Operations, Maintenance and Monitoring Plan Soil Operable Unit

Prepared for: Universal Instruments Corporation Kirkwood, New York

October 2005

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Transmitted Via Priority Mail

October 31, 2005

James A. Moras, Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau D, 12th Floor
625 Broadway
Albany, NY 12233-7013

Re: Operations, Maintenance and Monitoring Plan – Soil Operable Unit
Universal Instruments, Kirkwood, Broome County, New York
NYSDEC Site No. 7-04-026

Dear Mr. Moras:

On behalf of Universal Instrument Corporation, Blasland, Bouck & Lee, Inc. (BBL) has prepared this Operations, Maintenance and Monitoring (OM&M) Plan for the Soil Operable Unit at the Universal Instruments Corporation (UIC) site in Kirkwood, New York. The OM&M Plan is supplemental to the March 2004 Soil Remedial Action Report submitted to the New York State Department of Environmental Conservation (NYSDEC) and conditionally approved by NYSDEC in a letter dated March 31, 2004.

OPERATIONS, MAINTENANCE AND MONITORING PLAN

Introduction

The OM&M Plan described below provides the guidance for checking and maintaining engineering controls at the site. The OM&M Plan includes procedures for documenting inspection and maintenance activities and any future changes that may occur to the engineering controls. Engineering controls at the site consist of two primary types: Cover systems that cap areas of remaining PCE-affected soil and an Active-Slab Depressurization (ASD) system that addresses indoor air quality within the facility building.

The purpose and objective of the OM&M Plan is provide for proper procedures that will ensure the cap systems covering remaining areas of soil affected by concentrations of contaminants of concern (COCs) above NYSDEC standards and the ASD system continue to function as effective engineering controls.

A summary of OM&M activities, the required performance frequency, and schedule is presented in Table 1.

Site Description

The former Dover facility is located at 29 Industrial Park Drive, Kirkwood, Broome County, New York. The facility is located on a site approximately 9.58 acres in size. A site location map is shown on Figure 1 and Figure 2 is the site plan.

The property is situated in an industrial setting. Major plants in the area include Truckstops of America Landfill (0.5 mile southeast), Frito Lay Plant (0.5 mile south), Universal Instruments (147 Industrial Park Drive, 0.5 mile east), Kason Industries (eastern property boundary), Consolidated Freightways (northern property boundary), and the newly developed Pilot Truck Stop to the south. Industrial properties surround the property to the north, east, and west. The site presently serves as one of Universal's service facilities with the site's uses including product training, research and development, and Odd Form Assembly (OFA), which involves the engineering and assembly of non-standard/specialty circuit boards.

Soil remediation activities conducted at the site during June and July 2003 were performed to mitigate PCE-affected soils in the unsaturated zone beneath and adjacent to the facility building at the site. The remedial action work included:

- abandonment and replacement of the roof leader from the roof drain system that handles stormwater runoff from the front part of the roof for the original building section of the facility;
- removal of specified soil from seven separate excavations;
- offsite transportation and disposal of non-hazardous and possible hazardous soil excavated;
- extension of the stormwater outfall from the southwest catch basin (CB-1547);
- restoration of excavated areas using compacted certified clean fill; and
- installation of an ASD system.

Deed Notice Areas

A deed notice with environmental restrictions was filed with the Broome County Clerk's Office to provide an institutional control for inaccessible soils that remain below facility floor slabs. The NYSDEC-approved deed notice was forwarded by UIC to the site owner on April 26, 2004 for signature and subsequent filing with the Broome County Clerk. The deed notice was filed by the Broome County Redevelopment Authority on October 20, 2005 (Attachment A).

The deed notice stipulates that there shall be no construction, use or occupancy of the property that results in the disturbance of the cover systems or which will result in human exposure to the contaminated soils, unless prior written approval by the NYSDEC is obtained.

The deed notice is for the areas beneath the footprints of the 1978 and 1984 building additions, areas beneath parts of the original building (1973) and the 1982 addition, and for seven additional areas where

complete removal of soil to below the NYSDEC criterion for PCE was not achieved. The areas that have environmental restrictions on the deed notice are shown on Figure 3.

An annual certification will be included with the last semi-annual OM&M report of each year. The certification will state that the approved institutional and engineering controls are in place and functioning as intended.

Soil Cap Monitoring and Maintenance

There are eight areas of the site were PCE-affected soils are capped. The PCE-affected soils are capped by asphalt, concrete, or a minimum of 3 feet of clean soil. The capped areas and the type of cap are listed below.

1. 1978 and 1984 Building Addition Area – 6-inch thick concrete slab
2. Area 1 of Figure 3 – soil, mulch, and landscaping
3. Area 2 of Figure 3 – asphalt (driveway)
4. Area 3 of Figure 3 – soil with grass surface
5. Area 4 of Figure 3 – soil with grass surface (drainage ditch)
6. Area 5 of Figure 3 – soil with grass surface (drainage ditch)
7. Area 6 of Figure 3 – soil with grass surface (drainage ditch)
8. Area 7 of Figure 3 – asphalt (parking lot)

These capped areas will be inspected monthly by UIC to check that the cap is being maintained in good condition. With respect to asphalt and concrete caps, the area surface will be visually checked for subsidence/settlement, excessive wear and/or cracking, and for breaches (such as pot holes). Areas with soil cover will be checked for subsidence/settlement, missing vegetative cover and/or excessive erosion. Construction activities (authorized or unauthorized) that have or may interfere with cap integrity will be noted.

If capped surfaces are found to be in unsatisfactory condition during inspections, site management will be notified and cap patches and repairs will be made, as warranted, with suitable material(s).

Should site activities necessitate that a cap be breached and PCE-affected soil removed, the soils will be placed either in drums or be placed on plastic sheeting and be covered by plastic sheeting. Removed soils will be tested for waste classification and will be properly disposed of offsite.

A Soils Management Plan (SMP) is attached to this OM&M Plan as Appendix A. The SMP provides a detailed description of the guidelines to be used for the handling and disposal of soil material that may be generated during future activities that may disturb or breach any or all of the capped areas. The SMP contains four standard operating procedures (SOPs) for performing various field activity functions; soil sampling, decontamination water sampling, monitoring equipment calibration, and sampling equipment cleaning. The SMP has been reviewed and approved by NYSDEC.

A Quality Assurance/Sampling Analysis Project Plan (QA/SAPP) was prepared to supplement both the OM&M Plan and the SMP. The QA/SAPP presents sampling and analytical methods and procedures to be used during implementation of the OM&M plan. The QA/SAPP is attached as Appendix B.

ASD System Operations, Maintenance, and Monitoring

Construction of the ASD system occurred during June 2003. The ASD system was installed within the 1978 and 1984 additions to see if it could be helpful in reducing indoor air concentrations of PCE within the building. The ASD system installation was performed as a field fabrication. The ASD system fabrication used typical design criteria, specifications, and technology common to the radon control industry (see ASTM International Standard Practice E 212-01, March 2001). ASD system construction details are shown on Figures 4 and 5.

Four extraction points, ASD-1 through ASD-4, were installed at the approximate locations shown on Figure 4. Suction pits for each extraction point were prepared by coring a 4.25-inch- diameter hole through the slab and then clearing gravel and soil from beneath the slab to create a hemispherical pit. The suction pits are approximately 12 inches in diameter and have a nominal volume of at least one cubic foot. The extraction point riser pipe was constructed of Schedule 40 PVC with a 4-inch-diameter. The slab penetration for the depressurization points were cleaned, prepared, and sealed in an air-tight manner with a compatible sealant that will not shrink or crack (see Figure 5 for details).

One ventilation fan was installed and is used to operate the ASD system. This fan operates the four sub-slab depressurization points through a manifold setup. The fan is an exterior mount (Radonwaway brand HS series HS5000 fan). The fan is Underwriter's Laboratory (UL)-approved for outdoor use (UL standard 507) and meets all electrical code requirements.

The performance range of this fan is: electrical usage 180-320 watts, 50 inches of water maximum pressure, 53 standard cubic feet per minute (scfm) at 0.1 inch of water to 24 scfm at 35 inches of water. Fan installation followed the manufacturer's instructions. The fan manufacturer's installation booklet for the HS series is found in Attachment B.

All ASD system electrical components are UL listed or of equivalent specifications. All plastic vent pipes and fittings are made of Schedule 40 PVC.

<u>Operations</u>

The ASD system is essentially self-operating and does not require adjustments. The ASD system essentially operates as either on or off. The ASD system includes mechanisms to monitor system performance and warn of system failure (shut off). The electrical monitor is installed on non-switched circuits and is designed to reset automatically after a power supply interruption.

Manometer-type pressure gauges are clearly marked to indicate the pressure readings that existed prior to system start. The circuit breakers controlling the circuits on which the vent fan and electrical system monitor operate are "ASD System."

Maintenance

The ASD system has only one mechanical part, the suction fan. The fan does not require maintenance and has an expected operational life of 7 to 8 years. Other systems components, such as piping, gauges, and wiring could be inadvertently damaged or broken by other site activities. During inspections these features will be checked for damage. Broken or damaged parts of the system will be repaired or replaced.

Monitoring

The ASD system will be checked daily by UIC to verify that it is operating. Vacuum readings on the system shall be recorded weekly.

Indoor air quality samples shall be collected within the facility building semi-annually (March/April and September) at five locations with one background sampling location outside the building. All sampling locations for indoor air quality monitoring are shown on Figure 6.

Indoor air quality is monitored through the collection of 8-hour time-weighted averaged (TWA) samples. The indoor air samples are collected in summa canisters following procedures provided by the analytical laboratory. The indoor air samples shall be analyzed by an NYSDEC and NYSDOH approved analytical laboratory using USEPA method TO-15.

Modification

The ASD system is a basic design based on radon mitigation type technology. Essentially the system consists of extraction points (suction pits) within the floor slab, plastic piping, and a fan. This system can be easily modified should future conditions warrant such changes. Additional extraction points can be added and plumbed to the existing system. Should additional points be added, an additional fan will be needed and the present system can be split into two separate operating systems.

Additionally, the present system can be operated in different configurations. The normal operating mode is for all four extraction point to be open. The existing system is flexible in that all points can be open or closed in any combination. This can allow for focused ASD if future testing would indicate a specific area of greater concern beneath the floor slab.

OM&M Reporting

Semi-annual reports will be submitted by UIC to NYSDEC that describe OM&M activities that were performed during the reporting period with respect to site engineering controls. The report will state that engineering controls inspections are being performed according to schedule and that the engineering controls are being maintained. The report will provide ASD system operational data and the results of indoor air quality monitoring. The report will describe any modifications that are made to the ASD system.

Self-inspection logs and ASD system operational logs will be provided to NYSDEC as attachments to the report. An example self-inspection log for the engineering controls at the site is provided in Attachment C. An example of the ASD system operational log is provided in Attachment D.

The report will state whether land use in the restricted property areas was consistent with use restrictions during the reporting period. Any changes to land use will be described and reported. Any excavations or disturbances (approved or unapproved) to the cover systems will be described and reported. The nature and extent, duration, and dates of occurrence for excavations or disturbances of the cover systems will be reported. The amounts of soil, if any, generated during excavations into or disturbances of the cover system will documented along with management of the soil onsite and final disposition off site.

OM&M reports will be submitted to NYSDEC at the end of June and the end of December of each year. The December report will contain a certification, signed by the site owner or operator that states the institutional and engineering controls are in place and functioning as intended.

Please call if you have further comments or questions.

Sincerely,

BLASLAND, BOUCK & LEE, INC.

Gregory Albright, R.G., C.HG.
Senior Geologist/Project Manager

GRA/jmp
Enclosure

cc: Ivonne M. Cabrera (Dover Corporation)
Patrick J. Gillard (Universal Instruments Corporation)
Mark A. Gialanella (Universal Instruments Corporation)
D. Robert Gan (Arcadis)
Philip Gitlin (Whiteman Osterman & Hanna)

Tables

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TABLE 1
OM&M ACTIVITIES, FREQUENCY, AND SCHEDULE

OPERATIONS, MAINTENANCE & MONITORING PLAN
UNIVERSAL INSTRUMENTS CORPORATION – FORMER DOVER ELECTRONICS SITE
KIRKWOOD, NEW YORK

OM&M Activity	Frequency	1Q[1]	2Q	3Q	4Q
CAP Monitoring	Monthly	3	3	3	3
ASD System Monitoring					
System Check	Daily	65	65	65	65
System Readings	Monthly	3	3	3	3
Indoor Air Sampling	Semi-Annual	1 (March)		1 (September)	
OM&M Reporting	Semi-Annual		1 (May)		1 (December)
OM&M Certification	Annual				1 (December)

Notes:

1. 1Q = First Quarter, numbers shown below in each column represent the number of activity events for that quarter. Months in parentheses indicate month activity is to be completed.

