MWH
MONTGOMERY WATSON HARZA

May 7, 2004

Ms. Pam Mylotta
Wisconsin Department of Natural Resources
Southeast Region – Milwaukee Service Center
2300 N. Dr. ML King Drive
PO Box 12436
Milwaukee, Wisconsin 53212-0436

Re: Additional Work Plan for VOC Groundwater Investigation
Former JCBGI Keefe Ave. Facility
900 East Keefe Avenue
Milwaukee, Wisconsin
FID#: 241032770
BRRTS#: 02-41-212365
Action: 35

Dear Pam:

MWH Americas, Inc. (MWH) has prepared this additional work plan on behalf of Johnson Controls Battery Group, Inc. (JCBGI) and C & D Technologies, Inc. (C&D). This additional work plan describes the groundwater investigation activities to be conducted at and near the current C&D (former JCBGI) facility located at 900 East Keefe Avenue, Milwaukee, Wisconsin. The scope of this additional investigation is in response to comments received from the Wisconsin Department of Natural Resources (WDNR) in a letter dated April 20, 2004 on the results presented in the *Groundwater VOC Investigation Report* (September 2002) and the *Remedial Action Options Report and Design Report* (September 2003).

This additional work plan builds upon the tasks set forth in the following work plans previously submitted to WDNR:

- *Work Plan for Onsite Soil and Groundwater Investigation – March 2000*
- *Work Plan for Offsite Soil and Groundwater Investigation – June 2001*
- *Additions to Work Plan for Offsite VOC Groundwater Investigation – October 2001*
- *Additions to Work Plan for VOC Groundwater Investigation – April 2002*

Please refer to the initial Work Plans for background and general scoping information. The following Scope of Work describes the additional activities that will be undertaken to address issues identified by WDNR and to remove potential data gaps from previous investigations regarding VOCs in groundwater at the facility. We plan to perform these activities at the Facility in May, June, and July. We are providing this Additional Work Plan update for your information and are not requesting review and approval. However, if you have any comments about the plan, please contact us.

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SCOPE OF WORK

A. Hydraulic Probe Investigation

A hydraulic probe investigation under the building will be conducted to determine degree and extent of contamination, to the extent that physical constraints inside the building allow. This investigation will mirror the footprint of the CVOC source areas. The objectives of the investigation are to:

- Evaluate the presence of a fringe effect from VOC contamination known to exist outside the building.
- Evaluate whether sources of VOC contamination are present underneath the building.
- Determine whether the results have any bearing on the proposed remedies.

Boreholes in each of the truck dock loading area and the acid unloading area will be located in two general areas with respect to the building wall adjacent to the contamination sources. A line of borings will be completed adjacent to the inside wall to evaluate whether contamination exists near the building wall. A second line of borings will be completed some distance away from the inside wall inside to evaluate whether there are contamination sources underneath the building that are contributing to the groundwater contamination problem.

1. Site Walkover

A site walkover will be conducted prior to the completion of the borings to evaluate access, inside utilities and overhangs, and to mark selected locations. This walkover will also be used to conduct the vapor intrusion exposure pathway assessment in both the truck dock loading area and the acid unloading area.

2. Utility Clearances & City Permits/Fees

Local utilities coming onto the site will be marked by Digger's Hotline and/or local utilities, as appropriate. C & D will be responsible for marking utilities on the site. Because the remedy performance monitoring wells will be on the City of Milwaukee (City) right-of-way, a public way permit will be necessary from the City for authorization to be drilling in the alleyway.

Monitoring wells in the public way will need special privilege from the City of Milwaukee to be installed for a period longer than 60 days. The application for special privilege will be made after the wells are installed.

3. Hydraulic Probe Investigations

a. Truck Dock Loading Area

Two lines of hydraulic probes will be installed to investigate the potential presence of VOCs in soil and groundwater beneath the building. The first set of probes will be conducted as close to the building wall, as possible, within approximately 10 ft of the wall, to assess a possible fringe effect. We assume that 3 hydraulic probes will be completed to a depth of 12 ft below ground surface. A second set of 2 probes will be conducted approximately 30 to 40 ft away from the building wall, to a similar depth. Hydraulic probe locations will be selected in the field considering access to appropriate locations available around the facility's process lines, office spaces, and storage structures. Concrete coring will be conducted in each location prior to completion of the hydraulic probe borings.

Soil samples collected from the hydraulic probes will be screened for VOCs with a PID upon collection. One unsaturated soil sample from each boring will be retained for laboratory analysis. If PID detections are made, the sample selected will have the highest PID reading. If PID detections are not measured, then the sample from just above the water table will be selected.

