Project Completion Report: Abandoned Chemical Plant - Horlivka, Ukraine

Project Details:

Location	Horlivka, Ukraine
Contaminant	48 tons of explosive trinitrotoluene (TNT) left in tanks and pipes at an abandoned chemical plant
Project Duration	November 2011 – June 2014
Project Cost	$ 650,000
Implementing Partners	International Council of Chemical Associations (ICCA), United Nations Industrial Development Organization (UNIDO), Green Cross Switzerland (GCS), Ukrainian Government, Delegation of the European Union, Swedish International Development Cooperation Agency, Trust for Mutual Understanding
Population Affected	300,000

Background and Scope:

In the Donetsk region of Southeast Ukraine there is an abandoned chemical and explosives facility known as the State Enterprise Horlivka Chemical Plant. The factory sits in the middle of Horlivka, a city with a population of 300,000. The plant produced several chemicals, including the carcinogen mononitrochlorobenzene (MNCB) and explosive trinitrotoluene (TNT), from the Soviet era until production at the plant was halted in 2001. The facility was not decommissioned appropriately, and large volumes of both of these toxic compounds were left in substandard storage around the 167-hectare site. In some buildings, the production was stopped mid-process and the compounds were left in the production equipment and piping. This was particularly dangerous for the TNT, which becomes more explosive when packed and confined in a closed pipe.

Residents of the city are routinely exposed to fumes from the leaking MNCB storage facility. In April 2011, the site contained approximately 2,350 tons of MNCB, much of which was stored in leaking drums and tanks, and 48 tons of TNT stored in aboveground equipment and underground tanks. A senior technical advisor with 20 years of explosives experience with the U.S. Army Environmental Centre estimated that each year there was a 5% chance of a massive TNT explosion at the site.

Solutions Implemented:

In the summer of 2013, UNIDO, Blacksmith Institute and its subcontractors began physical work to remove and secure TNT at the three main production buildings at the chemical plant. The team installed perimeter fences, hired security, mounted appropriate safety signage, cleared access routes, rented the necessary equipment and sent all local labourers to a training course on the safe handling of explosives.

Large sections of the buildings were removed before the equipment inside was dismantled, removed and washed. TNT remnants from the equipment were collected and stored in plastic drums in a temporary secure storage facility. An acid wastewater neutralization system using a soda solution and an active carbon absorption column was used to treat waste water at the site.

Two emergency tanks were excavated, removed from the ground, cut open, emptied and cleaned. TNT and related products from the tanks were stored in the temporary storage facility, while mud that formed the top layer of the material inside the tank was removed and set aside under cover for potential neutralization at a future date.

Project Performance:

In September 2012, news broke that the court in charge of the Horlivka Plant's bankruptcy proceedings had ordered that some of the equipment containing TNT be immediately sold to partially compensate the Plant's creditors. Within weeks, large pieces of equipment containing small amounts of TNT were removed from the property. Despite bureaucratic and regulatory hurdles that caused delays in the project's implementation, Blacksmith Institute managed to contract a design institute for a revised remediation plan that accounted for significant changes at the project site.

Aside from clearing all equipment, debris, contaminated dirt and sludge out of the buildings and storing any contaminated material in the temporary TNT storage facility, the team also reviewed existing environmental analysis data collected over the past fifteen years to identify gaps and guide the design of the soil and water sampling program. The team also reviewed hydrological and geological data to obtain a comprehensive understanding the underground site characteristics. The finalized environmental assessment program includes seven new water-sampling wells at a depth of ten meters each, three surface water-sampling points, and soil sampling at multiple depths at each well.

Outcomes & Follow-up:

As of March 2014, Blacksmith Institute has safely and successfully removed 48 tons of TNT, related byproducts and precursors from the production buildings.

The chemical plant was one of the many toxic sites left by the Soviet industrial complex. Since many of these industrial facilities were secret under Soviet rule, the newly-independent governments that emerged after the breakup of the Soviet Union are still not fully aware of the location and characteristics of all contaminated sites within their borders. Throughout the region, former Soviet states are discovering and trying to address polluted sites that pose extraordinary risks to human health and Blacksmith Institute is committed to aiding them.