TABLE 1 (continued)

DOVER CORPORATION/UNIVERSAL INSTRUMENTS
KIRKWOOD, NEW YORK

POST EXCAVATION SOIL ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
Former Dover Electronics Site
Kirkwood, New York

Blasland, Bouck & Lee, Inc.	Sample I.D.	PX-C-1	PX-C-2	PX-C-3	PX-C-4	PX-C-5	PX-C-6	PX-C-7	PX-C-8	PX-C-9	PX-C-10
	Laboratory I.D.	650559	650560	650561	650562	650563	650564	650565	650566	650567	650568.00
	Date Collected	6/19/2003	6/19/2003	6/19/2003	6/19/2003	6/19/2003	6/19/2003	6/19/2003	6/19/2003	6/19/2003	6/19/2003
Volatile Organic Compounds	Regulatory Limit (ug/kg)										
1,1,1-Trichloroethane	760	<480	<620	<600	<480	<430	<480	<560	<440	<490	<460
1,1-Dichloroethane	200	<480	<620	<600	<480	<430	<480	<560	<440	<490	<460
1,1-Dichloroethene	400	<480	<620	<600	<480	<430	<480	<560	<440	<490	<460
trans-1,2-Dichloroethene	100	<480	<620	<600	<480	<430	<480	<560	<440	<490	<460
cis-1,2-Dichloroethene	300	<480	<620	<600	<480	<430	<480	<560	<440	<490	<460
Tetrachloroethene	1,400	270 J	620	130 J	380 J	240 J	1,300	**4,700**	**1,900**	890	930
Trichloroethene	700	<480	<620	<600	<480	<430	<480	<560	<440	<490	<460
Vinyl Chloride	120	<480	<620	<600	<480	<430	<480	<560	<440	<490	<460

Blasland, Bouck & Lee, Inc.	Sample I.D.	PX-C-11	PX-C-12	PX-C-13	PX-C-14	PX-C-15	PX-D-1	PX-D-2	PX-D-3	PX-D-4	PX-D-5
	Laboratory I.D.	652398	652399	652400	652401	650563	651153	651154	651155	651156	651157
	Date Collected	6/26/2003	6/26/2003	6/26/2003	6/26/2003	6/26/2003	6/23/2003	6/23/2003	6/23/2003	6/23/2003	6/23/2003
Volatile Organic Compounds	Regulatory Limit (ug/kg)										
1,1,1-Trichloroethane	760	390 J	380 J	350 J	<460	<430	<530	<610	<430	<420	<480
1,1-Dichloroethane	200	<490	<530	<400	<460	<430	<530	<610	<430	<420	<480
1,1-Dichloroethene	400	<490	<530	<400	<460	<430	<530	<610	<430	<420	<480
trans-1,2-Dichloroethene	100	<490	<530	<400	<460	<430	<530	<610	<430	<420	<480
cis-1,2-Dichloroethene	300	<490	<530	<400	<460	<430	<530	<610	<430	<420	<480
Tetrachloroethene	1,400	**1,600**	850	510	1,100	<430	<530	**4,600**	**17,000**	**2,800**	**1,300**
Trichloroethene	700	<490	<530	<400	<460	<430	<530	<610	<430	<420	<480
Vinyl Chloride	120	<490	<530	<400	<460	<430	<530	<610	<430	<420	<480

Blasland, Bouck & Lee, Inc.	Sample I.D.	PX-D-6	PX-D-7	PX-D-8	PX-D-9	PX-D-10	PX-D-11	PX-D-12	PX-D-13	PX-D-14	
	Laboratory I.D.	651158	651159	651160	652403	652504	652405	652406	652407	652408	
	Date Collected	6/23/2003	6/23/2003	6/23/2003	6/26/2003	6/26/2003	6/26/2003	6/26/2003	6/26/2003	6/26/2003	
Volatile Organic Compounds	Regulatory Limit (ug/kg)										
1,1,1-Trichloroethane	760	<490	<420	<430	<420	<390	<400	<400	<450	<410	
1,1-Dichloroethane	200	<490	<420	<430	<420	<390	<400	<400	<450	<410	
1,1-Dichloroethene	400	<490	<420	<430	<420	<390	<400	<400	<450	<410	
trans-1,2-Dichloroethene	100	<490	<420	<430	<420	<390	<400	<400	<450	<410	
cis-1,2-Dichloroethene	300	<490	<420	<430	<420	<390	<400	<400	<450	<410	
Tetrachloroethene	1,400	**3,500**	**5,300**	980	<420	<390	<400	1,100	630	**86,000**	
Trichloroethene	700	<490	<420	<430	<420	<390	<400	<400	<450	<410	
Vinyl Chloride	120	<490	<420	<430	<420	<390	<400	<400	<450	<410	

NOTES:
J - Estimated result less than reporting limit
denotes second round of post excavation sampling

UNIVERSAL INSTRUMENTS CORPORATION
KIRKWOOD, NEW YORK

TABLE 2

HISTORICAL INDOOR AIR VOC SAMPLE RESULTS
FORMER DOVER ELECTRONICS SITE

	PCE µg/m3	TCE µg/m3	Cis-1,2-DCE µg/m3	Vinyl Chloride µg/m3	
OFFICE #1					
Nov-98	61	-	-	-	
Dec-98	35	-	-	-	
Mar-99	58	-	-	-	
Feb-02	36	-	-	-	
Apr-02	68	-	-	-	
May-02	27	-	-	-	
Sep-02	60	1.3	-	-	
Aug-03	20	-	-	-	
Sep-03	52	-	-	-	
Jan-04	110	1.3	-	-	
Apr-04	79	-	-	-	
Sep-04	66	-	-	-	
Mar-05	51	-	-	-	
OFFICE #2					
Aug-03	28	-	-	-	
Sep-03	24	-	-	-	
Jan-04	87	-	-	-	
Apr-04	44	-	-	-	
Sep-04	41	-	-	-	
Mar-05	39	-	-	-	
CAFETERIA					
Aug-03	17	-	-	-	
Sep-03	23	-	-	-	
Jan-04	110	1.7	3.5	-	
Apr-04	43	-	1.5	-	
Sep-04	27	-	-	-	
Mar-05	40	-	-	-	
ELECTRICAL AREA					
Nov-98	1,017	-	17.8	-	
Dec-98	678	-	9.5	-	
Mar-99	387	-	6.3	-	
Feb-02	186	4.4	6.1	-	
Apr-02	406	8.2	14.1	1.6	
May-02	165	1.9	4.8	-	
Sep-02	124	2.6	3.7	-	
Aug-03	64	-	-	-	
Sep-03	62	-	-	-	
Jan-04	75	-	-	-	
Apr-04	88	2.7	2.1	-	
Sep-04	70	-	-	-	
Mar-05	60	-	-	-	

Table 2 continued

A/C AREA					
Nov-98	482	6.5	15.9	-	
Dec-98	244	3.6	7.5	-	
Mar-99	183	-	5.6	-	
Feb-02	165	4.9	8.1	-	
Apr-02	248	4.9	10.5	-	
May-02	138	2.1	5.2	-	
Sep-02	110	2.6	3.6	-	
Aug-03	94	-	1.4	-	
Sep-03	88	-	-	-	
Jan-04	85	1.7	3.6	-	
Apr-04	100	1.4	2.1	-	
Sep-04	62	-	-	-	
Mar-05	85	-	1.4	-	
BACKGROUND					
Nov-98	-	-	-	-	
Dec-98	-	-	-	-	
Mar-99	-	-	-	-	
Feb-02	-	-	-	-	
Apr-02	13	4	-	-	
May-02	-	-	-	-	
Sep-02	-	-	-	-	
Aug-03	-	-	-	-	
Sep-03	2.2	-	-	-	
Jan-04	-	-	-	-	
Apr-04	1.8	-	-	-	
Sep-04	-	-	-	-	
Mar-05	-	-	-	-	

Figures

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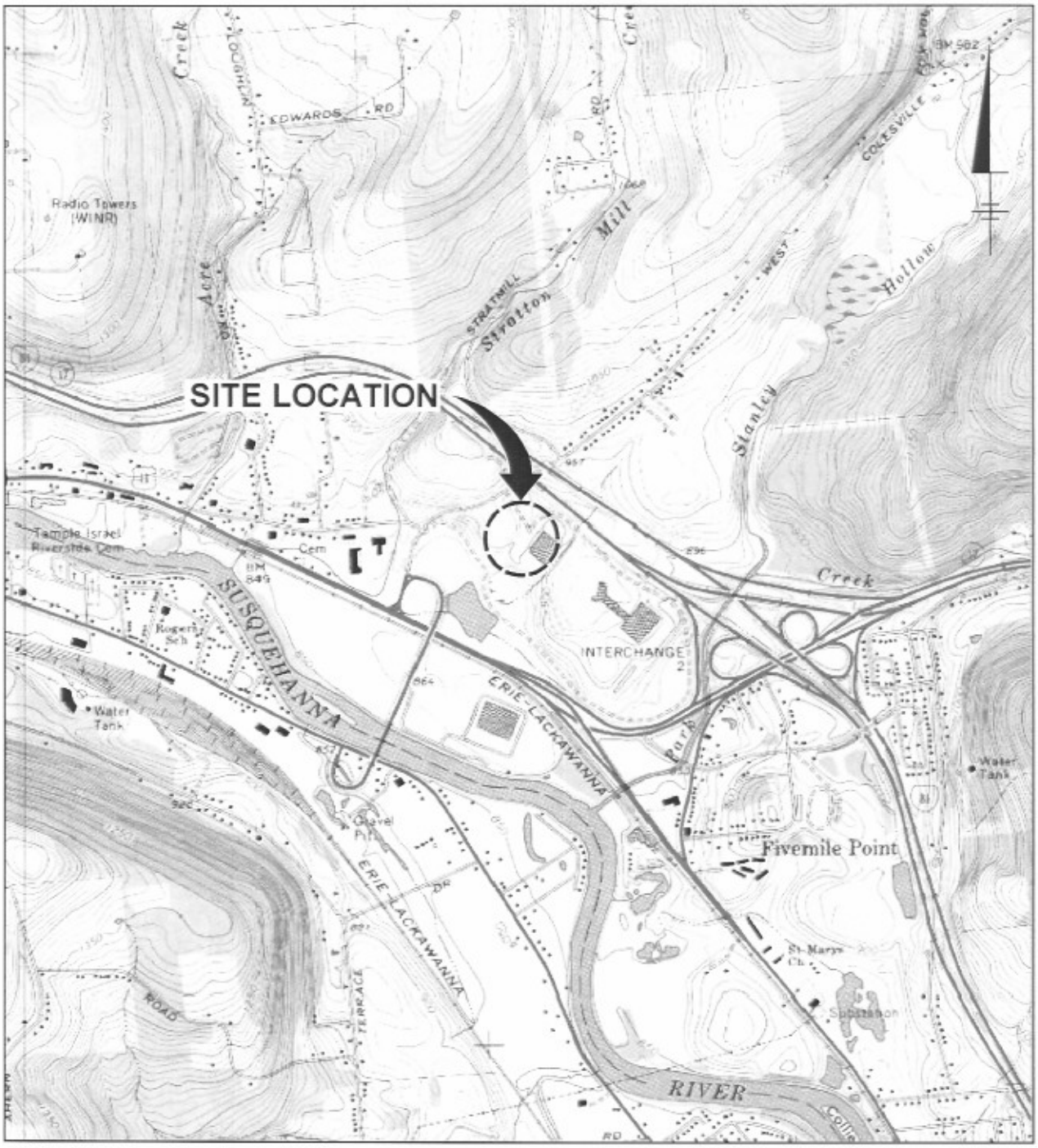

REFERENCE: Base Map Source USGS 7.5 Minute Quad. Series Binghamton East, New York, 1968, Photorevised 1976.

2000' 0 2000'

Approximate Scale: 1" = 2000'

AREA LOCATION

07/18/01 CRA-54-IY
05203003/05203n01.cdr

UNIVERSAL INSTRUMENTS CORPORATION
KIRKWOOD, NEW YORK

LOCATION MAP

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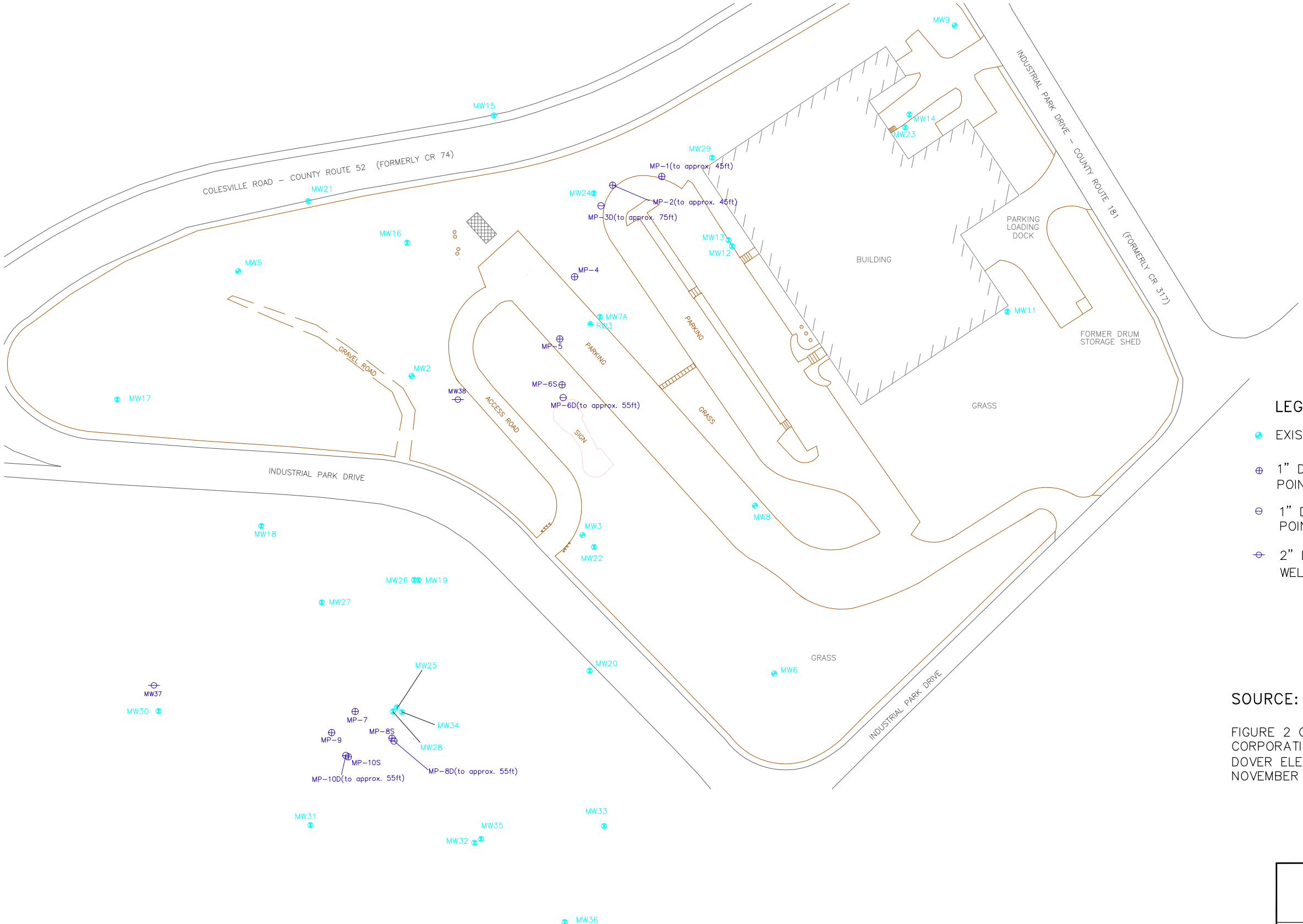
FIGURE
1



LEGEND

- EXISTING MONITORING WELL
- ⊕ 1" DIAMETER, SHALLOW MONITORING POINT TO 25ft UNLESS OTHERWISE INDICATED
- ⊖ 1" DIAMETER, DEEP MONITORING POINT TO INDICATED DEPTH
- ⊖ 2" DIAMETER, DEEP MONITORING WELL TO INDICATED DEPTH

SOURCE:

FIGURE 2 OF LETTER REPORT "UNIVERSAL INSTRUMENTS CORPORATION, KIRKWOOD, BROOME COUNTY, NEW YORK: DOVER ELECTRONICS SITE", GANNETT FLEMING, INC., NOVEMBER 9, 2000.

