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## MEMORANDUM

TO: Paul Doherty, EPA/PO

FROM: Eric Nold, E & E/STM *EN*

THRU: Hieu Q. Vu, E & E/START PM. *[Signature]*

DATE: November 18, 1996

SUBJECT: Removal Action: Blackhawk Iron and Metal Site, Waterloo, Iowa

SSID #: NX  
CERCLIS ID No.: IAD022364897  
TDD: S07-9603-001D  
PAN: 0114BHRAXX  
OSC: Jim Kudlinski

### INTRODUCTION

The Ecology & Environment, Inc. (E & E), former Technical Assistance Team (TAT) was tasked by the U.S. Environmental Protection Agency (EPA) Region VII Emergency Planning and Response (EP&R) Branch under Technical Direction Document (TDD) T07-9510-042 to assist the EPA with a time-critical removal (Phase II) of lead-contaminated soil from the Blackhawk Iron and Metal site in Black Hawk County, Iowa. Specific elements of the TDD included (but were not limited to) coordinating all activities with the EPA on-scene coordinator (OSC); assessing and documenting site conditions; developing a site-specific Health and Safety Plan; conducting soil screening with a Metorex X-MET X-ray fluorescence spectrometer (XRF); collecting soil confirmation samples; collecting soil verification samples of the stabilized/treated soil; collecting air samples; collecting drum samples to facilitate off-site disposal; developing spreadsheet databases for site documentation; and monitoring Emergency Response Cleanup Services (ERCS) contractor activities. TAT Member (TATM) Eric Nold was assigned as project manager for the site, and activities were coordinated through EPA OSC Jim Kudlinski. The ERCS response

manager (RM) for the removal was John Vrenick. On-site removal activities began the week of September 11, 1995.

After on-site activities began and prior to preparation of this report, contract changes occurred within the EPA's Removal program. As of December 18, 1995, the former TAT contract was replaced by the Superfund Technical Assessment and Response Team (START) contract. This project reopened under the START contract as TDD S07-9603-001 to finalize field work and prepare the final report. START Member (STM) Nold continued as project manager to complete the assigned tasks. Meanwhile, the EPA reorganized in October 1995, and the removal activities described herein were carried out under the Emergency Response and Removal (ER&R) program.

## **BACKGROUND**

### **Site Location and Description**

The inactive Blackhawk Iron and Metal site is located at 2724 Lafayette Street, Waterloo, Iowa (Attachment A: Figure 1. Site Location Map). The site is located in a residential area in the east-central portion of Waterloo. The site is within the SW1/4, SW1/4, SE1/4, Sec.30., T.89N., R.12W., Black Hawk County, Iowa. The site is bounded on the north, east, and west by residences along Lafayette, Zuma, and California streets, respectively. The south boundary consists of a wooded floodplain of the Cedar River. The 7.5-acre site is divided by an east-west trending Chicago Central Railroad (CCR) line, which apportions the site into a north parcel (3.5 acres) and south parcel (4.0 acres) of land. Three residential dwellings are located immediately north of the site, seven immediately east of the site, and eight immediately west of the site (Attachment A: Figure 2. Site-Specific Map). The Cedar River is approximately 2,000 feet southwest of the site. The site is underlain by the Cedar Valley and Wapsipinicon limestone aquifers and the overlying glacial drift aquifer, which are all hydrologically interconnected, and are the most commonly utilized aquifers in the area. Depth to ground water in the vicinity of the site varies from 15 to 35 feet below ground surface. Information concerning the site's geologic setting was obtained from a Preliminary Assessment (PA) report prepared by TAT under TDD T07-9404-007.

### **Site History and Previous Investigations**

The Blackhawk Iron & Metal Company conducted battery, transformer, and scrap metal reclamation activities on the site from 1950 until 1987. RNM Midwest continued reclamation of transformers and scrap metal from 1987 to 1989. Subsequently, Capital Metals, Inc., conducted reclamation of transformers from

February 1991 to May 1991, when a fire destroyed the facility's office building. No business activities have been conducted at the site since the fire. According to a 1984 plat map, the portion of the site north of the railroad tracks is owned by Tom Wesley of Waterloo, Iowa, and the portion south of the tracks is owned by Nina Smith of Mesa, Arizona.

