/2004	0.25		X			X
EBT4-25M	SED-29C	EBT4	11/02/2004	0.25	X	X			X
EBT4-25M	SED-29D	EBT4	11/02/2004	0.25		X			X
EM-SEEP19	SED-48C	EBT4	10/23/2007	0.25			X		X
SED-55C	SED-55C	EBT4	10/23/2007	0.25			X		X
SED-55C	SED-55C	EBT4	10/23/2007	0.25			X		X
SED-56C	SED-56C	EBT4	10/23/2007	0.25			X		X
SED-51C	SED-51C	EBT5	10/23/2007	0.25			X		X
EM-POND1	SED-POND-1	Pond1	09/19/2006	0.5			X		X
EM-POND2	SED-POND-2	Pond2	09/19/2006	0.5			X		X
EM-POND3	SED-POND-3	Pond3	09/19/2006	0.5			X		X
EM-POND4	SED-POND-4	Pond4	09/19/2006	0.5			X		X
EM-POND5	SED-POND-5	Pond5	09/19/2006	0.5			X		X
EM-POND6	SED-POND-6	Pond6	09/19/2006	0.5			X		X
SB-3300M	LOC-48	SHB-Background	09/10/2001	0					X
SB-3510M	SED-07A	SHB-Background	11/04/2004	0.25		X			X
SB-3510M	SED-07B	SHB-Background	11/04/2004	0.25		X			X
SB-3510M	SED-07C	SHB-Background	11/04/2004	0.25	X	X			X
SB-3510M	SED-07C	SHB-Background	11/04/2004	0.25	X	X			X
SB-3670M	SB-3670M	SHB-Background	06/20/2006	0					X
SB-3670M	SED-SB-1B	SHB-Background	08/22/2006	0.5	X		X	X	X
SBT1-6M	SED-25A	SBT1	11/04/2004	0.25		X			X
SBT1-6M	SED-25B	SBT1	11/04/2004	0.25		X			X
SBT1-6M	SED-25C	SBT1	11/04/2004	0.25		X			X
SBT1-6M	SED-25C	SBT1	11/04/2004	0.25	X	X			X
SBT1-6M	SED-25D	SBT1	11/04/2004	0.25		X			X
SB-3020M	SED-04A	SHB-UR	11/04/2004	0.25		X			X
SB-3020M	SED-04C	SHB-UR	11/04/2004	0.25	X	X			X
SB-3020M	SED-04D	SHB-UR	11/04/2004	0.25		X			X
SB-3020M	SED-04E	SHB-UR	11/04/2004	0.25		X			X
SB-3125M	SB-3125M	SHB-UR	06/20/2006	0					X
SB-3125M	SED-05A	SHB-UR	11/04/2004	0.25		X			X
SB-3125M	SED-05C	SHB-UR	11/04/2004	0.25	X	X			X
SB-3125M	SED-05D	SHB-UR	11/04/2004	0.25		X			X

Table 3-2c
Sediment Analytical Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Depth	AVS/SEM	CEC	Geochem	Grain Size	TAL Metals
SB-3250M	SED-06A	SHB-UR	11/04/2004	0.25		X			X
SB-3250M	SED-06C	SHB-UR	11/04/2004	0.25	X	X			X
SB-3250M	SED-06D	SHB-UR	11/04/2004	0.25		X			X
SB-3260M	SED-SB	SHB-UR	08/23/2006	0.5			X		X
SB-1140M	LOC-52	SHB-LR	09/10/2001	0					X
SB-1360M	SED-01A	SHB-LR	11/03/2004	0.25		X			X
SB-1360M	SED-01C	SHB-LR	11/03/2004	0.25	X	X			X
SB-1360M	SED-01D	SHB-LR	11/03/2004	0.25		X			X
SB-1360M	SED-SB-4B	SHB-LR	08/23/2006	0.5	X		X	X	X
SB-140M	SB-140M	SHB-LR	06/20/2006	0					X
SB-140M	SED-SB-5B	SHB-LR	08/22/2006	0.5	X		X	X	X
SB-140M	SED-SB-5B	SHB-LR	08/22/2006	0.5	X		X	X	X
SB-20M	SED-27A	SHB-LR	11/04/2004	0.25		X			X
SB-20M	SED-27B	SHB-LR	11/04/2004	0.25		X			X
SB-20M	SED-27C	SHB-LR	11/04/2004	0.25		X			X
SB-20M	SED-27C	SHB-LR	11/04/2004	0.25	X	X			X
SB-20M	SED-27D	SHB-LR	11/04/2004	0.25		X			X
SB-2400M	SB-2400M	SHB-LR	06/20/2006	0					X
SB-2400M	SED-SB-3B	SHB-LR	08/22/2006	0.5	X		X	X	X
SB-2900M	SED-02A	SHB-LR	11/04/2004	0.25		X			X
SB-2900M	SED-02C	SHB-LR	11/04/2004	0.25	X	X			X
SB-2900M	SED-02D	SHB-LR	11/04/2004	0.25		X			X
SB-2900M	SED-02E	SHB-LR	11/04/2004	0.25		X			X
SB-2920M	SED-03A	SHB-LR	11/04/2004	0.25		X			X
SB-2920M	SED-03C	SHB-LR	11/04/2004	0.25	X	X			X
SB-2920M	SED-03D	SHB-LR	11/04/2004	0.25		X			X
OR-23650M	SED-26A	EBOR-Background	11/04/2004	0.25		X			X
OR-23650M	SED-26B	EBOR-Background	11/04/2004	0.25		X			X
OR-23650M	SED-26C	EBOR-Background	11/04/2004	0.25	X	X			X
OR-23650M	SED-26D	EBOR-Background	11/04/2004	0.25		X			X
OR-24050M	OR-24050M	EBOR-Background	06/21/2006	0					X
OR-24050M	SED-OR-1B	EBOR-Background	08/22/2006	0.5	X		X	X	X
OR-24500M	LOC-53	EBOR-Background	09/10/2001	0					X
ORT-1080M	SED-24A	ORT1	11/02/2004	0.25		X			X
ORT-1080M	SED-24C	ORT1	11/02/2004	0.25	X	X			X
ORT-1080M	SED-24D	ORT1	11/02/2004	0.25		X			X
ORT-1150M	SED-23A	ORT1	11/02/2004	0.25		X			X
ORT-1150M	SED-23C	ORT1	11/02/2004	0.25	X	X			X
ORT-1150M	SED-23D	ORT1	11/02/2004	0.25		X			X
ORT-1190M	SED-22A	ORT1	11/02/2004	0.25		X			X
ORT-1190M	SED-22C	ORT1	11/02/2004	0.25	X	X			X
ORT-1190M	SED-22D	ORT1	11/02/2004	0.25		X			X
OR-11850M	LOC-35	EBOR	07/19/2000	0	X		X	X	X
OR-15200M	LOC-56	EBOR	09/10/2001	0					X
OR-20200M	OR-20200M	EBOR	06/21/2006	0					X

Table 3-2c
Sediment Analytical Sample Summary for Samples Collected by URS and USGS Prior to 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location	Sample ID	Study Area	Sample Date	Depth	AVS/SEM	CEC	Geochem	Grain Size	TAL Metals
OR-22320M	OR-22320M	EBOR	06/21/2006	0					X
OR-23200M	OR-23200M	EBOR	06/21/2006	0					X
OR-23200M	SED-OR-3B	EBOR	08/22/2006	0.5	X		X	X	X
OR-23630M	SED-28A	EBOR	11/04/2004	0.25		X			X
OR-23630M	SED-28B	EBOR	11/04/2004	0.25		X			X
OR-23630M	SED-28C	EBOR	11/04/2004	0.25	X	X			X
OR-23630M	SED-28D	EBOR	11/04/2004	0.25		X			X
OR-23630M	SED-28E	EBOR	11/04/2004	0.25		X			X
OR-8350M	LOC-45	EBOR	10/02/2000	0	X				X
OR-8350M	LOC-45	EBOR	09/05/2001	0					X

Notes:
Depth = Depth below stream bottom in feet
AVS/SEM = acid volatile sulfide/simultaneously extracted metals analysis
CEC = cation exchange capacity analysis
Geochem = conventional aqueous geochemical parameters
EB-LR = Ely Brook Lower Reach
EB-MR = Ely Brook Middle Reach
EB-UR = Ely Brook Upper Reach
EBT = Ely Brook Tributary [designated by number]
SHB-UR = Schoolhouse Brook Upper Reach
SHB-LR = Schoolhouse Brook Lower Reach
EBOR = East Branch of the Ompomponoosuc River
SBT = tributary to Schoolhouse Brook [designated by number]
ORT = tributary to EBOR [designated by number]

Table 5-1
2009 Packer Sampling Specific Capacity Testing Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Name	Static Head Annulus (Top of Riser)	Static Head Riser (Top of Riser)	Final Head Annulus (Top of Riser)	Final Head Riser (Top of Riser)	Change in Head Annulus (ft)	Change in Head Riser (ft)	Time Elapsed (min)	Volume Purged (gal)	Avg. Pumping Rate (gpm)	Specific Capacity (gpm/ft)	Comments
MW-14D/52 - 62	4.39	3.58	4.40	52.30	-0.01	-48.72	10	15	1.50	0.0308	Interval purged dry during testing
MW-14D/75 - 85	3.81	6.25	3.81	71.00	0.00	-64.75	15	20	1.33	0.0206	Interval purged dry during testing
MW-14D/98 - 108	4.45	5.35	10.35	18.15	-5.90	-12.80	30	80	2.67	0.2083	
MW-19D/36 - 46	18.36	17.80	18.38	30.14	-0.02	-12.34	31	55	1.77	0.1438	
MW-19D/48 - 58	--	--	--	--	--	--	--	--	--	--	Interval purged dry during testing; insufficient data collected to perform calculations
MW-19D/68 - 78	17.84	17.80	19.27	53.50	-1.43	-35.70	29	35	1.21	0.0338	
MW-19D/104 - 114	17.35	14.04	17.72	94.40	-0.37	-80.36	31	45	1.45	0.0181	Interval purged dry during testing
MW-20D/30 - 40	--	--	--	--	--	--	--	--	--	--	Interval purged dry during testing; insufficient data collected to perform calculations
MW-20D/50 - 60	--	--	--	--	--	--	--	--	--	--	Interval purged dry during testing; insufficient data collected to perform calculations
MW-20D/80 - 85	33.50	26.50	28.80	67.70	4.70	-41.20	31	60	1.94	0.0470	Interval purged dry during testing
MW-20D/100 - 110	26.72	25.58	25.68	82.55	1.04	-56.97	15	15	1.00	0.0176	Interval purged dry during testing
MW-20D/110 - 120	17.01	14.38	17.77	89.35	-0.76	-74.97	20	20	1.00	0.0133	Interval purged dry during testing

Notes:
ft = feet; min = minute; gal = gallons
gpm = gallons per minute
gpm/ft = gallons per minute per foot

Table 5-2
Soil Geotechnical Analytical Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	GT-P04	GT-P07	GT-P07	GT-P08	GT-P08	GT-P09	GT-P11	GT-P11	GT-P12	GT-EBS	GT-FM1	GT-RB1
Station ID:	GT-P04-110409AX	GT-P07-110409AX	GT-P07-110409AX	GT-P08-110409AX	GT-P08-110409BX	GT-P09-110409BX	GT-P11-110409AX	GT-P11-110409BX	GT-P12-110409AX	GT-EBS-110409AX	GT-FM1-110409AX	GT-RB1-110409AX
Sample Date:	11/4/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009
Parameter												
Grain Size Analysis:												
% cobble	--	--	--	--	--	--	--	--	--	--	--	--
% gravel	5.5	33.4	9.70	19.60	14.00	7.30	22.00	4.70	2.70	19.10	0.4	4.40
% sand	60.3	47.8	66.50	62.50	55.50	71.10	54.40	70.10	67.30	73.70	54.9	61.30
% silt & clay	34.2	18.8	23.80	17.90	30.50	21.60	23.60	25.20	30.00	7.20	44.7	34.30
Specific Gravity	NM	NM	NM	2.75	NM	NM	2.79	NM	NM	2.79	NM	NM
Standard Proctor Test	NM	*	NM	*	*	NM	*	*	NM	*	NM	NM
Shear Tests	NM	*	NM	*	*	NM	*	*	NM	*	NM	NM

Notes:
1. NM = not measured

Table 5-3
Surface Water Flow and Metal Loading Estimates by Nobis for August 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	SW-04		SW-09		SW-13		SW-17		SW-29		SW-32	
Station ID:	SW-04X-080709AX	Flow Rate	SW-09X-080709AX	Flow Rate	SW-13X-080609AX	Flow Rate	SW-17X-080409AX	Flow Rate	SW-29X-080409AX	Flow Rate	SW-32X-080609AX	Flow Rate
Sample Date:	8/7/2009	9124	8/7/2009	736	8/6/2009	150	8/4/2009	100	8/4/2009	20	8/6/2009	673
	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)
Total Metals												
Aluminum	394 U	0.0	2270	20.1	276 U	0.0	200 U	0.0	3600	0.9	4990	40.4
Antimony	2 U	0.0	2 U	0.0	2 U	0.0	2 U	0.0	2 U	0.0	2 U	0.0
Arsenic	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0
Barium	17	1.9	16.6	0.1	15.7	0.0	14.3 J	0.0	34.5 J	0.0	13.2	0.1
Beryllium	5 U	0.0	5 U	0.0	5 U	0.0	5 U	0.0	0.41 J	0.0	0.27 J	0.0
Cadmium	1 U	0.0	1.1 J	0.0	0.17 J	0.0	0.5 UJ	0.0	2 J	0.0	2.2 J	0.0
Calcium	25900	2840.0	14900	131.8	9860	17.8	7550	9.1	18900	4.5	19700	159.3
Chromium	10 U	0.0	0.51 J	0.0	10 U	0.0	10 U	0.0	10 U	0.0	2.3 J	0.0
Cobalt	2 J	0.2	32.7 J	0.3	4.3 J	0.0	50 UJ	0.0	59.4 J	0.0	57.8	0.5
Copper	70.6	7.7	1040	9.2	178	0.3	6.9	0.0	2410	0.6	2030	16.4
Cyanide	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0
Iron	484	53.1	2890	25.6	100 U	0.0	100 UJ	0.0	22.1 J	0.0	5040	40.8
Lead	0.26 J	0.0	0.36 J	0.0	1 U	0.0	1 U	0.0	1 U	0.0	0.82 J	0.0
Magnesium	1510 J	165.6	3100 J	27.4	1240 J	2.2	768 J	0.9	4330 J	1.0	5130	41.5
Manganese	48	5.3	267	2.4	36.8	0.1	3.9 J	0.0	437 J	0.1	506	4.1
Mercury	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0
Molybdenum	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0
Nickel	40 U	0.0	11.8 J	0.1	40 U	0.0	0.92 J	0.0	25.4 J	0.0	21.5 J	0.2
Potassium	1590 J	174.3	2330 J	20.6	1450 J	2.6	747 J	0.9	3000 J	0.7	2600 J	21.0
Selenium	5 U	0.0	5 U	0.0	5 U	0.0	5 UJ	0.0	5 UJ	0.0	5 U	0.0
Silver	0.5 U	0.0	0.5 U	0.0	0.5 U	0.0	0.5 UJ	0.0	0.5 UJ	0.0	0.5 U	0.0
Sodium	3100 J	339.9	1910 J	16.9	1070 J	1.9	891 J	1.1	1860 J	0.4	1790 J	14.5
Strontium	128	14.0	52.9	0.5	40.1	0.1	32.6	0.0	82.1	0.0	56	0.5
Thallium	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0
Vanadium	0.86 J	0.1	0.26 J	0.0	5 UJ	0.0	0.34 J	0.0	0.3 J	0.0	0.87 J	0.0
Zinc	17.3 J	1.9	184	1.6	25.4 J	0.0	9.3 J	0.0	249	0.1	336	2.7

Table 5-3
Surface Water Flow and Metal Loading Estimates by Nobis for August 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	SW-04		SW-09		SW-13		SW-17		SW-29		SW-32	
Station ID:	SW-04X-080709AX	Flow Rate	SW-09X-080709AX	Flow Rate	SW-13X-080609AX	Flow Rate	SW-17X-080409AX	Flow Rate	SW-29X-080409AX	Flow Rate	SW-32X-080609AX	Flow Rate
Sample Date:	8/7/2009	9124	8/7/2009	736	8/6/2009	150	8/4/2009	100	8/4/2009	20	8/6/2009	673
	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)
Dissolved Metals												
Aluminum	200 U	0.0	2260	20.0	200 U	0.0	52.3 J	0.1	3700	0.9	4470	36.2
Antimony	2 U	0.0	2 U	0.0	2 U	0.0	2 U	0.0	2 U	0.0	2 U	0.0
Arsenic	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0
Barium	15.5	1.7	16.4	0.1	15.6	0.0	14.1 J	0.0	33.8 J	0.0	12.6	0.1
Beryllium	5 U	0.0	5 U	0.0	5 U	0.0	5 U	0.0	5 U	0.0	5 U	0.0
Cadmium	1 U	0.0	1.2	0.01	1 U	0.0	0.5 UJ	0.0	2.1 J	0.0	2.2	0.0
Calcium	25500	2796.2	15300	135.3	9950	17.9	7920	9.5	19800	4.8	18400	148.8
Chromium	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	0.54 J	0.0	10 U	0.0
Cobalt	50 U	0.0	34 J	0.3	50 U	0.0	50 U	0.0	61.1	0.0	60	0.5
Copper	29.9	3.3	1030	9.1	99	0.2	6.1	0.0	2520	0.6	2060	16.7
Iron	100 U	0.0	2670	23.6	100 U	0.0	100 U	0.0	100 U	0.0	3930	31.8
Lead	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	0.48 J	0.0
Magnesium	1520 J	166.7	3300 J	29.2	1260 J	2.3	851 J	1.0	4470 J	1.1	4840 J	39.1
Manganese	30.6 J	3.4	280 J	2.5	36.8 J	0.1	3.4 J	0.0	448 J	0.1	497 J	4.0
Mercury	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0
Molybdenum	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0
Nickel	1.4 J	0.2	12.3 J	0.1	3.2 J	0.0	40 U	0.0	25.6 J	0.0	21.6 J	0.2
Potassium	5000 U	0.0	2340 J	20.7	5000 U	0.0	5000 U	0.0	3450 J	0.8	5000 U	0.0
Selenium	5 U	0.0	5 U	0.0	5 U	0.0	5 UJ	0.0	5 UJ	0.0	5 U	0.0
Silver	0.5 U	0.0	0.5 U	0.0	0.5 U	0.0	0.5 UJ	0.0	0.5 UJ	0.0	0.5 U	0.0
Sodium	3280 J	359.7	2090 J	18.5	1130 J	2.0	875 J	1.1	1970 J	0.5	1920 J	15.5
Strontium	130	14.3	54.7	0.5	42.3	0.1	34.1	0.0	84.3	0.0	56.7	0.5
Thallium	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0
Vanadium	5 U	0.0	5 U	0.0	5 U	0.0	5 UJ	0.0	5 UJ	0.0	0.35 J	0.0
Zinc	10.4 J	1.1	191	1.7	23.6 J	0.0	5.6 J	0.0	256	0.1	345	2.8

Notes:

1. All concentrations listed in micrograms per liter (µg/L).
2. U=Not detected, detection limit shown; UJ= not detected, reporting limit raised; J=estimated concentration.
3. Blank cell indicates sample was not analyzed for that particular parameter.

Table 5-3
Surface Water Flow and Metal Loading Estimates by Nobis for August 2009
Ely Copper Mine Superfund Site
Vershire, Vermont
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Sample Location:	SW-34		SW-38		SW-41		SW-42		SW-49		SW-81	
Station ID:	SW-34X-080609AX	Flow Rate	SW-38X-080709AX	Flow Rate	SW-41X-080409AX	Flow Rate	SW-42X-080409AX	Flow Rate	SW-49X-080509AX	Flow Rate	SW-81X-080509AX	Flow Rate
Sample Date:	8/6/2009	5	8/7/2009	6689	8/4/2009	50	8/4/2009	10	8/5/2009	4	8/5/2009	60
	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)
Total Metals												
Aluminum	1690	0.1	200 U	0.0	1220	0.7	23400	2.8	5690	0.3	21300	15.4
Antimony	2 U	0.0	2 U	0.0	2 U	0.0	2 U	0.0	2 U	0.0	2 U	0.0
Arsenic	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0
Barium	34.8	0.0	15.5	1.2	10.8 J	0.0	14.1 J	0.0	14.2 J	0.0	10.9	0.0
Beryllium	5 U	0.0	5 U	0.0	5 U	0.0	1.2 J	0.0	0.42 J	0.0	0.88 J	0.0
Cadmium	1.3 J	0.0	0.5 U	0.0	0.89 J	0.0	12.5 J	0.0	1.6 J	0.0	8.9 J	0.0
Calcium	8010	0.5	26800	2154.4	9830	5.9	49900	6.0	22200	1.1	56300	40.6
Chromium	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	12.1	0.0
Cobalt	19.5 J	0.0	50 U	0.0	16.5 J	0.0	241 J	0.0	53.4 J	0.0	267	0.2
Copper	1680	0.1	2 U	0.0	630	0.4	10900	1.3	1780	0.1	9680	7.0
Cyanide	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0
Iron	1450	0.1	105 U	0.0	122 J	0.1	152 J	0.0	2000 J	0.1	7820	5.6
Lead	0.47 J	0.0	1 U	0.0	1 U	0.0	0.74 J	0.0	0.75 J	0.0	0.61 J	0.0
Magnesium	1390 J	0.1	1340 J	107.7	1950 J	1.2	14100	1.7	6190	0.3	17700	12.8
Manganese	146	0.0	15.8	1.3	156 J	0.1	1610 J	0.2	584 J	0.0	1750	1.3
Mercury	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0
Molybdenum	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0
Nickel	9 J	0.0	40 U	0.0	7.3 J	0.0	97.3	0.0	22.3 J	0.0	90.2	0.1
Potassium	2870 J	0.2	1680 J	135.1	1170 J	0.7	4680 J	0.6	2900 J	0.1	4890 J	3.5
Selenium	5 U	0.0	5 U	0.0	5 UJ	0.0	1.3 J	0.0	5 UJ	0.0	5 U	0.0
Silver	1 U	0.0	0.5 U	0.0	0.5 UJ	0.0	0.5 UJ	0.0	0.5 UJ	0.0	1 U	0.0
Sodium	1880 J	0.1	2960 J	238.0	1200 J	0.7	3290 J	0.4	1980 J	0.1	3500 J	2.5
Strontium	36.4	0.0	132	10.6	35.9	0.0	126	0.0	48.7	0.0	102	0.1
Thallium	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0
Vanadium	0.43 J	0.0	0.34 J	0.0	0.5 J	0.0	5 U	0.0	5 U	0.0	0.39 J	0.0
Zinc	109	0.0	2.9 J	0.2	135	0.1	1860	0.2	329	0.0	1330	1.0

Table 5-3
Surface Water Flow and Metal Loading Estimates by Nobis for August 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	SW-34		SW-38		SW-41		SW-42		SW-49		SW-81	
Station ID:	SW-34X-080609AX	Flow Rate	SW-38X-080709AX	Flow Rate	SW-41X-080409AX	Flow Rate	SW-42X-080409AX	Flow Rate	SW-49X-080509AX	Flow Rate	SW-81X-080509AX	Flow Rate
Sample Date:	8/6/2009	5	8/7/2009	6689	8/4/2009	50	8/4/2009	10	8/5/2009	4	8/5/2009	60
	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)	Sample Conc.	Loading Rate (lbs/day)
Dissolved Metals												
Aluminum	1760	0.1	200 U	0.0	200 U	0.0	24200	2.9	5900	0.3	22800	16.4
Antimony	2 U	0.0	2 U	0.0	2 U	0.0	2 U	0.0	2 U	0.0	2 U	0.0
Arsenic	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0
Barium	34.8	0.0	15	1.2	11.3 J	0.0	14.3 J	0.0	14.1	0.0	10.6	0.0
Beryllium	5 U	0.0	5 U	0.0	5 U	0.0	1.3 J	0.0	5 U	0.0	5 U	0.0
Cadmium	1.3	0.0	0.5 U	0.0	0.91 J	0.0	12.9 J	0.0	1.6 J	0.0	8.6	0.0
Calcium	8100	0.5	27700	2226.8	10100	6.1	52400	6.3	23700	1.1	54700	39.4
Chromium	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	13.9	0.0
Cobalt	20.3 J	0.0	50 U	0.0	17.5 J	0.0	249	0.0	55.9	0.0	280	0.2
Copper	1720	0.1	0.66 J	0.1	486	0.3	10900	1.3	1850	0.1	9520	6.9
Iron	530	0.0	100 U	0.0	100 U	0.0	130	0.0	1890	0.1	8200	5.9
Lead	0.35 J	0.0	1 U	0.0	1 U	0.0	0.71 J	0.0	0.8 J	0.0	0.6 J	0.0
Magnesium	1450 J	0.1	1400 J	112.5	1970 J	1.2	14700	1.8	6700	0.3	18000	13.0
Manganese	151 J	0.0	8.5 J	0.7	159 J	0.1	1700 J	0.2	613 J	0.0	1810 J	1.3
Mercury	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0	0.1 U	0.0
Molybdenum	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0	10 U	0.0
Nickel	9.1 J	0.0	0.86 J	0.1	7.4 J	0.0	99	0.0	23.3 J	0.0	94.9	0.1
Potassium	2760 J	0.2	5000 U	0.0	1500 J	0.9	5350	0.6	3880 J	0.2	4680 J	3.4
Selenium	5 U	0.0	5 U	0.0	5 UJ	0.0	1.5 J	0.0	5 UJ	0.0	1.2 J	0.0
Silver	0.5 U	0.0	0.5 U	0.0	0.5 UJ	0.0	0.5 UJ	0.0	0.5 UJ	0.0	1 U	0.0
Sodium	2500 J	0.2	3520 J	283.0	1240 J	0.7	3390 J	0.4	2040 J	0.1	3700 J	2.7
Strontium	38.4	0.0	142	11.4	36.9	0.0	131	0.0	50.3	0.0	105	0.1
Thallium	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0	1 U	0.0
Vanadium	5 U	0.0	5 U	0.0	5 UJ	0.0	5 UJ	0.0	0.37 J	0.0	5 U	0.0
Zinc	130	0.0	2.7 J	0.2	138	0.1	1910	0.2	349	0.0	1410	1.0

Notes:

1. All concentrations listed in micrograms per liter (µg/L).
2. U=Not detected, detection limit shown; UJ= not detected, reporting limit raised; J=estimated concentration.
3. Blank cell indicates sample was not analyzed for that particular parameter.

Table 5-4
Surface Water Flow and Loading Estimates by URS for November 2004 and May 2007
Ely Copper Mine Superfund Site
Vershire, Vermont

Location Units	Sampling Date	Flow (gpm)	Aluminum Total Load (lbs/day)	Antimony Total Load (lbs/day)	Arsenic Total Load (lbs/day)	Barium Total Load (lbs/day)	Beryllium Total Load (lbs/day)	Cadmium Total Load (lbs/day)	Calcium Total Load (lbs/day)	Chromium Total Load (lbs/day)	Cobalt Total Load (lbs/day)	Copper Total Load (lbs/day)	Cyanide Total Load (lbs/day)	Iron Total Load (lbs/day)	Lead Total Load (lbs/day)	Magnesium Total Load (lbs/day)
SW-01	11/3/2004	1074.95	2.58	0.0065	0.0012	0.19	0.0065	0.0065	361.28	0.0028	0.02	0.65	0.0323	2.19	0.0008	24.52
SW-02	11/4/2004	2243.25	6.19	0.0135	0.0051	0.41	0.0135	0.0135	807.79	0.0062	0.07	1.81	0.0673	6.46	0.0027	53.85
SW-03	11/4/2004	1935.35	7.43	0.0116	0.0033	0.41	0.0116	0.0035	743.38	0.0067	0.09	2.21	0.0581	7.67	0.0037	48.78
SW-04	11/4/2004	1929.52	9.73	0.0116	0.0028	0.41	0.0116	0.0028	741.14	0.0107	0.08	2.45	0.0579	10.89	0.003	48.64
SW-04	5/2/2007	5610.37	16.16	0.002	0.0044	0.78	0.0168	0.0067	1279.51	0.0138	0.15	5.19	0.1684	11.45	0.0047	74.08
SW-05	11/4/2004	1666.06	7.6	0.01	0.0026	0.35	0.01	0.0028	639.94	0.0064	0.07	2.15	0.05	7.4	0.007	42
SW-06	11/4/2004	1557.89	8.04	0.0093	0.0026	0.33	0.0093	0.0026	598.39	0.009	0.08	2.23	0.0467	7.11	0.0019	39.27
SW-06	5/2/2007	7772.06	33.58	0.0061	0.0233	1.08	0.0233	0.014	1679.22	0.041	0.33	11.57	0.2332	26.12	0.0224	111.95
SW-07	11/4/2004	1293.53	0.68	0.0078	0.0017	0.28	0.0078	0.0078	512.38	0.002	0	0.01	0.0388	0.48	0.0078	27.95
SW-09	11/3/2004	47.13	2.55	0.0003	0.0003	0.01	0.0001	0.0009	11.31	0.0012	0.03	0.71	0.0014	2.66	0.0002	2.72
SW-09	5/2/2007	235.61	7.35	0.0001	0.0007	0.04	0.0004	0.0034	33.94	0.0028	0.1	3.59	0.0071	5.09	0.001	7.07
SW-10	11/3/2004	35.01	1.98	0.0002	0	0.01	0.0001	0.0007	7.98	0.0011	0.02	0.55	0.0011	3.19	0.0002	2.14
SW-11	11/3/2004	67.32	4.28	0.0004	0.0001	0.01	0.0002	0.0015	16.97	0.0024	0.04	1.06	0.002	6.38	0.0003	4.53
SW-12	11/1/2004	121.18	6.4	0.0007	0.0007	0.02	0.0003	0.0022	30.55	0.0033	0.06	1.45	0.0036	6.98	0.0005	8.15
SW-12	5/2/2007	262.11	13.21	0.0002	0.0004	0.04	0.0005	0.0041	37.75	0.0082	0.12	4.31	0.0079	9.75	0.0028	8.49
SW-13	11/1/2004	32.99	0.07	0.0002	0	0.01	0.0002	0.0002	5.54	0.0001	0	0.08	0.001	0.01	0	0.87
SW-14	11/1/2004	71.81	2.59	0.0004	0.0004	0.01	0.0001	0.0019	13.79	0.0012	0.04	1.21	0.0022	4.83	0.0004	3.62
SW-14	5/2/2007	887.94	24.51	0.0001	0.0027	0.12	0.0013	0.0149	104.45	0.0107	0.35	12.9	0.0266	30.91	0.005	23.45
SW-16	11/3/2004	7.41	0	0	0	0	0	0	0.76	0	0	0	0.0002	0.03	0	0.12
SW-17	11/2/2004	36.36	0.08	0.0002	0	0.01	0.0002	0.0002	4.15	0.0002	0	0	0.0012	0.05	0.0001	0.48
SW-17	5/2/2007	100.13	0.05	0	0.0003	0.01	0.0003	0	7.33	0.0001	0	0.01	0.003	0.04	0	0.81
SW-18	11/2/2004	23.56	0.02	0.0001	0	0	0.0001	0.0001	3.11	0	0	0	0.0007	0.01	0.0001	0.31
SW-20	11/3/2004	8.08	0.02	0	0	0	0	0	0.97	0.0001	0	0	0.0004	0.19	0	0.11
SW-21	11/3/2004	7.18	0.04	0	0	0	0	0	0.65	0.0001	0	0	0.0002	0.06	0	0.12
SW-22	11/2/2004	21.54	0.03	0.0001	0	0	0.0001	0.0001	0.88	0	0	0	0.0006	0.01	0.0001	0.17
SW-23	11/2/2004	201.97	0.18	0.0012	0.0001	0.03	0.0012	0.0012	8	0.0004	0	0	0.0061	0.06	0.0012	1.55
SW-24	11/2/2004	204.67	0.39	0.0012	0.0001	0.03	0.0012	0.0012	6.63	0.0006	0	0	0.0061	0.06	0.0004	1.45
SW-25	11/4/2004	745.06	0.31	0.0045	0.0016	0.08	0.0045	0.0045	223.58	0.0012	0	0	0.0224	0.18	0.0045	14.31
SW-26	11/4/2004	5037.67	2.42	0.0302	0.0091	1.23	0.0302	0.0302	1874.52	0.0079	0	0.02	0.1512	1.75	0.0048	102.8
SW-27	11/4/2004	2787.77	5.69	0.0167	0.0047	0.51	0.0167	0.0167	970.41	0.0074	0.05	1.44	0.0837	5.35	0.0054	66.92
SW-28	11/4/2004	6962.7	11.7	0.0418	0.0142	1.46	0.0418	0.0418	2507.25	0.0192	0.1	2.71	0.2089	10.86	0.0117	158.79
SW-29	11/2/2004	8.58	0.81	0.0001	0.0001	0	0.0001	0.0004	3.92	0.0001	0.01	0.43	0.0003	0.01	0	0.94
SW-29	5/2/2007	38.29	1.75	0.0001	0.0001	0.01	0.0001	0.0009	8.27	0.0002	0.03	1.05	0.0011	0.05	0.0001	1.93
SW-30	5/2/2007	106.02	22.91	0	0.0003	0.01	0.0011	0.0076	49.63	0.0078	0.19	9.16	0.0032	8.65	0.0013	15.27
SW-31	11/1/2004	188.51	17.42	0.0011	0.0001	0.03	0.0009	0.0054	58.83	0.0066	0.15	3.76	0.0057	22.63	0.0015	18.1
SW-32	11/1/2004	348.74	37.26	0.0021	0.0003	0.04	0.0021	0.0109	117.21	0.0172	0.3	7.8	0.0105	46.05	0.0027	36.84
SW-32	5/2/2007	282.73	20.7	0.0002	0.0003	0.04	0.0008	0.0075	50.9	0.0092	0.2	7.53	0.0085	14.59	0.0048	13.91
SW-33	11/3/2004	61.49	3.69	0.0004	0.0004	0.01	0.0002	0.0013	14.76	0.002	0.04	0.94	0.0015	4.95	0.0002	3.99
SW-33	5/2/2007	636.14	21.38	0.0001	0.0007	0.09	0.0011	0.0099	91.63	0.0107	0.29	10.69	0.0191	16.03	0.0029	19.85
SW-34	11/2/2004	7.41	0.29	0	0	0	0	0.0002	0.89	0.0001	0	0.22	0.0002	0.05	0	0.19
SW-34	5/2/2007	17.67	0.01	0	0.0001	0	0.0001	0	0.78	0	0	0	0.0005	0.01	0	0.16
SW-35	11/3/2004	1.26	0	0	0	0	0	0	0.09	0	0	0	0	0	0	0.02
SW-36	11/3/2004	0.36	0	0	0	0	0	0	0.03	0	0	0	0	0.01	0	0.01
SW-38	5/3/2007	11544.71	12.61	0.0035	0.0062	1.68	0.0346	0.0346	2632.91	0.0263	0.01	0.69	0.3464	11.09	0.0076	152.43
SW-39	5/2/2007	671.48	21.76	0.0001	0.002	0.11	0.0013	0.0113	88.66	0.0113	0.31	11.36	0.0201	19.34	0.004	20.96
SW-40	5/2/2007	103.08	0.66	0	0.0001	0.02	0	0.0003	9.53	0.0001	0.01	0.38	0.0031	0.04	0.0001	1.36
SW-41	5/3/2007	216.46	5.2	0.0001	0.0002	0.03	0.0003	0.0034	24.42	0.0007	0.07	2.78	0.0065	0.36	0.0005	5.46
SW-42	5/3/2007	8.84	3.18	0	0	0	0.0001	0.0016	4.56	0.0003	0.03	1.3	0.0003	0.06	0.0001	1.59
SW-43	5/3/2007	0.37	0.04	0	0	0	0	0	0.08	0	0	0.02	0	0.03	0	0.03
SW-45	5/3/2007	23.56	7.07	0	0.0001	0	0.0002	0.0033	10.75	0.0021	0.06	3.03	0.0007	0.4	0.0001	3.39
SW-46	5/3/2007	22.09	4.51	0	0.0001	0	0.0002	0.0016	9.01	0.0018	0.04	1.81	0.0007	0.27	0.0002	2.92
SW-47	5/3/2007	29.82	9.31	0.0001	0.0001	0	0.0004	0.0036	21.48	0.0069	0.11	4.4	0.0009	8.23	0.0001	6.8
SW-48	5/3/2007	33.13	0.72	0.0001	0.0001	0.01	0.0001	0.0005	2.27	0.0001	0.01	0.45	0.001	0.08	0.0001	0.68
SW-49	5/2/2007	92.77	7.35	0.0003	0.0003	0.01	0.0003	0.0027	24.5	0.0042	0.08	3.33	0.0028	4.01	0.0008	6.68
SW-51	5/2/2007	44.18	0.03	0	0	0	0.0001	0.0001	4.08	0	0	0.02	0.0013	0.03	0	0.49

Notes:
gpm = gallons per minute; lbs/day = pounds per day

Table 5-4
Surface Water Flow and Loading Estimates by URS for November 2004 and May 2007
Ely Copper Mine Superfund Site
Vershire, Vermont

Location Units	Sampling Date	Flow (gpm)	Manganese Total Load (lbs/day)	Mercury Total Load (lbs/day)	Molybdenum Total Load (lbs/day)	Nickel Total Load (lbs/day)	Potassium Total Load (lbs/day)	Selenium Total Load (lbs/day)	Silver Total Load (lbs/day)	Sodium Total Load (lbs/day)	Strontium Total Load (lbs/day)	Thallium Total Load (lbs/day)	Vanadium Total Load (lbs/day)	Zinc Total Load (lbs/day)
SW-01	11/3/2004	1074.95	0.27	0.0013	0.0018	0.01	28.13	0.0065	0.0006	40.13	1.88	0.0065	0.003	0.17
SW-02	11/4/2004	2243.25	0.82	0.0027	0.0011	0.03	54.93	0.0135	0.0013	81.32	4.23	0.0135	0.0048	0.5
SW-03	11/4/2004	1935.35	0.97	0.0023	0.0008	0.03	51.57	0.0116	0.0012	80.84	3.81	0.0116	0.0042	0.56
SW-04	11/4/2004	1929.52	1.12	0.0023	0.0579	0.03	51.18	0.0116	0.0012	77.12	3.75	0.0116	0.0102	0.61
SW-04	5/2/2007	5610.37	1.68	0.0067	0.0111	0.08	94.28	0.0337	0.0168	148.15	6.33	0.0168	0.0229	2.67
SW-05	11/4/2004	1666.06	0.86	0.002	0.0007	0.03	43.6	0.01	0.001	66.99	3.26	0.01	0.0044	0.43
SW-06	11/4/2004	1557.89	0.89	0.0019	0.0467	0.03	41.7	0.0093	0.0009	62.08	3.05	0.0093	0.0039	0.65
SW-06	5/2/2007	7772.06	3.11	0.0093	0.0233	0.15	130.61	0.0466	0.0037	205.24	8.21	0.0233	0.0299	2
SW-07	11/4/2004	1293.53	0.14	0.0016	0.0005	0	33.54	0.0078	0.0008	50.93	2.64	0.0078	0.0033	0.02
SW-09	11/3/2004	47.13	0.23	0.0001	0.0014	0.01	1.54	0.0004	0	1.21	0.04	0	0.0001	0.15
SW-09	5/2/2007	235.61	0.59	0.0003	0.0007	0.03	5.37	0.0017	0.0001	5.66	0.12	0.0001	0.0004	0.49
SW-10	11/3/2004	35.01	0.18	0	0.0011	0.01	1.12	0.0003	0	0.82	0.03	0	0.0001	0.11
SW-11	11/3/2004	67.32	0.41	0.0001	0.002	0.01	2.25	0.0008	0	1.66	0.05	0	0.0003	0.26
SW-12	11/1/2004	121.18	0.76	0.0001	0.0036	0.02	4.04	0.001	0.0001	2.98	0.1	0.0001	0.0002	0.38
SW-12	5/2/2007	262.11	0.79	0.0003	0.0003	0.04	5.98	0.0028	0.0003	4.09	0.12	0.0001	0.0041	0.8
SW-13	11/1/2004	32.99	0.03	0	0.001	0	0.82	0.0002	0	0.54	0.02	0.0002	0.0001	0.02
SW-14	11/1/2004	71.81	0.38	0.0001	0.0022	0.01	2.11	0.0005	0	1.59	0.05	0	0.0002	0.3
SW-14	5/2/2007	887.94	2.21	0.0011	0.0005	0.11	18.12	0.0043	0.0003	15.99	0.35	0.0002	0.0037	2.22
SW-16	11/3/2004	7.41	0.01	0	0.0002	0	0.19	0	0	0.11	0	0	0	0
SW-17	11/2/2004	36.36	0.01	0	0.0011	0	0.67	0.0002	0	0.46	0.02	0.0002	0.0001	0.01
SW-17	5/2/2007	100.13	0	0.0001	0.0003	0	1.32	0.0006	0.0003	1.2	0.03	0.0003	0.0002	0.01
SW-18	11/2/2004	23.56	0	0	0.0007	0	0.47	0.0001	0	0.3	0.01	0.0001	0	0
SW-20	11/3/2004	8.08	0.11	0	0	0	0.21	0	0	0.1	0	0	0.0001	0
SW-21	11/3/2004	7.18	0	0	0	0	0.22	0	0	0.11	0	0	0.0002	0
SW-22	11/2/2004	21.54	0	0	0.0006	0	0.2	0.0001	0	0.2	0	0.0001	0	0
SW-23	11/2/2004	201.97	0	0.0002	0.0061	0	1.83	0.0012	0.0001	1.84	0.03	0.0012	0.0004	0.01
SW-24	11/2/2004	204.67	0.01	0.0002	0.0061	0	1.72	0.0012	0.0001	1.9	0.02	0.0012	0.0004	0.06
SW-25	11/4/2004	745.06	0.02	0.0009	0.0224	0	14.85	0.0045	0.0004	15.56	1.24	0.0045	0.0014	0.01
SW-26	11/4/2004	5037.67	0.37	0.006	0.0027	0.01	131.82	0.0302	0.003	393.04	9.19	0.0302	0.0127	0.04
SW-27	11/4/2004	2787.77	0.57	0.0033	0.0015	0.03	67.59	0.0167	0.0017	124.15	4.95	0.0167	0.006	0.41
SW-28	11/4/2004	6962.7	1.25	0.0084	0.0054	0.06	183.03	0.0418	0.0042	387.79	12.62	0.0418	0.0167	0.84
SW-29	11/2/2004	8.58	0.09	0	0.0003	0	0.47	0.0002	0	0.32	0.01	0	0	0.05
SW-29	5/2/2007	38.29	0.17	0	0.0001	0.01	1.24	0.0004	0.0001	0.83	0.03	0	0	0.09
SW-30	5/2/2007	106.02	1.62	0.0001	0	0.07	6.36	0.0038	0.0001	5.85	0.11	0.0001	0.0004	1.03
SW-31	11/1/2004	188.51	2.08	0.0002	0.0057	0.05	7.9	0.0023	0	5.68	0.18	0.0001	0.0006	0.96
SW-32	11/1/2004	348.74	4.09	0.0004	0.0105	0.11	14.23	0.0084	0.0001	11.13	0.35	0.0002	0.0012	1.99
SW-32	5/2/2007	282.73	1.33	0.0003	0.0008	0.06	7.81	0.0034	0.0003	8.14	0.15	0.0002	0.0027	1.05
SW-33	11/3/2004	61.49	0.35	0.0001	0.0018	0.01	2.02	0.0006	0	1.45	0.05	0	0.0002	0.23
SW-33	5/2/2007	636.14	1.84	0.0008	0.0005	0.09	14.51	0.0053	0.0002	10.69	0.29	0.0002	0.002	1.4
SW-34	11/2/2004	7.41	0.02	0	0.0002	0	0.3	0.0001	0	0.24	0	0	0	0.02
SW-34	5/2/2007	17.67	0	0	0	0	0.25	0.0001	0.0001	0.2	0	0.0001	0	0
SW-35	11/3/2004	1.26	0	0	0	0	0.03	0	0	0.02	0	0	0	0
SW-36	11/3/2004	0.36	0	0	0	0	0.01	0	0	0.01	0	0	0	0
SW-38	5/3/2007	11544.71	1.93	0.0139	0.0146	0.08	194	0.0693	0.0346	457.29	13.44	0.0346	0.0485	59.93
SW-39	5/2/2007	671.48	1.89	0.0008	0.0008	0.1	15.31	0.0064	0.0005	11.28	0.31	0.0002	0.004	1.45
SW-40	5/2/2007	103.08	0.07	0.0001	0.0003	0	1.73	0.0006	0.0003	1.03	0.04	0.0003	0.0001	0.04
SW-41	5/3/2007	216.46	0.49	0.0003	0.0006	0.03	4.16	0.0013	0.0006	3.38	0.08	0.0001	0.0004	0.48
SW-42	5/3/2007	8.84	0.15	0	0	0.01	0.51	0.0004	0	0.87	0.01	0	0	0.19
SW-43	5/3/2007	0.37	0	0	0	0	0.01	0	0	0.01	0	0	0	0
SW-45	5/3/2007	23.56	0.32	0	0.0001	0.02	1.3	0.0011	0	1.75	0.02	0.0001	0.0001	0.41
SW-46	5/3/2007	22.09	0.28	0	0.0001	0.01	1.01	0.0008	0	1.22	0.02	0	0	0.2
SW-47	5/3/2007	29.82	0.59	0	0.0001	0.04	1.9	0.0018	0	2.68	0.05	0.0001	0.0001	0.41
SW-48	5/3/2007	33.13	0.06	0	0.0001	0	0.64	0.0002	0	0.44	0.01	0	0.0001	0.06
SW-49	5/2/2007	92.77	0.62	0.0001	0.0003	0.03	3.45	0.0011	0.0001	2.78	0.05	0.0001	0.0002	0.37
SW-51	5/2/2007	44.18	0.01	0.0001	0	0	0.64	0.0003	0.0001	0.45	0.02	0.0001	0.0002	0.01

Notes:
gpm = gallons per minute; lbs/day = pounds per d

Table 5-5
Groundwater Level Monitoring Data
Ely Copper Mine Superfund Site
Vershire, Vermont

Well Number	Screened Interval (ft bgs)	Screen Midpoint	Ground Surface Elevation (ft msl)	Screened Interval (ft msl)	Reference Elevation (ft msl)	13-Dec-06			10-Jan-07			5-Feb-07			6-Mar-07			9-Apr-07		
						DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]
MW-01A	7 to 17	955.2	967.2	960.2 to 950.2	969.02	17.54	951.48	0.003	17.46	951.56	0.013	17.6	951.42	-0.001	17.97	951.05	-0.007	17.5	951.52	0.015
MW-01B	26 to 36	935.8	966.8	940.8 to 930.8	968.9	17.37	951.53	0.241	17.15	951.75	0.244	17.5	951.4	0.232	17.96	950.94	0.229	17.15	951.75	0.237
MW-01C	47.3 to 55.3	915.6	966.9	919.6 to 911.6	968.48	12.08	956.4		11.8	956.68		12.39	956.09		12.91	955.57		11.94	956.54	
MW-02A	6 to 16	965.6	976.6	970.6 to 960.6	978.54	11.95	966.59	-0.138	11.74	966.8	-0.164	13.12	965.42	-0.163	14.85	963.69	-0.097	11.89	966.65	-0.185
MW-02B	22 to 32	949.7	976.7	954.7 to 944.7	978.65	13.98	964.67	0.034	14.14	964.51	0.044	15.4	963.25	0.046	16.17	962.48	0.046	14.57	964.08	0.050
MW-02C	80.5 to 90.5	891	976.5	896.0 to 886.0	979.05	12.35	966.69		11.93	967.12		13.1	965.95		13.87	965.18		12.04	967.01	
MW-03C	29.5 to 39.5	981.8	1016.3	986.8 to 976.8	1018.1	22.03	996.07		21.57	996.53		23.29	994.81		24.8	993.3		21.95	996.15	
MW-04A	3 to 9	1024.9	1030.9	1027.9 to 1021.9	1033.29	4.55	1028.74	-0.094	3.57	1029.72	-0.098	5.81	1027.48	-0.072	7.22	1026.07	-0.040	3.71	1029.58	-0.101
MW-04C	20 to 40	1000.5	1030.5	1010.5 to 990.5	1033.05	6.6	1026.45		5.71	1027.34		7.3	1025.75		7.93	1025.12		5.93	1027.12	
MW-05A	4 to 14	1129.1	1138.1	1134.1 to 1124.1	1140.5	12.66	1127.84	0.080	11.77	1128.73	0.093	13.44	1127.06	0.107	14.18	1126.32	0.105	11.85	1128.65	0.093
MW-05B	15.5 to 25.5	1117.6	1138.1	1122.6 to 1112.6	1141.39	12.88	1128.51	-0.049	11.84	1129.55	-0.062	13.48	1127.91	-0.046	14.27	1127.12	-0.039	11.92	1129.47	-0.065
MW-05C	66 to 76	1067.1	1138.1	1072.1 to 1062.1	1141.07	15.02	1126.05		14.65	1126.42		15.5	1125.57		15.94	1125.13		14.87	1126.2	
MW-06A	3 to 13	1151.7	1159.7	1156.7 to 1146.7	1162.19	6.36	1155.83	-0.235	5.88	1156.31	-0.237	7.36	1154.83	-0.249	7.48	1154.71	-0.251	5.76	1156.43	-0.258
MW-06C	19 to 29	1135.7	1159.7	1140.7 to 1130.7	1162.98	10.8	1152.18		10.41	1152.57		11.9	1151.08		12.04	1150.94		10.65	1152.33	
MW-07A	3 to 13	1326.3	1334.3	1331.3 to 1321.3	1336.95	3.12	1333.83	0.034	2.59	1334.36		NM	-		NM	-		2.82	1334.13	0.045
MW-07C	20.5 to 30.5	1308.8	1334.3	1313.8 to 1303.8	1336.87	2.45	1334.42		NM	-		NM	-		NM	-		1.96	1334.91	
MW-08A	4 to 12	1075.5	1083.5	1079.5 to 1071.5	1085.51	5.09	1080.42		4.56	1080.95		5.51	1080		5.56	1079.95		5.12	1080.39	
MW-09A	3 to 6	1159.6	1164.11	1161.1 to 1158.1	1165.84	-	-		-	-		-	-		-	-		-	-	
MW-09C	54.5 to 64.5	1104.9	1164.43	1109.9 to 1099.9	1166.02	-	-		-	-		-	-		-	-		-	-	
MW-10B	3.5 to 8.5	990.9	996.94	993.4 to 988.4	999.3	-	-		-	-		-	-		-	-		-	-	
MW-10C	30 to 40	961.8	996.76	966.8 to 956.8	998.74	-	-		-	-		-	-		-	-		-	-	
MW-11A	3 to 10	972.2	978.71	975.7 to 968.7	980.5	-	-		-	-		-	-		-	-		-	-	
MW-11C	20 to 30	953.6	978.58	958.6 to 948.6	980.71	-	-		-	-		-	-		-	-		-	-	
MW-12C	9.5 to 17.5	1081.7	1095.16	1085.7 to 1077.7	1097.16	-	-		-	-		-	-		-	-		-	-	
MW-13A	3 to 9	1104.6	1110.55	1107.6 to 1101.6	1112.25	-	-		-	-		-	-		-	-		-	-	
MW-14A	4 to 9	976.5	983	979.0 to 974.0	984.13	-	-		-	-		-	-		-	-		-	-	
MW14C	27.5 - 37.5	952.78	985.28	957.78 to 947.78	985.83	-	-		-	-		-	-		-	-		-	-	
MW14D	32.88-150	891.64	983.08	950.2 to 833.08	985.20	-	-		-	-		-	-		-	-		-	-	
MW-15A	2.5-7	996.23	1000.98	998.5 to 994.0	1000.84	-	-		-	-		-	-		-	-		-	-	
MW-16A	3-9.5	980.3	986.56	983.6 to 977.1	988.09	-	-		-	-		-	-		-	-		-	-	
MW17A	3 - 8	1079.98	1085.48	1082.48 to 1077.48	1088.31	-	-		-	-		-	-		-	-		-	-	
MW18A	4 - 9	1186.78	1193.28	1189.28 to 1184.28	1195.51	-	-		-	-		-	-		-	-		-	-	
MW19A	8 - 16	1232.18	1244.18	1236.18 to 1229.18	1246.66	-	-		-	-		-	-		-	-		-	-	
MW19C	26 - 36	1213.45	1244.45	1218.45 to 1208.45	1246.75	-	-		-	-		-	-		-	-		-	-	
MW19D	30.76-150	1155.53	1245.91	1215.15 to 1095.91	1247.65	-	-		-	-		-	-		-	-		-	-	
MW20A	3.5 - 5.5	1019.84	1024.34	1020.84 to 1018.84	1027.12	-	-		-	-		-	-		-	-		-	-	
MW20C	11 - 21	1008.51	1024.51	997.51 to 987.51	1026.94	-	-		-	-		-	-		-	-		-	-	
MW20D	21.55-150	939.01	1024.78	1003.23 to 874.78	1026.23	-	-		-	-		-	-		-	-		-	-	
MW21A	5 - 12	1024.84	1033.34	1028.34 to 1021.34	1035.51	-	-		-	-		-	-		-	-		-	-	
MW21C	19 - 29	1008.38	1032.38	1013.38 to 1003.38	1034.68	-	-		-	-		-	-		-	-		-	-	
MW22A	9 - 19	1046.23	1060.23	1051.23 to 1041.23	1062.47	-	-		-	-		-	-		-	-		-	-	
MW23A	4.75 - 14.75	1033.25	1043.00	1038.25 to 1028.25	1045.58	-	-		-	-		-	-		-	-		-	-	

Notes: [1] Downward gradients are <0; upward gradient are >0.
Value shown adjacent to the shallower well of well pair evaluated (A-B, B-C, or A-C if no B well).
DTW = depth to water (feet below reference elevation); GWSE = groundwater surface elevation
NM = not measured due to ice; ft msl = feet above mean sea level
A = shallow overburden; B = deep overburden/Till; C = shallow bedrock; D = deep bedrock
*Not measured due to surface water infiltration; ** = Flowing well/TIC elevation shown
"-" = not applicable

Table 5-5
Groundwater Level Monitoring Data
Ely Copper Mine Superfund Site
Vershire, Vermont

Well Number	Screened Interval (ft bgs)	Screen Midpoint	Ground Surface Elevation (ft msl)	Screened Interval (ft msl)	Reference Elevation (ft msl)	16-May-07			12-Jun-07			17-Jul-07			17-Aug-07			19-Sep-07		
						DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]
MW-01A	7 to 17	955.2	967.2	960.2 to 950.2	969.02	17.53	951.49	0.002	17.55	951.47	-0.026	16.71	952.31	-0.081	18.52	950.5	0.006	18.73	950.29	0.001
MW-01B	26 to 36	935.8	966.8	940.8 to 930.8	968.9	17.38	951.52	0.237	17.82	951.08	0.243	17.84	951.06	0.228	18.31	950.59	0.229	18.6	950.3	0.231
MW-01C	47.3 to 55.3	915.6	966.9	919.6 to 911.6	968.48	12.17	956.31		12.49	955.99		12.82	955.66		13.26	955.22		13.52	954.96	
MW-02A	6 to 16	965.6	976.6	970.6 to 960.6	978.54	12.37	966.17	-0.184	13.41	965.13	-0.156	14.5	964.04	-0.110	14.91	963.63	-0.103	15.51	963.03	-0.068
MW-02B	22 to 32	949.7	976.7	954.7 to 944.7	978.65	15	963.65	0.047	15.58	963.07	0.049	16	962.65	0.048	16.3	962.35	0.045	16.44	962.21	0.043
MW-02C	80.5 to 90.5	891	976.5	896.0 to 886.0	979.05	12.64	966.41		13.12	965.93		13.57	965.48		14.08	964.97		14.32	964.73	
MW-03C	29.5 to 39.5	981.8	1016.3	986.8 to 976.8	1018.1	22.55	995.55		23.12	994.98		24.46	993.64		26.19	991.91		27.08	991.02	
MW-04A	3 to 9	1024.9	1030.9	1027.9 to 1021.9	1033.29	5.31	1027.98	-0.075	5.66	1027.63	-0.002	6.55	1026.74	-0.051	7.17	1026.12	-0.047	7.54	1025.75	-0.043
MW-04C	20 to 40	1000.5	1030.5	1010.5 to 990.5	1033.05	6.91	1026.14		7.14	1025.91		7.52	1025.53		8.04	1025.01		8.31	1024.74	
MW-05A	4 to 14	1129.1	1138.1	1134.1 to 1124.1	1140.5	13.07	1127.43	0.099	13.48	1127.02	0.090	13.71	1126.79	0.088	14.15	1126.35	0.090	14.63	1125.87	0.097
MW-05B	15.5 to 25.5	1117.6	1138.1	1122.6 to 1112.6	1141.39	13.15	1128.24	-0.050	13.65	1127.74	-0.047	13.91	1127.48	-0.044	14.35	1127.04	-0.041	14.8	1126.59	-0.035
MW-05C	66 to 76	1067.1	1138.1	1072.1 to 1062.1	1141.07	15.34	1125.73		15.7	1125.37		15.82	1125.25		16.09	1124.98		16.27	1124.8	
MW-06A	3 to 13	1151.7	1159.7	1156.7 to 1146.7	1162.19	7.08	1155.11	-0.243	7.15	1155.04	-0.261	7.68	1154.51	-0.258	8.72	1153.47	-0.251	8.33	1153.86	-0.260
MW-06C	19 to 29	1135.7	1159.7	1140.7 to 1130.7	1162.98	11.57	1151.41		11.9	1151.08		12.31	1150.67		13.12	1149.86		12.91	1150.07	
MW-07A	3 to 13	1326.3	1334.3	1331.3 to 1321.3	1336.95	4.8	1332.15	0.048	5.28	1331.67	0.058	6.91	1330.04	-0.129	8.22	1328.73	0.051	8.83	1328.12	0.028
MW-07C	20.5 to 30.5	1308.8	1334.3	1313.8 to 1303.8	1336.87	3.88	1332.99		4.19	1332.68		9.01	1327.86		7.32	1329.55		8.3	1328.57	
MW-08A	4 to 12	1075.5	1083.5	1079.5 to 1071.5	1085.51	5.18	1080.33		5.12	1080.39		5.27	1080.24		5.29	1080.22		5.39	1080.12	
MW-09A	3 to 6	1159.6	1164.11	1161.1 to 1158.1	1165.84	-	-		-	-		-	-		-	-		-	-	
MW-09C	54.5 to 64.5	1104.9	1164.43	1109.9 to 1099.9	1166.02	-	-		-	-		-	-		-	-		-	-	
MW-10B	3.5 to 8.5	990.9	996.94	993.4 to 988.4	999.3	-	-		-	-		-	-		-	-		-	-	
MW-10C	30 to 40	961.8	996.76	966.8 to 956.8	998.74	-	-		-	-		-	-		-	-		-	-	
MW-11A	3 to 10	972.2	978.71	975.7 to 968.7	980.5	-	-		-	-		-	-		-	-		-	-	
MW-11C	20 to 30	953.6	978.58	958.6 to 948.6	980.71	-	-		-	-		-	-		-	-		-	-	
MW-12C	9.5 to 17.5	1081.7	1095.16	1085.7 to 1077.7	1097.16	-	-		-	-		-	-		-	-		-	-	
MW-13A	3 to 9	1104.6	1110.55	1107.6 to 1101.6	1112.25	-	-		-	-		-	-		-	-		-	-	
MW-14A	4 to 9	976.5	983	979.0 to 974.0	984.13	-	-		-	-		-	-		-	-		-	-	
MW14C	27.5 - 37.5	952.78	985.28	957.78 to 947.78	985.83	-	-		-	-		-	-		-	-		-	-	
MW14D	32.88-150	891.64	983.08	950.2 to 833.08	985.20	-	-		-	-		-	-		-	-		-	-	
MW-15A	2.5-7	996.23	1000.98	998.5 to 994.0	1000.84	-	-		-	-		-	-		-	-		-	-	
MW-16A	3-9.5	980.3	986.56	983.6 to 977.1	988.09	-	-		-	-		-	-		-	-		-	-	
MW17A	3 - 8	1079.98	1085.48	1082.48 to 1077.48	1088.31	-	-		-	-		-	-		-	-		-	-	
MW18A	4 - 9	1186.78	1193.28	1189.28 to 1184.28	1195.51	-	-		-	-		-	-		-	-		-	-	
MW19A	8 - 16	1232.18	1244.18	1236.18 to 1229.18	1246.66	-	-		-	-		-	-		-	-		-	-	
MW19C	26 - 36	1213.45	1244.45	1218.45 to 1208.45	1246.75	-	-		-	-		-	-		-	-		-	-	
MW19D	30.76-150	1155.53	1245.91	1215.15 to 1095.91	1247.65	-	-		-	-		-	-		-	-		-	-	
MW20A	3.5 - 5.5	1019.84	1024.34	1020.84 to 1018.84	1027.12	-	-		-	-		-	-		-	-		-	-	
MW20C	11 - 21	1008.51	1024.51	997.51 to 987.51	1026.94	-	-		-	-		-	-		-	-		-	-	
MW20D	21.55-150	939.01	1024.78	1003.23 to 874.78	1026.23	-	-		-	-		-	-		-	-		-	-	
MW21A	5 - 12	1024.84	1033.34	1028.34 to 1021.34	1035.51	-	-		-	-		-	-		-	-		-	-	
MW21C	19 - 29	1008.38	1032.38	1013.38 to 1003.38	1034.68	-	-		-	-		-	-		-	-		-	-	
MW22A	9 - 19	1046.23	1060.23	1051.23 to 1041.23	1062.47	-	-		-	-		-	-		-	-		-	-	
MW23A	4.75 - 14.75	1033.25	1043.00	1038.25 to 1028.25	1045.58	-	-		-	-		-	-		-	-		-	-	

Notes: [1] Downward gradients are <0; upward gradient are >0.
Value shown adjacent to the shallower well of well pair evaluated (A-B, B-C, or A-C if no B well).
DTW = depth to water (feet below reference elevation); GWSE = groundwater surface elevation
NM = not measured due to ice; ft msl = feet above mean sea level
A = shallow overburden; B = deep overburden/Till; C = shallow bedrock; D = deep bedrock
*Not measured due to surface water infiltration; ** = Flowing well/TIC elevation shown
"-" = not applicable

Table 5-5
Groundwater Level Monitoring Data
Ely Copper Mine Superfund Site
Vershire, Vermont

Well Number	Screened Interval (ft bgs)	Screen Midpoint	Ground Surface Elevation (ft msl)	Screened Interval (ft msl)	Reference Elevation (ft msl)	18-Dec-07			22-Jan-08			19-Feb-08			10-Mar-08			15-Apr-08		
						DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]
MW-01A	7 to 17	955.2	967.2	960.2 to 950.2	969.02	17.54	951.48	-0.008	17.5	951.52	0.007	17.5	951.52	0.004	17.4	951.62	0.011	17.23	951.79	0.019
MW-01B	26 to 36	935.8	966.8	940.8 to 930.8	968.9	17.54	951.36	0.230	17.28	951.62	0.237	17.32	951.58	0.233	17.12	951.78	0.236	16.82	952.08	0.251
MW-01C	47.3 to 55.3	915.6	966.9	919.6 to 911.6	968.48	12.47	956.01		12.08	956.4		12.19	956.29		11.93	956.55		11.33	957.15	
MW-02A	6 to 16	965.6	976.6	970.6 to 960.6	978.54	13.33	965.21	-0.162	12.65	965.89	-0.153	13.42	965.12	-0.119	11.96	966.58	-0.159	9.97	968.57	-0.198
MW-02B	22 to 32	949.7	976.7	954.7 to 944.7	978.65	15.58	963.07	0.051	14.83	963.82	0.049	15.09	963.56	0.051	14.28	964.37	0.048	13.03	965.62	-0.044
MW-02C	80.5 to 90.5	891	976.5	896.0 to 886.0	979.05	12.96	966.09		12.37	966.68		12.51	966.54		11.86	967.19		10.86	968.19	
MW-03C	29.5 to 39.5	981.8	1016.3	986.8 to 976.8	1018.1	22.78	995.32		22.17	995.93		22.29	995.81		21.49	996.61		20.08	998.02	
MW-04A	3 to 9	1024.9	1030.9	1027.9 to 1021.9	1033.29	5.3	1027.99	-0.080	4.47	1028.82	-0.093	4.04	1029.25	-0.099	3.29	1030	-0.103	2.78	1030.51	-0.089
MW-04C	20 to 40	1000.5	1030.5	1010.5 to 990.5	1033.05	7.02	1026.03		6.5	1026.55		6.22	1026.83		5.56	1027.49		4.71	1028.34	
MW-05A	4 to 14	1129.1	1138.1	1134.1 to 1124.1	1140.5	13.4	1127.1	0.089	12.31	1128.19	0.075	13.22	1127.28	0.090	12.51	1127.99	0.094	9.78	1130.72	0.061
MW-05B	15.5 to 25.5	1117.6	1138.1	1122.6 to 1112.6	1141.39	13.58	1127.81	-0.044	12.56	1128.83	-0.053	13.38	1128.01	-0.039	12.61	1128.78	-0.045	10.07	1131.32	-0.081
MW-05C	66 to 76	1067.1	1138.1	1072.1 to 1062.1	1141.07	15.5	1125.57		14.91	1126.16		15.05	1126.02		14.57	1126.5		13.85	1127.22	
MW-06A	3 to 13	1151.7	1159.7	1156.7 to 1146.7	1162.19	6.99	1155.2	-0.239	6.21	1155.98	-0.240	5.01	1157.18	-0.287	4.84	1157.35	-0.278	4.64	1157.55	-0.273
MW-06C	19 to 29	1135.7	1159.7	1140.7 to 1130.7	1162.98	11.42	1151.56		10.75	1152.23		10.39	1152.59		10.08	1152.9		9.8	1153.18	
MW-07A	3 to 13	1326.3	1334.3	1331.3 to 1321.3	1336.95	4.13	1332.82	0.046	3	1333.95		2.95	1334		2.67	1334.28		2.6	1334.35	0.078
MW-07C	20.5 to 30.5	1308.8	1334.3	1313.8 to 1303.8	1336.87	3.25	1333.62		NM	-		NM	-		NM	-		1.16	1335.71	
MW-08A	4 to 12	1075.5	1083.5	1079.5 to 1071.5	1085.51	5.4	1080.11		5.31	1080.2		5.04	1080.47		4.47	1081.04		3.35	1082.16	
MW-09A	3 to 6	1159.6	1164.11	1161.1 to 1158.1	1165.84	4.16	1161.68	-0.244	3.81	1162.03	-0.221	3.51	1162.33	-0.226	3.33	1162.51	-0.217	2.79	1163.05	-0.215
MW-09C	54.5 to 64.5	1104.9	1164.43	1109.9 to 1099.9	1166.02	17.67	1148.35		16.06	1149.96		16.05	1149.97		15.36	1150.66		14.72	1151.3	
MW-10B	3.5 to 8.5	990.9	996.94	993.4 to 988.4	999.3	3.29	996.01		NM	-		2.82	996.48		2.59	996.71		2.3	997	
MW-10C	30 to 40	961.8	996.76	966.8 to 956.8	998.74	0	998.74**		NM	-		NM	-		NM	-		NM	-	
MW-11A	3 to 10	972.2	978.71	975.7 to 968.7	980.5	5.36	975.14	0.063	3.38	977.12	-0.060	2.71	977.79	-0.077	2.17	978.33	-0.071	2.07	978.43	-0.059
MW-11C	20 to 30	953.6	978.58	958.6 to 948.6	980.71	4.41	976.3		4.7	976.01		4.36	976.35		3.7	977.01		3.37	977.34	
MW-12C	9.5 to 17.5	1081.7	1095.16	1085.7 to 1077.7	1097.16	7.23	1089.93		6.98	1090.18		6.59	1090.57		6.42	1090.74		6.29	1090.87	
MW-13A	3 to 9	1104.6	1110.55	1107.6 to 1101.6	1112.25	4.12	1108.13		3.34	1108.91		2.88	1109.37		2.55	1109.7		2.4	1109.85	
MW-14A	4 to 9	976.5	983	979.0 to 974.0	984.13	2.36	981.77		2.07	982.06		1.88	982.25		1.78	982.35		1.64	982.49	
MW14C	27.5 - 37.5	952.78	985.28	957.78 to 947.78	985.83	-	-		-	-		-	-		-	-		-	-	
MW14D	32.88-150	891.64	983.08	950.2 to 833.08	985.20	-	-		-	-		-	-		-	-		-	-	
MW-15A	2.5-7	996.23	1000.98	998.5 to 994.0	1000.84	0.21	1000.63		*	-		*	-		*	-		0.05	1000.79	
MW-16A	3-9.5	980.3	986.56	983.6 to 977.1	988.09	3.55	984.54		3.44	984.65		3.2	984.89		3.02	985.07		2.58	985.51	
MW17A	3 - 8	1079.98	1085.48	1082.48 to 1077.48	1088.31	-	-		-	-		-	-		-	-		-	-	
MW18A	4 - 9	1186.78	1193.28	1189.28 to 1184.28	1195.51	-	-		-	-		-	-		-	-		-	-	
MW19A	8 - 16	1232.18	1244.18	1236.18 to 1229.18	1246.66	-	-		-	-		-	-		-	-		-	-	
MW19C	26 - 36	1213.45	1244.45	1218.45 to 1208.45	1246.75	-	-		-	-		-	-		-	-		-	-	
MW19D	30.76-150	1155.53	1245.91	1215.15 to 1095.91	1247.65	-	-		-	-		-	-		-	-		-	-	
MW20A	3.5 - 5.5	1019.84	1024.34	1020.84 to 1018.84	1027.12	-	-		-	-		-	-		-	-		-	-	
MW20C	11 - 21	1008.51	1024.51	997.51 to 987.51	1026.94	-	-		-	-		-	-		-	-		-	-	
MW20D	21.55-150	939.01	1024.78	1003.23 to 874.78	1026.23	-	-		-	-		-	-		-	-		-	-	
MW21A	5 - 12	1024.84	1033.34	1028.34 to 1021.34	1035.51	-	-		-	-		-	-		-	-		-	-	
MW21C	19 - 29	1008.38	1032.38	1013.38 to 1003.38	1034.68	-	-		-	-		-	-		-	-		-	-	
MW22A	9 - 19	1046.23	1060.23	1051.23 to 1041.23	1062.47	-	-		-	-		-	-		-	-		-	-	
MW23A	4.75 - 14.75	1033.25	1043.00	1038.25 to 1028.25	1045.58	-	-		-	-		-	-		-	-		-	-	

Notes: [1] Downward gradients are <0; upward gradient are >0.
Value shown adjacent to the shallower well of well pair evaluated (A-B, B-C, or A-C if no B well).
DTW = depth to water (feet below reference elevation); GWSE = groundwater surface elevation
NM = not measured due to ice; ft msl = feet above mean sea level
A = shallow overburden; B = deep overburden/Till; C = shallow bedrock; D = deep bedrock
*Not measured due to surface water infiltration; ** = Flowing well/TIC elevation shown
"-" = not applicable

Table 5-5
Groundwater Level Monitoring Data
Ely Copper Mine Superfund Site
Vershire, Vermont

Well Number	Screened Interval (ft bgs)	Screen Midpoint	Ground Surface Elevation (ft msl)	Screened Interval (ft msl)	Reference Elevation (ft msl)	19-May-08			10-Aug-09			19-Nov-09		
						DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]	DTW (feet)	GWSE (ft msl)	Vertical Gradient [1]
MW-01A	7 to 17	955.2	967.2	960.2 to 950.2	969.02	17.51	951.51	-0.009	17.46	951.56	-0.007	17.45	951.57	-0.072
MW-01B	26 to 36	935.8	966.8	940.8 to 930.8	968.9	17.53	951.37	0.236	17.45	951.45	0.230	18.42	950.48	0.276
MW-01C	47.3 to 55.3	915.6	966.9	919.6 to 911.6	968.48	12.34	956.14		12.39	956.09		12.42	956.06	
MW-02A	6 to 16	965.6	976.6	970.6 to 960.6	978.54	11.91	966.63	-0.171	11.57	966.97	-0.170	12.09	966.45	-0.547
MW-02B	22 to 32	949.7	976.7	954.7 to 944.7	978.65	14.4	964.25	0.041	14.07	964.58	0.036	19.76	958.89	0.121
MW-02C	80.5 to 90.5	891	976.5	896.0 to 886.0	979.05	12.41	966.64		12.18	966.87		13.05	966.00	
MW-03C	29.5 to 39.5	981.8	1016.3	986.8 to 976.8	1018.1	22.58	995.52		21.71	996.39		22.60	995.50	
MW-04A	3 to 9	1024.9	1030.9	1027.9 to 1021.9	1033.29	5.11	1028.18	-0.082	4.54	1028.75	-0.214	4.39	1028.90	-0.217
MW-04C	20 to 40	1000.5	1030.5	1010.5 to 990.5	1033.05	6.87	1026.18		9.52	1023.53		9.44	1023.61	
MW-05A	4 to 14	1129.1	1138.1	1134.1 to 1124.1	1140.5	13.01	1127.49	0.082	11.11	1129.39	0.073	12.25	1128.25	0.015
MW-05B	15.5 to 25.5	1117.6	1138.1	1122.6 to 1112.6	1141.39	13.23	1128.16	-0.051	11.33	1130.06	-0.083	13.01	1128.38	-0.062
MW-05C	66 to 76	1067.1	1138.1	1072.1 to 1062.1	1141.07	15.49	1125.58		15.20	1125.87		15.82	1125.25	
MW-06A	3 to 13	1151.7	1159.7	1156.7 to 1146.7	1162.19	7.25	1154.94	-0.237	6.03	1156.16	-0.248	6.28	1155.91	-0.379
MW-06C	19 to 29	1135.7	1159.7	1140.7 to 1130.7	1162.98	11.62	1151.36		10.72	1152.26		12.98	1150.00	
MW-07A	3 to 13	1326.3	1334.3	1331.3 to 1321.3	1336.95	4.81	1332.14	0.043	3.41	1333.54	0.054	2.89	1334.06	0.051
MW-07C	20.5 to 30.5	1308.8	1334.3	1313.8 to 1303.8	1336.87	3.97	1332.9		2.38	1334.49		1.92	1334.95	
MW-08A	4 to 12	1075.5	1083.5	1079.5 to 1071.5	1085.51	5.15	1080.36		4.69	1080.97		5.04	1080.62	
MW-09A	3 to 6	1159.6	1164.11	1161.1 to 1158.1	1165.84	3.75	1162.09	-0.236	3.77	1162.07	-0.220	3.70	1162.14	-0.238
MW-09C	54.5 to 64.5	1104.9	1164.43	1109.9 to 1099.9	1166.02	16.82	1149.2		16.05	1150.03		16.95	1149.13	
MW-10B	3.5 to 8.5	990.9	996.94	993.4 to 988.4	999.3	3.4	995.9		2.95	996.35	0.054	3.53	995.77	0.018
MW-10C	30 to 40	961.8	996.76	966.8 to 956.8	998.74	0	998.74**		0.81	997.93		2.46	996.28	
MW-11A	3 to 10	972.2	978.71	975.7 to 968.7	980.5	4.27	976.23	-0.038	3.33	977.17	-0.048	2.02	978.48	-0.101
MW-11C	20 to 30	953.6	978.58	958.6 to 948.6	980.71	5.19	975.52		4.43	976.28		4.11	976.60	
MW-12C	9.5 to 17.5	1081.7	1095.16	1085.7 to 1077.7	1097.16	7.15	1090.01		6.94	1090.22		7.07	1090.09	
MW-13A	3 to 9	1104.6	1110.55	1107.6 to 1101.6	1112.25	4.42	1107.83		3.65	1108.60		3.88	1108.37	
MW-14A	4 to 9	976.5	983	979.0 to 974.0	984.13	2.28	981.85		2.03	982.10	-0.039	2.13	982.00	-0.039
MW14C	27.5 - 37.5	952.78	985.28	957.78 to 947.78	985.83	-	-		4.65	981.18	0.013	4.75	981.08	0.015
MW14D	32.88-150	891.64	983.08	950.2 to 833.08	985.20	-	-		3.23	981.97		3.18	982.02	
MW-15A	2.5-7	996.23	1000.98	998.5 to 994.0	1000.84	0.04	1000.8		0.13	1000.71		1.08	999.76	
MW-16A	3-9.5	980.3	986.56	983.6 to 977.1	988.09	3.69	984.4		3.62	984.47		3.65	984.44	
MW17A	3 - 8	1079.98	1085.48	1082.48 to 1077.48	1088.31	-	-		7.10	1081.21		6.32	1081.99	
MW18A	4 - 9	1186.78	1193.28	1189.28 to 1184.28	1195.51	-	-		9.15	1186.36		10.10	1185.41	
MW19A	8 - 16	1232.18	1244.18	1236.18 to 1229.18	1246.66	-	-		9.44	1237.22	-0.300	12.95	1233.71	-0.247
MW19C	26 - 36	1213.45	1244.45	1218.45 to 1208.45	1246.75	-	-		15.14	1231.61	0.030	17.49	1229.26	0.064
MW19D	30.76-150	1155.53	1245.91	1215.15 to 1095.91	1247.65	-	-		14.33	1233.32		14.68	1232.97	
MW20A	3.5 - 5.5	1019.84	1024.34	1020.84 to 1018.84	1027.12	-	-		5.59	1021.53	-0.078	5.29	1021.83	-0.094
MW20C	11 - 21	1008.51	1024.51	997.51 to 987.51	1026.94	-	-		6.29	1020.65	-0.225	6.18	1020.76	-0.216
MW20D	21.55-150	939.01	1024.78	1003.23 to 874.78	1026.23	-	-		21.23	1005.00		20.45	1005.78	
MW21A	5 - 12	1024.84	1033.34	1028.34 to 1021.34	1035.51	-	-		4.23	1031.28	-0.035	4.21	1031.30	-0.127
MW21C	19 - 29	1008.38	1032.38	1013.38 to 1003.38	1034.68	-	-		3.98	1030.70		5.47	1029.21	
MW22A	9 - 19	1046.23	1060.23	1051.23 to 1041.23	1062.47	-	-		5.85	1056.62		5.89	1056.58	
MW23A	4.75 - 14.75	1033.25	1043.00	1038.25 to 1028.25	1045.58	-	-		11.32	1034.26		11.58	1034.00	

Notes: [1] Downward gradients are <0; upward gradient are >0.
Value shown adjacent to the shallower well of well pair evaluated (A-B, B-C, or A-C if no B well).
DTW = depth to water (feet below reference elevation); GWSE = groundwater surface elevation
NM = not measured due to ice; ft msl = feet above mean sea level
A = shallow overburden; B = deep overburden/Till; C = shallow bedrock; D = deep bedrock
*Not measured due to surface water infiltration; ** = Flowing well/TIC elevation shown
"-" = not applicable

Table 5-6
Bedrock Borehole Geophysical Logging Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Borehole ID:	MW-14D	MW-19D	MW-20D
Sample Date:	11/4/2009	11/4/2009	11/4/2009
Parameter			
Total Depth (feet below top of casing)	151.4	151.4	151.50
Casing Length (feet)	35	32.5	23
Water Level (feet)	3.85	15.7	20.51
Caliper (inches)*	5.76	5.62	5.65
Temperature (°C)*	7.94	8.03	7.85
Fluid Resistivity (ohm-meters)*	71	47	19
Single Point Resistance (ohms)*	1015	607	491
Gamma (counts per sencond)*	105	95	100

Notes:
Casing length include approx 1.5 ft stickup above ground surface.
* Result listed is the median value for that borehole.
°C = degrees Celcius

Table 5-7
Site Hydraulic Conductivity Data
Ely Copper Mine Superfund Site
Vershire, Vermont

Stratagraphic Unit	Location	Hydraulic Conductivity (cm/sec)	Hydraulic Conductivity (ft/day)
Shallow Overburden	MW-02A (Slag)	6.10E-02	1.73E+02
	MW-04A	8.60E-04	2.44E+00
	MW-06A	3.58E-04	1.01E+00
	MW-07A	1.30E-03	3.69E+00
	MW-08A	1.64E-03	4.65E+00
	MW-09A	2.09E-04	5.92E-01
	MW-10B (fill/weathered bedrock)	2.54E-04	7.20E-01
	MW-11A	3.98E-04	1.13E+00
	MW-13A	3.38E-04	9.58E-01
	MW-14A	4.45E-04	1.26E+00
	MW-15A	2.42E-04	6.86E-01
	MW-16A	5.39E-04	1.53E+00
	MW-17A	2.82E-04	7.99E-01
	MW-18A	1.44E-04	4.07E-01
	MW-19A	1.77E-04	5.01E-01
	MW-20A	9.62E-05	2.73E-01
	MW-21A	2.87E-05	8.13E-02
	MW-22A	3.79E-04	1.07E+00
	MW-23A	2.88E-05	8.15E-02
	Average Shallow Overburden(excluding slag)	4.29E-04	1.22E+00
Glacial Till	MW-01B	4.74E-04	1.34E+00
	MW-02B	3.54E-05	1.00E-01
	MW-05B	3.00E-05	8.50E-02
	Average Glacial Till	1.80E-04	5.10E-01
Shallow Bedrock	MW-01C	6.49E-04	1.84E+00
	MW-02C	1.61E-04	4.56E-01
	MW-03C	1.99E-03	5.64E+00
	MW-04C	1.88E-04	5.33E-01
	MW-05C	7.36E-04	2.09E+00
	MW-06C	2.14E-04	6.07E-01
	MW-07C	7.65E-04	2.17E+00
	MW-09C	1.29E-05	3.66E-02
	MW-11C	5.78E-05	1.64E-01
	MW-12C	7.42E-04	2.10E+00
	MW-14C	9.24E-06	2.62E-02
	MW-19C	3.71E-04	1.05E+00
	MW-20C	6.73E-05	1.91E-01
	MW-21C	1.19E-04	3.37E-01
	Average Shallow Bedrock	*4.34E-04*	1.23E+00

Notes:
(ft/day) = feet per day
(cm/sec) = centimeter per second

Table 6-1
OU1 COPCs and COPECs
Ely Copper Mine Superfund Site
Vershire, Vermont

Analyte	Surface Soil - 0'-1' ft bgs [3]	Total Soil - 0'-10' ft bgs	Sediment	Surface Water	Vernal Pools	Overburden Groundwater	Shallow Bedrock Groundwater	Deep Bedrock Groundwater	Residential Groundwater	Soil Invertebrates	Small Mammals
Aluminum	H [1]	H	H	H		H, E [2]	H	H		E	E
Aroclor 1248								H			
Antimony	H	H				E	H				
Arsenic	H	H	H	H		H, E	H	H			E
Barium					E	H					
Beryllium							H				
Bis(2-Ethylhexyl)Phthalate								H			
Cadmium	H	H		H	E	H, E	H	H		E	E
Chromium	H	H	H	H		H, E	H	H	H	E	E
Cobalt	H	H	H	H		H, E	H	H			
Copper	H	H	H	H, E	E	H, E	H	H	H	E	E
Iron	H	H	H	H		H, E	H	H		E	E
Lithium			H	H							
Lead	H	H				H, E	H				E
Manganese	H	H	H	H	E	H, E	H	H		E	E
Mercury	H	H		H		E					
Molybdenum	H	H				H, E	H				
Nickel		H		H		H, E	H	H			
Selenium	H	H	H			E					
Silver	E					E				E	
Strontium	E					E					
Thallium	E					E					
Vanadium	H	H	H	H		H, E	H	H	H		
Zinc	E	H		H		H, E	H			E	E

Notes:
1. H = maximum detected concentration in exceedance of human health risk screening level.
2. E = maximum detected soil or surface water concentration in exceedance of ecological risk screening level or any compound detected in biota.
3. ft bgs = feet below ground surface.

Table 6-2
OU1 Contaminants of Concern
Ely Copper Mine Superfund Site
Vershire, Vermont

Parameter	Average Detected Concentration	Maximum Detected Concentration	Interim Clean-Up Level	Unit [7]	Frequency of Detection	Frequency of Exceedance	Basis for Interim Clean-Up Level
Soil							
Cobalt	44	1,500	24	mg/Kg	98%	35%	Ely Site-Specific
Copper	1,678	36,000	629	mg/Kg	96%	55%	Ely Site-Specific
Iron	74,697	456,000	44,800	mg/Kg	96%	41%	Ely Site-Specific
Sediment							
Copper	2,078	11,000	149	mg/Kg	100%	70%	Ely Site-Specific
Surface Water							
Aluminum	9,453	123,000	87	µg/L	89%	73%	NRWQC
Cadmium	6	55.8	1.1	µg/L	70%	57%	VTWQC [3]
Chromium	10	130	11	µg/L	57%	13%	VTWQC
Copper	4,546	91,800	8.6	µg/L	94%	84%	Ely Site-Specific [4]
Iron	8,811	199,000	1,000	µg/L	90%	56%	NRWQC
Lead	0.57	5.2	3.2	µg/L	58%	1%	VTWQC [3]
Mercury	0.048	0.16	0.012	µg/L	11%	11%	VTWQC
Nickel	42	456	52	µg/L	88%	22%	NRWQC [3]
Selenium	1.3	9.3	5	µg/L	47%	2%	VTWQC
Silver	0.11	5	3.2	µg/L	27%	0%	NRWQC [3]
Sulfide	681	1,300	2	µg/L	19%	19%	NRWQC
Zinc	569	8,192	106	µg/L	95%	70%	NRWQC [3]
Groundwater							
Aluminum	11,565	360,000	1,248	µg/L	62%	35%	Ely Site-Specific
Bis(2-Ethylhexyl)phthalate	5.1	7.5	6	µg/L	18%	9%	MCL [5]
Cadmium	7.5	36.8	5	µg/L	51%	28%	MCL/VTGWES
Chromium	12	365	100	µg/L	52%	2%	MCL/VTGWES
Cobalt	130	668	5	µg/L	61%	46%	Ely Site-Specific
Copper	4,318	49,581	588	µg/L	77%	37%	Ely Site-Specific
Iron	9,887	310,000	556	µg/L	76%	28%	Ely Site-Specific
Lead	3.6	52.2	15	µg/L	26%	1%	MCL/VTGWES
Manganese	754	4,033	300	µg/L	95%	47%	EPA Health Advisory
Molybdenum	14	92.7	40	µg/L	30%	3%	VTGWES
Nickel	43	402	100	µg/L	83%	12%	VTGWES
Sulfate	189,048	930,000	250,000	µg/L	99%	29%	VT GW Secondary Standard
Zinc	695	3,867	465	µg/L	68%	36%	Ely Site-Specific

Notes:
1. NRWQC = National Recommended Water Quality Criteria. 2009.
2. VTWQC = Vermont (VT) Water Quality Criteria. From the VT Water Quality Standards, Jan 2008.
3. Interim clean-up level adjusted for hardness based on VTWQC
   Appendix C or NRWQC note E. Assumes hardness = 100 mg/L.
4. Recommended aquatic BERA site-specific interim clean-up level adjusted for hardness = 9 ug/L x CF
   CF = 0.96 (EPA National Recommended Water Quality Criteria: Appendix A. 2009.)
5. MCL = Maximum Contaminant Level from National Primiary Drinking Water Regulations, May 2009.
6. VTGWES = VT Groundwater Enforcement Standard from VT Groundwater Protection Rules and Strategy.
7. µg/L = micrograms per liter. mg/Kg = milligrams per kilogram.

Table 6-3
OU1 Preliminary Remediation Goals
Ely Copper Mine Superfund Site
Vershire, Vermont

Analyte	OU1 Maximum Detected Concentration	Average Background Concentration	Preliminary Remediation Goal	Basis for PRG
Soil (mg/Kg)				
Cobalt	4,330	6.6	**24**	HHRA risk-based standard (NC) [1]
Copper	65,700	15	**629**	HHRA risk-based standard (NC) [1]
Iron	190,000	13,852	**44,800**	HHRA risk-based standard (NC) [1]
Sediment (mg/Kg)				
Copper	11,000	5.6	**149**	Aquatic BERA risk-based standard
Surface Water (µg/L)				
Aluminum	120,000	82	**87**	NRWQC [2]
Cadmium	55.8	ND (0.24) [6]	**1.10**	VTWQC [3, 4]
Chromium	130	1.2	**11**	VTWQC [3]
Copper	88,500	2.4	**8.6**	Site-Specific [5]
Iron	199,000	101.8	**1,000**	NRWQC [2]
Lead	17	0.1	**3.2**	VTWQC [3, 4]
Mercury	0.2	ND (0.2)	**0.012**	VTWQC [3]
Nickel	456	0.6	**52**	NRWQC [4]
Selenium	27	ND (1.0)	**5**	VTWQC [3]
Silver	4.2	ND (2.2)	**3.2**	NRWQC [4]
Zinc	8,192	149.5	**106**	VTWQC [3, 4]
Sulfide	1,300	ND (100)	**2.0**	NRWQC [2]

		Average Background Concentration [7]			
Analyte	**OU1 Maximum Detected Concentration**	**Overburden**	**Shallow Bedrock**	**Criteria [8]**	**Basis for Criteria**
Groundwater (µg/L)					
Aluminum	360,000	565	1,121	**1,248**	HHRA risk-based standard (NC) [1]
Cadmium	36.5	ND	ND	**5**	MCL/VTGWES [9, 10]
Chromium	365.4	4.1	3.8	**100**	MCL/VTGWES [9, 10]
Cobalt	668	13	14.0	**5**	HHRA risk-based standard (NC) [1]
Copper	49,581	9	9.7	**588**	MCL/VTGWES [9, 10]
Iron	310,000	581	711	**556**	HHRA risk-based standard (NC) [1]
Lead	52	ND	4.1	**15**	MCL/VTGWES [9, 10]
Manganese	4,026	33	38.0	**300**	Health advisory (VT Standard)
Molybdenum	93	ND	ND	**40**	VTGWES [10]
Nickel	402	12	6.8	**100**	VTGWES [10]
Zinc	3,867	64	27.0	**465**	HHRA risk-based standard (NC) [1]
Sulfate	930,000	NA	NA	**250,000**	VSGWQS[11]
Bis(2-Ethylhexyl)Phthalate	8	NA	NA	**6**	MCL/VTGWES [9, 10]

Notes:

1. HHRA = Human Health Risk Assessment; NC = noncancer based level
2. NRWQC = National Recommended Water Quality Criteria. 2009.
3. VTWQC = Vermont Water Quality Criteria. Vermont Water Quality Standards: Appendix C. Jan 2008.
4. Interim clean-up level adjusted for hardness based on VTWQC. Appendix C or NRWQC note E. Assumes hardness = 100 mg/L.
5. Recommended aquatic BERA site-specific interim clean-up level adjusted for hardness = 9 µg/L x CF
   CF = 0.96 (EPA National Recommended Water Quality Criteria: Appendix A. 2009.)
6. ND = non-detect with the average detection limit shown in parentheses; NA = not applicable
7. Average background concentrations include detected concentrations and NDs at one half the detection limit.
8. All Site groundwater impacts are incorporated in OU2 and no groundwater PRGs have formally been established for OU1.
9. MCL = Maximum Contaminant Level (National Primary Drinking Water Regulations, May 2009)
10. VTGWES = Vermont Primary Groundwater Enforcement Standard
11. VSGWQS = Secondary Groundwater Quality Standards, Vermont Groundwater Protection Rule and Strategy: Appendix 1, February 2005.
12. BERA = Baseline Ecological Risk Assessment

Table 6-4
OU1 Background Samples
Ely Copper Mine Superfund Site
Vershire, Vermont

Background Study Area	Station ID	Sampling Agency	Historic Station Name
Soil			
Off-Site Soil	BK-07A	URS	
Off-Site Soil	BK-07B	URS	
Off-Site Soil	BK-07C	URS	
Off-Site Soil	BK-08A	URS	
Off-Site Soil	BK-08B	URS	
Off-Site Soil	BK-08C	URS	
Off-Site Soil	BK-10A	URS	
Off-Site Soil	BK-10B	URS	
Off-Site Soil	BK-10C	URS	
Off-Site Soil	BK-14A	URS	
Off-Site Soil	BK-14B	URS	
Off-Site Soil	BK-14C	URS	
Off-Site Soil	BK-15A	URS	
Off-Site Soil	BK-15B	URS	
Off-Site Soil	BK-15C	URS	
Sediment			
EB Background	SED-20A	URS	EB-1430M
EB Background	SED-20C	URS	EB-1430M
EB Background	SED-20D	URS	EB-1430M
EBOR	OR-24050M	USGS, EPA, ADL	Site 1, SED10, F-13
EBOR	OR-24500M	ADL	LOC-53
EBOR	SED-26A	URS	OR-23650M
EBOR	SED-26B	URS	OR-23650M
EBOR	SED-26C	URS	OR-23650M
EBOR	SED-26D	URS	OR-23650M
ORT1	SED-22A	URS	ORT-1190M
ORT1	SED-22C	URS	ORT-1190M
ORT1	SED-22D	URS	ORT-1190M
ORT1	SED-23A	URS	ORT-1150M
ORT1	SED-23C	URS	ORT-1150M
ORT1	SED-23D	URS	ORT-1150M
ORT1	SED-24A	URS	ORT-1080M
ORT1	SED-24C	URS	ORT-1080M
ORT1	SED-24D	URS	ORT-1080M
SHB	SB-3300M	ADL	LOC-48
SHB	SB-3320M	USGS, ADL	ELYM-9-SS, Ely Bk station 2.3
SHB	SB-3670M	USGS, EPA	Site 1, SED6 EMTT-4 REF
SHB	SED-07A	URS	SB-3510M
SHB	SED-07B	URS	SB-3510M
SHB	SED-07C	URS	SB-3510M
SHB	SED-25A	URS	SBT1-6M
SHB	SED-25B	URS	SBT1-6M
SHB	SED-25C	URS	SBT1-6M
SHB	SED-25D	URS	SBT1-6M

Table 6-4
OU1 Background Samples
Ely Copper Mine Superfund Site
Vershire, Vermont

Background Study Area	Station ID	Sampling Agency	Historic Station Name
Surface Water			
EB Background	SW-20	URS	EB-1430M
EBOR	OR-24050M	USGS, EPA, ADL	Site 1, SED10, F-13
EBOR	OR-24150M	CRREL	OR-1
EBOR	OR-24500M	ADL	LOC-53
EBOR	SW-26	URS	OR-23650M
ORT1	SW-22	URS	ORT-1190M
ORT1	SW-23	URS	ORT-1150M
ORT1	SW-24	URS	ORT-1080M
SHB	SB-3290M	CRREL, URS	SB-1, SW-38
SHB	SB-3300M	ADL	LOC-48
SHB	SB-3670M	USGS, EPA	Site 1, SED6 EMTT-4 REF
SHB	SBT1-57M	ADL	LOC-50
SHB	SW-07	URS	SB-3510M
SHB	SW-25	URS	SBT1-6M
SHB	SW-38	URS	SB-3290M
Groundwater			
On-Site Groundwater	MW-07A	Nobis	
On-Site Groundwater	MW-07C	Nobis	

Notes:
EB = Ely Brook
EBOR = East Branch Ompompanoosuc River; ORT = Ompompanoosuc River Tributary
SHB = Schoolhouse Brook
URS = URS Corporation
USGS = United States Geological Survey
EPA = United States Environmental Protection Agency
ADL = Arthur D. Little Consultants
CRREL = United States Army Corp of Engineers, Cold Regions Research and Engineering Laboratory

Table 6-5
OU1 Background Concentration Summary
Ely Copper Mine Superfund SIte
Vershire, Vermont

Parameter	Samples	Average Detected Concentration	Maximum Detected Concentration	95% UCL	Unit
Soil					
Cobalt	16	7	16	8.5	mg/Kg
Copper	16	15	45	19	mg/Kg
Iron	16	13,830	31,000	17,442	mg/Kg
Sediment					
Copper	72	11	50	13	mg/Kg
Surface Water					
Aluminum	105	101	1,300	132	
Cadmium	71	1	2.5	1.1	µg/L
Chromium	87	2	5	2.0	µg/L
Copper	90	2	5	2.0	µg/L
Iron	102	133	2,000	187	µg/L
Lead	86	6	25	7.9	µg/L
Mercury	21	0.3	2.5	0.58	µg/L
Nickel	94	2	20	2.4	µg/L
Selenium	43	0.7	2.5	0.84	µg/L
Silver	66	0.4	2.5	0.56	µg/L
Sulfide	10	480	2,000	944	µg/L
Zinc	115	18	432.5	27	µg/L
Groundwater					
Aluminum	15	515	3,700	975	µg/L
Cadmium	11	1	2.5	2.1	µg/L
Chromium	14	3	6.1	4.5	µg/L
Cobalt	15	12	25	18	µg/L
Copper	13	8	12.5	10	µg/L
Iron	16	368	2,400	702	µg/L
Lead	14	3	5	4.2	µg/L
Manganese	16	25	123.2	40	µg/L
Molybdenum	14	1	2.5	1.8	µg/L
Nickel	15	7	20	11	µg/L
Sulfate	8	5,050	7,200		µg/L
Zinc	15	30	175.1	49	µg/L

Notes:
UCL = Upper Confidence Limit
mg/Kg = milligrams per kilograms
µg/L = micrograms per liter

Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background
Station:		BK-07A	BK-07B	BK-07C	BK-08A	BK-08B	BK-08C	BK-10A	BK-10B	BK-10C	BK-10C	BK-14A	BK-14B
Field Sample ID:		ELY-SS-BK-07A (0-3)	ELY-SS-BK-07B (0-3)	ELY-SS-BK-07C (0-4)	ELY-SS-BK-08A (0-10)	ELY-SS-BK-08B (0-7)	ELY-SS-BK-08C (0-12)	ELY-SS-BK-10A (0-6)	ELY-SS-BK-10B (0-1)	ELY-SS-BK-10C (0-6)	ELY-SS-BK-10C (0-6) DUP	ELY-SS-BK-14A (0-1)	ELY-SS-BK-14B (0-8)
Date:		10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007
Depth ft bgs:		0 - 0.25	0 - 0.25	0 - 0.33	0 - 0.83	0 - 0.58	0 - 1	0 - 0.5	0 - 0.08	0 - 0.5	0 - 0.5	0 - 0.08	0 - 0.67
Analyte	**PRGs**												
ALUMINUM	NA	12,000	6,700	5,800	9,900	5,200	12,000	12,000	12,000	10,000	12,000	8,200	6,600 J
ANTIMONY	NA	5 U	8.8 U	7.4 U	6.3 U	2.6 U	6 U	5.4 U	5.7 U	2.7 U	0.24 UJ	4.1 U	3.3 U
ARSENIC	NA	1.5	4.3	3.4	2.3	1.5	2.6	1.9	2.1	0.91	1.4	1.3	1 J
BARIUM	NA	78	54	130	190	98	350	59	64	70	79	25	29 J
BERYLLIUM	NA	1	0.6 J	0.51 J	0.65	0.37	0.94	0.7	0.67	0.65	0.75	0.5	0.5
CADMIUM	NA	1 U	1.8 U	0.52 J	0.34 UJ	0.21 J	0.4 J	1.1 U	1.1 U	0.21 UJ	0.24 UJ	0.82 U	0.2 J
CHROMIUM	NA	32	22	18	24	12	32	30	30	28	30	18	29 J
COBALT	24	16	8.7	7.4	7.7	4.6	14	7.8	7.6	6.7	8	5.6	3.8 J
COPPER	629	45	26	20	14	10	23	14	13	13	14	12	7.9 J
IRON	44,800	31,000	25,000	20,000	16,000	8,700	22,000	16,000	15,000	13,000	14,000	9,500	10,000 J
LEAD	NA	12	77	59	19	12	18	17	25	7.8	9.6	8.6	11 J
MANGANESE	NA	1700 J	620 J	940 J	1700 J	7800 J	5200 J	600 J	930 J	590 J	710 J	98 J	150
MERCURY	NA	0.082 J	0.19	0.21	0.088 J	0.06 J	0.13	0.084 J	0.14	0.052 J	0.064 J	0.12 J	0.02 J
MOLYBDENUM	NA	5 U	8.8 U	7.4 U	6.3 U	2.6 U	6 U	5.4 U	5.7 U	0.19 UJ	0.64 UJ	0.43 UJ	0.29 J
NICKEL	NA	28	18	15	18	9.5	30	20	21	19	21	13	12 J
SELENIUM	NA	2.1	2.9 J	2.5 J	1.5 J	0.98 J	2.2 J	1.2 J	1.5 J	0.94 J	1 J	1.4 J	1.2 J
SILVER	NA	0.61 UJ	0.65 UJ	0.58 UJ	0.49 UJ	0.44 UJ	1.4	0.22 UJ	0.34 UJ	0.2 UJ	0.24 UJ	0.16 UJ	0.078 UJ
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	1.4 J	1.3 J	1.2 J	1.3 J	0.91 J	4.3 J	2.1 U	1.2 J	1.1 U	1.1 U	1.6 U	6.5 U
VANADIUM	NA	59	58	40	28	15	39	32	32	26	30	18	27 J
ZINC	NA	56	37	86	74	40	74	37	41	44	49	25	21 J

Notes: Units are in mg/kg = miligram per kilogram .
TAL = Target Analyte List
UWA = Upper Waste Area; LWA = Lower Waste Area; TZ= Transition Zone; ORB = Ore Roast Bed; EB-LR = Ely Brook Lower Reach
Light gray highlighted cells indicate exceedance of criteria.
ft bgs = feet below ground surface
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit

Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	Background	Background	Background	Background	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA
	Station:	BK-14C	BK-15A	BK-15B	BK-15C	01JH31A	01JH31B	02ELY1A	02ELY1A	02ELY2A-B	02ELY2A-B	02ELY3	02ELY4A-B
	Field Sample ID:	ELY-SS-BK-14C (0-1)	ELY-SS-BK-15A (0-2)	ELY-SS-BK-15B (0-0.5)	ELY-SS-BK-15C (0-2.5)	01JH31A	01JH31B	02Ely 1A	02Ely 1B	02Ely 2A	02Ely 2B	02Ely 3	02Ely 4A
	Date:	10/16/2007	10/16/2007	10/16/2007	10/16/2007	11/10/2001	11/10/2001	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002
	Depth ft bgs:	0 - 0.08	0 - 0.17	0 - 0.04	0 - 0.21	0 - 0	0 - 0	0 - 0	0.82 - 0.82	0 - 0	0.82 - 0.82	0 - 0	0 - 0
Analyte	**PRGs**												
ALUMINUM	NA	9,700 J	840 J	1,800 J	1,300 J	48,100	31,200	44,000	45,000	45,000	46,000	57,000	53,000
ANTIMONY	NA	3.1 U	4 U	4.8 U	5.4 U	0.1 U	0.1 U	-	-	-	-	-	-
ARSENIC	NA	1.8 J	1.9 J	2.2 J	2.7 J	0.6	0.9	10 U	10 U	10 U	10 U	10 U	10 U
BARIUM	NA	21 J	26 J	29 J	19 J	257	67	163	164	160	158	126	171
BERYLLIUM	NA	0.62	0.028 J	0.14 J	0.095 J	1.7	0.3	1.1	1.1	1	1.1	1 U	1 U
CADMIUM	NA	0.25 J	0.28 J	0.52 J	0.32 J	3	3.4	2 U	2 U	2 U	2 U	2 U	2 U
CHROMIUM	NA	23 J	1.4 J	3.4 J	2.4 J	80	82	49	66	57	72	149	107
COBALT	24	5.9 J	0.35 J	1.3 J	0.92 J	325	145	31	28	31	31	39	37
COPPER	629	11 J	5.5 J	8 J	6.4 J	10100	11500	3680	1620	2320	1240	5660	2050
IRON	44,800	15,000 J	780 J	3,500 J	1,800 J	253,000	160,000	175,000	157,000	174,000	165,000	156,000	184,000
LEAD	NA	13 J	28 J	36 J	71 J	27	33	32	23	35	27	78	49
MANGANESE	NA	290	45	44	26	1600	160	1390	1160	1620	862	667	1050
MERCURY	NA	0.052 J	0.27 J	0.16 J	0.29 J	-	-	-	-	-	-	-	-
MOLYBDENUM	NA	0.64 J	4 U	0.64 J	0.37 J	29	10	31	32	28	27	18	33
NICKEL	NA	11 J	3.5 J	6.8 J	4.4 J	57	26	12	19	11	20	11	13
SELENIUM	NA	1.8 J	1.8 J	2.2 J	2.3 J	24	19	-	-	-	-	-	-
SILVER	NA	0.18 J	0.079 J	0.19 UJ	0.28 J	4.2	5.5	6.4	5.7	5.8	6	6.6	6.2
STRONTIUM	NA	-	-	-	-	32	24	87	100	80	104	71	80
THALLIUM	NA	6.2 U	1.6 U	1.9 U	2.2 U	0.6	0.7	-	-	-	-	-	-
VANADIUM	NA	32 J	3.9 J	11 J	9.2 J	116	1430	135	139	156	148	268	212
ZINC	NA	26 J	30 J	31 J	17 J	2580	744	102	91	201	105	341	194

Notes: Units are in mg/kg = miligram per kilogram
TAL = Target Analyte List
UWA = Upper Waste Area; LWA = Lower Waste Area; TZ= Transition Zone; ORB = Ore Roast Bed; EB-LR = Ely Brook Lower Reach
Light gray highlighted cells indicate exceedance of criteria.
ft bgs = feet below ground surface
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit

Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	UWA	UWA	UWA	UWA	UWA	UWA	Natural Forest	Natural Forest	Natural Forest	Natural Forest	Natural Forest	Natural Forest
	Station:	02ELY4A-B	02ELY5A-B	02ELY5A-B	02ELY6A-B	02ELY6A-B	ES-4_OCHRE	NF-14	NF-14	NF-15	NF-15	NF-16	NF-16
	Field Sample ID:	02Ely 4B	02Ely 5A	02Ely 5B	02Ely 6A	02Ely 6B	ES-4	ELY-SS-NF-14 (0-3)	ELY-SS-NF-14 (3-12)	ELY-SS-NF-15 (0-2)	ELY-SS-NF-15 (2-5)	ELY-SS-NF-16 (0-1)	ELY-SS-NF-16 (1-12)
	Date:	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007
	Depth ft bgs:	0.82 - 0.82	0 - 0	0.82 - 0.82	0 - 0	0.82 - 0.82	0 - 0	0 - 0.25	0.25 - 1	0 - 0.17	0.17 - 0.42	0 - 0.08	0.08 - 1
Analyte	**PRGs**												
ALUMINUM	NA	53,000	46,000	45,000	47,000	50,000	10,000	8,400	14,000	7,600 J	23,000 J	2,900 J	16,000 J
ANTIMONY	NA	-	-	-	-	-	-	7 U	11 U	6.2 U	12 U	2.7 U	12 U
ARSENIC	NA	10 U	10 U	10 U	10 U	10 U	10 U	2.7	1 J	2.8	2.5 U	1.2	2.5 U
BARIUM	NA	169	127	239	139	151	71	60 J	40 J	170	71	55	51
BERYLLIUM	NA	1 U	1 U	1.1	1 U	1	1 U	0.44 J	0.76 J	0.43 J	1.2	0.16 J	0.86 J
CADMIUM	NA	2 U	2 U	2 U	2 U	2 U	2 U	0.4 J	2.2 U	2.2	0.24 J	0.38 J	2.5 U
CHROMIUM	NA	102	75	86	73	98	1.3	21 J	33 J	20 J	50 J	9.1 J	41 J
COBALT	24	38	39	31	39	39	27	6.8	9.4	6.8	12	2.8	10
COPPER	629	1530	3250	1440	4220	2560	2640	37	54	24	35	21	130
IRON	44,800	159,000	214,000	138,000	183,000	159,000	456,000	14,000	17,000	11,000 J	27,000 J	4,800 J	20,000 J
LEAD	NA	42	46	27	52	42	4 U	32	6.3 J	35 J	13 J	19 J	7.5 J
MANGANESE	NA	1020	890	998	1340	1440	134	500	210	900 J	94 J	320 J	240 J
MERCURY	NA	-	-	-	-	-	-	0.1 J	0.045 J	0.2 J	0.078 J	0.1	0.04 J
MOLYBDENUM	NA	21	34	14	34	21	5.3	0.62 J	11 U	6.2 U	12 U	0.2 J	12 U
NICKEL	NA	16	12	20	12	18	11	20 J	26 J	18 J	39 J	7.4 J	30 J
SELENIUM	NA	-	-	-	-	-	-	1.6 J	1.6 J	2.4 J	2.3 UJ	1.2	2 UJ
SILVER	NA	5	8	3.6	9.7	7.6	4.2	0.33 J	2.2 U	0.62 J	0.21 J	0.27 J	0.16 J
STRONTIUM	NA	78	68	94	69	82	2.3	-	-	-	-	-	-
THALLIUM	NA	-	-	-	-	-	-	2.8 U	4.5 U	2.5 UJ	5 UJ	1.1 UJ	4.9 UJ
VANADIUM	NA	183	202	143	172	162	60	32 J	38 J	26 J	55 J	12 J	38 J
ZINC	NA	151	269	160	223	184	60	72	44	140	52	71	42

Notes: Units are in mg/kg = miligram per kilogram
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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	NOBIS
	Study Area	Natural Forest	Natural Forest	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA-TZ
	Station:	NF-17	NF-17	SA-24	SA-24	SA-25	SA-26	SA-27	SA-28	SA-29	SA-30	SA-31	SS-33
	Field Sample ID:	ELY-SS-NF-17 (0-4)	ELY-SS-NF-17 (4-10)	ELY-SS-SA-24 (0-6)	ELY-SS-SA-24 (0-6) DUP	ELY-SS-SA-25 (0-6)	ELY-SS-SA-26 (0-6)	ELY-SS-SA-27 (0-6)	ELY-SS-SA-28 (0-6)	ELY-SS-SA-29 (0-6)	ELY-SS-SA-30 (0-6)	ELY-SS-SA-31 (0-6)	SS-33X-083109AX
	Date:	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	8/31/2009
	Depth ft bgs:	0 - 0.33	0.33 - 0.83	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 2
Analyte	**PRGs**												
ALUMINUM	NA	1,600	16,000	3,700	4,100	5,600 J	970	4,500	4,700	3,200 J	7,000	1,200 J	24,800
ANTIMONY	NA	3.4 U	1.2 UJ	1.1 J	1.8 J	23 U	4.6 J	11 U	1.4 J	2 J	1.5 J	23 U	0.5 U
ARSENIC	NA	1.4	2.6 U	2.3 U	2.3 U	4.6 U	1.1 J	2.3 U	2.4 U	4.8 U	2.4 U	4.6 U	1 U
BARIUM	NA	170	91	47 J	50 J	51 J	41 J	49 J	42 J	40 J	72	39	65.8
BERYLLIUM	NA	0.13 J	0.94 J	0.26 J	0.35 J	0.28 UJ	1.2 U	0.4 UJ	0.58 J	0.26 UJ	0.6 J	2.3 U	0.49 J
CADMIUM	NA	1.3	0.23 UJ	1.5 J	1.4 J	4.6 U	2.2 J	0.8 UJ	1.4 J	4.8 U	0.28 J	0.59 J	0.41
CHROMIUM	NA	5.2	58	28 J	34 J	25 J	14 J	31 J	52 J	31 J	44	8.2 J	86.2
COBALT	24	3.9	10	12	14	9.7	13	16	14	12	11	5.7 J	18.1
COPPER	629	16	53	4700 J	1900 J	2600 J	2200 J	1400 J	1100	1900 J	510	2100	79.7
IRON	44,800	2,700	22,000	150,000	140,000	110,000 J	210,000	120,000	180,000	130,000 J	92,000	190,000 J	31,100
LEAD	NA	28 J	6.6 J	21	23	15 J	57	14	19	20 J	6.8 J	15 J	12.5
MANGANESE	NA	1000 J	460 J	68 J	77 J	110 J	26 J	68 J	80	58 J	91 J	33 J	484
MERCURY	NA	0.19	0.059 J	0.03 J	0.018 J	0.019 J	0.26	0.15	0.028 J	0.09 J	0.019 UJ	0.055 J	0.038 J
MOLYBDENUM	NA	0.24 UJ	13 U	11	10 J	19 J	17	16	18	21 J	9.3 J	69	0.61
NICKEL	NA	6.6	28	4.9 J	4.9 J	3.3 J	3.7 J	5.4 J	6.8 J	3 UJ	14	1.5 J	45.4
SELENIUM	NA	1.4	2.6 J	44	38	54 J	67	49	48	55 J	30	170	0.45 J
SILVER	NA	0.35 J	0.2 UJ	11	6	6	16	4.8	5.3	8.2	2.1 J	17	0.73 J
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	6
THALLIUM	NA	0.45 J	5.3 UJ	4.5 U	4.6 U	3.7 J	4.8 U	3.2 J	9.7 U	9.5 U	4.9 UJ	9.2 UJ	0.14 J
VANADIUM	NA	8	52	70	78	100 J	54	81	100 J	180 J	74	64 J	78.9
ZINC	NA	120	46	110	110	110 J	70	85	88	91 J	46	65	114

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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
	Study Area	UWA-TZ	UWA-TZ	UWA-TZ	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA
	Station:	SS-34	SS-35	SS-36	SS-37	SS-37	SS-38	SS-39	TN	TN	TP	TQ	TQ
	Field Sample ID:	SS-34X-082609AX	SS-35X-082609AX	SS-36X-082609AX	SS-37X-082609AX	SS-37X-082609AD	SS-38X-082609AX	SS-39X-082609AX	TN-02X-082509AX	TN-02X-082509AD	TN-10X-082709AX	TQ-16X-082609AX	TQ-06X-082609AX
	Date:	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/25/2009	8/25/2009	8/27/2009	8/26/2009	8/26/2009
	Depth ft bgs:	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Analyte	**PRGs**												
ALUMINUM	NA	27,800	14,000	22,800	6,600	7,130	4,740	7,620	18,800	24,600	19,100	23,200	8,850
ANTIMONY	NA	0.5 U	0.079 J	0.5 U	0.49 U	0.074 J	0.093 J	0.062 J	0.11 J	0.13 J	0.079 J	0.056 J	0.048 J
ARSENIC	NA	1.7	1 U	1 UJ	0.99 UJ	1 UJ	0.99 UJ	1 UJ	1.4	2	1 UJ	0.62 J	1 U
BARIUM	NA	145	57.8	56.5	97.9	104	68.3	127	33.1	41.1	43.8	77.7	40.1
BERYLLIUM	NA	0.63	0.22 J	0.53	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.54	0.7	0.45 J	0.53	0.08 J
CADMIUM	NA	0.2 J	0.071 J	0.18 J	0.0066 J	0.016 J	0.016 J	0.04 J	0.12 J	0.15 J	0.18 J	0.14 J	0.017 J
CHROMIUM	NA	67.8	66.7	48	43	45.5	53.6	46.2	39.1	49.4	48.6	55.9	52.1
COBALT	24	18.4	11.1	15.9	9.2	8.8	7.2	22.2	8.3	9.2	9.7	10.2	4.1 J
COPPER	629	287	313	114 J	632 J	503 J	655 J	611 J	61	78.3	135 J	109	288
IRON	44,800	32,500	34,100	25,900	103,000	97,500	107,000	126,000	20,300	25,300	24,900	26,100	73,700
LEAD	NA	12.6	84.5	10 J	13.3 J	12.2 J	13.6 J	36.8 J	12.1	14.6	15.9 J	8.5	6.1
MANGANESE	NA	873	167	296 J	68.9 J	68.1 J	81.9 J	233 J	315	289	263 J	228	78.1
MERCURY	NA	0.034 J	0.024 J	0.02 J	0.095 U	0.09 U	0.024 J	0.1 U	0.059 J	0.075 J	0.057 J	0.033 J	0.037 J
MOLYBDENUM	NA	0.69	0.99	0.69	4.8	4.7	5.2	14.7	0.73	0.58	0.62	0.33 J	0.84
NICKEL	NA	64.5	27.2	44.8	21.5	22.3	15.3	8.2	27.8	34.7	32.8	40.1	23.3
SELENIUM	NA	0.42 J	2.3	0.35 J	9.4	9.2	14.3	15.9	0.62 J	0.68 J	0.76 J	0.46 J	2.7
SILVER	NA	1 U	1 U	0.23 J	1.8	1.9	2.4	3	0.16 J	0.17 J	0.38 J	0.38 J	1.4
STRONTIUM	NA	19.3	2.7	5.4	3.8	4.1	2.3	10.9	5.2	6.9	4.4	4.4	1.2
THALLIUM	NA	0.39	0.17 J	0.11 J	0.2 J	0.26	0.15 J	0.41	0.1 J	0.13 J	0.11 J	0.16 J	0.12 J
VANADIUM	NA	64.6	51.6	52.5	65.6	64	72.5	91.6	37.9	48.3	47.5	50.5	52.8
ZINC	NA	69.1	55.6	63.9	23.5	22.3	22.1	49.4	58.6	72	76.1	76	38

Notes: Units are in mg/kg = miligram per kilogram
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Table 6-6
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Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA
	Station:	TR-07A	TR-07A	TR-07B	TR-07B	TR-07C	TR-07C	TR-07D	TR-07D	TR-08A	TR-08A	TR-08A	TR-08A
	Field Sample ID:	ELY-SS-TR-07A (0-1)	ELY-SS-TR-07A (1-8)	ELY-SS-TR-07B (0-2)	ELY-SS-TR-07B (2-8)	ELY-SS-TR-07C (0-2)	ELY-SS-TR-07C (2-12)	ELY-SS-TR-07D (0-2)	ELY-SS-TR-07D (2-9)	ELY-SS-TR-08A (0.5-12)	ELY-SS-TR-08A (0.5-12)DUP	ELY-SS-TR-08A (0-0.5)	ELY-SS-TR-08A (0-0.5) DUP
	Date:	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007
	Depth ft bgs:	0 - 0.08	0.08 - 0.67	0 - 0.17	0.17 - 0.67	0 - 0.17	0.17 - 1	0 - 0.17	0.17 - 0.75	0.04 - 1	0.04 - 1	0 - 0.04	0 - 0.04
Analyte	**PRGs**												
ALUMINUM	NA	2,200	8,000	8,700	17,000	2,500	17,000	8,600	16,000	5,100 J	4,800 J	5,300 J	5,500 J
ANTIMONY	NA	18 U	11 U	16 U	12 U	4.4 U	13 U	5.5 U	11 U	23 U	8.1 J	1.8 UJ	24 U
ARSENIC	NA	1.6 J	1.1 J	1.6 J	2.6	2.5	1.5 J	2.4	2.3 U	1.4 J	4.8 U	2.3 U	4.9 U
BARIUM	NA	34 J	66 J	84 J	49 J	40 J	46 J	19 J	40 J	40 J	55 J	68	70 J
BERYLLIUM	NA	0.19 J	0.58 J	0.54 J	0.86 J	0.13 J	0.86 J	0.44 J	0.84 J	0.36 UJ	0.29 J	0.41 UJ	0.38 UJ
CADMIUM	NA	3.6 U	0.31 J	0.31 J	0.29 J	0.52 J	0.22 J	0.24 J	0.19 J	4.7 U	4.8 U	0.5 UJ	4.9 U
CHROMIUM	NA	12 J	44 J	40 J	47 J	5.5 J	39 J	22 J	39 J	39 J	34 J	34 J	36 J
COBALT	24	7.9	15	17	14	7.4	12	5.8	9.6	9.5	12	8.6	9.5 J
COPPER	629	420 J	470 J	630 J	560 J	340 J	480 J	61 J	44	4,000 J	1,400 J	950	880 J
IRON	44,800	29,000	81,000	56,000	32,000	6,800	21,000	14,000	18,000	120,000 J	120,000 J	94,000 J	100,000 J
LEAD	NA	19	17	43	16	74	11 J	43	8.6 J	46 J	37 J	62 J	58 J
MANGANESE	NA	120 J	110 J	300 J	290 J	56 J	360 J	110 J	260	69 J	68 J	83 J	81 J
MERCURY	NA	0.23	0.052 J	0.094 J	0.051 J	0.26	0.053 J	0.1	0.057 J	0.49 J	0.55 J	0.16	0.14 J
MOLYBDENUM	NA	2.2 J	6.3 J	2.6 J	1.2 J	0.86 J	13 U	0.61 J	1.1 J	10 J	17 J	9.4 J	10 J
NICKEL	NA	5.9 J	13	12	37	10	30	15	27 J	11 J	10 J	9.1 J	10 J
SELENIUM	NA	11	21	14	4.1 J	3.9	1.6 J	2.1 J	1.6 J	42 J	38 J	28	33 J
SILVER	NA	1.7 J	2.6	4	0.53 J	6.4	0.29 J	0.49 J	0.16 J	9	7	4.7	5.9
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	2.6 J	2.9 J	2.4 J	4.9 U	1.8 U	5.1 U	2.2 U	4.6 U	6.9 J	7.2 J	4.6 UJ	5.2 J
VANADIUM	NA	26	67	63	49	15	42	31	38 J	68 J	67 J	62 J	67 J
ZINC	NA	130	76	120	78	50	56	58	58	93 J	99 J	120	110 J

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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA
	Station:	TR-08B	TR-08B	TR-08B	TR-08B	TR-08C	TR-08C	TR-08C	TR-08C	TR-08D	TR-08D	TR-08D	TR-08D
	Field Sample ID:	ELY-SS-TR-08B (0-3)	ELY-SS-TR-08B (0-3) DUP	ELY-SS-TR-08B (3-8)	ELY-SS-TR-08B (3-8) DUP	ELY-SS-TR-08C (0-5)	ELY-SS-TR-08C (0-5) DUP	ELY-SS-TR-08C (5-12)	ELY-SS-TR-08C (5-12) DUP	ELY-SS-TR-08D (0-2)	ELY-SS-TR-08D (0-2) DUP	ELY-SS-TR-08D (2-12)	ELY-SS-TR-08D (2-12) DUP
	Date:	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007
	Depth ft bgs:	0 - 0.25	0 - 0.25	0.25 - 0.67	0.25 - 0.67	0 - 0.42	0 - 0.42	0.42 - 1	0.42 - 1	0 - 0.17	0 - 0.17	0.17 - 1	0.17 - 1
Analyte	**PRGs**												
ALUMINUM	NA	5,600 J	1,900 J	9,400 J	4,600 J	6,100 J	12,000 J	9,800 J	9,300 J	6,400 J	8,300 J	14,000 J	14,000 J
ANTIMONY	NA	2.2 J	4.5 J	3.5 J	2.4 J	14 U	2.4 J	0.96 J	1.2 J	4.1 U	3.9 U	4.4 U	12 U
ARSENIC	NA	3.2 J	2.5 J	1.3 J	5.1 U	1.3 J	2.8 U	2.6 U	2.6 U	1.6	2.3	0.98	0.96 J
BARIUM	NA	120 J	83 J	83 J	35 J	67 J	110 J	48 J	55 J	180 J	140 J	59 J	60 J
BERYLLIUM	NA	0.29 UJ	2.4 U	0.35 UJ	2.6 U	0.27 UJ	0.64 J	0.54 J	0.58 J	0.26 J	0.39	0.66	0.66 J
CADMIUM	NA	0.47 J	4.8 U	0.41 J	5.1 U	0.27 J	0.43 J	0.62 J	0.47 J	1.5	1	0.25 J	0.22 J
CHROMIUM	NA	37 J	11 J	44 J	29 J	46 J	90 J	72 J	74 J	17	24 J	37 J	39 J
COBALT	24	21	6 J	19	20	8	13	14 J	13	7.4	9.2	11	12
COPPER	629	1,400 J	360 J	1,400 J	2,600 J	1,600 J	930 J	500 J	450 J	36 J	49 J	110 J	650 J
IRON	44,800	140,000 J	37,000 J	130,000 J	170,000 J	48,000 J	78,000 J	98,000 J	100,000 J	8,800 J	11,000 J	16,000 J	18,000 J
LEAD	NA	180 J	55 J	180 J	160 J	12 J	24 J	18 J	18 J	23 J	46 J	5.5 J	6.4 J
MANGANESE	NA	110 J	470 J	150 J	100 J	84 J	180 J	140 J	130 J	950 J	790 J	330 J	350 J
MERCURY	NA	0.14 J	0.23 J	0.15 J	0.16 J	0.065 J	0.045 J	0.046 J	0.021 J	0.1 J	0.24 J	0.055 J	0.032 J
MOLYBDENUM	NA	16 J	8.5 J	13 J	20 J	1.6 UJ	4 UJ	5.6 J	7.5 J	0.37 UJ	0.61 UJ	4.4 U	2.1 UJ
NICKEL	NA	11 J	6.5 J	14	11 J	3.6 J	9.6	5.1 J	5.7 J	17	22	27	29
SELENIUM	NA	44 J	13 J	37 J	67 J	22 J	24 J	33 J	40 J	1.5 J	2.1 J	1.5 J	1.6 J
SILVER	NA	12	4.9	9.8	15	9.6	2.2 J	2.6	2.1 J	0.52 J	0.65 J	0.11 UJ	0.41 UJ
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	10 J	4.1 J	7 J	3.4 J	5.8 U	5.5 U	1.9 J	3.5 J	1.6 U	1.6 U	1.8 U	4.6 U
VANADIUM	NA	75 J	20 J	75 J	51 J	78 J	110 J	120 J	120 J	18 J	26 J	34 J	35 J
ZINC	NA	210 J	250 J	190 J	270 J	100 J	140 J	130 J	120 J	190 J	100 J	47 J	59 J

Notes: Units are in mg/kg = miligram per kilogram
TAL = Target Analyte List
UWA = Upper Waste Area; LWA = Lower Waste Area; TZ= Transition Zone; ORB = Ore Roast Bed; EB-LR = Ely Brook Lower Reach
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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA-TZ	UWA-TZ	UWA-TZ	UWA-TZ
	Station:	TR-09A	TR-09A	TR-09B	TR-09B	TR-09C	TR-09C	TR-09D	TR-09D	TZ-34	TZ-34	TZ-35	TZ-35
	Field Sample ID:	ELY-SS-TR-09A (0-2.5)	ELY-SS-TR-09A (2.5-12)	ELY-SS-TR-09B (0-2)	ELY-SS-TR-09B (2-5)	ELY-SS-TR-09C (0-1.5)	ELY-SS-TR-09C (1.5-8)	ELY-SS-TR-09D (0-3)	ELY-SS-TR-09D (3-12)	ELY-SS-TZ-34 (0-2.5)	ELY-SS-TZ-34 (2.5-8)	ELY-SS-TZ-35 (0-2)	ELY-SS-TZ-35 (2-9)
	Date:	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007
	Depth ft bgs:	0 - 0.21	0.21 - 1	0 - 0.17	0.17 - 0.42	0 - 0.13	0.13 - 0.67	0 - 0.25	0.25 - 1	0 - 0.21	0.21 - 0.67	0 - 0.17	0.17 - 0.75
Analyte	**PRGs**												
ALUMINUM	NA	16,000	18,000	3,800	11,000	3,500	4,600	940	5,600	2,400	17,000	2,200	12,000
ANTIMONY	NA	15 U	12 U	3.8 U	7.5 U	1.7 UJ	0.94 UJ	7.1 U	2.5 UJ	5.5 U	12 U	2.5 UJ	1.1 J
ARSENIC	NA	1.3 J	0.9 J	1.7	1.8	2.7 U	2.4 U	1.7	2.7 U	1.5	1.1 J	2.5 J	0.92 J
BARIUM	NA	98 J	91 J	8.3	32	54	56	31	68	25 J	35 J	82	88
BERYLLIUM	NA	0.77 J	0.78 J	0.12 J	0.55 J	0.22 UJ	0.33 UJ	0.052 UJ	0.41 UJ	0.12 J	0.6 J	3 U	0.58 J
CADMIUM	NA	0.38 UJ	0.52 UJ	0.39 J	0.21 UJ	2.7 U	2.4 U	0.84 J	0.45 UJ	0.36 J	0.3 J	6 U	2.6 U
CHROMIUM	NA	67 J	68 J	11	47	21	28	2.5	28	10 J	68 J	12	57
COBALT	24	14	26	5.9	9.6	6	9.2	7.1	20	4	17	3.9 J	12
COPPER	629	790 J	1,100 J	1,000	520	820	920	170	810	64 J	470 J	840	940
IRON	44,800	36,000	37,000	4,800	22,000	75,000	98,000	6,400	140,000	6,100	31,000	47,000	50,000
LEAD	NA	19	6.2 J	11 J	16 J	10 J	13 J	38 J	16 J	32	15	68 J	19 J
MANGANESE	NA	290 J	510 J	29 J	130 J	87 J	71 J	36 J	95 J	110 J	260 J	38 J	170 J
MERCURY	NA	0.093 J	0.024 J	0.12 J	0.042 UJ	0.094 J	0.04 UJ	0.22 J	0.033 UJ	0.2 J	0.046 J	0.35	0.055 J
MOLYBDENUM	NA	1.7 J	1.7 J	0.38 UJ	7.5 U	5.9 J	8.4 J	0.87 J	18	0.45 J	12 U	3.9 J	2.5 J
NICKEL	NA	33	37	6.2	24	7.2	9.1	6	9.6	7.5	34	6.3 J	22
SELENIUM	NA	6.4	6.6	1.7	3.7	27	36	5.2	63	3	3.2 J	15	9.6
SILVER	NA	3.1	0.81 J	10	2.9	3.6	2.4	22	4.4	0.9 J	0.51 J	11	3.2
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	2 J	4.7 U	1.5 UJ	3 UJ	5.3 UJ	4.9 UJ	2.8 UJ	5.5 UJ	2.2 U	5 U	4 UJ	5.2 UJ
VANADIUM	NA	61	58	9.4	42	41	55	7.4	55	13	59	37	57
ZINC	NA	94	96	30	46	39	43	80	55	180	110	44	66

Notes: Units are in mg/kg = miligram per kilogram
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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	UWA-TZ	UWA-TZ	UWA-TZ	UWA-TZ	UWA	UWA	UWA	UWA	UWA-TZ	UWA-TZ	UWA	UWA
	Station:	TZ-36	TZ-36	TZ-37	TZ-37	TZ-38	TZ-38	TZ-39	TZ-39	TZ-40	TZ-40	TZ-41	TZ-41
	Field Sample ID:	ELY-SS-TZ-36 (0-1.5)	ELY-SS-TZ-36 (1.5-9)	ELY-SS-TZ-37 (0-2)	ELY-SS-TZ-37 (2-12)	ELY-SS-TZ-38 (0.5-7)	ELY-SS-TZ-38 (0-0.5)	ELY-SS-TZ-39 (0-3)	ELY-SS-TZ-39 (3-8)	ELY-SS-TZ-40 (0-2)	ELY-SS-TZ-40 (2-10)	ELY-SS-TZ-41 (0-1.5)	ELY-SS-TZ-41 (1.5-11)
	Date:	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007
	Depth ft bgs:	0 - 0.13	0.13 - 0.75	0 - 0.17	0.17 - 1	0.04 - 0.58	0 - 0.04	0 - 0.25	0.25 - 0.67	0 - 0.17	0.17 - 0.83	0 - 0.13	0.13 - 0.92
Analyte	**PRGs**												
ALUMINUM	NA	4,300	18,000	2,200 J	5,600	6,200 J	3,800 J	2,500 J	7,400 J	4,100 J	11,000 J	8,200	14,000
ANTIMONY	NA	12 U	12 U	30 U	2.6 UJ	1.9 UJ	23 U	24 U	2.8 J	5.5 U	11 U	1.2 J	12 U
ARSENIC	NA	0.84 J	0.76 J	2.2 J	5.6 U	2.4 U	4.5 U	3.7 J	5.4 U	2.2	1.7 J	1.5 J	2.3 J
BARIUM	NA	55 J	58 J	84 J	61	50	38	53 J	45 J	180	58	120 J	63 J
BERYLLIUM	NA	0.27 UJ	0.93 J	0.2 UJ	0.63 UJ	0.24 UJ	2.3 U	0.14 UJ	0.42 UJ	0.26 J	0.58 J	0.43 J	0.72 J
CADMIUM	NA	0.5 UJ	0.33 UJ	6 U	5.6 U	2.4 U	0.84 J	4.8 U	5.4 U	2.3	2.2 U	0.67 J	0.28 J
CHROMIUM	NA	23 J	54 J	12 J	32	32 J	14 J	12 J	34 J	12 J	28 J	38 J	40 J
COBALT	24	5.9	14	6.2 J	17	11	7.5 J	9.1 J	17	9.9	10	13	11
COPPER	629	690 J	270 J	460 J	490	1,400	3700	530 J	1,500 J	110	260	1,000 J	510 J
IRON	44,800	59,000	36,000	60,000 J	160,000	87,000 J	39,000 J	53,000 J	170,000 J	9,600 J	20,000 J	86,000	48,000
LEAD	NA	10 J	11 J	16 J	34 J	19 J	20 J	90 J	93 J	38 J	28 J	48	20
MANGANESE	NA	97 J	250 J	78 J	99 J	110 J	220 J	54 J	110 J	1600 J	420 J	340 J	240 J
MERCURY	NA	0.065 J	0.077 J	0.12 J	0.036 UJ	0.022 J	0.16 J	0.57 J	2.8 J	0.16 J	0.028 J	0.17	0.062 J
MOLYBDENUM	NA	6.3 J	2 J	6.7 J	20 J	4.3 J	4.2 J	6.5 J	26 J	0.53 J	11 U	5.6 J	2.1 J
NICKEL	NA	8.5	32	6 J	11 J	12 J	8.7 J	10 J	8 J	16 J	25 J	11	23
SELENIUM	NA	21	7.7	25 J	66	28	15	20 J	76 J	3.1	3.2 UJ	26	11
SILVER	NA	2.7	0.83 J	6.2	5.4 J	4	4.3 J	14	14	1.3	0.33 J	3.2	1.2 J
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	4.7 U	4.7 U	12 U	11 UJ	3 J	9 UJ	9.6 U	6.8 J	2.2 UJ	4.4 UJ	6.1 U	4.8 U
VANADIUM	NA	40	52	32 J	85	37 J	19 J	44 J	130 J	16 J	28 J	80	55
ZINC	NA	42	69	97 J	45	89	190	97 J	95 J	330	46	120	69

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Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	UWA	UWA	UWA	UWA	LWA	LWA	LWA	LWA	LWA	LWA	LWA	Natural Forest
	Station:	SB-06	TP-15	TP-15	TP-15	02ELY7A-B	02ELY7A-B	02ELY8A-B-	02ELY8A-B-	02ELY8A-B-	ELY00JH22	ELY00JH24	NF-10
	Field Sample ID:	ELY-SB-6 (0-2)	TP-15X-073009AX	TP-15X-073009AD	TP-15X-073009BX	02Ely 7A	02Ely 7B	02Ely 8A	02Ely 8B	02Ely 8C	Ely00JH22	Ely00JH24	ELY-SS-NF-10 (0-4)
	Date:	12/2/2006	7/30/2009	7/30/2009	7/30/2009	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	6/27/2000	6/27/2000	10/16/2007
	Depth ft bgs:	0 - 2	0 - 1	0 - 1	1 - 2	0 - 0	0.82 - 0.82	0 - 0	1.15 - 1.15	2.33 - 2.33	0 - 0	0 - 0	0 - 0.33
Analyte	**PRGs**												
ALUMINUM	NA	7,500	7,370	8,060	15,400	41,000	40,000	38,000	50,000	49,000	42,600	43,100	16,000 J
ANTIMONY	NA	28 U	0.5 UJ	0.5 UJ	0.5 UJ	-	-	-	-	-	-	-	17 U
ARSENIC	NA	5.5 U	1 U	1 U	1.4	10 U	10 U	10 U	10 U	11	10 U	10 U	2.1 J
BARIUM	NA	61 J	115	96	101	121	106	178	179	140	283	254	91 J
BERYLLIUM	NA	2.8 U	0.5 U	0.5 U	0.26 J	1	1 U	1 U	1	1 U	1 U	1 U	0.83 J
CADMIUM	NA	5.5 U	0.25 UJ	0.25 UJ	0.25 UJ	2 U	2 U	2 U	2 U	42	2 U	2 U	0.82 J
CHROMIUM	NA	45 J	42.3	42.5	59.8	45	38	38	68	103	48	71	45 J
COBALT	24	11	9.2 J	8.4 J	9.5 J	34	54	25	20	1040	14	19	12 J
COPPER	629	1,700 J	584	462	269	7,020	6,540	2,240	1,510	25,600	5,100	2,400	85 J
IRON	44,800	130,000	111,000	91,600	51,700	184,000	196,000	160,000	108,000	190,000	194,000	183,000	20,000 J
LEAD	NA	13 J	29.3 J	14.5 J	8.7 J	57	63	50	46	52	69	82	36 J
MANGANESE	NA	100 J	90 J	167 J	224	2420	1740	2520	2050	2010	2180	1920	500 J
MERCURY	NA	0.026 UJ	0.1 U	0.099 U	0.1 U	-	-	-	-	-	-	-	0.059 J
MOLYBDENUM	NA	9.7 J	10.2	6.8	2.9	46	46	28	20	18	42	69	17 U
NICKEL	NA	18 J	15.5	17	34	11	13	7.2	7	237	3 U	3 U	30 J
SELENIUM	NA	25	23.7	18.4	7	-	-	-	-	-	-	-	1.7 UJ
SILVER	NA	2.3 J	2.5	1.8	0.99 U	10	13	8.4	6.8	5.4	8	9	0.47 UJ
STRONTIUM	NA	-	7.3	6.6	4.6	61	58	61	80	55	72	79	-
THALLIUM	NA	11 U	0.34 J	0.27 J	0.28 J	-	-	-	-	-	-	-	6.9 U
VANADIUM	NA	67	63.9	55.3	56.3	145	150	139	144	132	197	211	44 J
ZINC	NA	72	51.2	50.7	68.3	216	214	219	113	3960	149	207	79

