

Quality Assurance Project Plan
for the
Scaffolding Waste Plan
and the
Waste Sampling and Management Plan

Remediation and Deconstruction of
Fiterman Hall
30 West Broadway
New York, NY

Prepared by:
Airtek Environmental Corp.

Prepared for:
Dormitory Authority of the State of New York
City University of New York

January 10, 2007

1.0 TITLE AND APPROVAL SHEET

Document Title: Quality Assurance Project Plan for the Scaffolding Waste Plan and the Waste Sampling and Management Plan – Remediation and Deconstruction of Fiterman Hall, 30 West Broadway, New York, NY

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Signature Date

Investigative Organization’s Project QA Director: Clifford Cooper, CIH - Airtek Environmental Corporation

Signature Date

Owner’s Project Manager: Richard Dalessio Dormitory Authority of the State of New York (DASNY)

Signature Date

QAPP – Scaffold Waste Plan & Waste Sampling and Management Plan
Fiterman Hall: 30 West Broadway NYC
Airtek Project 06-0200 – January 10, 2007

Revision No. _____
Date _____

Contract Laboratory Robert Bell, Amerisci Laboratories

Signature

Date

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3.0 DISTRIBUTION LIST

3.1 Distribution List

The Distribution List (Table 3-1) documents who will receive copies of the approved Quality Assurance Project Plan (QAPP) and any subsequent revisions or amendments to the QAPP. A complete copy of the QAPP and any subsequent revisions will be maintained on file at Airtek Environmental Corporation (Airtek), New York, New York. All project personnel performing work associated with waste sampling and characterization work on the Fiterman Hall 30 West Broadway remediation and deconstruction project will read and comply with this QAPP.

Table 3-1 - Distribution List:

QAPP Recipients & Title	Organization	Telephone Number
Pat Evangelista - WTC Coordinator	US EPA Region 2	212-637-4447
Sal Carlomagno - Project Manager	NYSDEC	718-482-4894
Chris Alonge - Project Manager	NYSDDL	518-457-7201
Krish Radhakrishnan - Project Manager	NYCDEP	718-595-3721
Richard Mendelson - Project Manager	OSHA	212-620-3200
Robert Iulo - Project Manager	NYCDOB	212-566-3364
Richard Dalessio - Project Manager	DASNY	212-273-5098
Benn Lewis - Principal-in-Charge	Airtek	212-768-0516
Erin Mackenzie - Project Manager	Airtek	212-768-0516
Clifford Cooper, CIH - Project QA Officer	Airtek	212-768-0516
Mike Porter - Field Sampling Coordinator	Airtek	212-768-0516
Safeera Gaffar - Data Manager	Airtek	212-768-0516
Joseph Walsh - Field Operations Director	Airtek	212-768-0516
Robert Bell-Lab Director	AmeriSci	781-337-9334
Porta-Project Manager	AmeriSci	781-337-9334

4.0 PROJECT ORGANIZATION

This section identifies the organizations and key personnel participating in the Fiterman Hall, 30 West Broadway Scaffold Waste Plan (SWP) and the Waste Sampling and Management Plan (WSMP). The specific roles and responsibilities of the key personnel are included in this section. An explanation of the lines of authority, reporting relationships and communication pathways are provided in this section.

4.1 Project Organization Chart

All organizations involved in the Fiterman Hall, 30 West Broadway SWP and WSMP are identified in the project organization chart (Figure 4-1). The responsibilities of key personnel are described in Section 4.3.

4.2 Communication Pathways

The lines of authority and communication specific to this study are also presented in the organization chart (Figure 4-1). The Airtek Project Manager will serve as the communication link between DASNY, EPA and Airtek. The Airtek Project Manager will be kept verbally apprised of the program's status by the Airtek Field Sampling Coordinator and the Airtek Project Quality Assurance (QA) Officer. These individuals will immediately notify the Airtek Project Manager of any internal or subcontractor issues that potentially affect budget, schedule, and/or achievement of the project objectives. The Airtek Project Manager will in turn communicate these issues to the DASNY Project Manager and EPA Project Manager by telephone. Laboratories will communicate any potential issues to the Airtek Project QA Officer who will in turn communicate these issues to the Airtek Project Manager if the issues may potentially affect the achievement of project objectives. The Airtek Project Manager will in turn notify the DASNY Project Manager and EPA Project Manager of these issues.

4.2.1 Modifications to Approved QAPP

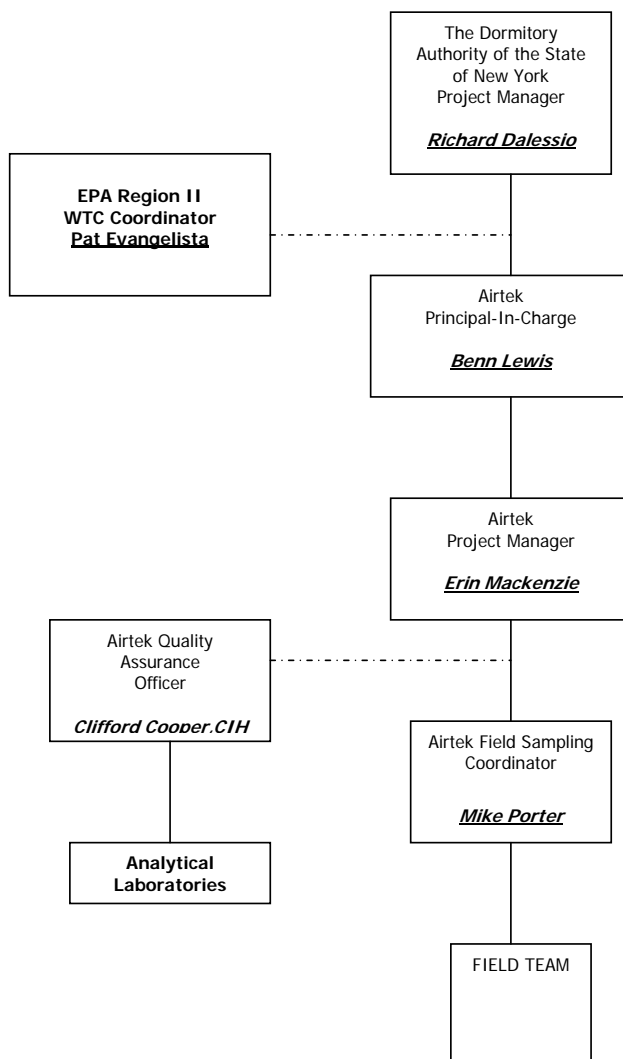
Any changes to the scope or procedures stated in this QAPP will be formally documented as QAPP revisions and must go through the same review and approval process as the original QAPP. The control block in the upper right corner of each changed page will be updated to reflect the date of the change and the revision number or an addendum to the QAPP may

be issued. For changes requiring immediate resolution and implementation, approval by phone will be secured from all levels of management (Airtek, DASNY, and EPA). This verbal approval will be documented in phone logs and will be followed by formal revision of the QAPP or a QAPP addendum as described above. If modifications to the QAPP are mandated by the Airtek Project Manager, the Airtek Project QA Officer will schedule a meeting with the appropriate team members to discuss the changes, make the necessary modifications to the QAPP or create a QAPP addendum and submit them to the Airtek Project Manager for review, and submit the revised QAPP or QAPP addendum to EPA for review and approval. After the revised QAPP has been approved, the revised QAPP or QAPP addendum will be provided to the team members, according to the original QAPP Distribution List. If a revised QAPP is issued, the prior QAPP will be removed and deemed obsolete; copies of the prior QAPP will be retained in project files for documentation purposes. Corrective action procedures for QAPP modifications during sampling and analysis are discussed in Section 15.3 of the QAPP.

**FIGURE 4-1
ORGANIZATION CHART AND
COMMUNICATION PATHWAY**

**Scaffold Waste Plan & Waste Sampling and
Management Plan**

Remediation and Deconstruciton of Fiterman Hall
Airtek Environmental Corp.



4.3 Personnel Responsibilities and Qualifications

The responsibilities of management, QA, field, and laboratory personnel are outlined below.

4.3.1 Management Responsibilities

EPA Project Manager

The U.S. EPA Project Manager for the Environmental Community Air Monitoring Program is Mr. Pat Evangelista. His primary responsibilities include administration of EPA responsibilities, oversight of the day-to-day activities, and receipt of all required written matter. Mr. Evangelista is also responsible for providing technical oversight and guidance and reviewing all technical deliverables, including plans and reports.

Airtek Principal-in-Charge

The Airtek Principal-in-Charge, Mr. Benn Lewis, will be responsible for periodically auditing the program to ensure compliance with Airtek's standard management procedures and providing all necessary senior technical support and program planning.

Airtek Project Manager

The Airtek Project Manager, Ms. Erin Mackenzie, has responsibility for technical and scheduling matters and will serve as the main contact with DASNY and the EPA Project Manager.

Other duties, as necessary, include the following:

- Assuring adherence to project plans and obtaining approvals for any changes to these plans,
- Assuring that approved procedures meet project objectives,
- Reviewing and approving all sampling procedures,
- Preparing and reviewing all reports,

- Assigning duties to project staff and orienting the staff to the specific needs and requirements of the project,
- Serving as the focus for coordination of all field task activities, communications, reports, and technical reviews, and other support functions, and facilitating activities with the technical requirements of the project,
- Coordinating field and office activities with the Airtek Project QA Officer and Airtek Field Sampling Coordinator,
- Implementing recommendations made by the Airtek Project QA Officer,
- Initiating corrective actions,
- Monitoring schedules for field, analytical, and data validation activities associated with the field sampling program and
- Maintaining the project file.

4.3.2 Quality Assurance Responsibilities

Airtek Project QA Officer

The Airtek Project QA Officer, Mr. Cliff Cooper, CIH, has overall responsibility for quality assurance oversight. The Airtek Project QA Officer communicates directly to the Airtek Project Manager. Specific responsibilities include the following:

- Preparing the QAPP,
- Reviewing and approving QA procedures, including any modifications to existing approved procedures,
- Providing oversight of the contract laboratory operations,
- Ensuring that QA audits of the various phases of the project are conducted as required,
- Providing QA technical assistance to project staff,
- Approving operating procedures,
- Following up on corrective action,
- Ensuring that data validation/data assessment is conducted in accordance with the QAPP and
- Reporting on the adequacy, status, and effectiveness of the QA program to the Airtek Project Manager.

4.3.3 Field Responsibilities

Airtek Field Sampling Coordinator

The Airtek Field Sampling Coordinator, Mr. Mike Porter, has overall responsibility for completion of all field activities in accordance with the QAPP and is the communication link between the field team, subcontractors, and Airtek project management. Specific responsibilities include:

- Understanding and implementing the QAPP,
- Coordinating activities in the field,
- Assigning specific duties to field team members,
- Ensuring site security and access,
- Training field staff,
- Overseeing and coordinating field data collection,
- Mobilizing and demobilizing of the field team and subcontractors to and from the site,
- Resolving any logistical problems that could potentially hinder field activities, such as equipment malfunctions or availability, personnel conflicts, or weather-dependent working conditions,
- Implementing field quality control (QC) including issuance and tracking of measurement and test equipment; the proper labeling, handling, storage, and shipping of samples; chain-of-custody procedures; and control and collection of all field documentation and
- Assisting with report preparation.

Airtek Field Staff

The Airtek Field staff reports directly to the Airtek Field Sampling Coordinator. The responsibilities of the field team include,

- Understanding and implementing QAPP requirements as they relate to their duties,
- Collecting samples, conducting field measurements, and decontaminating equipment according to documented procedures stated in the QAPP,

- Ensuring that field instruments are properly operated, calibrated, and maintained, and that adequate documentation is kept for all instruments,
- Performing technical procedures and data recording in accordance with the operating procedures,
- Collecting the required QC samples and thoroughly documenting QC sample collection,
- Ensuring that field documentation and data are complete and accurate and
- Communicating any nonconformance or potential data quality issues to the Airtek Field Sampling Coordinator.

4.3.4 Laboratory Responsibilities

Analyses will be performed by the following organizations:

Parameter	Laboratory
TCLP, Total PCBs, RCRA Characteristics, NYC Sewer Discharge Parameters	AmeriSci Boston Laboratory Director 8 School St Weymouth, MA 02189 Phone: (781) 337 9334 Contact: Robert Bell

Laboratory Manager

The Laboratory Manager is ultimately responsible for the data produced by the laboratory. Specific responsibilities include:

- Implementing and adhering to the QA and corporate policies and procedures within the laboratory,
- Approving Standard Operating Procedures (SOPs),
- Maintaining adequate staffing and
- Implementing internal/external audit findings and corrective actions.

Laboratory QA Manager

The Laboratory QA Manager reports directly to the Laboratory Manager. Specific responsibilities include:

- Approving the laboratory SOPs,
- Ensuring and improving quality within the laboratory,
- Supervising and providing guidance and training to laboratory staff,
- Addressing all client inquiries involving data quality issues,
- Performing QA audits and assessments,

- Tracking external and internal findings of QA audits and
- Coordinating laboratory certification and accreditation programs.

Laboratory Project Manager

The Laboratory Project Manager is the primary point of contact between the laboratory and Airtek. Specific responsibilities of the Laboratory Project Manager include:

- Keeping the laboratory and client informed of project status,
- Monitoring, reviewing, and evaluating the progress and performance of projects,
- Reporting client inquiries involving data quality issues or data acceptability to the Laboratory QA Manager and to the operations staff and
- Reviewing project data packages for completeness and compliance to client needs.

