



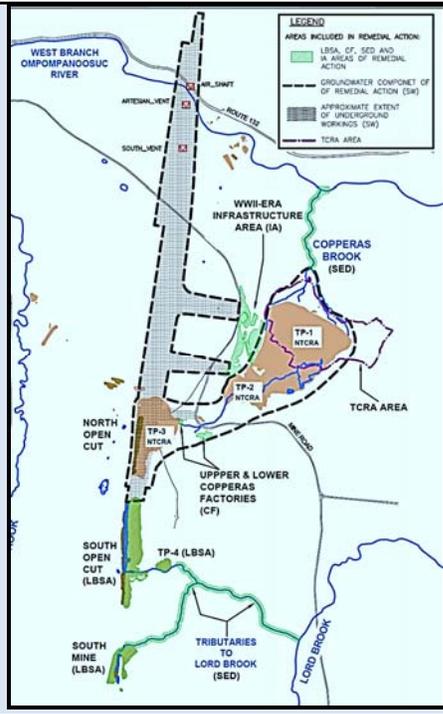
What is a Five-Year Review?

- Five-Year Review
 - Completed within 5 years of the start of the Remedial Action.
 - Elizabeth Phase 1 Remedial Action began in June 2009 - Copperas Factories.
 - The major focus of a Five-Year Review is to make sure the completed cleanup actions are performing as intended and continue to protect human health and the environment.
 - The Five-Year Review may also look at on-going and not yet implemented (in design) cleanup actions to determine if the cleanup plan will protect human health and the environment.
 - The Five-Year Review will evaluate whether information (site information or changes in laws or toxicity information) suggests the need for additional cleanup actions.
 - The Five-Year Review creates an opportunity to seek input from community to identify any issues or concerns regarding completed or planned cleanup actions or areas not being addressed by a cleanup action.
 - A Five-Year Review Report is completed to document the review.

Five-Year Review Summary

Completed TCRA, NTCRA, and Phase 1 Remedial Action: Copperas Factories

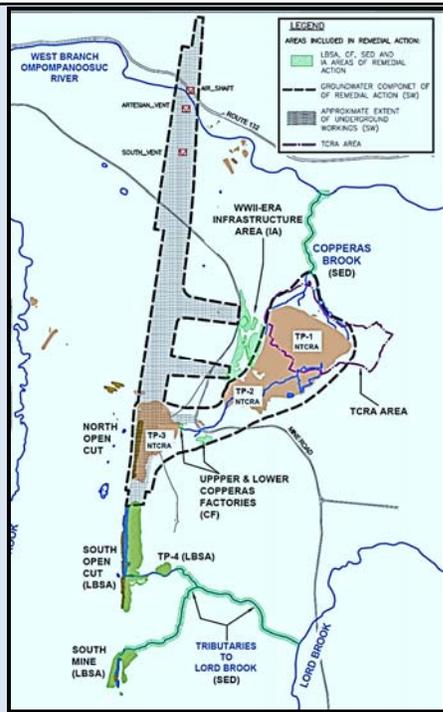
- The TCRA, NTCRA, and Phase 1 Remedial Action: Copperas Factory cleanup actions are currently protective of human health and the environment.
- The lead contaminated soil identified by the Record of Decision has been covered to prevent human contact.
- Mine waste is contained beneath TP-1/ TP-2 cover system and surface water is diverted around the waste material.
- The tailing dam has been stabilized due to the soil buttress, improved drainage, and the substantial decline in water levels within tailing pile as a result of the cover system.
- The iron load to Copperas Brook and WBOR has reduced by more than 80% and leachate generation had reduced by more than 60%.
- Land-use restrictions are in place to protect the TP-1/TP-2 cover system, TCRA, and surface water diversions.
- Substantial improvement of aquatic life in WBOR and Copperas Brook.
- Long-term protection for these actions dependent on continued maintenance and completion of the land-use restriction for the properties included in the Phase 1 Remedial Action: Copperas Factories.