The site was identified as a potential hazardous waste site through a citizen's report to EPA concerning the presence of elemental mercury in site soils. The report was investigated by the TAT in December 1993, under TDD T07-9312-001. Because battery casings/fragments were observed over much of the site, soil samples were collected throughout the site to characterize the nature of potential contaminants. Field screening and laboratory results of those samples indicated that an isolated area of mercury contamination was present (and was subsequently partially removed) and that elevated levels of lead and copper existed across the site. Soil samples collected during the emergency response revealed concentrations of lead ranging from non-detect to 53,200 milligrams per kilogram (mg/kg).

A removal assessment was conducted at the site by the TAT under TDD T07-9312-014 in January 1994. During that study, field screening and laboratory analysis of surface and subsurface soils for lead, copper, and polychlorinated biphenyls (PCBs) were conducted. Lead was detected above 500 mg/kg in surface and subsurface soils throughout the site and in five adjacent residential yards. Nineteen samples were subjected to Toxicity Characteristic Leaching Procedure (TCLP) for lead, all of which exceeded the TCLP regulatory limit of 5.0 milligrams per liter (mg/L). Locations of elevated copper levels were found to correlate with the lead-contaminated areas. The highest concentration of PCBs (16 mg/kg) was found in a subsurface sample collected from the central portion of the site. From the data, the TAT approximated that 170,000 square feet of surface soil on the site had concentrations of lead above the action level of 500 mg/kg. The TAT estimated that a volume of 49,255 cubic yards of soil would require excavation and treatment.

An emergency removal (Phase I) of contaminated residential soils was conducted in June 1994 under TDD T07-9405-019. During the removal, further investigation indicated that five additional residential yards contained lead concentrations exceeding 500 mg/kg, for a total of 10 contaminated residential yards adjacent to the site. Approximately 1,500 cubic yards of contaminated, off-site soil were excavated and stockpiled on site by ERCS during the emergency removal. This soil was temporarily stored under a lean-to-shed and covered with plastic for later incorporation into the treatment process of contaminated soils to be addressed in a second phase of the removal. Following excavation activities, ERCS erected a security fence around the site perimeter. The emergency removal activities lasted for approximately 3 weeks.

### **Pre-Remedial Evaluation**

To fulfill requirements for EPA's Remedial program for sites listed in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), a PA was initiated by the TAT under TDD T07-9404-007. Results of the PA prompted a Site Inspection (SI) that was undertaken by the TAT under TDD S07-9601-024. On-site activities for the SI were conducted in September 1995, concurrent with removal activities. Both the PA and SI have been completed with final reports delivered to the EPA.

### **SITE ACTIVITIES**

TAT, EPA, and the ERCS contractor, Smith Environmental Technologies, Inc., mobilized to the site on September 11, 1995, to begin removal activities for Phase II of the removal. The activities conducted were segregated into the following categories for reporting purposes:

- A) Mobilization and site setup.
- B) Air sampling.
- C) Excavation.
- D) XRF screening and confirmation soil sampling.
- E) Demolition/disposal of debris.
- F) Chemical fixation (stabilization) of contaminated material.
- G) Verification soil sampling and disposal.
- H) Restoration.
- I) Drum sampling, bulking, and disposal.
- J) Documentation.

The ERCS crew (and/or their subcontractor) was responsible for conducting the actual excavation/stabilization activities, while the TAT/START performed general oversight and documentation, field screening, sampling, and tracking of environmental media samples to ensure that all objectives of the removal action were achieved. The TAT/START activities during the removal were in accordance with a previously developed (and approved) Quality Assurance Project Plan (QAPP).

Due to the duration of the removal, rotations were established by the TAT/START, EPA, and ERCS. The following is a list of key personnel that performed on site activities:

*EPA OSC:* Jim Kudlinski, Jim Augustyn, and Jeff Weatherford.

*TATMs/STMs:* Eric Nold, Buck Brooks, Hieu Vu, Sam Mudumala, Lynn Parman, Kirby Rogers, and Keith Slider.

*ERCS RM:* John Vrenick and David Brinkmeyer.