Laboratory Section Leader

Specific responsibilities include:

- Supervising daily activities within the group,
- Supervising QC activities,
- Supervising the preparation and maintenance of laboratory records,
- Evaluating instrument performance and supervising the calibration, preventive maintenance, and scheduling of repairs and
- Overseeing or performing review and approval of all data.

Laboratory Analyst/Technician

Each analyst or technician is responsible for:

- Performing technical procedures and data recording in accordance with documented procedures,
- Performing and documenting calibration and preventive maintenance,
- Performing data processing and data review procedures,
- Reporting nonconformances to the appropriate personnel and

- Ensuring sample and data integrity by adhering to internal chain-of-custody procedures.

Laboratory Sample Custodian

The Sample Custodian ensures implementation of proper sample receipt procedures, including maintenance of chain-of-custody. Other specific responsibilities include:

- Notifying the Laboratory Project Manager of any discrepancies or anomalies with incoming samples,
- Logging samples into the laboratory tracking system,
- Ensuring that all samples are stored in the proper environment and
- Overseeing sample disposal.

5.0 SPECIAL TRAINING NEEDS/CERTIFICATION

Most of the off-site activities described in this QAPP constitute routine sampling and analyses for which no certifications are needed. However, all Airtek staff working on-site will comply with *Regulatory Submittal Part III(S) - Scaffold Health and Safety Plan*, and *Regulatory Submittal Part III – Health and Safety Plan* in effect at the time. All health and safety training records are maintained in the Airtek files. Prior to the start of the on-site work, all field personnel will be given instruction specific to the project, covering the following areas:

- Organization and lines of communication and authority,
- Overview of the QAPP, including sample collection, handling, and labeling procedures,
- QA/QC requirements,
- Documentation requirements and
- Health and safety requirements.

Instruction will be provided by the Airtek Field Sampling Coordinator and Airtek Project QA Officer.

6.0 PROBLEM DEFINITION/BACKGROUND

This section documents project planning, identifies the environmental problem, defines the environmental questions that need to be answered and provides background information.

6.1 Problem Definition/Site History and Background - The Building at Fiterman Hall: 30 West Broadway

On September 11, 2001, the 30 West Broadway Building was severely damaged when debris from the World Trade Center broke hundreds of windows and cut a fifteen story gash in the south façade of the building. Since September 11, 2001 the building has been unoccupied. The current owner of the building plans to abate and deconstruct the Building as part of redevelopment and rebuilding at this site.

Environmental Characterization

The Owner contracted with Airtek Environmental Corporation to conduct Asbestos Surveys and Environmental Building Characterization for the Fiterman Hall: 30 West Broadway building. Due to the proximity of these buildings to the WTC, and the extensive environmental tests carried out at the 130 Liberty Street (Deutsche Bank) Building, it is assumed that similar potentially contaminated WTC dust is present at this site. The settled dust in and on the Building may contain elevated levels of six COPCs designated by the United States Environmental Protection Agency (USEPA) as being associated with the WTC dust (asbestos, MMVF (man-made vitreous fibers), silica, dioxin, PAH (polycyclic aromatic hydrocarbons) and lead) as well as other contaminants suspected of being present in the Building including polychlorinated biphenyls (PCBs) and heavy metals (antimony, barium, beryllium, cadmium, chromium, copper, manganese, mercury, nickel and zinc).

The principal purpose of the waste sampling and management plan, as described in the documents entitled *Regulatory Submittal Part IV(S) – Scaffold Waste Plan* and *Regulatory Submittal Part IV – Waste Sampling and Management Plan* is to provide guidance on the organization and documentation of the testing, handling, packaging, storage, transport and disposal of all waste generated by the project.

Site Description

The Property is currently developed for higher educational use. The Property includes a vacant fifteen-story building. The building was most recently occupied by The Borough of Manhattan Community College.

The Property is located within the urban commercial downtown Financial District of Manhattan, New York City, immediately north of the former World Trade Center site. The Property is bounded to the west by Greenwich Street, to the north by Park Place, to the east by West Broadway, and to the south by Barclay Street.

Remediation and Deconstruction Work

Remediation and Deconstruction will include Asbestos and COPC Abatement and Removal and Structural Deconstruction.

Remediation Phase:

The Remediation Phase includes the scaffolding erection operation and exterior cleaning of those portions of the building that require further cleaning. This includes the entire gash area of the building. The Remediation Phase also includes the cleaning and removal of all interior surfaces and non-structural elements within the building under negative pressure containment. The clean-up and abatement will be conducted so that the buildings can be safely deconstructed to allow for redevelopment of the Site. The Remediation Phase includes the following general categories: (a) undertaking environmental monitoring during the remediation phase; (b) the scaffold erection operation; (c) the exterior cleaning of those portions of the building façade that require further cleaning; (d) the general area cleanup of WTC dust and debris; (e) removal and disposal of installed porous and certain non-porous building materials and components; (f) cleaning and salvage of certain installed non-porous building equipment and components; (g) the removal of building materials containing asbestos which were present in the Building prior to September 11, 2001 (referred to herein as “ACBM”), primarily within the Building interior but also including some non-friable ACM façade components; (h) packaging of asbestos and other regulated waste including, but not limited to light bulbs, lighting ballasts, batteries, mercury-containing thermostats, etc. at

Deleted: and

generation points; and, movement of containers to the decontamination unit and movement of decontaminated containers to waste loading. The proposed remediation will be conducted so that the Building can be safely deconstructed in compliance with applicable law to allow for redevelopment of the Site. Following the Remediation Phase, the Deconstruction Phase includes deconstruction and removal of the remaining “clean” building components including the clean exterior brick walls, roofs, and structural components.

Deconstruction Phase:

The Deconstruction Phase of the project is expected to consist generally of: (a) preparation of the building for deconstruction; (b) deconstructing the building; (c) undertaking environmental monitoring during the deconstruction; (d) transporting and disposing of all waste and debris from the building; and (e) backfilling, grading and paving the Site as appropriate following the cleaning and deconstruction.

Regulatory Oversight.

The Dormitory Authority of the State of New York (DASNY) is the owner of Fiterman Hall: 30 West Broadway and is fully responsible for the cleaning and deconstruction of the building and will comply with all Federal, State and City regulations pertaining to environmental protection, asbestos abatement, hazardous material disposal and construction. DASNY will release deconstruction plan documents including, but not limited to, *Regulatory Submittal Part I(S) – Scaffolding Work Plan*, *Regulatory Submittal Part I – Work Plan*, *Regulatory Submittal Part II – Environmental Community Air Monitoring Program*, *Regulatory Submittal Part III(S) – Scaffolding HASP*, *Regulatory Submittal Part III – HASP*, *Regulatory Submittal Part IV(S) – Scaffolding Waste Plan*, and *Regulatory Submittal Part IV – Waste Sampling and MangementPlan* and formally submitted the plans for review to the following agencies:

- United States Environmental Protection Agency (USEPA)
- United States Occupational Safety and Health Administration (OSHA)
- New York State Department of Labor (NYS DOL)
- New York State Department of Environmental Conservation (NYS DEC)
- New York City Department of Environmental Protection (NYC DEP)

- New York City Department of Buildings (NYCDOB)

6.2 Project Purpose and Objectives

The principal purpose of the waste sampling and management plan, as described in the documents entitled *Regulatory Submittal Part IV(S) – Scaffold Waste Plan* and *Regulatory Submittal Part IV – Waste Sampling and Management Plan* is to provide an organized framework for waste management decision making, and to provide an organized set of sampling protocols for making waste determinations. The plans consist of sampling of waste streams as yet uncharacterized, and provide guidance on the management of both characterized and uncharacterized waste. Principal objective of the plans is as follows:

- Provide guidance on the organization and documentation of the testing, handling, packaging, storage, transport and disposal of all waste generated by the project.

6.3 Project Reference Levels

Reference guidance applied by this QAPP includes the following:

6.3.1 Toxicity

Method 1311 in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” EPA Publication SW-846 as follows:

- TCLP Base/Neutral/Acids Method SW 846-1311/8270C
- TCLP Herbicides Method SW 846/8151
- TCLP RCRA Metals Method SW 846-1311/6010
- TCLP Pesticides Method SW 846-1311/8081
- TCLP Volatiles Method SW 846-1311/8260
- TCLP Mercury Method SW 846-1311/7470

6.3.2 RCRA Characteristics

6.3.2.1 Ignitability

SW 846 1030P

6.3.2.1 Corrosivity

Method 9045D or 9040C as set forth in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” EPA Publication SW-846. National Association of Corrosion Engineers (NACE) Standard TM-01-69 as standardized in SW-846 shall be utilized to evaluate corrosion rate if the suspected corrosive hazardous waste is a liquid.

6.3.2.3 Reactivity

SW 846 Ch. 7.3.3 and 7.3.4

6.3.3. Total PCBs

PCB Method SW846-3510C/8082

6.3.4 NYC Sewer Discharge Parameters

Volatiles – NYCDEP Target List – EPA Method 624

Metals – NYCDEP Target List – EPA 200.7

Phenols, Total – EPA 420.1/2

Chromium, hexavalent SW846-7196A

Mercury – EPA 245.1

Non-Polar Material – EPA 1664A

A summary listing of the Reference Levels provided on a parameter-specific basis is shown in Table 6-1.

6.4 Decisions Based on Project Reference Levels

If results of waste characterization sampling and analysis dictate that waste material must be managed and disposed of as both an asbestos and a hazardous waste, both asbestos and hazardous waste management and disposal requirements will be met. If there are conflicts between the requirements for asbestos and hazardous waste that preclude compliance with both, then the hazardous waste requirements will dictate specific management and disposal requirements.

Table 6-1. Waste Characterization Reference Levels		
Parameter	RCRA/TSCA Limit (ug/L)	NYC DEP¹ (WASTE WATER)
Full TCLP		
1,4-dichlorobenzene	7,500	N/A
2,4,5-trichlorophenol	400,000	N/A
2,4,6-trichlorophenol	2,000	N/A
2,4-dinitrotoluene	130	N/A
Cresol (total)	200,000	N/A
Hexachloro-1,3,-butadiene	500	N/A
Hexachlorobenzene	130	N/A
Hexachloroethane	3,000	N/A
m-Cresol	200,000	N/A
Nitrobenzene	2,000	N/A
o-cresol	200,000	N/A
p-cresol	200,000	N/A
Pentachlorophenol	100,000	N/A
Pyridine	5,000	N/A
2,4,5-TP (Silvex)	1,000	N/A
2,4-D	10,000	N/A
Arsenic	5,000	N/A
Barium	100,000	N/A
Cadmium	1,000	N/A
Chromium	5,000	N/A
Lead	5,000	N/A
Selenium	1,000	N/A
Silver	5,000	N/A
Mercury	200	N/A
Chlordane	30	N/A
Endrin	20	N/A
Heptachlor (and the epoxide)	8	N/A
Lindane	400	N/A

Methoxychlor	10,000	N/A
Toxaphene	500	N/A
1,1-Dichloroethylene	700	N/A
1,2-Dichloroethane	500	N/A
Benzene	500	N/A
Carbon Tetrachloride	500	N/A
Chlorobenzene	100,000	N/A
Chloroform	6,000	N/A
Methyl Ethyl Ketone	200,000	N/A
Tetrachloroethylene	700	N/A
Trichloroethylene	500	N/A
Vinyl Chloride	200	N/A
Total PCBs		
PCB 1016	Total of 50 ppm for all Aroclors	N/A
PCB 1221		N/A
PCB 1232		N/A
PCB 1242		N/A
PCB 1248		N/A
PCB 1254		N/A
PCB 1260		N/A
PCB, total		N/A
RCRA Characteristics		
Ignitability	Flashpoint <60°C	N/A
Corrosivity	pH ≤2 or ≥12.5	N/A
Reactive Cyanide	N/A ¹	N/A
Reactive Sulphide	N/A ¹	N/A
NYC Sewer Discharge Criteria		
Cadmium	N/A	2000 (ug/L)
Chromium (hexavalent)	N/A	5000 (ug/L)
Copper	N/A	5000 (ug/L)
Cyanide (amendable)	N/A	200 (ug/L)
Lead	N/A	2000 (ug/L)
Mercury	N/A	50 (ug/L)

Nickel	N/A	3000 (ug/L)
Zinc	N/A	5000 (ug/L)
1,1,1-trichloroethane	N/A	Detection
1,2,4-trichlorobenzene	N/A	Detection
1,4-dichlorobenzene	N/A	Detection
Bezene	N/A	134
Carbon Tetrachloride	N/A	Detection
Chloroform	N/A	Detection
Ethylbenzene	N/A	380
MTBE	N/A	50
Napthalene	N/A	47
Tetrachloroethylene	N/A	20
Toluene	N/A	74
Xylenes, total	N/A	74
Phenols, Total	N/A	Detection
Non-polar Material	N/A	50,000
1. NYC Sewer Discharge Criteria for waste water.		

(1) Not Applicable; no value assigned to this measurement.

**FIGURE 6-1
 SAMPLE SCHEDULE**

**Samples Received at Lab
 (24 Hours After Collected)**

5 Days	5 Days	5 Days	5 Days	14 Days	14 Days	14 Days	14 Days
Full TCLP EDD to Airtek PM, Airtek QAO & Airtek DM	RCRA Characteristics EDD to Airtek PM, Airtek QAO & Airtek DM	Total PCBs EDD to Airtek PM, Airtek QAO & Airtek DM	NYC Sewer Discharge Criteria EDD To Airtek PM, Airtek QAO & Airtek DM	Hardcopy Full TCLP Report Sent to Airtek QAO for Validation/ Usability Assessment	Hardcopy RCRA Characteristics Report Sent to Airtek QAO for Validation/ Usability Assessment	Hardcopy Total PCBs Report Sent to Airtek QAO for Validation/ Usability Assessment	Hardcopy NYC Sewer Discharge Criteria Report Sent to Airtek QAO for Validation/ Usability Assessment
Ongoing Activities							
QA Report (If Issues Noted) and/or For Data Validation Memo Generated for Each Batch of Samples EDD = Electronic Data Deliverable QAO = Quality Assurance Officer DM = Data Manager							

7.0 PROJECT/TASK DESCRIPTION

This section provides a general overview of the activities that will be performed and how and when they will be performed. Specific details for individual project activities will be discussed in later sections of the QAPP.