Five-Year Review Summary

Clean-Up Actions not yet implemented:

- No threats to human health based on current land use conditions.
- Lord Brook tributaries remain toxic to aquatic life based on testing performed in 2013.
- The extent of groundwater contamination is larger than defined in 2006 cleanup decision.
- Groundwater use restrictions are necessary to prevent consumption of contaminated groundwater and provide long-term protection.
- Soil contamination at several areas not subject to the cleanup could be a concern if these locations were to be developed as residential properties.
- Land use restrictions necessary to protect cleanup actions.
- Long-term protections relies upon inspections, sampling, and maintenance.



Completed Cleanup Actions

Time-Critical Removal Action (TCRA):

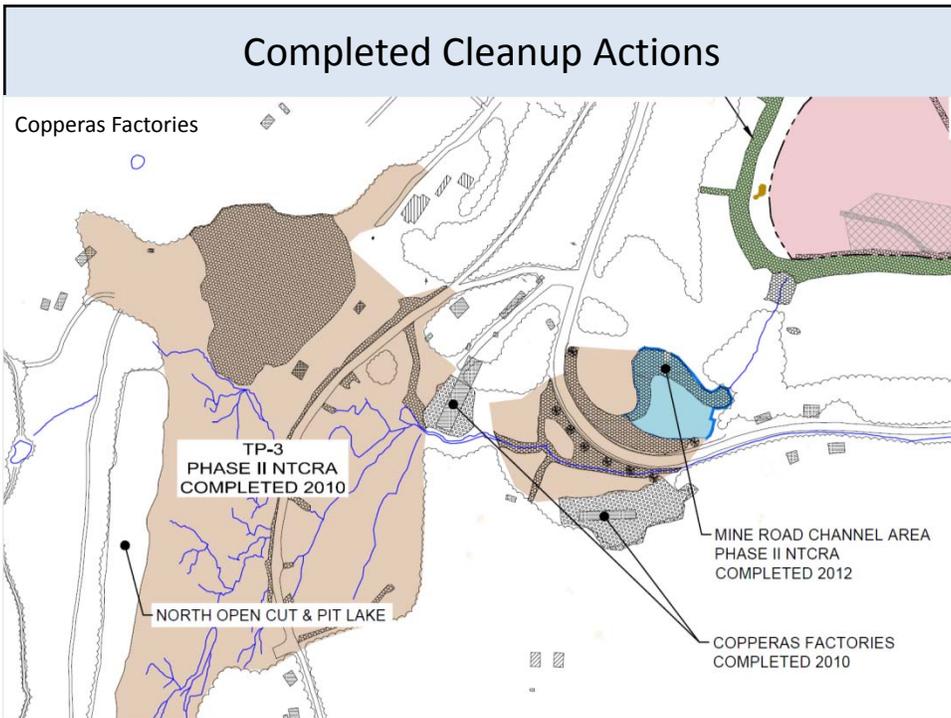
- Implemented to stabilize tailing dam.
- Key components:
 - Install buttress
 - Reduce grade on steep slopes
 - Improve drainage from TP-1 and route Copperas Brook around TP-1
- Work was performed 2003-2005.
- Buttress, toe drain, and slope are in good condition.



Completed Cleanup Actions

- Phase 1: Surface water diversion channels, groundwater interceptor trench, and water treatment system – 2006-2010.
- Phase 2: waste consolidation (TP-3, TP-4, South Mine), cover system installation (TP-1 and TP-2), and site restoration – 2010 – 2015/2016.
- Interim water treatment system began in phase 1 and will continue in phase 2 – until implementation of passive treatment system.