At any given time, up to one OSC, two STMs, and 12 ERCS members occupied the site.

#### **A) Mobilization and site setup**

**September 11-28, 1995:** On September 11, 1995, the TAT mobilized personnel and equipment to the site to support the removal activities. The EPA Mobile Command Post (MCP) was mobilized to the site for utilization as a temporary office, until an office trailer could be delivered. ERCS arranged for delivery of a rental office trailer on September 15, 1995, and it was placed on site in the northeast corner of the gravel parking lot (after that area had been excavated and restored). START erected four high volume (HiVol) air samplers on the perimeter of the site, and a meteorological station (met-station) next to the office trailer. ERCS mobilized a decontamination (decon) shower trailer and equipment trailer to the site. Electricity, telephone lines, and water were later established by ERCS subcontractors for use during the removal. ERCS also procured office equipment and heavy machinery necessary to complete the removal.

#### **B) Air sampling**

**September 25-November 8, 1995:** Four HiVols were erected around the perimeter of the site, between site activities and the nearest off-site receptors. Two collocated HiVols (HV1 and HV2) were located in the backyard of 2716 Lafayette, one HiVol (HV3) was located in the backyard of 350 California, and one HiVol (HV4) was located in the backyard of 69 Zuma (Attachment A: Figure 3. HiVol Location Map). A met-station, mounted atop a 25-foot tower, was erected between the office and decon trailers.

The HiVols were calibrated prior to initial sample collection, and audits were performed bi-weekly to ensure that the flow volume was within acceptable limits (calibration/audit printouts and daily weather printouts were placed in the START TDD file). HiVol brushes, motors, and flow control boxes were changed, as necessary, to ensure that continuous sampling for off-site fugitive metals laden dust was conducted. The HiVols were calibrated, installed, operated, and maintained according to EPA Region VII Standard Operating Procedure (SOP) No. 2314.1A. A 12-inch-square glass-fiber filter was used as the sampling medium. Filters were placed in sealable plastic bags and were initially shipped on the day of

collection, unless collected on a Sunday, to the EPA Region VII Laboratory, Kansas City, Kansas. (EPA lab) for particulate lead analysis. Samples collected on Sundays were shipped the following Monday. Results were received within 1 day of the laboratory's receipt of the samples (24-hour turnaround). Once baseline air concentrations of off-site lead were established, some sample shipments included samples accumulated over several days to reduce shipping cost.

HiVol samples were collected over a 24-hour sampling period to ensure that an adequate volume of air had been sampled for proper analysis. Twenty-nine sets of air samples under four activity numbers (BP1NX001-017; GP1NX011-047; GP2NX001-038F; GP3NX201-218F) were collected during the removal activities (Appendix B: Table 1. HiVol Air Sampling Results), resulting in 110 total air samples (including field blanks). Of the 110 air samples, only one sample (BP1NX011) exceeded the National Ambient Air Quality Standards (NAAQSs) action level of 1.5 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). That sample, (BP1NX-011, collected September 28, 1995) showed a lead concentration of 1.57  $\mu\text{g}/\text{m}^3$  (Appendix C: Field sheets, Chain of Custody forms, and Analytical Request Reports). A water source (water truck) was utilized on site for dust suppression during a short time span of the collection of this sample and dust suppression was intensified when needed during any excavation thereafter.

### **C) Excavation**

**September 12-December 14, 1995, and March 12-June 3, 1996:** Based on the time period and location, soil excavation activities were separated into four major areas for reporting purposes: parking lot; south parcel; railroad tracks parcel; and north parcel. Removal activities were temporarily postponed for three months (December 14, 1995-March 12, 1996), because of freezing winter conditions.

*Parking lot:* ERCS began excavation of the driveway entrance and gravel parking lot adjacent to Lafayette Street on September 12, 1995, in preparation to establish a "clean zone" for site operations. Using a trackhoe, ERCS operators excavated 12-inch lifts and STMs screened the area of excavation with an XRF. Excavation was continued until lead concentrations were below the 500 mg/kg removal action level. The depth of excavation in this area ranged from 1-4 feet below ground surface (BGS). The west fence of the parking lot was temporarily taken down in order to excavate a contaminated strip of soil approximately 1.5 foot wide on the west side of the fenceline that had been left during Phase I removal activities. An area east of the east fenceline of the parking lot area was also excavated. An area of contaminated soil (approximately 3 feet wide and 20 feet long) next to the garage at 2732 Lafayette that also had been left during Phase I removal activities was excavated. Soil from this area of excavation was

temporarily staged with the previously excavated contaminated residential yard soil that had been removed during Phase I.

