5.0 HEALTH AND SAFETY

Health and Safety has been a continual focus in the ACS project since the beginning of the investigations in 1988, through the completion of remedial construction and on into the future for the Operations, Maintenance, and Monitoring program.

A Site Safety Plan was developed for the first phase of investigation during the Remedial Investigation. This plan has been amended and modified to cover new Site activities as the investigations continued, and it has been modified for remedial construction activities that were started in 1996. The following are key components of the comprehensive safety focus maintained throughout the project.

- All MWH employees are required to read the applicable Health and Safety Plan or Safety Plan amendment before working at the ACS Site
- All MWH staff working at the ACS Site must provide documentation of completion of the 40-hour Occupational Safety and Health Administration (OSHA) Hazwoper training and an up-to-date eight-hour refresher course.
- All MWH staff working on the Site must provide documentation that they are part of a medical monitoring program.
- All subcontractors working on the Site are required to develop their own Health and Safety Plan for the specific work that they conduct at the Site. They are required to provide a copy to MWH before starting work.
- Prior to starting work, all subcontractors must provide written documentation that their on-site workers are up-to-date on OSHA Hazwoper training and medical monitoring.
- During times when construction activities were being conducted over several weeks or months, weekly Health and Safety meetings were conducted with members of the various work crews.
- Each workday was started with a tailgate safety meeting for each investigation or construction work crew.

Lee Orosz, the manager of the GWTP is the designated Site Safety Officer for the project. Lee is a full-time MWH employee and he is on site full time each week, except during holidays and vacation.

Approximately one-half of the investigative work and remedial construction has been conducted on the active ACS facility. Lee Orosz communicates regularly with Tom Froman, Health and Safety Coordinator for ACS Inc., to coordinate activities and be sure that ACS employees are aware of MWH activities planned for the Site and that MWH employees and subcontractors are aware of activities that ACS is planning on the site. In addition, any MWH employees or subcontractors that will be working on the ACS Site participate in the ACS Inc. Safety Training program, prior to working on the facility.

The Health and Safety statistics for the ACS Site as of September 22, 2005 are:

- 3,008 consecutive days with no lost time due to an accident or H&S incident.
- 731 consecutive days without an incident requiring first aid.

These statistics are indicative of the emphasis that has been placed on health and safety throughout the project. During tasks spanning predesign investigations to design and construction, MWH has worked to maintain focus on safety and minimize the potential for workers at the site to become complacent.

The agenda for each weekly construction meeting included a site safety review. In the review, each worker was encouraged to report on near misses and potentially dangerous situations they observed during the previous week and also to anticipate how the activities planned for the next week might lead to unsafe or dangerous conditions.

MWH's response to a near miss reported on May 7, 2003, provides an example of how the safety focus is maintained at the site. On that date, an MWH technician was collecting water levels at a set of monitoring wells inside the barrier wall to document the progress of site dewatering. It was a routine activity that this technician had been conducting twice a month for the past year, using the same equipment and following the same procedures.

However upon completing the measurements on this date, the technician felt dizzy and disoriented. Nevertheless, he drove home. When his wife observed his condition, she expressed concern and asked him to report his condition to his supervisor. Upon hearing about it that evening, the Project Manager, Peter Vagt strongly recommended that he go to his doctor or the local emergency room for a physical check up. The technician did go to the emergency room that evening and then went in for a follow-up evaluation one week later.

In addition, the Project Manager called a Root Cause Analysis Meeting to discuss the event, develop a map of potential causes, and implement corrective actions. The technician attended the meeting, as well as the Project Manager, the site safety officer, a meeting facilitator and the engineer and scientist who had developed the work plan and used the collected data.

The meeting was specifically planned and conducted so that the technician did not feel blamed for the event. Rather, the goal was to examine the planning and the management of the project to identify the root causes within the MWH project structure that led to the event. As a direct result of the meeting, a new work plan was developed to more fully define the work and a health and safety addendum was developed to clarify personal protective levels required during varying site conditions.

Indirect goals of the meeting included heightening the awareness of safety on the project and "sending the message" that reporting on potential or real safety events is the correct course of action and that no blame will be placed on the reporting person.

6.0 FINAL INSPECTION AND DOCUMENTATION

As has been noted in Section 4.0, as each major component of the remedy has been completed, a CCR has been prepared and submitted to the Agencies. The CCRs typically have provided information regarding chronology of the construction activities, equipment specifications, and as-built figures. These CCRs have been reviewed and approved by the EPA. Table 2 provides a summary of the total capital cost tasks and the corresponding document or action that addresses completion of the task.