Completed Cleanup Actions



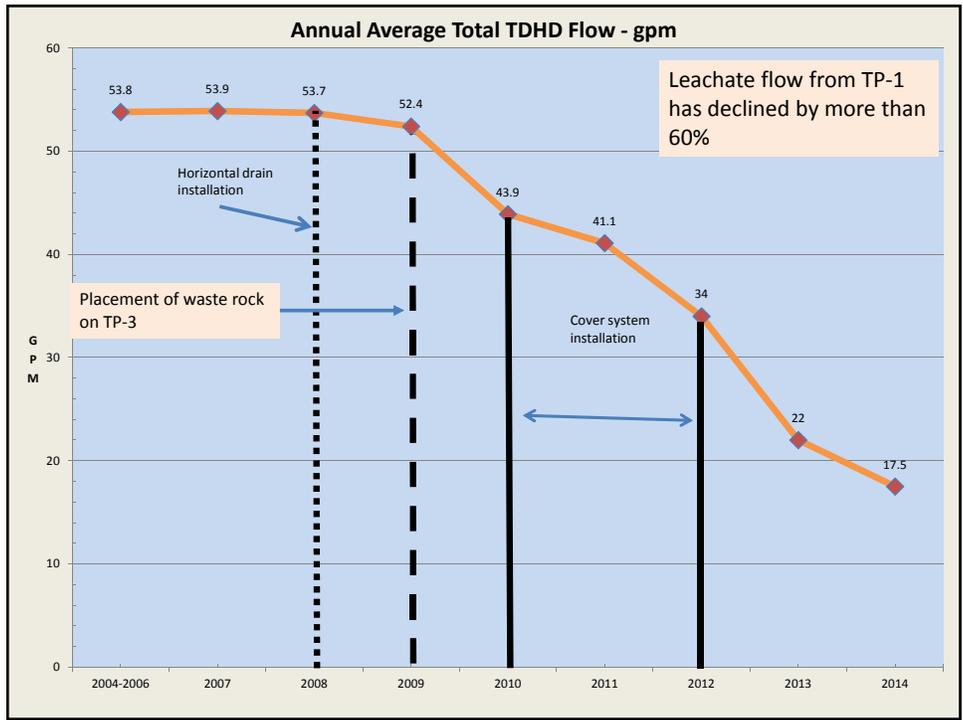
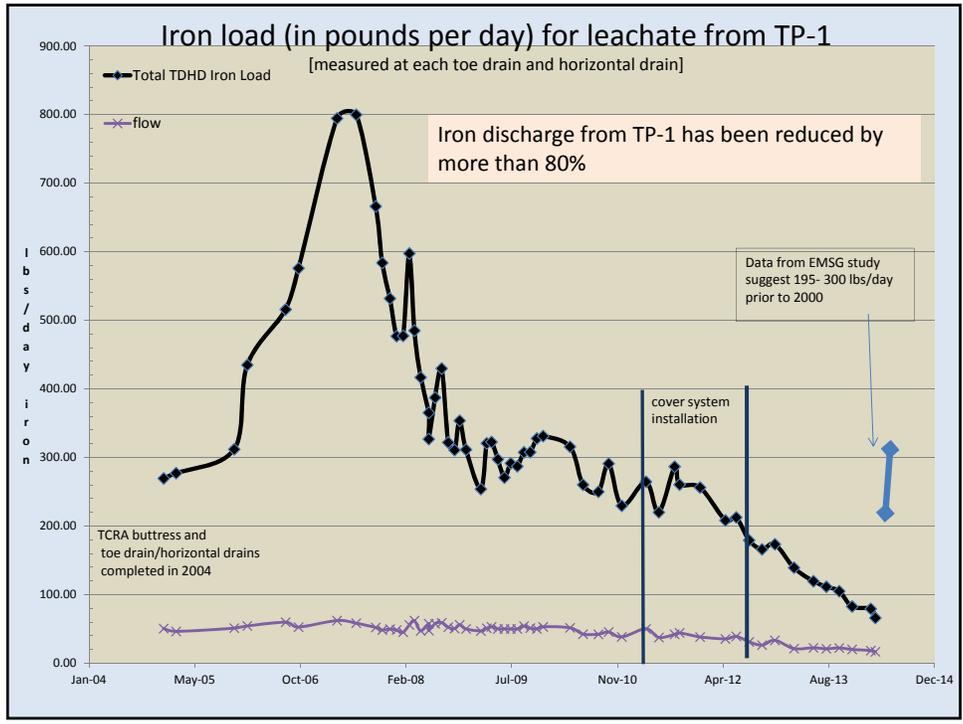
Completed Cleanup Actions