0 60' 120'
GRAPHIC SCALE

X:
L: OFF=REF
P: PAGESET/PLT-DL
06/22/04 CRA-85-IY, TLF
05203011/05203B01.DWG

UNIVERSAL INSTRUMENTS CORPORATION
KIRKWOOD, NEW YORK

OPERATIONS, MAINTENANCE AND MONITORING PLAN

SITE MAP

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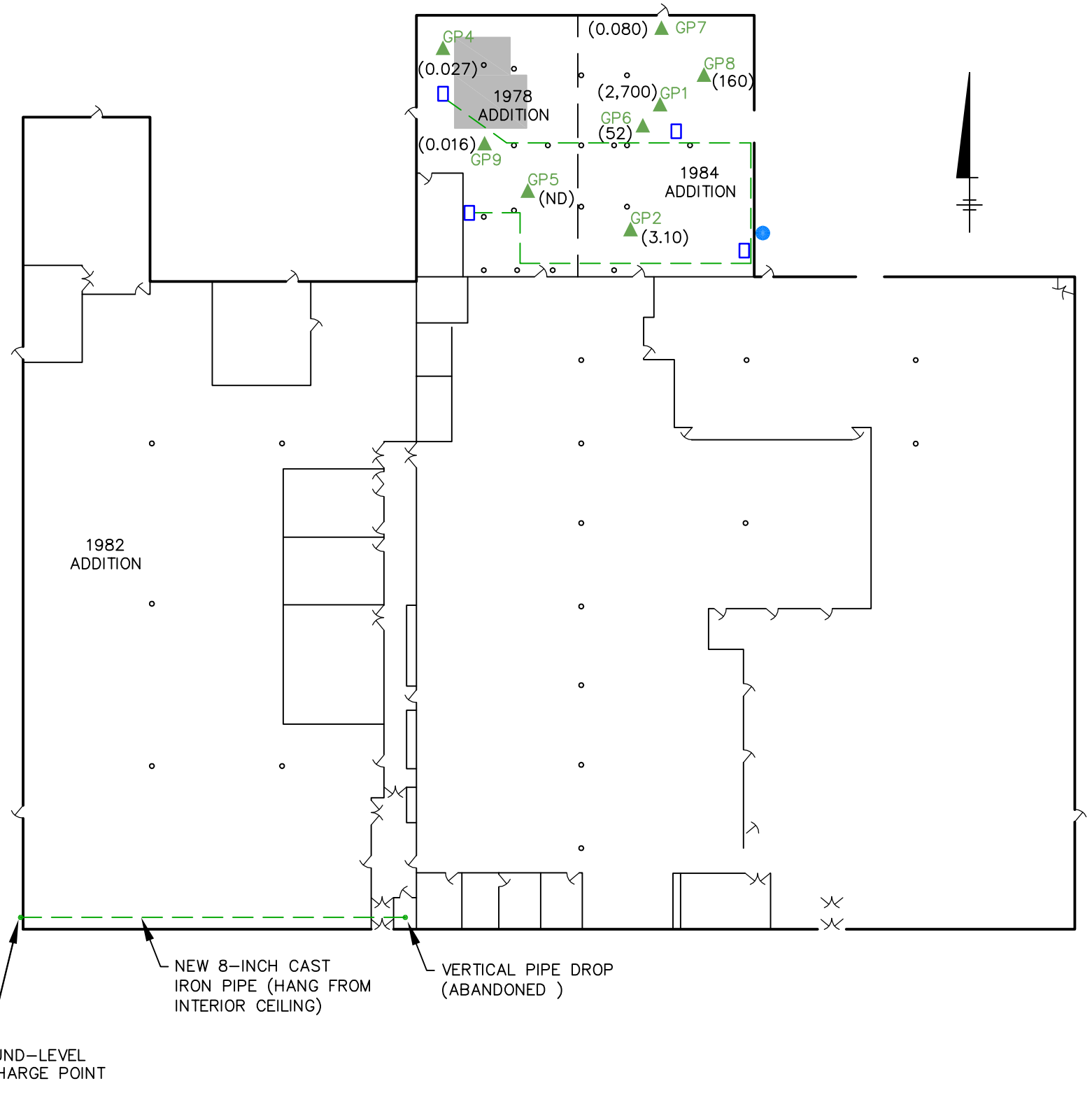
FIGURE
2



LEGEND:

- ACTIVE SUB-SLAB DEPRESSURIZATION POINT LOCATION
- PIPING RUN
- VERTICAL BUILDING POST
- EXTERIOR FAN AND EXHAUST LOCATION
- SOIL SAMPLE LOCATIONS
- (2,700) PCE CONCENTRATIONS IN MILLIGRAMS PER KILOGRAM (mg/kg)
- INACCESSIBLE AREA

SOURCE:

BUILDING LAYOUT DIGITIZED FROM PHOTOCOPY OF DRAWING FAXED FROM UNIVERSAL INSTRUMENTS CORPORATION FACILITIES DEPARTMENT. NO FILE NAME OR SCALE PROVIDED.

UNIVERSAL INSTRUMENTS CORPORATION
KIRKWOOD, NEW YORK

OPERATIONS, MAINTENANCE AND MONITORING PLAN

ASD EXTRACTION POINT LOCATIONS

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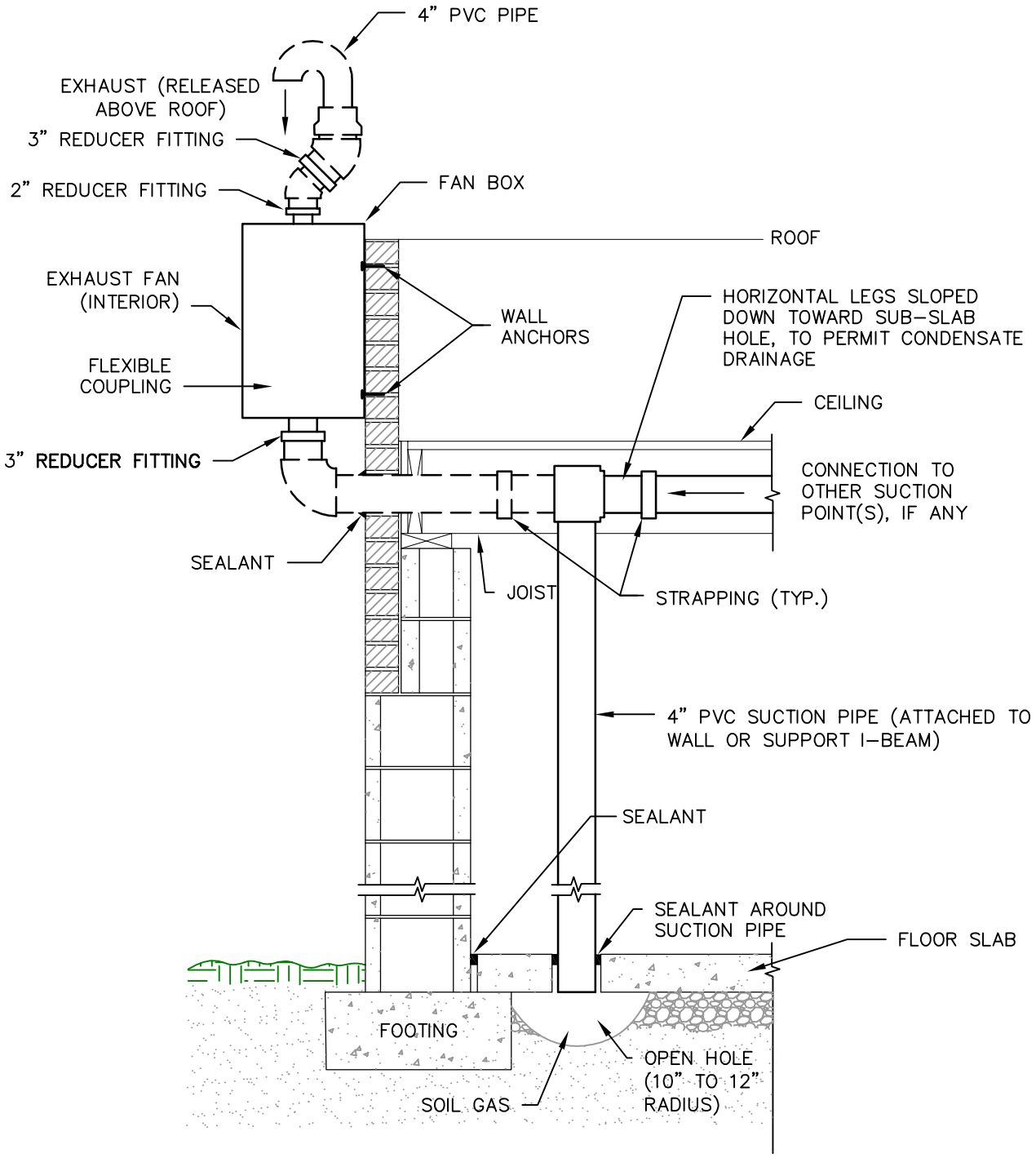
FIGURE **4**

X:
L: OFF-REF*
P: PAGESET/PLT-BL
06/22/04 CRA-85-TLF
05203011/05203G02.DWG



UNIVERSAL INSTRUMENTS CORPORATION
KIRKWOOD, NEW YORK
OPERATIONS, MAINTENANCE AND MONITORING PLAN

ASD SYSTEM DETAILS

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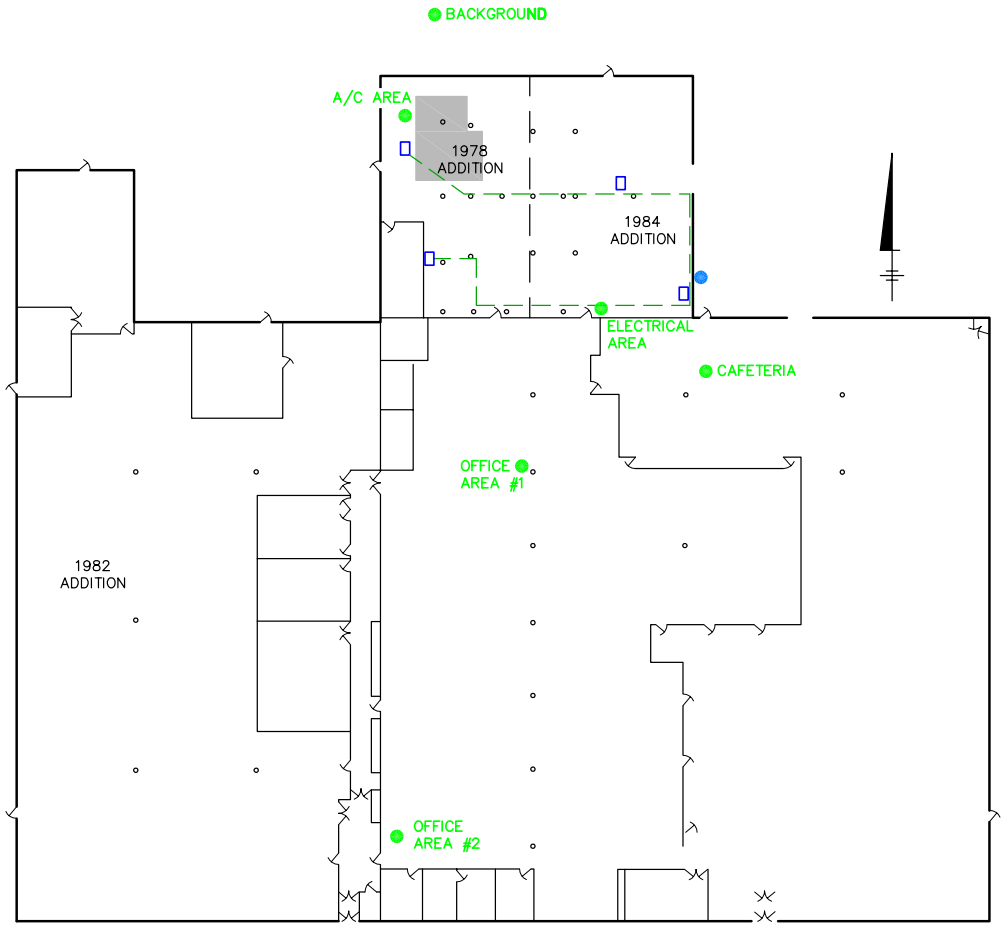
FIGURE 5

X:
L: OFF=REF*
P: PAGESET/PLT-AP
06/22/04 CRA-85-TLF
05203011/05203M01.DWG



LEGEND:

- ACTIVE SUB-SLAB DEPRESSURIZATION POINT LOCATION
- PIPING RUN
- VERTICAL BUILDING POST
- EXTERIOR FAN AND EXHAUST LOCATION
- INACCESSIBLE AREA
- INDOOR AIR SAMPLING LOCATION

SOURCE:

BUILDING LAYOUT DIGITIZED FROM PHOTOCOPY OF DRAWING FAXED FROM UNIVERSAL INSTRUMENTS CORPORATION FACILITIES DEPARTMENT. NO FILE NAME OR SCALE PROVIDED.

UNIVERSAL INSTRUMENTS CORPORATION
KIRKWOOD, NEW YORK
OPERATIONS, MAINTENANCE AND MONITORING PLAN

INDOOR AIR SAMPLING LOCATIONS

BBL BARLAND, BOUCK & LEE, INC.
engineers, scientists, consultants

FIGURE
6

X:
L: OFF-REF*
P: PAGESET/PLT-BL
06/22/04 CRA-85-TLF
05203011/05203G03.DWG

Attachments

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Attachment A

Deed Notice

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

DECLARATION of COVENANTS and RESTRICTIONS

THIS COVENANT, made the 12 day of August, 2005, by the BROOME COUNTY INDUSTRIAL DEVELOPMENT AGENCY, a public benefit corporation organized and existing under the laws of the State of New York, and having its principal place of business at the Edwin L. Crawford County Office Building, 44 Hawley Street, Binghamton, New York 13902.