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Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	Natural Forest	Natural Forest	Natural Forest	Natural Forest	Natural Forest	Natural Forest	Natural Forest	LWA	LWA	LWA	LWA	LWA
	Station:	NF-10	NF-11	NF-11	NF-12	NF-12	NF-13	NF-13	SA-16	SA-17	SA-18	SA-19	SA-20
	Field Sample ID:	ELY-SS-NF-10 (4-12)	ELY-SS-NF-11 (0-3)	ELY-SS-NF-11 (3-9)	ELY-SS-NF-12 (0-2)	ELY-SS-NF-12 (2-9)	ELY-SS-NF-13 (0-2.5)	ELY-SS-NF-13 (2.5-12)	ELY-SS-SA-16 (0-6)	ELY-SS-SA-17 (0-6)	ELY-SS-SA-18 (0-6)	ELY-SS-SA-19 (0-6)	ELY-SS-SA-20 (0-6)
	Date:	10/16/2007	10/16/2007	10/16/2007	10/19/2007	10/19/2007	10/19/2007	10/19/2007	10/17/2007	10/16/2007	10/17/2007	10/16/2007	10/17/2007
	Depth ft bgs:	0.33 - 1	0 - 0.25	0.25 - 0.75	0 - 0.17	0.17 - 0.75	0 - 0.21	0.21 - 1	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Analyte	**PRGs**												
ALUMINUM	NA	21,000 J	18,000 J	20,000 J	14,000	24,000	14,000	12,000	2,400	1,100 J	2,700 J	5,900 J	860 J
ANTIMONY	NA	13 U	21 U	12 U	5.8 U	12 U	14 U	12 U	25 U	26 U	24 U	25 U	2 J
ARSENIC	NA	1.8 J	4.2	1.9 J	3	2.4 U	2.1 J	2.4 U	5 U	5.2 U	4.8 U	5 U	3.8 J
BARIUM	NA	61 J	120 J	79 J	34	63	76	68	48	36 J	43	74 J	34 J
BERYLLIUM	NA	1 J	0.94 J	0.96 J	0.72	1.3	0.6 J	0.59 J	0.25 UJ	2.6 U	0.2 UJ	0.43 UJ	2.4 U
CADMIUM	NA	0.51 J	1.1 J	0.45 J	0.39 J	0.25 J	0.45 J	0.38 J	0.65 J	5.2 U	4.8 U	0.61 J	0.73 J
CHROMIUM	NA	61 J	53 J	51 J	28 J	47 J	44 J	48 J	22	8.8 J	18 J	38 J	7.3
COBALT	24	14 J	16 J	13 J	7.1	16	12	12	21	4.4 J	10	19 J	5.5 J
COPPER	629	66 J	94 J	110 J	23	48	520	570	3,300	1,600 J	1,300	1,400 J	3,200
IRON	44,800	25,000 J	23,000 J	21,000 J	14,000	26,000	43,000	59,000	190,000	160,000 J	150,000 J	160,000 J	170,000
LEAD	NA	16 J	94 J	18 J	44	7.8 J	16	9.6 J	30	14 J	48 J	45 J	30
MANGANESE	NA	410 J	1700 J	660 J	140 J	140 J	230 J	150 J	26 J	18 J	54 J	120 J	26 J
MERCURY	NA	0.037 J	0.12 J	0.032 J	0.068 J	0.029 J	0.092 J	0.02 J	0.34	0.034 J	0.04 J	0.031 J	0.032 J
MOLYBDENUM	NA	13 U	21 U	12 U	0.59 UJ	12 U	1.8 J	4.2 J	38	16 J	18 J	12 J	41
NICKEL	NA	35 J	33 J	31 J	22	53	28	24	3.9 J	13 UJ	4.2 J	5.6 J	1.1 J
SELENIUM	NA	1.7 UJ	2.5 UJ	1.6 UJ	1.5 J	1.4 J	8.3	17	84	31	44	37	86
SILVER	NA	0.3 UJ	0.82 UJ	0.29 UJ	1.2 U	2.4 U	2.4 J	1 J	23	4.9 J	5.3	6.2	8.6
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	5.3 U	8.3 U	4.8 U	2.3 U	4.9 U	5.5 U	4.8 U	8.7 J	7.5 J	3 J	7.8 J	5 J
VANADIUM	NA	59 J	59 J	50 J	32	48	47	56	120	57 J	65 J	81 J	76 J
ZINC	NA	60	120	64	60 J	44 J	110 J	87 J	310	50	78	180	49

Notes: Units are in mg/kg = miligram per kilogram
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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
	Study Area	LWA	Tailing	LWA	LWA-TZ	LWA-TZ	LWA-TZ	LWA-TZ	Natural	LWA-TZ	Natural	LWA	LWA
	Station:	SA-21	SA-22	SA-23	SS-20	SS-20	SS-21	SS-23	SS-24	SS-25	SS-26	SS-27	SS-27
	Field Sample ID:	ELY-SS-SA-21 (0-6)	ELY-SS-SA-22 (0-6)	ELY-SS-SA-23 (0-6)	SS-20X-083109AX	SS-20X-083109BX	SS-21X-083109AX	SS-23X-082709AX	SS-24X-083109AX	SS-25X-082709AX	SS-26X-083109AX	SS-27X-082609AX	SS-27X-082609BX
	Date:	10/17/2007	10/17/2007	10/19/2007	8/31/2009	8/31/2009	8/31/2009	8/27/2009	8/31/2009	8/27/2009	8/31/2009	8/26/2009	8/26/2009
	Depth ft bgs:	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.2	0.2 - 1.5	0 - 0.2	0 - 1	0 - 0.2	0 - 1	0 - 0.3	0 - 1	1 - 2
Analyte	**PRGs**												
ALUMINUM	NA	5,700 J	2,700 J	8,700	7,340	26,000	4,320	11,300	5,150	4,210 J	13,100	4,140 J	28,500
ANTIMONY	NA	24 U	0.58 J	23 U	0.31 J	0.49 U	1.8	0.26 J	0.36 J	0.36 J	0.28 J	0.38 J	0.5 U
ARSENIC	NA	4.7 U	0.41 UJ	4.6 U	2.3	0.7 J	1.4	3.2 J	2.4	3.5 J	3.5	2.2 J	2.3 J
BARIUM	NA	34 J	46 J	57	34.3	47.4	14.6 J	75.1	148	177 J	214	111 J	102
BERYLLIUM	NA	0.21 UJ	0.55 J	0.39 UJ	0.11 J	0.76	0.068 J	0.3 J	0.11 J	0.3 J	0.32 J	0.18 J	0.52
CADMIUM	NA	0.78 J	0.66 J	0.39 J	0.26	0.34	0.4	0.87	2.2	2.5	2.9	4.8	0.29
CHROMIUM	NA	29	18	92 J	23.1	54	13.5	30.1	14.8	14 J	32.4	12.1 J	82.5
COBALT	24	10	3.1	27	4.4 J	8.4	4.5 J	18	7.3	4.9 J	13.9	7.5 J	26.2
COPPER	629	2,800	89	670	85.9	192	50.8	103 J	45.8	231 J	64	1,370 J	1,180 J
IRON	44,800	130,000	41,000 J	130,000	15,400	33,500	8,560	17,000	8,870	5,820 J	19,600	8,320 J	36,800
LEAD	NA	21 J	26	27	47 J	12.2 J	26 J	71.2 J	107 J	116 J	109	82 J	10.2 J
MANGANESE	NA	110 J	86 J	150 J	62.7 J	119 J	70 J	450 J	1160 J	991 J	2170	893 J	1170 J
MERCURY	NA	0.02 J	0.026 J	0.05 J	0.081 J	0.054 J	0.057 J	0.081 J	0.13	0.17	0.21	0.25	0.098 J
MOLYBDENUM	NA	16 J	12	6 UJ	1.3	0.81	0.6	0.79	0.52	1.4	0.81	1.2	5.8
NICKEL	NA	8.6 J	2 J	15	16.1	39.5	8.6	23.1	13.7	15.6 J	33.2	27.4 J	61.5
SELENIUM	NA	52	40	26	1.6	0.46 J	0.59 J	1.2	0.6 J	5.9	0.9 J	4	2
SILVER	NA	4.4 J	5.7	2.9 J	0.42 J	0.49 J	0.16 J	0.41 J	0.51 J	0.77 J	0.36 J	1.6 J	0.51 J
STRONTIUM	NA	-	-	-	5.5 J	3.5 J	4.8 J	24.8	35 J	107 J	33.1	107 J	22.8
THALLIUM	NA	9.5 U	2.9 J	5.2 UJ	0.024 J	0.088 J	0.02 J	0.081 J	0.091 J	0.21 J	0.21 J	0.44	0.39
VANADIUM	NA	60 J	31 J	110	31.1	64.1	20.3	36	20.5	25.4 J	43.2	14.4 J	67.5
ZINC	NA	130	24	140 J	59.5	65.4	28.8	71.7	122	43.2 J	225	99 J	85.7

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Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	URS
	Study Area	Natural	LWA-TZ	LWA	LWA	LWA-TZ	LWA	EB-UR-TZ	LWA	LWA	LWA	LWA	LWA
	Station:	SS-28	SS-29	SS-30	SS-30	SS-32	TH	TI	TK	TL	TO	TR-04A	TR-04A
	Field Sample ID:	SS-28X-083109AX	SS-29X-083109AX	SS-30X-083109AX	SS-30X-083109AD	SS-32X-083109AX	TH-01X-082509AX	TI-03X-082509AX	TK-01X-082509AX	TL-04X-082509AX	TO-05X-082709AX	ELY-SS-TR-04A (0-1)	ELY-SS-TR-04A (1-12)
	Date:	8/31/2009	8/31/2009	8/31/2009	8/31/2009	8/31/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/27/2009	10/17/2007	10/17/2007
	Depth ft bgs:	0 - 1	0 - 0.3	0 - 2	0 - 2	0 - 2	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 0.08	0.08 - 1
Analyte	**PRGs**												
ALUMINUM	NA	13,000	13,300	3,270	3,520	21,100	8,460	22,500	14,000	18,100	14,100	10,000 J	3,900 J
ANTIMONY	NA	0.17 J	0.3 J	0.052 J	0.5 U	0.5 U	0.27 J	0.098 J	0.062 J	0.19 J	0.058 J	35 U	14 U
ARSENIC	NA	2.4	1.6	0.99 U	1 U	1.1	0.99 U	1	0.97 J	1.9	1 UJ	7 U	2.8 U
BARIUM	NA	64.3	134	168	150	66.5	99.3	46	72.5	49.4	75	130	28
BERYLLIUM	NA	0.23 J	0.23 J	0.5 U	0.5 U	0.53	0.04 J	0.54	0.41 J	0.4 J	0.25 J	0.68 UJ	0.26 UJ
CADMIUM	NA	0.26	3.5	0.05 J	0.054 J	0.69	0.23 J	0.12 J	0.33	0.2 J	0.13 J	0.57 J	8.5
CHROMIUM	NA	38.9	48.9	32.8	32.3	45	50.3	47.3	35.2	51.3	43.6	58 J	23 J
COBALT	24	12.1	12.2	4.5 J	5.7	18.7	11.1	12.6	8.3	10.2	18	12 J	200
COPPER	629	95.4	65.6	1,400	1,390	327	1,920	61.8	110	68.6	1,100 J	1,700	23,000
IRON	44,800	22,400	17,700	166,000	181,000	22,400	96,600	23,600	17,400	20,800	74,000	150,000 J	44,000 J
LEAD	NA	55.6	92.8	36.2	33.2	7.9	29.5	22.7	26.8	15	17.9 J	86 J	13 J
MANGANESE	NA	450	813	41.5	49.7	180	139	322	467	338	383 J	150 J	90 J
MERCURY	NA	0.078 J	0.23	0.031 J	0.018 J	0.031 J	0.053 J	0.071 J	0.07 J	0.048 J	0.099 U	0.079 J	0.022 J
MOLYBDENUM	NA	0.72	0.9	11.5	14.4	0.45 J	7.3	0.43 J	0.5	0.69	3.7	17 J	3.2 UJ
NICKEL	NA	32.9	36.2	3.3 J	3 J	51	16.6	42.6	30.3	29.7	22.7	15 J	46 J
SELENIUM	NA	0.7 J	1.1	15.6	16.4	1	18.2	0.58 J	0.42 J	0.69 J	7.7	58	48
SILVER	NA	0.5 J	0.73 J	5.1	6.2	0.19 J	5.2	0.27 J	1 U	0.28 J	1.4	6.4 J	2.5 J
STRONTIUM	NA	5.4	26	9.8	9.6	23	5.2	4.6	13.8	4.6	7.2	-	-
THALLIUM	NA	0.1 J	0.15 J	0.51	0.46	0.61	0.32	0.18 J	0.18 J	0.17 J	0.17 J	14 UJ	5.6 UJ
VANADIUM	NA	58.2	42.9	107	116	37.9	64.7	39.6	33.8	46	55.2	94 J	29 J
ZINC	NA	60.1	195	85	114	443	107	77.5	75.1	55.2	85.7	120	860

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Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	LWA	LWA	LWA	LWA	LWA	LWA	LWA	LWA	LWA	LWA	LWA	LWA
	Station:	TR-04B	TR-04B	TR-04C	TR-04C	TR-05A	TR-05A	TR-05B	TR-05B	TR-05C	TR-05C	TR-05D	TR-05D
	Field Sample ID:	ELY-SS-TR-04B (0-1.5)	ELY-SS-TR-04B (1.5-12)	ELY-SS-TR-04C 0-3)	ELY-SS-TR-04C (3-6)	ELY-SS-TR-05A (0-2.5)	ELY-SS-TR-05A (2.5-9)	ELY-SS-TR-05B (0-1)	ELY-SS-TR-05B (1-7)	ELY-SS-TR-05C (0-1)	ELY-SS-TR-05C (1-12)	ELY-SS-TR-05D (0-3)	ELY-SS-TR-05D (3-12)
	Date:	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007
	Depth ft bgs:	0 - 0.13	0.13 - 1	0 - 0.25	0.25 - 0.5	0 - 0.21	0.21 - 0.75	0 - 0.08	0.08 - 0.58	0 - 0.08	0.08 - 1	0 - 0.25	0.25 - 1
Analyte	**PRGs**												
ALUMINUM	NA	1,600 J	17,000 J	7,300 J	22,000 J	4,500 J	4,400 J	6,500 J	7,900 J	8,900 J	16,000 J	8,300 J	8,400 J
ANTIMONY	NA	4.1 U	6.5 U	12 U	18 U	0.68 J	1.8 J	0.65 J	0.83 J	6.2 U	0.33 J	0.7 J	1.2 J
ARSENIC	NA	0.9	1 J	3.7	2.4 J	4.2	5.5 U	1.8 U	2 U	2.2 U	0.59 UJ	4.7	0.96 UJ
BARIUM	NA	22	37	110	160	26 J	58 J	28 J	26 J	24 J	44 J	40 J	46
BERYLLIUM	NA	0.084 UJ	0.84	0.36 J	0.99 J	0.15 UJ	0.25 UJ	0.18 UJ	0.18 UJ	0.34 J	0.66	0.34 J	0.34 J
CADMIUM	NA	0.25 J	0.31 J	1.4 J	0.72 J	1.4 J	5.5 U	0.95 J	1.1	0.69 J	0.96 J	1.4 J	1.4
CHROMIUM	NA	5.1 J	50 J	21 J	64 J	22	28	35	46	72	150	60	82
COBALT	24	1.8	11	7.4	14	11	13	9.1	8.4	15	27	14	11
COPPER	629	42	240	240	1,300	750	690	770	730	550	430	940	1,300
IRON	44,800	3,900 J	22,000 J	22,000 J	94,000 J	48,000	120,000	50,000	54,000	33,000	35,000	72,000	77,000
LEAD	NA	17 J	15 J	15 J	40 J	59	20 J	22	17	21	0.72 J	40	7.8
MANGANESE	NA	81 J	180 J	540 J	260 J	130 J	69 J	81 J	100 J	66 J	120 J	83 J	82 J
MERCURY	NA	0.27	0.33	0.13 J	0.14 J	0.31	0.11	0.048 J	0.038 J	0.042 J	0.031 J	0.13 J	0.085 J
MOLYBDENUM	NA	0.5 UJ	0.48 UJ	1.7 J	6.3 J	4.7 J	16 J	3.7 J	2.2 J	0.95 J	4.9 U	3.8 J	3.1 J
NICKEL	NA	3.9 J	31 J	16 J	34 J	12 J	10 J	12 J	14 J	19 J	41 J	17 J	15 J
SELENIUM	NA	1.7	1.6 J	7.8	25	15	47	12	9.4	5.3	2.6	16	18
SILVER	NA	0.31 J	0.12 J	0.83 J	2.8 J	19	11	2.1	0.86 J	0.91 J	0.11 J	11	2.4
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	1.6 UJ	2.6 UJ	4.6 UJ	7.3 UJ	2.8 J	4.3 J	5.7 U	5.1 U	2.2 J	1.4 J	2.8 J	6.6 U
VANADIUM	NA	7.2 J	47 J	25 J	80 J	44 J	53 J	39 J	50 J	49 J	71 J	66 J	100 J
ZINC	NA	35	77	160	130	99	78	66	56	72	120	100	51

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Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	LWA	LWA	LWA	LWA	LWA	LWA	EB-MR	EB-MR	LWA-TZ	LWA-TZ	LWA	LWA
	Station:	TR-06A	TR-06A	TR-06B	TR-06B	TR-06C	TR-06C	TZ-22	TZ-22	TZ-23	TZ-23	TZ-26	TZ-26
	Field Sample ID:	ELY-SS-TR-06A (0-1)	ELY-SS-TR-06A (1-12)	ELY-SS-TR-06B (0-3)	ELY-SS-TR-06B (3-7)	ELY-SS-TR-06C (0-3)	ELY-SS-TR-06C (3-12)	ELY-SS-TZ-22 (0-2)	ELY-SS-TZ-22 (2-10)	ELY-SS-TZ-23 (0-2.5)	ELY-SS-TZ-23 (2.5-12)	ELY-SS-TZ-26 (0-1.5)	ELY-SS-TZ-26 (1.5-12)
	Date:	10/19/2007	10/19/2007	10/19/2007	10/19/2007	10/19/2007	10/19/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007
	Depth ft bgs:	0 - 0.08	0.08 - 1	0 - 0.25	0.25 - 0.58	0 - 0.25	0.25 - 1	0 - 0.17	0.17 - 0.83	0 - 0.21	0.21 - 1	0 - 0.13	0.13 - 1
Analyte	**PRGs**												
ALUMINUM	NA	10,000	3,600	6,800	10,000	17,000	12,000	4,800 J	8,900 J	2,500	18,000	3,100 J	7,500
ANTIMONY	NA	15 U	25 U	18 U	22 U	18 U	14 U	23 U	14 U	4 U	12 U	10 U	1.1 J
ARSENIC	NA	3 U	4.9 U	1.3 J	2.7 J	7.9	2.4 J	2.1 J	2.9 U	1.9	0.73 J	2.6	1.8 J
BARIUM	NA	76	47	66	84	100	70	110	61	18	56	46 J	63
BERYLLIUM	NA	0.4 J	0.15 UJ	0.34 UJ	0.37 UJ	0.61 J	0.52 J	0.21 UJ	0.47 UJ	0.13 J	0.83 J	0.11 UJ	0.39 UJ
CADMIUM	NA	0.44 J	0.45 J	0.36 J	4.3 U	0.43 J	0.27 J	2.4 J	0.46 J	0.29 J	0.25 J	1 J	0.6 J
CHROMIUM	NA	48 J	37 J	31 J	42 J	48 J	42 J	18 J	42 J	8.1	54	12	39
COBALT	24	9.8	20	6.3 J	10	14	9.6	41	12	2.4	11	6.9	11
COPPER	629	650	580	410	1,200	1,100	730	1,600	2,200	56	260	3,500	860
IRON	44,800	86,000	140,000	42,000	66,000	50,000	50,000	55,000 J	99,000 J	5,000	20,000	24,000 J	84,000
LEAD	NA	24	83	38	38	21	21	21 J	21 J	16	5.6 J	54	21
MANGANESE	NA	100 J	130 J	66 J	95 J	170 J	140 J	1200 J	140 J	51 J	140 J	61 J	100 J
MERCURY	NA	0.058 J	0.045 J	0.27	0.23	0.087 J	0.061 J	0.12 J	0.035 J	0.18	0.045 J	0.23	0.11
MOLYBDENUM	NA	5 J	18 J	3.6 J	4.2 J	2.4 J	3.4 J	4.8 J	9.6 J	0.4 UJ	12 U	2.3 J	7.6 J
NICKEL	NA	19	5.2 J	14	19	30	23	22 J	16 J	7.4	34	6.9 J	15
SELENIUM	NA	25	83	12	17	11	15	26	29	2.5	1.8 J	13	34
SILVER	NA	6.4	5.8	9.9	5.7	13	1.7 J	3.1 J	3.1	0.55 J	0.28 UJ	4.7	5.1
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	3.2 UJ	5.2 UJ	3.2 UJ	2.7 UJ	2.2 UJ	3.1 UJ	3 J	5.8 UJ	1.6 U	2.2 J	4 U	5.3
VANADIUM	NA	58	55	44	48	51	50	27 J	63 J	11	44	22 J	54
ZINC	NA	76 J	170 J	77 J	68 J	93 J	81 J	110	100	40	49	130	78

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	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	LWA	LWA	Tailing	Tailing	LWA	LWA	LWA	LWA	UWA-TZ	UWA-TZ	UWA	UWA
	Station:	TZ-27	TZ-27	TZ-28	TZ-28	TZ-29	TZ-29	TZ-30	TZ-30	TZ-31	TZ-31	TZ-32	TZ-32
	Field Sample ID:	ELY-SS-TZ-27 (0-2.5)	ELY-SS-TZ-27 (2.5-8)	ELY-SS-TZ-28 (0.5-9)	ELY-SS-TZ-28 (0-0.5)	ELY-SS-TZ-29 (0-1)	ELY-SS-TZ-29 (1-9)	ELY-SS-TZ-30 (0.5-12)	ELY-SS-TZ-30 (0-0.5)	ELY-SS-TZ-31 (0-3)	ELY-SS-TZ-31 (3-9)	ELY-SS-TZ-32 (0-2)	ELY-SS-TZ-32 (2-9)
	Date:	10/16/2007	10/16/2007	10/19/2007	10/19/2007	10/19/2007	10/19/2007	10/19/2007	10/19/2007	10/19/2007	10/19/2007	10/19/2007	10/19/2007
	Depth ft bgs:	0 - 0.21	0.21 - 0.67	0.04 - 0.75	0 - 0.04	0 - 0.08	0.08 - 0.75	0.04 - 1	0 - 0.04	0 - 0.25	0.25 - 0.75	0 - 0.17	0.17 - 0.75
Analyte	**PRGs**												
ALUMINUM	NA	8,600 J	21,000 J	7,000	13,000	7,400	13,000	12,000	8,700	8,900	12,000	12,000	18,000
ANTIMONY	NA	32 U	17 U	11 U	1 J	18 U	14 U	14 U	1.9 J	6.6 U	13 U	13 U	13 U
ARSENIC	NA	13	2.2 J	2.3	7.5	3.7 U	2.8 U	1.4 J	1.8 J	4.3	2.2 J	2.5 J	2.7 U
BARIUM	NA	130 J	60 J	31	45	110	73	69	58	15 J	22	29	37
BERYLLIUM	NA	0.51 J	1 J	0.27 UJ	0.41 J	0.49 J	0.84 J	0.43 J	0.3 UJ	0.43 J	0.54 J	0.45 J	0.54 J
CADMIUM	NA	1.6 J	0.44 J	2.3 U	0.32 J	0.53 J	0.8 J	0.34 J	0.26 J	0.13 J	2.6 U	0.39 J	0.3 J
CHROMIUM	NA	38 J	52 J	24 J	27 J	50 J	82 J	52 J	33 J	28 J	37 J	59 J	78 J
COBALT	24	16 J	14 J	5.4	8.3	12	17	10	8.5	6.8	8.6	15	20
COPPER	629	680 J	610 J	380	1,700	620	740	1,300	1,100	300 J	240	440	640
IRON	44,800	52,000 J	34,000 J	28,000	26,000	100,000	120,000	60,000	46,000	18,000	21,000	30,000	31,000
LEAD	NA	200 J	63 J	4.8 J	24	28	19	33	29	60	20	31	8 J
MANGANESE	NA	310 J	260 J	95 J	140 J	130 J	160 J	120 J	110 J	81 J	100 J	160 J	280 J
MERCURY	NA	0.58	0.32	0.009 J	0.11 J	0.22	0.091 J	0.07 J	0.069 J	0.007 J	0.032 J	0.14	0.11
MOLYBDENUM	NA	5.6 J	1.3 J	1.6 UJ	1.4 J	11 J	12 J	3.4 J	5.8 J	1.3 J	1.6 J	1.6 UJ	1.8 UJ
NICKEL	NA	20 J	33 J	13	18	12	19	24	18	17	22	24	33
SELENIUM	NA	13	3.6 UJ	5.9	7.8	32	44	13	11	3	2.5 J	4.7 J	2.7 J
SILVER	NA	2.8 J	0.39 UJ	0.36 J	1.2 J	6	3.5	1.2 J	1.4 J	2.5	1.4 J	2.6 J	1.1 J
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	13 U	6.8 U	1.4 UJ	4.6 U	3.9 UJ	4.4 UJ	5.8 U	6.5 U	1.3 J	5.2 U	2.1 UJ	5.4 U
VANADIUM	NA	84 J	60 J	26	28	86	120	51	39	41	38	58	67
ZINC	NA	170	88	57 J	67 J	140 J	160 J	64 J	86 J	44	56 J	97 J	100 J

Notes: Units are in mg/kg = miligram per kilogram
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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	URS
	Study Area	UWA	UWA	LWA-TZ	LWA	Tailing	LWA	LWA	Natural Forest	Natural Forest	Natural Forest	Natural Forest	Natural Forest
	Station:	TZ-33	TZ-33	MW-17A	MW-21A	MW-22A	TP-16	TP-16	NF-05	NF-05	NF-06	NF-06	NF-08
	Field Sample ID:	ELY-SS-TZ-33 (0-2)	ELY-SS-TZ-33 (2-12)	MW-17A-073009AX	MW-21A-083109AX	MW-22A-083109AX	TP-16X-080309AX	TP-16X-080309BX	ELY-SS-NF-05 (0-3)	ELY-SS-NF-05 (3-11)	ELY-SS-NF-06 (0-3)	ELY-SS-NF-06 (3-12)	ELY-SS-NF-08 (0-2)
	Date:	10/18/2007	10/18/2007	7/30/2009	8/31/2009	8/31/2009	8/3/2009	8/3/2009	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007
	Depth ft bgs:	0 - 0.17	0.17 - 1	0 - 2	0 - 2	0 - 2	0 - 1	1 - 2	0 - 0.25	0.25 - 0.92	0 - 0.25	0.25 - 1	0 - 0.17
Analyte	**PRGs**												
ALUMINUM	NA	2,700	8,500	20,700	3,850	4,610	17,800	19,300	13,000 J	10,000 J	14,000 J	15,000 J	20,000 J
ANTIMONY	NA	0.44 J	0.84 J	0.5 UJ	0.11 J	0.097 J	0.5 UJ	0.5 UJ	13 U	12 U	16 U	18 U	12 U
ARSENIC	NA	1.4	2.4 U	2.4	1 U	1 U	0.36 J	0.56 J	3.2	2.4	1.9 J	2.1 J	1.2 J
BARIUM	NA	23 J	50 J	75.4	78.4	89.2	119	113	48 J	36 J	72 J	64 J	49 J
BERYLLIUM	NA	0.13 J	0.42 J	0.61	0.5 U	0.5 U	0.36 J	0.44 J	0.68 J	0.55 J	0.68 J	0.69 J	0.95 J
CADMIUM	NA	0.64 J	0.34 J	0.25 UJ	0.5	0.14 J	0.7 J	0.35 J	1 J	1 J	2.5 J	1.9 J	0.36 J
CHROMIUM	NA	12 J	55 J	45.7	35.9	29	43.4	52.4	29 J	22 J	32 J	33 J	48 J
COBALT	24	5.6	14	17.9	7.5	25.3	23.1	16.2	42 J	50 J	16 J	14 J	12 J
COPPER	629	260	700	107	2,240	866	554	205	1,500 J	1,400 J	300 J	290 J	56 J
IRON	44,800	22,000	85,000	24,800	170,000	136,000	30,600	25,000	39,000 J	36,000 J	18,000 J	18,000 J	20,000 J
LEAD	NA	14	23	5.7 J	42.6 J	34.9	48.7	8.6 J	75 J	34 J	24 J	22 J	6.7 J
MANGANESE	NA	42	120	389	61.9 J	156	1070	687	300 J	410 J	1200 J	1000 J	240 J
MERCURY	NA	0.2 J	0.041 J	0.094 U	0.099 U	0.044 J	0.84	0.097 U	0.12	0.079 J	0.11 J	0.12 J	0.064 J
MOLYBDENUM	NA	1.4 J	6.2 J	0.5 U	8.4	11	1.3	0.78	2.7 J	3 J	16 U	1.2 J	12 U
NICKEL	NA	7.4 J	14 J	55.2	5.3	9.2	37	45.9	19 J	16 J	24 J	24 J	38 J
SELENIUM	NA	9.2	25	0.25 J	15.6	16.9	1.3 J	0.43 J	5.6	4.3 J	2.6 UJ	1.3 UJ	1.4 UJ
SILVER	NA	7.1	2.6	0.99 U	8.9	4.5	0.18 J	1 U	1.5 J	0.51 UJ	0.64 UJ	0.6 UJ	0.14 UJ
STRONTIUM	NA	-	-	4.4	18.7 J	6.3	6.5	6.9	-	-	-	-	-
THALLIUM	NA	2.6 U	4.7 U	0.38 J	0.29	0.37	0.24 J	0.31 J	5.4 U	4.7 U	6.6 U	2.9 J	4.7 U
VANADIUM	NA	21 J	72 J	47.6	75.7	70.2	48.8	48.4	36 J	23 J	32 J	33 J	39 J
ZINC	NA	97	100	65.4	235	227	118	90.9	360	470	110	97	56

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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	URS
	Study Area	Natural Forest	EB-LR-TZ	EB-LR-TZ	EB-MR-TZ	Natural Forest	LWA-TZ	EB-LR-TZ	EB-LR-TZ	ORB-TZ	EB-LR-TZ	EB-LR-TZ	EB-LR-TZ
	Station:	NF-08	SS-10	SS-11	SS-12	SS-16	SS-17	TA	TA	TF	TF	TR-03C	TR-03C
	Field Sample ID:	ELY-SS-NF-08 (2-11)	SS-10X-090309AX	SS-11X-090309AX	SS-12X-090309AX	SS-16X-090309AX	SS-17X-083109AX	TA-04X-082409AX	TA-14X-082409AX	TF-02X-090109AX	TF-17X-090109AX	ELY-SS-TR-03C (0-3)	ELY-SS-TR-03C (3-12)
	Date:	10/16/2007	9/3/2009	9/3/2009	9/3/2009	9/3/2009	8/31/2009	8/24/2009	8/24/2009	9/1/2009	9/1/2009	10/17/2007	10/17/2007
	Depth ft bgs:	0.17 - 0.92	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.3	0 - 1	0 - 1	0 - 2	0 - 2	0 - 0.25	0.25 - 1
Analyte	**PRGs**												
ALUMINUM	NA	15,000 J	12,400	41,900 J	5,910	19,500	13,000	16,500	18,300	8,050	18,300	1,700	12,000
ANTIMONY	NA	18 U	0.2 J	0.2 J	0.5 U	0.14 J	0.31 J	0.13 J	0.23 J	0.49 U	0.5 U	5.5 U	14 U
ARSENIC	NA	2.6 J	2.6	6.5 J	0.76 JE	2.3	4.2	1.3	1.1	1 U	1 U	1.3	1.4 J
BARIUM	NA	100 J	63.4	122 J	28.8	55.2	56.7	50.1	90.3	130	63.7	60 J	32 J
BERYLLIUM	NA	0.69 J	0.41 J	0.82 J	0.15 J	0.54	0.27 J	0.52	0.61	0.063 J	0.35 J	0.035 UJ	0.57 J
CADMIUM	NA	1.2 J	2.4	1.4	0.37	0.39	0.92	1.1	1	0.35	0.22 J	2.3	2.9 U
CHROMIUM	NA	35 J	21.9	111 J	20.6	40.4	35.2	26.8	30.9	40.9	72.8	2.6 J	35 J
COBALT	24	11 J	10.6	18.1 J	5.8	13.7	9.2	9.8	15.2	13.5	16.6	7.8	5.4 J
COPPER	629	47 J	605	897 J	149	80.1	265	365	632	1,350	81.7	190 J	270 J
IRON	44,800	14,000 J	20,800	78,700 J	9,760	26,300	28,700	20,900	23,300	89,000	25,000	9,500	25,000
LEAD	NA	27 J	93.9 J	74.9 J	19.5 J	18.7 J	59.8 J	27.6	116	29.5	9.6	22	23
MANGANESE	NA	660 J	360 J	306 J	139 J	1070 J	214 J	527	717	118	441	33	92
MERCURY	NA	0.11 J	0.12	0.26	0.078 J	0.061 J	0.17	0.12	0.36	0.056 J	0.062 J	0.19 J	0.044 J
MOLYBDENUM	NA	18 U	1.1	2.4	0.32 J	0.49 J	2.9	0.95	1	8.4	0.7	0.66 J	14 U
NICKEL	NA	29 J	16.7	66.3 J	10.6	32	25.1	19.2	23.6	16.3	37	4.9	15
SELENIUM	NA	1.6 UJ	2	3.3	0.8 J	0.47 J	4.4	1	1.4	17.6	0.64 J	4.6	3.6 J
SILVER	NA	0.34 UJ	0.86 J	3 J	1 U	1 U	2.4	0.29 J	0.35 J	5.3	0.45 J	5.5	0.55 J
STRONTIUM	NA	-	31.5	18.1 J	11.5	6.4	9.7 J	12.7	18	13	14.5	-	-
THALLIUM	NA	7 U	0.16 J	0.35	0.043 J	0.16 J	0.098 J	0.1 J	0.17 J	0.28	0.11 J	2.2 U	5.8 U
VANADIUM	NA	32 J	31.4	128 J	18.3	54.8	46.3	31.3	34.9	54.4	61.4	5.2	39
ZINC	NA	120	129	164 J	37.2	67.5	113	113	136	90.2	53.1	35	74

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Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	NOBIS	NOBIS	NOBIS
	Study Area	EB-LR-TZ	EB-LR-TZ	ORB	ORB	Natural Forest	Natural Forest	ORB	ORB	ORB	ORB	ORB-TZ	ORB-TZ
	Station:	TZ-15	TZ-15	02ELY10A-B	02ELY10A-B	NF-09	NF-09	SA-14	SA-15	SA-15	SS-13	SS-14	SS-15
	Field Sample ID:	ELY-SS-TZ-15 (0-3.5)	ELY-SS-TZ-15 (3.5-12)	02Ely 10A	02Ely 10B	ELY-SS-NF-09 (0-1.5)	ELY-SS-NF-09 (1.5-12)	ELY-SS-SA-14 (0-6)	ELY-SS-SA-15 (0-6)	ELY-SS-SA-15 (0-6) DUP	SS-13X-082809AX	SS-14X-083109AX	SS-15X-083109AX
	Date:	10/17/2007	10/17/2007	10/8/2002	10/8/2002	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	8/28/2009	8/31/2009	8/31/2009
	Depth ft bgs:	0 - 0.29	0.29 - 1	0 - 0	0.82 - 0.82	0 - 0.13	0.13 - 1	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.3	0 - 0.2	0 - 0.2
Analyte	**PRGs**												
ALUMINUM	NA	3,100	9,400	-	-	7,500	17,000	1,900	5,400	7,600	17,700 J	6,050	1,580 J
ANTIMONY	NA	7.4 U	1.3 J	-	-	23 U	11 U	1.2 J	12 U	12 U	0.6	0.51	0.42 J
ARSENIC	NA	2.8	2.3 J	10 U	10 U	4.8	0.77 J	1.1 J	0.63 J	2.3 U	9.4 J	3.5 J	2.6 J
BARIUM	NA	36 J	28 J	182	161	72	62	54	66	48	220 J	108	102 J
BERYLLIUM	NA	0.22 J	0.45 J	1 U	1	0.42 UJ	0.84 J	0.2 UJ	0.54 J	0.7 J	1.6 J	0.13 J	0.062 J
CADMIUM	NA	0.93 J	3.2 U	2 U	2 U	0.5 J	0.35 J	0.33 J	2.3 U	0.24 J	7.2	0.79	1.5
CHROMIUM	NA	15 J	43 J	68	86	30	57	15	42	45	20 J	21.2	5.3 J
COBALT	24	5.1	8.7	50	31	15	14	7.8	6.2	6	28.9 J	6.8	4.3 J
COPPER	629	230 J	460 J	2,040	1,630	530	320	2,200	400	450	995 J	142 J	31.4 J
IRON	44,800	18,000	37,000	-	-	93,000	27,000	85,000	74,000	73,000	11,800 J	18,800	3,400 J
LEAD	NA	56	19	47	21	74	5.7 J	9.1 J	3.6 J	2.6 J	118 J	93.9 J	63.9 J
MANGANESE	NA	83	240	1210	915	110 J	180 J	42 J	69 J	50 J	8380 J	217 J	50.3 J
MERCURY	NA	0.26 J	0.073 J	-	-	0.26	0.044 J	0.1	0.016 J	0.014 J	0.3	0.19	0.24
MOLYBDENUM	NA	2 J	2.8 J	0.041	0.024	15 J	1.8 UJ	12 J	0.86 J	12 U	2.7	1.7	0.6
NICKEL	NA	8.8	16	18	19	18	36	1.4 J	17	22	57.7 J	15.9	7.4 J
SELENIUM	NA	7.1	8.1	-	-	35	4.5	44	8.5	5.5	10.4	2.9	1.5
SILVER	NA	3.8	0.87 J	19	12	9.3	1.3 J	7	1.7 J	0.55 UJ	1 UJ	1.5	0.4 J
STRONTIUM	NA	-	-	70	106	-	-	-	-	-	63.6 J	20.8	40.4 J
THALLIUM	NA	1.7 J	2.2 J	-	-	5 J	4.5 U	6.9 J	5.8 J	5.4 J	3.2	0.07 J	0.25 U
VANADIUM	NA	26	46	169	129	71	47	39	60	57	20.6 J	38.2	12.9 J
ZINC	NA	67	50	447	235	130	61	56	25	23	49.2 J	122	69.2 J

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Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	ORB	ORB	LWA-TZ	ORB	ORB	ORB	ORB	ORB	ORB	ORB	ORB	ORB
	Station:	SS-18	SS-19	SS-22	TG	TZ-17	TZ-17	TZ-18	TZ-18	TZ-19	TZ-19	TZ-24	TZ-24
	Field Sample ID:	SS-18X-082709AX	SS-19X-082709AX	SS-22X-082709AX	TG-02X-082409AX	ELY-SS-TZ-17 (0.5-12)	ELY-SS-TZ-17 (0-0.5)	ELY-SS-TZ-18 (.5-12)	ELY-SS-TZ-18 (0-.5)	ELY-SS-TZ-19 (.5-12)	ELY-SS-TZ-19 (0-.5)	ELY-SS-TZ-24 (0-1)	ELY-SS-TZ-24 (1-12)
	Date:	8/27/2009	8/27/2009	8/27/2009	8/24/2009	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007
	Depth ft bgs:	0 - 1	0 - 1	0 - 1	0 - 1	0.04 - 1	0 - 0.04	0.04 - 1	0 - 0.04	0.04 - 1	0 - 0.04	0 - 0.08	0.08 - 1
Analyte	**PRGs**												
ALUMINUM	NA	3,560 J	2,500	7,150	10,800	13,000	3,500	10,000	4,100	8,700	5,900	3,100	1,500
ANTIMONY	NA	0.32 J	0.32 J	0.64	0.11 J	12 U	3.6 U	12 U	16 U	1 J	18 U	2.5 J	1.1 J
ARSENIC	NA	1.6 J	1.9 J	3.2 J	0.62 J	2.4 U	1.1	0.7 J	1.4 J	2.4 U	1.6 J	2.8 U	1.6 J
BARIUM	NA	203 J	117	44.2	32.7	64	32	92	48	59	84	71	63
BERYLLIUM	NA	0.16 J	0.08 J	0.12 J	0.15 J	0.59 J	0.15 J	0.55 UJ	0.19 UJ	0.5 UJ	0.28 UJ	1.4 U	0.19 UJ
CADMIUM	NA	2.9	1.4	0.62	0.13 J	0.57 J	0.28 J	2.3 U	3.3 U	0.66 J	0.58 J	1.4 J	0.8 J
CHROMIUM	NA	10.7 J	7.8	26.1	34.6	61	15	55	22	52	32	18	35
COBALT	24	11.3 J	3.9 J	6.1	10.1	24	6.4	7.8	5.4 J	6.4	8.5	20	4.5 J
COPPER	629	1,280 J	74 J	149 J	182	460	130	530	280	420	550	1,600	480
IRON	44,800	14,400 J	6,120	18,400	19,800	52,000	13,000	43,000	25,000	78,000	60,000	160,000	160,000
LEAD	NA	39.2 J	34.7 J	78.3 J	7.7	2.5 J	5.3	5 J	7.1 J	3.3 J	71	22	2.6 J
MANGANESE	NA	83.2 J	452 J	62.3 J	187	88 J	59 J	89 J	160 J	40 J	88 J	61 J	17 J
MERCURY	NA	0.14	0.15	0.13	0.034 J	0.1 U	0.034 J	0.009 J	0.074 J	0.065 J	0.15	0.14	0.044 J
MOLYBDENUM	NA	0.84	0.85	2	0.55	0.88 UJ	0.31 UJ	12 U	1.1 UJ	2.6 UJ	4 UJ	35	1.9 J
NICKEL	NA	10.5 J	7.2	15.8	29.6	35	9.1	26	11	11	11	7.2	2.5 J
SELENIUM	NA	3.3	1.4	4.8	0.85 J	6.4	3.2	3.1 J	7.1	28	19	74	18
SILVER	NA	3.7 J	0.51 J	4	0.18 J	0.98 J	0.32 J	0.35 UJ	3 J	2.1 J	2.8 J	19	2.6
STRONTIUM	NA	26.8 J	40.5	11.3	3.2	-	-	-	-	-	-	-	-
THALLIUM	NA	0.3	0.069 J	0.18 J	0.078 J	1.9 J	1.4 U	2.4 J	6.5 U	3 J	3 J	8.5 J	8.5 J
VANADIUM	NA	13.5 J	16.1	39.2	37.6	60	16	44	20	72	42	79	60
ZINC	NA	52.8 J	160	103	30.3	140	64	45	62	33	89	240	28

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	Sampling Company:	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	URS	URS	URS
	Study Area	ORB	ORB	LWA-TZ	ORB	ORB	Smelter	Natural Forest	Natural Forest	Natural Forest	Natural Forest	Smelter	Smelter
	Station:	TZ-25	TZ-25	MW-20A	MW-23A	MW-23A	02ELY11	NF-01	NF-01	NF-03	NF-03	SA-02	SA-02
	Field Sample ID:	ELY-SS-TZ-25 (0-3)	ELY-SS-TZ-25 (3-11)	MW-20A-083109AX	MW-23A-070809AX	MW-23A-083109AX	02Ely 11	ELY-SS-NF-01 (0-2)	ELY-SS-NF-01 (2-7)	ELY-SS-NF-03 (0-4)	ELY-SS-NF-03 (4-12)	ELY-SS-SA-02 (0-3)	ELY-SS-SA-02 (0-3) DUP
	Date:	10/17/2007	10/17/2007	8/31/2009	7/8/2009	8/31/2009	10/8/2002	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007
	Depth ft bgs:	0 - 0.25	0.25 - 0.92	0 - 2	0 - 2	0 - 2	0 - 0	0 - 0.17	0.17 - 0.58	0 - 0.33	0.33 - 1	0 - 0.25	0 - 0.25
Analyte	**PRGs**												
ALUMINUM	NA	5,600	7,000	27,900	14,500	4,020	40,000	8,000 J	14,000 J	1,300 J	100,000 J	3,300 J	3,000 J
ANTIMONY	NA	2 J	15 U	0.49 U	0.5 U	0.052 J	-	4 U	12 U	6 U	15 U	1.9 J	3 J
ARSENIC	NA	1.9 J	2.4 J	0.91 J	1 U	1 UJ	10 U	2.3 J	0.59 J	1.3	2.7 J	6.3 J	8.8 J
BARIUM	NA	62	75	55.9	89	90.2	228	37 J	23 J	36	110	38 J	29 J
BERYLLIUM	NA	0.29 UJ	0.4 UJ	0.57	0.26 J	0.042 J	1.2	0.33 J	0.4 UJ	0.057 UJ	5.4	2.3 U	2.3 U
CADMIUM	NA	0.69 J	0.66 J	0.32	0.69	0.35	2 U	0.35 J	0.26 J	2.2	3.6	4.8	3.8 J
CHROMIUM	NA	30	40	61.9	56.1	33.4	70	21 J	36 J	3.7 J	440 J	29 J	29 J
COBALT	24	13	14	11.5	26.7	2.8 J	78	13 J	16 J	2.9	87	160 J	180 J
COPPER	629	1,000	1,800	292	517 J	309 J	2,780	180 J	220 J	34	2,000	3,100 J	3,300 J
IRON	44,800	72,000	92,000	28,100	26,400	42,100	160,000	14,000 J	20,000 J	2,400 J	140,000 J	180,000 J	190,000 J
LEAD	NA	24	21	10.7 J	3.3 J	7.7 J	65	17 J	4.7 J	12	20	50 J	53 J
MANGANESE	NA	87 J	68 J	370 J	527 J	31.7 J	699	130	180	260	660	140	160
MERCURY	NA	0.078 J	0.098 J	0.053 J	0.081 J	0.097 U	-	0.03 J	0.017 J	0.22	0.042 J	0.14 J	0.14 J
MOLYBDENUM	NA	7.8 J	9.7 J	0.84	1.1	1.9	20	0.55 J	12 U	6 U	3.7 J	21 J	21 J
NICKEL	NA	15	17	47.4	37.7	5.9	26	14 J	19 J	4.1	110	30 J	34 J
SELENIUM	NA	27	35	1.1	0.48 J	9.4	-	2.8 J	2.7 J	1.5 J	9.9	52 J	48 J
SILVER	NA	4.6	6.5	0.44 J	1 U	1.3	11	0.39 J	0.33 J	0.17 J	1 J	8.9	7.9
STRONTIUM	NA	-	-	3.8 J	8.5	23.5	106	-	-	-	-	-	-
THALLIUM	NA	5.6 J	7.7 J	0.11 J	0.33	0.13 J	-	1.5 J	4.7 U	2.4 U	6.1 U	3.3 J	9.2 U
VANADIUM	NA	43	55	59.7	49.4	36.3	115	31 J	49 J	7.2 J	400 J	48 J	47 J
ZINC	NA	120	110	55.6	111	23.5	425	63 J	40 J	150	460	560 J	450 J

Notes: Units are in mg/kg = miligram per kilogram
TAL = Target Analyte List
UWA = Upper Waste Area; LWA = Lower Waste Area; TZ= Transition Zone; ORB = Ore Roast Bed; EB-LR = Ely Brook Lower Reach
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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area		Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter-TZ	Smelter-TZ	Smelter-TZ	Smelter-TZ	Smoke Flue	Smoke Flue
Station:		SA-05	SA-06	SA-07	SA-08	SS-01	SS-01	SS-02	SS-02	SS-03	SS-03	SS-07	SS-07
Field Sample ID:		ELY-SS-SA-05 (0-6)	ELY-SS-SA-06 (0-6)	ELY-SS-SA-07 (0-6)	ELY-SS-SA-08 (0-6)	SS-01X-090209AX	SS-01X-090209BX	SS-02X-090209AX	SS-02X-090209BX	SS-03X-090209AX	SS-03X-090209BX	SS-07X-090209AX	SS-07X-090209BX
Date:		10/15/2007	10/15/2007	10/15/2007	10/15/2007	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009
Depth ft bgs:		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0.5 - 2	0 - 0.5	0.5 - 1.5	0 - 0.5	0.5 - 2	0 - 0.5	0.5 - 2
Analyte	**PRGs**												
ALUMINUM	NA	5,300	2,200	3,300 J	9,500 J	15,500	11,900	14,200	26,400	20,200	20,900	20,200	27,400
ANTIMONY	NA	2.9 UJ	5.9 J	1.2 J	2.1 J	1.1	0.5 U	0.12 J	0.5 U	0.49 U	0.5 U	0.058 J	0.5 U
ARSENIC	NA	6.7	2.5	2.4 J	4 J	3.1	0.81 JE	3.7	1.3 JE	1.9 JE	0.61 JE	1.5 JE	0.46 JE
BARIUM	NA	54	59	43	69	74.8	88.8	81.9	43.2	91.5	82.2	37.6	53.8
BERYLLIUM	NA	0.13 UJ	0.34 UJ	1.1 U	0.31 J	0.29 J	0.26 J	0.27 J	0.58	0.41 J	0.46 J	0.48 J	0.7
CADMIUM	NA	2.3 U	5 U	4.4 UJ	2.4 UJ	0.92	0.88	0.35	0.16 J	0.2 J	0.37	0.21 J	0.17 J
CHROMIUM	NA	26	18	32 J	34 J	46.2	39.9	44.8	56.8	46.2	46.8	39.4	57.9
COBALT	24	82	35	24 J	71 J	14.9	9.2	16	6.7	11.4	13.7	7.1	11.7
COPPER	629	2,500	1,700	1,100 J	3,000 J	362	172	494	418	188	283	26.4	23.5
IRON	44,800	140,000	170,000	94,000 J	85,000 J	31,000	17,100	34,000	27,700	25,300	29,600	22,800	31,200
LEAD	NA	76	180	21 J	60 J	295 J	6.6 J	29.7 J	11.6 J	17.9 J	10.4 J	34.9 J	8.8 J
MANGANESE	NA	170 J	100 J	75 J	300 J	200 J	325 J	116 J	117 J	222 J	237 J	120 J	236 J
MERCURY	NA	0.29	0.44	0.13	0.13	0.088 J	0.095 U	0.074 J	0.062 J	0.039 J	0.034 J	0.11	0.052 J
MOLYBDENUM	NA	16	27	11	9.1 J	1.9	0.83	2.4	0.73	0.63	0.88	0.45 J	0.53
NICKEL	NA	16	8.9	9.1	19	34.2	27.3	31.1	29.5	40.8	41.6	25.1	37
SELENIUM	NA	44	72	25	28	3.3	1.6	4.2	1.1	0.57 J	1.2	0.66 J	0.48 J
SILVER	NA	9	12	3.6	4.8	4	0.5 J	1.5	0.63 J	0.54 J	0.69 J	1 U	1 U
STRONTIUM	NA	-	-	-	-	10.6	11.5	5.9	2.7	4.5	4.7	2.8	4.5
THALLIUM	NA	6.9 J	5.9 J	6.4 J	4 J	0.18 J	0.16 J	0.24	0.13 J	0.18 J	0.2 J	0.16 J	0.22 J
VANADIUM	NA	44	85	32 J	46 J	47.6	33.4	43.2	46.8	51.1	51	46.3	71.1
ZINC	NA	480	190	84	470	108	65	73.5	58.6	55.8	72.2	55.6	72.4

Notes: Units are in mg/kg = miligram per kilogram
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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	NOBIS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	Smelter	Natural Forest	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter
	Station:	SS-08	SS-09	TR-02A	TR-02A	TR-02B	TR-02B	TR-02C	TR-02C	TR-02D	TR-02D	TR-02D	TR-02D
	Field Sample ID:	SS-08X-090209AX	SS-09X-090209AX	ELY-SS-TR-02A (0-1.5)	ELY-SS-TR-02A (1.5-11)	ELY-SS-TR-02B (0-4)	ELY-SS-TR-02B (4-11)	ELY-SS-TR-02C (0-3)	ELY-SS-TR-02C (3-12)	ELY-SS-TR-02D (0-2)	ELY-SS-TR-02D (2-12)	ELY-SS-TR-02D (2-12) DUP	ELY-SS-TR-02D (0-2) DUP
	Date:	9/2/2009	9/2/2009	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007
	Depth ft bgs:	0 - 1	0 - 1	0 - 0.13	0.13 - 0.92	0 - 0.33	0.33 - 0.92	0 - 0.25	0.25 - 1	0 - 0.17	0.17 - 1	0.17 - 1	0 - 0.17
Analyte	**PRGs**												
ALUMINUM	NA	8,560	17,900	2,200 J	6,200 J	1,700 J	5,700 J	9,300 J	6,200 J	11,000 J	10,000 J	11,000 J	24,000 J
ANTIMONY	NA	0.5 U	0.14 J	0.39 J	0.28 J	6.8 U	1.2 J	0.92 J	0.7 J	0.64 UJ	1.2 J	2.6 J	1 J
ARSENIC	NA	1.1 JE	2.8	2.3 J	3.1 J	2.4 J	14 J	6.8 J	9.1 J	8.3 J	3.6 J	3 J	15 J
BARIUM	NA	62.3	67.1	21	43	58	74	44	55	91	56	52	150
BERYLLIUM	NA	0.21 J	0.36 J	0.099 J	0.35	0.053 J	0.24 J	0.43	0.31	0.44 J	0.36 J	0.36 J	1
CADMIUM	NA	0.54	0.88	0.54 J	3.2 J	1 J	1 UJ	1.1 J	2.8 J	1.7 UJ	2.6 UJ	2.6 UJ	2 UJ
CHROMIUM	NA	28.4	53.2	6 J	13 J	4.2 J	16 J	14 J	9 J	33 J	27 J	27 J	72 J
COBALT	24	31.6	17.1	7 J	47 J	12 J	33 J	14 J	8.5 J	22 J	82 J	110 J	32 J
COPPER	629	848	699	280 J	1,500 J	670 J	1,900 J	420 J	360 J	690 J	2,100 J	2,800 J	1,200 J
IRON	44,800	25,900	34,300	12,000 J	12,000 J	8,500 J	40,000 J	14,000 J	11,000 J	39,000 J	75,000 J	98,000 J	72,000 J
LEAD	NA	8.8 J	22.9 J	33 J	11 J	39 J	68 J	200 J	200 J	54 J	51 J	26 J	44 J
MANGANESE	NA	441 J	256 J	150 J	500 J	180 J	150 J	240 J	240 J	440 J	350 J	390 J	880 J
MERCURY	NA	0.095 U	0.058 J	0.044 J	0.02 J	0.15 J	0.09 J	0.074 J	0.028 J	0.13 J	0.044 J	0.055 J	0.14 J
MOLYBDENUM	NA	1.5	1.6	0.37 J	0.95 J	0.68 J	3.6 J	1.5 J	1.2 J	3.2 J	6.6 J	9.8 J	6.8 J
NICKEL	NA	27.3	29.2	6	16	6.4	14	13	10	25	18	17	50
SELENIUM	NA	2.4	3	3	11	6.6	38	2.6	2.6	9.3	9.4	11	18
SILVER	NA	1.1	1.5	0.24 UJ	0.71	1 J	1.6	0.24 UJ	0.38 J	2.9	1.4 J	1.7 J	4.3
STRONTIUM	NA	4.8	2.4	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	0.11 J	0.19 J	1 J	9.5 U	2.7 U	10 U	5.3 U	10 U	2.7 J	4.9 J	4.1 J	4.4 J
VANADIUM	NA	35.2	61.6	9.6	19 J	7.3 J	20 J	30 J	21 J	43 J	33 J	33 J	82 J
ZINC	NA	54.5	97.1	100	210	180	120	120	150	170	1000	1500	200

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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		EB-LR-TZ	EB-LR-TZ	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter
Station:		TZ-02	TZ-02	TZ-05	TZ-05	TZ-05	TZ-05	TZ-06	TZ-06	TZ-09	TZ-09	TZ-12	TZ-12
Field Sample ID:		ELY-SS-TZ-02 (0-1.5)	ELY-SS-TZ-02 (1.5-6)	ELY-SS-TZ-05 (0-1)	ELY-SS-TZ-05 (1-8)	ELY-SS-TZ-05 (0-1)	ELY-SS-TZ-05 (1-8)	ELY-SS-TZ-06 (0-1)	ELY-SS-TZ-06 (1-12)	ELY-SS-TZ-09 (0.5-12)	ELY-SS-TZ-09 (0-0.5)	ELY-SS-TZ-12 (0-3)	ELY-SS-TZ-12 (3-8)
Date:		10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/23/2007	10/23/2007	10/16/2007	10/16/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007
Depth ft bgs:		0 - 0.13	0.13 - 0.5	0 - 0.08	0.08 - 0.67	0 - 0.08	0.08 - 0.67	0 - 0.08	0.08 - 1	0.04 - 1	0 - 0.04	0 - 0.25	0.25 - 0.67
Analyte	**PRGs**												
ALUMINUM	NA	5,200 J	5,200 J	7,800 J	7,000 J	9,700	6,900	7,800 J	14,000 J	3,600	4,100	1,400	8,700
ANTIMONY	NA	1.8 J	2.5 J	13 U	11 U	13 U	11 U	13 U	12 U	2 U	0.24 J	6.1	1.9 UJ
ARSENIC	NA	5.9 J	8.6 J	14	4.7	23	2.4	3.3	2.3 J	0.43	0.81	3.2	22
BARIUM	NA	36 J	29 J	44	43	58 J	35 J	76	98	20	25	25	83
BERYLLIUM	NA	1.4 U	1.2 U	0.31 J	0.38 J	0.48 J	0.44 J	0.33 J	0.64 J	0.23	0.24	0.064 UJ	0.42 UJ
CADMIUM	NA	1.9 J	2.6	2.3 J	1.5 J	3	0.96 J	0.87 J	1.3 J	0.083 J	0.25 J	1	0.93 J
CHROMIUM	NA	28 J	33 J	16 J	17 J	21 J	16 J	33 J	43 J	8.1	10	3.9	28
COBALT	24	120 J	160 J	19	40	28	32	71	44	2.9	4.4	4.2	23
COPPER	629	2,300 J	2,900 J	710	1,700	990	1,500	2,000	1,500	7.5	34	120	640
IRON	44,800	98,000 J	130,000 J	29,000 J	31,000 J	30,000	23,000	79,000 J	54,000 J	5,000	8,800	9,200	53,000
LEAD	NA	52 J	67 J	64	18	90	11	23	19	1.8 J	10 J	1700 J	36 J
MANGANESE	NA	200	190	230	310	280	260	120	230	210 J	210 J	150 J	320 J
MERCURY	NA	0.39 J	0.56 J	0.024 J	0.017 J	0.1 J	0.035 J	0.076 J	0.042 J	0.08 U	0.026 UJ	0.34	0.065 J
MOLYBDENUM	NA	9.7 J	14	1.2 J	4.6 J	2 J	2.2 J	11 J	4.1 J	2 U	0.83 J	1.5 J	1.8 UJ
NICKEL	NA	30 J	35 J	27	20	31 J	16 J	24	31	8.9	9.8	6.9	20
SELENIUM	NA	27 J	35 J	4.1 J	4.3 J	5.5	4.4	19	12	0.82 U	1.7	6	9.1
SILVER	NA	3.4	5.1	2.6 U	1.2 J	0.25 J	1 J	7.8	1.9 J	0.079 J	0.34 J	4	1.2 J
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	5.6 U	7.5 J	2 J	4.5 U	1.7 J	4.4 U	5.4 U	4.7 U	0.82 UJ	0.89 UJ	1.9 UJ	4.5 UJ
VANADIUM	NA	34 J	40 J	23 J	20 J	30 J	17 J	43 J	47 J	8	11	14	32
ZINC	NA	280 J	340 J	210	290	300	240	140	180	10	40	79	100

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Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	Smelter	Smelter	Smelter	Smelter	EB-LR	Slag	Smelter	Slag	Slag	Slag	Natural Forest	Slag
	Station:	TP-103	TP-104	TP-108	TP-109	00JH34	00JH38	01JH34A-B	01JH37	01JH37	02ELY12	NF-02	SA-01
	Field Sample ID:	ELY-TP-103 (1-2)	ELY-TP-104 (0-1)	ELY-TP-108 (1-2)	ELY-TP-109 (0-1)	00JH34	00JH38	01JH34	01JH37 CORE	01JH37 RIND	02Ely 12	ELY-SS-NF-02 (0-8)	ELY-SS-SA-01 (0-2)
	Date:	10/5/2007	10/5/2007	10/5/2007	10/5/2007	10/16/2000	10/16/2000	11/10/2001	11/10/2001	11/10/2001	10/8/2002	10/16/2007	10/16/2007
	Depth ft bgs:	1 - 2	0 - 1	1 - 2	0 - 1	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0.67	0 - 0.17
Analyte	**PRGs**												
ALUMINUM	NA	6,800	13,000	9,700	5,500	39,100	48,100	36,900	40,000	41,000	40,000	16,000 J	3,700 J
ANTIMONY	NA	1.8 J	1.5 J	1.4 J	4 J	0.2	0.6	0.1	-	-	-	3.1 U	1.1 J
ARSENIC	NA	5.4	1.2 UJ	3.2 U	1.2 UJ	0.7	0.5 U	0.5 U	20 U	20 U	-	2.4 J	2.7 J
BARIUM	NA	110	46	61	43	130	171	162	27	29	191	71 J	38 J
BERYLLIUM	NA	1.9 U	0.36 UJ	0.31 J	0.11 UJ	1.2	1.1	1.6	2 U	2 U	1.4	0.82	0.12 UJ
CADMIUM	NA	2.2 J	2.4 U	2.4 U	10 U	2.7	0.84	1.9	10	10	2 U	0.88	1 J
CHROMIUM	NA	51	23	33	29	104	83	56	88	89	35	36 J	12 J
COBALT	24	75 J	51 J	40 J	17 J	922	330	716	360	360	431	15 J	51 J
COPPER	629	2,700	1,600	2,000	1,500	6,940	6,340	6,390	14,000	8,100	6,880	270 J	1,700 J
IRON	44,800	110,000	73,000	66,000	140,000	506,000	421,000	410,000	330,000	330,000	284,000	19,000 J	54,000 J
LEAD	NA	49	12	37	32	12	20	11	10	8 U	93	35 J	21 J
MANGANESE	NA	140 J	280 J	180 J	110 J	1400	2000	1300	540	550	878	720	160
MERCURY	NA	0.14 J	0.014 UJ	0.28	0.072 J	-	-	-	-	-	-	0.19 J	0.42 J
MOLYBDENUM	NA	7.8 J	4.4 J	7.2 J	9.8 J	67	34	47	28	28	34	0.41 J	5.6 J
NICKEL	NA	20	17	23	9.1	18	8.5	18	37	30	32	26 J	11 J
SELENIUM	NA	33	9	78	41	10	8.8	5.8	-	-	-	1.7 J	13 J
SILVER	NA	1.8 J	1.1 UJ	4.3	4.6	0.94	0.96	0.98	4 U	4 U	4.8	0.33 J	1.9 J
STRONTIUM	NA	-	-	-	-	70	53	71	35	36	109	-	-
THALLIUM	NA	7.8 U	4.8 U	2 J	16 J	0.2	0.2	0.2	-	-	-	6.1 U	4.6 U
VANADIUM	NA	31	26	40	51	220	177	121	98	100	104	34 J	21 J
ZINC	NA	790	560	200	130	7500	6160	6070	8100	8200	3440	94 J	310 J

Notes: Units are in mg/kg = miligram per kilogram
TAL = Target Analyte List
UWA = Upper Waste Area; LWA = Lower Waste Area; TZ= Transition Zone; ORB = Ore Roast Bed; EB-LR = Ely Brook Lower Reach
Light gray highlighted cells indicate exceedance of criteria.
ft bgs = feet below ground surface
PRG = Prelimary Remediation Goal
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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	Slag	Slag	Slag	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Slag
	Station:	SA-03	SA-04	SA-09	TR-01A	TR-01A	TR-01B	TR-01B	TR-01C	TR-01C	TR-01D	TR-01D	TZ-01
	Field Sample ID:	ELY-SS-SA-03 (0-6)	ELY-SS-SA-04 (0-6)	ELY-SS-SA-09 (0-4)	ELY-SS-TR-01A (0-1)	ELY-SS-TR-01A (1-8)	ELY-SS-TR-01B (0-1.5)	ELY-SS-TR-01B (1.5-8)	ELY-SS-TR-01C (0-2)	ELY-SS-TR-01C (2-11)	ELY-SS-TR-01D (0.5-10)	ELY-SS-TR-01D (0-0.5)	ELY-SS-TZ-01 (0-1.5)
	Date:	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/15/2007	10/16/2007
	Depth ft bgs:	0 - 0.5	0 - 0.5	0 - 0.33	0 - 0.08	0.08 - 0.67	0 - 0.13	0.13 - 0.67	0 - 0.17	0.17 - 0.92	0.04 - 0.83	0 - 0.04	0 - 0.13
Analyte	**PRGs**												
ALUMINUM	NA	12,000	6,200	6,400	12,000 J	11,000 J	11,000 J	11,000 J	8,500 J	7,000 J	6,600 J	9,800 J	7,200 J
ANTIMONY	NA	2.4 U	1.2 UJ	2.3 UJ	1.5 J	0.62 J	5.2 U	5.3 U	4.6 U	4.5 U	4.3 U	5.2 U	15 U
ARSENIC	NA	0.64	3.3	1.3 J	0.83 UJ	1.5 J	0.98 UJ	1.1 UJ	0.86 UJ	0.87 UJ	0.94 UJ	1.3 J	11 J
BARIUM	NA	44	77	41	41	66	50	62	46	36	36	54	60 J
BERYLLIUM	NA	0.67	0.27 UJ	0.18 UJ	0.53	0.56 J	0.52	0.53	0.4 J	0.33 J	0.29 J	0.48 J	0.22 UJ
CADMIUM	NA	0.48 U	2.4 U	2.2 U	0.96 UJ	0.24 J	1 UJ	0.19 J	0.92 UJ	0.91 UJ	0.85 UJ	1 UJ	0.91 J
CHROMIUM	NA	25	20	34	25 J	26 J	25 J	25 J	19 J	15 J	16 J	22 J	20 J
COBALT	24	15	73	120	22 J	27 J	8.4 J	10 J	8.9 J	8.1 J	8.3 J	9.3 J	50 J
COPPER	629	850	3,800	1,600	930 J	1,700 J	260 J	620 J	360 J	270 J	610 J	310 J	520 J
IRON	44,800	19,000	63,000	150,000	18,000 J	23,000 J	18,000 J	19,000 J	17,000 J	12,000 J	16,000 J	18,000 J	62,000 J
LEAD	NA	9.2	41	16	9.6 J	60 J	8.2 J	8.8 J	6 J	4.5 J	4 J	6.6 J	59 J
MANGANESE	NA	130 J	180 J	200 J	220 J	460 J	320 J	270 J	400 J	320 J	330 J	440 J	460
MERCURY	NA	0.057 J	0.22	0.21	0.015 J	0.04 J	0.01 J	0.01 J	0.006 J	0.08 U	0.09 U	0.1 U	0.091 J
MOLYBDENUM	NA	1 J	6 J	17	1.4 J	1.5 J	0.66 J	0.66 J	0.64 J	4.5 U	0.58 J	0.48 J	2.2 J
NICKEL	NA	16	17	7.9	17	21	19	19	16	14	14	19	27 J
SELENIUM	NA	1.9	15	22	1.7 J	3.2	2.7	2.9	2.5	0.97 J	1.9	2.1	6.7 J
SILVER	NA	0.32 UJ	3.9	5.9	0.27 UJ	0.5 UJ	0.35 UJ	0.44 UJ	0.37 UJ	0.27 UJ	0.32 UJ	0.38 UJ	0.62 J
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	0.65 J	4.4 J	5.3 J	1.6 J	2.1 J	1.4 J	1.1 J	1.6 J	1.4 J	4.3 U	2 J	6 U
VANADIUM	NA	26	27	67	25 J	28 J	26 J	26 J	21 J	16 J	18 J	23 J	21 J
ZINC	NA	140	300	730	120	240	61	98	52	59	48	64	340 J

Notes: Units are in mg/kg = miligram per kilogram
TAL = Target Analyte List
UWA = Upper Waste Area; LWA = Lower Waste Area; TZ= Transition Zone; ORB = Ore Roast Bed; EB-LR = Ely Brook Lower Reach
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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	Slag	Slag	Slag	Slag	Slag	Slag	Slag	Slag	Slag	Slag	Slag	Slag
	Station:	TZ-01	TZ-04	TZ-04	TZ-04	TZ-04	TZ-07	TZ-07	TZ-08	TZ-08	TZ-10	TZ-10	TZ-11
	Field Sample ID:	ELY-SS-TZ-01 (1.5-8)	ELY-SS-TZ-04 (0-2)	ELY-SS-TZ-04 (0-2) DUP	ELY-SS-TZ-04 (2-6)	ELY-SS-TZ-04 (2-6) DUP	ELY-SS-TZ-07 (0-1.5)	ELY-SS-TZ-07 (1.5-6.5)	ELY-SS-TZ-08 (0.5-10)	ELY-SS-TZ-08 (0-0.5)	ELY-SS-TZ-10 (0-1)	ELY-SS-TZ-10 (1-10)	ELY-SS-TZ-11 (0-1)
	Date:	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/15/2007	10/15/2007	10/15/2007
	Depth ft bgs:	0.13 - 0.67	0 - 0.17	0 - 0.17	0.17 - 0.5	0.17 - 0.5	0 - 0.13	0.13 - 0.54	0.04 - 0.83	0 - 0.04	0 - 0.08	0.08 - 0.83	0 - 0.08
Analyte	**PRGs**												
ALUMINUM	NA	7,400 J	URS J	3,500 J	9,900 J	8,300 J	9,200 J	9,800 J	11,000 J	9,200 J	14,000	6,800	8,100
ANTIMONY	NA	11 U	11 U	6.3 U	12 U	2.5 U	3.1 U	11 U	2.3 U	2.6 U	6.1 U	11 U	4.2 J
ARSENIC	NA	1.6 J	3.2 J	2.5 J	5.4 J	2.3 J	0.93 J	0.87 J	1 J	1.6 J	1.9	0.84 UJ	3.2
BARIUM	NA	44 J	89 J	43 J	56 J	42 J	46 J	61 J	45 J	73 J	50	29	42
BERYLLIUM	NA	0.3 UJ	0.76 J	0.16 J	0.48 UJ	0.4	0.52	0.43 UJ	0.59	0.46	0.87	0.33 UJ	0.42 J
CADMIUM	NA	0.64 J	0.74 J	0.56 J	0.86 J	0.58	0.79	0.59 J	0.49	0.62	0.2 UJ	2.3 U	0.29 J
CHROMIUM	NA	20 J	40 J	9.1 J	27 J	22 J	20 J	24 J	23 J	20 J	38	19	23
COBALT	24	52 J	29 J	12 J	34 J	19 J	11 J	19 J	13 J	11 J	22	41	28
COPPER	629	920 J	780 J	230 J	2,500 J	740 J	150 J	520 J	410 J	260 J	460	810	420
IRON	44,800	30,000 J	28,000 J	8,200 J	24,000 J	14,000 J	12,000 J	22,000 J	16,000 J	15,000 J	31,000	33,000	27,000
LEAD	NA	52 J	110 J	50 J	60 J	40 J	13 J	55 J	11 J	17 J	57	17	43
MANGANESE	NA	510	610	420	380	300	350	390	390	550	250 J	270 J	410 J
MERCURY	NA	0.1 J	0.19 J	0.13 J	0.71 J	0.11 J	0.021 J	0.079 J	0.017 J	0.041 J	0.086 J	0.056 J	0.03 J
MOLYBDENUM	NA	1.8 J	1.4 UJ	0.68 J	0.99 J	0.69 J	0.22 UJ	11 U	0.34 J	0.45 J	1.6 J	2.4 J	1.5 J
NICKEL	NA	16 J	30 J	8.7 J	25 J	18 J	16 J	19 J	20 J	16 J	25	12	20
SELENIUM	NA	4.2 J	4.7 J	3.6 J	4.9 J	2.6 J	0.88 J	2.3 J	1.4 J	1.8 J	3.4	4.1 J	2.7
SILVER	NA	0.38 J	0.52 J	0.61 J	0.73 J	0.4 J	0.3 J	0.15 J	0.18 UJ	0.26 UJ	0.72 UJ	0.47 UJ	0.51 UJ
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	4.5 U	1.5 J	2.5 U	4.8 U	5 U	0.55 UJ	4.5 U	4.6 U	5.2 U	0.84 J	4.6 U	1.4 J
VANADIUM	NA	20 J	42 J	12 J	26 J	20 J	21 J	22 J	24 J	21 J	42	22	25
ZINC	NA	310 J	270 J	140 J	180 J	120 J	120 J	200 J	67 J	110 J	190	360	200

Notes: Units are in mg/kg = miligram per kilogram
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UWA = Upper Waste Area; LWA = Lower Waste Area; TZ= Transition Zone; ORB = Ore Roast Bed; EB-LR = Ely Brook Lower Reach
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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	NOBIS	NOBIS	NOBIS	NOBIS
	Study Area	Slag	Smoke Flue	Natural Forest	Natural Forest	Natural Forest	Natural Forest	Natural Forest	Natural Forest	Smoke Flue-TZ	Smoke Flue-TZ	Smoke Flue	Smoke Flue
	Station:	TZ-11	02ELY13	NF-04	NF-04	NF-04	NF-04	NF-07	NF-07	SS-04	SS-04	SS-05	SS-05
	Field Sample ID:	ELY-SS-TZ-11 (1-5.5)	02Ely 13	ELY-SS-NF-04 (0-4)	ELY-SS-NF-04 (0-4) DUP	ELY-SS-NF-04 (4-10)	ELY-SS-NF-04 (4-10) DUP	ELY-SS-NF-07 (0-2)	ELY-SS-NF-07 (2-8)	SS-04X-090209AX	SS-04X-090209BX	SS-05X-090209AX	SS-05X-090209BX
	Date:	10/15/2007	10/8/2002	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/17/2007	10/17/2007	9/2/2009	9/2/2009	9/2/2009	9/2/2009
	Depth ft bgs:	0.08 - 0.46	0 - 0	0 - 0.33	0 - 0.33	0.33 - 0.83	0.33 - 0.83	0 - 0.17	0.17 - 0.67	0 - 0.5	0.5 - 2	0 - 0.3	0.3 - 2
Analyte	**PRGs**												
ALUMINUM	NA	9,700	65,000	38,000 J	1,700 J	20,000 J	17,000 J	7,000 J	7,600 J	12,500	24,500	14,800	30,400
ANTIMONY	NA	2.4 UJ	-	7.9 U	6.6 U	6.3 U	5.9 U	4.9 U	4.4 U	0.46 U	0.5 U	0.06 J	0.5 U
ARSENIC	NA	3.8	10 U	2.1 U	2.1	1.6	1.7 U	2.5	0.6 UJ	0.64 J	1 U	1.1	0.75 J
BARIUM	NA	60	239	130 J	26 J	46 J	41 J	42 J	30 J	47.5	84.7	44.9	85.6
BERYLLIUM	NA	0.48 UJ	1.6	2.2	0.11 J	0.94	0.9	0.26 J	0.23 J	0.23 J	0.54	0.31 J	0.66
CADMIUM	NA	0.39 J	2 U	1.3 J	0.74 J	0.72 J	0.54 J	0.47 J	0.26 J	0.15 J	0.16 J	0.28	0.091 J
CHROMIUM	NA	30	101	88 J	3.2 J	47 J	42 J	9	7.3	34	59.9	34.8	66.3
COBALT	24	70	14	24 J	3.1 J	11 J	9.3 J	8	9.4	6.6	10.7	4.6 J	12.5
COPPER	629	1,400	45	400 J	51 J	320 J	250 J	48	56	122	62.1	31.8	28.8
IRON	44,800	57,000	52,000	53,000 J	2,400 J	29,000 J	26,000 J	17,000	13,000	21,000	29,500	23,500	29,000
LEAD	NA	54	120	14 J	65 J	8.6 J	9.3 J	22	1.1 J	15.3	9.9	17.8	9
MANGANESE	NA	480 J	750	270 J	74 J	160 J	170 J	400 J	77 J	118	178	116	176
MERCURY	NA	0.061 J	-	0.18	0.26	0.045 J	0.041 J	0.051 J	0.022 J	0.045 J	0.035 J	0.079 J	0.057 J
MOLYBDENUM	NA	4.2 J	2.2	0.64 J	0.55 J	0.54 J	0.43 J	0.78 J	0.76 J	0.44 J	0.47 J	0.48 J	0.43 J
NICKEL	NA	20	34	61 J	7.9 J	25 J	20 J	8.1 J	9 J	23.7	46.2	17.4	54.7
SELENIUM	NA	8.3	-	3.7	2.6	3.3	2.5 U	2	1.4 UJ	0.62 J	0.36 J	0.97 J	0.5 J
SILVER	NA	1.5 UJ	2 U	0.3 J	0.21 J	0.11 J	0.23 J	0.17 J	0.88 U	0.45 J	0.54 J	0.32 J	0.36 J
STRONTIUM	NA	-	139	-	-	-	-	-	-	1.8	2.7	1.8	4.9
THALLIUM	NA	4 J	-	3 J	2.6 U	2.1 J	5.9 U	1.1 J	1.2 J	0.11 J	0.23 J	0.096 J	0.22 J
VANADIUM	NA	36	171	110 J	6 J	56 J	53 J	52 J	39 J	39.2	57.4	53.5	70.1
ZINC	NA	550	81	99	71	52	44	45	24	47.1	64.2	41.6	62.5

Notes: Units are in mg/kg = miligram per kilogram
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Table 6-6
Surface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	Smoke Flue	Smoke Flue	Smoke Flue	Smoke Flue-TZ	Smoke Flue-TZ	Smoke Flue-TZ	Smoke Flue-TZ	Smoke Flue	Smoke Flue	Smoke Flue	Smoke Flue
	Station:	SS-06	SS-06	TC	TZ-42	TZ-42	TZ-43	TZ-43	TZ-44	TZ-44	TZ-45	TZ-45
	Field Sample ID:	SS-06X-090209AX	SS-06X-090209BX	TC-03X-082609AX	ELY-SS-TZ-42 (0-2)	ELY-SS-TZ-42 (2-12)	ELY-SS-TZ-43 (0-2.5)	ELY-SS-TZ-43 (2.5-11)	ELY-SS-TZ-44 (0-3)	ELY-SS-TZ-44 (3-12)	ELY-SS-TZ-45 (0-2)	ELY-SS-TZ-45 (2-12)
	Date:	9/2/2009	9/2/2009	8/26/2009	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007
	Depth ft bgs:	0 - 0.5	0.5 - 2	0 - 1	0 - 0.17	0.17 - 1	0 - 0.21	0.21 - 0.92	0 - 0.25	0.25 - 1	0 - 0.17	0.17 - 1
Analyte	**PRGs**											
ALUMINUM	NA	21,200	32,700	15,400	6,200 J	11,000 J	9,200 J	18,000 J	6,700 J	18,000 J	1,900 J	13,000 J
ANTIMONY	NA	0.079 J	0.5 U	0.068 J	5 U	4.6 U	7.4 U	4.7 U	18 U	12 U	4.5 U	5.8 U
ARSENIC	NA	2.1	0.98 J	0.48 J	3.5	1.4 U	2.9	1.6 U	1.9 J	3.4	1.8	1.1 UJ
BARIUM	NA	45.4	76.5	24.9	110 J	36 J	38 J	39 J	66 J	43 J	66 J	29 J
BERYLLIUM	NA	0.5	1	0.43 J	0.34 J	0.39 J	0.39 J	0.79	0.4 J	0.83 J	0.12 J	0.75
CADMIUM	NA	0.23 J	0.11 J	0.13 J	2.2	0.46 J	0.44 J	0.39 J	0.62 J	0.24 J	0.67 J	0.66 J
CHROMIUM	NA	42	59.3	32.2	21	30	23	38	10 J	45 J	3.8	36
COBALT	24	7.9	14.8	4.7 J	11	12	6	9.8	7.5 J	9.2 J	2.2	4.8
COPPER	629	44.7	33.2	19.3	66	150	22	41	98 J	63 J	16	12
IRON	44,800	23,700	28,800	21,300	12,000	16,000	12,000	18,000	12,000 J	25,000 J	2,900	41,000
LEAD	NA	37.1	11.8	16.7	44	6.6	26	6	620 J	680 J	55	16
MANGANESE	NA	199	409	166	810 J	320 J	120 J	110 J	86 J	180 J	460 J	89 J
MERCURY	NA	0.1	0.052 J	0.049 J	0.18 J	0.026 J	0.12 J	0.034 J	0.064 J	0.057 J	0.22	0.05 J
MOLYBDENUM	NA	0.48 J	0.31 J	0.33 J	0.87 J	0.37 J	7.4 U	4.7 U	1.6 J	12 U	0.37 J	0.53 J
NICKEL	NA	28.7	46.1	15.6	16 J	17 J	16 J	27 J	15 J	25 J	5.9 J	13 J
SELENIUM	NA	0.94 J	0.43 J	0.63 J	4.8	1.9 U	2.6 J	1.7 UJ	14	58	2.7	3.9
SILVER	NA	0.33 J	0.22 J	1 U	0.55 J	0.13 J	1.5 U	0.94 U	0.64 UJ	0.26 UJ	0.28 J	0.18 J
STRONTIUM	NA	3.4	6.2	1.8	-	-	-	-	-	-	-	-
THALLIUM	NA	0.14 J	0.26	0.1 J	2 U	1 J	1.5 J	1.4 J	7.3 U	5 U	1.8 U	2 J
VANADIUM	NA	47.5	59.1	48.6	35 J	45 J	30 J	41 J	16 J	61 J	7.9 J	120 J
ZINC	NA	56.8	75.7	43.8	130	45	58	38	67	50	68	39

Notes: Units are in mg/kg = miligram per kilogram
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Table 6-7
Subsurface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	URS
	Study Area	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA
	Station:	MW-18A	MW-18A	MW-18A	MW-18A	MW-19A	MW-19A	MW-19A	SB-04	SB-05	SB-05	SB-06	SB-07
	Field Sample ID:	MW-18A-080309AX	MW-18A-080309BX	MW-18A-080309BD	MW-18A-080309CX	MW-19A-072109AX	MW-19A-072109BX	MW-19A-072109CX	ELY-SB-4 (8-10.6)	ELY-SB-5 (16-18)	ELY-SB-5 (8-12)	ELY-SB-6 (2-4)	ELY-SB-7 (22-24)
	Date:	8/3/2009	8/3/2009	8/3/2009	8/3/2009	7/21/2009	7/21/2009	7/21/2009	12/2/2006	11/30/2006	11/30/2006	12/2/2006	12/1/2006
	Depth ft bgs:	2 - 4	4 - 6	4 - 6	4 - 6	2 - 6	6 - 8	8 - 12.9	8 - 10.6	16 - 18	8 - 12	2 - 4	22 - 24
Analyte	**PRGs**												
ALUMINUM	NA	13900	19400	15500	22400	10500	13900	14600	18000	11000	12000	20000	23000
ANTIMONY	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	22 U	0.29 J	26 U	2.4 U	2.7 U
ARSENIC	NA	0.99 U	1 U	0.92 U	1 U	1 U	1 U	0.59 J	4.5 U	0.98	5.1 U	0.52	1
BARIUM	NA	93.4	99	79.2	136	104	101	92	59 J	74 J	31 J	76 J	68 J
BERYLLIUM	NA	0.5 U	0.5 U	0.46 U	0.5 U	0.082 J	0.13 J	0.36 J	2.2 U	2.4 U	2.6 U	2.4 U	2.7 U
CADMIUM	NA	0.25 UJ	0.25 UJ	0.25 UJ	0.25 UJ	1.1 J	0.077 J	0.46 J	0.7 J	0.14 J	1.1 J	0.21 J	0.17 J
CALCIUM	NA	521	988	947	1190	1270 J	397 J	58800 J	960 J	24000 J	1800 J	1300 J	1200 J
CHROMIUM	NA	185	229	183	229	56.4 J	79.3 J	45.3 J	84 J	28 J	55 J	62 J	54 J
COBALT	24	27.9	37	30	44.8	193 J	11.5 J	44.8 J	37	14	110	21	26
COPPER	629	498	281	276	267	4250	703	1870	1100 J	260 J	1700 J	270 J	500 J
IRON	44800	72400	40400	35100	49300	144000	57200	25700	74000	16000	76000	26000	27000
LEAD	NA	4.7 J	1 R	1.1 R	1.2 R	12.6 J	3.8 J	7.8 J	8.5 J	2.7 J	6.2 J	2.1 J	5.5 J
MAGNESIUM	NA	6700	9120	7620	9490	6950	9140	10700	14000	6400	6800	12000	9400
MANGANESE	NA	338	764	671	595	175 J	130 J	1600 J	180 J	470 J	330 J	300 J	500 J
MERCURY	NA	0.13 U	0.099 U	0.098 U	0.092 U	0.031 J	0.099 U	0.097 U	0.031 UJ	0.011 UJ	0.018 UJ	0.009 UJ	0.06 UJ
MOLYBDENUM	NA	3.7	1.1	0.99	0.92	5	0.25 J	0.2 J	3.9 J	0.25 J	2.7 J	0.56 J	0.67 J
NICKEL	NA	63.9	81.2	63.9	86.6	49.9	36.7	47.9	32 J	28 J	40 J	40 J	37 J
POTASSIUM	NA	7820	7850	6200	10900	6760	6160	5450	6600	4300	4100	4800	2400
SELENIUM	NA	5.6	1.9	1.8	0.71 J	15.7 J	0.46 J	1.2 U	6.8 J	0.94 U	6.9 J	0.97 U	1.1 U
SILVER	NA	1.8	1 U	0.92 U	1 U	3.1	0.8 J	1 U	1.3 J	0.065 J	0.82 J	0.48 U	0.088 J
SODIUM	NA	104 R	79.9 R	79.4 R	90.7 R	192 J	114 J	145 J	900 U	210	1000 U	970 U	1100 U
STRONTIUM	NA	3	2.6	2.3	3.9	4.8 J	3.7 J	130 J	-	-	-	-	-
THALLIUM	NA	0.37 J	0.34 J	0.34 J	0.48 J	0.26 J	0.74	0.35	9 U	0.94 U	10 U	9.7 U	1.1 U
VANADIUM	NA	90.8	87.6	69.1	58.5	68.8	64.1	36.6	73	26	47	51	55
ZINC	NA	91.7	99.5	80.3	129	205 J	61 J	134 J	260	37	270	44	67

Notes: Units are in mg/kg = miligram per kilogram
TAL = Target Analyte List
UWA = Upper Waste Area; LWA = Lower Waste Area; TZ= Transition Zone; ORB = Ore Roast Bed; EB-LR = Ely Brook Lower Reach
Light gray highlighted cells indicate exceedance of criteria.
ft bgs = feet below ground surface
PRG = Prelimary Remediation Goal
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Table 6-7
Subsurface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	NOBIS	NOBIS	NOBIS
	Study Area	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	LWA-TZ	LWA
	Station:	SB-07	SB-07	SB-08	SB-08	TP-08	TP-08	TP-09	TP-10	TP-11	TP-15	MW-17A	MW-21A
	Field Sample ID:	ELY-SB-7 (27-30)	ELY-SB-7 (6-12)	ELY-SB-8 (0-6)	ELY-SB-8 (6-10)	ELY-TP8 (2-3)	ELY-TPQS1	ELY-TP9 (3-4)	ELY-TP10 (7-9)	ELY-TP11 (4-6)	TP-15X-073009CX	MW-17A-073009BX	MW-21A-072809AX
	Date:	12/1/2006	12/1/2006	12/1/2006	12/1/2006	5/14/2007	5/14/2007	5/14/2007	5/14/2007	5/14/2007	7/30/2009	7/30/2009	7/28/2009
	Depth ft bgs:	27 - 30	6 - 12	0 - 6	6 - 10	2 - 3	2 - 3	3 - 4	7 - 9	4 - 6	2 - 3	2 - 2.6	2 - 4
Analyte	**PRGs**												
ALUMINUM	NA	17000	20000	6700	20000	6800	6200	8200	11000	4300	19900	15200	2930
ANTIMONY	NA	2.3 U	25 U	25 U	2.4 U	24 UJ	3.2 J	24 UJ	1.9 J	12 J	0.5 UJ	0.5 UJ	0.5 UJ
ARSENIC	NA	0.74	5.1 U	4.9 U	0.18 J	4.9 U	4.8 U	4.7 U	4.8 U	4.8 U	1 U	0.38 J	0.99 U
BARIUM	NA	77 J	58 J	17 J	98 J	62 J	62 J	63 J	86 J	53 J	112	104	99.2
BERYLLIUM	NA	2.3 U	2.5 U	0.81 J	2.4 U	0.42 J	0.49 J	0.4 J	0.66 J	0.29 J	0.5 U	0.37 J	0.5 U
CADMIUM	NA	0.078 J	1.4 J	4.9 U	0.18 J	4.9 U	4.8 U	4.7 U	4.8 U	4.8 U	0.25 UJ	0.25 UJ	1.7 J
CALCIUM	NA	1700 J	17000 J	420 J	1300 J	160	130	160	230	110	1590	1600	229 J
CHROMIUM	NA	51 J	130 J	39 J	81 J	45	44	48	64	35	57.7	41.1	22.4
COBALT	24	23	88	160	29	9 J	8.3 J	12	6.7 J	29	9.5	11.9	67.6
COPPER	629	330 J	6000 J	2200 J	480 J	590	580	960	490	680	152	84.7	6160 J
IRON	44800	26000	130000	190000	34000	110000	100000	59000	54000	120000	27400	18800	191000
LEAD	NA	3 J	19 J	16 J	2.4 J	4 J	4.2 J	4.7 J	4.6 J	9.9 J	6.2 J	4.7 J	52.3
MAGNESIUM	NA	10000	14000	4700	11000	3900	3500	4500	6700	2400	9640	7610	1470
MANGANESE	NA	500 J	1000 J	150 J	540 J	110	110	95	96	71	350	427	50.9
MERCURY	NA	0.016 UJ	0.039 UJ	0.024 UJ	0.016 UJ	0.014 J	0.018 J	0.008 J	0.006 J	0.006 J	0.1 U	0.097 U	0.1
MOLYBDENUM	NA	0.6 J	12 J	10 J	0.57 J	24 U	2.1 J	24 U	24 U	17 J	0.62	0.5 U	22.9
NICKEL	NA	39 J	44 J	27 J	40 J	20	20	22	24	16	47.2	39.2	9.4
POTASSIUM	NA	3800	14000	7100	6300	7000	6100	4600	5700	5600	4480	4820	8790 J
SELENIUM	NA	9.3 U	21	38	0.95 U	19 J	17 J	7.1 J	5.3 J	37 J	0.87 J	0.38 J	50.9 J
SILVER	NA	0.065 J	2.6 J	2.5 J	0.11 J	1.1 J	1.4 J	0.87 J	4.8 U	3.2 J	1 U	0.99 U	12.2 J
SODIUM	NA	93 U	1000 U	990 U	950 U	970 U	960 U	950 U	960 U	960 U	149 R	122 R	462 J
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	7.3	5.6	9.1
THALLIUM	NA	0.93 U	10 U	9.9 U	0.95 U	14	20	10	8.8 J	23	0.36 J	0.3 J	0.66 J
VANADIUM	NA	54	120	68	64	85	93	50	50	62	46	48	81.7
ZINC	NA	66	310	45	62	41	28	54	31	96	48.6	37.1	327

Notes: Units are in mg/kg = miligram per kilogram
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Light gray highlighted cells indicate exceedance of criteria.
ft bgs = feet below ground surface
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value

Table 6-7
Subsurface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	URS	URS
	Study Area	LWA	LWA	LWA	Tailing	Tailing	Tailing	Tailing	Tailing	Tailing	LWA	LWA	LWA
	Station:	MW-21A	MW-21A	MW-21A	MW-22A	MW-22A	MW-22A	SB-09	SB-09	SB-09	TP-04A	TP-06	TP-07A
	Field Sample ID:	MW-21A-072809BX	MW-21A-072809CX	MW-21A-072809CD	MW-22A-072909AX	MW-22A-072909BX	MW-22A-072909CX	SB-09X-073009AX	SB-09X-073009BX	SB-09X-073009CX	ELY-TP4A (2-3)	ELY-TP6 (3-4)	ELY-TP7A (4-5)
	Date:	7/28/2009	7/28/2009	7/28/2009	7/29/2009	7/29/2009	7/29/2009	7/30/2009	7/30/2009	7/30/2009	5/14/2007	5/14/2007	5/14/2007
	Depth ft bgs:	4 - 6	6 - 10	6 - 10	2 - 4	7.1 - 8.2	8.2 - 11.5	2.2 - 3	3 - 6	8 - 10	2 - 3	3 - 4	4 - 5
Analyte	**PRGs**												
ALUMINUM	NA	14700	11600	12400	11100	17700	14200	18600	13400	17200	5500	1700	13000
ANTIMONY	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	2.2 J	23 UJ	2.5 J
ARSENIC	NA	0.99 U	1 U	1 U	0.9 U	1 U	0.99 U	1 U	1 U	1 U	1.3 J	4.6 U	4.5 U
BARIUM	NA	132	92.6	83.1	89.8	59.6	107	119	109	128	13 J	40 J	15 J
BERYLLIUM	NA	0.17 J	0.21 J	0.18 J	0.56 U	0.3 J	0.27 J	0.5 U	0.5 U	0.24 J	2.4 U	2.3 U	2.3 U
CADMIUM	NA	0.042 J	0.03 J	0.039 J	2.7 J	4.8 J	1.5 J	30.4	24.6	0.7 J	6.4	4.6 U	45
CALCIUM	NA	1130	2300	1700	1490	742	2090	1330	2010	1640	220	32 J	240
CHROMIUM	NA	52.2	37.6	44.9	51.9	46.7	42.6	154	80.1	53	65	10	17
COBALT	24	7.3	13	6.7	82	252	11.3	395	344	23.1	600	5.6 J	1500
COPPER	629	308 J	415 J	152 J	4530 J	5160 J	355 J	19300	6750	252	36000	3400	24000
IRON	44800	26800	22000	18400	85500	90000	19300	111000	175000	27600	140000	150000	150000
LEAD	NA	4.1	4.8	3.1	20.2	10.5	5.4	27.1 J	40.8 J	4 J	34	37	46
MAGNESIUM	NA	11400	6890	7870	6900	4600	8950	10800	6510	9470	1700	760	2200
MANGANESE	NA	180	149	96.2	364	107	667	364	283 J	154	84	37	110
MERCURY	NA	0.12 U	0.098 U	0.096 U	0.11 U	0.13 U	0.12 UJ	0.097 U	0.096 U	0.097 U	0.033 J	0.047 J	0.069 J
MOLYBDENUM	NA	0.79	0.3 J	0.31 J	6.5	2.1	1.6	5.4	17.1	0.5 U	9.9 J	31	1.8 J
NICKEL	NA	28	30.7	27.8	41.6	91.6	35.9	87	81.5	42	88	2 J	470
POTASSIUM	NA	5630 J	4370 J	4530 J	7750 J	1740 UJ	5050 J	11500	11700	5340	2500	6500	1600
SELENIUM	NA	0.38 J	1 UJ	1 UJ	13.9 J	14.1 J	3.9 J	11.3	34.3	1.5	92 J	89 J	63 J
SILVER	NA	1 UJ	1 UJ	1 UJ	3.3 J	2.5 J	0.99 UJ	3.8	6	0.32 J	6.5	8.4	16
SODIUM	NA	101 J	147 J	155 J	119 J	52 J	148 J	174 R	253 R	143 R	950 J	930 U	15000
STRONTIUM	NA	5.8	8.6	10	3.2	3.1	12	1.7	14.9	11.9	-	-	-
THALLIUM	NA	0.22 J	0.23 J	0.27 J	0.53 J	0.19 J	0.24 J	0.75 J	0.43 J	0.28 J	16	20	20
VANADIUM	NA	50.5	31.1	36.1	54.2	43	37	126	97.5	43.2	53	80	24
ZINC	NA	52	68.1	60.6	375	939	43.2	1350	5040	171	730	57	5700

Notes: Units are in mg/kg = miligram per kilogram
TAL = Target Analyte List
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Table 6-7
Subsurface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	URS
	Study Area	LWA	LWA-TZ	LWA-TZ	LWA-TZ	ORB	ORB	ORB	ORB	ORB	ORB	ORB
	Station:	TP-16	MW-20A	MW-20A	MW-20A	MW-23A	MW-23A	SB-01	SB-01	SB-02	SB-02	SB-03
	Field Sample ID:	TP-16X-080309CX	MW-20A-072909AX	MW-20A-072909BX	MW-20A-072909CX	MW-23A-070809BX	MW-23A-070809CX	ELY-SB-1 (0-4)	ELY-SB-1 (4.5-5.6)	ELY-SB-2 (0-4)	ELY-SB-2 (6-10)	ELY-QC-2
	Date:	8/3/2009	7/29/2009	7/29/2009	7/29/2009	7/8/2009	7/8/2009	12/5/2006	12/5/2006	12/3/2006	12/3/2006	12/3/2006
	Depth ft bgs:	2 - 5	2 - 2.4	2.4 - 4	4 - 5.5	6 - 8	8 - 10	0 - 4	4.5 - 5.6	0 - 4	6 - 10	0 - 4
Analyte	**PRGs**											
ALUMINUM	NA	16000	14000	15800	9680	17000	13600	19000	14000	18000	13000	4800
ANTIMONY	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	2.3 U	2.3 U	26 U	2.3 U	24 U
ARSENIC	NA	0.44 J	1 U	1 U	0.99 U	1 U	0.99 U	0.36 J	0.65	5.3 U	0.65	4.8 U
BARIUM	NA	114	91.8	91.9	63.2	141	126	74 J	72 J	76 J	63 J	32 J
BERYLLIUM	NA	0.39 J	0.27 J	0.27 J	0.59 U	0.31 J	0.24 J	2.3 U	2.3 U	2.6 U	2.3 U	0.34 J
CADMIUM	NA	0.23 J	0.16 J	0.17 J	0.19 J	0.4	0.23 J	0.2 J	0.46 U	1.2 J	0.31 J	0.54 J
CALCIUM	NA	2040	2750	1670	1970	2070	1590	660 J	970 J	980 J	1700 J	190 J
CHROMIUM	NA	41.6	44.3	58.9	32.7	65.9	47.3	53 J	38 J	79 J	35 J	38 J
COBALT	24	13.5	78.3	15	40.2	18.4	19.9	15	11	28	19	17
COPPER	629	111	2230 J	231 J	1440 J	156 J	466 J	540 J	310 J	1300 J	210 J	940 J
IRON	44800	21700	55100	18600	32600	22800	20400	40000	24000	61000	18000	110000
LEAD	NA	7.4 J	12.1	3.3	8.5	3.4 J	3.2 J	3.4 J	2.6 J	3.2 J	6.8 J	14 J
MAGNESIUM	NA	8030	8360	8830	5850	10200	8260	9000	7000	6200	7700	1800
MANGANESE	NA	568	333	371	241	654 J	253 J	240 J	160 J	190 J	590 J	37 J
MERCURY	NA	0.094 U	0.031 J	0.1 U	0.097 U	0.024 J	0.02 J	0.038 UJ	0.015 UJ	0.039 UJ	0.031 UJ	0.032 UJ
MOLYBDENUM	NA	0.61	0.59 J	0.42 J	0.63	0.68	0.89	0.98 J	0.42 J	26 UJ	0.74 J	16 J
NICKEL	NA	44.7	47.1	36.5	34	56.3	45.5	31 J	28 J	30 J	37 J	8.6 J
POTASSIUM	NA	3540	5400 J	5140 J	3670 J	7800	5760	6300	4100	3800	3800	3200
SELENIUM	NA	0.34 J	0.76 J	1 UJ	1 UJ	0.24 J	0.24 J	9.1 U	9.2 U	11 U	0.94 U	26
SILVER	NA	1 U	1.1 J	1 UJ	1 J	1 U	0.99 U	0.11 J	0.46 U	5.3 U	0.47 U	7.6
SODIUM	NA	106 R	197 J	143 J	122 J	214 J	186 J	84 J	150	540 J	94 U	970 U
STRONTIUM	NA	8.5	11.4	7.4	6.6	7	4.8	-	-	-	-	-
THALLIUM	NA	0.29 J	0.21 J	0.24 J	0.24 J	0.34	0.26	9.1 U	0.92 U	11 U	0.94 U	9.7 U
VANADIUM	NA	39.3	42.2	38.3	29.3	52.7	41.2	50	36	76	31	82
ZINC	NA	64.6	722	44.1	170	47.2	77.4	70	32	86	44	140

Notes: Units are in mg/kg = miligram per kilogram
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Table 6-7
Subsurface Soil TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	ORB	ORB	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter
	Station:	SB-03	SB-03	TP-01	TP-02B	TP-100	TP-104	TP-106	TP-106	TP-03A	TP-03B
	Field Sample ID:	ELY-SB-3 (0-4)	ELY-SB-3 (4.5-8)	ELY-TP1 (4-5)	ELY-TP2B (2-3)	ELY-TP-100 (4-6)	ELY-TP-104 (2-3)	ELY-TP-106 (2-3)	ELY-TP-106 (2-3) DUP	ELY-TP3A (1.5-2.5)	ELY-TP3B (2-3)
	Date:	12/3/2006	12/3/2006	5/14/2007	5/14/2007	10/5/2007	10/5/2007	10/5/2007	10/5/2007	5/14/2007	5/14/2007
	Depth ft bgs:	0 - 4	4.5 - 8	4 - 5	2 - 3	4 - 6	2 - 3	2 - 3	2 - 3	1.5 - 2.5	2 - 3
Analyte	**PRGs**										
ALUMINUM	NA	6400	16000	11000	3300	22000	17000	7800	7800	13000	11000
ANTIMONY	NA	2.6 U	2.6 U	2.7 J	2.2 J	2.5 U	2.6 U	2.2 U	2.2 U	26 UJ	22 UJ
ARSENIC	NA	1.6	0.33 J	4.7 J	4.2 J	1.2	0.97	0.54	0.57	1.5 J	4.4 U
BARIUM	NA	42 J	130 J	72 J	46 J	67	38	39	37	59 J	53 J
BERYLLIUM	NA	0.091 J	2.6 U	0.45 J	2.5 U	1	0.83	0.34	0.34	0.58 J	0.52 J
CADMIUM	NA	1.4	0.28 J	3.2 J	1.2 J	0.083 J	0.46 J	0.048 J	0.13 J	5.2 U	4.4 U
CALCIUM	NA	250 J	550 J	900	240	750	1100	1300	1200	1800	1800
CHROMIUM	NA	40 J	63 J	34	22	50	29	24	24	26	23
COBALT	24	21	16	49	52	8.8 J	14 J	20 J	16 J	11	85
COPPER	629	1800 J	880 J	1600	3400	400	600	1300	1400	770	1300
IRON	44800	130000	37000	69000	120000	25000	18000	17000	13000	18000	34000
LEAD	NA	69 J	2.8 J	27	38	6.5	9	2.4	2.6	5.2 J	8.2 J
MAGNESIUM	NA	2200	8900	5100	2100	5900	6000	4200	4300	5600	4900
MANGANESE	NA	45 J	110 J	220	110	160 J	140 J	230 J	240 J	160	870
MERCURY	NA	0.041 UJ	0.023 UJ	0.058 J	0.48	0.057 J	0.038 J	0.09 U	0.006 UJ	0.017 J	0.01 J
MOLYBDENUM	NA	17 J	0.72 J	6.4 J	19 J	0.19 J	0.2 J	0.89 J	0.33 J	26 U	1.5 J
NICKEL	NA	10 J	32 J	25	13	27	20	17	17	18	18
POTASSIUM	NA	4800	6600	3800	5400	2300	1300	2000	2000	1600	2100
SELENIUM	NA	34	10 U	22 J	79 J	1.4	2	2	1.8	1.8 J	4.5 J
SILVER	NA	9.7	0.51 U	3.1 J	10	0.14 UJ	0.17 UJ	0.41 J	0.34 J	5.2 U	4.4 U
SODIUM	NA	740	74 J	740 J	490 J	R	R	R	R	390 J	490 J
STRONTIUM	NA	-	-	-	-	-	-	-	-	-	-
THALLIUM	NA	10 U	1 U	8.5 J	15	1 U	1 U	0.58 J	0.3 J	3.3 J	5.9 J
VANADIUM	NA	75	57	39	57	50	32	26	25	27	26
ZINC	NA	170	83	410	280	53	60	88	67	110	270

Notes: Units are in mg/kg = miligram per kilogram
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UWA = Upper Waste Area; LWA = Lower Waste Area; TZ= Transition Zone; ORB = Ore Roast Bed; EB-LR = Ely Brook Lower Reach
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Table 6-8
Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	EPA	USGS	URS	URS	URS	URS	EPA	USGS	URS
Study Area		EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-Background	EB-Background	EB-Background	EB-LR	EB-LR	EB-LR	EB-LR
Station:		EB-1030M	EB-1030M	EB-1030M	EB-1030M	EB-1080M	EB-1080M	EB-1430M	EB-1430M	EB-1430M	EB-15M	EB-190M	EB-20M	EB-210M
Field Sample ID:		SED-18A	SED-18C	SED-18D	SED-18E	AA62433	06Ely01	SED-20A	SED-20C	SED-20D	ELYM-8-SS	AA62436	06Ely11	SED-10A
Date:		11/2/2004	11/2/2004	11/2/2004	11/2/2004	6/20/2006	8/23/2006	11/3/2004	11/3/2004	11/3/2004	8/25/1998	6/20/2006	8/23/2006	11/3/2004
Depth ft bgs:		0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	-	-	0 - 0.25	0 - 0.25	0 - 0.25	-	-	-	0 - 0.25
Analyte	**PRGs**													
ALUMINUM	NA	15000	7200	6700	14000	11000	-	12000	14000	17000	-	6600	-	4900
ANTIMONY	NA	6.6 U	6.6 U	6.5 U	6.9 U	20 U	0.05 U	11 U	12 U	21 U	-	49 U	1.15	19 U
ARSENIC	NA	3.6	3.2	3.7	4.1	20 U	1 U	1.2 J	0.98 J	2.4 J	10 U	49 U	2	3.8 U
BARIUM	NA	70	30	28	64	56	249	75	88	120	207	60	191	41
BERYLLIUM	NA	0.66 UJ	0.66 UJ	0.65 UJ	0.69 UJ	1 U	1.4	1.1 UJ	1.2 UJ	2.1 UJ	2	2.5 U	1.3	0.3 J
CADMIUM	NA	1.3 U	1.3 U	1.3 U	1.4 U	3.1 U	0.1	0.44 J	2.4 U	0.83 J	2	7.4 U	0.7	R
CHROMIUM	NA	40	18	16	38	29	57	34 J	40 J	48 J	83	31	67	27 J
COBALT	NA	13	7.6	6.4	13	12	9.8	11	14	19	12	16	15.1	6.6 J
COPPER	149	110 J	140 J	230 J	130 J	40	75.4	31	20	50	1730	2400	3700	1600
IRON	NA	22000	17000	14000	22000	20000	-	14000	19000	24000	-	93000	-	400000
LEAD	NA	6.5 J	3.3 J	3.4 J	6.3 J	20 U	24.8	12	5.6 J	20 J	41	49 U	38	47
MANGANESE	NA	490 J	230 J	270 J	440 J	390	780	420 J	540 J	1800 J	1050	96	1020	52
MERCURY	NA	0.1 U	0.09 U	0.1 U	0.11 U	-	0.02 U	0.057 J	0.018 J	0.084 J	0.04	-	0.03	0.071 J
MOLYBDENUM	NA	0.4 J	0.27 J	0.26 J	0.37 J	-	0.41	0.37 J	0.26 J	0.75 J	21	-	16.2	8.7 J
NICKEL	NA	25	12	12	24	28	16.5	28	30	44	14	15 U	15	4 J
SELENIUM	NA	0.93 J	0.91 J	0.84 J	1.3 J	10 U	0.3	0.88 J	0.8 J	2.4 J	-	36	35.2	34
SILVER	NA	1.3 U	1.3 U	1.3 U	1.4 U	3.1 U	1 U	2.2 U	2.4 U	4.2 U	8 U	7.4 U	3	4.6 J
THALLIUM	NA	1.3 U	1.3 U	1.3 U	1.4 U	55 U	-	2.2 U	2.4 U	4.2 U	-	120 U	-	2.8 J
VANADIUM	NA	38	20	18	37	30	73	33 J	39 J	46 J	108	56	112	60 J
ZINC	NA	60	38	29	58	40 U	56	45 J	55 J	71 J	153	110	196	63
CYANIDE	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes Units are in mg/kg = miligram per kilogram
TAL = Target Analyte List
EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook; UR = Upper Reach; LR = Lower Reach
EBOR = East Branch of Ompompanoosuc River; ORT = Ompomanoosuc River Tributaries
Light gray highlighted cells indicate exceedance of criteria.
ft bgs = feet below ground surface
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit; R = Rejected

Table 6-8
Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR
Station:		EB-210M	EB-210M	EB-210M	EB-210M	EB-30M	EB-30M	EB-30M	EB-30M	EB-30M	EB-30M	SA-10	SA-11	SA-12
Field Sample ID:		SED-10B	SED-10C	SED-10D	SED-10E	QS-02	SED-09A	SED-09B	SED-09C	SED-09D	SED-09E	ELY-SS-SA-10	ELY-SS-SA-11	ELY-SS-SA-12
Date:		11/3/2004	11/3/2004	11/3/2004	11/3/2004	11/3/2004	11/3/2004	11/3/2004	11/3/2004	11/3/2004	11/3/2004	10/17/2007	10/17/2007	10/17/2007
Depth ft bgs:		0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.5	0 - 0.5	0 - 0.5
Analyte	**PRGs**													
ALUMINUM	NA	2300	2100	3400	5400	3200	6600	16000	3400	3400	7100	3,600	6,200	6,200
ANTIMONY	NA	6.3 U	6.2 U	6.5 U	6.9 U	6.7 U	8 U	7.9 U	6.9 U	6.5 U	7.5 U	1.6 J	2.1 J	11 U
ARSENIC	NA	0.29 J	1.2 U	0.48 J	0.77 J	0.3 J	0.89 J	1.1 J	0.36 J	0.73 J	0.9 J	2.6 U	0.81 J	2.2 U
BARIUM	NA	20	18	26	33	31	61	50	31	28	82	31 J	58 J	71 J
BERYLLIUM	NA	0.63 U	0.62 U	0.65 U	0.69 U	0.67 U	0.8 U	0.79 U	0.69 U	0.65 U	0.75 U	0.1 UJ	0.35 UJ	0.46 J
CADMIUM	NA	R	R	R	R	R	R	3.2 J	R	R	0.51 J	0.41 J	0.25 J	2.2 U
CHROMIUM	NA	14 J	13 J	20 J	35 J	17 J	33 J	64 J	17 J	19 J	35 J	21 J	32 J	33 J
COBALT	NA	6.3	6.3	7.5	9.8	8.8	9.7	140	9.2	7.5	9.8	7.2	7.5	5.6
COPPER	149	5600	4000	3400	420	3600	1500	5200	3100	2100	950	4,900 J	1,700 J	280 J
IRON	NA	130000	99000	100000	97000	140000	140000	130000	120000	100000	140000	100,000	97,000	45,000
LEAD	NA	18	14	18	17	17	32	42	21	17	38	15	16	6.8 J
MANGANESE	NA	35	31	44	90	44	81	180	46	43	84	63	90	58
MERCURY	NA	0.1 U	0.09 U	0.007 J	0.031 J	0.1 U	0.054 J	0.074 J	0.011 J	0.014 J	0.12	0.019 J	0.031 J	0.012 J
MOLYBDENUM	NA	6.4	5.6 J	8.7	3.2 J	8.5	13	12	8.9	9.8	10	6.6 J	10 J	2.2 J
NICKEL	NA	3.4	3.7	6.1	13	4.4	8.3	35	5	5.2	9.6	6.5	10	15
SELENIUM	NA	25	21	24	11	27	40	44	28	26	30	31	35	10
SILVER	NA	2.3 J	1.8 J	2.4 J	1.9 J	1.8 J	4 J	8.7 J	2 J	2.4 J	13 J	2.4 UJ	3.2	0.83 UJ
THALLIUM	NA	1.2 U	1.2 U	1.3 U	1.4 U	1.3 U	1.6 U	1.6 U	0.58 J	0.45 J	1.5 U	-	-	-
VANADIUM	NA	37 J	30 J	40 J	56 J	38 J	65 J	110 J	42 J	43 J	64 J	8.6 J	9.6 J	3.3 J
ZINC	NA	67	57	80	43	75	78	410	88	94	74	42	53	42
CYANIDE	NA	--	--	--	--	--	--	--	--	--	--	75	120	25

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Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	URS
Study Area		EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR
Station:		SA-12	SA-13	TD	TD	TE	TE	TE	TF	TF	TF	TF	TR-03A	TR-03A
Field Sample ID:		ELY-SS-SA-12	ELY-SS-SA-13	TD-03X-082809-AX	TD-05X-082809-DX	TE-09X-090109AX	TE-12X-090109BX	TE-15X-090109CX	TF-11X-090909AX	TF-11X-090209AX	TF-13X-090209BX	TF-13X-090909BX	ELY-SS-TR-03A	ELY-SS-TR-03A
Date:		10/17/2007	10/17/2007	8/28/2009	8/28/2009	9/1/2009	9/1/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009	10/17/2007	10/17/2007
Depth ft bgs:		0 - 0.5	0 - 0.5	0 - 1	0 - 1	0 - 2	0 - 2.5	2.5 - 4	0 - 0.5	0 - 0.5	1 - 3.5	0 - 0.5	0.04 - 1	0 - 0.04
Analyte	**PRGs**													
ALUMINUM	NA	5,600	4,900	4,180	14,800	10,200	13,600	24,600	13,600	-	-	11,300	7,700	8,000
ANTIMONY	NA	0.79 J	11 U	0.11 J	0.052 J	0.06 J	0.5 U	0.5 U	-	0.088 J	0.49 U	-	1.9 J	1.3 J
ARSENIC	NA	2.3 U	2.3 U	1 UJ	1 UJ	1 U	1 U	1	1 U	-	-	1 U	3 U	3.4 U
BARIUM	NA	82 J	56 J	49.2	58.3	165	72.9	207	99.4	-	-	77.7	62 J	93 J
BERYLLIUM	NA	0.43 J	0.44 J	0.5 U	0.23 J	0.046 J	0.12 J	0.39 J	0.18 J	-	-	0.15 J	0.43 J	0.52 J
CADMIUM	NA	2.3 U	2.3 U	0.092 J	0.27	0.062 J	0.013 J	0.47	-	0.31	1.9	-	0.67 J	0.32 J
CHROMIUM	NA	36 J	24 J	25.4	57.6	60.8	65.2	74.2	57.8	-	-	39	42 J	47 J
COBALT	NA	5.4	4.7	5.5	8.4	4.4 J	9	21.7	17.8	-	-	66.5	9.9	8.6
COPPER	149	1,000 J	180 J	2,750 J	420 J	469	185	268	5,610	-	-	7,850	3,400 J	750 J
IRON	NA	65,000	52,000	100,000	18,800	78,200	21,700	29,600	135,000	-	-	30,700	130,000	140,000
LEAD	NA	10 J	5.8 J	29 J	9.5 J	32.3	3.4	9.2	46.1 J	-	-	4.8 J	28	23
MANGANESE	NA	60	64	60.3 J	103 J	176	98	250	108 J	-	-	109 J	92	98
MERCURY	NA	0.013 J	0.012 J	0.096 U	0.094 U	0.032 J	0.022 J	0.064 J	-	0.045 J	0.087 U	-	0.039 J	0.042 J
MOLYBDENUM	NA	3.6 J	0.99 J	1.6	0.33 J	7.8	0.2 J	0.82	-	0.37 J	0.65	-	9.1 J	9.8 J
NICKEL	NA	12	13	11	27.3	9.1	28.7	62.6	19.8	-	-	36.9	9.4	12
SELENIUM	NA	19	11	3.8	0.58 J	22.8	1.2	2.2	-	33.2	3.7	-	45	37
SILVER	NA	2.2 J	0.86 J	2.1	0.23 J	3.1	0.41 J	0.46 J	7.4	-	-	2.4	4.9	3.6
THALLIUM	NA	-	-	2.8	3.9	8.4	2.7	30.3	2.2	-	-	2.8	-	-
VANADIUM	NA	4.5 J	2.9 J	0.1 J	0.13 J	0.48	0.15 J	0.38	-	0.32	0.22 J	-	9.9 J	10 J
ZINC	NA	40	40	43.8	35.9	105	38.4	57.8	91.9	-	-	33.6	72	72
CYANIDE	NA	37	23	184	70.5	69.3	51.9	116	140	-	-	107	160	120

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Table 6-8
Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-MR	EB-MR	EB-MR	EB-MR
Station:		TR-03B	TR-03B	TZ-13	TZ-13	TZ-14	TZ-14	TZ-16	TZ-16	00JH34	EB-405M	EB-405M	EB-405M	EB-405M
Field Sample ID:		ELY-SS-TR-03B	ELY-SS-TR-03B	ELY-SS-TZ-13	ELY-SS-TZ-13	ELY-SS-TZ-14	ELY-SS-TZ-14	ELY-SS-TZ-16	ELY-SS-TZ-16	00JH34	QS-08	SED-33A	SED-33C	SED-33D
Date:		10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/17/2007	10/16/2000	11/3/2004	11/3/2004	11/3/2004	11/3/2004
Depth ft bgs:		0 - 0.17	0.17 - 1	0 - 0.33	0.33 - 1	0 - 0.33	0.33 - 1	0 - 0.33	0.33 - 1	0 - 0	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25
Analyte	**PRGs**													
ALUMINUM	NA	6,800	15,000	3,000	20,000	6,400	8,200	2,000	18,000	39,100	2700	6200	2700	7800
ANTIMONY	NA	43 U	1.9 J	7.9 U	3.6 J	32 U	4.3 J	9.4 U	2.6 J	0.2	6.6 U	7.2 U	13 U	7.2 U
ARSENIC	NA	8.6 U	1.7 J	2.1	2.3 J	2.7 J	7 U	2.2	2.7 J	0.7	0.25 J	1.1 J	2.6 U	1 J
BARIUM	NA	120 J	190 J	59	110 J	110 J	75 J	75 J	68 J	130	24	36	22	43
BERYLLIUM	NA	4.3 U	1.1 J	0.11 J	0.95 J	0.34 UJ	3.5 U	0.079 UJ	0.66 J	1.2	0.66 U	0.72 U	1.3 U	0.72 U
CADMIUM	NA	2 J	2 J	2.3	0.32 J	3 J	0.8 J	2.5	0.5 J	2.7	R	R	R	R
CHROMIUM	NA	7.4 J	77 J	6.4	59 J	32 J	59 J	3.1 J	74 J	104	15 J	26 J	16 J	36 J
COBALT	NA	6.4 J	35	18	13	21	10 J	25	17	922	8.2	12	7	9.8
COPPER	149	1,600 J	2,900 J	760	640 J	980 J	1,200 J	1,200 J	1,800 J	6,940	5700	3300	6600	930
IRON	NA	62,000	160,000	23,000	40,000	100,000	300,000	16,000	100,000	506,000	110000	98000	100000	110000
LEAD	NA	180	62	20	21	48	46	34	27	12	17	17	15	19
MANGANESE	NA	40	160	310 J	180	310	110	140	260	1400	52	77	51	81
MERCURY	NA	0.14 J	0.074 J	0.18 J	0.09 J	0.26 J	0.1 J	0.14 J	0.073 J	-	0.1 U	0.12 U	0.11 U	0.016 J
MOLYBDENUM	NA	43 U	16 J	1.5 J	3.4 J	4.7 J	11 J	0.76 J	5.3 J	67	7.4	8.1	7.8 J	11
NICKEL	NA	7.4 J	32	7.5	33	13 J	12 J	11	11	18	4.1	10	4.5 J	13
SELENIUM	NA	19	62	7.1	7.2	34	55	7.8	31	10	27	30	27	31
SILVER	NA	10	11	5.1	0.84 UJ	12	8.2	7.2	4	0.94	2.3 J	2.4 J	2.5 J	2.9 J
THALLIUM	NA	-	-	-	-	-	-	-	-	70	1.3 U	1.4 U	2.1 UJ	1.4 U
VANADIUM	NA	6.4 J	13 J	3.2 U	6.4 U	7.6 J	13 J	3.8 U	11 J	0.2	36 J	47 J	36 J	62 J
ZINC	NA	9.3	120	10	59	55	99	9.7	110	220	89	96	71	73
CYANIDE	NA	320	280	98	85	160	97	75	190	7500	--	--	--	--

Notes Units are in mg/kg = miligram per kilogram
TAL = Target Analyte List
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Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	EPA	URS	URS	URS	URS	URS	URS	URS
Study Area		EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR
Station:		EB-405M	EB-440M	EB-440M	EB-440M	EB-440M	EB-515M	EB-530M	EB-530M	EB-530M	EB-530M	EB-535M	TZ-20	TZ-20
Field Sample ID:		SED-33E	SED-11A	SED-11C	SED-11D	SED-11E	AA62435	SED-12A	SED-12C	SED-12D	SED-12E	EB-SS	ELY-SS-TZ-20	ELY-SS-TZ-20
Date:		11/3/2004	11/3/2004	11/3/2004	11/3/2004	11/3/2004	6/20/2006	11/1/2004	11/1/2004	11/1/2004	11/1/2004	8/25/1998	10/17/2007	10/17/2007
Depth ft bgs:		0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	-	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	-	0 - 0.08	0.08 - 1
Analyte	**PRGs**													
ALUMINUM	NA	2100	5700	1900	4800	7200	6300	2800	2400	1400	1100	-	10,000	6,400
ANTIMONY	NA	6.9 U	7.9 U	6.3 U	5.7 U	7.1 U	43 U	6.4 U	6.4 U	6.6 U	6.8 U	-	1.4 J	1.1 J
ARSENIC	NA	0.36 J	1.6 U	1.2 U	0.5 J	1 J	43 U	0.32 J	0.33 J	1.3 U	1.4 U	1.6	1.5 J	2.6 U
BARIUM	NA	27	46	20	33	47	58	27 J	21 J	22 J	24 J	189	110 J	65 J
BERYLLIUM	NA	0.69 U	0.79 U	0.63 U	0.57 U	0.71 U	2.2 U	0.64 UJ	0.64 UJ	0.66 UJ	0.68 UJ	2	0.53 J	0.44 J
CADMIUM	NA	R	0.31 J	R	R	0.44 J	6.5 U	R	R	R	R	2 U	3.8 U	0.21 J
CHROMIUM	NA	11 J	37 J	12 J	24 J	40 J	25	16 J	13 J	9.1 J	7.2 J	80	46 J	34 J
COBALT	NA	5.8	9.3	11	6.3	11	38	11	7.6	6.4	6.5	35	9.2	6.1
COPPER	149	310	1400	3300	1100	710	4100	1100	6100	3600	5400	5320	1,100 J	410 J
IRON	NA	97000	220000	140000	68000	130000	95000	87000	110000	140000	170000	-	110,000	89,000
LEAD	NA	24	27	18	13	27	43 U	14 J	21 J	24 J	24 J	43	28	15
MANGANESE	NA	66	76	35	60	92	270	38	38	29	23	2000	160	78
MERCURY	NA	0.039 J	0.028 J	0.09 U	0.09 U	0.022 J	-	0.006 J	0.006 J	0.015 J	0.012 J	0.03	0.11 J	0.042 J
MOLYBDENUM	NA	15	14	12	4.7 J	12	-	4.8 J	7.1	13	16	26	10 J	4.4 J
NICKEL	NA	2.4 J	6.9	2.7 J	9.7	9.2	14	5.3	4	0.98 J	0.9 J	13	15	13
SELENIUM	NA	42	39	38	14	39	41	17	22	32	39	-	39	24
SILVER	NA	5 J	4.5 J	2.4 J	1.4 J	3.5 J	6.5 U	1.3	2.4	3.5	3.4	3	4.7	2.5 J
THALLIUM	NA	1.4 U	1.6 U	1.2 U	1.1 U	1.4 U	110 U	1 J	0.86 J	3.3 J	0.76 J	-	-	-
VANADIUM	NA	37 J	74 J	45 J	34 J	72 J	53	34	36	49	50	112	14 J	8.1 J
ZINC	NA	80	69	72	39	78	100	150	78	110	62	176	71	59
CYANIDE	NA	--	--	--	--	--	--	--	--	--	--	--	110	63

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Table 6-8
Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	USGS	USGS	USGS	URS	URS	URS	URS	EPA	USGS
Study Area		EB-MR	EB-MR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-LR
Station:		TZ-21	TZ-21	EB-560M	EB-560M	EB-600M	EB-770M	EB-770M	EB-770M	EB-815M	EB-815M	EB-815M	EB-865M	EB-90M
Field Sample ID:		ELY-SS-TZ-21	ELY-SS-TZ-21	SED-13A	SED-13C	06Ely03	06Ely02	06Ely02-2	SED-40C (0-0.25)	QS-03	SED-17C	SED-17C (0-0.25)	AA62434	06Ely04
Date:		10/17/2007	10/17/2007	11/1/2004	11/1/2004	8/23/2006	8/23/2006	8/23/2006	10/23/2007	11/2/2004	11/2/2004	10/23/2007	6/20/2006	8/23/2006
Depth ft bgs:		0 - 0.42	0.42 - 1	0 - 0.25	0 - 0.25	-	-	-	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	-	-
Analyte	**PRGs**													
ALUMINUM	NA	10,000	29,000 J	13000	6300	-	-	-	16000	14000	11000	11000	7600	-
ANTIMONY	NA	13 U	9.4 U	7 U	6.2 U	1.15	0.06	0.37	10 U	8.4 U	8 U	9.9 U	21 U	2.03
ARSENIC	NA	6.4	2.3	1.7	1.3	3	2	4	3.7	2.2	1.5 J	4.8	21 U	2
BARIUM	NA	120 J	120	61 J	33 J	236	255	239	62 J	79	63	49 J	36	166
BERYLLIUM	NA	0.47 J	1.4	0.7 UJ	0.62 UJ	1.5	1.6	1.6	0.71 J	0.84 UJ	0.8 UJ	0.47 J	1.1 U	1.1
CADMIUM	NA	3.2	0.83 J	R	R	1	0.4	0.6	0.89 J	0.4 J	0.33 J	0.57 J	3.2 U	1
CHROMIUM	NA	24 J	82 J	28 J	22 J	64	66	65	41	43	30	27	19	62
COBALT	NA	60	21	120	40	65.5	22.4	22.4	29	31	25	16	11	14.4
COPPER	149	960 J	590	4000	1600	2730	1160	1230	990	780 J	920 J	460	320	5950
IRON	NA	35,000	35,000 J	59000	57000	-	-	-	34000	31000	29000	22000	17000	-
LEAD	NA	58	31 J	12 J	8.7 J	174	14.6	15	6.4 J	7.4 J	6.7 J	4.6 J	21 U	38.1
MANGANESE	NA	1600	280 J	1000	410	1820	2090	2200	460	420 J	320 J	410	290	2200
MERCURY	NA	0.21 J	0.38	0.009 J	0.1 U	0.02 U	0.02 U	0.02 U	0.008 J	0.13 U	0.008 J	0.006 J	-	0.02 U
MOLYBDENUM	NA	2.4 J	1 UJ	3.6 J	2.1 J	8.33	2.11	3.91	1.3 J	0.68 J	0.44 J	9.9 U	-	17.4
NICKEL	NA	25	43 J	21	13	23.4	20	20.2	28	29	22	20	15	10.6
SELENIUM	NA	12	3.5 J	11	9.2	8.1	4.1	3.9	7.3	2.6 J	2.3 J	3.1 J	11 U	30.1
SILVER	NA	1.3 J	0.73 J	0.73 J	0.47 J	1 U	1 U	1 U	0.47 J	1.7 U	1.6 U	0.39 J	3.2 U	3
THALLIUM	NA	-	-	1.4 U	1.2 U	-	-	-	4 U	1.7 U	1.6 U	4 U	45 U	-
VANADIUM	NA	5.2 U	3.8 J	38	38	97	96	90	42	39	31	30	22	112
ZINC	NA	43	76 J	140	81	186	122	139	130	140	120	88	56	206
CYANIDE	NA	82	130	--	--	--	--	--	--	--	--	--	--	--

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Table 6-8
Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		EBT1	EBT1	EBT1	EBT1	EBT1	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2
Station:		EBT1-10M	EBT1-10M	EBT1-10M	EBT1-110M	EBT1-110M	EBT2-185M	EBT2-23M	EBT2-23M	EBT2-23M	EBT2-23M	EBT2-315M	EBT2-430M	EBT2-430M
Field Sample ID:		SED-34A	SED-34C	SED-34D	QS-09	SED-36C	SED-37C	SED-31A	SED-31B	SED-31C	SED-31D	SED-16C	QS-04	SED-21C
Date:		11/2/2004	11/2/2004	11/2/2004	11/3/2004	11/3/2004	11/2/2004	11/1/2004	11/1/2004	11/1/2004	11/1/2004	11/3/2004	11/3/2004	11/3/2004
Depth ft bgs:		0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25
Analyte	**PRGs**													
ALUMINUM	NA	5500	2300	5800	1400	1600	32000	6400	5800	3600	2200	22000	14000	15000
ANTIMONY	NA	7 U	7 U	9 U	7.4 U	7.1 U	5.4 J	7.2 U	6.9 U	6.7 U	5.9 U	12 U	12 U	11 U
ARSENIC	NA	0.48 J	1.4 U	0.51 J	1.5 U	1.4 U	4.7	0.63 J	0.43 J	0.46 J	0.38 J	2.6	1 J	0.79 J
BARIUM	NA	28	23	53	39	40	57	25 J	28 J	28 J	20 J	100	74	73
BERYLLIUM	NA	0.7 UJ	0.7 UJ	0.9 UJ	0.74 UJ	0.71 UJ	1.4 UJ	0.72 UJ	0.69 UJ	0.67 UJ	0.59 UJ	1.2 UJ	1.2 UJ	1.1 UJ
CADMIUM	NA	1.4 U	0.22 J	1.8 U	1.5 U	1.4 U	2.9 U	R	R	R	R	1.1 J	2.3 U	2.3 U
CHROMIUM	NA	28	14	33	11 J	12 J	51	34 J	28 J	19 J	12 J	60 J	40 J	40 J
COBALT	NA	10	7.4	11	4.6	5.4	17	9.9	11	8.5	11	38	13	13
COPPER	149	1200 J	3100 J	1200 J	1400	1500	1200 J	1500	2000	2300	2900	400	46	44
IRON	NA	100000	76000	130000	110000	110000	28000	110000	97000	100000	110000	30000	22000	22000
LEAD	NA	29	15	38	44	58	16	24 J	22 J	17 J	26 J	9.3 J	7.9 J	7.6 J
MANGANESE	NA	72 J	36 J	74 J	36 J	39 J	160 J	94	79	55	43	920 J	150 J	150 J
MERCURY	NA	0.048 J	0.01 J	0.064 J	0.069 J	0.047 J	0.021 J	0.03 J	0.015 J	0.11 U	0.1 U	0.044 J	0.041 J	0.03 J
MOLYBDENUM	NA	14	7.2	17	18 J	19 J	2.1 J	12	11	8.5	12	1.1 J	0.4 J	0.61 J
NICKEL	NA	9	4.4	10	1.4 J	2 J	36	8.8	9.2	6.5	3.5	56	25	25
SELENIUM	NA	34	19	40	28	37	2.7 J	35	33	23	36	1.3 J	1.2 J	0.74 J
SILVER	NA	4.8	2.7	5.9	5.1	5.6	0.68 J	4.1	2.9	2.2	2.9	2.4 U	2.3 U	2.3 U
THALLIUM	NA	1 J	1.4	1.3 J	1.5 U	1.4 U	5.8 U	1.4 U	1.4 U	0.73 J	0.74 J	2.4 U	2.3 U	2.3 U
VANADIUM	NA	59	29	72	55 J	58 J	48	67	59	43	48	58 J	50 J	50 J
ZINC	NA	95	130	89	45 J	58 J	94	96	110	90	70	320 J	49 J	48 J
CYANIDE	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

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Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT3	EBT3	EBT3	EBT3	EBT3	EBT4	EBT4
Station:		EBT2-58M	EBT2-58M	EBT2-58M	EBT2-7M	EBT2-7M	EBT2-7M	EBT3-230M	EBT3-60M	EBT3-60M	EBT3-60M	EBT3-60M	EBT4-25M	EBT4-25M
Field Sample ID:		SED-14A	SED-14C	SED-14D	SED-32A	SED-32C	SED-32D	ELYM-SS-2	SED-30A	SED-30B	SED-30C	SED-30D	QS-07	SED-29A
Date:		11/1/2004	11/1/2004	11/1/2004	11/1/2004	11/1/2004	11/1/2004	8/25/1998	11/1/2004	11/1/2004	11/1/2004	11/1/2004	11/2/2004	11/2/2004
Depth ft bgs:		0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	-	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25
Analyte	**PRGs**													
ALUMINUM	NA	2700	1700	3300	3900	2800	6000	-	7200	12000	3900	4700	6800	11000
ANTIMONY	NA	6.9 U	6.5 U	6.7 U	7.1 U	6.4 U	6.9 U	-	8.2 U	6.3 U	6.6 U	6.9 U	6.6 U	9.2 U
ARSENIC	NA	1.4 U	1.3 U	0.84 J	0.44 J	0.64 J	1.4 U	2	0.55 J	0.33 J	0.67 J	0.47 J	3.4	1.7 J
BARIUM	NA	27 J	22 J	23 J	32 J	22 J	58 J	8 U	45 J	30 J	32 J	27 J	30	65
BERYLLIUM	NA	0.69 UJ	0.65 UJ	0.67 UJ	0.71 UJ	0.64 UJ	0.69 UJ	230	0.82 UJ	0.63 UJ	0.66 UJ	0.69 UJ	0.66 UJ	0.92 UJ
CADMIUM	NA	R	R	R	R	R	R	50 U	R	R	R	R	1.3 U	1.8 U
CHROMIUM	NA	15 J	10 J	18 J	23 J	13 J	34 J	15	35 J	58 J	21 J	28 J	23	49
COBALT	NA	10	9.5	9.2	9	8.4	7.4	17	8.9	10	8.4	12	9.1	14
COPPER	149	4000	2800	2700	2400	1800	290	101	1100	3100	1700	1400	630 J	1400 J
IRON	NA	100000	120000	110000	130000	97000	43000	-	67000	87000	120000	110000	41000	100000
LEAD	NA	29 J	24 J	29 J	24 J	18 J	11 J	12	16 J	48 J	17 J	28 J	7	22
MANGANESE	NA	59	35	60	54	51	84	11	78	210	69	84	160 J	120 J
MERCURY	NA	0.007 J	0.1 U	0.011 J	0.015 J	0.1 U	0.03 J	0.02 U	0.011 J	0.031 J	0.1 U	0.023 J	0.1 U	0.017 J
MOLYBDENUM	NA	14	12	16	11	8.1	2.6 J	1030	4.6 J	3.2 J	6.8	14	1.8 J	7.6 J
NICKEL	NA	3.3 J	2 J	4.6	6.3	4.9	16	9 U	12	6.5	6.5	7.4	13	16
SELENIUM	NA	32	38	40	33	27	6.3	-	20	20	23	36	7.1	30
SILVER	NA	3.8	2.9	4.3	3.3	1.8	0.59 J	1.8	1.7	6	1.7	4.5	0.32 J	3.2
THALLIUM	NA	0.79 J	2.6 U	1 J	0.87 J	0.69 J	1.4 U	-	1.6 U	1.3 U	1.3 U	1.4 U	1 J	0.84 J
VANADIUM	NA	49	46	57	59	41	38	100 U	59	100	48	68	26	68
ZINC	NA	80	120	82	74	69	33	1	74	68	80	87	68	74
CYANIDE	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

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Sampling Company:		URS	URS	USGS	USGS	USGS	USGS	USGS	USGS	URS	URS	URS	URS	URS
Study Area		EBT4	EBT4	Pond1,2,3	Pond1,2,3	Pond1,2,3	Pond4	Pond5	Pond6	EBT1	EBT2	EBT2	EBT3	EBT3
Station:		EBT4-25M	EBT4-25M	EM-POND1	EM-POND2	EM-POND3	EM-POND4	EM-POND5	EM-POND6	EM-SEEP13	EM-SEEP14	EM-SEEP16	EM-SEEP17	EM-SEEP18
Field Sample ID:		SED-29C	SED-29D	06ElyPond1S	06ElyPond2S	06ElyPond3S	06ElyPond4S	06ElyPond5S	06ElyPond6S	SED-35C	SED-42C (0-0.25)	SED-45C (0-0.25)	SED-46C (0-0.25)	SED-47C (0-0.25)
Date:		11/2/2004	11/2/2004	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	11/3/2004	10/23/2007	10/23/2007	10/23/2007	10/23/2007
Depth ft bgs:		0 - 0.25	0 - 0.25	-	-	-	-	-	-	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25
Analyte	**PRGs**													
ALUMINUM	NA	5900	9700	-	-	-	-	-	-	7600	12000	11000	9600	2600
ANTIMONY	NA	6.6 U	8.2 U	0.05 U	0.11	0.3	0.31	0.97	1.42	6.5 U	1.4 J	21 U	20 U	20 U
ARSENIC	NA	2.5	2.5	1 U	1 U	3	7	3	3	0.58 J	4 U	4.1 U	4.1 U	4 U
BARIUM	NA	25	42	276	321	377	337	296	184	53	40 J	32 J	25 J	26 J
BERYLLIUM	NA	0.66 UJ	0.82 UJ	1.8	1.8	1.6	1.6	1.6	2.2	0.65 UJ	0.37 J	2.1 U	0.46 J	2 U
CADMIUM	NA	1.3 U	1.6 U	0.8	1.3	1.2	2.5	4	0.2	1.3 U	0.59 J	1.5 J	1.8 J	1.2 J
CHROMIUM	NA	19	30	102	130	85	67	70	47	27 J	51	78	56	17
COBALT	NA	8	10	19.8	24	30.9	29.2	78.3	13.3	8	15	11	12	14
COPPER	149	1100 J	1100 J	86.6	87.6	81.7	380	3540	1770	360	810	1400	1300	2400
IRON	NA	40000	62000	-	-	-	-	-	-	21000	54000	130000	130000	98000
LEAD	NA	6 J	10	26.4	31.8	43.7	20.2	23.5	18.4	3.6 J	11 J	24 J	22 J	9.2 J
MANGANESE	NA	160 J	130 J	527	769	3130	2410	1430	443	89 J	240	150	110	57
MERCURY	NA	0.1 U	0.016 J	0.07	0.11	0.15	0.09	0.09	0.07	0.006 J	0.034 J	0.1	0.051 J	0.01 J
MOLYBDENUM	NA	1.5 J	4.2 J	0.63	2.58	2.15	1.75	2.54	2.8	1.1 J	2.7 J	4 J	17 J	11 J
NICKEL	NA	11	14	35.6	45.4	38.6	61.1	56.8	29.5	17	19	13	13	5.6 J
SELENIUM	NA	7.1	13	0.7	1.1	1.4	0.7	1.3	1.4	3.4	14	30	53	45
SILVER	NA	0.37 J	0.87 J	1 U	1 U	1 U	1 U	1 U	1 U	0.42 J	1 J	8.8	5.8	2.4 J
THALLIUM	NA	0.99 J	1.5 J	-	-	-	-	-	-	1.3 U	8 U	8.3 U	8.1 U	7.9 U
VANADIUM	NA	24	38	163	148	125	93	79	68	26 J	50	62	91	49
ZINC	NA	46	60	126	131	127	316	507	68	48 J	81	80	84	110
CYANIDE	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