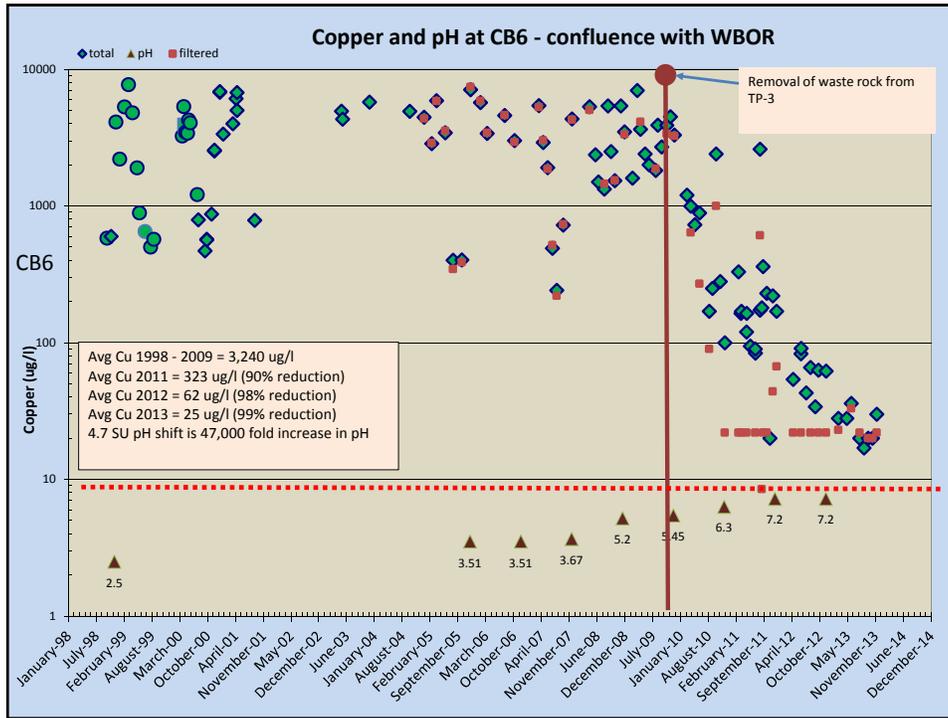


Evaluation of Completed Cleanup Actions

TCRA, NTCRA, Phase 1 Remedial
Action: Copperas Factory



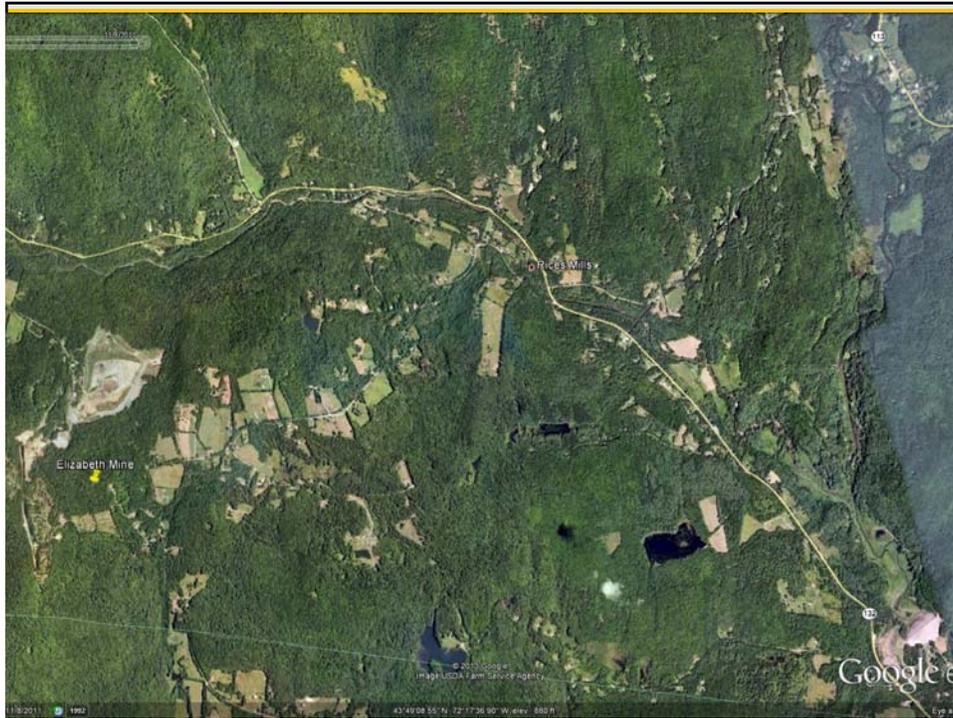




Updated Assessment of Copperas Brook					Is surface water at this location toxic to aquatic organisms?		Is sediment at this location toxic to aquatic organisms?	
		Copper sediment concentration for 2013 toxicity testing (mg/l)	Copper surface water average for 2013 (ug/l)	Status of Benthic Community	acute toxicity	chronic toxicity	acute toxicity	chronic toxicity
Copperas Brook	Surface water pH (2013)							
CB6	7.2	410	25	impaired	no	no	no	yes
CB16		610	22	not assessed	yes	yes	no	yes
	Surface water pH (2000)	Copper sediment concentration for 2000 toxicity testing (mg/l)	Copper surface water average for 2000 (ug/l)	Status of Benthic Community	acute toxicity	chronic toxicity	acute toxicity	chronic toxicity