WHEREAS, the BROOME COUNTY INDUSTRIAL DEVELOPMENT AGENCY is the owner of the Universal Instruments/ Dover Electronics inactive hazardous waste disposal site which is listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York State as Site Number 704026, located at 29 Industrial Park Drive, Kirkwood, Broome County, New York, which is part of lands conveyed to the Broome County Industrial Development Agency by deed dated January 22, 1997 and recorded in the Broome County Clerk's Office on January 23, 1997 in Book 1876 of Deeds at Page 145 and being more particularly described in Appendix "A" (as shown on Figure A-1) attached to this declaration and made a part hereof, and hereinafter referred to as "the Property"; and

WHEREAS, the Property is the subject of a consent order issued by the New York State Department of Environmental Conservation to Universal Instruments Corporation, dated January 19, 2001; and

WHEREAS, the New York State Department of Environmental Conservation set forth a remedy to eliminate or mitigate all significant threats to the environment presented by hazardous waste disposal at the Site in a Record of Decision ("ROD") dated March 30, 2000, and such ROD or the Work Plan for the implementation of the ROD required that the Property be subject to restrictive covenants.

NOW, THEREFORE, BROOME COUNTY INDUSTRIAL DEVELOPMENT AGENCY, for itself and its successors and/or assigns, covenants

First, the Property subject to this Declaration of Covenants and Restrictions is described in Appendix "A" (as shown on Figure A-1) attached to this Declaration and made a part hereof.

Second, unless prior written approval by the New York State Department of Environmental Conservation or, if the Department shall no longer exist, any New York State agency or agencies subsequently created to protect the environment of the State and the health of the State's citizens, hereinafter referred to as "the Relevant Agency," is first obtained, no person shall engage in any activity that will, or that reasonably is anticipated to, prevent or interfere significantly with any proposed, ongoing or completed program at the Property or that will, or is reasonably foreseeable to, expose the public health or the environment to a significantly increased threat of harm or damage.

Third, the portion of the Property consisting of the area of the 1978, 1982, and 1984 building additions at the Property, part of the area of the original building (1973), an exterior area outside the front employees entrance (#1 on Figure B-1), an exterior area adjacent to catch basin

CB-2044 (#2 on Figure B-1), an area east of the east-side transformer pad (#3 on Figure B-1), an exterior area of the southeast parking area (#7 on Figure B-1), and three exterior areas along the eastern property boundary adjacent to County Route 181 [Industrial Park Drive] (#4, #5, and #6 on Figure B-1); hereinafter referred to as the "Restricted Building Property", is shown on the map attached hereto and made a part hereof in Appendix "B" (Figure B-1).

Fourth, the owner or operator of the Restricted Building Property shall either maintain the building covering the Restricted Building Property or, after obtaining written approval of the Relevant Agency, excavate and remove the inaccessible soils under the Restricted Building Property which are contaminated with hazardous wastes or constituents thereof in accordance with regulatory standards and criteria.

Fifth, the owner of the Restricted Building Property shall prohibit the Restricted Building Property from ever being used for purposes other than for industrial or commercial use excluding use for daycare, child care and medical care without the express written waiver of such prohibition by the Relevant Agency.

Sixth, the owner of the Property shall prohibit the use of the groundwater underlying the Property without treatment rendering it safe for drinking water or industrial purposes, as appropriate, unless the user first obtains permission to do so from the Relevant Agency.

Seventh, the owner of the Property shall continue in full force and effect any institutional and engineering controls the Department required Respondent to put into place and maintain unless the owner first obtains permission to discontinue such controls from the Relevant Agency.

Eighth, this Declaration is and shall be deemed a covenant that shall run with the land and shall be binding upon all future owners of the Property and shall provide that the owner, and its successors and assigns, consent to the enforcement by the Relevant Agency of this Declaration and hereby covenant not to contest the authority of the Department to seek enforcement.

Ninth, any deed of conveyance of the Property, or any portion thereof, shall recite, unless the Relevant Agency has consented to the termination of such covenants and restrictions, that said conveyance is subject to this Declaration of Covenants and Restrictions.

IN WITNESS WHEREOF, the undersigned has executed this instrument the day written below.

BROOME COUNTY INDUSTRIAL DEVELOPMENT AGENCY

By: _____
Name: Richard D'Attilio
Title: Executive Director

State of New York
SS:
County of Broome

On the 12th day of August, 2005, before me, the undersigned, appeared RICHARD D'ATTILIO personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity and that by his signature on the instrument the person on behalf of which the individual acted, executed the instrument.

Ruth L Manning (Fiato)
Notary Public

RUTH L. MANNING (Fiato)
Notary Public, State of New York
No. 01MA6044000
Qualified in Broome County
Commission Expires June 26, 20 06

This Indenture made January 22, 19 97

Between UNIVERSAL INSTRUMENTS CORP., a Delaware Corporation, having an office and place of business at 90 Bevier Street, Binghamton, New York 13901

party of the first part, and

BROOME COUNTY INDUSTRIAL DEVELOPMENT AGENCY, P.O. Box 995, Binghamton, New York 13902

party of the second part,

Witnesseth that the party of the first part, in consideration of ONE Dollars ($1.00) lawful money of the United States, and other good and valuable consideration paid by the party of the second part, does hereby grant and release unto the party of the second part, the heirs or successors and assigns of the party of the second part forever,

ALL THAT TRACT OR PARCEL OF LAND, situate in the Town of Kirkwood, County of Broome and State of New York, bounded and described as follows: Commencing at the intersection of the centerline of Barlow Road, extended southeasterly, with the former southeasterly boundary of Colesvile Road (County Road 52); thence along said former highway boundary, the following three courses: 1) N 30-46-37 E, a distance of 37 feet to a point; 2) N 49-46-49 E, a distance of l44.00 feet to a point; and 3) N 79-38-34 E, a distance of l92.84 feet to the Point of Beginning; thence along the southeasterly boundary of Colesville Road, the following seven (7) courses: 1) N 00-00-00 E, a distance of 9.73 feet to a point; 2) N 77-28-44 E, a distance of 137.07 feet to a point; 3) N 66-44-45 E, a distance of 87.32 feet to a point; 4) N 77-45-24 E, a distance of 225.63 feet to a point; 5) N 56-03-01 E, a distance of 257.84 feet to a concrete mon., 6) S 43-15-39 E, a distance of l.64 feet to a concrete mon., 7) N 55-57-51 E, a distance of 126.63 feet to a point; thence S 31-15-18 E, along the southwesterly boundary of Industrial Park Drive (County Road 181) a distance of 534.29 feet to a point; thence S 45-49-11 W, along the northwesterly boundary of Industrial Park Drive, a distance of 552.84 feet to a point; thence N 51-25-41 W, along the northeasterly boundary of Industrial Park Drive, a distance of 812.49 feet to the Point of Beginning.

Containing 9.5887 acres of land as surveyed by Warren D. Jennings, L.S., August 10, 1995 and shown on a map dated September 5, 1995 (file no. 4269).

The above mentioned parcel is subject to a 30 foot Town of Kirkwood permanent easement for sanitary, sewer and water main.

Being the same premises conveyed to the Grantor herein by Warranty Deed from Dovatron, Inc., dated November l5, l995 and recorded November 29, l995 in the Broome County Clerk's Office in Liber 1859 of Deeds at page 1446.

Appendix A (1 of 2)

Together with the appurtenances and all the estate and rights of the party of the first part in and to said premises,

To have and to hold the premises herein granted unto the party of the second part, the heirs or successors and assigns of the party of the second part forever.

And the party of the first part covenants as follows:

First, That the party of the second part shall quietly enjoy the said premises;

Second, That the party of the first part will forever Warrant the title to said premises.

Third, the party of the first part, in compliance with Section 13 of the Lien Law, covenants that the party of the first part will receive the consideration for this conveyance and will hold the right to receive such consideration as a trust fund to be applied first for the purpose of paying the cost of the improvement and will apply the same first to the payment of the cost of the improvement before using any part of the total of the same for any other purpose.

The word "party" shall be construed as if it read "parties" whenever the sense of this indenture so requires.

In Witness Whereof, the party of the first part has duly executed this deed the day and year first above written.

In Presence of

UNIVERSAL INSTRUMENTS CORP. L.S.

By: Patrick J. Gillard
Vice President, Finance L.S.

L.S.

L.S.

STATE OF NEW YORK, COUNTY OF ss.:

On 19 , before me personally came

to me known to be the individual described in, and who executed the foregoing instrument, and acknowledged that he executed the same.

STATE OF NEW YORK, COUNTY OF ss.:

On 19 , before me personally came

to me known to be the individual described in, and who executed the foregoing instrument, and acknowledged that he executed the same.

STATE OF NEW YORK, COUNTY OF BROOME ss.:

On January 22, 19 97 before me personally came PATRICK J. GILLARD to me known, who, being by me duly sworn, did depose and say that deponent resides at No.

deponent is V.P., Finance of Universal Instruments Corp. the corporation described in and which executed, the foregoing instrument; deponent knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation; deponent signed deponent's name thereto by like order.

Notary Public, State of New York
No. 02GC4722704
Qualified in Broome County
My Commission Expires Jan. 31, 1999

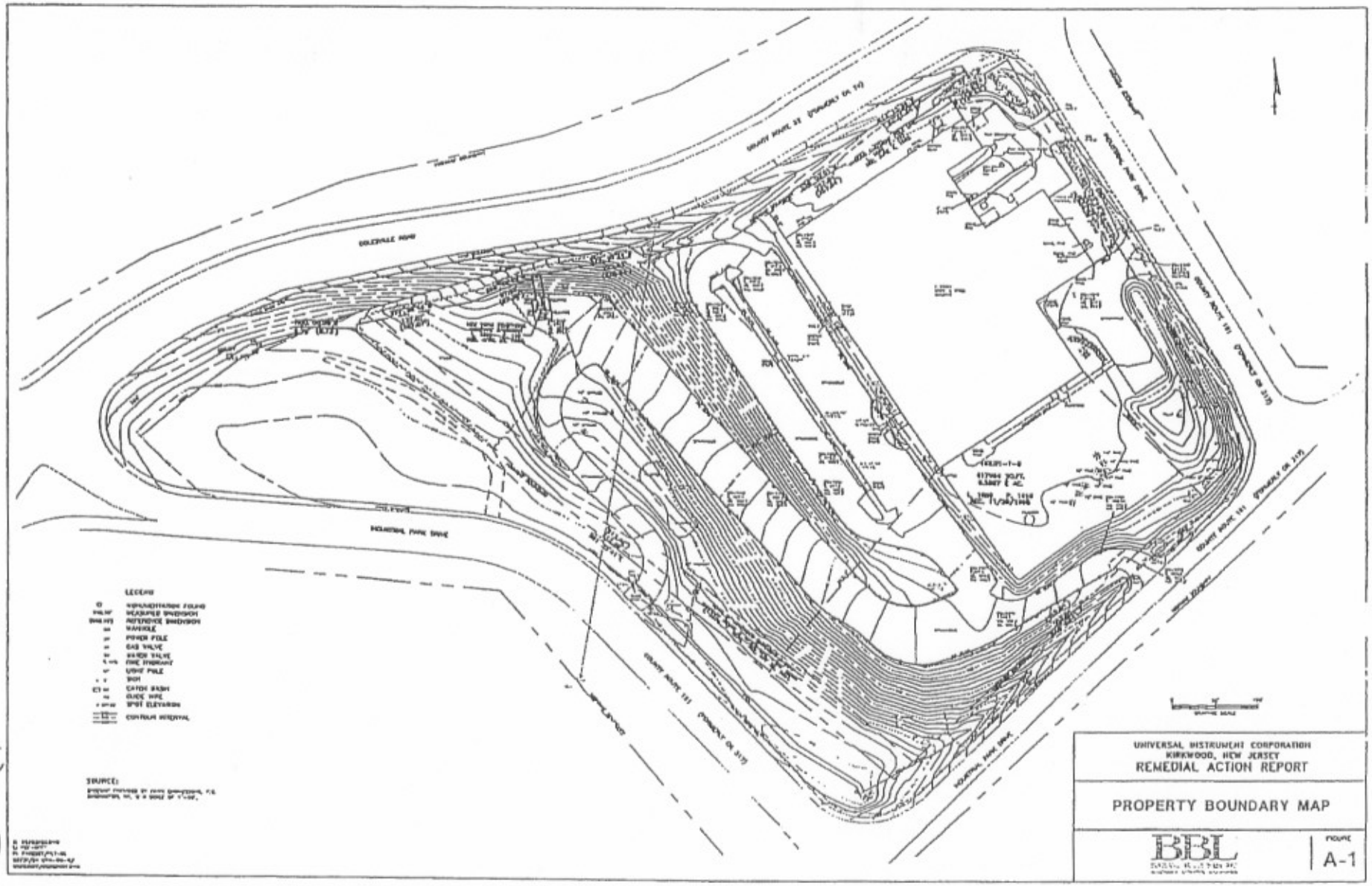
STATE OF NEW YORK, COUNTY OF ss.:

On 19. , before me personally came

the subscribing witness to the foregoing instrument, with whom I am personally acquainted, who, being by me duly sworn, did depose and say that he resides at No.

that he knows to be the individual described in and who executed the foregoing instrument; that he, said subscribing witness, was present and saw execute the same; and that he, said witness, at the same time subscribed h name as witness thereto.

