Saving Children's Lives by Cleaning Up Pollution

Project Completion Report

Short title: The Long Shadow of Chemical Weapons
Short problem: Over 65,000 acres of forest tainted by dioxins
Short solution: When the land you've got is too polluted—make new land!
Quote: Aggressive soil reconstruction sealed off the pollutant pathway

Project Name:	**Remediation Works on Chemical Weapon Dismantling Platform #2**
ID#:	
Location:	**Penza, Penza Oblast, Russia**
Start Date: April 2007	**End Date: April 2008**
Cost – Blacksmith:	**$ 16 000**
Others:	**$ -**

Implementation Partner: Green Cross Russia, Penza affiliate; Russian Federation Ministry of Natural Resources
Other Partners: -

PROBLEM:
Beginning in 1997, scientists were able to document the alarming fact that throughout the 1950s and '60s chemical weapons were dismantled, without proper environmental oversight, 10km northwest of the town of Leonidovka, in the Russian state of Penza Oblast. The polluted area covers 65,800 acres of forest, where the plantlife, soil, and water all tested positive for arsenic, dioxins, and heavy metals at levels that were hazardous to human health. Locals also fear that toxins have penetrated into groundwater supplies and can be pushed back to the surface after heavy rains.

SOLUTION:
The most critically urgent step was to warn locals of the danger, with appropriate signage and direct outreach. This had to happen first because local citizens had been hunting and foraging in this region, and it was overwhelmingly likely that the toxins would continue to spread due to gravity, water flow, and bioaccumulation in the food web.

Once this pathway of immediate human exposure was closed, the next step was to try to reduce the toxicity and opportunities for spread at the sites themselves.

RESULTS:
Blacksmith's Technical Advisory Board considered several remediation methods, and decided to recommend re-cultivation of the contaminated sites: literally constructing a new ground structure that would seal off the toxins and prevent further exposure to groundwater. Some of these layers include both synthetic and natural polymers that will bind to and absorb remaining pollutants. One of the tools in our arsenal here is zeolite: a compound of quartz, clay, and other minerals. It is highly useful in filtering sulfur, nitrogen, and radioactive isotopes, and also good at absorbing rainwater and thus preventing it from interacting with the chemicals buried beneath it.

As of now, 2/3rds of the contaminated areas feature this new soil structure. Viewed as a cross-section from top to bottom, it now appears as:

-New topsoil plants
-Deep-rooted plants to bind the topsoil together
-New topsoil
-Impermeable polymer layer
-Clay
-Zeolite layer
-Original contaminated soils

FOLLOW-UP:
The final 1/3rd of this site still needs remediation. Even in the sites where the soil is now clean, since the contaminants had so many decades in which to spread and accumulate in the food web it will be necessary to make sure locals do not forage in these zones for years to come.

Additional Resources:
List URL's of additional information.

- Chemical Weapon Destruction in Russia (according to the Chemical Weapons Convention): http://www.chemicaldisarmament.ru/
- Opening of the 4th Chemical Weapon Destruction Facility in Leonidovka, Penza Oblast: http://www.globalgreen.org/press/72
- "Russia's Forgotten Chemical Weapons", Washington Post, 1998: http://www.washingtonpost.com/wp-srv/inatl/longterm/coldwar/leonidovkaa.htm