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Sampling Company:		URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area		EBT4	SHB-UR	SHB-UR	EB-LR	EB-LR	EB-LR	EB-MR	EB-MR	EB-UR	EB-UR	EBT2	Pond5	Pond4
Station:		EM-SEEP19	SD-58	SD-59	SD-60	SD-61	SD-61	SD-62	SD-63	SD-64	SD-65	SD-66	SD-67	SD-68
Field Sample ID:		SED-48C (0-0.25)	SD-58X-080709AX	SD-59X-080709AX	SD-60X-080709AX	SD-61X-080709AX	SD-61X-080709AD	SD-62X-080709AX	SD-63X-080709AX	SD-64X-080709AX	SD-65X-080609AX	SD-66X-080609AX	SD-67X-080609AX	SD-68X-080609AX
Date:		10/23/2007	8/7/2009	8/7/2009	8/7/2009	8/7/2009	8/7/2009	8/7/2009	8/7/2009	8/7/2009	8/6/2009	8/6/2009	8/6/2009	8/6/2009
Depth ft bgs:		0 - 0.25	-	-	-	-	-	-	-	-	-	-	-	-
Analyte	**PRGs**													
ALUMINUM	NA	8800	4960 J	4850 J	9950 J	2890 J	7810 J	4790 J	14200 J	8270 J	20600 J	21200 J	25200 J	21200 J
ANTIMONY	NA	20 U	0.62 U	0.66 U	0.28 J	0.078 J	0.67 U	0.71 U	0.68 U	0.64 U	0.11 J	0.13 J	0.76 U	0.89 U
ARSENIC	NA	4 U	0.99 UJ	0.99 UJ	1 UJ	1 UJ	0.99 UJ	1 UJ	1 UJ	18.5	1.5 J	1 UJ	0.63 J	4.4 J
BARIUM	NA	64 J	23.2	27.3	93.8	36.5	75.4	62.3	175	57.7	84.5	41.4	58.7	54.6
BERYLLIUM	NA	0.38 UJ	0.15 J	0.13 R	0.18 R	0.5 U	0.5 U	0.5 U	0.18 R	0.31 R	0.66 J	0.5 J	0.45 J	1.1 J
CADMIUM	NA	4 U	0.075 J	0.09 J	1.2	0.18 J	0.2 J	0.23 J	0.57	0.73	0.88	0.21 J	0.18 J	0.78
CHROMIUM	NA	41	10.8 J	10.8 J	50.1 J	17 J	39.2 J	28.4 J	67 J	22.1 J	35.9 J	34.2 J	69.1 J	30.3 J
COBALT	NA	20	3.9 J	3.4 J	35 J	16.3 J	7.6 J	10 J	61.8 J	57.3 J	102 J	24.2 J	24.7 J	65.5 J
COPPER	149	1100	207 J	298 J	7120 J	3550 J	1800 J	2640 J	11000 J	2580 J	3820 J	1600 J	596 J	3050 J
IRON	NA	94000	8760 J	16200 J	126000 J	105000 J	72100 J	117000 J	137000 J	42500 J	58500 J	56300 J	22500 J	17000 J
LEAD	NA	17 J	2.5 J	2.9 J	19.5	24.1	25.8	23.9	54.6	8.2 J	26	15.3	7.8	12.4
MANGANESE	NA	130	206	270	69	64.8	70.2	69.9	145	581	1210	338	294	216
MERCURY	NA	0.029 J	0.091 U	0.09 U	0.038 J	0.096 U	0.096 U	0.097 U	0.031 J	0.092 U	0.1 U	0.027 J	0.031 J	0.03 J
MOLYBDENUM	NA	7.7 J	0.26 J	0.54 J	7.9	6.1	5.4	7	8	1.7	2.7	1.8	0.57 J	0.44 J
NICKEL	NA	14	7.3	9.6	16.9	6.5	21.3	9.7	24.9	18.5	33.8	20.4	41.9	44.6
SELENIUM	NA	37	0.73 J	1.8	24.2	20	15.6	11.6	26.2	5.9	8.7	3.6	0.44 J	1.2 J
SILVER	NA	2.1 J	0.99 U	0.99 U	5.6	2.1	0.94 J	3.4	9.5	0.48 J	0.88 J	0.41 J	1 U	1 U
THALLIUM	NA	5.6 J	0.032 J	0.021 J	0.36 J	0.11 J	0.15 J	0.2 J	0.48	0.064 J	0.22 J	0.091 J	0.12 J	0.15 J
VANADIUM	NA	51	9.8	11.9	72	46	55.6	61.5	101	28	45.7	36.1	51.5	35.6
ZINC	NA	75	21.8 J	25.3 J	169 J	98.4 J	38 J	121 J	209 J	116 J	163 J	83.8 J	81 J	203 J
CYANIDE	NA	--	1.3 U	1.3 U	1.2 U	1.2 U	1.2 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U

Notes Units are in mg/kg = miligram per kilogram
TAL = Target Analyte List
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Light gray highlighted cells indicate exceedance of criteria.
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Table 6-8
Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		Pond1,2,3	Pond1,2,3	Pond4	EBT5	EBT5	EBT5	EBT3	EBT3	EBT4	EBT4	EBT4	EB-UR	SHB-LR
Station:		SD-69	SD-70	SD-71	SD-72	SD-73	SED-51C	SED-53C	SED-54C	SED-55C	SED-55C	SED-56C	SED-57C	SB-20M
Field Sample ID:		SD-69X-080709AX	SD-70X-080609AX	SD-71X-080609AX	SD-72X-080609AX	SD-73X-080609AX	SED-51C (0-0.25)	SED-53C (0-0.25)	SED-54C (0-0.25)	SED-55C (0-0.25)	SED-55C (0-0.25) DUP	SED-56C (0-0.25)	SED-57C (0-0.25)	QS-06
Date:		8/7/2009	8/6/2009	8/6/2009	8/6/2009	8/6/2009	10/23/2007	10/23/2007	10/23/2007	10/23/2007	10/23/2007	10/23/2007	10/23/2007	11/4/2004
Depth ft bgs:		-	-	-	-	-	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25
Analyte	**PRGs**													
ALUMINUM	NA	12100 J	17800 J	17800 J	14800 J	22800 J	29000	2800	2800	7100	6800	15000	11000	5200
ANTIMONY	NA	0.74 U	2.2 U	1 U	0.12 J	0.14 J	21 U	20 U	20 U	20 U	20 U	9.9 U	10 U	5.6 U
ARSENIC	NA	0.83 J	1.7 J	2.6 J	1.5 J	1 UJ	2.3 J	4 U	1.2 J	4 U	4 U	2.9	4.7	0.92 J
BARIUM	NA	59.9	134	59.1	94.8	57.5	47 J	28 J	27 J	42 J	43 J	57 J	45 J	28
BERYLLIUM	NA	0.33 J	0.51 J	0.63 J	0.34 J	0.7 J	1 J	2 U	2 U	0.24 J	0.32 UJ	0.57 J	0.42 J	0.56 UJ
CADMIUM	NA	0.16 J	1 J	1.5	0.62	0.51	0.99 J	1.2 J	1.3 J	0.9 J	4 U	0.88 J	0.59 J	1.1 U
CHROMIUM	NA	27.4 J	43.5 J	41.3 J	46.4 J	23.6 J	25	19	18	32	33	49	26	12 J
COBALT	NA	9.5 J	15.5 J	14.5 J	10.5 J	44.8 J	69	12	12	15	14	19	16	13
COPPER	149	47.6 J	80.7 J	584 J	126 J	5210 J	3300	3000	2600	2200	1900	740	520	230
IRON	NA	13700 J	37800 J	19300 J	23500 J	84900 J	45000	110000	100000	99000	98000	41000	24000	11000 J
LEAD	NA	5.5 J	24.7	11.6	18	28.1	21 J	9.4 J	9.2 J	13 J	11 J	5.9 J	3.6 J	3.9 J
MANGANESE	NA	530	564	180	622	621	460	64	62	140	150	280	420	240 J
MERCURY	NA	0.095 U	0.1	0.1	0.042 J	0.026 J	0.031 J	0.008 J	0.009 J	0.013 J	0.012 J	0.012 J	0.004 J	0.09 U
MOLYBDENUM	NA	0.35 J	1.4 J	1 J	0.42 J	4.4	4.5 J	11 J	10 J	6.8 J	6.4 UJ	1.9 J	10 U	0.59 J
NICKEL	NA	23.7	35.6	40.1	29	14.5	16	6 J	6.3 J	11	11	28	20	10
SELENIUM	NA	0.35 J	1.3 J	0.95 J	1.1 J	8.8	15	46	45	36	33	9.6	3.4 J	0.5 J
SILVER	NA	1 U	1 U	1 U	1 U	2.3	1.7 J	2.2 J	2.1 J	2 J	2 J	0.52 J	0.22 J	1.1 U
THALLIUM	NA	0.11 J	0.37 J	0.22 J	0.19 J	0.13 J	8.4 U	7.9 U	8 U	8.1 U	5.4 J	4 U	4 U	1.1 U
VANADIUM	NA	30	65.5	42.9	52.5	45.3	36	50	50	46	46	48	28	13 J
ZINC	NA	34.9 J	81 J	226 J	61.9 J	132 J	120	84	100	72	66	100	92	59 J
CYANIDE	NA	1.2 U	1.3 U	1.3 U	1.3 U	1.3 U	-	-	-	-	-	-	-	-

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Table 6-8
Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	URS	URS	URS	USGS	EPA	USGS	USGS	EPA
Study Area		SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR
Station:		SB-20M	SB-20M	SB-20M	SB-20M	SB-1140M	SB-1360M	SB-1360M	SB-1360M	SB-1360M	SB-140M	SB-140M	SB-140M	SB-2400M
Field Sample ID:		SED-27A	SED-27B	SED-27C	SED-27D	SED-12-52L	SED-01A	SED-01C	SED-01D	06Ely07	AA62440	06Ely08	06Ely08R	AA62439
Date:		11/4/2004	11/4/2004	11/4/2004	11/4/2004	9/10/2001	11/3/2004	11/3/2004	11/3/2004	8/23/2006	6/20/2006	8/22/2006	8/22/2006	6/20/2006
Depth ft bgs:		0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	-	0 - 0.25	0 - 0.25	0 - 0.25	-	-	-	-	-
Analyte	**PRGs**													
ALUMINUM	NA	4900	4800	4900	10000	5190	4800	3700	12000	-	5800	-	-	9200
ANTIMONY	NA	6.1 U	6 U	6.1 U	7.8 U	0.71 U	5.4 U	6.2 U	6.7 U	1.8	22 U	2.14	1.35	20 U
ARSENIC	NA	0.48 J	0.85 J	0.47 J	1.5 J	1.2 J	0.79 J	0.33 J	1.1 J	1	22 U	1	1	20 U
BARIUM	NA	30	24	24	48	26.2 J	25	20	60	191	29	198	199	34
BERYLLIUM	NA	0.61 UJ	0.6 UJ	0.61 UJ	0.78 UJ	0.1 J	0.54 UJ	0.62 UJ	0.67 UJ	1.6	1.1 U	1.6	1.5	1 U
CADMIUM	NA	1.2 U	1.2 U	1.2 U	0.49 J	0.05 U	1.1 U	1.2 U	0.25 J	0.2	3.3 U	0.2	0.2	3 U
CHROMIUM	NA	12 J	10 J	11 J	22 J	10.8	12 J	11 J	26 J	28	12	32	29	18
COBALT	NA	17	16	11	28	11.4 J	8.3	14	14	9.6	8.3	13.5	12.1	7.5
COPPER	149	260	290	200	540	231	200	230	180	198	170	243	255	160
IRON	NA	12000 J	11000 J	9600 J	17000 J	9850	10000	10000	17000	2000	12000	2120	-	13000
LEAD	NA	3.2 J	7.6	6.7	8	3.1	6.9	2.2 J	7.1	11	11 U	31.4	24	20 U
MANGANESE	NA	290 J	250 J	200 J	320 J	283	260 J	220 J	580 J	864	200	869	784	290
MERCURY	NA	0.1 U	0.09 U	0.09 U	0.013 J	0.06 U	0.09 U	0.1 U	0.11 U	0.02 U	-	0.02 U	0.02 U	-
MOLYBDENUM	NA	0.59 J	0.55 J	0.42 J	0.96 J	-	0.34 J	0.54 J	0.49 J	2.53	-	2.59	1.76	-
NICKEL	NA	11	10	10	21	8.4 J	9.8	8.5	20	11.6	8.8	13.6	12.1	15
SELENIUM	NA	0.64 J	0.32 J	0.49 J	1.1 J	0.83 U	0.79 J	0.8 J	1 J	1.5	11 U	1.1	1.2	10 U
SILVER	NA	1.2 U	1.2 U	1.2 U	0.19 J	0.49 J	1.1 U	1.2 U	1.3 U	1 U	3.3 U	1 U	1 U	3 U
THALLIUM	NA	1.2 U	1.2 U	1.2 U	1.6 U	1.3 U	1.1 U	1.2 U	1.3 U	-	40 U	-	-	40 U
VANADIUM	NA	12 J	11 J	12 J	23 J	12.1 J	12 J	10 J	26 J	48	14	52	50	18
ZINC	NA	64 J	65 J	51 J	130 J	40.1	42 J	57 J	69 J	66	36	85	77	36
CYANIDE	NA	-	-	-	-									-

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Table 6-8
Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		USGS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		SHB-LR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR
Station:		SB-2400M	SB-2900M	SB-2900M	SB-2900M	SB-2900M	SB-2920M	SB-2920M	SB-2920M	SB-3020M	SB-3020M	SB-3020M	SB-3020M	SB-3125M
Field Sample ID:		06Ely06	SED-02A	SED-02C	SED-02D	SED-02E	SED-03A	SED-03C	SED-03D	SED-04A	SED-04C	SED-04D	SED-04E	SED-05A
Date:		8/22/2006	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004
Depth ft bgs:		-	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25
Analyte	**PRGs**													
ALUMINUM	NA	-	9200	5200	8900	10000	7800	3200	5400	11000	3800	9700	8000	8000
ANTIMONY	NA	0.65	6.7 U	6.1 U	6.7 U	6.9 U	6.3 U	6 U	5.6 U	7.1 U	5.9 U	7.1 U	6.9 U	6.6 U
ARSENIC	NA	1	0.82 J	0.56 J	0.92 J	1.3 J	0.75 J	0.39 J	0.44 J	1 J	0.62 J	1 J	1 J	0.75 J
BARIUM	NA	191	48	30	45	56	41	21	28	56	22	51	31	38
BERYLLIUM	NA	1.7	0.67 UJ	0.61 UJ	0.67 UJ	0.69 UJ	0.63 UJ	0.6 UJ	0.56 UJ	0.71 UJ	0.59 UJ	0.71 UJ	0.69 UJ	0.66 UJ
CADMIUM	NA	0.1	1.3 U	1.2 U	1.3 U	0.36 J	1.2 U	1.2 U	1.1 U	1.4 U	1.2 U	1.4 U	0.24 J	1.3 U
CHROMIUM	NA	23	20 J	11 J	18 J	21 J	18 J	7.1 J	12 J	24 J	8.9 J	21 J	18 J	19 J
COBALT	NA	10.8	8.2	8.8	10	14	9.8	8.7	5.2	10	7	9.9	93	8.7
COPPER	149	167	130	220	240	210	160	290	44	150	230	240	870	240
IRON	NA	-	14000 J	14000 J	16000 J	15000 J	19000 J	13000 J	8500 J	21000 J	15000 J	17000 J	12000 J	17000 J
LEAD	NA	10.5	5.8 J	3.4 J	5.2 J	12	5.4 J	3.1 J	3.7 J	7.7	3.8 J	5.7 J	4.8 J	5.5 J
MANGANESE	NA	504	420 J	250 J	370 J	480 J	360 J	200 J	260 J	470 J	220 J	420 J	860 J	340 J
MERCURY	NA	0.02 U	0.005 J	0.09 U	0.005 J	0.024 J	0.006 J	0.09 U	0.09 U	0.012 J	0.09 U	0.012 J	0.09 U	0.006 J
MOLYBDENUM	NA	2.29	0.4 J	0.85 J	0.78 J	0.42 J	1.3 J	0.78 J	0.16 J	1.1 J	0.97 J	0.68 J	0.3 J	0.84 J
NICKEL	NA	11.4	17	9.2	15	18	14	6.7	11	19	8.6	17	14	14
SELENIUM	NA	1.8	0.61 J	1.9 J	1.5 J	0.48 J	2.2 J	2.2 J	0.19 J	1.8 J	3.8	1.9 J	0.74 J	2.4 J
SILVER	NA	1 U	1.3 U	0.16 J	0.17 J	1.4 U	0.19 J	1.2 U	1.1 U	0.29 J	0.16 J	1.4 U	1.4 U	1.3 U
THALLIUM	NA	-	1.3 U	1.2 U	1.3 U	1.4 U	1.2 U	1.2 U	1.1 U	1.4 U	1.2 U	1.4 U	1.4 U	1.3 U
VANADIUM	NA	43	21 J	14 J	21 J	23 J	20 J	9.2 J	13 J	27 J	12 J	23 J	18 J	20 J
ZINC	NA	54	34 J	42 J	54 J	64 J	50 J	41 J	21 J	55 J	34 J	51 J	86 J	42 J
CYANIDE	NA	-	-	-	-	-	-	-	-	-	-	-	-	-

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Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	EPA	URS	URS	URS	URS	USGS	URS	URS	URS	URS
Study Area		SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-BACKGROUN	SHB-BACKGROUN	SHB-BACKGROUN	SHB-BACKGROUN
Station:		SB-3125M	SB-3125M	SB-3125M	SB-3245M	SB-3250M	SB-3250M	SB-3250M	SB-3260M	SB-3300M	SB-3320M	SB-3510M	SB-3510M
Field Sample ID:		SED-05C	SED-05D	AA62438	ELYM-10-SS	SED-06A	SED-06C	SED-06D	06Ely12	SED-12-48R	ELYM-9-SS	QS-01	SED-07A
Date:		11/4/2004	11/4/2004	6/20/2006	8/25/1998	11/4/2004	11/4/2004	11/4/2004	8/23/2006	9/10/2001	8/25/1998	11/4/2004	11/4/2004
Depth ft bgs:		0 - 0.25	0 - 0.25	-	-	0 - 0.25	0 - 0.25	0 - 0.25	-	-	-	0 - 0.25	0 - 0.25
Analyte	**PRGs**												
ALUMINUM	NA	4300	6400	8800	-	8800	4600	7800	-	6870	-	4300	12000
ANTIMONY	NA	5.8 U	6 U	20 U	-	6.1 U	5.9 U	6.9 U	2.39	0.69 U	-	5.8 U	7 U
ARSENIC	NA	0.53 J	0.62 J	20 U	12	0.8 J	0.58 J	0.74 J	2	1.1 U	10 U	0.76 J	1.6
BARIUM	NA	26	35	43	158	41	30	38	173	35 J	174	22	64
BERYLLIUM	NA	0.58 UJ	0.6 UJ	1 U	2	0.61 UJ	0.59 UJ	0.69 UJ	1.4	0.17 J	2	0.58 UJ	0.7 UJ
CADMIUM	NA	1.2 U	1.2 U	3 U	2 U	1.2 U	0.41 J	0.36 J	0.3	0.05 U	2 U	1.2 U	1.4 U
CHROMIUM	NA	10 J	15 J	21	85	18 J	11 J	20 J	40	15.3	88	9.4 J	24 J
COBALT	NA	7.7	7.9	7.5	9	6	6.8	29	11	2.7 J	7	2.9	8.4
COPPER	149	220	430	300	312	73	410	720	1390	5.5 J	17	5.3	17
IRON	NA	17000 J	24000 J	21000	-	12000 J	25000 J	34000 J	-	7410	-	5500 J	15000 J
LEAD	NA	4.1 J	6.3	20 U	10	4 J	6.1	7.5	17.9	2.8	10	2.2 J	7.1
MANGANESE	NA	280 J	290 J	340	1400	360 J	250 J	420 J	1120	268	1130	240 J	640 J
MERCURY	NA	0.09 U	0.005 J	-	0.02 U	0.1 U	0.1 U	0.1 U	0.02 U	0.06 U	0.02 U	0.1 U	0.008 J
MOLYBDENUM	NA	1.4 J	1.3 J	-	2 U	0.26 J	1.5 J	2.1 J	7.26	-	2 U	0.26 J	0.21 J
NICKEL	NA	8.1	11	14	22	14	7.7	15	11.5	10.2	21	7.6	21
SELENIUM	NA	3.1	4.4	10 U	-	0.41 J	6.2	6.8	9.8	0.81 U	-	2.3 U	2.8 U
SILVER	NA	0.18 J	0.36 J	3 U	8 U	1.2 U	0.25 J	0.46 J	1 U	0.36 J	8 U	1.2 U	1.4 U
THALLIUM	NA	1.2 U	1.2 U	50 U	-	1.2 U	1.2 U	1.4 U	-	1.2 U	-	1.2 U	1.4 U
VANADIUM	NA	13 J	19 J	23	56	19 J	16 J	26 J	62	14.2	53	9.1 J	26 J
ZINC	NA	44 J	42 J	43	73	31 J	100 J	78 J	93	20.2	46	14 J	39 J
CYANIDE	NA	-	-	-	-	-	-	-	-	-	-	-	-

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Light gray highlighted cells indicate exceedance of criteria.
ft bgs = feet below ground surface
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit; R = Rejected

Table 6-8
Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	EPA	USGS	URS	URS	URS	URS	URS	URS	URS	EPA
Study Area		SHB-BACKGROUN	SHB-BACKGROUN	SHB-BACKGROUN	SHB-BACKGROUN	SHB-BACKGROUN	SHB-BACKGROUN	SHB-BACKGROUN	SHB-BACKGROUN	SHB-BACKGROUN	EBOR	EBOR	EBOR
Station:		SB-3510M	SB-3510M	SB-3670M	SB-3670M	SBT1-6M	SBT1-6M	SBT1-6M	SBT1-6M	SBT1-6M	OR-11850M	OR-15200M	OR-20200M
Field Sample ID:		SED-07B	SED-07C	AA62437	06Ely05	QS-05	SED-25A	SED-25B	SED-25C	SED-25D	SED-03-35R	SED-12-56R	AA62444
Date:		11/4/2004	11/4/2004	6/20/2006	8/22/2006	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	7/19/2000	9/10/2001	6/21/2006
Depth ft bgs:		0 - 0.25	0 - 0.25	-	-	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	-	-	-
Analyte	**PRGs**												
ALUMINUM	NA	9100	4700	8700	-	3700	6600	5400	5200	7200	12200	5380	14000
ANTIMONY	NA	6.1 U	5.9 U	20 U	0.15	6 U	6 U	5.5 U	6.2 U	6.4 U	1.8 J	0.74 U	21 U
ARSENIC	NA	1 J	0.56 J	20 U	3	0.29 J	0.45 J	0.52 J	0.26 J	0.73 J	1.2 U	1.2 U	21 U
BARIUM	NA	46	25	36	207	20	32	28	28	37	58.6	23.5 J	59
BERYLLIUM	NA	0.61 UJ	0.59 UJ	1 U	1.8	0.6 UJ	0.6 UJ	0.55 UJ	0.62 UJ	0.64 UJ	0.32	0.09 J	1 U
CADMIUM	NA	1.2 U	1.2 U	3 U	0.1 U	1.2 U	1.2 U	1.1 U	1.2 U	1.3 U	0.18 UJ	0.05 U	3.1 U
CHROMIUM	NA	19 J	11 J	16	24	9.5 J	14 J	14 J	12 J	17 J	31.5	13	31
COBALT	NA	6.1	2.9	5.3	4.8	3.1	4.6	4.1	3.8	5.7	14.4	8.6 J	13
COPPER	149	11	5.7	6	10.4	3.7	7.6	5.8	5	24	114 J	64.4	120
IRON	NA	11000 J	5700 J	9200	-	5100 J	7600 J	6500 J	6700 J	9600 J	17000	8930	17000
LEAD	NA	4.6 J	2.3 J	20 U	11.2	1.6 J	2.4 J	2.1 J	2 J	4.5 J	8.3	2.9	21 U
MANGANESE	NA	530 J	240 J	330	501	220 J	250 J	260 J	290 J	420 J	562	206	420
MERCURY	NA	0.1 U	0.09 U	-	0.02 U	0.09 U	0.09 U	0.09 U	0.1 U	0.014 J	0.08 UJ	0.06 U	-
MOLYBDENUM	NA	0.13 J	5.9 UJ	-	0.28	6 UJ	6 UJ	5.5 UJ	0.15 J	0.17 J	-	-	-
NICKEL	NA	14	7.6	14	13.2	8	12	10	9.6	14	20.5	9.3 J	21
SELENIUM	NA	2.4 U	2.3 U	10 U	0.2 U	2.4 U	2.4 U	2.2 U	2.5 U	0.3 J	0.69 UJ	0.86 U	10 U
SILVER	NA	1.2 U	1.2 U	3 U	1 U	1.2 U	1.2 U	1.1 U	1.2 U	1.3 U	0.19 U	0.46 J	3.1 U
THALLIUM	NA	1.2 U	1.2 U	40 U	-	1.2 U	1.2 U	1.1 U	1.2 U	1.3 U	0.72 UJ	1.3 U	55 U
VANADIUM	NA	20 J	9.8 J	18	40	9.1 J	14 J	12 J	12 J	17 J	31.2	12.7	33
ZINC	NA	72 J	15 J	23	32	12 J	16 J	14 J	14 J	26 J	76 J	46.2	65
CYANIDE	NA	-	-	-	-	-	-	-	-	-	-	-	-

Notes Units are in mg/kg = miligram per kilogram
TAL = Target Analyte List
EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook; UR = Upper Reach; LR = Lower Reach
EBOR = East Branch of Ompompanoosuc River; ORT = Ompomanoosuc River Tributaries
Light gray highlighted cells indicate exceedance of criteria.
ft bgs = feet below ground surface
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit; R = Rejected

Table 6-8
Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		EPA	EPA	USGS	URS	URS	URS	URS	URS	URS	URS	URS	URS	EPA
Study Area		EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR-BACKGROUN	EBOR-BACKGROU	EBOR-BACKGROU	EBOR-BACKGROU	EBOR-BACKGROU
Station:		OR-22320M	OR-23200M	OR-23200M	OR-23630M	OR-23630M	OR-23630M	OR-23630M	OR-23630M	OR-23650M	OR-23650M	OR-23650M	OR-23650M	OR-24050M
Field Sample ID:		AA62443	AA62442	06Ely10	SED-28A	SED-28B	SED-28C	SED-28D	SED-28E	SED-26A	SED-26B	SED-26C	SED-26D	AA62441
Date:		6/21/2006	6/21/2006	8/22/2006	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	11/4/2004	6/21/2006
Depth ft bgs:		-	-	-	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	-
Analyte	**PRGs**													
ALUMINUM	NA	6900	8100	-	6300	4900	4700	11000	8000	5600	4600	6200	14000	4600
ANTIMONY	NA	20 U	20 U	0.22	5.4 U	6.2 U	6 U	8.4 U	5.8 U	5.4 U	5.9 U	6.1 U	8 U	20 U
ARSENIC	NA	20 U	20 U	5	0.64 J	0.75 J	0.47 J	1.2 J	0.88 J	0.58 J	0.51 J	0.48 J	1.4 J	20 U
BARIUM	NA	25	38	195	32	28	24	57	38	28	23	31	74	20
BERYLLIUM	NA	0.99 U	1 U	1.8	0.54 UJ	0.62 UJ	0.6 UJ	0.84 UJ	0.58 UJ	0.54 UJ	0.59 UJ	0.61 UJ	0.8 UJ	1 U
CADMIUM	NA	3 U	3 U	0.1	0.18 J	1.2 U	1.2 U	1.7 U	1.2 U	1.1 U	1.2 U	1.2 U	1.6 U	3 U
CHROMIUM	NA	13	16	29	14 J	13 J	11 J	22 J	17 J	13 J	11 J	13 J	27 J	11
COBALT	NA	6	6.4	8.1	13	16	7.2	7.1	5.1	3.6	2.5	3.9	8.3	3 U
COPPER	149	48	35	76.7	220	260	85	15	10	6.5	4.2	6.8	17	3 U
IRON	NA	7900	9800	1070	11000 J	12000 J	7800 J	13000 J	9300 J	6700 J	5100 J	7100 J	15000 J	5300
LEAD	NA	20 U	20 U	10.4	4.3 J	11	3 J	6.4 J	4.2 J	2.7 J	2.3 J	3.1 J	8.5	20 U
MANGANESE	NA	170	260	1120	280 J	290 J	220 J	570 J	290 J	210 J	170 J	180 J	700 J	170
MERCURY	NA	-	-	0.02 U	0.09 U	0.09 U	0.08 U	0.014 J	0.09 U	0.09 U	0.08 U	0.1 U	0.024 J	-
MOLYBDENUM	NA	-	-	0.5	1.1 J	0.74 J	0.24 J	0.23 J	0.14 J	0.11 J	5.9 UJ	6.1 UJ	0.18 J	-
NICKEL	NA	9.9	11	10.8	13	12	8.9	17	12	9.6	7.9	9.6	21	6 U
SELENIUM	NA	9.9 U	10 U	0.3	0.62 J	0.81 J	2.4 U	3.4 U	2.3 U	2.2 U	2.4 U	2.4 U	3.2 U	10 U
SILVER	NA	3 U	3 U	1 U	1.1 U	1.2 U	1.2 U	1.7 U	1.2 U	1.1 U	1.2 U	1.2 U	1.6 U	3 U
THALLIUM	NA	35 U	40 U	-	1.1 U	1.2 U	1.2 U	1.7 U	1.2 U	1.1 U	1.2 U	1.2 U	1.6 U	35 U
VANADIUM	NA	14	17	49	15 J	13 J	11 J	24 J	18 J	12 J	9.4 J	13 J	28 J	10
ZINC	NA	28	29	53	52 J	64 J	32 J	40 J	26 J	17 J	13 J	19 J	46 J	14
CYANIDE	NA	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes Units are in mg/kg = miligram per kilogram
TAL = Target Analyte List
EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook; UR = Upper Reach; LR = Lower Reach
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Light gray highlighted cells indicate exceedance of criteria.
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PRG = Prelimary Remediation Goal
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Table 6-8
Sediment TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		USGS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		EBOR-BACKGROU	EBOR-BACKGROU	EBOR	EBOR	ORT1	ORT1	ORT1	ORT1	ORT1	ORT1	ORT1	ORT1	ORT1
Station:		OR-24050M	OR-24500M	OR-8350M	OR-8350M	ORT-1080M	ORT-1080M	ORT-1080M	ORT-1150M	ORT-1150M	ORT-1150M	ORT-1190M	ORT-1190M	ORT-1190M
Field Sample ID:		06Ely09	SED-12-53R	SED-04-45R	SED-12-45L	SED-24A	SED-24C	SED-24D	SED-23A	SED-23C	SED-23D	SED-22A	SED-22C	SED-22D
Date:		8/22/2006	9/10/2001	10/2/2000	9/5/2001	11/2/2004	11/2/2004	11/2/2004	11/2/2004	11/2/2004	11/2/2004	11/2/2004	11/2/2004	11/2/2004
Depth ft bgs:		-	-	-	-	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25	0 - 0.25
Analyte	**PRGs**													
ALUMINUM	NA	-	6600	5880 J	7790	13000	14000	19000	20000	12000	17000	16000	13000	21000
ANTIMONY	NA	0.19	0.71 U	1.6 U	0.75 U	6.6 U	7 U	7.8 U	7.2 U	7 U	8.4 U	12 U	7 U	8.7 U
ARSENIC	NA	3	1.6 J	0.43 U	1.2 U	0.76 J	0.55 J	1 J	0.93 J	0.5 J	1.1 J	2.1 J	0.7 J	1.9
BARIUM	NA	187	31.1 J	23.6	30 J	53	64	83	94	62	90	100	72	86
BERYLLIUM	NA	1.6	0.15 J	0.2 U	0.05 J	0.66 UJ	0.7 UJ	0.78 UJ	0.72 UJ	0.7 UJ	0.84 UJ	0.18 J	0.7 UJ	0.87 UJ
CADMIUM	NA	0.1 U	0.05 U	0.58 U	0.05 U	0.21 J	1.4 U	1.6 U	0.34 J	1.4 U	0.5 J	1.3 J	1.4 U	0.58 J
CHROMIUM	NA	37	14.6	27.9	18.1	31	35	47	49	33	44	31	41	44
COBALT	NA	4.5	2.3 J	28.5	6.9 J	13	17	20	16	9.9	14	16	12	16
COPPER	149	4.5	3.6 J	153	61.8	13 J	11 J	15 J	18 J	12 J	16 J	27 J	13 J	22 J
IRON	NA	1430	6420	22100 J	11000	13000	15000	19000	23000	15000	19000	14000	16000	19000
LEAD	NA	9.6	2.9	0.63 J	3.8	4 J	4.7 J	3.2 J	5 J	3 J	6.8 J	22	3.2 J	6.1 J
MANGANESE	NA	475	189	244 J	138	690 J	660 J	750 J	860 J	430 J	860 J	2200 J	760 J	2100 J
MERCURY	NA	0.02 U	0.06 U	0.06 UJ	0.06 U	0.02 J	0.11 U	0.014 J	0.006 J	0.11 U	0.026 J	0.11 J	0.1 U	0.081 J
MOLYBDENUM	NA	0.16	-	-	-	0.21 J	0.2 J	0.31 J	0.29 J	0.69 J	0.34 J	0.54 J	0.26 J	0.71 J
NICKEL	NA	11.7	8.6 J	7.4	12.9	26	30	36	41	27	38	33	29	35
SELENIUM	NA	0.2 U	0.83 U	1.3 U	0.87 U	0.37 J	2.8 U	0.49 J	0.53 J	0.38 J	0.41 J	0.7 J	0.32 J	0.49 J
SILVER	NA	1 U	0.28 J	0.78 U	0.57 J	1.3 U	1.4 U	1.6 U	1.4 U	1.4 U	1.7 U	2.5 U	1.4 U	1.7 U
THALLIUM	NA	-	1.2 U	0.51 U	1.3 U	1.3 U	1.4 U	1.6 U	1.4 U	1.4 U	1.7 U	2.5 U	1.4 U	1.7 U
VANADIUM	NA	38	13	18.7	17.5	26	31	39	47	31	40	28	33	40
ZINC	NA	33	19.7	125	42.6	52	62	74	86	54	80	92	57	76
CYANIDE	NA	-	-	-	-	-	-	-	-	-	-	-	-	-

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EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
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Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	USGS	USGS	URS	URS	URS	USGS	USGS	USGS
	Study Area	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-Background	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR
	Sample Location:	EB-1030M	EB-1080M	EB-1080M	EB-1080M	EB-1080M	EB-1080M	EB-1080M	EB-1080M	EB-1430M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M
	Field Sample ID:	ELY-SW-18	EB-1	EB-1	EB-1	EB-1	EB-1	06Ely01A FA	06Ely01A RA	ELY-SW-20	EB-6	EB-6	EB6-0402S10RA	EB6-0402S11RA	EB6-0402S1RA
	Date:	11/2/2004	4/2/2002	4/11/2002	5/21/2002	6/20/2002	7/24/2002	8/23/2006	8/23/2006	11/3/2004	3/28/2002	3/31/2002	4/2/2002	4/2/2002	4/2/2002
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	11460	-	-	-	-	-	-	-	9810	-	-	-	-	-
ORP	-	171.1	-	-	-	-	-	-	-	191.9	-	-	638	639	634
pH	-	6.58	-	-	-	-	-	-	7.2	7.67	-	-	4.21	4.21	4.15
Specific Conductivity	-	79	-	-	-	-	-	-	87	72	-	-	188.9	190.5	198.5
Temperature	-	6.7	-	-	-	-	-	-	-	7.13	-	-	3.37	3.28	6.59
Turbidity	-	0.63	-	-	-	-	-	-	-	1.81	-	-	-	-	-
ANALYTICAL PARAMETERS															
Acidity	-	2000 U	-	-	-	-	-	-	-	11000	-	-	-	-	-
Alkalinity	20000	29000	-	-	-	-	-	40640	-	28000	-	-	-	-	-
Carbonate (as $CaCO_3$)	-	2000 U	-	-	-	-	-	-	-	2000 U	-	-	-	-	-
Chloride	230000	850	6500	6900	6700	6900	5400	1400	-	1400	140000	92000	1000	-	1000
Hardness (as $CaCO_3$)	-	33000	14377	16410	17950	27883	39812	-	-	30000	58895	43142	40233	43553	43142
Hydroxide (as $CaCO_3$)	-	2000 U	-	-	-	-	-	-	-	2000 U	-	-	-	-	-
Nitrate	10000	-	-	-	-	-	-	80 U	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	100 U	-	-	-	-	-	60 U	-	23 J	-	-	-	-	-
Nitrite	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	-	-	-	2 U	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	7100	1000	3800	8500	7800	3000	4300	4000	4800	260000	160000	160000	150000	140000
Sulfide	2	100 U	-	-	-	-	-	-	-	100 U	-	-	-	-	-
Total Dissolved Solids	-	41000	-	-	-	-	-	-	-	29000	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	72	-	-	-	-	-	-	-
Total Suspended Solids	-	5000 U	-	-	-	-	-	-	-	5000 UJ	-	-	-	-	-

Notes: Surface water criteria developed during Elizabeth Mine Remedial Investigation and from the Vermont Department of Environmental Conservation
Highlited cells indicate exceedance of criteria.
UJ = constituent not detected at estimated detection limit
NTU = nephelometric turbidity units
µg/L = micrograms per liter
mV = milivolts
SU = standard units
µS/cm = microSiemens per centimeter
C = degrees Celcius
U = below detection limit
J = quantitation approximate
- = Criteria not established and/or sample not analyzed for specific parameter
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc Ririver
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS
	Study Area	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR
	Sample Location:	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M
	Field Sample ID:	EB6-0402S2RA	EB6-0402S3RA	EB6-0402S4RA	EB6-0402S5RA	EB6-0402S6RA	EB6-0402S7RA	EB6-0402S8RA	EB6-0402S9RA	EB6-0403S10RA	EB6-0403S11RA	EB6-0403S12RA	EB6-0403S1RA	EB6-0403S2RA	EB6-0403S3RA
	Date:	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ORP	-	636	635	637	636	638	637	637	638	634	633	632	636	636	636
pH	-	4.17	4.2	4.21	4.21	4.21	4.2	4.21	4.21	4.22	4.22	4.22	4.2	4.2	4.18
Specific Conductivity	-	191	186.3	183.7	183	184.2	186.2	187	187.9	192.4	191.8	190.6	191.6	193.2	198.2
Temperature	-	5.72	5.62	4.87	4.42	4.03	3.78	3.6	3.47	3.44	3.79	4.3	3.2	3.16	3.15
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANALYTICAL PARAMETERS															
Acidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity	20000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	230000	-	-	900	-	-	900	-	-	-	1000	-	-	1000	-
Hardness (as $CaCO_3$)	-	40233	39821	39821	37324	40233	40233	40233	40233	40645	40233	43553	43142	43142	43553
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	140000	90000	92000	92000	92000	92000	94000	160000	150000	150000	150000	150000	150000	150000
Sulfide	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: Surface water criteria developed during Elizabeth Mine Remedial Investigation and from the Vermont Department of Environmental Conservation
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Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	USGS	USGS	USGS	USGS	USGS	USGS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR
	Sample Location:	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-210M	EB-30M	EB-30M
	Field Sample ID:	EB6-0403S4RA	EB6-0403S5RA	EB6-0403S6RA	EB6-0403S7RA	EB6-0403S8RA	EB6-0403S9RA	EB-6	EB-6	EB-6	EB-6	EB-6	EB-6	ELY-SW-10	ELY-SW-09	ELY-SW-09
	Date:	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/10/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	11/3/2004	11/3/2004	5/2/2007
Analyte	**SW Criteria**															
FIELD PARAMETERS																
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	12880	12780	10960
ORP	-	637	637	637	636	635	634	-	-	-	-	-	-	-	457.8	262.9
pH	-	4.19	4.2	4.21	4.21	4.22	4.22	-	-	-	-	-	-	4.08	3.84	4.52
Specific Conductivity	-	197.9	195.4	193.4	192.7	192.7	192.5	-	-	-	-	-	-	334	307	179
Temperature	-	3.12	3.12	3.12	3.13	31.8	3.34	-	-	-	-	-	-	6.11	5.49	12.34
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6	3.3	1.23
ANALYTICAL PARAMETERS																
Acidity	-	-	-	-	-	-	-	-	-	-	-	-	-	50000	46000	25000
Alkalinity	20000	-	-	-	-	-	-	-	-	-	-	-	-	2000 U	2000 U	2000 U
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	2000 U	2000 U	2000 U
Chloride	230000	-	1000	-	-	1000	-	90000	1E+05	2E+05	1800	5200	2800	790	990	1500
Hardness (as $CaCO_3$)	-	43965	43553	43553	43553	43142	40233	43142	54676	77408	1E+05	78003	80163	69000	69000	-
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	2000 U	2000 U	2000 U
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	29 J	29 J	45 UJ
Nitrite	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	150000	150000	150000	150000	150000	150000	2E+05	1E+05	1E+05	2E+05	45000	29000	2E+05	2E+05	96000
Sulfide	2	-	-	-	-	-	-	-	-	-	-	-	-	100 U	100 U	100 U
Total Dissolved Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	1E+05	1E+05	1E+05
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	13000 J	5200 J	5000 U

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Table 6-9
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Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	NOBIS	NOBIS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR
	Sample Location:	EB-30M	EB-30M	EB-30M	EB-325M	EB-405M	EB-405M	EB-440M	EB-465M	EB-465M	EB-465M	EB-465M	EB-465M	EB-465M	EB-465M	EB-530M
	Field Sample ID:	ELY-SW-09 DUP	SW-09X-080709AX	SW-09-111909AX	ELY-SW-39	ELY-SW-33	ELY-SW-33	ELY-SW-11	EB-5	EB-5	EB-5	EB-5	EB-5	EB-5	EB-5	ELY-SW-12
	Date:	5/2/2007	8/7/2009	11/19/2009	5/2/2007	11/3/2004	5/2/2007	11/3/2004	4/2/2002	4/11/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	11/1/2004
Analyte	**SW Criteria**															
FIELD PARAMETERS																
Dissolved Oxygen	-	-	-	-	10620	12840	10880	12890	-	-	-	-	-	-	-	11560
ORP	-	-	-	-	348.7	464	356.6	-	-	-	-	-	-	-	-	464
pH	-	-	3.9 X	-	4.06	4.13	4.05	4.1	-	-	-	-	-	-	-	4.26
Specific Conductivity	-	-	180	-	188	336	183	355	-	-	-	-	-	-	-	317
Temperature	-	-	-	-	14.67	6.16	13.51	6.57	-	-	-	-	-	-	-	7.46
Turbidity	-	-	-	-	0.7	2.1	0.9	1.7	-	-	-	-	-	-	-	1.8
ANALYTICAL PARAMETERS																
Acidity	-	29000	60000	32000	26000	53000	27000	57000	-	-	-	-	-	-	-	49000
Alkalinity	20000	2000 U	5000 U	5000 U	2000 U	2000 U	2000 U	2000 U	-	-	-	-	-	-	-	2000 U
Carbonate (as $CaCO_3$)	-	2000 U	-	-	2000 U	2000 U	2000 U	2000 U	-	-	-	-	-	-	-	2000 U
Chloride	230000	1500	430	400	290 UJ	840	250 UJ	830	98000	1E+05	1E+05	2E+05	3E+05	5000 U	600	770
Hardness (as $CaCO_3$)	-	-	-	-	-	73000	-	75000	41056	48109	55574	78880	1E+05	2E+05	3E+05	75000
Hydroxide (as $CaCO_3$)	-	2000 U	-	-	2000 U	2000 U	2000 U	2000 U	-	-	-	-	-	-	-	2000 U
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	49 UJ	-	-	48 UJ	39 J	84 UJ	45 J	-	-	-	-	-	-	-	40 J
Nitrite	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	20 U	20 U	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	97000	75000	77000	79000	2E+05	1E+05	2E+05	2E+05	2E+05	1E+05	2E+05	2E+05	8E+05	7E+05	210000
Sulfide	2	100 U	2000 U	2000 U	100 U	100 U	100 U	100 U	-	-	-	-	-	-	-	100 U
Total Dissolved Solids	-	1E+05	2E+05	120000	1E+05	1E+05	1E+05	2E+05	-	-	-	-	-	-	-	160000
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	5000 U	6000	4500 J	5000	10000 J	11000	24000 J	-	-	-	-	-	-	-	5000 U

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Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	USGS	USGS	USGS	USGS	URS	NOBIS	NOBIS	URS
	Study Area	EB-MR	EB-MR	EB-MR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR
	Sample Location:	EB-530M	EB-530M	EB-530M	EB-560M	EB-560M	EB-560M	EB-560M	EB-600M	EB-600M	EB-770M	EB-770M	EB-770M	EB-770M	EB-770M	EB-815M
	Field Sample ID:	ELY-SW-12	SW-12X-080609AX	SW-12-111809AX	ELY-SW-13	ELY-SW-13	SW-13X-080609AX	SW-13-111809AX	06Ely03AFA	06Ely03ARA	06Ely02AFA	06Ely02ARA	ELY-SW-40	SW-40X-080409AX	SW-40-111709AX	ELY-SW-17
	Date:	5/2/2007	8/6/2009	11/18/2009	11/1/2004	5/2/2007	8/6/2009	11/18/2009	8/23/2006	8/23/2006	8/23/2006	8/23/2006	5/2/2007	8/4/2009	11/17/2009	11/2/2004
Analyte	**SW Criteria**															
FIELD PARAMETERS																
Dissolved Oxygen	-	11010	-	-	11380	11570	-	-	-	-	-	-	11790	-	-	10930
ORP	-	343.1	-	-	342.1	292	-	-	-	-	-	-	231.3	-	-	178.2
pH	-	4.18	4.6 X	-	6.41	6.9	7 X	-	-	7	-	6.3	6.67	6.7	-	6.38
Specific Conductivity	-	174	153	-	118	70	70	-	-	123	-	149	68	72	-	72
Temperature	-	13.35	-	-	7.59	10.93	-	-	-	-	-	-	10.43	-	-	6.84
Turbidity	-	22.8	-	-	2	1.2	-	-	-	-	-	-	1.2	-	-	0.37
ANALYTICAL PARAMETERS																
Acidity	-	28000	36000	19000	2900	2000 U	10000 U	10000 U	-	-	-	-	2000 U	19000	10000 U	2000 U
Alkalinity	20000	700 J	5000 U	5000 U	15000	13000	13000	12000	15960	-	11390	-	12000	5000 U	12000	24000
Carbonate (as $CaCO_3$)	-	2000 U	-	-	2000 U	2000 U	-	-	-	-	-	-	2000 U	-	-	2000 U
Chloride	230000	380 J	230	400	740	380 J	220	380	1500	-	1400	-	320 UJ	220	400	820
Hardness (as $CaCO_3$)	-	-	-	-	43000	-	-	-	-	-	-	-	-	-	-	28000
Hydroxide (as $CaCO_3$)	-	2000 U	-	-	2000 U	2000 U	-	-	-	-	-	-	2000 U	-	-	2000 U
Nitrate	10000	-	-	-	-	-	-	-	500	-	500	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	81 UJ	-	-	17 J	25 UJ	-	-	60 U	-	60 U	-	110 U	-	-	100 U
Nitrite	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	2 U	-	2 U	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	20 U	20 U	-	-	18 J	20 U	-	-	-	-	-	20 U	20 U	-
Sulfate	-	96000	70000	71000	39000	21000	15000	20000	38200	37600	52500	54500	20000	17000	21000	9800
Sulfide	2	100 U	2000 U	2000 U	100 U	100 U	2000 U	2000 U	-	-	-	-	100 U	570 J	2000 U	100 U
Total Dissolved Solids	-	1E+05	1E+05	97000	51000	59000	45000	41000	-	-	-	-	48000	46000	34000	30000
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	53 E	-	42 E	-	-	-	-	-
Total Suspended Solids	-	20000	7500	4000 J	5000 U	5000 U	5000 U	5000 U	-	-	-	-	5000 U	2000 J	5000 U	5000 U

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Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	NOBIS	NOBIS	URS	EPA	EPA	USGS	USGS	URS	URS	URS	URS	NOBIS	NOBIS	URS
	Study Area	EB-UR	EB-UR	EB-UR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EBT1	EBT1	EBT1	EBT1	EBT1	EBT1	EBT1
	Sample Location:	EB-815M	EB-815M	EB-815M	EB-90M	EB-90M	EB-90M	EB-90M	EB-90M	EBT1-105M	EBT1-105M	EBT1-10M	EBT1-10M	EBT1-10M	EBT1-10M	EBT1-110M
	Field Sample ID:	ELY-SW-17	SW-17X-080409AX	SW-17-111709AX	SWU-12-49L	AA62007	NO ID	06Ely04AFA	06Ely04ARA	EB-7	EB-7	ELY-SW-34	ELY-SW-34	SW-34X-080609AX	SW-34-111809AX	ELY-SW-36
	Date:	5/2/2007	8/4/2009	11/17/2009	9/5/2001	6/19/2006	6/19/2006	8/23/2006	8/23/2006	4/8/2002	4/11/2002	11/2/2004	5/2/2007	8/6/2009	11/18/2009	11/3/2004
Analyte	**SW Criteria**															
FIELD PARAMETERS																
Dissolved Oxygen	-	11990	-	-	-	-	8240	-	-	-	-	14430	12540	-	-	10400
ORP	-	229	-	-	-	-	-	-	-	-	-	393.2	286.6	-	-	290.7
pH	-	6.98	7.1 X	-	-	-	4.18	-	3.2	-	-	4.36	6.52	3.8 X	-	5.92
Specific Conductivity	-	49	50	-	-	-	210	-	447	-	-	203	57	140	-	66
Temperature	-	10.24	-	-	-	-	21.32	-	-	-	-	6.19	6.49	-	-	7.32
Turbidity	-	0.3	-	-	-	-	3.5	-	-	-	-	12	0.5	-	-	5.9
ANALYTICAL PARAMETERS																
Acidity	-	2000 U	10000 U	10000 U	-	-	-	-	-	-	-	30000	2000 U	19000	30000	4500
Alkalinity	20000	15000	7500	16000	-	20000 U	62000	-	-	-	-	2000 U	7200	5000 U	5000 U	19000
Carbonate (as $CaCO_3$)	-	2000 U	-	-	-	20000 U	20000 U	-	-	-	-	2000 U	2000 U	-	-	2000 U
Chloride	230000	240 UJ	210	400	-	290	3600	2600	-	7900	7400	560	290 UJ	250	350	920
Hardness (as $CaCO_3$)	-	-	-	-	197000	-	-	-	-	10714	10755	35000	-	-	-	24000
Hydroxide (as $CaCO_3$)	-	2000 U	-	-	-	-	-	-	-	-	-	2000 U	2000 U	-	-	2000 U
Nitrate	10000	-	-	-	-	100 U	100 U	1000	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	20 U	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	32 UJ	-	-	-	-	-	60 U	-	-	-	17 J	33 UJ	-	-	38 J
Nitrite	1000	-	-	-	-	100 U	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	-	30 U	-	2 U	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	20 U	20 U	-	-	-	-	-	-	-	-	-	20 U	20 U	-
Sulfate	-	6500	5600	6800	-	92000	7700	143000	140000	9400	9300	85000	10000	55000	66000	9300
Sulfide	2	100 U	1300 J	2000 U	-	-	-	-	-	-	-	100 U	100 U	2000 U	2000 U	100 U
Total Dissolved Solids	-	20000 U	33000	20000	-	-	-	-	-	-	-	87000	38000	99000	120000	25000
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	72	-	-	-	-	-	-	-	-
Total Suspended Solids	-	5000 U	2700 J	5000 U	-	-	-	-	-	-	-	5000 U	5000 U	5000 U	5000 U	12000 J

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	Sampling Company:	NOBIS	URS	URS	EPA	URS	NOBIS	NOBIS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	EBT1	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2
	Sample Location:	EBT1-110M	EBT2-185M	EBT2-23M	EBT2-245M	EBT2-255M	EBT2-255M	EBT2-255M	EBT2-265M	EBT2-265M	EBT2-265M	EBT2-315M	EBT2-383M	EBT2-383M	EBT2-383M	EBT2-383M
	Field Sample ID:	SW-36-111809AX	ELY-SW-37	ELY-SW-31	AA62006	ELY-SW-41	SW-41X-080409AX	SW-41-111709AX	EB-2	EB-2	EB-2	ELY-SW-16	EB-2a	EB-2a	EB-2a	EB-2a
	Date:	11/18/2009	11/2/2004	11/1/2004	6/19/2006	5/3/2007	8/4/2009	11/17/2009	4/2/2002	4/11/2002	5/21/2002	11/3/2004	5/21/2002	6/20/2002	7/24/2002	8/20/2002
Analyte	**SW Criteria**															
FIELD PARAMETERS																
Dissolved Oxygen	-	-	12010	11460	8500	12270	-	-	-	-	-	12110	-	-	-	-
ORP	-	-	261.8	477.4	-	188.4	-	-	-	-	-	152.3	-	-	-	-
pH	-	-	5.2	4.12	5.48	5.3	6.2	-	-	-	-	6.06	-	-	-	-
Specific Conductivity	-	-	157	321	103	142	84	-	-	-	-	74	-	-	-	-
Temperature	-	-	5.85	8.08	21.3	7.49	-	-	-	-	-	6.98	-	-	-	-
Turbidity	-	-	1.56	0.9	8.5	2.6	-	-	-	-	-	6.16	-	-	-	-
ANALYTICAL PARAMETERS																
Acidity	-	10000 U	12000	89000	-	110000	15000	10000 U	-	-	-	2000 U	-	-	-	-
Alkalinity	20000	11000	2500	2000 U	800	3000	5000 U	4000 J	-	-	-	20000	-	-	-	-
Carbonate (as $CaCO_3$)	-	-	2000 U	2000 U	500 U	2000 U	-	-	-	-	-	2000 U	-	-	-	-
Chloride	230000	400	720	980	260	390 UJ	210	480	57000	38000	60000	950	6800	5500	1400	800
Hardness (as $CaCO_3$)	-	-	56000	99000	-	-	-	-	33767	29461	53471	27000	14284	20266	33644	41459
Hydroxide (as $CaCO_3$)	-	-	2000 U	2000 U	-	2000 U	-	-	-	-	-	2000 U	-	-	-	-
Nitrate	10000	-	-	-	250	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	60	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	39 J	63 J	-	36 UJ	-	-	-	-	-	58 J	-	-	-	-
Nitrite	1000	-	-	-	100 U	-	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	30 U	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	20 U	-	-	-	-	20 U	20 U	-	-	-	-	-	-	-	-
Sulfate	-	7800	68000	360000	53000	54000	31000	33000	61000	40000	68000	11000	8300	7000	1000 U	2300
Sulfide	2	2000 U	100 U	100 U	-	100 U	2000 U	2000 U	-	-	-	100 U	-	-	-	-
Total Dissolved Solids	-	23000	47000	230000	-	70000	56000	51000	-	-	-	17000	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	2500 J	5000 U	5000 U	-	5800	8500	8500	-	-	-	5000 UJ	-	-	-	-

Notes: Surface water criteria developed during Elizabeth Mine Remedial Investigation and from the Vermont Department of Environmental Conservation
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Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	NOBIS
	Study Area	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2
	Sample Location:	EBT2-383M	EBT2-430M	EBT2-430M	EBT2-58M	EBT2-58M	EBT2-78M	EBT2-78M	EBT2-78M	EBT2-78M	EBT2-78M	EBT2-78M	EBT2-7M	EBT2-7M	EBT2-7M
	Field Sample ID:	EB-2a	ELY-QS-02	ELY-SW-21	ELY-SW-14	ELY-SW-14	EB-3	EB-3	EB-3	EB-3	EB-3	EB-3	ELY-SW-32	ELY-SW-32	SW-32X-080609AX
	Date:	9/19/2002	11/3/2004	11/3/2004	11/1/2004	5/2/2007	4/2/2002	4/11/2002	5/21/2002	6/20/2002	7/24/2002	9/19/2002	11/1/2004	5/2/2007	8/6/2009
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	-	11880	11540	10350	-	-	-	-	-	-	11510	10320	-
ORP	-	-	-	147.2	440.6	380	-	-	-	-	-	-	481.8	405.1	-
pH	-	-	-	5.96	4.22	3.92	-	-	-	-	-	-	4.04	3.58	3.7 X
Specific Conductivity	-	-	-	62	289	163	-	-	-	-	-	-	574	291	280
Temperature	-	-	-	6.78	7.98	15.15	-	-	-	-	-	-	7.99	16.25	-
Turbidity	-	-	-	4.1	2.6	5.9	-	-	-	-	-	-	50.7	11.8	-
ANALYTICAL PARAMETERS															
Acidity	-	-	3000	2000 U	37000	23000	-	-	-	-	-	-	100000	56000	78000
Alkalinity	20000	-	21000	22000	2000 U	2000 U	-	-	-	-	-	-	2000 U	2000 U	5000 U
Carbonate (as $CaCO_3$)	-	-	2000 U	2000 U	2000 U	2000 U	-	-	-	-	-	-	2000 U	2000 U	-
Chloride	230000	100	960	900	880	330 UJ	540000	67000	73000	75000	500 U	200	820	300 UJ	250
Hardness (as $CaCO_3$)	-	34231	24000	23000	58000	-	217198	33605	42642	47299	82612	111184	110000	-	-
Hydroxide (as $CaCO_3$)	-	-	2000 U	2000 U	2000 U	2000 U	-	-	-	-	-	-	2000 U	2000 U	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	23 J	100 U	56 J	64 UJ	-	-	-	-	-	-	67 J	77 UJ	-
Nitrite	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20 U
Sulfate	-	23000	7400	6800	130000	77000	750000	81000	81000	77000	110000	290000	390000	290000	130000
Sulfide	2	-	100 U	100 U	100 U	100 U	-	-	-	-	-	-	100 U	100 U	700 J
Total Dissolved Solids	-	-	15000	19000	100000	91000	-	-	-	-	-	-	250000	180000	200000
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	-	5000 UJ	21000 J	5000 U	6200	-	-	-	-	-	-	5000 U	11000	3500 J

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Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	NOBIS	NOBIS
	Study Area	EBT2	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT4	EBT4	EBT4	EBT4
	Sample Location:	EBT2-7M	EBT3-60M	EBT3-60M	EBT3-84M	EBT3-84M	EBT3-84M	EBT3-84M	EBT3-84M	EBT3-84M	EBT3-84M	EBT4-25M	EBT4-25M	EBT4-25M	EBT4-25M
	Field Sample ID:	SW-32-111809AX	ELY-SW-30	ELY-SW-30	EB-4	EB-4	EB-4	EB-4	EB-4	EB-4	EB-4	ELY-SW-29	ELY-SW-29	SW-29X-080409AX	SW-29-111709AX
	Date:	11/18/2009	11/1/2004	5/2/2007	4/2/2002	4/11/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	11/2/2004	5/2/2007	8/4/2009	11/17/2009
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	11060	11020	-	-	-	-	-	-	-	10240	12420	-	-
ORP	-	-	500.7	471.7	-	-	-	-	-	-	-	359.8	287.9	-	-
pH	-	-	3.82	3.04	-	-	-	-	-	-	-	4.61	4.41	7	-
Specific Conductivity	-	-	1114	720	-	-	-	-	-	-	-	400	210	200	-
Temperature	-	-	8.83	12.93	-	-	-	-	-	-	-	8.08	7.79	-	-
Turbidity	-	-	0.61	0.8	-	-	-	-	-	-	-	0.42	0.9	-	-
ANALYTICAL PARAMETERS															
Acidity	-	69000	240000	170000	-	-	-	-	-	-	-	58000	29000	15000	38000
Alkalinity	20000	5000 U	2000 U	2000 U	-	-	-	-	-	-	-	2000 U	2000 U	5000 U	5000 U
Carbonate (as $CaCO_3$)	-	-	2000 U	2000 U	-	-	-	-	-	-	-	2000 U	2000 U	-	-
Chloride	230000	430	620	370 J	74000	570000	580000	550000	570000	5000 U	700	540	320 UJ	220	360
Hardness (as $CaCO_3$)	-	-	220000	-	34928	240416	246808	251552	252249	245695	240215	130000	-	-	-
Hydroxide (as $CaCO_3$)	-	-	2000 U	2000 U	-	-	-	-	-	-	-	2000 U	2000 U	-	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	53 J	57 UJ	-	-	-	-	-	-	-	26 J	33 UJ	-	-
Nitrite	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	20 U	-	-	-	-	-	-	-	-	-	-	-	25	20 U
Sulfate	-	130000	870000	610000	86000	730000	540000	520000	490000	620000	520000	290000	100000	101000	110000
Sulfide	2	2000 U	100 U	100 U	-	-	-	-	-	-	-	100 U	100 U	670 J	2000 U
Total Dissolved Solids	-	190000	560000	440000	-	-	-	-	-	-	-	260000	140000	190000	170000
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	5500	5000 U	5000 U	-	-	-	-	-	-	-	5000 U	5000 U	5000 U	5000 U

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Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	NOBIS	NOBIS	USGS	USGS	EPA	EPA	EPA	EPA	EPA	EPA	USGS	USGS	USGS
	Study Area	EBT5	EBT5	EBT5	Pond1,2,3	Pond1,2,3	Pond1,2,3	Pond1,2,3	Pond1,2,3	Pond1,2,3	Pond1,2,3	Pond1,2,3	Pond1,2,3	Pond1,2,3	Pond1,2,3
	Sample Location:	EBT5-60M	EBT5-60M	EBT5-60M	EM-POND1	EM-POND1	EM-POND1	EM-POND1	EM-POND1	EM-POND1	EM-POND1	EM-POND1	EM-POND2	EM-POND2	EM-POND3
	Field Sample ID:	ELY-SW-51	SW-51X-080409AX	SW-51-111809AX	06ElyPond1FA	06ElyPond1RA	TSWP 1	TSWP 1	TSWP 1	TSWP 1	TSWP 1	TSWP 1	06ElyPond2FA	06ElyPond2RA	06ElyPond3FA
	Date:	5/2/2007	8/4/2009	11/18/2009	9/19/2006	9/19/2006	5/2/2007	5/10/2007	5/21/2007	5/28/2007	6/4/2007	6/11/2007	9/19/2006	9/19/2006	9/19/2006
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	10910	-	-	-	-	10850	19890	8710	8680	6340	8660	-	-	-
ORP	-	206.4	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	6.91	6.8 X	-	-	7	6.96	.	7.49	6.9	7.76	7.25	-	6.5	-
Specific Conductivity	-	63	65	-	-	51	0.038	0.047	0.042	0.046	0.045	0.045	-	65	-
Temperature	-	9.36	-	-	-	-	14.68	21.17	15.58	23.31	18.09	22	-	-	-
Turbidity	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-
ANALYTICAL PARAMETERS															
Acidity	-	2000 U	10000 U	10000 U	-	-	-	-	-	-	-	-	-	-	-
Alkalinity	20000	19000	5000 U	28000	18900	-	-	-	-	-	-	-	27180	-	30580
Carbonate (as $CaCO_3$)	-	2000 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	230000	200 UJ	220	330	110	-	-	-	-	-	-	-	1400	-	1300
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide (as $CaCO_3$)	-	2000 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	10000	-	-	-	80 U	-	-	-	-	-	-	-	600	-	600
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	52 UJ	-	-	60 U	-	-	-	-	-	-	-	60 U	-	30 E
Nitrite	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	2 U	-	-	-	-	-	-	-	2 U	-	2 U
Nitrogen, Nitrite + Nitrate	-	-	20 U	20 U	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	7900	6000	8100	7000	8000	-	-	-	-	-	-	6000	7000	7000
Sulfide	2	100 U	670 J	430 J	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	-	40000	47000	37000	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	456	-	-	-	-	-	-	-	220	-	251
Total Suspended Solids	-	5000 U	2000 J	5000 U	-	-	-	-	-	-	-	-	-	-	-

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Vershire, Vermont

	Sampling Company:	USGS	EPA	EPA	EPA	EPA	USGS	USGS	EPA	EPA	EPA	EPA	EPA	EPA	USGS
	Study Area	Pond1,2,3	Pond4	Pond4	Pond4	Pond4	Pond4	Pond4	Pond4	Pond4	Pond4	Pond4	Pond4	Pond4	Pond5
	Sample Location:	EM-POND3	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND5
	Field Sample ID:	06ElyPond3 RA	AA62005	EMTT-1 REF	AA62296	EMTT-1 REF	06ElyPond4 FA	06ElyPond4 RA	TSWP 4	TSWP 4	TSWP 4	TSWP 4	TSWP 4	TSWP 4	06ElyPond5 FA
	Date:	9/19/2006	6/19/2006	6/19/2006	6/23/2006	6/23/2006	9/19/2006	9/19/2006	5/2/2007	5/10/2007	5/21/2007	5/28/2007	6/4/2007	6/11/2007	9/19/2006
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	-	6420	-	5960	-	-	11570	17440	8160	7150	6010	6650	-
ORP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	6.7	-	7.25	-	7.69	-	6.7	6.49	.	7.01	6.91	7.8	7.15	-
Specific Conductivity	-	70	-	43	-	46	-	78	0.06	0.079	0.07	0.061	0.067	0.077	-
Temperature	-	-	-	21.58	-	19.93	-	-	14.4	18.68	13.02	21.9	16.47	18.61	-
Turbidity	-	-	-	0.46	-	0.43	-	-	-	-	-	-	-	-	-
ANALYTICAL PARAMETERS															
Acidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity	20000	-	14500	14500	20000	20000	29730	-	-	-	-	-	-	-	17220
Carbonate (as $CaCO_3$)	-	-	500 U	500 U	20000 U	500 U	-	-	-	-	-	-	-	-	-
Chloride	230000	-	230	230	210	210	210	-	-	-	-	-	-	-	1300
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	10000	-	100 U	100 U	-	-	80 U	-	-	-	-	-	-	-	600
Nitrate as Nitrogen	10000	-	20 U	-	20 U	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	-	-	-	-	60 U	-	-	-	-	-	-	-	60 U
Nitrite	1000	-	100 U	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	-	-	2 U	-	-	-	-	-	-	-	2 U
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	7000	6700	6700	6800	6800	11000	12000	-	-	-	-	-	-	35000
Sulfide	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	189	-	-	-	-	-	-	-	106
Total Suspended Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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	Sampling Company:	USGS	EPA	EPA	EPA	USGS	USGS	URS	URS	URS	URS	URS	URS	URS	NOBIS
	Study Area	Pond5	Pond5	Pond5	Pond5	Pond6	Pond6	EBT3	EBT3	EBT2	EBT2	EBT5	EBT4	EBT1	EBT1
	Sample Location:	EM-POND5	EM-POND5	EM-POND5	EM-POND5	EM-POND6	EM-POND6	EM-SEEP1	EM-SEEP1	EM-SEEP10	EM-SEEP10	EM-SEEP11	EM-SEEP12	EM-SEEP13	EM-SEEP13
	Field Sample ID:	06ElyPond5 RA	TSWP 5	TSWP 5	TSWP 5	06ElyPond6 FA	06ElyPond6 RA	ES-1	ES-1	ES-10	ES-10	ES-11	ES-12	ELY-SW-35	SW-35X-080609AX
	Date:	9/19/2006	5/2/2007	5/10/2007	5/21/2007	9/19/2006	9/19/2006	4/4/2002	4/11/2002	4/8/2002	4/11/2002	4/8/2002	4/11/2002	11/3/2004	8/6/2009
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	10860	19840	8160	-	-	-	-	-	-	-	-	10090	-
ORP	-	-	-	-	-	-	-	-	-	-	-	-	-	253.7	-
pH	-	6.5	4.25	.	4.46	-	4.7	-	-	-	-	-	-	5.81	6.9 X
Specific Conductivity	-	117	0.463	0.484	0.355	-	206	-	-	-	-	-	-	56	45
Temperature	-	-	14.53	18.23	13.67	-	-	-	-	-	-	-	-	8.63	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-
ANALYTICAL PARAMETERS															
Acidity	-	-	-	-	-	-	-	-	-	-	-	-	-	8000	10000 U
Alkalinity	20000	-	-	-	-	-	-	-	-	-	-	-	-	16000	5000 U
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	2000 U	-
Chloride	230000	-	-	-	-	200	-	1E+06	980000	910000	780000	13000	55000	500 U	200
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	495290	559074	147282	124940	14621	26950	20000	-
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	2000 U	-
Nitrate	10000	-	-	-	-	600	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	-	-	-	30 E	-	-	-	-	-	-	-	2100	-
Nitrite	1000	-	-	-	-	-	-								
Nitrite as Nitrogen	1000	-	-	-	-	2 U	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20 U
Sulfate	-	34700	-	-	-	93000	86500	2E+06	2E+06	1E+06	980000	17000	79000	9700	6700
Sulfide	2	-	-	-	-	-	-	-	-	-	-	-	-	100 U	2000 U
Total Dissolved Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	18000	36000
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	96	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	5000 UJ	5000 U

Notes: Surface water criteria developed during Elizabeth Mine Remedial Investigation and from the Vermont Department of Environmental Conservation
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Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS
	Study Area	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT3	EBT3	EBT3	EBT3
	Sample Location:	EM-SEEP14	EM-SEEP14	EM-SEEP14	EM-SEEP15	EM-SEEP15	EM-SEEP15	EM-SEEP16	EM-SEEP16	EM-SEEP16	EM-SEEP16	EM-SEEP17	EM-SEEP17	EM-SEEP17	EM-SEEP18
	Field Sample ID:	ELY-SW-42	SW-42X-080409AX	SW-42-111709AX	ELY-SW-43	SW-43X-080509AX	SW-43-120209AX	ELY-SW-45	SW-45X-080509AX	SW-45-111709AX	SW-45-111709AD	ELY-SW-46	SW-46X-080509AX	SW-46-111609AX	ELY-SW-47
	Date:	5/3/2007	8/4/2009	11/17/2009	5/3/2007	8/5/2009	12/2/2009	5/3/2007	8/5/2009	11/17/2009	11/17/2009	5/3/2007	8/5/2009	11/17/2009	5/3/2007
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	11900	-	-	10760	-	-	12640	-	-	-	12800	-	-	12600
ORP	-	257	-	-	421	-	-	326.1	-	-	-	278.3	-	-	493.2
pH	-	3.79	3.7	-	3.25	2.9 X	-	3.42	3.5 X	-	-	3.81	3.3 X	-	2.81
Specific Conductivity	-	685	620	-	467	650	-	661	450	-	-	545	580	-	1271
Temperature	-	5.27	-	-	14.13	-	-	4.16	-	-	-	4.03	-	-	5.32
Turbidity	-	0.6	-	-	27.1	-	-	0.7	-	-	-	6.3	-	-	0.5
ANALYTICAL PARAMETERS															
Acidity	-	200000	150000	150000	93000	160000	160000	180000	190000	150000	160000	130000	95000	150000	330000
Alkalinity	20000	2000 U	5000 U	5000 U	2000 U	5000 U	5000 U	2000 U	5000 U	5000 U	5000 U	2000 U	17000	5000 U	2000 U
Carbonate (as $CaCO_3$)	-	2000 U	-	-	2000 U	-	-	2000 U	-	-	-	2000 U	-	-	2000 U
Chloride	230000	340 UJ	300	360	400 UJ	310	370	480 UJ	360	380	360	420 UJ	360	380	450 UJ
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide (as $CaCO_3$)	-	2000 U	-	-	2000 U	-	-	2000 U	-	-	-	2000 U	-	-	2000 U
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	80 UJ	-	-	70 UJ	-	-	440	-	-	-	160	-	-	54 UJ
Nitrite	1000														
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	20 U	20 U	-	20 U	120	-	38	80	79	-	21	170	-
Sulfate	-	480000	370000	360000	260000	290000	1E+06	660000	440000	380000	390000	730000	320000	330000	2E+06
Sulfide	2	100 U	470 J	2000 U	100 U	670 J	2000 U	100 U	770 J	2000 U	2000 U	100 U	2000 U	2000 U	100 U
Total Dissolved Solids	-	550000	590000	530000	220000	450000	2E+06	500000	690000	560000	580000	360000	550000	480000	850000
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	5000 U	5000 U	5000 U	5000 U	12000	14000	5000 U	6500	5000 U	5000 U	32000	1500 J	5000 U	5000 U

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Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	URS	URS	NOBIS	NOBIS	URS	URS	URS	URS
	Study Area	EBT3	EBT3	EBT4	EBT4	EBT4	EBT3	EBT3	EBT2	EBT2	EBT2	EBT3	EBT2	EBT2	EBT2
	Sample Location:	EM-SEEP18	EM-SEEP18	EM-SEEP19	EM-SEEP19	EM-SEEP19	EM-SEEP2	EM-SEEP2	EM-SEEP20	EM-SEEP20	EM-SEEP20	EM-SEEP21	EM-SEEP3	EM-SEEP4	EM-SEEP5
	Field Sample ID:	SW-47X-080509AX	SW-47-111609-AX	ELY-SW-48	SW-48X-080509AX	SW-48-111609AX	ES-2	ES-2	ELY-SW-49	SW-49X-080509AX	SW-49-111609AX	ELY-SW-52	ES-3	ES-4	ES-5
	Date:	8/5/2009	11/16/2009	5/3/2007	8/5/2009	11/16/2009	4/4/2002	4/11/2002	5/2/2007	8/5/2009	11/16/2009	5/2/2007	4/4/2002	4/4/2002	4/4/2002
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	-	13050	-	-	-	-	13750	-	-	830	-	-	-
ORP	-	-	-	333.7	-	-	-	-	406.9	-	-	202.1	-	-	-
pH	-	2.8 X	-	4.29	4.2	-	-	-	3.3	3.4 X	-	4	-	-	-
Specific Conductivity	-	1300	-	120	110	-	-	-	411	400	-	599	-	-	-
Temperature	-	-	-	6.43	-	-	-	-	3.09	-	-	2.9	-	-	-
Turbidity	-	-	-	0.5	-	-	-	-	1.8	-	-	2	-	-	-
ANALYTICAL PARAMETERS															
Acidity	-	270000	400000	17000	12000	10000 U	-	-	71000	57000	67000	210000	-	-	-
Alkalinity	20000	5000 U	5000 U	2000 U	5000 U	5000 U	-	-	2000 U	5000 U	5000 U	2000 U	-	-	-
Carbonate (as $CaCO_3$)	-	-	-	2000 U	-	-	-	-	2000 U	-	-	2000 U	-	-	-
Chloride	230000	350	340	310 UJ	210	420	550000	500000	410 UJ	340	400	350 UJ	280000	290000	280000
Hardness (as $CaCO_3$)	-	-	-	-	-	-	220440	202216	-	-	-	-	132693	106102	100284
Hydroxide (as $CaCO_3$)	-	-	-	2000 U	-	-	-	-	2000 U	-	-	2000 U	-	-	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	-	32 UJ	-	-	-	-	130 U	-	-	120 U	-	-	-
Nitrite	1000														
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	20 U	20 U	-	17 J	20 U	-	-	-	20 U	58	-	-	-	-
Sulfate	-	570000	560000	63000	51000	39000	710000	630000	250000	156000	200000	460000	350000	350000	340000
Sulfide	2	2000 U	2000 U	100 U	670 J	2000 U	-	-	100 U	970 J	2000 U	100 U	-	-	-
Total Dissolved Solids	-	910000	940000	37000 U	97000	62000	-	-	180000	280000	320000	560000	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	49000	22000	5000 U	5000 U	5000 U	-	-	8300	3500 J	5000 U	62000	-	-	-

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Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	EBT2	EBT2	EBT2	EBT3	EBT3	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR
	Sample Location:	EM-SEEP6	EM-SEEP7	EM-SEEP8	EM-SEEP9	EM-SEEP9	OR-11850M	OR-11850M	OR-11850M	OR-15000M	OR-15000M	OR-15000M	OR-15000M	OR-15000M	OR-15000M	OR-15000M
	Field Sample ID:	ES-6	ES-7	ES-8	ES-9	ES-9	SWF-01-35C	SWU-03-35R	SWU-12-35R	OR-3	OR-3	OR-3	OR-3	OR-3	OR-3	OR-3
	Date:	4/8/2002	4/8/2002	4/8/2002	4/8/2002	4/11/2002	5/8/2000	7/19/2000	9/5/2001	3/31/2002	4/10/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002
Analyte	**SW Criteria**															
FIELD PARAMETERS																
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ORP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific Conductivity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANALYTICAL PARAMETERS																
Acidity	-	-	-	-	-	-	5000 U	5000 U	-	-	-	-	-	-	-	-
Alkalinity	20000	-	-	-	-	-	47000	69000	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	230000	50000	150000	530000	630000	640000	7200	2500 U	-	8600	7400	8300	8800	9300	25000	21000
Hardness (as $CaCO_3$)	-	26079	87545	250404	216322	213825	54700	77700	87800	39488	34494	47553	61610	81735	99526	80750
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	140	190	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite	1000															
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	75000	250000	840000	1E+06	990000	7800	10000	-	3100	2100	9400	10000	6600	12000	10000
Sulfide	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	-	-	-	-	-	-	68000	113000	-	-	-	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	-	-	-	-	-	4000 U	4000 U	-	-	-	-	-	-	-	-

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	Sampling Company:	URS	URS	URS	URS	URS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS
	Study Area	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR
	Sample Location:	OR-15200M	OR-17400M	OR-19150M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M
	Field Sample ID:	SWU-12-56R	SWU-12-55L	SWU-12-54R	OR-2	OR-2	OR2-0402S10RA	OR2-0402S11RA	OR2-0402S1RA	OR2-0402S2RA	OR2-0402S3RA	OR2-0402S4RA	OR2-0402S5RA	OR2-0402S6RA	OR2-0402S7RA	OR2-0402S8RA
	Date:	9/10/2001	9/10/2001	9/10/2001	3/29/2002	3/31/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002
Analyte	**SW Criteria**															
FIELD PARAMETERS																
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ORP	-	-	-	-	-	-	372	366	327	325	335	333	332	334	339	358
pH	-	-	-	-	-	-	7.04	7.03	7.03	7.04	7.02	7.03	7.04	7.04	7.04	7.05
Specific Conductivity	-	-	-	-	-	-	83	82.1	82	82.1	81.7	82.1	80.8	81.3	80.6	81.5
Temperature	-	-	-	-	-	-	1.77	1.69	2.25	2.57	2.73	2.88	2.77	2.45	2.17	1.96
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANALYTICAL PARAMETERS																
Acidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity	20000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	230000	-	-	-	11000	7700	6700	-	7000	-	-	7000	-	-	6800	-
Hardness (as $CaCO_3$)	-	89000	87600	86100	54882	39900	36167.2	36167.2	36373	36332	36291	36373	36373	39035	36332	38911
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite	1000															
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	-	-	-	7000	4900	13000	13000	13000	14000	14000	13000	14000	13000	13000	14000
Sulfide	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc Ririver
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Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	URS	URS
	Study Area	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR
	Sample Location:	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M
	Field Sample ID:	OR2-0402S9RA	OR2-0403S10RA	OR2-0403S11RA	OR2-0403S1RA	OR2-0403S2RA	OR2-0403S3RA	OR2-0403S4RA	OR2-0403S5RA	OR2-0403S6RA	OR2-0403S7RA	OR2-0403S8RA	OR2-0403S9RA	OR-2	OR-2
	Date:	4/2/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/10/2002	5/21/2002
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ORP	-	367	318	318	361	358	355	353	352	352	337	322	319	-	-
pH	-	7.05	7.12	7.15	7.04	7.04	7.05	7.06	7.07	7.07	7.08	7.09	7.1	-	-
Specific Conductivity	-	81.2	94.5	96.3	83.1	85.4	86.4	87.6	88.1	89	91.8	92.4	93.8	-	-
Temperature	-	1.83	1.75	2.37	1.61	1.51	1.45	1.43	1.36	1.25	1.14	1.1	1.3	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANALYTICAL PARAMETERS															
Acidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity	20000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	230000	-	-	7100	-	6800	-	-	7000	-	-	7000	-	7600	9100
Hardness (as $CaCO_3$)	-	38994	41408	38705	38788	38952	39076	39035	38911	38952	41491	41491	38911	36579	53471
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite	1000														
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	13000	13000	8600	14000	12000	12000	12000	13000	12000	12000	12000	13000	2000	10000
Sulfide	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	USGS	USGS	URS	USGS	USGS	URS	USGS	USGS	URS	URS
	Study Area	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR-Background	EBOR-Background	EBOR-Background	EBOR-Background	EBOR-Background
	Sample Location:	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-23200M	OR-23200M	OR-23630M	OR-23630M	OR-23630M	OR-23650M	OR-24050M	OR-24050M	OR-24150M	OR-24150M
	Field Sample ID:	OR-2	OR-2	OR-2	OR-2	06Ely10A FA	06Ely10A RA	ELY-SW-28	06Ely20A FA	06Ely20A RA	ELY-SW-26	06Ely09A FA	06Ely09A RA	OR-1	OR-1
	Date:	6/20/2002	7/24/2002	8/20/2002	9/19/2002	8/21/2006	8/21/2006	11/4/2004	8/21/2006	8/21/2006	11/4/2004	8/21/2006	8/21/2006	3/29/2002	3/31/2002
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	-	-	-	-	-	13830	-	-	13450	-	-	-	-
ORP	-	-	-	-	-	-	-	212.4	-	-	207.6	-	-	-	-
pH	-	-	-	-	-	-	8.1	8.15	-	8	8.13	-	8	-	-
Specific Conductivity	-	-	-	-	-	-	196	189	-	198	212	-	196	-	-
Temperature	-	-	-	-	-	-	-	1.71	-	-	2.45	-	-	-	-
Turbidity	-	-	-	-	-	-	-	0.97	-	-	1.3	-	-	-	-
ANALYTICAL PARAMETERS															
Acidity	-	-	-	-	-	-	-	2000 U	-	-	2000 U	-	-	-	-
Alkalinity	20000	-	-	-	-	85320	-	77000	87130	-	86000	87560	-	-	-
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	2000 U	-	-	2000 U	-	-	-	-
Chloride	230000	10000	11000	21000	19000	5400	-	5100	6000	-	9000	5700	-	8900	9100
Hardness (as $CaCO_3$)	-	84583	107117	104033	73596	-	-	82000	-	-	85000	-	-	56966.8	44481.8
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	2000 U	-	-	2000 U	-	-	-	-
Nitrate	10000	-	-	-	-	500	-	-	600	-	-	600	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	-	-	-	60	-	51 J	70	-	86 J	70	-	-	-
Nitrite	1000														
Nitrite as Nitrogen	1000	-	-	-	-	1.29 E	-	-	1.42 E	-	-	1.21 E	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	13000	7100	14000	11000	9000	10000	11000	9000	10000	7700	7200	8000	4200	3000
Sulfide	2	-	-	-	-	-	-	100 U	-	-	100 U	-	-	-	-
Total Dissolved Solids	-	-	-	-	-	-	-	90000	-	-	97000	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	195	-	-	198	-	-	210	-	-	-
Total Suspended Solids	-	-	-	-	-	-	-	5000 U	-	-	5000 U	-	-	-	-

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Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	EBOR-Background	EBOR-Background	EBOR-Background	EBOR-Background	EBOR-Background	EBOR-Background	EBOR-Background	EBOR	EBOR	EBOR	ORT1	ORT1	ORT1	SHB-LR
	Sample Location:	OR-24150M	OR-24150M	OR-24150M	OR-24150M	OR-24150M	OR-24150M	OR-24500M	OR-8350M	OR-8350M	OR-8350M	ORT-1080M	ORT-1150M	ORT-1190M	SB-1140M
	Field Sample ID:	OR-1	OR-1	OR-1	OR-1	OR-1	OR-1	SWU-12-53R	SWU-EM-EB1	SWU-04-45R	SWU-12-45L	ELY-SW-24	ELY-SW-23	ELY-SW-22	SWU-12-52L
	Date:	4/10/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	9/10/2001	7/6/2000	9/20/2000	9/5/2001	11/2/2004	11/2/2004	11/2/2004	9/10/2001
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	7290	7530	7090	-
ORP	-	-	-	-	-	-	-	-	-	-	-	200.1	185.5	206.3	-
pH	-	-	-	-	-	-	-	-	-	-	-	6.37	6.44	6.38	-
Specific Conductivity	-	-	-	-	-	-	-	-	-	-	-	29	33	33	-
Temperature	-	-	-	-	-	-	-	-	-	-	-	7.33	7.36	7.15	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	1.8	1.2	1.8	-
ANALYTICAL PARAMETERS															
Acidity	-	-	-	-	-	-	-	-	-	5000 U	-	5600	4100	4800	-
Alkalinity	20000	-	-	-	-	-	-	-	-	72300	-	6400	9000	8700	-
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	2000 U	2000 U	2000 U	-
Chloride	230000	7000	7600	8200	8800	27000	23000	-	-	20000 U	-	580	630	630	-
Hardness (as $CaCO_3$)	-	41573	56467.4	88415.9	106543	104283	111524	99700	80200	87400	91600	9200	11000	11000	121000
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	2000 U	2000 U	2000 U	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	1900	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	100 U	100 U	100 U	-
Nitrite	1000														-
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	10 U	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	2000	8800	9900	4500	11000	12000	-	-	20000 U	-	4400	4300	4200	-
Sulfide	2	-	-	-	-	-	-	-	-	-	-	100 U	100 U	100 U	-
Total Dissolved Solids	-	-	-	-	-	-	-	-	-	135000	-	10000 U	9000 J	10000 U	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	-	-	-	-	-	-	-	-	4000 U	-	5000 U	5000 U	5000 U	-

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Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	USGS	USGS	USGS	USGS	URS	EPA	EPA	EPA	USGS	USGS	EPA	EPA
	Study Area	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-UR	SHB-UR
	Sample Location:	SB-1360M	SB-1360M	SB-1360M	SB-1360M	SB-140M	SB-140M	SB-20M	SB-20M	SB-20M	SB-20M	SB-2400M	SB-2400M	SB-2860M	SB-2860M
	Field Sample ID:	ELY-QS-01	ELY-SW-01	06Ely07A FA	06Ely07A RA	06Ely08A FA	06Ely08A RA	ELY-SW-27	AA62012	AA62012	AA62303	06Ely06A FA	06Ely06A RA	AA62011	AA62302
	Date:	11/3/2004	11/3/2004	8/23/2006	8/23/2006	8/21/2006	8/21/2006	11/4/2004	6/19/2006	6/23/2006	6/23/2006	8/22/2006	8/22/2006	6/19/2006	6/23/2006
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	13670	-	-	-	-	14050	9160	-	9710	-	-	9070	9050
ORP	-	-	165.6	-	-	-	-	204.4	-	-	-	-	-	-	-
pH	-	-	6.59	-	7.9	-	8.2	8.21	8.02	-	8.04	-	8.3	7.81	7.9
Specific Conductivity	-	-	174	-	203	-	186	177	139	-	146	-	210	140	148
Temperature	-	-	5.63	-	-	-	-	1.7	18.32	-	15.81	-	-	18.09	15.68
Turbidity	-	-	1.48	-	-	-	-	0.86	0.5	-	1.02	-	-	1.16	1.32
ANALYTICAL PARAMETERS															
Acidity	-	2000 U	2000 U	-	-	-	-	2000 U	-	-	-	-	-	-	-
Alkalinity	20000	72000	72000	86020	-	79790	-	75000	56000	61000	61000	88650	-	56000	61000
Carbonate (as $CaCO_3$)	-	2000 U	2000 U	-	-	-	-	2000 U	20000 U	20000 U	20000 U	-	-	20000 U	20000 U
Chloride	230000	4000	4000	4600	-	4000	-	4600	4800	4800	4800	5000	-	4100	3900
Hardness (as $CaCO_3$)	-	77000	74000	-	-	-	-	81000	-	-	-	-	-	-	-
Hydroxide (as $CaCO_3$)	-	2000 U	2000 U	-	-	-	-	2000 U	-	-	-	-	-	-	-
Nitrate	10000	-	-	500	-	500	-	-	100 U	-	-	600	-	100 U	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	20 U	-	-	-	-	20 U	20 U
Nitrate plus Nitrite (as N)	-	44 J	69 J	30 E	-	60 U	-	63 J	-	-	-	40 E	-	-	-
Nitrite	1000	-	-	-	-	-	-	-	100 U	-	-	-	-	100 U	-
Nitrite as Nitrogen	1000	-	-	1.02 E	-	1.05 E	-	-	30 U	-	30 U	2 U	-	30 U	30 U
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	11000	12000	16000	17000	13000	13200	12000	12000	12000	12000	19000	19000	13000	13000
Sulfide	2	100 U	100 U	-	-	-	-	100 U	-	-	-	-	-	-	-
Total Dissolved Solids	-	86000	99000	-	-	-	-	97000	-	-	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	92	-	117	-	-	-	-	-	94	-	-	-
Total Suspended Solids	-	5000 UJ	5000 UJ	-	-	-	-	6700	-	-	-	-	-	-	-

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Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS
	Study Area	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR
	Sample Location:	SB-2900M	SB-2920M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M
	Field Sample ID:	ELY-SW-02	ELY-SW-03	SB-2	SB-2	SB2-0402S10RA	SB2-0402S11RA	SB2-0402S1RA	SB2-0402S2RA	SB2-0402S3RA	SB2-0402S4RA	SB2-0402S5RA	SB2-0402S6RA	SB2-0402S7RA
	Date:	11/4/2004	11/4/2004	3/28/2002	3/31/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002
Analyte	**SW Criteria**													
FIELD PARAMETERS														
Dissolved Oxygen	-	13170	13340	-	-	-	-	-	-	-	-	-	-	-
ORP	-	216.3	215.7	-	-	254	252	248	249	251	251	252	252	253
pH	-	8.07	8.02	-	-	7.73	7.73	7.72	7.73	7.74	7.75	7.75	7.75	7.74
Specific Conductivity	-	193	203	-	-	85.4	85.7	87.7	86.7	85.7	85.1	85.1	84.7	84.9
Temperature	-	2.84	3.3	-	-	2.54	2.46	4.54	4.48	4.34	3.98	3.61	3.28	3
Turbidity	-	1.2	1.7	-	-	-	-	-	-	-	-	-	-	-
ANALYTICAL PARAMETERS														
Acidity	-	2000 U	2000 U	-	-	-	-	-	-	-	-	-	-	-
Alkalinity	20000	79000	79000	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	-	2000 U	2000 U	-	-	-	-	-	-	-	-	-	-	-
Chloride	230000	4100	4600	21000	14000	3800	-	4200	-	-	3800	-	-	3800
Hardness (as $CaCO_3$)	-	84000	90000	51534.8	47364.4	39487.8	36990.8	37402.6	39899.6	39899.6	36990.8	36990.8	36990.8	36990.8
Hydroxide (as $CaCO_3$)	-	2000 U	2000 U	-	-	-	-	-	-	-	-	-	-	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	40 J	38 J	-	-	-	-	-	-	-	-	-	-	-
Nitrite	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	14000	17000	20000	21000	22000	22000	22000	22000	20000	20000	20000	21000	21000
Sulfide	2	100 U	100 U	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	-	73000	110000	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	5000 U	5000 U	-	-	-	-	-	-	-	-	-	-	-

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Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS
	Study Area	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR
	Sample Location:	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M
	Field Sample ID:	SB2-0402S8RA	SB2-0402S9RA	SB2-0403S10RA	SB2-0403S11RA	SB2-0403S12RA	SB2-0403S1RA	SB2-0403S2RA	SB2-0403S3RA	SB2-0403S4RA	SB2-0403S5RA	SB2-0403S6RA	SB2-0403S7RA	SB2-0403S8RA
	Date:	4/2/2002	4/2/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002
Analyte	**SW Criteria**													
FIELD PARAMETERS														
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ORP	-	253	253	254	254	254	256	254	252	251	252	252	253	255
pH	-	7.74	7.74	7.75	7.75	7.76	7.73	7.73	7.72	7.72	7.73	7.73	7.74	7.74
Specific Conductivity	-	84.8	85	86.2	86.1	85.6	86.6	86.6	86.9	86.6	86.6	86.5	86.5	86.3
Temperature	-	2.8	2.65	2.6	2.83	3.11	2.4	2.37	2.37	2.37	2.37	2.38	2.39	2.42
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANALYTICAL PARAMETERS														
Acidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity	20000	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	230000	-	-	-	3800	-	-	4000	-	-	4000	-	-	3900
Hardness (as $CaCO_3$)	-	36990.8	36990.8	39487.8	39487.8	39487.8	39899.6	39899.6	39487.8	39487.8	36990.8	36990.8	39487.8	39487.8
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	22000	21000	21000	20000	21000	22000	22000	23000	22000	22000	20000	22000	22000
Sulfide	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: Surface water criteria developed during Elizabeth Mine Remedial Investigation and from the Vermont Department of Environmental Conservation
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Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	USGS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	NOBIS	NOBIS	EPA
	Study Area	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR
	Sample Location:	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2960M	SB-3020M	SB-3020M	SB-3020M	SB-3020M	SB-3020M	SB-3100M
	Field Sample ID:	SB2-0403S9RA	SB-2	SB-2	SB-2	SB-2	SB-2	SB-2	SWU-12-51L	ELY-SW-04	ELY-SW-04	ELY-SW-04 DUP	SW-04X-080709AX	SW-04-111909AX	AA62010
	Date:	4/3/2002	4/10/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	9/10/2001	11/4/2004	5/2/2007	5/2/2007	8/7/2009	11/18/2009	6/19/2006
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	12850	12730	-	-	-	9100
ORP	-	254	-	-	-	-	-	-	-	218	269.6	-	-	-	-
pH	-	7.75	-	-	-	-	-	-	-	7.95	7.75	-	7.5 X	-	7.6
Specific Conductivity	-	86.5	-	-	-	-	-	-	-	203	170	-	150	-	140
Temperature	-	2.5	-	-	-	-	-	-	-	3.77	8.1	-	-	-	17.9
Turbidity	-	-	-	-	-	-	-	-	-	1.75	1.9	-	-	-	0.9
ANALYTICAL PARAMETERS															
Acidity	-	-	-	-	-	-	-	-	-	2000 U	2000 U	2000 U	4000 J	10000 U	-
Alkalinity	20000	-	-	-	-	-	-	-	-	80000	44000	44000	56000	58000	57000
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	2000 U	2000 U	2000 U	-	-	20000 U
Chloride	230000	-	10000	15000	19000	24000	14000	10000	-	4500	4000	4000	2900	2500	4200
Hardness (as $CaCO_3$)	-	39487.8	34493.8	49550.3	76666.9	105518	131474	114508	124000	89000	-	-	-	-	-
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	2000 U	2000 U	2000 U	-	-	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	100 U
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	20 U
Nitrate plus Nitrite (as N)	-	-	-	-	-	-	-	-	-	20 J	120 U	140 U	-	-	-
Nitrite	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	100 U
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	30 U
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	36	31	-
Sulfate	-	21000	5400	17000	22000	18000	30000	18000	-	18000	10000	9900	10000	12000	13000
Sulfide	2	-	-	-	-	-	-	-	-	100 U	100 U	100 U	2000 U	2000 U	-
Total Dissolved Solids	-	-	-	-	-	-	-	-	-	94000	78000	83000	88000	71000	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	-	-	-	-	-	-	-	-	5000 U	5000 U	5000 U	8000	5000 U	-

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Table 6-9
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Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	EPA	URS	USGS	USGS	EPA	EPA	URS	URS	URS	URS	URS	URS	URS	URS
	Study Area	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background
	Sample Location:	SB-3100M	SB-3125M	SB-3125M	SB-3125M	SB-3245M	SB-3245M	SB-3250M	SB-3250M	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3290M
	Field Sample ID:	AA62301	ELY-SW-05	06Ely19A FA	06Ely19A RA	AA62009	AA62299	ELY-SW-06	ELY-SW-06	SB-1	SB-1	SB-1	SB-1	SB-1	SB-1
	Date:	6/23/2006	11/4/2004	8/22/2006	8/22/2006	6/19/2006	6/23/2006	11/4/2004	5/2/2007	3/28/2002	3/31/2002	4/10/2002	5/21/2002	6/20/2002	7/24/2002
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	9470	12780	-	-	9600	9490	12790	12360	-	-	-	-	-	-
ORP	-	-	139.5	-	-	-	-	81	242.3	-	-	-	-	-	-
pH	-	7.78	7.85	-	7.8	7.6	7.64	7.71	7.41	-	-	-	-	-	-
Specific Conductivity	-	151	202	-	215	140	149	201	102	-	-	-	-	-	-
Temperature	-	15.29	3.93	-	-	17.6	14.99	4.1	8.69	-	-	-	-	-	-
Turbidity	-	1.65	1.51	-	-	3.1	1.9	1.4	2.3	-	-	-	-	-	-
ANALYTICAL PARAMETERS															
Acidity	-	-	2000 U	-	-	-	-	2000 U	2000 U	-	-	-	-	-	-
Alkalinity	20000	68000	80000	88670	-	54000	58000	78000	42000	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	-	20000 U	2000 U	-	-	20000 U	20000 U	2000 U	2000 U	-	-	-	-	-	-
Chloride	230000	4100	4400	4600	-	3800	3800	4400	3800	8600	7300	6700	8100	8400	9600
Hardness (as $CaCO_3$)	-	-	89000	-	-	-	-	90000	-	49887.6	42808.4	31585	49563.4	74682.4	106955
Hydroxide (as $CaCO_3$)	-	-	2000 U	-	-	-	-	2000 U	2000 U	-	-	-	-	-	-
Nitrate	10000	-	-	600	-	100 U	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	20 U	-	-	-	20 U	20 U	-	-	-	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	100 U	40 E	-	-	-	44 J	140	-	-	-	-	-	-
Nitrite	1000	-	-	-	-	100 U	-	-	-	-	-	-	-	-	-
Nitrite as Nitrogen	1000	30 U	-	2 U	-	30 U	30 U	-	-	-	-	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	14000	17000	20000	21000	15000	17000	18000	13000	4500	2600	2000	9200	9300	6400
Sulfide	2	-	100 U	-	-	-	-	100 U	100 U	-	-	-	-	-	-
Total Dissolved Solids	-	-	110000	-	-	-	-	100000	67000	-	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	111	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	-	5000 U	-	-	-	-	5000 U	5000 U	-	-	-	-	-	-

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Vershire, Vermont

	Sampling Company:	URS	URS	URS	NOBIS	NOBIS	URS	URS	EPA	EPA	USGS	USGS	URS	URS	URS
	Study Area	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-LR	SHB-LR	SHB-LR
	Sample Location:	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3300M	SB-3510M	SB-3670M	SB-3670M	SB-3670M	SB-3670M	SB-540M	SB-540M	SB-540M
	Field Sample ID:	SB-1	SB-1	ELY-SW-38	SW-38X-080709AX	SW-38-111909AX	SWU-12-48R	ELY-SW-07	AA62008	AA62298	06Ely05A FA	06Ely05A RA	SB-3	SB-3	SB-3
	Date:	8/20/2002	9/19/2002	5/3/2007	8/7/2009	11/19/2009	9/5/2001	11/4/2004	6/19/2006	6/23/2006	8/22/2006	8/22/2006	3/29/2002	3/31/2002	4/10/2002
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	-	12570	-	-	-	12620	9700	9490	-	-	-	-	-
ORP	-	-	-	240.2	-	-	-	141.9	-	-	-	-	-	-	-
pH	-	-	-	7.42	7.7 X	-	-	8.2	7.6	7.77	-	8.2	-	-	-
Specific Conductivity	-	-	-	120	150	-	-	198	136	147	-	212	-	-	-
Temperature	-	-	-	8.46	-	-	-	4.12	16.7	14.44	-	-	-	-	-
Turbidity	-	-	-	2.1	-	-	-	0.64	0.6	1.43	-	-	-	-	-
ANALYTICAL PARAMETERS															
Acidity	-	-	-	2000 U	7900 J	10000 U	-	2000 U	-	-	-	-	-	-	-
Alkalinity	20000	-	-	47000	65000	64000	-	88000	62000	68000	98650	-	-	-	-
Carbonate (as $CaCO_3$)	-	-	-	2000 U	-	-	-	2000 U	20000 U	20000 U	-	-	-	-	-
Chloride	230000	12000	9000	4200	2800	2500	-	4400	3600	3400	4200	-	17000	12000	8800
Hardness (as $CaCO_3$)	-	121175	87316.4	-	-	-	117000	90000	-	-	-	-	47802.4	37814.4	31337.9
Hydroxide (as $CaCO_3$)	-	-	-	2000 U	-	-	-	2000 U	-	-	-	-	-	-	-
Nitrate	10000	-	-	-	-	-	-	-	100 U	-	600	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	20 U	20 U	-	-	-	-	-
Nitrate plus Nitrite (as N)	-	-	-	160	-	-	-	25 J	-	-	40 E	-	-	-	-
Nitrite	1000	-	-	-	-	-	-	-	100 U	-	-	-	-	-	-
Nitrite as Nitrogen	1000	-	-	-	-	-	-	-	30 U	30 U	1.29 E	-	-	-	-
Nitrogen, Nitrite + Nitrate	-	-	-	-	47	33	-	-	-	-	-	-	-	-	-
Sulfate	-	15000	10000	9000	5900	6900	-	8800	7700	8000	9000	10000	14000	8400	3900
Sulfide	2	-	-	100 U	2000 U	2000 U	-	100 U	-	-	-	-	-	-	-
Total Dissolved Solids	-	-	-	86000	87000	82000	-	86000	-	-	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-	-	-	-	-	76	-	-	-	-
Total Suspended Solids	-	-	-	5000 U	2000 J	2000 J	-	5000 U	-	-	-	-	-	-	-

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Vershire, Vermont

	Sampling Company:	URS	URS	URS	URS	URS	URS	URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
	Study Area	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-Background	SHB-Background	EBT2	EBT2	EBT5	EBT5	EBT5	EBT5	EBT2
	Sample Location:	SB-540M	SB-540M	SB-540M	SB-540M	SB-540M	SBT1-57M	SBT1-6M	SW-71	SW-71	SW-72	SW-72	SW-73	SW-73	SW-75
	Field Sample ID:	SB-3	SB-3	SB-3	SB-3	SB-3	SWU-12-50L	ELY-SW-25	SW-71X-080409AX	SW-71-111709AX	SW-72X-080609AX	SW-72-111809AX	SW-73X-080409AX	SW-73-111809AX	SW-75X-080509AD
	Date:	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	9/10/2001	11/4/2004	8/4/2009	11/17/2009	8/6/2009	11/18/2009	8/4/2009	11/18/2009	8/5/2009
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	-	-	-	-	-	13040	-	-	-	-	-	-	-
ORP	-	-	-	-	-	-	-	210	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	8.14	4.4	-	6.5	-	6.7	-	2.8
Specific Conductivity	-	-	-	-	-	-	-	150	160	-	60	-	67	-	870
Temperature	-	-	-	-	-	-	-	2.94	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-
ANALYTICAL PARAMETERS															
Acidity	-	-	-	-	-	-	-	2000 U	15000	10000 U	5500	10000 U	10000 U	10000 U	150000
Alkalinity	20000	-	-	-	-	-	-	70000	5000 U	2000 J	28000	25000	9000	27000	5000 U
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	2000 U	-	-	-	-	-	-	-
Chloride	230000	13000	16000	21000	16000	9800	-	2300	240	570	210	500	220	340	300
Hardness (as $CaCO_3$)	-	46391.8	72921.4	104769	119326	108515	121000	69000	-	-	-	-	-	-	-
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	2000 U	-	-	-	-	-	-	-
Nitrate	10000	-	-	-	-	-	-	23 J	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	-	-	-	-	-	-	-	20 U	20 U	13 J	20 U	20 U	20 U	20 U
Nitrate plus Nitrite (as N)	-	-	-	-	-	-									
Nitrite	1000	-	-	-	-	-									
Nitrite as Nitrogen	1000	-	-	-	-	-									
Nitrogen, Nitrite + Nitrate	-	-	-	-	-	-									
Sulfate	-	15000	19000	16000	25000	15000	-	5200	67000	70000	5700	5900	7700	9400	280000
Sulfide	2	-	-	-	-	-	-	100 U	930 J	530 J	600 J	530 J	470 J	2000 U	2000 U
Total Dissolved Solids	-	-	-	-	-	-	-	64000	120000	110000	66000	34000	50000	33000	340000
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-	-	-	-	-	-									
Total Suspended Solids	-	-	-	-	-	-	-	5000 U	2000 J	7000	3500 J	51000	1500 J	5000 U	12000

Notes: Surface water criteria developed during Elizabeth Mine Remedial Investigation and from the Vermont Department of Environmental Conservation
Highlited cells indicate exceedance of criteria.
UJ = constituent not detected at estimated detection limit
NTU = nephelometric turbidity units
µg/L = micrograms per liter
mV = milivolts
SU = standard units
µS/cm = microsiemens per centimeter
C = degrees Celcius
U = below detection limit
J = quantitation approximate
- = Criteria not established and/or sample not analyzed for specific parameter
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc Ririver
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
	Study Area	EBT2	EBT2	EBT2	EBT4	EBT4	EBT3	EBT3	EBT3	EBT4	EBT4	EBT4	EBT4	EBT3	EBT3
	Sample Location:	SW-75	SW-75	SW-76	SW-77	SW-77	SW-78	SW-78	SW-78	SW-79	SW-79	SW-80	SW-80	SW-81	SW-81
	Field Sample ID:	SW-75X-080509AX	SW-75-111609AX	SW-76X-080509AX	SW-77X-080509AX	SW-77-111609AX	SW-78X-080509AX	SW-78X-080509AD	SW-78-111609AX	SW-79X-080609AX	SW-79-111609AX	SW-80X-080509AX	SW-80-111609AX	SW-81X-080509AX	SW-81-111709AX
	Date:	8/5/2009	11/16/2009	8/5/2009	8/5/2009	11/16/2009	8/5/2009	8/5/2009	11/16/2009	8/6/2009	11/16/2009	8/5/2009	11/16/2009	8/5/2009	11/17/2009
Analyte	**SW Criteria**														
FIELD PARAMETERS															
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ORP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	2.8	-	3.3	4.2	-	3.1	3.1	-	3.1 X	-	4.1	-	3	-
Specific Conductivity	-	440	-	520	94	-	970	970	-	660	-	260	-	860	-
Temperature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANALYTICAL PARAMETERS															
Acidity	-	160000	270000	82000	16000	17000	190000	190000	160000	120000	140000	34000	110000	200000	180000
Alkalinity	20000	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	230000	320	340	340	220	340	330	320	360	270	350	230	380	340	380
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	20 U	110	120	20 U	56	28	160	20 U	20 U	20 U	31	20 U	20 U	61
Nitrate plus Nitrite (as N)	-														
Nitrite	1000														
Nitrite as Nitrogen	1000														
Nitrogen, Nitrite + Nitrate	-														
Sulfate	-	270000	390000	250000	40000	22000	500000	480000	410000	300000	360000	130000	130000	480000	410000
Sulfide	2	2000 U	2000 U	2000 U	670 J	2000 U	870 J	570 J	2000 U	2000 U	2000 U	570 J	2000 U	2000 U	2000 U
Total Dissolved Solids	-	450000	670000	380000	86000	49000	820000	790000	680000	420000	600000	240000	190000	768000	610000
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-														
Total Suspended Solids	-	19000	5500	42000	2000 J	5000 U	19000	3000 J	29000	5000 U	2500 J	2000 J	5000 U	5000 U	2500 J

Notes: Surface water criteria developed during Elizabeth Mine Remedial Investigation and from the Vermont Department of Environmental Conservation
Highlited cells indicate exceedance of criteria.
UJ = constituent not detected at estimated detection limit
NTU = nephelometric turbidity units
µg/L = micrograms per liter
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EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc Ririver
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-9
Summary of Surface Water Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
	Study Area	EBT3	EBT3	EBT3	EBT3	EBT3	EBT1	EBT1	VP-1	VP-2,3,4	VP-2,3,5	VP-2,3,6	VP-2,3,7
	Sample Location:	SW-82	SW-82	SW-83	SW-83	SW-83	SW-84	SW-84	VP-1	VP-2	VP-3	VP-3	VP-4
	Field Sample ID:	SW-82X-080409AX	SW-82-111709AX	SW-83X-080609AX	SW-83-111809AX	SW-83-111809AD	SW-84X-080609AX	SW-84-111809AX	VP-01X-072909AX	VP-02X-072809AX	VP-03X-072809AX	VP-03X-072809AD	VP-04X-072809AX
	Date:	8/4/2009	11/17/2009	8/6/2009	11/18/2009	11/18/2009	8/6/2009	11/18/2009	7/29/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009
Analyte	**SW Criteria**												
FIELD PARAMETERS													
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-
ORP	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	3.1	-	3.1	-	-	6.4	-	6.33	6.39	7.27	7.46	6.33
Specific Conductivity	-	740	-	770	-	-	45	-	98	67	62	62	29
Temperature	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-
ANALYTICAL PARAMETERS													
Acidity	-	140000	160000	157000	170000	140000	48000	10000 U	10000 U	18000	8700 J	13000	9400 J
Alkalinity	20000	5000 U	5000 U	5000 U	5000 U	5000 U	20000	11000	9500	35000	26000	29000	5000 U
Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	230000	340	380	360	370	360	900	390	340	200	230	230	220
Hardness (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	10000	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as Nitrogen	10000	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	86
Nitrate plus Nitrite (as N)	-												
Nitrite	1000												
Nitrite as Nitrogen	1000												
Nitrogen, Nitrite + Nitrate	-												
Sulfate	-	350000	350000	390000	350000	350000	3700	6600	31000	1800	5600	5600	4300
Sulfide	2	670 J	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	-	-	-	-	-
Total Dissolved Solids	-	520000	490000	510000	520000	540000	37000	21000	-	-	-	-	-
Total Nitrogen (NH_3+NO_2+NO_3+Organic)	-												
Total Suspended Solids	-	8500	5000 U	3500 J	5000 U	5000 U	8500	2500 J	-	-	-	-	-

Notes: Surface water criteria developed during Elizabeth Mine Remedial Investigation and from the Vermont Department of Environmental Conservation
Highlited cells indicate exceedance of criteria.
UJ = constituent not detected at estimated detection limit
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- = Criteria not established and/or sample not analyzed for specific parameter
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Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS
Study Area		EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR
Station:		EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M
Field Sample ID:		EB-6	EB-6	EB6-0402S10RA	EB6-0402S11RA	EB6-0402S1RA	EB6-0402S2RA	EB6-0402S3RA	EB6-0402S4RA	EB6-0402S5RA	EB6-0402S6RA	EB6-0402S7RA	EB6-0402S8RA	EB6-0402S9RA	EB6-0403S10RA	EB6-0403S11RA	EB6-0403S12RA	EB6-0403S1RA	EB6-0403S2RA	EB6-0403S3RA	EB6-0403S4RA
Date:		3/28/2002	3/31/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	5600	4100	3900	3800	3700	3800	2400	2400	2400	2500	2500	2500	3900	3800	3900	3800	3800	3800	4000	4000
Antimony	ns	0.02 U	0.02	0.048	0.02 U	0.026	0.02 U	0.17	0.02 U	0.02 U	1.7	2.5	0.29	0.073	0.02 U	0.02 U	0.02 U	0.02 U	0.33	0.027	0.03
Arsenic	ns	0.26	0.2 U	0.65	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1.4	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Barium	ns	9.4	11	8.8	8.8	9.2	9.1	9.2	9.1	9.2	9.2	9	9.1	8.8	8.8	8.9	8.8	8.8	8.9	8.8	8.8
Beryllium	ns	0.21	0.22	0.16	0.14	0.15	0.09	0.078	0.093	0.099	0.083	0.11	0.078	0.1	0.082	0.14	0.11	0.11	0.11	0.14	0.11
Cadmium	1.1	4.7	3.2	3.2	3.3	3.3	3.2	3.1	3.2	3.1	3.3	3.2	3.2	3.2	3.3	3.4	3.4	3.3	3.3	3.5	3.4
Chromium	11	4.1	3.1	2.6	2.6	2.6	2.6	1.8	1.7	1.7	1.8	1.8	1.8	2.8	2.6	2.6	2.5	2.6	2.6	2.7	2.7
Cobalt	ns	110	77	76	75	74	73	60	60	60	61	61	63	77	76	76	75	75	76	78	80
Copper	8.6	3400	2500	2600	2600	2600	2600	2200	2200	2200	2200	2200	2200	2500	2500	2500	2500	2600	2600	2700	2600
Iron	1000	8400	5300	4200	4200	4000	3800	3100	3100	3100	3300	3300	3400	4200	4200	4200	4200	4200	4300	4800	4800
Lead	3.2	0.4	0.71	0.34	0.35	0.61	0.46	0.42	0.37	0.34	0.38	0.4	0.35	0.34	0.29	0.28	0.31	0.31	0.35	0.33	0.32
Manganese	ns	370	250	260	250	250	250	200	200	200	210	200	200	260	250	260	260	250	260	260	260
Mercury	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	ns	0.16	0.14	0.28	0.09	0.041	0.072	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.38	0.058	0.066	0.09	0.064	0.053	0.044	0.034
Nickel	52	28	19	19	18	18	18	15	15	15	15	15	15	19	19	19	18	19	19	19	19
Selenium	5	0.44	0.42	0.51	0.3	0.21	0.23	0.2 U	0.31	0.2 U	0.2 U	0.25	0.22	0.46	0.34	0.24	0.3	0.37	0.27	0.25	0.25
Silver	3.2	0.012	0.019	0.017	0.016	0.011	0.014	0.01	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.017	0.011	0.013	0.015	0.013	0.011	0.011	0.01
Sodium	ns	1100	910	1300	1300	1200	1300	830	820	820	800	830	810	1300	1200	1300	1200	1200	1200	1200	1200
Strontium	ns	41	31	32	32	31	32	31	32	31	33	32	32	32	32	33	33	32	32	32	32
Thallium	ns	0.05 U	0.05 U	0.063	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.14	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vanadium	ns	0.38	1	0.26	0.24	0.28	0.26	0.1	0.1 U	0.11	0.11	0.1	0.11	0.33	0.19	0.16	0.21	0.21	0.18	0.22	0.23
Zinc	106	440	320	330	330	320	320	290	280	280	290	290	300	330	330	330	330	330	330	340	340
Cyanide	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																					
Aluminum	87	5800	3700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	ns	0.043	0.028	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	ns	0.51	0.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	ns	40	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	ns	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	1.1	4.7	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	11	4.1	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	ns	120	76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	8.6	3400	2500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	1000	8300	3900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	3.2	0.34	0.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ns	380	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	ns	0.21	0.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	52	28	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	5	0.46	0.39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	3.2	0.014	0.011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	41	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	ns	0.05 U	0.05 U	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	ns	0.2	0.1 U	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	106	470	330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		USGS	USGS	USGS	USGS	USGS	URS	URS	URS	URS	URS	URS	URS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	URS
Study Area		EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR
Station:		EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-15M	EB-30M	EB-30M	EB-30M	EB-30M	EB-30M	EB-30M	EB-90M	EB-90M	EB-90M
Field Sample ID:		EB6-0403S5RA	EB6-0403S6RA	EB6-0403S7RA	EB6-0403S8RA	EB6-0403S9RA	EB-6	EB-6	EB-6	EB-6	EB-6	EB-6	ELY-SW-09	ELY-SW-09	ELY-SW-09 DUP	SW-09X-080709AX	SW-09-111909AX	SW-09-111809AF	SWU-09-49C	SWF-12-49L	SWU-12-49L
Date:		4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/10/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	11/3/2004	5/2/2007	5/2/2007	8/7/2009	11/19/2009	11/19/2009	5/3/2001	9/5/2001	9/5/2001
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	3800	3900	3800	3800	3800	3500	4600	5300	7900	100	42	4500	2600	2500	2270	2992	-	3590	-	5230
Antimony	ns	0.04	0.062	0.02 U	2	0.061	0.02 U	0.02 U	0.02 U	0.06 U	0.03 U	0.05 U	1 U	0.05 UJ	0.02 UJ	2 U	2 U	-	2.5 U	-	2.9 U
Arsenic	ns	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.3 U	0.6 U	1 U	0.1 J	0.5 U	1 U	1 U	-	2.6 U	-	4.6 U
Barium	ns	8.8	8.8	8.8	8.8	8.7	9.6	11	17	25	13	14	14.6	13.1	12.2	16.6	13.1 J	-	12.7 J	-	28.4 J
Beryllium	ns	0.12	0.14	0.11	0.12	0.15	0.13	0.26	0.31	0.5	0.05 U	0.05 U	0.21 J	0.13 J	0.14 J	5 U	5 U	-	0.3 U	-	0.1 U
Cadmium	1.1	4.4	3.4	3.3	3.3	3.3	2.9	2.8	3.3	4.3	0.1	0.5	1.6	1.2	1.2	1.1 J	1.1 J	-	2.4 J	-	2.5 J
Chromium	11	2.6	2.6	2.7	2.6	2.6	2.2	1.4	1.5	5	1 U	1 U	2.2	1	1	0.51 J	1.2 J	-	1.4 J	-	3.8 J
Cobalt	ns	77	77	77	75	76	70	68	86	170	4.2	1.6	46.3	34.6	33.2	32.7 J	33.8 J	-	63.2	-	120
Copper	8.6	2600	2600	2600	2500	2500	2000	1900	1900	1900	44	22	1262	1260	1270	1040	1067	-	1960	-	1980
Iron	1000	4400	4300	4300	4200	4200	3800	3200	3400	5500	1000	110	4700	1800	1700	2890	3527	-	3780	-	7170
Lead	3.2	0.3	0.29	0.29	0.33	0.28	0.23	0.3	0.66	0.9	0.1	0.1	0.44 J	0.37 J	0.36 J	0.36 J	0.33 J	-	2.8 U	-	1.8 U
Manganese	ns	260	260	250	250	250	240	310	460	1200	26	14	414.4	206.9	204.1	267	285 J	-	319	-	539
Mercury	0.012	-	-	-	-	-	-	-	-	-	-	-	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	-	0.1 U	-	0.1 U
Molybdenum	ns	0.042	0.055	0.047	0.053	0.054	0.094	0.042	0.025	0.1	0.08	0.2	5 U	0.5 U	0.1 UJ	10 U	10 U	-	-	-	-
Nickel	52	19	19	19	19	19	17	18	24	37	0.9	1	15.5	10.6	10.5	11.8 J	11.2 J	-	17.1 J	-	26.6 J
Selenium	5	0.23	0.2 U	0.3	0.23	0.2 U	0.32	0.2 U	0.2 U	0.2 U	0.8	0.5	0.7 J	0.6 J	0.6 J	5 U	0.56 J	-	2 U	-	3.7 J
Silver	3.2	0.012	0.011	0.01	0.01	0.011	0.02	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.1 U	0.03 J	0.03 J	0.5 U	0.5 UJ	-	0.5 U	-	0.39 J
Sodium	ns	1300	1300	1300	1200	1300	1100	1300	2000	3500	11000	7600	2140	1700 J	2000	1910 J	1579 J	-	1410 J	-	3420 J
Strontium	ns	33	33	32	32	33	35	43	67	93	120	120	66	43	43	52.9	53.9	-	-	-	-
Thallium	ns	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05	0.06	0.05 U	0.05 U	0.05 J	0.05 J	0.05 UJ	1 U	1 U	-	3.4 U	-	5.1 U
Vanadium	ns	0.17	0.22	0.2	0.19	0.17	0.17	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.19 J	0.14 J	0.14 J	0.26 J	0.35 J	-	1 U	-	1.8 J
Zinc	106	340	330	330	330	330	290	320	410	600	22	10	265.6	168.3	174	184	178	-	285	-	391
Cyanide	ns	-	-	-	-	-	-	-	-	-	-	-	5 U	5 U	5 U	10 U	10 UJ	-	-	-	-
Dissolved Metals																					
Aluminum	87	-	-	-	-	-	3500	4500	5200	7700	18	11	4300	2500	2500	2260	-	2858	-	2680	-
Antimony	ns	-	-	-	-	-	0.023	0.02 U	0.02 U	0.1	0.13	0.05 U	1 U	0.05 J	0.02 UJ	2 U	-	2 U	-	2.9 U	-
Arsenic	ns	-	-	-	-	-	0.2 U	0.2 U	0.2 U	0.3 U	0.3 U	0.6 U	0.11 UJ	0.08 J	0.5 U	1 U	-	1 U	-	4.6 U	-
Barium	ns	-	-	-	-	-	16	17	29	24	12	13	14.6	12.7	12.6	16.4	-	13.1	-	22.6	-
Beryllium	ns	-	-	-	-	-	0.12	0.19	0.25	0.5	0.05 U	0.05 U	0.21 J	0.11 J	0.11 J	5 U	-	5 U	-	0.1 U	-
Cadmium	1.1	-	-	-	-	-	2.9	2.8	3.3	4.2	0.08	0.08	1.7	1.2	1.2	1.2	-	1.1	-	2.5 J	-
Chromium	11	-	-	-	-	-	2.2	1.4	1.4	5	1 U	1 U	2.1	1	0.9	10 U	-	1.2 J	-	1 J	-
Cobalt	ns	-	-	-	-	-	72	70	86	170	3.7	1.7	46.8	36.9	32.7	34 J	-	34.8 J	-	118	-
Copper	8.6	-	-	-	-	-	2000	1900	1900	1900	10	15	1271	1240	1270	1030	-	1036	-	1810	-
Iron	1000	-	-	-	-	-	3700	3100	3300	5400	63	42	4000	1700	1700	2670	-	2514	-	1040	-
Lead	3.2	-	-	-	-	-	0.21	0.28	0.66	0.88	0.05 U	0.05 U	0.43 UJ	0.32 J	0.37 J	1 U	-	0.21 J	-	1.8 U	-
Manganese	ns	-	-	-	-	-	250	320	460	1100	23	14	415.2	216.8	201	280 J	-	278	-	520	-
Mercury	0.012	-	-	-	-	-	-	-	-	-	-	-	0.2 U	0.2 U	0.2 U	0.1 U	-	0.1 U	-	0.1 U	-
Molybdenum	ns	-	-	-	-	-	0.14	0.042	0.035	0.1	0.07	0.2	5 U	0.16 J	0.04 UJ	10 U	-	10 U	-	-	-
Nickel	52	-	-	-	-	-	17	18	23	36	0.8	0.6	15.5	11.4	10.1	12.3 J	-	11.2 J	-	25.4 J	-
Selenium	5	-	-	-	-	-	0.2 U	0.2 U	0.2 U	0.2 U	0.8	0.6	0.6 J	0.7 J	1 U	5 U	-	5 U	-	3.4 U	-
Silver	3.2	-	-	-	-	-	0.01	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.1 U	0.5 U	0.5 U	0.5 U	-	0.5 U	-	0.4 J	-
Strontium	ns	-	-	-	-	-	35	43	66	91	120	120	70	40	40	54.7	-	53.6	-	-	-
Thallium	ns	-	-	-	-	-	0.05 U	0.05 U	0.05	0.06	0.05 U	0.05 U	0.05 J	0.04 J	0.04 UJ	1 U	-	1 U	-	5.1 U	-
Vanadium	ns	-	-	-	-	-	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.11 J	0.11 J	0.5 U	5 U	-	0.4 J	-	0.7 U	-
Zinc	106	-	-	-	-	-	300	330	400	590	20	10	269.7	172.2	166.3	191	-	180	-	391	-

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	EPA	EPA	USGS	USGS	EPA	EPA	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR
Station:		EB-90M	EB-90M	EB-90M	EB-90M	EB-90M	EB-90M	EB-90M	EB-90M	EB-210M	EB-325M	EB-405M	EB-405M	EB-440M	EB-440M	EB-465M	EB-465M	EB-465M	EB-465M	EB-465M	EB-465M
Field Sample ID:		MA1NM6	MA1NM7	AA62007	AA62305	06Ely04A FA	06Ely04A RA	MA1PY8	MA1PY9	ELY-SW-10	ELY-SW-39	ELY-SW-33	ELY-SW-33	SWU-09-59C	ELY-SW-11	EB-5	EB-5	EB-5	EB-5	EB-5	EB-5
Date:		10/5/2005	10/5/2005	6/19/2006	6/23/2006	8/23/2006	8/23/2006	4/11/2007	4/11/2007	11/3/2004	5/2/2007	11/3/2004	5/2/2007	5/3/2001	11/3/2004	4/2/2002	4/11/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	-	10300 J	3500	2900	-	3890	-	3570	4700	2700	5000	2800	4420	5300	3000	3300	5300	6400	11000	28000
Antimony	ns	-	60 U	0.5 U	0.5 U	-	0.3 U	-	60 U	1 U	0.03 UJ	1 U	0.02 UJ	2.5 U	1 U	0.02 U	0.02 U	0.02 U	0.05	0.06 U	0.04 U
Arsenic	ns	-	6.7 UJ	1 U	1 U	-	1 U	-	10 U	0.12 UJ	0.5 U	1 U	0.09 J	2.6 U	0.14 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U
Barium	ns	-	18.1	14	15	-	18.9	-	12.3	14.3	13.1	13.1	12.4	12.9 J	13.3	7.8	8.4	9.9	14	18	18
Beryllium	ns	-	0.48	0.23	0.22	-	0.3	-	0.15 UJ	0.22 J	0.16 J	0.24 J	0.15 J	0.3 U	0.24 J	0.14	0.16	0.24	0.35	0.7	1.8
Cadmium	1.1	-	3.1	1.5	1.7	-	1.93	-	0.71 J	1.7	1.4	1.8	1.3	3 J	1.9	3.1	3.4	3	3.6	5.8	15
Chromium	11	-	7.6	2.4 B	2.8 B	-	2.2	-	3.3	2.6	1.4	2.7	1.4	2.3 J	3	2.9	3	2	2.4	9	32
Cobalt	ns	-	118	45	50	-	64.4	-	38.8	48	37.9	52.1	38.1	74.9	54.1	82	94	76	91	240	580
Copper	8.6	-	2230	1500	1600	-	1560	-	1500	1300	1410	1271	1400	2380	1313	2600	2300	2100	2000	2400	5100
Iron	1000	-	13000	2600 J2	3100 BJ2	-	5950	-	7980	7600	2400	6700	2100	4710	7900	5800	6300	4400	6300	14000	71000
Lead	3.2	-	. R	0.63	0.62	-	0.87	-	10 U	0.51 J	0.5	0.32 J	0.38 J	2.8 U	0.4 J	0.25	0.2	0.21	0.41	0.5	1.5
Manganese	ns	-	1110	280	350	-	528	-	246	431.8	234.1	478.1	241.4	388	501.4	270	330	350	500	1500	3100
Mercury	0.012	-	0.054 UJ	-	-	-	-	-	0.099 J	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	0.2 U	-	-	-	-	-	-
Molybdenum	ns	-	-	0.5 U	0.5 U	-	2 U	-	-	5 U	0.19 UJ	5 U	0.13 UJ	-	5 U	0.025	0.02 U	0.044	0.035	0.1	0.2
Nickel	52	-	33.2	14	15	-	19.5	-	12	16	11.9	17.6	12.2	20.7 J	18.2	20	23	21	25	51	130
Selenium	5	-	35 UJ	1 U	1 U	-	1 U	-	35 U	0.6 J	0.8 J	0.8 J	0.7 J	2 U	1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.8
Silver	3.2	-	10 UJ	0.2 U	0.2 U	-	3 U	-	10 U	0.03 J	0.06 J	0.03 UJ	0.03 J	0.5 U	0.05 UJ	0.014	0.011	0.01 U	0.01 U	0.01 U	0.02
Sodium	ns	-	3150	-	-	-	1870	-	-	1940	1400 J	1960	1400 J	1550 J	2060	680	800	1100	1500	2600	5800
Strontium	ns	-	-	-	-	-	65.7	-	-	63	38	66	38	-	67	31	36	38	59	82	170
Thallium	ns	-	25 U	0.5 U	0.5 U	-	0.1 U	-	25 U	0.04 J	0.06 UJ	0.05 J	0.05 UJ	3.4 U	0.05 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05	0.1
Vanadium	ns	-	50 U	0.2 U	0.2 U	-	0.5 U	-	2.6	0.35 J	0.5	0.24 J	0.26 J	1 U	0.38 J	0.35	0.13	0.1 U	0.1 U	0.4	2
Zinc	106	-	581	190	210	-	342	-	181	273.6	179.4 J	314.8	183.7 J	356	320.5	370	390	350	460	840	2300
Cyanide	ns	-	-	-	-	-	-	-	-	5 U	5 U	2 J	5 U		5 U						
Dissolved Metals																					
Aluminum	87	10200 J	-	3100	-	4190	-	3030	-	4600	2600	4700	2700	-	5000	3500	3600	5100	5900	11000	28000
Antimony	ns	60 U	-	2.5 U	-	0.3 U	-	60 U	-	1 U	0.03 UJ	1 U	0.02 UJ	-	1 U	0.28	0.12	0.02 U	0.02 U	0.1	0.04 U
Arsenic	ns	10 UJ	-	2.5 U	-	1 U	-	10 U	-	0.12 UJ	0.5 U	1 U	0.5 U	-	0.13 UJ	1.9	0.43	0.2 U	0.2 U	0.3 U	0.2 U
Barium	ns	18	-	15	-	19	-	7.8	-	14.7	12.9	13.2	11.9	-	13.4	20	22	21	26	18	18
Beryllium	ns	0.49	-	1 U	-	0.3	-	0.091 UJ	-	0.22 J	0.11 J	0.21 J	0.11 J	-	0.26 J	0.18	0.2	0.24	0.34	0.6	1.8
Cadmium	1.1	3.2	-	1.6	-	1.99	-	0.89 J	-	1.8	1.3	1.9	1.4	-	2	3.1	3.3	3.1	3.5	5.7	14
Chromium	11	7.4	-	2.5 U	-	2.1	-	1.2	-	2.4	1	2.6	1.1	-	3	2.9	2.9	2	2.2	9	32
Cobalt	ns	119	-	45	-	63	-	39	-	50.2	36.1	51.8	36.8	-	55.8	84	88	77	91	230	580
Copper	8.6	2240	-	1500	-	1560	-	1460	-	1360	1330	1284	1370	-	1359	2600	2200	2100	2000	2300	5100
Iron	1000	13000	-	2100	-	5920	-	2180	-	4600	1700	5800	1800	-	6800	5500	5800	4300	6200	13000	70000
Lead	3.2	. R	-	1 U	-	0.95	-	10 U	-	0.42 UJ	0.36 J	0.28 UJ	0.34 J	-	0.33 UJ	0.18	0.19	0.22	0.34	0.5	1.4
Manganese	ns	1120	-	290	-	521	-	238	-	451.5	222.5	479.4	227.8	-	520.8	290	310	350	500	1400	3000
Mercury	0.012	0.2 UJ	-	-	-	0.02 U	-	0.16	-	0.2 U	0.2 U	0.2 U	0.2 U	-	0.2 U	-	-	-	-	-	-
Molybdenum	ns	-	-	2.5 U	-	2 U	-	-	-	5 U	0.08 UJ	5 U	0.5 U	-	5 U	1.8	0.59	0.04	0.029	0.1	0.2
Nickel	52	33.8	-	14	-	19.5	-	11.5	-	16.8	11.3	17.6	11.4	-	18.9	20	22	21	25	49	140
Selenium	5	35 U	-	5 U	-	1 U	-	35 U	-	0.7 J	0.5 J	0.6 J	0.4 J	-	1	0.6	0.23	0.2 U	0.2 U	0.2 U	0.9
Silver	3.2	10 UJ	-	1 U	-	3 U	-	10 U	-	0.1 U	0.5 U	0.1 U	0.5 U	-	0.1 U	0.15	0.051	0.01 U	0.01 U	0.01 U	0.02
Strontium	ns	-	-	-	-	64	-	-	-	60	40	70	40	-	70	32	37	39	59	80	170
Thallium	ns	25 U	-	2.5 U	-	0.1 U	-	25 U	-	0.04 UJ	0.05 UJ	0.04 UJ	0.04 UJ	-	0.05 UJ	0.11	0.05 U	0.05 U	0.05 U	0.05	0.1
Vanadium	ns	50 U	-	1 U	-	0.5 U	-	50 U	-	0.09 J	0.08 J	0.09 J	0.09 J	-	0.14 J	0.11	0.1 U	0.1 U	0.1 U	0.5	3
Zinc	106	583	-	220	-	373	-	177	-	286.1	182.5	305.7	188.4	-	329.9	370	400	370	450	810	2300

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	NOBIS	USGS	USGS	URS	USGS	USGS	URS	NOBIS
Study Area		EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR
Station:		EB-465M	EB-515M	EB-515M	EB-530M	EB-530M	EB-530M	EB-530M	EB-530M	EB-560M	EB-560M	EB-560M	EB-560M	EB-560M	EB-600M	EB-600M	EB-610M	EB-770M	EB-770M	EB-770M	EB-770M
Field Sample ID:		EB-5	MA1NM2	MA1NM3	ELY-SW-12	ELY-SW-12	SW-12X-080609AX	SW-12-111809AX	SW-12-111809AF	ELY-SW-13	ELY-SW-13	SW-13X-080609AX	SW-13-111809AX	SW-13-111809AF	06Ely03AFA	06Ely03ARA	SWU-09-57C	06Ely02AFA	06Ely02ARA	ELY-SW-40	SW-40X-080409AX
Date:		9/19/2002	10/5/2005	10/5/2005	11/1/2004	5/2/2007	8/6/2009	11/18/2009	11/18/2009	11/1/2004	5/2/2007	8/6/2009	11/18/2009	11/18/2009	8/23/2006	8/23/2006	5/3/2001	8/23/2006	8/23/2006	5/2/2007	8/4/2009
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	34000	-	9960 J	4400	4200	2670	2774	-	180	360	276 U	349 U	-	484	-	17900	-	1320	530	481
Antimony	ns	0.04 U	-	60 U	1 U	0.12 UJ	2 U	2 U	-	1 U	0.02 UJ	2 U	2 U	-	0.3 U	-	2.5 U	-	0.34	0.02 UJ	2 U
Arsenic	ns	0.2 U	-	10 UJ	1 U	0.13 J	1 U	1 U	-	0.12 UJ	0.5 U	1 U	1 U	-	1 U	-	2.6 J	-	1 U	0.09 J	1 U
Barium	ns	13	-	6.4	13.2	13.1	13.7	11.8 J	-	15.9	12.7	15.7	12.9 J	-	17.4	-	7.3 J	-	20.1	13.1	16.3 J
Beryllium	ns	1.3	-	0.3 J	0.24 J	0.17 J	5 U	5 U	-	1 U	0.03 J	5 U	5 U	-	0.05	-	0.53 J	-	0.1	0.04 J	5 U
Cadmium	1.1	13	-	2 UJ	1.5	1.3	1.2 J	1	-	0.44 J	0.18 J	0.17 J	0.25 J	-	0.51	-	8.5	-	0.94	0.26 J	0.26 J
Chromium	11	30	-	12.2 J	2.3	2.6	0.85 J	1 J	-	0.13 J	0.17 UJ	10 U	10 U	-	1 U	-	6.6 J	-	1 U	0.11 J	10 U
Cobalt	ns	630	-	87	42.1	36.9	32.2 J	30 J	-	10	5.3	4.3 J	5.7 J	-	12.9	-	225	-	32.2	7.7	7 J
Copper	8.6	6400	-	1220	993.4	1370	1120	1007	-	208.9	202	178	202	-	385	-	8070	-	1040	309	308
Iron	1000	48000	-	55800	4800	3100	2250	2595	-	22 J	33 J	100 U	100 U	-	50 U	-	6660	-	54	35 J	30.8 J
Lead	3.2	1.1	-	. R	0.32 J	0.9	0.23 J	0.2 J	-	0.05 J	0.04 UJ	1 U	1 U	-	0.07	-	2.8 U	-	0.2	0.05 J	1 U
Manganese	ns	3100	-	1170	523.9	251.2	276	284 J	-	79.1	38.9	36.8	47.2 J	-	93.9	-	1470	-	224	53.5	59.6 J
Mercury	0.012	-	-	0.2 UJ	0.2 U	0.2 U	0.1 U	0.1 U	-	0.2 U	0.2 U	0.1 U	0.1 U	-	-	-	0.1 U	-	-	0.2 U	0.1 U
Molybdenum	ns	0.06	-	-	5 U	0.21 UJ	10 U	10 U	-	5 U	0.08 UJ	10 U	10 U	-	2 U	-	-	-	2 U	0.5 U	10 U
Nickel	52	140	-	20.2	15.9	12.7	12.7 J	10.9 J	-	5.6	2.8	40 U	3.4 J	-	6.2	-	71.1	-	12.2	3.5	3.7 J
Selenium	5	0.2 U	-	35 U	0.7 J	0.9 J	5 U	5 U	-	0.5 J	1 U	5 U	5 U	-	1 U	-	2 U	-	1 U	1 U	5 UJ
Silver	3.2	0.01 U	-	10 UJ	0.1 U	0.11 J	0.5 U	0.5 UJ	-	0.1 U	0.5 U	0.5 U	0.5 UJ	-	3 U	-	0.5 U	-	3 U	0.5 U	0.5 UJ
Sodium	ns	6900	-	3260 J	2050	1300 J	1470 J	1464 J	-	1360	630 J	1070 J	1004 J	-	1150	-	2660 J	-	1310	830 J	1020 J
Strontium	ns	170	-	-	68	39	48.9	50.5	-	51	31	40.1	39.7	-	51.9	-	-	-	61.6	33	39
Thallium	ns	0.1	-	25 U	0.04 J	0.04 UJ	1 U	1 U	-	1 U	0.5 U	1 U	1 U	-	0.1 U	-	3.4 U	-	0.1 U	0.5 U	1 U
Vanadium	ns	2	-	2.6 UJ	0.14 J	1.3	0.39 J	0.55 J	-	0.14 J	0.12 J	5 UJ	5 UJ	-	0.5 U	-	1 U	-	0.5 U	0.11 J	5 U
Zinc	106	2100	-	650	261.3	255.8 J	185	168	-	46.2	23.9 J	25.4 J	29.9 J	-	54.9	-	1060	-	109	33.1 J	37.9 J
Cyanide	ns				5 U	5 U	10 U	10 UJ	-	5 U	5 U	10 U	10 UJ	-	-	-	-	-	-	5 U	10 U
Dissolved Metals																					
Aluminum	87	34000	10100 J	-	4200	2600	2020	-	2338	48 J	63 J	200 U	-	60.7 J	-	20.7	-	25.1	-	49 J	98.6 J
Antimony	ns	0.04 U	60 U	-	1 U	0.02 UJ	2 U	-	2 U	1 U	0.02 UJ	2 U	-	2 U	-	0.3 U	-	0.3 U	-	0.5 U	2 U
Arsenic	ns	0.2 U	10 UJ	-	0.09 UJ	0.5 U	1 U	-	1 U	1 U	0.5 U	1 U	-	1 U	-	1 U	-	1 U	-	0.5 U	1 U
Barium	ns	13	6.4	-	13.4	11.5	13.9	-	11.9	15.5	12.9	15.6	-	13.1	-	17	-	19.9	-	13.5	16.9 J
Beryllium	ns	1.3	0.34 J	-	0.26 J	0.1 J	5 U	-	5 U	1 U	0.5 U	5 U	-	0.26 J	-	0.05 U	-	0.06	-	0.5 U	5 U
Cadmium	1.1	13	2 UJ	-	1.5	1.2	1.2	-	1	0.45 J	0.21 J	1 U	-	0.19 J	-	0.48	-	0.95	-	0.21 J	0.26 J
Chromium	11	31	12.3 J	-	2.2	0.9	10 U	-	0.48 J	0.11 J	0.13 J	10 U	-	10 U	-	1 U	-	1 U	-	0.11 J	10 U
Cobalt	ns	630	89.6	-	42.6	32.2	33.8 J	-	30 J	10	5.1	50 U	-	5.9 J	-	12.5	-	31.1	-	7.3	50 U
Copper	8.6	6500	1270	-	991.4	1270	1110	-	1025	176.7	107	99	-	137	-	211	-	837	-	218	209
Iron	1000	48000	55600	-	4300	1700	1610	-	1667	50 U	50 U	100 U	-	100 U	-	50 U	-	50 U	-	50	100 U
Lead	3.2	1.1	. R	-	0.33 J	0.33 J	1 U	-	0.14 J	1 U	0.5 U	1 U	-	1 U	-	0.06	-	0.1	-	0.5 U	1 U
Manganese	ns	3100	1170	-	527.7	223	278 J	-	272	78.1	37.5	36.8 J	-	46.6	-	92.8	-	217	-	54.9	60.4 J
Mercury	0.012	-	0.2 UJ	-	0.2 U	0.2 U	0.1 U	-	0.1 U	0.2 U	0.2 U	0.1 U	-	0.1 U	0.02 U	-	-	0.02 U	-	0.2 U	0.1 U
Molybdenum	ns	0.07	-	-	5 U	0.5 U	10 U	-	10 U	5 U	0.5 U	10 U	-	10 U	-	2 U	-	2 U	-	0.5 U	10 U
Nickel	52	140	20.6	-	16.1	10.7	12.9 J	-	10.7 J	5.6	2.7	3.2 J	-	3.4 J	-	6.4	-	12.1	-	3.2	4 J
Selenium	5	0.2 U	35 U	-	0.6 J	0.4 J	5 U	-	5 U	0.2 J	1 U	5 U	-	5 U	-	1 U	-	1 U	-	1 U	5 UJ
Silver	3.2	0.01 U	10 UJ	-	0.1 U	0.5 U	0.5 U	-	0.5 U	0.1 U	0.5 U	0.5 U	-	0.5 U	-	3 U	-	3 U	-	0.5 U	0.5 UJ
Strontium	ns	170	-	-	70	40	49.6	-	47	50	30	42.3	-	39.9	-	52.6	-	62.3	-	30	40.4
Thallium	ns	0.1	25 U	-	0.04 UJ	0.03 UJ	1 U	-	1 U	1 U	0.5 U	1 U	-	1 U	-	0.1 U	-	0.1 U	-	0.5 U	1 U
Vanadium	ns	3	1.8 UJ	-	0.1 J	0.06 J	5 U	-	0.31 J	0.09 J	0.06 J	5 U	-	5 U	-	0.5 U	-	0.5 U	-	0.1 J	0.27 J
Zinc	106	2100	652	-	269.2	532.2	196	-	162	47.1	26.7	23.6 J	-	30 J	-	64.2	-	114	-	35.8	36.8 J