7.1 Project Overview

Based upon the documents *Regulatory Submittal Part IV(S) – Scaffold Waste Plan* and *Regulatory Submittal Part IV – Waste Sampling and Management Plan*, the primary objective of the plans is to properly characterize and manage waste originating from 30 West Broadway during the deconstruction of the building on that property. The aspect of the plans pertinent to this QAPP is waste characterization sampling and analyses.

7.1.1 Sampling Tasks

Sampling tasks will include:

7.1.1.1 Solid Waste Stream Sampling

The Owner's Environmental Consultant will conduct sampling of solid waste material types that have not yet been characterized (if any are encountered). In addition, sampling will be conducted of representative composite samples of the following waste streams:

- Personal Protective Equipment (Suits/filters/gloves/booties)
- Abatement Materials (rags, bags, poly sheeting)
- HEPA Vacuum Bags/Negative Air Filters
- Miscellaneous Contaminated Disposables
- Pilot Program Tent Brick and Mortar
- Gash Area and other WTC-impacted Fascia Brick and Mortar

Samples will be selected to be representative of differing work locations and work procedures as follows:

Personal Protective Equipment (Suits/filters/gloves/booties):

Representative samples of PPE will be tested for waste characterization per Sections 3.3 and 5.0 of the Scaffold Waste Plan. Three composite samples of PPE will be collected. Samples will be comprised of a minimum of five grab samples. A minimum of five grab samples will be collected from PPE used on the lower floors to make one sample. A minimum of five grab samples will be collected from PPE used on the middle floors to make a second sample, and a minimum of five grab samples will be collected from PPE

used on the high floors to make the third sample. These materials will be treated as ACM waste at a minimum, and according to the results of waste characterization testing.

Abatement Materials (rags, bags, poly sheeting), HEPA Vacuum Bags/Negative Air Filters, Miscellaneous Contaminated Disposables:

Representative samples of Miscellaneous Remediation Consumables will be tested for waste characterization per Sections 3.3 and 5.0 of the Scaffold Waste Plan. Three composite samples of these materials will be collected. Composite samples will be comprised of a minimum of five grab samples. A minimum of five grab samples will be collected from materials on the lower floors to make one sample. A minimum of five grab samples will be collected from materials used on the middle floors to make a second sample, and a minimum of five grab samples will be collected from materials used on higher floors to make the third sample. These materials will be treated as ACM waste at a minimum, and according to the results of waste characterization testing.

7.1.1.2 Liquid Waste Stream (Wastewater) Sampling

The Owner's Environmental Consultant will conduct sampling of wastewater. Sampling will be conducted of representative composite samples of the following waste streams:

- Cleaning water
- Decontamination unit wash water
- Any other waste water generated

Samples will be selected to be representative of differing work locations and work procedures. The intent of the analyses is to confirm that the waste water is not hazardous waste and does not exceed NYC DEP Sewer Discharge criteria, so that it can be filtered for ACM to 5 microns for disposal to the NYC Sewer.

Samples will be selected as follows:

As façade cleaning will be conducted by moist wiping and HEPA vacuuming, it is not anticipated that a large quantity of liquid waste will be produced. Most of the liquid produced is anticipated to be produced at the decontamination unit showers/cleaning stations. All liquid waste produced will be drummed and stored in a secure waste storage facility with secondary containment until analytical testing is complete. Liquids intended for filtration and disposal to the NYC Sewer will be tested for RCRA/TSCA compliance and also for NYC DEP sewer discharge parameters.

Drums will be standard 55-gallon waste drums. Every ten drums of cleaning and decon liquids liquids will be composited for analysis per Sections 3.3 and 5.0. Liquid in each container will be agitated through stirring, and one grab sample will be collected from each of the ten drums with a disposable plastic bailer. Sampling bailers collect a sample that is a water column representative of the various strata in a liquid container. If the liquids do not exceed RCRA/TSCA limits, they will be assumed be ACM-contaminated and will be filtered per NYC DEP Title 15 to the NYC Sewer.

7.1.2 Analytical Tasks

The following target parameters were selected for inclusion in the Waste Plan based upon their industry standard applicability to the work of the project:

- Full TCLP (toxicity)
- Total PCBs
- RCRA Characteristics (reactivity/corrosivity/ignitability)
- NYC DEP Sewer Discharge Criteria

All analyses will be performed by fixed laboratories.

8.0 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

This section provides an overview of the environmental decisions that need to be made and the level of data quality needed to ensure that these decisions are based on sound scientific data.

8.1 Project Quality Objectives (PQOs)

As discussed in Section 6.2, the principal objective of the SWP and WSMP is to support waste management decisions at Fiterman Hall, 30 West Broadway during the deconstruction of the building on that property.

The quality of data needed to achieve the PQOs includes the necessary data quality indicators (precision, accuracy, representativeness, comparability, completeness, selectivity, and sensitivity) required of each analytical parameter used for each media sampled. The limits set on each of these items are referred to as *measurement performance criteria* and define the quality of data generated. Measurement performance criteria have been established for each parameter in order to ensure the data are sound, highly defensible, and with quantitation limits significantly below project reference levels.

The waste parameters are outlined in Table 8-1 and include the quantitation limits and associated project reference levels for each waste parameter. This table has been completed for each parameter. In general, the proposed analytical methodologies will be able to achieve the PQOs. That is, the analytical methodologies are generally capable of detecting the target analytes well below the applicable reference limit. These methods provide data of known quality and can be used for the objectives of this program. However, in order to ensure that the analytical methodologies are capable of achieving the data quality objectives, measurement performance criteria have been set for the analytical measurements in terms of accuracy, precision, representativeness, completeness, sensitivity, selectivity, and comparability.

Table 8-1 Comparison of Laboratory Quantitation Limits with Project Action Levels		
Parameter	Laboratory Quantitation Limits (QLs)	Project Action Levels¹
TCLP Metals		
Arsenic	0.1 mg/L	5 mg/L
Barium	2.0 mg/L	100 mg/L
Cadmium	0.050 mg/L	1.0 mg/L
Chromium	0.1 mg/L	5.0 mg/L
Lead	0.050 mg/L	5.0 mg/L
Mercury	0.002 mg/L	0.2 mg/L
Selenium	0.1 mg/L	1.0 mg/L
Silver	0.1 mg/L	5.0 mg/L
TCLP VOCs		
Benzene	0.005 mg/L	0.5 mg/L
Carbon Tetrachloride	0.005 mg/L	0.5 mg/L
Chlorobenzene	0.005 mg/L	100 mg/L
Chloroform	0.005 mg/L	6.0 mg/L
1,4-Dichlorobenzene	0.005 mg/L	7.5 mg/L
1,2-Dichloroethane	0.005 mg/L	0.5 mg/L
1,1-Dichloroethylene	0.005 mg/L	0.7 mg/L
Methyl Ethyl Ketone	0.025 mg/L	200 mg/L
Tetrachloroethylene	0.005 mg/L	0.7 mg/L
Trichloroethylene	0.005 mg/L	0.5 mg/L
Vinyl Chloride	0.005 mg/L	0.2 mg/L
TCLP SVOCs		
o-Cresol	0.025 mg/L	200 mg/L
m-Cresol	0.050 mg/L	200 mg/L
p-Cresol	0.050 mg/L	200 mg/L
Cresol	0.050 mg/L	200 mg/L
2,4-Dinitrotoluene	0.025 mg/L	0.13 mg/L
Hexachlorobenzene	0.025 mg/L	0.13 mg/L
Hexachlorobutadiene	0.025 mg/L	0.5 mg/L
Hexachlorethane	0.025 mg/L	3.0 mg/L
Nitrobenzene	0.025 mg/L	2.0 mg/L
Pentachlorophenol	0.025 mg/L	100 mg/L
Pyridine	0.025 mg/L	5.0 mg/L
2,4,5-Trichlorophenol	0.025 mg/L	400 mg/L
2,4,6-Trichlorophenol	0.025 mg/L	2.0 mg/L
TCLP Pesticides		
Chlordane	0.005 mg/L	0.03 mg/L
Endrin	0.0003 mg/L	0.02 mg/L
Heptachlor	0.0003 mg/L	0.008 mg/L
Heptachlor epoxide	0.0003 mg/L	0.008 mg/L

Gamma-BHC (Lindane)	0.0003 mg/L	0.4 mg/L
Methoxychlor	0.0003 mg/L	10 mg/L
Toxaphene	0.005 mg/L	0.5 mg/L
TCLP Herbicides		
2,4-D	0.0008 mg/L	10 mg/L
2,4,5-TP (Silvex)	0.0004 mg/L	1.0 mg/L
Total Metals		
Cadmium	0.5 mg/kg	NA1
Chromium	0.5 mg/kg	NA2
RCRA Characteristics		
Ignitability	NA	Flashpoint <60°C
Corrosivity	NA	pH ≤ 2 or ≥ 12.5
Reactive Cyanide	10 mg/kg 10mg/L	N/A ¹
Reactive Sulfide	40 mg/kg 40 mg/L	N/A ¹
PCB Aroclors		
Aroclor 1016	0.017 mg/kg	50 mg/kg (2)
Aroclor 1221	0.017 mg/kg	50 mg/kg (2)
Aroclor 1232	0.017 mg/kg	50 mg/kg (2)
Aroclor 1242	0.017 mg/kg	50 mg/kg (2)
Aroclor 1248	0.017 mg/kg	50 mg/kg (2)
Aroclor 1254	0.017 mg/kg	50 mg/kg (2)
Aroclor 1260	0.017 mg/kg	50 mg/kg (2)

(1) Not Applicable; no value assigned to this measurement

8.2 Measurement Performance Criteria

The SWP and WSMP are designed to produce data of the quality necessary to achieve PQOs and meet or exceed the minimum standard requirements for field and analytical methods. The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting which will provide results that are scientifically valid, and the levels of which are sufficient to meet PQOs. Measurement performance criteria are summarized in Tables 8-2 – 8-11.

Table 8-2. Measurement Performance Criteria Table – TCLP Metals and Total Metals

QC Sample or Activity	Frequency	Measurement Performance Criteria	Corrective Action	DQI
Field Duplicates	1/10 samples/matrix	*RPD < 50 for solid samples and < 30 for aqueous samples when positive results for both samples are > 5x QL *No situation where one result is detected at > 5x QL and other result is not detected	Assess laboratory precision, qualify data, and/or resample.	Precision-Overall
Laboratory Duplicates	1/prep batch	RPD < 20 if results are > 5x QL	Qualify data.	Precision-Laboratory
Laboratory Control Sample ²	1/prep batch	Percent recoveries 75-125%	Determine cause of problem, reprep, reanalyze, and/or qualify data.	Accuracy/Bias
Serial Dilution Analysis ¹	1/batch	+ 10% of original result	Qualify data.	Accuracy/Bias
Interference Check Sample ¹	Beginning of run and every 8 hours	Percent recoveries 80-120%	Recalibrate and reanalyze and/or qualify data.	Accuracy/Bias
Calibration Blanks	1/10 samples	Absolute value of target metal must be < QL	Reclean, retest, reanalyze, and/or qualify data.	Accuracy/Bias - Contamination
Preparation Blanks	1/prep batch	Absolute value of target metal must be < QL	Reclean, reprep, reanalyze, and/or qualify data.	Accuracy/Bias - Contamination
Matrix Spikes	1/prep batch	Percent recoveries 75-125%	Check LCS. Reanalyze and/or qualify data.	Accuracy/Bias
Data Completeness Check	NA	Field 80%, Laboratory 95%	NA	Data Completeness

¹ Not applicable to mercury.

² For mercury, initial calibration verification is used for the LCS as this Reanalyze: refers to reanalysis of same digestate or QC sample.

Table 8-3. Measurement Performance Criteria Table – TCLP SVOCs

QC Sample or Activity	Frequency	Measurement Performance Criteria	Corrective Action	DQI
Field Duplicates	1/10 samples/matrix	*RPD < 50 for solid samples and < 30 for aqueous samples when positive results for both samples are > 5x QL *No situation where one result is detected at > 5x QL and other result is not detected	Assess laboratory precision, qualify data, and/or resample.	Precision-Overall
Internal Standards	Every sample, blank, QC	IS area counts: -50% to +100% of IS areas in continuing calibration standard; IS retention times + 30 sec of IS retention times in continuing calibration standard	Reanalyze and/or qualify data.	Accuracy/Bias
Method Blanks	1/extraction batch	No target compounds > QL	Reclean, reextract, reanalyze and/or qualify data.	Accuracy/Bias-Contamination
Laboratory Control Sample	1/extraction batch	Percent recoveries 25-125%	Determine cause of problem, reextract, reanalyze, and/or qualify data.	Accuracy/Bias
Surrogates ⁽¹⁾	Every sample, blank, QC	Percent recoveries as specified below.	Reextract, reanalyze, and/or qualify data.	Accuracy/Bias
Data Completeness Check	NA	Field 80%, Laboratory 95%	NA	Data Completeness
Matrix Spikes	1/extraction batch	Percent recoveries 25-125%	Reanalyze and/or qualify data.	Accuracy/Bias
Matrix Spike Duplicates	1/extraction batch	Percent recoveries 25-125%; RPD < 30	Reanalyze and/or qualify data.	Accuracy/Bias and Precision
DFTPP	Every day, prior to sample analysis	Per SW-846 8270C requirements	Retune instrument, reanalyze DFTPP.	Accuracy/Bias

(1) Surrogates: Nitrobenzene-d5: 35-114%
 2-Fluorobiphenyl: 43-116%
 Terphenyl-d14: 33-141%
 Phenol-d6: 10-94%
 2-Fluorophenol: 21-100%
 2,4,6-Tribromophenol: 10-123%
 Reanalyze: refers to reanalysis of same extract.