Appendix A "(2012)


UNIVERSAL INSTRUMENT CORPORATION
KIRKWOOD, NEW JERSEY
REMEDIAL ACTION REPORT
PROPERTY BOUNDARY MAP
BBL
FIGURE
A-1

Appendix B

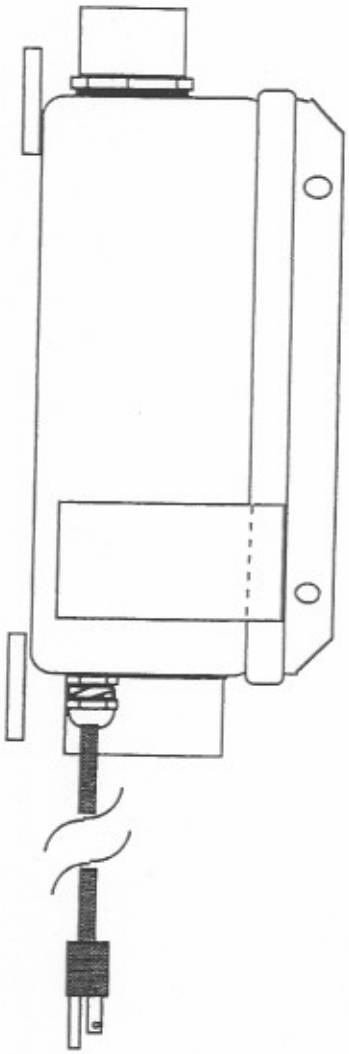
Attachment B

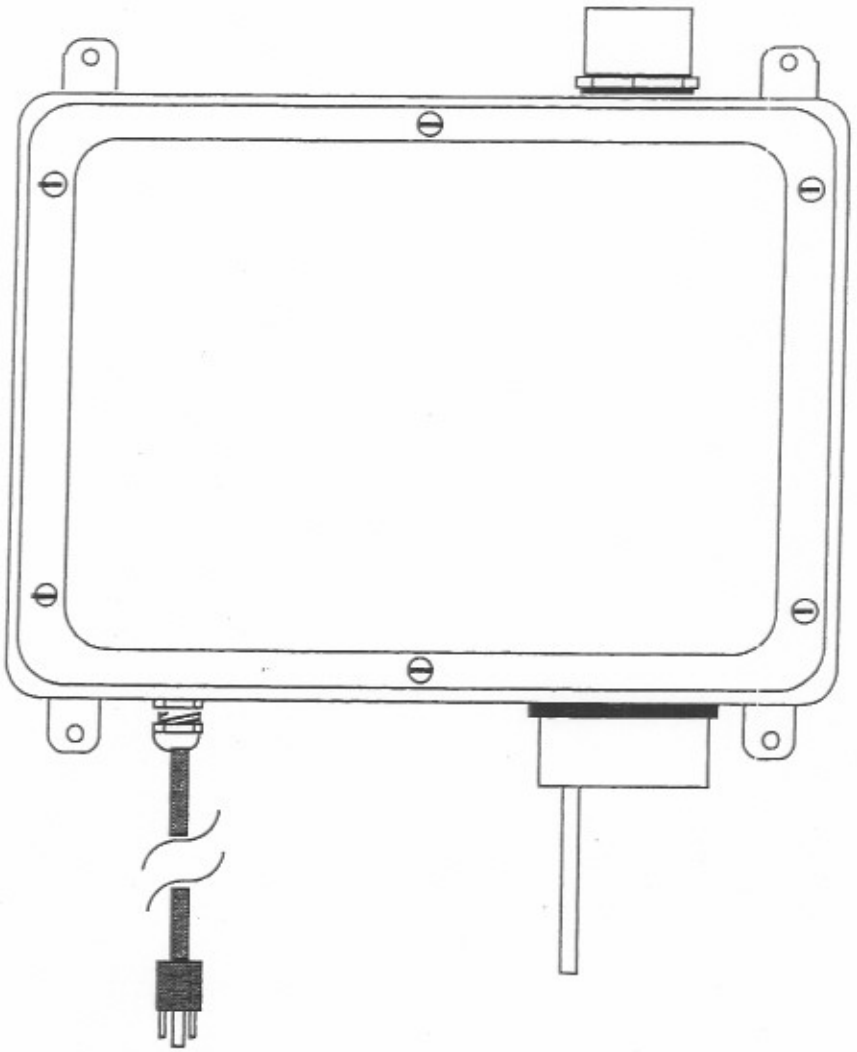
Manufacturer's Installation Booklet

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

HS SERIES INSTALLATION INSTRUCTIONS

BY RadonAway™





RadonAway, Inc. Haverhill, MA.

P/N IN007 Rev D

RadonAway™
Your Full Service Radon Specialists

INSTALLATION INSTRUCTIONS (Rev D)
for DynaVac High Suction Series
HS2000 p/n 23004-1
HS3000 p/n 23004-2
HS5000 p/n 23004-3

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The DynaVac is intended for use by trained, professional Radon mitigators. The purpose of this instruction is to provide additional guidance for the most effective use of the DynaVac. This instruction should be considered as a supplement to EPA standard practices, state and local building codes and state regulations. In the event of a conflict, those codes, practices and regulations take precedence over this instruction.

1.2 ENVIRONMENTALS

The DynaVac is designed to perform year-round in all but the harshest climates without additional concern for temperature or weather. For installations in an area of severe cold weather, please contact RadonAway for assistance. When not in operation, the DynaVac should be stored in an area where the temperature is never less than 32 degrees F. or more than 100 degrees F. The DynaVac is thermally protected such that it will shut off when the internal temperature is above 104 degrees F. Thus if the DynaVac is idle in an area where the ambient temperature exceeds this shut off, it will not restart until the internal temperature falls below 104 degrees F.

1.3 ACOUSTICS

The DynaVac, when installed properly, operates with little or no noticable noise to the building occupants. There are, however, some considerations to be taken into account in the system design and installation. When installing the DynaVac above sleeping areas, select a location for mounting which is as far away as possible from those areas. Avoid mounting near doors, fold-down stairs or other uninsulated structures which may transmit sound. Insure a solid mounting for the DynaVac to avoid structure-borne vibration or noise.

The velocity of the outgoing air must also be considered in the overall system design. With small diameter piping, the "rushing" sound of the outlet air can be disturbing. The system design should incorporate a means to slow and quiet the outlet air. The use of the RadonAway Exhaust Muffler, p/n 24001, is strongly recommended.

1.4 GROUND WATER

Under no circumstances should water be allowed to be drawn into the inlet of the DynaVac as this may result in damage to the unit. The DynaVac should be mounted at least 5 feet above the slab penetration to minimize the risk of filling the DynaVac with water in installations with occasional high water tables.

In the event that a temporary high water table results in water at or above slab level, water will be drawn into the riser pipes thus blocking air flow to the DynaVac. The lack of cooling air will result in the DynaVac cycling on and off as the internal temperature rises above the thermal cutoff and falls upon shutoff. Should this condition arise, it is recommended that the DynaVac be disconnected until the water recedes allowing for return to normal operation.

1.5 CONDENSATION & DRAINAGE

(***WARNING!***: Failure to provide adequate drainage for condensation can result in system failure and damage the DynaVac).

Condensation is formed in the piping of a mitigation system when the air in the piping is chilled below its dew point. This can occur at points where the system piping goes through unheated space such as an attic, garage or outside. The system design must provide a means for water to drain back to a slab hole to remove the condensation.

The use of small diameter piping in a system increases the speed at which the air moves. The speed of the air can pull water uphill and at sufficient velocity it can actually move water vertically up the side walls of the pipe. This has the potential of creating a problem in the negative pressure (inlet) side piping. For DynaVac inlet piping, the following table provides the minimum recommended pipe diameters as well as minimum pitch under several system condition. Use this chart to size piping for a system.

Pipe Diam.	Minimum Rise per Foot* @ 25 CFM	@ 50 CFM	@ 100 CFM
4"	1/32"	3/32"	3/8"
3"	1/8"	3/8"	1 1/2"

*Typical operational flow rates:

HS3000, or HS5000	20 - 40 CFM
HS2000	50 - 90 CFM

(For more precision, determine actual depressurization in the inlet pipe using a Magnehelic or other pressure differential device and determine flow rate by using chart in addendum.)

All exhaust piping should be 2" PVC.

1.6 "SYSTEM ON" INDICATOR

A properly designed system should incorporate a "System On" Indicator for affirmation of system operation. A Magnehelic pressure gauge is recommended for this purpose. The indicator should be mounted at least 5 feet above the slab penetration to minimize the risk of filling the gauge with water in installations with occasional high water tables.

1.7 SLAB COVERAGE

The DynaVac can provide coverage of well over 1000 sq. ft. per slab penetration. This will, of course, depend on the sub-slab aggregate in any particular installation and the diagnostic results. In general, sand and gravel are much looser aggregates than dirt and clay. Additional suction points can be added as required. It is recommended that a small pit (2 to 10 gallons in size) be created below the slab at each suction hole.

1.8 ELECTRICAL WIRING

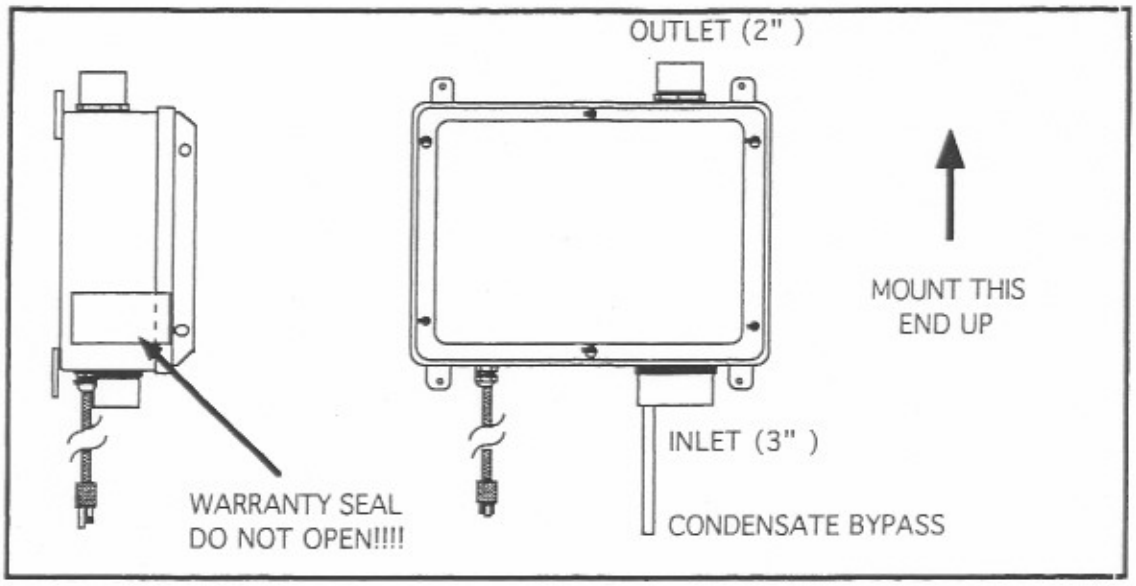
The DynaVac plugs into a standard 120V outlet. All wiring must be performed in accordance with the National Electrical Code and state and local building codes.

1.8a ELECTRICAL BOX (optional)

The optional Electrical Box (p/n 20003) provides a weathertight box with switch for outdoor hardwire connection. All wiring must be performed in accordance with the National Electrical Code and state and local building codes. All electrical work should be performed by a qualified electrician. Outdoor installations require the use of a U.L. listed watertight conduit.

1.9 SPEED CONTROLS

Electronic speed controls can **NOT** be used on HS series units.



2.0 INSTALLATION

2.1 MOUNTING

Mount the DynaVac to the wall studs, or similar structure, in the selected location with (4) 1/4" x 1 1/2" lag screws (not provided). Insure the DynaVac is both plumb and level.

2.2 DUCTING CONNECTIONS

Make final ducting connection to DynaVac with flexible couplings. Insure all connections are tight. Do not twist or torque inlet and outlet piping on DynaVac or leaks may result.

2.3 VENT MUFFLER INSTALLATION

Install the muffler assembly in the selected location in the outlet ducting. Solvent weld all connections. The muffler is normally installed above the roofline at the end of the vent pipe.

2.5 OPERATION CHECKS

____ Make final operation checks by verifying all connections are tight and leak-free.

____ Insure the DynaVac and all ducting is secure and vibration-free.

____ Verify system vacuum pressure with Magnehelic. Insure vacuum pressure is less than the maximum recommended as shown below:

DynaVac	HS2000	14" WC
DynaVac	HS3000	21" WC
DynaVac	HS5000	40" WC

(Above are based on sea-level operation, at higher altitudes reduce above by about 4% per 1000 Feet.)
If these are exceeded, increase number of suction points.

____ Verify Radon levels by testing to EPA protocol.

3.0 IMPORTANT INSTRUCTIONS TO INSTALLER

3.1 Inspect DynaVac for shipping damage within 15 days of receipt. Notify carrier of any damages immediately. RadonAway is not responsible for damages incurred during shipping.

3.2 There are no user servicable parts inside the DynaVac. Do not attempt to open. Return unit to the factory for service.

3.3 Install the DynaVac in accordance with all EPA standard practices, and state and local building codes and state regulations.

3.4 In the event the DynaVac is immersed in water, return unit to factory for service before operating.

3.5 Do not twist or torque inlet and outlet piping on the DynaVac. Leakage can result.

4.0 WARRANTY INFORMATION

Subject to applicable consumer protection legislation, RadonAway, Inc. warrants that the DynaVac will be free from defective materials and workmanship for a period of (1) year from the date of purchase. Warranty is contingent on installation in accordance with the instructions provided. This warranty does not apply where repairs or alterations have been made or attempted by others; or the unit has been abused or misused. Warranty does not include damage in shipment unless the damage is due to the negligence of RadonAway, Inc. To make a claim under these limited warranties, you must return the defective item to RadonAway, Inc. with a copy of the purchase receipt. All other warranties, expressed or written, are not valid. RadonAway, Inc. is not responsible for installation or removal cost associated with this warranty.

5.0 OPTIONAL THREE YEAR EXTENDED WARRANTY

Under this option all warranty terms and conditions are extended to (3) years from date of purchase. Purchase receipt provides proof of purchase of this option and Serial Number of DynaVac covered.

Record the following for your records:

Serial No._____

Receipt Date_____

ADDENDUM

PRODUCT SPECIFICATIONS

Model	Maximum Static Suction	Typical CFM vs Static Suction WC (Recommended Operating Range) 0"	10"	15"	20"	25"	35"	Power* Watts @ 115 VAC
HS2000	18"	110	72	40	--	--	--	150-270
HS3000	27"	40	33	30	23	18	--	105-195
HS5000	50"	53	47	42	38	34	24	180-320

*Power consumption varies with actual load conditions

Inlet: 3.0" PVC

Outlet: 2.0" PVC

Mounting: Brackets for vertical mount

Weight: Approximately 18 lbs.

Size: Approximately 15"W x 13"H x 8"D

Minimum recommended inlet ducting (greater diameter may always be used):

Main line of 3.0" or greater PVC Pipe
Any branch lines may be 2.0" or greater PVC Pipe

Outlet ducting: 2.0" PVC

Storage temperature range: 32 - 100 degrees F.

Thermally protected

Locked rotor protection

Internal Condensate Bypass

Attachment C

Self Inspection Log

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Monthly Inspection Checklist
Universal Instruments Site
Kirkwood, New York

Date: XX/XX/200X

Representative: Xxx Xxxxx

Item No.	Description	Yes	No	Actions	Comments
1	1978 Building Addition floor slab in good condition?	X		No maintenance required	None
2	1984 Building Addition floor slab in good condition?	X			
3	Area 1 (front employee entrance) landscape cover intact?	X			
4	Area 2 (driveway at north catch basin CB-2044) asphalt surface in good condition?	X			
5	Area 3 (transformer pad location) vegetative cover intact?	X			
6	Area 4 (drainage ditch along CR 181) in good condition?	X			
7	Area 5 (drainage ditch along CR 181) in good condition?	X			
8	Area 6 (drainage ditch along CR 181) in good condition?	X			
9	Area 7 (parking lot at southeast loading dock) asphalt surface in good condition?	X			
10	ASD system operational?	X			
11	ASD system vacuum readings normal?	X			
12	ASD system components in good condition?	X			
13					
14					
15					
16					
17					
18					
19					

Attachment D

ASD System operational Log

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

UNIVERSAL INSTRUMENTS CORPORATION

ACTIVE SUB-SLAB DEPRESSURIZATION (ASD) OPERATIONAL DATA
Former Dover Electronics Site
Kirkwood, New York

Date	Time	System On? (Y/N)	Vaccum Reading (inches water)				Comments
			ASD-1	ASD-2	ASD-3	ASD-4	

Appendices

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Appendix A

Soil Management Plan

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

SOILS MANAGEMENT PLAN

Overview and Objectives

The former Dover facility is located at 29 Industrial Park Drive, Kirkwood, Broome County, New York. The facility is located on a site approximately 9.58 acres in size. Figure 1 is the site plan.