After an area of approximately 4,000 square foot was excavated to below 500 mg/kg based on XRF screening, 10 equidistant grid points (at 20-foot centers) were established by STMs and in situ XRF readings were taken (Attachment A: Figure 4. Parking Lot Excavation Area). Seven grids were excavated in order to establish the clean zone (Grids 1-7). Approximately 3,000 tons of material had been removed and stockpiled on the site when the excavation of this area was completed on September 20, 1995.

*South parcel:* The ERCS contractor began excavation of the south parcel of the site on October 5, 1995. Initial excavation lifts were taken at 1-foot depth intervals. After extensive XRF screening, it was determined that excavation lifts would be taken until there were no visible battery casings or debris. The depth of excavation in this area ranged from 1-20 feet BGS. Fifteen grids (Grids 7 south-Grid 21) were established for confirmation sampling to determine whether the removal action level was achieved (Attachment A: Figure 5. South parcel excavation area).

The material excavated from the south parcel was a mix of sandy soil, battery casings, construction debris, concrete blocks, tires, bulk newspapers, crushed drums, car parts, and various plastic, glass, and metal waste. Excavated material was placed into MOXY (or T-REX) dump trucks (an off-road dump truck) and transported to the north parcel. Excavated soil was placed in the contaminated soil stockpile for stabilization. Other material that was excavated (as indicated above) were placed in a mixed debris stockpile for further separation. The ERCS contractor completed excavation of the south parcel on December 7, 1995, after an estimated 33,300 tons of material were removed.

*Railroad tracks parcel:* On March 25, 1996, CCR personnel began manually removing the railroad spur that separated the site into the north and south parcels. An agreement between the EPA and CCR involving the labor and financial obligations of each party with respect to the cleanup had been agreed to previously. CCR finished removing the railroad tracks on March 26, 1996, and ERCS began removing the railroad ties and segregating them based on their physical appearance for reuse (CCR representatives visually inspected the ties). Reusable ties were deconned by ERCS and staged for future use while ties that could not be reused were placed with the wood stockpile for disposal. Following removal of the ties, ERCS began excavating the railroad parcel while STMs guided removal activities based on XRF readings. Excavated material was placed in a MOXY and transferred to the north parcel contaminated soil stockpile. The depth of excavation in this area ranged from 1-1.5 feet BGS. Due to the railroad parcel being narrow

and exhibiting an uneven boundary of excavation, grids were not established. Instead, two rows (R1 & R2) were established along the length of the former tracks. Grid points were placed at 20-foot intervals (points A-ZZ) to determine if the removal action level was achieved (Attachment A: Figure 6. Railroad Tracks Parcel Excavation Area). ERCS completed excavation of the railroad parcel on March 28, 1996, with an estimated 2,400 tons of soil removed from this location.

*North parcel:* The ERCS crew began excavation of the north parcel of the site on April 17, 1996. Approximately 100 feet of fencing was taken down on the southeastern portion of the north parcel so that a narrow strip of the yard at 47 Zuma could be scraped back due to site runoff having deposited sediment onto this property since Phase I removal activities had occurred. Material excavated from the north parcel was similar in consistency to the material that had been removed from the south parcel. Excavated soil was placed into a MOXY and transferred to the contaminated-soil stockpile. Debris was placed in the appropriate stockpile for future disposal. The depth of the excavation in this area was directed by STMs using an XRF, and ranged from 1-20 feet BGS. Twenty-one grids (Grids 22-42) were established for confirmation sampling to determine whether the removal action level was achieved (Attachment A. Figure 7. North parcel excavation area). ERCS completed excavation of the north parcel of the site on June 3, 1996, with an estimated 12,700 tons of soil removed from this location.

