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February 11, 2011

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Ms. Karen Knight
U.S. Environmental Protection Agency
61 Forsyth St. W.
Atlanta, GA 30303

Subject: Groundwater Interim Measures Work Plan Addendum for the Former Chemical Plant, Walter Coke, Birmingham, Alabama

Dear Ms. Knight:

As promised, CH2M HILL is submitting on behalf of Walter Coke, Inc., for EPA's review and approval this Addendum to the previous Interim Measure Work Plan (IMWP) submitted to EPA on February 20, 2002, for the former chemical plant (FCP) located at Walter Coke's Birmingham, Alabama, facility. This Addendum to the IMWP does not reiterate the details of the 2002 IMWP; however, if EPA needs another copy of that IMWP, please advise and we will send one. This Addendum presents minor modifications to the well locations proposed in the original IMWP, and proposes performance monitoring not included in the original IMWP. In addition, EPA's comments to the original IMWP, submitted on November 24, 2003, are addressed in this Addendum.

## Objective of the Interim Measure

The groundwater plume at the FCP is primarily dissolved phase chlorinated solvents that have migrated to the downgradient property boundary along Shuttlesworth Avenue. The objective of the interim measure (IM) is to provide hydraulic containment and to reduce the potential for groundwater to migrate from the FCP beyond the property boundary.

In regard to EPA's comments requesting additional evaluation of IMs to reduce chemical concentrations in FCP soils, including soil vapor extraction, Walter Coke will evaluate the feasibility of source control and treatment remedies as part of the Corrective Measures Study. This IMWP only addresses implementation of the groundwater containment system described in Section 5 of the 2002 IMWP.

## Modifications to the 2002 IMWP

The following paragraphs describe the proposed modifications to the 2002 IMWP including: 1) performance objective; 2) containment well locations; 3) preconstruction monitoring; 4) construction pump testing; 5) system performance monitoring; and 6) fracturing to improve yield.

**Performance Objective.** The performance objective of the hydraulic containment IM is to maintain an inward gradient at those locations along the downgradient property boundary where chemical concentrations have been detected above EPA's tap water regional screening levels (RSLs). The specific area being targeted is around monitoring wells MW-49S, MW-50, and MW-51 (Figure 1). Following EPA's approval of this Addendum, Walter Coke will submit a separate groundwater monitoring plan to address the sampling and analysis of chemicals of potential concern.

**Containment Well Locations.** Walter Coke proposes to adjust the location of 5 of the 6 originally proposed containment well locations (CWs-1, 3, 4, 5, and 6), as shown in Figure 1 (this Figure 1 replaces Figure 5-1 of the original IMWP, and note that all wells are now designated as CW for containment wells). The proposed containment wells have been relocated to be closer to the center of the FCP area, further away from existing monitoring wells, and in the case of CW-5, closer to the fence line where chemicals in groundwater are near the property boundary. The location of CW-2, proposed along the fence line, has not been moved.

The adjustment away from monitoring wells was done to minimize the potential for pumping to affect the ability to collect groundwater samples from monitoring wells. Also, the CW well locations were adjusted so that the impacts of pumping could be monitored by a broader set of wells. The adjustments also resulted in several of the wells being moved closer to the downgradient boundary.

**Preconstruction Monitoring.** Monthly water levels will be collected from the wells summarized in Table 1, and shown in Figure 1, for 3 months before installing the recovery wells to establish a baseline for hydraulic gradient. All of the selected wells are screened within the shallow bedrock at depths ranging from 10 to 50 feet below ground surface (ft bgs).

**Construction Pump Testing.** Following borehole development as described in the 2002 IMWP, pump tests will be conducted to evaluate well yield for selection of pump size. During the yield test procedure, water levels will be monitored in nearby wells to evaluate the potential for short-term hydraulic impacts on those wells. This testing and the post-construction testing described below address EPA's comment about demonstrating hydraulic interconnection between the containment wells and the monitoring wells.