The property is situated in an industrial setting. Major plants in the area include Truckstops of America Landfill (0.5 mile southeast), Frito Lay Plant (0.5 mile south), Universal Instruments (147 Industrial Park Drive, 0.5 mile east), Kason Industries (eastern property boundary), Consolidated Freightways (northern property boundary), and the newly developed Pilot Truck Stop to the south. Industrial properties surround the property to the north, east, and west. The site presently serves as one of Universal's service facilities with the site's uses including product training, research and development, and Odd Form Assembly (OFA), which involves the engineering and assembly of non-standard/specialty circuit boards.

Soil remediation activities conducted at the site during June and July 2003 were performed to mitigate tetrachlorethene (PCE)-affected soils in the unsaturated zone beneath and adjacent to the facility building at the site.

The objective of this Soils Management Plan (SMP) is to set guidelines for management of soil material during any future activities which would breach the cover system (engineering control) at the site. This SMP addresses environmental concerns related to soil management and has been reviewed and approved by the New York State Department of Environmental Conservation (NYSDEC) in a letter dated December 21, 2004 (Exhibit 1).

Nature and Extent of Remaining PCE-Affected Soils

Based on data from previous investigations and the remediation performed at the site, a soil remedial action report was prepared by Blasland, Bouck and Lee (BBL) (*Remedial Action Report, July 2004*). The constituents of concern in soil at the site are volatile organic compounds: PCE and its breakdown products – cis-1,2-dichloroethene and vinyl chloride.

Remedial action for soils was performed at the site by removing soil from seven separate accessible areas on the site that had been identified during remedial investigation as areas of concern. One area beneath the facility building was deemed inaccessible. An approximate total of 487 cubic yards was excavated from these seven areas of the facility (see Figure 2). Post-excavation sampling showed that some PCE-affected soils remained that were above NYSDEC TAGM #4046 standards for PCE.

Deed Notice

A deed notice with environmental restrictions is to be filed with the Broome County Clerk's Office to provide an institutional control for inaccessible soils that remain below facility floor slabs. The NYSDEC-approved deed notice was forwarded by UIC to the site owner on April 26, 2004 for signature and subsequent filing with the Broome County Clerk.

The deed notice stipulates that there shall be no construction, use or occupancy of the property that results in the disturbance of the cover systems or which will result in human exposure to the contaminated soils, unless prior written approval by the NYSDEC is obtained.

The deed notice is for the areas beneath the footprints of the 1978 and 1984 building additions, areas beneath parts of the original building (1973) and the 1982 addition, and for seven additional areas where complete removal of soil to below the NYSDEC criterion for PCE was not achieved. The areas that have environmental restrictions on the deed notice are shown on Figure 3.

Remaining PCE-Affected Soils

Field personnel assessed the excavation limits through field screening. All post-excavation soil samples were collected as grab samples. Sidewall samples were collected from the excavation sidewalls at a depth interval coincident with 0 to 6 inches above the excavation base at the time of collection. Bottom post-excavation samples were collected along the central long-axis of each excavation. The post-excavation sample locations were biased based on field judgment, towards sidewall and bottom areas that were suspected to most likely contain residual contamination.

Verification post-excavation samples were collected as undisturbed grab samples and were analyzed offsite by a New York State-certified laboratory (Columbia Analytical Services, Rochester, New York) for VOC SSPL analysis using United States Environmental Protection Agency (USEPA) Method 8260 to assess compliance with New York State groundwater protection requirements (NYSDEC, *TAGM #4046*, 1994).

Because some of the analytical results from the first set of post-excavation samples exceeded the NYSDEC criterion for PCE, additional excavation work was performed and a second round or verification samples were collected and analyzed for SSPL VOCs. During the first round of post-excavation sampling, results for 23 of 52 samples exceeded the NYSDEC soil criterion for PCE of 1,400 micrograms per kilogram (µg/kg). During the second round of post-excavation sampling, results for 5 of 26 samples exceeded the criterion for PCE.

The PCE exceedances in soil were detected in Excavation A-1, Excavation C, Excavation D, and Excavation E, and the unsatisfactory verification results in the final post-excavation samples [from first and/ or second round] are summarized below.

- The PCE soil concentration in the unsatisfactory verification sample collected in Excavation A-1 (PXA1-5, second round) was 18,000 µg/kg. This sample was collected against the base of the stairway leading to the employee entrance.
- The PCE soil concentration in the high verification samples collected in Excavation C were 4,700 µg/kg (PXC-7, first round) and 1,600 µg/kg (PXC-11, second round). Sample PXC-7 was collected at the upper end of Excavation "C" where the entrance to the southeast parking area and loading dock is located. This post-excavation sample was collected from between the highway drainage swale culvert pipe that runs beneath the driveway and the stormwater outfall pipe from Catch Basin CB-1845 (an 18- inch distance between the two pipes). Sample PXC-11 was collected from the base of the excavation at the downslope end of the excavation.

- The PCE soil concentration in the high verification samples collected in Excavation D were 3,500 µg/kg (PXC-6, first round) and 86,000 µg/kg (PXD-14, second round). Sample PXD-6 was collected from the west end of Excavation D where the excavation terminated against the cedar tree hedge and the transformer pad. Sample PX-14 was collected in the most downslope corner of Excavation D where a minor amount of free-phase PCE was observed before removal.

- The PCE soil concentrations in the two high verification sample collected in Excavation E (PXE-11 and PXE-12, second round) were 14,000 µg/kg and 2,000 µg/kg, respectively. These samples were collected from the downslope end of the excavation.

Additional areas were added to the proposed deed notice to address the PCE soil exceedances associated with Excavation E (see Figure 17). The PCE soil exceedance detected at Excavation A-1 was already addressed by existing proposed deed notice areas. The PCE soil exceedance detected at Excavation C is minor and does not warrant further action. Although the PCE soil exceedance detected in sample PXD-14 is elevated, the location next to the county road and the presence of a large water main preclude further soil excavation at this location. At the time of sample collection, the visual evidence from observation of the excavation sidewall and bottom showed that all free-phase PCE had been removed. Areas of Excavation C and Excavation D were also added to the deed notice.

The analytical results of both rounds of post-excavation sampling are presented in Table 1. The locations of the 78 post-excavation samples are shown on Figures 4 through 10.

The depth to PCE-affected soils in the deed notice areas is shown on Figure 3. These depths range from 3 feet to 8 feet below the ground surface.

Contemplated Site Use

The site is zoned industrial by the Town of Kirkwood and is located in an area known as the Kirkwood Industrial Park. The property is presently owned by the Broome County Redevelopment Authority and leased to Universal Instruments Corporation (UIC), a subsidiary of Dover Corporation. Allowable uses for the site include offices, manufacturing, warehousing, research laboratories, and associated commercial activities.

The present zoning specifically prohibits residential uses.

Surface Cover System

The purpose of the surface cover system is to eliminate the potential for human contact with fill material and remaining contaminated soil, and eliminate the potential for soil erosion and contaminated soil and storm water runoff from the property. The cover system consists of two types, depending upon location of the area of concern. These cover system types are soil with vegetated cover and soil with an asphalt cover.

The cover systems at the site for accessible areas consist of the following two types:

1. Soil and vegetated cover – clean native and/or imported fill stabilized by grass or landscaping (tan bark/peat moss and shrubbery)

2. Soil and asphalt cover – clean native and/or imported fill covered by 4 to 6 inches of asphalt base and a 2-inch thick layer of asphaltic concrete

Cover system type #1 is found at deed notice areas **1, 3, 4, 5, and 6**. Cover system type #2 is found at deed notice areas **2 and 7**. The deed notice areas are shown on Figure 3.

There are eight areas of the site were PCE-affected soils are capped by a cover system. The PCE-affected soils are capped by asphalt, concrete, and/or a minimum of 3 feet of clean soil. The capped areas and the type of cap are listed below.

1. 1978 and 1984 Building Addition Area – 6-inch thick concrete slab
2. Area 1 of Figure 3 – soil, mulch, and landscaping
3. Area 2 of Figure 3 – asphalt (driveway)
4. Area 3 of Figure 3 – soil with grass surface
5. Area 4 of Figure 3 – soil with grass surface (drainage ditch)
6. Area 5 of Figure 3 – soil with grass surface (drainage ditch)
7. Area 6 of Figure 3 – soil with grass surface (drainage ditch)
8. Area 7 of Figure 3 – asphalt (parking lot)

Management of Soils and Long-Term Cover System Maintenance

The purpose of this section is to provide environmental guidelines for management of subsurface soils and the long-term maintenance of the cover system during any future intrusive work that may breach the cover system.

The SMP includes the following conditions:

- Any breach of the cover system, including for the purposes of construction or utility work, must be replaced or repaired using materials such as clean soil with grass seed or sod or impervious asphaltic or cementious concrete (as described in Section 4 or materials that will perform the same function) to prevent future possible erosion.
- Control of surface erosion and storm water runoff from the deed notice areas at all times, including during construction activities in these areas.
- Site soil that is excavated from a deed notice area and is intended for removal from the property must be managed, characterized, and properly disposed of in accordance with NYSDEC regulations and directives.
- Prior to any construction activities within the deed notice areas, workers are to be notified of the site conditions with clear instructions regarding how the work is to proceed safely. Invasive/intrusive work performed in the deed notice areas will be conducted in accordance with applicable local, state, and federal regulations to protect worker health and safety.
- The controlling entity on the site (owner and/or tenant) shall complete and submit to NYSDEC an annual report by January 15th of each year. The annual report shall contain a certification that the institutional controls put in place (Deed Notice with Environmental Restrictions[1]) are still in place; have not been altered and are still effective, that the remedy and protective cover

[1] Filed in Broome County at the Office of the County Clerk

have been maintained; and that the conditions at the site are fully protective of public health and the environment.

If any (or all) of the cover systems was breached during the year covered by the Annual Report, the responsible party shall include a certification that all work, including repair/replacement, was performed in conformance with this SMP.

These capped areas will be inspected monthly by the responsible party to check that the cap is being maintained in good condition. With respect to asphalt and concrete caps, the area surface will be visually checked for subsidence/settlement, excessive wear and/or cracking, and for breaches (such as pot holes). Areas with soil cover will be checked for subsidence/settlement, missing vegetative cover and/or excessive erosion. Construction activities (authorized or unauthorized) that have or may interfere with cap integrity will be noted.

If capped surfaces are found to be in unsatisfactory condition during inspections, site management will be notified and cap patches and repairs will be made, as warranted, with suitable material(s) as described in this SMP.

Attachment A – Field Equip. Calibration, Operation, and Maintenance Standard Operating Procedure

A-1 HNU Photoionization Detector Calibration, Operation, and Maintenance Procedures

A-2 pH Meter Calibration, Operation, and Maintenance Procedures

Attachment A-1 – HNU Photoionization Detector Calibration, Operation, & Maintenance Procedures

I. Introduction

The HNU meter measures relative concentrations of total organic and inorganic vapors and will be calibrated daily prior to use. The HNU meter is certified by Factory Mutual for use in Class 1, Division 2, Group A, B, C, and D environments. The HNU will be used to monitor breathing zones and work zones as specified in the Health and Safety Plan.

II. Materials

- HNU Photoionization Detector (PID)
- Isobutylene calibration gas tank with pressure regulator
- Plastic tubing to connect the PID probe to the calibration gas tank
- PID calibration log

III. Calibration Procedures

1. Turn the HNU meter dial to the standby position and zero the meter needle with the zero dial.

2. Switch the meter dial to the appropriate concentration range so as to be able to accurately read the calibration gas value.

3. Loosen the dial on the regulator allowing the calibration gas to flow from the tank, through the plastic tubing to the HNU probe.

4. Adjust the HNU calibration dial so that the meter value is equal to the calibration gas concentration.

5. Record the calibration dial value and the other information on the PID Calibration and Maintenance Log.

IV. Operation Procedure

1. Put on health and safety equipment (as required by the Health and Safety Plan).

2. Turn the FUNCTION switch to the BATTERY CHECK position. Check that the indicator is within or beyond the green battery arc. If indicator is below the arc or the red LED is lit, the battery must be charged.

3. Turn the FUNCTION switch to the STANDBY position and rotate the ZERO POTENTIOMETER until the meter reads zero. Wait 15 to 20 seconds to confirm the adjustment. If unstable, readjust.

4. Check to see that the SPAN POTENTIOMETER is set for the appropriate setting for the probe being used (5.0 for 9.5 eV probe, 9.8 for 10.2 eV, and 5.0 for 11.7 eV).

5. Set the FUNCTION switch to the desired ppm range (0-20, 0-200, or 0-2,000). A violet glow from the UV source should be visible at the sample inlet of the probe/sensor unit.

6. Listen for the fan operation to verify fan function (HNU only).

7. Measure and record the background PID reading.

8. Use PID as specified in the Health and Safety Plan.

V. Maintenance Procedures

1. At the end of each day or after 8 hours of monitoring with the HNU, recharge the batteries for 12 hours.

2. Store the instrument in protective case when not in use.

3. Keep records of operation, maintenance, calibration, problems, and repairs.

4. After use, the instrument will be inspected and the inspection recorded in the field notebook.

5. A replacement instrument will be available on-site or ready for overnight shipment, if necessary.

6. The HNU will be sent back to the manufacturer for service, if needed.

7. Record calibration information on PID Calibration and Maintenance Log.

Attachment A-2 – pH Meter Calibration, Operation, & Maintenance Procedures

I. Introduction

The pH meter will be calibrated daily prior to use.

II. Materials

- 10.0, 7.0, 4.0 pH buffer solutions
- Thermometer
- Distilled water
- Disposable plastic beakers
- Calibration and maintenance log

III. Calibration Procedures

The pH meter will be calibrated as follows:

1. Switch on instrument.

2. Connect electrode to meter and remove protective cap.

3. Rinse electrode in distilled water.

4. Measure and record temperature of buffer solutions.

5. Immerse pH electrode in pH buffer 7.00, set the temperature control to that of the buffer 7.00 and allow sufficient time for the electrode to stabilize. Adjust the Standardize Control for the correct readout.