Table 8-4. Measurement Performance Criteria Table – TCLP VOCs

QC Sample or Activity	Frequency	Measurement Performance Criteria	Corrective Action	DQI
Field Duplicates	1/10 samples/matrix	*RPD < 50 for solid samples and < 30 for aqueous samples when positive results for both samples are > 5x QL *No situation where one result is detected at > 5x QL and other result is not detected	Assess laboratory precision, qualify data, and/or resample.	Precision-Overall
Internal Standards	Every sample, blank, QC	IS area counts: -50% to +100% of IS areas in continuing calibration standard; IS retention times + 30 sec of IS retention times in continuing calibration standard	Reanalyze and/or qualify data.	Accuracy/Bias
Method Blanks	1/batch	No target compounds > QL	Reclean, reanalyze and/or qualify data.	Accuracy/Bias-Contamination
Laboratory Control Sample	1/batch	Percent recoveries 70-130%	Determine cause of problem, reanalyze, and/or qualify data.	Accuracy/Bias
Surrogates ⁽¹⁾	Every sample, blank, QC	Percent recoveries as specified below	Reanalyze and/or qualify data.	Accuracy/Bias
Data Completeness Check	NA	Field 80%, Laboratory 95%	NA	Data Completeness
Matrix Spikes	1/batch	Percent recoveries 70-130%	Reanalyze and/or qualify data.	Accuracy/Bias
Matrix Spike Duplicates	1/batch	Percent recoveries 70-130%; RPDs < 30	Reanalyze and/or qualify data.	Accuracy/Bias and Precision
BFB	Every day, prior to sample analysis	Per SW-846 8260B requirements	Retune instrument, reanalyze BFB.	Accuracy/Bias

⁽¹⁾ Surrogates: 1,2-Dichloroethane-d₄: 72-119%

Dibromofluoromethane: 84-115%

Toluene-d₈: 81-120%

4-Bromofluorobenzene: 76-119%

Reanalyze: refers to reanalysis of same extract/filtrate.

Table 8-5. Measurement Performance Criteria Table – TCLP Pesticides

QC Sample or Activity	Frequency	Measurement Performance Criteria	Corrective Action	DQI
Field Duplicates	1/10 samples/matrix	*RPD < 50 for solid samples and < 30 for aqueous samples when positive results for both samples are > 5x QL *No situation where one result is detected at > 5x QL and other result is not detected	Assess laboratory precision, qualify data, and/or resample.	Precision-Overall
Surrogates	Every sample, blank, QC	Percent recoveries TCMX and DCB 40-135%	Reextract if both surrogates outside limits or one <10%, and/or qualify data.	Accuracy/Bias
Method Blanks	1/extraction batch	No target compounds > QL	Reclean, reextract, reanalyze and/or qualify data.	Accuracy/Bias-Contamination
Laboratory Control Sample	1/extraction batch	Percent recoveries 60-140%	Determine cause of problem, reextract, reanalyze, and/or qualify data.	Accuracy/Bias
Dual Column Analysis	Every sample, blank, QC	RPD between columns < 40	Narrate/flag data.	Precision
Matrix Spike	1/extraction batch	Percent recoveries 60-140%	Reanalyze and/or qualify data.	Accuracy/Bias
Matrix Spike Duplicates	1/extraction batch	Percent recoveries 60-140%; RPD < 30	Reanalyze and/or qualify data.	Accuracy/Bias and Precision
Data Completeness Check	NA	Field 80%, Laboratory 95%	NA	Data Completeness
DDT/Endrin Breakdown	Prior to sample analysis	Breakdown must be < 15%	Perform injection port maintenance and/or reanalyze	Accuracy/Bias

TCMX – Tetrachloro-m-xylene

DCB – Decachlorobiphenyl

Reanalyze: refers to reanalysis of same extract.

Table 8-6. Measurement Performance Criteria Table – TCLP Herbicides

QC Sample or Activity	Frequency	Measurement Performance Criteria	Corrective Action	DQI
Field Duplicates	1/10 samples/matrix	*RPD < 50 for solid samples and < 30 for aqueous samples when positive results for both samples are > 5x QL *No situation where one result is detected at > 5x QL and other result is not detected	Assess laboratory precision, qualify data, and/or resample.	Precision-Overall
Surrogates	Every sample, blank, QC	Percent recoveries DCAA 45-140%	Reextract and/or qualify data.	Accuracy/Bias
Method Blanks	1/extraction batch	No target compounds > QL	Reclean, reextract, reanalyze and/or qualify data.	Accuracy/Bias-Contamination
Laboratory Control Sample	1/extraction batch	Percent recoveries 60-138% for 2,4-D and 48-140% for 2,4,5-TP	Determine cause of problem, reextract, reanalyze, and/or qualify data.	Accuracy/Bias
Dual Column Analysis	Every sample, blank, QC	RPD between columns < 40	Narrate/flag data.	Precision
Data Completeness Check	NA	Field 80%, Laboratory 95%	NA	Data Completeness
Matrix Spike	1/extraction batch	Percent recoveries 60-140%	Reanalyze and/or qualify data.	Accuracy/Bias
Matrix Spike Duplicates	1/extraction batch	Percent recoveries 60-140%; RPD < 30	Reanalyze and/or qualify data.	Accuracy/Bias and Precision

DCAA – Dichlorophenyl acetic acid

Reanalyze: refers to reanalysis of same extract.

Table 8-7. Measurement Performance Criteria Table – PCBs

QC Sample or Activity	Frequency	Measurement Performance Criteria	Corrective Action	DQI
Field Duplicates	1/10 samples/matrix	*RPD < 50 for solid samples and < 30 for aqueous samples when positive results for both samples are > 5x QL *No situation where one result is detected at > 5x QL and other result is not detected	Assess laboratory precision, qualify data, and/or resample.	Precision-Overall
Surrogates	Every sample, blank, QC	Percent recoveries TCMX and DCB 69-124% and 58-125%, respectively	Reextract if both surrogates outside limits or one <10%, and/or qualify data.	Accuracy/Bias
Method Blanks	1/extraction batch	No target compounds > QL	Reclean, reextract, reanalyze and/or qualify data.	Accuracy/Bias-Contamination
Laboratory Control Sample	1/extraction batch	Percent recoveries Aroclor 1016 and Aroclor 1260 55-128% and 58-140%, respectively	Determine cause of problem, reextract, reanalyze, and/or qualify data.	Accuracy/Bias
Dual Column Analysis	Every sample, blank, QC	RPD between columns < 40	Narrate/flag data.	Precision
Data Completeness Check	NA	Field 80%, Laboratory 95%	NA	Data Completeness
Matrix Spike	1/extraction batch	Percent recoveries Aroclor 1016 and Aroclor 1260 55-128% and 58-140%, respectively	Reanalyze and/or qualify data.	Accuracy/Bias
Matrix Spike Duplicates	1/extraction batch	Percent recoveries Aroclor 1016 and Aroclor 1260 55-128% and 58-140%, respectively; RPD < 20	Reanalyze and/or qualify data.	Accuracy/Bias and Precision

TCMX – Tetrachloro-m-xylene

DCB – Decachlorobiphenyl

Reanalyze: refers to reanalysis of same extract.

Table 8-8. Measurement Performance Criteria Table – Ignitability				
QC Sample or Activity	Frequency	Measurement Performance Criteria	Corrective Action	DQI
Laboratory Duplicates	1/ batch	RPD < 20	Reanalyze and qualify data.	Precision
Data Completeness Check	NA	Field 80%, Laboratory 95%	NA	Data Completeness

Reanalyze: refers to reanalysis of separate sample aliquot.

Table 8-9. Measurement Performance Criteria Table – Corrosivity

QC Sample or Activity	Frequency	Measurement Performance Criteria	Corrective Action	DQI
Laboratory Duplicates	1/ batch	RPD < 20	Reanalyze and qualify data.	Precision
Method Blanks	1/ batch	NA	Reclean, reprep, reanalyze and/or qualify data.	Accuracy/Bias-Contamination
Data Completeness Check	NA	Field 80%, Laboratory 95%	NA	Data Completeness

Reanalyze: refers to reanalysis of separate sample aliquot.

Table 8-10. Measurement Performance Criteria Table – Reactive Cyanide

QC Sample or Activity	Frequency	Measurement Performance Criteria	Corrective Action	DQI
Field Duplicates	1/10	*RPD < 50 for solid samples and < 30 for	Assess laboratory precision, qualify data, and/or resample.	Precision-Overall
	samples/matrix	aqueous samples when positive results for both samples are > 5x QL *No situation where one result is detected at > 5x QL and other result is not detected		
Laboratory Duplicates	1/ batch	RPD < 20 if results are > 5x detection limit	Reanalyze and qualify data.	Precision
Method Blanks	1/ batch	Reactive cyanide < QL	Reclean, reprep, reanalyze and/or qualify data.	Accuracy/Bias-Contamination
Reference Solution	1/batch	Percent recoveries > 50%	Reanalyze and/or qualify data.	Accuracy/Bias
Data Completeness Check	NA	Field 80%, Laboratory 95%	NA	Data Completeness

Reanalyze: refers to reanalysis of separate sample aliquot.

Table 8-11. Measurement Performance Criteria Table – Reactive Sulfide

QC Sample or Activity	Frequency	Measurement Performance Criteria	Corrective Action	DQI
Field Duplicates	1/10	*RPD < 50 for solid samples and < 30 for	Assess laboratory precision, qualify data, and/or resample.	Precision-Overall
	samples/matrix	aqueous samples when positive results for both samples are > 5x QL *No situation where one result is detected at > 5x QL and other result is not detected		
Laboratory Duplicates	1/ batch	RPD < 20 if results are > 5x detection limit	Reanalyze and qualify data.	Precision
Method Blanks	1/ batch	Reactive sulfide < QL	Reclean, reprep, reanalyze and/or qualify data.	Accuracy/Bias-Contamination
Data Completeness Check	NA	Field 80%, Laboratory 95%	NA	Data Completeness
Reference Solution	1/batch	Percent recovery > 50%	Reanalyze and/or qualify data.	Accuracy/Bias

Reanalyze: refers to reanalysis of separate sample aliquot.

8.2.1 Precision

Precision is the agreement among a set of replicate measurements without consideration of the “true” or accurate value: i.e., variability between measurements of the same material for the same analyte. Precision is measured in a variety of ways including statistically, such as calculating variance or standard deviation. Precision control limits and frequency of precision measurements are provided in Tables 8-2 through 8-11.

Field Precision Objectives

Field precision is assessed through the collection and measurement of collocated and/or duplicate samples (also called field duplicates) which consist of a second sample in addition to the original field sample. In general, field duplicates will be collected at a frequency of once per ten waste characterization sample events. Precision will be measured through the calculation of relative percent difference (RPD). The resulting information will be used to assess sample homogeneity, spatial variability at the site, sample collection reproducibility, and analytical variability. Field duplicate RPDs must be <40 for waste samples. Field precision will be maintained by utilizing experienced/trained sampling crews and conducting field audits.

Laboratory Precision Objectives

Precision in the laboratory is assessed through the calculation of RPD for duplicate preparation and analyses of laboratory control samples, or replicate injections of samples. Laboratory precision measures both sample preparation and analysis reproducibility. Precision control limits and frequency of precision measurements will be in accordance with NYS DOH ELAP requirements.

8.2.2 Accuracy

Accuracy is the closeness of agreement between an observed value and an accepted reference value. The difference between the observed value and the reference value includes components of both systematic error (bias) and random error. Information pertaining to accuracy

are provided in tables 8-2 through 8-11.

Field Accuracy Objectives

Accuracy in the field is assessed through the adherence to all field sample handling, preservation, and holding time requirements. Accuracy will also be evaluated through the use of cooler temperature blanks and duplicate samples.

Laboratory Accuracy Objectives

Laboratories assess the overall accuracy of their instruments and analytical methods (independent of sample or matrix effects) through the measurement of “standards”, materials of accepted reference value. Accuracy will vary from analysis to analysis because of individual sample and matrix effects. In an individual analysis, accuracy will be measured in terms of method blank results, processing blank results, the percent recovery (%R) of surrogate or internal standard compounds, standard reference materials (SRMs) and/or laboratory control samples (LCSs) and LCS Duplicates as applicable to the analysis being conducted. This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds and provides a measure of bias for the parameter of interest. Accuracy control limits will be in accordance with NYS DOH ELAP requirements.

The laboratory method blanks will indicate any adverse effects of sample contamination from an outside source (i.e., sample preparation or sample analysis) and could result in a positive bias. The frequencies of surrogates or internal standards will be in accordance with NYS DOH ELAP requirements. Laboratory accuracy will be improved by following the EPA methods which include detailed requirements for each analysis, utilizing experienced/trained laboratory personnel, ensuring the purity of all chemicals, and conducting laboratory audits.

8.2.3 Representativeness

Representativeness is a qualitative parameter which expresses the degree to which the data and sampling design accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. Representativeness is a qualitative parameter that is dependent upon the proper design of the sampling program and the laboratory quality

control program.