#### **D) XRF screening and confirmation soil sampling**

**September 13-December 14, 1995, and March 28-June 3, 1996:** XRF readings were taken by STMs at intervals of approximately 10 feet during excavation activities so that the 500 mg/kg action level established in the Quality Assurance Project Plan (QAPP) could be maintained. Once an area of approximately 4,000 ft<sup>2</sup> was excavated to below 500 mg/kg, grid points (labelled alphanumerically) were established on 20-foot centers and final XRF readings were recorded (Attachment A: Figures 4-7).

Low and mid-level standards were read hourly with the XRF during use to ensure the accuracy of the XRF (Attachment B: Tables 2-6. XRF Standards Readings). In addition to using the XRF to direct excavation activities, XRF readings were also taken in 10 residential yards adjacent to the site. This was done at the request of the OSC to determine whether potential off-site migration of fugitive lead dust was impacting the neighboring yards (Attachment B: Table 7. Residential Yards XRF Readings). The XRF was also used to initially, and then randomly, screen backfill clay and top soil to ensure that restoration activities did not recontaminate the site (all readings of backfill material were 0.0 mg/kg).

Confirmation soil sampling was conducted at 9.69% (for a total of 56 samples) of the final XRF grid points (slightly less than the 10% as stated in the QAPP) to validate XRF readings and ensure that cleanup goals had been achieved. In the parking lot area, seven confirmation samples were collected (BP1NX071-078) (Attachment B: Table 8. Confirmation Soil Sample Results [total lead] and Attachment C). In the south parcel of the site, 18 confirmation samples (including two duplicate samples) were collected (GP2NX071-075; GP3NX001-002; GP4NX003-004; and GP5NX005-012). In the railroad parcel of the site, seven confirmation samples (including one duplicate sample) were collected (GP6NX001-006). Twenty-four confirmation samples (including three duplicate samples) were collected from the north parcel of the site (GP7NX001-014; and GP8NX015-021D). Confirmation samples were collected with disposable stainless steel spoons, placed in a disposable aluminum pie pan, and homogenized. Triplicate XRF readings of the homogenized samples were then taken and the samples were placed into 8-ounce glass jars for shipment to the EPA Lab for total lead, antimony, arsenic, copper, cadmium, and mercury analyses (Attachment C).

A confirmation sample of the backfill clay and top-soil was also collected (BP1NX072) and sent for the aforementioned metals analysis prior to approving receipt of the backfill material (Attachment C). A large wood chip pile was formed during the wood chipping activities of timber logs (cut down from all areas of the site) and other wood products. Due to the amount of mud on the majority of trees and wood being chipped, the chip pile was sampled (BP1NX079) for total lead, antimony, arsenic, copper, cadmium, and mercury analyses. Sample results indicated a lead concentration above 500 mg/kg, and it was determined that the wood chip pile would be spread across the site and incorporated into the material requiring treatment (as opposed to the chips being loaded out as nonhazardous wood debris).

#### **E) Demolition/disposal of debris**

**September 12-December 14, 1995, and March 6-June 4, 1996:** Because the entire site required excavation, all of the metal structures on site were demolished by ERCS and placed in roll-off boxes for reclamation at Wiessman Iron & Metal Recycling in Waterloo, Iowa. Only metal debris that was free of soil contamination was allowed in the roll-off boxes. Excavated metal debris with soil contamination was decontaminated and then placed in the roll-off boxes. The last of the 30 roll-off boxes was taken off site on June 4, 1996, resulting in 287.07 tons of scrap metal being reclaimed for recycling (Attachment B: Table 9. Disposal Tracking Spreadsheet).

Construction debris (nonmetal) from on-site structures was placed into separate roll-off boxes for disposal as nonhazardous waste at the Black Hawk County Sanitary Landfill. Twenty-five roll-off boxes containing 180.53 tons of construction debris had been disposed of by the end of removal activities (Attachment B: Table 9).

The Black Hawk County Sanitary Landfill has special disposal provisions for tires, and because of this, separate roll-off boxes were used for all of the tires that were unearthed. At the conclusion of removal activities, six roll-off boxes containing 36.02 tons of deconned tires had been disposed of (Attachment B: Table 9).