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	URS	URS	USGS	USGS	URS	URS	URS	URS	NOBIS
Study Area		EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-UR	EB-Background	EB-LR	EB-LR	EB-LR	EB-LR
Station:		EB-770M	EB-770M	EB-815M	EB-815M	EB-815M	EB-815M	EB-815M	EB-1030M	EB-1080M	EB-1080M	EB-1080M	EB-1080M	EB-1080M	EB-1080M	EB-1080M	EB-1430M	EB-30M	EB-30M	EB-30M	EB-30M
Field Sample ID:		SW-40-111709AX	SW-40-111709AF	ELY-SW-17	ELY-SW-17	SW-17X-080409AX	SW-17-111709AX	SW-17-111709AF	ELY-SW-18	EB-1	EB-1	EB-1	EB-1	EB-1	06Ely01AFA	06Ely01ARA	ELY-SW-20	ELY-SW-09	ELY-SW-09	ELY-SW-09 DUP	SW-09X-080709AX
Date:		11/17/2009	11/17/2009	11/2/2004	5/2/2007	8/4/2009	11/17/2009	11/17/2009	11/2/2004	4/2/2002	4/11/2002	5/21/2002	6/20/2002	7/24/2002	8/23/2006	8/23/2006	11/3/2004	11/3/2004	5/2/2007	5/2/2007	8/7/2009
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	544	-	180	41 J	200 U	200 U	-	54 J	16	98	13	9.6	120	-	33.9	240	4500	2600	2500	2270
Antimony	ns	2 U	-	1 U	0.02 UJ	2 U	2 U	-	1 U	0.033	0.034	0.02 U	0.02 U	0.25	-	0.3 U	1 U	1 U	0.05 UJ	0.02 UJ	2 U
Arsenic	ns	1 U	-	0.16 UJ	0.5 U	1 U	1 UJ	-	0.12 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	-	1 U	0.32 UJ	1 U	0.1 J	0.5 U	1 U
Barium	ns	13.4 J	-	15.6	11.5	14.3 J	11.1	-	14.7	8.6	9.4	10	16	25	-	20.3	37.3	14.6	13.1	12.2	16.6
Beryllium	ns	5 U	-	1 U	0.5 U	5 U	5 U	-	1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	1 U	0.21 J	0.13 J	0.14 J	5 U
Cadmium	1.1	0.28 J	-	1 U	0.02 J	0.5 UJ	0.5 UJ	-	1 U	0.02 U	0.083	0.02 U	0.02 U	0.05	-	0.02 U	1 U	1.6	1.2	1.2	1.1 J
Chromium	11	10 U	-	0.46 J	0.1 J	10 U	10 U	-	0.11 J	1 U	1 U	1 U	1 U	1 U	-	1 U	0.62 J	2.2	1	1	0.51 J
Cobalt	ns	7.6 J	-	0.3 UJ	0.16 J	50 UJ	50 U	-	0.04 UJ	0.048	1.7	0.02 U	0.02 U	0.3	-	0.16	3	46.3	34.6	33.2	32.7 J
Copper	8.6	318	-	7.6 U	6.3 J	6.9	5.1	-	1.9 U	2	65	1.2	2.1	4	-	1.7	1.2	1262	1260	1270	1040
Iron	1000	100 U	-	120	33 J	100 UJ	100 U	-	50 U	8.9	58	14	17	100	-	86	2000	4700	1800	1700	2890
Lead	3.2	1 U	-	0.24 J	0.03 J	1 U	1 UJ	-	1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.1	-	0.05 U	0.36 J	0.44 J	0.37 J	0.36 J	0.36 J
Manganese	ns	68.1 J	-	12.8	2.8	3.9 J	2.4 J	-	2.8	1.4	8	2.3	4.1	65	-	169	1162	414.4	206.9	204.1	267
Mercury	0.012	0.1 U	-	0.2 U	0.2 U	0.1 U	0.1 U	-	0.2 U	-	-	-	-	-	-	-	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U
Molybdenum	ns	10 U	-	5 U	0.5 U	10 U	10 U	-	5 U	0.02 U	0.02 U	0.074	0.045	0.41	-	2 U	0.12 UJ	5 U	0.5 U	0.1 UJ	10 U
Nickel	52	3.9 J	-	0.77 J	0.49 J	0.92 J	-	-	0.26 J	0.11	0.52	0.1 U	0.11	0.8	-	0.5	2.3	15.5	10.6	10.5	11.8 J
Selenium	5	5 U	-	1 U	1 U	5 UJ	5 U	-	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	-	1 U	1 U	0.7 J	0.6 J	0.6 J	5 U
Silver	3.2	0.5 UJ	-	0.1 U	0.5 U	0.5 UJ	0.5 U	-	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	3 U	0.1 U	0.1 U	0.03 J	0.03 J	0.5 U
Sodium	ns	1054 J	-	1060	2000 U	891 J	533 J	-	1070	390	430	710	900	1000	-	980	989 J	-	-	-	-
Strontium	ns	41.6	-	37	26	32.6	31.5	-	42	18	20	21	35	46	-	50.9	36	66	43	43	52.9
Thallium	ns	1 U	-	1 U	0.5 U	1 U	1 U	-	1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.1 U	0.05 J	0.05 J	0.05 J	0.05 UJ	1 U
Vanadium	ns	0.43 J	-	0.34 J	0.13 J	0.34 J	0.43 J	-	0.15 J	0.1 U	0.1 U	0.1 U	0.16	0.5	-	0.5 U	1	0.19 J	0.14 J	0.14 J	0.26 J
Zinc	106	37.5 J	-	26.2	4.86 J	9.3 J	2.7 J	-	2.17 J	0.79	10	0.95	1.8	3	-	16.4	3.35 J	265.6	168.3	174	184
Cyanide	ns	10 UJ	-	2.8 J	5 U	10 U	10 UJ	-	5 U	-	-	-	-	-	-	-	3.7 J	5 U	5 U	5 U	10 U
Dissolved Metals																					
Aluminum	87	-	78.5 J	35 J	32 J	52.3 J	-	200 U	28 J	13	10	8.8	6.7	3.3	3.4	-	24 UJ	4300	2500	2500	2260
Antimony	ns	-	2 U	1 U	0.02 UJ	2 U	-	2 U	1 U	0.045	0.036	0.02 U	0.02 U	0.32	0.3 U	-	1 U	1 U	0.05 J	0.02 UJ	2 U
Arsenic	ns	-	1 U	0.13 UJ	0.5 U	1 U	-	1 U	0.13 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.4	1 U	-	0.16 J	0.11 UJ	0.08 J	0.5 U	1 U
Barium	ns	-	13.9	15.2	11.8	14.1 J	-	11.1	14.8	17	21	19	30	23	18.4	-	18	14.6	12.7	12.6	16.4
Beryllium	ns	-	5 U	1 U	0.5 U	5 U	-	5 U	1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	1 U	0.21 J	0.11 J	0.11 J	5 U
Cadmium	1.1	-	0.22 J	1 U	0.5 U	0.5 UJ	-	0.5 U	1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	1 U	1.7	1.2	1.2	1.2
Chromium	11	-	10 U	0.14 J	0.18 J	10 U	-	10 U	0.13 J	1 U	1 U	1 U	1 U	1 U	1 U	-	0.16 J	2.1	1	0.9	10 U
Cobalt	ns	-	8.1 J	0.06 UJ	0.13 J	50 U	-	50 U	0.04 UJ	0.044	0.02 U	0.02 U	0.02 U	0.02 U	0.08	-	0.14 J	46.8	36.9	32.7	34 J
Copper	8.6	-	225	5.5 U	6.9 J	6.1	-	5	1.9 U	1.9	1.5	1.2	1.9	2	1.3	-	0.4 J	1271	1240	1270	1030
Iron	1000	-	100 U	50 U	21 J	100 U	-	100 U	50 U	6.4	4	8.9	21	16	50 U	-	30 J	4000	1700	1700	2670
Lead	3.2	-	1 U	1 U	0.5 U	1 U	-	1 U	0.05 J	0.05 U	0.05 U	0.05 U	0.09	0.05 U	0.05 U	-	0.05 J	0.43 UJ	0.32 J	0.37 J	1 U
Manganese	ns	-	64	1.7	2.4	3.4 J	-	1.9 J	2.1	0.65	0.54	0.8	1.8	0.91	124	-	88.8	415.2	216.8	201	280 J
Mercury	0.012	-	0.1 U	0.2 U	0.2 U	0.1 U	-	0.036 J	0.2 U	-	-	-	-	-	0.005 U	-	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U
Molybdenum	ns	-	10 U	5 U	0.5 U	10 U	-	10 U	5 U	0.025	0.028	0.072	0.053	0.51	2 U	-	5 U	5 U	0.16 J	0.04 UJ	10 U
Nickel	52	-	4 J	0.52 J	0.42 J	40 U	-	0.99 J	0.37 J	0.12	0.1 U	0.1 U	0.1	0.4	0.5	-	0.67 J	15.5	11.4	10.1	12.3 J
Selenium	5	-	5 U	1 U	1 U	5 UJ	-	5 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	-	1 U	0.6 J	0.7 J	1 U	5 U
Silver	3.2	-	0.5 U	0.1 U	0.5 U	0.5 UJ	-	0.5 U	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01	3 U	-	0.03 J	0.1 U	0.5 U	0.5 U	0.5 U
Strontium	ns	-	40.6	30	30	34.1	-	31.9	40	18	20	22	35	45	47.6	-	30	70	40	40	54.7
Thallium	ns	-	1 U	1 U	0.5 U	1 U	-	1 U	1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.1 U	-	1 U	0.05 J	0.04 J	0.04 UJ	1 U
Vanadium	ns	-	5 U	0.12 UJ	0.13 J	5 UJ	-	0.42 J	0.14 UJ	0.1 U	0.1 U	0.1 U	0.14	0.2	0.5 U	-	0.13 J	0.11 J	0.11 J	0.5 U	5 U
Zinc	106	-	35.7 J	7.7	9.1	5.6 J	-	2.8 J	3.17 J	14	23	21	33	2	5.6	-	2.52 J	269.7	172.2	166.3	191

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	NOBIS	URS
Study Area		EB-LR	EB-LR	EBT1	EBT1	EBT1	EBT1	EBT1	EBT1	EBT1	EBT1	EBT1	EBT1	EBT1	EBT1	EBT1	EBT1	EBT1	ORB	ORB	EB-MR
Station:		EB-30M	EB-30M	EBT1-10M	EBT1-10M	EBT1-10M	EBT1-10M	EBT1-10M	EBT1-32M	EBT1-32M	EBT1-105M	EBT1-105M	EBT1-110M	EBT1-110M	EBT1-110M	SW-84	SW-84	SW-84	EM-SEEP13	EM-SEEP13	EB-530M
Field Sample ID:		SW-09-111909AX	SW-09-111809AF	ELY-SW-34	ELY-SW-34	SW-34X-080609AX	SW-34-111809AX	SW-34-111809AF	MA1NM4	MA1NM5	EB-7	EB-7	ELY-SW-36	SW-36-111809AX	SW-36-111809AF	SW-84X-080609AX	SW-84-111809AF	SW-84-111809AX	ELY-SW-35	SW-35X-080609AX	ELY-SW-12
Date:		11/19/2009	11/19/2009	11/2/2004	5/2/2007	8/6/2009	11/18/2009	11/18/2009	10/5/2005	10/5/2005	4/8/2002	4/11/2002	11/3/2004	11/18/2009	11/18/2009	8/6/2009	11/18/2009	11/18/2009	11/3/2004	8/6/2009	11/1/2004
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	2992	-	3300	49 J	1690	2991	-	-	3660 J	42	30	89 J	200 U	-	200 U	-	200 U	74 J	200 U	4400
Antimony	ns	2 U	-	1 U	0.02 UJ	2 U	2 U	-	-	60 U	0.02 U	0.02 U	1 U	2 U	-	2 U	-	2 U	1 U	2 U	1 U
Arsenic	ns	1 U	-	1 U	0.5 U	1 U	1 U	-	-	10 UJ	0.2 U	0.2 U	1 U	1 U	-	1 U	-	1 U	0.12 UJ	1 U	1 U
Barium	ns	13.1 J	-	31.7	11.2	34.8	30.3	-	-	39.2	6.9	6.5	11.3	8.6 J	-	12.9	-	8.9 J	14.4	11.8	13.2
Beryllium	ns	5 U	-	0.23 J	0.5 U	5 U	5 U	-	-	0.21	0.05 U	0.05 U	1 U	5 U	-	5 U	-	5 U	1 U	5 U	0.24 J
Cadmium	1.1	1.1 J	-	2	0.03 J	1.3 J	1.7 J	-	-	2.7	0.028	0.024	1 U	0.5 UJ	-	0.5 U	-	0.5 UJ	1 U	0.5 U	1.5
Chromium	11	1.2 J	-	0.65 J	0.21 UJ	10 U	10 U	-	-	10 U	1 U	1 U	0.45 J	10 U	-	10 U	-	10 U	0.22 J	10 U	2.3
Cobalt	ns	33.8 J	-	33.3	0.29 J	19.5 J	35.4 J	-	-	54.6	0.084	0.074	0.38 J	50 UJ	-	0.55 J	-	0.43 J	0.08 J	50 U	42.1
Copper	8.6	1067	-	2500	22	1680	2045	-	-	3520	16	14	26	13.8	-	10.1	-	4.9	6.1	18.5	993.4
Iron	1000	3527	-	560	70	1450	154	-	-	500	670	73	1600	178	-	474	-	155	49 J	155	4800
Lead	3.2	0.33 J	-	0.53 J	0.09 UJ	0.47 J	0.9 J	-	-	. R	0.95	0.092	0.68 J	0.14 J	-	1 U	-	1 U	0.13 J	1 U	0.32 J
Manganese	ns	285 J	-	227.7	5.9	146	249 J	-	-	283	0.74	0.76	3.6	3.7 J	-	35.9	-	11.7 J	18.6	20	523.9
Mercury	0.012	0.1 U	-	0.2 U	0.2 U	0.1 U	0.1 U	-	-	0.04 UJ	-	-	0.2 U	0.1 U	-	0.1 U	-	0.1 U	0.2 U	0.1 U	0.2 U
Molybdenum	ns	10 U	-	5 U	0.11 UJ	10 U	10 U	-	-	-	0.034	0.039	0.14 J	10 U	-	10 U	-	10 U	5 U	10 U	5 U
Nickel	52	11.2 J	-	12.1	1	9 J	12.2 J	-	-	16.5	0.3	0.31	0.68 J	0.75 J	-	40 U	-	0.65 J	0.74 J	40 U	15.9
Selenium	5	0.56 J	-	1	1 U	5 U	0.93 J	-	-	35 U	0.2 U	0.24	0.5 J	5 U	-	5 U	-	5 U	1 U	5 U	0.7 J
Silver	3.2	0.5 UJ	-	0.08 J	0.5 U	1 U	0.5 UJ	-	-	10 UJ	0.034	0.045	0.2	0.5 UJ	-	1 U	-	0.5 UJ	0.1 U	1 U	0.1 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	53.9	-	44	19	36.4	45	-	-	-	15	16	37	26.2	-	36.1	-	28.2	28	34	68
Thallium	ns	1 U	-	0.11 UJ	0.5 U	1 U	0.074 J	-	-	25 U	0.05 U	0.05 U	1 U	1 U	-	1 U	-	1 U	1 U	1 U	0.04 J
Vanadium	ns	0.35 J	-	0.34 J	0.15 J	0.43 J	5 UJ	-	-	50 U	0.46	0.1 U	0.7 J	0.51 J	-	0.48 J	-	0.62 J	0.24 J	0.3 J	0.14 J
Zinc	106	178	-	172.5	10.9 J	109	167	-	-	258	1.6	1.5	3.28 J	60 U	-	60 U	-	60 U	3.17 J	60 U	261.3
Cyanide	ns	10 UJ		5 U	5 U	10 U	10 UJ	-	-	-	-	-	5 U	10 UJ	-	10 U	-	10 UJ	5 U	10 U	5 U
Dissolved Metals																					
Aluminum	87	-	2858	3200	100 U	1760	-	2985	3610 J	-	26	25	35 UJ	-	71.9 J	200 U	200 U	-	29 UJ	200 U	4200
Antimony	ns	-	2 U	1 U	0.02 UJ	2 U	-	2 U	60 U	-	0.02 U	0.02 U	1 U	-	2 U	2 U	2 U	-	1 U	2 U	1 U
Arsenic	ns	-	1 U	1 U	0.5 U	1 U	-	1 U	10 UJ	-	0.2 U	0.2 U	0.14 J	-	1 U	1 U	1 U	-	0.13 J	1 U	0.09 UJ
Barium	ns	-	13.1	30.6	10.7	34.8	-	30.6	38.7	-	14	20	10	-	8.3	12.2	8.8	-	13.9	11.1	13.4
Beryllium	ns	-	5 U	0.2 J	0.5 U	5 U	-	5 U	0.23	-	0.05 U	0.05 U	1 U	-	0.33 J	5 U	5 U	-	1 U	5 U	0.26 J
Cadmium	1.1	-	1.1	1.9	0.05 J	1.3	-	1.6	2.9	-	0.026	0.028	1 U	-	0.5 U	0.5 U	0.5 U	-	1 U	0.5 U	1.5
Chromium	11	-	1.2 J	0.54 J	0.11 J	10 U	-	0.54 J	10 U	-	1 U	1 U	0.27 J	-	10 U	10 U	10 U	-	0.17 J	10 U	2.2
Cobalt	ns	-	34.8 J	32.7	0.27 J	20.3 J	-	36.1 J	54.4	-	0.095	0.072	0.35 J	-	0.52 J	50 U	50 U	-	0.03 J	50 U	42.6
Copper	8.6	-	1036	2457	20	1720	-	2081	3490	-	13	13	16.8	-	13.6	4.7	3.8	-	2.2	15.3	991.4
Iron	1000	-	2514	80	27 J	530	-	115	133	-	20	15	60	-	46.9 J	187	58.2 J	-	50 U	100 U	4300
Lead	3.2	-	0.21 J	0.33 UJ	0.5 U	0.35 J	-	0.23 J	. R	-	0.05 U	0.05 U	0.05 J	-	1 U	1 U	1 U	-	1 U	1 U	0.33 J
Manganese	ns	-	278	224.7	5.5	151 J	-	251	283	-	0.65	0.67	2.9	-	3.4 J	25.2 J	5.6 J	-	1.6	18.8 J	527.7
Mercury	0.012	-	0.1 U	0.2 U	0.2 U	0.1 U	-	0.1 U	0.2 UJ	-	-	-	0.2 U	-	0.1 U	0.1 U	0.1 U	-	0.2 U	0.1 U	0.2 U
Molybdenum	ns	-	10 U	5 U	0.5 U	10 U	-	10 U	-	-	0.087	0.051	0.17 UJ	-	10 U	10 U	10 U	-	0.09 UJ	10 U	5 U
Nickel	52	-	11.2 J	12.1	0.9	9.1 J	-	12.7 J	16.5	-	0.3	0.29	0.76 J	-	0.8 J	1.2 J	40 U	-	0.56 J	1 J	16.1
Selenium	5	-	5 U	0.8 UJ	1 U	5 U	-	0.78 J	35 U	-	0.2 U	0.25	0.4 J	-	5 U	5 U	5 U	-	1 U	5 U	0.6 J
Silver	3.2	-	0.5 U	0.1 U	0.5 U	0.5 U	-	0.5 U	10 UJ	-	0.01 U	0.01 U	0.1 U	-	0.5 U	0.5 U	0.5 U	-	0.04 UJ	1 U	0.1 U
Strontium	ns	-	53.6	40	20	38.4	-	44.4	-	-	15	16	30	-	26.8	37.1	27.3	-	20	33	70
Thallium	ns	-	1 U	0.11 UJ	0.5 U	1 U	-	1 U	25 U	-	0.05 U	0.05 U	1 U	-	1 U	1 U	1 U	-	1 U	1 U	0.04 UJ
Vanadium	ns	-	0.4 J	0.07 UJ	0.5 U	5 U	-	0.44 J	50 U	-	0.1 U	0.1 U	0.11 J	-	0.44 J	5 U	0.28 J	-	0.15 J	5 U	0.1 J
Zinc	106	-	180	171	10	130	-	168	255	-	13	27	4.31 J	-	3.6 J	5.5 J	60 U	-	4.23 J	3.1 J	269.2

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		EB-MR	EB-MR	EB-MR	EB-MR	EB-MR	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EB-MR	EBT2	EBT2	EBT2	EBT2
Station:		EB-530M	EB-530M	EB-530M	EB-530M	EB-530M	EBT2-7M	EBT2-7M	EBT2-7M	EBT2-7M	EBT2-7M	EBT2-23M	EBT2-55M	EBT2-55M	EBT2-58M	EBT2-58M	EBT2-67M	EBT2-78M	EBT2-78M	EBT2-78M	EBT2-78M
Field Sample ID:		ELY-SW-12	ELY-SW-12	SW-12X-080609AX	SW-12-111809AX	SW-12-111809AF	ELY-SW-32	ELY-SW-32	SW-32X-080609AX	SW-32-111809AX	SW-32-111809AF	ELY-SW-31	MA1NL8	MA1NL9	ELY-SW-14	ELY-SW-14	SWU-09-58C	EB-3	EB-3	EB-3	EB-3
Date:		5/2/2007	5/2/2007	8/6/2009	11/18/2009	11/18/2009	11/1/2004	5/2/2007	8/6/2009	11/18/2009	11/18/2009	11/1/2004	10/5/2005	10/5/2005	11/1/2004	5/2/2007	5/3/2001	4/2/2002	4/11/2002	5/21/2002	6/20/2002
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	4200	4200	2670	2774	-	8900	6100	4990	5293	-	7700	-	4330 J	3000	2300	1960	22000	1400	3300	2000
Antimony	ns	0.12 UJ	0.12 UJ	2 U	2 U	-	1 U	0.13 UJ	2 U	2 U	-	1 U	-	60 U	1 U	0.02 UJ	2.5 U	0.02 U	0.02 U	0.02 U	0.02 U
Arsenic	ns	0.13 J	0.13 J	1 U	1 U	-	0.12 UJ	0.09 J	1 U	1 U	-	0.09 UJ	-	10 UJ	1 U	0.5 U	2.6 U	0.2 U	0.2 U	0.2 U	0.2 U
Barium	ns	13.1	13.1	13.7	11.8 J	-	10.6	11	13.2	10.8 J	-	11.2	-	15.8	11.8	11.6	12.2 J	6.7	7.8	9.2	13
Beryllium	ns	0.17 J	0.17 J	5 U	5 U	-	0.49 J	0.24 J	0.27 J	5 U	-	0.41 J	-	0.17	0.15 J	0.12 J	0.3 U	0.85	0.097	0.17	0.14
Cadmium	1.1	1.3	1.3	1.2 J	1	-	2.6	2.2	2.2 J	1.9 J	-	2.4	-	3.1	2.2	1.4	1.9 J	17	1.9	2.3	1.8
Chromium	11	2.6	2.6	0.85 J	1 J	-	4.1	2.7	2.3 J	1.9 J	-	2.9	-	3.7	1.4	1	1.3 J	16	1.1	1 U	1 U
Cobalt	ns	36.9	36.9	32.2 J	30 J	-	72	57.7	57.8	54.4 J	-	64.5	-	94.9	50.3	32.4	45.4 J	460	53	51	42
Copper	8.6	1370	1370	1120	1007	-	1864	2220	2030	1918	-	1663	-	1700	1406	1210	1520	15000	1400	1500	910
Iron	1000	3100	3100	2250	2595	-	11000	4300	5040	5447	-	10000	-	24300	5600	2900	2110	12000	3400	2100	3500
Lead	3.2	0.9	0.9	0.23 J	0.2 J	-	0.65 J	1.4	0.82 J	0.42 J	-	0.65 J	-	. R	0.42 J	0.47 J	2.8 U	0.93	0.19	0.21	0.3
Manganese	ns	251.2	251.2	276	284 J	-	975.9	390.5	506	528	-	919.7	-	791	436	207.1	235	2100	180	240	280
Mercury	0.012	0.2 U	0.2 U	0.1 U	0.1 U	-	0.2 U	0.2 U	0.1 U	0.1 U	-	0.2 U	-	0.2 UJ	0.2 U	0.2 U	0.1 U	-	-	-	-
Molybdenum	ns	0.21 UJ	0.21 UJ	10 U	10 U	-	5 U	0.5 U	10 U	10 U	-	5 U	-	-	5 U	0.09 UJ	-	0.088	0.052	0.091	0.076
Nickel	52	12.7	12.7	12.7 J	10.9 J	-	25.2	18.8	21.5 J	18.2 J	-	23.3	-	23.5	17.1	10.1	13.6 J	130	13	14	12
Selenium	5	0.9 J	0.9 J	5 U	5 U	-	2	1	5 U	0.68 J	-	1	-	35 U	0.6 J	0.4 J	2 U	0.94	0.2 U	0.2 U	0.28
Silver	3.2	0.11 J	0.11 J	0.5 U	0.5 UJ	-	0.03 UJ	0.1 J	0.5 U	0.5 UJ	-	0.03 UJ	-	10 UJ	0.1 U	0.03 J	0.5 U	0.03	0.021	0.01 U	0.01 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	39	39	48.9	50.5	-	83	44	56	59.2	-	78	-	-	55	33	-	94	31	34	43
Thallium	ns	0.04 UJ	0.04 UJ	1 U	1 U	-	0.05 J	0.07 J	1 U	0.024 J	-	0.05 J	-	25 U	0.03 J	0.04 UJ	3.4 U	0.094	0.05 U	0.05 U	0.05 U
Vanadium	ns	1.3	1.3	0.39 J	0.55 J	-	0.28 J	0.8	0.87 J	0.82 J	-	0.28 J	-	1.1 UJ	0.27 J	0.35 J	1 U	0.1 U	0.1 U	0.1 U	0.1
Zinc	106	255.8 J	255.8 J	185	168	-	475.8	308.5 J	336	307	-	424	-	436	352.1	207.9 J	251	2000	260	330	260
Cyanide	ns	5 U	5 U	10 U	10 UJ	-	5 U	5 U	10 U	10 UJ	-	5 U	-	-	5 U	5 U	-	-	-	-	-
Dissolved Metals																					
Aluminum	87	2600	2600	2020	-	2338	8500	4800	4470	-	4938	7300	4290 J	-	2200	1400	-	23000	1100	2600	1100
Antimony	ns	0.02 UJ	0.02 UJ	2 U	-	2 U	1 U	0.02 UJ	2 U	-	1.7 J	0.07 J	60 U	-	1 U	0.02 UJ	-	0.02 U	0.02 U	0.02 U	0.02 U
Arsenic	ns	0.5 U	0.5 U	1 U	-	1 U	0.12 UJ	0.5 U	1 U	-	1 U	0.12 UJ	4.7 UJ	-	0.11 UJ	0.08 J	-	0.2 U	0.2 U	0.2 U	0.2 U
Barium	ns	11.5	11.5	13.9	-	11.9	10.7	10.9	12.6	-	10.9	10.9	15.3	-	11.5	11.4	-	20	18	18	34
Beryllium	ns	0.1 J	0.1 J	5 U	-	5 U	0.48 J	0.25 J	5 U	-	5 U	0.46 J	0.21	-	0.14 J	0.08 J	-	0.8	0.05 U	0.18	0.05 U
Cadmium	1.1	1.2	1.2	1.2	-	1	2.7	2.3	2.2	-	2	2.4	2.8	-	2.2	1.4	-	18	2.1	2.4	1.8
Chromium	11	0.9	0.9	10 U	-	0.48 J	4.1	1.9	10 U	-	1.6 J	2.9	3.5	-	1.4	0.7	-	13	1 U	1 U	1 U
Cobalt	ns	32.2	32.2	33.8 J	-	30 J	73.4	58.8	60	-	55.1	63.7	94.1	-	49.5	31.5	-	400	42	54	42
Copper	8.6	1270	1270	1110	-	1025	1895	2250	2060	-	1970	1652	1690	-	1379	1170	-	14000	1300	1600	910
Iron	1000	1700	1700	1610	-	1667	10000	3400	3930	-	4613	9300	24100	-	5100	2600	-	9200	2400	2100	3200
Lead	3.2	0.33 J	0.33 J	1 U	-	0.14 J	0.65 J	0.6	0.48 J	-	0.41 J	0.64 J	. R	-	0.45 J	0.39 J	-	0.83	0.15	0.17	0.22
Manganese	ns	223	223	278 J	-	272	995.4	413.7	497 J	-	522	910.4	786	-	433.1	200.5	-	1700	150	250	280
Mercury	0.012	0.2 U	0.2 U	0.1 U	-	0.1 U	0.2 U	0.2 U	0.1 U	-	0.1 U	0.2 U	0.061 UJ	-	0.2 U	0.2 U	-	-	-	-	-
Molybdenum	ns	0.5 U	0.5 U	10 U	-	10 U	5 U	0.5 U	10 U	-	10 U	5 U	-	-	5 U	0.5 U	-	0.02 U	0.024	0.1	0.059
Nickel	52	10.7	10.7	12.9 J	-	10.7 J	25.8	18.7	21.6 J	-	18 J	22.8	23.4	-	16.8	10	-	110	10	15	12
Selenium	5	0.4 J	0.4 J	5 U	-	5 U	1	0.8 J	5 U	-	5 U	1	35 U	-	0.5 J	0.4 J	-	0.71	0.2 U	0.28	0.2 U
Silver	3.2	0.5 U	0.5 U	0.5 U	-	0.5 U	0.1 U	0.5 U	0.5 U	-	0.5 U	0.1 U	10 UJ	-	0.1 U	0.5 U	-	0.02	0.014	0.01 U	0.01 U
Strontium	ns	40	40	49.6	-	47	80	40	56.7	-	56.9	80	-	-	50	30	-	92	29	34	43
Thallium	ns	0.03 UJ	0.03 UJ	1 U	-	1 U	0.05 UJ	0.05 UJ	1 U	-	1 U	0.05 UJ	25 U	-	0.04 UJ	0.03 UJ	-	0.089	0.05 U	0.05 U	0.05 U
Vanadium	ns	0.06 J	0.06 J	5 U	-	0.31 J	0.21 J	0.08 J	0.35 J	-	0.78 J	0.26 J	0.97 UJ	-	0.23 J	0.11 J	-	0.1 U	0.1 U	0.1 U	0.1 U
Zinc	106	532.2	532.2	196	-	162	489.7	320.8	345	-	304	431.7	436	-	347.4	205.5	-	1800	240	340	270

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PRG = Prelimary Remediation Goal
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EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	EPA	EPA	URS	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS
Study Area		EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	Pond4	EBT2	EBT2	EBT2	EBT2	EBT2
Station:		EBT2-78M	EBT2-78M	EBT2-120M	EBT2-120M	EBT2-185M	EBT2-245M	EBT2-245M	EBT2-255M	EBT2-255M	EBT2-255M	EBT2-255M	EBT2-265M	EBT2-265M	EBT2-265M	EBT2-315M	SW-71	SW-71	SW-71	EM-SEEP6	EM-SEEP7
Field Sample ID:		EB-3	EB-3	MA1NM0	MA1NM1	ELY-SW-37	AA62006	AA62304	ELY-SW-41	SW-41X-080409AX	SW-41-111709AX	SW-41-111709AF	EB-2	EB-2	EB-2	ELY-SW-16	SW-71X-080409AX	SW-71-111709AX	SW-71-111709AF	ES-6	ES-7
Date:		7/24/2002	9/19/2002	10/5/2005	10/5/2005	11/2/2004	6/19/2006	6/23/2006	5/3/2007	8/4/2009	11/17/2009	11/17/2009	4/2/2002	4/11/2002	5/21/2002	11/3/2004	8/4/2009	11/17/2009	11/17/2009	4/8/2002	4/8/2002
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	3900	8500	-	7.4 J	620	5800	1700	2000	1220	1239	-	2000	2900	34	41 J	271	321 U	-	2400	5900
Antimony	ns	0.06 U	0.07	-	60 U	1 U	0.5 U	0.5 U	0.05 UJ	2 U	2 U	-	0.026	0.022	0.02 U	1 U	2 U	2 U	-	0.02 U	0.02 U
Arsenic	ns	0.3 U	0.2 U	-	10 UJ	0.09 UJ	1 U	1 U	0.09 J	1 U	1 U	-	0.2 U	0.2 U	0.2 U	0.15 UJ	1 U	1 U	-	0.2 U	0.2 U
Barium	ns	21	18	-	18	14.6	12	11 B	10.9	10.8 J	10.4 J	-	7	8.2	20	10.4	24.7 J	29	-	28	18
Beryllium	ns	0.2	0.4	-	5 U	1 U	0.22	0.2 U	0.11 J	5 U	5 U	-	0.1	0.12	0.05 U	1 U	5 U	5 U	-	0.23	0.64
Cadmium	1.1	4.1	9.2	-	5 U	1.8	1.6	1.4	1.3	0.89 J	0.86 J	-	2.2	1.2	0.041	1 U	1.5 J	0.55 J	-	1.7	6.2
Chromium	11	2	11	-	10 U	0.1 J	3.7 B	1.7 B	0.28 J	10 U	10 U	-	1 U	1 U	1 U	0.19 J	10 U	10 U	-	1 U	1 U
Cobalt	ns	130	390	-	1 J	37.7	30	27	26	16.5 J	15.8 J	-	36	21	0.91	0.27 J	12.7 J	6 J	-	18	58
Copper	8.6	1800	8400	-	69.6	1122	1400	1200	1070	630	545	-	1300	740	16	3.7	541	72.4	-	1800	3500
Iron	1000	3900	24000	-	13.9 U	80	490 J2	270 B,	140	122 J	85.7 J	-	68	310	25	330	246 J	1290	-	290	26
Lead	3.2	0.5	1.4	-	. R	0.18 J	0.32	0.2 U	0.2 J	1 U	1 U	-	0.12	0.32	0.05 U	0.07 J	1 U	0.061 J	-	1.7	0.41
Manganese	ns	1100	1200	-	9.8	416.5	240	280	189.5	156 J	167 J	-	160	110	10	149.8	475 J	408	-	280	760
Mercury	0.012	-	-	-	0.2 UJ	0.2 U	-	-	0.2 U	0.1 U	0.1 U	-	-	-	-	0.2 U	0.1 U	0.1 U	-	-	-
Molybdenum	ns	0.1	0.06	-	-	5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	-	0.032	0.068	0.05	5 U	10 U	10 U	-	0.02 U	0.02 U
Nickel	52	31	71	-	2.6 J	14.7	11	9.6	10	7.3 J	7 J	-	11	6.9	0.1 U	0.43 J	12.1 J	-	-	10	30
Selenium	5	0.2 U	1	-	35 U	0.4 J	1 U	1 U	0.5 J	5 UJ	5 U	-	0.2 U	0.2 U	0.2 U	1 U	5 UJ	5 U	-	0.2 U	0.2 U
Silver	3.2	0.01 U	0.01 U	-	10 UJ	0.1 U	0.2 U	0.2 U	0.5 U	0.5 UJ	0.5 UJ	-	0.01 U	0.01 U	0.01 U	0.1 U	0.5 UJ	0.5 U	-	0.01	0.01
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	63	85	-	-	52	-	-	32	35.9	38.9	-	25	26	84	35	98.3	104	-	18	88
Thallium	ns	0.05 U	0.1	-	25 U	0.03 UJ	0.5 U	0.5 U	0.03 J	1 U	0.078 J	-	0.05 U	0.05 U	0.05 U	1 U	1 U	1 U	-	0.05 U	0.062
Vanadium	ns	0.4	3	-	50 U	0.11 J	0.2 U	0.2 U	0.14 J	0.5 J	0.29 J	-	0.1 U	0.15	0.1 U	0.24 J	5 U	0.54 J	-	0.55	0.1 U
Zinc	106	530	830	-	26.4	290	190	170	185.9 J	135	121	-	240	150	14	6.8	223	131	-	220	700
Cyanide	ns	-	-	-	-	5 U	-	-	5 U	10 U	10 UJ	-	-	-	-	5 U	10 U	10 UJ	-	-	-
Dissolved Metals																					
Aluminum	87	3600	8500	200 UJ	-	380	410	-	780	200 U	-	139 J	1800	400	2200	22 UJ	296	-	253	2000	6000
Antimony	ns	0.1	0.04 U	60 U	-	1 U	2.5 U	-	0.02 UJ	2 U	-	2 U	3.1	0.57	0.02 U	1 U	2 U	-	2 U	0.02 U	0.02 U
Arsenic	ns	0.3 U	0.2 U	10 UJ	-	0.15 UJ	2.5 U	-	0.5 U	1 U	-	1 U	0.2 U	0.2 U	0.2 U	0.09 J	1 U	-	1 U	0.2 U	0.2 U
Barium	ns	21	18	18.3	-	14	12	-	11.3	11.3 J	-	10.8	17	18	17	10	24.1 J	-	29.5	43	34
Beryllium	ns	0.4	0.3	5 U	-	1 U	1 U	-	0.07 J	5 U	-	5 U	0.12	0.05	0.08	1 U	5 U	-	5 U	0.24	0.55
Cadmium	1.1	4	9.2	5 U	-	1.7	1.7	-	1.4	0.91 J	-	0.82	2.2	1.3	2.3	1 U	1.5 J	-	0.19 J	1.7	6.2
Chromium	11	1	11	10 U	-	0.07 J	2.5 U	-	0.16 J	10 U	-	10 U	1 U	1 U	1 U	0.2 J	10 U	-	10 U	1 U	1 U
Cobalt	ns	130	380	1.3 J	-	36	31	-	25.2	17.5 J	-	16.9 J	36	21	45	0.14 J	13.4 J	-	6.4 J	17	59
Copper	8.6	1800	8300	66.4	-	1069	1200	-	1070	486	-	447	1300	580	1500	2.4	567	-	4.7	1800	3500
Iron	1000	3300	24000	18.9 U	-	70	250 U	-	80	100 U	-	38.1 J	41	20	29	150	121	-	1322	18	27
Lead	3.2	0.4	1.3	. R	-	0.16 J	1 U	-	0.08 UJ	1 U	-	1 U	0.16	0.05	0.079	0.05 J	1 U	-	0.036 J	0.48	0.39
Manganese	ns	1000	1200	10.1	-	399	230	-	189.4	159 J	-	166	160	110	240	107.5	433 J	-	407	280	780
Mercury	0.012	-	-	0.2 UJ	-	0.2 U	-	-	0.2 U	0.1 U	-	0.1 U	-	-	-	0.2 U	0.1 U	-	0.041 J	-	-
Molybdenum	ns	0.2	0.1	-	-	5 U	2.5 U	-	0.05 UJ	10 U	-	10 U	0.048	0.042	0.044	5 U	10 U	-	10 U	0.02 U	0.02 U
Nickel	52	32	69	3.2 J	-	14.1	11	-	9.4	7.4 J	-	6.9 J	11	6.8	15	0.39 J	12.2 J	-	10.3 J	9.8	30
Selenium	5	0.2 U	0.9	35 U	-	0.4 J	5 U	-	0.4 J	5 UJ	-	5 U	0.2 U	0.2 U	0.2 U	1 U	5 UJ	-	5 U	0.2 U	0.29
Silver	3.2	0.01 U	0.01 U	10 UJ	-	0.1 U	1 U	-	0.5 U	0.5 UJ	-	0.5 U	0.01 U	0.01 U	0.01 U	0.03 J	0.5 UJ	-	0.5 U	0.01	0.016
Strontium	ns	63	84	-	-	50	-	-	30	36.9	-	37.5	25	26	29	30	98.7	-	105	18	89
Thallium	ns	0.05 U	0.1	25 U	-	0.03 UJ	2.5 U	-	0.03 UJ	1 U	-	1 U	0.05 U	0.05 U	0.05 U	1 U	1 U	-	1 U	0.05 U	0.05 U
Vanadium	ns	0.1 U	3	50 U	-	0.07 UJ	1 U	-	0.5 U	5 UJ	-	5 U	0.1 U	0.1 U	0.1 U	0.18 J	5 UJ	-	0.77 J	0.1 U	0.1 U
Zinc	106	530	820	26.9	-	279.8	210	-	203.5	138	-	123	250	150	340	6.2	219	-	124	240	710

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	URS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	NOBIS
Study Area		EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EB-MR	EBT2
Station:		EBT2-383M	EBT2-383M	EBT2-383M	EBT2-383M	EBT2-383M	EBT2-430M	EBT2-430M	EM-SEEP14	EM-SEEP14	EM-SEEP14	EM-SEEP14	EM-SEEP8	EM-SEEP16	EM-SEEP16	EM-SEEP16	EM-SEEP16	EM-SEEP16	EM-SEEP16	EM-SEEP15	EM-SEEP15
Field Sample ID:		EB-2a	EB-2a	EB-2a	EB-2a	EB-2a	ELY-QS-02	ELY-SW-21	ELY-SW-42	SW-42X-080409AX	SW-42-111709AX	SW-42-111709AF	ES-8	ELY-SW-45	SW-45X-080509AX	SW-45-111709AX	SW-45-111709AF	SW-45-111709AD	SW-45-111709AG	ELY-SW-43	SW-43X-080509AX
Date:		5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	11/3/2004	11/3/2004	5/3/2007	8/4/2009	11/17/2009	11/17/2009	4/8/2002	5/3/2007	8/5/2009	11/17/2009	11/17/2009	11/17/2009	11/17/2009	5/3/2007	8/5/2009
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	15	77	24	30	10	350	430	30000	23400	23600	-	28000	25000	26000	24100	-	22600	-	8200	10900
Antimony	ns	0.02 U	0.029	0.38	0.03 U	0.1	1 U	1 U	0.03 UJ	2 U	2 U	-	0.02 U	0.02 UJ	2 U	2 U	-	2 U	-	0.02 UJ	2 U
Arsenic	ns	0.2 U	0.2 U	0.6	0.3 U	0.6 U	1 U	0.09 UJ	0.5 U	1 U	1 U	-	0.2 U	0.5 U	1 U	1 U	-	1 U	-	0.5 U	1 U
Barium	ns	7.9	19	28	26	14	20.8	21.3	10.7	14.1 J	11.9	-	14	7.6	8.8	9.1	-	9.2	-	21.9	28
Beryllium	ns	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	1 U	1 U	1.2	1.2 J	1.2 J	-	0.71	0.7	0.77 J	1.2 J	-	5 U	-	0.28 J	0.33 J
Cadmium	1.1	0.02 U	0.057	0.02	0.87	0.02 U	1 U	1 U	14.9	12.5 J	12.1 J	-	23	11.7	12.7 J	11.9 J	-	12.4 J	-	3.4	6.9 J
Chromium	11	1 U	1 U	1 U	1 U	1 U	1	1.2	2.8	10 U	0.99 J	-	20	7.6	6.6 J	2.7 J	-	2.5 J	-	9	12.2
Cobalt	ns	0.034	0.48	0.83	0.94	0.2	0.29 J	0.35 J	249.8	241 J	217	-	440	210.3	243	221	-	213	-	78.3	150
Copper	8.6	0.87	1.8	1	1	0.6	2.3	2.6	12300	10900	8033	-	14000	10700	11200	8990	-	8992	-	4360	7150
Iron	1000	72	810	970	2700	890	590	710	540	152 J	80.8 J	-	19000	1400	2220	516	-	525	-	6700	18500
Lead	3.2	0.05 U	0.22	0.08	0.1	0.06	0.37 J	0.47 J	0.7	0.74 J	0.45 J	-	2	0.3 J	1 U	0.085 J	-	0.085 J	-	0.7	1.1
Manganese	ns	27	570	1300	1600	390	15.9	17.2	1415	1610 J	1610	-	1700	1125	1570	1620	-	1560	-	535.8	873
Mercury	0.012	-	-	-	-	-	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	-	-	0.2 U	0.1 U	0.1 U	-	0.1 U	-	0.2 U	0.1 U
Molybdenum	ns	0.13	0.16	0.75	0.1	1	0.09 UJ	0.09 UJ	0.5 U	10 U	10 U	-	0.31	0.5 U	10 U	10 U	-	10 U	-	0.5 U	10 U
Nickel	52	0.1 U	0.47	0.8	0.9	0.3	0.7 J	0.78 J	86.4	97.3	-	-	120	70.7	92.2	-	-	-	-	25.8	39.9 J
Selenium	5	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	1 U	1 U	4	1.3 J	1.1 J	-	2.6	4	5 U	1.3 J	-	1.2 J	-	1	5 U
Silver	3.2	0.013	0.01 U	0.01	0.01 U	0.1	0.1 U	0.1 U	0.05 J	0.5 UJ	0.5 U	-	0.19	0.14 J	1 U	0.072 J	-	0.074 J	-	0.08 J	1 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	16	26	41	58	45	27	27	101	126	138	-	130	74	126	137	-	132	-	34	41.4
Thallium	ns	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	1 U	1 U	0.19 J	1 U	0.16 J	-	0.12	0.18 J	1 U	0.2 J	-	0.19 J	-	0.05 J	1 U
Vanadium	ns	0.15	0.66	0.3	0.4	0.2 U	1.6	1.9	0.5 U	5 U	0.49 J	-	3.2	0.5 U	5 UJ	0.27 J	-	0.44 J	-	0.08 J	1.4 J
Zinc	106	0.61	21	7	2	0.7	2 J	2.57 J	1820 J	1860	1680	-	2600	1455 J	1880	1760	-	1680	-	431.4 J	812
Cyanide	ns	-	-	-	-	-	5 U	5 U	5 U	10 U	10 UJ	-	-	5 U	10 U	10 UJ	-	10 UJ	-	5 U	10 U
Dissolved Metals																					
Aluminum	87	9.5	12	7.8	4.6	4.5	21 UJ	25 J	30000	24200	-	23498	28000	25000	27700	-	23517	-	23027	8200	10900
Antimony	ns	0.02 U	0.02 U	0.77	0.42	1.1	1 U	1 U	0.02 UJ	2 U	-	2 U	0.02 U	0.5 U	2 U	-	2 U	-	2 U	0.5 U	2 U
Arsenic	ns	0.2 U	0.2 U	1	0.3 U	0.6 U	0.13 J	0.13 J	0.5 U	1 U	-	1 U	0.2 U	0.5 U	1 U	-	1 U	-	1 U	0.5 U	1 U
Barium	ns	18	30	17	19	14	18.1	17.3	11.3	14.3 J	-	12.6	18	7.8	9	-	8.9	-	8.7	23.6	25.7
Beryllium	ns	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	1 U	1 U	1.3	1.3 J	-	0.76 J	0.62	0.7	0.78 J	-	5 U	-	0.58 J	0.26 J	5 U
Cadmium	1.1	0.02 U	0.02 U	0.02 U	0.08	0.02	1 U	1 U	15	12.9 J	-	12.5	23	11.3	12.7	-	12.4	-	11.9	3.6	6.7
Chromium	11	1 U	1 U	1 U	1 U	2	0.17 J	0.18 J	2.9	10 U	-	1.3 J	7.9	7.6	6.8 J	-	2.7 J	-	2.7 J	8.8	12.6
Cobalt	ns	0.02	0.1	0.66	0.6	0.2	0.06 J	0.06 J	243.5	249	-	218	440	199.3	254	-	218	-	216	78.4	154
Copper	8.6	0.89	0.98	0.6	0.7	11	0.62 J	0.67 J	12100	10900	-	8201	14000	10700	11200	-	8664	-	8826	4410	7300
Iron	1000	38	260	300	390	320	120	120	530	130	-	92.5 J	970	1400	1380	-	468	-	456	5300	14900
Lead	3.2	0.05 U	0.061	0.05 U	0.05 U	0.1	0.06 J	0.05 J	0.8	0.71 J	-	0.46 J	0.21	0.3 J	1 U	-	0.095 J	-	0.12 J	0.7	0.74 J
Manganese	ns	20	140	1100	1300	350	10.5	10.1	1402	1700 J	-	1625	1700	1083	1620 J	-	1653	-	1608	547.4	851 J
Mercury	0.012	-	-	-	-	-	0.2 U	0.2 U	0.2 U	0.1 U	-	0.045 J	-	0.2 U	0.1 U	-	0.04 J	-	0.034 J	0.2 U	0.1 U
Molybdenum	ns	0.15	0.12	1	0.1	0.2	0.1 UJ	0.13 UJ	0.5 U	10 U	-	10 U	0.11	0.5 U	10 U	-	10 U	-	10 U	0.5 U	10 U
Nickel	52	0.1 U	0.15	0.7	0.6	0.7	0.19 J	2.7	83.4	99	-	88.3	120	66.9	96.3	-	86.5	-	86	24.7	40.8
Selenium	5	0.2 U	0.2 U	0.2 U	0.3 U	0.5	1 U	1 U	4	1.5 J	-	1.3 J	1.6	3	1.4 J	-	0.87 J	-	1.1 J	1	0.73 J
Silver	3.2	0.013	0.01 U	0.02	0.01 U	0.04	0.03 J	0.04 UJ	0.03 J	0.5 UJ	-	0.5 U	0.021	0.12 J	1 U	-	0.033 J	-	0.038 J	0.08 J	1 U
Strontium	ns	16	24	40	57	43	20	20	100	131	-	139	130	70	130	-	140	-	137	30	40.6
Thallium	ns	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	1 U	1 U	0.17 UJ	1 U	-	0.07 J	0.088	0.18 UJ	1 U	-	0.1 J	-	0.1 J	0.04 UJ	1 U
Vanadium	ns	0.12	0.2	0.2	0.1	0.7	0.36 J	0.35 J	0.5 U	5 UJ	-	0.34 J	0.1 U	0.5 U	5 U	-	0.52 J	-	0.65 J	0.5 U	5 U
Zinc	106	24	44	2	10	10	1.23 J	2.41 J	1823	1910	-	1730	2700	1462	1970	-	1756	-	1736	446.6	823

Notes: Units are in µg/L = micrograms per liter
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TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	NOBIS
Study Area		EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EBT2	EB-MR	EB-MR	EB-MR
Station:		EM-SEEP15	EM-SEEP15	EM-SEEP4	EM-SEEP5	SW-75	SW-75	SW-75	SW-75	EM-SEEP3	SW-76	SW-76	EM-SEEP10	EM-SEEP10	EM-SEEP20	EM-SEEP20	EM-SEEP20	EM-SEEP20	EB-530M	EB-530M	EB-530M
Field Sample ID:		SW-43-120209AF	SW-43-120209AX	ES-4	ES-5	SW-75X-080509AD	SW-75X-080509AX	SW-75-111609AX	SW-75-111609AF	ES-3	SW-76X-080509AD	SW-76X-080509AX	ES-10	ES-10	ELY-SW-49	SW-49-111609AX	SW-49-111609AF	SW-49X-080509AX	ELY-SW-12	ELY-SW-12	SW-12X-080609AX
Date:		12/2/2009	12/2/2009	4/4/2002	4/4/2002	8/5/2009	8/5/2009	11/16/2009	11/16/2009	4/4/2002	8/5/2009	8/5/2009	4/8/2002	4/11/2002	5/2/2007	11/16/2009	11/16/2009	8/5/2009	11/1/2004	5/2/2007	8/6/2009
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	-	103590	8300	7600	10600	10700	17400	-	9900	-	9730	21000	19000	6600	5510	-	5690	4400	4200	2670
Antimony	ns	-	2 U	0.02 U	1.2	2 U	2 U	2 U	-	0.02 U	-	2 U	0.031	0.02	0.5 U	2 U	-	2 U	1 U	0.12 UJ	2 U
Arsenic	ns	-	0.4 J	0.2 U	0.2 U	1 U	1 U	1 U	-	0.2 U	-	1 U	0.2 U	0.2 U	0.5 U	1 U	-	1 U	1 U	0.13 J	1 U
Barium	ns	-	14.3	14	15	25.3	26.4	26.2	-	11	-	23.4 J	3.2	2.1	11.2	13	-	14.2 J	13.2	13.1	13.7
Beryllium	ns	-	1.9 J	0.38	0.35	0.38 J	0.37 J	5 U	-	0.45	-	0.62 J	0.6	0.68	0.28 J	5 U	-	0.42 J	0.24 J	0.17 J	5 U
Cadmium	1.1	-	55.8	9.6	9.9	6.5 J	6.5 J	9 J	-	6.9	-	6.3 J	42	32	2.4	1.2 J	-	1.6 J	1.5	1.3	1.2 J
Chromium	11	-	125	10	9.2	12	12.4	11.1	-	4.1	-	10 U	56	49	3.8	2.3 J	-	10 U	2.3	2.6	0.85 J
Cobalt	ns	-	1174	240	210	148	147	218	-	230	-	114 J	1000	910	74	45 J	-	53.4 J	42.1	36.9	32.2 J
Copper	8.6	-	33178	9800	10000	6970	7060	12886	-	7400	-	6130	21000	24000	2990	1553	-	1780	993.4	1370	1120
Iron	1000	-	20131	12000	13000	20300	21600	17400	-	560	-	8750 J	170000	110000	3600	1560	-	2000 J	4800	3100	2250
Lead	3.2	-	3.6	1.5	5.2	0.73 J	0.85 J	0.43 J	-	0.24	-	2.1	2.4	1.7	0.7	0.85 J	-	0.75 J	0.32 J	0.9	0.23 J
Manganese	ns	-	5230	880	880	851	856	1500	-	1200	-	1300 J	1500	1300	557.4	687	-	584 J	523.9	251.2	276
Mercury	0.012	-	0.1 U	-	-	0.1 U	0.1 U	0.1 U	-	-	-	0.1 U	-	-	0.2 U	0.1 U	-	0.1 U	0.2 U	0.2 U	0.1 U
Molybdenum	ns	-	1.4 J	0.02 U	0.02 U	10 U	10 U	10 U	-	0.02 U	-	10 U	0.068	0.24	0.5 U	10 U	-	10 U	5 U	0.21 UJ	10 U
Nickel	52	-	308	62	56	39.1 J	38.9 J	-	-	70	-	51.6	210	180	26.6	-	-	22.3 J	15.9	12.7	12.7 J
Selenium	5	-	9.3	0.2 U	0.2 U	5 U	5 U	1.4 J	-	0.51	-	5 J	1.6	3.9	1	0.6 J	-	5 UJ	0.7 J	0.9 J	5 U
Silver	3.2	-	0.8	0.04	0.043	1 U	1 U	0.13 J	-	0.05	-	0.5	0.041	0.088	0.06 J	0.037 J	-	0.5 UJ	0.1 U	0.11 J	0.5 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	-	144	42	36	40.3	41	55.3	-	63	-	61.1	44	38	48	74.9	-	48.7	68	39	48.9
Thallium	ns	-	0.31 J	0.05 U	0.05 U	1 U	1 U	0.088 J	-	0.057	-	1 U	0.062	0.064	0.06 J	0.16 J	-	1 U	0.04 J	0.04 UJ	1 U
Vanadium	ns	-	6.7	0.1 U	0.1 U	0.27 J	0.97 J	0.63 J	-	0.1 U	-	4.3 J	7.6	3	0.17 J	5 U	-	5 U	0.14 J	1.3	0.39 J
Zinc	106	-	8192	840	950	795	794	1240	-	870	-	1040	2800	2300	329.6 J	288	-	329	261.3	255.8 J	185
Cyanide	ns	10 U	-	-	-	10 U	10 U	10 UJ	-	-	-	10 U	-	-	5 U	10 UJ	-	10 U	5 U	5 U	10 U
Dissolved Metals																					
Aluminum	87	98085	-	8000	7400	11100	11000	-	16975	9400	9850	-	22000	18000	6500	-	5195	5900	4200	2600	2020
Antimony	ns	2 U	-	0.02 U	0.02 U	2 U	2 U	-	2 U	0.02 U	-	2 U	0.13	0.058	0.02 UJ	-	2 U	2 U	1 U	0.02 UJ	2 U
Arsenic	ns	1 U	-	0.2 U	0.2 U	1 U	1 U	-	1 U	0.2 U	-	1 U	0.2 U	0.2 U	0.5 U	-	1 U	1 U	0.09 UJ	0.5 U	1 U
Barium	ns	2.9 J	-	25	22	25.2	26	-	25	22	-	14.6	40	5.8	10.7	-	13.1	14.1	13.4	11.5	13.9
Beryllium	ns	1.7 J	-	0.33	0.36	0.29 J	5 U	-	5 U	0.47	5 U	-	0.53	0.4	0.25 J	-	5 U	5 U	0.26 J	0.1 J	5 U
Cadmium	1.1	54.5	-	9.5	9.9	6.7	6.8	-	8.9	6.9	-	6.3 J	42	31	2.3	-	1.1	1.6 J	1.5	1.2	1.2
Chromium	11	125	-	10	9.2	12.9	12.8	-	11	4	10 U	-	57	48	3.6	-	2.4 J	10 U	2.2	0.9	10 U
Cobalt	ns	1146	-	220	210	153	151	-	217	220	115	-	1000	890	73	-	45.4 J	55.9	42.6	32.2	33.8 J
Copper	8.6	32841	-	9500	10000	7360	7400	-	12409	7000	-	6080	20000	24000	2970	-	1499	1850	991.4	1270	1110
Iron	1000	9079	-	12000	13000	20200	19700	-	16783	530	407	-	170000	110000	2600	-	1472	1890	4300	1700	1610
Lead	3.2	0.24 J	-	1.5	5	0.74 J	0.74 J	-	0.38 J	0.22	-	1 U	2.2	1	0.6	-	0.86 J	0.8 J	0.33 J	0.33 J	1 U
Manganese	ns	4987	-	870	840	866 J	845 J	-	1479	1200	1380 J	-	1500	1300	544.3	-	674	613 J	527.7	223	278 J
Mercury	0.012	0.1 U	-	-	-	0.1 U	0.1 U	-	0.034 J	-	-	0.1 U	-	-	0.2 U	-	0.044 J	0.1 U	0.2 U	0.2 U	0.1 U
Molybdenum	ns	10 U	-	0.07	0.053	10 U	10 U	-	10 U	0.1	10 U	-	0.025	0.021	0.5 U	-	10 U	10 U	5 U	0.5 U	10 U
Nickel	52	302	-	60	56	40.1	39.8 J	-	58.4	69	50.8	-	210	180	25.1	-	20.7 J	23.3 J	16.1	10.7	12.9 J
Selenium	5	6.4	-	0.2 U	0.2 U	0.64 J	5 U	-	1.3 J	0.44	-	1.5 J	1	3	1	-	0.59 J	5 UJ	0.6 J	0.4 J	5 U
Silver	3.2	0.13 J	-	0.028	0.029	1 U	1 U	-	0.069 J	0.037	-	0.14 J	0.035	0.037	0.03 J	-	0.5 U	0.5 UJ	0.1 U	0.5 U	0.5 U
Strontium	ns	134	-	42	36	41.6	40.4	-	54.6	61	61.9	-	44	38	50	-	73.4	50.3	70	40	49.6
Thallium	ns	0.18 J	-	0.05 U	0.05 U	1 U	1 U	-	1 U	0.054	-	1 U	0.05 U	0.05	0.04 J	-	0.049 J	1 U	0.04 UJ	0.03 UJ	1 U
Vanadium	ns	2.7 J	-	0.1 U	0.1 U	5 U	5 U	-	0.27 J	0.1 U	-	5 UJ	7.8	1.8	0.5 U	-	5 U	0.37 J	0.1 J	0.06 J	5 U
Zinc	106	7997	-	830	960	820	813	-	1242	850	1090	-	2800	2400	325.8	-	287	349	269.2	532.2	196

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		EB-MR	EB-MR	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3
Station:		EB-530M	EB-530M	EBT2-7M	EBT2-7M	EBT2-7M	EBT2-7M	EBT2-7M	EBT2-23M	EBT3-60M	EBT3-60M	EBT3-84M	EBT3-84M	EBT3-84M	EBT3-84M	EBT3-84M	EBT3-84M	EBT3-84M	EBT3-120M	EBT3-120M	EM-SEEP9
Field Sample ID:		SW-12-111809AX	SW-12-111809AF	ELY-SW-32	ELY-SW-32	SW-32X-080609AX	SW-32-111809AX	SW-32-111809AF	ELY-SW-31	ELY-SW-30	ELY-SW-30	EB-4	EB-4	EB-4	EB-4	EB-4	EB-4	EB-4	MA1NL6	MA1NL7	ES-9
Date:		11/18/2009	11/18/2009	11/1/2004	5/2/2007	8/6/2009	11/18/2009	11/18/2009	11/1/2004	11/1/2004	5/2/2007	4/2/2002	4/11/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	10/5/2005	10/5/2005	4/8/2002
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	2774	-	8900	6100	4990	5293	-	7700	22000	18000	2000	22000	30000	27000	26000	22000	25000	-	12600 J	27000
Antimony	ns	2 U	-	1 U	0.13 UJ	2 U	2 U	-	1 U	1 U	0.03 UJ	0.02 U	0.02 U	0.02 U	0.02 U	0.06	0.04 U	0.04 U	-	60 U	0.02 U
Arsenic	ns	1 U	-	0.12 UJ	0.09 J	1 U	1 U	-	0.09 UJ	1 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	-	10 UJ	0.2 U
Barium	ns	11.8 J	-	10.6	11	13.2	10.8 J	-	11.2	10.6	8.2	6.8	6.5	6.9	9.2	11	7.4	5.9	-	14.8	10
Beryllium	ns	5 U	-	0.49 J	0.24 J	0.27 J	5 U	-	0.41 J	1.3	0.9	0.064	0.89	1.3	1.5	1.9	1.9	1.7	-	0.89 J	1
Cadmium	1.1	1	-	2.6	2.2	2.2 J	1.9 J	-	2.4	2	6	2.4	16	15	11	4.8	3.2	3	-	0.95 UJ	3.6
Chromium	11	1 J	-	4.1	2.7	2.3 J	1.9 J	-	2.9	6.9	6.1	1.4	15	12	7.2	9	13	13	-	6.2 J	11
Cobalt	ns	30 J	-	72	57.7	57.8	54.4 J	-	64.5	75.8	149.8	61	450	340	260	240	96	96	-	30.7	350
Copper	8.6	1007	-	1864	2220	2030	1918	-	1663	1600	7200	2000	14000	12000	7700	2800	2600	3300	-	177	5200
Iron	1000	2595	-	11000	4300	5040	5447	-	10000	27000	6800	3500	9900	9800	12000	21000	25000	17000	-	66700	69000
Lead	3.2	0.2 J	-	0.65 J	1.4	0.82 J	0.42 J	-	0.65 J	1.4	1	0.23	0.8	0.88	1.1	0.78	2.7	1.1	-	. R	0.93
Manganese	ns	284 J	-	975.9	390.5	506	528	-	919.7	2337	1272	200	2200	1900	2000	3600	3000	2600	-	1950	2000
Mercury	0.012	0.1 U	-	0.2 U	0.2 U	0.1 U	0.1 U	-	0.2 U	0.2 U	0.2 U	-	-	-	-	-	-	-	-	0.2 UJ	-
Molybdenum	ns	10 U	-	5 U	0.5 U	10 U	10 U	-	5 U	5 U	0.06 UJ	0.037	0.042	0.037	0.032	0.2	0.4	0.03	-	-	0.02 U
Nickel	52	10.9 J	-	25.2	18.8	21.5 J	18.2 J	-	23.3	31.4	54.8	15	130	100	82	61	37	35	-	13.5	74
Selenium	5	5 U	-	2	1	5 U	0.68 J	-	1	3	3	0.2 U	0.54	0.2 U	0.2 U	0.2 U	0.2	0.2 U	-	35 U	0.2 U
Silver	3.2	0.5 UJ	-	0.03 UJ	0.1 J	0.5 U	0.5 UJ	-	0.03 UJ	0.06 UJ	0.06 J	0.011	0.014	0.01 U	0.01 U	0.01 U	0.02	0.01 U	-	10 UJ	0.033
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	50.5	-	83	44	56	59.2	-	78	146	89	28	110	110	120	130	170	160	-	-	110
Thallium	ns	1 U	-	0.05 J	0.07 J	1 U	0.024 J	-	0.05 J	0.07 J	0.15 UJ	0.05 U	0.1	0.11	0.13	0.07	0.06	0.05	-	25 U	0.05 U
Vanadium	ns	0.55 J	-	0.28 J	0.8	0.87 J	0.82 J	-	0.28 J	1.2	0.29 J	0.14	0.1 U	0.26	0.28	0.6	0.1 U	0.1 U	-	7 J	5.6
Zinc	106	168	-	475.8	308.5 J	336	307	-	424	481.7	810.3 J	310	1900	1800	1400	860	660	590	-	149	1200
Cyanide	ns	10 UJ	-	5 U	5 U	10 U	10 UJ	-	5 U	5 U	5 U	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																					
Aluminum	87	-	2338	8500	4800	4470	-	4938	7300	21000	18000	1900	22000	30000	26000	26000	22000	25000	12300 J	-	28000
Antimony	ns	-	2 U	1 U	0.02 UJ	2 U	-	1.7 J	0.07 J	1 U	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.06	0.04	0.04 U	5.6 UJ	-	0.02 U
Arsenic	ns	-	1 U	0.12 UJ	0.5 U	1 U	-	1 U	0.12 UJ	1 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	10 UJ	-	0.2 U
Barium	ns	-	11.9	10.7	10.9	12.6	-	10.9	10.9	10	8.3	20	14	12	19	11	7.4	6.1	14.1	-	22
Beryllium	ns	-	5 U	0.48 J	0.25 J	5 U	-	5 U	0.46 J	1.2	0.8	0.056	0.96	1.5	1.8	1.6	1.9	1.4	0.84 J	-	0.94
Cadmium	1.1	-	1	2.7	2.3	2.2	-	2	2.4	2	6	2.7	17	15	11	4.8	3	3.1	0.72 UJ	-	3
Chromium	11	-	0.48 J	4.1	1.9	10 U	-	1.6 J	2.9	6.3	6.1	1 U	11	12	7.4	9	13	13	5.8 J	-	11
Cobalt	ns	-	30 J	73.4	58.8	60	-	55.1	63.7	75.1	146.9	51	390	380	260	240	94	95	30.9	-	360
Copper	8.6	-	1025	1895	2250	2060	-	1970	1652	1565	7040	2000	13000	12000	7700	2700	2600	3300	3 J	-	280
Iron	1000	-	1667	10000	3400	3930	-	4613	9300	25000	6700	2500	7600	9700	11000	21000	24000	17000	65600	-	70000
Lead	3.2	-	0.14 J	0.65 J	0.6	0.48 J	-	0.41 J	0.64 J	1.2	1	0.16	0.75	0.81	1.1	0.76	2.5	1.1	. R	-	0.4
Manganese	ns	-	272	995.4	413.7	497 J	-	522	910.4	2317	1243	170	1800	1900	2000	3600	2900	2600	1920	-	2000
Mercury	0.012	-	0.1 U	0.2 U	0.2 U	0.1 U	-	0.1 U	0.2 U	0.2 U	0.2 U	-	-	-	-	-	-	-	0.2 UJ	-	-
Molybdenum	ns	-	10 U	5 U	0.5 U	10 U	-	10 U	5 U	5 U	0.5 U	0.023	0.02 U	0.02 U	0.026	0.2	1.2	0.03	-	-	0.023
Nickel	52	-	10.7 J	25.8	18.7	21.6 J	-	18 J	22.8	31.3	52.5	13	110	100	82	60	37	35	13.6	-	76
Selenium	5	-	5 U	1	0.8 J	5 U	-	5 U	1	3	3	0.21	0.64	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	35 U	-	0.2 U
Silver	3.2	-	0.5 U	0.1 U	0.5 U	0.5 U	-	0.5 U	0.1 U	0.07 UJ	0.5 U	0.01	0.01	0.01 U	0.01 U	0.01 U	0.01	0.01 U	10 UJ	-	0.11
Strontium	ns	-	47	80	40	56.7	-	56.9	80	140	90	27	110	110	130	130	180	160	-	-	110
Thallium	ns	-	1 U	0.05 UJ	0.05 UJ	1 U	-	1 U	0.05 UJ	0.06 UJ	0.13 UJ	0.05 U	0.1	0.1	0.11	0.08	0.05 U	0.06	7.8 J	-	0.05 U
Vanadium	ns	-	0.31 J	0.21 J	0.08 J	0.35 J	-	0.78 J	0.26 J	0.36 J	0.23 J	0.1 U	0.1 U	0.1 U	0.19	0.4	0.2	0.1	6.2 J	-	5.6
Zinc	106	-	162	489.7	320.8	345	-	304	431.7	488.6	796.1	290	1800	1700	1400	830	630	590	140	-	1300

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SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
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Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	URS	URS	NOBIS
Study Area		EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3
Station:		EM-SEEP9	EBT3-180M	EBT3-180M	EM-SEEP21/	EM-SEEP21/	EM-SEEP21/	EM-SEEP21/	EM-SEEP21/	EM-SEEP21/	EM-SEEP21/	SW-82	SW-82	SW-82	SW-81	SW-81	SW-81	EM-SEEP2	EM-SEEP2	EM-SEEP17	EM-SEEP17
Field Sample ID:		ES-9	MA1NL4	MA1NL5	ELY-SW-52	ELY-SW-52	SW-83X-080609AX	SW-83-111809AX	SW-83-111809AF	SW-83-111809AD	SW-83-111809AG	SW-82X-080409AX	SW-82-111709AX	SW-82-111709AF	SW-81X-080509AX	SW-81-111709AX	SW-81-111709AF	ES-2	ES-2	ELY-SW-46	SW-46X-080509AX
Date:		4/11/2002	10/5/2005	10/5/2005	5/2/2007	5/2/2007	8/6/2009	11/18/2009	11/18/2009	11/18/2009	11/18/2009	8/4/2009	11/17/2009	11/17/2009	8/5/2009	11/17/2009	11/17/2009	4/4/2002	4/11/2002	5/3/2007	8/5/2009
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	27000	-	25400 J	20000	16900	16900	18765	-	18792	-	16100	18300	-	21300	23100	-	21000	19000	17000	16500
Antimony	ns	0.02 U	-	60 U	0.02 UJ	2 U	2 U	2 U	-	2 U	-	2 U	2 U	-	2 U	2 U	-	0.44	0.02 U	0.11 UJ	2 U
Arsenic	ns	0.2 U	-	10 UJ	0.5 U	1 U	1 U	1 U	-	1 U	-	1 U	1 U	-	1 U	1 U	-	0.2 U	0.2 U	0.5 U	1 U
Barium	ns	10	-	12.4	10.4	14.6	14.6	13.9 J	-	14 J	-	16 J	14.6	-	10.9	11.1	-	6.3	6.8	11.1	15.4
Beryllium	ns	1.2	-	1.5	1	0.78 J	0.78 J	5 U	-	5 U	-	0.94 J	5 U	-	0.88 J	1.2 J	-	0.74	0.68	0.6	0.58 J
Cadmium	1.1	2.6	-	10	0.6	7.1 J	7.1 J	6.5 J	-	6.9 J	-	7 J	6.9 J	-	8.9 J	8.7 J	-	19	16	6	7 J
Chromium	11	10	-	8.4	5.7	6 J	6 J	3.6 J	-	3.6 J	-	10 U	3.6 J	-	12.1	8 J	-	19	16	6.9	5.7 J
Cobalt	ns	350	-	301	54.4	200	200	182 J	-	182 J	-	188 J	177	-	267	225	-	480	420	140.3	164
Copper	8.6	470	-	7050	164	7320	7320	6265	-	6039	-	7790	5988	-	9680	6958	-	19000	16000	6830	8120
Iron	1000	67000	-	3680	38000	4870	4870	1648	-	1615	-	5080 J	1110	-	7820	1660	-	6200	4400	1000	1930
Lead	3.2	0.26	-	. R	0.09 UJ	1	1	0.91 J	-	0.86 J	-	1.2	0.75 J	-	0.61 J	0.6 J	-	0.6	0.49	0.8	0.54 J
Manganese	ns	2000	-	2980	12000	1570	1570	1774	-	1776	-	1470 J	1700	-	1750	2040	-	2400	2100	1066	1360
Mercury	0.012	-	-	0.2 UJ	0.2 U	0.1 U	0.1 U	0.1 U	-	0.1 U	-	0.1 U	0.1 U	-	0.1 U	0.1 U	-	-	-	0.2 U	0.1 U
Molybdenum	ns	0.023	-	-	0.09 UJ	10 U	10 U	10 U	-	10 U	-	10 U	10 U	-	10 U	10 U	-	0.032	0.026	0.5 U	10 U
Nickel	52	74	-	116	16.9	74.5	74.5	74.4	-	74.2	-	73.9	-	-	90.2	-	-	140	130	52.6	61.4
Selenium	5	0.2 U	-	35 U	3	5 U	5 U	1.6 J	-	1.2 J	-	1.6 J	0.89 J	-	5 U	1.7 J	-	0.67	0.79	3	5 U
Silver	3.2	0.027	-	10 UJ	0.5 U	1 U	1 U	0.5 UJ	-	0.5 UJ	-	0.12 J	0.5 U	-	1 U	0.14 J	-	0.13	0.073	0.17 J	1 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	110	-	-	98	107	107	124	-	124	-	99.3	121	-	102	123	-	64	67	57	68.8
Thallium	ns	0.05 U	-	25 U	0.5 U	1 U	1 U	0.2 J	-	0.18 J	-	1 U	0.18 J	-	1 U	0.15 J	-	0.095	0.095	0.12 J	1 U
Vanadium	ns	5.8	-	50 U	4.4	0.32 J	0.32 J	0.28 J	-	0.5 J	-	1.3 J	0.28 J	-	0.39 J	1.1 J	-	0.1 U	0.76	0.14 J	0.6 J
Zinc	106	1100	-	1350	178.9 J	1050	1050	978	-	981	-	1010	919	-	1330	1240	-	2200	1900	738 J	985
Cyanide	ns	-	-	-	5 U	10 U	10 U	10 UJ	-	10 UJ	-	10 U	10 UJ	-	10 U	10 UJ	-	-	-	5 U	10 U
Dissolved Metals																					
Aluminum	87	29000	25900 J	-			17500	-	19205	-	18685	16000	-	18783	22800	-	23768	21000	19000	17000	16500
Antimony	ns	0.02 U	60 U	-	21000	17500	2 U	-	2 U	-	2 U	2 U	-	2 U	2 U	-	2 U	0.45	0.023	0.03 UJ	2 U
Arsenic	ns	0.2 U	6.2 UJ	-	0.5 U	2 U	1 U	-	1 U	-	1 U	1 U	-	1 U	1 U	-	1 U	0.2 U	0.2 U	0.5 U	1 U
Barium	ns	15	13.2	-	0.5 U	1 U	14.6	-	13.6	-	13.8	14.3 J	-	14.6	10.6	-	9.2	17	10	11.2	14.8
Beryllium	ns	1	1.6	-	10.7	14.6	5 U	-	1.2 J	-	0.82 J	5 U	-	0.96 J	5 U	-	0.53 J	0.66	0.73	0.6	5 U
Cadmium	1.1	2.7	10.4	-	0.9	5 U	6.9	-	6.7	-	6.8	7 J	-	6.9	8.6	-	8.6	20	17	6.2	6.6
Chromium	11	11	8.2	-	1	6.9	7 J	-	4.3 J	-	3.6 J	10 U	-	3.9 J	13.9	-	8.2 J	19	16	7	6.6 J
Cobalt	ns	350	309	-	5.7	7 J	210	-	183	-	179	194	-	186	280	-	233	490	420	140.6	167
Copper	8.6	190	7200	-	53.1	210	7490	-	6285	-	6202	7640	-	6069	9520	-	7018	19000	16000	6860	8010
Iron	1000	70000	3680	-	2.5 J	7490	4350	-	1560	-	1539	3600	-	1120	8200	-	1403	6200	3800	850	1530
Lead	3.2	0.27	. R	-	39000	4350	1	-	0.8 J	-	0.8 J	1.1	-	0.78 J	0.6 J	-	0.28 J	0.58	0.42	0.6	0.36 J
Manganese	ns	2100	3060	-	0.05 UJ	1	1540	-	1797	-	1781	1520 J	-	1791	1810 J	-	2110	2400	2100	1113	1330 J
Mercury	0.012	-	0.2 UJ	-	12000	1540	0.1 U	-	0.1 U	-	0.1 U	0.1 U	-	0.039 J	0.1 U	-	0.039 J	-	-	0.2 U	0.1 U
Molybdenum	ns	0.025	-	-	0.2 U	0.1 U	10 U	-	10 U	-	10 U	10 U	-	10 U	10 U	-	10 U	0.18	0.14	0.09 UJ	10 U
Nickel	52	74	120	-	0.5 U	10 U	80.1	-	73.5	-	72.5	74.7	-	75.7	94.9	-	90.6	140	130	52.4	63.5
Selenium	5	0.2 U	35 U	-	16.6	80.1	0.97 J	-	1.2 J	-	0.84 J	1.3 J	-	1 J	1.2 J	-	1.1 J	0.63	0.52	3	0.67 J
Silver	3.2	0.042	10 UJ	-	3	0.97 J	0.5 U	-	0.5 U	-	0.5 U	0.5 UJ	-	0.5 U	1 U	-	0.032 J	0.068	0.054	0.11 J	1 U
Strontium	ns	110	-	-	0.5 U	0.5 U	108	-	122	-	121	102	-	129	105	-	126	65	68	60	68
Thallium	ns	0.05 U	25 U	-	100	108	1 U	-	0.14 J	-	0.13 J	1 U	-	0.086 J	1 U	-	0.057 J	0.09	0.091	0.11 J	1 U
Vanadium	ns	5.8	50 U	-	0.5 U	1 U	0.35 J	-	0.3 J	-	0.39 J	5 UJ	-	0.45 J	5 U	-	0.5 J	0.1 U	0.1 U	0.5 U	5 U
Zinc	106	1100	1390	-	4.2	0.35 J	1070	-	969	-	950	1040	-	1000	1410	-	1322	2200	1900	803.6	1010

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	URS	NOBIS	NOBIS	NOBIS	URS	URS	URS	NOBIS	NOBIS	NOBIS	NOBIS	URS	NOBIS	NOBIS	NOBIS	URS	URS	NOBIS
Study Area		EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EBT3	EB-UR	EB-UR	EB-UR	EB-UR	EBT4	EBT4	EBT4
Station:		EM-SEEP17	EM-SEEP17	EM-SEEP18	EM-SEEP18	EM-SEEP18	EM-SEEP18	EM-SEEP21	EM-SEEP1	EM-SEEP1	EM-SEEP1/SW-78	EM-SEEP1/SW-78	EM-SEEP1/SW-78	EM-SEEP1/SW-78	EB-770M	EB-770M	EB-770M	EB-770M	EBT4-25M	EBT4-25M	EBT4-25M
Field Sample ID:		SW-46-111609AX	SW-46-111609AF	ELY-SW-47	SW-47X-080509AX	SW-47-111609-AX	SW-47-111609-AF	ELY-SW-52	ES-1	ES-1	SW-78X-080509AX	SW-78X-080509AD	SW-78-111609AX	SW-78-111609AF	ELY-SW-40	SW-40X-080409AX	SW-40-111709AX	SW-40-111709AF	ELY-SW-29	ELY-SW-29	SW-29X-080409AX
Date:		11/17/2009	11/17/2009	5/3/2007	8/5/2009	11/16/2009	11/16/2009	5/2/2007	4/4/2002	4/11/2002	8/5/2009	8/5/2009	11/16/2009	11/16/2009	5/2/2007	8/4/2009	11/17/2009	11/17/2009	11/2/2004	5/2/2007	8/4/2009
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	18400	-	26000	21100	23300	-	20000	70000	200000 >	20200	21000	19800	-	530	481	544	-	7900	3800	3600
Antimony	ns	2 U	-	0.5 U	2 U	2 U	-	0.02 UJ	0.02 U	0.02 U	2 U	2 U	2 U	-	0.02 UJ	2 U	2 U	-	1 U	0.5 U	2 U
Arsenic	ns	1 U	-	0.5 U	1 U	1 U	-	0.5 U	0.2 U	0.2 U	1 U	1 U	1 U	-	0.09 J	1 U	1 U	-	1 U	0.5 U	1 U
Barium	ns	11.9	-	1.7	11.6 J	4.2 J	-	10.4	22	12	10.9 J	11.3 J	14.9	-	13.1	16.3 J	13.4 J	-	23.1	26.7	34.5 J
Beryllium	ns	5 U	-	1.2	1.4 J	1.4 J	-	1	2.3	2.6	1.4 J	1.4 J	1.2 J	-	0.04 J	5 U	5 U	-	0.54 J	0.29 J	0.41 J
Cadmium	1.1	6.5 J	-	10	9.4 J	9.6 J	-	0.6	22	26	9.2 J	8.9 J	8.2 J	-	0.26 J	0.26 J	0.28 J	-	3.6	1.9	2 J
Chromium	11	3.4 J	-	19.4	14.7	14.6	-	5.7	84	130	12.5	12.9	5 J	-	0.11 J	10 U	10 U	-	0.66 J	0.41 J	10 U
Cobalt	ns	160	-	319.1	365 J	329	-	54.4	1400	1600	382 J	398 J	320	-	7.7	7 J	7.6 J	-	115.2	56.4	59.4 J
Copper	8.6	6795	-	12300	12300	9402	-	164	52000	77000	19500	19200	12769	-	309	308	318	-	4173	2290	2410
Iron	1000	330	-	23000	24700 J	28300	-	38000	24000	20000	2370 J	2410 J	2160	-	35 J	30.8 J	100 U	-	120	110	22.1 J
Lead	3.2	0.25 J	-	0.23 J	1.5	0.52 J	-	0.09 UJ	3.1	0.92	0.71 J	0.74 J	2.2	-	0.05 J	1 U	1 U	-	0.23 J	0.2 J	1 U
Manganese	ns	1610	-	1656	2030 J	1840	-	1446	5300	6000	2130 J	2200 J	1860	-	53.5	59.6 J	68.1 J	-	855.3	372.9	437 J
Mercury	0.012	0.1 U	-	0.2 U	0.1 U	0.1 U	-	0.2 U	-	-	0.1 U	0.1 U	0.1 U	-	0.2 U	0.1 U	0.1 U	-	0.2 U	0.2 U	0.1 U
Molybdenum	ns	10 U	-	0.5 U	10 U	10 U	-	0.09 UJ	0.73	0.37	10 U	10 U	10 U	-	0.5 U	10 U	10 U	-	5 U	0.5 U	10 U
Nickel	52	-	-	98.6	120	-	-	16.9	350	390	135	140	-	-	3.5	3.7 J	3.9 J	-	44.9	21.8	25.4 J
Selenium	5	1.3 J	-	5	3.9 J	2.4 J	-	3	7.9	7.2	3.4 J	3.4 J	2.9 J	-	1 U	5 UJ	5 U	-	2	0.9 J	5 UJ
Silver	3.2	0.072 J	-	0.06 J	0.24 J	0.083 J	-	0.5 U	0.34	0.3	0.13 J	0.11 J	0.15 J	-	0.5 U	0.5 UJ	0.5 UJ	-	0.03 UJ	0.5 U	0.5 UJ
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	79.4	-	134	173	177	-	98	180	180	180	189	209	-	33	39	41.6	-	141	74	82.1
Thallium	ns	0.14 J	-	0.16 J	1 U	0.16 J	-	0.5 U	0.25	0.22	1 U	1 U	0.2 J	-	0.5 U	1 U	1 U	-	0.11 J	0.09 J	1 U
Vanadium	ns	0.35 J	-	0.5 U	3.4 J	1.2 J	-	4.4	13	4.4	0.53 J	0.44 J	2.2 J	-	0.11 J	5 U	0.43 J	-	0.18 J	0.06 J	0.3 J
Zinc	106	883	-	1134 J	1220	1190	-	178.9 J	2300	2600	973	1010	816	-	33.1 J	37.9 J	37.5 J	-	504.6	198.6 J	249
Cyanide	ns	10 UJ	-	5 U	10 U	10 UJ	-	5 U	-	-	10 U	10 U	10 UJ	-	5 U	10 U	10 UJ	-	5 U	5 U	10 U
Dissolved Metals																					
Aluminum	87	-	18541	26000	21400	-	23205	21000	74000	200000 >	20400	21200	-	19047	49 J	98.6 J	-	78.5 J	7300	4000	3700
Antimony	ns	-	2 U	0.02 UJ	2 U	-	2 U	0.5 U	0.076	0.046	2 U	2 U	-	2 U	0.5 U	2 U	-	2 U	1 U	0.06 UJ	2 U
Arsenic	ns	-	1 U	0.5 U	1 U	-	1 U	0.5 U	0.42	0.36	1 U	1 U	-	1 U	0.5 U	1 U	-	1 U	1 U	0.5 U	1 U
Barium	ns	-	13.9	1.9	6.4	-	3.1 J	10.7	14	5.5	10.4	10 J	-	10.9	13.5	16.9 J	-	13.9	21.9	29.4	33.8 J
Beryllium	ns	-	0.54 J	1.2	1.6 J	-	1 J	0.9	2.4	2.7	1.5 J	1.7 J	-	0.81 J	0.5 U	5 U	-	5 U	0.5 J	0.34 J	5 U
Cadmium	1.1	-	6.2	10.5	9.4 J	-	9.8	1	23	25	9.3 J	9.3 J	-	8	0.21 J	0.26 J	-	0.22 J	3.4	2	2.1 J
Chromium	11	-	3.4 J	21	12.8	-	14.8	5.7	78	120	12.3	13.2	-	5.1 J	0.11 J	10 U	-	10 U	0.54 J	0.5	0.54 J
Cobalt	ns	-	161	332.3	375	-	335	53.1	1400	1600	388	406	-	323	7.3	50 U	-	8.1 J	109.1	61.2	61.1
Copper	8.6	-	6702	12500	12200	-	9305	2.5 J	52000	76000	19200	19300	-	12639	218	209	-	225	4153	2370	2520
Iron	1000	-	330	23000	19800	-	27449	39000	8600	14000	2050	2160	-	1454	50	100 U	-	100 U	35 J	100	100 U
Lead	3.2	-	0.42 J	0.25 J	0.5 J	-	0.29 J	0.05 UJ	0.17	0.05	0.62 J	0.62 J	-	1.3	0.5 U	1 U	-	1 U	0.2 UJ	0.2 J	1 U
Manganese	ns	-	1620	1778	2140 J	-	1856	1379	5200	5700	2200 J	2290 J	-	1859	54.9	60.4 J	-	64	813.8	419.1	448 J
Mercury	0.012	-	0.044 J	0.2 U	0.1 U	-	0.033 J	0.2 U	-	-	0.1 U	0.1 U	-	0.037 J	0.2 U	0.1 U	-	0.1 U	0.2 U	0.2 U	0.1 U
Molybdenum	ns	-	10 U	0.07 UJ	10 U	-	10 U	0.5 U	0.49	0.29	10 U	10 U	-	10 U	0.5 U	10 U	-	10 U	5 U	0.16 UJ	10 U
Nickel	52	-	64.5	102.5	120	-	100	16.6	350	380	134	140	-	115	3.2	4 J	-	4 J	42.7	23.4	25.6 J
Selenium	5	-	0.87 J	5	2.5 J	-	1.8 J	3	5.7	6.4	3.3 J	3.1 J	-	1.6 J	1 U	5 UJ	-	5 U	1 U	1	5 UJ
Silver	3.2	-	0.5 U	0.07 J	0.063 J	-	0.5 U	0.5 U	0.044	0.072	0.5 UJ	0.5 UJ	-	0.5 U	0.5 U	0.5 UJ	-	0.5 U	0.1 U	0.5 U	0.5 UJ
Strontium	ns	-	80.1	130	178	-	178	100	180	180	182	186	-	209	30	40.4	-	40.6	140	80	84.3
Thallium	ns	-	0.062 J	0.16 J	1 U	-	0.06 J	0.5 U	0.18	0.2	1 U	1 U	-	0.11 J	0.5 U	1 U	-	1 U	0.1 UJ	0.09 J	1 U
Vanadium	ns	-	0.36 J	0.5 U	0.36 J	-	0.84 J	4.2	0.1 U	0.1 U	5 UJ	0.45 J	-	0.26 J	0.1 J	0.27 J	-	5 U	0.05 UJ	0.07 J	5 UJ
Zinc	106	-	917	1199	1280	-	1219	192.3	2300	2500	991	1030	-	822	35.8	36.8 J	-	35.7 J	376.9	218.8	256

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TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	NOBIS	NOBIS	NOBIS	URS	NOBIS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS
Study Area		EBT4	EBT4	EBT4	EBT4	EBT4	EBT4	EBT4	EBT4	EBT4	EBT4	EBT4	EBT4	EBT4	EBT4	EBT4	EBT4	EBT2	EBT3	EBT4	EBT5
Station:		EBT4-25M	EBT4-25M	SW-80	SW-80	SW-80	SW-79	SW-79	SW-79	EM-SEEP19	EM-SEEP19	EM-SEEP19	EM-SEEP19	EM-SEEP12	SW-77	SW-77	SW-77	EBT2-7M	EBT2-7M	EBT2-7M	EBT2-7M
Field Sample ID:		SW-29-111709AX	SW-29-111709AF	SW-80X-080509AX	SW-80-111609AX	SW-80-111609AF	SW-79X-080609AX	SW-79-111609AX	SW-79-111609AF	ELY-SW-48	SW-48X-080509AX	SW-48-111609AX	SW-48-111609AF	ES-12	SW-77X-080509AX	SW-77-111609AX	SW-77-111609AF	ELY-SW-32	ELY-SW-32	SW-32X-080609AX	SW-32-111809AX
Date:		11/17/2009	11/17/2009	8/5/2009	11/16/2009	11/16/2009	8/6/2009	11/16/2009	11/16/2009	5/3/2007	8/5/2009	11/16/2009	11/16/2009	4/11/2002	8/5/2009	11/16/2009	11/16/2009	11/1/2004	5/2/2007	8/6/2009	11/18/2009
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	4030	-	5340	5590	-	10800	16900	-	1800	1830	1440	-	2400	1600	458	-	8900	6100	4990	5293
Antimony	ns	2 U	-	2 U	2 U	-	2 U	2 U	-	0.5 U	2 U	2 U	-	0.02 U	2 U	2 U	-	1 U	0.13 UJ	2 U	2 U
Arsenic	ns	1 UJ	-	1 U	1 U	-	1 U	1 U	-	0.5 U	1 U	1 U	-	0.2 U	1 U	1 U	-	0.12 UJ	0.09 J	1 U	1 U
Barium	ns	24	-	36.7 J	26.4	-	16.8	11.9	-	37.2	46.1 J	41.8	-	31	42.5 J	42.8	-	10.6	11	13.2	10.8 J
Beryllium	ns	5 U	-	0.53 J	5 U	-	0.89 J	1.2 J	-	0.16 J	5 U	5 U	-	0.1	5 U	5 U	-	0.49 J	0.24 J	0.27 J	5 U
Cadmium	1.1	2.1 J	-	2.5 J	2.5 J	-	3.8 J	4.5 J	-	1.2	1.5 J	1.7 J	-	2.2	0.45 J	0.3 J	-	2.6	2.2	2.2 J	1.9 J
Chromium	11	10 U	-	10 U	0.43 J	-	3.6 J	5.4 J	-	0.3 J	10 U	10 U	-	1 U	10 U	10 U	-	4.1	2.7	2.3 J	1.9 J
Cobalt	ns	56.1	-	83.2 J	74.2	-	175	206	-	22.4	28.5 J	18.4 J	-	43	30.2 J	11.2 J	-	72	57.7	57.8	54.4 J
Copper	8.6	2208	-	3180	2961	-	7240	6955	-	1140	1330	921	-	1300	1020	326	-	1864	2220	2030	1918
Iron	1000	100 U	-	100 UJ	100 U	-	1250	1020	-	190	35.1 J	19.3 J	-	29	26.2 J	74.7 J	-	11000	4300	5040	5447
Lead	3.2	0.067 J	-	1 U	0.087 J	-	0.23 J	0.49 J	-	0.26 J	0.22 J	0.14 J	-	0.32	0.22 J	0.12 J	-	0.65 J	1.4	0.82 J	0.42 J
Manganese	ns	473	-	596 J	613	-	1200	1590	-	147.4	211 J	192	-	240	161 J	126	-	975.9	390.5	506	528
Mercury	0.012	0.1 U	-	0.1 U	0.1 U	-	0.1 U	0.1 U	-	0.2 U	0.1 U	0.1 U	-	-	0.1 U	0.1 U	-	0.2 U	0.2 U	0.1 U	0.1 U
Molybdenum	ns	10 U	-	10 U	10 U	-	10 U	10 U	-	0.5 U	10 U	10 U	-	0.14	10 U	10 U	-	5 U	0.5 U	10 U	10 U
Nickel	52	-	-	33.1 J	-	-	62	-	-	8.9	12.1 J	-	-	13	10.9 J	-	-	25.2	18.8	21.5 J	18.2 J
Selenium	5	5 U	-	0.65 J	0.58 J	-	5 U	2 J	-	0.5 J	5 UJ	5 U	-	0.2 U	5 UJ	5 U	-	2	1	5 U	0.68 J
Silver	3.2	0.5 U	-	0.5 U	0.5 U	-	1 U	0.099 J	-	0.03 J	0.5 U	0.5 U	-	0.01 U	0.5 U	0.062 J	-	0.03 UJ	0.1 J	0.5 U	0.5 UJ
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	94.6	-	94.9	100	-	136	205	-	27	35.7	28.2	-	28	31.1	21.1	-	83	44	56	59.2
Thallium	ns	0.059 J	-	1 U	0.073 J	-	1 U	0.16 J	-	0.08 J	1 U	0.048 J	-	0.05 U	1 U	0.11 J	-	0.05 J	0.07 J	1 U	0.024 J
Vanadium	ns	0.33 J	-	0.27 J	5 U	-	5 UJ	0.92 J	-	0.16 J	5 U	0.36 J	-	0.1 U	5 U	5 U	-	0.28 J	0.8	0.87 J	0.82 J
Zinc	106	239	-	300	304	-	423	588	-	143.6 J	195	235	-	230	56 J	40.9 J	-	475.8	308.5 J	336	307
Cyanide	ns	3.4 J	-	10 U	10 UJ	-	10 U	10 UJ	-	5 U	10 U	10 UJ	-	-	10 U	10 UJ	-	5 U	5 U	10 U	10 UJ
Dissolved Metals																					
Aluminum	87	-	4024	5430	-	5395	11700	-	16846	1800	2910	-	1425	2400	1330	-	459	8500	4800	4470	-
Antimony	ns	-	2 U	2 U	-	2 U	2 U	-	2 U	0.02 UJ	2 U	-	2 U	0.02 U	2 U	-	2 U	1 U	0.02 UJ	2 U	-
Arsenic	ns	-	1 U	1 U	-	1 U	1 U	-	1 U	0.5 U	1 U	-	1 U	0.2 U	1 U	-	1 U	0.12 UJ	0.5 U	1 U	-
Barium	ns	-	23.5	36.6	-	26.3	16.1	-	10.6	36.2	43.2	-	41.5	38	43.9	-	40.9	10.7	10.9	12.6	-
Beryllium	ns	-	5 U	5 U	-	0.36 J	5 U	-	0.53 J	0.13 J	5 U	-	5 U	0.21	5 U	-	5 U	0.48 J	0.25 J	5 U	-
Cadmium	1.1	-	2.1	2.7 J	-	2.5	3.8	-	4.6	1.2	1.7 J	-	1.6	2.3	0.37 J	-	0.18 J	2.7	2.3	2.2	-
Chromium	11	-	10 U	10 U	-	0.58 J	10 U	-	5.3 J	0.2 J	10 U	-	10 U	1 U	10 U	-	10 U	4.1	1.9	10 U	-
Cobalt	ns	-	57.8	84	-	73	188	-	209	22.1	44.7 J	-	18.1 J	42	24.8 J	-	11.1 J	73.4	58.8	60	-
Copper	8.6	-	2223	3460	-	3018	7100	-	6902	1130	2240	-	900	1300	811	-	236	1895	2250	2060	-
Iron	1000	-	100 U	100 U	-	39.1 J	705	-	481	80	100 U	-	100 U	18	100 U	-	88.9 J	10000	3400	3930	-
Lead	3.2	-	0.09 J	0.28 J	-	0.11 J	1 U	-	0.24 J	0.2 J	0.23 J	-	0.17 J	0.29	1 U	-	0.091 J	0.65 J	0.6	0.48 J	-
Manganese	ns	-	486	616 J	-	596	1250 J	-	1618	147.6	305 J	-	193	240	141 J	-	128	995.4	413.7	497 J	-
Mercury	0.012	-	0.037 J	0.1 U	-	0.041 J	0.1 U	-	0.031 J	0.2 U	0.1 U	-	0.036 J	-	0.1 U	-	0.034 J	0.2 U	0.2 U	0.1 U	-
Molybdenum	ns	-	10 U	10 U	-	10 U	10 U	-	10 U	0.5 U	10 U	-	10 U	0.42	10 U	-	10 U	5 U	0.5 U	10 U	-
Nickel	52	-	25.3 J	33.3 J	-	29.6 J	66.6	-	75.6	8.8	17.9 J	-	8.3 J	13	9.5 J	-	4.8 J	25.8	18.7	21.6 J	-
Selenium	5	-	5 U	0.58 J	-	0.65 J	1.6 J	-	1.5 J	0.4 J	5 UJ	-	5 U	0.2 U	5 UJ	-	5 U	1	0.8 J	5 U	-
Silver	3.2	-	0.5 U	0.5 UJ	-	0.5 U	1 U	-	0.5 U	0.5 U	0.5 UJ	-	0.5 U	0.01 U	0.5 UJ	-	0.5 U	0.1 U	0.5 U	0.5 U	-
Strontium	ns	-	97.7	97.6	-	98.5	141	-	210	30	51.2	-	27.8	28	28.9	-	20.4	80	40	56.7	-
Thallium	ns	-	1 U	1 U	-	1 U	1 U	-	0.059 J	0.07 J	1 U	-	1 U	0.05 U	1 U	-	1 U	0.05 UJ	0.05 UJ	1 U	-
Vanadium	ns	-	0.68 J	5 UJ	-	0.56 J	5 U	-	0.51 J	0.5 U	5 UJ	-	1.1 J	0.1 U	5 UJ	-	0.48 J	0.21 J	0.08 J	0.35 J	-
Zinc	106	-	250	299	-	301	456	-	605	152.9	214	-	231	240	51.2 J	-	39.6 J	489.7	320.8	345	-

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	URS	NOBIS	NOBIS	NOBIS	URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	USGS	USGS	EPA	EPA	EPA	EPA	EPA	EPA
Study Area		EBT6	EBT5	EBT5	EBT5	EBT5	EBT5	EBT5	EBT5	EBT5	EBT5	EBT5	EBT5	Pond1,2.3	Pond1,2.3	Pond1,2.3	Pond1,2.3	Pond1,2.3	Pond1,2.3	Pond1,2.3	Pond1,2.3
Station:		EBT2-7M	EBT5-60M	EBT5-60M	EBT5-60M	EBT5-60M	EM-SEEP11	SW-72	SW-72	SW-72	SW-73	SW-73	SW-73	EM-POND1	EM-POND1	EM-POND1	EM-POND1	EM-POND1	EM-POND1	EM-POND1	EM-POND1
Field Sample ID:		SW-32-111809AF	ELY-SW-51	SW-51X-080409AX	SW-51-111809AX	SW-51-111809AF	ES-11	SW-72X-080609AX	SW-72-111809AX	SW-72-111809AF	SW-73X-080409AX	SW-73-111809AX	SW-73-111809AF	06ElyPond 1 FA	06ElyPond 1 RA	TSWP 1	TSWP 1	TSWP 1	TSWP 1	TSWP 1	TSWP 1
Date:		11/18/2009	5/2/2007	8/4/2009	11/18/2009	11/18/2009	4/8/2002	8/6/2009	11/18/2009	11/18/2009	8/4/2009	11/18/2009	11/18/2009	9/19/2006	9/19/2006	5/2/2007	5/10/2007	5/21/2007	5/28/2007	6/4/2007	6/11/2007
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	-	55 J	200 U	200 U	-	42	200 U	2352	-	200 U	200 U	-	-	388	-	-	-	-	-	-
Antimony	ns	-	0.02 UJ	2 U	2 U	-	0.02 U	2 U	2 U	-	2 U	2 U	-	-	0.3 U	-	-	-	-	-	-
Arsenic	ns	-	0.09 J	1 U	1 U	-	0.2 U	1 U	0.64 J	-	1 U	1 U	-	-	1 U	-	-	-	-	-	-
Barium	ns	-	8.9	11.6 J	10.6 J	-	7.2	12.9	33	-	14.3 J	10.8 J	-	-	12.2	-	-	-	-	-	-
Beryllium	ns	-	0.5 U	5 U	5 U	-	0.05 U	5 U	5 U	-	5 U	5 U	-	-	0.05 U	-	-	-	-	-	-
Cadmium	1.1	-	0.5 U	0.5 UJ	0.5 UJ	-	0.12	0.5 U	0.5 UJ	-	0.5 UJ	0.5 UJ	-	-	0.03	-	-	-	-	-	-
Chromium	11	-	0.16 UJ	10 U	10 U	-	1 U	10 U	4.3 J	-	10 U	10 U	-	-	1.2	-	-	-	-	-	-
Cobalt	ns	-	0.28 J	50 UJ	50 UJ	-	2.4	50 U	1.6 J	-	50 UJ	0.88 J	-	-	0.36	-	-	-	-	-	-
Copper	8.6	-	30	14.5	15.3	-	55	3.1	30.3	-	40.2	38.6	-	-	3.1	-	-	-	-	-	-
Iron	1000	-	60	28 J	60.3 J	-	230	225	3672	-	29.7 J	59.9 J	-	-	522	-	-	-	-	-	-
Lead	3.2	-	0.05 UJ	1 U	0.11 J	-	0.31	0.71 J	3.9	-	1 U	1 U	-	-	0.3	-	-	-	-	-	-
Manganese	ns	-	10.8	10.6 J	16.1 J	-	4	24.7	127 J	-	38.9 J	15.5 J	-	-	7.5	-	-	-	-	-	-
Mercury	0.012	-	0.2 U	0.1 U	0.1 U	-	-	0.1 U	0.1 U	-	0.1 U	0.1 U	-	-	-	-	-	-	-	-	-
Molybdenum	ns	-	0.11 UJ	10 U	10 U	-	0.02 U	10 U	10 U	-	10 U	10 U	-	-	2 U	-	-	-	-	-	-
Nickel	52	-	0.41 J	40 U	0.56 J	-	0.91	40 U	4.2 J	-	40 U	0.99 J	-	-	1	-	-	-	-	-	-
Selenium	5	-	1 U	5 UJ	5 U	-	0.2 U	5 U	0.57 J	-	5 U	5 U	-	-	1 U	-	-	-	-	-	-
Silver	3.2	-	0.5 U	0.5 UJ	0.5 UJ	-	0.018	0.5 U	0.07 J	-	0.5 UJ	0.5 UJ	-	-	3 U	-	-	-	-	-	-
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	-	40	52.8	53.1	-	20	57.8	57.3	-	60.1	50.6	-	-	21.8	-	-	-	-	-	-
Thallium	ns	-	0.5 U	1 U	1 U	-	0.05 U	1 U	0.057 J	-	1 UJ	1 U	-	-	0.1 U	-	-	-	-	-	-
Vanadium	ns	-	0.3 J	0.28 J	0.49 J	-	0.14	0.86 J	11.3	-	5 U	5 UJ	-	-	1.4	-	-	-	-	-	-
Zinc	106	-	20.9 J	7.2 J	3.7 J	-	8.3	3.9 J	9.8 J	-	8.3 J	6.5 J	-	-	3	-	-	-	-	-	-
Cyanide	ns	-	5 U	10 U	10 UJ	-	-	10 U	10 UJ	-	10 U	10 UJ	-	-	-	-	-	-	-	-	-
Dissolved Metals																					
Aluminum	87	4938	32 J	48.1 J	-	68.2 J	24	200 U	-	76.5 J	59.3 J	-	200 U	15.8	-	120 U	120 U	120 U	120 U	120 U	120 U
Antimony	ns	1.7 J	0.02 UJ	2 U	-	2 U	0.02 U	2 U	-	2 U	2 U	-	2 U	0.3 U	-	11 U	11 U	11 U	11 U	11 U	11 U
Arsenic	ns	1 U	0.5 U	1 U	-	1 U	0.2 U	1 U	-	1 U	1 U	-	1 U	1 U	-	22 U	22 U	22 U	22 U	22 U	22 U
Barium	ns	10.9	8.9	11.5 J	-	10.3	17	10.6	-	10.4	12.9 J	-	10.9	9.61	-	22 U	22 U	22 U	22 U	22 U	22 U
Beryllium	ns	5 U	0.5 U	5 U	-	0.27 J	0.05 U	5 U	-	5 U	5 U	-	5 U	0.05 U	-	9 U	9 U	9 U	9 U	9 U	9 U
Cadmium	1.1	2	0.5 U	0.5 UJ	-	0.5 U	0.13	0.5 U	-	0.5 U	0.5 UJ	-	0.5 U	0.02 U	-	11 U	11 U	11 U	11 U	11 U	11 U
Chromium	11	1.6 J	0.13 J	10 U	-	10 U	1 U	10 U	-	10 U	10 U	-	10 U	1 U	-	22 U	22 U	22 U	22 U	22 U	22 U
Cobalt	ns	55.1	0.13 J	50 U	-	0.46 J	2.5	50 U	-	50 U	50 U	-	1.1 J	0.03	-	22 U	22 U	22 U	22 U	22 U	22 U
Copper	8.6	1970	22	13.3	-	11.3	57	1 U	-	2.2	36	-	36.8	1.1	-	22 U	22 U	22 U	22 U	22 U	22 U
Iron	1000	4613	40 J	100 U	-	100 U	35	100 U	-	49.6 J	100 U	-	24.7 J	50 U	-	58	69	67	45 U	78	60
Lead	3.2	0.41 J	0.5 U	1 U	-	1 U	0.05 U	1 U	-	1 U	1 U	-	1 U	0.09	-	22 U	22 U	22 U	22 U	22 U	22 U
Manganese	ns	522	1	10.7 J	-	11.9 J	3.8	1.4 J	-	51.2	5.3 J	-	16.4	2.7	-	22 U	22 U	22 U	22 U	22 U	22 U
Mercury	0.012	0.1 U	0.2 U	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	0.1 U	-	0.1 U	-	-	-	-	-	-	-	-
Molybdenum	ns	10 U	0.12 UJ	10 U	-	10 U	0.026	10 U	-	10 U	10 U	-	10 U	2 U	-	-	-	-	-	-	-
Nickel	52	18 J	0.37 J	40 U	-	40 U	0.91	0.74 J	-	40 U	40 U	-	0.87 J	0.4 U	-	22 U	22 U	22 U	22 U	22 U	22 U
Selenium	5	5 U	1 U	5 UJ	-	5 U	0.2 U	5 U	-	5 U	5 UJ	-	5 U	1 U	-	22 U	22 U	22 U	22 U	45 U	45 U
Silver	3.2	0.5 U	0.5 U	0.5 UJ	-	0.5 U	0.01 U	0.5 U	-	0.5 U	0.5 UJ	-	0.5 U	3 U	-	11 U	11 U	11 U	11 U	11 U	11 U
Strontium	ns	56.9	40	53.5	-	53.9	20	55.3	-	49.3	56.4	-	49.5	20.5	-	-	-	-	-	-	-
Thallium	ns	1 U	0.5 U	1 U	-	1 U	0.05 U	1 U	-	1 U	1 U	-	1 U	0.1 U	-	22 U	45 U	22 U	22 U	45 U	22 U
Vanadium	ns	0.78 J	0.25 J	0.38 J	-	0.43 J	0.1 U	0.62 J	-	1.1 J	5 UJ	-	5 U	0.5 U	-	11 U	11 U	11 U	11 U	22 U	11 U
Zinc	106	304	8.3	5 J	-	3.8 J	22	3.1 J	-	60 U	6.1 J	-	8.3 J	2.3	-	39	36	22 U	22 U	37	45 U

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Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		USGS	USGS	USGS	USGS	EPA	EPA	USGS	USGS	EPA	EPA	EPA	EPA	EPA	EPA	USGS	USGS	EPA	EPA	EPA	USGS
Study Area		Pond1,2.3	Pond1,2.3	Pond1,2.3	Pond1,2.3	Pond4	Pond4	Pond4	Pond4	Pond4	Pond4	Pond4	Pond4	Pond4	Pond4	Pond5	Pond5	Pond5	Pond5	Pond5	Pond6
Station:		EM-POND2	EM-POND2	EM-POND3	EM-POND3	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND4	EM-POND5	EM-POND5	EM-POND5	EM-POND5	EM-POND5	EM-POND6
Field Sample ID:		06ElyPond2FA	06ElyPond2RA	06ElyPond3FA	06ElyPond3RA	AA62005	AA62296	06ElyPond4FA	06ElyPond4RA	TSWP 4	TSWP 4	TSWP 4	TSWP 4	TSWP 4	TSWP 4	06ElyPond5FA	06ElyPond5RA	TSWP 5	TSWP 5	TSWP 5	06ElyPond6FA
Date:		9/19/2006	9/19/2006	9/19/2006	9/19/2006	6/19/2006	6/23/2006	9/19/2006	9/19/2006	5/2/2007	5/10/2007	5/21/2007	5/28/2007	6/4/2007	6/11/2007	9/19/2006	9/19/2006	5/2/2007	5/10/2007	5/21/2007	9/19/2006
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	-	34.4	-	21.2	28	18 B	-	41.2	-	-	-	-	-	-	-	427	-	-	-	-
Antimony	ns	-	0.3 U	-	0.3 U	0.5 U	0.5 U	-	0.3 U	-	-	-	-	-	-	-	0.3 U	-	-	-	-
Arsenic	ns	-	1 U	-	1 U	1 U	1 U	-	1 U	-	-	-	-	-	-	-	1 U	-	-	-	-
Barium	ns	-	14.1	-	13	12	12 B	-	14.6	-	-	-	-	-	-	-	13.5	-	-	-	-
Beryllium	ns	-	0.05 U	-	0.05 U	0.2 U	0.2 U	-	0.05 U	-	-	-	-	-	-	-	0.06	-	-	-	-
Cadmium	1.1	-	0.02 U	-	0.02 U	0.2 U	0.2 U	-	0.07	-	-	-	-	-	-	-	1.04	-	-	-	-
Chromium	11	-	1 U	-	1 U	1.5 B	1.5 B	-	1 U	-	-	-	-	-	-	-	1 U	-	-	-	-
Cobalt	ns	-	0.18	-	0.26	0.44	0.42	-	0.56	-	-	-	-	-	-	-	20.2	-	-	-	-
Copper	8.6	-	1.3	-	1.4	30	32	-	19.3	-	-	-	-	-	-	-	518	-	-	-	-
Iron	1000	-	1240	-	1020	300 J2	350 B,	-	412	-	-	-	-	-	-	-	87	-	-	-	-
Lead	3.2	-	0.09	-	0.07	0.2 U	0.2 U	-	0.09	-	-	-	-	-	-	-	0.05 U	-	-	-	-
Manganese	ns	-	226	-	454	100	130	-	241	-	-	-	-	-	-	-	387	-	-	-	-
Mercury	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	ns	-	2 U	-	2 U	0.5 U	0.5 U	-	2 U	-	-	-	-	-	-	-	2 U	-	-	-	-
Nickel	52	-	0.4	-	0.4 U	1	0.97 B	-	0.9	-	-	-	-	-	-	-	7.5	-	-	-	-
Selenium	5	-	1 U	-	1 U	1 U	1 U	-	1 U	-	-	-	-	-	-	-	1 U	-	-	-	-
Silver	3.2	-	3 U	-	3 U	0.2 U	0.2 U	-	3 U	-	-	-	-	-	-	-	3 U	-	-	-	-
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	-	31.9	-	36.1	-	-	-	39.6	-	-	-	-	-	-	-	43.3	-	-	-	-
Thallium	ns	-	0.1 U	-	0.1 U	0.5 U	0.5 U	-	0.1 U	-	-	-	-	-	-	-	0.1 U	-	-	-	-
Vanadium	ns	-	0.5 U	-	0.5 U	0.2 U	0.2 U	-	0.5 U	-	-	-	-	-	-	-	0.5 U	-	-	-	-
Zinc	106	-	1.1	-	0.8	17 B	16 B	-	17.7	-	-	-	-	-	-	-	143	-	-	-	-
Cyanide	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																					
Aluminum	87	6.5	-	6.2	-	11	14	5.5	-	120 U	120 U	120 U	120 U	120 U	120 U	10.1	-	120 U	120 U	120 U	1410
Antimony	ns	0.3 U	-	0.62	-	0.5 U	0.5 U	0.3 U	-	11 U	11 U	11 U	11 U	11 U	11 U	0.3 U	-	11 U	11 U	11 U	0.52
Arsenic	ns	1 U	-	1 U	-	0.5 U	0.5 U	1 U	-	22 U	22 U	22 U	22 U	22 U	22 U	1 U	-	22 U	22 U	22 U	1 U
Barium	ns	13.5	-	12.5	-	12	12	18.6	-	22 U	22 U	22 U	22 U	22 U	22 U	13.7	-	22 U	22 U	22 U	13.2
Beryllium	ns	0.05 U	-	0.05 U	-	0.2 U	0.2 U	0.05 U	-	9 U	9 U	9 U	9 U	9 U	9 U	0.05 U	-	9 U	9 U	9 U	0.2
Cadmium	1.1	0.02 U	-	0.02 U	-	0.2 U	0.2 U	0.08	-	11 U	11 U	11 U	11 U	11 U	11 U	1.02	-	11 U	11 U	11 U	2.28
Chromium	11	1 U	-	1 U	-	0.5 U	0.5 U	1 U	-	22 U	22 U	22 U	22 U	22 U	22 U	1 U	-	22 U	22 U	22 U	1 U
Cobalt	ns	0.13	-	0.23	-	1.7	1.6	0.41	-	22 U	22 U	22 U	22 U	22 U	22 U	20.4	-	22 U	22 U	22 U	46.3
Copper	8.6	2.9	-	1.7	-	25	39	13.4	-	45	22 U	64	22	62	22 U	444	-	380	240	670	1380
Iron	1000	324	-	243	-	150	190	84	-	120	140	83	130	120	150	50 U	-	45 U	45 U	45 U	434
Lead	3.2	0.08	-	0.1	-	0.2 U	0.2 U	0.1	-	22 U	22 U	22 U	22 U	22 U	22 U	0.05 U	-	22 U	22 U	22 U	0.4
Manganese	ns	201	-	435	-	94	130	212	-	33	31	48	69	140	76	386	-	92	90	170	564
Mercury	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	ns	2 U	-	2 U	-	0.5 U	0.5 U	2 U	-	-	-	-	-	-	-	2 U	-	-	-	-	2 U
Nickel	52	0.4	-	0.6	-	1.1	1.3	1.3	-	22 U	22 U	22 U	22 U	22 U	22 U	7.7	-	22 U	22 U	22 U	16.7
Selenium	5	1 U	-	1 U	-	1 U	1 U	1 U	-	22 U	22 U	22 U	22 U	45 U	45 U	1 U	-	22 U	22 U	22 U	1 U
Silver	3.2	3 U	-	3 U	-	0.2 U	0.2 U	3 U	-	11 U	11 U	11 U	11 U	11 U	11 U	3 U	-	11 U	11 U	11 U	3 U
Strontium	ns	29.5	-	34.8	-	-	-	38.2	-	-	-	-	-	-	-	43.4	-	-	-	-	50.4
Thallium	ns	0.1 U	-	0.1 U	-	0.5 U	0.5 U	0.1 U	-	22 U	45 U	22 U	22 U	45 U	22 U	0.1 U	-	22 U	45 U	22 U	0.1 U
Vanadium	ns	0.5 U	-	0.5 U	-	0.2 U	0.2 U	0.5 U	-	11 U	11 U	11 U	11 U	22 U	11 U	0.5 U	-	11 U	11 U	11 U	0.5 U
Zinc	106	11.5	-	2.4	-	15	19	14.8	-	33	41	27	22 U	65	45 U	143	-	110	70	160	325

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		USGS	URS	EPA	EPA	EPA	EPA	USGS	USGS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		Pond6	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-LR
Station:		EM-POND6	SB-20M	SB-20M	SB-20M	SB-35M	SB-35M	SB-140M	SB-140M	SB-540M	SB-540M	SB-540M	SB-540M	SB-540M	SB-540M	SB-540M	SB-540M	SB-1140M	SB-1140M	SB-1360M	SB-1360M
Field Sample ID:		06ElyPond6RA	ELY-SW-27	AA62012	AA62303	MA1PZ6	MA1PZ7	06Ely08AFA	06Ely08ARA	SB-3	SB-3	SB-3	SB-3	SB-3	SB-3	SB-3	SB-3	SWU-09-52L	SWU-12-52L	ELY-QS-01	ELY-SW-01
Date:		9/19/2006	11/4/2004	6/19/2006	6/23/2006	4/11/2007	4/11/2007	8/21/2006	8/21/2006	3/29/2002	3/31/2002	4/10/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	5/3/2001	9/10/2001	11/3/2004	11/3/2004
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	2040	170	160	160	-	317	-	215	350	700	320	250	200	110	42	20	268	133 J	200	200
Antimony	ns	0.3 U	1 U	0.5 U	0.5 U	-	60 U	-	0.67	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.1	0.04 U	0.05 U	2.5 U	2.9 U	1 U	0.12 UJ
Arsenic	ns	1 U	0.14 J	1 U	1 U	-	10 U	-	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.6 U	2.6 U	4.6 U	0.18 UJ	0.09 J
Barium	ns	12.6	15.1	12	13 B	-	10.6	-	16.6	11	14	9	9.9	15	22	27	25	11.2 J	25.4 J	15.1	13.8
Beryllium	ns	0.2	1 U	0.2 U	0.2 U	-	5 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.3 U	0.1 U	1 U	1 U
Cadmium	1.1	2.28	1 U	0.2 U	0.2 U	-	5 UJ	-	0.07	0.29	0.2	0.082	0.15	0.13	0.08	0.04	0.02	0.6 U	0.2 U	1 U	1 U
Chromium	11	1 U	0.22 J	3.8 B	2.7 B	-	0.81 J	-	1 U	1 U	1.1	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U	0.4 U	0.22 J	0.22 J
Cobalt	ns	46.4	1.6	1.4	1.8	-	2 U	-	1.47	6.2	4.4	1.7	3.5	3.2	2.3	0.08	0.02 U	1.3 J	1.1 U	1.7	1.6
Copper	8.6	1440	43.1	56	58	-	67.8	-	55	170	140	49	97	57	21	11	6	70.3	10.9 J	50.5	46
Iron	1000	528	160	140 B,	430 B,	-	304	-	236	520	800	330	210	110	76	54	56	226	13.9 J	170	170
Lead	3.2	0.4	0.16 J	0.2 U	16	-	10 U	-	0.1	0.2	0.65	0.31	0.13	0.05 U	0.05 U	0.05	0.05 U	2.8 U	1.8 U	0.06 J	0.06 J
Manganese	ns	579	17.1	13	19 B	-	27.7	-	20.3	30	55	26	22	22	16	2.9	1.1	20.8	0.84 J	20.8	19.2
Mercury	0.012	-	0.2 U	-	-	-	0.17	-	-	-	-	-	-	-	-	-	-	0.1 U	0.1 U	0.2 U	0.2 U
Molybdenum	ns	2 U	0.09 UJ	0.5 U	0.5 U	-	-	-	2 U	0.077	0.049	0.046	0.065	0.088	0.32	0.4	0.4	-	-	0.07 UJ	0.28 UJ
Nickel	52	16.7	0.85 J	1.1	1.8 B	-	40 U	-	0.8	1.6	2	0.87	0.94	0.77	1.2	0.4	0.2	1.1 U	1.6 U	0.84 J	0.76 J
Selenium	5	1 U	1 U	1 U	1 U	-	35 U	-	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5	0.2 U	2 U	3.4 U	1 U	1 U
Silver	3.2	3 U	0.1 U	0.2 U	0.2 U	-	10 U	-	3 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04	0.01 U	0.5 U	0.3 U	0.1 U	0.1 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	52.6	148	-	-	-	-	-	144	77	64	51	74	120	150	230	200	-	-	146	144
Thallium	ns	0.1 U	1 U	0.5 U	0.5 U	-	25 U	-	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	3.4 U	5.1 U	1 U	1 U
Vanadium	ns	5.1	0.18 J	0.2 U	0.2 U	-	50 U	-	0.5 U	0.24	1.2	0.55	0.18	0.12	0.2	0.1 U	0.2 U	1 U	0.7 U	0.23 J	0.2 J
Zinc	106	328	12.2	12 B	13 B		11.9	-	10.3	27	21	8.8	25	13	8	9	3	12.7 J	1.7 J	11.8	13.5
Cyanide	ns	-	5 U																	5 U	5 U
Dissolved Metals																					
Aluminum	87	-	90 J	120	120	86.5	-	93.5	-	24	48	49	87	100	87	39	21	-	104 J	120	110
Antimony	ns	-	1 U	0.5 U	0.5 U	60 U	-	0.3 U	-	0.024	1.7	0.11	0.02 U	0.02 U	0.1	0.05	0.05 U	-	2.9 U	1 U	1 U
Arsenic	ns	-	1 U	0.5 U	0.5 U	10 U	-	1 U	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.6 U	-	4.6 U	0.12 J	1 U
Barium	ns	-	14.5	12	13	9.1	-	14.8	-	22	58	12	18	22	22	27	25	-	325	14.5	13.1
Beryllium	ns	-	1 U	0.2 U	0.2 U	5 U	-	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.1 U	1 U	1 U
Cadmium	1.1	-	1 U	0.2 U	0.2 U	5 UJ	-	0.05	-	0.25	0.14	0.076	0.13	0.11	0.06	0.03	0.02	-	0.2 U	1 U	1 U
Chromium	11	-	0.21 J	0.5 U	0.5 U	10 U	-	1 U	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	-	0.4 U	0.19 J	0.11 J
Cobalt	ns	-	1.5	2.3	3.2	2.8 U	-	1.1	-	5.8	3.4	1.5	3.4	3.1	2.1	0.03	0.02 U	-	1.1 U	1.6	1.4
Copper	8.6	-	22	49	41	37.9	-	20.4	-	33	40	33	42	26	12	10	6	-	0.9 U	31.9	26.2
Iron	1000	-	34 J	76	81	37.9	-	50 U	-	48	64	62	61	23	40	45	57	-	9.8 U	60	46 J
Lead	3.2	-	1 U	0.2 U	0.87	10 U	-	0.1	-	0.074	0.16	0.05 U	0.11	0.05 U	0.05 U	0.05 U	0.05 U	-	1.8 U	0.06 J	1 U
Manganese	ns	-	15.8	14	16	15.6	-	13.6	-	23	18	8.6	20	21	16	2.3	1.1	-	1.5 J	18.5	16.6
Mercury	0.012	-	0.2 U	-	-	0.15 J	-	0.005 U	-	-	-	-	-	-	-	-	-	-	0.1 U	0.2 U	0.2 U
Molybdenum	ns	-	0.09 UJ	0.5 U	0.5 U	-	-	2 U	-	0.15	0.13	0.095	0.064	0.093	0.34	0.4	0.4	-	-	0.1 UJ	0.07 UJ
Nickel	52	-	0.87 J	1.3	1.3	40 U	-	1	-	1.3	0.86	0.36	0.84	0.71	1.2	0.3	0.2	-	1.6 U	0.83 J	0.68 J
Selenium	5	-	1 U	1 U	1 U	35 U	-	1 U	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5	0.2	-	3.4 U	1 U	1 U
Silver	3.2	-	0.1 U	0.2 U	0.2 U	10 U	-	3 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.06	0.01 U	-	0.3 U	0.1 U	0.1 U
Strontium	ns	-	150	-	-	-	-	134	-	78	61	49	75	120	150	230	200	-	-	140	140
Thallium	ns	-	1 U	0.5 U	0.5 U	25 U	-	0.1 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	5.1 U	1 U	1 U
Vanadium	ns	-	0.13 J	0.2 U	0.2 U	50 U	-	0.5 U	-	0.1 U	0.1 U	0.1 U	0.1 U	0.13	0.3	0.1 U	0.2 U	-	0.7 U	0.16 J	0.13 J
Zinc	106	-	10.5	11	8.3	11.1	-	12.8	-	38	42	14	25	18	3	4	1	-	68.8	11.1	7.7

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		USGS	USGS	USGS	USGS	EPA	EPA	URS	URS	URS	URS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS
Study Area		SHB-LR	SHB-LR	SHB-LR	SHB-LR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR
Station:		SB-1360M	SB-1360M	SB-2400M	SB-2400M	SB-2860M	SB-2860M	SB-2900M	SB-2920M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M
Field Sample ID:		06Ely07AFA	06Ely07ARA	06Ely06AFA	06Ely06ARA	AA62011	AA62302	ELY-SW-02	ELY-SW-03	SB-2	SB-2	SB2-0402S10RA	SB2-0402S11RA	SB2-0402S1RA	SB2-0402S2RA	SB2-0402S3RA	SB2-0402S4RA	SB2-0402S5RA	SB2-0402S6RA	SB2-0402S7RA	SB2-0402S8RA
Date:		8/23/2006	8/23/2006	8/22/2006	8/22/2006	6/19/2006	6/23/2006	11/4/2004	11/4/2004	3/28/2002	3/31/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	-	170	-	234	240	190	230	320	770	1400	390	380	470	460	460	440	430	420	410	410
Antimony	ns	-	0.3 U	-	0.3 U	0.5 U	0.5 U	1 U	1 U	0.076	0.028	0.34	0.2	2.9	0.11	3.6	0.025	0.042	0.11	0.08	5.8
Arsenic	ns	-	1 U	-	1 U	1 U	1 U	0.19 J	0.14 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Barium	ns	-	18.5	-	19.5	14	12 B	15.2	17.5	14	18	9	8.8	9.7	9.6	9.8	9.5	9.5	9.2	9.1	9.1
Beryllium	ns	-	0.05 U	-	0.05 U	0.2 U	0.2 U	1 U	1 U	0.05 U	0.059	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Cadmium	1.1	-	0.09	-	0.11	0.2 U	0.2 U	1 U	0.15 J	0.51	0.26	0.25	0.25	0.28	0.25	0.26	0.24	0.23	0.24	0.24	0.26
Chromium	11	-	1 U	-	1 U	4.5 B	2.2 B	0.23 J	0.29 J	1 U	2.9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cobalt	ns	-	2.09	-	3.16	3.3	3.1	2.7	3.7	11	7.8	6.8	6.8	7.3	6.8	6.6	6.3	6.4	6.4	6.5	6.7
Copper	8.6	-	55.2	-	68.4	110	89	67.4	95	300	220	200	200	220	210	200	190	190	190	200	200
Iron	1000	-	175	-	179	230 B,	290 B,	240	330	1000	1700	530	520	640	620	610	590	570	560	550	540
Lead	3.2	-	0.06	-	0.07	0.2 U	0.2 U	0.1 J	0.16 J	0.54	1.1	0.17	0.16	0.49	0.32	0.37	0.27	0.25	0.22	0.22	0.35
Manganese	ns	-	20.9	-	34.2	29	31 B	30.6	41.9	61	110	37	36	46	44	43	43	40	40	39	38
Mercury	0.012	-	-	-	-	-	-	0.2 U	0.2 U	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	ns	-	2 U	-	2 U	0.5 U	-	0.08 UJ	0.07 UJ	0.045	0.02 U	0.046	0.035	0.033	0.02	0.02 U	0.02 U	0.02	0.033	0.034	0.064
Nickel	52	-	0.9	-	1.1	1.7	2 B	1.1	1.4	3.1	3.6	1.7	1.6	2.2	1.9	1.9	1.7	1.7	1.7	1.7	1.7
Selenium	5	-	1 U	-	1 U	1 U	1 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Silver	3.2	-	3 U	-	3 U	0.2 U	0.2 U	0.1 U	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	-	155	-	158	-	-	157	164	79	70	62	62	62	62	61	61	62	62	62	61
Thallium	ns	-	0.1 U	-	0.1 U	0.5 U	0.5 U	1 U	1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vanadium	ns	-	0.5 U	-	0.5 U	0.2 U	0.2 U	0.18 J	0.18 J	0.78	2.7	0.29	0.29	0.47	0.54	0.59	0.56	0.46	0.42	0.44	0.35
Zinc	106	-	13	-	15.8	22 B	17 B	18.7	23.9	46	36	29	30	32	29	30	27	27	28	29	31
Cyanide	ns	-	-	-	-	-	-	5 U	5 U	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																					
Aluminum	87	84.4	-	128	-	160	160	97 J	96 J	4.6	62	-	-	-	-	-	-	-	-	-	-
Antimony	ns	0.3 U	-	0.3 U	-	0.5 U	0.5 U	1 U	1 U	0.12	0.055	-	-	-	-	-	-	-	-	-	-
Arsenic	ns	1 U	-	1 U	-	0.5 U	0.5 U	1 U	1 U	0.2 U	0.2 U	-	-	-	-	-	-	-	-	-	-
Barium	ns	18.4	-	18.5	-	13	14	16.1	16.3	45	19	-	-	-	-	-	-	-	-	-	-
Beryllium	ns	0.05 U	-	0.05 U	-	0.2 U	0.2 U	1 U	1 U	0.05 U	0.05 U	-	-	-	-	-	-	-	-	-	-
Cadmium	1.1	0.07	-	0.08	-	0.2 U	0.2 U	0.15 J	1 U	0.46	0.22	-	-	-	-	-	-	-	-	-	-
Chromium	11	1 U	-	1 U	-	0.5 U	0.5 U	0.18 J	0.11 J	1 U	1 U	-	-	-	-	-	-	-	-	-	-
Cobalt	ns	1.94	-	2.82	-	4.2	3.7	3.3	3.4	11	6.4	-	-	-	-	-	-	-	-	-	-
Copper	8.6	21.6	-	25	-	85	79	32.7	33.1	58	66	-	-	-	-	-	-	-	-	-	-
Iron	1000	50 U	-	50 U	-	110	130	26 J	20 J	120	100	-	-	-	-	-	-	-	-	-	-
Lead	3.2	0.05 U	-	0.05 U	-	0.2 U	0.2 U	1 U	1 U	0.05 U	0.05 U	-	-	-	-	-	-	-	-	-	-
Manganese	ns	19.1	-	31.5	-	26	26	35.9	37.2	40	32	-	-	-	-	-	-	-	-	-	-
Mercury	0.012	0.005 U	-	0.005 U	-	-	-	0.2 U	0.2 U	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	ns	2 U	-	2 U	-	0.5 U	0.5 U	0.09 UJ	0.07 UJ	0.064	0.082	-	-	-	-	-	-	-	-	-	-
Nickel	52	1.1	-	1.2	-	1.7	1.6	1.3	1.3	2.3	1.2	-	-	-	-	-	-	-	-	-	-
Selenium	5	1 U	-	1 U	-	1 U	1 U	0.3 J	1 U	0.2 U	0.2 U	-	-	-	-	-	-	-	-	-	-
Silver	3.2	3 U	-	3 U	-	0.2 U	0.2 U	0.1 U	0.1 U	0.01 U	0.01 U	-	-	-	-	-	-	-	-	-	-
Strontium	ns	152	-	158	-	-	-	170	160	76	62	-	-	-	-	-	-	-	-	-	-
Thallium	ns	0.1 U	-	0.1 U	-	0.5 U	0.5 U	1 U	1 U	0.05 U	0.05 U	-	-	-	-	-	-	-	-	-	-
Vanadium	ns	0.5 U	-	0.5 U	-	0.2 U	0.2 U	0.12 J	0.1 J	0.1 U	0.1 U	-	-	-	-	-	-	-	-	-	-
Zinc	106	19.8	-	6.6	-	17	18	17.7	18.3	63	48	-	-	-	-	-	-	-	-	-	-

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	URS	URS	URS	URS	URS	URS	URS
Study Area		SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR
Station:		SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2940M	SB-2960M
Field Sample ID:		SB2-0402S9RA	SB2-0403S10RA	SB2-0403S11RA	SB2-0403S12RA	SB2-0403S1RA	SB2-0403S2RA	SB2-0403S3RA	SB2-0403S4RA	SB2-0403S5RA	SB2-0403S6RA	SB2-0403S7RA	SB2-0403S8RA	SB2-0403S9RA	SB-2	SB-2	SB-2	SB-2	SB-2	SB-2	SWU-09-51C
Date:		4/2/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/10/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	5/3/2001
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	390	340	330	350	480	420	420	410	400	370	360	360	360	480	540	360	330	60	36	325
Antimony	ns	3.4	0.035	0.02	0.03	0.023	0.34	0.071	0.02	0.02 U	0.02 U	0.02 U	0.031	0.062	0.02 U	0.02 U	0.02 U	0.1	0.04 U	0.05 U	2.5 U
Arsenic	ns	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.6 U	2.6 U
Barium	ns	8.9	8.6	8.7	8.6	10	9.2	9.1	9	9.1	8.8	9	9	8.7	11	12	16	24	28	27	11 J
Beryllium	ns	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.08	0.05 U	0.05 U	0.3 U
Cadmium	1.1	0.26	0.25	0.24	0.23	0.26	0.26	0.27	0.27	0.26	0.26	0.25	0.25	0.25	0.13	0.24	0.26	0.3	0.2	0.1	0.6 U
Chromium	11	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U
Cobalt	ns	6.7	6.6	6.5	6.4	6.8	6.9	7.3	7.3	7.1	7	6.8	6.8	6.6	2.9	5.7	6.5	9	4.5	2.7	2.8 J
Copper	8.6	200	190	190	190	200	200	210	210	210	200	200	200	190	78	160	140	92	49	32	94.4
Iron	1000	530	490	480	500	650	570	590	590	580	540	530	510	500	500	450	240	280	200	170	288
Lead	3.2	0.25	0.13	0.13	0.14	0.24	0.19	0.19	0.19	0.17	0.17	0.17	0.13	0.13	0.37	0.56	0.051	0.06	0.05 U	0.05 U	2.8 U
Manganese	ns	38	34	33	33	41	40	39	37	38	36	36	35	33	38	42	41	64	36	20	28.1
Mercury	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1 U
Molybdenum	ns	0.04	0.02 U	0.02 U	0.02 U	0.023	0.028	0.024	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.065	0.038	0.06	0.2	0.3	0.2	-
Nickel	52	1.7	1.6	1.6	1.5	1.8	1.7	1.8	1.8	1.7	1.6	1.6	1.6	1.6	1.3	1.5	1.5	2.5	1.2	0.7	1.2 J
Selenium	5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5	0.2 U	2 U
Silver	3.2	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01	0.01 U	0.67 J
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	62	61	63	62	63	62	62	62	62	63	63	63	62	54	76	130	160	260	220	-
Thallium	ns	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	3.4 U
Vanadium	ns	0.35	0.24	0.28	0.25	0.56	0.36	0.36	0.35	0.33	0.32	0.3	0.25	0.27	0.97	0.38	0.12	0.2	0.2	0.2 U	1 U
Zinc	106	30	28	28	28	30	30	33	33	30	30	29	30	29	16	31	36	46	28	20	25.6
Cyanide	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																					
Aluminum	87	-	-	-	-	-	-	-	-	-	-	-	-	-	65	56	78	120	48	30	-
Antimony	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	0.024	0.02 U	0.02 U	0.1	0.06	0.05 U	-
Arsenic	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.6 U	-
Barium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	81	15	21	24	28	27	-
Beryllium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Cadmium	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	0.12	0.22	0.22	0.2	0.1	0.09	-
Chromium	11	-	-	-	-	-	-	-	-	-	-	-	-	-	1 U	1 U	1 U	1 U	1 U	1 U	-
Cobalt	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	2.7	5.4	6.2	8.5	4.4	2.6	-
Copper	8.6	-	-	-	-	-	-	-	-	-	-	-	-	-	46	49	40	24	27	18	-
Iron	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	90	33	20	43	56	80	-
Lead	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Manganese	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	14	32	40	62	35	20	-
Mercury	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	0.13	0.046	0.073	0.2	0.3	0.2	-
Nickel	52	-	-	-	-	-	-	-	-	-	-	-	-	-	0.71	1.3	1.5	2.2	1.1	0.6	-
Selenium	5	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2 U	0.2 U	0.2 U	0.2 U	0.4	0.2 U	-
Silver	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01 U	0.01 U	0.01 U	0.01 U	0.02	0.01 U	-
Strontium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	51	76	130	160	260	230	-
Thallium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Vanadium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1 U	0.1 U	0.1 U	0.2	0.1 U	0.2 U	-
Zinc	106	-	-	-	-	-	-	-	-	-	-	-	-	-	46	29	25	10	20	10	-