Measures to Ensure Representativeness of Field Data

Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the SWP and WSMP, referenced sampling methodologies, and required QC procedures are followed and that proper sampling, sample handling, and sample preservation techniques are used. Refer to Section 10.0 of the QAPP for the sampling design which will provide representative data over the site. Representativeness may also be assessed by the use of field duplicate samples. By definition, field duplicate samples are collected so they are equally representative of a given point in space and time. In this way, they provide both precision and representativeness information. As stated previously, field duplicate samples will generally be collected at a frequency of one per ten waste sampling events per analytical parameter. In general, representativeness in the field will be maximized by following the reference sampling methodologies, proper sample preservation procedures, utilizing experienced/trained sampling crews, and conducting field audits.

Measures to Ensure Representativeness of Laboratory Data

Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, and meeting sample holding times. Following the detailed requirements outlined in the EPA methods will maximize the representativeness of the laboratory data.

8.2.4 Comparability

Comparability is a qualitative parameter that expresses the confidence with which one data set can be compared to another.

Measures to Ensure Field Comparability

Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the QAPP is followed, sampling and analytical methodologies are followed, and that proper sampling and preservation techniques are used.

Measures to Ensure Laboratory Comparability

Comparability is dependent on the use of the selected EPA methods that are appropriate for producing data that may be compared to the project Reference Limits and the reporting of data in standardized units.

8.2.5 Sensitivity

Sensitivity is the ability of the instrument or method to detect the contaminants of concern at the level of interest.

Quantitation Limits

Table 8-1 outlines the required quantitation limits for each matrix, each analytical parameter and each analyte. These quantitation limits are significantly below the project Reference Limits. In almost all cases, EPA methodologies were selected with specific requirements or modifications to achieve quantitation limits that are significantly below the project Reference Limits. The laboratories selected will, at a minimum, meet the project quantitation limits included in Table 8-1. Laboratories will need to adjust all quantitation limits based on dilutions, sample volumes, extract/digestate volumes, and cleanup procedures. In all cases, the adjusted quantitation limit (or sample quantitation limit) must be below the project Reference Limit.

8.2.6 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under normal conditions.

Field Completeness Objectives

Field completeness is a measure of the amount of (1) valid measurements obtained from all the measurements taken in the project and (2) valid samples collected. The field completeness objective will be a minimum of 80 percent. This allows for the potential loss of samples due to sampling problems or media breakage during transport.

Laboratory Completeness Objectives

Laboratory completeness is a measure of the amount of valid measurements obtained from all valid samples submitted to the laboratory. The laboratory completeness objective will be a minimum of 90 percent. This allows for the potential loss of samples impossible to analyze due to unforeseen interferences and rejected data following data validation.

9.0 NOT USED

10.0 FIELD SAMPLING REQUIREMENTS

10.1 Sampling Process Design

Refer to Section 7.1.1 for the sampling design of this project. This section discusses the areas being sampled, what is being tested, and how often. Refer also to Section 4.0 of *Regulatory Submittal Part IV(S) – Scaffold Waste Plan* and *Regulatory Submittal Part IV – Waste Sampling and Management Plan* for additional information on the sampling design for this project.

10.2 Sampling Methods

The following sections provide a brief description of the sampling procedures to be employed for each parameter and a summary of the required equipment.

10.2.1 Full TCLP

Waste samples to be analyzed for TCLP will be collected according to the guidelines presented in EPA 530-D-02-002, August 2002.

- 2 Liter Glass Jars
- Un-powdered Laytex Gloves
- Disposable Bailer for liquids

10.2.2 Total PCBs

Waste samples to be analyzed for Total PCBs will be collected according to the guidelines presented in EPA 530-D-02-002, August 2002.

- 1 Liter Glass Jars
- Un-powdered Laytex gloves
- Disposable Bailer for liquids

10.2.3 RCRA Characteristics

Waste samples to be analyzed for RCRA Characteristics will be collected according to the guidelines presented in EPA 530-D-02-002, August 2002.

- 1 Liter Glass Jars
- Un-powdered Laytex
- Disposable Bailer for liquids

10.2.4 NYC Sewer Discharge Criteria

Waste samples to be analyzed for NYC Sewer Discharge Criteria will be collected according to the guidelines presented in EPA 530-D-02-002, August 2002. For each waste water sample to be processed, the following field sampling materials will be required:

- (2) 40 ml glass vials with hydrochloric acid preservative
- (2) 50 ml – nitric acid preservative
- (1) 500 ml Glass – sulphuric acid preservative
- (1) 1 liter glass jar – no preservative
- (1) 1 liter plastic jar – no preservative
- Disposable Bailers
- Un-powdered Laytex Gloves
- Coolers/cold packs for temperature-controlled transport

10.3 Field Sample Handling and Quality Control

10.3.1 Field Quality Control

Field quality control parameters including precision, accuracy, representativeness, comparability, sensitivity and completeness are discussed in section 8.2 above.

10.3.2 Field Blanks

The analysis of Field Blanks is a technique used to measure the potential impact to sample results of the sample collection media itself which, in most air sampling protocols, is actually processed along with the material collected. In the case of most bulk materials sampling, including waste characterization sampling, the bulk material collected is separated from the media (i.e., glass or plastic bottle) and processed on its own. In such a case (as is the case for this project) field blanks are of no use and for this project will not be utilized.

10.3.3 Cooler Temperature Blanks

Maintenance of low temperature for waste characterization and site assessment purposes is a requirement for soil sampling and is not normally applied to building materials waste characterization sampling. The purpose of maintaining a low temperature is to prevent volatilization of specific VOC and SVOC compounds that might have been trapped in soil, but could be released once the soil is excavated and allowed to volitalize due to warmer temperatures and exposure to air. This could result in results biased to the low side due to contaminant loss. Although this further volatilization is neither likely, nor expected for the materials to be sampled on this project, cooler temperature blanks will be utilized. A cooler temperature blank is a sample container filled with water that is included in the sample shipment cooler. Coolers serve the purpose of maintaining temperature and protecting the sample containers. The receiving laboratory will measure the temperature of the water in the temperature blank container. The goal is to have the samples received at 4° C ($\pm 2^\circ$ C). The laboratory will record the temperature upon receipt. Receipt of samples outside the intended range will not necessarily void the analysis, but will be taken into account in interpretation of the results.

10.3.4 Field Duplicates

As noted in the subsections of Section 8.2 above, field duplicate samples will be collected for every ten waste characterization sampling events. Co-located samples will be collected of like materials and submitted for identical analyses. In the case of composite samples, an equal number of co-located grab samples will be collected in the duplicate sample. In the case of aqueous samples, sample containers will be filled by alternately filling sample containers from the same source. Identical sample containers and handling procedures will be utilized, and the duplicate sample will be shipped in the same container as the original sample.

11.0 ANALYTICAL REQUIREMENTS

11.1 Analytical Methods

This section of the QAPP describes the analytical techniques that will be used by the fixed laboratories to generate data for the project. It documents the fixed laboratory analytical methods that will be used to meet measurement performance criteria and achieve the project-required quantitation limits for all contaminants of concern in the specific matrices.

11.1.1 Fixed Laboratory Analytical Methods and SOPs

Table 11-1 details the analytical methods that will be used in this investigation.

Table 11-1. Summary of Preparation and Analytical Methods		
	Preparation Methods	Analytical Method
TCLP VOCs	SW-846 Methods 1311/5030A	SW-846 Method 8260B
TCLP SVOCs	SW-846 Methods 1311/3510C	SW-846 Method 8270C
TCLP Pesticides	SW-846 Methods 1311/3510C	SW-846 Method 8081A
TCLP Herbicides	SW-846 Methods 1311/3510C	SW-846 Method 8151A
TCLP Metals	SW-846 Methods 1311/3010A	SW-846 Method 6010B/7470A
Ignitability	NA	SW-846 Method 1010
Corrosivity	NA	SW-846 Method (aqueous) / 9045C 9040C (solid)
Reactive Cyanide	SW-846 Chapter 7	SW-846 Method 904a5C
Reactive Sulfide	SW-846 Chapter 7	SW-846 Chapter 7
PCBs	SW-846 Method 3541 or 3545	SW-846 Method 8082
Total Cadmium and Chromium	SW-846 Method 3050B	SW-846 Method 6010B

11.2 Analytical Quality Control

All required QC checks and QC samples and the associated QC acceptance limits are detailed in the associated methods and in Tables 8-2 through 8-8.

11.2.1 Field Analytical QC

11.2.2 Fixed Laboratory QC

11.2.2.1 Method Blanks/Preparation Blanks

Method blanks will be performed as part of each analytical batch for each methodology performed. Method blanks are used to evaluate contamination introduced during sample preparation and/or analysis by the laboratory.

11.2.2.2 Instrument Blanks

Instrument blanks are used to evaluate contamination resulting from the analytical reagents and the instrumentation. In addition, instrument blanks are sometimes used to assess potential carryover after the analysis of a highly contaminated sample. Instrument blanks are only required for select analytical parameters.

11.2.2.3 Surrogate Spikes

Surrogate spikes are used to evaluate extraction efficiency or analytical bias on a sample by sample basis for organic parameters. Surrogate spikes are added to all samples for organic parameters. Surrogate spikes are another measure of sample-specific QC.

11.2.2.4 Laboratory Control Samples

Laboratory control samples (LCSs) and LCS Duplicates are used to evaluate almost all parameters for the ability of the laboratory to accurately and precisely identify and quantitate target compounds in a reference matrix when spiked at the mid range of the calibration curve at a known concentration using a secondary source standard. LCSs and/or LCS Duplicates are typically performed as part of each analytical batch for each methodology with the exception of asbestos, PM10, PM2.5, ignitability and corrosivity,

11.2.2.5 Laboratory Duplicate

Laboratory duplicates are used to evaluate laboratory preparation and analysis precision. These analyses are typically performed for inorganic parameters only. Laboratory duplicates

are typically performed at a frequency of one per twenty samples.

11.2.2.6 Internal Standards

Internal standards are used to assess the analytical accuracy, precision, and stability. Internal standards are typically only used for organic analyses and ICP/MS analyses. Internal standards are spiked into all samples and are considered a sample-specific QC measure.

11.2.2.7 Standard Reference Materials

Standard reference materials (SRMs) are used to evaluate laboratory preparation and analysis bias for specific compounds in a reference matrix. SRMs will be used for the asbestos analysis.

11.2.2.8 Matrix Spike Samples

The matrix spike samples are used to determine laboratory preparation and analysis bias for specific compounds in specific matrices (i.e., sample-specific QC). Matrix spikes are typically performed at a frequency of one per twenty investigative samples per analytical parameters with the exception of the RCRA characteristics.

12.0 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

Summaries of sample media, required sample volumes, preservation, and holding time requirements for all samples are presented in Table 12-1. With the exception of samples that are completed on Sundays, samples will be delivered to the laboratories via overnight courier immediately after collection on ice (where required) with coolers under custody seal or via courier service. Samples completed on Sundays will be shipped with Monday's shipment.

12.1 Sample Custody

Sample custody is addressed in two parts: field sample collection and laboratory analysis. A sample is considered to be under a person's custody if, 1- the item is in the actual possession of a person; 2-the item is in the view of the person after being in actual possession of the person; 3-the item was in the actual physical possession of the person but is locked up to prevent tampering; and, 4- the item is in a designated and identified secure area.

12.1.1 Field Sample Custody

Proper sample handling is a crucial process in sampling quality assurance. Sample integrity must be maintained and be demonstrated by written records from the handling and control of the blank sample media, if any, the sample collection and record, and the storage, handling, transport, and analysis of the sample. Documentation must provide a sample tracking record from collection to shipment, laboratory receipt, and laboratory analysis. Sample chain-of-custody and packaging procedures are summarized below.

The Airtek Field Sampling Coordinator (or designee) is responsible for overseeing and supervising the implementation of proper sample custody procedures in the field and up until the samples have been transferred to a courier. The chain-of-custody procedures are initiated in the field immediately following sample collection. The procedures consist of: (1) preparing and attaching a unique sample label to each sample collected, (2) completing the chain-of-custody form, and (3) preparing and packing the samples for shipment.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.
- All media will be identified by the use of pre-printed adhesive sample labels with site name and location, sample locations, date/time of collection, type of preservation, type of analysis, and sampler's initials. The sample numbering system is presented in Section 14.2.2 of this QAPP. Figure 12-1 provides an example sample label. In most cases, sample labels will be generated prior to the sampling event.
- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather. If a label is lost or ruined, sample analysis will continue. If a project reference level is exceeded, further investigation will be performed.
- Samples will be transported in containers (coolers) which will maintain the

refrigeration temperature for those parameters for which refrigeration is required.

- Determine if the temperature required for the requested testing program has been maintained during shipment and document the temperature on the chain-of-custody or sample login records,
- Temperature blanks will be utilized as required to determine if the temperature required for the requested testing program has been maintained during shipment.
- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage location.
- Chain-of-custody records are initiated by the samplers in the field. The field portion of the custody documentation should include: (1) the project name; (2) signatures of samplers; (3) the sample number, date and time of collection; (4) signatures of individuals involved in sampling; (5) if applicable, identification number of media associated with each sample; and (6) if applicable, air bill or other shipping number. To the extent possible, this information will be entered prior to the sampling event.
- All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and copies will be retained by the sampler and placed in the project files. An example chain-of-custody is included in Figure 12-2.
- Samples will be properly packaged for shipment and dispatched to the laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. If an authorized laboratory courier does not pickup the samples from the project site, custody seals will be attached to the

front right and back left of the cooler and covered with clear plastic tape after being signed by field personnel. An example of a cooler custody seal is provided in Figure 12-3. Subsequently, the cooler will be strapped shut with strapping tape in at least two locations.