#### **F) Chemical fixation (stabilization) of contaminated material**

**October 23-December 13, 1995, and April 9-May 23, 1996:** Excavated soil was stockpiled in the southwest corner of the north parcel of the site for chemical fixation (stabilization) treatment. Severson Environmental Services (SES) (Munster, Indiana), a subcontractor to ERCS, was responsible for oversight and assistance of treatment activities. Four treatment cells were established in the west-central portion of the north parcel. Each cell was approximately 25 by 25 by 2 feet deep so that batches of approximately 50 cubic yards of contaminated material could be treated with an established volume of MAECTITE<sup>®</sup>, the proprietary treatment reagent. MAECTITE<sup>®</sup> from a tanker truck was applied with a 1-inch hose to the contaminated material in the treatment cell. Water was then added and the material was thoroughly mixed with a track hoe. Once thoroughly mixed, the treated material was placed into MOXY trucks and then transported to stockpiles. Ten batches were needed to create a treated stockpile of approximately 500 tons. Each stockpile was numbered alphanumerically and each was kept as a separate unit for sampling purposes. Upon completion of the project, 84 stockpiles (TSP001-TSP084) had been treated.

#### **G) Verification soil sampling and disposal**

**October 24-December 13, 1995 and April 10-June 3, 1996:** In order to verify that the chemical fixation treatment provided stabilization of the contaminants (lead, arsenic, and cadmium) below the TCLP regulatory levels of 5.0, 5.0, and 1.0 mg/L, respectively, samples of the 500-ton stockpiles were collected by STMs. A composite sample comprised of 10 aliquots was collected and homogenized in a disposable aluminum pie pan from each stockpile. A split of each sample was given to the SES chemist for on-site analysis, and the sample was shipped to Ameritest and Research Company, Inc. (A&RC) (Bedford Heights, Ohio) for TCLP analysis (Attachment B: Table 10. Verification Soil Sample Results [TCLP]). A 3-day

turnaround time for sample results (TSP001-TSP084) was maintained by A&RC (Attachment D: Chain of Custody Forms and TCLP Results From A&RC and SES Labs, and Corresponding Generator Certification Forms). Samples for TCLP analysis were also collected from the original mercury spill area (PINX001) and from the recovery drum containing the recovered mercury spill material (PINX002) and shipped to the EPA lab for analysis. This was done to ensure that the mercury had been recovered and would not be included with the rest of the excavated material, as it was thought that the chemical fixation treatment might not work on high concentrations of mercury.

Upon receipt of sample verification results that each stockpile was below the regulatory levels for lead, arsenic, and cadmium (Table 9) (Attachment E: Treated Soil Disposal Logs), the stockpile was loaded into dump trucks and transported to the Black Hawk County Sanitary landfill. The landfill utilized the treated soil as cover to reduce the possibility of wind blown trash. Three thousand three hundred and ninety-one dump-truck loads (over 51,399 tons) were delivered to the landfill by the end of the removal (Table 9, Attachment E).

#### **H) Restoration**

**September 14-October 4, 1995:** Following excavation and confirmation that the parking lot area was "clean", backfill clay was hauled in and spread out until it was even with the original grade (187 truckloads totaling 2,416 tons) (Attachment B: Table 11. Restoration Tracking Spreadsheet). Backfill rock (3-inch diameter) was then laid down as the base for the driveway and truck turnaround/load-out area. Backfill gravel (1 1/4-inch diameter) was then hauled in as a final component and graded in the parking lot and driveway area (75 truckloads of rock totalling 1,098 tons). To maintain general upkeep of the driveway and load-out area from use by truck traffic, 13 additional truckloads of gravel totalling 194 tons were used.

**March 6-April 2, 1996:** The uneven surface of the south parcel, which resulted from excavation activities, was contoured with a bulldozer to restore the area to its approximate original grade prior to the dumping practices that had occurred. Once the area was prepared, 56 pounds of rye grass seed were broadcasted on the railroad embankment and a burlap erosion control mat was applied over the seeded area. The newly restored wetland area of the south parcel was then broadcasted with 20 pounds of wetland marsh seed.