CB6	2.5	163 - 437	3,240	impaired	yes	yes	yes	yes

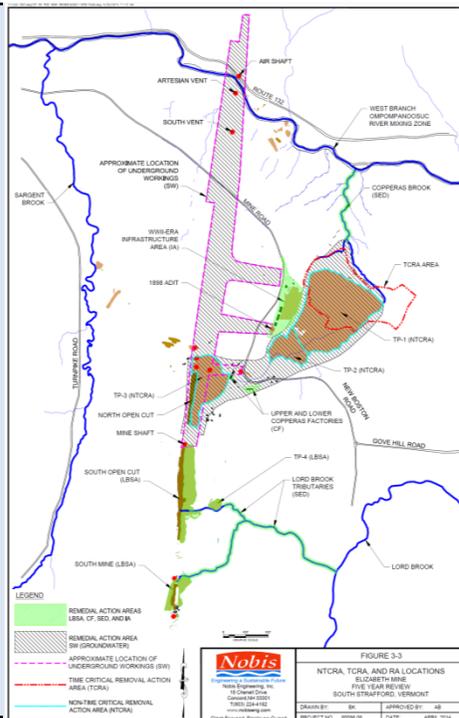
Surface Water/Sediment Summary:

- WBOR has shown recovery of aquatic communities.
- Strong improvement in Copperas Brook but has not yet fully achieved cleanup goals.
- In 2000, CB6 surface water and sediment were acutely toxic – even 10% of CB6 water cause 100% mortality.



Remaining Cleanup Action for Elizabeth Mine

- NTCRA Phase 3: Passive treatment system for TP-1 leachate to replace current water treatment system. Design complete. Awaiting leachate flow reduction to below 10 gallons per minute.
- Phase 2 Remedial Action: Lord Brook Source Areas. Design is ongoing to develop cleanup plan for South Open Cut, South Mine, and TP-4. Design should be completed in 2014.
- Phase 3 Remedial Action: Groundwater use restrictions, long-term monitoring, and site restoration. Design should be complete in 2015.