- If the samples are sent by common carrier, the air bill will be used. Air bills will be retained by the laboratory as part of the permanent documentation. Commercial carriers are not required to sign off on the custody forms since the custody forms will be sealed inside the sample cooler and the custody seals will remain intact.
- Samples remain in the custody of the sampler until transfer of custody is completed. This consists of delivery of samples to the laboratory sample custodian, and signature of the laboratory sample custodian on the chain-of-custody document as receiving the samples and signature of sampler as relinquishing samples.

12.1.2 Laboratory Sample Custody

Samples will be received and logged in by a designated sample custodian or his/her designee. Upon sample receipt, the sample custodian will:

- Examine the shipping containers to verify that the custody tape is intact,
- Examine all sample containers for damage,
- Determine if the temperature required for the requested testing program has been maintained during shipment and document the temperature on the chain-of-custody or sample login records,
- Compare samples received against those listed on the chain-of-custody,
- Verify that sample holding times have not been exceeded,
- Examine all shipping records for accuracy and completeness,
- Sign and date the chain-of-custody immediately (if shipment is accepted) and attach the air bill,
- Note any problems associated with the coolers and/or samples on the cooler receipt form and notify the Laboratory Project Manager, who will be responsible

for contacting the Airtek Project QA Officer,

- Attach laboratory sample container labels with unique laboratory identification and test, and
- Place the samples in the proper laboratory storage.

Following receipt, samples will be logged in according to the following procedure:

- The samples will be entered into the laboratory tracking system. At a minimum, the following information will be entered: project name or identification, unique sample numbers (both client and internal laboratory), type of sample, required tests, date and time of laboratory receipt of samples, and field identification provided by field personnel.
- The Laboratory Project Manager will be notified of sample arrival.
- The completed chain-of-custody, air bills, and any additional documentation will be placed in the final file.

Figure 12-1.
Sample Label

AIRTEK ENVIRONMENTAL CORP. (212) 768-0516

Project #06-0200 Fiterman Hall

Date:
Sample ID:
Analyte:
Location:
Lab:

Figure 12-3. Chain-of-Custody Seal

<p>AIRTEK ENVIRONMENTAL CORP. (212) 768-0516</p> <p>Project #06-0200 Fiterman Hall</p> <p>Date:</p> <p>Signature:</p> <p>Lab:</p>

Table 12-1. Summary of Media, Preservation, and Holding Time Requirements					
Analytical Parameter	Analytical Method	Estimated Sample Volume	Media	Preservation Requirements	Maximum Holding Time
TCLP					
Full TCLP	EPA 1311 EPA 8260 EPA 8081 EPA 8270 EPA 8151 EPA 200.7/6010	2 Liters	Two (2) x 1-Liter Glass Jars Two (2) x 40 ml HCL Voa	Cool, 4 Deg.C HCL	14 days to extraction
TCLP Metals	1311/ 200.7/6010	~0.5 L	(1) x 1L. Plastic or Glass	Cool, 4°C	14 Days to Extraction
TCLP VOCs	1311/ 8260	80 ml.	(2) x 40ml. HCL VOA	HCL	14 days
TCLP SVOCs	1311/ 8270	~0.5 L	(1) x 1L. Glass	Cool, 4°C	14 days to Extraction
TCLP Pesticides	1311/ 8081	~0.5 L	(1) x 1L Glass	Cool, 4°C	14 Days to Extraction
TCLP Herbicides	1311/ 8151	~0.5 L	(1) x 1L. Glass	Cool, 4°C	14 days to Extraction
Total PCBs	SW 846-3510C/8082	1 Liter	One (1) x 1-Liter Glass Jar	Cool, 4°C	7 days liquid, 14 days solid
RCRA					
RCRA Characteristics	SW 846-7.3, 1010,	1 Liter	One (1) x 1-Liter Glass Jar	Cool, 4°C	ASAP
Flashpoint	SW 846-7.3, 1010	~ 100 ml.	One (1) x 1-Liter Glass Jar	Cool, 4°C	ASAP
Reactivity (CN- + S-)	SW 846-7.3, 1010	~200 ml.	One (1) x 1-Liter Glass Jar	Cool, 4°C	ASAP
Corrosivity/ pH	150.1/ SW9045	~100 ml.	One (1) x 1-Liter Glass Jar	Cool, 4°C	ASAP
NYC SEWER DISCHARGE CRITERIA					
VOC	EPA 8260	~80 mL	Two (2) x 40ml Glass Vials (VOA)	Hydrochloric Acid	14 days
Metals (Inc. Hg)	EPA 200.7	1 Liter	One (1) x 1 Liter Plastic Bottle (Metals)	Nitric Acid	6 Months
Phenol + Non-Polar	EPA420.1/2, EPA 1664A	1Liter	One (1) x 1 Liter Glass Jar (Phenol + Non-Polar-Same Container)	Sulfuric Acid	28 days

Hexavalent Chromium	SW 846-7196A	1 Liter	One (1) x 1-liter Glass Jar (Cr+6)	None	24 Hours
Amenable Cyanide	335.3	1 Liter	One (1) x 1-Litrer Plastic Jar (AmenableCN-)	NaOH	14 days

13.0 SAMPLING EQUIPMENT/SUPPLIES and LABORATORY EQUIPMENT MAINTENANCE REQUIREMENTS

13.1 Sampling Equipment/Supplies

Critical Supplies and Consumables	Inspection Requirements and Acceptance Criteria	Responsible Individual
Sample bottles, media	Visually inspected upon receipt for cracks, breakage, and cleanliness.	Field Sampling Coordinator
Chemicals and reagents	Visually inspected for proper labeling, expiration dates, appropriate grade. Record lot numbers of reagents used.	Field Sampling Coordinator

13.2 Laboratory Instrument/Equipment Testing, Inspection, and Maintenance

Procedures and documentation activities will be performed to ensure that all fixed laboratory instrumentation and equipment are available and in good working order when needed. Equipment maintenance logs must be kept and equipment must be checked prior to use. The maintenance responsibilities for fixed laboratory instruments will be assigned to the Laboratory Section Managers. Laboratory analysts will be responsible for daily checks and calibrations and for reporting any problems with the instruments. The maintenance schedule will follow the manufacturer’s recommendations. Laboratory analysts will be responsible for performing routine operator maintenance and cleaning in accordance with the manufacturer’s specifications.

13.3 Inspection/Acceptance of Supplies and Consumables

Critical supplies and sample containers will be inspected in the following manner.

Critical Supplies and Consumables	Inspection Requirements and Acceptance Criteria	Responsible Individual
Sample bottles, media	Visually inspected upon receipt for cracks, breakage, and cleanliness. Must be accompanied by certificate of	Sample Custodian

	analysis.	
Chemicals and reagents	Visually inspected for proper labeling, expiration dates, appropriate grade. Record lot numbers of reagents used for calibration.	Laboratory Analysts

Supplies and consumables not meeting acceptance criteria will initiate the appropriate corrective reference. Corrective measures may include notification of vendor and subsequent replacement of defective or inappropriate materials. All references will be documented in the project files.

13.4 Laboratory Instrument/Equipment Calibration and Frequency

Calibration procedures are associated with all fixed laboratory instruments. These calibration procedures ensure that the analytical methods and selected instrumentation meet project requirements for selectivity, sensitivity, accuracy and precision of quantitation. These calibration procedures are discussed in the individual methods.

The use of materials of known purity and quality will be utilized for the calibration of all instruments as part of this project. The laboratories will carefully monitor the use of all laboratory materials including solutions, standards and reagents through well documented procedures. All solid chemicals and acids/bases used by the laboratories will be reagent grade or better. All gases will be high purity or better. All standards or standard solutions will be obtained from USEPA certified commercial sources. All materials including standards or standard solutions will be dated upon receipt, and will be identified by material name, lot number, purity or concentration, supplier, receipt/preparation date, recipient/preparer's name, and expiration date. Standards or standard solution concentrations will be validated prior to use. This validation may be restandardized for acids and bases, response factor comparison, standard curve response, comparison to other standards made at a different time and/or by a different analyst. All standards and standard materials will be checked for signs of deterioration including unusual volume changes (solvent loss), discoloration, and formation of precipitates or changes in analyte response. All standards and standard solutions will be properly stored and handled and will be labeled with all appropriate information including compound/solution name, concentration, solvent, expiration date, preparation date, and the initials of the preparer. All solvent materials or materials used as part of a given procedure will also be checked. Each new lot of solvent will be analyzed to ensure the absence of interference.

14.0 DATA MANAGEMENT

14.1 Sample Collection Documentation

This section of the QAPP describes field documentation procedures that will be followed for this project. Records of field data will be made throughout the project to document critical data that might be needed at a later time, such as during preparation of the report, or for use by other investigators who were not present when the data were collected. Field data will be recorded on the following logs, forms, and/or notebooks.

- Daily Personnel Log
- Field Notebooks
- Field Data Forms
- Photographs
- Equipment Calibration Logs
- Health and Safety Logs

The Airtek Field Sampling Coordinator has the responsibility to maintain the various logs, forms, and notebooks that document daily field activities as discussed below. Individual responsibilities will be delegated to other field staff as appropriate. Special emphasis will be placed on the completeness and accuracy of all information recorded in the field, and will contain statements that are legible, accurate, and inclusive documentation of project activities. Because the logbooks, field data forms, and chain-of-custody forms provide the basis for future reports, they must contain accurate facts and observations. The language used in recording all field data will be objective, factual, and free of personal interpretations or other terminology that may prove inappropriate. In general, field forms will be used to record most of the daily field information including sample volumes, equipment inspections, etc. The following sections describe how data collected in the field will be documented, tracked, and controlled.

14.1.1 Daily Personnel Log

A log may be maintained in the field trailer to record the identities of all personnel who are onsite for the duration of the project. A sign will be posted at the entrance to the site indicating that all visitors and contractors must sign-in at the field trailer. The log will record the following information.

- Names of field personnel
- Names of subcontractor personnel
- Names of visitors
- Affiliation of each person on-site
- Time of entry and exit.

14.1.2 Field Logbooks

Field logbooks will provide the means of recording the chronology of data collection activities performed during the investigation. As such, entries will be described in as much detail as possible so that a particular situation could be reconstructed without reliance on memory. Field logbooks will be bound field survey books or notebooks. Logbooks will be assigned to field personnel, but will be stored in the project files when not in use. All logbooks will be water resistant and have sequentially numbered pages. The title page of each logbook will contain the following:

- Person to whom the logbook is assigned,
- The logbook number,
- Project name and number,
- Site name and location,
- Site location by longitude and latitude, if known,
- Project start date, and
- End date.

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, and names of all sampling team members present will be entered. Each page of the logbook will be signed and dated by the person making the entry. All entries will be made in permanent ink, signed, and dated and no erasures or obliterations will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark which is signed and dated by the sampler. The correction shall be written adjacent to the error.

Field activities will be fully documented. Information included in the logbook may include:

- Chronology of activities, including entry and exit times,
- Names of all people involved in sampling activities and organizational affiliations,
- Level of personal protection used,
- Any changes made to planned protocol,
- Names of visitors to the site during sampling and reason for their visit,
- Sample location and identification,
- Weather conditions, including temperature and relative humidity,
- Dates (month/day/year) and times (military) of sample collection,
- Measurement equipment identification (model/manufacturer) and calibration information,
- Field screening results,
- Site observations,
- Sample collection methods and equipment,
- Sample collection date and time,
- Sample identification code,
- Tests or analyses to be performed,
- Sample preservation and storage conditions,
- QC sample collection,
- Unusual observations,
- Record of photographs,
- Sketches or diagrams, and
- Signature of person recording the information

Field logbooks will be reviewed on a daily basis by the Airtek Field Sampling Coordinator. Logbooks will be supported by standardized forms. Separate field logbooks will be issued for each field team or field task in order to preserve a contemporaneous streaming record of each field activity. Each field logbook will be numbered, and a log will be kept denoting the date each notebook was issued, and the field activity corresponding to each notebook. Upon receipt of the field logbook for a particular activity, the designated person recording the notes will begin recording notes on a new page. The person recording the notes will sign the top of the new page and indicate the date, time, and weather conditions, prior to recording information about the field activity. The field logbook will indicate whether any Field Data Forms are used and the serial number of all forms will be recorded for reference. When the designated person recording

the notes either relinquishes the field logbook to another team member or turns the book in at the end of the day, the person relinquishing the field logbook will affix a signature and date to the bottom of the last page used. If the page is not complete, a diagonal line will be struck across the blank portion of the page.

14.1.3 Field Data Forms

Forms were designed to minimize the potential for critical data loss from the field. Field personnel are instructed to utilize these forms to record critical data during the field activities for which each form was designed. A stockpile of blank forms will be kept in the field office. As forms are completed, they will be kept in a three-ring notebook in the field office. As with the field logbooks, all documentation will be recorded in permanent ink. Corrections to errors in documentation or recorded calculations will be made by first striking out the error with a single line so as not to obliterate the original entry. Then the replacement entry or value will be inserted where appropriate. The person originating the change will initial and date each separate change. All revisions, deletions, and changes will be made in indelible ink.

14.1.4 Photographs

Field personnel will be instructed to photo-document field activities where possible. A field logbook entry or Photograph Log may be used to record the date and time of all photographs taken at the site.

14.1.5 Equipment Calibration Log

A field logbook entry or field form will be used to record which instruments were calibrated each day (identified by manufacturer, model number and serial number), the individual who performed the calibration, and any notes regarding the maintenance of the instrument.