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SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	EPA	EPA	EPA	EPA	URS	USGS	USGS	EPA	EPA	URS
Study Area		SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR
Station:		SB-2960M	SB-2960M	SB-3020M	SB-3020M	SB-3020M	SB-3020M	SB-3020M	SB-3020M	SB-3100M	SB-3100M	SB-3100M	SB-3100M	SB-3100M	SB-3100M	SB-3125M	SB-3125M	SB-3125M	SB-3245M	SB-3245M	SB-3250M
Field Sample ID:		SWF-12-51L	SWU-12-51L	ELY-SW-04	ELY-SW-04	ELY-SW-04 DUP	SW-04X-080709AX	SW-04-111909AX	SW-04-111909AF	MA1NN2	MA1NN3	AA62010	AA62301	MA1PZ4	MA1PZ5	ELY-SW-05	06Ely19AFA	06Ely19ARA	AA62009	AA62299	ELY-SW-06
Date:		9/10/2001	9/10/2001	11/4/2004	5/2/2007	5/2/2007	8/7/2009	11/18/2009	11/19/2009	10/5/2005	10/5/2005	6/19/2006	6/23/2006	4/11/2007	4/11/2007	11/4/2004	8/22/2006	8/22/2006	6/19/2006	6/23/2006	11/4/2004
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	-	134 J	420	240	240	394 U	289 U	-	-	232 J	260	210	-	755	380	-	364	340	1500	430
Antimony	ns	-	2.9 U	1 U	0.05 UJ	0.06 UJ	2 U	2 U	-	-	60 U	0.5 U	0.5 U	-	60 U	1 U	-	0.3 U	0.63 J3	0.7	1 U
Arsenic	ns	-	4.6 U	0.12 J	0.09 UJ	0.13 UJ	1 U	1 U	-	-	10 U	1 U	1 U	-	10 U	0.13 J	-	1 U	1 U	1 U	0.14 J
Barium	ns	-	24.9 J	17.8	11.8	11.6	17	12.9 J	-	-	23.3	14	14	-	13.5	17.6	-	20.6	13	11 B	17.5
Beryllium	ns	-	0.1 U	1 U	0.5 U	0.5 U	5 U	5 U	-	-	5 U	0.2 U	0.2 U	-	5 U	1 U	-	0.05 U	0.2 U	0.2 U	1 U
Cadmium	1.1	-	0.2 U	0.12 J	0.08 UJ	0.1 J	1 U	0.5 UJ	-	-	5 U	0.2 U	0.2 U	-	5 UJ	0.14 J	-	0.15	0.2 U	1.2	0.14 J
Chromium	11	-	0.4 U	0.46 J	0.41 UJ	0.37 UJ	10 U	10 U	-	-	10 U	4.3 B	3.6 B	-	1.2	0.32 J	-	1 U	3.8 B,J3	2.2 B	0.48 J
Cobalt	ns	-	3.5 J	3.5	2.2	2.1	2 J	2.4 J	-	-	2.1	3.4	3.3	-	3.5 U	3.5	-	4.5	4	25	4.1
Copper	8.6	-	32.6	105.9	77	74	70.6	70.4	-	-	57.2	110	100	-	92.5	107.5	-	118	130	1100	119.1
Iron	1000	-	184	470	170	160	484	251	-	-	255	460 J1	250 B,	-	815	370	-	368	280 BJ2	260 BJ2	380
Lead	3.2	-	1.8 U	0.13 J	0.1 UJ	0.14 UJ	0.26 J	1 U	-	-	. R	0.2 U	0.2 U	-	10 U	0.35 J	-	0.08	0.2 U	0.23	0.1 J
Manganese	ns	-	30.1	48.2	25	24.5	48	26.5 J	-	-	32.3	32	33	-	61.5	43.1	-	48	35	260	47.4
Mercury	0.012	-	0.1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	-	-	0.055 UJ	-	-	-	0.13 J	0.2 U	-	-	-	-	0.2 U
Molybdenum	ns	-	-	5 U	0.33 UJ	0.29 UJ	10 U	10 U	-	-	-	0.5 U	0.5 U	-	-	0.07 UJ	-	2 U	0.5 U	0.5 U	5 U
Nickel	52	-	1.6 J	1.5	1.2	1.2	40 U	1.3 J	-	-	40 U	5.5	1.9 B	-	1.8 J	1.4	-	1.7	1.9	8.9	1.6
Selenium	5	-	3.4 U	1 U	1 U	1 U	5 U	5 U	-	-	35 UJ	1 U	1 U	-	8.5 J	1 U	-	1 U	1 U	1 U	1 U
Silver	3.2	-	0.3 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 UJ	-	-	10 UJ	0.2 U	0.2 U	-	10 U	0.1 U	-	3 U	0.2 U	0.2 U	0.1 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	-	-	162	94	92	128	122	-	-	-	-	-	-	-	163	-	157	-	-	163
Thallium	ns	-	5.1 U	1 U	0.5 U	0.5 U	1 U	1 U	-	-	25 U	0.5 U	0.5 U	-	25 U	1 U	-	0.1 U	0.5 U	0.5 U	1 U
Vanadium	ns	-	0.7 U	0.44 J	0.34 J	0.31 J	0.86 J	0.43 J	-	-	50 U	0.2 U	0.2 U	-	0.86 J	0.22 J	-	0.5 U	0.2 U	0.2 U	0.21 J
Zinc	106	-	16.4 J	26.3	13.3 J	39.6 J	17.3 J	14.3 J	-	-	15.6	20 B	22 B	-	20.5	21.5	-	24.7	24 B	150	34.6
Cyanide	ns	-	-	5 U	5 U	5 U	10 U	10 UJ	-	-	-	-	-	-	-	5 U	-	-	-	-	5 U
Dissolved Metals																					
Aluminum	87	77.6 J	-	96 J	140	89 J	200 U	-	294	91.9 J	-	170	170	124	-	100	124	-	210	220	110
Antimony	ns	2.9 U	-	1 U	0.05 UJ	0.05 UJ	2 U	-	2 U	60 U	-	0.5 U	0.5 U	60 U	-	1 U	0.78	-	0.5 U	0.5 U	1 U
Arsenic	ns	4.6 U	-	0.09 J	0.5 U	0.5 U	1 U	-	1 U	7.1 UJ	-	0.5 U	0.5 U	10 U	-	1 U	1 U	-	0.5 U	0.5 U	0.11 J
Barium	ns	289	-	16.2	11.6	10.9	15.5	-	12.8	22.3	-	13	14	9.1	-	16.5	19.8	-	13	14	16
Beryllium	ns	0.1 U	-	1 U	0.5 U	0.5 U	5 U	-	5 U	5 U	-	0.2 U	0.2 U	5 U	-	1 U	0.05 U	-	0.2 U	0.2 U	1 U
Cadmium	1.1	0.2 U	-	1 U	0.09 J	0.07 J	1 U	-	0.5 U	5 U	-	0.2 U	0.2 U	5 UJ	-	1 U	0.12	-	0.2 U	0.2 U	0.14 J
Chromium	11	0.4 U	-	0.15 J	0.18 J	0.1 J	10 U	-	10 U	10 U	-	0.5 U	0.5 U	10 U	-	0.54 J	1 U	-	0.5 U	0.5 U	0.18 J
Cobalt	ns	3.2 J	-	3	2	1.9	50 U	-	2.8 J	2.9	-	3.7	4.2	3.6 U	-	3.3	4.31	-	4.8	4.9	3.7
Copper	8.6	17.4 J	-	34.2	61	41	29.9	-	51.3	21	-	93	84	55.1	-	43.9	42.8	-	110	100	58.9
Iron	1000	86.5 J	-	22 J	90	50	100 U	-	116	31.3 U	-	120	130	86	-	43 J	50 U	-	140	180	140
Lead	3.2	1.8 U	-	1 U	0.03 UJ	0.03 UJ	1 U	-	1 U	. R	-	0.2 U	0.2 U	10 U	-	1 U	0.07	-	0.2 U	0.2 U	1 U
Manganese	ns	29.7	-	36.7	17.5	16.4	30.6 J	-	25.5	32.3	-	27	27	21.5	-	39.5	43.8	-	33	35	42.4
Mercury	0.012	0.1 U	-	0.2 U	0.2 U	0.2 U	0.1 U	-	0.1 U	0.2 UJ	-	-	-	0.17	-	0.2 U	0.005 U	-	-	-	0.2 U
Molybdenum	ns	-	-	0.08 UJ	0.18 UJ	0.22 UJ	10 U	-	10 U	-	-	0.5 U	0.5 U	-	-	0.08 UJ	2 U	-	0.5 U	0.5 U	0.1 UJ
Nickel	52	1.6 U	-	1.3	1	0.9	1.4 J	-	0.89 J	40 U	-	1.7	1.6	1.2 J	-	1.4	1.5	-	1.9	1.9	1.5
Selenium	5	3.4 U	-	0.3 J	1 U	1 U	5 U	-	5 U	35 UJ	-	1 U	1 U	35 U	-	0.2 J	1 U	-	1 U	1 U	0.3 J
Silver	3.2	0.3 U	-	0.1 U	0.5 U	0.5 U	0.5 U	-	0.5 U	10 UJ	-	0.2 U	0.2 U	10 U	-	0.1 U	3 U	-	0.2 U	0.2 U	0.1 U
Strontium	ns	-	-	160	90	90	130	-	118	-	-	-	-	-	-	160	157	-	-	-	160
Thallium	ns	5.1 U	-	1 U	0.5 U	0.5 U	1 U	-	1 U	25 U	-	0.5 U	0.5 U	2.8 UJ	-	1 U	0.1 U	-	0.5 U	0.5 U	1 U
Vanadium	ns	0.7 U	-	0.12 J	0.14 J	0.11 J	5 U	-	0.3 J	50 U	-	0.2 U	0.2 U	50 U	-	0.12 J	0.5 U	-	0.2 U	0.2 U	0.13 J
Zinc	106	18.8 J	-	16.1	15.5	12.2	10.4 J	-	13.7 J	9.8	-	20	20	12.5	-	17.9	15.6	-	22	22	49.5

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	EPA	EPA	URS	URS	URS	URS	URS	URS	URS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	URS
Study Area		SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-UR	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background
Station:		SB-3250M	SB-3255M	SB-3255M	SB-3255M	SB-3255M	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3290M	SB-3300M	SB-3300M	SB-3300M
Field Sample ID:		ELY-SW-06	MA1NN0	MA1NN1	MA1PZ0	MA1PZ1	SB-1	SB-1	SB-1	SB-1	SB-1	SB-1	SB-1	SB-1	ELY-SW-38	SW-38X-080709AX	SW-38-111909AX	SW-38-111909AF	SWU-09-48C	SWF-12-48R	SWU-12-48R
Date:		5/2/2007	10/5/2005	10/5/2005	4/11/2007	4/11/2007	3/28/2002	3/31/2002	4/10/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	5/3/2007	8/7/2009	11/19/2009	11/19/2009	5/3/2001	9/5/2001	9/5/2001
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	360	-	210 J	-	942	300	730	470	52	17	37	30	23	91 J	200 U	200 U	-	155 J	-	135 J
Antimony	ns	0.13 UJ	-	60 U	-	60 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.1	0.03 U	0.05	0.05 UJ	2 U	2 U	-	2.5 U	-	2.9 U
Arsenic	ns	0.5 U	-	10 U	-	10 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.3 U	0.6 U	0.09 UJ	1 U	1 U	-	2.6 U	-	4.6 U
Barium	ns	11.6	-	23	-	13.4	13	16	11	11	15	23	27	28	12.1	15.5	12.8 J	-	11.7 J	-	22.8 J
Beryllium	ns	0.5 U	-	5 U	-	5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	5 U	5 U	-	0.3 U	-	0.1 U
Cadmium	1.1	0.15 J	-	5 U	-	5 UJ	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02	0.02	0.5 U	0.5 U	0.5 UJ	-	0.6 U	-	0.2 U
Chromium	11	0.44 J	-	10 U	-	1.6	1 U	1.4	1 U	1 U	1 U	1 U	1 U	1 U	0.38 UJ	10 U	10 U	-	0.6 U	-	0.4 U
Cobalt	ns	3.5	-	2	-	4.9	0.22	0.5	0.3	0.02 U	0.02 U	0.03	0.02 U	0.03	0.1 J	50 U	50 UJ	-	1 U	-	1.1 U
Copper	8.6	124	-	44.5	-	163	0.94	1.7	1.1	0.66	0.5 U	0.6	1	2	10 U	2 U	2 U	-	1.5 J	-	0.9 U
Iron	1000	280	-	254	-	1030	300	700	430	54	26	71	83	140	80	105 U	35.7 J	-	116	-	54.8 J
Lead	3.2	0.24 J	-	. R	-	10 U	0.38	0.82	0.43	0.056	0.05 U	0.05 U	0.05 U	0.06	0.11 UJ	1 U	0.036 J	-	2.8 U	-	1.8 U
Manganese	ns	33.3	-	29.4	-	77.7	26	59	36	8.3	6.6	11	7.7	13	13.9	15.8	8 J	-	14.2 J	-	10.8 J
Mercury	0.012	0.2 U	-	0.2 UJ	-	0.14 J	-	-	-	-	-	-	-	-	0.2 U	0.1 U	0.1 U	-	0.1 U	-	0.1 U
Molybdenum	ns	0.5 U	-	-	-	-	0.024	0.03	0.024	0.049	0.076	0.34	0.2	0.2	0.21 UJ	10 U	10 U	-	-	-	-
Nickel	52	1.6	-	40 U	-	1.6 J	0.46	1.4	0.83	0.1 U	0.1 U	0.6	0.1	0.5	0.6	40 U	0.61 J	-	1.1 U	-	1.6 U
Selenium	5	1 U	-	35 UJ	-	35 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	1 U	5 U	5 U	-	2 U	-	3.4 U
Silver	3.2	0.04 J	-	10 UJ	-	10 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.5 U	0.5 U	0.5 UJ	-	0.5 U	-	0.3 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	88	-	-	-	-	83	72	53	84	130	160	230	190	97	132	130	-	-	-	-
Thallium	ns	0.5 U	-	25 U	-	25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	1 U	1 U	-	3.4 U	-	5.1 U
Vanadium	ns	0.32 J	-	50 U	-	0.73 J	0.61	1.6	0.99	0.2	0.16	0.3	0.3	0.2 U	0.35 J	0.34 J	0.3 J	-	1 U	-	0.7 U
Zinc	106	21.4 J	-	13.1	-	24.9	4.1	4.9	2.6	1.4	0.5 U	20	10	3	432.5 J	2.9 J	60 U	-	4.5 J	-	0.9 U
Cyanide	ns	5 U	-	-	-	-	-	-	-	-	-	-	-	-	5 U	10 U	10 UJ	-	-	-	-
Dissolved Metals																					
Aluminum	87	180	69 J	-	74.6	-	4.6	10	9.3	6.4	5.8	9.1	10	5.7	100 U	200 U	-	200 U	-	74.6 J	-
Antimony	ns	0.03 UJ	60 U	-	60 U	-	0.11	0.071	0.057	0.02 U	0.02 U	0.22	0.03 U	0.05 U	0.04 UJ	2 U	-	2 U	-	2.9 U	-
Arsenic	ns	0.11 J	10 U	-	10 U	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.3 U	0.6 U	0.5 U	1 U	-	1 U	-	4.6 U	-
Barium	ns	12	23	-	9.3	-	110	20	75	17	26	23	27	28	11.8	15	-	12.9	-	23.2 J	-
Beryllium	ns	0.5 U	5 U	-	5 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	5 U	-	5 U	-	0.1 U	-
Cadmium	1.1	0.13 J	5 U	-	5 UJ	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 J	0.5 U	-	0.5 U	-	0.2 U	-
Chromium	11	0.39 J	10 U	-	10 U	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.16 J	10 U	-	10 U	-	0.58 J	-
Cobalt	ns	3.6	3.6	-	5.7	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.06 J	50 U	-	50 U	-	1.1 U	-
Copper	8.6	89	19	-	86.3	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1	0.9	1.1 J	0.66 J	-	0.66 J	-	0.9 U	-
Iron	1000	210	53.2	-	160	-	22	20	16	16	16	46	55	72	37 J	100 U	-	100 U	-	10 J	-
Lead	3.2	0.04 J	. R	-	10 U	-	0.082	0.05 U	0.05 U	0.058	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	1 U	-	1 U	-	1.9 J	-
Manganese	ns	28.5	30.4	-	34.1	-	5.9	4.6	2.8	5.9	5.4	6	5.1	4.3	5.3	8.5 J	-	7.6 J	-	5.3 J	-
Mercury	0.012	0.2 U	0.2 UJ	-	0.099 J	-	-	-	-	-	-	-	-	-	0.2 U	0.1 U	-	0.1 U	-	0.1 U	-
Molybdenum	ns	0.09 UJ	-	-	-	-	0.051	0.045	0.04	0.056	0.081	0.34	0.2	0.3	0.14 UJ	10 U	-	10 U	-	-	-
Nickel	52	1.6	40 U	-	1.3 J	-	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.6	0.1 U	0.2	0.39 J	0.86 J	-	40 U	-	1.6 U	-
Selenium	5	1 U	35 UJ	-	35 U	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	1 U	5 U	-	5 U	-	3.4 U	-
Silver	3.2	0.5 U	10 UJ	-	10 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.5 U	0.5 U	-	0.5 U	-	0.3 U	-
Strontium	ns	90	-	-	-	-	84	66	50	82	130	160	230	230	100	142	-	120	-	-	-
Thallium	ns	0.5 U	25 U	-	5.5 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	1 U	-	1 U	-	5.1 U	-
Vanadium	ns	0.17 J	50 U	-	50 U	-	0.1 U	0.1 U	0.1 U	0.1 U	0.27	0.4	0.2	0.2 U	0.17 J	5 U	-	0.26 J	-	0.7 U	-
Zinc	106	27.4	10.5	-	20.5	-	35	21	34	11	12	1	2	1	49.4	2.7 J	-	60 U	-	2.1 J	-

Notes: Units are in µg/L = micrograms per liter
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TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	EPA	EPA	USGS	USGS	URS	URS	URS	URS	URS	URS	URS	URS	URS	EPA	EPA	URS	URS	URS	URS
Study Area		SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-Background	SHB-UR	SHB-Background	SHB-Background	SHB-Background	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR
Station:		SB-3510M	SB-3670M	SB-3670M	SB-3670M	SB-3670M	SB-2900M	SBT1-6M	SBT1-57M	SBT1-57M	OR-8350M	OR-8350M	OR-8350M	OR-8350M	OR-8350M	OR-11800M	OR-11800M	OR-11850M	OR-11850M	OR-11850M	OR-11850M
Field Sample ID:		ELY-SW-07	AA62008	AA62298	06Ely05AFA	06Ely05ARA	ELY-SW-02	ELY-SW-25	SWU-09-50C	SWU-12-50L	SWU-EM-EB1	SWU-04-45R	SWU-09-45L	SWF-12-45L	SWU-12-45L	MA1Q03	MA1Q02	SWF-01-35C	SWU-03-35R	SWU-09-35R	SWF-12-35R
Date:		11/4/2004	6/19/2006	6/23/2006	8/22/2006	8/22/2006	11/4/2004	11/4/2004	5/3/2001	9/10/2001	7/6/2000	9/20/2000	5/2/2001	9/5/2001	9/5/2001	4/9/2007	4/9/2007	5/8/2000	7/19/2000	5/1/2001	9/5/2001
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	44 J	38	46 B	-	33.3	230	35 J	85.9 J	101 J	200 U	163 U	379	-	95.4 J	149	-	88.2 J	238 U	212	-
Antimony	ns	1 U	0.5 U	0.5 U	-	0.3 U	1 U	1 U	2.5 U	2.9 U	5 U	4.6 U	3 U	-	2.9 U	60 U	-	2.4 U	4.9 U	3 U	-
Arsenic	ns	0.11 J	1 U	1 U	-	1 U	0.19 J	0.18 J	2.6 U	4.6 U	10 U	2.2 U	4 U	-	4.6 U	10 U	-	3.4 U	3.8 U	4 U	-
Barium	ns	17.9	13	14	-	20.4	15.2	9.1	6.8 J	19.8 J	200 U	20.7 U	14.9 J	-	20.3 J	10	-	13.2 J	16.5	12.3 J	-
Beryllium	ns	1 U	0.2 U	0.2 U	-	0.05 U	1 U	1 U	0.3 U	0.1 U	5 U	0.3 U	0.2 U	-	0.1 U	0.082 UJ	-	0.36 U	0.1 U	0.2 U	-
Cadmium	1.1	1 U	0.2 U	0.2 U	-	0.02 U	1 U	1 U	0.6 U	0.2 U	5 U	0.8 U	0.3 U	-	0.2 U	5 UJ	-	0.33 U	0.4 UJ	0.3 U	-
Chromium	11	0.13 J	3 B	2.6 B	-	1 U	0.23 J	0.13 J	0.6 U	0.4 U	10 U	1 U	1.1 J	-	0.4 U	10 U	-	0.64 U	0.7 U	0.7 U	-
Cobalt	ns	0.04 J	0.2 U	0.2 U	-	0.02 U	2.7	0.04 J	1 U	1.1 U	50 U	3.1 U	1.1 U	-	1.1 U	0.56 UJ	-	0.8 U	1.1 U	1.1 U	-
Copper	8.6	0.35 J	0.94	5 U	-	0.5 U	67.4	0.33 J	1.8 J	1.1 J	25 U	2.7 U	13 J	-	1.9 J	8.2	-	9.2 J	11.4 J	10.4 J	-
Iron	1000	31 J	86 B,	160 B,	-	50 U	240	20 J	29.2 J	19.5 J	300 U	166	361	-	74.5 J	185	-	129 J	144 J	181	-
Lead	3.2	1 U	0.2 U	0.2 U	-	0.05 U	0.1 J	1 U	2.8 U	1.8 U	5 U	1 U	1.5 U	-	1.8 U	10 UJ	-	1.6 U	2 UJ	1.5 U	-
Manganese	ns	9.1	9.9	15 B	-	8.8	30.6	1.7	4.2 J	3.4 J	22.4	40.5	38.1	-	18.3	20.1	-	23	35.2	22.7	-
Mercury	0.012	0.2 U	-	-	-	-	0.2 U	0.2 U	0.1 U	0.1 U	1 U	0.1 U	0.1 U	-	0.1 U	0.12 J	-	0.06 U	0.1 U	0.1 U	-
Molybdenum	ns	0.07 UJ	0.5 U	0.5 U	-	2 U	0.08 UJ	5 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	52	0.22 J	0.68	1.1 B	-	0.4 U	1.1	0.28 J	1.1 U	1.6 U	40 U	3 U	1.5 J	-	1.6 U	40 U	-	1 U	2 U	1.5 U	-
Selenium	5	1 U	1 U	1 U	-	1 U	1 U	1 U	2 U	3.4 U	10 U	1.9 U	3.4 U	-	3.4 U	35 U	-	2 U	2.2 U	3.4 U	-
Silver	3.2	0.1 U	0.2 U	0.2 U	-	3 U	0.1 U	0.1 U	0.5 U	0.3 U	10 U	1.1 U	0.8 U	-	0.3 U	10 U	-	0.96 U	0.6 U	0.8 U	-
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	170	-	-	-	166	157	139	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	ns	1 U	0.5 U	0.5 U	-	0.1 U	1 U	1 U	3.4 U	5.1 U	10 U	3.7 U	3.9 U	-	5.1 U	25 U	-	2.7 U	9.5 U	3.9 U	-
Vanadium	ns	0.21 J	0.2 U	0.2 U	-	0.5 U	0.18 J	0.16 J	1 U	0.7 U	50 U	3.7 U	0.9 U	-	0.7 U	50 U	-	0.72 U	1.3 UJ	0.9 U	-
Zinc	106	1.33 J	7.8 B	5.3 B	-	2.8	18.7	1.2 J	4.2 J	1.5 J	20 U	5.3 U	12.8 J	-	1.4 J	5.2	-	4.5 J	3100	6.4 J	-
Cyanide	ns	5 U	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 U	4.5 U	-	-
Dissolved Metals							97 J	23 UJ	-	104 J											
Aluminum	87	22 UJ	11	11	12.8	-	1 U	1 U	-	2.9 U	-	133 U	-	90.8 J	-	-	38	37 J	60 J	-	122 J
Antimony	ns	1 U	0.5 U	0.5 U	0.3 U	-	1 U	1 U	-	4.6 U	-	4.6 U	-	2.9 U	-	-	60 U	2.4 U	2.39 U	-	2.9 U
Arsenic	ns	1 U	0.5 U	0.5 U	1 U	-	16.1	8.5	-	325	-	2.2 U	-	4.6 U	-	-	10 U	3.4 U	3.45 U	-	4.6 U
Barium	ns	16.6	13	15	20.5	-	1 U	1 U	-	0.1 U	-	374	-	22.2 J	-	-	9.2	13 J	17.1 J	-	22.9 J
Beryllium	ns	1 U	0.2 U	0.2 U	0.05 U	-	0.15 J	1 U	-	0.2 U	-	0.3 U	-	0.1 U	-	-	0.083 UJ	0.36 U	1.2 J	-	0.1 U
Cadmium	1.1	1 U	0.2 U	0.2 U	0.02 U	-	0.18 J	0.2 J	-	0.4 U	-	0.8 U	-	0.2 U	-	-	5 UJ	0.33 U	0.33 U	-	0.2 U
Chromium	11	0.14 J	0.5 U	0.5 U	1 U	-	3.3	1 U	-	1.1 U	-	1.7 J	-	0.55 J	-	-	10 U	3.4 J	3.3 J	-	0.4 U
Cobalt	ns	0.03 J	0.43	1.9	0.02 U	-	32.7	0.35 J	-	0.9 U	-	3.1 U	-	1.1 U	-	-	50 U	0.8 U	0.797 U	-	1.1 J
Copper	8.6	0.31 J	0.85	0.36	0.5 U	-	26 J	50 U	-	9.8 U	-	2.7 U	-	2.6 J	-	-	4.7	10.3 J	6.7 J	-	2.7 J
Iron	1000	50 U	50 U	50 U	50 U	-	1 U	1 U	-	1.8 U	-	554	-	28.1 J	-	-	25.6	69.6 J	128 J	-	22.5 J
Lead	3.2	0.05 J	0.2 U	0.2 U	0.05	-	35.9	0.95 J	-	1.5 J	-	2.8 U	-	2.5 J	-	-	10 UJ	2.1 J	1.59 U	-	2.6 J
Manganese	ns	7	6	8.5	5.6	-	0.2 U	0.2 U	-	0.1 U	-	29.3	-	15.1	-	-	12.8	15.3	19.6	-	34.1
Mercury	0.012	0.2 U	-	-	0.005 U	-	0.09 UJ	5 U	-	-	-	0.1 U	-	0.1 U	-	-	0.16	0.06 U	0.06 U	-	0.1 U
Molybdenum	ns	0.08 UJ	0.5 U	0.5 U	2 U	-	1.3	0.28 J	-	1.6 U	-	-	-	-	-	-	-	-	-	-	-
Nickel	52	0.26 J	0.75	0.9	0.4 U	-	2050	1530	-	2280 J	-	3 U	-	1.6 U	-	-	40 U	1 U	4.2 J	-	1.6 U
Selenium	5	1 U	1 U	1 U	1 U	-	0.3 J	0.2 J	-	3.4 U	-	1.9 U	-	3.4 U	-	-	35 U	2 U	3.6 J	-	3.4 U
Silver	3.2	0.1 U	0.2 U	0.2 U	3 U	-	0.1 U	0.1 U	-	0.3 U	-	1.1 U	-	0.42 J	-	-	10 U	0.96 U	0.963 U	-	0.36 J
Strontium	ns	170	-	-	166	-	170	140	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	ns	1 U	0.5 U	0.5 U	0.1 U	-	1 U	1 U	-	5.1 U	-	3.7 U	-	5.1 U	-	-	25 U	2.7 U	5 J	-	5.1 U
Vanadium	ns	0.18 J	0.2 U	0.2 U	0.5 U	-	0.12 J	0.11 J	-	0.7 U	-	3.7 U	-	0.7 U	-	-	50 U	0.72 U	0.717 U	-	0.7 U
Zinc	106	1.87 J	5.3	5 U	2.8	-	17.7	1.64 J	-	68.8	-	25.3	-	1.4 J	-	-	4	14 J	11.7 J	-	2.2 J

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	EPA	EPA	EPA	EPA	URS	URS
Study Area		EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR
Station:		OR-11850M	OR-15000M	OR-15000M	OR-15000M	OR-15000M	OR-15000M	OR-15000M	OR-15000M	OR-15200M	OR-15200M	OR-17400M	OR-19150M	OR-19150M	OR-19150M	OR-19560M	OR-19560M	OR-22390M	OR-22390M	OR-22450M	OR-22450M
Field Sample ID:		SWU-12-35R	OR-3	OR-3	OR-3	OR-3	OR-3	OR-3	OR-3	SWU-09-56R	SWU-12-56R	SWU-12-55L	SWU-09-54L	SWF-12-54R	SWU-12-54R	MA1Q00	MA1Q01	MA1PZ8	MA1PZ9	OR-2	OR-2
Date:		9/5/2001	3/31/2002	4/10/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	5/3/2001	9/10/2001	9/10/2001	5/3/2001	9/10/2001	9/10/2001	4/9/2007	4/9/2007	4/9/2007	4/9/2007	3/29/2002	3/31/2002
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	92.1 J	180	370	93	40	32	32	6.8	242	110 J	124 J	204	-	122 J	-	143	-	112	120	470
Antimony	ns	2.9 U	0.02	0.02 U	0.02 U	0.02 U	0.2	0.03 U	0.06	2.5 U	2.9 U	2.9 U	2.5 U	-	2.9 U	-	60 U	-	60 U	0.02	0.24
Arsenic	ns	4.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.3 U	0.6 U	2.6 U	4.6 U	4.6 U	2.6 U	-	4.6 U	-	10 U	-	10 U	0.2 U	0.2 U
Barium	ns	22.2 J	11	12	11	15	20	24	27	14.1 J	21.6 J	22 J	12.5 J	-	23.3 J	-	10.1	-	11.8	13	14
Beryllium	ns	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.3 U	0.1 U	0.1 U	0.3 U	-	0.1 U	-	5 U	-	5 U	0.05 U	0.05 U
Cadmium	1.1	0.2 U	0.035	0.035	0.02	0.02 U	0.02 U	0.02 U	0.02 U	0.6 U	0.2 U	0.2 U	0.6 U	-	0.2 U	-	5 UJ	-	5 UJ	0.089	0.084
Chromium	11	0.4 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U	0.4 U	0.4 U	0.6 U	-	0.4 U	-	10 U	-	10 U	1 U	1 U
Cobalt	ns	1.1 U	0.69	0.67	0.35	0.1	0.1	0.08	0.02 U	1 U	1.1 U	1.1 U	1 U	-	1.1 U	-	50 U	-	0.91 UJ	1.8	1.7
Copper	8.6	2.2 J	24	16	14	6.9	3	4	2	11.1 J	3 J	2.4 J	10.4 J	-	2.2 J	-	10	-	19	49	55
Iron	1000	104	220	390	85	63	79	120	89	209	129	174	164	-	275	-	151	-	110	170	490
Lead	3.2	1.8 U	0.32	0.56	0.059	0.05 U	0.05	0.05	0.05 U	2.8 U	1.8 U	1.8 U	2.8 U	-	1.8 U	-	10 UJ	-	10 UJ	0.087	0.56
Manganese	ns	40.1	24	38	18	20	22	20	8.2	26.8	16.2	34.7	26.6	-	171	-	18	-	11.7	14	41
Mercury	0.012	0.1 U	-	-	-	-	-	-	-	0.1 U	0.1 U	0.1 U	0.1 U	-	0.1 U	-	0.15 J	-	0.2	-	-
Molybdenum	ns	-	0.038	0.03	0.057	0.083	0.4	0.2	0.3	-	-	-	-	-	-	-	-	-	-	0.081	0.053
Nickel	52	1.6 U	0.44	0.88	0.1 U	0.1 U	0.4	0.3	0.3	1.1 U	1.6 U	1.6 U	1.1 U	-	2.8 J	-	40 U	-	40 U	0.46	1
Selenium	5	3.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	2.2 J	3.4 U	3.4 U	2 U	-	3.4 U	-	35 U	-	5.8 J	0.2 U	0.2 U
Silver	3.2	0.3 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.5 U	0.3 U	0.3 U	0.5 U	-	0.3 U	-	10 U	-	10 U	0.01 U	0.01 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	-	61	55	72	99	120	190	190	-	-	-	-	-	-	-	-	-	-	86	65
Thallium	ns	5.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	3.4 U	5.1 U	5.1 U	3.4 U	-	5.1 U	-	25 U	-	5.6 U	0.05 U	0.05 U
Vanadium	ns	0.7 U	0.36	0.87	0.17	0.24	0.3	0.3	0.2 U	1 U	0.7 U	0.7 U	1 U	-	0.7 U	-	50 U	-	50 U	0.1 U	0.91
Zinc	106	1.7 J	3.9	5.3	2.7	3.5	7	5	2	6.5 J	0.9 U	0.9 U	7.2 J	-	1.3 J	-	6.2	-	4.5	9.4	11
Cyanide	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																					
Aluminum	87	-	15	21	24	18	18	9.6	13	-	76.1 J	71.2 J	-	70.3 J	-	37.2	-	57.2	-	15	31
Antimony	ns	-	0.28	0.17	0.02 U	0.02 U	0.24	0.12	0.05 U	-	2.9 U	2.9 U	-	2.9 U	-	60 U	-	60 U	-	0.032	3
Arsenic	ns	-	0.2 U	0.2 U	0.2 U	0.2 U	0.3	0.3 U	0.6 U	-	4.6 U	4.6 U	-	4.6 U	-	10 U	-	10 U	-	0.2 U	0.2 U
Barium	ns	-	19	73	19	27	20	24	27	-	338	337	-	351	-	9.2	-	11.4	-	46	19
Beryllium	ns	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.1 U	0.1 U	-	0.1 U	-	5 U	-	5 U	-	0.05 U	0.05 U
Cadmium	1.1	-	0.021	0.02	0.02 U	0.02 U	0.03	0.02 U	0.02 U	-	0.2 U	0.2 U	-	0.2 U	-	5 UJ	-	5 UJ	-	0.081	0.053
Chromium	11	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	-	0.4 U	0.4 U	-	0.4 U	-	10 U	-	10 U	-	1 U	1 U
Cobalt	ns	-	0.43	0.23	0.28	0.069	0.3	0.02 U	0.02 U	-	1.1 U	1.1 U	-	1.1 U	-	0.81 UJ	-	0.87 UJ	-	1.7	1.1
Copper	8.6	-	11	8.5	9	4.8	4	3	1	-	1.7 J	1.4 J	-	1 J	-	6.5	-	13.4	-	17	23
Iron	1000	-	23	32	24	21	49	54	81	-	75.5 J	98.8 J	-	168	-	24.9	-	24.9	-	30	40
Lead	3.2	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06	-	1.8 U	1.8 U	-	1.8 U	-	10 UJ	-	10 UJ	-	0.05 U	0.22
Manganese	ns	-	7	5.4	13	16	13	11	5	-	9.5 J	21.9	-	160	-	11.6	-	10.5	-	10	8.9
Mercury	0.012	-	-	-	-	-	-	-	-	-	0.1 U	0.1 U	-	0.1 U	-	0.12 J	-	0.15 J	-	-	-
Molybdenum	ns	-	0.052	0.048	0.068	0.092	0.44	0.2	0.3	-	-	-	-	-	-	-	-	-	-	0.21	0.067
Nickel	52	-	0.15	0.1	0.1 U	0.1 U	0.5	0.2	0.3	-	1.6 U	1.6 U	-	1.6 U	-	40 U	-	40 U	-	0.35	0.32
Selenium	5	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	-	3.4 U	3.4 U	-	3.4 U	-	35 U	-	35 U	-	0.2 U	0.2 U
Silver	3.2	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.3 U	0.3 U	-	0.3 U	-	10 U	-	10 U	-	0.01	0.01 U
Strontium	ns	-	60	53	74	99	120	190	230	-	-	-	-	-	-	-	-	-	-	86	64
Thallium	ns	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	5.1 U	5.1 U	-	5.1 U	-	25 U	-	25 U	-	0.05 U	0.05 U
Vanadium	ns	-	0.1 U	0.1 U	0.1 U	0.14	0.3	0.2	0.2 U	-	0.7 U	0.7 U	-	0.7 U	-	50 U	-	50 U	-	0.1 U	0.1 U
Zinc	106	-	18	38	12	17	5	2	2	-	13.3 J	21.2	-	62.5	-	4.2	-	7.4	-	29	16

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Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
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SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS	USGS
Study Area		EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR
Station:		OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M
Field Sample ID:		OR2-0402S10R	OR2-0402S11R	OR2-0402S1RA	OR2-0402S2RA	OR2-0402S3RA	OR2-0402S4RA	OR2-0402S5RA	OR2-0402S6RA	OR2-0402S7RA	OR2-0402S8RA	OR2-0402S9RA	OR2-0403S10R	OR2-0403S11R	OR2-0403S1RA	OR2-0403S2RA	OR2-0403S3RA	OR2-0403S4RA	OR2-0403S5RA	OR2-0403S6RA	OR2-0403S7RA
Date:		4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/2/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002	4/3/2002
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	200	180	240	230	230	230	230	230	230	220	200	150	110	180	180	180	180	160	160	160
Antimony	ns	0.34	0.058	0.53	0.027	0.02 U	3.8	0.4	0.02 U	0.02	0.02 U	0.02 U	0.02 U	0.44	3.7	0.068	3.8	3.1	0.97	0.21	0.031
Arsenic	ns	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	4.6	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Barium	ns	10	10	11	10	11	11	11	11	11	11	11	10	11	10	10	10	10	10	10	10
Beryllium	ns	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Cadmium	1.1	0.052	0.051	0.077	0.28	0.057	0.055	0.053	0.056	0.054	0.076	0.056	0.058	0.067	0.053	0.052	0.067	0.058	0.1	0.054	0.053
Chromium	11	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cobalt	ns	1.3	1.3	1.4	1.5	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.1	1.3	1.3	1.3	1.3	1.4	1.3	1.3
Copper	8.6	38	38	42	43	43	41	40	39	39	38	38	39	34	38	38	39	40	40	40	39
Iron	1000	230	200	280	260	260	260	260	260	260	230	220	180	140	200	220	210	210	200	190	200
Lead	3.2	0.21	0.16	0.31	0.27	0.26	0.39	0.26	0.23	0.35	0.2	0.2	0.15	0.15	0.28	0.16	0.29	0.29	0.18	0.15	0.16
Manganese	ns	20	18	26	24	24	23	24	24	22	21	21	16	13	17	19	19	18	17	17	17
Mercury	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	ns	0.054	0.053	0.071	0.07	0.078	0.087	0.13	0.1	0.15	0.079	0.1	0.02 U	2.1	0.066	0.028	0.042	0.029	0.02 U	0.02 U	0.02 U
Nickel	52	0.47	0.33	0.52	0.46	0.5	0.53	0.5	0.48	0.48	0.37	0.41	0.31	0.38	0.41	0.39	0.43	0.41	0.35	0.35	0.33
Selenium	5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.88	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Silver	3.2	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.18	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	64	61	62	62	63	63	63	64	65	64	64	62	63	62	65	65	66	64	64	61
Thallium	ns	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05	0.05 U	0.05 U	0.05 U	0.087	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vanadium	ns	0.31	0.24	0.44	0.44	0.43	0.44	0.46	0.47	0.45	0.32	0.39	0.21	0.15	0.32	0.31	0.31	0.29	0.24	0.24	0.26
Zinc	106	6.8	7.5	7.6	6.2	6.2	7	6.4	7.4	6.3	6	8.6	6.3	6.1	6.6	7.5	9	9.5	6.3	7.4	7.2
Cyanide	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																					
Aluminum	87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	8.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	106	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		USGS	USGS	URS	URS	URS	URS	URS	URS	USGS	USGS	URS	USGS	USGS	URS	USGS	USGS	URS	URS	URS	URS
Study Area		EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR	EBOR-Backgroun	EBOR-Backgroun	EBOR-Backgroun	EBOR-Backgroun	EBOR-Backgroun	EBOR-Backgroun
Station:		OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-22450M	OR-23200M	OR-23200M	OR-23630M	OR-23630M	OR-23630M	OR-23650M	OR-24050M	OR-24050M	OR-24150M	OR-24150M	OR-24150M	OR-24150M
Field Sample ID:		OR2-0403S8RA	OR2-0403S9RA	OR-2	OR-2	OR-2	OR-2	OR-2	OR-2	06Ely10AFA	06Ely10ARA	ELY-SW-28	06Ely20AFA	06Ely20ARA	ELY-SW-26	06Ely09AFA	06Ely09ARA	OR-1	OR-1	OR-1	OR-1
Date:		4/3/2002	4/3/2002	4/10/2002	5/21/2002	6/20/2002	7/24/2002	8/20/2002	9/19/2002	8/21/2006	8/21/2006	11/4/2004	8/21/2006	8/21/2006	11/4/2004	8/21/2006	8/21/2006	3/29/2002	3/31/2002	4/10/2002	5/21/2002
Analyte	**PRG**																				
Total Metals																					
Aluminum	87	150	150	400	86	66	38	11	14	-	127	140	-	118	40 J	-	160	33	320	390	34
Antimony	ns	0.02 U	0.02 U	0.02 U	0.02 U	0.088	0.06 U	0.03 U	0.05 U	-	0.3 U	1 U	-	0.76	1 U	-	0.3 U	0.065	0.048	0.032	0.02 U
Arsenic	ns	0.2 U	0.2 U	0.2 U	0.2 U	0.2	0.3 U	0.3 U	0.6 U	-	1 U	0.17 J	-	1 U	0.15 J	-	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Barium	ns	10	10	12	13	18	28	27	30	-	19.9	17.5	-	22.6	20.3	-	22.1	14	15	14	14
Beryllium	ns	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	1 U	-	0.05 U	1 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Cadmium	1.1	0.054	0.055	0.039	0.042	0.035	0.02 U	0.02 U	0.02 U	-	0.02	1 U	-	0.02 U	1 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Chromium	11	1 U	1 U	1 U	1 U	1.2	1 U	1 U	1 U	-	1 U	0.23 J	-	1 U	0.13 J	-	1 U	1 U	1 U	1 U	1 U
Cobalt	ns	1.3	1.3	0.76	0.94	0.72	0.3	0.04	0.02	-	0.42	1.2	-	0.18	0.05 J	-	0.11	0.02 U	0.21	0.24	0.02 U
Copper	8.6	39	38	18	27	15	5	3	2	-	15	32.4	-	5.9	0.28 J	-	0.6	0.5 U	0.7	0.7	0.5 U
Iron	1000	180	180	370	74	63	56	60	80	-	126	130	-	113	29 J	-	162	52	300	360	34
Lead	3.2	0.15	0.12	0.47	0.05 U	0.05 U	0.05	0.05 U	0.05	-	0.1	0.14 J	-	0.1	0.08 J	-	0.2	0.061	0.48	0.5	0.05 U
Manganese	ns	16	15	34	12	13	14	15	12	-	19.3	14.9	-	30.2	6.1	-	28.2	8.5	34	38	8.4
Mercury	0.012	-	-	-	-	-	-	-	-	-	-	0.2 U	-	-	0.2 U	-	-	-	-	-	-
Molybdenum	ns	0.02 U	0.02 U	0.064	0.05	0.2	0.2	0.2	0.1	-	2 U	0.13 UJ	-	2 U	0.09 UJ	-	2 U	0.088	0.085	0.08	0.035
Nickel	52	0.3	0.31	0.74	0.12	0.3	0.7	0.1 U	0.2	-	0.5	0.75 J	-	0.4	0.23 J	-	0.5	0.1 U	0.52	0.65	0.1 U
Selenium	5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	-	1 U	1 U	-	1 U	1 U	-	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Silver	3.2	0.01 U	0.01 U	0.01 U	0.01 U	0.032	0.01 U	0.01 U	0.01 U	-	3 U	0.1 U	-	3 U	0.1 U	-	3 U	0.01 U	0.01 U	0.01 U	0.01 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	ns	62	62	58	83	130	150	180	190	-	141	151	-	142	152	-	141	91	73	62	90
Thallium	ns	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.1 U	1 U	-	0.1 U	1 U	-	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U
Vanadium	ns	0.19	0.2	0.75	0.12	0.46	0.3	0.2	0.2 U	-	0.5 U	0.2 J	-	0.5 U	0.21 J	-	0.5	0.1 U	0.66	0.91	0.11
Zinc	106	6	6.2	4.8	5.6	20	7	2	1	-	3.3	10.1	-	3	0.65 J	-	16.3	2.8	2.2	2.6	0.5
Cyanide	ns	-	-	-	-	-	-	-	-	-	-	5 U	-	-	5 U	-	-	-	-	-	-
Dissolved Metals																					
Aluminum	87	-	-	24	-	35	25	7.5	5.7	44.6	-	81 UJ	23.3	-	24 UJ	13.4	-	4.3	7.7	10	6.8
Antimony	ns	-	-	0.026	-	0.038	0.1	0.03 U	0.05	0.3 U	-	1 U	0.3 U	-	1 U	0.3 U	-	0.091	0.06	0.042	0.02 U
Arsenic	ns	-	-	0.2 U	-	0.29	0.3 U	0.3 U	0.6 U	1 U	-	1 U	1 U	-	1 U	1 U	-	0.63	0.38	0.22	0.2 U
Barium	ns	-	-	22	-	26	27	27	30	19.1	-	14.8	20.2	-	20	19.9	-	92	56	21	23
Beryllium	ns	-	-	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	1 U	0.05 U	-	1 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U
Cadmium	1.1	-	-	0.021	-	0.032	0.02 U	0.02 U	0.02 U	0.1	-	1 U	0.02	-	1 U	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U
Chromium	11	-	-	1 U	-	1	1 U	1 U	1 U	1 U	-	0.14 J	1 U	-	0.14 J	1 U	-	1 U	1 U	1 U	1 U
Cobalt	ns	-	-	0.44	-	0.73	0.2	0.04	0.02 U	0.31	-	1.3	0.11	-	0.03 J	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U
Copper	8.6	-	-	12	-	9.7	4	3	2	8.9	-	19.1	3.3	-	0.29 J	0.84	-	0.5	0.5 U	0.5 U	0.5 U
Iron	1000	-	-	31	-	31	42	52	66	50 U	-	30 J	50 U	-	50 U	50 U	-	27	17	17	15
Lead	3.2	-	-	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.2	-	1 U	0.06	-	0.29 J	0.08	-	0.05 U	0.05 U	0.05 U	0.05 U
Manganese	ns	-	-	4.6	-	12	12	13	9.7	8.9	-	14	7.1	-	4.4	4.7	-	5.1	3.7	2.4	6.4
Mercury	0.012	-	-	-	-	-	-	-	-	0.005 U	-	0.2 U	0.005 U	-	0.2 U	0.005 U	-	-	-	-	-
Molybdenum	ns	-	-	0.15	-	0.25	0.2	0.2	0.2	2 U	-	0.1 UJ	2 U	-	0.08 UJ	2 U	-	0.44	0.31	0.23	0.058
Nickel	52	-	-	0.11	-	0.17	0.6	0.1 U	0.2	0.5	-	0.81 J	0.4 U	-	0.26 J	0.4 U	-	0.1 U	0.1 U	0.1 U	0.1 U
Selenium	5	-	-	0.2 U	-	0.2 U	0.2 U	0.3 U	0.2 U	1 U	-	1 U	1 U	-	0.2 J	1 U	-	0.2 U	0.2 U	0.2 U	0.2 U
Silver	3.2	-	-	0.01 U	-	0.047	0.01 U	0.01 U	0.01 U	3 U	-	0.1 U	3 U	-	0.1 U	3 U	-	0.03	0.018	0.011	0.01 U
Strontium	ns	-	-	56	-	130	150	180	190	139	-	150	139	-	160	138	-	92	70	60	88
Thallium	ns	-	-	0.05 U	-	0.088	0.05 U	0.05 U	0.05 U	0.1 U	-	1 U	0.1 U	-	1 U	0.1 U	-	0.05 U	0.05 U	0.05 U	0.05 U
Vanadium	ns	-	-	0.1 U	-	0.44	0.2	0.2	0.2 U	0.5 U	-	0.13 J	0.5 U	-	0.16 J	0.5 U	-	0.1 U	0.1 U	0.1 U	0.1 U
Zinc	106	-	-	17	-	12	1	3	2	6.9	-	8.9	12.5	-	1.89 J	9.3	-	31	35	14	9.7

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
PRG = Prelimary Remediation Goal
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit.
EB = Ely Brook; LR = Lower Reach; MR = Middle Reach; UR = Upper Reach; EBOR = East Branch of Ompompanoosuc River
SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-10
Surface Water TAL Metals Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
Study Area		EBOR-Backgroun	EBOR-Backgroun	EBOR-Backgroun	EBOR-Backgroun	EBOR-Backgroun	EBOR-Background	EBOR-Background	ORT1	ORT1	ORT1
Station:		OR-24150M	OR-24150M	OR-24150M	OR-24150M	OR-24500M	OR-24500M	OR-24500M	ORT-1080M	ORT-1150M	ORT-1190M
Field Sample ID:		OR-1	OR-1	OR-1	OR-1	SWU-09-53R	SWF-12-53R	SWU-12-53R	ELY-SW-24	ELY-SW-23	ELY-SW-22
Date:		6/20/2002	7/24/2002	8/20/2002	9/19/2002	5/3/2001	9/10/2001	9/10/2001	11/2/2004	11/2/2004	11/2/2004
Analyte	**PRG**										
Total Metals											
Aluminum	87	15	83	62	22	162 J	-	98.5 J	160	75 J	100
Antimony	ns	0.03	0.06 U	0.03 U	0.05	2.5 U	-	2.9 U	1 U	1 U	1 U
Arsenic	ns	0.2 U	0.3 U	0.3 U	0.2 U	2.6 U	-	4.6 U	0.09 UJ	0.11 UJ	0.11 UJ
Barium	ns	20	30	29	28	15.5 J	-	29 J	11.5	11.4	11
Beryllium	ns	0.05 U	0.05 U	0.05 U	0.05 U	0.3 U	-	0.1 U	1 U	1 U	1 U
Cadmium	1.1	0.02 U	0.02 U	0.02 U	0.02 U	0.6 U	-	0.2 U	1 U	1 U	1 U
Chromium	11	1.3	1 U	1 U	1 U	0.6 U	-	0.4 U	0.25 J	0.18 J	0.19 J
Cobalt	ns	0.02 U	0.06	0.02	0.02 U	1 U	-	1.1 U	0.11 UJ	0.04 UJ	0.04 UJ
Copper	8.6	0.5 U	0.5 U	0.5	0.5 U	1.1 J	-	1.1 J	1.3 U	0.71 UJ	1.1 U
Iron	1000	35	84	100	71	110	-	32.9 J	50 U	50 U	50 U
Lead	3.2	0.05 U	0.1	0.07	0.05 U	2.8 U	-	1.8 U	0.16 J	1 U	1 U
Manganese	ns	10	23	34	14	18.9	-	16.7	5.7	1.6	1.5
Mercury	0.012	-	-	-	-	0.1 U	-	0.1 U	0.2 U	0.2 U	0.2 U
Molybdenum	ns	0.14	0.09	0.1	0.2	-	-	-	5 U	5 U	5 U
Nickel	52	0.1 U	0.5	0.2	0.2	1.1 U	-	1.6 U	0.7 J	0.49 J	0.44 J
Selenium	5	0.2 U	0.2 U	0.3 U	0.2 U	2 U	-	3.4 U	1 U	1 U	1 U
Silver	3.2	0.015	0.01 U	0.01 U	0.01 U	0.5 U	-	0.3 U	0.1 U	0.1 U	0.1 U
Sodium	ns	-	-	-	-	-	-	-	-	-	-
Strontium	ns	140	160	180	190	-	-	-	10	12	12
Thallium	ns	0.05 U	0.05 U	0.05 U	0.05 U	3.4 U	-	5.1 U	1 U	1 U	1 U
Vanadium	ns	0.44	0.4	0.4	0.2	1 U	-	0.7 U	0.17 J	0.15 J	0.19 J
Zinc	106	2.3	10	2	4	5.2 J	-	0.9 U	25.7	2.27 J	16.7
Cyanide	ns	-	-	-	-	-	-	-	5 U	5 U	5 U
Dissolved Metals											
Aluminum	87	4.9	10	9.9	5.4	-	80.4 J	-	61 J	51 J	57 J
Antimony	ns	0.029	0.07	0.03 U	0.04 U	-	2.9 U	-	1 U	1 U	1 U
Arsenic	ns	0.2 U	0.3 U	0.3 U	0.2 U	-	4.6 U	-	0.11 UJ	0.11 UJ	0.15 UJ
Barium	ns	29	29	29	28	-	296	-	10.8	11.1	11.1
Beryllium	ns	0.05 U	0.05 U	0.05 U	0.05 U	-	0.1 U	-	1 U	1 U	1 U
Cadmium	1.1	0.02 U	0.02 U	0.02 U	0.02 U	-	0.2 U	-	1 U	1 U	1 U
Chromium	11	1.1	1 U	1 U	1 U	-	0.4 U	-	0.18 J	0.16 J	0.24 J
Cobalt	ns	0.02 U	0.02 U	0.02 U	0.02 U	-	1.1 U	-	0.05 UJ	0.03 UJ	0.04 UJ
Copper	8.6	0.5 U	0.5 U	0.5 U	0.5 U	-	0.9 U	-	0.73 UJ	0.69 UJ	1.1 U
Iron	1000	29	41	50	60	-	10.7 J	-	50 U	50 U	50 U
Lead	3.2	0.05 U	0.05 U	0.05 U	0.05 U	-	1.8 U	-	0.08 UJ	1 U	1 U
Manganese	ns	8.9	12	26	12	-	14.1 J	-	1.5	1.2	0.72 J
Mercury	0.012	-	-	-	-	-	0.1 U	-	0.2 U	0.2 U	0.2 U
Molybdenum	ns	0.19	0.2	0.2	0.3	-	-	-	5 U	5 U	5 U
Nickel	52	0.1 U	0.6	0.1 U	0.2	-	1.6 U	-	0.71 J	0.55 J	0.51 J
Selenium	5	0.2 U	0.2 U	0.3 U	0.2 U	-	3.4 U	-	1 U	1 U	1 U
Silver	3.2	0.022	0.01 U	0.01 U	0.01 U	-	0.3 U	-	0.1 U	0.1 U	0.1 U
Strontium	ns	140	160	180	190	-	-	-	10	10	10
Thallium	ns	0.05 U	0.05 U	0.05 U	0.05 U	-	5.1 U	-	1 U	1 U	1 U
Vanadium	ns	0.41	0.2	0.4	0.2	-	0.7 U	-	0.12 UJ	0.14 UJ	0.15 UJ
Zinc	106	13	4	3	2	-	42.6	-	3.84 J	25.3	2.65 J

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SHB = Schoolhouse Brook; LR = Lower Reach; UR= Upper Reach;
EBT = Ely Brook Tributary (designated by number); ORT = Ompompanoosuc River Tributary (designated by number)

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	NOBIS	NOBIS	URS	URS	URS	NOBIS	NOBIS	URS	URS	URS
Study Area:		UWA	UWA	UWA	UWA	UWA	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag
Aquifer:		Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock
Station:		BOM-01	BOM-01	BM-01	BM-01	BOM-03	MW-01C	MW-01C	MW-01C	MW-01C	MW-02C	MW-02C	MW-02C
Field Sample ID:		ELY-BOM-1	ELY-BOM-1	BM-01X-081809AX	BM-01-120109AX	ELY-GW-BOM3	ELY-MW-01C	ELY-MW-01C	MW-01C-081209AX	MW-01C-112309AX	ELY-MW-02C	ELY-MW-02C	ELY-GW-MW-02C
Date:		12/11/2006	6/14/2007	8/18/2009	12/1/2009	11/12/2007	12/13/2006	6/12/2007	8/12/2009	11/23/2009	12/13/2006	6/13/2007	11/6/2007
Analyte	**Units**												
Acidity	mg/L	2 U	2 U	10 U	NA	350	2 U	2 U	10 U	NA	2 U	2 U	2 U
Alkalinity (as $CaCO_3$)	mg/L	32	28	30	NA	2 U	96	87	87	NA	140	100	100
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	32	28	30	NA	2 U	96	87	87	NA	140	100	100
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	2 U	2 U	5 U	NA	2 U	2 U	2 U	5 U	NA	2 U	2 U	2 U
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	NA	0.49 J	5 U	NA	0.44 J	NA	0.51	5 U	NA	NA	0.64	0.48 J
Chloride	mg/L	2 U	2 U	0.85 J	NA	2 U	2 U	2 U	0.45	NA	2 U	2 U	2 U
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	0.075 J	0.22	0.12	NA	0.075 J	0.075 J	0.48	0.018	NA	0.041 J	0.49	0.063 J
Sulfate	mg/L	8.2	9.2	5.3	8.3	200	130	120	90	110	94	90	83
Sulfide	mg/L	0.1 U	0.1 U	2 U	NA	0.05 J	0.1 U	0.1 U	0.4 J	NA	0.1 U	0.1 U	0.1 U
Field Measured Parameter													
pH	SU	7.92	8.92	6.1	6.62	4.68	8.41	7.25	7.05	8.56	7.78	7.91	7.59
Specific Conductivity	µS/cm	100	106	77	72	450	441	387	342	368	408	420	378
Dissolved Oxygen	mg/L	9.81	9.65	7.99	10.03	7.38	3.03	1.47	2	2.04	1.92	0.19	0.37
Oxidation Reduction Potential	mV	67.5	186.2	66.9	140.1	310	240.8	252.1	314.5	-27.6	-102.2	-154.7	37.4
Turbidity	NTU	NA	117	7.11	1.54	NA	12.3	6.81	8.37	0.92	NA	165	5
Temperature	°C	4.01	11.29	11.49	5.81	8.69	8.68	10.38	12.77	8.02	8.71	10.12	9.65

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microSiemens per centimeter.
NTU = Nephelometric turbidity units
°C = degrees Celsius
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS
Study Area:		Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	ORB	ORB	ORB	ORB	LWA	LWA	LWA	LWA	UWA
Aquifer:		Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock
Station:		MW-02C	MW-02C	MW-02C	MW-03C	MW-03C	MW-03C	MW-03C	MW-04C	MW-04C	MW-04C	MW-04C	MW-05C
Field Sample ID:		ELY-GW-MW-02C	MW-02C-081209AX	MW-02C-112009AX	ELY-MW-03C	ELY-MW-03C	MW-03C-081109AX	MW-03C-112309AX	ELY-MW-04C	ELY-MW-04C	MW-04C-081209AX	MW-04C-112409AX	ELY-MW-05C
Date:		11/6/2007	8/12/2009	11/20/2009	12/11/2006	6/12/2007	8/11/2009	11/23/2009	12/12/2006	6/13/2007	8/12/2009	11/24/2009	12/12/2006
Analyte	**Units**												
Acidity	mg/L	2 U	10 U	NA	2 U	2 U	10 U	NA	2 U	2 U	10 U	NA	2 U
Alkalinity (as $CaCO_3$)	mg/L	100	100	NA	40	39	16	NA	150	130	140	NA	110
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	100	100	NA	40	39	15	NA	150	130	140	NA	110
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	2 U	5 U	NA	2 U	2 U	5 U	NA	2 U	2 U	5 U	NA	2 U
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	0.5	5 U	NA	NA	0.46 J	5 U	NA	NA	0.56	5 U	NA	NA
Chloride	mg/L	2 U	0.46	NA	2 U	2 U	0.29	NA	2 U	2 U	0.89 J	NA	2 U
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	0.057 J	0.02 U	NA	0.037 J	0.076 J	0.019	NA	0.058 J	0.087 J	0.12	NA	0.052 J
Sulfate	mg/L	83	84	87	7.2	6.6	5.7	5.7	110	63	72	83	420
Sulfide	mg/L	0.1 U	0.4 J	NA	0.1 U	0.1 U	0.43 J	NA	0.1 U	0.1 U	0.6 J	NA	0.1 U
Field Measured Parameter													
pH	SU	7.59	6.57	7.27	8.17	9.4	6.68	6.48	8.13	6.79	6.57	7.21	7.25
Specific Conductivity	µS/cm	378	404	384	83	120	66	66	437	434	404	400	872
Dissolved Oxygen	mg/L	0.37	0.55	0.35	9.37	7.89	7.81	8.39	4.77	0.33	0.55	0.71	0.9
Oxidation Reduction Potential	mV	37.4	33.6	-149.8	109.2	191.1	-63	125.8	1	77.8	33.6	60.6	76.4
Turbidity	NTU	5	0.59	9.95	3.5	4.21	2.12	< 1	7.73	17.5	0.59	0.41	17
Temperature	°C	9.65	12.59	10.26	10.38	9.87	11.21	7.92	10.25	9.66	12.59	8.4	8.77

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microsiemens per centimeter.
NTU = Nephelometric turbidity units
°C = degrees centigrade.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS
Study Area:		UWA	UWA	UWA	UWA	UWA	UWA	UWA	Background	Background	Background	Background	UWA
Aquifer:		Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock
Station:		MW-05C	MW-05C	MW-05C	MW-06C	MW-06C	MW-06C	MW-06C	MW-07C	MW-07C	MW-07C	MW-07C	MW-09C
Field Sample ID:		ELY-MW-05C	MW-05C-081309AX	MW-05C-112509AX	ELY-MW-06C	ELY-MW-06C	MW-06C-081209AX	MW-06C-112509AX	ELY-MW-07C	ELY-MW-07C	MW-07C-081209AX	MW-07C-112509AX	ELY-GW-MW-09C
Date:		6/13/2007	8/13/2009	11/25/2009	12/11/2006	6/13/2007	8/12/2009	11/25/2009	12/11/2006	6/13/2007	8/12/2009	11/25/2009	11/6/2007
Analyte	**Units**												
Acidity	mg/L	2 U	10 U	NA	2 U	2 U	10 U	NA	2 U	2 U	10 U	NA	2 U
Alkalinity (as $CaCO_3$)	mg/L	88	69	NA	160	130	110	NA	23	16	12	NA	54
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	88	69	NA	160	130	110	NA	23	16	12	NA	54
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	2 U	5 U	NA	2 U	2 U	5 U	NA	2 U	2 U	5 U	NA	2 U
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	0.78	5 U	NA	NA	0.54	5 U	NA	NA	0.33 J	5 U	NA	0.9
Chloride	mg/L	2 U	0.93 J	NA	2 U	2 U	0.35	NA	2 U	2 U	0.77 J	NA	2 U
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	0.12	0.056	NA	0.092 J	0.11	0.024	NA	0.094 J	0.23	0.038	NA	0.18
Sulfate	mg/L	420	350	340	250	210	140	150	6	5.4	3.2	4.6	350
Sulfide	mg/L	0.1 U	0.63 J	NA	0.1 U	0.1 U	2 U	NA	0.1 U	0.1 U	0.4 J	NA	0.1 U
Field Measured Parameter													
pH	SU	6.08	4.85	7.66	7.12	7.39	6.93	7.16	7.41	6.4	4.32	6.11	8.26
Specific Conductivity	µS/cm	994	777	787	177	641	509	492	84	61	47	52	770
Dissolved Oxygen	mg/L	2.5	2.3	2.23	3.72	1.22	2.14	1.92	10.64	8.26	8.21	9.99	4.73
Oxidation Reduction Potential	mV	217.3	106.8	40.5	212.8	40.3	-58.4	160	124.2	172	645.2	-100.1	207.6
Turbidity	NTU	1.81	3.76	0.21	7.81	2.06	0.98	< 1	369	66.5	9.3	2.12	2
Temperature	°C	9.38	11.21	7.51	9.35	8.55	12.72	7.84	9.35	9.13	13.23	8.2	7.72

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microsiemens per centimeter.
NTU = Nephelometric turbidity units
°C = degrees centigrade.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS	NOBIS
Study Area:		UWA	UWA	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	UWA	UWA	UWA	EB-LR
Aquifer:		Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock
Station:		MW-09C	MW-09C	MW-10C	MW-10C	MW-10C	MW-11C	MW-11C	MW-11C	MW-12C	MW-12C	MW-12C	MW-14C
Field Sample ID:		MW-09C-081309AX	MW-09C-112409AX	ELY-GW-MW-10C	MW-10C-081109AX	MW-10C-112309AX	ELY-GW-MW-11C	MW-11C-081109AX	MW-11C-112309AX	ELY-GW-MW-12C	MW-12C-081109AX	MW-12C-112409AX	MW-14C-081309AX
Date:		8/13/2009	11/24/2009	11/6/2007	8/11/2009	11/23/2009	11/7/2007	8/11/2009	11/23/2009	11/7/2007	8/11/2009	11/24/2009	8/13/2009
Analyte	**Units**												
Acidity	mg/L	10 U	NA	2 U	10 U	NA	2 U	10 U	NA	25	14	NA	10 U
Alkalinity (as $CaCO_3$)	mg/L	30	NA	69	51	NA	110	78	NA	14	5 U	NA	79
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	28	NA	69	51	NA	110	78	NA	14	5 U	NA	79
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	2	NA	2 U	5 U	NA	2 U	5 U	NA	2 U	5 U	NA	5 U
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	5 U	NA	0.4 J	5 U	NA	0.57	5 U	NA	0.37 UJ	5 U	NA	5 U
Chloride	mg/L	1.1	NA	2 U	0.35	NA	2 U	0.45	NA	2 U	0.3	NA	2.6
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	0.16	NA	0.042 J	0.041	NA	0.11	0.02 U	NA	0.15	0.028	NA	0.014
Sulfate	mg/L	360	390	19	17	19	49	47	48	190	180	160	18
Sulfide	mg/L	0.53 J	NA	0.1 U	0.47 J	NA	0.1 U	2 U	NA	0.1 U	2 U	NA	2 U
Field Measured Parameter													
pH	SU	7.9	8.34	8	5.4	7.52	7.38	5.46	7.54	5.87	4.66	4.9	7.82
Specific Conductivity	µS/cm	742	853	189	168	174	330	289	276	283	370	360	213
Dissolved Oxygen	mg/L	2.36	1.18	4.05	5.61	4.17	0.93	0.39	0.87	6.84	4.22	6.5	4.62
Oxidation Reduction Potential	mV	-50.8	-80.8	176.8	406.9	128.6	-37.8	339.7	13.9	186.8	117.8	128.1	378.9
Turbidity	NTU	4.37	0.34	11	2.17	1.51	114	7.23	0.44	3	1.76	0.98	13.3
Temperature	°C	11.14	9.15	8.19	12.4	7.37	8.87	11.96	8.3	10.51	15.42	10.17	12.42

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microsiemens per centimeter.
NTU = Nephelometric turbidity units
°C = degrees centigrade.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:		EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	UWA	UWA	UWA	UWA	UWA	UWA	LWA
Aquifer:		Shallow Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Shallow Bedrock	Shallow Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Shallow Bedrock
Station:		MW-14C	MW-14D	MW-14D	MW-14D	MW-14D	MW-19C	MW-19C	MW-19D	MW-19D	MW-19D	MW-19D	MW-20C
Field Sample ID:		MW-14C-112309AX	MW-14D-091709AX	MW-14D-091809AX	MW-14D-091809BX	MW-14D-120109AX	MW-19C-081409AX	MW-19C-112509AX	MW-19D-091509AX	MW-19D-091509AD	MW-19D-091509BX	MW-19D-120209AX	MW-20C-081309AX
Date:		11/23/2009	9/17/2009	9/18/2009	9/18/2009	12/1/2009	8/14/2009	11/25/2009	9/15/2009	9/15/2009	9/15/2009	12/2/2009	8/13/2009
Analyte	**Units**												
Acidity	mg/L	NA	10 U	10 U	10 U	NA	57	NA	10 U	10 U	49	NA	10 U
Alkalinity (as $CaCO_3$)	mg/L	NA	67	67	70	NA	5 U	NA	NA	NA	NA	NA	5 U
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	NA	67	67	70	NA	5 U	NA	23	20	5 U	NA	5 U
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	NA	5 U	5 U	5 U	NA	5 U	NA	5 U	5 U	5 U	NA	5 U
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	NA	5 U	5 U	5 U	NA	5 U	NA	5 U	5 U	3 J	NA	5 U
Chloride	mg/L	NA	0.42	0.4	0.47	NA	0.44	NA	0.38	0.4	0.37	NA	2.3
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	NA	0.02 U	0.02 U	0.02 U	NA	0.056	NA	0.03	0.031	0.06	NA	0.036
Sulfate	mg/L	15	30	23	34	27	380	290	220	220	220	210	140
Sulfide	mg/L	NA	2 U	2 U	0.43	NA	2 U	NA	2 U	2 U	2 U	NA	0.83 J
Field Measured Parameter													
pH	SU	7.58	6.78	8.03	NA	NA	3.39	5.68	3.75	6.33	NA	NA	5.99
Specific Conductivity	µS/cm	195	259	198	NA	NA	768	634	511	436	NA	NA	466
Dissolved Oxygen	mg/L	4.78	3.52	2.59	NA	NA	6.61	6.1	6.18	4.21	NA	NA	7.75
Oxidation Reduction Potential	mV	-176.2	208.8	57.9	NA	NA	674.5	158.9	298.8	179.3	NA	NA	98.5
Turbidity	NTU	1.49	27.8	8.01	NA	NA	9.38	0.1	25.5	151	NA	NA	2.04
Temperature	°C	7.78	10.48	7.60	NA	NA	13.33	8.94	11.28	9.01	NA	NA	13.07

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microsiemens per centimeter.
NTU = Nephelometric turbidity units
°C = degrees centigrade.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS
Study Area:		LWA	LWA	LWA	LWA	LWA	LWA	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag
Aquifer:		Shallow Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Deep Overburden
Station:		MW-20C	MW-20D	MW-20D	MW-20D	MW-21C	MW-21C	MW-01A	MW-01A	MW-01A	MW-01A	MW-01B	MW-01B
Field Sample ID:		MW-20C-112309AX	MW-20D-091609AX	MW-20D-091709AX	MW-20D-120209AX	MW-21C-081409AX	MW-21C-112409AX	ELY-MW-01A	ELY-MW-01A	MW-01A-081009AX	MW-01A-112009AX	ELY-MW-01B	ELY-MW-01B
Date:		11/23/2009	9/16/2009	9/17/2009	12/2/2009	8/14/2009	11/24/2009	12/13/2006	6/12/2007	8/10/2009	11/20/2009	12/13/2006	6/12/2007
Analyte	**Units**												
Acidity	mg/L	NA	10 U	10 U	NA	110	NA	16	46	10 U	NA	2 U	2 U
Alkalinity (as $CaCO_3$)	mg/L	NA	24	95	NA	5 U	NA	4.4	2 U	4 J	NA	96	91
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	NA	5 U	5 U	NA	5 U	NA	4.4	2 U	4 J	NA	96	91
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	NA	20	15	NA	5 U	NA	2 U	2 U	5 U	NA	2 U	2 U
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	NA	4	80	NA	5 U	NA	NA	50	5 U	NA	NA	0.61
Chloride	mg/L	NA	0.4	0.41	NA	2.1	NA	2 U	2 U	51	NA	2 U	2 U
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	NA	0.011 J	0.013 J	NA	0.02 U	NA	0.12	0.18	0.21	NA	0.04 J	0.071 J
Sulfate	mg/L	60	79	58	76	500	600	210	280	180 X	170	230	230
Sulfide	mg/L	NA	2 U	2 U	NA	0.43 J	NA	0.1 U	0.1 U	2 U	NA	0.1 U	0.1 U
Field Measured Parameter													
pH	SU	6.46	10.62	NA	12.07	2.13	3.75	5.77	2.58	1.26	3.73	8.28	5.78
Specific Conductivity	µS/cm	302	465	NA	270	1026	1035	563	720	550	534	602	556
Dissolved Oxygen	mg/L	3.55	1.70	NA	0.410	1.59	0.28	8.9	2.41	6.35	6.17	4.07	0.38
Oxidation Reduction Potential	mV	105.1	188.5	NA	-35.0	242.8	322.7	206.5	322.9	581	123.8	129.8	284.5
Turbidity	NTU	0.3	12.6	NA	35.8	57.3	10.27	38.5	8.4	0.77	0.53	47.7	20.3
Temperature	°C	7.84	9.83	NA	8.26	14.57	10.49	12.24	10.61	15.93	9.52	10.07	11.01

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microsiemens per centimeter.
NTU = Nephelometric turbidity units
°C = degrees centigrade.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	URS	URS	URS	URS	NOBIS	NOBIS	URS	URS	URS	NOBIS
Study Area:		Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag
Aquifer:		Deep Overburden	Deep Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Station:		MW-01B	MW-01B	MW-02A	MW-02A	MW-02A	MW-02A	MW-02A	MW-02A	MW-02B	MW-02B	MW-02B	MW-02B
Field Sample ID:		MW-01B-081009AX	MW-01B-112009AX	ELY-MW-02A	ELY-QS-01	ELY-MW-02A	ELY-MW-02A DUP	MW-02A-081009AX	MW-02A-113009AX	ELY-MW-02B	ELY-MW-02B	ELY-GW-MW-02B	MW-02B-081009AX
Date:		8/10/2009	11/20/2009	12/12/2006	12/12/2006	6/12/2007	6/12/2007	8/10/2009	11/30/2009	12/13/2006	6/12/2007	11/6/2007	8/10/2009
Analyte	**Units**												
Acidity	mg/L	10 U	NA	44	48	54	54	50	NA	10 U	2 U	2 U	10 U
Alkalinity (as $CaCO_3$)	mg/L	93	NA	2.2	2.1	2 U	2 U	5 U	NA	1200	80	75	70
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	93	NA	2.2	2.1	2 U	2 U	5 U	NA	1200	80	75	70
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	5 U	NA	2 U	2 U	2 U	2 U	5 U	NA	20 U	2 U	2 U	5 U
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	5 U	NA	NA	NA	46	50	5 U	NA	NA	0.79	0.84	5 U
Chloride	mg/L	0.53	NA	2 U	2 U	2 U	2 U	32	NA	20 U	2 U	2 U	0.71
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	0.02 U	NA	0.26	0.26	0.4	0.42	0.16	NA	0.15	0.08 J	0.66	0.02 U
Sulfate	mg/L	190	180	200	210	170	170	160	170	140	160	160	140
Sulfide	mg/L	2 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	2 U	NA	0.29	0.1 U	0.1 U	2 U
Field Measured Parameter													
pH	SU	7.14	8.38	5.13	5.13	3.55	3.55	3.49	4.11	8.26	7.7	7.98	4.21
Specific Conductivity	µS/cm	499	516	408	408	469	469	433	444	426	459	450	408
Dissolved Oxygen	mg/L	0.4	0.46	1.41	1.41	1.02	1.02	2	6.84	1.57	3.3	0.27	0.61
Oxidation Reduction Potential	mV	47.3	3	202.5	202.5	251.6	251.6	214	188.3	-274.1	-155.6	-148.6	341
Turbidity	NTU	18.7	1.02	2.3	2.3	5.31	5.31	< 1	0.40	NA	61.5	3	51.9
Temperature	°C	15.46	9.12	11.54	11.54	9.26	9.26	13.9	9.78	12.75	11.5	9.03	14.22

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microsiemens per centimeter.
NTU = Nephelometric turbidity units
°C = degrees centigrade.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS	URS	NOBIS	NOBIS	NOBIS	URS
	Study Area:	Smelter/ Slag	LWA	LWA	LWA	LWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA
	Aquifer:	Deep Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden
	Station:	MW-02B	MW-04A	MW-04A	MW-04A	MW-04A	MW-05A	MW-05A	MW-05A	MW-05A	MW-05A	MW-05A	MW-05B
	Field Sample ID:	MW-02B-112009AX	ELY-MW-04A	ELY-MW-04A	MW-04A-081209AX	MW-04A-112409AX	ELY-MW-05A	ELY-MW-05A	ELY-GW-MW-05A	MW-05A-081109AX	MW-05A-120109AX	MW-05A-120109AD	ELY-MW-05B
	Date:	11/20/2009	12/12/2006	6/13/2007	8/13/2009	11/24/2009	12/12/2006	6/13/2007	11/7/2007	8/11/2009	12/1/2009	12/1/2009	12/12/2006
Analyte	**Units**												
Acidity	mg/L	NA	160	140	120	NA	39	170	200	150	NA	NA	2 U
Alkalinity (as $CaCO_3$)	mg/L	NA	0.9 J	1.3 UJ	5 U	NA	21	2 U	2 U	5 U	NA	NA	190
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	NA	0.9 J	2 U	5 U	NA	21	2 U	2 U	5 U	NA	NA	190
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	NA	2 U	2 U	5 U	NA	2 U	2 U	2 U	5 U	NA	NA	2 U
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	NA	NA	0.32 J	5 U	NA	NA	0.36 J	0.44 UJ	5 U	NA	NA	NA
Chloride	mg/L	NA	2 U	2 U	0.78 J	NA	2 U	2 U	2 U	0.3	NA	NA	2 U
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	NA	0.084 J	0.14	0.15	NA	0.18	0.19	0.33	0.13	NA	NA	0.1 U
Sulfate	mg/L	140	480	340	250	240	400	510	490	380	370	370	370
Sulfide	mg/L	NA	0.1 U	0.1 U	0.43 J	NA	0.1 U	0.1 U	0.1 U	0.43 J	NA	NA	0.1 U
Field Measured Parameter													
pH	SU	10.11	5.18	4.32	3.96	3.68	5.97	4.04	4.16	2.7	4.07	4.07	7.03
Specific Conductivity	µS/cm	437	599	710	419	501	704	693	633	573	621	621	932
Dissolved Oxygen	mg/L	0.52	9.11	5.8	7.84	11.06	7.68	9.94	8.72	9.17	8.62	8.62	1.82
Oxidation Reduction Potential	mV	-120.7	303.3	255.6	165	214.1	210.3	264.7	213.5	694.4	137.2	137.2	81.8
Turbidity	NTU	2.62		84.4	8.86	8.11	24.5	5.76	2	4.5	0.67	0.67	78.9
Temperature	°C	9.59	10.17	10.37	16.25	6.75	10.42	9.41	9.31	13.89	8.44	8.44	12.28

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microsiemens per centimeter.
NTU = Nephelometric turbidity units
°C = degrees centigrade.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	NOBIS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS
	Study Area:	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	Background	Background	Background	Background
	Aquifer:	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
	Station:	MW-05B	MW-05B	MW-05B	MW-05B	MW-06A	MW-06A	MW-06A	MW-06A	MW-07A	MW-07A	MW-07A	MW-07A
	Field Sample ID:	ELY-MW-05B	MW-05B-081209AX	MW-05B-081209AD	MW-05B-112409AX	ELY-MW-06A	ELY-MW-06A	MW-06A-081209AX	MW-06A-112509AX	ELY-MW-07A	ELY-MW-07A	MW-07A-081209AX	MW-07A-112509AX
	Date:	6/13/2007	8/12/2009	8/12/2009	11/24/2009	12/12/2006	6/12/2007	8/12/2009	11/24/2009	12/11/2006	6/13/2007	8/12/2009	11/25/2009
Analyte	**Units**												
Acidity	mg/L	2 U	10 U	10 U	NA	2 U	2 U	10 U	NA	5	8.9	10 U	NA
Alkalinity (as $CaCO_3$)	mg/L	130	140	140	NA	58	44	42	NA	27	17	13	NA
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	130	140	140	NA	58	44	42	NA	27	17	13	NA
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	2 U	5 U	5 U	NA	2 U	2 U	5 U	NA	2 U	2 U	5 U	NA
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	0.35 J	5 U	5 U	NA	NA	0.33 J	5 U	NA	NA	0.35 J	5 U	NA
Chloride	mg/L	2 U	0.36	0.32	NA	2 U	2 U	0.19 J	NA	2 U	2 U	0.76 J	NA
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	2	0.02 U	0.02 U	NA	0.034 J	0.12	0.02 U	NA	0.099 J	0.21	0.045	NA
Sulfate	mg/L	330	320	290	280	22	20	16	25	5.7	7.2	3.5	4.8
Sulfide	mg/L	0.1 U	2 U	1.6 J	NA	0.1 U	0.1 U	2 U	NA	0.1 U	0.1 U	1 J	NA
Field Measured Parameter													
pH	SU	7.22	7.03	7.08	7.03	7.06	6.21	5.85	6.21	6.42	6.61	4.51	5.96
Specific Conductivity	µS/cm	875	880	856	880	697	126	128	105	66	56	42	53
Dissolved Oxygen	mg/L	0.5	1.24	2.76	1.24	1.81	7.65	3.68	8.88	7.34	6.14	5.02	9.39
Oxidation Reduction Potential	mV	-103.3	423.2	52.6	423.2	46.1	243.5	-48.6	151.7	159.6	156.9	646	-45.7
Turbidity	NTU	6.71	5.8	9.02	5.8	7.07	7.22	5.34	< 1	103	2.32	3.7	0.56
Temperature	°C	9.78	11.6	9.41	11.6	11.61	8.93	12.63	7.35	7.66	11.16	13.6	8.2

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microsiemens per centimeter.
NTU = Nephelometric turbidity units
°C = degrees centigrade.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	URS	NOBIS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS
	Study Area:	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag
	Aquifer:	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Shallow Overburden
	Station:	MW-08A	MW-08A	MW-08A	MW-08A	MW-08A	MW-09A	MW-09A	MW-09A	MW-10B	MW-10B	MW-10B	MW-11A
	Field Sample ID:	ELY-MW-08A	ELY-MW-08A	MW-08A-081109AX	MW-08A-112409AX	MW-08A-112409AD	ELY-GW-MW-09A	MW-09A-081209AX	MW-09A-120209AX	ELY-GW-MW-10B	MW-10B-081109AX	MW-10B-112309AX	ELY-GW-MW-11A
	Date:	12/12/2006	6/12/2007	8/11/2009	11/24/2009	11/24/2009	11/6/2007	8/12/2009	12/2/2009	11/6/2007	8/11/2009	11/23/2009	11/7/2007
Analyte	**Units**												
Acidity	mg/L	140	140	110	NA	NA	150	79	NA	18	10 U	NA	17
Alkalinity (as $CaCO_3$)	mg/L	2 U	2 U	5 U	NA	NA	2 U	5 U	NA	15	6	NA	26
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	2 U	2 U	5 U	NA	NA	2 U	5 U	NA	15	6	NA	26
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	2 U	2 U	5 U	NA	NA	2 U	5 U	NA	2 U	5 U	NA	2 U
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	NA	0.39 J	5 U	NA	NA	0.52	5 U	NA	0.35 J	5 U	NA	1.4
Chloride	mg/L	2 U	2 U	0.32	NA	NA	2 U	0.29	NA	2 U	0.3	NA	2 U
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	0.047 J	0.082 J	0.02 U	NA	NA	0.18	0.12	NA	0.079 J	0.014	NA	0.15
Sulfate	mg/L	390	430	380	390	380	330	190	230	12	9.8	9.7	42
Sulfide	mg/L	0.1 U	0.1 U	2 U	NA	NA	0.1 U	0.5 J	NA	0.1 U	2 U	NA	0.1 U
Field Measured Parameter													
pH	SU	4.19	4.26	3.88	4.06	4.06	4.32	3.9	4.23	6.08	4.21	5.83	6.1
Specific Conductivity	µS/cm	627	620	61	684	684	612	420	454	78	53	48	174
Dissolved Oxygen	mg/L	6.44	10.26	9.4	9.06	9.06	5.91	9.09	9.49	5.95	9.19	8.66	0.44
Oxidation Reduction Potential	mV	256	418.6	164	156.5	156.5	323.9	589.6	144.2	237.7	399.7	140.2	-5.8
Turbidity	NTU	13.9	25.6	4.79	0.29	0.29	5	1.7	0.70	4	1.69	< 1	2
Temperature	°C	9.24	9.4	13.09	8.72	8.72	8.89	14.73	7.21	8.01	11.79	7.57	9.3

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microsiemens per centimeter.
NTU = Nephelometric turbidity units
°C = degrees centigrade.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS
Study Area:		Smelter/ Slag	Smelter/ Slag	UWA	UWA	UWA	EB-LR	EB-LR	EB-LR	EB-TZ	EB-TZ	EB-TZ
Aquifer:		Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Station:		MW-11A	MW-11A	MW-13A	MW-13A	MW-13A	MW-14A	MW-14A	MW-14A	MW-15A	MW-15A	MW-15A
Field Sample ID:		MW-11A-081109AX	MW-11A-120109AX	ELY-GW-MW-13A	MW-13A-081209AX	MW-13A-112409AX	ELY-GW-MW-14A	MW-14A-081109AX	MW-14A-112309AX	ELY-GW-MW-15A	MW-15A-081309AX	MW-15A-112409AX
Date:		8/11/2009	12/1/2009	11/7/2007	8/12/2009	11/24/2009	11/7/2007	8/11/2009	11/23/2009	11/5/2007	8/13/2009	11/24/2009
Analyte	**Units**											
Acidity	mg/L	18	NA	2 U	10 U	NA	7.4	10 U	NA	2 U	10 U	NA
Alkalinity (as $CaCO_3$)	mg/L	45	NA	62	42	NA	29	11	NA	130	110	NA
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	45	NA	62	42	NA	29	11	NA	130	110	NA
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	5 U	NA	2 U	5 U	NA	2 U	5 U	NA	2 U	5 U	NA
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	5 U	NA	0.5	5 U	NA	0.42 UJ	5 U	NA	1.5	5 U	NA
Chloride	mg/L	0.39	NA	2 U	0.29	NA	2 U	0.31	NA	2 U	0.79 J	NA
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	0.02 U	NA	0.16	0.025 X	NA	0.084 J	0.019	NA	0.069 J	0.012	NA
Sulfate	mg/L	18	27	59	42	43	14	9.3	9	47	5	7.5
Sulfide	mg/L	0.53 J	NA	0.1 U	0.5 J	NA	0.1 U	0.43 J	NA	0.1 U	0.63 J	NA
Field Measured Parameter												
pH	SU	5.5	6.25	5.65	6.38	6.57	6.4	5.46	6.01	7.63	6.37	6.53
Specific Conductivity	µS/cm	184	143	245	190	191	111	57	69	401	120	118
Dissolved Oxygen	mg/L	0.32	0.32	10.24	6.21	8.14	4.21	5.91	6.46	2.34	0.65	0.8
Oxidation Reduction Potential	mV	39.1	-70.1	163.1	-36.5	173.3	163.9	-28.2	-95.7	140.5	-46.9	179.8
Turbidity	NTU	7.5	1.03	6	0.16	< 1	11	2.31	0.33	57	4.19	1.87
Temperature	°C	15.85	7.46	8.63	13.52	8.95	8.02	13.6	7.55	10.11	14.68	7.64

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microsiemens per centimeter.
NTU = Nephelometric turbidity units
°C = degrees centigrade.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
	Study Area:	EB-TZ	EB-TZ	EB-TZ	LWA	LWA	UWA	UWA	UWA	UWA	LWA
	Aquifer:	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
	Station:	MW-16A	MW-16A	MW-16A	MW-17A	MW-17A	MW-18A	MW-18A	MW-19A	MW-19A	MW-20A
	Field Sample ID:	ELY-GW-MW-16A	MW-16A-081309AX	MW-16A-112409AX	MW-17A-081409AX	MW-17A-112409AX	MW-18A-081409AX	MW-18A-120109AX	MW-19A-081409AX	MW-19A-113009AX	MW-20A-081409AX
	Date:	11/5/2007	8/13/2009	11/24/2009	8/14/2009	11/24/2009	8/14/2009	12/1/2009	8/14/2009	11/30/2009	8/14/2009
Analyte	**Units**										
Acidity	mg/L	2 U	10 U	NA	10 U	NA	160	NA	140	NA	50
Alkalinity (as $CaCO_3$)	mg/L	100	88	NA	77	NA	5 U	NA	5 U	NA	5 U
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	100	88	NA	77	NA	5 U	NA	5 U	NA	5 U
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	2 U	5 U	NA	5 U	NA	5 U	NA	5 U	NA	5 U
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	0.45 J	5 U	NA	5 U	NA	5 U	NA	5 U	NA	5 U
Chloride	mg/L	2 U	0.88 J	NA	0.28	NA	0.38	NA	0.33	NA	0.28
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	0.084 J	0.12	NA	0.029	NA	0.14 X	NA	0.11	NA	0.031
Sulfate	mg/L	11	7	9.2	10	10	460	930	330	350	180
Sulfide	mg/L	0.1 U	0.43 J	NA	0.43 J	NA	0.53 J	NA	0.63 J	NA	0.43 J
Field Measured Parameter											
pH	SU	7.53	7.1	7.31	6.47	6.3	3.98	DRY	2.87	5.85	4.01
Specific Conductivity	µS/cm	253	208	192	182	145	713	DRY	593	681	335
Dissolved Oxygen	mg/L	1.77	1.98	1.99	4.93	7.03	9.16	DRY	8.55	8.24	7.62
Oxidation Reduction Potential	mV	147.1	-49.5	183.9	455.7	-15.8	187	DRY	648.8	161.7	176
Turbidity	NTU	2	1.79	< 1	4.2	0.15	55.1	DRY	3.7	5.78	2.33
Temperature	°C	9.4	12.62	7.94	15.33	8.09	17.15	DRY	15.44	9.87	14.02

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microsiemens per centimeter.

NTU = Nephelometric turbidity units
°C = degrees centigrade.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-11
Groundwater Geochemical Parameters
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:		LWA	LWA	LWA	LWA	LWA	Tailing	Tailing	Tailing	Tailing
Aquifer:		Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Station:		MW-20A	MW-21A	MW-21A	MW-21A	MW-21A	MW-22A	MW-22A	MW-23A	MW-23A
Field Sample ID:		MW-20A-120109AX	MW-21A-081309AX	MW-21A-081309AD	MW-21A-113009AX	MW-21A-113009AD	MW-22A-081309AX	MW-22A-113009AX	MW-23A-081309AX	MW-23A-112309AX
Date:		12/1/2009	8/13/2009	8/13/2009	11/30/2009	11/30/2009	8/13/2009	11/30/2009	8/13/2009	11/23/2009
Analyte	**Units**									
Acidity	mg/L	NA	230	100	NA	NA	130	NA	10 U	NA
Alkalinity (as $CaCO_3$)	mg/L	NA	80	5 U	NA	NA	5 U	NA	5 U	NA
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	NA	80	5 U	NA	NA	5 U	NA	5 U	NA
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	NA	5 U	5 U	NA	NA	5 U	NA	5 U	NA
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	NA	5 U	5 U	NA	NA	5 U	NA	5 U	NA
Chloride	mg/L	NA	0.44	0.44	NA	NA	0.35	NA	0.77 J	NA
Nitrogen, Nitrite + Nitrate (criteria 10 mg/L)	mg/L	NA	0.02 U	0.02 U	NA	NA	0.028	NA	0.028	NA
Sulfate	mg/L	190	660	660	630	620	410	410	16	11
Sulfide	mg/L	NA	0.53 J	0.73 J	NA	NA	1.2 J	NA	0.83 J	NA
Field Measured Parameter										
pH	SU	5.13	1.71	1.71	3.28	3.28	3.48	4.04	5.07	5.42
Specific Conductivity	µS/cm	394	973	973	983	983	679	219	48	56
Dissolved Oxygen	mg/L	10.66	0.8	0.8	0.8	0.8	0.28	0.44	1.32	2.62
Oxidation Reduction Potential	mV	206.6	269.3	269.3	270.1	270.1	289.4	201.5	593.6	8.3
Turbidity	NTU	0.97	2.89	2.89	0.67	0.67	2.9	0.08	1.4	0.54
Temperature	°C	4.56	16.1	16.1	8.44	8.44	16.94	7.69	14.98	9.64

Notes: U = Not Detected. Reporting limit shown.
J = Estimated concentration.
mg/L = milligrams per liter
SU = standard pH units
µS/cm = microsiemens per centimeter.
NTU = Nephelometric turbidity units
°C = degrees centigrade.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-12
Groundwater TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	URS	NOBIS	NOBIS	URS	URS	URS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS	URS
Study Area:		UWA	UWA	UWA	UWA	UWA	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag
Aquifer:		Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Overburden	Shallow Overburden	Shallow Overburden
Station:		BOM-01	BOM-01	BM-01	BM-01	BOM-03	MW-01A	MW-01A	MW-01A	MW-01A	MW-01B	MW-01B	MW-01B	MW-01B	MW-01C	MW-01C	MW-01C	MW-01C	MW-02A	MW-02A	MW-02A
Field Sample ID:		ELY-BOM-1	ELY-BOM-1	BM-01X-081809AX	BM-01-120109AX	ELY-GW-BOM3	ELY-MW-01A	ELY-MW-01A	MW-01A-081009AX	MW-01A-112009AX	ELY-MW-01B	ELY-MW-01B	MW-01B-081009AX	MW-01B-112009AX	ELY-MW-01C	ELY-MW-01C	MW-01C-081209AX	MW-01C-112309AX	ELY-MW-02A	ELY-QS-01	ELY-MW-02A
Date:		12/11/2006	6/14/2007	8/18/2009	12/1/2009	11/12/2007	12/13/2006	6/12/2007	8/10/2009	11/20/2009	12/13/2006	6/12/2007	8/10/2009	11/20/2009	12/13/2006	6/12/2007	8/12/2009	11/23/2009	12/12/2006	12/12/2006	6/12/2007
Analyte	**Criteria**																				
Total Metals																					
Aluminum	1248	4400	7700	109 J	223 U	360000	1700	1100	200 UJ	428	390	500	1030	200 U	230	47 J	513	200 U	2300	2300	3100
Antimony	ns	0.15 UJ	0.13 UJ	2 U	2.2 U	4.32 J	0.09 UJ	0.1 UJ	2 U	2 U	0.05 UJ	0.06 UJ	2 U	2 U	0.03 UJ	0.03 UJ	2 U	2 U	0.02 UJ	0.05 UJ	0.02 UJ
Arsenic	ns	0.11 UJ	0.6	10 U	10 U	4.88 J	0.32 J	0.1 J	10 U	10 UJ	0.15 J	0.21 J	10 U	10 UJ	0.14 J	0.11 J	10 U	10 UJ	0.5 U	0.1 J	0.5 U
Barium	ns	36	40.2	4.1 J	5.5 J	85	32.2	18	20.2 J	15.2 J	34	41.5	45 J	37.9 J	23.1	22.6	23.9 J	21.1 J	26	25.2	23.2
Beryllium	ns	0.19 J	0.6	1 U	1 U	7.3	0.1 J	0.21 J	1 U	0.057 J	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	1 U	1 U	0.2 J	0.21 J	0.37 J
Cadmium	5	0.05 UJ	0.05 J	5 U	5 U	9	3.1	3.5	1.4 J	1.3 J	0.08 UJ	0.5 U	5 U	5 U	0.02 UJ	0.5 U	5 U	5 U	2.3	2.2	6
Calcium	ns	12000	12000	10700	11777	42000	43000	47000	45600	34973	82000	81000	88900	84899	61000	56000	55400	59739	31000	31000	29000
Chromium	100	14.5	24.4	10 U	1.6 J	172	23.5	0.21 J	10 U	10 U	2.8	1.4	10 U	10 U	5.2	0.9	6.4 J	0.71 J	27.2	21.5	0.11 J
Cobalt	5	13.4	24	50 U	0.65 J	140.5 J	220.1	261.5	159	123 J	0.6	0.8	50 U	50 UJ	0.28 UJ	0.17 UJ	50 U	50 UJ	124	121.5	306
Copper	588	32	75	25 U	50 UJ	9950	3130	1780	520	1119	2.8 J	11	18 J	7.4 J	2.6 J	1.1 J	5.2 J	25 UJ	2380	2340	4240
Cyanide	ns	5 U	5 U	10 UJ	10 UJ	5 U	2.9 J	5 U	10 U	10 UJ	3.5 J	5 U	10 U	10 UJ	5 U	5 U	10 UJ	10 UJ	5 U	5 U	5 U
Iron	556	6600	16000	473	1468	310000	8100	1300	77.3 J	193	460	640	1310	81 J	250	130	547 J	100 U	13000	13000	8200
Lead	15	3.4 U	7.6	10 U	2.4 J	27.2	2.4	0.6	10 U	10 U	0.2 UJ	0.19 J	10 U	10 U	0.9	0.04 J	10 U	10 U	0.45 UJ	0.41 UJ	0.17 J
Magnesium	ns	3900	4100	1130 J	1195 J	14000	8700	9700	9050	6419	10000	10000	10600	9708	7800	7700	7150	7677	5000	5000	3800
Manganese	300	213.7	676.4	14.1 J	49.7 J	1781	1084	1299	707	558	133.1	38.5	29.1	9.1 J	3.91 UJ	1.1	6 J	15 U	771.8	751.7	654.9
Mercury	ns	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U	0.03 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Molybdenum	40	0.88 J	1.5 U	10 U	10 U	28.4	3.05 J	0.9 U	10 U	10 U	2.72 J	1.9	10 U	10 U	1.83 J	1.5 U	10 U	10 U	3.41 J	2.82 J	0.07 UJ
Nickel	100	23	50.7	1.9 J	3.6 J	125 J	38.8	25.5	14.8 J	11.3 J	3.1	2.1	40 U	40 U	3.5	0.8	4.1 J	40 U	38.5	34.2	64.2
Potassium	ns	3700	3600	1890 J	1468 J	14000	11000	11000	8650	7154 J	8900	6900	6330	5815 J	4800	4300	4250 J	3663 J	6500	6500	6600
Selenium	ns	1	1	35 U	35 U	8.9 J	7	5	8.7 J	35 U	0.7 J	0.8 J	35 U	35 U	0.7 J	0.7 J	35 U	35 U	2	2	1
Silver	ns	0.13 UJ	0.7	10 UJ	10 UJ	4.15 J	0.13 UJ	0.03 J	10 U	10 U	0.5 U	0.5 U	10 U	0.43 J	0.5 U	0.5 U	10 U	10 U	0.03 UJ	0.5 U	0.5 U
Sodium	ns	1200 J	2700	1200 J	1164 J	12000	35000	29000	50500	35458 J	11000	8400	7550	7503 J	4700	3800	4070 J	4337 J	19000	18000	28000
Strontium	ns	53	54	45.3	46.5	200	217	235	213	167	420	397	418	399	276	246	233	246	187	187	176
Thallium	ns	0.09 UJ	0.12 UJ	1 U	1 U	2.33 J	0.12 UJ	0.14 UJ	1 U	0.14 J	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	1 U	1 U	0.1 UJ	0.09 UJ	0.18 UJ
Vanadium	ns	15	30.8	50 U	1.2 J	36.6	3	0.5 U	50 U	50 UJ	3.3	2.8	4 J	2.2 J	4.3	3.6	4.8 J	3.4 J	0.5 U	0.16 UJ	0.5 U
Zinc	465	58.6 U	58.8	60 U	4.3 J	1234	1595	1212	788	661	13.7 U	5.6 U	60 U	60 U	9 U	3.13 UJ	6.3 J	60 U	688.5	658.5	1852
Dissolved Metals																					
Aluminum	1248	--	--	200 U	200 U	6900	370	1100	200 U	377	--	--	200 U	200 U	--	--	200 U	200 U	2400	2300	3700
Antimony	ns	--	--	2 U	2 U	0.82 J	0.03 UJ	0.18 UJ	2 U	2 U	--	--	2 U	2 U	--	--	2 U	2 U	0.02 UJ	0.05 UJ	0.03 UJ
Arsenic	ns	--	--	10 U	2.7 J	0.19 UJ	0.5 U	0.5 U	10 U	10 U	--	--	10 U	10 U	--	--	10 U	10 U	0.5 U	0.08 J	0.11 J
Barium	ns	--	--	200 U	4.3 J	14.5	24	17.9	19.6 J	15.1 J	--	--	38 J	36.2 J	--	--	8.2 J	20.2 J	23.5	23.5	22.9
Beryllium	ns	--	--	1 U	1 U	0.93 J	0.07 J	0.19 J	1 U	0.055 J	--	--	1 U	1 U	--	--	1 U	1 U	0.23 J	0.19 J	0.41 J
Cadmium	5	--	--	5 U	5 U	8.2	2.9	3.4	5 U	1.4 J	--	--	5 U	5 U	--	--	5 U	5 U	2.4	2.3	5.2
Calcium	ns	--	--	10900 J	12192	41000	44000	48000	42000	33645	--	--	87300	81440	--	--	22000	57249	32000	32000	30000
Chromium	100	--	--	10 U	10 U	0.92 J	2.1	0.29 J	10 U	10 U	--	--	10 U	10 U	--	--	10 U	0.63 J	5	6.5	0.17 J
Cobalt	5	--	--	50 UJ	50 UJ	126.9	211.3	263.3	153	114 J	--	--	50 U	50 UJ	--	--	50 U	50 UJ	112.1	114.2	247.6
Copper	588	--	--	2.2 J	2.3 J	5110	2620 J	1850	502	1091	--	--	9.5 J	3.8 J	--	--	25 U	25 U	2420 J	2360 J	4540
Iron	556	--	--	33.3 J	100 U	1200	2200	1500	43.6 J	158	--	--	100 U	100 U	--	--	100 UJ	100 U	10000	10000	6000
Lead	15	--	--	10 U	10 U	0.71 J	0.7	0.7	10 U	10 U	--	--	10 U	10 U	--	--	10 U	10 U	0.3 J	0.7	0.34 J
Magnesium	ns	--	--	1080 J	1213 J	9200	8400	10000	8670	6330	--	--	10400	9456	--	--	2820 J	7352	5200	5100	4000
Manganese	300	--	--	2.4 J	5.4 J	1243	1055	1292	685 J	534	--	--	4 J	2.3 J	--	--	1.3 J	15 U	743.5	744.8	616.9
Mercury	ns	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	--	--	0.2 U	0.2 UJ	--	--	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U
Molybdenum	40	--	--	10 U	10 U	2.9	0.57 UJ	0.9 U	10 U	10 U	--	--	10 U	10 U	--	--	10 U	10 U	0.91 UJ	1.27 UJ	0.17 UJ
Nickel	100	--	--	1.1 J	1.7 J	76	28.5	26.7	14.2 J	10.8 J	--	--	40 U	40 U	--	--	40 U	40 U	27.4	30.2	54.2
Potassium	ns	--	--	1350 J	1592 J	7100	11000	12000	8040	7008 J	--	--	5750	5421 J	--	--	5000 U	3617 J	6500	6400	6800
Selenium	ns	--	--	35 U	35 U	3	7	4	12.1 J	35 U	--	--	35 U	35 U	--	--	35 U	35 U	2	2	2
Silver	ns	--	--	10 U	10 UJ	0.09 UJ	0.5 U	0.5 U	10 U	10 U	--	--	10 U	10 U	--	--	10 U	10 U	0.5 U	0.5 U	0.5 U
Sodium	ns	--	--	5000 U	1370 J	8800	34000	31000	49100 J	34839 J	--	--	7850 J	7138 J	--	--	1620 J	4227 J	19000	19000	29000
Strontium	ns	--	--	43.4	51.1	200	210	240	199	164	--	--	413	394	--	--	92.3	240	190	190	180
Thallium	ns	--	--	1 U	1 U	0.56 J	0.1 UJ	0.15 UJ	1 U	0.098 J	--	--	1 U	1 U	--	--	1 U	1 U	0.11 J	0.1 UJ	0.18 UJ
Vanadium	ns	--	--	50 U	50 U	0.5 J	0.5 U	0.5 U	50 U	50 UJ	--	--	1.5 J	1.7 J	--	--	50 U	2.8 J	0.5 U	0.5 U	0.5 U
Zinc	465	--		4.1 J	3.1 J	1084	1072	1181 J	773	620	--	--	4.3 J	60 U	--	--	60 U	60 U	648	648	1525 J

Notes: Units are in µg/L = micrograms per liter
UJ = Value is estimated non-detect below the laboratory detection limit.
U = Not detected at or above the reporting limit.
J = Value is estimated below laboratory reporting limit.

Light gray highlighted cells indicate exceedance of criteria.
UWA = Upper Waste Area; ORB = Ore Roast Bed; LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach; EB-TZ = Ely Brook Transition Zone

Table 6-12
Groundwater TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	NOBIS	NOBIS	URS	URS	URS	NOBIS	NOBIS	URS	URS	URS	URS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS
Study Area:		Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	ORB	ORB	ORB	ORB	LWA	LWA
Aquifer:		Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Overburden	Shallow Overburden
Station:		MW-02A	MW-02A	MW-02A	MW-02B	MW-02B	MW-02B	MW-02B	MW-02B	MW-02C	MW-02C	MW-02C	MW-02C	MW-02C	MW-02C	MW-03C	MW-03C	MW-03C	MW-03C	MW-04A	MW-04A
Field Sample ID:		ELY-MW-02A DUP	MW-02A-081009AX	MW-02A-113009AX	ELY-MW-02B	ELY-MW-02B	ELY-GW-MW-02B	MW-02B-081009AX	MW-02B-112009AX	ELY-MW-02C	ELY-MW-02C	ELY-GW-MW-02C	ELY-GW-MW-02C	MW-02C-081209AX	MW-02C-112009AX	ELY-MW-03C	ELY-MW-03C	MW-03C-081109AX	MW-03C-112309AX	ELY-MW-04A	ELY-MW-04A
Date:		6/12/2007	8/10/2009	11/30/2009	12/13/2006	6/12/2007	11/6/2007	8/10/2009	11/20/2009	12/13/2006	6/13/2007	11/6/2007	11/6/2007	8/12/2009	11/20/2009	12/11/2006	6/12/2007	8/11/2009	11/23/2009	12/12/2006	6/13/2007
Analyte	**Criteria**																				
Total Metals																					
Aluminum	1248	3500	4680	3682	150000	700	48 J	468 J	200 U	11000	2000	170	180	3590	200 U	270	120	200 UJ	200 U	36000	14000
Antimony	ns	0.04 UJ	2 U	2 U	0.31 J	0.04 UJ	0.12 UJ	2 U	2 U	0.4 J	0.19 UJ	0.7 U	0.5 U	2 U	2 U	0.03 UJ	0.04 UJ	2 U	2 U	0.1 UJ	0.13 UJ
Arsenic	ns	0.12 J	10 U	10 U	4.8	0.14 J	0.13 UJ	10 U	10 UJ	3.2	0.6	0.33 UJ	0.3 UJ	10 U	10 UJ	0.11 UJ	0.18 J	10 U	10 UJ	0.7	0.5 U
Barium	ns	23.4	25.6 J	30.7 J	1202	40.5	33.5	43 J	35.7 J	146	57.7	25.9	27.3	83.6 J	26.2 J	11.3	12.3	7.5 J	7.1 J	139.4	18.9
Beryllium	ns	0.41 J	1 U	0.52 J	3.2	0.03 UJ	0.5 U	1 U	1 U	1.6	0.24 J	0.03 UJ	0.5 U	0.15 J	1 U	0.5 U	0.5 U	1 U	1 U	1	0.6
Cadmium	5	5.5	3.5 J	4.9 J	1.1	0.5 U	0.5 U	5 U	5 U	0.33 J	0.05 J	0.02 UJ	0.05 UJ	5 U	5 U	0.5 U	0.5 U	5 U	5 U	15.1	12.2
Calcium	ns	29000	23800	21508	380000	59000	59000	66500	59730	58000	49000	50000	51000	51900	53109	11000	12000	8640	7912	62000	45000
Chromium	100	0.16 J	10 U	10 U	289.5	1.8	0.23 UJ	10 U	10 U	16.6	4.7	0.42 J	0.4 UJ	25.1	0.38 J	4.6	0.4 J	10 U	10 U	88.4	3.1
Cobalt	5	257.5	106	212 J	96.2	0.8	0.17 UJ	50 U	50 UJ	4.3	1.3	0.37 UJ	0.28 UJ	50 U	50 UJ	5	0.14 UJ	50 U	50 UJ	317.8	282.5
Copper	588	4370	14700	27795	2230	12	0.7 U	10.7 J	25 UJ	19	7.4 J	1.1 U	0.9 U	16.4 J	25 UJ	10 U	1.5 J	25 U	3.3 J	12300	10700
Cyanide	ns	5 U	10 U	10 UJ	5 U	5 U	5 U	10 U	10 UJ	5 U	5 U	5 U	5 U	10 UJ	10 UJ	5 U	5 U	10 U	10 UJ	5 U	5 U
Iron	556	6000	1940	51.4 J	200000	1600	420	1800	386	22000	2800	250	220	5420 J	378	190	49 J	100 U	100 U	20000	660
Lead	15	0.17 UJ	10 U	3 J	52.2	0.4 J	0.07 UJ	10 U	10 U	15.3	5.9	0.6	0.5	8.8 J	10 U	0.26 UJ	0.09 UJ	10 U	10 U	6.6	0.4 J
Magnesium	ns	3900	3550 J	3500 J	90000	9700	9000	9600	8559	10000	8500	8000	8000	8910	8103	960	790	656 J	744 J	19000	10000
Manganese	300	633.2	431	464 J	3488	91.2	53.5	73	50.1 J	224.5	36.3	9.1	9.4	60.8 J	12.8 J	6.7 U	1.7	15 U	15 U	2645	1207
Mercury	ns	0.2 U	0.2 U	0.2 U	0.04 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.01 UJ	0.01 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Molybdenum	40	0.22 UJ	10 U	10 U	27	1.5	1.6	10 U	10 U	17.1	2.3	4.1	2.7	10 U	10 U	0.62 UJ	0.19 UJ	10 U	10 U	7.2	0.19 UJ
Nickel	100	52.8	20.2 J	31.4 J	177.3	1.7	1	40 U	40 U	20.9	3	1.3	1.4	14.5 J	40 U	2.9	0.5	40 U	40 U	191.3	92
Potassium	ns	6600	6710	9770 J	84000	5200	5000	5300	4664 J	7700	5500	5600	5600	5490 J	4446 J	5300	2300 J	1770 J	1351 J	17000	11000
Selenium	ns	2	35 U	35 U	11	0.6 J	0.6 J	35 U	35 U	1	0.6 J	0.5 J	0.4 J	35 U	35 U	1 U	1 U	35 U	35 U	6	4
Silver	ns	0.5 U	10 U	10 UJ	0.9	0.5 U	0.5 U	10 U	0.48 J	0.08 UJ	0.05 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.2 J	0.5 U
Sodium	ns	28000	30100	20243 J	14000	8200	9400	9860	9543 J	21000	8300	9400	9500	8160	8488 J	2600	2500	1340 J	1284 J	11000	5800
Strontium	ns	176	143	159	1800	373	372	414	372	419	228	224	228	232	229	146	87	53.5	45.6	223	173
Thallium	ns	0.16 UJ	1 U	1 U	3	0.5 U	0.5 U	1 U	1 U	0.15 UJ	0.03 UJ	0.05 UJ	0.5 U	1 U	1 U	0.5 U	0.5 U	1 U	1 U	0.49 J	0.33 J
Vanadium	ns	0.5 U	50 U	50 U	260.8	1.6	0.11 UJ	1.5 J	50 UJ	6.6	7.2	2.4	2.4	12.9 J	2.8 J	0.9	0.7	0.86 J	0.78 J	35.3	1
Zinc	465	1591	884	1951	937	9.3	2.75 UJ	60 U	60 U	148.1	79.4	3.32 UJ	2.55 UJ	26.5 J	3 J	5.1 U	151.2	60 U	60 U	1158	932.2
Dissolved Metals																					
Aluminum	1248	3700	4570	3731	--	--	--	200 U	200 U	--	--	--	--	200 U	200 U	--	--	200 U	200 U	12000	13000
Antimony	ns	0.04 UJ	2 U	2 U	--	--	--	2 U	2 U	--	--	--	--	2 U	2 U	--	--	2 U	2 U	0.03 UJ	0.02 UJ
Arsenic	ns	0.08 J	10 U	10 U	--	--	--	10 U	10 U	--	--	--	--	10 U	10 U	--	--	10 U	10 U	0.1 J	0.5 U
Barium	ns	22.8	28.9 J	30.9 J	--	--	--	40.4 J	35.6 J	--	--	--	--	24.7 J	23 J	--	--	7.8 J	9.2 J	21.1	16.8
Beryllium	ns	0.41 J	0.44 J	0.5 J	--	--	--	1 U	1 U	--	--	--	--	1 U	1 U	--	--	1 U	1 U	0.5	0.6
Cadmium	5	5.2	5 U	4.6 J	--	--	--	5 U	5 U	--	--	--	--	5 U	5 U	--	--	5 U	5 U	12.6	12.5
Calcium	ns	30000	22900	22385	--	--	--	60000	59411	--	--	--	--	56700	51958	--	--	7700	7758	62000	46000
Chromium	100	0.16 J	10 U	10 U	--	--	--	10 U	10 U	--	--	--	--	10 U	10 U	--	--	10 U	10 U	15.1	1.6
Cobalt	5	246	106	191 J	--	--	--	50 U	50 UJ	--	--	--	--	50 U	50 UJ	--	--	50 U	50 UJ	266.8	289.4
Copper	588	4580	14100	23199	--	--	--	1.3 J	25 U	--	--	--	--	25 U	25 U	--	--	25 U	1.8 J	9260 J	10900
Iron	556	5700	1830	100 U	--	--	--	226	184	--	--	--	--	75.8 J	87.5 J	--	--	100 U	100 U	420	120
Lead	15	0.2 J	10 U	10 U	--	--	--	10 U	10 U	--	--	--	--	10 U	10 U	--	--	10 U	10 U	0.47 J	0.24 J
Magnesium	ns	4000	3630 J	3739 J	--	--	--	8920	8613	--	--	--	--	8650	8039	--	--	753 J	728 J	11000	10000
Manganese	300	628.2	433 J	490 J	--	--	--	48.8 J	48.1 J	--	--	--	--	9.6 J	8.7 J	--	--	15 U	15 U	2237	1248
Mercury	ns	0.2 U	0.2 U	0.2 U	--	--	--	0.2 U	0.2 UJ	--	--	--	--	0.2 U	0.2 UJ	--	--	0.2 U	0.2 UJ	0.2 U	0.2 U
Molybdenum	40	0.26 UJ	10 U	10 U	--	--	--	10 U	10 U	--	--	--	--	10 U	10 U	--	--	10 U	10 U	2.41 UJ	0.18 UJ
Nickel	100	50.3	20.3 J	27.7 J	--	--	--	0.57 J	40 U	--	--	--	--	40 U	40 U	--	--	0.54 J	40 U	134.6	95.1
Potassium	ns	6800	6400	9615 J	--	--	--	4550 J	4662 J	--	--	--	--	5210 J	4635 J	--	--	1610 J	1512 J	9200	11000
Selenium	ns	2	35 U	35 U	--	--	--	35 U	35 U	--	--	--	--	35 U	35 U	--	--	35 U	35 U	4	4
Silver	ns	0.5 U	2.8 J	10 UJ	--	--	--	10 U	10 U	--	--	--	--	0.46 J	10 U	--	--	10 U	10 U	0.5 U	0.5 U
Sodium	ns	29000	30300 J	21908 J	--	--	--	9580 J	9575 J	--	--	--	--	8970 J	8362 J	--	--	1400 J	1267 J	8800	5800
Strontium	ns	180	140	158	--	--	--	379	380	--	--	--	--	241	229	--	--	49.1	45.4	200	180
Thallium	ns	0.18 J	0.027 J	1 U	--	--	--	1 U	1 U	--	--	--	--	1 U	1 U	--	--	1 U	1 U	0.15 J	0.31 J
Vanadium	ns	0.5 U	50 U	50 U	--	--	--	50 U	50 UJ	--	--	--	--	50 U	1.3 J	--	--	50 U	50 UJ	0.5 U	0.5 U
Zinc	465	1485 J	900	1724	--	--	--	60 U	60 U	--	--	--	--	60 U	3.7 J	--	--	60 U	60 U	848.6	922.3 J

Notes: Units are in µg/L = micrograms per liter
UJ = Value is estimated non-detect below the laboratory detection limit.
U = Not detected at or above the reporting limit.
J = Value is estimated below laboratory reporting limit.

Light gray highlighted cells indicate exceedance of criteria.

UWA = Upper Waste Area; ORB = Ore Roast Bed; LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach; EB-TZ = Ely Brook Transition Zone

Table 6-12
Groundwater TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	NOBIS
Study Area:		LWA	LWA	LWA	LWA	LWA	LWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA
Aquifer:		Shallow Overburden	Shallow Overburden	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock
Station:		MW-04A	MW-04A	MW-04C	MW-04C	MW-04C	MW-04C	MW-05A	MW-05A	MW-05A	MW-05A	MW-05A	MW-05A	MW-05B	MW-05B	MW-05B	MW-05B	MW-05B	MW-05C	MW-05C	MW-05C
Field Sample ID:		MW-04A-081209AX	MW-04A-112409AX	ELY-MW-04C	ELY-MW-04C	MW-04C-081209AX	MW-04C-112409AX	ELY-MW-05A	ELY-MW-05A	ELY-GW-MW-05A	MW-05A-081109AX	MW-05A-	MW-05A-120109AD	ELY-MW-05B	ELY-MW-05B	MW-05B-081209AX	MW-05B-081209AD	MW-05B-112409AX	ELY-MW-05C	ELY-MW-05C	MW-05C-081309AX
Date:		8/13/2009	11/24/2009	12/12/2006	6/13/2007	8/12/2009	11/24/2009	12/12/2006	6/13/2007	11/7/2007	8/11/2009	12/1/2009	12/1/2009	12/12/2006	6/13/2007	8/12/2009	8/12/2009	11/24/2009	12/12/2006	6/13/2007	8/13/2009
Analyte	**Criteria**																				
Total Metals																					
Aluminum	1248	16900	16336	340	30 J	200 UJ	200 U	25000	25000	25000	25500	25017	25558	13000	490	200 U	200 U	200 U	570	62 J	200 UJ
Antimony	ns	2 U	2 U	0.2 UJ	0.04 UJ	2 U	2 U	0.17 UJ	0.09 UJ	0.17 UJ	2 U	2 U	2 U	0.19 UJ	0.03 UJ	2 U	2 U	2 U	0.14 UJ	0.02 UJ	2 U
Arsenic	ns	3.2 J	10 UJ	0.19 J	0.37 J	10 U	10 UJ	0.7	0.5 U	0.5 U	10 U	2.5 J	10 U	1	0.32 J	10 U	10 U	10 U	0.32 J	0.2 J	10 U
Barium	ns	20.6 J	15.3 J	25.8	17.2	21.6 J	20.7 J	41.9	10.8	11.9	11.5 J	11 J	11.4 J	133.8	16.5	22.3 J	20.7 J	19.3 J	23.2	17.4	16.3 J
Beryllium	ns	0.96 J	0.75 J	0.5 U	0.5 U	1 U	1 U	1.2	1.2	1.4	1.3 J	1.4 J	1.3 J	0.3 J	0.5 U	1 U	1 U	1 U	0.5 U	0.5 U	1 U
Cadmium	5	9.1	9.5	0.16 UJ	0.5 U	5 U	0.18 J	16.6	13.5	14	13.1	14.2 J	14.5 J	0.45 UJ	0.5 U	5 U	5 U	5 U	0.27 UJ	0.13 J	5 UJ
Calcium	ns	22200	29438	59000	53000	67100	62269	69000	39000	47000	39600	45954	47406	85000	100000	144000	141000	143013	130000	130000	139000
Chromium	100	10 U	10 U	5.7	0.1 J	10 U	10 U	365.4	0.5	0.47 UJ	10 U	0.51 J	0.4 J	77.2	0.9	10 U	10 U	10 U	17.5	0.39 J	10 U
Cobalt	5	158	272 J	1	0.44 UJ	50 U	50 UJ	280.3	266.6	259.7	259	282 J	286 J	30.8	2.9	50 U	50 U	50 UJ	6.7	0.6	50 U
Copper	588	12400	10367	2.9 J	7.7 J	25 U	3.8 J	14100	13600	15400	13500	13346	13432	146	18	1.9 J	25 U	25 U	27	14	23.3 J
Cyanide	ns	10 U	10 UJ	5 U	5 U	10 U	10 UJ	3.3 J	5 U	5 U	10 UJ	10 UJ	10 UJ	5 U	5 U	10 UJ	10 UJ	10 UJ	5 U	5 U	10 U
Iron	556	822	187	460	450	77.3 J	100 U	9600	180	160	19.7 J	100 U	100 U	15000	1500	355 J	619 J	168	900	200	64.2 J
Lead	15	10 U	10 U	2.4	0.05 UJ	10 U	10 U	11.6	1.5	0.3 UJ	10 U	10 U	10 U	7.9	0.32 J	10 U	10 U	10 U	0.8 U	0.08 J	10 U
Magnesium	ns	7010	13013	7400	7000	7110	6576	14000	13000	14000	13200	14740	14997	16000	17000	17500	14400	15647	20000	21000	20000
Manganese	300	742	1276	395.1	342.4	253	155 J	2238	1572	1656	1570 J	1838	1887	4026	3200	628 J	1250 J	381 J	432.3	29	7.1 J
Mercury	ns	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.03 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.02 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Molybdenum	40	10 U	10 U	5.3	2.1	10 U	10 U	52.4	0.06 UJ	0.26 UJ	10 U	10 U	10 U	16.1	4.6	5.1 J	6.8 J	6.4 J	3.38 J	0.36 UJ	10 U
Nickel	100	74.1	108	5.2	1.6	4.4 J	2 J	340.6	100.8	103.6	103	113	115	67.4	4.4	1.3 J	1 J	1.1 J	19.1	5	40 U
Potassium	ns	7580	5924 J	9000	5900	5520	5201 J	9700	6400	7600	6640 J	5693 J	6036 J	16000	5600	8260 J	9270 J	8549 J	11000	8700	8120
Selenium	ns	35 U	35 U	0.6 J	0.5 J	35 U	35 U	6	4	5	35 U	35 U	35 U	2	1	35 U	35 U	35 U	1	2	35 U
Silver	ns	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.43 J	0.13 UJ	0.15 UJ	10 U	0.35 J	10 UJ	0.15 UJ	0.5 U	1.1 J	0.38 J	10 UJ	0.5 U	0.5 U	10 U
Sodium	ns	3330 J	3923 J	15000	6400	6640	4794 J	9000	6900	10000	3440 J	3623 J	3731 J	110000	17000	10300	6680	6776 J	7600	4800	5130
Strontium	ns	85.1	87.5	207	185	226	213	264	131	159	123	132	136	372	463	584	561	542	422	430	461
Thallium	ns	1 U	0.29 J	0.5 U	0.5 U	1 U	1 U	0.32 J	0.24 J	0.27 UJ	0.27 J	1 U	1 U	0.26 J	0.5 U	1 U	1 U	1 U	0.5 U	0.5 U	1 U
Vanadium	ns	1.6 J	50 UJ	0.9	0.07 J	50 U	50 UJ	0.8	0.1 J	0.14 UJ	50 U	50 U	50 U	27.4	0.8	50 U	50 U	50 U	1.1	0.18 J	50 U
Zinc	465	637	810	58.8	4.28 UJ	60 U	6.2 J	1500	1548	1636	1690	1757	1793	165.7	12.9	2.9 J	60 U	60 U	201.6	104.4	60 U
Dissolved Metals																					
Aluminum	1248	13800	16233	36 J	100 U	200 U	97.8 J	6300	24000	24000	25600	25946	25459	360	32 J	200 U	200 U	200 U	84 J	--	200 UJ
Antimony	ns	2 U	2 U	0.17 UJ	0.03 UJ	2 U	2 U	0.03 UJ	0.03 UJ	0.1 UJ	2 U	2 U	2 U	0.11 UJ	0.05 UJ	2 U	2 U	2 U	0.04 UJ	--	2 U
Arsenic	ns	10 U	10 U	0.17 J	0.35 J	10 U	10 U	0.08 J	0.5 U	0.5 U	10 U	2.6 J	2.5 J	0.4 J	0.3 J	10 U	10 U	10 U	0.2 J	--	10 U
Barium	ns	16.8 J	15.4 J	22	17.5	20.9 J	20.2 J	22.4	11.2	12	11.8 J	12 J	11.2 J	38.5	15.6	17.7 J	19.5 J	17.3 J	18.7	--	15.8 J
Beryllium	ns	0.68 J	0.78 J	0.5 U	0.5 U	1 U	1 U	0.7 J	1.2	1.4	1.3 J	1.3 J	1.3 J	0.5 U	0.5 U	1 U	1 U	1 U	0.5 U	--	1 U
Cadmium	5	9.2 U	9.8	0.09 UJ	0.5 U	5 U	0.28 J	11.6	14.5	14.3	13.3	15.2 J	14.9 J	0.17 UJ	0.5 U	5 U	5 U	5 U	0.22 UJ	--	0.22 J
Calcium	ns	20700	30200	59000	53000	62500	61979	87000	46000	45000	42700	47021	46021	74000	100000	136000	146000	143130	140000	--	131000
Chromium	100	10 U	10 U	0.24 UJ	0.5 U	10 U	10 U	9.1	0.44 J	0.42 UJ	10 U	10 U	10 U	2	0.22 J	10 U	10 U	10 U	1.1	--	10 U
Cobalt	5	152	277 J	0.7	0.48 J	50 U	50 UJ	247.2	281.2	261.3	267	294 J	287 J	9.1	2.2	50 U	50 U	50 UJ	5.9	--	50 U
Copper	588	11600	10600	10 UJ	8.3 J	1.9 J	3.4 J	10400 J	14300	15100	13900	14032	13389	8 J	12	25 U	25 U	25 U	4.6 J	--	17.3 J
Iron	556	21 J	49.8 J	160	390	18.9 J	219	420	130	160	100 UJ	100 U	100 U	480	430	1340 J	759 J	25.1 J	210	--	100 U
Lead	15	10 U	2.6 J	0.44 J	0.04 UJ	10 U	10 U	1.7	0.4 J	0.37 UJ	10 U	10 U	10 U	1.4	0.1 UJ	10 U	10 U	10 UJ	0.09 UJ	--	10 U
Magnesium	ns	6520	13375	7400	7000	7040	6492	14000	14000	13000	13800	15648	15323	10000	17000	12800	14100	17466	20000	--	19600
Manganese	300	707 J	1301	355.8	347.6	246 J	148 J	2223	1748	1675	1630 J	1969	1937	4033	3093	1550 J	1560 J	42.1 J	423.2	--	3.1 J
Mercury	ns	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U	0.07 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 U
Molybdenum	40	10 U	10 U	4.78 J	2.2 U	10 U	10 U	2.25 UJ	0.14 UJ	0.21 UJ	10 U	10 U	10 U	8.4	4.7	7.5 J	7.6 J	5.6 J	1.9 UJ	--	10 U
Nickel	100	70.6	110	2.8	2.4	4.2 J	1.8 J	118	111.1	105.1	108	119	117	16.2	5.5	40 U	40 U	1 J	11.2	--	2.9 J
Potassium	ns	7600	6356 J	8600	5900	5370	5266 J	8700	6900	7500	7120 J	6546 J	6352 J	8600	5800	9070 J	9380 J	7444 J	10000	--	7970
Selenium	ns	35 U	35 U	0.7 J	0.4 J	35 U	35 U	4	5	5	35 U	35 U	35 U	1	1	35 U	35 U	35 U	1	--	35 U
Silver	ns	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.13 J	0.16 UJ	10 U	10 UJ	10 UJ	0.5 U	0.5 U	0.57 J	0.56 J	10 UJ	0.5 U	--	10 U
Sodium	ns	3300 J	4012 J	14000	6400	6460 J	4648 J	8000	7300	9800	3630 J	3992 J	3906 J	110000	17000	5130 J	5640 J	8029 J	6200	--	5130 J
Strontium	ns	79.7	91.7	200	190	213	212	330	170	150	134	143	140	290	470	533	576	517	410	--	440
Thallium	ns	0.25 J	0.29 J	0.5 U	0.5 U	1 U	1 U	0.21 J	0.27 J	0.32 J	0.25 J	1 U	1 U	0.04 UJ	0.5 U	1 U	1 U	1 U	0.5 U	--	1 U
Vanadium	ns	50 U	50 UJ	0.23 J	0.5 U	50 U	50 UJ	0.06 J	0.06 J	0.1 J	50 U	50 U	50 U	0.8	0.19 J	50 U	50 U	50 U	0.21 J	--	50 U
Zinc	465	625	814	10.9	4.04 UJ	6 J	5 J	1140	1612 J	1715	1720	1826	1771	24.6	8.4 UJ	3.2 J	3.7 J	2.8 J	16.2	--	38.5 J

Notes: Units are in µg/L = micrograms per liter
UJ = Value is estimated non-detect below the laboratory detection limit.
U = Not detected at or above the reporting limit.
J = Value is estimated below laboratory reporting limit.

Light gray highlighted cells indicate exceedance of criteria.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-12
Groundwater TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	URS	URS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS	NOBIS
Study Area:		UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	Background	Background	Background	Background	Background	Background	Background	Background	UWA	UWA	UWA
Aquifer:		Shallow Bedrock	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Overburden	Shallow Overburden	Shallow Overburden
Station:		MW-05C	MW-06A	MW-06A	MW-06A	MW-06A	MW-06C	MW-06C	MW-06C	MW-06C	MW-07A	MW-07A	MW-07A	MW-07A	MW-07C	MW-07C	MW-07C	MW-07C	MW-08A	MW-08A	MW-08A
Field Sample ID:		MW-05C-112509AX	ELY-MW-06A	ELY-MW-06A	MW-06A-081209AX	MW-06A-112509AX	ELY-MW-06C	ELY-MW-06C	MW-06C-081209AX	MW-06C-112509AX	ELY-MW-07A	ELY-MW-07A	MW-07A-081209AX	MW-07A-112509AX	ELY-MW-07C	ELY-MW-07C	MW-07C-081209AX	MW-07C-112509AX	ELY-MW-08A	ELY-MW-08A	MW-08A-081109AX
Date:		11/25/2009	12/12/2006	6/12/2007	8/12/2009	11/24/2009	12/11/2006	6/13/2007	8/12/2009	11/25/2009	12/11/2006	6/13/2007	8/12/2009	11/25/2009	12/11/2006	6/13/2007	8/12/2009	11/25/2009	12/12/2006	6/12/2007	8/11/2009
Analyte	**Criteria**																				
Total Metals																					
Aluminum	1248	200 U	140	160	200 U	200 U	380	130	200 U	200 U	2000	60 J	200 U	200 U	3700	560	168 J	54.1 J	22000	22000	19300
Antimony	ns	2 U	0.08 UJ	0.06 UJ	2 U	2 U	0.04 UJ	0.04 UJ	2 U	2 U	0.08 UJ	0.02 UJ	2 U	2 U	0.23 UJ	0.13 UJ	2 U	2 U	0.1 UJ	0.5 U	2 U
Arsenic	ns	10 U	0.13 J	0.5 U	10 U	10 U	0.28 UJ	0.13 J	10 U	10 U	0.19 UJ	0.5 U	10 U	10 U	0.5 U	0.13 J	10 U	10 U	0.18 J	0.5 U	10 U
Barium	ns	18 J	21.5	20.8	27.5 J	18 J	20.5	16.5	15.8 J	14.6 J	25.2	10	10.7 J	16.2 J	37	13.5	10.6 J	10.6 J	27.4	11.5	11.7 J
Beryllium	ns	1 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.035 J	1 U	0.9	0.13 UJ	1 U	1 U	0.8	0.8	0.79 J
Cadmium	5	5 U	0.06 UJ	0.5 U	5 U	5 U	0.13 UJ	0.5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	0.06 UJ	0.5 U	5 U	5 U	10.9	10.2	10.3
Calcium	ns	123450	21000	18000	18800	13784	120000	96000	95200	83247	8400	5400	5340	5785	10000	6100	6490	5343	57000	49000	58100
Chromium	100	0.49 J	1.2 U	0.46 J	0.4 J	10 U	3.8	0.44 J	10 U	10 U	6.1	0.36 J	10 U	10 U	4.9	0.49 J	10 U	10 U	22.4	3.5	1.2 J
Cobalt	5	50 UJ	0.7	0.23 UJ	50 U	50 UJ	0.9	0.41 UJ	50 U	50 UJ	1.4	0.09 UJ	50 U	50 UJ	5.4	0.2 UJ	50 U	50 UJ	240.4	208.9	213
Copper	588	25 U	10 U	2.1 J	1.4 J	25 U	4.5 J	10 U	1.7 J	25 U	5.3 J	10 U	25 U	25 U	8.8 J	10 U	25 U	25 U	8710	8060	7630
Cyanide	ns	10 UJ	5 U	5 U	10 UJ	10 UJ	5 U	5 U	10 UJ	10 UJ	5 U	5 U	10 UJ	10 UJ	5 U	2.4 J	10 U	10 UJ	5 U	5 U	10 UJ
Iron	556	42 J	120	220	189 J	67 J	470	120	26.1 J	100 U	2200	50	22.1 J	100 U	2400	320	92.9 J	32.8 J	4600	930	258 J
Lead	15	10 U	0.9	0.19 UJ	10 U	10 U	3.5 U	0.2 J	10 U	10 U	2.6 U	0.08 UJ	10 UJ	10 U	10 U	1.4	10 U	10 U	3.2	0.16 UJ	10 U
Magnesium	ns	18871	2200	1800	1860 J	1388 J	10000	9000	8590	7429	1800	760	745 J	735 J	2400	910	764 J	706 J	14000	13000	15400
Manganese	300	11.1 J	252.1	48	9.3 J	6.9 J	29.4	2.7	15 UJ	15 U	85.6	22.7	15.1	15 U	123.2	20	5.2 J	3.2 J	1934	1393	1470 J
Mercury	ns	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Molybdenum	40	10 U	1.48 J	1.1 U	10 U	10 U	2.96 J	1.2 U	10 U	10 U	0.24 UJ	0.14 UJ	10 U	10 U	0.68 UJ	0.17 UJ	10 U	10 U	0.53 UJ	0.08 UJ	10 U
Nickel	100	2.8 J	3.2	1.9	1.3 J	0.54 J	7.8	3.3	1.7 J	1.7 J	6.1	0.7	40 U	40 U	5.4	1	40 U	0.62 J	112.3	90.8	98.2
Potassium	ns	7470 J	3600	4100	3670 J	1816 J	7100	5600	4900 J	4022 J	1900 J	1200 J	936 J	690 J	2600	1000 J	1080 J	644 J	6500	5200	5240 J
Selenium	ns	35 U	1 U	1 U	35 U	35 U	1	0.9 J	35 U	35 U	1 U	1 U	35 U	35 U	0.6 J	1 U	35 U	35 U	4	4	35 U
Silver	ns	0.5 J	0.5 U	0.5 U	0.37 J	10 UJ	0.5 U	0.5 U	10 U	10 UJ	0.5 U	0.5 U	10 UJ	10 UJ	0.08 UJ	0.5 U	10 U	10 UJ	0.04 UJ	0.07 UJ	10 U
Sodium	ns	7024 J	5700	1000 J	1970 J	1952 J	8800	4400	2920 J	2842 J	2300	1800 J	940 J	865 J	6700	1200 J	977 J	860 J	7400	6400	3830 J
Strontium	ns	431	92	73	60.5	47	386	327	307	276	32	22	20.9	19.5	70	22	22.2	18.6	117	104	129
Thallium	ns	1 U	0.5 U	0.03 UJ	1 U	1 U	0.5 U	0.5 U	1 U	1 U	0.06 UJ	0.5 U	1 U	1 U	0.08 UJ	0.5 U	1 U	1 U	0.14 UJ	0.1 UJ	0.2 J
Vanadium	ns	50 U	0.3 UJ	0.46 J	50 U	50 U	1	0.33 J	50 U	50 U	4.4	0.14 J	50 U	50 U	2.5	0.37 J	50 U	50 U	8.5	1.6	50 U
Zinc	465	38.5 J	19.1 U	54.6	2.9 J	60 U	17.4 U	82.3	3.2 J	60 U	44.1 U	175.1	60 U	60 U	54 U	22	60 U	60 U	1309	1295	1460
Dissolved Metals																					
Aluminum	1248	200 U	--	NA	200 U	200 U	--	--	200 U	200 U	NA	NA	200 U	60.6 J	--	--	200 U	200 U	20000	21000	18700
Antimony	ns	2 U	--	NA	2 U	2 U	--	--	2 U	2 U	NA	NA	2 U	2 U	--	--	2 U	2 U	0.03 UJ	0.02 UJ	2 U
Arsenic	ns	10 U	--	NA	10 U	10 U	--	--	10 U	10 U	NA	NA	10 U	10 U	--	--	10 U	10 U	0.5 U	0.5 U	10 U
Barium	ns	17.6 J	--	NA	25.3 J	18.1 J	--	--	17.2 J	14.9 J	NA	NA	9.4 J	200 U	--	--	9.3 J	200 U	15.1	10.5	10.8 J
Beryllium	ns	1 U	--	NA	1 U	1 U	--	--	1 U	1 U	NA	NA	1 U	1 U	--	--	1 U	1 U	0.8	0.8	0.86 J
Cadmium	5	0.27 J	--	NA	5 U	0.18 J	--	--	5 U	5 U	NA	NA	5 U	5 U	--	--	5 U	5 U	11.5	10.6	10.1
Calcium	ns	124877	--	NA	18700	14921	--	--	110000	90399	NA	NA	5010 J	5952	--	--	5670	5110	56000	49000	59700
Chromium	100	10 U	--	NA	10 U	10 U	--	--	10 U	10 U	NA	NA	10 U	10 U	--	--	10 U	10 U	6.4	0.6	0.43 J
Cobalt	5	50 UJ	--	NA	50 U	50 UJ	--	--	50 U	50 UJ	NA	NA	50 UJ	50 UJ	--	--	50 U	50 UJ	246.6	231	208
Copper	588	18.6 J	--	NA	25 U	25 U	--	--	25 U	25 U	NA	NA	25 U	25 U	--	--	25 U	25 U	8840 J	7940	7510
Iron	556	100 U	--	NA	100 UJ	32.4 J	--	--	100 UJ	100 U	NA	NA	100 U	100 U	--	--	100 U	29.2 J	420	160	20 J
Lead	15	10 UJ	--	NA	10 U	10 UJ	--	--	10 U	10 UJ	NA	NA	10 U	10 UJ	--	--	10 U	10 UJ	2.1	0.19 UJ	10 U
Magnesium	ns	18153	--	NA	1760 J	1426 J	--	--	9550	7730	NA	NA	664 J	754 J	--	--	743 J	646 J	14000	14000	15600
Manganese	300	11 J	--	NA	2 J	1.6 J	--	--	15 U	15 U	NA	NA	11.2 J	15 U	--	--	15 U	1.5 J	1936	1497	1460 J
Mercury	ns	0.2 U	--	NA	0.2 U	0.2 U	--	--	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Molybdenum	40	10 U	--	NA	10 U	10 U	--	--	10 U	10 U	NA	NA	10 U	10 U	--	--	10 U	10 U	0.42 UJ	0.05 UJ	10 U
Nickel	100	3.1 J	--	NA	40 U	0.61 J	--	--	40 U	1.9 J	NA	NA	40 U	40 U	--	--	0.83 J	0.56 J	112.3	104.9	95.7
Potassium	ns	7278 J	--	NA	3390 J	2339 J	--	--	5490 J	4299 J	NA	NA	765 J	1031 J	--	--	904 J	475 J	6200	5100	5280 J
Selenium	ns	35 U	--	NA	35 U	35 U	--	--	35 U	35 U	NA	NA	35 U	35 U	--	--	35 U	35 U	4	4	35 U
Silver	ns	10 UJ	--	NA	10 U	10 UJ	--	--	0.5 J	10 UJ	NA	NA	10 U	10 UJ	--	--	10 U	10 UJ	0.5 U	0.07 J	10 U
Sodium	ns	6611 J	--	NA	2010 J	1847 J	--	--	3190 J	2683 J	NA	NA	5000 U	813 J	--	--	911 J	779 J	7000	5500	3380 J
Strontium	ns	415	--	NA	58.6	47.9	--	--	345	282	NA	NA	19.4	19.3	--	--	19.4	17.2	110	100	131
Thallium	ns	1 U	--	NA	1 U	1 U	--	--	1 U	1 U	NA	NA	1 U	1 U	--	--	1 U	1 U	0.12 UJ	0.1 J	1 U
Vanadium	ns	50 U	--	NA	50 U	50 U	--	--	50 U	50 U	NA	NA	50 U	50 U	--	--	50 U	50 U	0.09 J	0.5 U	50 U
Zinc	465	41 J	--	NA	60 U	60 U	--	--	3 J	60 U	NA	NA	60 U	60 U	--	--	5.8 J	60 U	1342	1341 J	1420

Notes: Units are in µg/L = micrograms per liter
UJ = Value is estimated non-detect below the laboratory detection limit.
U = Not detected at or above the reporting limit.
J = Value is estimated below laboratory reporting limit.