Evaluation of Remaining Cleanup Actions

NTCRA Phase 3, Remedial Action Phase 2,
and Remedial Action Phase 3



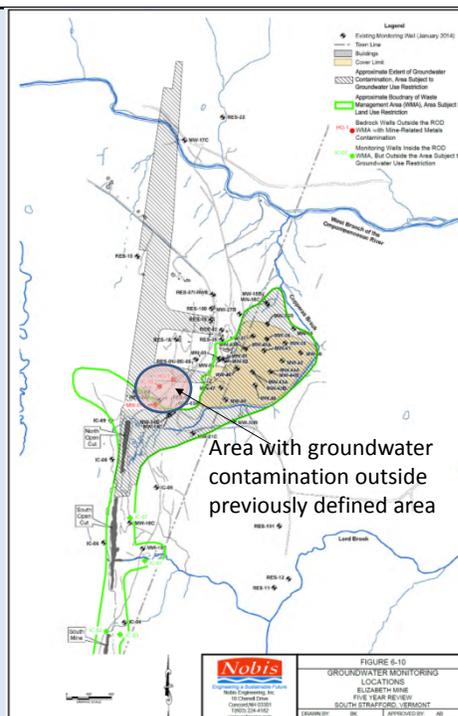
Evaluation of Remaining Cleanup Action Lord Brook Source Areas				Is surface water at this location toxic to aquatic organisms?		Is sediment at this location toxic to aquatic organisms?	
Assessment of Tributaries to Lord Brook that drain South Mine and South Open Cut.				acute toxicity	chronic toxicity	acute toxicity	chronic toxicity
Tributaries to Lord Brook	Copper sediment concentration for 2013 toxicity testing (mg/l)	Copper surface water average for 2013 (ug/l)	Status of Benthic Community				
SM1	2800	285	impaired	yes	yes	yes	yes
SC4	3300	64	impaired	yes	yes	yes	yes
SC2	880	20	impaired	no	no	no	yes

Surface Water/Sediment Summary:

- Lord Brook has shown recovery of aquatic communities.
- Lord Brook tributaries show substantial impairment for stations close to South Mine and South Open Cut with less impairment at station near Lord Brook.
- Five-Year Review supports the need to design and implement a cleanup to achieve EPA and Vermont water quality standards for the tributaries to Lord Brook and provide long-term protection for Lord Brook.

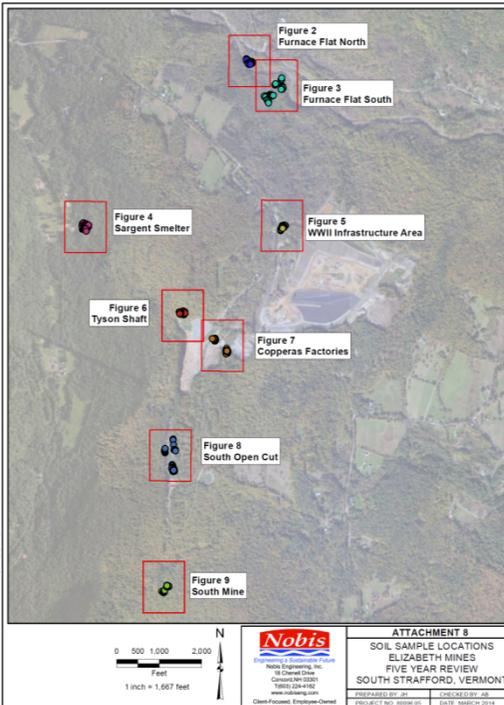
Evaluation of Remaining Cleanup Actions: Phase 3 Remedial Action: Groundwater use restrictions

- Cleanup plan assumed all contaminated groundwater was either within the underground workings or beneath the waste areas.
- Cleanup plan identified the need for land-use restrictions to prevent consumption of contaminated groundwater.
- Groundwater contamination has been found at several locations near TP-3 and the underground workings.
- Residential wells in current use are clean.
- Three residential wells, not currently in use, are contaminated.
- Remedial Design will evaluate the revised extent of groundwater contamination.
- Cleanup level for manganese will also be lowered from 840 ug/l to 300 ug/l.



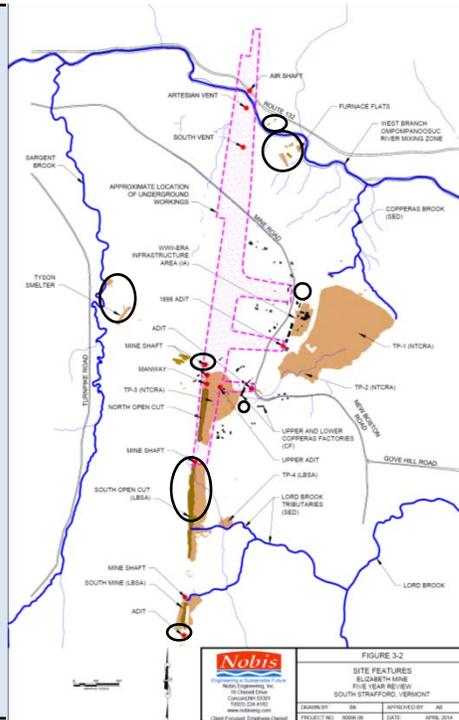
Other Issues Identified by Five-Year Review