The boreholes will stand open for a period of 24 hours before groundwater samples will be collected from each borehole and analyzed for VOCs in an analytical laboratory under rapid turnaround. No permanent monitoring wells will be installed during this study.

b. Acid Unloading Area

In this area, 4 probes will be conducted nearest the building wall and 3 probes further away, assuming the same depths and distances as for the truck dock loading area. Sampling and analysis will be conducted similar as in the truck dock loading area. Because of the presence of a specially constructed containment area for the facility's Acid Farm that is adjacent to the acid unloading area, the hydraulic probe locations for this area will be selected so as not to compromise the Acid Farm containment system.

Following completion of the investigation, the probe holes will be abandoned with granular bentonite and the concrete repaired.

B. Vapor Intrusion Study

This study is a step-wise assessment of the potential for vapor intrusion into the building as a result of VOC contamination that may exist outside or inside the building.

1. Vapor Intrusion Exposure Pathway Assessment

This assessment will include onsite observations inside the building for the possible vapor migration pathways, including foundation and floor cracks, doorways, sumps/sewers that are in the vicinity of the footprint of each of the contamination source areas prior to the

chemical injection pilot study. A PID will be used to evaluate suspected pathways for the presence of VOCs. If the acid unloading area is found to have potential vapor migration routes and the results of the chemical injection vapor monitoring below indicate the potential for vapor migration, then a vapor migration control plan will be prepared.

2. Investigation Results

The results of the hydraulic probe investigation will be evaluated for the potential for vapor intrusion, based on the presence of contamination detected beneath the building in either the truck dock loading area or the acid unloading area. If the potential for vapor intrusion from VOC contaminated soil or groundwater beneath the building is suggested, then vapor monitoring inside the building based on those results will be included in a vapor migration control plan.

3. Chemical Injection Vapor Monitoring

Potential vapor migration will be evaluated during the chemical injection pilot study and possibly during the full-scale injection. During the pilot study, vapor monitoring probes will be installed inside and outside the building, for monitoring before, during and after treatment. This would include the installation of 2 probes into the subsurface, one inside the building and one outside the area of treatment in the direction of the residences to the east. These probes will be monitored for LEL with a multigas meter, pressure with a magnahelic gauge, and total VOCs with a PID.

The monitoring from the pilot study will be used to assess the potential for vapor migration during the full-scale injection. If the pilot study suggests that migration is not occurring during the pilot study, then recommendations will be made that the monitoring need not be conducted during the full-scale injection and a vapor migration control plan is not necessary.

C. Monitoring Well Installations

The following new monitoring wells will be installed for performance monitoring of the remedy:

1. Piezometer Well Installations

A single piezometer will be installed in each of the source area locations. In the acid unloading area, a piezometer will be installed adjacent to well MW04R. In the truck dock area, a piezometer will be installed adjacent to well MW06. Each of the piezometers will be installed as double-cased wells below the known depth of VOC contamination, so they will be installed as potentially clean wells and the vertical extent of contamination will be documented with permanent wells.

Each of the piezometers will be installed to a depth of approximately 35 ft below ground surface. The wells will be constructed of 2-in. diameter PVC well materials and a 5-ft well screen. The wells will be installed as flush-mount, so there will be no well stickups.

2. Remedial Action Performance Assessment Monitoring Well Installations

Groundwater monitoring wells will be installed to monitor the performance of the respective remedial actions in each of the two source areas. Four wells will be installed downgradient of the truck dock loading area and four wells will be installed downgradient of the acid unloading area.

The proposed well located near well TW17, to the north, could possibly be damaged during installation of the wall. If we assess that this well is likely to be damaged during wall construction, we will install it at a later date.

Each of the monitoring wells will be installed to a depth of approximately 16 ft below ground surface. The wells will be constructed of 2-in. diameter PVC well materials and a 10-ft well screen. The wells will be installed as flush-mount, so there will be no well stickups.

Monitoring wells will also be installed just inside the wall to determine whether the groundwater has reached a stable or shrinking plume, to support eventual closure. The monitoring system will not be installed until some time after wall installation. The installation of these wells is not budgeted at this time.

3. Survey and Water Level Measurements

Each of the newly installed monitoring wells will be surveyed for location and for ground surface, top of PVC casing, and top of well protector elevation. The location survey will be conducted to the nearest 0.1 ft and the elevations will be surveyed to the nearest 0.01 ft.

After the wells are installed and developed, a round of water levels will be collected from all the site wells. Groundwater elevations will be determined in each of the new wells. The table of groundwater elevations will be updated for the new wells and elevations. Groundwater flow direction at the site will be interpreted with the new information to see if it has any bearing on the proposed remedies.