Light gray highlighted cells indicate exceedance of criteria.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-12
Groundwater TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS
Study Area:		UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag	Smelter/ Slag
Aquifer:		Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Deep Overburden	Deep Overburden	Deep Overburden	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Bedrock	Shallow Bedrock	Shallow Bedrock
Station:		MW-08A	MW-08A	MW-09A	MW-09A	MW-09A	MW-09C	MW-09C	MW-09C	MW-10B	MW-10B	MW-10B	MW-10C	MW-10C	MW-10C	MW-11A	MW-11A	MW-11A	MW-11C	MW-11C	MW-11C
Field Sample ID:		MW-08A-112409AX	MW-08A-112409AD	ELY-GW-MW-09A	MW-09A-081209AX	MW-09A-120209AX	ELY-GW-MW-09C	MW-09C-081309AX	MW-09C-112409AX	ELY-GW-MW-10B	MW-10B-081109AX	MW-10B-112309AX	ELY-GW-MW-10C	MW-10C-081109AX	MW-10C-112309AX	ELY-GW-MW-11A	MW-11A-081109AX	MW-11A-120109AX	ELY-GW-MW-11C	MW-11C-081109AX	MW-11C-112309AX
Date:		11/24/2009	11/24/2009	11/6/2007	8/12/2009	12/2/2009	11/6/2007	8/13/2009	11/24/2009	11/6/2007	8/11/2009	11/23/2009	11/6/2007	8/11/2009	11/23/2009	11/7/2007	8/11/2009	12/1/2009	11/7/2007	8/11/2009	11/23/2009
Analyte	**Criteria**																				
Total Metals																					
Aluminum	1248	21028	21432	17000	12700	13296	130	200 UJ	200 U	65 J	200 U	200 U	170	200 UJ	200 U	100 U	200 UJ	200 U	2600	168 J	200 U
Antimony	ns	2 U	2 U	0.34 UJ	2 U	2 U	0.32 UJ	2 U	2 U	0.12 UJ	2 U	2 U	0.2 UJ	2 U	2 U	0.49 UJ	2 U	2 U	0.35 UJ	2 U	2 U
Arsenic	ns	10 UJ	10 UJ	0.5 U	10 U	2.7 J	0.43 UJ	3.1 J	10 U	0.12 UJ	10 U	10 UJ	0.11 UJ	10 U	10 UJ	0.15 UJ	10 U	10 U	0.34 UJ	10 U	10 UJ
Barium	ns	12.1 J	10.8 J	35.6	16.5 J	12.6 J	19.2	18 J	20.4 J	16.1	5.9 J	5.8 J	6.6	5 J	4.1 J	27.1	27.7 J	26.5 J	40.6	20.6 J	19.6 J
Beryllium	ns	0.87 J	0.85 J	1.6	1.3 J	1.1 J	0.5 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	1 U	1 U	0.06 J	1 U	1 U
Cadmium	5	11.3	11.3	14.6	8.9	8.3 J	0.31 UJ	5 UJ	5 U	0.22 UJ	5 U	5 U	0.08 UJ	5 U	5 U	0.6	5 U	0.3 J	0.5 U	5 U	5 U
Calcium	ns	59970	60837	40000	27900	32912	100000	125000	131810	5000	4310 J	4498 J	21000	20400	21249	12000	11500	9232	45000	39400	38936
Chromium	100	10 U	10 U	2.3	0.82 J	0.78 J	1.8	10 U	10 U	0.32 UJ	10 U	10 U	0.5	10 U	0.39 J	0.31 UJ	10 U	0.5 J	8.3	10 U	10 U
Cobalt	5	222 J	224 J	215.2	112	121 J	4.3	50 U	50 UJ	12.6	50 U	50 UJ	0.17 UJ	50 U	50 UJ	19.6	9.3 J	10.9 J	2.1	50 U	50 UJ
Copper	588	7998	8609	10300	7030	6519	15.7	25 U	25 U	136.3	17.2 J	8.2 J	7.3	25 U	25 UJ	26.7	15.8 J	44.8	20.8	25 U	1.5 J
Cyanide	ns	10 UJ	10 UJ	5 U	10 UJ	10 UJ	3.2 J	10 U	10 UJ	3 J	10 UJ	10 UJ	2.9 J	10 U	10 UJ	5 U	10 U	10 UJ	5 U	10 U	10 UJ
Iron	556	41.7 J	35.8 J	4300	43.7 J	30.9 J	140	246	161	100	46.1 J	100 U	190	101	179	310	23900	16731	2800	438	71.3 J
Lead	15	10 U	10 U	0.42 J	10 U	10 U	0.2 UJ	10 U	10 U	0.15 UJ	10 U	10 U	0.6	10 U	10 U	0.17 UJ	10 U	10 U	1.4	10 U	10 U
Magnesium	ns	15721	15996	12000	7780	10871	15000	11900	14925	1100	1030 J	978 J	4700	4540 J	4865 J	2900	2680 J	1902 J	6600	5380	5250
Manganese	300	1698	1731	2574	921 J	1086	137.8	68.4	88.1 J	318	5.9 J	2.1 J	5.5	3.2 J	1.8 J	2851	3020	1609	117.1	18.1	14.2 J
Mercury	ns	0.2 U	0.2 U	0.01 UJ	0.2 U	0.2 U	0.01 UJ	0.2 U	0.2 U	0.01 UJ	0.2 U	0.2 U	0.01 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Molybdenum	40	10 U	10 U	1.2	10 U	10 U	78.5	48.1	34.6	39.5	10 U	10 U	92.7	6.9 J	8 J	12.1	7.6 J	2 J	3	10 U	10 U
Nickel	100	98.4	99.7	402.1	58.7	60.2	21.7	40 U	3 J	229.2	2.3 J	0.66 J	0.9	40 U	40 U	11.1	40 U	3.3 J	12.4	40 U	40 U
Potassium	ns	5197 J	5317 J	12000	9870 J	7151 J	15000	10600	9749 J	2200 J	1750 J	1143 J	7100	3620 J	3817 J	3700	3840 J	2974 J	7200	4000 J	4028 J
Selenium	ns	35 U	35 U	5	35 U	35 U	1	35 U	35 U	2	35 U	35 U	7	35 U	6.5 J	3	35 U	35 U	3	35 U	35 U
Silver	ns	0.92 J	0.46 J	0.5 U	10 U	10 UJ	0.04 UJ	10 U	10 UJ	0.13 UJ	0.53 J	0.74 J	0.6	10 U	10 U	0.05 UJ	10 U	10 UJ	0.03 UJ	10 U	0.52 J
Sodium	ns	3911 J	3741 J	21000	4040 J	3804 J	22000	27700	18443 J	2600	1390 J	1371 J	3000	2590 J	2651 J	3900	9320	4172 J	5500	4920 J	4936 J
Strontium	ns	138	141	245	173	154	436	439	389	28	22.8	22.7	51	54.5	58.7	79	69.4	52.1	213	186	186
Thallium	ns	0.075 J	0.078 J	0.12 UJ	0.057 J	1 U	0.5 U	1 U	1 U	0.03 UJ	1 U	1 U	0.03 UJ	1 U	1 U	0.05 UJ	1 U	1 U	0.06 UJ	1 U	1 U
Vanadium	ns	50 UJ	50 UJ	0.28 UJ	50 U	50 U	2.1	1.7 J	50 U	0.27 UJ	50 U	50 UJ	2.6	50 U	50 UJ	0.3 J	50 U	0.87 J	10	1.6 J	50 UJ
Zinc	465	1577	1584	2560	1090	983	46.6	60 U	60 U	570.2	8.9 J	5.1 J	4 UJ	60 U	2.8 J	21	60 U	17.1 J	23.4	60 U	60 U
Dissolved Metals																					
Aluminum	1248	21201	21189	17000	12900	13821	120	200 U	200 U	100 U	200 U	200 U	34 J	200 U	200 U	100 U	200 U	200 U	--	200 U	200 U
Antimony	ns	2 U	2 U	0.15 UJ	2 U	2 U	0.18 UJ	2 U	2 U	0.05 UJ	2 U	2 U	0.2 UJ	2 U	2 U	0.6 U	2 U	2 U	--	2 U	2 U
Arsenic	ns	10 U	10 U	0.5 U	3 J	3.2 J	0.37 J	10 U	10 U	0.5 U	10 U	10 U	0.22 J	10 U	10 U	0.15 UJ	10 U	10 U	--	10 U	10 U
Barium	ns	11.4 J	11.1 J	33.2	16.7 J	13.2 J	19	21.8 J	19.5 J	14.1	6.2 J	5.1 J	6.2	5.6 J	3.9 J	26.6	26.4 J	26.2 J	--	18.2 J	18.5 J
Beryllium	ns	0.86 J	0.92 J	1.5	1.2 J	1 J	0.5 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	1 U	1 U	0.03 J	1 U	1 U	--	1 U	1 U
Cadmium	5	11.4	11.4	13.6	8.8	9 J	0.25 UJ	5 U	5 U	0.18 UJ	5 U	5 U	0.02 UJ	5 U	5 U	0.5	5 U	0.23 J	--	5 U	5 U
Calcium	ns	60527	60697	42000	29700	35175	100000	118000	134997	5100	4710 J	4293 J	21000	18200	20430	12000	10800	9352	--	37900	36646
Chromium	100	10 U	10 U	2	10 U	0.8 J	1.5	10 U	10 U	0.13 UJ	10 U	10 U	0.29 UJ	10 U	10 U	0.28 J	10 U	10 U	--	10 U	10 U
Cobalt	5	221 J	221 J	202.2	114	129 J	4	50 U	50 UJ	11.3	50 U	50 UJ	0.1 UJ	50 U	50 UJ	19.7	7.7 J	11 J	--	50 U	50 UJ
Copper	588	8469	8380	10400	7280	6820	12.4	25 U	25 U	117.6	25 U	7.4 J	2.4	25 U	25 U	18.4	25 U	25 UJ	--	25 U	25 U
Iron	556	20.9 J	20.3 J	4900	36.1 J	100 U	80	77.5 J	159	50 U	100 UJ	100 U	29 J	100 U	100 U	320	22200	17075	--	100 U	100 U
Lead	15	10 U	10 U	0.41 J	10 U	2.4 J	0.1 UJ	10 U	10 UJ	0.08 UJ	10 U	10 U	0.08 UJ	10 U	10 U	0.22 UJ	10 U	10 U	--	10 U	10 U
Magnesium	ns	15838	15817	13000	8110	11393	14000	12000	14948	1100	1110 J	949 J	4700	4290 J	4668 J	3000	2590 J	2005 J	--	5360	4909 J
Manganese	300	1708	1700	2584	948 J	1156	133.8	66 J	91.7 J	299.8	6.5 J	1.5 J	3	2.3 J	15 U	2894	2860 J	1671	--	14.8 J	12.8 J
Mercury	ns	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 UJ	0.07 J	0.2 U	0.2 U	--	0.2 U	0.2 UJ
Molybdenum	40	10 U	10 U	0.7	10 U	10 U	77.1	45	33.6	34.4	10 U	10 U	92.2	4.5 J	6.9 J	11.9	6.3 J	10 U	--	10 U	10 U
Nickel	100	97.8	105	384.9	59.5	65	20.9	2.9 J	3.8 J	199.6	40 U	0.73 J	0.8	1.1 J	40 U	11.2	2 J	3.2 J	--	0.74 J	40 U
Potassium	ns	5428 J	5582 J	12000	9990 J	8133 J	15000	10300	9844 J	2100 J	1810 J	1426 J	7100	2980 J	3524 J	3800	3670 J	3101 J	--	3940 J	3836 J
Selenium	ns	35 U	35 U	5	35 U	35 U	2	35 U	35 U	2	35 U	35 U	8	8 J	6.3 J	3	35 U	35 U	--	35 U	35 U
Silver	ns	10 U	10 U	0.03 UJ	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 UJ	--	10 U	10 U
Sodium	ns	3655 J	3721 J	21000	4580 J	4198 J	21000	25400 J	17057 J	2500	1740 J	1347 J	3400	2270 J	2593 J	3600	8540 J	4339 J	--	5040 J	4759 J
Strontium	ns	142	140	260	181	172	440	402	380	30	24.1	22	50	49.1	57	80	65.2	55.9	--	181	177
Thallium	ns	0.076 J	0.077 J	0.13 UJ	1 U	1 U	0.5 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	1 U	1 U	0.06 UJ	1 U	1 U	--	1 U	1 U
Vanadium	ns	50 UJ	50 UJ	0.08 UJ	50 U	50 U	2	50 U	0.86 J	0.11 UJ	50 U	50 UJ	2.5	50 U	50 UJ	0.3 J	0.76 J	50 U	--	50 U	50 UJ
Zinc	465	1559	1568	2408	1080	1046	31.2	60 U	3 J	491.5	10.9 J	3 J	3.24 UJ	60 U	60 U	20.9	10.7 J	15.7 J	--	60 U	60 U

Notes: Units are in µg/L = micrograms per liter
UJ = Value is estimated non-detect below the laboratory detection limit.
U = Not detected at or above the reporting limit.
J = Value is estimated below laboratory reporting limit.

Light gray highlighted cells indicate exceedance of criteria.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-12
Groundwater TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		URS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	URS	NOBIS	NOBIS	URS	NOBIS
Study Area:		UWA	UWA	UWA	UWA	UWA	UWA	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-LR	EB-TZ	EB-TZ	EB-TZ	EB-TZ	EB-TZ
Aquifer:		Shallow Bedrock	Shallow Bedrock	Shallow Bedrock	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Bedrock	Shallow Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Station:		MW-12C	MW-12C	MW-12C	MW-13A	MW-13A	MW-13A	MW-14A	MW-14A	MW-14A	MW-14C	MW-14C	MW-14D	MW-14D	MW-14D	MW-14D	MW-15A	MW-15A	MW-15A	MW-16A	MW-16A
Field Sample ID:		ELY-GW-MW-12C	MW-12C-081109AX	MW-12C-112409AX	ELY-GW-MW-13A	MW-13A-081209AX	MW-13A-112409AX	ELY-GW-MW-14A	MW-14A-081109AX	MW-14A-112309AX	MW-14C-081309AX	MW-14C-112309AX	MW-14D-091709AX	MW-14D-091809AX	MW-14D-091809BX	MW-14D-120109AX	ELY-GW-MW-15A	MW-15A-081309AX	MW-15A-112409AX	ELY-GW-MW-16A	MW-16A-081309AX
Date:		11/7/2007	8/11/2009	11/24/2009	11/7/2007	8/12/2009	11/24/2009	11/7/2007	8/11/2009	11/23/2009	8/13/2009	11/23/2009	9/17/2009	9/18/2009	9/18/2009	12/1/2009	11/5/2007	8/13/2009	11/24/2009	11/5/2007	8/13/2009
Analyte	**Criteria**																				
Total Metals																					
Aluminum	1248	800	1450	1108	200	200 U	200 U	330	200 UJ	200 U	259 J	200 U	165 J	605	200 U	200 U	1700	71.4 J	200 U	63 J	200 UJ
Antimony	ns	0.07 UJ	2 U	2 U	0.15 UJ	2 U	2 U	0.07 UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	1.4	2 U	2 U	0.6	2 U
Arsenic	ns	0.11 UJ	10 U	10 U	0.14 UJ	10 U	10 U	0.12 UJ	10 U	10 UJ	2.5 J	10 UJ	10 U	10 U	2.6 J	10 U	0.6 U	2.6 J	10 UJ	0.32 UJ	10 U
Barium	ns	24.2	22.8 J	17.4 J	27.8	20.4 J	21.1 J	10.5	5.8 J	5.7 J	9.7 J	10 J	5.4 J	18.4 J	6.1 J	5.9 J	42.7	25.3 J	23.6 J	23.9	13.4 J
Beryllium	ns	0.27 J	0.29 J	0.26 J	0.5 U	1 U	1 U	0.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.08 UJ	1 U	1 U	0.5 U	1 U
Cadmium	5	3.4	4.5 J	3.3 J	0.5 U	5 U	5 U	0.05 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.07 UJ	5 U	5 U	0.02 UJ	5 U
Calcium	ns	46000	48000	42241	30000	26400	26951	10000	6570	7050	25200	23368	26100	25200	25000	26103	33000	18200	17565	33000	33600
Chromium	100	1.1	10 U	10 U	0.6	10 U	10 U	0.9	10 U	10 U	10 U	0.41 J	1.2 J	2.7 J	132 J	1.2 J	4.5	10 U	10 U	0.28 UJ	10 U
Cobalt	5	51.7	62.7	47 J	1.1	50 U	50 UJ	5.4	50 U	50 UJ	50 U	50 UJ	50 UJ	4 J	50 UJ	1.5 J	2.7	50 U	50 UJ	0.35 UJ	50 U
Copper	588	1436	1840	1423	11	1.2 J	25 U	26	40.6	29.4	25 U	25 UJ	25 U	25 U	25 U	1.1 J	11.7	25 U	1.1 J	0.7	25 U
Cyanide	ns	5 U	10 UJ	10 UJ	5 U	10 UJ	10 UJ	5 U	10 U	10 UJ	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	5 U	10 U	10 UJ	5 U	10 U
Iron	556	120	100 UJ	100 U	200	100 UJ	20.8 J	450	32.7 J	17.9 J	324	45.2 J	1360 J	1550 J	1550 J	4275	1900	176	62.9 J	60	100 U
Lead	15	0.09 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.6	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	1.2	10 U	10 U	0.24 UJ	10 U
Magnesium	ns	8000	9610	8163	4600	3940 J	4048 J	1900	1110 J	1270 J	4180 J	3910 J	4160 J	4190 J	4100 J	3885 J	5300	1270 J	1281 J	2100	2040 J
Manganese	300	423.9	475 J	358 J	329.4	3.5 J	2.4 J	281.7	24.6	21.5 J	49.3	14.9 J	35.3 J	287 J	85.4 J	71.1 J	800.6	164	243 J	91.4	111
Mercury	ns	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.01 UJ	0.2 U	0.2 U	0.01 UJ	0.2 U
Molybdenum	40	0.34 UJ	10 U	10 U	1.5	10 U	10 U	3.2	10 U	10 U	6.1 J	10 U	10 U	10 U	12	10 U	14.5	10 U	10 U	4.1	10 U
Nickel	100	35.1	35.6 J	27.1 J	7.2	40 U	40 U	3.6	40 U	0.81 J	40 U	1.3 J	40 U	40 U	40 U	1.6 J	8.8	40 U	2.1 J	1	40 U
Potassium	ns	6900	5580 J	3697 J	5800	4050 J	3335 J	2800	2210 J	1957 J	6660	4431 J	4670 J	4200 J	6070 J	3639 J	11000	3680 J	2868 J	4800	3440 J
Selenium	ns	2	35 U	35 U	0.3 J	35 U	35 U	0.8 J	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	0.8 J	35 U	35 U	0.3 J	35 U
Silver	ns	0.5 U	0.41 J	10 UJ	0.5 U	0.97 J	10 UJ	0.12 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	0.04 UJ	10 U	10 U	0.03 UJ	10 U
Sodium	ns	6700	3050 J	2534 J	2500	2070 J	1925 J	1100 J	1540 J	1523 J	7370	4198 J	3700 J	3450 J	4330 J	3108 J	30000	4570 J	4385 J	6100	2200 J
Strontium	ns	235	200	169	152	130	132	71	52.2	53.9	99	102	119	112	117	107	163	66.7	67	182	174
Thallium	ns	0.09 UJ	0.035 J	0.067 J	0.5 U	1 U	1 U	0.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.13 UJ	1 U	1 U	0.07 UJ	1 U
Vanadium	ns	0.36 J	50 U	50 U	0.6	50 U	50 U	0.8	50 U	50 UJ	2.1 J	1.2 J	50 U	50 U	50 U	1.1 J	5	50 U	50 UJ	0.6	50 U
Zinc	465	508	627	466	4.6 UJ	60 U	60 U	13.6	60 U	60 U	60 U	60 U	44.8 J	95.2	192	83.7	10.8 U	60 U	33.8 J	1.53 UJ	60 U
Dissolved Metals																					
Aluminum	1248	460	1260	876	43 J	200 U	200 U	--	200 U	200 U	200 U	200 U	200 U	200 U	1120	200 U	170	200 U	200 U	--	200 U
Antimony	ns	0.08 UJ	2 U	2 U	0.13 UJ	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	1.4	2 U	2 U	--	2 U
Arsenic	ns	0.15 UJ	10 U	10 U	0.11 UJ	10 U	10 U	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	2.6 J	0.6	10 U	10 U	--	10 U
Barium	ns	24.1	24.2 J	16.5 J	26.7	20 J	19.4 J	--	5.1 J	200 U	8.3 J	8.7 J	5 J	3.5 J	19.9 J	3.4 J	27.1	26.2 J	22 J	--	14 J
Beryllium	ns	0.25 J	0.33 J	0.25 J	0.5 U	1 U	1 U	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.05 UJ	1 U	1 U	--	1 U
Cadmium	5	3.3	4.4 J	3.2 J	0.5 U	5 U	5 U	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.05 UJ	5 U	5 U	--	5 U
Calcium	ns	46000	52300	42689	31000	26700	26991	--	6150	6595	23900	23265	25800	24500	27700	27204	32000	19000	17102	--	32600
Chromium	100	1	0.4 J	10 U	0.15 UJ	10 U	10 U	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	0.7	10 U	10 U	--	10 U
Cobalt	5	51.5	63.3	46.3 J	1	50 U	50 UJ	--	3 J	2.4 J	50 U	50 UJ	50 U	50 U	50 U	50 UJ	1.3	50 U	50 UJ	--	50 U
Copper	588	1367	1920	1383	11.4	25 U	25 U	--	35.9	29.5	25 U	25 U	25 U	25 U	20 J	4.8 J	2.9	25 U	25 U	--	25 U
Iron	556	80	100 UJ	100 U	60	100 UJ	31.8 J	--	100 U	100 U	100 U	100 U	91.7 J	100 UJ	4640 J	230 U	200	100 U	100 U	--	100 U
Lead	15	0.12 UJ	10 U	10 UJ	0.08 UJ	10 U	10 UJ	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	0.5	10 U	10 U	--	10 U
Magnesium	ns	8000	10200	7831	4600	3930 J	3827 J	--	1130 J	1208 J	4050 J	3870 J	4150 J	3940 J	5070	4101 J	4300	1410 J	1250 J	--	2130 J
Manganese	300	413	493 J	346 J	323.6	3.4 J	2.4 J	--	21.5	18.5 J	44 J	12 J	29.3 J	22.9 J	247 J	59 J	696.3	179 J	226 J	--	14.7 J
Mercury	ns	0.07 J	0.2 U	0.2 U	0.07 J	0.2 U	0.2 U	--	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	--	0.2 U
Molybdenum	40	0.45 UJ	10 U	10 U	1.5	10 U	10 U	--	10 U	10 U	7 J	10 U	10 U	10 U	10 U	10 U	14.2	10 U	10 U	--	10 U
Nickel	100	34.7	36 J	26.4 J	7.7	40 U	0.66 J	--	1.2 J	0.83 J	2 J	0.96 J	40 U	40 U	5.4 J	0.62 J	4.3	2.3 J	1.6 J	--	0.75 J
Potassium	ns	6800	5770 J	3379 J	5800	4010 J	3164 J	--	1890 J	1430 J	7000	4484 J	5070 J	4130 J	7210 J	4018 J	10000	4040 J	3046 J	--	3570 J
Selenium	ns	1	35 U	35 U	0.3 J	35 U	35 U	--	35 U	35 U	6.3 J	35 U	35 U	35 U	35 U	35 U	0.9 J	35 U	35 U	--	35 U
Silver	ns	0.5 U	10 U	10 UJ	0.5 U	10 U	10 UJ	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	0.04 UJ	10 U	10 U	--	10 U
Sodium	ns	6600	3290 J	2314 J	2900	2000 J	1753 J	--	1880 J	1405 J	7970 J	4207 J	3890 J	3540 J	4550 J	3520 J	28000	4780 J	4198 J	--	2330 J
Strontium	ns	230	212	163	150	129	125	--	48.9	51.9	96.1	103	123	115	127	117	150	69.8	65.5	--	172
Thallium	ns	0.07 UJ	1 U	1 U	0.03 UJ	1 U	1 U	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 UJ	1 U	1 U	--	1 U
Vanadium	ns	0.26 UJ	50 U	50 U	0.28 UJ	50 U	50 U	--	50 U	50 UJ	0.8 J	50 UJ	50 U	50 U	50 U	50 U	1.2	50 U	50 UJ	--	50 U
Zinc	465	501	615	467	5.8 U	60 U	60 U	--	4.1 J	3.4 J	60 U	60 U	60 U	52.1 J	512	10.1 J	4.56 UJ	31.9 J	32.3 J	--	60 U

Notes: Units are in µg/L = micrograms per liter
UJ = Value is estimated non-detect below the laboratory detection limit.
U = Not detected at or above the reporting limit.
J = Value is estimated below laboratory reporting limit.

Light gray highlighted cells indicate exceedance of criteria.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-12
Groundwater TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:		EB-TZ	LWA	LWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	LWA	LWA	LWA	LWA	LWA	LWA	LWA
Aquifer:		Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Bedrock	Shallow Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Shallow Overburden	Shallow Overburden	Shallow Bedrock	Shallow Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock
Station:		MW-16A	MW-17A	MW-17A	MW-18A	MW-18A	MW-19A	MW-19A	MW-19C	MW-19C	MW-19D	MW-19D	MW-19D	MW-19D	MW-20A	MW-20A	MW-20C	MW-20C	MW-20D	MW-20D	MW-20D
Field Sample ID:		MW-16A-112409AX	MW-17A-081409AX	MW-17A-112409AX	MW-18A-081409AX	MW-18A-120109AX	MW-19A-081409AX	MW-19A-113009AX	MW-19C-081409AX	MW-19C-112509AX	MW-19D-091509AX	MW-19D-091509AD	MW-19D-091509BX	MW-19D-120209AX	MW-20A-081409AX	MW-20A-120109AX	MW-20C-081309AX	MW-20C-112309AX	MW-20D-091609AX	MW-20D-091709AX	MW-20D-120209AX
Date:		11/24/2009	8/14/2009	11/24/2009	8/14/2009	12/1/2009	8/14/2009	11/30/2009	8/14/2009	11/25/2009	9/15/2009	9/15/2009	9/15/2009	12/2/2009	8/14/2009	12/1/2009	8/13/2009	11/23/2009	9/16/2009	9/17/2009	12/2/2009
Analyte	**Criteria**																				
Total Metals																					
Aluminum	1248	200 U	292	200 U	28500	64456	16800	1781	7680	4145	3130	2960	6810	5694	5050	12505	200 U	200 U	171 J	93 J	200 U
Antimony	ns	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Arsenic	ns	10 UJ	10 U	10 UJ	4.8 J	5.4 J	4.8 J	10 U	3.1 J	10 U	10 U	10 U	10 U	2.6 J	2.9 J	10 U	10 U	10 UJ	10 U	10 U	10 U
Barium	ns	14.4 J	31.1 J	28.2 J	33.1 J	14.6 J	14.4 J	23.4 J	15.5 J	15.1 J	27.6 J	26.7 J	10.9 J	11.9 J	25.1 J	15.1 J	37.2 J	35.3 J	21.7 J	68.1 J	38.6 J
Beryllium	ns	1 U	1 U	1 U	1.3 J	2.1 J	1.2 J	1 U	0.63 J	0.54 J	0.2 J	0.17 J	0.77 J	0.86 J	0.42 J	0.58 J	1 U	1 U	1 U	1 U	1 U
Cadmium	5	5 U	5 U	5 U	15.8	36.5 J	6.4	4.8 J	5.7	5.8 J	2.5 J	2.7 J	6.6	5 J	4.3 J	6.2 J	0.52 J	0.96 J	5 U	5 U	5 U
Calcium	ns	32854	29000	22720	53600	104923	40500	122073	94300	82423	74100	72700	44400	47480	26300	29335	45300	39485	40800	62700	54363
Chromium	100	10 U	10 U	10 U	14	11.9	10.4	2.7 J	10 U	1.6 J	5.6 J	6.1 J	2.1 J	2.5 J	10 U	2 J	10 U	10 U	0.7 J	0.85 J	0.73 J
Cobalt	5	50 UJ	50 U	50 UJ	338	668	241	130 J	164	134 J	49.9 J	51.1 J	153 J	141 J	93.8	127 J	5.3 J	50 UJ	50 UJ	50 UJ	50 UJ
Copper	588	2.9 J	25 U	25 UJ	20700	49581	14500	2054	10600	9713	1360	1340	8910	7484	5860	9685	267	476	25 U	25 U	5.5 J
Cyanide	ns	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Iron	556	100 U	420	100 U	3660	1572	128	1100	27.3 J	100 U	4510 J	5030 J	509 J	16948	178	166	100 U	20.3 J	263 J	169 J	315
Lead	15	10 U	10 UJ	10 U	10 UJ	6.3 J	10 UJ	10 U	10 UJ	10 U	2.3 J	10 U	2.8 J	10 U	10 UJ	10 U	10 UJ	10 U	10 U	10 U	10 U
Magnesium	ns	2121 J	2100 J	1869 J	19500	35401	11400	12956	14900	13294	11500	11400	9640	9504	5110	6041	4160 J	3720 J	2380 J	2430 J	10293
Manganese	300	149 J	51.4	12.5 J	2380	3506	1620	2388	1140	1018	625 J	636 J	1290 J	1433	641	796	145	85 J	15 U	15 U	23 J
Mercury	ns	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U
Molybdenum	40	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nickel	100	40 U	40 U	40 U	129	214	81.8	49.9	77.3	68.3	45.4	46.7	86.5	87.4	39 J	52.1	6.8 J	6.2 J	40 U	40 U	1.2 J
Potassium	ns	3105 J	3310 J	1315 J	5580	5156 J	5380	8049 J	8040	7095 J	7040 J	6960 J	6130 J	5678 J	4750 J	3653 J	4930 J	4625 J	6450 J	6390 J	5222 J
Selenium	ns	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U
Silver	ns	0.64 J	10 UJ	0.37 J	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	0.33 J	10 U	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 U	10 U	10 U	10 UJ
Sodium	ns	2090 J	1810 J	1696 J	3180 J	4764 J	5460	5962 J	6970	6236 J	3390 J	3430 J	3230 J	3120 J	3820 J	3553 J	12000	9433 J	5610 J	4930 J	4139 J
Strontium	ns	173	129	112	101	102	150	409	289	285	179	175	122	124	81	71.5	201	178	244	356	246
Thallium	ns	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.052 J	1 U	1 U	1 U	1 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vanadium	ns	50 UJ	50 U	50 UJ	50 U	2.1 J	50 U	1.7 J	50 U	50 U	4.6 J	5 J	50 U	50 U	50 U	50 U	50 U	1.3 J	3.8 J	50 U	0.77 J
Zinc	465	60 U	60 U	60 U	1790	3867	622	283	505	491	699	781	994	519	352	545	17.9 J	32.6 J	38.2 J	39 J	4.9 J
Dissolved Metals																					
Aluminum	1248	200 U	200 U	200 U	25000	62366	15500	554	6660	2057	133 J	107 J	6420	2766	4910	11486	200 U	58.8 J	47.8 J	200 U	200 U
Antimony	ns	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Arsenic	ns	10 U	10 U	10 U	10 U	4.6 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Barium	ns	13.8 J	28.1 J	27.1 J	20.5 J	9.1 J	12.6 J	18.5 J	12.5 J	15 J	15.9 J	15.3 J	10.6 J	13.6 J	23.2 J	13.6 J	32 J	34.3 J	16.4 J	63.3 J	30.4 J
Beryllium	ns	1 U	1 U	1 U	1.3	2 J	1.2	0.13 J	0.72 J	0.41 J	1 U	1 U	0.84 J	0.52 J	0.44 J	0.52 J	1 U	1 U	1 U	1 U	1 U
Cadmium	5	5 U	5 U	5 U	16.5	36.8 J	7	5.8 J	6.1	6.2 J	2.2 J	2.3 J	6.6	4.9 J	4.8 J	5.8 J	5 U	1 J	5 U	5 U	5 U
Calcium	ns	32213	29000 J	22173	51000 J	101397	38300 J	113193	82100 J	89242	74100	74500	44000	48033	25900 J	26464	43000 J	38873	36300	53300	36238
Chromium	100	10 U	10 U	10 U	10 U	7.1 J	9.9 J	1.2 J	10 U	1.5 J	10 U	10 U	10 U	1.6 J	10 U	1.7 J	10 U	10 U	10 U	10 U	10 U
Cobalt	5	50 UJ	50 UJ	50 UJ	329	665 J	244	144 J	164	139 J	47.9 J	49.6 J	149	140 J	95.4	120 J	50 UJ	5 J	50 U	50 U	50 UJ
Copper	588	1.4 J	25 U	25 U	19200	49117	13800	4401	10000	9461	1040	1050	8380	5743	5960	9266	152	507	25 U	25 U	1.2 J
Iron	556	100 U	100 U	100 U	442	100 U	72 J	100 U	17.3 J	100 U	1250 J	1890 J	536 J	4007	135	100 U	44.5 J	100 U	100 UJ	100 UJ	100 U
Lead	15	10 U	10 U	10 U	10 U	6.5 J	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ns	2077 J	1950 J	1844 J	18000	34975	10700	13021	13500	13817	10600	10600	9480	9563	5030	5600	3810 J	3733 J	1450 J	1880 J	5631
Manganese	300	13 J	46.5	9.8 J	2210	3461	1570	2193	1150	1034	581 J	597 J	1240	1439	654	743	82.1	97.5 J	15 U	1.3 J	1.9 J
Mercury	ns	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U
Molybdenum	40	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nickel	100	40 U	40 U	40 U	122	214	82.1	58.6	76.4	72	37.3 J	38.6 J	84.8	88.3	41.2	49.2	4.8 J	6.5 J	40 U	40 U	40 U
Potassium	ns	3310 J	3140 J	1428 J	4260 J	4903 J	4870 J	8062 J	6260	7685 J	6540 J	6420 J	6190 J	5416 J	4280 J	3203 J	4150 J	4690 J	6430 J	6650 J	5172 J
Selenium	ns	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U
Silver	ns	10 U	10 U	10 U	4.8 J	10 UJ	3.7 J	10 UJ	3.7 J	10 UJ	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 U	10 U	10 U	10 U	10 UJ
Sodium	ns	2089 J	1800 J	1544 J	2820 J	4866 J	5050	5987 J	5770	6570 J	3420 J	3340 J	3190 J	3206 J	3820 J	3334 J	11600	10451 J	5490	5040	4352 J
Strontium	ns	170	124	111	89.8	103	136	418	236	303	179	177	121	128	78.5	65.8	190	176	229	348	233
Thallium	ns	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vanadium	ns	50 UJ	1.6 J	50 UJ	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 UJ	50 U	50 U	50 U
Zinc	465	60 U	2.7 J	60 U	1780	3797	630	386	521	532	673	795	995	495	360	506	12.9 J	33.3 J	60 U	60 U	60 U

Notes: Units are in µg/L = micrograms per liter
UJ = Value is estimated non-detect below the laboratory detection limit.
U = Not detected at or above the reporting limit.
J = Value is estimated below laboratory reporting limit.

Light gray highlighted cells indicate exceedance of criteria.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-12
Groundwater TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
	Study Area:	LWA	LWA	LWA	LWA	LWA	LWA	Tailing	Tailing	ORB	ORB
	Aquifer:	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Bedrock	Shallow Bedrock	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
	Station:	MW-21A	MW-21A	MW-21A	MW-21A	MW-21C	MW-21C	MW-22A	MW-22A	MW-23A	MW-23A
	Field Sample ID:	MW-21A-081309AX	MW-21A-081309AD	MW-21A-113009AX	MW-21A-113009AD	MW-21C-081409AX	MW-21C-112409AX	MW-22A-081309AX	MW-22A-113009AX	MW-23A-081309AX	MW-23A-112309AX
	Date:	8/13/2009	8/13/2009	11/30/2009	11/30/2009	8/14/2009	11/24/2009	8/13/2009	11/30/2009	8/13/2009	11/23/2009
Analyte	**Criteria**										
Total Metals											
Aluminum	1248	27300	29200	30479	30697	12400	21910	9070	15029	200 UJ	200 U
Antimony	ns	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Arsenic	ns	2.6 J	4.5 J	5.9 J	7.6 J	4.7 J	10 U	2.6 J	6.1 J	2.6 J	10 UJ
Barium	ns	27.7 J	29.8 J	15.5 J	15.8 J	28.4 J	16.9 J	22.2 J	15.4 J	86.1 J	94.7 J
Beryllium	ns	1.8 J	1.7 J	1.6 J	1.6 J	1.2 J	1.8 J	0.65 J	0.68 J	1 U	1 U
Cadmium	5	16.4 J	17.2 J	12.9 J	13 J	12.7 J	13 J	2.9 J	1.3 J	5 UJ	0.17 J
Calcium	ns	68900	72300	60143	61190	110000	86150	53700	46834	4860 J	4905 J
Chromium	100	8.1 J	8.8 J	7.6 J	7.7 J	10 U	3.7 J	2.9 J	2.9 J	10 U	10 U
Cobalt	5	283	301	256 J	258 J	220	267 J	36.9 J	44 J	50 U	50 UJ
Copper	588	7370	7980	7053	7278	5490	7936	76.8	74.6	175	197
Cyanide	ns	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U	10 UJ
Iron	556	79700	84500	84798	85401	66300	76524	59000	69372	100 U	100 U
Lead	15	10 UJ	10 UJ	3.6 J	10 U	10 UJ	5.2 J	10 UJ	10 U	10 U	10 U
Magnesium	ns	22400	23900	22448	22596	20000	22523	13500	15140	639 J	714 J
Manganese	300	2470	2610	2153	2175	3000	2381	1760	2053	21.5	19 J
Mercury	ns	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U
Molybdenum	40	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nickel	100	98.3	105	88.1	88.7	92.4	97.6	13.9 J	14.2 J	40 U	2.7 J
Potassium	ns	6690 J	7310 J	5591 J	5745 J	7040 J	6627 J	8180 J	6532 J	1090 J	915 J
Selenium	ns	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U
Silver	ns	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U	0.62 J
Sodium	ns	5380 J	5840 J	7074 J	7135 J	6730	6716 J	3440 J	3809 J	1240 J	1281 J
Strontium	ns	182	194	169	171	350	298	149	128	15	15.2
Thallium	ns	1 U	1 U	1 U	1 U	1 U	0.42 J	1 U	1 U	1 U	0.033 J
Vanadium	ns	50 U	50 U	7.3 J	7.3 J	50 U	3 J	50 U	1.9 J	50 U	50 UJ
Zinc	465	2220	2310	1974	1991	1440	1902	350	396	60 U	8.5 J
Dissolved Metals											
Aluminum	1248	27300	27800	32818	32339	9410	20254	8720	15483	200 U	200 U
Antimony	ns	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Arsenic	ns	10 U	10 U	7.7 J	8.8 J	10 U	7.9 J	10 U	6 J	10 U	10 U
Barium	ns	27.1 J	28.5 J	17.7 J	16.4 J	19.6 J	200 U	21.7 J	16 J	88.5 J	87.8 J
Beryllium	ns	1.7	1.8	1.6 J	1.6 J	1	1.8 J	0.57 J	0.62 J	1 U	1 U
Cadmium	5	21.4 J	22.4 J	14.1 J	13.8 J	15 J	12.2 J	5.8 J	1.2 J	5 U	0.28 J
Calcium	ns	67100 J	68900 J	63284	63141	96600	88779	54200 J	48618	4760 J	4686 J
Chromium	100	8.3 J	8.7 J	8.1 J	7.8 J	10 U	1.6 J	10 U	2.5 J	10 U	10 U
Cobalt	5	301	315	276 J	271 J	209	261 J	36.8 J	45.4 J	50 U	1.7 J
Copper	588	7430	7800	7655	7620	4890	7285	75.5	74.2	181	178
Iron	556	78100	79900	90678	89659	57200	73679	58800	72225	100 U	100 U
Lead	15	10 U	10 U	2.8 J	2.9 J	10 U	2.7 J	10 U	10 U	10 U	10 U
Magnesium	ns	22000	22500	24264	23819	17100	20866	13500	15837	688 J	662 J
Manganese	300	2430	2540	2333	2299	2470	2274	1810	2166	22.1 J	18.1 J
Mercury	ns	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ
Molybdenum	40	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nickel	100	104	108	94.8	93.4	84.7	92.9	15.4 J	14.3 J	3.7 J	2.7 J
Potassium	ns	6440 J	6570 J	6612 J	6514 J	6380	5595 J	8090	7313 J	977 J	804 J
Selenium	ns	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U
Silver	ns	3 J	3.5 J	10 UJ	10 UJ	3.1 J	10 UJ	10 U	10 UJ	10 U	10 U
Sodium	ns	5650 J	5770 J	7746 J	7704 J	12700	6044 J	3670 J	4101 J	1300 J	1207 J
Strontium	ns	184	188	181	180	313	288	152	137	15.3	14.8
Thallium	ns	1 U	1 U	1 U	1 U	1 U	0.4 J	1 U	1 U	1 U	0.036 J
Vanadium	ns	8.1 J	8.7 J	7.9 J	8 J	2.2 J	50 U	3 J	50 U	50 U	50 UJ
Zinc	465	2200	2290	2126	2085	1330	1920	348	409	10.4 J	8.2 J

Notes: Units are in µg/L = micrograms per liter
UJ = Value is estimated non-detect below the laboratory detection limit.
U = Not detected at or above the reporting limit.
J = Value is estimated below laboratory reporting limit.

Light gray highlighted cells indicate exceedance of criteria.
UWA = Upper Waste Area; ORB = Ore Roast Bed;
LWA = Lower Waste Area; EB-LR = Ely Brook Lower Reach;
EB-TZ = Ely Brook Transition Zone

Table 6-13
Deep Bedrock Packer Sample Groundwater Metal Results
Ely Copper Mine
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:		EB-LR	EB-LR	EB-LR	UWA	UWA	UWA	LWA	LWA
Aquifer:		Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock
Sample Location:		MW-14D	MW-14D	MW-14D	MW-19D	MW-19D	MW-19D	MW-20D	MW-20D
Station ID:		MW-14D-091709AX	MW-14D-091809AX	MW-14D-091809BX	MW-19D-091509AX	MW-19D-091509AD	MW-19D-091509BX	MW-20D-091609AX	MW-20D-091709AX
Sample Date:		9/17/2009	9/18/2009	9/18/2009	9/15/2009	9/15/2009	9/15/2009	9/16/2009	9/17/2009
Sample Interval (ft bgs):		98 - 108	75 - 85	52 - 62	68 - 78	68 - 78	36 - 46	85 - 95	30 - 40
Total Metals	**Criteria**								
Aluminum	1248	165 J	605	200 U	3130	2960	6810	171 J	93 J
Antimony	ns	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Arsenic	ns	10 U	10 U	2.6 J	10 U	10 U	10 U	10 U	10 U
Barium	ns	5.4 J	18.4 J	6.1 J	27.6 J	26.7 J	10.9 J	21.7 J	68.1 J
Beryllium	ns	1 U	1 U	1 U	0.2 J	0.17 J	0.77 J	1 U	1 U
Cadmium	5	5 U	5 U	5 U	2.5 J	2.7 J	6.6	5 U	5 U
Calcium	ns	26100	25200	25000	74100	72700	44400	40800	62700
Chromium	100	1.2 J	2.7 J	132 J	5.6 J	6.1 J	2.1 J	0.7 J	0.85 J
Cobalt	5	50 UJ	4 J	50 UJ	49.9 J	51.1 J	153 J	50 UJ	50 UJ
Copper	588	25 U	25 U	25 U	1360	1340	8910	25 U	25 U
Cyanide	ns	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Iron	556	1360 J	1550 J	1550 J	4510 J	5030 J	509 J	263 J	169 J
Lead	15	10 U	10 U	10 U	2.3 J	10 U	2.8 J	10 U	10 U
Magnesium	ns	4160 J	4190 J	4100 J	11500	11400	9640	2380 J	2430 J
Manganese	300	35.3 J	287 J	85.4 J	625 J	636 J	1290 J	15 U	15 U
Mercury	ns	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Molybdenum	ns	10 U	10 U	12	10 U	10 U	10 U	10 U	10 U
Nickel	100	40 U	40 U	40 U	45.4	46.7	86.5	40 U	40 U
Potassium	ns	4670 J	4200 J	6070 J	7040 J	6960 J	6130 J	6450 J	6390 J
Selenium	ns	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U
Silver	ns	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Sodium	ns	3700 J	3450 J	4330 J	3390 J	3430 J	3230 J	5610 J	4930 J
Strontium	ns	119	112	117	179	175	122	244	356
Thallium	ns	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vanadium	ns	50 U	50 U	50 U	4.6 J	5 J	50 U	3.8 J	50 U
Zinc	465	44.8 J	95.2	192	699	781	994	38.2 J	39 J

Table 6-13
Deep Bedrock Packer Sample Groundwater Metal Results
Ely Copper Mine
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:		EB-LR	EB-LR	EB-LR	UWA	UWA	UWA	LWA	LWA
Aquifer:		Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock	Deep Bedrock
Sample Location:		MW-14D	MW-14D	MW-14D	MW-19D	MW-19D	MW-19D	MW-20D	MW-20D
Station ID:		MW-14D-091709AX	MW-14D-091809AX	MW-14D-091809BX	MW-19D-091509AX	MW-19D-091509AD	MW-19D-091509BX	MW-20D-091609AX	MW-20D-091709AX
Sample Date:		9/17/2009	9/18/2009	9/18/2009	9/15/2009	9/15/2009	9/15/2009	9/16/2009	9/17/2009
Sample Interval (ft bgs):		98 - 108	75 - 85	52 - 62	68 - 78	68 - 78	36 - 46	85 - 95	30 - 40
Dissolved Metals	**Criteria**								
Aluminum	1248	200 U	200 U	1120	133 J	107 J	6420	47.8 J	200 U
Antimony	ns	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Arsenic	ns	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Barium	ns	5 J	3.5 J	19.9 J	15.9 J	15.3 J	10.6 J	16.4 J	63.3 J
Beryllium	ns	1 U	1 U	1 U	1 U	1 U	0.84 J	1 U	1 U
Cadmium	5	5 U	5 U	5 U	2.2 J	2.3 J	6.6	5 U	5 U
Calcium	ns	25800	24500	27700	74100	74500	44000	36300	53300
Chromium	100	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cobalt	5	50 U	50 U	50 U	47.9 J	49.6 J	149	50 U	50 U
Copper	588	25 U	25 U	20 J	1040	1050	8380	25 U	25 U
Iron	556	91.7 J	100 UJ	4640 J	1250 J	1890 J	536 J	100 UJ	100 UJ
Lead	15	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ns	4150 J	3940 J	5070	10600	10600	9480	1450 J	1880 J
Manganese	300	29.3 J	22.9 J	247 J	581 J	597 J	1240	15 U	1.3 J
Mercury	ns	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Molybdenum	ns	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nickel	100	40 U	40 U	5.4 J	37.3 J	38.6 J	84.8	40 U	40 U
Potassium	ns	5070 J	4130 J	7210 J	6540 J	6420 J	6190 J	6430 J	6650 J
Selenium	ns	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U
Silver	ns	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Sodium	ns	3890 J	3540 J	4550 J	3420 J	3340 J	3190 J	5490	5040
Strontium	ns	123	115	127	179	177	121	229	348
Thallium	ns	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vanadium	ns	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Zinc	465	60 U	52.1 J	512	673	795	995	60 U	60 U

Notes:
All concentrations listed in micrograms per liter (µg/L).
U=below detection limit, J=quantitation approximate
Shaded indicates exceedance of criteria
ft bgs = feet below ground surface
ns = no standard available
EB-LR = Ely Brook Lower Reach; UWA = Upper Waste Area; LWA = Lower Waste Area

Table 6-14
Groundwater Organic Compound Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:	Smelter/ Slag	UWA	UWA	UWA	Smelter/ Slag	UWA	UWA	LWA	LWA	LWA	Tailing
Aquifer:	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Shallow Overburden	Deep Overburden	Shallow Overburden	Shallow Overburden
Station:	MW-02A	MW-05A	MW-05A	MW-09A	MW-11A	MW-19A	MW-19D	MW-20A	MW-20D	MW-21A	MW-22A
Field Sample ID:	MW-02A-113009AX	MW-05A-120109AX	MW-05A-120109AD	MW-09A-120209AX	MW-11A-120109AX	MW-19A-113009AX	MW-19D-120209AX	MW-20A-120109AX	MW-20D-120209AX	MW-21A-113009AX	MW-22A-113009AX
Date:	11/30/2009	12/1/2009	12/1/2009	12/2/2009	12/1/2009	11/30/2009	12/2/2009	12/1/2009	12/2/2009	11/30/2009	11/30/2009
Analyte											
VOCs											
1,1,1-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-TRICHLOROBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DIBROMOETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROPROPANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-DICHLOROBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-DICHLOROBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-BUTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOCHLOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMODICHLOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOFORM	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CARBON DISULFIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CARBON TETRACHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 6-14
Groundwater Organic Compound Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:	Smelter/ Slag	UWA	UWA	UWA	Smelter/ Slag	UWA	UWA	LWA	LWA	LWA	Tailing
Aquifer:	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Shallow Overburden	Deep Overburden	Shallow Overburden	Shallow Overburden
Station:	MW-02A	MW-05A	MW-05A	MW-09A	MW-11A	MW-19A	MW-19D	MW-20A	MW-20D	MW-21A	MW-22A
Field Sample ID:	MW-02A-113009AX	MW-05A-120109AX	MW-05A-120109AD	MW-09A-120209AX	MW-11A-120109AX	MW-19A-113009AX	MW-19D-120209AX	MW-20A-120109AX	MW-20D-120209AX	MW-21A-113009AX	MW-22A-113009AX
Date:	11/30/2009	12/1/2009	12/1/2009	12/2/2009	12/1/2009	11/30/2009	12/2/2009	12/1/2009	12/2/2009	11/30/2009	11/30/2009
Analyte											
VOCs (cont.)											
CHLOROFORM	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,3-DICHLOROPROPENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CYCLOHEXANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
DIBROMOCHLOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
DICHLORODIFLUOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ETHYLBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
FREON-113	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ISOPROPYLBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-XYLENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYL ACETATE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYL TERT-BUTYL ETHER	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYLCYCLOHEXANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYLENE CHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
O-XYLENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
STYRENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOLUENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRANS-1,2-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROFLUOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 6-14
Groundwater Organic Compound Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:	Smelter/ Slag	UWA	UWA	UWA	Smelter/ Slag	UWA	UWA	LWA	LWA	LWA	Tailing
Aquifer:	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Shallow Overburden	Deep Overburden	Shallow Overburden	Shallow Overburden
Station:	MW-02A	MW-05A	MW-05A	MW-09A	MW-11A	MW-19A	MW-19D	MW-20A	MW-20D	MW-21A	MW-22A
Field Sample ID:	MW-02A-113009AX	MW-05A-120109AX	MW-05A-120109AD	MW-09A-120209AX	MW-11A-120109AX	MW-19A-113009AX	MW-19D-120209AX	MW-20A-120109AX	MW-20D-120209AX	MW-21A-113009AX	MW-22A-113009AX
Date:	11/30/2009	12/1/2009	12/1/2009	12/2/2009	12/1/2009	11/30/2009	12/2/2009	12/1/2009	12/2/2009	11/30/2009	11/30/2009
Analyte											
SVOCs											
1,1'-BIPHENYL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4,5-TETRACHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2'-Oxybis(1-chloropropane)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,3,4,6-TETRACHLOROPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4,5-TRICHLOROPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4,6-TRICHLOROPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4-DICHLOROPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4-DIMETHYLPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4-DINITROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROTOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,6-DINITROTOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLORONAPHTHALENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLOROPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-METHYLNAPHTHALENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-METHYLPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-NITROANILINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3,3'-DICHLOROBENZIDINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-NITROANILINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,6-DINITRO-2-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-BROMOPHENYL-PHENYLETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-CHLORO-3-METHYLPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-CHLOROANILINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-CHLOROPHENYL-PHENYLETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYLPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-NITROANILINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-NITROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

Table 6-14
Groundwater Organic Compound Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:	Smelter/ Slag	UWA	UWA	UWA	Smelter/ Slag	UWA	UWA	LWA	LWA	LWA	Tailing
Aquifer:	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Shallow Overburden	Deep Overburden	Shallow Overburden	Shallow Overburden
Station:	MW-02A	MW-05A	MW-05A	MW-09A	MW-11A	MW-19A	MW-19D	MW-20A	MW-20D	MW-21A	MW-22A
Field Sample ID:	MW-02A-113009AX	MW-05A-120109AX	MW-05A-120109AD	MW-09A-120209AX	MW-11A-120109AX	MW-19A-113009AX	MW-19D-120209AX	MW-20A-120109AX	MW-20D-120209AX	MW-21A-113009AX	MW-22A-113009AX
Date:	11/30/2009	12/1/2009	12/1/2009	12/2/2009	12/1/2009	11/30/2009	12/2/2009	12/1/2009	12/2/2009	11/30/2009	11/30/2009
Analyte											
SVOCs (cont.)											
ACENAPHTHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACENAPHTHYLENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETOPHENONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ANTHRACENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ATRAZINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZALDEHYDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZO(A)ANTHRACENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZO(A)PYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZO(B)FLUORANTHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZO(G,H,I)PERYLENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZO(K)FLUORANTHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BIS(2-CHLOROETHOXY)METHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BIS(2-CHLOROETHYL)PHTHALATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BIS(2-ETHYLHEXYL)PHTHALATE	5 U	5 U	5 U	5 U	5 U	5 U	7.5	5 U	5 U	5 U	2.6 J
BUTYLBENZYLPHTHALATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CAPROLACTAM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBAZOLE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHRYSENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBENZ(A,H)ANTHRACENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBENZOFURAN	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIETHYLPHTHALATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIMETHYLPHTHALATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DI-N-BUTYL PHTHALATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DI-N-OCTYL PHTHALATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
FLUORANTHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
FLUORENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Table 6-14
Groundwater Organic Compound Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:	Smelter/ Slag	UWA	UWA	UWA	Smelter/ Slag	UWA	UWA	LWA	LWA	LWA	Tailing
Aquifer:	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Shallow Overburden	Deep Overburden	Shallow Overburden	Shallow Overburden
Station:	MW-02A	MW-05A	MW-05A	MW-09A	MW-11A	MW-19A	MW-19D	MW-20A	MW-20D	MW-21A	MW-22A
Field Sample ID:	MW-02A-113009AX	MW-05A-120109AX	MW-05A-120109AD	MW-09A-120209AX	MW-11A-120109AX	MW-19A-113009AX	MW-19D-120209AX	MW-20A-120109AX	MW-20D-120209AX	MW-21A-113009AX	MW-22A-113009AX
Date:	11/30/2009	12/1/2009	12/1/2009	12/2/2009	12/1/2009	11/30/2009	12/2/2009	12/1/2009	12/2/2009	11/30/2009	11/30/2009
Analyte											
SVOCs (cont.)											
HEXACHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
HEXACHLOROBUTADIENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
HEXACHLOROCYCLOPENTADIENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
HEXACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
INDENO(1,2,3-CD)PYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPHORONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
NITROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSO-DI-N-PROPYLAMINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSODIPHENYLAMINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PHENANTHRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PHENOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pesticides											
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.03 J	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.024 J	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.058 J	0.1 U	0.1 U
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-CHORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DIELDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Table 6-14
Groundwater Organic Compound Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:	Smelter/ Slag	UWA	UWA	UWA	Smelter/ Slag	UWA	UWA	LWA	LWA	LWA	Tailing
Aquifer:	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Shallow Overburden	Deep Overburden	Shallow Overburden	Shallow Overburden
Station:	MW-02A	MW-05A	MW-05A	MW-09A	MW-11A	MW-19A	MW-19D	MW-20A	MW-20D	MW-21A	MW-22A
Field Sample ID:	MW-02A-113009AX	MW-05A-120109AX	MW-05A-120109AD	MW-09A-120209AX	MW-11A-120109AX	MW-19A-113009AX	MW-19D-120209AX	MW-20A-120109AX	MW-20D-120209AX	MW-21A-113009AX	MW-22A-113009AX
Date:	11/30/2009	12/1/2009	12/1/2009	12/2/2009	12/1/2009	11/30/2009	12/2/2009	12/1/2009	12/2/2009	11/30/2009	11/30/2009
Analyte											
Pesticides (cont.)											
ENDOSULFAN SULFATE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN KETONE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
METHOXYCHLOR	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOXAPHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PCBs											
AROCLOR 1016	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR 1221	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR 1232	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR 1242	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR 1248	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.48 J	1 U	1 U
AROCLOR 1254	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR 1260	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR 1262	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR 1268	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Notes: Units are in µg/L = micrograms per liter
Light gray highlighted cells indicate exceedance of bis(2-ethylexyl)phthalate criteria of 6 ug/L.
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit
UWA = Upper Waste Area; LWA = Lower Waste Ara

Table 6-15
Soil COC Magnitude of Background Factors
Ely Copper Mine Superfund Site
Vershire, Vermont

Waste Source Soils	Condition	Depth Zone	Cobalt	Copper	Iron
UWA	Barren Zone	Surface	1.7	38	3.2
		Subsurface	2.6	18	2.3
LWA	Barren Zone	Surface	1.1	40	2.8
		Subsurface	23	259	3.7
Tailing	Barren Zone	Surface	0.9	21	2.2
		Subsurface	26	273	4.2
ORB	Barren Zone	Surface	0.9	17	2.1
		Subsurface	1.1	19	2.0
Slag Pile	Barren Zone	Surface	6.9	60	3.7
Smelter Area	Barren Zone	Surface	4.1	33	2.3
		Subsurface	2.0	30	1.3
Average Magntitude of Background Factor			**6.9**	**77**	**2.6**

Non-Waste Source Soils	Condition	Depth Zone	Cobalt	Copper	Iron
UWA	Transition Zone	Surface	0.8	8.2	1.3
LWA	Transition Zones	Surface	0.6	3.4	0.6
		Subsurface	2.3	22	1.0
ORB	Transition Zone	Surface	0.5	11	1.2
EB-UR	Transition Zone	Surface	0.8	1.4	0.8
EB-MR	Transition Zone	Surface	0.4	3.3	0.3
EB-LR	Transition Zone	Surface	2.1	18	1.4
Smelter	Transition Zone	Surface	0.8	7.7	0.9
Smoke Flue	Transition Zone	Surface	0.6	1.7	0.6
Natural Forest	Healthy Forest	Surface	0.9	6.2	0.9
Average Magntitude of Background Factor			**1.0**	**8.3**	**0.9**

Notes:

1. The magnitude of background factor is calculated by dividing the maximum background COC concentration by the average COC concentration for each of the sample sets (for example background average divided by the UWA average for barren area soils).
2. UWA = Upper Waste Area
   LWA = Lower Waste Area
   ORB = Ore Roast Bed
   EB-UR = Ely Brook Upper Reach
   EB-MR = Ely Brook Middle Reach
   EB-LR = Ely Brook Lower Reach
   COC = Contaminant of Concern

Table 6-16
Sediment COC Magnitude of Background Factors
Ely Copper Mine Superfund Site
Vershire, Vermont

Sediment Impact Area	Copper MB
EB-UR	27
EB-MR	69
EB-LR	45
EBT1	29
EBT2	33
EBT3	37
EBT4	25
EBT5	58
Pond 6	33
Ponds 1, 2, and 3	1.5
SHB-UR	14
SHB-LR	10
EBOR	6

Notes:

1. The magnitude of background factor (MB) is calculated by dividing the maximum background copper concentration by the average copper concentration for each of the sample sets (for example background average divided by the EBT1 average).
2. EB-UR = Ely Brook Upper Reach
   EB-MR = Ely Brook Middle Reach
   EB-LR = Ely Brook Lower Reach
   EBT = Ely Brook Tributary (designated by number)
   SHB-UR = Schoolhouse Brook Upper Reach
   SHB-LR = Schoolhouse Brook Lower Reach
   EBOR = East Branch Ompompanoosuc River
   COC = Contaminant of Concern

Table 6-17
Surface Water COC Magnitude of Background Factors
Ely Copper Mine Superfund Site
Vershire, Vermont

Study Area	Aluminum	Cadmium	Chromium	Copper	Iron	Lead	Mercury	Nickel	Selenium	Silver	Zinc
On-Site - Impacted Surface Water											
EB-UR	1.9	2.1	4.4	241	0.1	20	3.5	2.3	2.0	13	13
EB-MR	42	9.3	13.3	2,231	9.7	23.5	1.0	18	3.5	9.1	222
EB-LR	17	5.1	5	1,761	2.4	28	2.0	9	3.2	10	94
EBT1	3.9	2.3	4.9	633	0.2	12	1.0	2.8	5.5	14	18
EBT2	41	15	14	4,679	6.3	28	1.0	21	3.8	9	248
EBT3	133	20	28	11,511	10	31	1.0	49	5.6	11	386
EBT4	20	4.7	5.8	2,187	0.1	9.9	1.0	11	3.3	8	80
EBT5	0.8	1.9	7	25	0.1	17.0	1.0	3.9	3.7	9	3.3
ORB	0.3	1.3	4.2	8	0.0	1.5	1.3	2.4	2.7	4.0	3.0
Pond 4	0.2	4.9	8	21	0.1	20	1.0	2.3	13	52	6.2
Pond 5	0.7	6.7	10	398	0.0	33		3.6	14	70	39
Pond 6	10	4.8	4.4	1,356	0.3	35		8	1.0	40	104
Vernal Pool 1	0.8	0.8	16	132	0.4	1.5	1.0	1.0	3.4	10	22
Average Magnitude of Background Factor	**21**	**6.1**	**10**	**1,937**	**2.2**	**20**	**1.3**	**10**	**5.0**	**20**	**95**
On-Site - Unimpacted Surface Water											
Ponds 1, 2, and 3	0.3	5.3	9	5.0	0.2	33		2.4	15	66	3.9
Vernal Pools 2, 3, and 4	0.8	1.0	14	2.3	0.1	2.2	1.0	9	10	10	6.1
Average Magnitude of Background Factor	**0.6**	**3.2**	**12**	**4**	**0.2**	**18**	**1.0**	**5.6**	**12.7**	**38**	**5**
Off-Site - Unimpacted Surface Water											
SHB-UR	0.3	0.5	0.5	28	0.3	0.4	0.1	0.2	0.8	0.2	0.1
SHB-LR	0.1	0.4	0.5	9.5	0.1	0.4	0.2	0.2	0.5	0.3	0.0
EBOR	0.2	0.5	0.5	4.2	0.2	0.4	0.1	0.7	1.0	0.2	0.7
Average Magnitude of Background Factor	**0.2**	**0.4**	**0.5**	**7**	**0.2**	**0.4**	**0.1**	**0.4**	**0.8**	**0.4**	**0.4**

Notes:

1. The magnitude of background (MB) is calculated by dividing the maximum background COC concentration by the average COC concentration for each of the sample sets (for example background average divided by the EBT1 average).
2. EB-UR = Ely Brook Upper Reach
   EB-MR = Ely Brook Middle Reach
   EB-LR = Ely Brook Lower Reach
   EBT = Ely Brook Tributary (designated by number)
   ORB = Ore Roast Bed
   SHB-UR = Schoolhouse Brook Upper Reach
   SHB-LR = Schoolhouse Brook Lower Reach
   EBOR = East Branch Ompompanoosuc River
   COC = Contaminant of Concern

Table 6-18
Groundwater COC Magnitude of Background Factors
Ely Copper Mine Superfund Site
Vershire, Vermont

Source Area and Aquifer	Aluminum	Cadmium	Cobalt	Copper	Iron	Manganese	Nickel	Zinc
UWA								
Shallow Overburden	8	4.0	7.5	752	0.5	15.9	4.9	6.5
Deep Overburden	1.4	0.8	0.9	3.0	1.6	22	0.8	0.3
Shallow Bedrock	0.3	0.8	1.6	126	0.1	2.2	1.1	6.7
Deep Bedrock	11.7	1.2	2.7	259	16.7	6.1	2.6	16.1
LWA								
Shallow Overburden	9	4.0	8.0	607	14	16.3	4.1	6.2
Shallow Bedrock	1.2	1.6	2.8	142	7	6.9	1.4	14.5
Deep Bedrock	0.0	1.0	1.0	0.8	0.1	0.1	0.7	0.9
Tailing								
Shallow Overburden	6.0	0.8	1.6	6.1	29	22.3	0.7	2.1
ORB								
Shallow Overburden	0.1	0.4	1.0	14.9	0.0	0.2	0.6	0.1
Shallow Bedrock	0.0	0.4	0.6	0.5	0.0	0.0	0.6	1.8
EB-LR								
Shallow Overburden	0.1	0.8	0.7	2.6	0.1	1.3	0.4	0.1
Transitional Zone - Shallow Overburden	0.2	0.8	0.7	0.6	0.2	3.0	0.6	0.1
Shallow Bedrock	0.0	1.0	1.0	1.0	0.1	0.3	0.6	1.0
Deep Bedrock	0.1	1.0	0.6	0.8	0.9	1.0	0.8	3.5
Smelter/Slag								
Shallow Overburden	0.9	1.2	5.9	384	3.0	13.3	1.4	5.2
Deep Overburden	6.4	0.4	0.9	16.5	7.8	4.2	2.1	0.8
Shallow Bedrock	0.4	0.4	0.5	0.7	0.9	0.3	0.6	0.9

Notes:

1. The magnitude of background factor (MB) is calculated by dividing the maximum background COC total metal concentration for a given compound by the average total metal COC concentration for each of the sample sets (for example background average divided by the UWA average for shallow overburden).
2. UWA = Upper Waste Area
   LWA = Lower Waste Area
   ORB = Ore Roast Bed
   EB-LR = Ely Brook Lower Reach
   COC = Contaminant of Concern

Table 6-19
Soil and Sediment XRF Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
T-01	TA	1	TA-01X-082409AX	8/24/2009	1250	73	25787	25	< 1656	< 2	77
T-01	TA	2	TA-02X-082409AX	8/24/2009	1255	1558	36234	450	< 2132	< 3	133
T-01	TA	3	TA-03X-082409AX	8/24/2009	1300	957	32639	57	< 1785	< 3	274
T-01	**TA**	**4**	**TA-04X-082409AX**	**8/24/2009**	**1305**	**309**	**26114**	**27**	**< 1747**	**< 2**	**83**
T-01	TA	5	TA-05X-082409AX	8/24/2009	1310	496	29152	20	< 2020	3	91
T-01	TA	6	TA-06X-082409AX	8/24/2009	1315	194	27957	17	1865	< 3	64
T-01	TA	7	TA-07X-082409AX	8/24/2009	1320	208	25194	20	< 1886	< 3	67
T-01	TA	8	TA-08X-082409AX	8/24/2009	1325	303	28686	32	< 1916	< 3	75
T-01	TA	9	TA-09X-082409AX	8/24/2009	1330	75	31814	16	< 2025	< 3	67
T-01			TA-09X LAB DUP			65	33562	17	< 2166	< 3	57
T-01	TA	10	TA-10X-082409AX	8/24/2009	1335	51	29264	14	< 1857	< 3	58
T-01	TA	11	TA-11X-082409AX	8/24/2009	1340	84	26149	52	< 1881	< 2	63
T-01	TA	12	TA-12X-082409AX	8/24/2009	1345	229	29611	47	< 1926	< 3	84
T-01	TA	13	TA-13X-082409AX	8/24/2009	1350	213	28740	71	< 2096	< 3	113
T-01	**TA**	**14**	**TA-14X-082409AX**	**8/24/2009**	**1355**	**483**	**29374**	**88**	**< 2108**	**< 3**	**104**
T-01	TA	15	TA-15X-082409AX	8/24/2009	1400	505	30904	130	< 2250	< 3	185
T-02	TB	1	TB-01X-082409AX	8/24/2009	1440	804	> 10%	41%	15558	26	276
T-02	TB	2	TB-02X-082409AX	8/24/2009	1445	525	57705	16	4795	4	102
T-02	TB	3	TB-03X-082409AX	8/24/2009	1455	145	33365	14	< 2322	< 3	48
T-02			TB-03X LAB DUP			156	32078	11	< 2213	< 3	46
T-02	TB	4	TB-04X-082409AX	8/24/2009	1520	201	32039	20	< 2064	< 3	59
T-02	TB	5	TB-05X-082409AX	8/24/2009	1525	801	46880	24	2486	5	97
T-02	TB	6	TB-06X-082409AX	8/24/2009	1530	549	43800	24	< 2385	< 3	130
T-02	TB	7	TB-07X-082409AX	8/24/2009	1535	122	36167	14	< 2210	< 3	70
T-02	TB	8	TB-08X-082409AX	8/24/2009	1545	263	39942	21	< 2330	< 3	75

Table 6-19
Soil and Sediment XRF Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
T-03	TC	1	TC-01X-082609AX	8/26/2009	0910	56	22541	1073	< 2033	390	29
T-03			TC-01X LAB DUP			52	22752	1153	< 2137	321	30
T-03	T3/TC-01	1 (1-2')	--			48	44142	20	<3191	7	58
T-03	TC	2	TC-02X-082609AX	8/26/2009	0915	30	35232	39	< 2068	< 3	66
T-03	**TC**	**3**	**TC-03X-082609AX**	**8/26/2009**	**0920**	**19**	**35477**	**27**	**< 2075**	**< 3**	**54**
T-03	TC	4	TC-04X-082609AX	8/26/2009	0925	38	30201	99	< 1808	< 3	35
T-03	TC	5	TC-05X-082609AX	8/26/2009	0930	37	38836	16	< 2277	< 3	88
T-03	TC	6	TC-06X-082609AX	8/26/2009	0935	99	26128	21	< 1853	< 2	43
T-03			TC-06X LAB DUP			112	25593	24	< 1943	< 3	41
T-03	TC	8	TC-08X-082609AX	8/26/2009	0940	78	32758	16	< 1955	< 3	107
T-04	TD	1	TD-01X-082809AX	8/28/2009	0840	3029	> 100000	75	26201	46	159
T-04	TD	1	TD-01X-082809BX	8/28/2009	0845	3029	> 100000	218	28237	62	264
T-04	TD	1	TD-01X-082809CX	8/28/2009	0850	3746	28174	17	3836	4	214
T-04	TD	1	TD-01X-082809DX	8/28/2009	0855	2420	66379	18	9170	8	150
T-04	TD	1	TD-01X-082809EX	8/28/2009	0900	621	45125	20	< 2816	4	76
T-04	TD	2	TD-02X-082809AX	8/28/2009	0820	2619	> 100000	88	26543	40	258
T-04	TD	2	TD-02X-082809BX	8/28/2009	0825	3302	> 100000	107	19170	41	363
T-04	TD	2	TD-02X-082809CX	8/28/2009	0830	274	37402	12	< 2649	< 3	122
T-04	TD	2	TD-02X-082809DX	8/28/2009	0835	255	54497	16	< 3083	< 3	103
T-04	**TD**	**3**	**TD-03X-082809AX**	**8/28/2009**	**0915**	**1318**	**> 100000**	**57**	**23861**	**34**	**135**
T-04			TD-03 LAB DUP			1365	> 100000	56	22552	34	114
T-04	TD	3	TD-03X-082809BX	8/28/2009	0930	6175	> 100000	200	26106	71	195
T-04	TD	3	TD-03X-082809CX	8/28/2009	0945	763	36455	16	6718	< 3	341
T-04	TD	3	TD-03X-082809DX	8/28/2009	0950	295	34446	14	< 2413	< 3	59
T-04	TD	4	TD-04X-082809AX	8/28/2009	0935	1224	> 100000	64	19383	27	92
T-04			TD-04 LAB DUP			1116	> 100000	50	19511	34	92

Table 6-19
Soil and Sediment XRF Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
T-04	TD	4	TD-04X-082809BX	8/28/2009	0940	162	> 100000	24	41611	< 3	64
T-04	TD	4	TD-04X-082809CX	8/28/2009	1015	227	65531	15	7168	< 3	74
T-04	TD	5	TD-05X-082809AX	8/28/2009	1025	1226	> 100000	60	16411	32	100
T-04	TD	5	TD-05X-082809BX	8/28/2009	1030	1130	65633	21	3399	10	86
T-04	TD	5	TD-05X-082809CX	8/28/2009	1035	294	63874	11	17296	< 3	59
T-04	**TD**	**5**	**TD-05X-082809DX**	**8/28/2009**	**1040**	**422**	**36456**	**13**	**< 2383**	**< 3**	**83**
T-04	TD	6	TD-06X-082809AX	8/28/2009	1045	1503	> 100000	64	20221	41	132
T-04	TD	6	TD-06X-082809BX	8/28/2009	1050	3876	> 100000	71	19772	33	301
T-04	TD	6	TD-06X-082809CX	8/28/2009	1035	1239	98182	20	7832	11	92
T-04			TD-06C LAB DUP			931	82409	20	6477	8	85
T-04	TD	6	TD-06X-082809DX	8/28/2009	1100	1234	37425	21	< 2611	< 3	119
T-04	TD	6	TD-06X-082809EX	8/28/2009	1105	1208	73102	23	4587	11	122
T-04	TD	7	TD-07X-082809AX	8/28/2009	1110	206	97927	31	26883	17	50
T-04			TD-07A LAB DUP			324	> 100000	44	22950	27	58
T-04	TD	8	TD-08X-082809AX	8/28/2009	1115	193	38852	16	< 2419	< 3	68
T-04	TD	9	TD-09X-082809AX	8/28/2009	1120	764	> 100000	75	5485	25	105
T-04	TD	10	TD-10X-082809AX	8/28/2009	1125	131	51108	13	< 2592	< 3	48
T-04	TD	11	TD-11X-082809AX	8/28/2009	1140	341	< 100000	297	8529	< 7	< 29
T-04	TD	11	TD-11X-082809BX	8/28/2009	1142	133	59971	23	< 2836	< 3	80
T-04	TD	12	TD-12X-082809AX	8/28/2009	1135	85	40808	12	< 2300	< 3	54
T-04	TD	13	TD-13X-082809AX	8/28/2009	1150	267	45891	17	< 2545	< 3	87
T-04	TD	14	TD-14X-082809AX	8/28/2009	1155	329	47714	28	< 2628	< 3	103
T-04			TD-14 LAB DUP			332	41445	24	< 2397	< 3	97
T-05	TE	1	TE-01X-090109AX	9/1/2009	0820	604	68199	31	5241	8	180
T-05	TE	2	TE-02X-090109AX	9/1/2009	0825	85	36282	16	< 2119	< 3	81
T-05	TE	3	TE-03X-090109AX	9/1/2009	0830	312	35359	373	< 2149	< 3	87
T-05	TE	4	TE-04X-090109AX	9/1/2009	0835	152	37099	< 7	< 2226	< 3	66
T-05	TE	5	TE-05X-090109AX	9/1/2009	0840	271	37804	20	< 2361	3	76
T-05	TE	6	TE-06X-090109AX	9/1/2009	0845	435	46066	38	< 2484	< 3	102

Table 6-19
Soil and Sediment XRF Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
T-05	TE	7	TE-07X-090109AX	9/1/2009	0850	320	> 100000	37	20991	30	43
T-05	TE	8	TE-08X-090109AX	9/1/2009	0855	159	39708	675	3675	< 4	59
T-05	**TE**	**9**	**TE-09X-090109AX**	**9/1/2009**	**0900**	**336**	**98293**	**56**	**33399**	**25**	**174**
T-05			TE-09 LAB DUP			373	> 100000	58	39034	28	145
T-05	TE	10A	TE-10X-090109AX	9/1/2009	1335	366	78092	61	41047	114	149
T-05			TE-10 LAB DUP			399	75240	62	35977	116	195
T-05	TE	10B	TE-10X-090109BX	9/1/2009	1340	201	71263	15	17666	5	69
T-05	TE	10C	TE-10X-090109CX	9/1/2009	1345	3948	59250	14	31038	8	867
T-05	TE	10D	TE-10X-090109DX	9/1/2009	1350	182	59656	10	<2926	<3	137
T-05	TE	11A	TE-11X-090109AX	9/1/2009	1410	344	>10%	21	39379	12	63
T-05	TE	11B	TE-11X-090109BX	9/1/2009	1420	224	71273	17	7848	6	62
T-05	TE	11C	TE-11X-090109CX	9/1/2009	1430	178	43235	9	<2788	<3	182
T-05	TE	12A	TE-12X-090109AX	9/1/2009	1440	2418	>10%	54	13447	37	182
T-05	**TE**	**12B**	**TE-12X-090109BX**	**9/1/2009**	**1445**	**176**	**43811**	**10**	**<2515**	**4**	**64**
T-05	TE	12C	TE-12X-090109CX	9/1/2009	1455	136	41656	13	<2557	<3	106
T-05	TE	13A	TE-13X-090109AX	9/1/2009	1505	1429	>10%	76	16339	41	86
T-05	TE	13B	TE-13X-090109BX	9/1/2009	1510	184	62243	15	<3294	<4	107
T-05	TE	13C	TE-13X-090109CX	9/1/2009	1515	170	41282	14	3375	<3	146
T-05	TE	14A	TE-14X-090109AX	9/1/2009	1530	1475	>10%	55	18214	22	75
T-05	TE	14B	TE-14X-090109BX	9/1/2009	1535	486	81249	17	6055	6	83
T-05	TE	14C	TE-14X-090109CX	9/1/2009	1540	112	38175	13	<2484	<3	102
T-05	TE	15A	TE-15X-090109AX	9/1/2009	1600	4835	>10%	117	19636	35	121
T-05	TE	15B	TE-15X-090109BX	9/1/2009	1605	207	60897	14	<3118	<3	92
T-05	**TE**	**15C**	**TE-15X-090109CX**	**9/1/2009**	**1610**	**133**	**31894**	**7**	**2752**	**<3**	**93**
T-05	TE	16	TE-16X-090109AX	9/1/2009	0910	168	41870	17	< 2773	< 3	106
T-05	TE	17	TE-17X-090109AX	9/1/2009	0915	171	48934	12	< 2804	< 3	75
T-05	TE	17	TE-17X-090309AX	9/3/2009	0935	192	> 100000	68	33086	23	171
T-05	TE	18	TE-18X-090109AX	9/1/2009	0920	148	43773	19	< 2522	< 3	91
T-05	TE	19	TE-019X-090109AX	9/1/2009	0925	126	39985	16	< 2524	< 3	96

Table 6-19
Soil and Sediment XRF Metal Results
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Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
T-06	TF	1	TF-01X-090109AX	9/1/2009	1015	518	88606	26	17765	25	102
T-06	**TF**	**2**	**TF-02X-090109AX**	**9/1/2009**	**1020**	**1099**	**> 100000**	**47**	**29405**	**31**	**227**
T-06	TF	3	TF-03X-090109AX	9/1/2009	1025	601	62591	22	6381	10	101
T-06	TF	4	TF-04X-090109AX	9/1/2009	1030	58	34361	11	< 2017	< 3	42
T-06	TF	5	TF-05X-090109AX	9/1/2009	1035	178	31952	14	< 1955	< 3	51
T-06	TF	6	TF-06X-090109AX	9/1/2009	1040	128	35925	18	< 2319	< 3	69
T-06	TF	7	TF-07X-090109AX	9/1/2009	1045	4771	58282	27	5423	10	423
T-06	TF	8	TF-08X-090109AX	9/1/2009	1050	305	> 100000	67	23363	40	42
T-06	TF	9A	TF-09X-090109AX	9/1/2009	1055	496	> 100000	35	34070	18	41
T-06	TF	9B	TF-09X-090109BX	9/1/2009	1057	731	44416	23	< 2903	< 3	67
T-06	TF	10A	TF-10X-090209AX	9/2/2009	1400	888	> 100000	51	17991	32	134
T-06	TF	10B	TF-10X-090209BX	9/2/2009	1405	480	41505	11	< 3423	4	100
T-06	TF	10D	TF-10X-090209DX	9/2/2009	1415	1284	33654	9	6387	6	171
T-06	TF	10E	TF-10X-090209EX	9/2/2009	1420	317	35677	< 8	< 3234	< 3	60
T-06	TF	10G	TF-10X-090209GX	9/2/2009	1410	147	34432	10	6520	5	122
T-06	**TF**	**11A**	**TF-11X-090209AX**	**9/2/2009**	**1430**	**4216**	**> 100000**	**72**	**< 4898**	**43**	**129**
T-06	TF	11B	TF-11X-090209BX	9/2/2009	1435	4447	77320	26	7000	8	141
T-06	TF	11C	TF-11X-090209CX	9/2/2009	1440	4768	36419	9	7773	5	115
T-06	TF	11D	TF-11X-090209DX	9/2/2009	1445	109	33466	8	< 3154	< 3	62
T-06	TF	11E	TF-11X-090209EX	9/2/2009	1450	143	36095	20	< 2900	< 3	118
T-06	TF	12A	TF-12X-090209AX	9/2/2009	1455	329	92068	24	13045	< 4	63
T-06	TF	12B	TF-12X-090209BX	9/2/2009	1500	20227	55653	42	13565	9	196
T-06	TF	12C	TF-12X-090209CX	9/2/2009	1505	5250	33042	13	12160	4	133
T-06	TF	12D	TF-12X-090209DX	9/2/2009	1510	221	43944	13	< 3598	< 3	84
T-06	TF	13A	TF-13X-090209AX	9/2/2009	1515	567	> 100000	37	10257	7	73
T-06	**TF**	**13B**	**TF-13X-090209BX**	**9/2/2009**	**1520**	**18554**	77677	**26**	**40827**	**13**	**287**
T-06	TF	13C	TF-13X-090209CX	9/2/2009	1525	1078	**37783**	< 7	< 3566	< 3	92
T-06			TF-13X-C LAB DUP			1123	35632	15	< 3203	< 3	100
T-06	TF	14A	TF-14X-090209AX	9/2/2009	1545	270	94460	33	9254	20	74
T-06	TF	15A	TF-15X-090209AX	9/2/2009	1605	2909	> 100000	63	45723	39	163

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Ely Copper Mine Superfund Site
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Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
T-06	TF	15B	TF-15X-090209BX	9/2/2009	1610	7895	17472	14	10576	< 3	1524
T-06	TF	15C	TF-15X-090209CX	9/2/2009	1615	1292	44321	11	5441	< 3	338
T-06	TF	16A	TF-16X-090109AX	9/1/2009	1130	1423	> 100000	67	13487	24	535
T-06	TF	16B	TF-16X-090109BX	9/1/2009	1132	2360	> 100000	59	82081	25	1950
T-06	**TF**	**17**	**TF-17X-090109AX**	**9/1/2009**	**1135**	**76**	**47969**	**12**	**< 2651**	**< 3**	**82**
T-06	TF	18	TF-18X-090109AX	9/1/2009	1140	211	39329	36	< 2651	< 3	82
T-06	TF	19	TF-19X-090109AX	9/1/2009	1145	52	38827	14	< 2559	< 3	59
T-06	TF	20	TF-20X-090109AX	9/1/2009	1150	168	33375	23	< 2152	< 3	68
T-06	TF	21	TF-21X-090109AX	9/1/2009	1155	126	33817	20	< 2122	< 3	59
T-06	TF	22	TF-22X-090109AX	9/1/2009	1200	31	32645	11	< 2224	< 3	47
T-06	TF	23	TF-23X-090109AX	9/1/2009	1205	41	31976	15	< 2033	< 3	54
T-07	TG	1	TG-01X-082409AX	8/24/2009	1030	1545	80631	< 8	15865	4	133
T-07	**TG**	**2**	**TG-02X-082409AX**	**8/24/2009**	**1035**	**180**	**62422**	**12**	**< 3089**	**< 3**	**86**
T-07	TG	3	TG-03X-082409AX	8/24/2009	1040	216	44700	13	< 2288	< 3	63
T-07	TG	4	TG-04X-082409AX	8/24/2009	1045	158	34483	12	< 1920	< 3	58
T-07	TG	5	TG-05X-082409AX	8/24/2009	1050	94	35866	12	< 2362	< 3	59
T-07	TG	6	TG-06X-082409AX	8/24/2009	1105	200	36360	15	< 2115	< 3	54
T-07	TG	7	TG-07X-082409AX	8/24/2009	1110	256	62167	19	< 3037	< 3	103
T-07	TG	8	TG-08X-082409AX	8/24/2009	1115	150	40079	12	< 2256	< 3	78
T-08	**TH**	**1**	**TH-01X-082509AX**	**8/25/2009**	**0835**	**1045**	**99183**	**44**	**18018**	**21**	**90**
T-08	TH	2	TH-02X-082509AX	8/25/2009	0840	776	> 10%	81	40357	27	77
T-08	TH	3	TH-03X-082509AX	8/25/2009	0845	224	48523	20	< 2446	5	57
T-08	TH	4	TH-04X-082509AX	8/25/2009	0850	142	36450	19	< 2218	< 2	46
T-08	TH	5	TH-05X-082509AX	8/25/2009	0905	419	29498	12	< 1957	< 3	60
T-08	TH	6	TH-06X-082509AX	8/25/2009	0910	208	37177	21	< 2358	< 3	74
T-08	TH	7	TH-07X-082509AX	8/25/2009	0920	317	41631	16	< 2350	< 3	74
T-08	TH	8	TH-08X-082509AX	8/25/2009	0925	712	> 10%	36	16288	43	165
T-08			TH-08X LAB DUP			719	> 10%	55	18239	39	188

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Ely Copper Mine Superfund Site
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Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
T-09	TI	1	TI-01X-082509AX	8/25/2009	1005	263	> 10%	54	24924	37	133
T-09	TI	2	TI-02X-082509AX	8/25/2009	1010	32	29489	12	< 2090	< 3	75
T-09	**TI**	**3**	**TI-03X-082509AX**	**8/25/2009**	**1015**	**77**	**36291**	**28**	**< 2249**	**< 3**	71
T-09	TI	4	TI-04X-082509AX	8/25/2009	1020	85	34712	14	< 2144	< 3	81
T-09	TI	5	TI-05X-082509AX	8/25/2009	1025	77	34660	13	< 2227	< 3	**60**
T-09	TI	6	TI-06X-082509AX	8/25/2009	1030	123	40484	40	< 2232	< 3	66
T-09	TI	7	TI-07X-082509AX	8/25/2009	1045	103	36314	22	< 2140	< 3	79
T-09	TI	8	TI-08X-082509AX	8/25/2009	1050	61	40427	10	< 2267	< 3	84
T-09	TI	9	TI-09X-082509AX	8/25/2009	1055	74	51641	11	< 2692	< 3	75
T-10	TJ	1	TJ-01X-082409AX	8/24/2009	0915	1347	> 10%	53	34727	15	74
T-10			TJ-01X LAB DUP			2306	> 10%	44	39476	28	111
T-10	TJ	2	TJ-02X-082409AX	8/24/2009	0925	467	> 10%	79	24242	24	93
T-10	TJ	3	TJ-03X-082409AX	8/24/2009	0930	719	39880	11	< 2549	< 3	164
T-10	TJ	4	TJ-04X-082409AX	8/24/2009	0940	66	19925	12	< 1926	< 2	35
T-10	TJ	5	TJ-05X-082409AX	8/24/2009	0940	111	34127	13	< 2472	3	54
T-10	TJ	6	TJ-06X-082409AX	8/24/2009	0945	29	31599	17	< 2333	< 3	52
T-10	TJ	7	TJ-07X-082409AX	8/24/2009	0955	43	39284	17	< 2416	< 3	57
T-10	TJ	8	TJ-08X-082409AX	8/24/2009	1000	23	31155	16	< 2416	< 3	49
T-11	**TK**	**1**	**TK-01X-082509AX**	**8/25/2009**	**1540**	**247**	45528	**27**	**< 2686**	**< 3**	**92**
T-11	TK	2	TK-02X-082509AX	8/25/2009	1545	304	29104	33	< 1945	< 3	77
T-11	TK	3	TK-03X-082509AX	8/25/2009	1550	97	22419	32	< 2498	< 3	81
T-11	TK	4	TK-04X-082509AX	8/25/2009	1555	679	39654	204	< 2534	< 3	381
T-11	TK	5	TK-05X-082509AX	8/25/2009	1600	190	35071	40	< 2091	< 3	146
T-11	TK	6	TK-06X-082509AX	8/25/2009	1605	65	35058	21	< 1930	< 2	61
T-11	TK	7	TK-07X-082509AX	8/25/2009	1610	66	35348	27	< 2234	< 3	57
T-11	TK	8	TK-08X-082509AX	8/25/2009	1615	72	50498	15	< 2646	< 3	102

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Soil and Sediment XRF Metal Results
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Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
T-12	TL	1	TL-01X-082509AX	8/25/2009	1220	1054	60158	15	5605	4	120
T-12	TL	2	TL-02X-082509AX	8/25/2009	1225	738	51226	11	< 2856	< 3	99
T-12			TL-02X LAB DUP			774	52794	18	< 2829	< 3	132
T-12	TL	3	TL-03X-082509AX	8/25/2009	1230	1435	> 10%	51	18002	8	156
T-12	**TL**	**4**	**TL-04X-082509AX**	**8/25/2009**	**1235**	**66**	**30601**	**15**	**< 1974**	**< 3**	**64**
T-12	TL	5	TL-05X-082509AX	8/25/2009	1240	48	33154	21	< 2214	< 3	74
T-12	TL	6	TL-06X-082509AX	8/25/2009	1245	29	35796	12	< 2238	**< 3**	**79**
T-12	TL	7	TL-07X-082509AX	8/25/2009	1250	55	31807	15	< 2026	< 3	65
T-13	TM	1	TM-01X-082509AX	8/25/2009	1310	71	29614	17	< 1931	< 3	60
T-13	TM	2	TM-02X-082509AX	8/25/2009	1315	60	29986	12	< 1794	< 2	47
T-13	TM	3	TM-03X-082509AX	8/25/2009	1320	54	31405	13	< 1756	< 3	69
T-13	TM	4	TM-04X-082509AX	8/25/2009	1325	73	27089	15	< 1751	< 3	59
T-13	TM	5	TM-05X-082509AX	8/25/2009	1330	41	28133	16	< 1928	< 3	52
T-14	TN	1	TN-01X-082509AX	8/25/2009	1415	90	34595	19	< 2168	< 3	61
T-14			TN-01X LAB DUP			86	36094	16	< 2195	< 3	53
T-14	**TN**	**2**	**TN-02X-082509AX**	**8/25/2009**	**1420**	**56**	**29697**	**13**	**< 1922**	**< 3**	**69**
T-14	**TN**	**2**	**TN-02X-082509AD**	**8/25/2009**	**1423**	**56**	**29697**	**13**	**< 1922**	**< 3**	**69**
T-14	TN	3	TN-03X-082509AX	8/25/2009	1425	61	30797	20	< 2044	< 2	67
T-14	TN	4	TN-04X-082509AX	8/25/2009	1430	43	33762	8	< 2290	< 2	50
T-14	TN	5	TN-05X-082509AX	8/25/2009	1435	45	32139	11	< 2163	< 3	68
T-14	TN	6	TN-06X-082509AX	8/25/2009	1440	33	31534	15	< 2028	< 3	74
T-14	TN	7	TN-07X-082509AX	8/25/2009	1445	42	32151	13	< 2087	4	74
T-14	TN	8	TN-08X-082509AX	8/25/2009	1450	66	32140	15	< 2213	< 3	62
T-14	TN	9	TN-09X-082509AX	8/25/2009	1455	59	32809	12	< 2190	< 3	53
T-14	TN	10	TN-10X-082509AX	8/25/2009	1500	61	29646	15	< 2114	< 3	51
T-14	TN	11	TN-011X-082509AX	8/25/2009	1505	62	32573	18	< 2264	< 3	55

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Soil and Sediment XRF Metal Results
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Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
T-15	TO	1	TO-01X-082709AX	8/27/2009	1045	305	59619	25	5304	7	78
T-15	TO	2	TO-02X-082709AX	8/27/2009	1050	309	61463	17	7375	8	99
T-15	TO	3	TO-03X-082709AX	8/27/2009	1055	287	61687	21	5597	8	110
T-15	TO	4	TO-04X-082709AX	8/27/2009	1100	240	43960	27	< 2415	< 3	201
T-15	**TO**	**5**	**TO-05X-082709AX**	**8/27/2009**	**1105**	**1080**	**99912**	**37**	**13219**	**14**	**84**
T-15			TO-05X LAB DUP			960	99984	32	15477	**16**	**110**
T-15	TO	6	TO-06X-082709AX	8/27/2009	1110	126	64827	26	< 3148	< 3	62
T-15	TO	7	TO-07X-082709AX	8/27/2009	1115	85	34923	18	< 2534	< 3	76
T-15	TO	8	TO-08X-082709AX	8/27/2009	1120	44	42003	15	< 2359	< 3	84
T-16	TP	1	TP-01X-082709AX	8/27/2009	0950	942	88318	15	12336	14	663
T-16			TP-01X LAB DUP			735	89293	23	14109	9	62
T-16	TP	2	TP-02X-082709AX	8/27/2009	0945	195	31507	16	< 2116	< 3	60
T-16	TP	3	TP-03X-082709AX	8/27/2009	0940	121	29636	13	< 2048	< 3	68
T-16	TP	4	TP-04X-082709AX	8/27/2009	0935	146	30718	19	< 2221	< 3	63
T-16	TP	5	TP-05X-082709AX	8/27/2009	0930	152	30744	7	< 2114	< 3	62
T-16	TP	6	TP-06X-082709AX	8/27/2009	0925	110	30176	19	< 1907	< 3	60
T-16	TP	7	TP-07X-082709AX	8/27/2009	0920	100	35523	17	< 2144	< 3	51
T-16	TP	8	TP-08X-082709AX	8/27/2009	0915	54	30357	13	< 1906	< 3	54
T-16	TP	9	TP-09X-082709AX	8/27/2009	0910	174	32370	19	< 2080	3	62
T-16	**TP**	**10**	**TP-10X-082709AX**	**8/27/2009**	**0905**	**121**	**34966**	**22**	**< 2053**	**< 3**	**80**
T-16	TP	11	TP-11X-082709AX	8/27/2009	0900	80	38911	18	< 2371	< 3	98
T-16	TP	12	TP-12X-082709AX	8/27/2009	0855	81	33819	13	< 2234	< 3	59
T-16	TP	13	TP-13X-082709AX	8/27/2009	0850	230	37924	38	< 2265	< 3	125
T-16			TP-13X LAB DUP			214	35977	23	< 2080	< 3	123
T-16	TP	14	TP-14X-082709AX	8/27/2009	0845	152	27476	29	< 2228	< 3	109
T-16	TP	15	TP-15X-082709AX	8/27/2009	0840	124	28020	26	< 2065	< 3	65

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Soil and Sediment XRF Metal Results
Ely Copper Mine Superfund Site
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Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
T-17	TQ	1	TQ-01X-082609AX	8/26/2009	1240	521	> 10%	57	28000	35	56
T-17			TQ-01X LAB DUP			350	> 10%	54	27433	31	71
T-17	TQ	2	TQ-02X-082609AX	8/26/2009	1235	235	56643	14	6773	6	58
T-17	TQ	3	TQ-03X-082609AX	8/26/2009	1230	211	39921	16	< 2399	< 3	59
T-17	TQ	4	TQ-04X-082609AX	8/26/2009	1225	197	62873	23	4389	7	66
T-17	TQ	5	TQ-05X-082609AX	8/26/2009	1220	261	> 10%	35	20013	20	33
T-17	**TQ**	**6**	**TQ-06X-082609AX**	**8/26/2009**	**1215**	**227**	**94500**	**15**	**< 3125**	**< 3**	**31**
T-17	TQ	7	TQ-07X-082609AX	8/26/2009	1215	330	98597	28	19894	20	54
T-17	TQ	8	TQ-08X-082609AX	8/26/2009	1205	458	80584	29	10255	13	56
T-17	TQ	9	TQ-09X-082609AX	8/26/2009	1155	45	13704	15	< 1636	< 3	49
T-17	TQ	10	TQ-10X-082609AX	8/26/2009	1140	89	38133	16	< 2192	< 3	101
T-17	TQ	11	TQ-11X-082609AX	8/26/2009	1130	80	32147	93	< 2062	< 3	81
T-17	TQ	12	TQ-12X-082609AX	8/26/2009	1125	41	24451	9	< 1961	< 2	34
T-17	TQ	13	TQ-13X-082609AX	8/26/2009	1120	82	27737	10	< 1967	< 3	40
T-17	TQ	14	TQ-14X-082609AX	8/26/2009	1115	256	55947	27	< 2863	< 3	95
T-17	TQ	15	TQ-15X-082609AX	8/26/2009	1105	196	25947	31	< 2012	< 2	67
T-17	**TQ**	**16**	**TQ-16X-082609AX**	**8/26/2009**	**1055**	**93**	**31648**	**13**	**< 2220**	**< 3**	**73**
TS	TS	1	TS-01X-090309AX	9/3/2009	1100	636	43651	23	4847	5	210
TS	TS	2	TS-02X-090309AX	9/3/2009	1105	690	36247	21	4404	5	137
TS	TS	3	TS-03X-090309AX	9/3/2009	1110	648	> 100000	40	22292	52	153
TS	TS	4	TS-04X-090309AX	9/3/2009	1115	178	30649	14	< 2517	6	44
TT	TT	1	TT-01X-090309AX	9/3/2009	1230	545	39909	10	< 2535	< 2	142
TT	TT	2	TT-02X-090309AX	9/3/2009	1235	467	44777	23	< 2951	< 3	171
TT	TT	3	TT-03X-090309AX	9/3/2009	1240	103	50562	10	< 3118	< 3	106
TU	TU	1	TU-01X-090309AX	9/3/2009	1145	552	38832	36	3465	4	59
TU	TU	2	TU-02X-090309AX	9/3/2009	1150	484	40080	48	< 2678	< 3	94
TU	TU	3	TU-03X-090309AX	9/3/2009	1155	106	32389	16	< 2738	< 3	51
TU			TU-03 LAB DUP	9/3/2009		104	30822	14	< 2630	< 3	59

Table 6-19
Soil and Sediment XRF Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
TV	TV	1	TV-01X-090309AX	9/3/2009	1410	950	82060	55	11669	12	133
TV	TV	2	TV-021X-090309AX	9/3/2009	1415	544	28428	13	< 2322	< 2	59
TV	TV	3	TV-03X-090309AX	9/3/2009	1420	45	28739	10	< 2413	< 3	47
TW	TW	1	TW-01X-090309AX	9/3/2009	1445	**1021**	> 10%	98	29300	15	23
TW	TW	2	TW-02X-090309AX	9/3/2009	1450	**699**	> 10%	119	37016	67	233
TW	TW	3	TW-03X-090309AX	9/3/2009	1455	**782**	> 10%	63	27314	25	93
TW	TW	4	TW-04X-090309AX	9/3/2009	1500	488	> 10%	43	27750	22	108
TW	TW	5	TW-05X-090309AX	9/3/2009	1505	579	62039	20	< 3648	< 3	114
TW	TW	A	TW-0AX-090309AX	9/3/2009	1510	73	> 10%	48	26867	37	202
TW			TW-A LAB DUP			80	> 10%	49	30204	42	173
TW	TW	B	TW-0BX-090309AX	9/3/2009	1515	**42679**	> 10%	72	> 10%	79	4236
TX	TX	1	TX-01X-090309AX	9/3/2009	1530	269	35459	73	< 2973	< 3	52
TX	TX	2	TX-02X-090309AX	9/3/2009	1535	68	27206	13	< 2154	< 3	54
TX	TX	3	TX-03X-090309AX	9/3/2009	1540	200	32055	15	< 2200	< 3	47
TY	TY	1	TY-01X-090409AX	9/4/2009	0815	474	> 10%	70	44962	46	64
TY	TY	2	TY-02X-090409AX	9/4/2009	0820	1314	57058	14	22175	< 3	178
TY	TY	3	TY-03X-090409AX	9/4/2009	0825	1969	48902	9	9462	5	679
TY	TY	4	TY-04X-090409AX	9/4/2009	0830	1473	74988	10	35264	< 3	195
TY	TY	5	TY-04X-090409AX	9/4/2009	0835	1069	95899	11	13680	< 3	100
TY	TY	6	TY-06X-090409AX	9/4/2009	0840	315	48019	17	< 3523	< 3	87
TY	TY	7	TY-04X-090409AX	9/4/2009	0845	292	39698	8	< 2563	< 3	68
TZ	TZ	1	TZ-01X-090409AX	9/4/2009	0930	269	52873	16	< 3597	4	61
TZ	TZ	2	TZ-02X-090409AX	9/4/2009	0935	205	40275	20	< 2586	< 3	56
TZ	TZ	3	TZ-03X-090409AX	9/4/2009	0940	75	40310	11	< 2641	< 3	62

Table 6-19
Soil and Sediment XRF Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
RA	RA	0-0.5	--	9/2/2009	0950	23	25803	25	<1893	8	42
RA	RA	0.5-2	--	9/2/2009	0955	34	37013	14	<2267	6	56
RB	RB	0-0.5	--	9/2/2009	0955	27	28120	30	<1733	<2	54
RB	RB	0.5-2	--	9/2/2009	1000	<15	34471	12	<2072	<3	57
RC	RC	0-0.5	--	9/2/2009	1005	28	31720	46	<1981	<3	75
RC	RC	0.5-2	--	9/2/2009	1010	18	37051	8	<2010	<3	45
RD	RD	0-0.5	--	9/2/2009	1015	26	34098	18	<1995	<3	54
RD	RD	0.5-1	--	9/2/2009	1020	28	34654	9	<2087	<3	58
SB	SB	A1	SB-A1X-090409AX	9/4/2009	1050	474	> 10%	70	44962	46	64
SB	SB	A2	SB-A2X-090409AX	9/4/2009	1055	1314	57058	14	22175	< 3	178
SB	SB	A3	SB-A3X-090409AX	9/4/2009	1100	1969	48902	9	9462	5	679
SB	SB	B1	SB-B1X-090409AX	9/4/2009	1110	1473	74988	10	35264	< 3	195
SB	SB	B2	SB-B2X-090409AX	9/4/2009	1115	1069	95899	11	13680	< 3	100
SB	SB	B3	SB-B3X-090409AX	9/4/2009	1120	315	48019	17	< 3523	< 3	87
SS	SS	1	SS-01X-090209AX	9/2/2009	1140	275	39188	164	< 3138	< 3	107
SS	SS	1	SS-01X-090209BX	9/2/2009	1145	138	26306	14	< 2739	< 3	62
SS	SS	2	SS-02X-090209AX	9/2/2009	1205	423	52941	28	5648	< 3	87
SS	SS	2	SS-02X-090209BX	9/2/2009	1210	332	35901	12	< 2660	< 3	54
SS	SS	3	SS-03X-090209AX	9/2/2009	1150	167	39351	17	< 2839	< 3	70
SS			SS-03X B LAB DUP			156	32429	21	< 2661	< 8	60
SS	SS	3	SS-03X-090209BX	9/2/2009	1155	217	35673	12	< 2681	< 3	73
SS	SS	4	SS-04X-090209AX	9/2/2009	1040	107	31479	22	< 2434	< 3	49
SS	SS	4	SS-04X-090209BX	9/2/2009	1045	47	36873	13	< 2762	< 2	58
SS	SS	5	SS-05X-090209AX	9/2/2009	0910	27	35523	22	< 1993	< 3	47
SS	SS	5	SS-05X-090209BX	9/2/2009	0915	30	37524	15	< 2779	< 3	68
SS	SS	6	SS-06X-090209AX	9/2/2009	0920	33	31297	31	< 2227	< 3	65
SS	SS	6	SS-06X-090209BX	9/2/2009	0920	23	36984	10	< 2712	< 3	101
SS	SS	7	SS-07X-090209AX	9/2/2009	0930	27	35595	34	< 2478	< 3	66

Table 6-19
Soil and Sediment XRF Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Transect ID	Field Transect ID	Sample Location	Sample ID	Sample Date	Sample Time	Copper 625	Iron 55,762	Lead 400	Sulfur	Selenium 4.37	Zinc 545
SS	SS	7	SS-07X-090209BX	9/2/2009	0935	27	44193	13	< 2819	< 3	79
SS	SS	10	SS-10X-090309AX	9/3/2009	0950	618	34692	96	< 2525	< 3	170
SS	SS	11	SS-11X-090309AX	9/3/2009	0930	261	39269	35	< 2919	< 3	77
SS	SS	12	SS-12X-090309AX	9/3/2009	0920	248	25839	36	< 2169	3	69
SS	SS	16	SS-16X-090309AX	9/3/2009	0900	55	29945	17	< 2336	< 3	68
SS	SS	16	SS-16X-090309BX	9/3/2009	0905	34	33787	13	< 2428	< 3	59
SS	SS	25	SS-25X-082609BX	8/27/2009	1255	97	47933	12	< 2965	< 3	91
SS	SS	22	SS-22X-082609BX	8/27/2009	1405	324	33929	12	< 2075	4	66
SS	SS	23	SS-23X-082609BX	8/27/2009	1335	321	56902	13	< 3203	< 3	110
SS	SS	19	SS-19X-082609BX	8/27/2009	1435	84	33233	15	< 2167	< 3	62
SS	SS	18	SS-18X-082609BX	8/27/2009	1450	358	68415	13	14786	< 3	65
SS	SS	27	SS-27X-082609BX	8/26/2009	1455	1347	46502	19	< 2697	4	91
SS	SS	13	SS-13X-082809BX	8/28/2009	1310	237	41335	10	< 2238	< 3	89
SS	SS	14	SS-14X-083109BX	8/31/2009	0935	369	35664	77	< 1891	< 3	77
SS	SS	15	SS-15X-083109BX	8/31/2009	0905	113	32460	16	< 2053	< 3	45
SS	SS	17	SS-17X-083109BX	8/31/2009	1015	204	93229	27	19237	24	50
SS	SS	20	SS-20X-083109BX	8/31/2009	1035	172	39607	13	2337	< 2	54
SS	SS	24	SS-24X-083109BX	8/31/2009	1115	43	34582	7	< 2218	< 3	56
SS	SS	26	SS-26X-083109BX	8/31/2009	1135	47	43306	14	< 2353	< 3	63
SS	SS	21	SS-21X-083109BX	8/31/2009	1400	99	49120	9	< 2673	< 3	64
SS	SS	29	SS-29X-083109BX	8/31/2009	1450	141	31686	23	< 2141	< 3	80
SS	SS	28	SS-28X-083109BX	8/31/2009	1510	56	55099	9	< 2686	< 3	60
SS	SS	30	SS-30X-083109AX	8/31/2009	1420	403	> 100000	72	49049	28	72
XR	XR	1	XR-01X-082809AX	8/28/2009	1255	375	75828	10	15821	< 3	81

Notes:
Site - specific soil criteria in mg/kg is shown in the metal result header.
Bold - Indicates fixed laboratory split was submitted for this sample. All "SS" samples were submitted for laboratory analysis.
Results are in milligrams per killogram (mg/kg).
Gray highlighted cells indicate exceedance of site-specific criteria.

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	MW-17A	MW-17A	MW-18A	MW-18A	MW-18A	MW-18A	MW-19A	MW-19A	MW-19A
Study Area	LWA-TZ	LWA-TZ	UWA	UWA	UWA	UWA	UWA	UWA	UWA
Station ID:	MW-17A-073009AX	MW-17A-073009BX	MW-18A-080309AX	MW-18A-080309AD	MW-18A-080309BX	MW-18A-080309CX	MW-19A-072109AX	MW-19A-072109BX	MW-19A-072109CX
Sample Date:	7/30/2009	7/30/2009	8/3/2009	8/3/2009	8/3/2009	8/3/2009	7/21/2009	7/21/2009	7/21/2009
Sample Depth (ft bgs):	0 - 2	2 - 2.6	2 - 4	2 - 4	4 - 6	6 - 8	2 - 6	6 - 8	8 - 12.9
Parameter									
Paste pH (Sobek 3.2.2 units)	5.43	6.15	3.02	3.24	3.88	4.28	3.69	3.63	6.57
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	0.131	2.952	1.158	1.204	1.748	1.530	7.850	1.430	2.800
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	4.61	-2.29	-18.09	-11.24	0.14	2.81	-227.00	-7.00	53.00

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	MW-20A	MW-20A	MW-20A	MW-20A	MW-21A	MW-21A	MW-21A	MW-21A	MW-21A
Study Area	LWA-TZ	LWA-TZ	LWA-TZ	LWA-TZ	LWA	LWA	LWA	LWA	LWA
Station ID:	MW-20A-072909AX	MW-20A-072909BX	MW-20A-072909CX	MW-20A-083109AX	MW-21A-072809AX	MW-21A-072809BX	MW-21A-072809CX	MW-21A-072809CD	MW-21A-083109AX
Sample Date:	7/29/2009	7/29/2009	7/29/2009	8/31/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009	8/31/2009
Sample Depth (ft bgs):	2 - 2.4	2.4 - 4	4 - 5.5	0 - 2	2 - 4	4 - 6	6 - 10	6 - 10	0 - 2
Parameter									
Paste pH (Sobek 3.2.2 units)	4.15	4.24	4.51	4.73	2.55	3.69	4.04	4.18	2.41
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	0.660	0.520	0.390	0.350	10.500	0.810	0.750	0.840	2.240
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	0.81	4.38	6.00	-1.88	-203.75	4.13	-0.19	3.38	-68.44

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	MW-22A	MW-22A	MW-22A	MW-22A	MW-23A	MW-23A	MW-23A	MW-23A	SB-09
Study Area	Tailing	Tailing	Tailing	Tailing	ORB	ORB	ORB	ORB	Tailing
Station ID:	MW-22A-072909AX	MW-22A-072909BX	MW-22A-072909CX	MW-22A-083109AX	MW-23A-070809AX	MW-23A-070809BX	MW-23A-070809CX	MW-23A-083109AX	SB-09X-073009AX
Sample Date:	7/29/2009	7/29/2009	7/29/2009	8/31/2009	7/8/2009	7/8/2009	7/8/2009	8/31/2009	7/30/2009
Sample Depth (ft bgs):	2 - 4	7.1 - 8.2	8.2 - 11.5	0 - 2	0 - 2	6 - 8	8 - 10	0 - 2	2.2 - 3
Parameter									
Paste pH (Sobek 3.2.2 units)	3.10	3.76	4.45	3.03	4.60	6.04	5.53	3.86	3.79
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	8.080	4.040	3.320	1.280	0.937	0.782	0.324		5.330
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	-109.19	-168.06	-61.25	-51.00	19.58	27.51	35.99	-37.81	-200.24

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	SB-09	SB-09	SD-58	SD-59	SD-60	SD-61	SD-61	SD-62	SD-63
Study Area	Tailing	Tailing	SHB-UR	SHB-UR	EB-LR	EB-LR	EB-LR	EB-MR	EB-MR
Station ID:	SB-09X-073009BX	SB-09X-073009CX	SD-58X-080709AX	SD-59X-080709AX	SD-60X-080709AX	SD-61X-080709AX	SD-61X-080709AD	SD-62X-080709AX	SD-63X-080709AX
Sample Date:	7/30/2009	7/30/2009	8/7/2009	8/7/2009	8/7/2009	8/7/2009	8/7/2009	8/7/2009	8/7/2009
Sample Depth (ft bgs):	3 - 6	8 - 10	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2
Parameter									
Paste pH (Sobek 3.2.2 units)	3.47	3.84	7.44	7.50	3.76	4.29	4.23	2.94	3.29
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	6.390	1.191	0.532	0.481	0.681	1.258	0.566	1.418	0.918
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	-251.03	3.91	15.68	21.00	-49.36	-61.49	-38.69	-58.75	-66.01

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	SD-64	SD-65	SD-66	SD-67	SD-68	SD-69	SD-70	SD-71	SD-72
Study Area	EB-UR	EB-UR	EBT2	Pond5	Pond4	Pond1,2,3	Pond1,2,4	Pond4	EBT5
Station ID:	SD-64X-080709AX	SD-65X-080609AX	SD-66X-080609AX	SD-67X-080609AX	SD-68X-080609AX	SD-69-080709AX	SD-70X-080609AX	SD-71X-080609AX	SD-72X-080609AX
Sample Date:	8/7/2009	8/6/2009	8/6/2009	8/6/2009	8/6/2009	8/7/2009	8/6/2009	8/6/2009	8/6/2009
Sample Depth (ft bgs):	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2
Parameter									
Paste pH (Sobek 3.2.2 units)	6.71	6.52	5.57	6.15	5.62	6.19	5.37	5.12	6.18
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	0.246	0.151	0.284	0.112	0.893	0.291	0.688	1.495	0.514
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	-9.62	-6.13	-10.38	1.77	-0.43	5.93	3.98	-0.64	8.00

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	SD-73	SS-08	SS-08	SS-09	SS-10	SS-11	SS-12	SS-13	SS-14
Study Area	EBT5	Smelter	Smelter	Natural Forest	EB-LR-TZ	EB-LR-TZ	EB-MR-TZ	ORB	ORB-TZ
Station ID:	SD-73X-080609AX	SS-08X-090209AX	SS-08X-090209AD	SS-09X-090209AX	SS-10X-090309AX	SS-11X-090309AX	SS-12X-090309AX	SS-13X-082809AX	SS-14X-083109AX
Sample Date:	8/6/2009	9/2/2009	9/2/2009	9/2/2009	9/3/2009	9/3/2009	9/3/2009	8/28/2009	8/31/2009
Sample Depth (ft bgs):	0 - 2	0 - 1	0 - 2	0 - 1	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.3	0 - 0.2
Parameter									
Paste pH (Sobek 3.2.2 units)	6.47	5.47	5.53	4.77	5.66	4.51	5.47	5.73	4.35
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	0.172	0.172	0.116	0.116	0.308	0.219	0.750	0.610	0.380
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	-22.67	NA	NA	NA	4.54	1.99	10.44	NA	NA

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	SS-15	SS-16	SS-17	SS-18	SS-19	SS-20	SS-21	SS-22	SS-23
Study Area	ORB-TZ	Natural Forest	LWA-TZ	ORB	ORB	LWA-TZ	LWA-TZ	LWA-TZ	LWA-TZ
Station ID:	SS-15X-083109AX	SS-16X-090309AX	SS-17X-083109AX	SS-18X-082709AX	SS-19X-082709AX	SS-20X-083109AX	SS-21X-083109AX	SS-22X-082709AX	SS-23X-082709AX
Sample Date:	8/31/2009	9/3/2009	8/31/2009	8/27/2009	8/27/2009	8/31/2009	8/31/2009	8/27/2009	8/27/2009
Sample Depth (ft bgs):	0 - 0.2	0 - 0.5	0 - 0.3	0 - 1	0 - 1	0 - 0.2	0 - 0.2	0 - 1	0 - 1
Parameter									
Paste pH (Sobek 3.2.2 units)	3.84	5.08	4.26	4.26	4.70	3.42	4.12	4.11	5.11
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	0.430	0.210	0.430	0.550	0.698	0.310	0.380	0.427	0.463
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	NA	2.96	NA	NA	NA	NA	NA	NA	NA

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	SS-24	SS-25	SS-26	SS-27	SS-28	SS-29	SS-30	SS-31	SS-32
Study Area	Natural Forest	LWA-TZ	Natural Forest	LWA	Natural Forest	LWA-TZ	LWA	LWA	UWA-TZ
Station ID:	SS-24X-083109AX	SS-25X-082709AX	SS-26X-083109AX	SS-27X-082609AX	SS-28X-083109AX	SS-29X-083109AX	SS-30X-083109AX	SS-31X-083109AX	SS-32X-083109AX
Sample Date:	8/31/2009	8/27/2009	8/31/2009	8/26/2009	8/31/2009	8/31/2009	8/31/2009	8/31/2009	8/31/2009
Sample Depth (ft bgs):	0 - 0.2	0 - 1	0 - 0.3	0 - 1	0 - 1	0 - 0.3	0 - 2	0 - 2	0 - 2
Parameter									
Paste pH (Sobek 3.2.2 units)	4.89	5.07	5.28	6.42	4.33	5.18	2.26	5.64	6.14
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	0.790	0.539	0.584	0.647	0.327	0.950	5.890	0.420	1.521
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	NA	NA	NA	NA	NA	NA	-111.79	6.00	21.00

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	SS-33	SS-34	SS-35	SS-36	SS-37	SS-37	SS-38	SS-39	TP-15X
Study Area	UWA-TZ	UWA-TZ	UWA-TZ	UWA-TZ	UWA	UWA	UWA	UWA	UWA
Station ID:	SS-33X-083109AX	SS-34X-082609AX	SS-35X-082609AX	SS-36X-082609AX	SS-37X-082609AX	SS-37X-082609AD	SS-38X-082609AX	SS-39X-082609AX	TP-15X-073009AX
Sample Date:	8/31/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	7/30/2009
Sample Depth (ft bgs):	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 1
Parameter									
Paste pH (Sobek 3.2.2 units)	5.18	5.78	4.57	5.20	2.41	2.23	2.30	2.46	3.60
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	0.253	0.194	0.379	0.207	2.820	2.689	3.130	1.920	0.264
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	1.24	2.65	2.75	-0.48	-28.60	-28.99	-21.19	-57.35	-34.49

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	TP-15X	TP-15X	TP-15X	TP-16X	TP-16X	TP-16X	00JH34	00JH34	00JH38
Study Area	UWA	UWA	UWA	LWA	LWA	LWA	EB-LR	EB-LR	Slag
Station ID:	TP-15X-073009AD	TP-15X-073009BX	TP-15X-073009CX	TP-16X-080309AX	TP-16X-080309BX	TP-16X-080309CX	00JH34 (DIW)	00JH34 (ESP)	00JH38 (DIW)
Sample Date:	7/30/2009	7/30/2009	7/30/2009	8/3/2009	8/3/2009	8/3/2009	10/16/2000	10/16/2000	10/16/2000
Sample Depth (ft bgs):	0 - 1	1 - 2	2 - 3	0 - 1	1 - 2	2 - 5	0 - 0	0 - 0	0 - 0
Parameter									
Paste pH (Sobek 3.2.2 units)	3.60	3.73	4.33	4.98	5.45	5.86	4.79	4.67	4.86
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	0.218	0.261	0.306	0.224	0.211	0.224	NA	NA	NA
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	-37.11	-9.36	2.38	0.65	6.00	6.00	NA	NA	NA

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	00JH38	01JH31A	01JH31A	01JH31B	01JH31B	01JH34A-B	01JH34A-B	02Ely1A	02Ely1B
Study Area	Slag	LWA	LWA	LWA	LWA	Smelter	Smelter	UWA	UWA
Station ID:	00JH38 (ESP)	01JH31A (DIW)	01JH31A (ESP)	01JH31B (DIW)	01JH31B (ESP)	01JH34 (DIW)	01JH34 (ESP)	02Ely1A	02Ely1B
Sample Date:	10/16/2000	11/10/2001	11/10/2001	11/10/2001	11/10/2001	11/10/2001	11/10/2001	10/8/2002	10/8/2002
Sample Depth (ft bgs):	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0	0.8
Parameter									
Paste pH (Sobek 3.2.2 units)	4.28	3.86	3.69	3.62	3.55	5.07	4.73	2.4	2.5
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	NA	NA	NA	NA	NA	NA	NA	-49.5	-33.9

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	02Ely2A	02Ely2B	02Ely3	02Ely4A	02Ely4B	02Ely5A	02Ely5B	02Ely6A
Study Area	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA
Station ID:	02Ely2A	02Ely2B	02Ely3	02Ely4A	02Ely4B	02Ely5A	02Ely5B	02Ely6A
Sample Date:	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002
Sample Depth (ft bgs):	0	0.8	0	0	0.8	0	0.8	0
Parameter								
Paste pH (Sobek 3.2.2 units)	2.3	2.4	2.4	2.5	2.4	2.3	2.5	2.4
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	NA	NA	NA	NA	NA	NA	NA	NA
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	-29.8	-35.1	-70.3	-37.6	-35	-59.6	-29.6	-42.6

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	02Ely6B	ES-4	Ely00JH24	98JH-ELY-EB	02Ely7A	02Ely7A Dup	02Ely7B	02Ely7B Dup
Study Area	UWA	UWA	LWA		LWA	LWA	LWA	LWA
Station ID:	02Ely6B	ES-4	Ely00JH24	98JH-ELY-EB	02Ely7A	02Ely7A Dup	02Ely7B	02Ely7B Dup
Sample Date:	10/8/2002	10/8/2002	6/27/2000	8/25/1998	10/8/2002	10/8/2002	10/8/2002	10/8/2002
Sample Depth (ft bgs):	0.8	0	0	0	0	0.8	0	0.8
Parameter								
Paste pH (Sobek 3.2.2 units)	2.5	2.4	2.8	2.1	2.3	2.3	2.3	2.3
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	NA	NA	NA	NA	NA	NA	NA	NA
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	-38.1	-	-65.8	-101	-64.6	-87.8	-76.1	-69.2

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-20
Soil and Sediment Paste pH, Paste Conductivity, and ABA Results
Ely Copper Mine Superfund Site
Vershire, Vermont

Sample Location:	02Ely8A	02Ely8B	02Ely8C	02Ely10A	02Ely10B	02Ely11	02Ely12	02Ely13
Study Area	Tailing	Tailing	Tailing	ORB	ORB	Smelter	Slag	Smoke Flue
Station ID:	02Ely8A	02Ely8B	02Ely8C	02Ely10A	02Ely10B	02Ely11	02Ely12	02Ely13
Sample Date:	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002
Sample Depth (ft bgs):	0	1.1-1.5	2.3-2.9	0	0.8	0	0	0
Parameter								
Paste pH (Sobek 3.2.2 units)	2.4	2.5	3.1	2.7	2.7	3.1	4.5	4.1
Paste Conductivity (Sobek 3.2.18 mmhos/cm)	NA	NA	NA	NA	NA	NA	NA	NA
Acid-Base Accounting (1.3.1 t $CaCO_3$/1000t)	-57.9	-26.1	-421.9	-20.4	-33.4	-14.4	NA	-3.1

Notes: NA=not analyzed.

