REDOX TECH, LLC

"Providing Innovative In Situ Soil and Groundwater Treatment"

A CASE STUDY FOR *IN SITU* SOIL BLENDING WITH PERMANGANATE TO TREAT TCE AND DCE IN CLAY AT A FORMER INDUSTRIAL SITE

Project Location
Former Industrial Site
Midwest US

Contaminants
Trichloroethene (TCE)
Dichloroethene (DCE)

Product Used
Permanganate (RemOx® S)

Scope and Media
ISCO Soil Blending in Clay

Results
TCE↓ non-detect
DCE↓ non-detect

A full scale implementation of *in situ* soil blending was completed during summer 2015. Redox Tech's proprietary soil blending equipment was used to treat clay that was impacted with TCE and daughter products at a former industrial site. *In situ* soil blending was selected over soil stabilization and dig and haul because it was less expensive and provides permanent treatment.

BACKGROUND

Past solvent management practices at the site resulted in soil and groundwater impacts with TCE and DCE. The soil is glacial till with interbedded sand layers. Soil vapor extraction had been utilized to treat the soil, but it did not completely eliminate the source area. Dig and haul had also been used to removed a small portion of the impacted soil. The impacted soil was limited to two areas. One was inside the footprint of the building and the other was along the edge of the building, and was both inside and outside. Figure 1 shows the area extent of impact soil above 750 ppb, as well as some pre-treatment contaminant levels. The impacted soil was between 2 feet and 25 feet below surface. The mass of soil for treatment in the respective areas was 420 and 16,250 tons of soil. Carus Corporations remediation potassium permanganate (Remox® S) was selected to treat the target contaminants in the soil.

APPLICATION AND RESULTS

A total of 167,800 pounds of potassium permanganate was used to treat the soil. The permanganate dose was 5 grams per Kg on average. Most of the soil was treated at 5 g/Kg, but the permanganate dose was varied for some cells to account for variation in contaminant levels. The individual treatment cells are shown in Figure 1. The permanganate was added to the soil in solid form, and makeup water was used to dissolve the permanganate in place. Blending the entire volume required 49 days in the field, which included site preparation and returning clean soil back to the area. The average amount of soil blended per day was 340 tons of soil. Soil sampling was completed by collecting soil samples with an excavator bucket within the cell. At least one confirmatory sample was collected in each cell, and at varying depths. All samples showed non-detectable levels of chlorinated solvents after treatment. Figures 2 and 3 are photos taken during the blending process. The blending was completed until a uniform purple color was achieved within the cell.

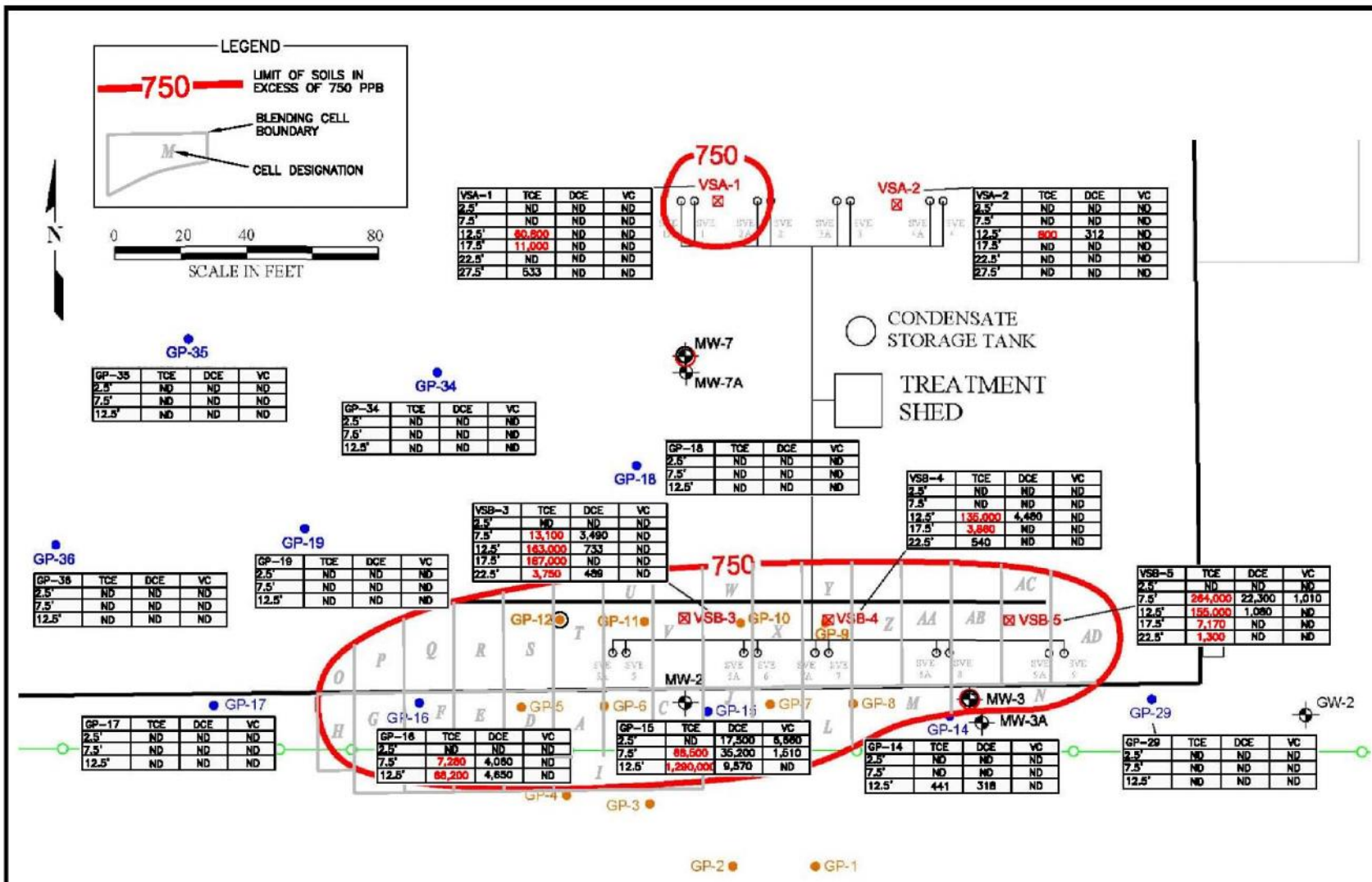

FIGURE 1. PRE-BLEND SOIL CONCENTRATION AND BLENDING CELLS.

Figure 2. Shallow soil Blending

Figure 3. Deep Soil Blending