6. Rinse electrode with distilled water.

7. Immerse pH electrode in buffer 4.0, set the temperature control to that of the buffer 4.0 and allow sufficient time for the electrode to stabilize. Adjust the Slope Control for the correct readout.

8a. Rinse the electrode with distilled water. The meter is calibrated and ready for use.

8b. (Optional step) If the pH is expected or could be between 7.0 to 10.0, then immerse the pH electrode in buffer 10.0, set temperature control, and allow sufficient time for the electrode to stabilize. Adjust the slope control for the correct read out.

9. Record calibration information on the Temperature/pH/DO/ORP/Conductivity Meter Calibration and Maintenance Log.

IV. Operation Procedures

1. Calibrate pH meter.

2. Rinse probe in distilled water.

3. Fill a disposable beaker with the water sample.

4. Insert probe into one sample beaker and obtain a reading. The meter will read between 0 and 14, in 0.01 increments.

5. Repeat Step 4.

6. Log results in field notebook and the average will be the actual result.

7. Rinse probe off in distilled water.

V. Maintenance Procedures

1. Replace batteries on a regular basis.

2. Store electrode in protective casing when not in use.

3. Keep records of operation, maintenance, calibration, problems, and repairs.

4. After use, the meter will be inspected and the inspection recorded in the field notebook.

5. A replacement meter will be available on-site or ready for overnight shipment, if necessary.

6. pH meter will be sent back to manufacturer for service, if needed.

7. Record maintenance information on the Temperature/pH/DO/ORP/Conductivity Meter Calibration and Maintenance Log.

Attachment B – Soil Sample Collection Procedures

I. Introduction

Prior to commencing any soil excavation activities, the Underground Facility Protection Organization (UFPO) must be contacted to have appropriate utility company (e.g., cable, gas, telephone) representatives mark the location of underground utilities at and in the vicinity of the proposed digging locations.

II. Equipment and Materials

The following materials, as needed, will be available during the soil sampling activities:

- photoionization detector (PID) - HNU, Microtip, Multi-RAE, or equivalent;
- appropriate health and safety equipment;
- plastic sheeting for each location;
- appropriate sample containers;
- appropriate transport containers (coolers) with ice and appropriate labeling, packing, and shipping materials;
- chain-of-custody forms;
- indelible ink pens; and
- site map with sampling locations.

III. Soil Sampling

Soil samples will be collected from excavated soil taken from deed notice areas. The soil samples will be analyzed for waste classification purposes so that the waste soil may be properly disposed offsite or re-used onsite depending upon analytical results. Representative portions of soil for each sample batch will be placed in the appropriate laboratory containers and a one-pint container for visual observations and headspace screening. This container will be labeled with: 1) site; 2) sample number; 3) date; and 4) initials of sampling personnel. All samples will be screened with a PID to assess the presence of organic vapors using the procedures described in Section IV below.

The descriptions will be recorded in a dedicated field notebook. The person responsible for sampling will also be responsible for recording the following information in the field notebook:

- start and finish dates of sampling;
- name and location of project;
- project location;
- sample number and depth;
- type and size of samples;
- depth to water;
- type of sampling equipment;
- size of casing;
- names of equipment operators, inspectors, or people at the project area; and

Any excess soils generated during sampling activities be returned to its place of origin, either a steel 55-gallon drums or stockpile on plastic sheeting for subsequent disposal.

IV. Field Screening Procedures

All soil samples will be field screened upon collection with the PID for a relative measure of the total volatile concentration. The readings will be recorded in the field book or on the soil boring logs.

The PID meter will be calibrated in accordance with Appendix B. The procedures for selection of subsurface soil samples are detailed in the Initial Soil and Groundwater Sampling Work Plan.

V. Procedures for Collecting Soil Samples for Laboratory Analysis

Soil samples will be collected from the drums or stockpiles so as to be representative of the larger whole. Samples designated for laboratory analysis will be placed in the appropriate containers. Soils collected for volatile organic analysis will be placed in individual and separate without mixing. Other soil for other analyses will be homogenized by mixing in a stainless steel bowl with a clean stainless steel trowel, and distributed to the appropriate sample containers.

VI. Equipment Cleaning

Equipment cleaning will occur prior to use on the site, between each soil boring location, and upon completion of the soil boring activities prior to leaving the site. All soil boring equipment and associated tools that may have come in contact with the soil will be cleaned in accordance with the equipment cleaning procedures described in Attachment D. The soil boring equipment will be cleaned in an area designated by the supervising geologist. Cleaning water, PPE, dedicated equipment, and residual materials will be collected and containerized for subsequent disposal.

Attachment C – Water Sampling Procedures

I. Introduction

This protocol describes the procedures to be used to collect decontamination water samples from drums or other containers.

II. Materials

The following materials, as required, shall be available during water sampling:

- Sample tubing, drum thief, or disposable bailer;
- Photoionization detector (PID);
- Appropriate health and safety equipment as specified in the Health and Safety Plan;
- Plastic sheeting (for each sampling location);
- New disposable polypropylene rope;
- Appropriate water sample containers;
- Appropriate blanks (trip blank supplied by the laboratory);
- Appropriate transport containers (coolers) with ice and appropriate labeling, packing, and shipping materials;
- Groundwater sampling logs;
- Chain-of-custody forms; and
- Indelible ink pens;

III. Procedures for Water Sampling

The procedures to sample water from drums or other container will be as follows:

1. Review materials check list (Part II) to ensure the appropriate equipment has been acquired.

2. Record the date and time. Identify the personnel and equipment utilized and other pertinent data requested on the logs.

3. Label all sample containers using the laboratory-supplied label.

4. Don safety equipment, as required in the Health and Safety Plan.

5. Place plastic sheeting adjacent to well to use as a clean work area.

6. Establish the background reading with the PID and record the reading on the field log.

7. Set out on plastic sheeting the dedicated or disposable sampling device and meters.

8. Fill in the sample label and cover the label with clear packing tape to secure the label onto the container.

9. Insert the sampling device (tubing, thief, or bailer – as appropriate) into the drum or container and obtain the water sample needed for analysis directly from the sampling device in the appropriate container and tightly

screw on the caps. The sample collection order (as appropriate) will be as follows: VOCs, SVOC, PCBs/pesticides, metals and cyanide, and others.

10. Secure with packing material and store at 4ºC on wet ice in an insulated transport container provided by the laboratory.

11. Record the time sampling procedures were completed on the field logs.

12. Place all disposable sampling materials (plastic sheeting, disposable bailers, and health and safety equipment) in an appropriately labeled containers.

13. Complete the procedures for packaging, shipping, and handling with associated chain-of-custody.

IV. Field Quality Control

The following quality control procedures should be observed in the field:

- Equipment blanks should include the sampling device; and

- All monitoring instrumentation shall be operated in accordance with manufacturer's instructions and calibration procedures. Instruments should be calibrated at the beginning of the sampling event.

V. Equipment Cleaning

All re-usable sampling equipment should be cleaned at the end of the sampling event.

VI. Material Disposal

Materials generated during groundwater sampling activities, including disposable equipment will be placed in appropriate containers and disposed of by the client/owner.

Attachment D – Equipment Decontamination and Cleaning Standard Operating Procedures

I. Introduction

This attachment presents procedures which will be used to decontaminate equipment used to collect soil and decontamination water samples. The adequacy of cleaning procedures will be monitored through the collection of QA/QC rinse blank samples, as required, which will be submitted for laboratory analysis, if needed.

II. Sampling Equipment Decontamination

Generally, dedicated sampling equipment will be used during the investigations (i.e., stainless-steel trowels, plastic scoops, groundwater sample bailers). However, equipment that is not dedicated (i.e., direct push sampler) will be decontaminated prior to each use to mitigate the potential for cross-contamination of the samples collected for laboratory analysis. The decontamination procedures to be utilized during the investigation are presented below:

<u>For PCB, VOC, SVOC, and Inorganic Sampling</u>

1. Alconox (or equivalent) detergent solution wash.
2. Tap water rinse.
3. 10% nitric acid (HNO3) ultrapure rinse (if carbon steel split spoon is used, then 1% nitric acid should be used instead).
4. Distilled water rinse.
5. Methanol rinse (pesticide grade or better).
6. Distilled water rinse.
7. Hexane rinse (pesticide grade or better).
8. Distilled (demonstrated analyte free) water rinse.
9. Allow to air-dry.
10. Wrap in aluminum foil for storage or transport if it is not going to be used immediately.

III. Disposal Methods

All waste materials generated during cleaning procedures will be collected, containerized and staged onsite.

Appendix B

Quality Assurance/Sampling and Analysis Project Plan

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Quality Assurance/Sampling and Analysis Project Plan

OM&M Plan Program
Former Dover Electronics Site
Kirkwood, New York

Prepared for:
Universal Instruments Corporation

December 2004

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

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Preface

This Quality Assurance/Sampling and Analysis Project Plan (QA/SAPP) supplements the Operations, Maintenance and Monitoring (OM&M) Plan and presents the sampling and analytical methods and procedures that will be used during implementation of the post-remediation for the Soils Operable Unit (OU#1) at the former Dover Electronics site (now Universal Instruments Corporation site) in Kirkwood, New York.

This QA/SAPP was prepared in a manner consistent with the following reference and guidance documents:

- United States Environmental Protection Agency's (USEPA's) "Test Methods for Evaluating Solid Waste, SW-846" (USEPA, 1996);
- USEPA's guidance document entitled, "EPA Requirements for Quality Assurance Project Plans for Environmental Operations," EPA-QA/R-5 (USEPA, 2001), which replaces QAMS-005/80 "Interim Guidance and Specifications for Preparing Quality Assurance Project Plans" (USEPA, 1980); and
- The National Enforcement Investigations Center (NEIC) Policies and Procedures Manual (USEPA, 1991).

Information contained in this QA/SAPP has been organized into the following sections:

Section	Content
Project Management	
1	Project Background
2	Project Description
3	Quality Objectives and Criteria for Measurement Data
4	Special Training Requirements/Certification
5	Documentation and Records
Measurement/Data Acquisition	
6	Sampling Method Requirements
7	Sample Handling and Custody Requirements
8	Quality Control Requirements
9	Instrument/Equipment Testing, Inspection, and Maintenance Requirements
10	Instrument Calibration and Frequency
11	Data Management
Data Validation and Usability	
12	Data Review, Validation, and Verification
13	Validation and Verification Methods

Details are provided in the subsequent sections. This document also contains pertinent information from the OM&M Plan related to measuring and evaluating the analytical data.

1. Project Background

The following summarizes background information for the former Dover Electronics site with respect to implementation of the OM&M Plan.

1.1 Site Location and Description

The former Dover facility is located at 29 Industrial Park Drive, Kirkwood, Broome County, New York. The facility is located on a site approximately 9.58 acres in size.

The property is situated in an industrial setting. Major plants in the area include Truckstops of America Landfill (0.5 mile southeast), Frito Lay Plant (0.5 mile south), Universal Instruments (147 Industrial Park Drive, 0.5 mile east), Kason Industries (eastern property boundary), Consolidated Freightways (northern property boundary), and the newly developed Pilot Truck Stop to the south. Industrial properties surround the property to the north, east, and west. The site presently serves as one of Universal's service facilities with the site's uses including product training, research and development, and Odd Form Assembly (OFA), which involves the engineering and assembly of non-standard/specialty circuit boards.

Soil remediation activities conducted at the site during June and July 2003 were performed to mitigate PCE-affected soils in the unsaturated zone beneath and adjacent to the facility building at the site. The remedial action work included:

- abandonment and replacement of the roof leader from the roof drain system that handles stormwater runoff from the front part of the roof for the original building section of the facility;
- removal of specified soil from seven separate excavations;
- offsite transportation and disposal of non-hazardous and possible hazardous soil excavated;
- extension of the stormwater outfall from the southwest catch basin (CB-1547);
- restoration of excavated areas using compacted certified clean fill; and
- installation of an ASD system.

1.2 Description of OM&M Areas

A deed notice with environmental restrictions is to be filed with the Broome County Clerk's Office to provide an institutional control for inaccessible soils that remain below facility floor slabs. The NYSDEC-approved deed notice was forwarded by UIC to the site owner on April 26, 2004 for signature and subsequent filing with the Broome County Clerk.

The deed notice stipulates that there shall be no construction, use or occupancy of the property that results in the disturbance of the cover systems or which will result in human exposure to the contaminated soils, unless prior written approval by the NYSDEC is obtained.

The deed notice is for the areas beneath the footprints of the 1978 and 1984 building additions, areas beneath parts of the original building (1973) and the 1982 addition, and for seven additional areas where complete

removal of soil to below the NYSDEC criterion for PCE was not achieved. The areas that have environmental restrictions on the deed notice are shown on Figure 3 of the OM&M Plan.

Deed Notice Areas (Engineering Controls)

There are eight areas of the site were PCE-affected soils are capped. The PCE-affected soils are capped by asphalt, concrete, or a minimum of 3 feet of clean soil. The capped areas and the type of cap are listed below.

1. 1978 and 1984 Building Addition Area – 6-inch thick concrete slab
2. Area 1 of Figure 3 – soil, mulch, and landscaping
3. Area 2 of Figure 3 – asphalt (driveway)
4. Area 3 of Figure 3 – soil with grass surface
5. Area 4 of Figure 3 – soil with grass surface (drainage ditch)
6. Area 5 of Figure 3 – soil with grass surface (drainage ditch)
7. Area 6 of Figure 3 – soil with grass surface (drainage ditch)
8. Area 7 of Figure 3 – asphalt (parking lot)

These capped areas will be inspected monthly by UIC to check that the cap is being maintained in good condition. With respect to asphalt and concrete caps, the area surface will be visually checked for subsidence/settlement, excessive wear and/or cracking, and for breaches (such as pot holes). Areas with soil cover will be checked for subsidence/settlement, missing vegetative cover and/or excessive erosion. Construction activities (authorized or unauthorized) that have or may interfere with cap integrity will be noted.

If capped surfaces are found to be in unsatisfactory condition during inspections, site management will be notified and cap patches and repairs will be made, as warranted, with suitable material(s).

Should site activities necessitate that a cap be breached and PCE-affected soil removed, the soils will be placed either in drums or be placed on plastic sheeting and be covered by plastic sheeting. Removed soils will be tested for waste classification and will be properly disposed of off-site.

