



IN SITU TREATMENT

Funnel-and-Gate™ System

Denver Federal Centre

Case History, No. 13

Date: October, 1996

Problem

The Federal Highway Administration (FHWA) had operated an asphalt testing facility on the grounds of the Denver Federal Centre for many years. The facility was closed in the early 1990's, and an environmental assessment was done on the site. An underground storage tank that had been used to hold common cleaning/degreasing solvent for use during testing had developed a leak and had to be abandoned. The storage tank and soil in the immediate vicinity were removed as the first step to remediate the site. However, the tank had been leaking for approximately 40 years and there was a significant residual plume of groundwater contaminated with TCE, cDCE and VC.

Solution

A Funnel-and-Gate™ in situ passive treatment system was selected using the EnviroMetal Process for the gate treatment media. Waterloo Barrier® WZ75 sheet piling was used to form the funnel. The overall length of the system was approximately 1,200 lineal feet, with the four treatment gates evenly distributed along the funnel. A shallow trench was excavated along the line of the funnel to allow the pile to be driven below grade so that there would be no visual sign of the system after completion of construction. For half of the length of the installation, the system was bounded by a pond on one side and by a major road on the other, making access difficult. Part of the funnel is shown in Figure 2. Gate number three is just visible in the tree line at the top of the photo.



Figure 1. Funnel in Trench

Construction sequence was critical for this project. First the funnel wall had to be driven to sufficient depth to allow the gates to be constructed. Templates were used to ensure proper alignment of the gates. The Waterloo Barrier® WZ75 sheet piling on the up gradient and down gradient faces of the gates was temporarily sealed during excavation and media placement to keep the cells dry. Once the media was in place in the treatment cells, the up and down gradient piles were removed and used to complete the funnel section at the end of the barrier. Construction of a typical cell and the template is shown in Figure 2.



Figure 2. Gate Template

During the initial site characterization, varying groundwater flow rates were documented. The variable rates were attributed to non-homogeneous sediments present on the site. Since treatment of the contaminated groundwater is dependent upon residence time in the EnviroMetal iron media, the thickness of the iron media was different from gate to gate. This was accomplished using temporary dividers in the gate and placing washed pea gravel on the up gradient and down gradient faces of the iron as a sandwich, with the iron in the middle. The shoring and the guide beams for the temporary dividers are shown in Figure 3.



Figure 3. Excavated Gate

SITE SUMMARY

Funnel: 28,000 sf of Waterloo Barrier® Sheet Piling WZ75

Gates: Four reactive gates 40 ft long x 10 ft wide.

Media: Granular Iron

Sealant: WBS 301 atapulgitic grout

Start: August 1996

Finish: October 1996

Consultant: IT Corporation, Denver, CO

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