Green Remediation at Continental Steel Superfund Site - It Just Made Cents

The Continental Steel Superfund Site is in Kokomo, Indiana. Formerly a steel mill that manufactured rods, wire, fence and nails from scrap metal, the company declared bankruptcy and abandoned the 185-acre facility in 1986. Continental Steel was proposed for the National Priorities List in 1989. IDEM and EPA began implementing green remediation at this State lead, fund-financed site in 1997 for very practical reasons. Four million dollars had already been spent on emergency removal actions, over $2 million had been spent for a non-time critical removal, and the cost of an interim remedial action was estimated at $8 million. Final remediation costs were estimated at $40 million. IDEM, US EPA and CH2M HILL, the remedial design contractor, sought every opportunity to reduce costs, reuse materials or recoup expenses. The key to success has been the willingness of all parties to seek out an incorporate new ideas and designs.

Reuse of contaminated soil for fill material

Residential yards east of the site were contaminated with lead. Three thousand five hundred cubic yards of contaminated soil that contained lead in excess of 400 parts per million (ppm) was removed during the non-time critical removal action that began in 1997. Since the soil contamination was within the risk-based acceptable level of lead for industrial use, the soil was stockpiled in the Slag Processing area. The contaminated soil would be used on site for fill where the future land use could be appropriately limited. These actions:

- Reduced the cost, fuel consumption and other transportation related expenses that would have been necessary to transport and dispose of the soil at a landfill;
- Reduced the cost, fuel consumption and other transportation related expenses that would have been necessary to obtain and transport clean fill; and
- Reduced the amount of landfill capacity required to remediate the site.

Lead contaminated soil and unprocessed slag stockpiles in Slag Processing Area.

Reuse of slag for fill

The nine-acre Slag Processing Area also contained stockpiles holding approximately 60,000 cubic yards (cy) of unprocessed slag. The remedy called for the slag to be graded

and covered, with some stabilization of adjacent creek banks. The design would have raised the grade of the land parcel significantly and created a broad mound with sloping sides. Eventual reuse options would be extremely limited. US EPA will require an estimated 160,500 tons of fill to complete the in place closure of surface impoundments and provide correct surface contours for a final soil and vegetative cover in the immediately adjacent Acid Lagoon Area. After reviewing the Applicable or Relevant and Appropriate Requirements (ARARs), IDEM and US EPA agreed on criteria that would allow some contaminated media to be used as fill in the Acid Lagoon Area. The unprocessed slag met the criteria. US EPA moved the slag to the Acid Lagoon Area. These actions:

- Reduced the amount of general fill needed to backfill the Acid Lagoon surface impoundments by approximately 60,000 cy, over 3300 truckloads; and
- Resulted in nearly nine reuseable acres instead of a limited use slag landfill

Reuse of uncontaminated concrete rubble for fill material

One hundred and twenty five buildings and other structures were demolished during the interim remedial action that began in 1998 and concluded in December 2000. Continental Steel's structures were designed to last. Former Continental Steel employees quoted the chief engineer's instructions to his staff as "…design it according to industry standards, then design it again, three times as strong, 'cause that's how I want it built." IDEM contractors used approximately 4500 cy of clean brick from the thick walls and floors to fill basements and voids, approximately 21,000 cy of crushed concrete for stone surfacing, and over 25,000 cy of stockpiled concrete rubble to fill low spots in the 87-acre Main Plant Area.

Crushed concrete stockpiles in Main Plant Area.