4. Investigation-Derived Wastes

Soil cuttings from the newly installed monitoring wells and the hydraulic probe borings will be barreled on site, pending a determination of how to appropriately manage the disposal of the soil. Cuttings from the source areas, where the two piezometers are being installed, will be segregated from the remaining monitoring well cuttings into separate barrels. Likewise, the cuttings from the hydraulic probes inside the building will be segregated, until we understand whether they are also within a source. A composite sample will be collected from each of the piezometer and hydraulic probe cuttings (total, two

samples) for analysis of VOCs and TCLP VOCs. It is assumed that the monitoring well cuttings can be managed as non-hazardous waste with the previous waste characterization profile during the VOC soil removal.

The wells will be developed after installation by purging and bailing. The purge water and soil cuttings will be barreled and staged onsite until water quality analysis on the wells determines how to appropriately manage the disposal of the water.

D. Chemical Injection Pilot Test & Permit

Based on the results of bench scale tests, sodium persulfate will be the injection chemical used in the pilot testing at the site. The potassium permanganate was not effective, based on the pilot testing. An injection permit has been prepared for the sodium persulfate injection and submitted to the WDNR for review. The injection permit additionally addressed several of the issues WDNR raised in their review letter such as vapor intrusion, injection area coverage, and groundwater monitoring.

This injection permit addresses the vapor migration monitoring needs inside the building for the acid unloading area during the chemical injection. The plan outlines the rationale, and methods for installation and monitoring for vapor migration. The scope for the pilot testing vapor migration monitoring was described above. The scope for the full-scale testing is anticipated to include 4 additional probes (for a total of 3 inside and 3 outside the building), unless exempted or changed by WDNR based on the results of the pilot-scale monitoring.

E. Groundwater Monitoring

Groundwater monitoring will be completed to satisfy requirements of WDNR before, during, and after construction of the remedies.

1. Pre-Construction Sampling

After the 8 new monitoring wells and 2 new piezometers are installed, pre-construction sampling will be conducted to collect a round of water quality samples from all site monitoring wells. This will include 17 monitoring wells and 2 piezometers. The last set of samples was collected in May 2003, so this will effectively be an annual sampling round.

Each of the samples will be analyzed in the laboratory for VOCs and natural attenuation parameters. Natural attenuation parameters include nitrate, sulfate, iron, manganese, ethene, ethane, methane, total chloride, total organic carbon, total inorganic carbon, and field parameters dissolved oxygen, redox, pH, temperature and specific conductivity. Since we have not analyzed natural attenuation parameters prior to this time and we will have to demonstrate natural attention for closure purposes, this is the only time we will be able to get a full set of pre-construction results for comparison to post-remedy monitoring results.

These data will be used to update the site-wide data tables for the site and likely will be the last comprehensive round of groundwater samples collected prior to site construction to assess the performance of the remedies over time.

F. Report Preparation

1. Supplement to Remedial Design Report

This letter report will be submitted to WDNR to provide the following information, which will modify the information presented in the Remedial Action Options and Design Report, associated with the construction of the iron wall:

- Describe what monitoring will be conducted to meet the specified case closure requirements.
- Explain how the monitoring results will be evaluated to determine when to request case closure.
- Adjust the estimate for the timeframe to closure.

2. Results of Additional Investigation & Pilot Testing

This report will be submitted to WDNR to provide the information from the new monitoring well installations, groundwater sampling and analysis, and vapor migration assessment. The information to be presented in this report will include:

- Methods, results, interpretation, and supporting information (tables, maps, appendices) for the investigation beneath the building. The calculation of residual mass inside the building will be presented in this report, as appropriate.
- Methods, results, and monitoring well installation information (boring logs, well construction details, well information form) for installing, sampling and analyzing newly installed groundwater monitoring wells. Survey and water level information will be presented, along with an interpretation of groundwater flow.
- Methods, results, and interpretation of the vapor migration assessment and any sampling results from inside the building or during the pilot test chemical injection.
- This brief letter report will provide the methods, results, and interpretation of the pilot chemical injection test. The report will indicate how the pilot testing results relate to the successful completion of the full-scale chemical injection and whether any modifications are needed to the approach.

G. Schedule

Field activities will take approximately 6 weeks to complete, including onsite and offsite activities. The groundwater VOC investigation report will be completed within three to four weeks after receipt of all analytical data.

If you have any questions or comments regarding the content of this work plan, please contact us at (608) 231-4747.

Sincerely,

MWH AMERICAS, INC.

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Senior Hydrogeologist

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