**May 22-June 13, 1996:** The north parcel was backfilled with clay after confirmation samples indicated that the excavated grids were "clean". Clay was then backfilled and graded until the surface was within 2-4 inches of the original grade. Backfill top soil was then brought in and graded to a 3-inch thickness.

and grass seed was broadcast across the entire north parcel (905 truckloads of clay and soil totalling 12.639 tons). Final restoration efforts included mending any areas of perimeter fencing (as needed), and removing the privacy slats from along the far north fenceline (adjacent to Lafayette Street).

By the end of the project, 88 truckloads of rock/gravel weighing 1,292 tons were used for restoration efforts. Also, 174 truckloads of clay/soil weighing 15,055 tons were delivered as backfill.

#### **I) Drum sampling, bulking, and disposal**

Thirty-three (33) drums found on site were labeled and inventoried (B001-B033), including one overpack drum containing the mercury-contaminated waste and one overpack drum containing diesel that was recovered during a leak from one of the excavator's fuel tanks. Fourteen of the drums were empty and one drum contained only metal debris. These 15 drums were crushed and placed in the metal debris stockpile. The remainder of the drums were field screened on site to determine proper waste streams for disposal. After field screening, it was determined that 10 of the drums contained rain water, with only eight drums containing waste product: one overpack containing diesel fuel; one overpack containing mercury waste; one drum containing flammable stain; and five drums containing waste oil. The 10 drums containing rain water were poured over the contaminated soil stockpile and the drums were crushed and placed in the metal stockpile. Of the remaining drums, the contents of the five drums containing waste oil (non PCB) were bulked into one drum and the flammable stain drum was bulked with the diesel fuel drum, leaving only these two drums and the mercury recovery drum for disposal. The bulked waste oil and bulked flammable waste drums were then sampled and analyzed for waste profiles and the results were sent to ENSA (South Bend, Indiana), where all three of the drums were ultimately disposed.

#### **J) Documentation**

**September 11-December 14, 1995; March 6-June 13, 1996; and August 29, 1996:** Site activities were recorded via written documentation in site logbooks, daily site maps, and spreadsheets. Logbooks containing daily site activities are kept in the START TDD file. Site activities were also recorded via photographic documentation (Attachment F-1, Removal Photographic Documentation). Photographs of site activities were taken throughout the removal. One roll of slide film was also taken during removal activities, and is being kept in the START TDD file. A follow up photographic reconnaissance was conducted by a STM two months after the removal was completed so that the post-restoration conditions

of the site could be documented (Attachment F-2. Post-Removal Photographic Documentation). This activity was conducted in association with other sites in Iowa in order to minimize costs.

## QUALITY CONTROL

### XRF Quality Control (QC)

Quality control (QC) criteria for XRF-screening results were assessed to evaluate the detection and quantitation limits (DL and QL, respectively), precision, and accuracy of the XRF data for each XRF unit and calibration model utilized during the removal (printouts of the calibration models are kept in the START TDD file). All QC criteria were compared to guidelines described in the Region VII START SOP entitled "Use of an Outokumpu X-MET 880 X-RAY Fluorescence Spectrometer for Field Screening of Heavy Metals". A confirmation sampling protocol of 10 percent was used, as suggested in the Office of Solid Waste and Emergency Response (OSWER) Directive 9360.4-01: "Quality Assurance/Quality Control Guidance for Removal Activities".

The DL was calculated by routinely measuring a low-level standard throughout the screening activities and multiplying the standard deviation of that set of measurements for each XRF unit by three (Attachment B: Tables 2-6. XRF Standard Readings). This resulted in a range of DLs from 302-710 mg/kg lead. The QL was calculated by multiplying the standard deviation by 10, which resulted in a range of QLs from 1,007-2,366 mg/kg lead (Attachment B: Table 12. XRF QC Analysis Summary). In accordance with the SOP, measurements below the DL are considered non-detect, while measurements between the DL and QL are considered qualitative to semi-quantitative, and measurements above the QL are considered quantitative.

Precision was evaluated for two concentration levels by calculating the percent relative standard deviations (%RSDs) for the previously referenced sets of low-level standard measurements, as well as for sets of mid-calibration range standard measurements that were also routinely obtained during the screening event. The following range of precision data (%RSDs) were derived: low-level lead = 20-65%; mid-level lead = 8.3-10.6%.