The EPA and IDEM conducted a pre-final inspection at the ACS site on September 23, 2004 and determined that the remedial systems were constructed and operating as designed. A punch list of minor tasks that were yet to be completed was developed at that time and provided to the ACS Potentially Responsible Parties (PRP) group. The punch list and the actions implemented to address each item are provided in Table 3.

The Preliminary Close-out Report (PCOR) was issued by the EPA in September 2004. That Report stated that, based on the EPA and IDEM's review during the pre-final inspection, the remedial action was constructed and operating as designed. The PCOR certified that the ACS site meets the criteria for designation as a construction completion site.

The final inspection was held on September 22, 2005. Representatives of EPA, IDEM, the ACS PRP Group, and MWH were present at the inspection. A review of the punch list created during the pre-final inspection indicated that all tasks had been completed. No other major issues were identified.

7.0 OPERATION & MAINTENANCE AND MONITORING ACTIVITIES

7.1 OPERATION AND MAINTENANCE ACTIVITIES

Operation and maintenance (O&M) of the remedial systems is an ongoing task that began with the completion of each of the components of the ROD. A full-time operator is present on Site to perform O&M activities. Major activities are reported to the EPA and IDEM regularly through monthly status reports and during monthly O&M meetings.

A brief description of the O&M activities associated with major components of the ROD are described below.

7.1.1 ISVE Systems

O&M activities associated with the ISVE systems are performed in accordance with *Operation & Maintenance Manual, ISVE Systems* (MWH, March 2005). Regular activities include evaluation of equipment operation, routine maintenance of equipment, and responding to system alarms or shutdowns. Samples are collected monthly to ensure that the thermal oxidizers are complying with the established performance criteria.

7.1.2 Dewatering Systems

O&M activities associated with the GWTP are performed in accordance with the *Operations & Maintenance Plan/Contingency Plan* (MWH, July 1997) and subsequent addenda. Regular activities include evaluation and maintenance of pumps installed in the BWES trenches, DPE wells, as well as in the PGCS wells. Routine maintenance is performed on the many components of the groundwater treatment system. Samples are collected monthly to ensure that the GWTP is performing within design standards and that the effluent stream does not exceed established criteria.

7.1.3 Engineered Covers

Routine inspections of the SBPA and Off-Site covers are performed to verify that they retain low permeability characteristics. The vacuum level and air flow through the ISVE system are monitored regularly to ensure integrity of the cover, inspections of the cover are conducted on a quarterly basis and after storm events to identify cracking or erosion, and water levels are measured in wells and piezometers to document the reduced water levels within the capped areas. If deficiencies are noted, remedial actions are completed to address them.

7.2 MONITORING ACTIVITIES

Monitoring of the remedial systems is performed in order to verify the ongoing remedial systems are meeting their design objectives. The performance requirements for the ISVE systems, GWTP, Dewatering/ Containment, and Chemical Oxidation that are necessary to effectively achieve the design objectives for each system are discussed below.

7.2.1 Groundwater

Groundwater monitoring activities are currently performed in accordance with the *Revised Long-Term Groundwater Monitoring Plan* (MWH, September 2002). Under the current monitoring plan, groundwater sampling occurs on a semi-annual basis. Sixteen upper aquifer wells and 16 lower aquifer wells in the monitoring network are analyzed for indicator parameters: benzene, chloroethane, tetrachloroethene, trichloroethene, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,1-dichloroethane, 1,2-dichloroethane, and vinyl chloride. Semi-volatile organic compounds (SVOCs) and metals are sampled from selected wells on an annual basis. A full-scan of Target Compound List/Target Analyte List (TCL/TAL) parameters will be analyzed for in 2006. In order to confirm that the BWES and PGCS are affecting the upper aquifer as planned, water level measurements are collected on a quarterly basis.

The groundwater sampling data demonstrates that the BWES is working to contain contaminants inside the Barrier Wall. Results from several monitoring wells outside the Barrier Wall, but inside the impacted groundwater zones, show that concentrations in contaminated groundwater areas are decreasing. Results from upgradient, downgradient and side-gradient monitoring wells have been consistently free of Site-related contaminants, indicating that contamination outside of the Barrier Wall has not migrated beyond its historical extent. These results also indicate that the PGCS has been effective in preventing further off-site migration of contaminants in the

groundwater. While some concentrations have shown variability, no upward trends exist. Most results are consistently below baseline values and some show decreasing concentration trends.

7.2.2 Residential Groundwater

The *Revised Long-Term Groundwater Monitoring Plan* (MWH, September 2002) includes a sampling plan for the residential groundwater wells located near the ACS Site. Five residential wells along Reder Road at the south side of the Site are sampled annually for low concentration full-scan (TCL/TAL) parameters. These wells will continue to be sampled during the third quarter of each year. To date, no Site-related contaminants have been detected in the private wells. The sampling has indicated that water quality in the private wells in the vicinity of the ACS site consistently meets drinking water standards.