14.1.6 Health and Safety Log

A field logbook entry or a Health and Safety Log may be used to record any Health and Safety issues that arise during field activities. Any injuries, illnesses, use of first aid supplies, use of personal protective equipment (for levels A, B or C only, if needed), or possible work-related symptoms will be recorded in the log together with the date, the name(s) of the

affected individual(s), and a description of the incident.

14.2 Field Documentation Management System

The Airtek Field Sampling Coordinator will maintain an inventory of all logbooks used during the program and will be responsible for ensuring that they are archived in the project files following the completion of the investigation. Completed standardized forms will be maintained by the Airtek Field Sampling Coordinator during the duration of the program and will be archived in the project files following completion of the sampling effort.

14.2.1 Sample Handling and Tracking System

This section documents the procedures that will be followed to identify and track samples collected in the field, samples delivered or shipped to a fixed laboratory for analysis, and sample transfer throughout the laboratory.

14.2.2 Sample Identification and Labeling

The establishment of a standard sample designation/labeling protocol is essential to ensure adequate quality assurance/quality control and to allow tracking of each sample and the associated analytical data. Proper labeling allows for the tracking of samples beginning from the time of sample collection, through analysis, and following project completion should future data correlation be deemed necessary. The proper labeling of samples is also critical in ensuring that samples are analyzed within the required sample holding times. All samples will be identified using a unique sample identification scheme suitable to the project and the sampling protocol.

The sample identification number will be recorded on the chain-of-custody forms accompanying each sample shipment submitted for analysis and will be recorded in the field logbooks.

14.3 Project Documentation and Records

A complete file of project-related documents will be maintained in a central file. The file will contain all contracts, work authorizations, change orders, invoices, and correspondence.

14.4 Data Deliverables

14.4.1 Fixed Laboratory Data Package Deliverables

14.4.1.1 Hardcopy Deliverables

Data deliverables for the fixed laboratories will consist of sample and QC results. At a minimum, the data packages from the analytical chemistry laboratories will include the following:

1. Case narrative
 - summary of analytical methods used
 - correlation of field sample identifications and laboratory sample identifications
 - data qualifier definitions
 - deviations from established QA/QC procedures with corrective action
2. Sample results
 - project name
 - field sample identification
 - batch number
 - collection/extraction/analysis dates
 - sample results calculated based on the volume sampled
 - quantitation limits
 - dilution factors
3. Sample documentation
 - original chain-of-custody
 - shipping documents
 - cooler receipt forms
4. Quality Assurance/Quality Control

- method blanks
- spike recoveries (surrogates, MS/MSDs, LCSs, internal standards, field spikes)
- measures of precision (laboratory duplicates, LCS/LCSDs)
- summary of tune and calibration results
- control limits for accuracy and precision

Depending on the analysis, analytical results will be reported within five (5) to seven (7) business days of receipt of samples by the laboratory. Non-detect results must be reported down to the quantitation limit and qualified with a U. All information related to analysis will be documented in controlled laboratory logbooks, instrument printouts, or other approved forms. All entries that are not generated by an automated data system will be made neatly and legibly in permanent, waterproof ink. Information will not be erased or obliterated. Corrections will be made by drawing a single line through the error and entering the correct information adjacent to the cross-out. All changes will be initialed, dated, and, if appropriate, accompanied by a brief explanation. Unused pages or portions of pages will be crossed out to prevent future data entry. Laboratory records will be reviewed by the Laboratory Section Leaders on a regular basis, and by the Laboratory QA Manager periodically, to verify adherence to documentation requirements.

14.4.2.2 Electronic Deliverables

Laboratory data will be received as hard copy and electronic data deliverables (EDD). EDDs associated with fixed laboratory analyses will be in Excel format. A copy of the required EDD format is provided in Attachment E.

14.5 Data Handling and Management

14.5.1 Data Entry and Verification

All data entry performed by Airtek or its contractors will be proofed 100% for accuracy. Verification will be carried out either by proofing a printout against the original data or by duplicate entry and comparison of the two data sets to detect discrepancies.

14.5.2 Data Transfer and Transmittal

Hard copy and EDDs from the laboratories will be transmitted to the Airtek Project QA Officer upon completion of analysis, who will forward all deliverables to the Airtek Project Manager. Copies of these transmittals will be forwarded to the Airtek Project Manager for storage in the project files. Each hard-copy report and EDD will be logged in to Airtek’s validation tracking log. As the package proceeds through data validation, review, and data management, the status of the package will be recorded in the log. Completion of validation and final disposition of the package will also be documented. All laboratory data will be maintained in a central file to allow easy retrieval of information and electronic transfer of the data to other parties. As laboratory analytical results are received, and validated, the results will be saved to the central file. All laboratory data will be provided by the laboratory in both electronic and hard copy format. After the data are validated, appropriate modifications to the data will be made to reflect the changes resulting from data validation (if any). A second quality assurance review will be performed after the validated data are entered.

14.5.3 Data Analysis and Reporting

All data reports will present summaries of all validated data collected during the field investigation.

14.6 Data Tracking and Control

Management of field data is described in Section 14.4.1. Laboratory data will be maintained as described in the laboratory’s QA Manuals. Airtek is the custodian of the project files and will maintain the contents of the files, including all relevant records, reports, logs, field notebooks, pictures, subcontractor reports, and data reviews in a secured, limited access area.

15.0 ASSESSMENT/OVERSIGHT

15.1 Assessments

Technical system audits (TSAs) of both field and laboratory activities are conducted to verify that sampling and analysis are performed in accordance with the procedures established in the QAPP.

Field Sampling TSAs

A system audit of field activities including sampling and field measurements may be conducted and documented by the Airtek Project QA Officer (or her designee) quarterly or at the start of each phase of sampling. The purpose of this audit is to verify that all established procedures are being followed as planned and documented and to allow for timely corrective action, reducing the impact of the nonconformance. The audit will ensure that all personnel have read the QAPP. The audit will cover field sampling records, field measurement results, field instrument operation and calibration records, sample collection, preservation, handling, and packaging procedures, adherence to QA procedures, personnel training, sampling procedures, review of sampling design versus the sampling plan, corrective action procedures, and chain-of-custody, etc. Follow-up surveillance will be conducted by the Airtek Field Sampling Coordinator to verify that QA procedures are maintained throughout the investigation. Upon completion of the audit, the Airtek Project QA Officer will prepare a written audit report, which summarizes the audit findings, identifies deficiencies and recommends corrective actions. In addition, a verbal debriefing will also be given to the Airtek Field Sampling Coordinator and Airtek Project Manager at the time of the audit. The written report will be submitted to the Airtek Project Manager, who will be responsible for ensuring that corrective measures are implemented.

Fixed Laboratory TSAs

Laboratory audits may be conducted by the Airtek Project QA Officer or by a designated qualified individual. If data quality issues are consistently noted during data validation, this may trigger the need for a laboratory audit. The fixed laboratory TSA includes a review of the following areas:

QA organization and procedures (including the Laboratory QA Plan):

- Personnel training and qualifications,
- Facility security
- Sample log-in procedures,
- Sample storage facilities,
- Analyst technique
- Adherence to analytical methods and the QAPP,
- Compliance with QA/QC objectives,
- Equipment, instrumentation and supplies kept on reserve,
- Instrument calibration and maintenance,
- Data recording, reduction, review, and reporting, and
- Cleanliness and housekeeping.

Preliminary results of the TSA will be discussed with the Laboratory Manager, Laboratory Project Manager, and Laboratory QA Manager during a verbal debriefing held at the facility. Assessment findings will be documented and reported as described in Section 15.2.

Data TSAs

Quarterly data audits will be performed by the Airtek Project QA Officer or by a designated qualified individual. These audits will demonstrate the accuracy of the reported data and eliminate any potential global/systematic calculation errors.

15.2 Assessment Findings and Corrective Action Responses

The results of the field sampling and fixed laboratory TSAs will be documented in written reports; in addition, verbal debriefings will also be held at the conclusion of all audits. The reports will be prepared by the auditor and will describe the scope of the TSA, summarize audit findings, and recommend corrective action. The report will be distributed to the appropriate personnel for response: the Airtek Field Sampling Coordinator will be responsible for responding to the field sampling TSA report, and the Laboratory Manager will be responsible for addressing the fixed laboratory TSA report. Significant issues that are discovered during the TSA

and which could potentially affect data quality or usability will be brought to the immediate

attention of the Airtek Project Manager. The response to the TSA reports will include a description of the corrective action(s) to be implemented, the identities of the personnel responsible for implementing the corrective action, and the schedule for implementation/completion. All responses must be completed within two weeks of issuing the TSA report. The response will be reviewed by the Airtek Project QA Officer and/or Airtek Project Manager and, if all issues have been addressed appropriately and in a timely manner, no further action will be required. In the event that the corrective action(s) are inadequate or inappropriate, follow-up activities, including additional audits, or discussions with the Airtek Project Manager, will be conducted by the Airtek Project QA Officer. The complete TSA report, including resolution of any deficiencies, will be included in the QA reports to management.

15.3 Additional QAPP Non-Conformances

15.3.1 Field Non Conformances

Corrective action in the field may be needed when the sample network is changed (i.e., more/less samples, sampling locations other than those specified in the QAPP), or when sampling procedures and/or field analytical procedures require modification, etc. due to unexpected conditions. The field team may identify the need for corrective action. The Airtek Field Sampling Coordinator will approve the corrective action and notify the Airtek Project Manager and Airtek QA Officer. The Airtek Project Manager, in consultation with the EPA Region 2 Project Manager, if necessary, will approve the corrective action. The Airtek Field Sampling Coordinator will ensure that the corrective action is implemented by the field team. Corrective actions will be implemented and documented in the field logbook. Documentation will include:

- A description of the circumstances that initiated the corrective action,
- The action taken in response,
- The final resolution, and
- Any necessary approvals.

No staff member will initiate corrective action without prior communication of findings through the proper channels as described above. All corrective actions will take into account the possible effect on the data. If necessary, a problem resolution audit will be conducted.

15.3.2 Laboratory Non-Conformances

Corrective action in the laboratory may occur prior to, during, and after initial analyses. A number of conditions such as broken sample media, omissions or discrepancies with chain-of-custody documentation, and potentially high concentration samples may be identified during sample log-in or just prior to analysis. Following consultation with laboratory analysts and Laboratory Section Leaders, it may be necessary for the Laboratory QA Manager to approve the implementation of corrective action. The analytical methods specify some conditions during or after analysis that may automatically trigger corrective action or optional procedures. These conditions may include dilution of samples, additional sample extract cleanup, automatic reinjection/reanalysis when certain QC criteria are not met, loss of sample through breakage or spillage, etc. If the corrective action is not clear, the Laboratory QA Manager must notify the Airtek Project Manager and Airtek QA Officer. All parties will decide and approve a subsequent corrective action procedure that will not adversely affect the achievement of project objectives. The analyst may identify the need for corrective action. The Laboratory Section Leader, in consultation with the staff, will approve the required corrective action to be implemented by the laboratory staff. The Laboratory QA Manager will ensure implementation and documentation of the corrective action. If the nonconformance causes project objectives not to be achieved, Airtek Project QA Officer will be notified. The Airtek Project QA Officer will notify the Airtek Project Manager, who in turn will contact all levels of project management for concurrence with the proposed corrective action. These corrective actions are performed prior to release of the data from the laboratory. The corrective action will be documented in both the laboratory's corrective action files, and the narrative data report sent from the laboratory to Airtek. If the corrective action does not rectify the situation, the laboratory will contact the Airtek Project QA Officer, who will determine the action to be taken and inform the appropriate personnel. If necessary, a problem resolution audit will be conducted.

15.4 Data Validation and Data Assessment Non-Conformances

The need for corrective action may be identified during either data validation or data assessment. Potential types of corrective action may include data qualification or reinjection/reanalysis of samples by the laboratory. These actions are dependent upon whether the data to be collected is necessary to meet the required QA objectives. If the data validator or data assessor identifies a corrective action situation, the Airtek Project Manager will be responsible for informing the appropriate personnel. All corrective actions of this type will be documented by the Airtek Project Manager and maintained in the project files.

16.0 DATA REVIEW, VERIFICATION, VALIDATION, AND USABILITY

16.1 Data Review, Verification, and Validation

All data generated through field activities or by the laboratory operation, will be reduced and/or validated prior to reporting. No data will be disseminated by Airtek or its subcontractors until it has been subjected to the procedures summarized below.

16.1.1 Field Sampling Data

Field sampling data will be verified daily by each person performing the tasks. These data will be verified for completeness and correctness. Field sampling data will also be independently reviewed daily by the Airtek Field Sampling Coordinator, or designee, to ensure that records are complete, accurate, and legible and verify that the sampling procedures are in accordance with the protocols specified in the QAPP. Personnel performing the verification tasks will sign the field notes after verification. Verification will include all field logbook notes, field sampling forms, and COCs. Sample collection information will be transcribed directly into the field logbook or onto standardized forms. If errors are made, results will be legibly crossed out, initialed and dated by the person recording the data, and corrected in a space adjacent to the original (erroneous) entry. Each member of the field sampling team will be responsible for an internal verification of the transcribed information. Daily external verification of the field records by the Airtek Field Sampling Coordinator, or designee, will ensure that:

- Logbooks and standardized forms have been filled out completely and that the

information recorded accurately reflects the activities that were performed.

- Records are legible and in accordance with good record keeping procedures, i.e., entries are signed and dated, data are not obliterated, changes are initialed, dated, and explained.
- Sample collection, handling, preservation, and storage procedures were conducted in accordance with the protocols described in the QAPP, and that any deviations were documented and approved by the appropriate personnel.