**System Performance Monitoring.** To evaluate and demonstrate the effectiveness of the IM, Walter Coke proposes the following performance measures:

- Perform a transducer study along the property boundary at MWs-49S, 50, and 51. The transducers will be installed in the wells one week before system startup and continue for 1 month past system startup. These data will be used to demonstrate hydraulic connectivity at the monitoring well locations and to create an inward gradient.

- Once the entire IM is operational, monthly water levels will be collected manually for 6 months in the wells listed in Table 1, followed by quarterly monitoring for the remainder of the year.

**TABLE 1**
List of Wells Proposed to Evaluate the Interim Measure
*Walter Coke, Birmingham, AL*

| Well ID | Monitored Unit | Screened Interval (ft bgs) | Depth to Bedrock (ft bgs) |
|---|---|---|---|
| ***Proposed to evaluate radius of influence*** | | | |
| MW-49S | SB | 16-26 | 13.5 |
| MW-50 | SB | 25-35 | 19 |
| MW-51 | SB | 14-24 | 9 |
| MW-52 | SB | 11.5-21.5 | 10.5 |
| MW-53 | SB | 12-22 | 10 |
| MW-54 | SB | 22-32 | 18 |
| MW-55 | SB | 12-22 | 8 |
| MW-56 | SB | 10-20 | 4 |
| MW-77 | SB | 25-35 | 6.5 |
| MW-78 | SB | 36-46 | 7.1 |
| MW-80 | SB | 33-43 | 20 |
| MW-81 | SB | 11-21 | 6.5 |
| ***Additional wells to evaluate IM performance*** | | | |
| MW-70 | SB | 18.8-28.8 | 13.3 |
| MW-71 | SB | 30.8-40.8 | 12 |
| MW-72 | SB | 42.8.52.8 | 16 |

Notes:
IM = interim measure
ft bgs = feet below ground surface
SB = shallow bedrock monitoring well

**Fracturing to Improve Yield.** To address EPA's comment about fracturing, CH2M HILL has contacted Frac Rite Environmental, LTD (Frac Rite) regarding retro-fracturing at existing containment wells. The company confirms that retro-fracturing near existing wells has been successful in the past to increase production and radius of influence, but cautions that site

geology can be a limiting factor in the technology's success. Walter Coke has submitted site-specific geologic information to Frac Rite for an evaluation of feasibility and cost.

Walter Coke shares EPA's interest in maximizing well yield and demonstrating performance. Walter Coke will review the system performance monitoring described above and, if the system does not achieve the standard after 1 year of monitoring, Walter Coke will evaluate methods of improving yield and containment, including the use of hydrofracturing.

## Schedule

Walter Coke proposes the following schedule for implementation of the containment system:

1. Receive EPA approval of the IMWP as modified by this Addendum (starting date)
2. Planning, design, acquisition of subcontracts: 90 days from #1
3. Preconstruction monitoring: 90 days from #1
4. Construction (well installation, construction testing, install pumps and piping, install controls): 90 days from completion of # 3
5. System performance monitoring: 1 year from completion of # 4