- Other issues identified by Five-Year Review - Soil exposure for areas outside cleanup actions**
- 2006 risk evaluation did not consider threat based on exposure to cobalt, copper, and iron in soil.
 - Toxicity information for these three metals was not available at that time.
 - EPA now has toxicity information to assess potential threats from human contact with cobalt, copper, and iron.
 - For the Five-Year Review, EPA re-evaluated the risk at the Elizabeth Mine, including areas where cleanup actions were not considered necessary in 2006.



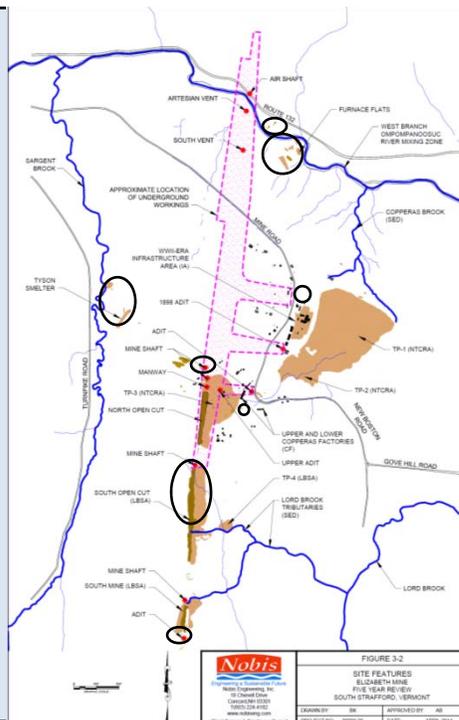
Other Issues Identified by the Five-Year Review

- A risk assessment was performed for each of the eight areas where waste remains.
- Risk evaluation used standard default assumptions for residential and trespass/recreational exposure.
- Residential Assumptions:
 - 350 days/year of exposure
 - Metals are fully bio-available except arsenic which used the 60% national default for availability
- Non-residential assumptions
 - 76 days/year of exposure
 - Metals are fully bio-available except arsenic which used the 60% national default for availability.



Other Issues Identified by the Five-Year Review

- Risk Assessment Outcome:
 - The contaminated soil found at all eight areas would not be suitable for residential exposure use based on risk evaluation.
 - Less frequent (non-residential exposure) would not represent a threat to human health.
- Next step is to evaluate the bioavailability of these metals.
- Previous testing by USGS suggests that these metals have limited bioavailability.
- If bioavailability is low, then the metals may not be a threat for the residential exposure.



Five-Year Review Summary

- Completed cleanup actions are currently protective of human health and the environment.
- Maintenance and land use restrictions critical for long-term protection.
- The cleanup actions in the design phase need to address the expanded area of groundwater contamination and the potential threat from waste material left behind in isolated areas across the site.
- Next review in 2019