16.1.2 Fixed Laboratory Data

16.1.2.1 Internal Reviews

Prior to the release of any data from the laboratory, the data will be verified and approved by laboratory personnel. This review will consist of a tiered review by the person performing the work, a qualified peer, and by supervisory personnel. Each laboratory used in the program has a procedure in place for documenting all levels of data review. Prior to being released as final, laboratory data will proceed through a tiered review process. Data verification starts with the analyst or technician who performs a 100 percent review of the data to ensure the work was done correctly the first time. It is the responsibility of the analyst or technician to ensure that the verification of data in his or her area is complete. The data reduction and initial verification process must ensure that:

- Sample preparation and analysis information is correct and complete,
- Results are correct and complete,
- The appropriate methods have been followed and are identified in the project records,
- Proper documentation procedures have been followed,
- All nonconformances have been documented,
- Project-specific requirements have been met.

Following the completion of the initial verification by the analyst or technician, a systematic check of the data will be performed by an experienced peer, Laboratory Section Leader, or designee. This check will be performed to ensure that initial review has been completed correctly and thoroughly. Included in this review will be an assessment of the acceptability of the data with respect to:

- Adherence of the procedure used to the referenced methods and specific instructions,
- Correct interpretation of data (e.g., mass spectra, chromatographic interferences, etc.),
- Correctness of numerical input when computer programs are used (checked randomly) and numerical correctness of calculations and formulas (checked

randomly),

- Acceptability of QC data,
- Documentation that instruments were operating according to method specifications (calibrations, performance checks, etc.),
- Documentation of dilution factors, standard concentrations, etc.,
- Sample holding time assessment and
- Nonconforming events have been addressed by corrective action as defined on a nonconformance memo.

A third-level review will be performed by the Laboratory Project Manager before results are submitted to the client. This review serves to verify the completeness of the data report and to ensure that project requirements are met for the analyses performed. The items to be reviewed will include:

- Results are present for every sample in the analytical batch or reporting group,
- Every parameter or target compound requested is reported,
- The correct units and correct number of significant figures are utilized,
- All nonconformances, including holding time violations, and data evaluation statements that impact the data quality are accompanied by clearly expressed comments from the laboratory,
- The final report is legible, contains all the supporting documentation required by the project, and is in either the standard format or in the client-required format.

A narrative to accompany the final report will be finalized by the Laboratory Project Manager. This narrative will include relevant comments, including data anomalies and non-conformances.

16.1.2.2 Independent Review

An independent review of fixed laboratory data will be performed by Airtek in order to determine the quality of the analytical data. Data will be validated according to *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA-540/R-99-008), October 1999, *USEPA Contract Laboratory Program National Functional*

Guidelines for Inorganic Data Review (EPA 540-R-04-004), October 2004. As appropriate, data will also be validated and qualified according to the following guidelines:

- *Evaluation of Metals Data for the CLP Program*, January 1992, SOP HW-2, Revision 11
- *TCPLP Data Validation*, March 1993, SOP HW-7, Revision 3
- *Validating Chlorinated Herbicides by Gas Chromatography*, November 1994, SOP HW-17, Revision 1.3
- *Validating Semivolatile Organic Compounds by SW-846 Method 8270*, June 2001, SOP HW-22, Revision 2
- *Validating Pesticide/PCB Compounds by SW-846 Method 8080A*, May 1995, SOP HW-23, Revision 0
- *Validating PCB Compounds by SW-846 Method 8082*, May 2002, SOP HW-23B, Revision 1.0
- *Validating Volatile Organic Compounds by SW-846 Method 8260B*, June 1999, SOP HW-24, Revision 1”

All data from the first waste characterization sampling event will be subjected to a limited validation, which includes, at a minimum, a completeness check, an evaluation of chain-of-custody and sample login documents, an overall evaluation of data and potential usability issues, technical holding times, and QC sample results (duplicates, LCS, etc.). Following this, a limited validation will be performed on a subset of the data. For the first two months of the program, the validation will be performed on a weekly basis on any waste characterization sampling conducted, followed by a monthly basis thereafter. Completeness checks will be administered on all data to determine whether deliverables specified in the QAPP are present. The reviewer will determine whether all required items are present and will request copies of missing deliverables. Field notes will be reviewed in conjunction with the laboratory data to allow for an overall assessment. Upon completion of the validation, a report will be prepared summarizing the elements reviewed. Validated data will be used to generate tables. Potential validation qualifiers are as follows:

- U – Not detected at the specified quantitation/detection limit
- UJ – Estimated nondetect
- J – Estimated value
- R – Unusable data point
- N – Presumptively present

16.2 Data Usability

The purpose of this section is to indicate the methods by which it will be ensured that the validated laboratory data collected for this investigation are consistent with the project quality objectives established for the project, to ensure the quality of data was sufficient for its intended use, and to identify trends, relationships, and anomalies in the data. Conclusions based on the data, limitations on the use of the data, and the determination if data gaps exist will be included in the Data Validation memoranda. This will be performed on a per sample batch basis.

16.2.1 Precision

The RPD between the LCS and LCS duplicate or sample and sample duplicate, is calculated to compare to precision objectives. LCS/LCS duplicates and laboratory duplicates will be used to assess analytical precision and the field duplicates will be used to assess project precision. The RPD will be calculated according to the following formula:

$$RPD = \frac{(Amount\ in\ Sample\ 1 - Amount\ in\ Sample\ 2)}{0.5(Amount\ in\ Sample\ 1 + Amount\ in\ Sample\ 2)} \times 100$$

The impact of analytical imprecision, project imprecision, and overall imprecision (when both analytical and project precision tests show problems) on data usability will be assessed. If the precision results yield data which are not usable, the Data Validation memoranda will identify how this problem will be resolved.

16.2.2 Accuracy

If field or laboratory contamination exists, the impact on the data will be evaluated during the data usability assessment. The direction of bias for contamination will be identified. Accuracy is assessed by determining percent recoveries (%Rs) for surrogate/internal standard compounds added to each field and QC sample to be analyzed for organic parameters. Accuracy for all analyses will be further assessed through determination of %Rs for LCSs, SRMs, and calibration results, etc. If the Data Validation memoranda indicate contamination and/or analytical biases, the impact on the data will be assessed. %R for LCSs, SRMs, and surrogate compound results will be determined according to the following equation:

$$\%R = \frac{\text{Experimental Concentration}}{\text{Known Amount Added}} \times 100$$

Overall contamination and accuracy/bias will be reviewed for each analytical parameter. The data usability assessment will include any limitations on the use of the data, if it is limited to a particular data set, parameter, or laboratory. If the accuracy results yield data which are not usable, the Data Validation memoranda will identify how this problem will be resolved.

16.2.3 Representativeness

If field duplicates indicate spatial variability, the data usability assessment will evaluate the impact on the data. Overall sample representativeness will be evaluated for each analytical parameter. The data usability assessment will include any limitations on the use of the data, if limited to a particular, data set, parameter, or laboratory. If the results of the evaluation of representativeness yield data which are not usable, the Data Validation memoranda will identify how this problem will be resolved.

16.2.4 Sensitivity and Quantitation Limits

Overall sensitivity will be reviewed for each analytical parameter. The impact on the lack of sensitivity or the reporting of higher quantitation limits by the laboratory will be assessed. The Data Usability Assessment will include any limitations on the use of the data, if limited to a particular data set, parameter, or laboratory. If the results of the evaluation of sensitivity yield data which are not usable, the Data Validation memoranda will identify how this problem will be resolved.

16.2.5 Completeness

Completeness is the ratio of the number of valid sample results to the total number of samples analyzed or processed. Following completion of the testing, the percent completeness will be calculated by the following equation:

$$\text{Completeness} = \frac{(\text{number of valid measurements})}{(\text{number of measurements planned})} \times 100$$

Overall completeness will be reviewed for each analytical parameter. The data usability assessment will include any limitations on the use of the data, if limited to a particular data set, parameter, or laboratory. If the results of the evaluation of completeness yield data that are not usable, the Data Validation memoranda will identify how this problem will be resolved.

16.2.6 Data Limitations and Actions

The field and laboratory data collected during this investigation will be used to achieve the objectives identified in Section 8.0 of this QAPP. The QC results associated with each analytical parameter will be compared to the objectives presented in this QAPP. Data generated in association with QC results meeting the stated acceptance criteria (i.e., data determined to be valid) will be considered usable for decision-making purposes. Limitations on the use of the data will be stated and explained, if necessary. In addition, the data obtained may be both qualitatively and quantitatively assessed on a project wide, location specific and parameter-specific basis. Results of the measurement error assessments may be applied against the site as a whole; any conclusions will be documented in data validation or QA reports. Data generated in association with QC results not meeting the stated acceptance criteria may still be considered usable for decision-making purposes, depending on certain factors. This assessment will be performed by the Airtek Project Manager, in conjunction with the Airtek Project QA Officer. In general, qualified data will still be usable for project objectives. Qualified data exhibiting concentrations close to the project Reference Levels will be evaluated further to determine if there is a potential bias caused by the QC nonconformance which may have caused a false exceedance or a false non-exceedance.

Factors to be considered in this assessment of field and laboratory data will include, but not necessarily be limited to, the following.

- Conformance to the field methodologies proposed in the QAPP,
- Conformance to the EPA methods provided in the QAPP,
- Adherence to proposed sampling strategy,
- Presence of elevated detection limits due to matrix interferences.
- Presence of analytes not expected to be present,
- Conformance to validation protocols included in the QAPP for both field and laboratory data,

- Unusable data sets (qualified as “R”) based on the data validation results,
- Data sets identified as usable for limited purposes (qualified as “J”) based on the data validation results,
- Effect of qualifiers applied as a result of data validation on the ability to achieve the project objectives,
- Status of all issues requiring corrective action, as presented in the QA reports to management,
- Effect of nonconformance (procedures or requirements) on project objectives,
- Adequacy of the data as a whole in meeting the project objectives,
- Identification of any remaining data gaps and need to reevaluate data needs,
- Examine collateral data collected at the site (e.g., results of other waste testing).

Every attempt will be made to eliminate any sources of sampling and analytical error as early as possible in the program. An ongoing data assessment program throughout the program will also assist in the early detection and correction of problems, thereby ensuring that project objectives are met. Reconciliation with the project objectives will have been considered to have been met if the measurement performance criteria from Section 8.0 are met. If the data usability indicates that the project quality objectives in Section 8.0 have not been met, then the project management team will meet to determine any additional work to be performed.

17.0 REPORTING, DOCUMENTS, AND RECORDS

QA summary reports will be submitted to the Airtek Project Manager to ensure that any problems identified during the sampling and analysis programs are investigated and the proper corrective measures taken in response. The QA reports may include:

- All results of field and laboratory audits,
- Problems noted during data validation and assessment, and
- Significant QA/QC problems, recommended corrective actions, and the outcome of corrective actions.

QA summary reports will be prepared and submitted on an as-needed basis.

ATTACHMENT A
Electronic Data Deliverable Requirements

**Lab EDD Specifications for Waste Characterization Data Reporting –
 Fiterman Hall: 30 West Broadway Deconstruction Project**

- 1) Unit is set as ug/l for leachate samples.
 Unit is set as ppm for PCBs.
 Unit is set as ug/l for waste water samples.

- 2) If an analyte is not detected, include the MDL in the concentration column with a flag '<' in the flag column and 'U' in the qualifier column. For detected analytes, the concentration is put in the Concentration column and there is no need to report the quantitation limit.

- 3) The result units are set differently but consistent with the parameters:

Full TCLP	ug/L
Total PCBs	ppm
RCRA Characteristics	Ignitable/pH/reactivity
NYC Sewer Discharge	ug/L

- 4) Each row in the EDD will contain information for a single analytical result from a single run of an analytical method, and should be in the format specified below.

Column # Name	Field Name	Description	Format	Required
1/A	Lab Name	The lab abbreviation that identifies the lab to provide the electronic results.	Text	Yes
2/B	Field Sample ID	The sample ID provided by Airtek on the chain-of-custody form.	Text	Yes*
3/C	Sample Location	The sample location that is	Text	Yes*

		provided by Airtek on the chain-of-custody.		
4/D	Date Collected	The date that the sample was collected in the field.	Date (mm/dd/yyyy)	Yes*
5/E	Volume Collected	The sample volume that was collected. Stored as text to preserve significant figures.	Text	Yes*
6/F	Volume Unit	A unit associated with the volume collected.	Text	Yes*
7/G	Lab Sample ID	The sample ID used by the lab.	Text	Yes
8/H	Date Received	The date that the sample was received by the lab.	Date (mm/dd/yyyy)	Yes*
9/I	Date Analyzed	The date that the sample was analyzed by the lab.	Date (mm/dd/yyyy)	Yes
10/J	Analytical Method	The lab method used to test for the presence of the parameter.	Text	Yes
11/K	Parameter Name	The full name of the parameter.	Text	Yes
12/L	Concentration	The result of the lab test.	Text	Yes
13/M	Unit	The unit associated with the concentration.	Text	Yes
14/N	Flag	A description of the result value. For non-detects; = for detects; for estimated; for unreliable.	Text	Yes
15/O	Qualifier	Lab data qualifiers. "U" for non-detects " , "B". "J" for detects. There may be more than one for a particular result.	Text	Yes
16/P	Date Respond	The date that the lab generates the EDD.	Date (mm/dd/yyyy)	Yes
17/Q	Note	Additional comments that the lab provides for each individual analytical result.	Text	Yes

- 5) Name each EDD file in the following format: parameter name followed by the sample collection date (e.g., PCBs8222005) or lab name followed by the sample collection date (e.g., YAL8222005).