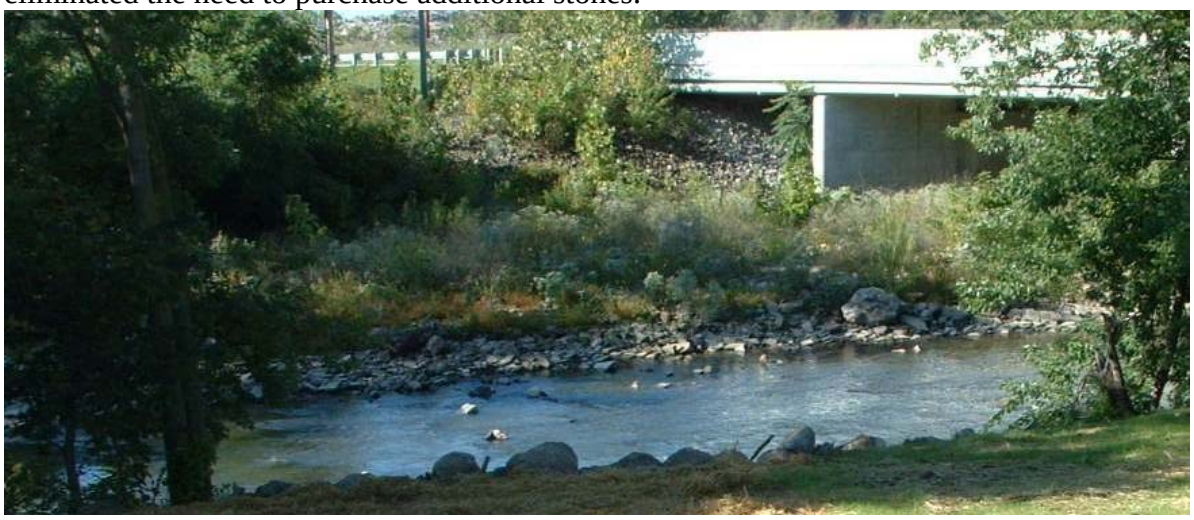
These actions:

- Reduced the cost of obtaining fill material by approximately $21,000. Reduced fuel consumption and other transportation related expenses that would have been necessary to transport and dispose of the rubble at a landfill;
- Reduced the cost of obtaining general fill by approximately $148,000. Reduced fuel consumption and other transportation related expenses that would have been necessary to obtain and transport clean fill; and

- Reduced the amount of landfill capacity required to remediate the site.

Large field stones used for creek bank restoration

IDEM contractors imported over 440,000 tons of clean soil to grade and cover the Main Plant Area. Large granite field stones were imported with the general fill and topsoil. Those stones had to be removed from the topsoil layer. At IDEM's direction, the stones were set aside and later used to help stabilize Kokomo and Wildcat creek banks, which eliminated the need to purchase additional stones.

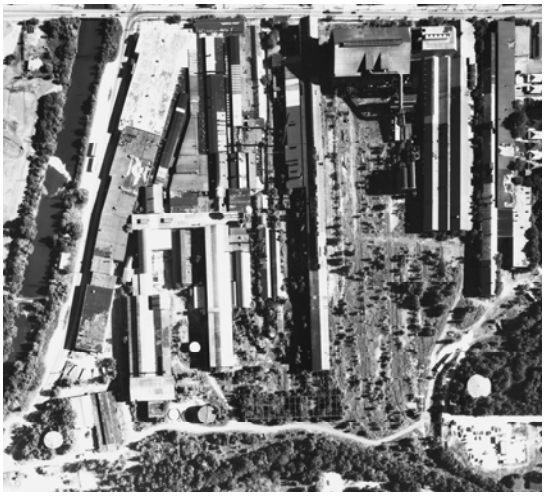


Field stones on north bank (bottom of photo), Wildcat Creek east of Dixon Road bridge.

Recycling steel scrap

IDEM contractors sorted and recycled steel scrap in every imaginable form, including I-beams, other framing and structural supports, tanks, piping, rebar, empty drums, train rails, wire coils, and stacks. Contractors were required to check comparative scrap prices monthly from several suppliers. These actions:

- Placed approximately $1.6 million in a dedicated account where it earned interest. As a result, $1.9 million was available to defray future remediation expenditures.
- Reduced the cost, fuel consumption and other transportation related expenses that would have been necessary to transport and dispose of the steel at a landfill; and
- Reduced the amount of landfill capacity required to remediate the site.



Pre-demolition photo, Main Plant Area, 1998

Reuse of site fence for Rails to Trails and other site areas

The 87-acre Main Plant area was fenced at the conclusion of the 1998-2000 decontamination and demolition. The final remedial action consisted of consolidation of contaminated soil, and backfill and cover over the entire Main Plant. The area was to be protective for recreational use. Once the cover was completed, the 9700 linear feet of 8-foot chain link perimeter fence and 574 linear feet of four-foot chain link fencing were no longer necessary or desirable. Selling the discarded fence for scrap did not seem like the best use for the relatively new material. IDEM advertised in the Indiana Materials Exchange and was able to sell the four-foot chain link and posts. Local volunteers for the Nickel Plate Rails to Trails project needed chain link for certain sections of their trail. They offered to remove approximately 75% of the eight-foot chain link and posts with their own labor and materials. Work release personnel provided some labor. IDEM staff and City of Kokomo personnel contributed oversight and assistance, and loaned re-useable protective equipment such as vests and traffic cones. Approximately 10% of the fence, located in areas that were overgrown and difficult to access, was disposed by the contractor. US EPA removed the remaining fence and re-installed it in other areas.