Sample Location: MW=soil sample collected during monitoring well installation; SB=subsurface soil sample; SD=sediment sample; SS=surface soil sample; TP=test pit sample.

ft bgs = feet below ground surface

LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone

EB = Ely Brook; UR = Upper Reach; MR = Middle Reach; LR = Lower Reach; EBT = Ely Brook Tributaries
SHB = Schoolhouse Brook

Table 6-21
Soil and Sediment SPLP Results
Ely Copper Mine Superfund Site
Vershire, Vermont

		Sampling Company:	URS	URS	URS	URS	URS	URS	URS	NOBIS	URS	URS	URS
		Study Area:	Slag	Slag	Slag	Slag	Slag	Slag	Slag	UWA	UWA	UWA	UWA
		Station:	02ELY12	00JH34	00JH34	00JH38	01JH34A-B	01JH34A-B	00JH38	SS-37	ES-4_OCHRE	02ELY1A	02ELY1A
		Field Sample ID:	02Ely 12	00JH34	00JH34	00JH38	01JH34	01JH34	00JH38	SS-37X-	ES-4	02Ely 1A	02Ely 1B
		Date:	10/8/2002	10/16/2000	10/16/2000	10/16/2000	11/10/2001	11/10/2001	10/16/2000	8/26/2009	10/8/2002	10/8/2002	10/8/2002
		Depth:	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 2	0 - 0	0 - 0	0.82 - 0.82
SPLP Metal	**GW**	**SW**											
Aluminum	1.248	0.087	0.0079	0.012	0.022	0.031	0.0097	0.029	0.044	0.00014	0.36	4.2	3.8
Antimony	ns	ns	0.00003	0.0094	0.0016	0.0014	0.00003 U	0.0023	0.001	-	0.00003 U	0.00003 U	0.00003 U
Beryllium	ns	ns	0.00005 U	0.00005 U	0.00006	0.00005 U	0.00005 U	0.00005 U	0.00005 U	-	0.00005 U	0.00005	0.00012
Cadmium	0.005	0.00113	0.00049	0.0018	0.0018	0.001	0.00086	0.00082	0.0011	2.5E-05	0.00013	0.00099	0.0012
Copper	0.588	0.086	0.9	0.3	0.54	1.6	1.1	1.7	1.9	0.00033	0.2	2.4	2.8
Iron	0.556	1	0.02 U	1.8	1.7	1.9	1.1	1.3	2.2	5.9E-05	2.7	2.5	0.5
Lead	0.015	0.00318	0.00071	0.001	0.0005	0.011	0.00005 U	0.0002	0.018	0.00001 U	0.00016	0.00005 U	0.00005 U
Manganese	0.3	ns	0.043	0.039	0.038	0.039	0.035	0.033	0.04	2.3E-05	0.023	0.15	0.48
Nickel	0.1	0.052	0.0035	0.008	0.0082	0.013	0.0099	0.0093	0.012	-	0.0017	0.013	0.016
Selenium	ns	0.005	0.0016	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.00005 U	0.0002 U	0.0027	0.0022
Silver	ns	0.0032	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U
Thallium	ns	ns	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U
Vanadium	ns	ns	0.0001 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.00001 U	0.0001 U	0.0001 U	0.0001 U
Zinc	0.465	0.106	0.12	0.32	0.33	0.18	0.15	0.15	0.18	0.00088	0.016	0.11	0.13

Notes: Units are in mg/L = miligram per liter
Bolded and shaded results exceed GW or SW criteria.
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit
LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone
SPLP = Synthetic Precipitation Leaching Procedure
GW = Groundwater criteria listed in Table 6-3; SW = Surface water Preliminary Remediation Goal listed in Table 6-3

Table 6-21
Soil and Sediment SPLP Results
Ely Copper Mine Superfund Site
Vershire, Vermont

		Sampling Company:	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
		Study Area:	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA
		Station:	02ELY2A-B	02ELY2A-B	02ELY3	02ELY4A-B	02ELY4A-B	02ELY5A-B	02ELY5A-B	02ELY6A-B	02ELY6A-B	01JH31A	01JH31A
		Field Sample ID:	02Ely 2A	02Ely 2B	02Ely 3	02Ely 4A	02Ely 4B	02Ely 5A	02Ely 5B	02Ely 6A	02Ely 6B	01JH31A	01JH31A
		Date:	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	11/10/2001	11/10/2001
		Depth:	0 - 0	0.82 - 0.82	0 - 0	0 - 0	0.82 - 0.82	0 - 0	0.82 - 0.82	0 - 0	0.82 - 0.82	0 - 0	0 - 0
SPLP Metal	**GW**	**SW**											
Aluminum	1.248	0.087	5.6	4.9	11	0.48	3.2	5.7	2.9	7	1.9	0.88	1.1
Antimony	ns	ns	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00006	0.00004
Beryllium	ns	ns	0.00012	0.00021	0.00018	0.00005 U	0.0001	0.00005	0.00014	0.0002	0.0002	0.00008	0.0002
Cadmium	0.005	0.00113	0.004	0.0031	0.015	0.00052	0.0021	0.0043	0.0038	0.0094	0.0045	0.0032	0.0038
Copper	0.588	0.086	4.3	3.8	7.9	0.69	2.3	3.2	2.3	5.1	4.5	3.1	3.9
Iron	0.556	1	1.1	0.65	0.88	0.11	1.1	1.2	0.67	1.3	0.5	18	19
Lead	0.015	0.00318	0.00005 U	0.00005 U	0.00012	0.00005 U	0.00005 U	0.00005 U	0.0002	0.00005 U	0.0001	0.00005 U	0.00005
Manganese	0.3	ns	0.24	0.4	0.94	0.13	0.24	0.16	0.41	0.34	0.52	0.28	0.31
Nickel	0.1	0.052	0.021	0.028	0.042	0.0042	0.023	0.013	0.026	0.03	0.028	0.071	0.081
Selenium	ns	0.005	0.0026	0.0013	0.0039	0.0022	0.0017	0.0025	0.00089	0.0044	0.0024	0.002	0.003
Silver	ns	0.0032	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U	0.00001 U
Thallium	ns	ns	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U
Vanadium	ns	ns	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0002 U	0.0002 U
Zinc	0.465	0.106	0.56	0.24	1.7	0.083	0.24	0.61	0.34	1	0.47	0.44	0.51

Notes: Units are in mg/L = miligram per liter
Bolded and shaded results exceed GW or SW criteria.
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit
LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone
SPLP = Synthetic Precipitation Leaching Procedure
GW = Groundwater criteria listed in Table 6-3; SW = Surface water Preliminary Remediation Goal listed in Table 6-3

Table 6-21
Soil and Sediment SPLP Results
Ely Copper Mine Superfund Site
Vershire, Vermont

		Sampling Company:	URS	URS	NOBIS	NOBIS	NOBIS	URS	URS	NOBIS	NOBIS	URS	URS
		Study Area:	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	UWA	ORB	ORB
		Station:	01JH31B	01JH31B	SS-37	TP-15	TP-15	TP-08	TP-08	MW-18A	MW-18A	02ELY10A-B	02ELY10A-B
		Field Sample ID:	01JH31B	01JH31B	SS-37X-	TP-15X-	TP-15X-	ELY-TP8 (2-	ELY-TPQS1	MW-18A-	MW-18A-	02Ely 10A	02Ely 10B
		Date:	11/10/2001	11/10/2001	8/26/2009	7/30/2009	7/30/2009	5/14/2007	5/14/2007	8/3/2009	8/3/2009	10/8/2002	10/8/2002
		Depth:	0 - 0	0 - 0	0 - 2	1 - 2	1 - 2	2 - 3	2 - 3	2 - 4	2 - 4	0 - 0	0.82 - 0.82
SPLP Metal	**GW**	**SW**											
Aluminum	1.248	0.087	3.2	3.8	0.14	0.184	0.209	0.15	0.13	0.185	0.152	0.12	0.16
Antimony	ns	ns	0.00006	0.00004	-	-	-	-	-	-	-	0.00003 U	0.00003 U
Beryllium	ns	ns	0.00007	0.00005	-	-	-	-	-	-	-	0.00005 U	0.00005 U
Cadmium	0.005	0.00113	0.007	0.0078	0.025	0.00017 J	0.00013 J	0.005 U	0.005 U	0.0011 J	0.0012 J	0.00018	0.0002
Copper	0.588	0.086	18	21	0.33	0.178	0.161	1.9	1.89	1.14	1.03	0.46	0.57
Iron	0.556	1	55	60	0.059	0.1 U	0.0347 J	0.18	0.26	0.749	0.445	0.12	0.044
Lead	0.015	0.00318	0.00005 U	0.00005 U	0.01 U	0.05 U	0.05 U	0.0022 J	0.01 U	0.00094 J	0.05 U	0.0011	0.00006
Manganese	0.3	ns	0.1	0.12	0.023	0.0325	0.0371	0.031	0.037	1.12	1.31	0.021	0.022
Nickel	0.1	0.052	0.17	0.19	-	-	-	-	-	-	-	0.00089	0.0007
Selenium	ns	0.005	0.001	0.001	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0058 J	0.01 U	0.0013	0.00099
Silver	ns	0.0032	0.00001 U	0.00001 U	0.01 U	0.01 U	0.01 U	0.007 UJ	0.007 UJ	0.01 U	0.00094 J	0.00006	0.00004
Thallium	ns	ns	0.00005 U	0.00005 U	0.05 U	0.01 U	0.01 U	0.02 U	0.02 U	0.01 U	0.01 U	0.00005 U	0.00005 U
Vanadium	ns	ns	0.04	0.032	0.01 U	0.05 U	0.05 U	0.01 U	0.01 U	0.00028 J	0.05 U	0.0001 U	0.0001 U
Zinc	0.465	0.106	0.35	0.42	0.88	0.0277	0.058	0.0197 J	0.0314 J	0.173	0.185	0.013	0.012

Notes: Units are in mg/L = miligram per liter
Bolded and shaded results exceed GW or SW criteria.
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit
LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone
SPLP = Synthetic Precipitation Leaching Procedure
GW = Groundwater criteria listed in Table 6-3; SW = Surface water Preliminary Remediation Goal listed in Table 6-3

Table 6-21
Soil and Sediment SPLP Results
Ely Copper Mine Superfund Site
Vershire, Vermont

		Sampling Company:	NOBIS	URS	URS	URS	URS	URS	URS	URS	URS	URS	URS
		Study Area:	ORB	ORB	ORB	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smelter	Smoke Flue
		Station:	MW-23A	SB-01	SB-01	02ELY11	TP-103	TP-104	TP-106	TP-106	TP-108	TP-109	02ELY13
		Field Sample ID:	MW-23A-	ELY-QC-3	ELY-SB-1 (0-	02Ely 11	ELY-TP-103	ELY-TP-104	ELY-TP-106	ELY-TP-106	ELY-TP-108	ELY-TP-109	02Ely 13
		Date:	7/8/2009	12/5/2006	12/5/2006	10/8/2002	10/5/2007	10/5/2007	10/5/2007	10/5/2007	10/5/2007	10/5/2007	10/8/2002
		Depth:	0 - 2	0 - 4	0 - 4	0 - 0	1 - 2	2 - 3	2 - 3	2 - 3	1 - 2	0 - 1	0 - 0
SPLP Metal	**GW**	**SW**											
Aluminum	1.248	0.087	0.0215 J	0.19	0.22	0.33	1.4	0.1	0.2	0.17	0.12	0.054 J	0.39
Antimony	ns	ns	-	-	-	0.00003 U	-	-	-	-	-	-	0.00007
Beryllium	ns	ns	-	-	-	0.00005 U	-	-	-	-	-	-	0.00005 U
Cadmium	0.005	0.00113	0.00066 J	0.005 U	0.005 U	0.00066	0.005 U	0.003 J	0.005 U	0.005 U	0.005 U	0.005 U	0.00015
Copper	0.588	0.086	0.288	0.095	0.1	1.5	3.18	0.357	1.43	2.02	0.37	0.146	0.0055
Iron	0.556	1	0.1 U	0.04 J	0.029 J	0.081	0.39	0.026 J	0.26	0.06	0.53	0.17	0.084
Lead	0.015	0.00318	0.0009 J	0.01 U	0.0015 J	0.00041	0.01 U	0.0026 J	0.0051 J	0.0019 J	0.0021 J	0.01 U	0.0038
Manganese	0.3	ns	0.103	0.048	0.053	0.092	0.063	0.428	0.111	0.106	0.025	0.004 J	0.023
Nickel	0.1	0.052	-	-	-	0.0065	-	-	-	-	-	-	0.0017
Selenium	ns	0.005	0.0071 J	0.01 U	0.01 U	0.0022	0.01 U	0.01 U	0.01 U	0.01 U	0.0061 J	0.01 U	0.0016
Silver	ns	0.0032	0.01 U	0.007 U	0.001 UJ	0.00003	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.001 U
Thallium	ns	ns	0.01 U	0.02 U	0.02 U	0.00005 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.00005 U
Vanadium	ns	ns	0.05 U	0.01 U	0.01 U	0.0001 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.00042
Zinc	0.465	0.106	0.0243 J	0.0146 J	0.0184 J	0.093	0.396	0.179	0.0242 J	0.0492 J	0.0458 J	0.0322 J	0.015

Notes: Units are in mg/L = miligram per liter
Bolded and shaded results exceed GW or SW criteria.
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit
LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone
SPLP = Synthetic Precipitation Leaching Procedure
GW = Groundwater criteria listed in Table 6-3; SW = Surface water Preliminary Remediation Goal listed in Table 6-3

Table 6-21
Soil and Sediment SPLP Results
Ely Copper Mine Superfund Site
Vershire, Vermont

		Sampling Company:	URS	URS	URS	URS	URS	NOBIS	URS	NOBIS	NOBIS	NOBIS
		Study Area:	LWA	LWA	LWA	LWA	LWA	EBT5	LWA	LWA	Tailing	Tailing
		Station:	02ELY7A-B	02ELY7A-B	02ELY8A-B-C	02ELY8A-B-C	02ELY8A-B-C	SD-73	TP-04A	MW-21A	SB-09	SB-09
		Field Sample ID:	02Ely 7A	02Ely 7B	02Ely 8A	02Ely 8B	02Ely 8C	SD-73X-	ELY-TP4A (2-	MW-21A-	SB-09X-	SB-09X-
		Date:	10/8/2002	10/8/2002	10/8/2002	10/8/2002	10/8/2002	8/6/2009	5/14/2007	8/31/2009 10:55	7/30/2009	7/30/2009
		Depth:	0 - 0	0.82 - 0.82	0 - 0	1.15 - 1.15	2.33 - 2.33	0 - 1	2 - 3	0 - 2	2.2 - 3	2.2 - 3
SPLP Metal	**GW**	**SW**										
Aluminum	1.248	0.087	3.8	8.5	1.8	2.5	19	0.63	0.21	0.46	2.33	1.84
Antimony	ns	ns	0.00003 U	0.00003 U	0.00003	0.00003 U	0.00009	-	-	-	-	-
Beryllium	ns	ns	0.00008	0.00026	0.00009	0.0001	0.00057	-	-	-	-	-
Cadmium	0.005	0.00113	0.0043	0.014	0.00093	0.0084	1.2	0.04	0.0011 J	0.055	0.452	0.395
Copper	0.588	0.086	3.9	16	2.1	10	120	0.064	55.6	2.6	65.7	63.1
Iron	0.556	1	4.7	16.4	0.5	0.44	90.6	0.4	1.4	0.87	6.49	5.72
Lead	0.015	0.00318	0.00031	0.00005	0.00005 U	0.00035	0.0059	0.01 U	0.012	0.01 U	0.0374 J	0.0359 J
Manganese	0.3	ns	0.12	0.66	0.2	0.2	0.21	0.01	0.021	0.047	0.0629	0.0596
Nickel	0.1	0.052	0.014	0.11	0.0085	0.039	3	-	-	-	-	-
Selenium	ns	0.005	0.0033	0.0046	0.0035	0.0023	0.01	0.05 U	0.014	0.05 U	0.01 U	0.01 U
Silver	ns	0.0032	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.035 UJ	0.01 U	0.0031 J	0.003 J
Thallium	ns	ns	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00039	0.05 U	0.02 U	0.006 J	0.0213	0.0197
Vanadium	ns	ns	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.01 U	0.01 U	0.01 U	0.05 U	0.05 U
Zinc	0.465	0.106	0.56	1.2	0.18	0.56	91	0.003 J	0.084	0.95	5.21	4.47

Notes: Units are in mg/L = miligram per liter
Bolded and shaded results exceed GW or SW criteria.
U = Not detected at or above the reporting limit; J = Value is estimated below laboratory reporting limit
LWA = Lower Waste Area; UWA = Upper Waste Area; TZ = Transition Zone
SPLP = Synthetic Precipitation Leaching Procedure
GW = Groundwater criteria listed in Table 6-3; SW = Surface water Preliminary Remediation Goal listed in Table 6-3

Table 6-22
Porewater TAL Metal and Geochemical Parameter Results for Samples Collected by Nobis in 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:		EB-UR	EB-UR	EB-UR	EB-UR	EBT4	EBT4	EBT4	EBT4
Sample Location:		PW-01	PW-02	PW-03	PW-04	PW-05	PW-06	PW-07	PW-07
Station ID:		PW-01X-081709AX	PW-02X-081809AX	PW-03X-081809AX	PW-04X-081809AX	PW-05X-081709AX	PW-06X-081809AX	PW-07X-081909AX	PW-07X-081909AD
Sample Date:		8/17/2009	8/18/2009	8/18/2009	8/18/2009	8/17/2009	8/18/2009	8/19/2009	8/19/2009
Total Metals	**PRG**								
Aluminum	87	57.7 J	200 U	200 U	200 U	3730	549	4390	4170
Antimony	ns	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Arsenic	ns	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Barium	ns	12.9 J	17 J	15.8 J	24.4 J	39.8 J	27.4 J	44.1 J	42.8 J
Beryllium	ns	1 U	1 U	1 U	1 U	0.29 J	1 U	0.41 J	0.43 J
Cadmium	1.1	5 U	5 U	5 U	0.25 J	2.2 J	0.64 J	3.1 J	3.1 J
Chromium	11	10 U	10 U	10 U	10 U	5.6 J	0.53 J	1.2 J	0.62 J
Cobalt	ns	50 U	50 U	50 U	9.2 J	66.1	9.9 J	87.5	88
Copper	8.6	15.2 J	13.3 J	18.4 J	32.4	2530	128	3160	3120
Iron	1000	134	49.5 J	29.2 J	2780	1350	461 J	574 J	105 J
Lead	3.2	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Manganese	ns	19.8	7.6 J	3.2 J	415	516	89.5 J	710 J	699 J
Mercury	0.012	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U
Molybdenum	ns	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nickel	52	1.1 J	40 U	40 U	1.8 J	28.7 J	5.8 J	34.7 J	33.8 J
Selenium	5	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U
Silver	3.2	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U	10 U	10 U
Strontium	ns	44.1	36.1	38.3	23.8	106	120	136	134
Thallium	ns	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vanadium	ns	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Zinc	106	60 U	60 U	60 U	60 U	236	33.2 J	316	315
Cyanide	ns	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U	10 U	10 U
Dissolved Metals	**PRG**								
Aluminum	87	200 U	200 U	200 U	200 U	3340	200 U	4090	4170
Antimony	ns	2 U	2 U	2 U	2 U	2 U	0.32 U	2 U	2 U
Arsenic	ns	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Barium	ns	12.8 J	15.5 J	16.1 J	22.8 J	38.7 J	25.1 J	42 J	43.5 J
Beryllium	ns	1 U	1 U	1 U	1 U	0.34 J	1 U	0.3 J	0.34 J
Cadmium	1.1	5 U	5 U	5 U	5 U	2.4 J	0.53 J	3 J	3.1 J
Chromium	11	10 U	10 U	10 U	10 U	10 U	10 U	0.62 J	0.51 J
Cobalt	ns	50 UJ	50 UJ	50 UJ	9 J	70.3	10.2 J	85.3	88.5

Table 6-22
Porewater TAL Metal and Geochemical Parameter Results for Samples Collected by Nobis in 2009
Ely Copper Mine Superfund Site
Vershire, Vermont

Sampling Company:		NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
Study Area:		EB-UR	EB-UR	EB-UR	EB-UR	EBT4	EBT4	EBT4	EBT4
Sample Location:		PW-01	PW-02	PW-03	PW-04	PW-05	PW-06	PW-07	PW-07
Station ID:		PW-01X-081709AX	PW-02X-081809AX	PW-03X-081809AX	PW-04X-081809AX	PW-05X-081709AX	PW-06X-081809AX	PW-07X-081909AX	PW-07X-081909AD
Sample Date:		8/17/2009	8/18/2009	8/18/2009	8/18/2009	8/17/2009	8/18/2009	8/19/2009	8/19/2009
Dissolved Metals (cont.)	**PRG**								
Copper	8.6	10.1 J	9.2 J	15.9 J	1.5 J	2510	108	3070	3180
Iron	1000	168	100 U	100 U	2660	37 J	100 U	100 U	17.8 J
Lead	3.2	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Manganese	ns	19.5 J	15 UJ	2.4 J	408	537	92.2 J	687 J	704 J
Mercury	0.012	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Molybdenum	ns	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nickel	52	1.2 J	40 U	1.1 J	2.5 J	29.1 J	6.4 J	33.4 J	34.9 J
Selenium	5	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U
Silver	3.2	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Strontium	ns	41	35.4	38.5	22.8	108	117	130	135
Thallium	ns	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vanadium	ns	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Zinc	106	15.9 J	5.4 J	8 J	14.6 J	252	34.3 J	303	314
Geochemical Parameters	**PRG**								
Acidity	ns	10000 U	10000 U	10000 U	10000 U	28000	10000 U	26000	23000
Alkalinity (as $CaCO_3$)	ns	17000	23000	24000	5000 U	5000 U	33000	5000 U	5000 U
Alkalinity, Bicarbonate (as $CaCO_3$)	ns	17000	5000 U	24000 U	5000 U	5000 U	33000	5000 U	5000 U
Alkalinity, Carbonate (as $CaCO_3$)	ns	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U
Alkalinity, Hydroxide (as $CaCO_3$)	ns	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U
Chloride	ns	830 J	780 J	800 J	780 J	810 J	860 J	820 J	810 J
Nitrogen, Nitrite + Nitrate	ns	43	58	49	20 U	20 U	20 U	72	88
Sulfate	ns	16000	4400	4600	2700	48000	58000	160000	140000
Sulfide	2	390 J	2000 U	2000 U	870 J	2000 U	2000 U	2000 U	2000 U

Notes:
All concentrations listed in micrograms per liter (µg/L).
Bold and shaded indicates exceedance of surface water criteria
TAL = Target Analyte List
PRG = Preliminary Remediation Goal
PW = Ely Brook Porewater; EB-UR = Ely Brook Upper Reach; EBT4 = Ely Brook Tributary 4
U = below detection limit, J = quantitation approximate

Table 6-23
Vernal Pool TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Study Area	VP-1	VP-2,3,4	VP-2,3,4	VP-2,3,4	VP-2,3,4
	Sample Location:	VP-01	VP-02	VP-03	VP-03	VP-04
	Station ID:	VP-01X-072909AX	VP-02X-072809AX	VP-03X-072809AX	VP-03X-072809AD	VP-04X-072809AX
	Sample Date:	7/29/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009
Total Metals	**Criteria**					
Aluminum	87	200 U	200 U	200 U	200 U	200 U
Antimony	ns	2 U	2 U	2 U	2 U	2 U
Arsenic	ns	1 U	1 U	1 U	1 U	1 U
Barium	ns	24 J	12.4 J	13.4	13.7 J	15.9 J
Beryllium	ns	5 U	5 U	5 U	5 U	5 U
Cadmium	1.13	0.39 J	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Calcium	ns	12000	12300	3150 J	9990	9910
Chromium	ns	10 U	0.38 J	10 U	10 U	10 U
Cobalt	ns	9.4 J	50 U	50 U	50 U	50 U
Copper	8.6	171	5.7	2.5	3.6	0.26 J
Iron	1000	1070 J	80.8 J	42.9 J	743 J	477 J
Lead	3.2	0.11 J	1 UJ	0.089 J	0.24 J	1 UJ
Magnesium	ns	1630 J	924 J	647 J	853 J	831 J
Manganese	ns	188 J	11 J	9.8 J	88 J	97.8 J
Mercury	0.012	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Molybdenum	ns	10 U	10 U	10 U	10 U	10 U
Nickel	52	2.5 J	0.98 J	0.81 J	0.6 J	0.59 J
Potassium	ns	2760 J	971 J	629 J	1310 J	1370 J
Selenium	5	1.7 J	5 UJ	5 UJ	5 UJ	5 UJ
Silver	3.2	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Sodium	ns	1690 J	1290 J	856 J	1350 J	1400 J
Strontium	ns	55.2 J	67.4 J	13.9 J	38.2 J	38.4 J
Thallium	ns	0.073 J	1 U	1 U	1 U	1 U
Vanadium	ns	5 UJ	5 UJ	0.34 J	0.58 J	0.29 J
Zinc	106	70.2	3.3 J	10.3 J	6.4 J	4.9 J
Dissolved Metals	**Criteria**					
Aluminum	87	200 U	200 U	200 U	200 U	200 U
Antimony	ns	2 U	2 U	2 U	2 U	2 U
Arsenic	ns	1 U	1 U	1 U	1 U	1 U
Barium	ns	24.3	12.6 J	13.8 J	13 J	16.1 J
Beryllium	ns	5 U	5 U	5 U	5 U	5 U
Cadmium	1.13	0.36 J	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Calcium	ns	12400	12500	10600	10700	3360 J
Chromium	ns	10 U	10 U	10 U	10 U	10 U
Cobalt	ns	9.4 J	50 U	50 U	50 U	50 U
Copper	8.6	145	4.7	1.5 J	1.7 J	2 U
Iron	1000	418	45.5 J	177	150	22.2 J
Lead	3.2	1 U	1 U	1 U	1 U	1 U
Magnesium	ns	1630 J	923 J	803 J	853 J	617 J
Manganese	ns	184	10.9 J	114	84.9	8.6 J
Mercury	0.012	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Molybdenum	ns	10 U	10 U	10 U	10 U	10 U
Nickel	52	2.3 J	40 U	40 U	40 U	40 U
Potassium	ns	2730 J	980 J	1460 J	1290 J	697 J
Selenium	5	1.7 J	5 U	5 U	5 U	5 U
Silver	3.2	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Sodium	ns	1700 J	1300 J	1450 J	1490 J	891 J
Strontium	ns	53.9	64.3	37.1	37.5	13.3
Thallium	ns	0.069 J	1 U	1 U	1 U	1 U
Vanadium	ns	5 UJ	5 UJ	0.29 J	0.36 J	5 UJ
Zinc	106	77.6	13.6 J	68.9	23.8 J	31.5 J

Notes:
Results shown in micrograms per liter (µg/L)
Light gray highlighted cells indicate exceedance of criteria.
TAL = Target Analyte List
U = Not detected at or above the reporting limit.
J = Value is estimated below laboratory reporting limit.
ns = no standard available

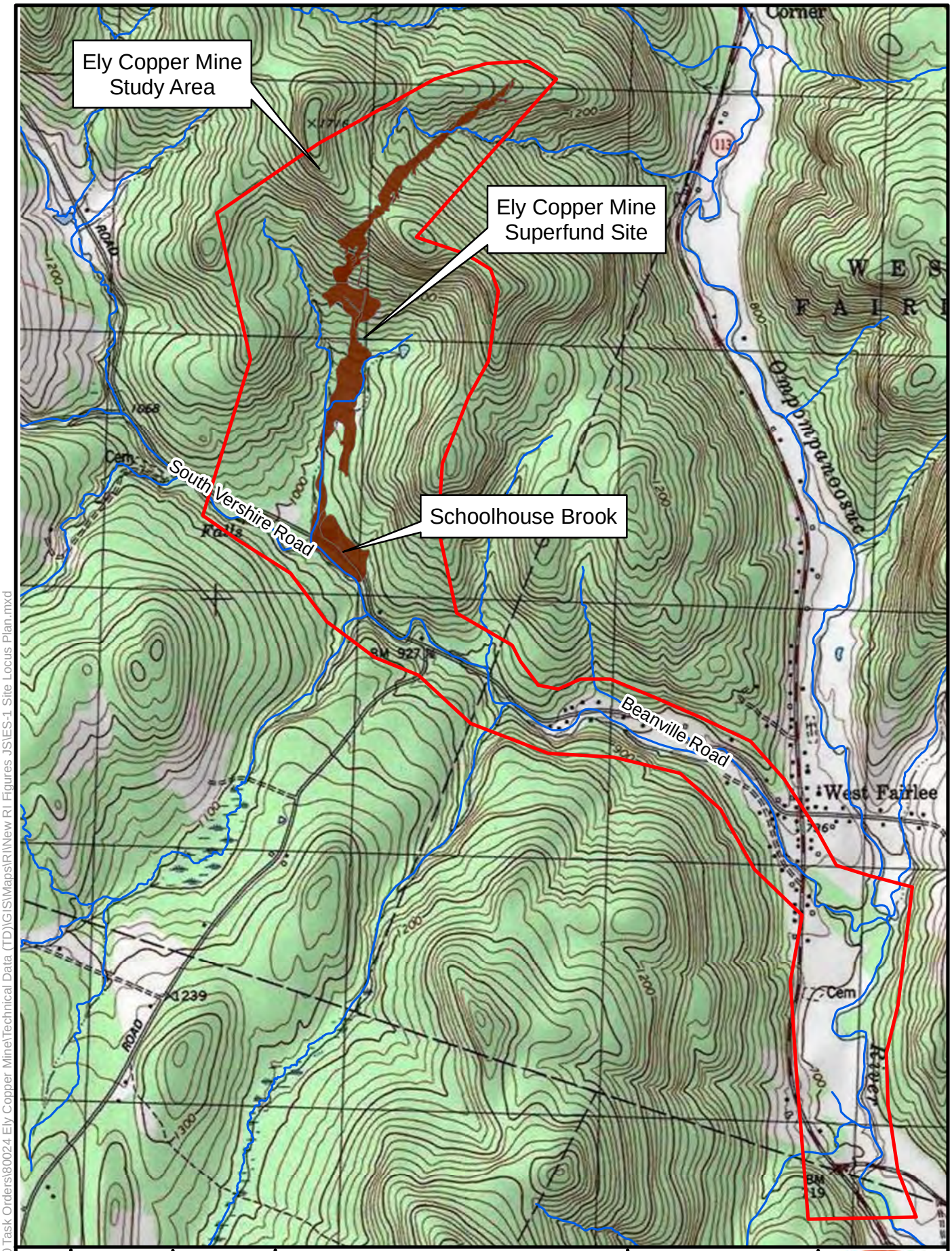
Table 6-24
Residential Well TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:			NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
	Sample Location:	RES-01	RES-01	M11LT19.0	M11LT55.1	M11LT60.0	M11LT63.0	M11LT064	M11LT065	M11LT065	M11LT065
	Station ID:	EMV-GW-RES-01	EMV-GW-RES-01	M11LT19.0-120809AX	M11LT55.1-120709AX	M11LT60.0-120709AX	M11LT63.0-120709AX	M11LT064-120709AX	M11LT065-1207090AX	M11LT065-1207090AD	M11LT065-041910AX
	Sample Date:	12/5/2007	12/5/2007	12/8/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	4/19/2010
Total Metals	**GW Criteria**										
Aluminum	1248	32 J	100 U	46.8 J	200 U	200 U	200 U	79.3 J	NA	NA	200 U
Antimony	ns	0.35 J	0.44 J	2 U	2 U	2 U	2 U	2 U	NA	NA	2 U
Arsenic	ns	2.0 U	2.0 U	10 U	10 U	10 U	10 U	10 U	NA	NA	10 U
Barium	ns	26.3	26.0	6.1 J	3.7 J	5.7 J	10.4 J	7.5 J	NA	NA	5.1 J
Beryllium	ns	2.0 U	2.0 U	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
Cadmium	5	2.0 U	2.0 U	5 U	5 U	5 U	5 U	5 U	NA	NA	5 U
Calcium	ns	38000	27000	29604	18686	33516	20848	19505	NA	NA	19452
Chromium	100	0.57 J	0.4 J	10 U	10 U	10 U	10 U	10 U	NA	NA	10 U
Cobalt	5	0.16 J	0.19 J	50 U	50 U	50 U	50 U	50 U	NA	NA	50 U
Copper	588	12	11	36.3	3.9 J	26.2	13.5 J	192	NA	NA	2.4 J
Cyanide	ns	5 U	5 U	10 U	10 U	3.2 J	10 U	3.8 J	NA	NA	0
Iron	556	50	42 J	62.9 J	105	78.5 J	100 U	104	NA	NA	452
Lead	15	0.81 J	0.8 J	2.5 J	10 U	6.8 J	10 U	11.3	NA	NA	10 U
Magnesium	ns	4700	4600	4043 J	4319 J	6127	1110 J	4761 J	NA	NA	5079
Manganese	300	1.72 J	1.13 J	15 U	15 U	34.6	11.5 J	2.4 J	NA	NA	36.6
Mercury	ns	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U
Molybdenum	40	0.61 J	0.88 J	10 U	1.9 J	1.5 J	10 U	10 U	NA	NA	
Nickel	100	0.75 J	0.82 J	1.1 J	40 U	40 U	40 U	0.87 J	NA	NA	40 U
Potassium	ns	3400	3400	3457 J	2748 J	3750 J	1300 J	2671 J	NA	NA	3085 J
Selenium	ns	4 U	4 U	35 U	35 U	35 U	35 U	35 U	NA	NA	35 U
Silver	ns	2.0 U	2.0 U	0.51 J	10 U	0.63 J	10 U	10 U	NA	NA	10 UJ
Sodium	ns	7200	6900	2327 J	3905 J	6979	1450 J	3504 J	NA	NA	2555 J
Strontium	ns	170	170	105	114	194	106	81.4	NA	NA	
Thallium	ns	2.0 U	2.0 U	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
Vanadium	ns	0.51 J	0.47 J	50 U	1.7 J	1.6 J	50 U	1 J	NA	NA	0.69 J
Zinc	465	4.34 J	4.59 J	45.8 J	9.6 J	11.2 J	10.5 J	153	NA	NA	60 U

Table 6-24
Residential Well TAL Metal Results
Ely Copper Mine Superfund Site
Vershire, Vermont

	Sampling Company:			NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS	NOBIS
	Sample Location:	RES-01	RES-01	M11LT19.0	M11LT55.1	M11LT60.0	M11LT63.0	M11LT064	M11LT065	M11LT065	M11LT065
	Station ID:	EMV-GW-RES-01	EMV-GW-RES-01	M11LT19.0-120809AX	M11LT55.1-120709AX	M11LT60.0-120709AX	M11LT63.0-120709AX	M11LT064-120709AX	M11LT065-1207090AX	M11LT065-1207090AD	M11LT065-041910AX
	Sample Date:	12/5/2007	12/5/2007	12/8/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	4/19/2010
Dissolved Metals	**GW Criteria**										
Aluminum	1248	100 U	100 U	200 U	200 U	200 U	200 U	200 U	200 U	46.8 J	NA
Antimony	ns	1.17 J	2.0 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA
Arsenic	ns	2.0 U	2.0 U	2.7 J	2.6 J	2.6 J	3.1 J	10 U	10 U	10 U	NA
Barium	ns	25.1	24.9	6.3 J	3 J	5.2 J	9.2 J	6.7 J	6.8 J	6.8 J	NA
Beryllium	ns	2.0 U	2.0 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA
Cadmium	5	2.0 U	2.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA
Calcium	ns	37000	37000	29292	19314	33064	19647	19009	20315	20664	NA
Chromium	100	2.0	0.4 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA
Cobalt	5	0.21 J	0.1 J	50 U	50 U	50 U	50 U	50 U	50 U	50 U	NA
Copper	588	12	12	6.8 J	2.1 J	25 U	9.8 J	60.4	35.8	7 J	NA
Iron	556	38 J	38 J	100 U	100 U	100 U	100 U	100 U	100 U	100 U	NA
Lead	15	0.66 J	0.58 J	10 U	10 U	10 U	10 U	3.7 J	7.9 J	5.8 J	NA
Magnesium	ns	4500 J	4600 J	4042 J	4508 J	5980	1070 J	4684 J	5183	5262	NA
Manganese	300	0.82 J	1.75 J	15 U	15 U	32.6	8.2 J	15 U	15 U	15 U	NA
Mercury	ns	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA
Molybdenum	40	1.55 J	0.33 J	10 U	2 J	10 U	10 U	10 U	3 J	2.8 J	NA
Nickel	100	0.51 J	0.4 J	1 J	40 U	40 U	40 U	40 U	0.67 J	0.56 J	NA
Potassium	ns	3400	3400	3655 J	2800 J	3729 J	1234 J	2693 J	3188 J	3313 J	NA
Selenium	ns	4 U	4 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	NA
Silver	ns	2.0 U	2.0 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA
Sodium	ns	6800	7100	2408 J	4067 J	6873	1392 J	3410 J	2748 J	2802 J	NA
Strontium	ns	170	170	106	119	190	100	81.9	83.3	83.8	NA
Thallium	ns	2.0 U	2.0 U	0.085 J	1 U	1 U	1 U	1 U	1 U	1 U	NA
Vanadium	ns	0.43 J	0.39 J	50 U	1.6 J	0.87 J	50 U	50 U	1.1 J	50 U	NA
Zinc	465	5.3 J	6.1 J	18.4 J	6.1 J	4.5 J	11.6 J	46.2 J	6.1 J	3.3 J	NA

Notes: All concentrations listed in micrograms per liter (µg/L).
Shaded indicates exceedance of the groundwater criteria listed in Table 6-3
U=below detection limit, J=quantitation approximate
ns = no standard available
NA = not appicable, metals not analyzed



N

Drawn By: JRS	Checked By: AJB
June 24, 2011	Revision No. 00

APPROXIMATE SCALE
0 400 800 1,600
Feet

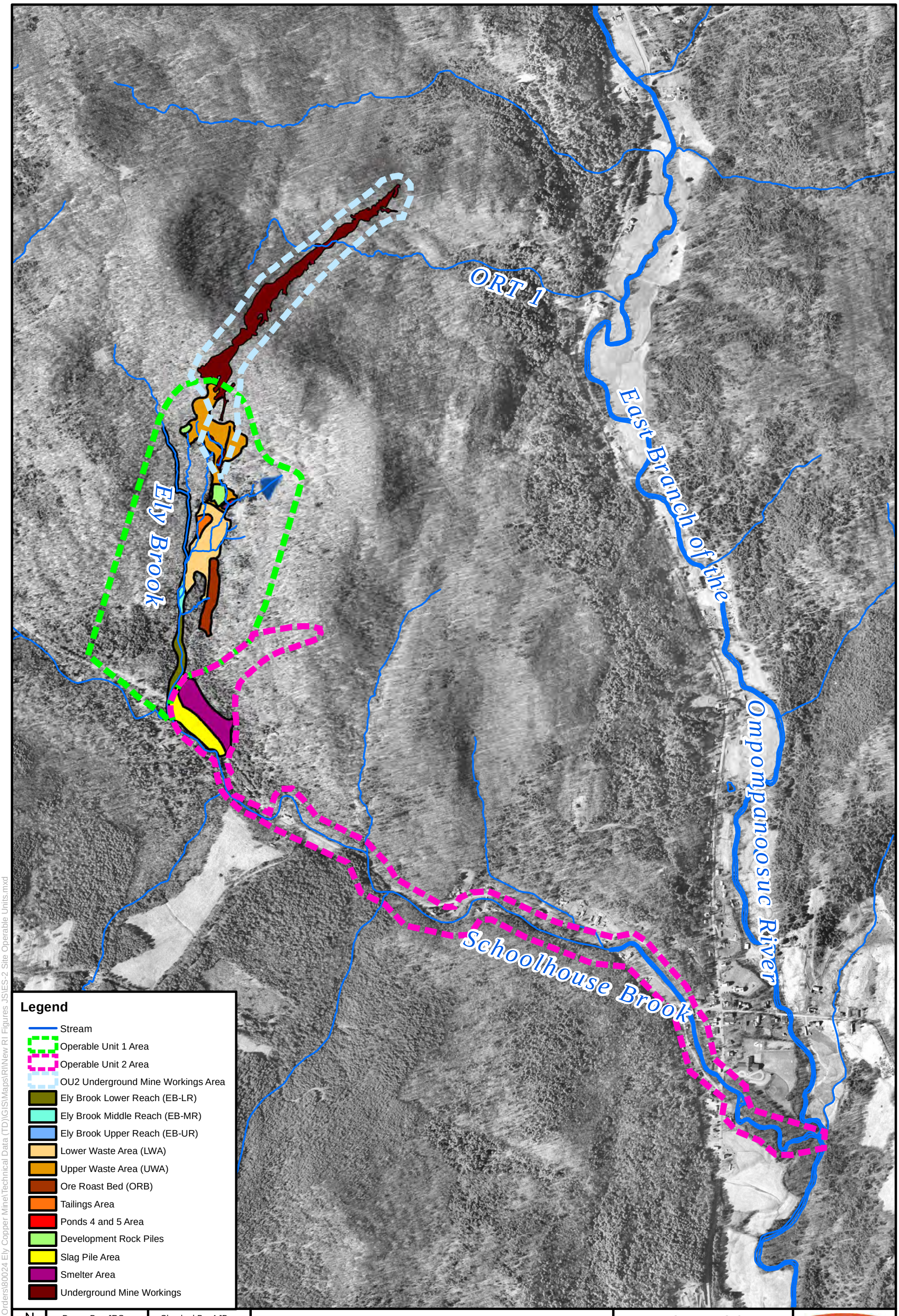
Quadrangle Location

USGS TOPOGRAPHIC MAP
VERSHIRE, VERMONT
1981; (Photo-inspected 1983)

FIGURE ES-1
Site Locus
Ely Copper Mine
Vershire, Vermont

Nobis
Engineering, Inc.
18 Chenell Drive
Concord, NH 03301
(603) 224-4182

Path: R:\80000 Task Orders\80024 Ely Copper Mine\Technical Data (TD)\GIS\Maps\RI\New RI Figures JS\ES-1 Site Locus Plan.mxd



N

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June 24, 2011 | Revision No. 00

APPROXIMATE SCALE
0 500 1,000 2,000 Feet

FIGURE ES-2

Site Operable Units
Ely Copper Mine
Vershire, Vermont

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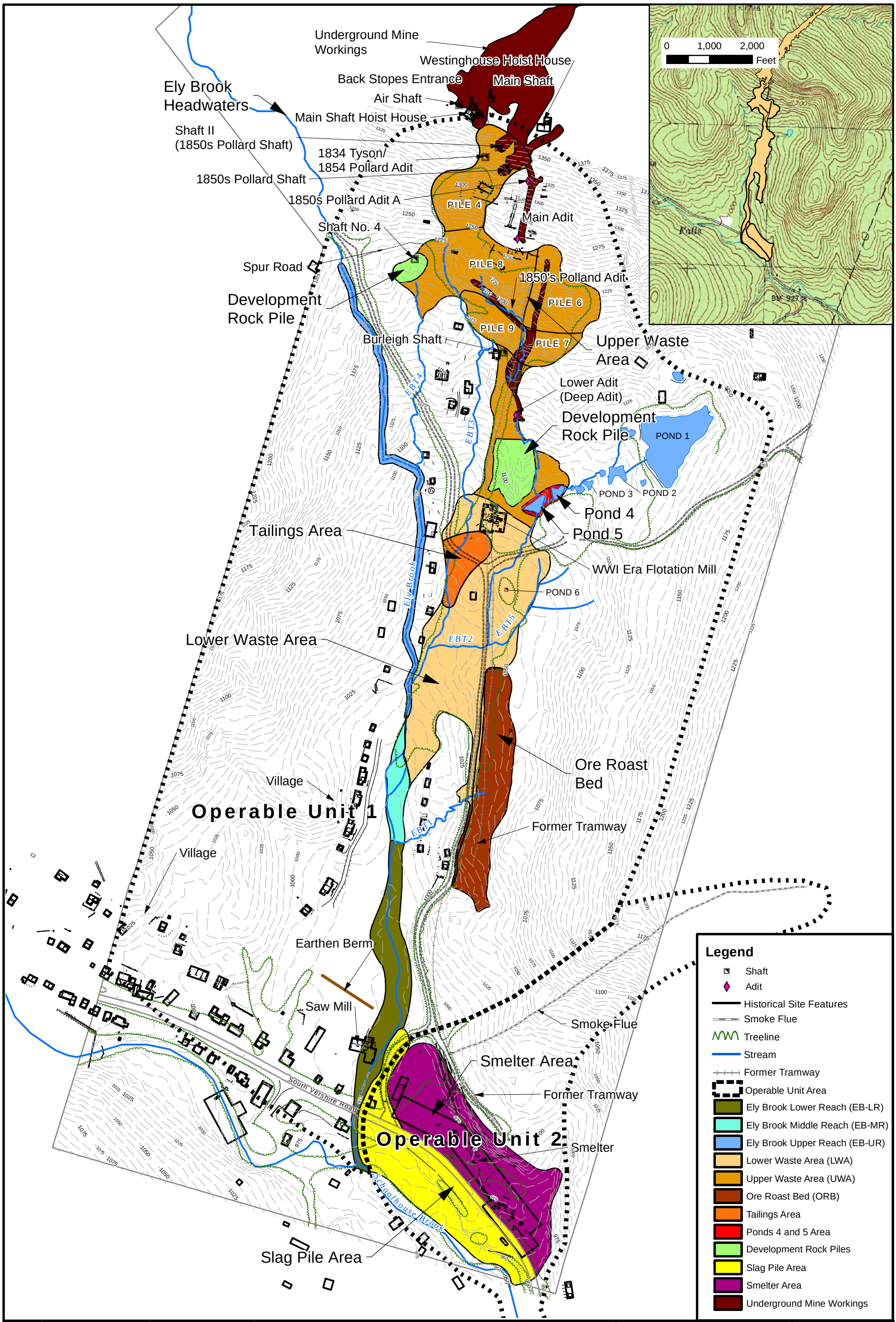

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June 24, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

NOTE: Elevations shown are feet above mean sea level (FT-AMSL).

FIGURE ES-3

Site Sketch
Ely Copper Mine
Vershire, Vermont

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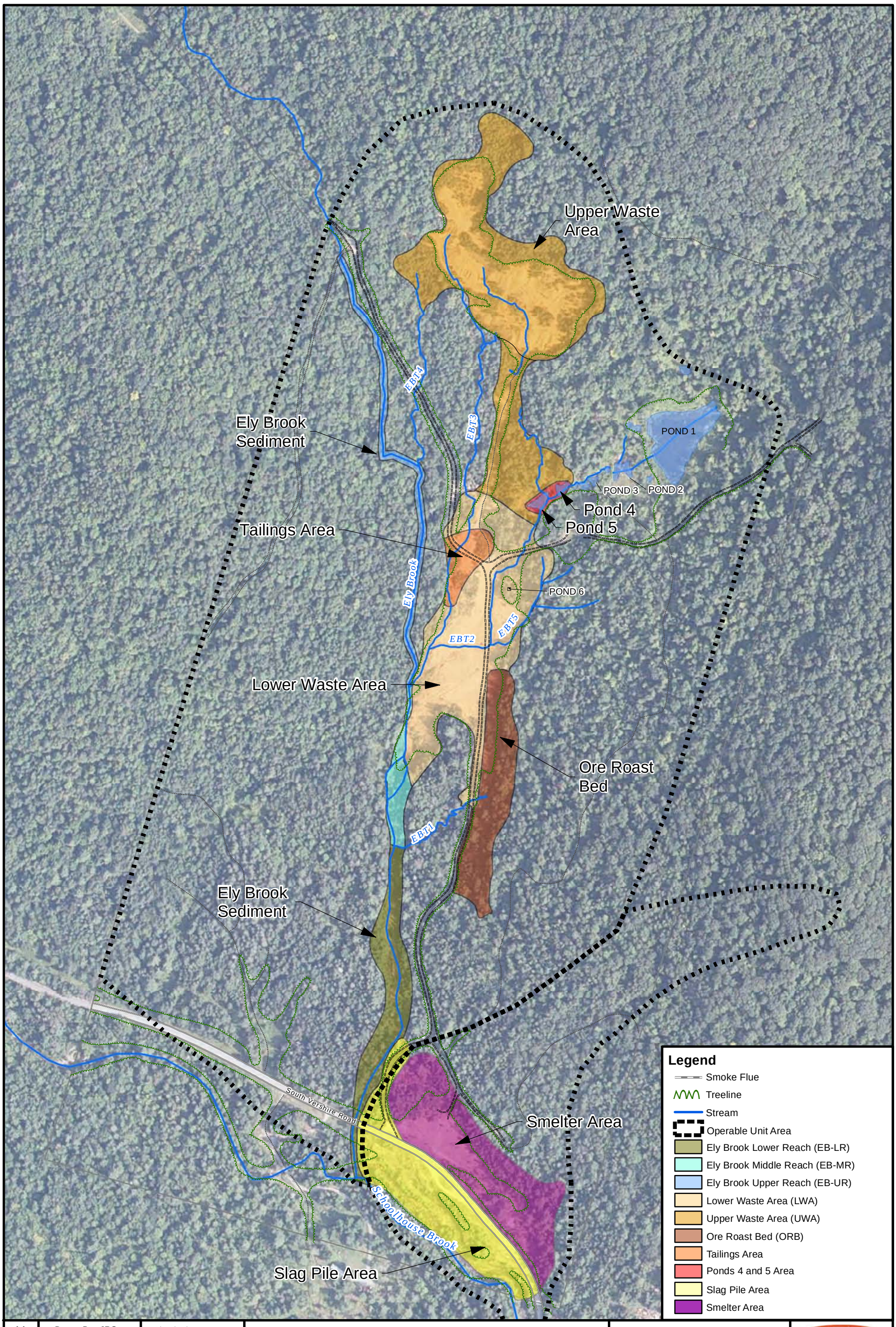

N

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June 24, 2011 | Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

FIGURE ES-4

Site Study Areas
Ely Copper Mine
Vershire, Vermont

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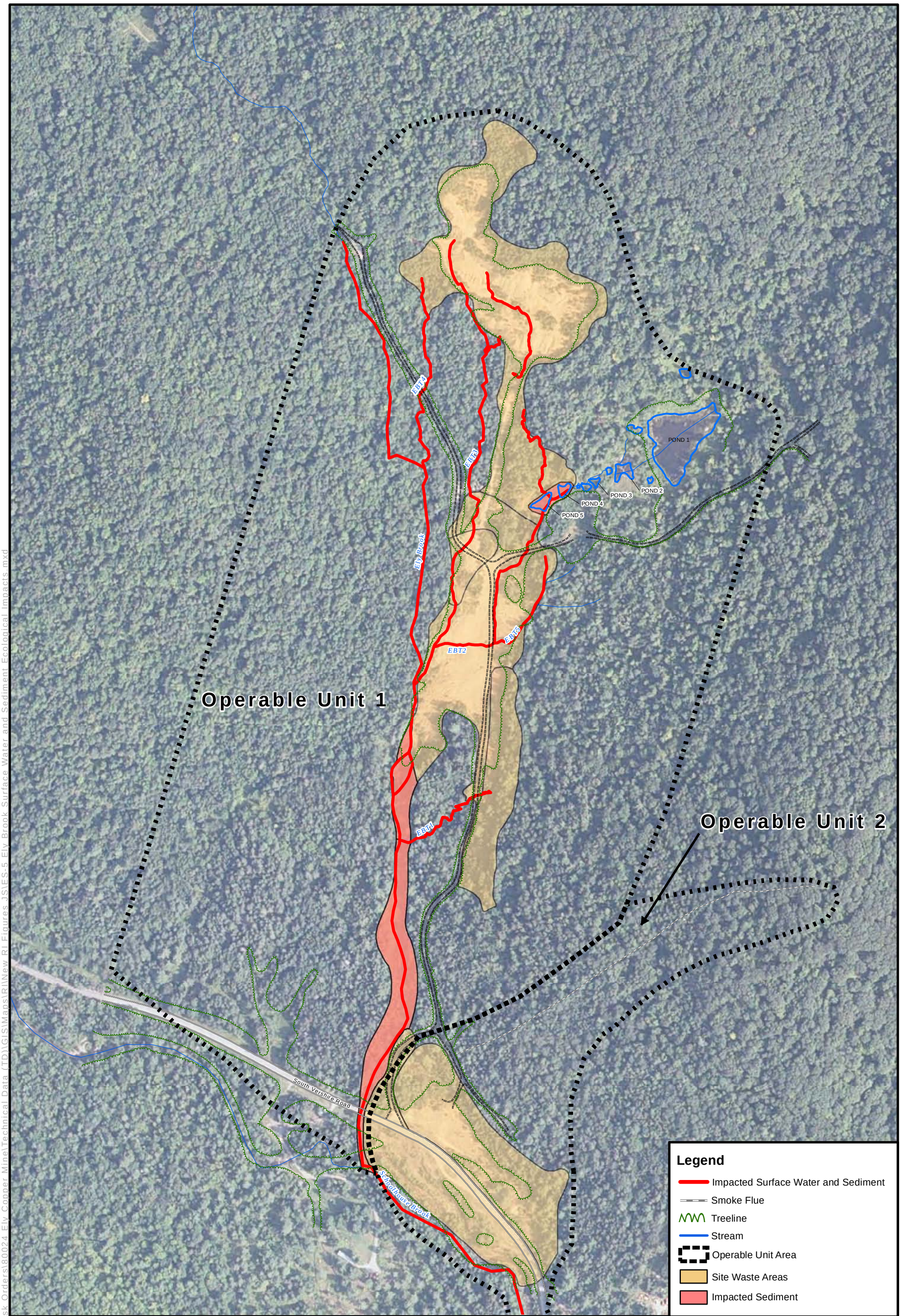
Path: R:\80000 Task Orders\80024 Ely Copper Mine\Technical Data (TD)\GIS\Maps\RI\New RI Figures JS\ES-4 Site Study Areas.mxd



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APPROXIMATE SCALE
0 150 300 600 Feet

FIGURE ES-5
Ely Brook Surface Water and Sediment Ecological Impact
Ely Copper Mine
Vershire, Vermont

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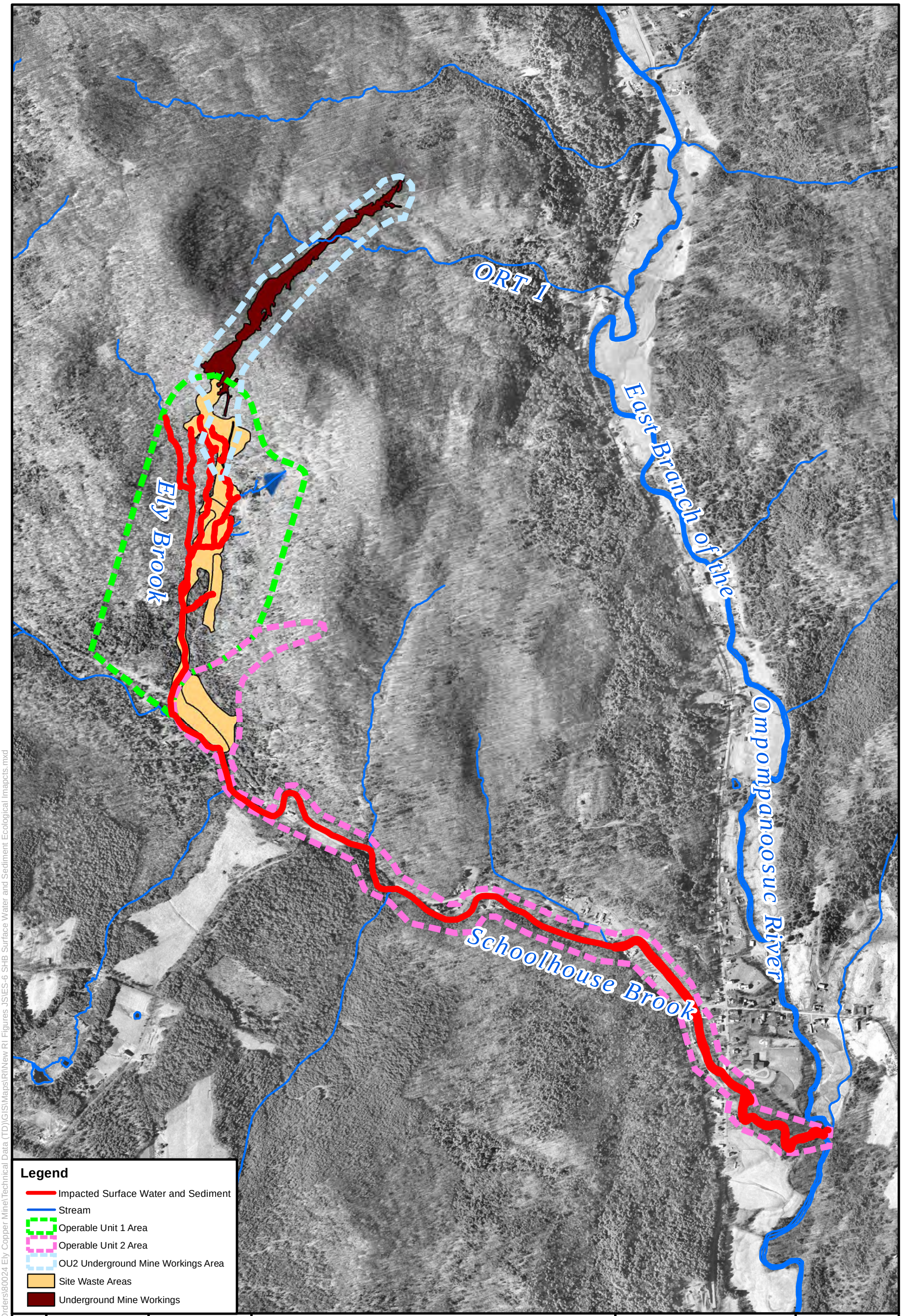

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June 24, 2011	Revision No. 00

APPROXIMATE SCALE
0 500 1,000 2,000 Feet

FIGURE ES-6
SHB Surface Water and Sediment Ecological Impacts
Ely Copper Mine
Vershire, Vermont

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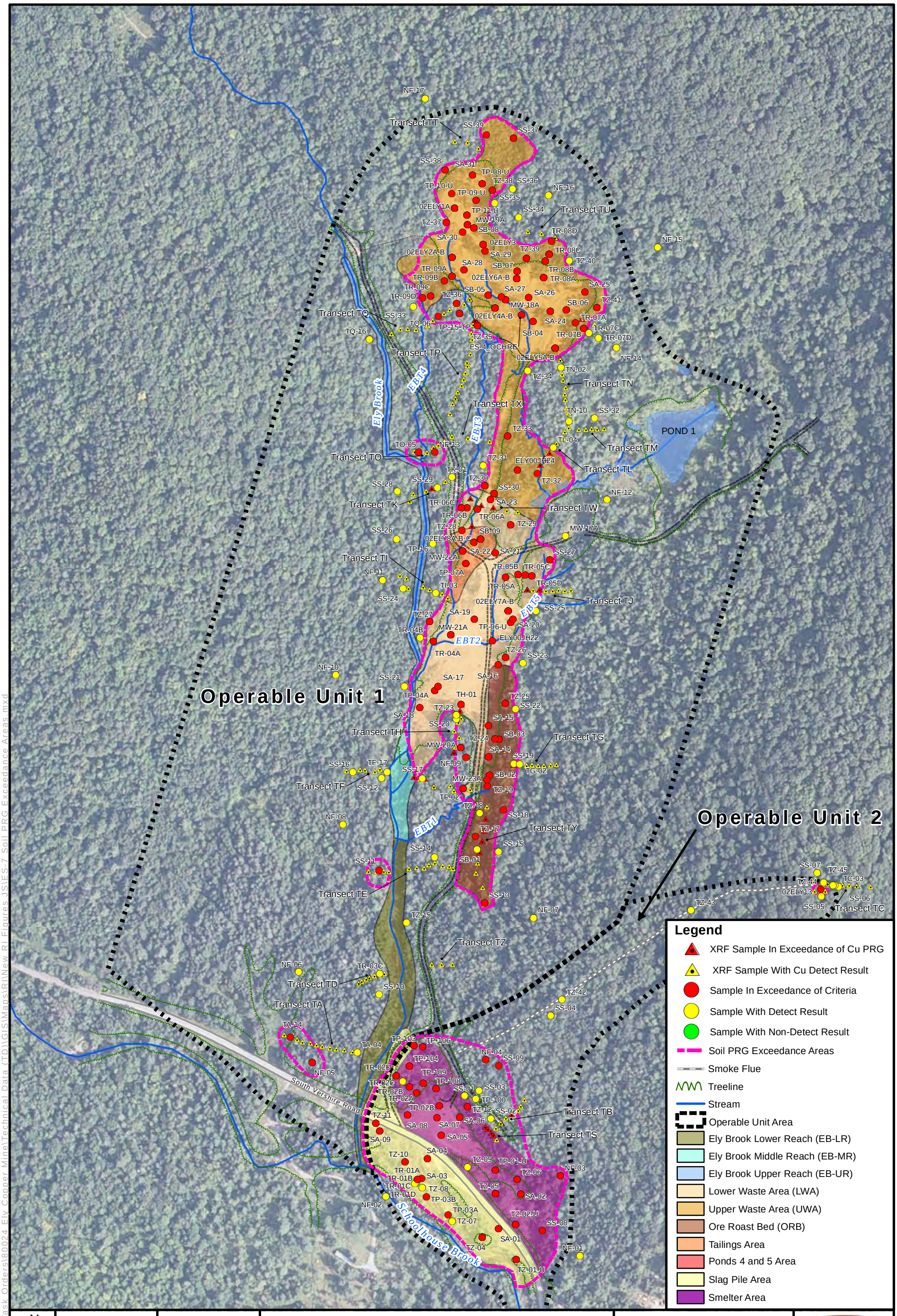

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June 24, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

NOTES:
PRG

Cobalt	24	mg/kg
Copper	629	mg/kg
Iron	44,800	mg/kg

FIGURE ES-7
Soil PRG
Exceedance Areas
Ely Copper Mine
Vershire, Vermont

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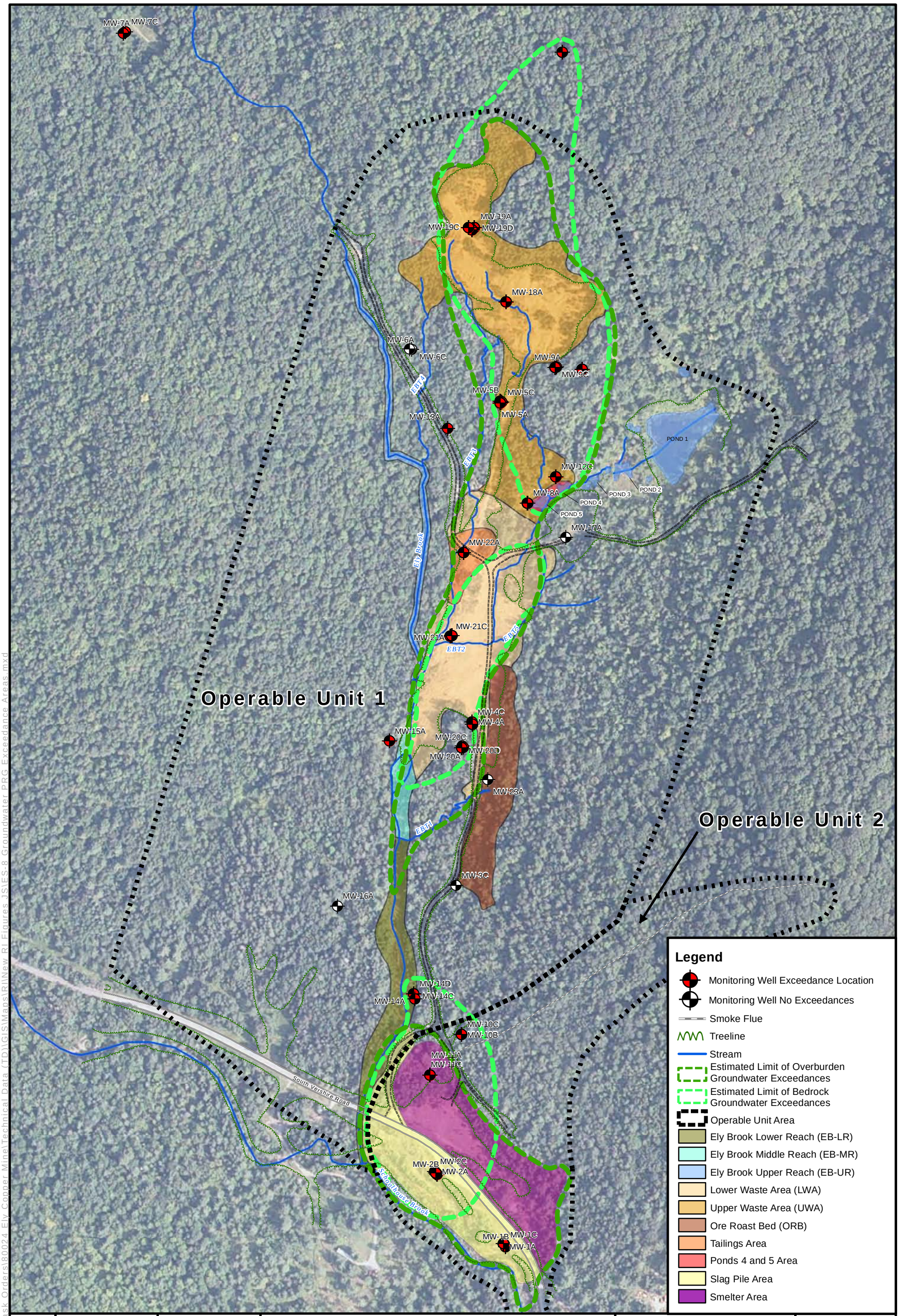

N

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June 24, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

FIGURE ES-8
Groundwater PRG Exceedance Areas
Ely Copper Mine
Vershire, Vermont

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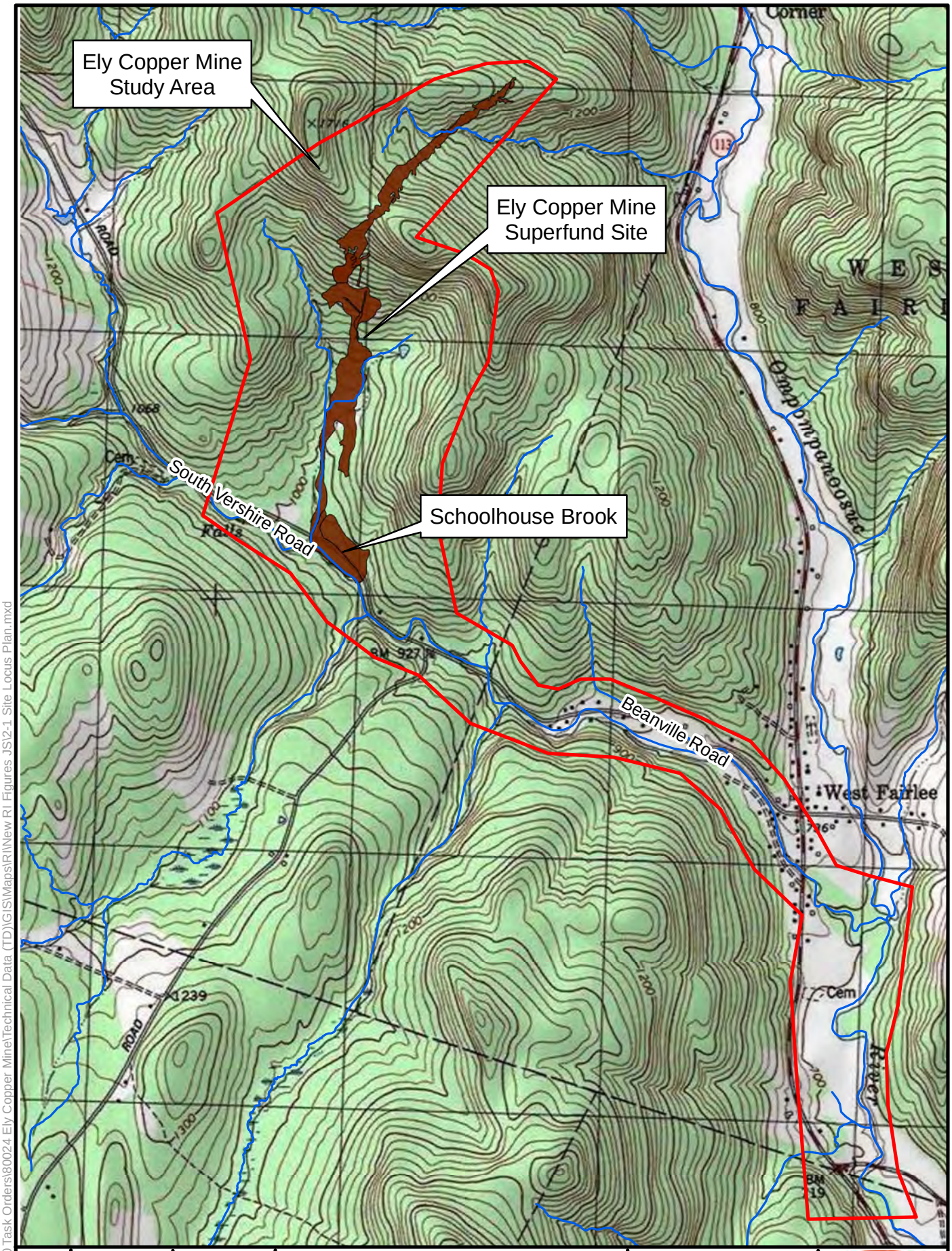

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N

Drawn By: JRS	Checked By: AJB
June 16, 2011	Revision No. 00

APPROXIMATE SCALE
0 400 800 1,600
Feet

Quadrangle Location

USGS TOPOGRAPHIC MAP
VERSHIRE, VERMONT
1981; (Photo-inspected 1983)

FIGURE 2-1
Site Locus
Ely Copper Mine
Vershire, Vermont

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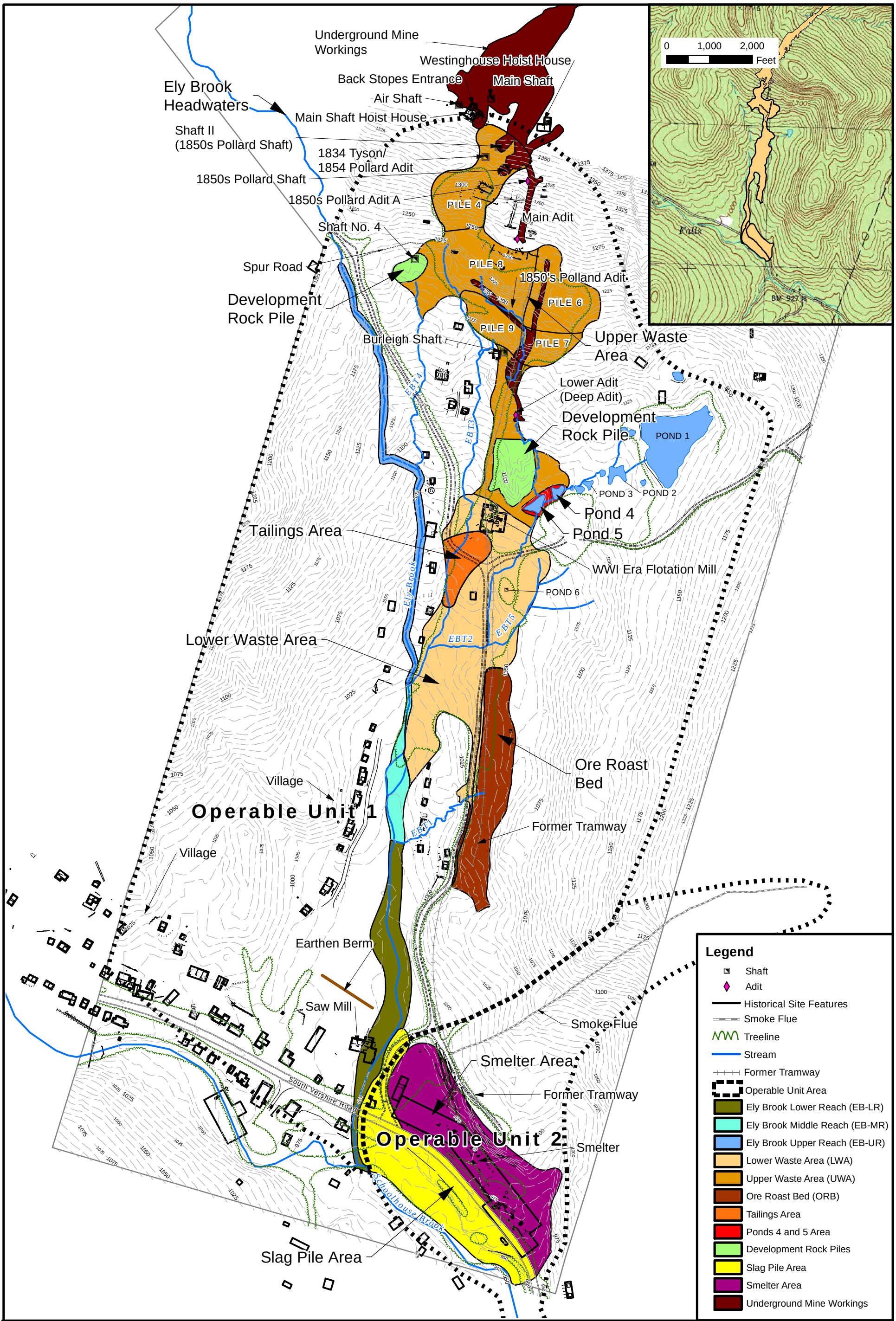

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June 20, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

NOTE: Elevations shown are feet above mean sea level (FT-AMSL).

FIGURE 2-2

Site Sketch
Ely Copper Mine
Vershire, Vermont

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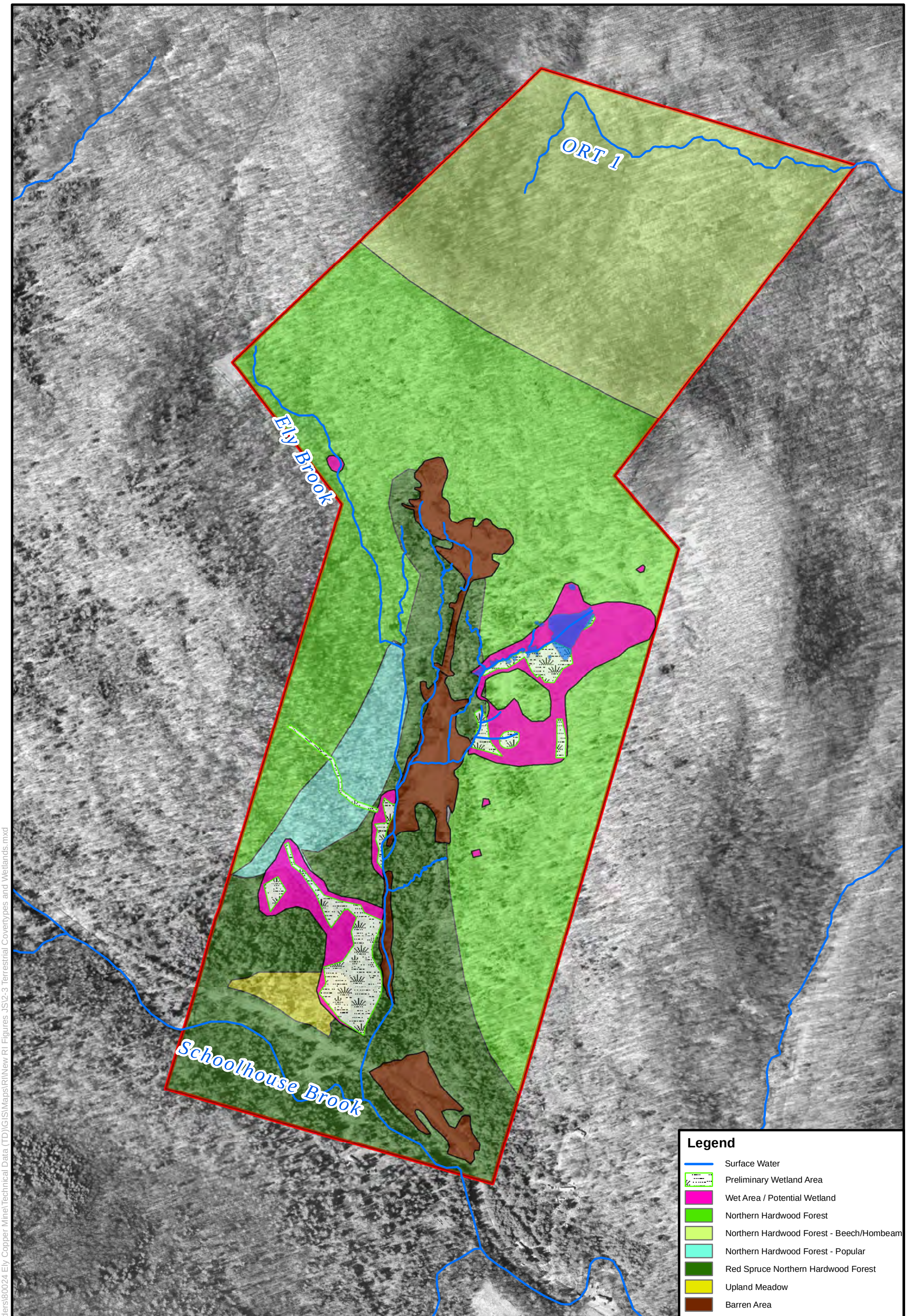
Path: R:\80000 Task Orders\80024 Ely Copper Mine\Technical Data (TD)\GIS\Maps\RI\New RI Figures JS\2-2 SiteSketch.mxd



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Drawn By: JRS	Checked By: AJB
June 21, 2011	Revision No. 00

APPROXIMATE SCALE
0 250 500 1,000 Feet

NOTE:
Figure was developed from the URS Habitat Assessment report (2005)

FIGURE 2-3
Terrestrial Covertypes and Wetlands
Ely Copper Mine
Vershire, Vermont

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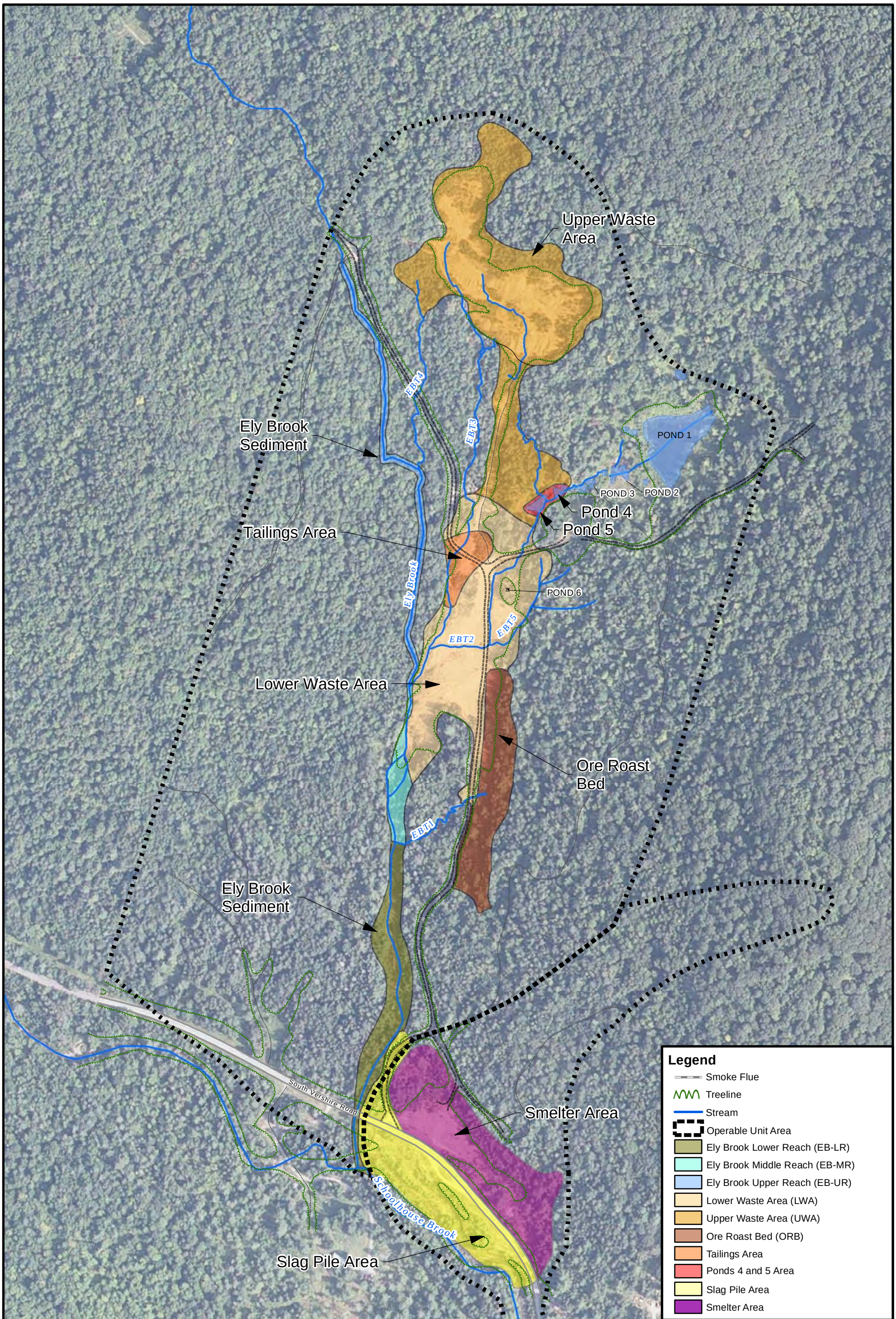
Path: R:\80000 Task Orders\80024 Ely Copper Mine\Technical Data (TD)\GIS\Maps\RI\New RI Figures JS\2-3 Terrestrial Covertypes and Wetlands.mxd



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June 20, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

FIGURE 2-4

Site Study Areas
Ely Copper Mine
Vershire, Vermont

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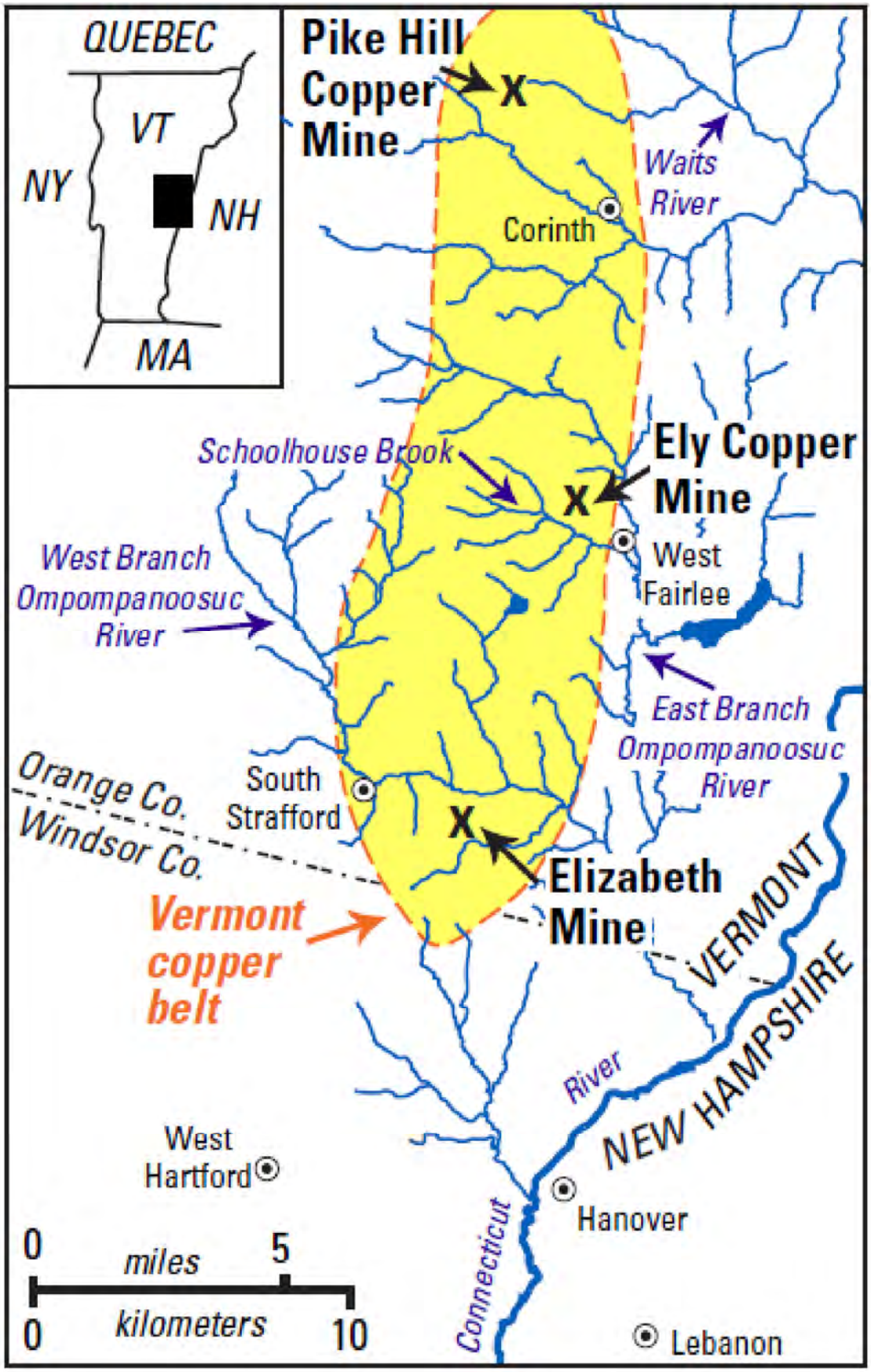
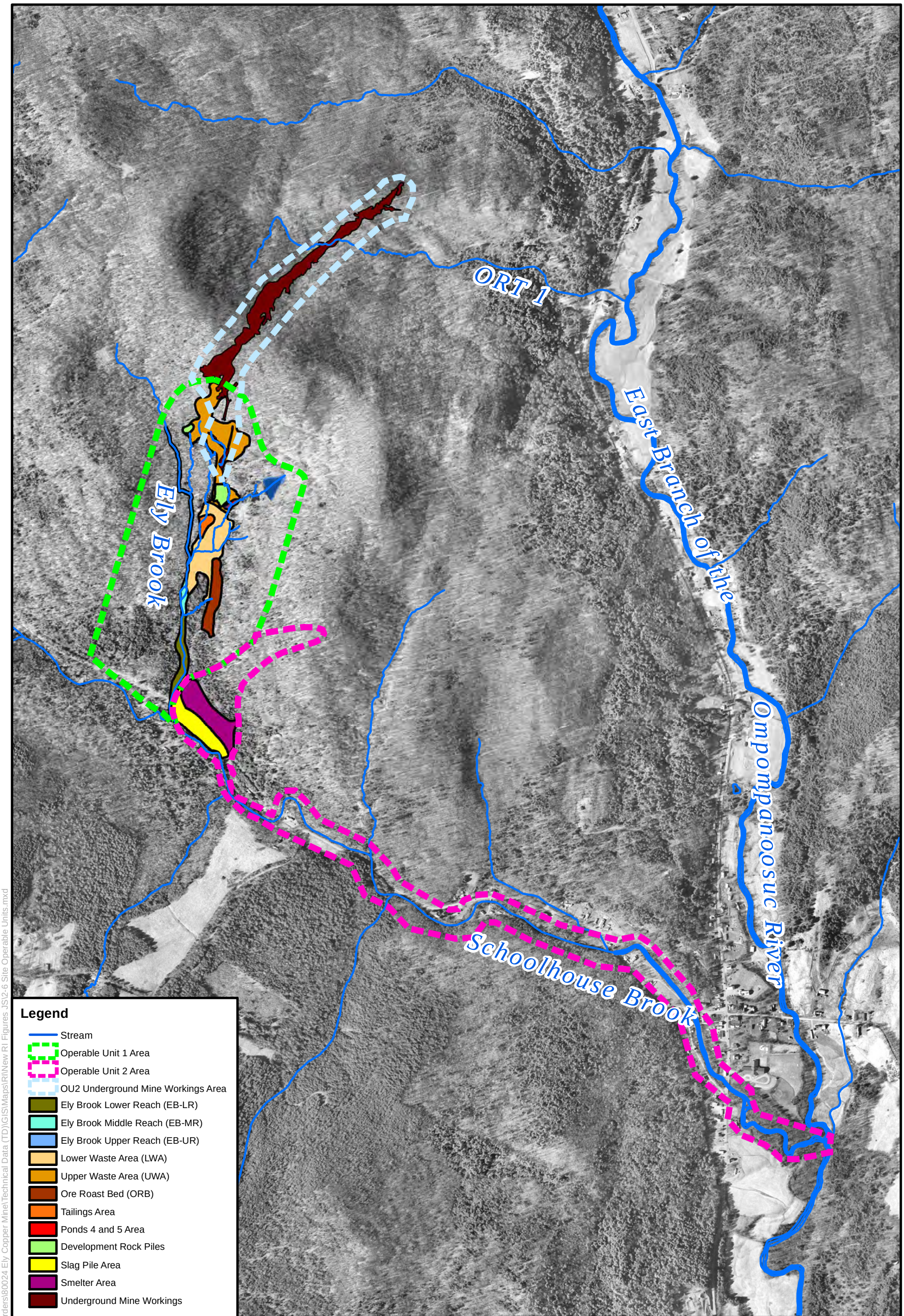


N	Drawn By: JRS	Checked By: AJB	This figure was developed from information found within the "USGS Geochemical Characterization of Mine Waste, Mine Drainage and Stream Sediments at the Pike Hill Copper Mine Superfund Site, Orange County, Vermont, Scientific Investigations Report 2006-5303."	FIGURE 2-5 Vermont Copper Belt Ely Copper Mine Vershire, Vermont	Nobis Engineering a Sustainable Future Nobis Engineering, Inc. 18 Chenell Drive Concord, NH 03304 (603) 224-4182
	June 21, 2011	Revision No. 00			

Path: R:\80000 Task Orders\80024 Ely Copper Mine\Technical Data (TD)\GIS\Maps\RI\New RI Figures JS\2-5 Vermont Copper Belt.mxd



N

Drawn By: JRS | Checked By: AJB

June 21, 2011 | Revision No. 00

APPROXIMATE SCALE
0 500 1,000 2,000 Feet

FIGURE 2-6

Site Operable Units
Ely Copper Mine
Vershire, Vermont

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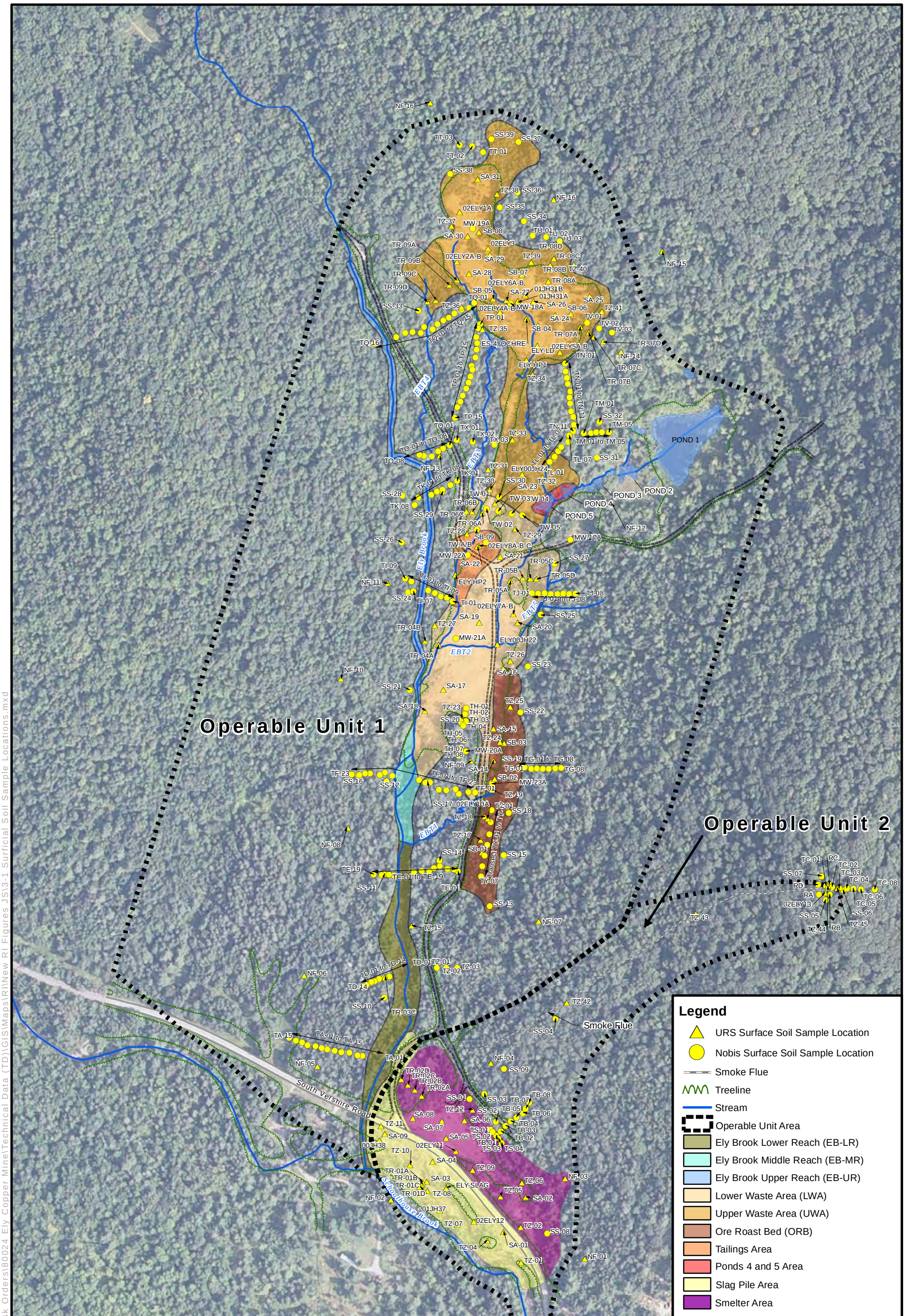
Path: R:\80000 Task Orders\80024 Ely Copper Mine\Technical Data (TD)\GIS\Maps\RI\New RI Figures JS\2-6 Site Operable Units.mxd



N

Drawn By: JRS	Checked By: AJB
June 21, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

FIGURE 3-1
Surficial Soil Sample Locations
Ely Copper Mine
Vershire, Vermont

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Concord, NH 03301
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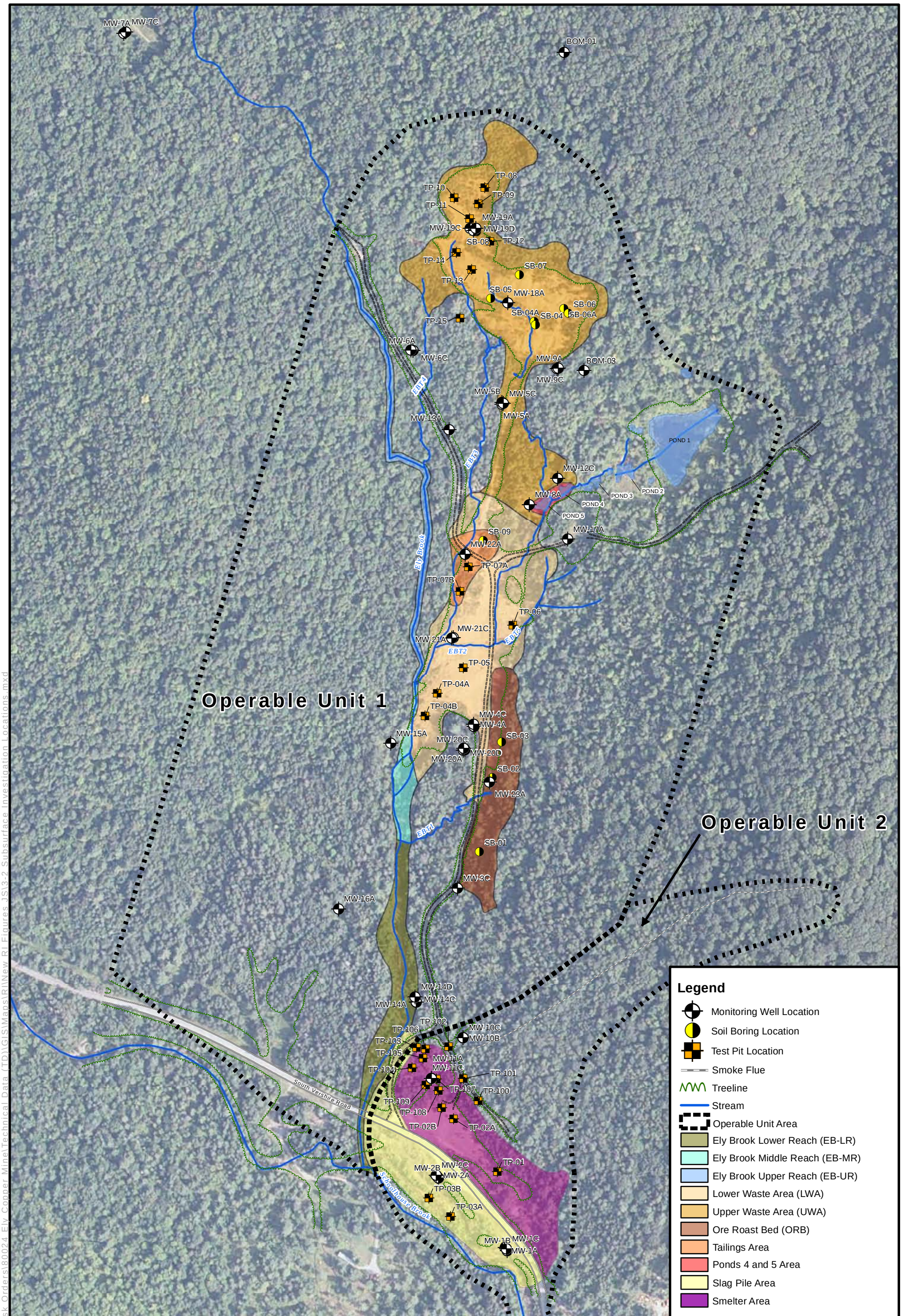
Path: R:\80000 Task Orders\80024 Ely Copper Mine\Technical Data (TD)\GIS\Maps\RI\New RI Figures JS\3-1 Surficial Soil Sample Locations.mxd



N

Drawn By: JRS	Checked By: AJB
June 17, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

FIGURE 3-2
Subsurface Investigation Locations
Ely Copper Mine
Vershire, Vermont

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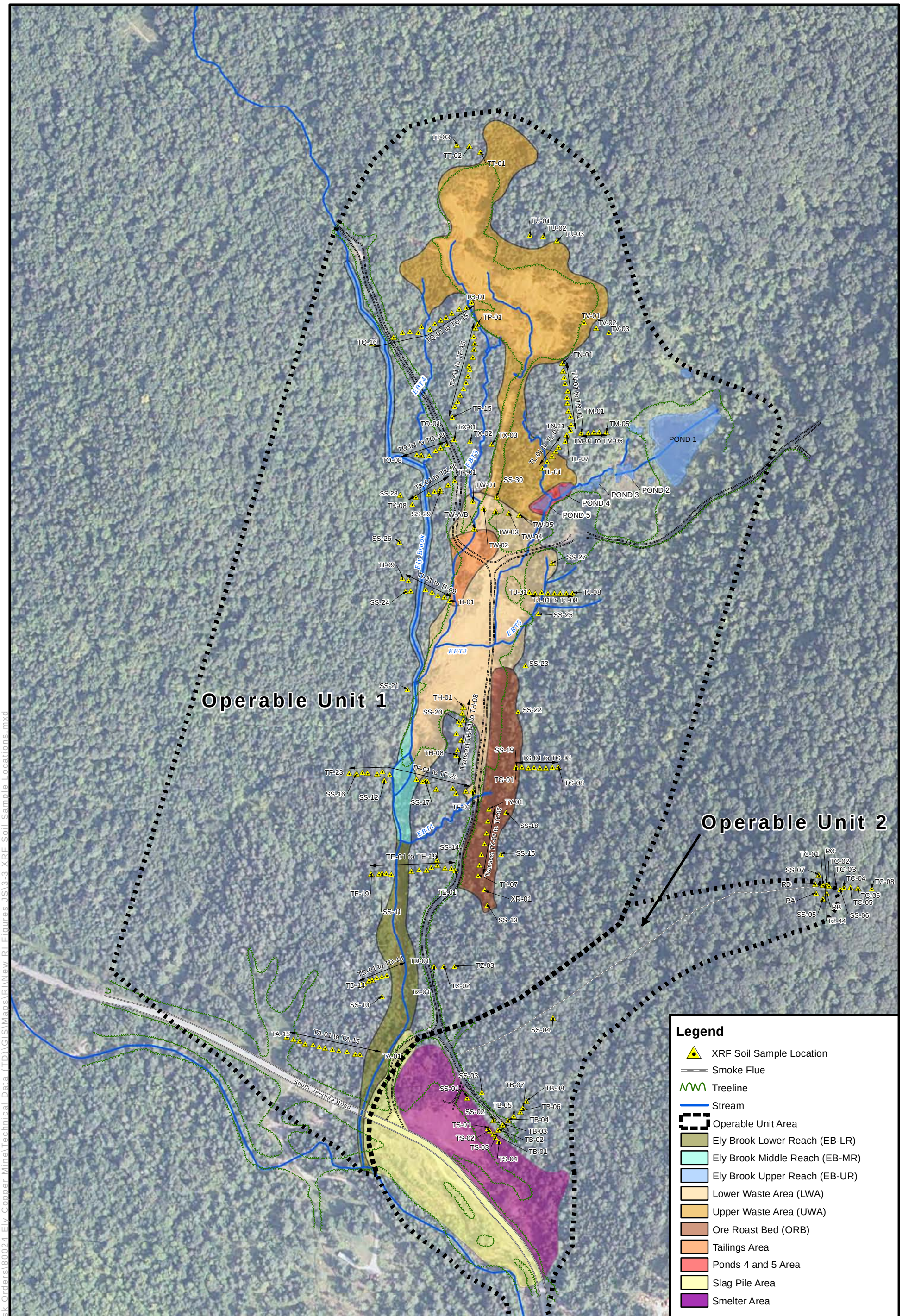
Concord, NH 03301
(603) 224-4182

Path: R:\80000 Task Orders\80024 Ely Copper Mine\Technical Data (TD)\GIS\Maps\RI\New RI Figures JS\3-2 Subsurface Investigation Locations.mxd



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N

Drawn By: JRS	Checked By: AJB
June 21, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

NOTE:
Some transects included sediment samples
those locations are not displayed.
XRF sediment sample locations are shown on Figure 3-7

FIGURE 3-3
XRF Soil
Sample Locations
Ely Copper Mine
Vershire, Vermont

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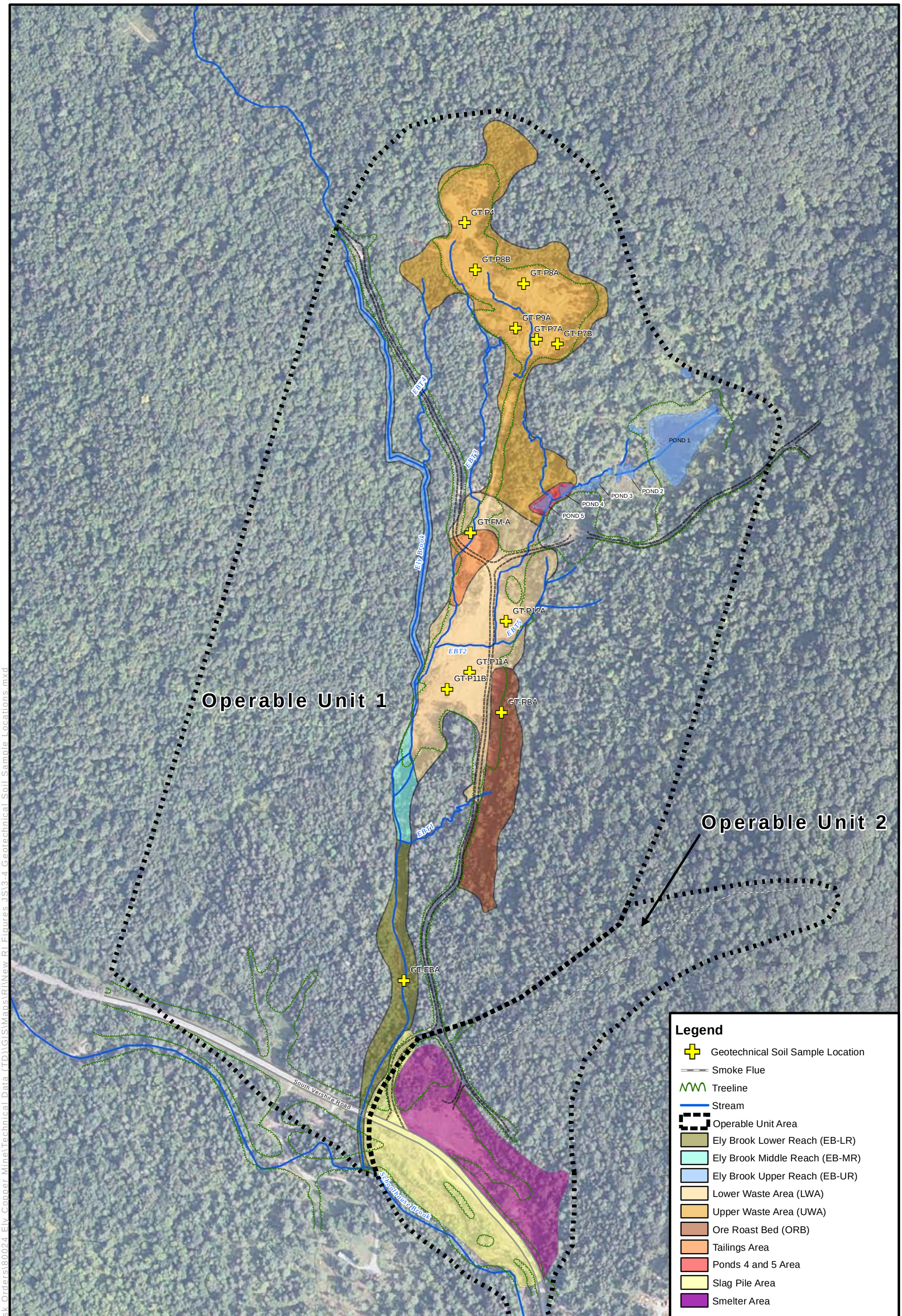

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N

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June 21, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

FIGURE 3-4
Geotechnical Soil Sample Locations
Ely Copper Mine
Vershire, Vermont

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Nobis Engineering, Inc.
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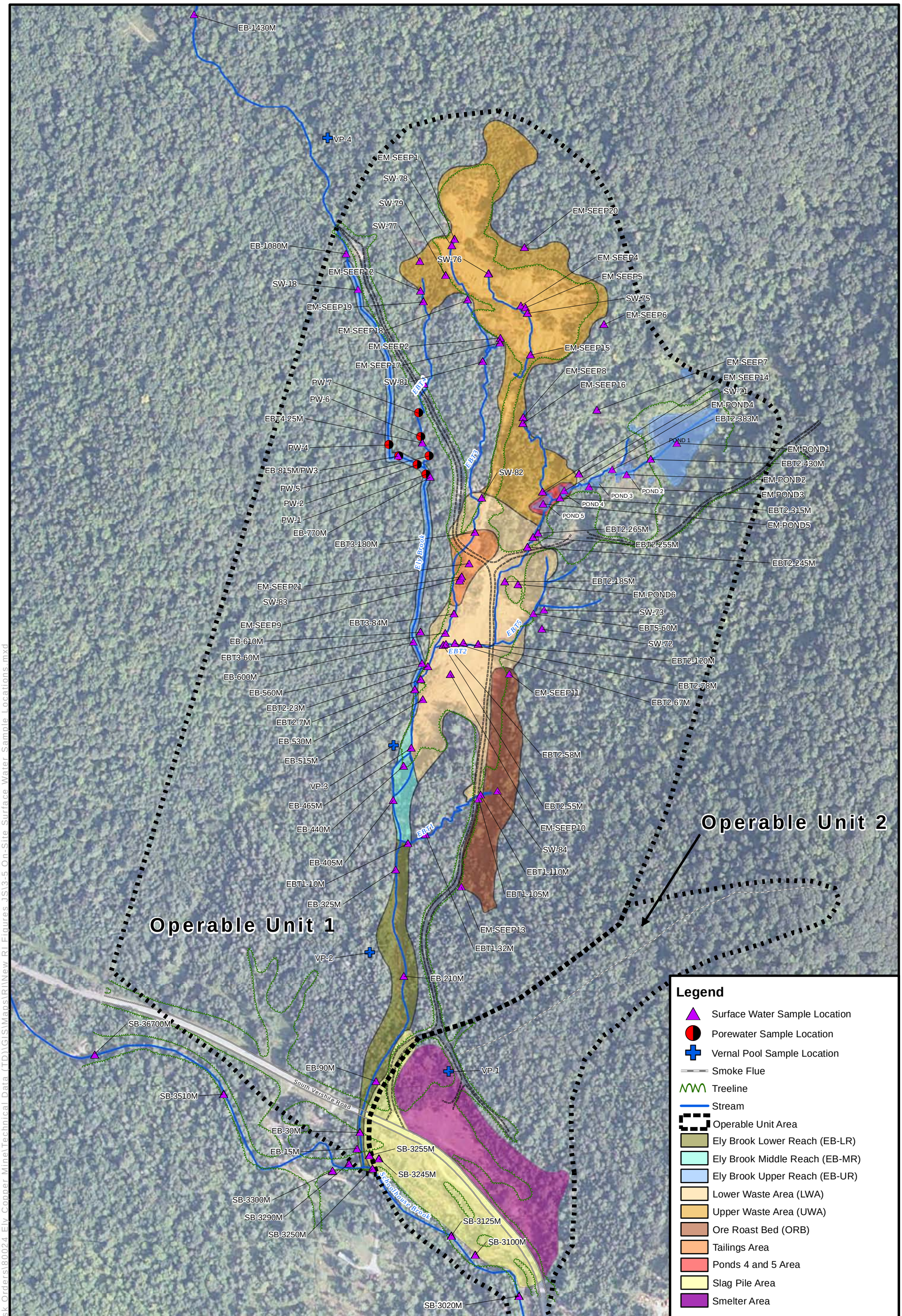
Concord, NH 03301
(603) 224-4182



N

Drawn By: JRS	Checked By: AJB
June 21, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

FIGURE 3-5
On-Site Surface Water Sample Locations
Ely Copper Mine
Vershire, Vermont

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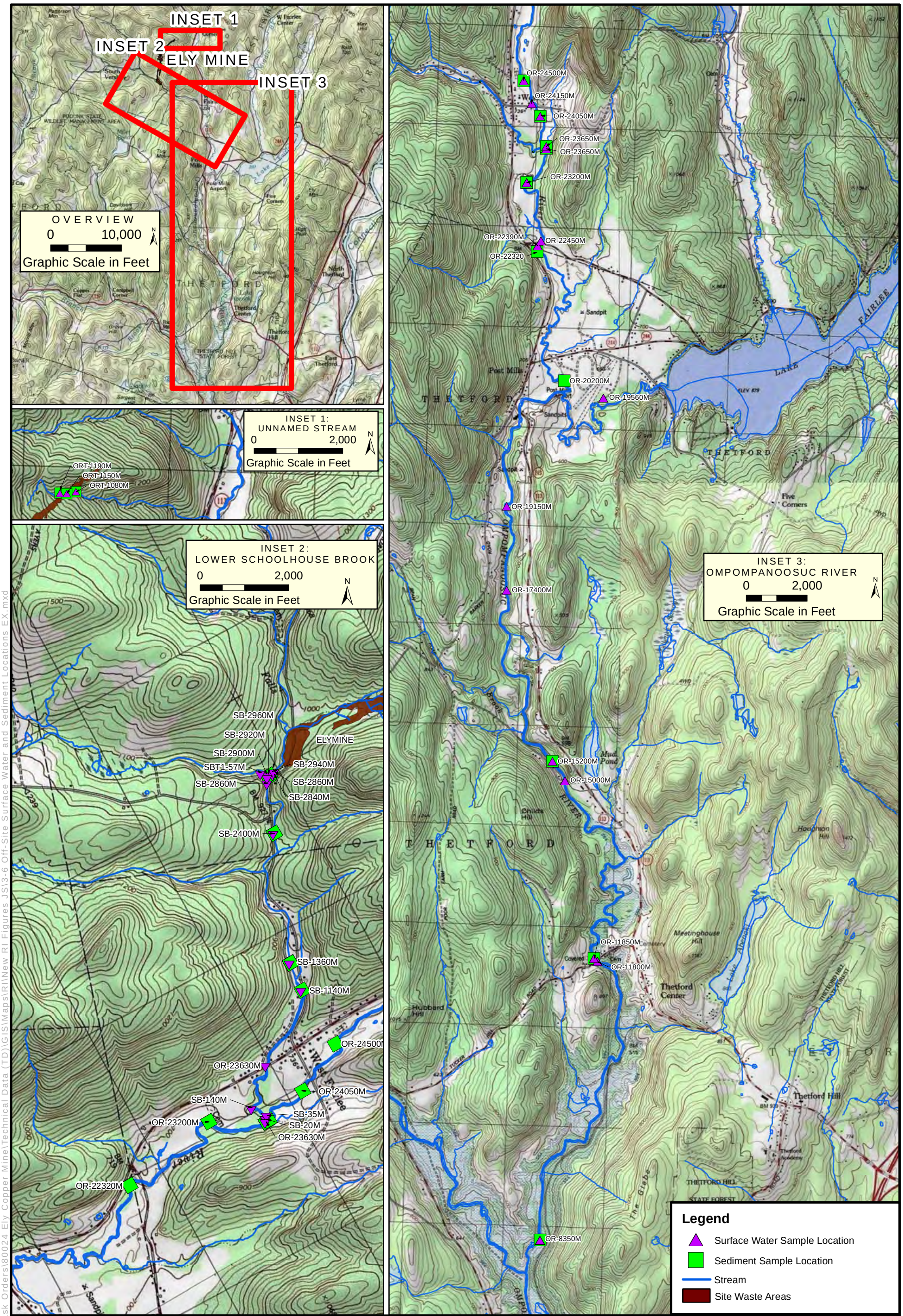
Path: R:\80000 Task Orders\80024 Ely Copper Mine\Technical Data (TD)\GIS\Maps\RI\New RI Figures JS\3-5 On-Site Surface Water Sample Locations.mxd



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June 29, 2011	Revision No. 00

FIGURE 3-6

Off-Site Surface Water and Sediment Locations
Ely Copper Mine
Vershire, Vermont

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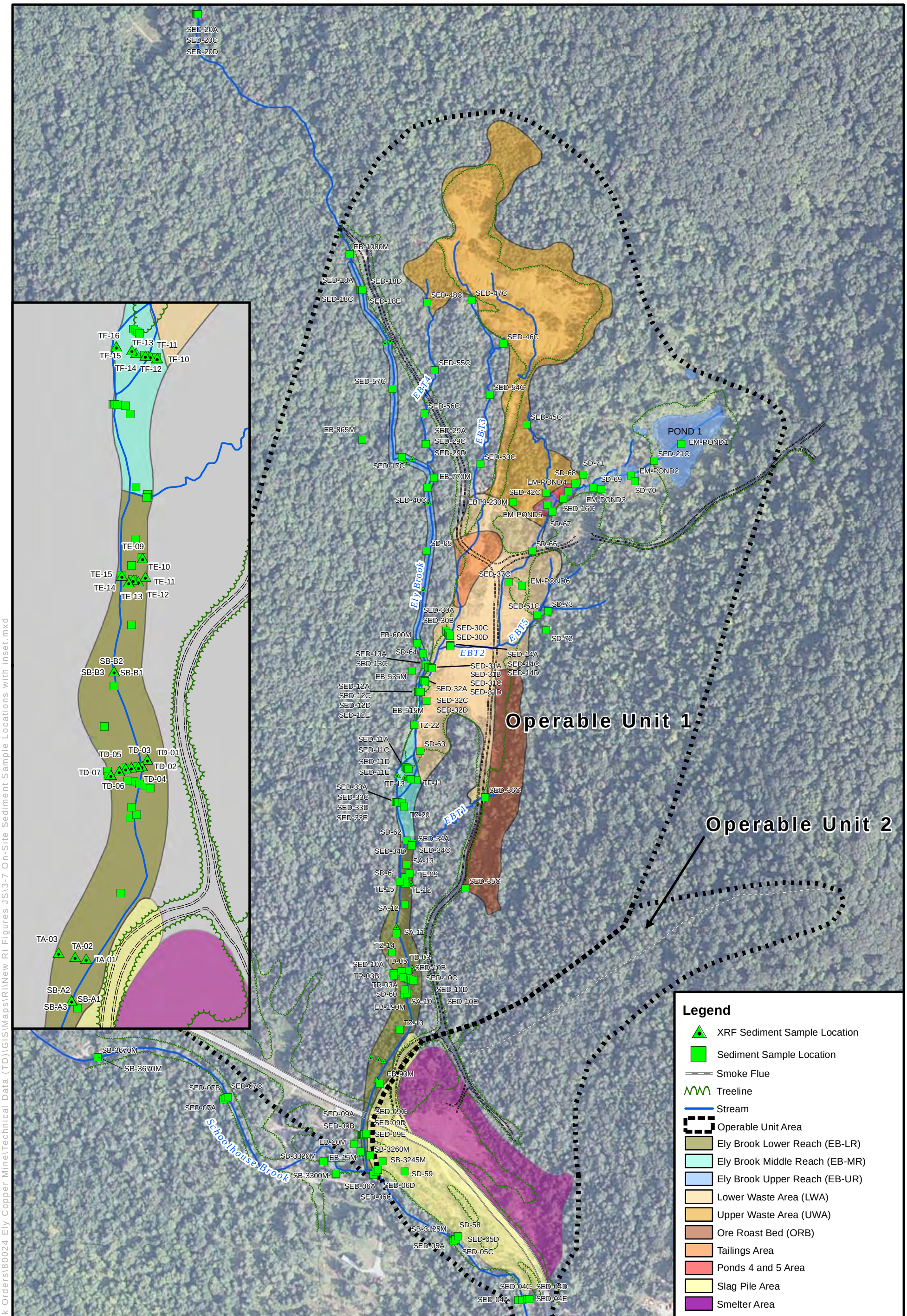

N

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June 21, 2011 | Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

FIGURE 3-7
On-Site Sediment Sample Locations
Ely Copper Mine
Vershire, Vermont

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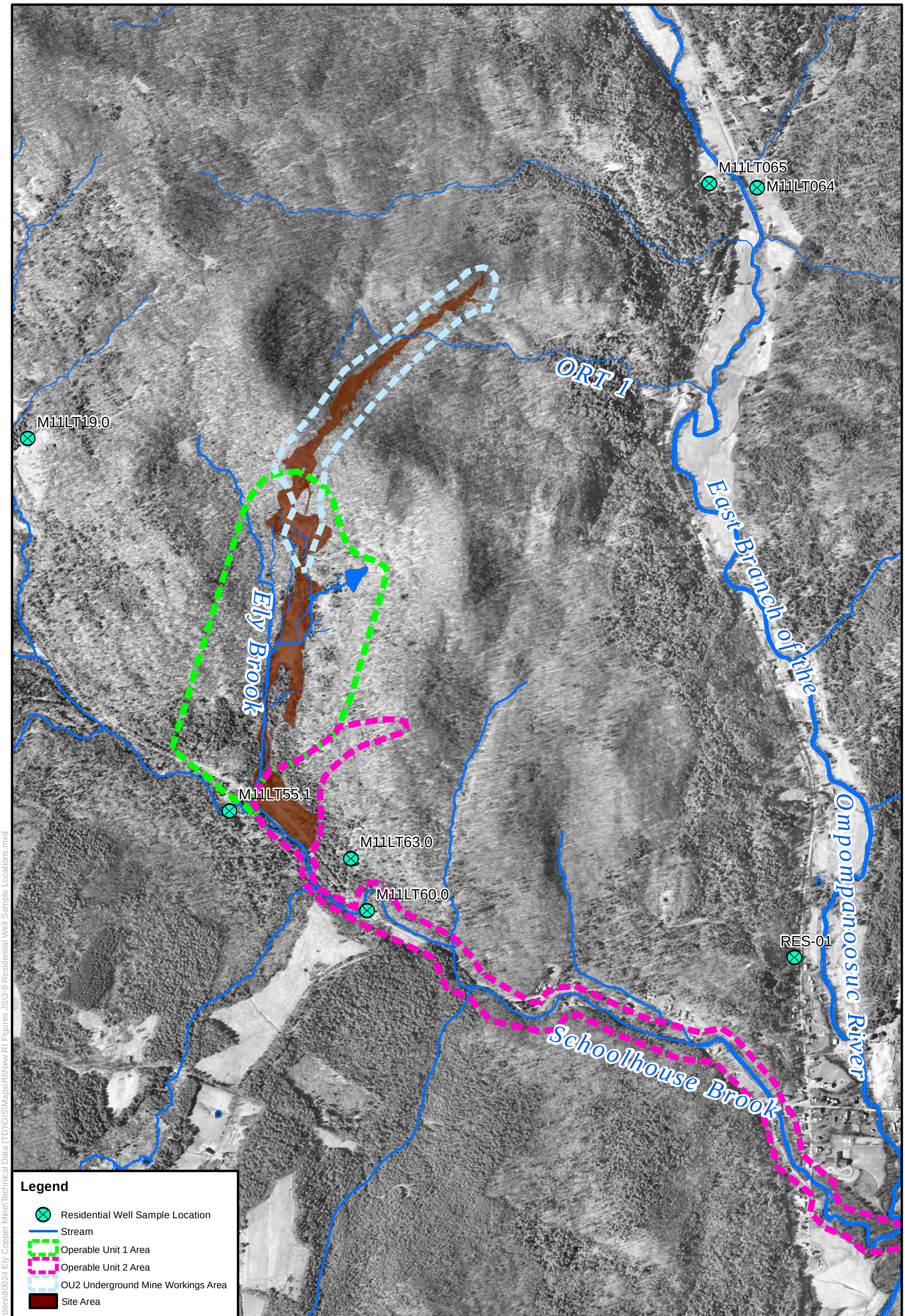

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APPROXIMATE SCALE
0 500 1,000 2,000 Feet

FIGURE 3-8
Residential Well Sample Locations
Ely Copper Mine
Vershire, Vermont

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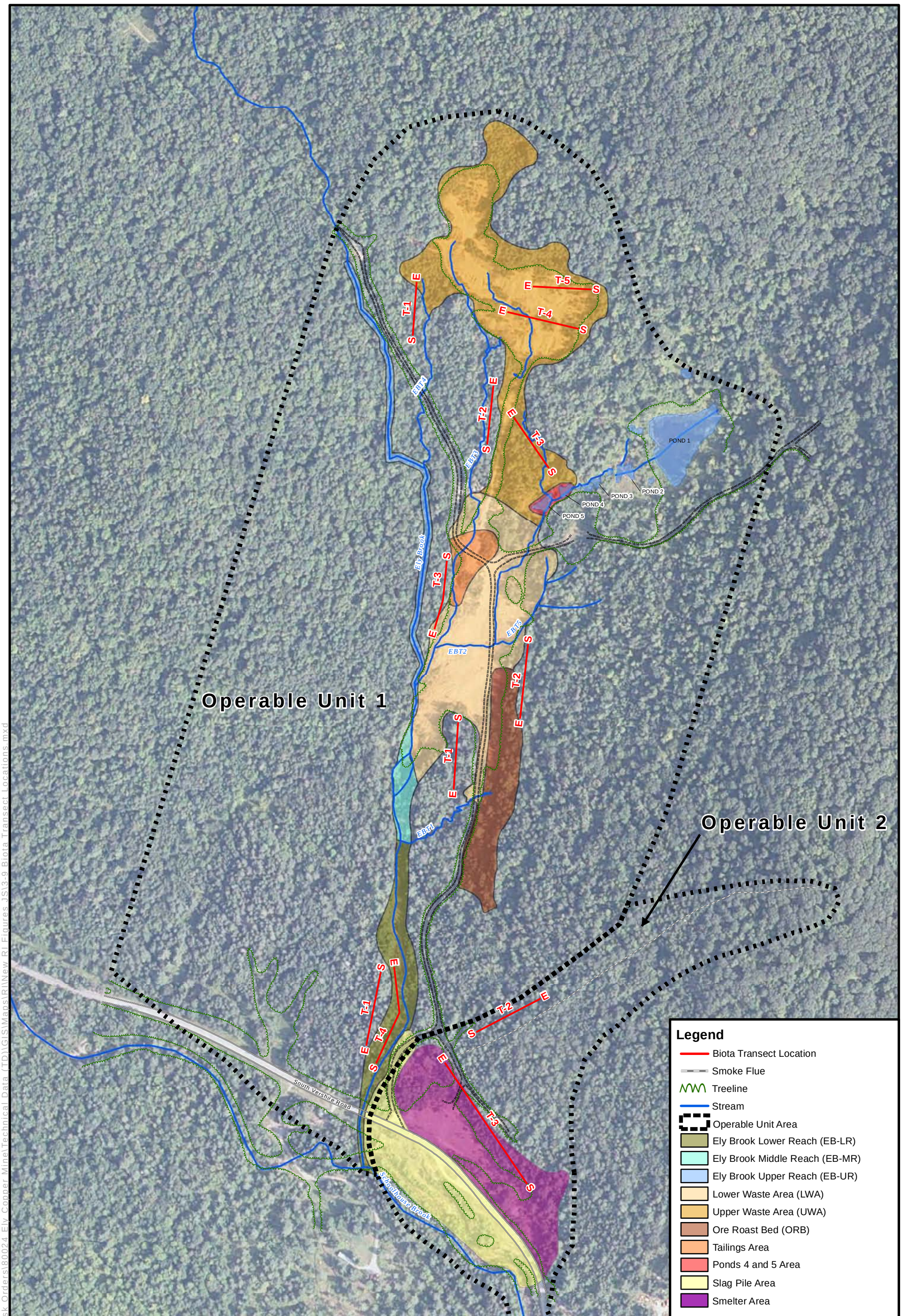
Path: R:\80000 Task Orders\80024 Ely Copper Mine\Technical Data (TD)\GIS\Maps\RI\New RI Figures JS\3-8 Residential Well Sample Locations.mxd



N

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APPROXIMATE SCALE
0 150 300 600 Feet

FIGURE 3-9
Biota Transect Locations
Ely Copper Mine
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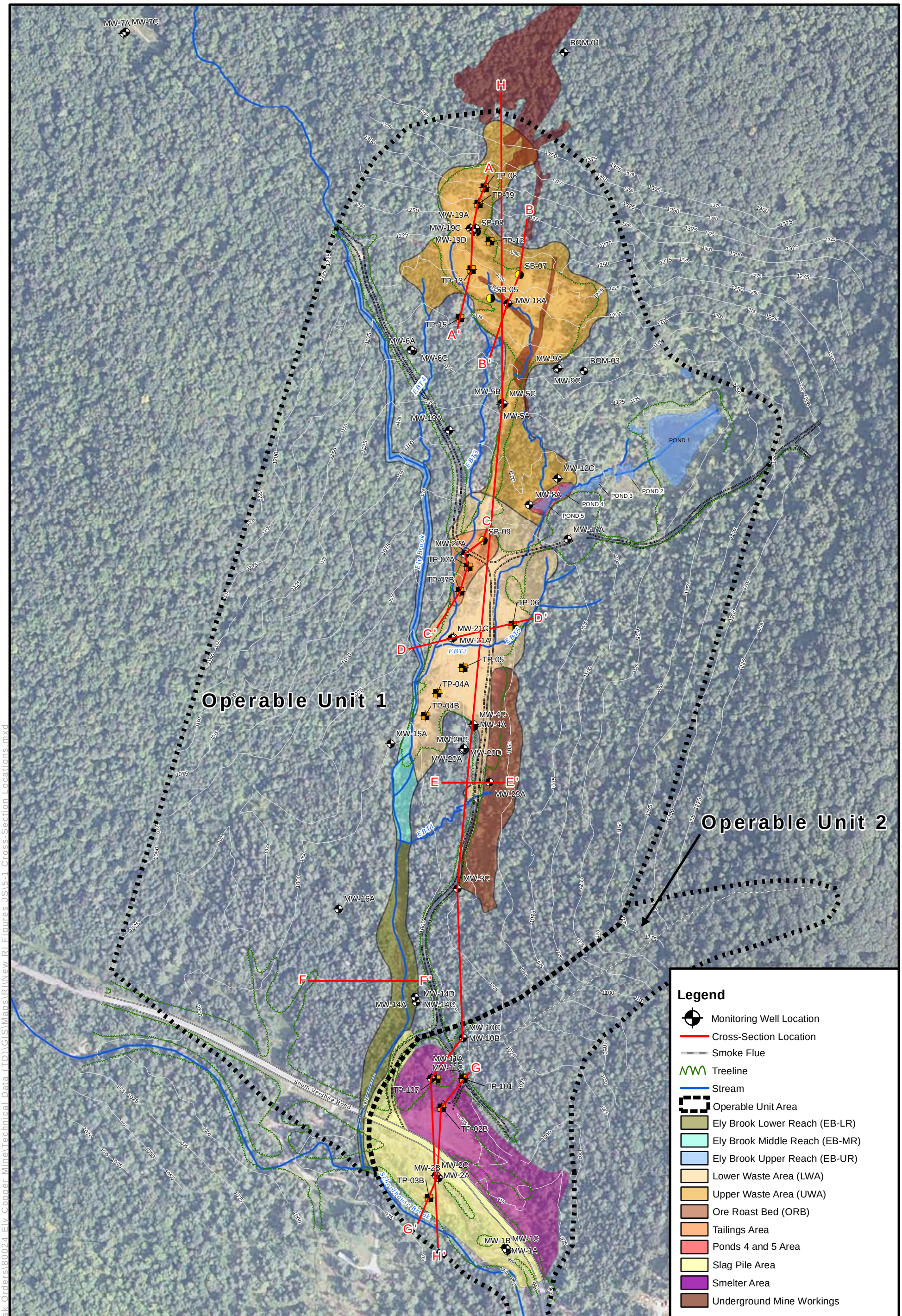

N

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June 21, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

NOTE: Elevations shown are feet above mean sea level (FT-AMSL).

FIGURE 5-1
Cross-Section Locations
Ely Copper Mine
Vershire, Vermont

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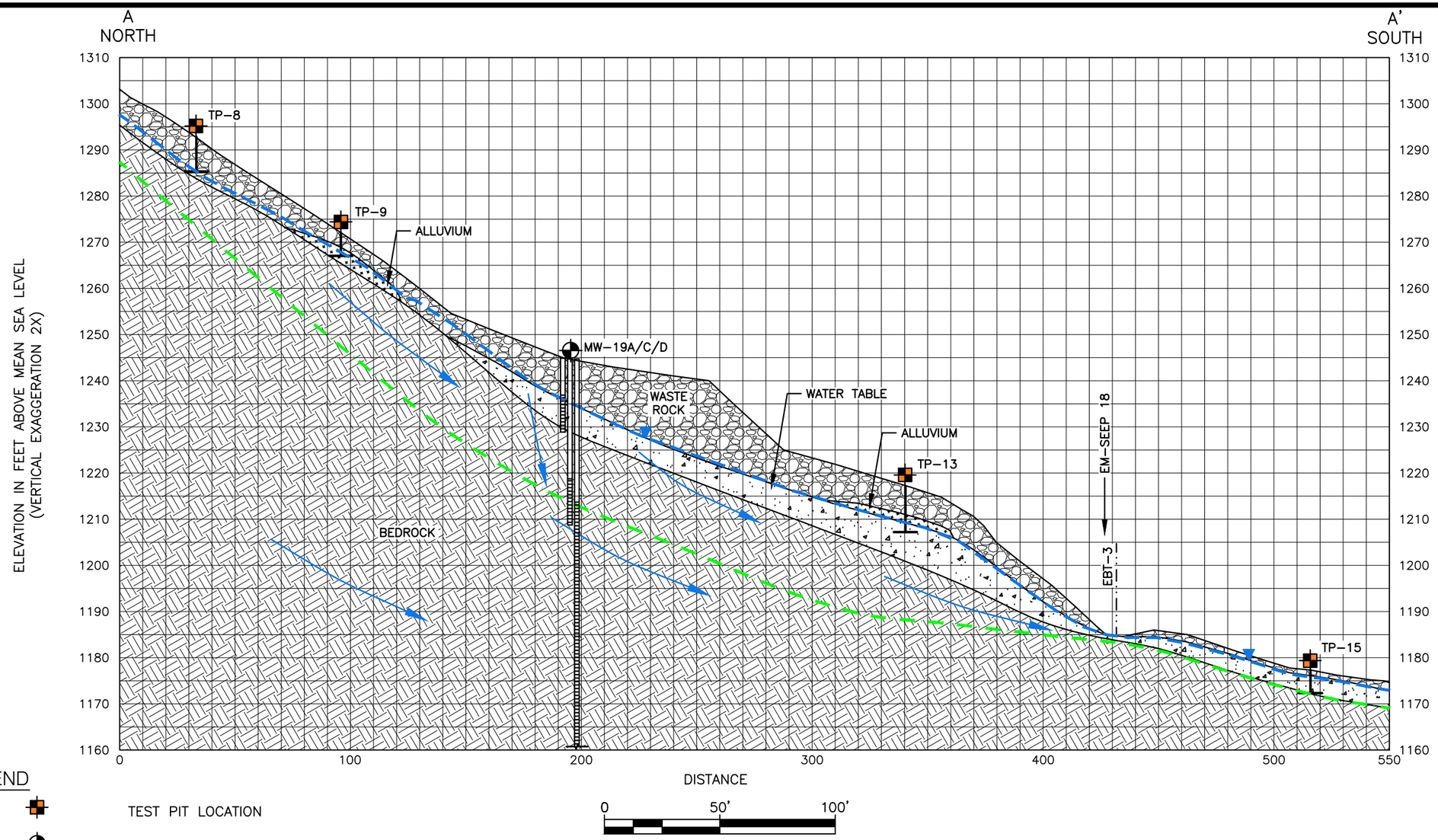
Path: R:\80000 Task Orders\80024 Ely Copper Mine\Technical Data (TD)\GIS\Maps\RI\New RI Figures JS\5-1 Cross-Section Locations.mxd



LEGEND

- TEST PIT LOCATION
- MONITORING WELL LOCATION
- APPROXIMATE WATER TABLE ELEVATION (AUGUST 2009)
- INFERRED DIRECTION OF GROUNDWATER FLOW
- ESTIMATED LIMIT OF GROUNDWATER CRITERIA EXCEEDANCES
- WASTE ROCK
- ALLUVIUM
- TILL
- BEDROCK

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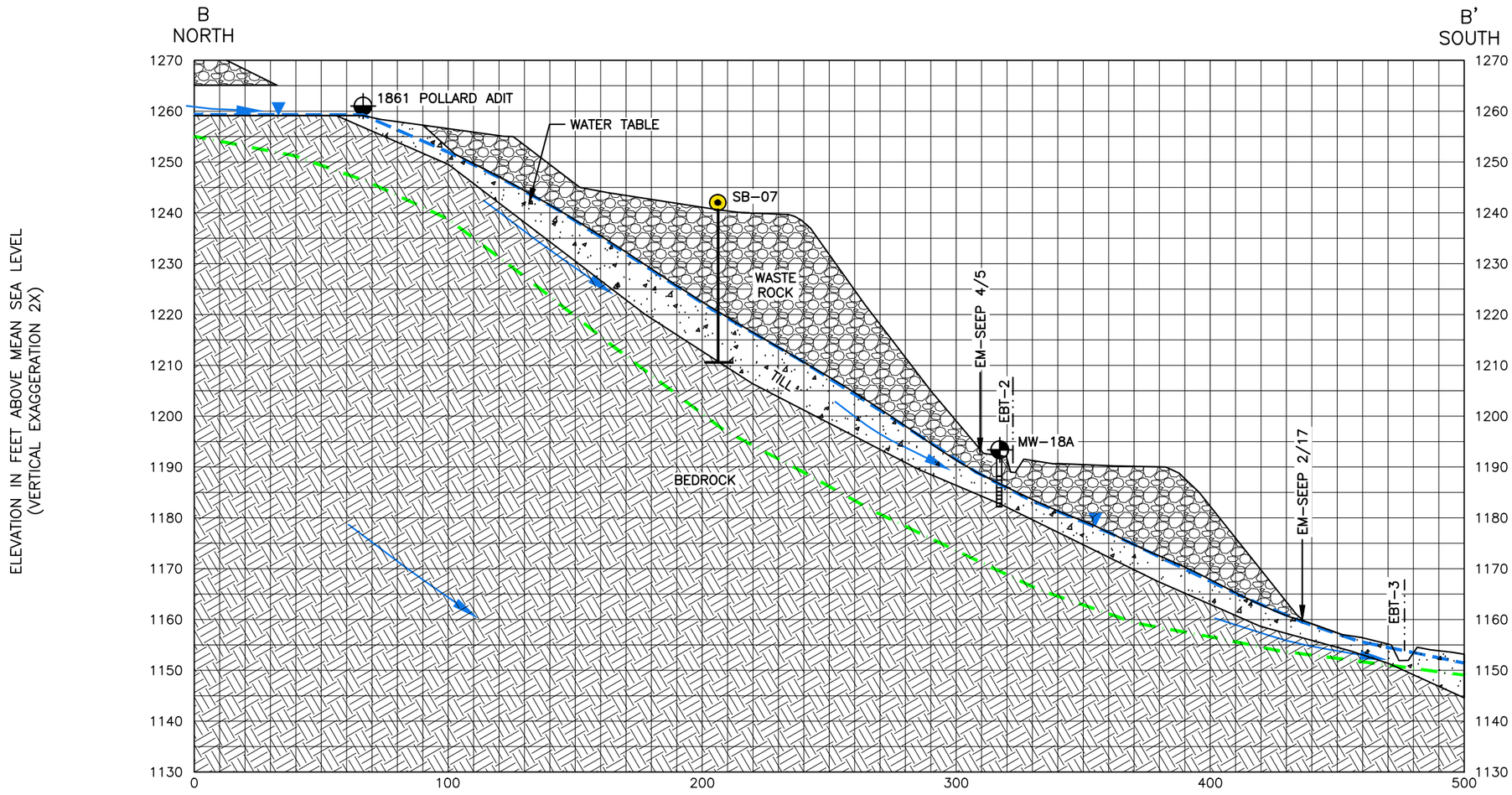
FIGURE 5-2

CROSS-SECTION A-A', UWA
ELY COPPER MINE
SUPERFUND SITE
VERSHIRE, VERMONT

DRAWN BY:	ML	APPROVED BY:	AB
PROJECT:	80024.09		JUNE 2011

R:\80000 Task Orders\80024 Ely Copper Mine\CAD\dwg\80024-SUBSURFACE-SECTION.dwg



DISTANCE

0 50' 100'

LEGEND

- TEST PIT LOCATION
- MONITORING WELL LOCATION
- SOIL BORING LOCATION
- APPROXIMATE WATER TABLE ELEVATION (AUGUST 2009)
- INFERRED DIRECTION OF GROUNDWATER FLOW
- ESTIMATED LIMIT OF GROUNDWATER CRITERIA EXCEEDANCES
- WASTE ROCK
- ALLUVIUM
- TILL
- BEDROCK

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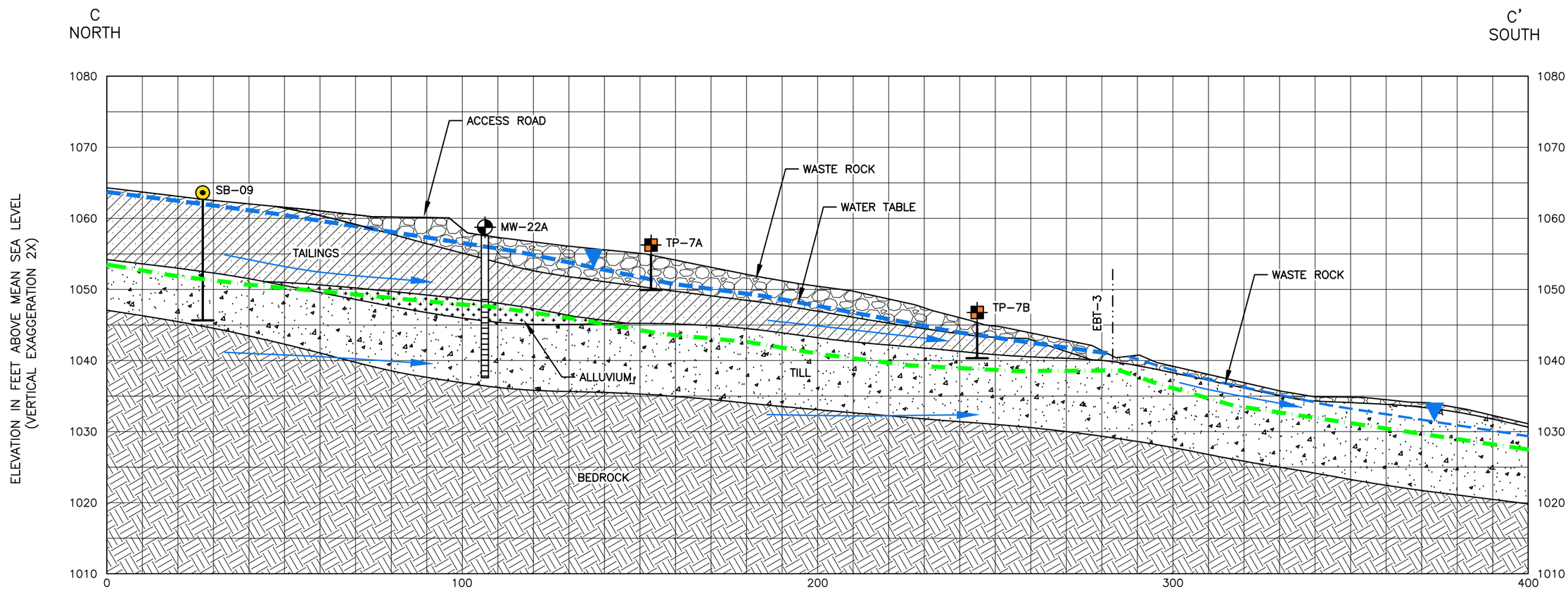
FIGURE 5-3

CROSS-SECTION B-B', UWA
ELY COPPER MINE
SUPERFUND SITE
VERSHIRE, VERMONT

DRAWN BY:	ML	APPROVED BY:	AB
PROJECT:	80024.09	JUNE 2011	

R:\80000 Task Orders\80024 Ely Copper Mine\CAD\dwg\80024-SUBSURFACE-SECTION.dwg



LEGEND

- TEST PIT LOCATION
- MONITORING WELL LOCATION
- SOIL BORING LOCATION
- APPROXIMATE WATER TABLE ELEVATION (AUGUST 2009)
- INFERRED DIRECTION OF GROUNDWATER FLOW
- ESTIMATED LIMIT OF GROUNDWATER CRITERIA EXCEEDANCES
- TAILINGS
- WASTE ROCK
- ALLUVIUM
- TILL
- BEDROCK

DISTANCE

0 30' 60'

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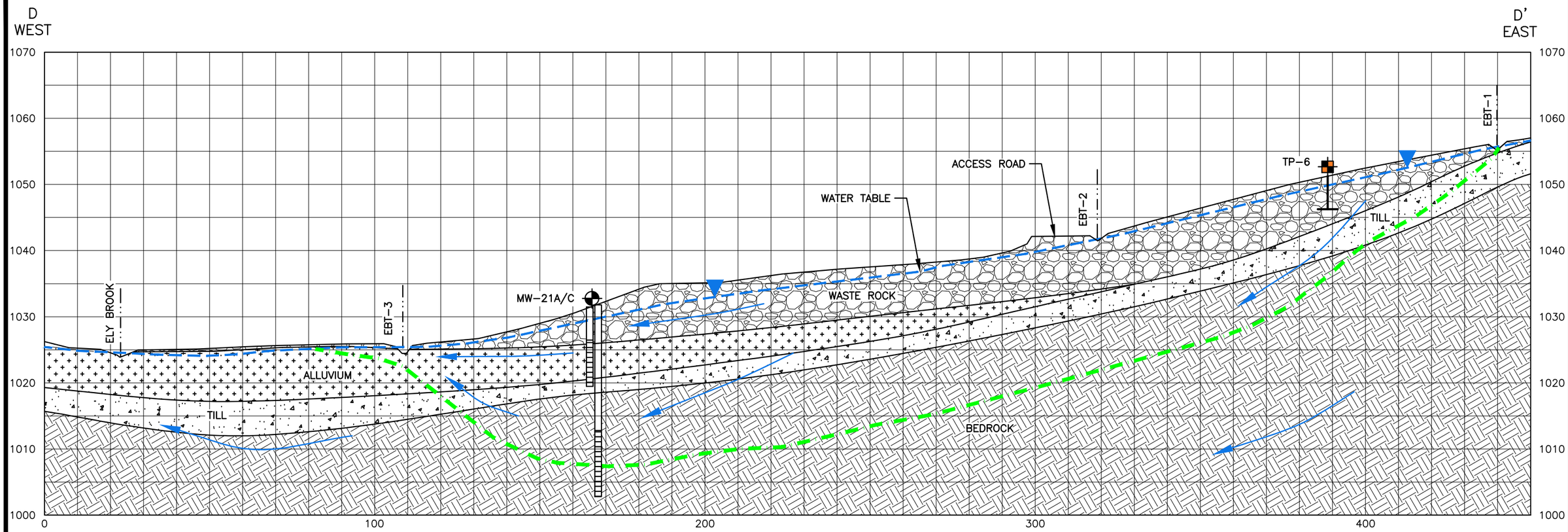
FIGURE 5-4

CROSS-SECTION C-C', TAILINGS PILE AREA
ELY COPPER MINE
SUPERFUND SITE
VERSHIRE, VERMONT

DRAWN BY:	ML	APPROVED BY:	AB
PROJECT:	80024.09	JUNE 2011	

R:\80000 Task Orders\80024 Ely Copper Mine\CAD\dwg\80024-SUBSURFACE-SECTION.dwg



DISTANCE

0 30' 60'

ELEVATION IN FEET ABOVE MEAN SEA LEVEL
(VERTICAL EXAGGERATION 2X)

LEGEND

- TEST PIT LOCATION
- MONITORING WELL LOCATION
- APPROXIMATE WATER TABLE ELEVATION (AUGUST 2009)
- INFERRED DIRECTION OF GROUNDWATER FLOW
- ESTIMATED LIMIT OF GROUNDWATER CRITERIA EXCEEDANCES
- WASTE ROCK
- ALLUVIUM
- TILL
- BEDROCK

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FIGURE 5-5

CROSS SECTION D-D', LWA
ELY COPPER MINE
SUPERFUND SITE
VERSHIRE, VERMONT

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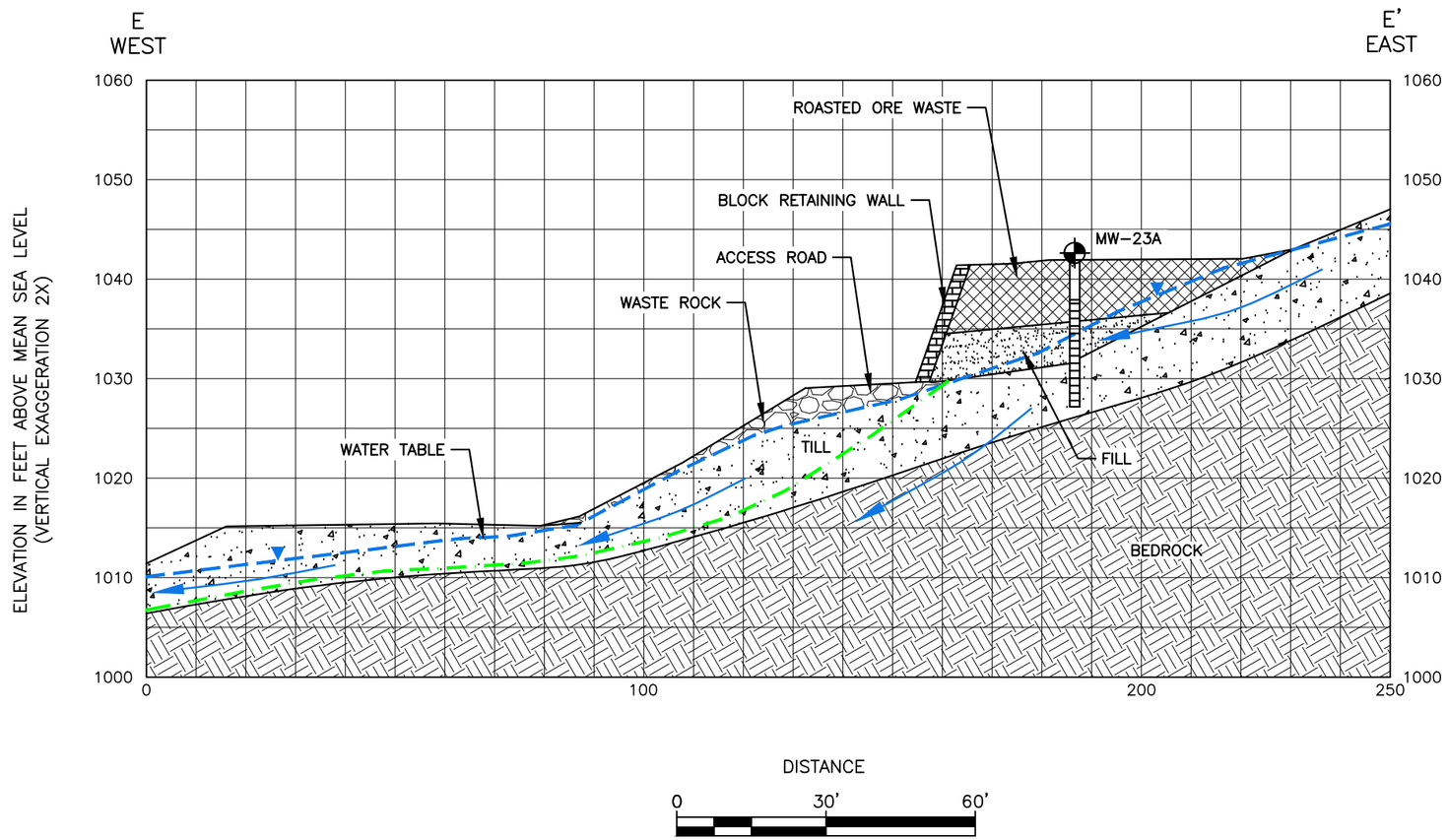
PROJECT:	80024.09	JUNE 2011	

R:\80000 Task Orders\80024 Ely Copper Mine\CAD\dwg\80024-SUBSURFACE-SECTION.dwg



LEGEND

- MONITORING WELL LOCATION
- APPROXIMATE WATER TABLE ELEVATION (AUGUST 2009)
- INFERRED DIRECTION OF GROUNDWATER FLOW
- ESTIMATED LIMIT OF GROUNDWATER CRITERIA EXCEEDANCES
- ROASTED ORE WASTE
- WASTE ROCK
- FILL
- ALLUVIUM
- TILL
- BEDROCK

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FIGURE 5-6

CROSS-SECTION E-E', ORB
ELY COPPER MINE
SUPERFUND SITE
VERSHIRE, VERMONT

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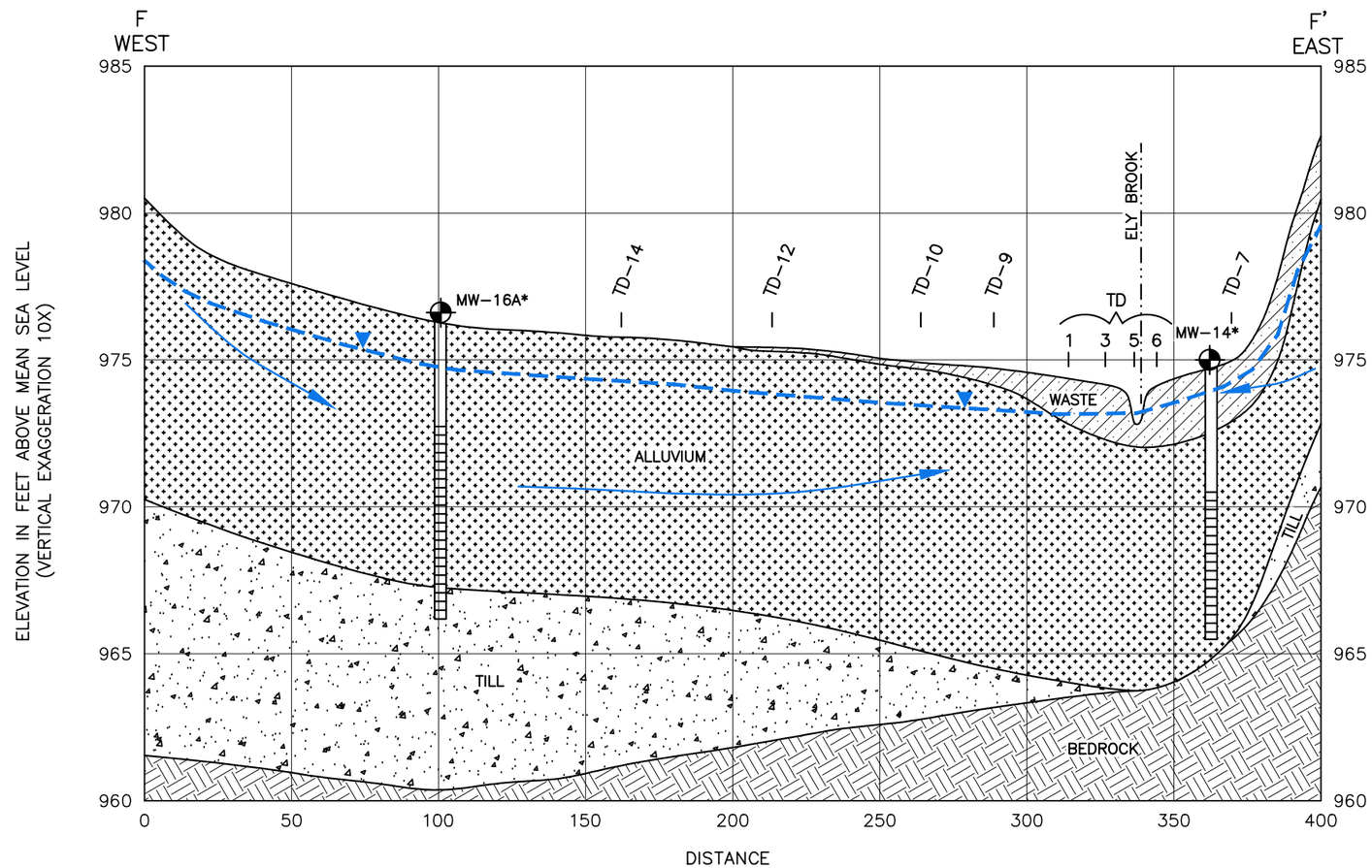
PROJECT:	80024.09	JUNE 2011	

R:\80000 Task Orders\80024 Ely Copper Mine\CAD\dwg\80024-SUBSURFACE-SECTION.dwg



0 50' 100'

LEGEND

- TEST PIT LOCATION
- MONITORING WELL LOCATION
- —TD-10 SOIL TRANSECT SAMPLE LOCATION
- APPROXIMATE WATER TABLE ELEVATION (AUGUST 2009)
- INFERRED DIRECTION OF GROUNDWATER FLOW
- WASTE
- ALLUVIUM
- TILL
- BEDROCK

*NOTE:
WELL MW-14A PROJECTED FROM 50' SOUTH OF SECTION LINE. WELL MW-16A PROJECTED FROM APPROXIMATELY 265' NORTH OF SECTION LINE.