The previously referenced XRF SOP recommends that %RSDs should be no greater than 20%. The low-level lead standard measurements were above the recommended value (Table 12). It was noted early in the screening process that the XRF was generally reading the low-level standard slightly lower than the actual value, and that was kept in mind throughout the screening process.

Accuracy of the XRF analyses was determined through routine triplicate measurements (every 1 to 2 hours) of the mid-calibration range standard. Three hundred thirty-three sets of standard measurements were taken for lead throughout the removal. The mean of each three measurement set was calculated and compared to the original model value for that standard. Eleven lead means of the 333 sets (3.3%) exceeded a percent difference of  $\pm 20\%$  (compared to the XRF model value). The average percent difference of all the sets of means for each XRF and calibration model utilized was below 11%, well within the  $\pm 20\%$  criteria recommended in the XRF SOP.

The XRF field screening data were compared to the lab results in Attachment B: Table 13. XRF Values versus Lab Results. No false negatives or false positives for lead were noted during the entire removal for any of the XRF units or calibration models (Table 13). Regressions ( $r^2$ ) were calculated between the sample sets (XRF vs. Laboratory) but are not discussed because of the frequency of zero XRF values (e.g. during excavation, distinct layers of contaminated versus clean soil was observed).

#### **Laboratory Quality Control (QC)**

Single aliquot grab samples were collected from 45 grids for confirmation analysis (BP1NX071-GP8NX021D). The highest concentration for total lead was 477 mg/kg (Table 14). Six duplicate (split) samples were submitted for laboratory analysis of total lead to assess the efficiency of homogenization techniques and laboratory precision. The results and relative percent differences for each of those duplicate sets ranged from 0.8 to 17.3 percent and are given in Table 14.

Two duplicate (split) samples were submitted for laboratory analysis of TCLP lead to assess the efficiency of homogenization techniques and laboratory precision at A&RC. The percent differences for those samples were 23.3 and 13.8 percent. SES conducted on-site analysis of the verification samples for TCLP lead to corroborate the results of the contracted TCLP lab, A&RC. Of the verification samples collected for TCLP lead from the 84 treated stockpiles, four false negatives and no false positives (based on a 5.0 mg/L TCLP lead action level) were detected by the on-site lab. Re-analysis was requested for the four false negatives, one of which was a lab error by A&RC, resulting in a total of three false negatives out of 89 total analyses. The three stockpiles for which the false negatives were derived were retreated and resampled, resulting in TCLP levels below the 5.0 mg/L action level.

## CONCLUSIONS AND RECOMMENDATIONS

### Removal Considerations

Site assessment activities conducted in January 1994, revealed that the site met removal criteria for lead-contaminated soils, which were the result of battery-cracking operations. The fund lead removal was divided into Phase I and Phase II activities. Phase I removal activities focused on the contaminated residential yards and were completed on June 28, 1994. Phase II removal activities were initiated on September 11, 1995, and were completed on June 13, 1996. Over 51,400 tons of material were excavated by ERCS under the guidance of STMs utilizing an XRF. STMs monitored the ambient air using HiVols from the beginning of site activities until November 9, 1995, to ensure that the off-site migration of airborne lead particulates did not exceed  $1.5 \mu\text{g}/\text{m}^3$ . Excavated materials were treated on site and subsequently disposed of at the local landfill as non-hazardous special wastes. Approximately 51,400 tons of treated waste were disposed of off the site. All aspects of the removal have been completed at this time and no further assistance from STMs is anticipated.

### Preremedial Considerations

As stated previously, a PA and SI were conducted prior to and during removal activities. Because the source of contamination has now been removed, re-evaluation of exposure pathways should be conducted to determine whether future remedial actions are needed at this site.

## ATTACHMENTS

### A: Figures

- Figure 1. Site Location Map
- Figure 2. Site-Specific Map
- Figure 3. HiVol Location Map
- Figure 4. Parking Lot Excavation Area
- Figure 5. South Parcel Excavation Area
- Figure 6. Railroad Tracks Parcel Excavation Area
- Figure 7. North Parcel Excavation Area