Rails to Trails volunteers remove chain link fence from Main Plant

These actions:

- Reduced the cost (to the community) of constructing the Nickel Plate trail;
- Reduced the cost of fence repair for other Continental Steel areas;
- Beneficial re-use of approximately 95% of the site fencing; and
- Reduced the amount of landfill capacity required to remediate the site.

Reuse of chipped trees for erosion control.

The Main Plant, abandoned since 1986, had become overgrown and wooded. IDEM contractors cleared many trees and chipped them on site. The 87-acre site slopes generally downward toward the north bank of Kokomo Creek. Erosion and storm water runoff controls were necessary to protect Kokomo Creek while clearing, excavating contaminated soil, and placing backfill and cover. IDEM used the wood chips to construct berms, protect site roads and as interim cover to augment erosion control measures.

- Reduced the cost, fuel consumption and other transportation related expenses that would have been necessary to transport and dispose of the wood chips at a landfill;
- Reduced the cost, fuel consumption and other transportation related expenses for erosion control;
- Reduced water needed for dust control on site roads; and
- Reduced the amount of landfill capacity required to remediate the site.

Sale of used equipment

IDEM also sold truck scales that IDEM had installed and used on the Main Plant for the demolition of the buildings. The sale was coordinated through the Indiana Department of Administration in accordance with federal procurement procedures. Since the successful bidder was a Solid Waste Management District in northern Indiana, Indiana recycling efforts will continue to benefit from the scales. These actions:

- Reduced the cost of equipment for the Solid Waste Management District;
- Recouped $6,000 in value that was placed in the site-cleanup dedicated fund account; and
- Achieved beneficial re-use of the equipment.

Stormwater retention areas-partnering with the community

IDEM and US EPA and the City of Kokomo combined their efforts to conserve resources for remedial action and storm water storage in two areas of the Continental Steel site.

The first was the combination of the Markland Quarry Backfill project with the Kitty Run Drain storm water storage basin project. The Markland Quarry Area contained a 4-acre pond, up to 70 feet deep. US EPA completely dewatered the pond and removed TCE-contaminated sediment from the pond floor. The plans called for the entire pond to be backfilled with clean fill. The City of Kokomo was preparing to perform a large excavation nearby to provide storm water storage for the Kitty Run Drain. The City needed to dig a hole, and we needed to fill one. As a result of good communication between IDEM, US EPA and Kokomo, the same contractor worked both jobs simultaneously. The contractor completed construction of the retention area, and soil excavated from Kitty Run Drain was transported directly to the Markland Quarry pond. The cost to fill the Markland Quarry pond was reduced because US EPA paid only for transportation and placement of the soil, and the City of Kokomo received a completed storm water retention area in exchange for the soil. These actions:

- Allowed the soil to be handled and transported only once for both projects;
- Due to the short distance between the two projects (approximately 5 miles round trip), minimized consumption of fuel and other transportation related resources; and
- Both projects benefit the environment and the community by eliminating the chemical and physical hazards of the Superfund site, and by providing storage for storm water thereby preventing combined sewer overflows and the need to bypass the wastewater treatment plant.

A second storm water retention area was proposed by the City of Kokomo for the Markland Quarry area. US EPA agreed to revise the remedial design and incorporate the new retention area. This area will be prepared within the footprint of the former pond by filling it to 8-10 feet lower than the surrounding grade. The retention area will receive storm water from the combined sewer system serving adjacent residential neighborhoods. Kokomo will construct and install in- and outlet lines to direct the stormwater. These actions:

- Reduced the amount of general fill needed to backfill the four-acre pond by approximately 58,000 cubic yards, over 3000 truckloads;
- Allowed construction of the retention pond without using heavy equipment to excavate soil; and
- Both projects benefit the environment and the community by eliminating the chemical and physical hazards of the Superfund site, and by providing storage for storm water thereby preventing combined sewer overflows and the need to bypass the wastewater treatment plant.

Wind Energy for the long term well pump systems.

US EPA and its contractor, CH2M HILL, are finalizing the specifications for the groundwater extraction system component of the site wide groundwater remedy. Current plans call for installing and using wind energy to power the well pumps. The approach would reduce long term energy consumption and related expenses, as well as benefit the local economy. The wind energy systems (wind mills or wind turbines) are manufactured in Kokomo. Cost estimates are under development.