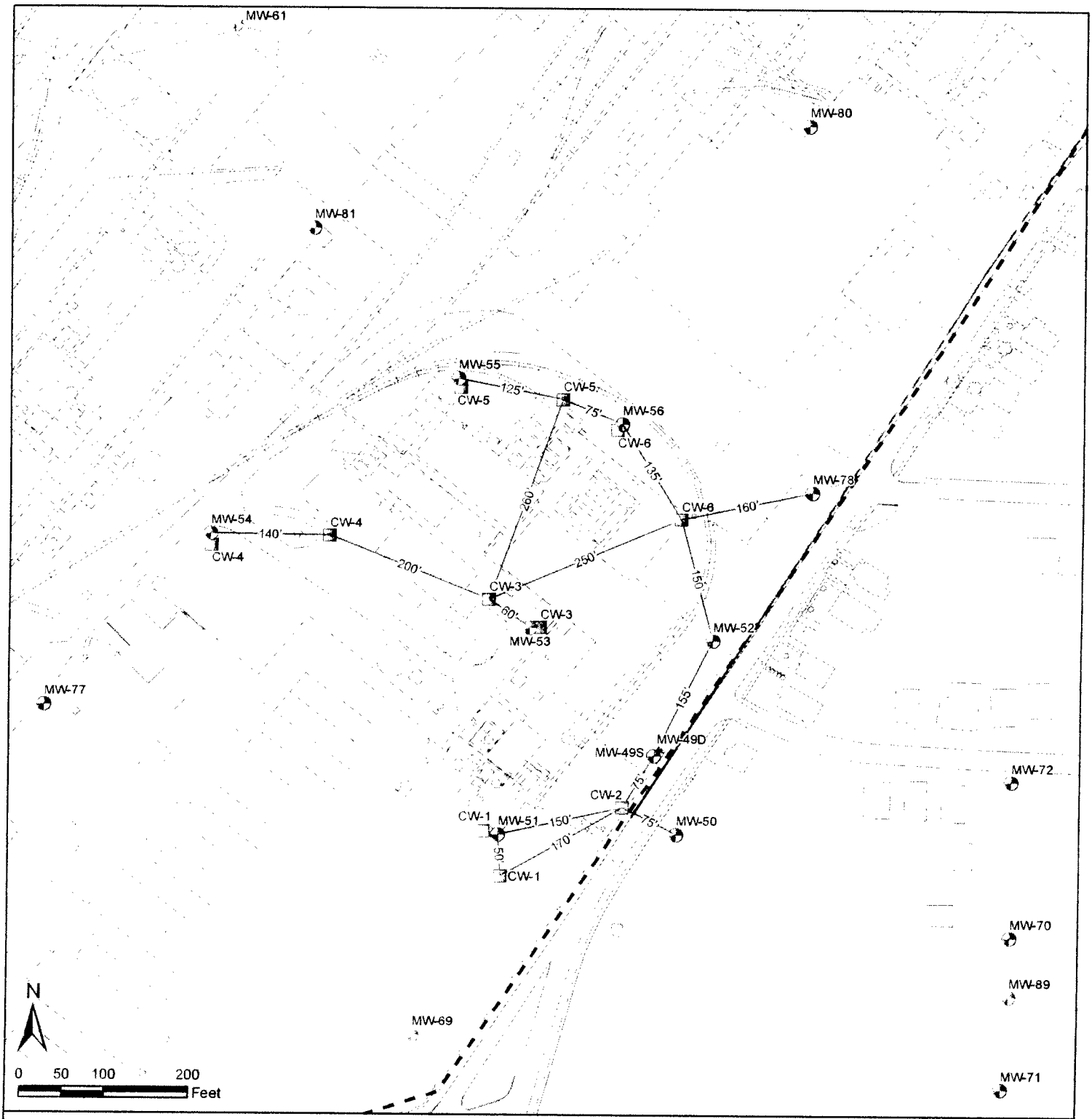
Walter Coke is ready to initiate the interim measure upon receiving EPA's approval of the IMWP, as modified by this Addendum.

Sincerely,

CH2M HILL

Kelly C. Moody, P.E.
Project Manager

mgm11-walter coke/IMWP
Enclosure




**Legend**

- Proposed for Performance Monitoring of IM
- Proposed Location for Containment Well
- Original Location for Containment Well

Notes:
1) IM - Interim Measure
2) Distance shown between wells is approximate

**Figure 1**
**Proposed Containment Well Locations**

Interim Measure at the
Former Chemical Manufacturing Plant

Walter Coke, Inc
Birmingham, AL

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# 5. Interim Remedial Measure Pilot Study Scope of Work