7.2.3 Off-Gas Treatment Systems

Compliance monitoring of the catalytic and thermal oxidizers is necessary to determine if off-gas emissions generated are allowable under the IDEM Air Permit Equivalency. Compliance monitoring consists of sampling and analyzing the inlet and outlet vapor streams of the catalytic and thermal oxidizers to determine if emissions are in compliance with IDEM regulations and to determine the overall destruction capacity of the oxidation units.

The samples are collected via Summa canisters and submitted to the laboratory for VOC and SVOC analysis via U.S. EPA methods TO-14 and TO-13. Collection of the effluent sample is not required when the thermal oxidation treatment process is not operational.

The performance standards for the treatment of off-gas are as follows:

- IDEM Air Quality standards as specified in Rule 326 Indiana Administrative Code [(IAC) 2-1-1(b)(3)(A)]; which states that the VOC emissions cannot exceed 3 pounds per hour or 15 pounds per day or 25 tons per year. Any contaminant detected via analytical method TO-14 and TO-13 will be used in calculating the pounds per hour and pounds per day. The off-gas flowrate will be determined using US EPA Method C.

The ROD requires that the excess cancer risk from off-gas emissions cannot exceed the $1x10^{-4}$ to $1x10^{-6}$ range for nearby residences or site workers.

7.2.4 GWTP Effluent

Compliance monitoring for the GWTP will continue to be conducted in accordance with the *Performance Standard Verification Plan* revised in the *Quality Assurance Project Plan* (MWH, November 2001).

In addition to the effluent samples, a sediment sample is collected near one of the effluent discharge structures in the wetlands to assess whether or not PCBs are accumulating as a result of the discharge. A sample is collected once per year for this purpose. There is no specific criterion or performance standard with which to compare the analytical data, but the data is evaluated to see if there is a definitive increasing trend.

Analyte	Frequency
Flowrate and pH	Continuous
BOD, TSS, SVOCs, and Metals	Once per quarter
VOCs	Once per quarter
PCBs	Once per quarter
PCBs in Sediment (one location)	Annually

The schedule of the sampling frequency and parameters for process monitoring are shown in the table above.

7.2.5 ISVE Systems

Performance monitoring is conducted to evaluate and optimize the ISVE systems in the SBPA, and the OFCA and K-P Areas. Performance monitoring consists of:

- Site conditions, such as temperature, relative humidity, atmospheric pressure and general weather conditions recorded on a regular basis to aid in determining factors that affect overall system performance,
- Gas flow rates at the individual ISVE wells, headers, catalytic oxidation units, and the discharge stack, as necessary to ensure the system is operating as intended,
- Vacuum at the individual ISVE wells, headers, blowers, and silencers, as necessary to evaluate capture of vapors,
- Gas temperature before and after the ISVE blowers,
- Natural gas consumption of the catalytic oxidation unit; and
- ISVE well water levels to determine: 1) if free product is present in the wells and its recoverability and 2) if the dewatering level is being maintained.

7.2.6 Dewatering Systems

In order to gauge the effectiveness of the dewatering efforts, periodic water level measurements are conducted on one-third of the ISVE wells. The measured wells are considered representative based on their location within their respective ISVE systems.

Area	Water Level Gauging Points
Kapica-Pazmey Area	SVE-1 SVE-4 SVE-8 SVE-10
Off-Site Containment Area	SVE-13 SVE-15 SVE-18 SVE-20 SVE-24 SVE-29 WVE-31 WVE-34 SVE-37 SVE-40
Still Bottoms Pond Area	SVE-44 SVE-46 SVE-49 SVE-53 SVE-56 SVE-59 SVE-62 SVE-65 SVE-69 SVE-72 SVE 73 SVE-77 SVE-79 SVE-82 SVE-86

In addition, existing BWES monitoring points are continually measured to confirm that a hydraulic capture zone within the barrier wall is maintained.

Area	Water Level Gauging Points
BWES Paired Piezometers	P93/P94 P95/P96 P97/P98 P99/P100 P101/P102 P103/P104 P105/P106 P107/P108
Additional Monitoring Points	P29 P31 P32 P36 P49

The water level data is used to generate upper aquifer groundwater contour maps for evaluating the capture zone of the extraction trenches and dual-phase extraction wells. In addition to water level measurements, the flowrate of groundwater extracted from the operational trenches and extraction wells is monitored to assess the performance of the dewatering system.