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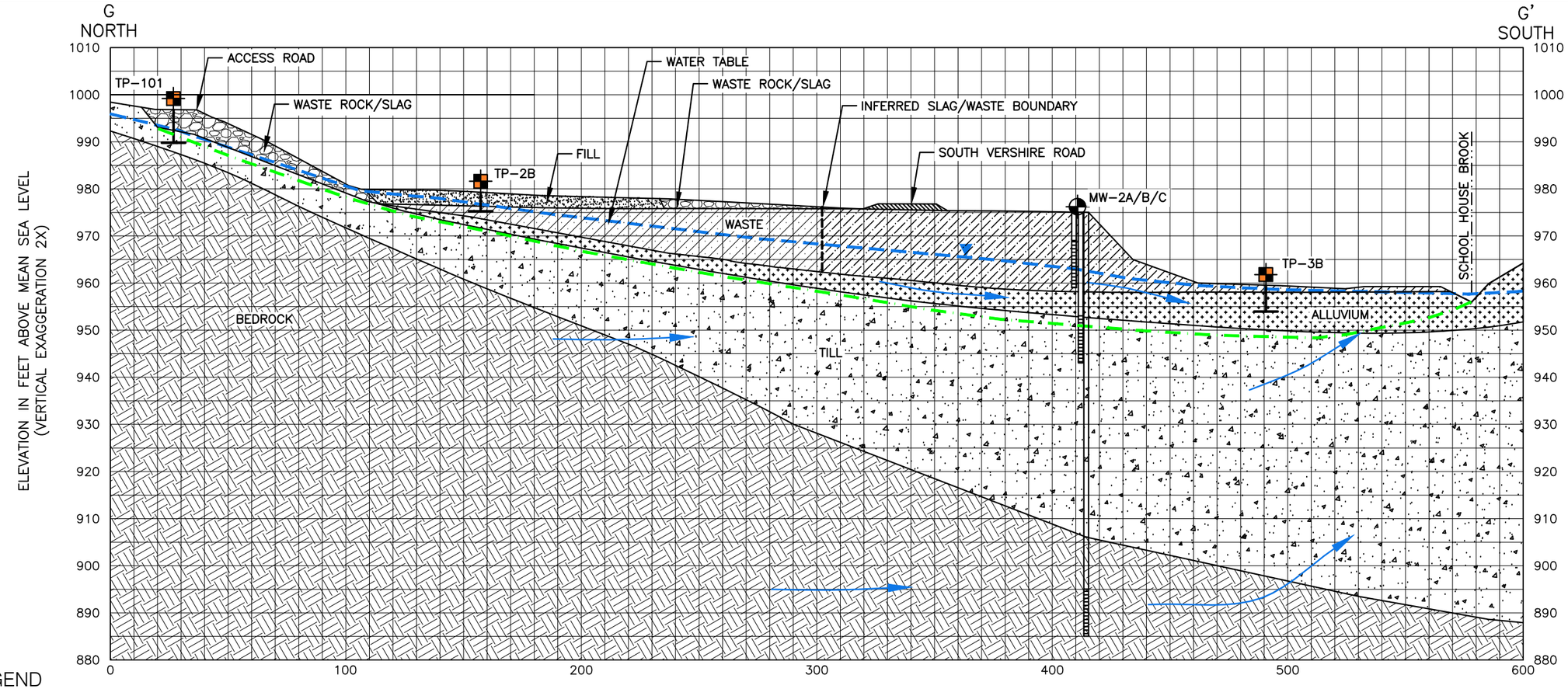
FIGURE 5-7

CROSS-SECTION F-F', ELY BROOK LOWER REACH
ELY COPPER MINE
SUPERFUND SITE
VERSHIRE, VERMONT

DRAWN BY:	ML	APPROVED BY:	AB
PROJECT:	80024.09	JUNE 2011	

R:\80000 Task Orders\80024 Ely Copper Mine\CAD\dwg\80024-SUBSURFACE-SECTION.dwg



LEGEND

- TEST PIT LOCATION
- MONITORING WELL LOCATION
- APPROXIMATE WATER TABLE ELEVATION (AUGUST 2009)
- INFERRED DIRECTION OF GROUNDWATER FLOW
- ESTIMATED LIMIT OF GROUNDWATER CRITERIA EXCEEDANCES
- ROAD BASE
- WASTE (SLAG, FILL, WASTE ROCK)
- SLAG
- WASTE ROCK
- FILL
- ALLUVIUM
- TILL
- BEDROCK

DISTANCE

0 50' 100'

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FIGURE 5-8

CROSS-SECTION G-G', SMELTER/SLAG PILE AREA
ELY COPPER MINE
SUPERFUND SITE
VERSHIRE, VERMONT

DRAWN BY:	ML	APPROVED BY:	AB
PROJECT:	80024.09	JUNE 2011	

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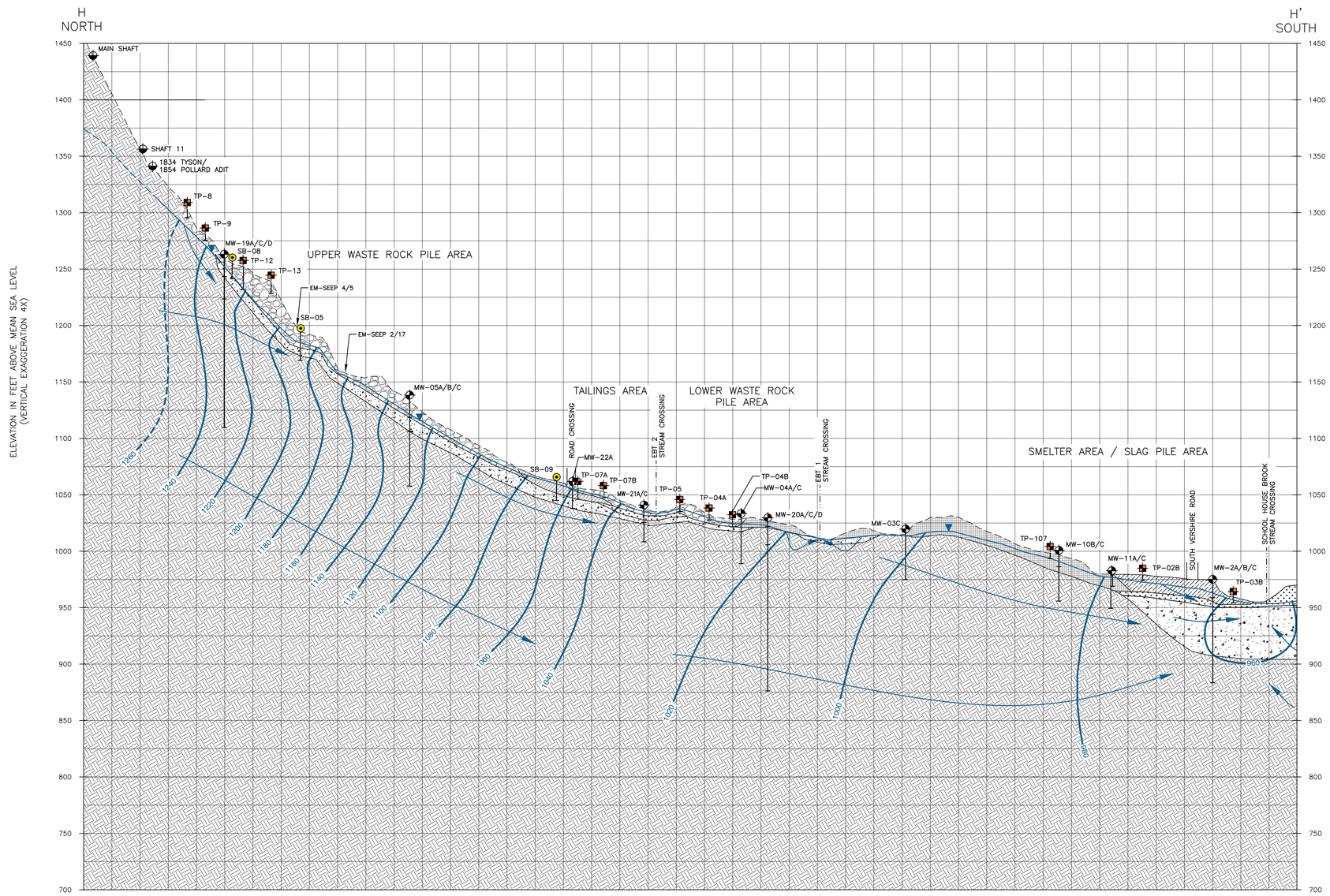

DISTANCE

0 200' 400'

NOTE:
BASE CROSS-SECTION TOPOGRAPHY AND GEOLOGY
FROM URS, 2009 MODIFIED EQUIPOTENTIAL CONTOURS.

LEGEND

MW-03C	MONITORING WELL
SB-05	TEST BORING
TP-12	TEST PIT
	BEDROCK – GILE MOUNTAIN FORMATION – GRAY, SCHIST, ACCESSORY MINERALS INCLUDE GARNET, MICA, BIOTITE, GRAPHITE, QUARTZ AND CHALCOPYRITE
	GLACIAL TILL – GRAY TO OLIVE GRAY, CLAYEY SILT GRAVELLY SILTY SAND, MEDIUM DENSE TO VERY DENSE, FINE SAND OFTEN CONTAINS FINE TO COARSE ANGULAR TO SUBROUNDED GRAVEL
	SLAG AND/OR SMELTER WASTE – GRAY TO BLACK, GLASSY TO COARSELY CRYSTALLINE W/LUSTER RANGING FROM METALLIC TO MATTE, SLAG IS INTERSPERSED/MIXED WITH WASTE ROCK, DESCRIBED BELOW, EAST OF THE ROAD
	ALLUVIUM – BROWN TO DARK BROWN SILTY SAND WITH ORGANIC MATTER, LOOSE
	TAILINGS – BROWNISH-YELLOW, PALE YELLOW, GRAY TO BLACK SILTY FINE SAND WITH LITTLE GRAVEL, THINLY LAYERED WITH JAROSITE, PYRRHOTITE, AND MUSCOVITE RICH LAYERS
	WASTE ROCK – YELLOWISH BROWN TO RED MEDIUM TO FINE SAND AND MEDIUM TO FINE ANGULAR TO SUBROUNDED GRAVEL
	FILL – REWORKED TILL AND ALLUVIUM WITH ROCK FRAGMENTS
	INTEPRETED GROUNDWATER SURFACE (DASHED WHERE INFERRED) (NOTE: BASED ON WATER LEVEL OBSERVATIONS SUMMER 2009)
1000	GROUNDWATER EQUIPOTENTIAL CONTOUR (NOTE: BASED ON WATER LEVEL OBSERVATIONS SUMMER 2009)
	INFERRED DIRECTION OF GROUNDWATER FLOW

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FIGURE 5-9

CROSS SECTION H-H'
ELY COPPER MINE
SUPERFUND SITE
VERSHIRE, VERMONT

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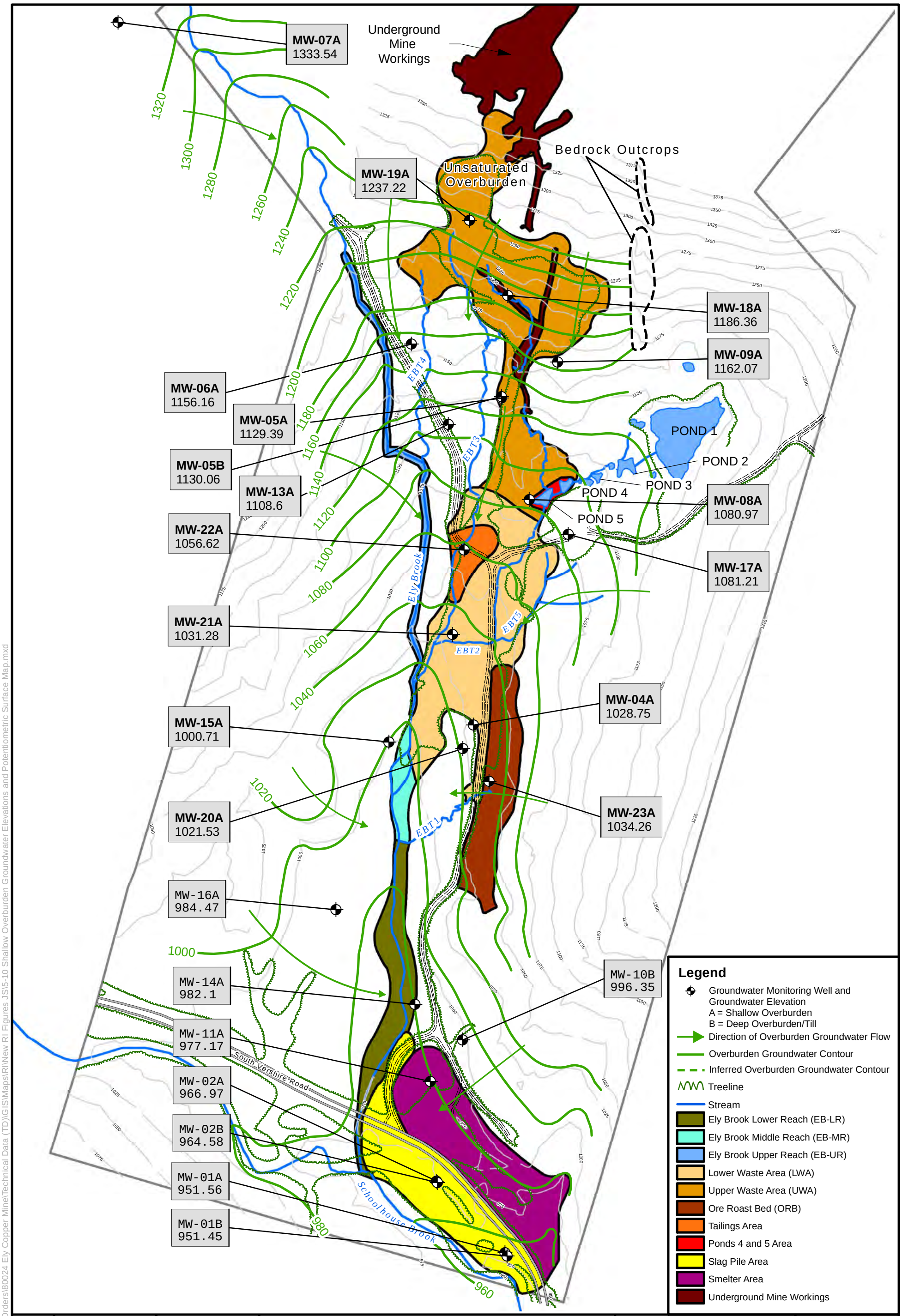

N

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June 24, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

NOTE: Elevations shown are feet above mean sea level (FT-AMSL) and were measured by Nobis Engineering, Inc. August 2009.

FIGURE 5-10
Shallow Overburden Groundwater Elevations and Potentiometric Surface Map
Ely Copper Mine
Vershire, Vermont

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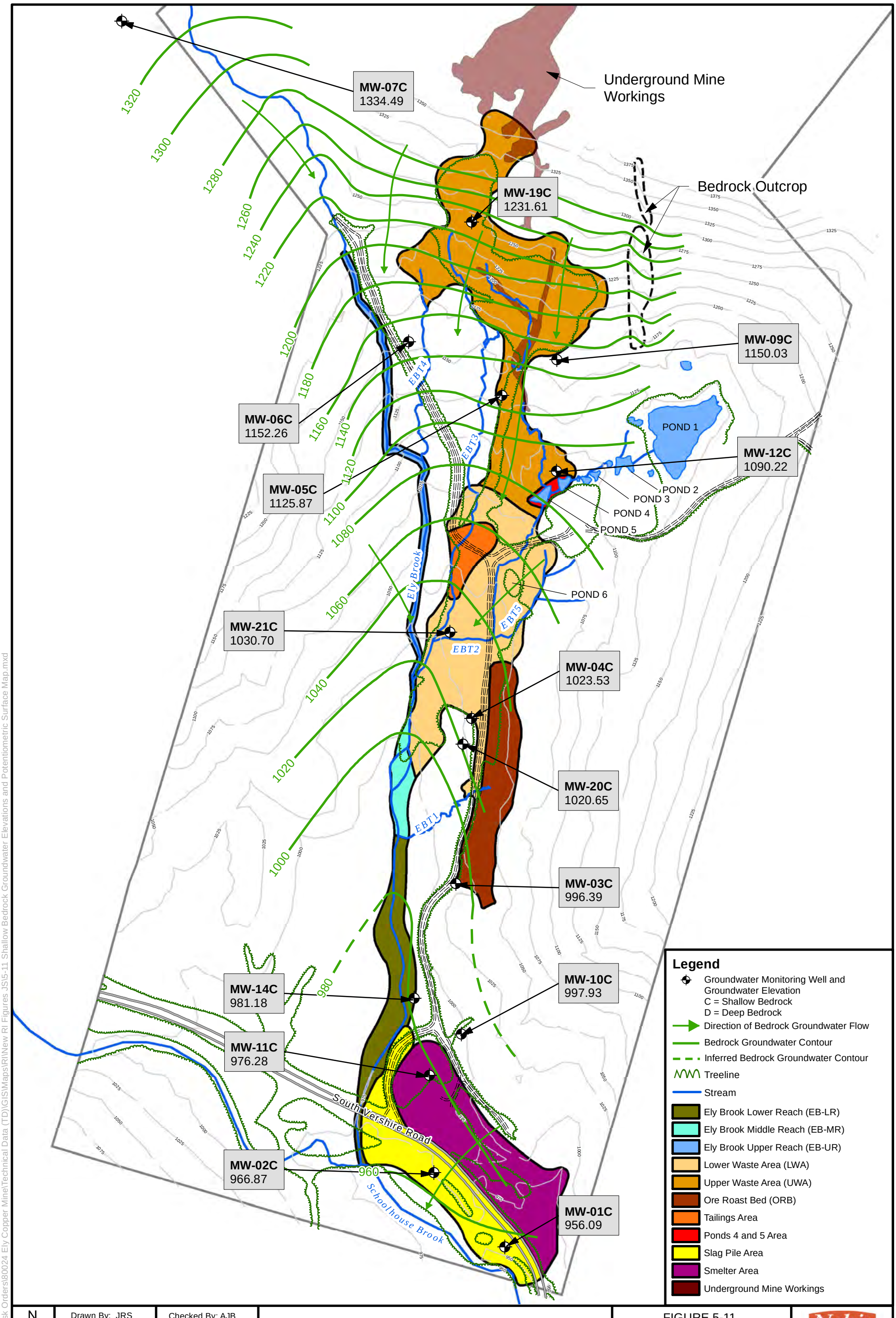

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APPROXIMATE SCALE
0 150 300 600 Feet

NOTE: Elevations shown are feet above mean sea level (FT-AMSL) measured by Nobis Engineering, Inc. in August 2009.

FIGURE 5-11
Shallow Bedrock Groundwater Elevations and Potentiometric Surface Map
Ely Copper Mine
Vershire, Vermont

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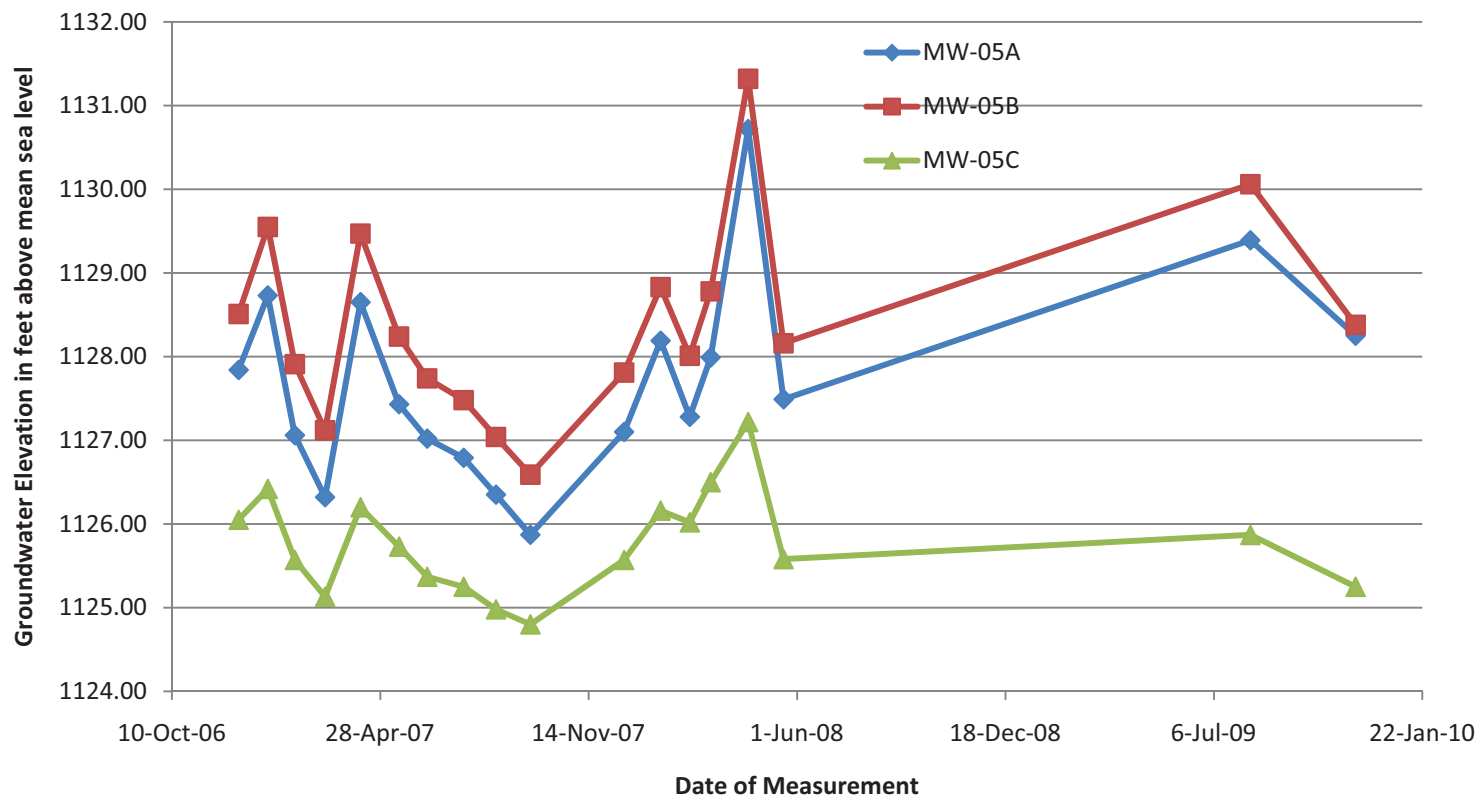

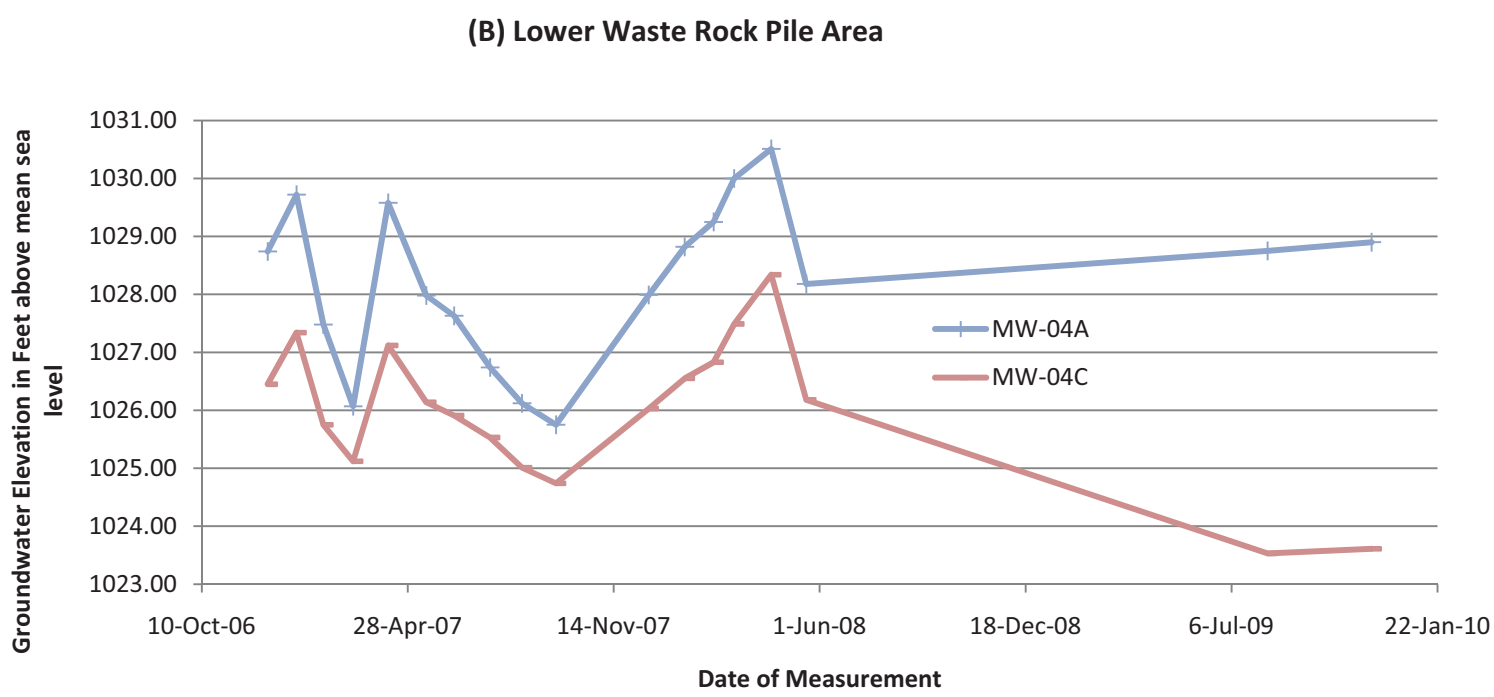

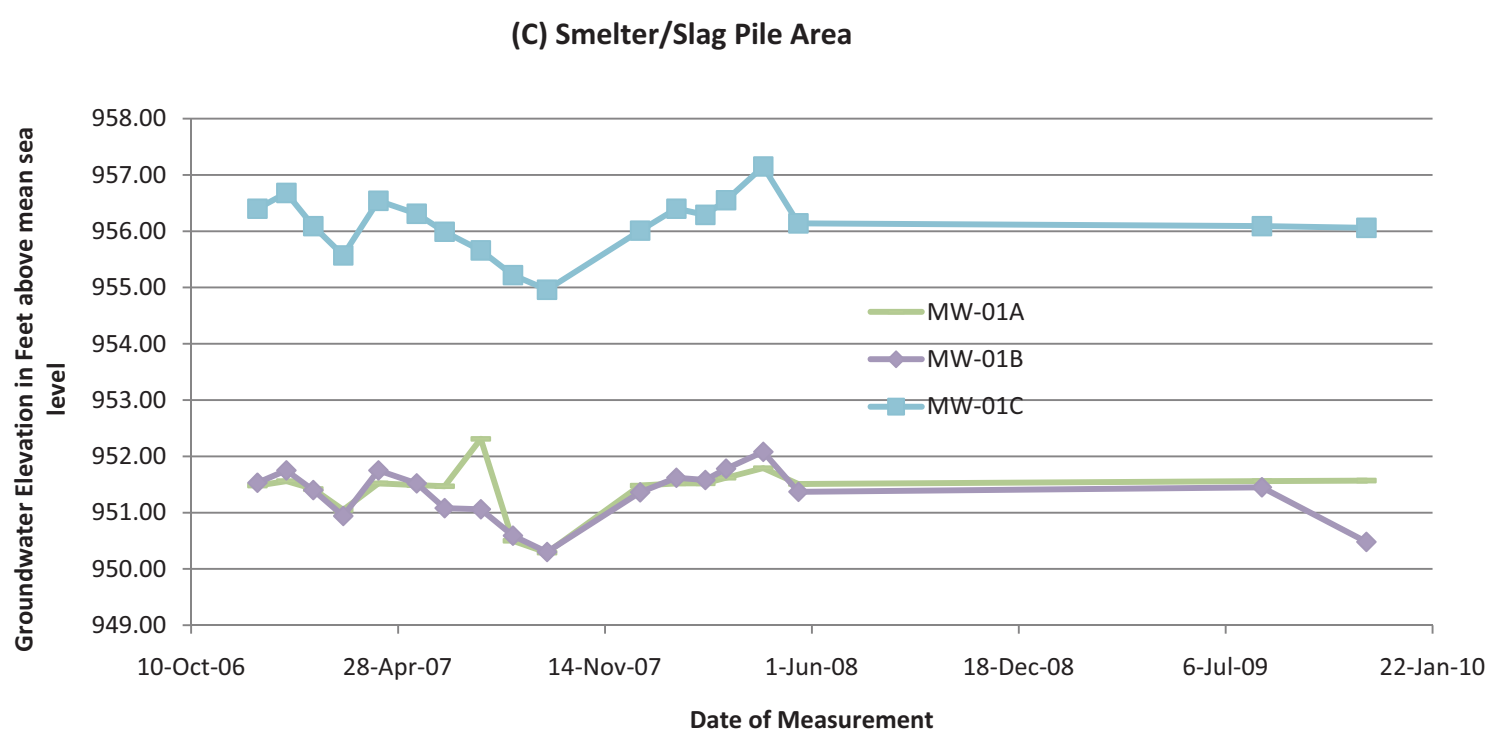

Figure 5-12

GROUNDWATER LEVEL FLUCTUATIONS FROM 2006 TO 2009
ELY COPPER MINE SUPERFUND SITE,
VERSHIRE, VERMONT

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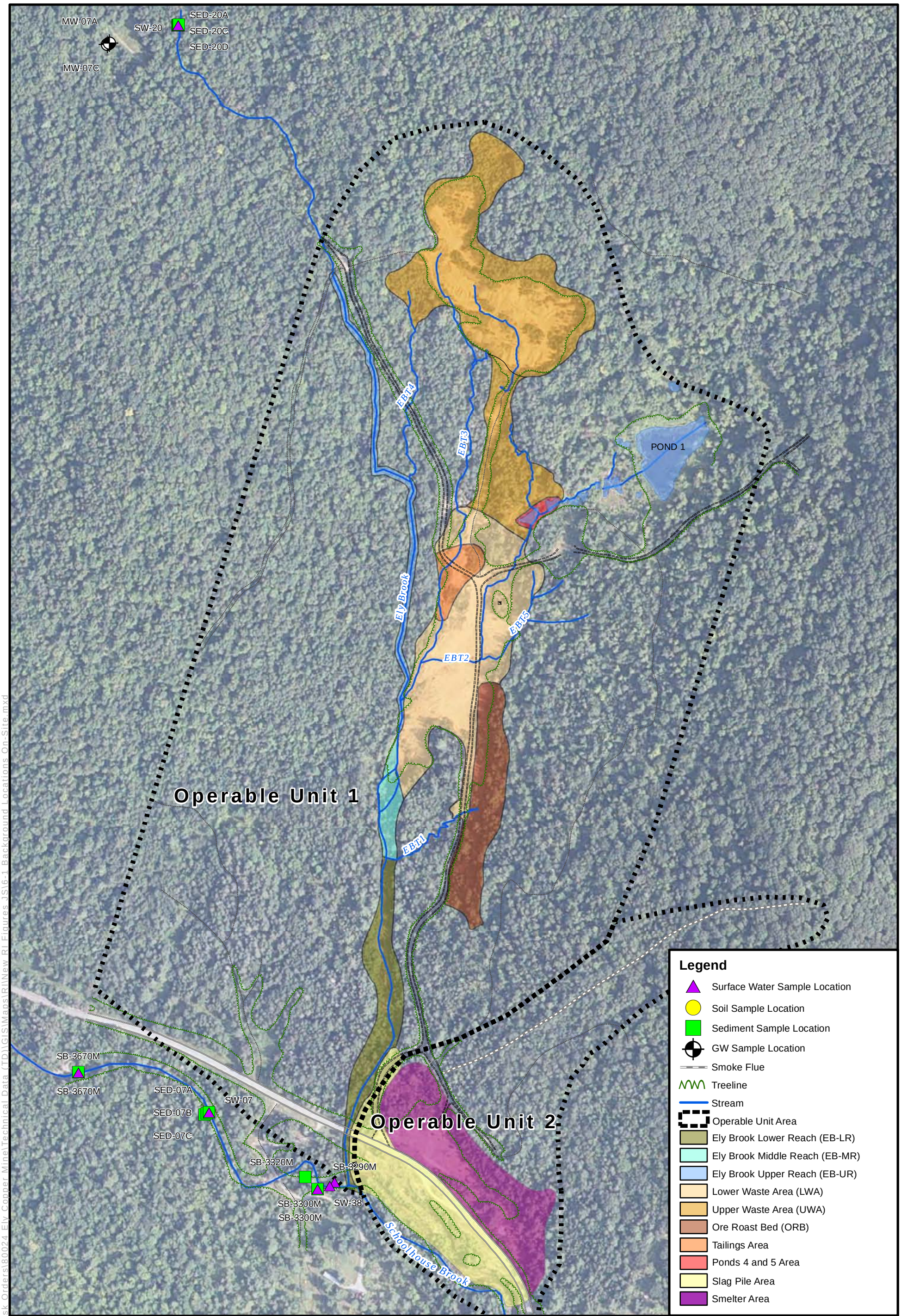

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APPROXIMATE SCALE
0 150 300 600 Feet

FIGURE 6-1
On-Site Background Sample Locations
Ely Copper Mine
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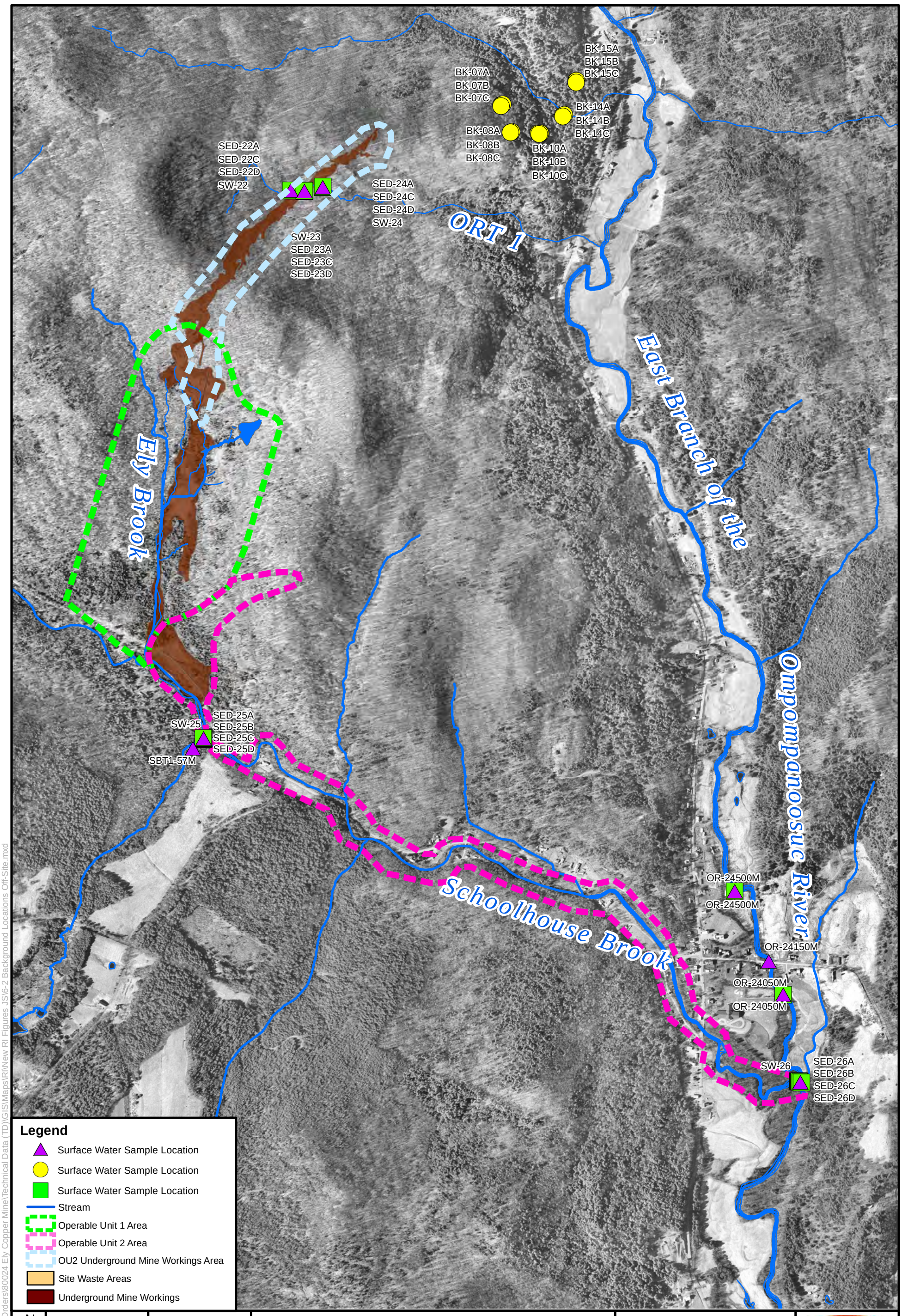

N

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APPROXIMATE SCALE
0 500 1,000 2,000 Feet

FIGURE 6-2
Off-Site Background
Sample Locations
Ely Copper Mine
Vershire, Vermont

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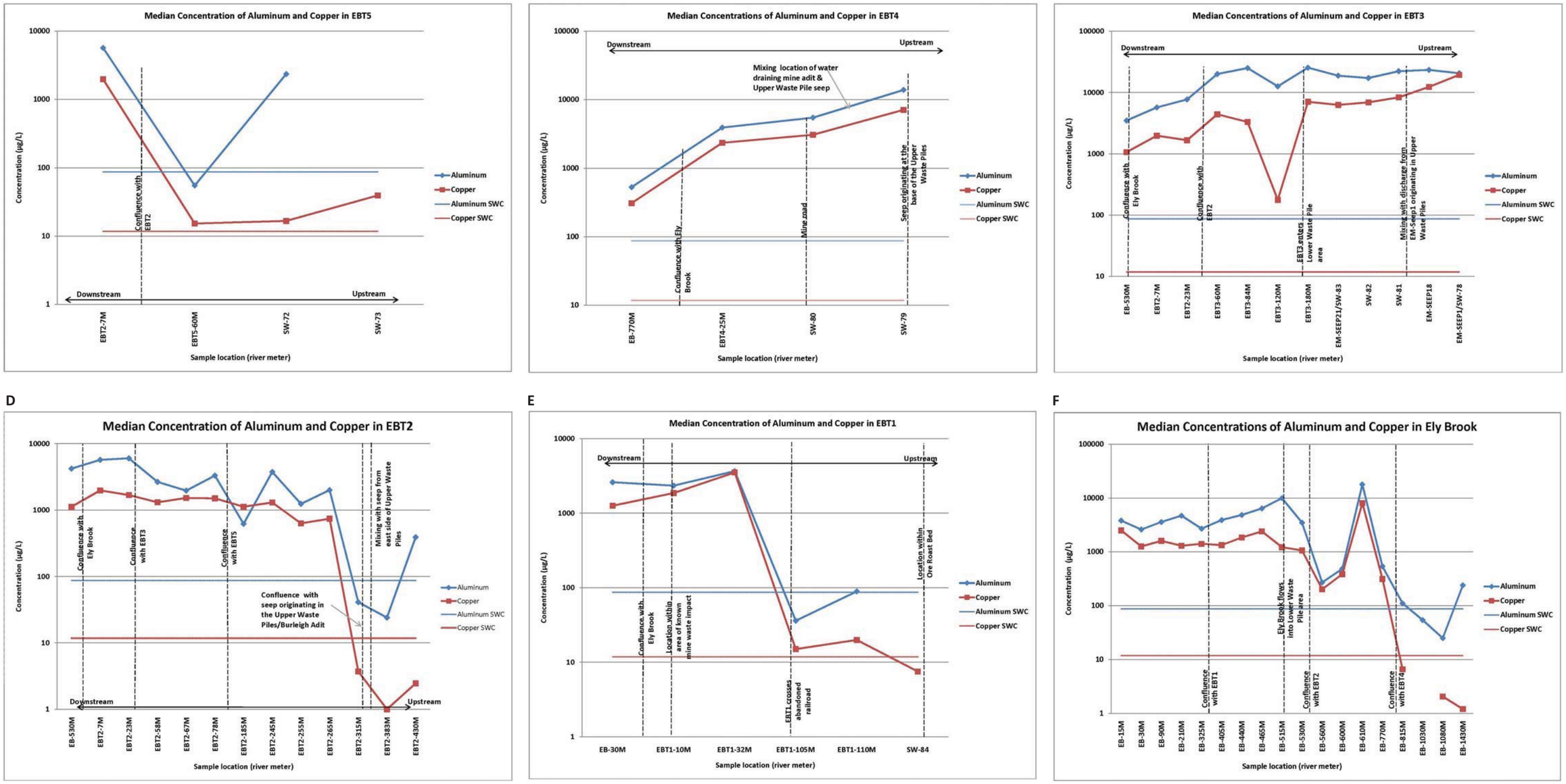

Caption: Graphs indicate median concentrations of aluminum and copper in: A) EBT5 showing the confluence with EBT2, B) EBT4 showing the location of the Upper Waste Piles, mine road, and confluence with Ely Brook, C) EBT3 showing the location of mixing with EM-SEEP1, where EBT3 enters the Lower Waste Piles, confluence with EBT2, and the confluence with Ely Brook, D) EBT2 showing mixing locations from the Upper Waste Piles, confluences with EBT5, EBT3, and Ely Brook, E) EBT1 showing location of Ore Roast bed, abandoned railroad, known mine waste impact, and the confluence with Ely Brook, F) Ely Brook showing confluences with EBT4, EBT2, and EBT1 and location of Lower Waste Piles.

Figure 6-3
Surface Water Confluence Profile Graphs
Ely Copper Mine Superfund Site, Vershire, Vermont

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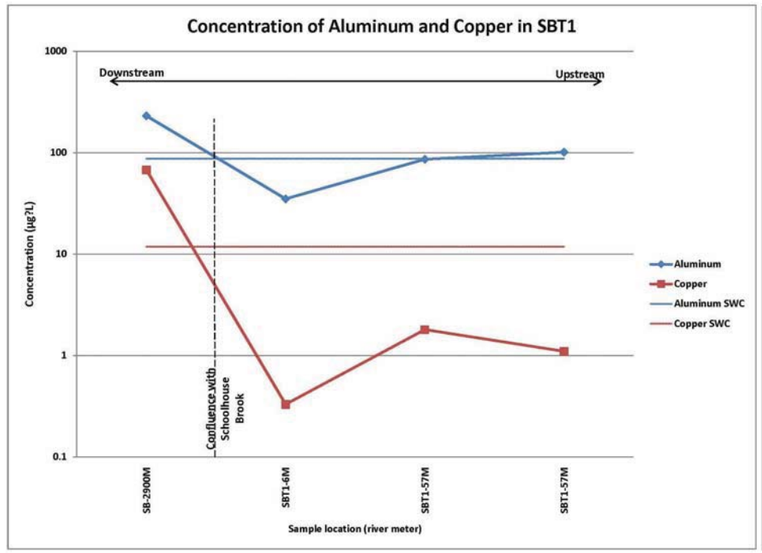
G



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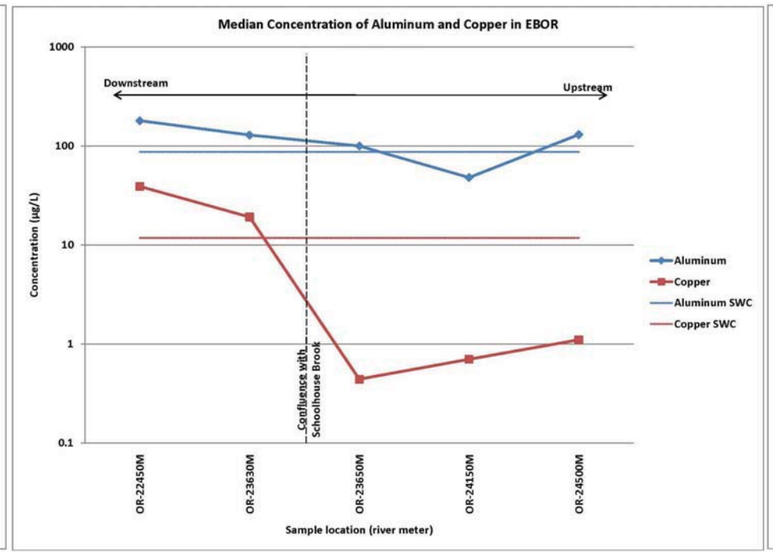

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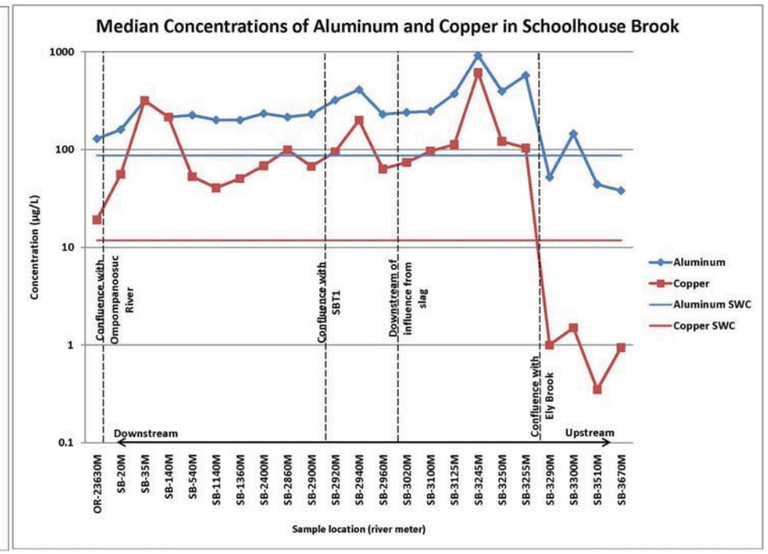

Caption: Graphs indicate median concentrations of aluminum and copper in: G) SBT1 showing confluence with the main stem of Schoolhouse Brook, H) Schoolhouse Brook showing confluence with Ely Brook, SBT1, and the Ompompanoosuc River and the point downstream of the influence of the slag pile, and I) EBOR showing the confluence with Schoolhouse Brook.

Figure 6-4
Surface Water Confluence Profile Graphs
Ely Copper Mine Superfund Site, Vershire, Vermont

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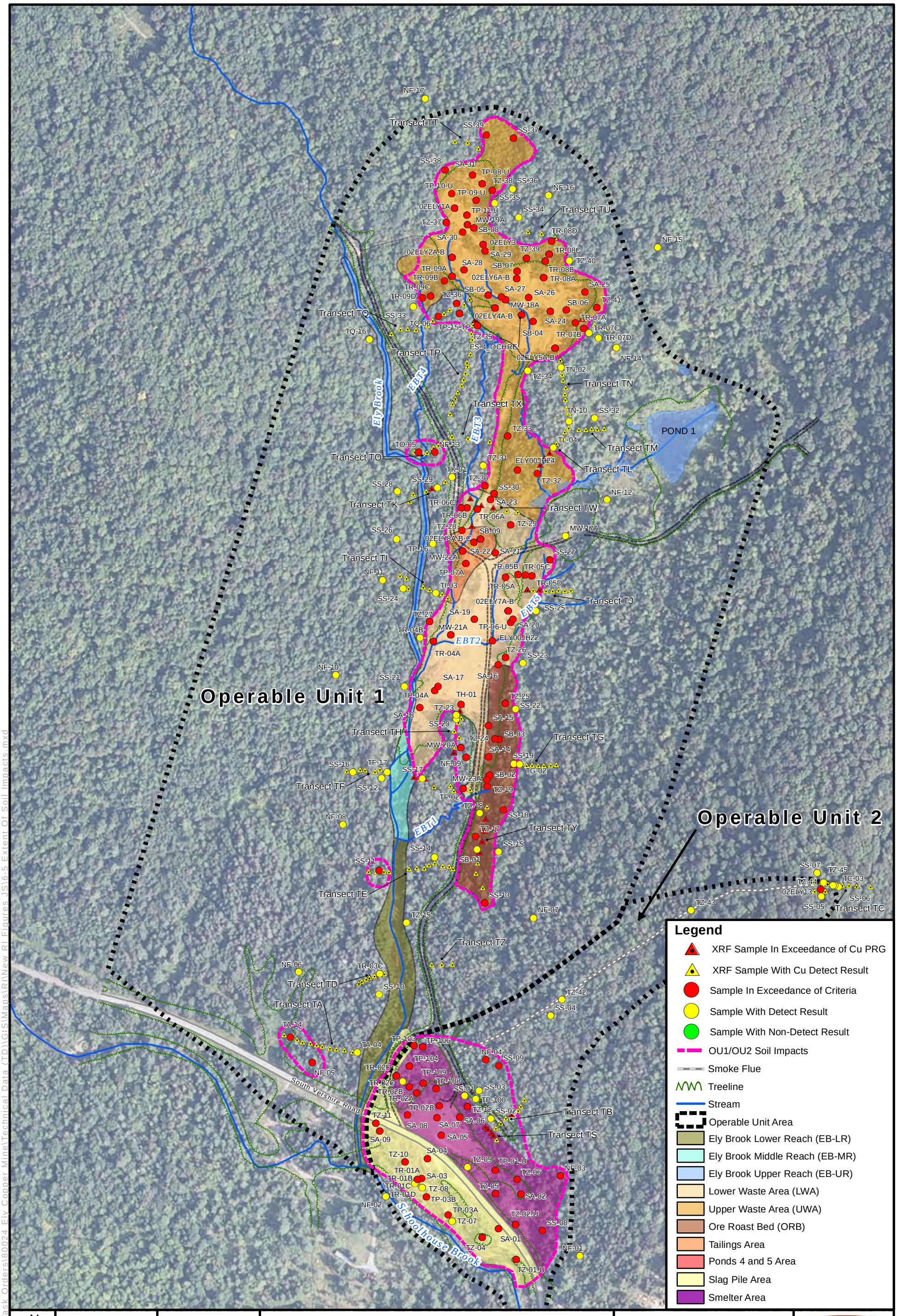

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June 21, 2011	Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

NOTES:
PRG
Cobalt 24 mg/kg
Copper 629 mg/kg
Iron 44,800 mg/kg

FIGURE 6-5
Extent of Soil Impacts
Ely Copper Mine
Vershire, Vermont

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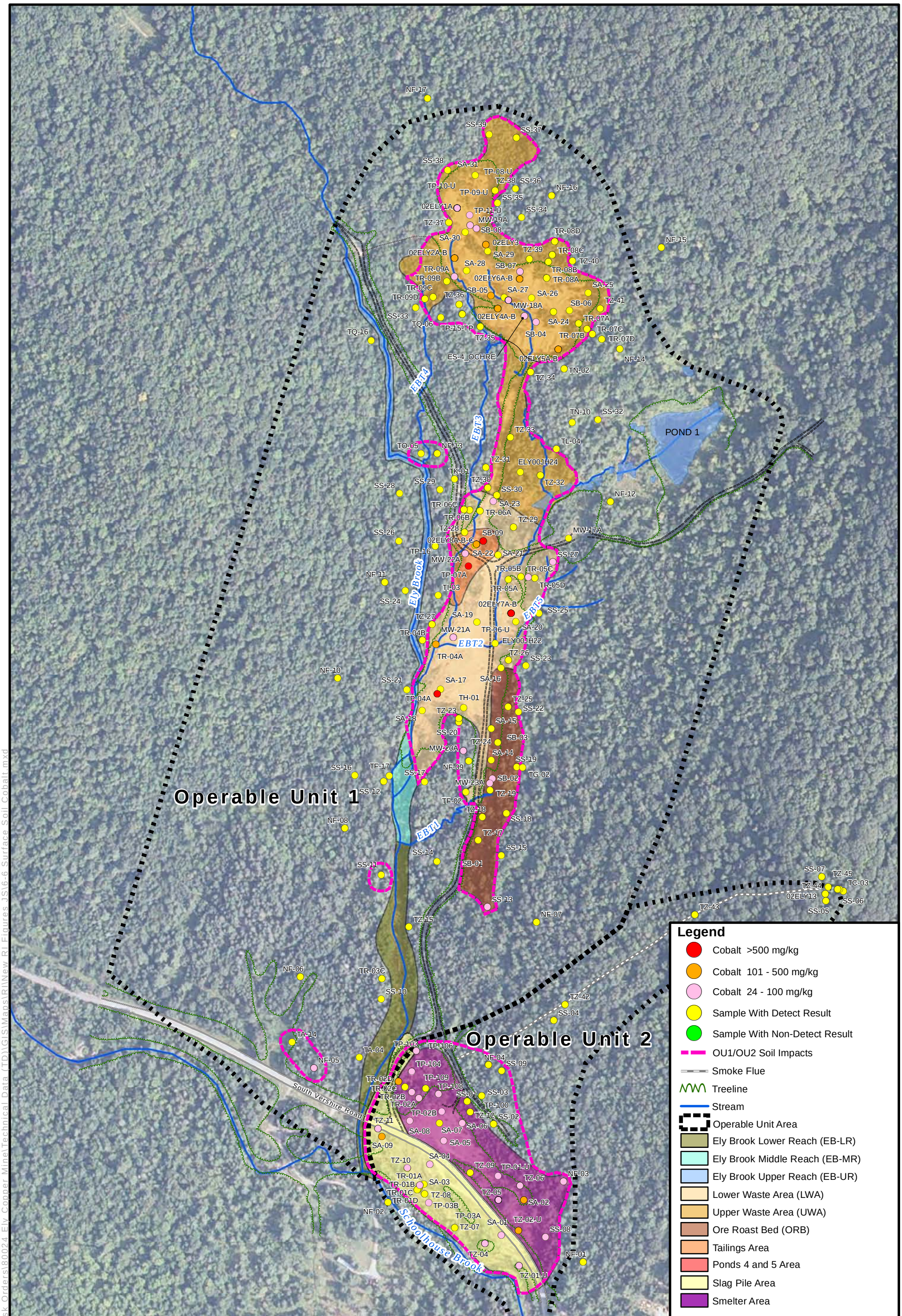

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APPROXIMATE SCALE
0 150 300 600 Feet

NOTES:
PRG
Cobalt 24 mg/kg

FIGURE 6-6
Surface Soil
Cobalt
Ely Copper Mine
Vershire, Vermont

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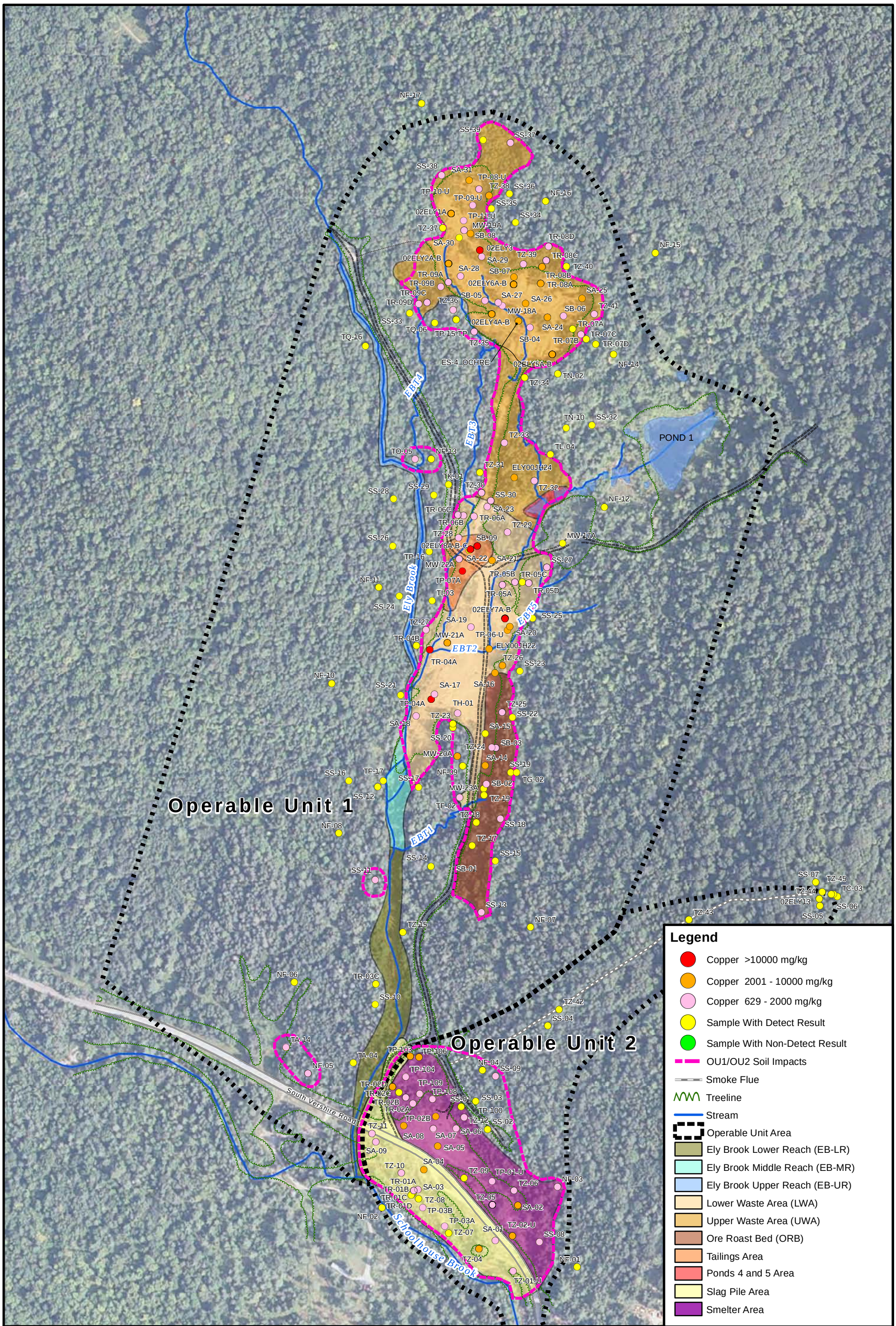

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APPROXIMATE SCALE
0 150 300 600 Feet

NOTES:
PRG
Copper 629 mg/kg

FIGURE 6-7
Surface Soil
Copper
Ely Copper Mine
Vershire, Vermont

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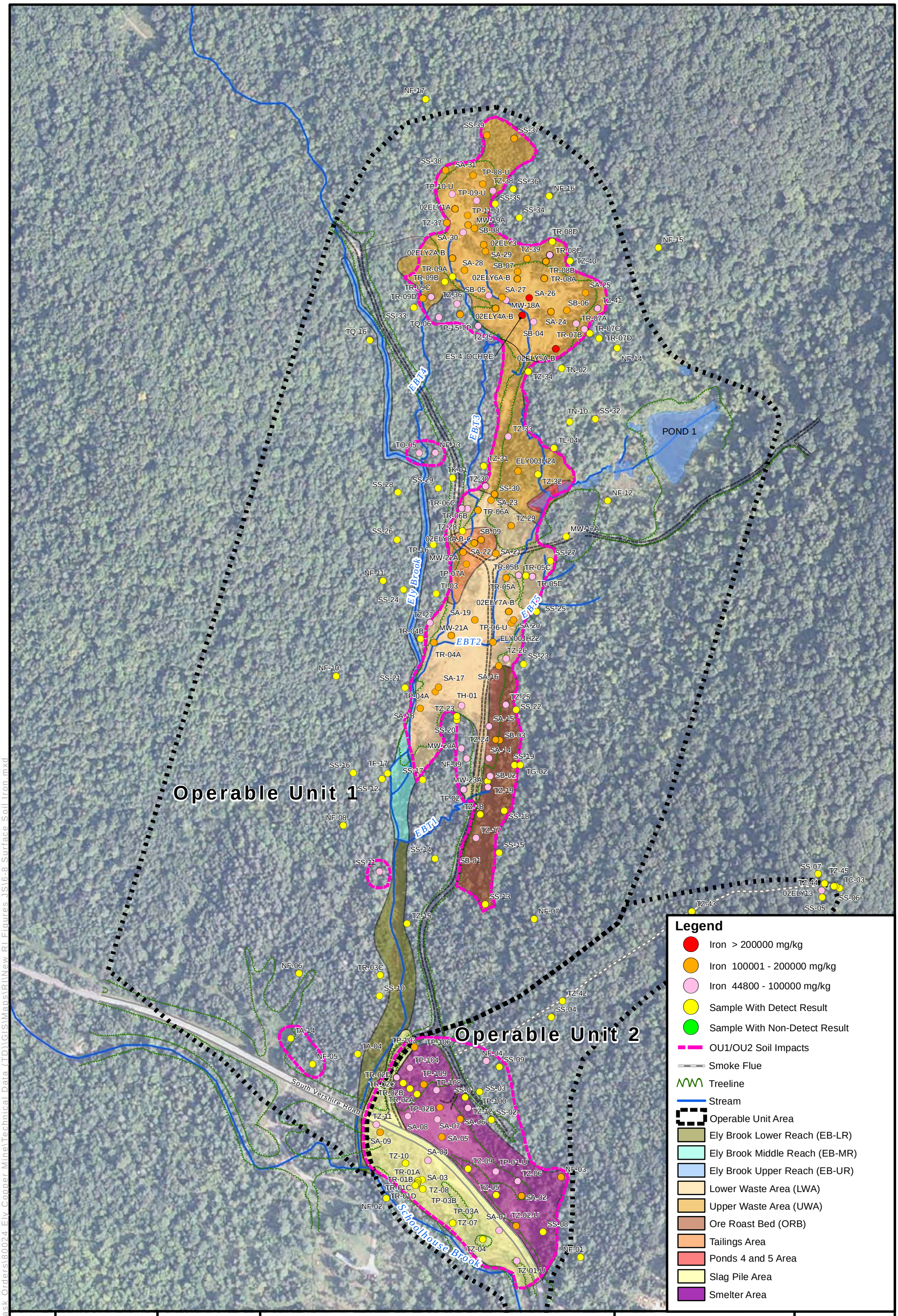

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APPROXIMATE SCALE
0 150 300 600 Feet

NOTES:
PRG
Iron 44,800 mg/kg

FIGURE 6-8
Surface Soil
Iron
Ely Copper Mine
Vershire, Vermont

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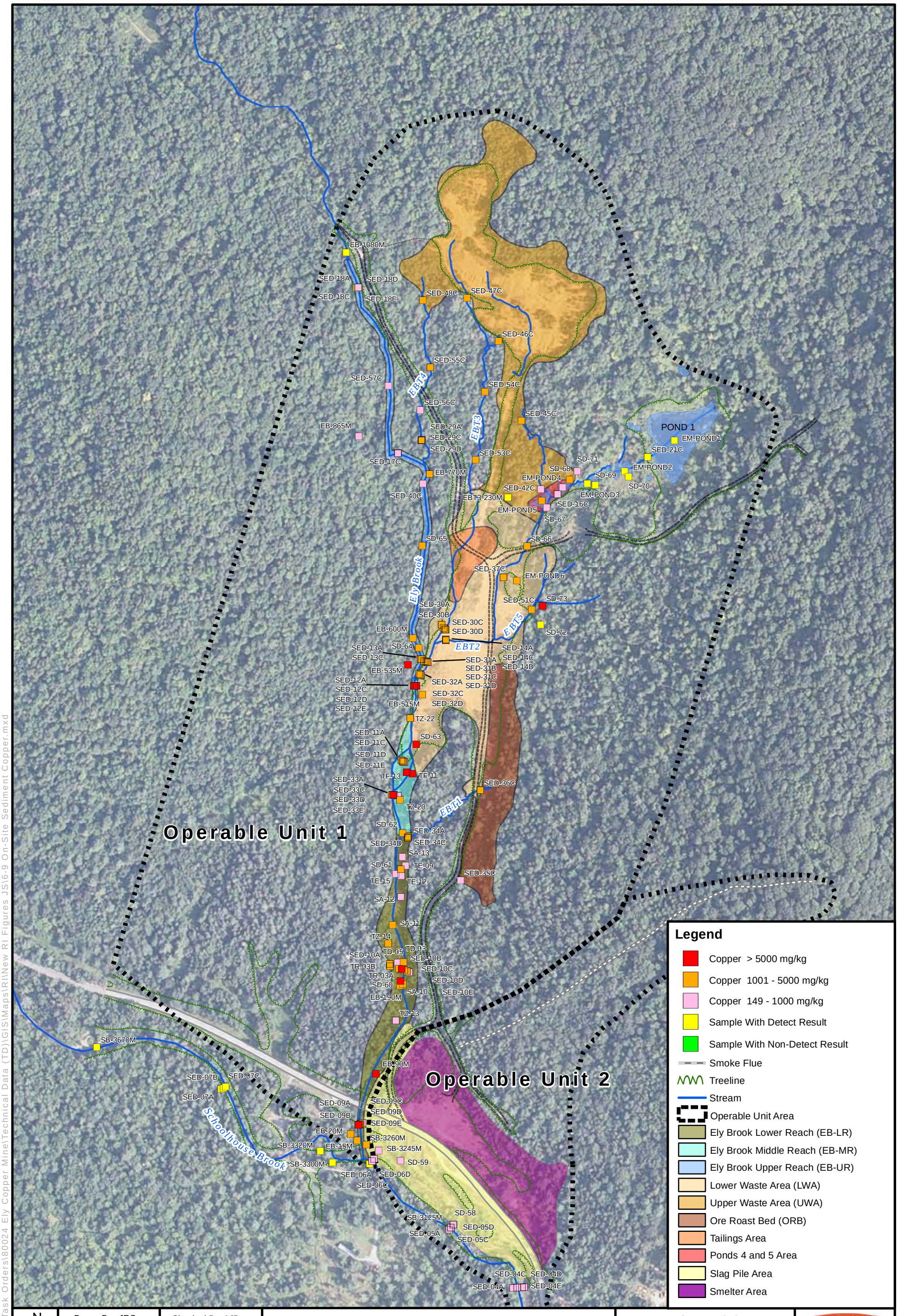

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APPROXIMATE SCALE
0 150 300 600 Feet

NOTES:
Sediment PRG
Copper 149 mg/kg

FIGURE 6-9
On-Site Sediment
Copper
Ely Copper Mine
Vershire, Vermont

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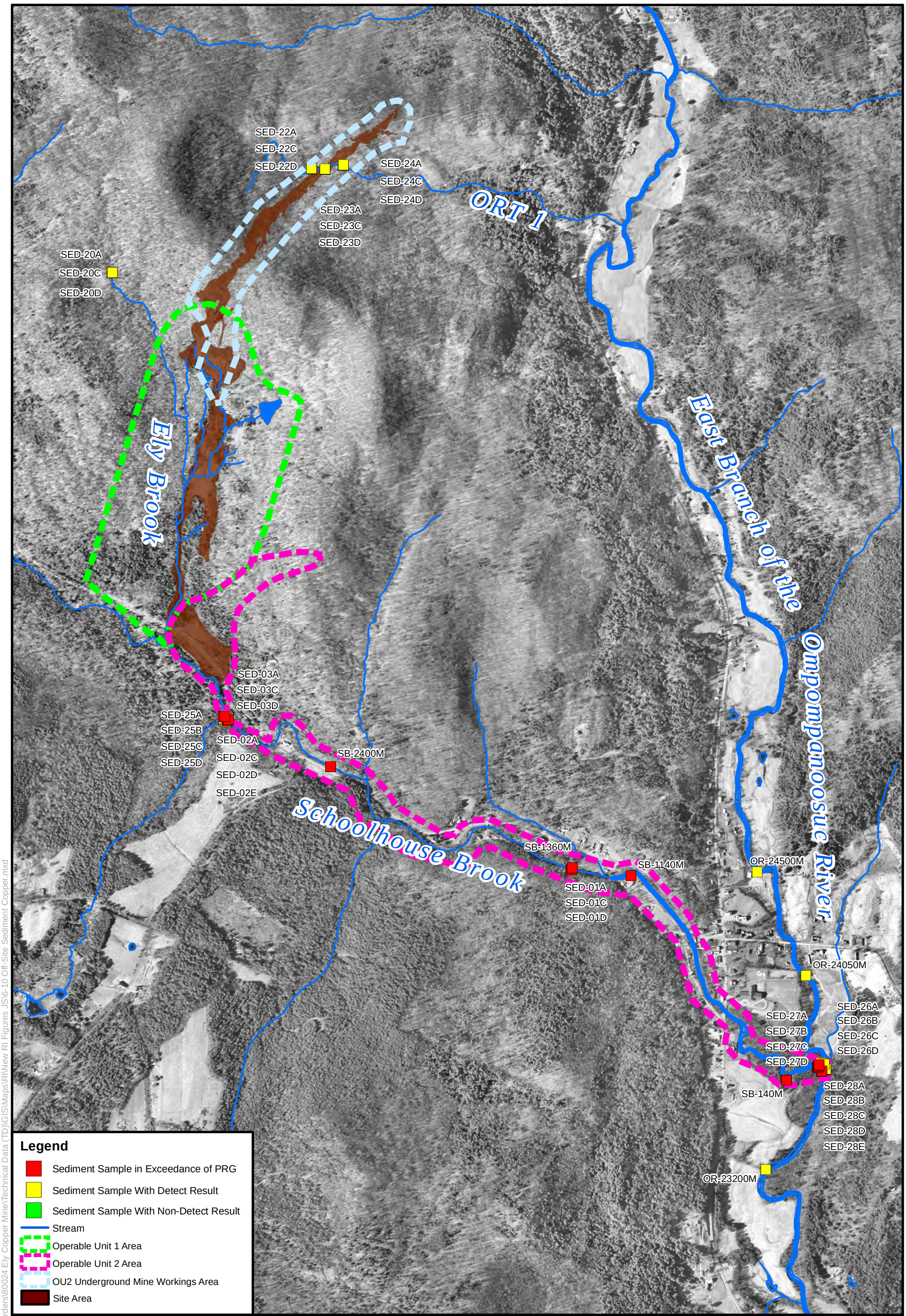

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APPROXIMATE SCALE
0 500 1,000 2,000 Feet

NOTES:
Sediment PRG
Copper 149 mg/kg

FIGURE 6-10
Off-Site Sediment
Copper
Ely Copper Mine
Vershire, Vermont

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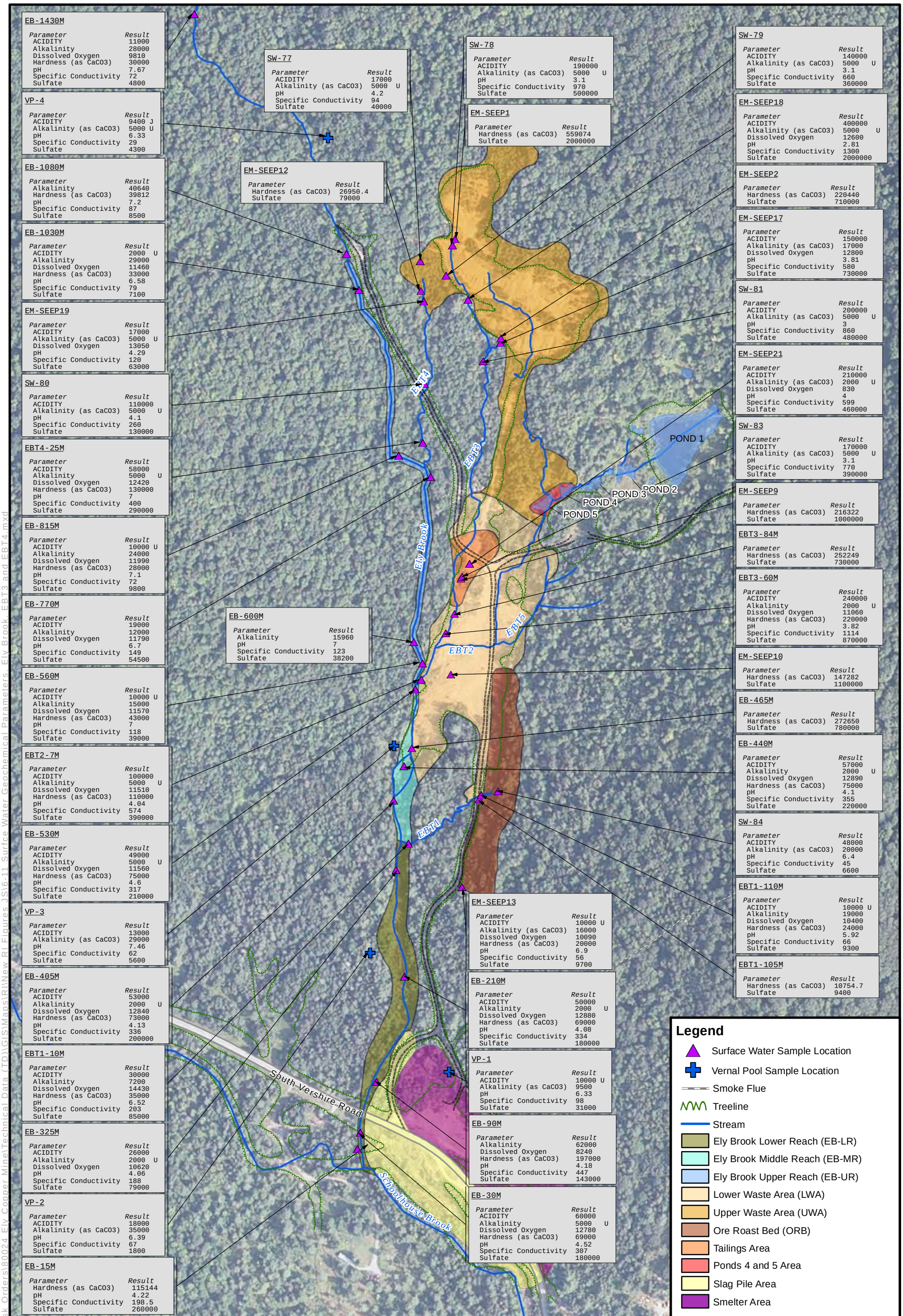

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APPROXIMATE SCALE
0 150 300 600 Feet

UNITS
ACIDITY ug/L
Alkalinity ug/L
Dissolved Oxygen ug/L
Hardness (as CaCO3) ug/L
pH SU
Specific Conductivity uS/cm
Sulfate ug/L

NOTES:
U - Non-Detect
Maximum value of each parameter is shown

FIGURE 6-11
Surface Water Geochemical Parameters, Ely Brook, EBT3, EBT4
Ely Copper Mine
Vershire, Vermont

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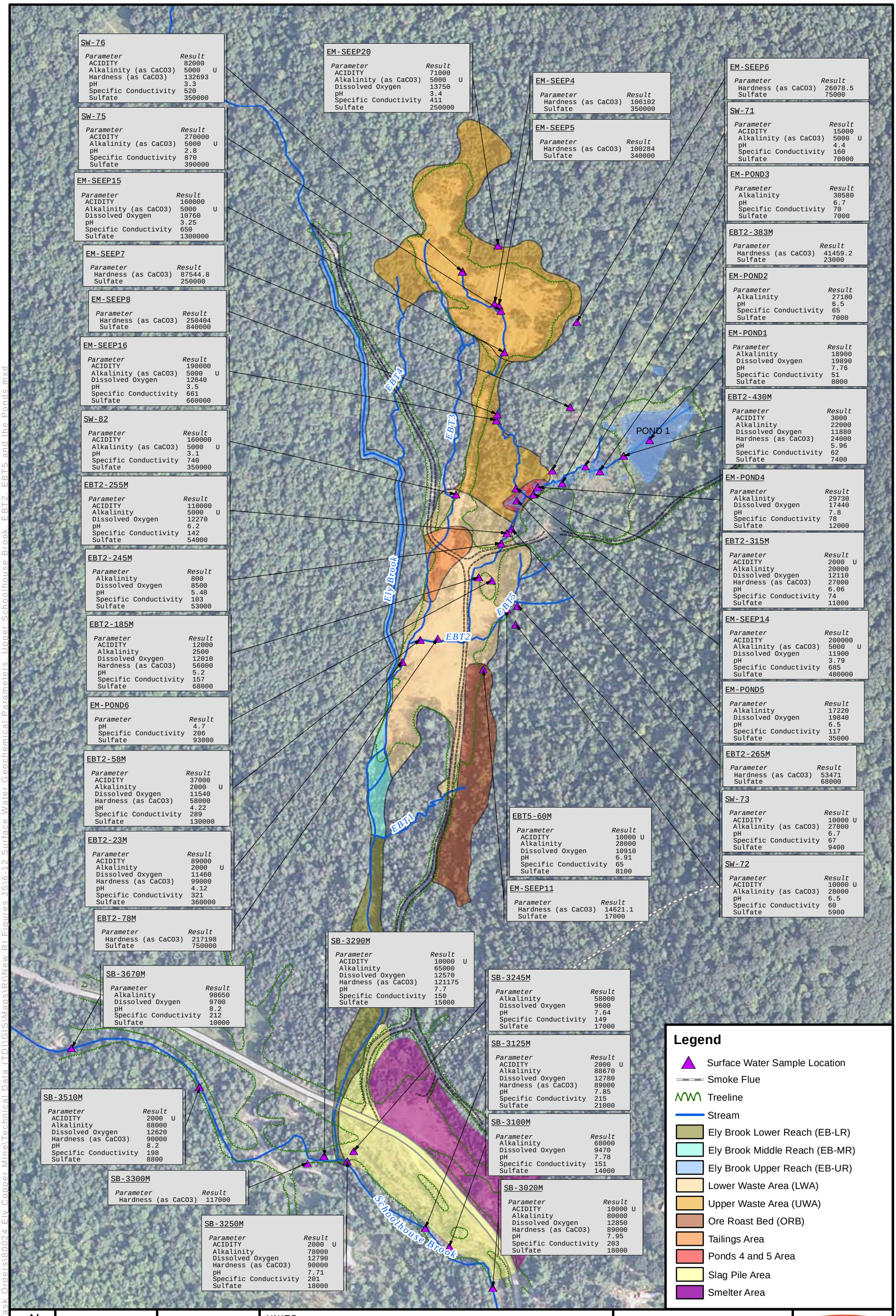
Path: R:\180000 Task Orders\180024 Ely Copper Mine\Technical Data (TD)\GIS\Maps\R\New RI Figures JS\6-11 Surface Water Geochemical Parameters, Ely Brook, EBT3 and EBT4.mxd



SW-76

Parameter	Result	
ACIDITY	82000	
Alkalinity (as CaCO3)	5000	U
Hardness (as CaCO3)	132693	
pH	3.3	
Specific Conductivity	520	
Sulfate	350000	

SW-75

Parameter	Result	
ACIDITY	270000	
Alkalinity (as CaCO3)	5000	U
pH	2.8	
Specific Conductivity	870	
Sulfate	390000	

EM-SEEP15

Parameter	Result	
ACIDITY	160000	
Alkalinity (as CaCO3)	5000	U
Dissolved Oxygen	10760	
pH	3.25	
Specific Conductivity	650	
Sulfate	1300000	

EM-SEEP7

Parameter	Result
Hardness (as CaCO3)	87544.8
Sulfate	250000

EM-SEEP8

Parameter	Result
Hardness (as CaCO3)	250404
Sulfate	840000

EM-SEEP16

Parameter	Result	
ACIDITY	190000	
Alkalinity (as CaCO3)	5000	U
Dissolved Oxygen	12640	
pH	3.5	
Specific Conductivity	661	
Sulfate	660000	

SW-82

Parameter	Result	
ACIDITY	160000	
Alkalinity (as CaCO3)	5000	U
pH	3.1	
Specific Conductivity	740	
Sulfate	350000	

EBT2-255M

Parameter	Result	
ACIDITY	110000	
Alkalinity	5000	U
Dissolved Oxygen	12270	
pH	6.2	
Specific Conductivity	142	
Sulfate	54000	

EBT2-245M

Parameter	Result
Alkalinity	800
Dissolved Oxygen	8500
pH	5.48
Specific Conductivity	103
Sulfate	53000

EBT2-185M

Parameter	Result
ACIDITY	12000
Alkalinity	2500
Dissolved Oxygen	12010
Hardness (as CaCO3)	56000
pH	5.2
Specific Conductivity	157
Sulfate	68000

EM-POND6

Parameter	Result
pH	4.7
Specific Conductivity	206
Sulfate	93000

EBT2-58M

Parameter	Result	
ACIDITY	37000	
Alkalinity	2000	U
Dissolved Oxygen	11540	
Hardness (as CaCO3)	58000	
pH	4.22	
Specific Conductivity	289	
Sulfate	130000	

EBT2-23M

Parameter	Result	
ACIDITY	89000	
Alkalinity	2000	U
Dissolved Oxygen	11460	
Hardness (as CaCO3)	99000	
pH	4.12	
Specific Conductivity	321	
Sulfate	360000	

EBT2-78M

Parameter	Result
Hardness (as CaCO3)	217198
Sulfate	750000

EM-SEEP20

Parameter	Result	
ACIDITY	71000	
Alkalinity (as CaCO3)	5000	U
Dissolved Oxygen	13750	
pH	3.4	
Specific Conductivity	411	
Sulfate	250000	

EM-SEEP4

Parameter	Result
Hardness (as CaCO3)	106102
Sulfate	350000

EM-SEEP5

Parameter	Result
Hardness (as CaCO3)	100284
Sulfate	340000

EM-SEEP6

Parameter	Result
Hardness (as CaCO3)	26078.5
Sulfate	75000

SW-71

Parameter	Result	
ACIDITY	15000	
Alkalinity (as CaCO3)	5000	U
pH	4.4	
Specific Conductivity	160	
Sulfate	70000	

EM-POND3

Parameter	Result
Alkalinity	30580
pH	6.7
Specific Conductivity	70
Sulfate	7000

EBT2-383M

Parameter	Result
Hardness (as CaCO3)	41459.2
Sulfate	23000

EM-POND2

Parameter	Result
Alkalinity	27180
pH	6.5
Specific Conductivity	65
Sulfate	7000

EM-POND1

Parameter	Result
Alkalinity	18900
Dissolved Oxygen	19890
pH	7.76
Specific Conductivity	51
Sulfate	8000

EBT2-430M

Parameter	Result
ACIDITY	3000
Alkalinity	22000
Dissolved Oxygen	11880
Hardness (as CaCO3)	24000
pH	5.96
Specific Conductivity	62
Sulfate	7400

EM-POND4

Parameter	Result
Alkalinity	29730
Dissolved Oxygen	17440
pH	7.8
Specific Conductivity	78
Sulfate	12000

EBT2-315M

Parameter	Result	
ACIDITY	2000	U
Alkalinity	20000	
Dissolved Oxygen	12110	
Hardness (as CaCO3)	27000	
pH	6.06	
Specific Conductivity	74	
Sulfate	11000	

EM-SEEP14

Parameter	Result	
ACIDITY	200000	
Alkalinity (as CaCO3)	5000	U
Dissolved Oxygen	11900	
pH	3.79	
Specific Conductivity	685	
Sulfate	480000	

EM-POND5

Parameter	Result
Alkalinity	17220
Dissolved Oxygen	19840
pH	6.5
Specific Conductivity	117
Sulfate	35000

EBT2-265M

Parameter	Result
Hardness (as CaCO3)	53471
Sulfate	68000

SW-73

Parameter	Result	
ACIDITY	10000	U
Alkalinity (as CaCO3)	27000	
pH	6.7	
Specific Conductivity	67	
Sulfate	9400	

SW-72

Parameter	Result	
ACIDITY	10000	U
Alkalinity (as CaCO3)	28000	
pH	6.5	
Specific Conductivity	60	
Sulfate	5900	

EBT5-60M

Parameter	Result	
ACIDITY	10000	U
Alkalinity	28000	
Dissolved Oxygen	10910	
pH	6.91	
Specific Conductivity	65	
Sulfate	8100	

EM-SEEP11

Parameter	Result
Hardness (as CaCO3)	14621.1
Sulfate	17000

SB-3290M

Parameter	Result	
ACIDITY	10000	U
Alkalinity	65000	
Dissolved Oxygen	12570	
Hardness (as CaCO3)	121175	
pH	7.7	
Specific Conductivity	150	
Sulfate	15000	

SB-3670M

Parameter	Result
Alkalinity	98650
Dissolved Oxygen	9700
pH	8.2
Specific Conductivity	212
Sulfate	10000

SB-3245M

Parameter	Result
Alkalinity	58000
Dissolved Oxygen	9600
pH	7.64
Specific Conductivity	149
Sulfate	17000

SB-3125M

Parameter	Result	
ACIDITY	2000	U
Alkalinity	88670	
Dissolved Oxygen	12780	
Hardness (as CaCO3)	89000	
pH	7.85	
Specific Conductivity	215	
Sulfate	21000	

SB-3510M

Parameter	Result	
ACIDITY	2000	U
Alkalinity	88000	
Dissolved Oxygen	12620	
Hardness (as CaCO3)	90000	
pH	8.2	
Specific Conductivity	198	
Sulfate	8800	

SB-3100M

Parameter	Result
Alkalinity	68000
Dissolved Oxygen	9470
pH	7.78
Specific Conductivity	151
Sulfate	14000

SB-3300M

Parameter	Result
Hardness (as CaCO3)	117000

SB-3020M

Parameter	Result	
ACIDITY	10000	U
Alkalinity	80000	
Dissolved Oxygen	12850	
Hardness (as CaCO3)	89000	
pH	7.95	
Specific Conductivity	203	
Sulfate	18000	

SB-3250M

Parameter	Result	
ACIDITY	2000	U
Alkalinity	78000	
Dissolved Oxygen	12790	
Hardness (as CaCO3)	90000	
pH	7.71	
Specific Conductivity	201	
Sulfate	18000	

N

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APPROXIMATE SCALE
0 150 300 600 Feet

UNITS

ACIDITY	ug/L
Alkalinity	ug/L
Dissolved Oxygen	ug/L
Hardness (as CaCO3)	ug/L
pH	SU
Specific Conductivity	uS/cm
Sulfate	ug/L

NOTES:
U - Non-Detect
Maximum value of each parameter is shown

FIGURE 6-12
Surface Water Geochemical Parameters, Upper Schoolhouse Brook, EBT2, EBT5 and Ponds
Ely Copper Mine
Vershire, Vermont

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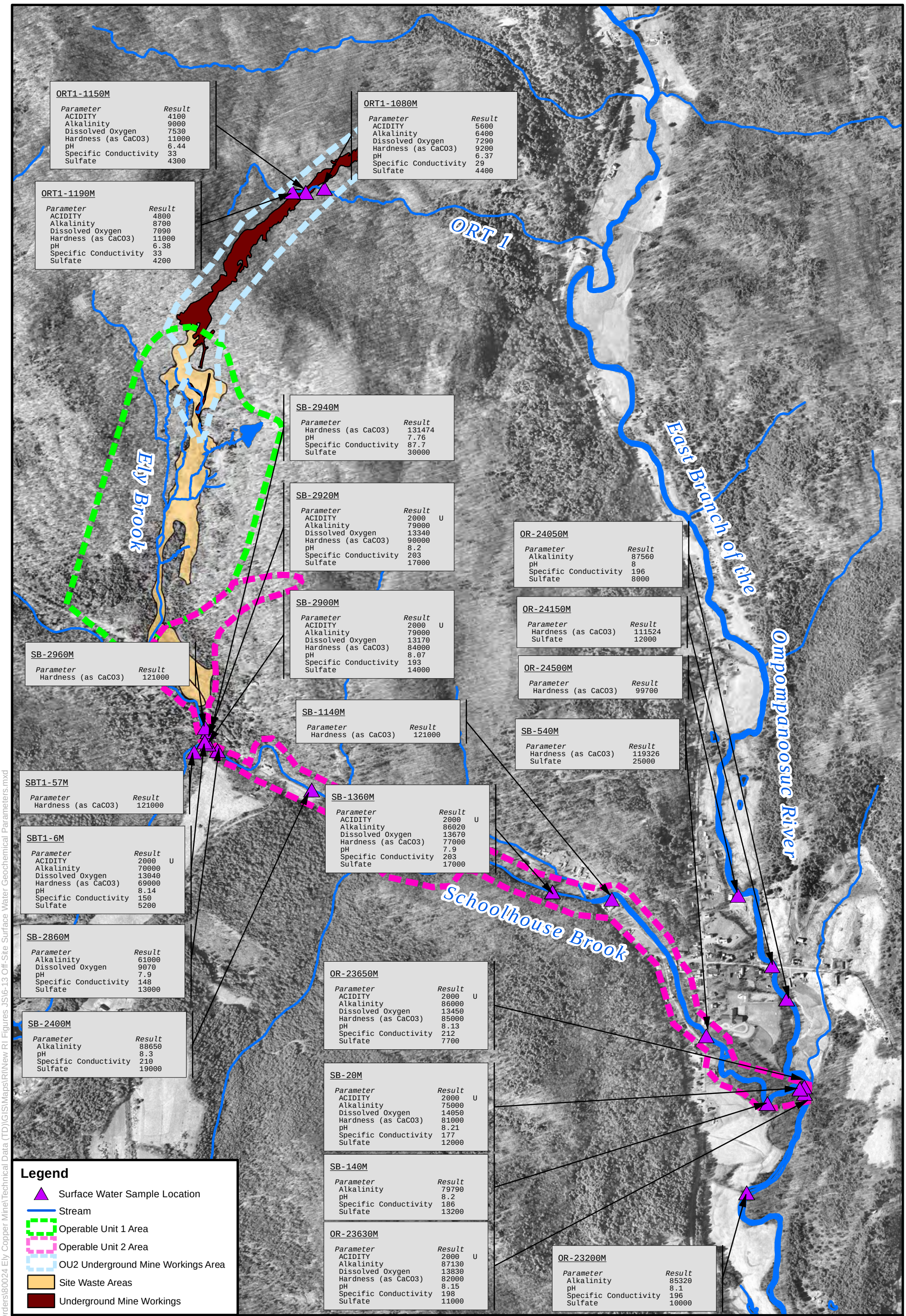

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APPROXIMATE SCALE
0 500 1,000 2,000 Feet

UNITS

ACIDITY	ug/L
Alkalinity	ug/L
Dissolved Oxygen	ug/L
Hardness (as CaCO3)	ug/L
pH	SU
Specific Conductivity	uS/cm
Sulfate	ug/L

NOTES:
U - Non-Detect
Maximum value of each parameter is shown

FIGURE 6-13
Off-Site Surface Water Geochemical Parameters
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Vershire, Vermont

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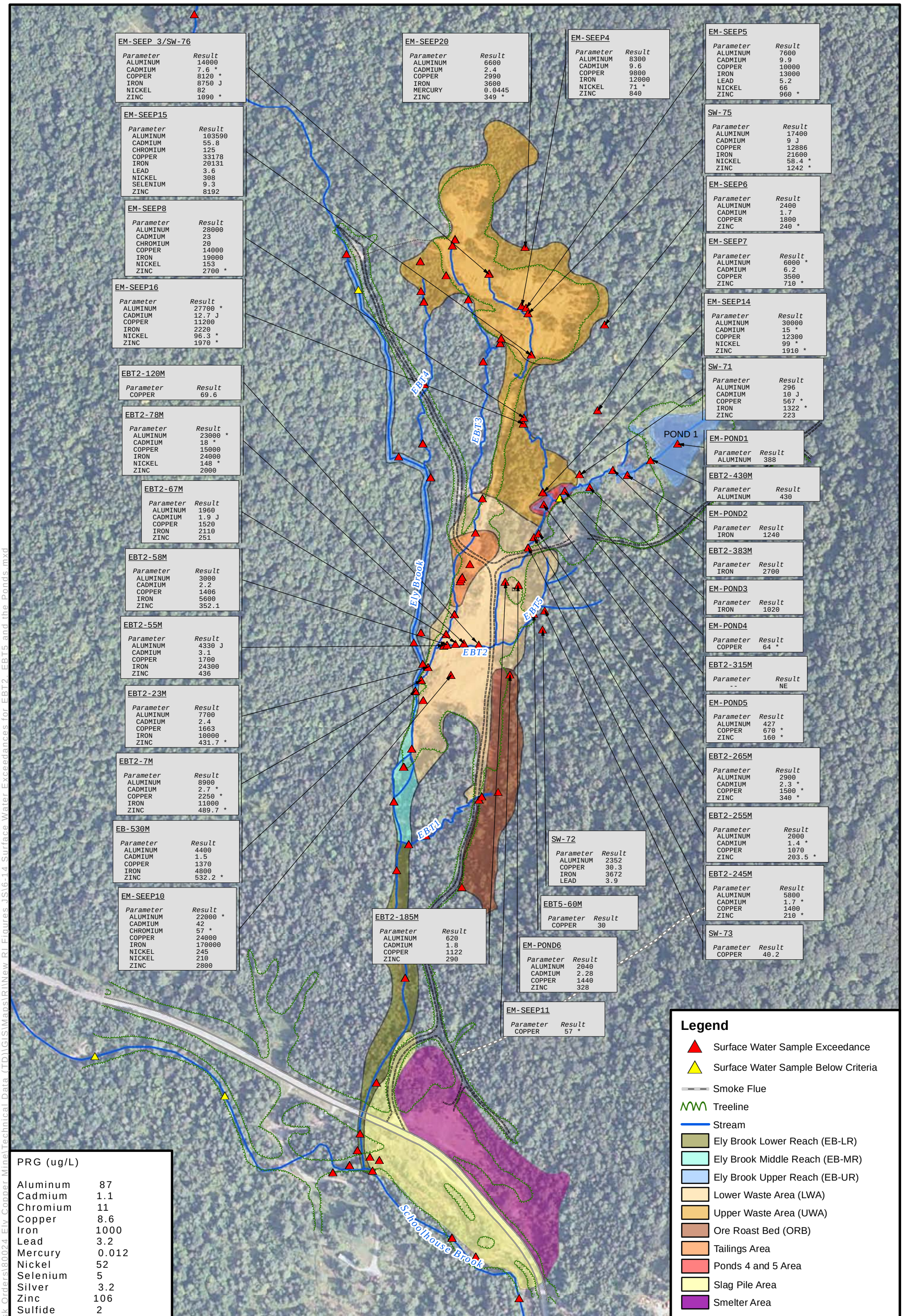

PRG (ug/L)

Aluminum	87
Cadmium	1.1
Chromium	11
Copper	8.6
Iron	1000
Lead	3.2
Mercury	0.012
Nickel	52
Selenium	5
Silver	3.2
Zinc	106
Sulfide	2

N

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APPROXIMATE SCALE
0 150 300 600 Feet

NOTES:
* - Dissolved Metal Result
J - Estimated Value
U - Non-Detect
NE - No Exceedance
Maximum value of each analyte is shown
For sample collection dates refer to the tables
See Figure 6-13 for SHB, Ely Brook, EBT1, EBT3, and EBT4 results.

FIGURE 6-14

Surface Water Exceedances
EBT2, EBT5, and Ponds
Ely Copper Mine
Vershire, Vermont

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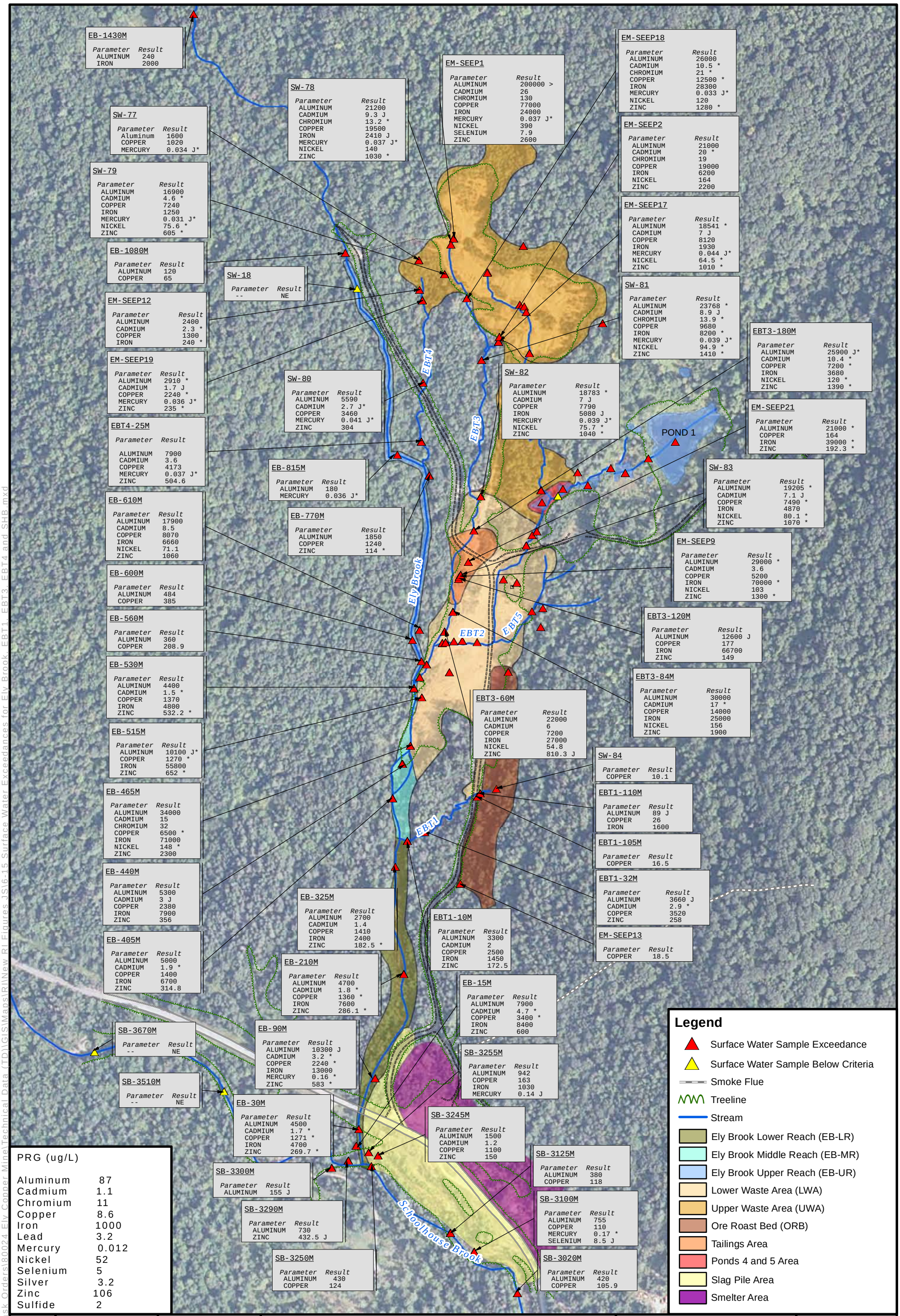

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APPROXIMATE SCALE
0 150 300 600 Feet

NOTES:
* - Dissolved Metal Result
J - Estimated Value
U - Non-Detect
NE - No Exceedance
Maximum value of each analyte is shown
For sample collection dates refer to the tables
See Figure 6-12 for the Ponds, EBT2 and EBT5 results.

FIGURE 6-15
Surface Water Exceedances
Ely Brook, EBT1, EBT3, EBT4, and SHB
Ely Copper Mine
Vershire, Vermont

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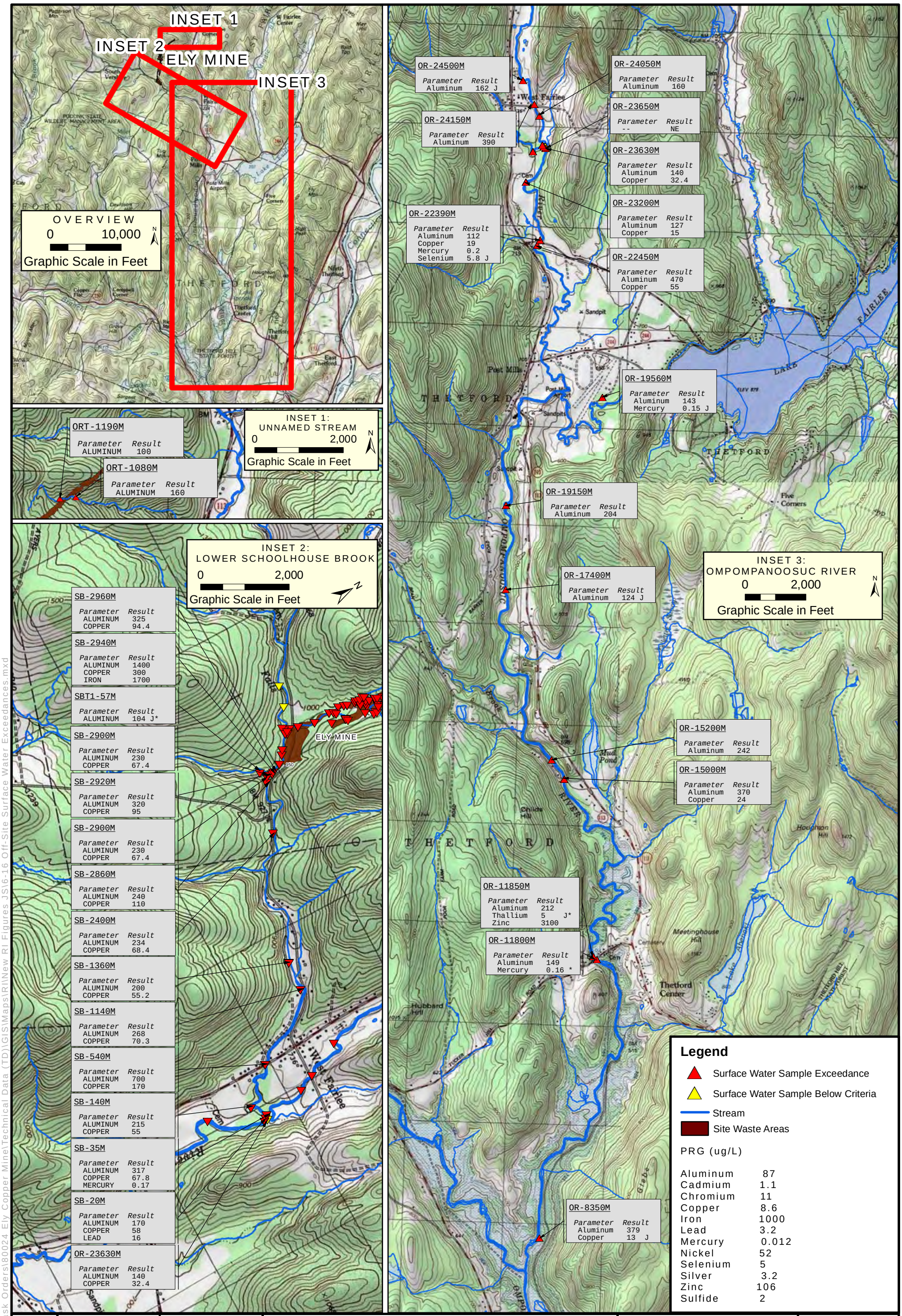

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NOTES:
* - Dissolved Metal Result
J - Estimated Value
U - Non-Detect
NE - No Exceedance
Maximum value of each analyte is shown
For sample collection dates refer to the tables

FIGURE 6-16

Off-Site Surface Water Exceedances
Ely Copper Mine
Vershire, Vermont

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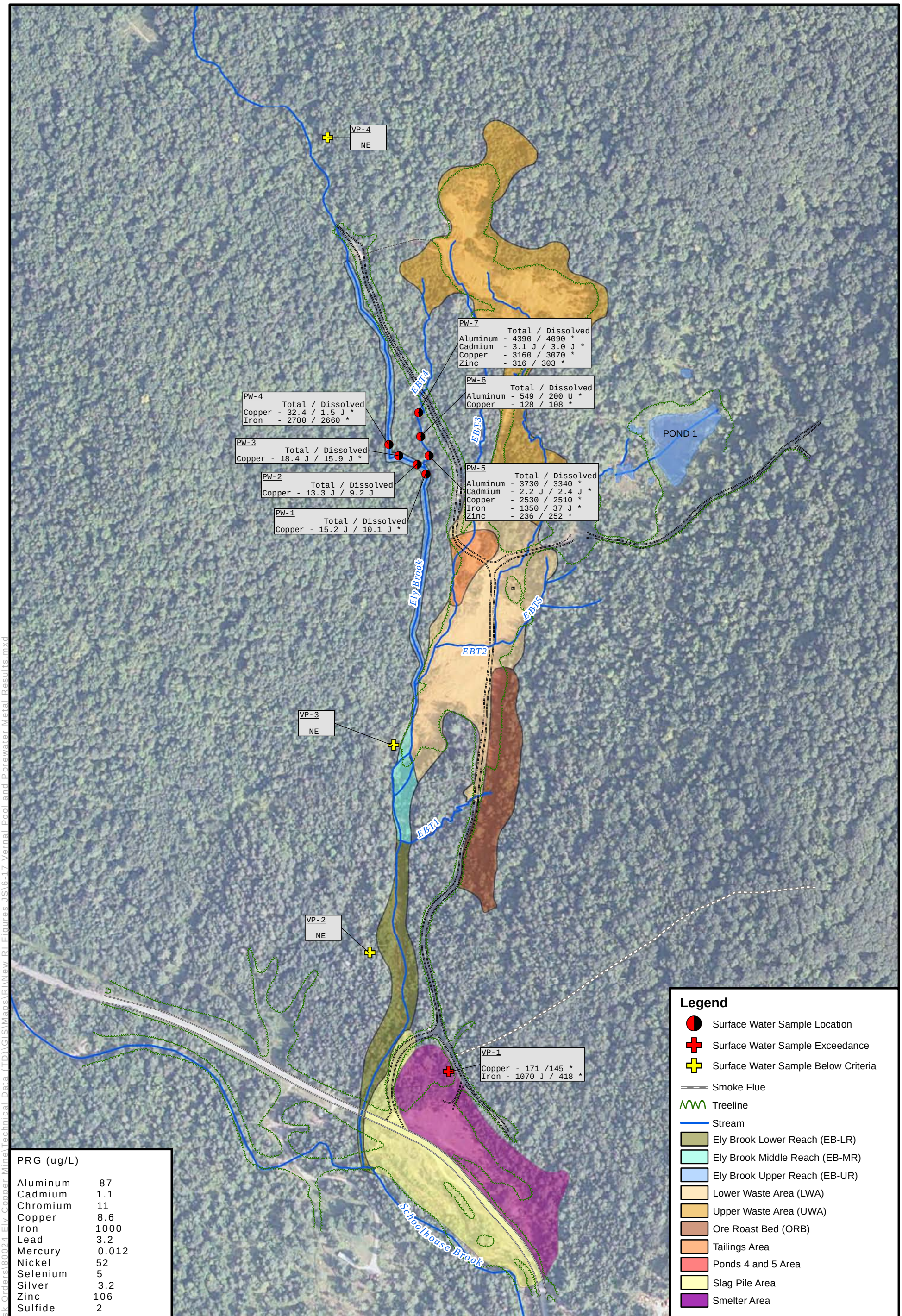

PRG (ug/L)

Aluminum	87
Cadmium	1.1
Chromium	11
Copper	8.6
Iron	1000
Lead	3.2
Mercury	0.012
Nickel	52
Selenium	5
Silver	3.2
Zinc	106
Sulfide	2

N

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APPROXIMATE SCALE
0 150 300 600 Feet

NOTES:
* - Dissolved Metal Result
J - Estimated Value
U - Non-Detect
NE - No Exceedance
Maximum value of each analyte is shown
For sample collection dates refer to the tables

FIGURE 6-17
Vernal Pool and Porewater Metal Results
Ely Copper Mine
Vershire, Vermont

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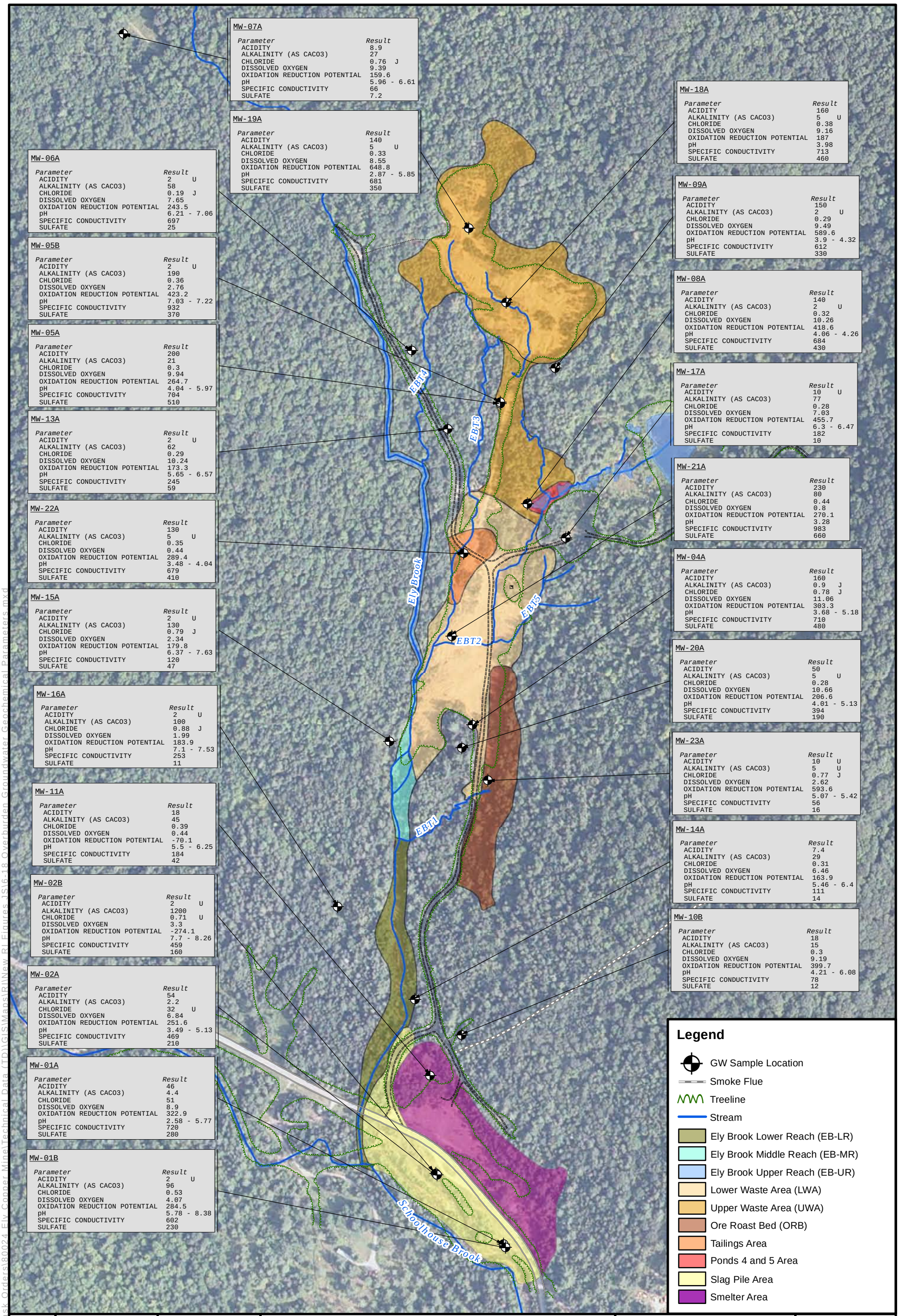

MW-07A

Parameter	Result
ACIDITY	8.9
ALKALINITY (AS CACO3)	27
CHLORIDE	0.76 J
DISSOLVED OXYGEN	9.39
OXIDATION REDUCTION POTENTIAL	159.6
pH	5.96 - 6.61
SPECIFIC CONDUCTIVITY	66
SULFATE	7.2

MW-19A

Parameter	Result
ACIDITY	140
ALKALINITY (AS CACO3)	5 U
CHLORIDE	0.33
DISSOLVED OXYGEN	8.55
OXIDATION REDUCTION POTENTIAL	648.8
pH	2.87 - 5.85
SPECIFIC CONDUCTIVITY	681
SULFATE	350

MW-06A

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	58
CHLORIDE	0.19 J
DISSOLVED OXYGEN	7.65
OXIDATION REDUCTION POTENTIAL	243.5
pH	6.21 - 7.06
SPECIFIC CONDUCTIVITY	697
SULFATE	25

MW-05B

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	190
CHLORIDE	0.36
DISSOLVED OXYGEN	2.76
OXIDATION REDUCTION POTENTIAL	423.2
pH	7.03 - 7.22
SPECIFIC CONDUCTIVITY	932
SULFATE	370

MW-05A

Parameter	Result
ACIDITY	200
ALKALINITY (AS CACO3)	21
CHLORIDE	0.3
DISSOLVED OXYGEN	9.94
OXIDATION REDUCTION POTENTIAL	264.7
pH	4.04 - 5.97
SPECIFIC CONDUCTIVITY	704
SULFATE	510

MW-13A

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	62
CHLORIDE	0.29
DISSOLVED OXYGEN	10.24
OXIDATION REDUCTION POTENTIAL	173.3
pH	5.65 - 6.57
SPECIFIC CONDUCTIVITY	245
SULFATE	59

MW-22A

Parameter	Result
ACIDITY	130
ALKALINITY (AS CACO3)	5 U
CHLORIDE	0.35
DISSOLVED OXYGEN	0.44
OXIDATION REDUCTION POTENTIAL	289.4
pH	3.48 - 4.04
SPECIFIC CONDUCTIVITY	679
SULFATE	410

MW-15A

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	130
CHLORIDE	0.79 J
DISSOLVED OXYGEN	2.34
OXIDATION REDUCTION POTENTIAL	179.8
pH	6.37 - 7.63
SPECIFIC CONDUCTIVITY	120
SULFATE	47

MW-16A

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	100
CHLORIDE	0.88 J
DISSOLVED OXYGEN	1.99
OXIDATION REDUCTION POTENTIAL	183.9
pH	7.1 - 7.53
SPECIFIC CONDUCTIVITY	253
SULFATE	11

MW-11A

Parameter	Result
ACIDITY	18
ALKALINITY (AS CACO3)	45
CHLORIDE	0.39
DISSOLVED OXYGEN	0.44
OXIDATION REDUCTION POTENTIAL	-70.1
pH	5.5 - 6.25
SPECIFIC CONDUCTIVITY	184
SULFATE	42

MW-02B

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	1200
CHLORIDE	0.71 U
DISSOLVED OXYGEN	3.3
OXIDATION REDUCTION POTENTIAL	-274.1
pH	7.7 - 8.26
SPECIFIC CONDUCTIVITY	459
SULFATE	160

MW-02A

Parameter	Result
ACIDITY	54
ALKALINITY (AS CACO3)	2.2
CHLORIDE	32 U
DISSOLVED OXYGEN	6.84
OXIDATION REDUCTION POTENTIAL	251.6
pH	3.49 - 5.13
SPECIFIC CONDUCTIVITY	469
SULFATE	210

MW-01A

Parameter	Result
ACIDITY	46
ALKALINITY (AS CACO3)	4.4
CHLORIDE	51
DISSOLVED OXYGEN	8.9
OXIDATION REDUCTION POTENTIAL	322.9
pH	2.58 - 5.77
SPECIFIC CONDUCTIVITY	720
SULFATE	280

MW-01B

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	96
CHLORIDE	0.53
DISSOLVED OXYGEN	4.07
OXIDATION REDUCTION POTENTIAL	284.5
pH	5.78 - 8.38
SPECIFIC CONDUCTIVITY	602
SULFATE	230

MW-18A

Parameter	Result
ACIDITY	160
ALKALINITY (AS CACO3)	5 U
CHLORIDE	0.38
DISSOLVED OXYGEN	9.16
OXIDATION REDUCTION POTENTIAL	187
pH	3.98
SPECIFIC CONDUCTIVITY	713
SULFATE	460

MW-09A

Parameter	Result
ACIDITY	150
ALKALINITY (AS CACO3)	2 U
CHLORIDE	0.29
DISSOLVED OXYGEN	9.49
OXIDATION REDUCTION POTENTIAL	589.6
pH	3.9 - 4.32
SPECIFIC CONDUCTIVITY	612
SULFATE	330

MW-08A

Parameter	Result
ACIDITY	140
ALKALINITY (AS CACO3)	2 U
CHLORIDE	0.32
DISSOLVED OXYGEN	10.26
OXIDATION REDUCTION POTENTIAL	418.6
pH	4.06 - 4.26
SPECIFIC CONDUCTIVITY	684
SULFATE	430

MW-17A

Parameter	Result
ACIDITY	10 U
ALKALINITY (AS CACO3)	77
CHLORIDE	0.28
DISSOLVED OXYGEN	7.03
OXIDATION REDUCTION POTENTIAL	455.7
pH	6.3 - 6.47
SPECIFIC CONDUCTIVITY	182
SULFATE	10

MW-21A

Parameter	Result
ACIDITY	230
ALKALINITY (AS CACO3)	80
CHLORIDE	0.44
DISSOLVED OXYGEN	0.8
OXIDATION REDUCTION POTENTIAL	270.1
pH	3.28
SPECIFIC CONDUCTIVITY	983
SULFATE	660

MW-04A

Parameter	Result
ACIDITY	160
ALKALINITY (AS CACO3)	0.9 J
CHLORIDE	0.78 J
DISSOLVED OXYGEN	11.06
OXIDATION REDUCTION POTENTIAL	303.3
pH	3.68 - 5.18
SPECIFIC CONDUCTIVITY	710
SULFATE	480

MW-20A

Parameter	Result
ACIDITY	50
ALKALINITY (AS CACO3)	5 U
CHLORIDE	0.28
DISSOLVED OXYGEN	10.66
OXIDATION REDUCTION POTENTIAL	206.6
pH	4.01 - 5.13
SPECIFIC CONDUCTIVITY	394
SULFATE	190

MW-23A

Parameter	Result
ACIDITY	10 U
ALKALINITY (AS CACO3)	5 U
CHLORIDE	0.77 J
DISSOLVED OXYGEN	2.62
OXIDATION REDUCTION POTENTIAL	593.6
pH	5.07 - 5.42
SPECIFIC CONDUCTIVITY	56
SULFATE	16

MW-14A

Parameter	Result
ACIDITY	7.4
ALKALINITY (AS CACO3)	29
CHLORIDE	0.31
DISSOLVED OXYGEN	6.46
OXIDATION REDUCTION POTENTIAL	163.9
pH	5.46 - 6.4
SPECIFIC CONDUCTIVITY	111
SULFATE	14

MW-10B

Parameter	Result
ACIDITY	18
ALKALINITY (AS CACO3)	15
CHLORIDE	0.3
DISSOLVED OXYGEN	9.19
OXIDATION REDUCTION POTENTIAL	399.7
pH	4.21 - 6.08
SPECIFIC CONDUCTIVITY	78
SULFATE	12

N

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June 21, 2011 | Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

UNITS

ACIDITY	ug/L
Alkalinity	ug/L
Dissolved Oxygen	ug/L
Hardness (as CaCO3)	ug/L
pH	SU
Specific Conductivity	uS/cm
Sulfate	ug/L

NOTES:
U - Non-Detect
Maximum value of each parameter is shown

FIGURE 6-18
Overburden Groundwater Geochemical Parameters
Ely Copper Mine
Vershire, Vermont

Nobis
Engineering a Sustainable Future
Nobis Engineering, Inc.
18 Chenell Drive
Concord, NH 03301
(603) 224-4182

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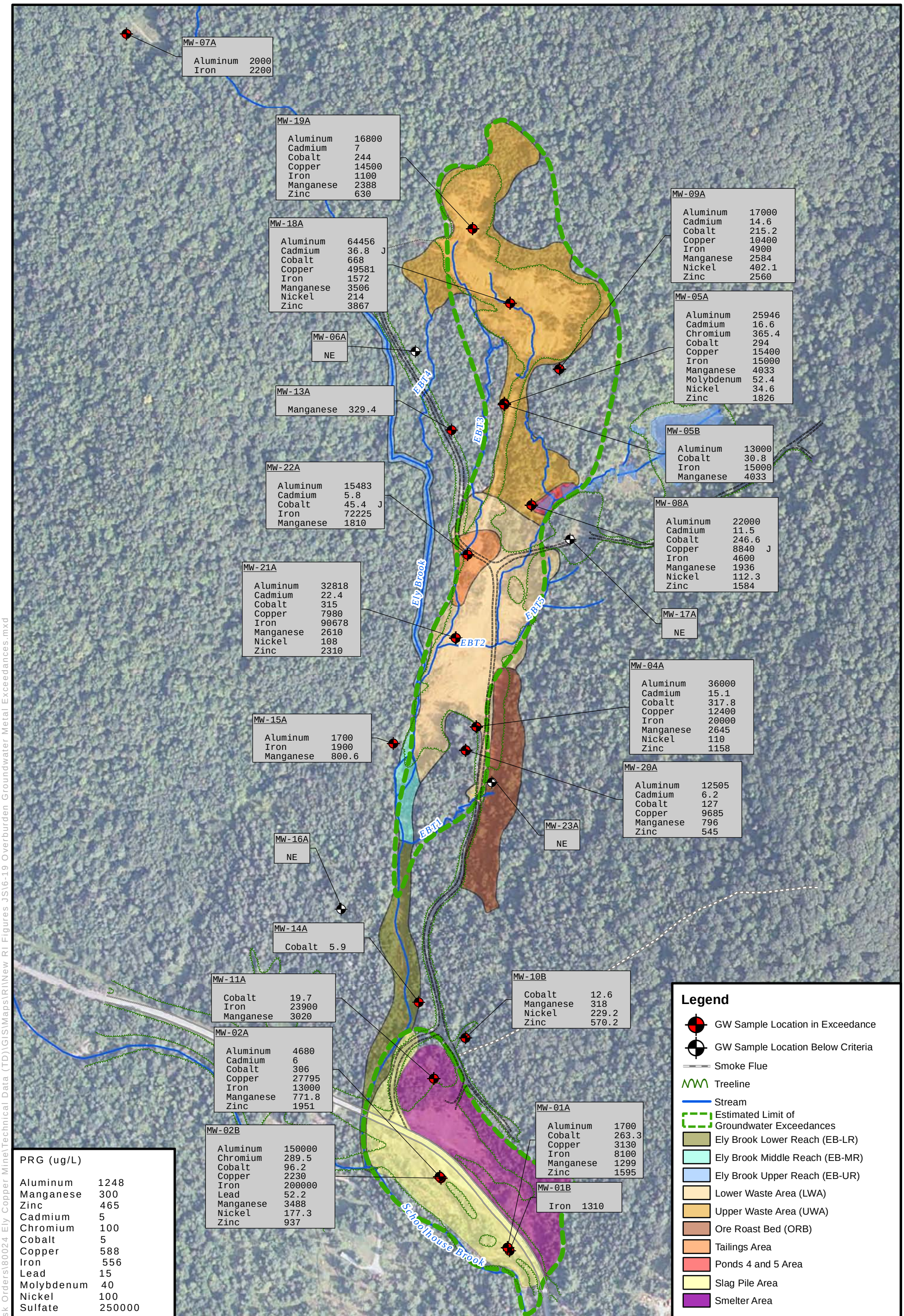

PRG (ug/L)

Aluminum	1248
Manganese	300
Zinc	465
Cadmium	5
Chromium	100
Cobalt	5
Copper	588
Iron	556
Lead	15
Molybdenum	40
Nickel	100
Sulfate	250000

N

Drawn By: JRS | Checked By: AJB

June 21, 2011 | Revision No. 00

APPROXIMATE SCALE
0 150 300 600 Feet

NOTES:
J - Estimated Value
U - Non-Detect
NE - No Exceedance
Maximum value of each analyte is shown
For sample collection dates refer to the tables

FIGURE 6-19
Overburden Groundwater Metal Exceedances
Ely Copper Mine
Vershire, Vermont

Nobis
Engineering a Sustainable Future
Nobis Engineering, Inc.
18 Chenell Drive
Concord, NH 03301
(603) 224-4182

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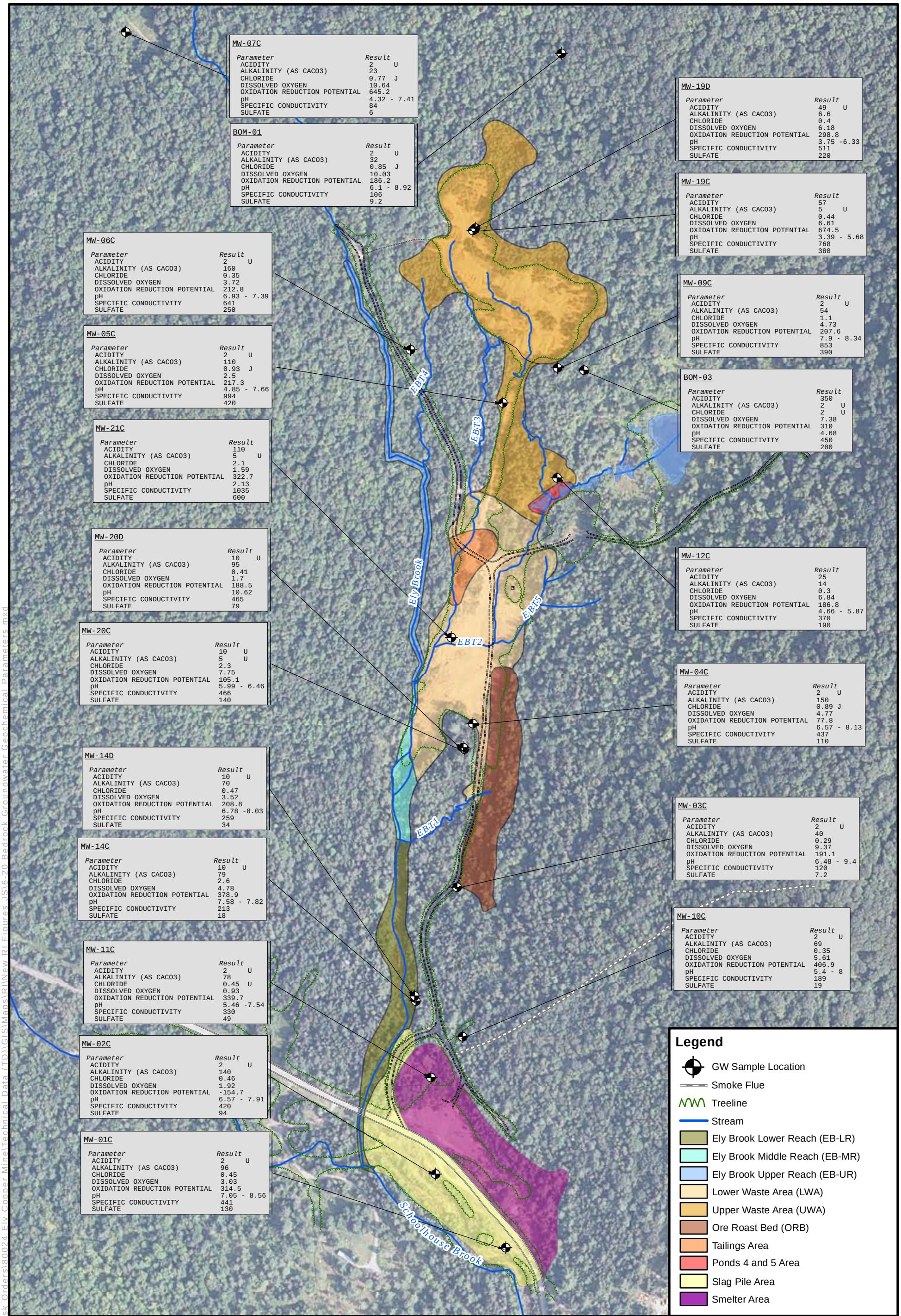

MW-07C

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	23
CHLORIDE	0.77 J
DISSOLVED OXYGEN	10.64
OXIDATION REDUCTION POTENTIAL	645.2
pH	4.32 - 7.41
SPECIFIC CONDUCTIVITY	84
SULFATE	6

BOM-01

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	32
CHLORIDE	0.85 J
DISSOLVED OXYGEN	10.03
OXIDATION REDUCTION POTENTIAL	186.2
pH	6.1 - 8.92
SPECIFIC CONDUCTIVITY	106
SULFATE	9.2

MW-06C

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	160
CHLORIDE	0.35
DISSOLVED OXYGEN	3.72
OXIDATION REDUCTION POTENTIAL	212.8
pH	6.93 - 7.39
SPECIFIC CONDUCTIVITY	641
SULFATE	250

MW-05C

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	110
CHLORIDE	0.93 J
DISSOLVED OXYGEN	2.5
OXIDATION REDUCTION POTENTIAL	217.3
pH	4.85 - 7.66
SPECIFIC CONDUCTIVITY	994
SULFATE	420

MW-21C

Parameter	Result
ACIDITY	110
ALKALINITY (AS CACO3)	5 U
CHLORIDE	2.1
DISSOLVED OXYGEN	1.59
OXIDATION REDUCTION POTENTIAL	322.7
pH	2.13
SPECIFIC CONDUCTIVITY	1035
SULFATE	600

MW-20D

Parameter	Result
ACIDITY	10 U
ALKALINITY (AS CACO3)	95
CHLORIDE	0.41
DISSOLVED OXYGEN	1.7
OXIDATION REDUCTION POTENTIAL	188.5
pH	10.62
SPECIFIC CONDUCTIVITY	465
SULFATE	79

MW-20C

Parameter	Result
ACIDITY	10 U
ALKALINITY (AS CACO3)	5 U
CHLORIDE	2.3
DISSOLVED OXYGEN	7.75
OXIDATION REDUCTION POTENTIAL	105.1
pH	5.99 - 6.46
SPECIFIC CONDUCTIVITY	466
SULFATE	140

MW-14D

Parameter	Result
ACIDITY	10 U
ALKALINITY (AS CACO3)	70
CHLORIDE	0.47
DISSOLVED OXYGEN	3.52
OXIDATION REDUCTION POTENTIAL	208.8
pH	6.78 -8.03
SPECIFIC CONDUCTIVITY	259
SULFATE	34

MW-14C

Parameter	Result
ACIDITY	10 U
ALKALINITY (AS CACO3)	79
CHLORIDE	2.6
DISSOLVED OXYGEN	4.78
OXIDATION REDUCTION POTENTIAL	378.9
pH	7.58 - 7.82
SPECIFIC CONDUCTIVITY	213
SULFATE	18

MW-11C

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	78
CHLORIDE	0.45 U
DISSOLVED OXYGEN	0.93
OXIDATION REDUCTION POTENTIAL	339.7
pH	5.46 -7.54
SPECIFIC CONDUCTIVITY	330
SULFATE	49

MW-02C

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	140
CHLORIDE	0.46
DISSOLVED OXYGEN	1.92
OXIDATION REDUCTION POTENTIAL	-154.7
pH	6.57 - 7.91
SPECIFIC CONDUCTIVITY	420
SULFATE	94

MW-01C

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	96
CHLORIDE	0.45
DISSOLVED OXYGEN	3.03
OXIDATION REDUCTION POTENTIAL	314.5
pH	7.05 - 8.56
SPECIFIC CONDUCTIVITY	441
SULFATE	130

MW-19D

Parameter	Result
ACIDITY	49 U
ALKALINITY (AS CACO3)	6.6
CHLORIDE	0.4
DISSOLVED OXYGEN	6.18
OXIDATION REDUCTION POTENTIAL	298.8
pH	3.75 -6.33
SPECIFIC CONDUCTIVITY	511
SULFATE	220

MW-19C

Parameter	Result
ACIDITY	57
ALKALINITY (AS CACO3)	5 U
CHLORIDE	0.44
DISSOLVED OXYGEN	6.61
OXIDATION REDUCTION POTENTIAL	674.5
pH	3.39 - 5.68
SPECIFIC CONDUCTIVITY	768
SULFATE	380

MW-09C

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	54
CHLORIDE	1.1
DISSOLVED OXYGEN	4.73
OXIDATION REDUCTION POTENTIAL	207.6
pH	7.9 - 8.34
SPECIFIC CONDUCTIVITY	853
SULFATE	390

BOM-03

Parameter	Result
ACIDITY	350
ALKALINITY (AS CACO3)	2 U
CHLORIDE	2 U
DISSOLVED OXYGEN	7.38
OXIDATION REDUCTION POTENTIAL	310
pH	4.68
SPECIFIC CONDUCTIVITY	450
SULFATE	200

MW-12C

Parameter	Result
ACIDITY	25
ALKALINITY (AS CACO3)	14
CHLORIDE	0.3
DISSOLVED OXYGEN	6.84
OXIDATION REDUCTION POTENTIAL	186.8
pH	4.66 - 5.87
SPECIFIC CONDUCTIVITY	370
SULFATE	190

MW-04C

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	150
CHLORIDE	0.89 J
DISSOLVED OXYGEN	4.77
OXIDATION REDUCTION POTENTIAL	77.8
pH	6.57 - 8.13
SPECIFIC CONDUCTIVITY	437
SULFATE	110

MW-03C

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	40
CHLORIDE	0.29
DISSOLVED OXYGEN	9.37
OXIDATION REDUCTION POTENTIAL	191.1
pH	6.48 - 9.4
SPECIFIC CONDUCTIVITY	120
SULFATE	7.2

MW-10C

Parameter	Result
ACIDITY	2 U
ALKALINITY (AS CACO3)	69
CHLORIDE	0.35
DISSOLVED OXYGEN	5.61
OXIDATION REDUCTION POTENTIAL	406.9
pH	5.4 - 8
SPECIFIC CONDUCTIVITY	189
SULFATE	19

N

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APPROXIMATE SCALE
0 150 300 600 Feet

UNITS

ACIDITY	ug/L
Alkalinity	ug/L
Dissolved Oxygen	ug/L
Hardness (as CaCO3)	ug/L
pH	SU
Specific Conductivity	uS/cm
Sulfate	ug/L

NOTES:
U - Non-Detect
Maximum value of each parameter is shown

FIGURE 6-20
Bedrock Groundwater Geochemical Parameters
Ely Copper Mine
Vershire, Vermont

Nobis
Engineering a Sustainable Future
Nobis Engineering, Inc.
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Concord, NH 03301
(603) 224-4182

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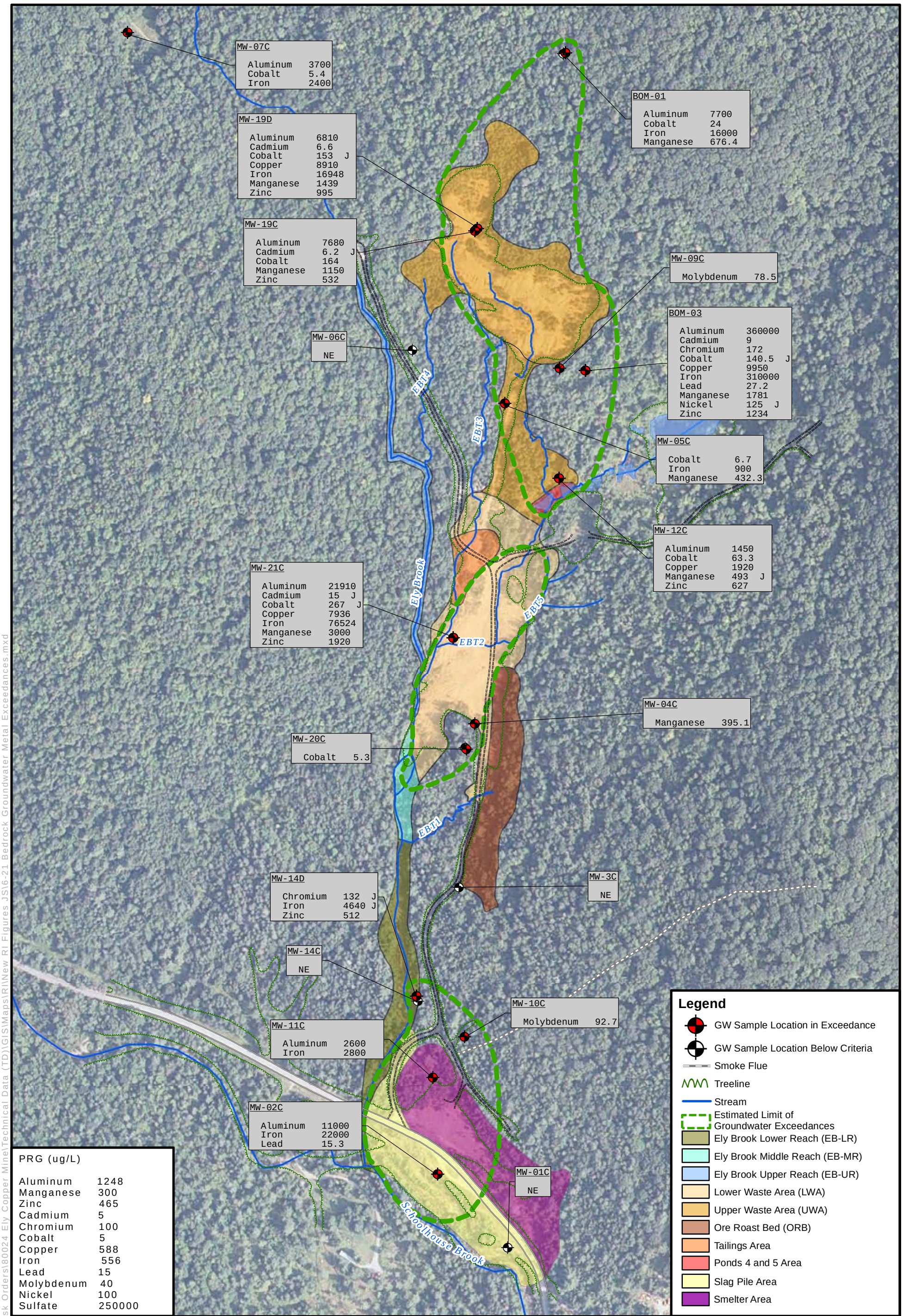

PRG (ug/L)

Aluminum	1248
Manganese	300
Zinc	465
Cadmium	5
Chromium	100
Cobalt	5
Copper	588
Iron	556
Lead	15
Molybdenum	40
Nickel	100
Sulfate	250000

N

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APPROXIMATE SCALE
0 150 300 600 Feet

NOTES:
J - Estimated Value
U - Non-Detect
NE - No Exceedance
Maximum value of each analyte is shown
For sample collection dates refer to the tables

FIGURE 6-21
Bedrock Groundwater Metal Exceedances
Ely Copper Mine
Vershire, Vermont

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