## 5.1 Groundwater Recovery System

Six recovery wells will be installed in the vicinity of MW-53, MW-54, MW-55, MW-56, in the area between MW-49 and MW-52, and in the area between MW-50 and MW-51 (Figure 5-1). All of these wells will be utilized to remove contaminant mass from the shallow groundwater. Sloss intends to install several bedrock boreholes at each recovery well location, if necessary, to locate a significant water-bearing zone. At each borehole location, a surface casing will be installed in the overburden to the top of bedrock to case off the soil zone. After the surface casing is installed, the air hammer will be used to advance the boring 15 ft into the bedrock. After the rock borehole is complete, it will be developed and a modified step drawdown pumping test will be performed to determine the yield of the bedrock at that location. If the pumping test data indicates that the well yield is low at the first location, another rock borehole will be completed and the well yield evaluated. If necessary, additional rock boreholes will be drilled and evaluated. The rock borehole(s) with the highest yield will be used in the groundwater recovery system.

### 5.1.1 Surface Casing Installation

The recovery well's surface casing will be installed using an air rotary drill rig. Overburden formation samples will not be collected during installation of the surface casings for the recovery wells since these wells will be installed near existing monitor wells. The air rotary rig will drill a nominal ten-inch diameter borehole to the top of bedrock and a six-inch diameter steel surface casing will be installed through the overburden into the bedrock surface.

After removal of the drill bit, a six-inch steel surface casing will be installed to the total depth of the borehole. Once installed, a small amount of bentonite chips will be poured into the casing and water added to seal the bottom of the casing. Potable water will then be added to completely fill the casing. This procedure will be performed so that the casing will remain in place and not rise due to the hydrostatic pressure of the grout when it is tremied around the casing. The water added to the casing will be displaced out of the borehole when advancing the borehole into the bedrock. The annular space will then be sealed with neat cement grout by grouting with a tremie pipe from the bottom of the hole to land surface. The cement grout mixture will consist of a mixture

of Portland Type I cement (ASTM Method C-150) and water in a proportion that does not exceed seven gallons of potable water per bag of cement (94 pounds). Additionally, three percent by weight of bentonite will be added to the grout to minimize shrinking and to control the heat of hydration during grouting. After allowing the surface casing grout to set for 24 hours, a nominal 6-inch diameter borehole will be drilled into the bedrock to a depth of 15 ft below the top of bedrock.

### 5.1.2 Rock Borehole Development and Pumping Tests

Based on field observations, recovery well boreholes that yield sufficient water for purposes of the remedial approach will be developed by surging and pumping. Field parameters including pH, temperature, specific conductance, ORP, and turbidity will be monitored during development. The development will be followed by a modified step drawdown aquifer test to determine the yield of the bedrock. The borehole will be pumped at several pumping rates to determine the rate the bedrock will maintain a sustained yield with minimal drawdown. Water levels will be monitored during the test. All purge water will be discharged into the Sloss process water treatment system.

### 5.1.3 Recovery Well Installation

The recovery wells will be completed as open borehole wells. Since the water bearing zones within the bedrock are for the most part thin fractures or soft zones, installation of a screen and sand pack would reduce the yield of the recovery wells.

The recovery wells will each be equipped with a float activated electric submersible pump. The recovery wells will be finished in below grade vaults equipped with locks. Each recovery well will be independently piped to a location that discharges into the BTF process wastewater system.

### 5.1.4 Groundwater Monitoring

Groundwater monitoring will be performed on a quarterly basis for the monitor wells identified in Table 5-1. Groundwater samples will be analyzed for VOCs (USEPA Method 8260) to assess the effectiveness of the groundwater recovery system. Low flow (minimal drawdown) sampling techniques will be used to sample the wells. The pump intake will be placed in the middle of the well screen. Field parameters including DO, Eh, specific conductance, pH, and temperature will be monitored during purging with a flow through cell. Groundwater samples will be collected in accordance with the site QAPP.

### 5.1.5 Soil and Purge Water Waste Management

Soil cuttings generated during drilling activities will be containerized in 55-gallon drums and transported to a staging area. Purge water will be discharged into the Sloss process wastewater system and treated by the BTF. Drummed soil cuttings will be sampled for VOCs, SVOCs, PP metals, and cyanide. The analytical data will be used to characterize the soil and rock cuttings for disposal.

## 6. References

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