WORK PLAN
AREA A VERTICAL HYDRAULIC BARRIER STA 7+28 - 7+48
FORMER BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK
December 17, 2013

Introduction

To prevent migration of contaminated groundwater from the former Buffalo Color Corporation Area A site to the Buffalo River, a vertical hydraulic barrier (VHB) was designed by Mactec Engineering and Consulting, P.C. (MACTEC) for installation along the properties 800 foot shoreline. The VHB would consist of a cement bentonite (CB) mix, which would be keyed 3 feet into a clay layer underlying the Area A property between approximately 25 feet and 35 feet below ground surface (BGS). The CB material would meet a hydraulic conductivity on the order of 1×10^{-6} cm/sec and unconfined compressive strength of 50 psi following a 28 day cure. The majority of the VHB installation would be accomplished by excavation and placement, but areas inaccessible by excavation machinery would be completed by high pressure jet grouting.

GeoCon/Environmental Barrier Company, LLC (GeoCon) under agreement with Ontario Specialty Contracting Inc. (OSC) began construction of the VHB in October of 2012. Excavation and placement of the VHB progressed through mid-December of 2012. While attempting to excavate and place the VHB near the southeastern corner of the existing building No. 75, a sudden but limited drop in the CB slurry level within the trench initiated an investigation within the immediate area. At that time it was noted that the concrete river retaining wall adjacent to the trench displayed signs of displacement which lead to a concern of instability due to the large surcharge load exhibited by the excavation machinery. The decision was made to backfill the area and complete the remaining VHB installations around building No. 75 utilizing jet grout methods; during the following spring season. In May of 2013, GeoCon mobilized jet grouting equipment to the site and attempted to complete the remaining installations of VHB in the northeastern corner of the Area A property. During jet grout operations near the southeastern corner of building No. 75, additional displacement of the river retaining wall was observed and VHB installation operations were ceased in the immediate area. An approximate 11.3 foot VHB section between design alignment stations 7+31.5 and 7+42.8 was left for future installation.

In October of 2013, BIDCO Marine Group Inc. (BIDCO) under agreement with OSC began construction of a sheet pile wall designed to stabilize the river retaining wall system located behind the existing building No. 75. Following the sheet pile wall installation, OSC along with materials support from United Materials, LLC (United Materials) will excavate and place CB slurry between design alignment stations 7+28 and 7+48, with the intensions of completing the Area A VHB system.

Work Plan

OSC will mobilize a John Deere 650 long reach excavator fitted with a 30-inch wide bucket. A working platform will be constructed around the southeastern corner of building No. 75, to provide stability during deep trenching operations.

Prior to the date of installation, OSC will provide United Materials with four 4,000 lb. jumbo sacks of premium powdered bentonite which were retained at the site from the GeoCon batch plant surplus. Twenty four hours prior to the date of installation, OSC will notify United Materials to begin hydrating the entire volume of bentonite at their ready-mix plant. Following the intensions to match the CB slurry mix previously utilized by GeoCon, United Materials will prepare 6 cy batches containing 12% slag

cement, 0.5% Portland cement, 3% bentonite clay and 84.5% water by weight. United Materials will deliver each batch to the Buffalo Color site within a concrete mixer truck which will be unloaded directly into the trench.

Slurry shall be introduced into the trench at the time excavation begins. The level of the slurry in the open trench shall remain above any underground water source and shall not be permitted to drop more than two feet below the surface of the working platform. OSC shall utilize a hand lead line to collect trench depth measurements every 10 lineal feet. The depth of the slurry wall trench will be determined by identifying key (clay) material in the field and then excavating the additional three foot depth into this layer. OSC will scrutinize each CB slurry load before it is placed into the trench and will intermittently perform onsite mud balance and marsh funnel tests to verify density and viscosity ranges against quality control values previously logged at the site. OSC will collect for analysis one CB slurry sample from an arbitrary mixer truck. Excavated trench spoils will be handled and solidified onsite for off-site disposal.

Upon completion of the VHB panel OSC will collect for analysis a composite sample of the CB slurry directly from the trench. The CB panel will then be isolated from traffic and left undisturbed for at least 72 hours. Following the 72 hour cure, polypropylene sheeting will be placed over the top of the CB panel and then backfilled with site soils.

Geotechnical Lab Analysis

Collect and analyze one batch CB sample and one composite trench CB sample within 3" x 6" cylinder molds (Molds).

- Ten Molds will be collected from a single arbitrary mixer truck for analysis
- Ten Molds will be collected as a composite sample from the trench at completion of CB Panel installation

Geotechnical laboratory analysis will consist of the following:

- Permeability Test (ASTM D 5084-10) and Unconfined compressive strength (ASTM D2166-06)
- Frequency of 7, 14 and 28 days