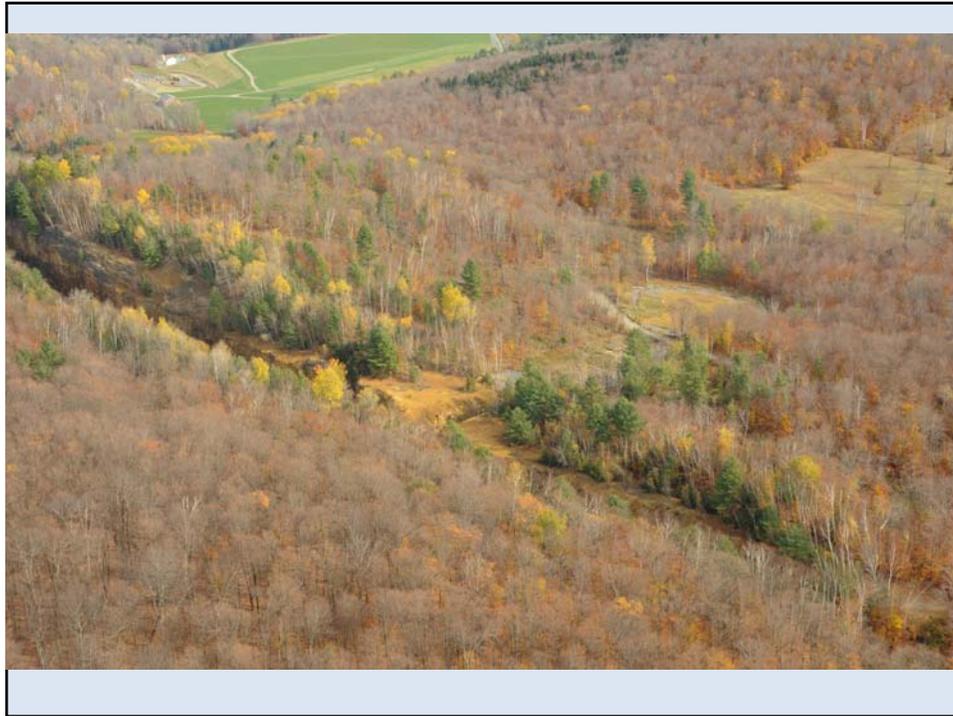
**Elizabeth Mine
Phase 2 Remedial Design Update
Lord Brook Source Areas**

May 2014

Lord Brook Source Areas – Remedial Design

- Cleanup plan objective is to achieve federal and state water quality standards at point of compliance.
- Key design issue is to control flow of water from South Open Cut and South Mine pit lakes to eliminate toxic discharge to tributaries of Lord Brook.
- Although source areas are less potent than Copperas Brook source areas the close proximity of the point of compliance creates a significant challenge for the design of this cleanup.





Evaluation of Remaining Cleanup Action Lord Brook Source Areas				Is surface water at this location toxic to aquatic organisms?		Is sediment at this location toxic to aquatic organisms?	
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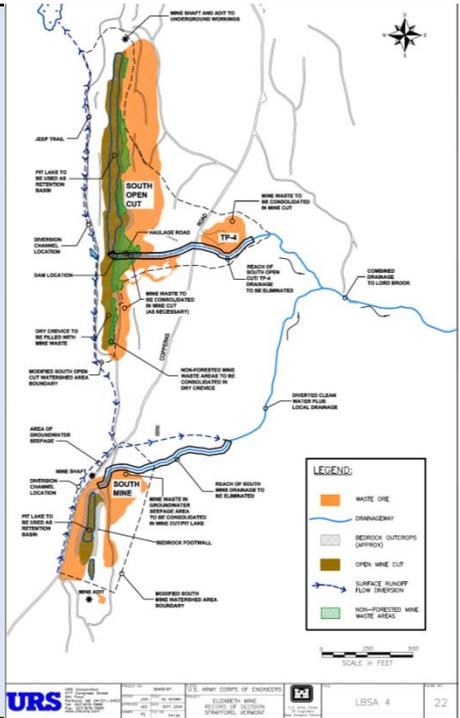
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Lord Brook Source Areas – Remedial Design

South Open Cut:

- Waste rock from haulage-way was removed to provide grade fill on TP-1.
- Current design components:
 - Surface water diversion along upgradient side of South Open Cut – about 1600 linear feet;
 - Fill and cover dry crevasse end of South Open Cut with about 20,000 cubic yards of material;
 - Controlled outlet for discharge from South Open Cut (pit lake holds 3.6 million gallons of water); and
 - Restoration.





Lord Brook Source Areas Design Update

- Next Steps:
 - Make decision regarding South Open Cut.
 - Meet with community to discuss Lord Brook Source Area design later in 2014.
- Other site activities:
 - Continue to work on Phase 3 Remedial Action design and provide community update in 2015.
 - Popular Report for Site history has been completed.
 - Interpretive panels are being developed.
 - Other Site work for 2014 will include additional site restoration, water treatment system operation, and completion of Five-Year Review.

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