ASD System

Construction of the ASD system occurred during June 2003. The ASD system was installed within the 1978 and 1984 additions to see if it could be helpful in reducing indoor air concentrations of PCE within the building. The ASD system installation was performed as a field fabrication. The ASD system fabrication used typical design criteria, specifications, and technology common to the radon control industry.

Four extraction points, ASD-1 through ASD-4, were installed at the approximate locations shown on Figure 4. Suction pits for each extraction point were prepared by coring a 4.25-inch- diameter hole through the slab and then clearing gravel and soil from beneath the slab to create a hemispherical pit. The suction pits are approximately 12 inches in diameter and have a nominal volume of at least one cubic foot. The extraction point riser pipe was constructed of Schedule 40 PVC with a 4-inch-diameter. The slab penetration for the depressurization points were cleaned, prepared, and sealed in an air-tight manner with a compatible sealant that will not shrink or crack.

One ventilation fan was installed and is used to operate the ASD system. This fan operates the four sub-slab depressurization points through a manifold setup. The fan is an exterior mount (Radonwaway brand HS series HS5000 fan). The fan is Underwriter's Laboratory (UL)-approved for outdoor use (UL standard 507) and meets

all electrical code requirements. All ASD system electrical components are UL listed or of equivalent specifications. All plastic vent pipes and fittings are made of Schedule 40 PVC.

The ASD system is essentially self-operating and does not require adjustments. The ASD system essentially operates as either on or off. The ASD system includes mechanisms to monitor system performance and warn of system failure (shut off).

The ASD system has only one mechanical part, the suction fan. The fan does not require maintenance and has an expected operational life of 7 to 8 years. Other systems components, such as piping, gauges, and wiring could be inadvertently damaged or broken by other site activities. During inspections these features will be checked for damage. Broken or damaged parts of the system will be repaired or replaced.

The ASD system will be checked daily by UIC to verify that it is operating. Vacuum readings on the system shall be recorded weekly.

Indoor air quality samples shall be collected within the facility building semi-annually (March and September) at five locations with one background sampling location outside the building. All sampling locations for indoor air quality monitoring are shown on Figure 6.

Indoor air quality is monitored through the collection of 8-hour time-weighted averaged (TWA) samples. The indoor air samples are collected in summa canisters following procedures provided by the analytical laboratory. The indoor air samples shall be analyzed by an NYSDEC and NYSDOH approved analytical laboratory using USEPA method TO-15.

2. Project Description

This section describes the activities to be conducted during OM&M Plan implementation. Sampling activities associated with the OM&M Plan will be conducted to provide data the will satisfy the following objectives:

- Worker Health and Safety/Community Concerns
- Soil and Water Handling and Disposal

Sampling protocols to be followed during OM&M activities are described in Section 8 of this QA/SAPP. Samples collected during will be analyzed in accordance with the methods presented in Table 1.

The QASAPP has been prepared for the use of field personnel. The field personnel will have the following responsibilities and duties while performing work required by the OM&M Plan:

- perform field procedures associated with the investigations as set forth in the Work Plan;
- perform field analyses and collect QA samples;
- calibrate, operate, and maintain field equipment;
- reduce field data;
- maintain sample custody; and
- prepare field records and logs.

2.1 Worker Health and Safety/Community Concerns

Office workers may be potentially exposed to elevated concentrations of volatile organic vapors, particularly tetrachloroethene (PCE), emanating from affected-soils beneath the building. Indoor air samples will be collected to monitor the indoor air quality at the UIC facility.

Workers could potentially be exposed (i.e., through dermal contact, ingestion, or inhalation) to contaminated soil during demolition/construction activities and during handling and transport of soil and decontamination water generated during demolition/construction activities. To assess these issues, field monitoring with a photoionization detector (PID) or flame-ionization detector (FID) should be performed during soil excavation work in deed noticed areas. Depending on the results, specific mitigation measures during demolition and construction may be needed as described in the Health and Safety Plan.

2.2 Soil and Water Handling/Disposal

Any soil generated during excavation work within any of the deed noticed areas will be sampled so that the analytical results can be used to determine transportation and disposal requirements for the soil and any decontamination water generated. Since the soil intended for disposal is regulated as a solid waste, a hazardous waste determination must be performed. In support of this determination, the QA/SAPP includes testing for specific parameters included in state and federal regulations.

3. Quality Objectives and Criteria for Measurement Data

The overall objectives of the OM&M Plan activities are as follows:

- To provide data to support performance evaluation of the ASD system (engineering control), which is being operated to reduce the potential for exposure to PCE vapors in excess of acceptable concentrations; and
- To provide data to evaluate handling and disposal options for soil and decontamination water removed during demolition/construction activities.

Data quality objectives (DQOs) are qualitative and quantitative statements that specify the quality of the data required to support decisions made during site-related activities and are based on the end uses of the data to be collected. Preliminary DQOs were identified to confirm that the data generated during field investigations will be of adequate quality and sufficient quantity to form a sound basis for decision making relative to the above objectives.

A DQO summary for the sampling investigation efforts is presented in the subsequent sections. The summary consists of stated DQOs relative to data uses, data types, data quantity, sampling and analytical methods, and data measurement performance criteria.

Two data categories have been defined to address various analytical data uses and the associated QA/QC effort and methods required to achieve the desired levels of quality. These categories are described below:

Screening Data: Screening data affords a quick assessment of site characteristics or conditions. This objective for data quality is applicable to data collection activities that involve rapid, non-rigorous methods of analysis and quality assurance. This objective is generally applied to physical and/or chemical properties of samples, degree of contamination relative to concentration differences, and preliminary health and safety assessment.

Confirmation Data: Confirmation data provided quanitative data for decision making by can be relatively less precise that more rigorous definitive data. Confirmation data is generated using laboratory analytical methods. This objective for data quality is available for data collection activities that require quantitative verification of field screening data where the verification process can rely on less rigorous laboratory-based methods and reporting.

A third category of data is:

Definitive Data: Definitive data are generated using analytical methods, such as approved USEPA reference methods. Data are analyte-specific, with confirmation of analyte identity and concentration. Methods produce raw data (e.g., chromatograms, spectra, digital values) in the form of paper printouts or computer-generated electronic files.

Only screening and confirmation type data are needed to satisfy the requirements of the OM&M Plan. Definitive data is not necessary for this project.

Subsequently for this project, two levels of data reporting have been defined. They are as follows:

Level 1 - Minimal Reporting: Minimal or "results only" reporting is used for analyses that, either due to their nature (i.e., field monitoring) or the intended data use (i.e., preliminary screening), do not generate or require extensive supporting documentation.

Level 2 - Modified Reporting: Modified reporting is used for analyses that are performed following standard USEPA-approved methods and QA/QC protocols. Based on the intended data use, modified reporting may require some supporting documentation but not, however, full "CLP-type" reporting.

Screening data and Level 1 reporting will be used for field activities, such as monitoring soil excavation work. Confirmation data and Level 2 reporting will be used for sampling activities associated with waste disposal (soil excavation) and indoor air quality (ASD monitoring).

4. Special Training Requirements/Certification

In compliance with the Occupational Safety and Health Administration's (OSHA's) final rule, "Hazardous Waste Operations and Emergency Response," 29CFR§1910.120(e), all personnel performing soil and groundwater sampling activities at the site will have completed the requirements for OSHA 40-hour Hazardous Waste Operations and Emergency Response training. Persons in field supervisory positions will have also completed the additional OSHA 8-hour Supervisory Training.

5. Documentation and Records

5.1 General

Indoor air, soil and decontamination water samples will be collected as described in the OM&M Plan and Section 8 of this document. Examples of sample designations, documentation, and reporting requirements are presented below.

5.2 Sample Designation System

Indoor air samples will be designated by the location of the sample collection point. There are six locations for indoor air sample collection. The designation for each location shall be as follows:

Background Sample	=	BACKGROUND
Air Conditioning Area	=	A/C AREA
Switch Gear Area	=	ELECTRICAL AREA
Office Space North	=	OFFICE #1
Office Space South	=	OFFICE #2
Cafeteria	=	CAFETERIA

Should additional samples be collected from the same location during the same indoor air monitoring and sampling event, they may be labeled as "-1", "-2" or "A", "B".

Soil samples collected for waste classification purposes should be labeled according to the drum or stockpile from which they are collected. The designation should read "Drum #1, Stockpile #1" or if a composite as "Composite #1) and so on in a consecutive manner as needed. Likewise, decontamination water samples should be labeled according to the drum or container from which they are collected.

5.3 Field Documentation

Field personnel will provide comprehensive documentation covering various aspects of field sampling, field analysis, and sample chain-of-custody. This documentation constitutes a record that allows reconstruction of field events to aid in the data review and interpretation process. Documents, records, and information relating to the performance of the field work will be retained in the project file.

The various forms of documentation to be maintained throughout the action include the following:

- Daily Production Documentation - A field notebook consisting of a waterproof, bound notebook that will contain a record of all activities performed at the site.

- Sampling Information - Detailed notes will be made as to the exact sampling location, physical observations, and weather conditions (as appropriate).

- Sample Chain-of-Custody - Chain-of-custody (COC) forms will provide the record of responsibility for sample collection, transport, and submittal to the laboratory. COC forms will be filled out at each

sampling site, at a group of sampling sites, or at the end of each day of sampling by field personnel responsible for sample custody. In the event that the samples are relinquished by the designated sampling person to other sampling or field personnel, the COC form will be signed and dated by the appropriate personnel to document the sample transfer. The original COC form will accompany the samples to the laboratory, and copies will be forwarded to the project files.

Persons will have custody of samples when the samples are in their physical possession, in their view after being in their possession, or in their physical possession and secured so they cannot be tampered with. In addition, when samples are secured in a restricted area accessible only to authorized personnel, they will be deemed to be in the custody of such authorized personnel.

- Field Equipment, Calibration, and Maintenance Logs - To document the calibration and maintenance of field instrumentation, calibration and maintenance logs will be maintained for each piece of field equipment that is not factory-calibrated.

5.4 Laboratory Documentation Files

5.4.1 Laboratory Project Files

The analytical laboratory will establish a file for pertinent data. The file will include correspondence, faxed information, phone logs, and COC forms. The laboratory will retain project files and data packages for not less than a period of 5 years.

5.4.2 Laboratory Logbooks and Electronic Records

Workbooks, bench sheets, instrument logbooks, and instrument printouts will be used to trace the history of samples through the analytical process and to document important aspects of the work, including the associated quality controls. As such, logbooks, bench sheets, instrument logs, and instrument printouts will be part of the permanent record of the laboratory.

Each page or entry will be dated and initialed by the analyst at the time of entry. Errors in entry will be crossed out in indelible ink with a single stroke, corrected without the use of white-out or by obliterating or writing directly over the erroneous entry, and initialed and dated by the individual making the correction. Pages of logbooks that are not used will be completed by lining out unused portions.

Information regarding the sample, analytical procedures performed, and the results of the testing will be recorded on laboratory forms or personal notebook pages by the analyst. These notes will be dated and will also identify the analyst, the instrument used, and the instrument conditions.

Laboratory notebooks will be periodically reviewed by the laboratory group leaders for accuracy, completeness, and compliance to this QA/SAPP. All entries and calculations will be verified by the laboratory group leader. If all entries on the pages are correct, then the laboratory group leader will initial and date the pages. Corrective action will be taken for incorrect entries before the laboratory group leader signs.

All electronic files and deliverables will be maintained on magnetic tape or disk for not less than 5 years; hard copy data packages (or electronic copies) will be maintained in the files for 5 years.

5.5 Data Reporting Requirements

5.5.1 Field Data Reporting

Information collected in the field through visual observation, manual measurement, and/or field instrumentation will be recorded in field notebooks or data sheets and/or on forms. Such data will be reviewed by the appropriate Task Manager. Concerns identified as a result of this review will be discussed with the field personnel, corrected if possible, and, as necessary, incorporated into the data evaluation process.

The original field logs, documents, and data reductions will be kept in the project file at the BBL office in Syracuse, New York.

5.5.2 Laboratory Data Reporting

The laboratory is responsible for preparing Level 1-equivalent data packages for all total VOCs, SVOCs, PCBs, metals, and reduced data packages and case narratives for all TCLP and characteristics analyses.

Data reports for all parameters will include, at a minimum, the following items.

Narrative: Summary of activities that took place during the course of sample analysis, including the following information:

- laboratory name and address;
- date of sample receipt;
- cross reference of laboratory identification number to contractor sample identification;
- analytical methods used;
- deviations from specified protocol; and
- corrective actions taken.

Included with the narrative will be any sample handling documents, including field and internal COC forms, air bills, and shipping tags.

Analytical Results: Reported according to analysis type and including the following information, as acceptable:

- sample ID;
- laboratory ID;
- date of collection;
- date of receipt;
- date of extraction;
- date of analysis; and
- detection limits.

Sample results on the report forms will be corrected for dilutions. Soil samples will be reported on a dry-weight basis. Unless otherwise specified, results will be reported uncorrected for blank contamination.

The data for total VOCs, SVOCs, PCBs, and metals analyses will be expanded to include supporting documentation necessary to provide a reduced deliverable-equivalent package when requested. This additional documentation will include, but is not limited to, raw data required to recalculate any result, including instrument printouts and quantitation reports. The report also will include standards used in calibration and calculation of analytical results; sample extraction, digestion, and other preparation logs; standard preparation logs; instrument run logs; and moisture content calculations.

6. Sampling Method Requirements

As part of the field investigations, several standard field procedures will be utilized. This section of the QA/SAPP introduces and references the appropriate detailed procedure in the Appendices to the OM&M Plan. Included are the ancillary procedures for equipment cleaning, field measurements, and calibration and maintenance of field instruments. Sample analytical constituents and parameters are summarized in Table 1. The required sample containers, volumes, preservation, and holding times are summarized in Table 3.

Sampling equipment and procedures will be as discussed in Appendices B, C, D, E, and G in the OM&M Plan.

7. Sample Handling and Custody Requirements

7.1 Sample Containers and Preservation

Appropriate sample containers, preservation methods, and laboratory holding times for OM&M samples are shown in Table 3.

The analytical laboratory will supply appropriate sample containers and preservatives, as necessary. The bottles will be purchased pre-cleaned according to USEPA Office of Solid Waste and Emergency Response (OSWER) Directive 9240.05A requirements. The field personnel will be responsible for properly labeling containers and preserving samples (as appropriate). Sample labeling procedures are described in ISGSP Work Plan Appendix G.

7.2 Field Custody Procedures

The objective of field sample custody is to assure that samples are not tampered with from the time of sample collection through the time of transport to the analytical laboratory. Persons will have "custody of samples" when the samples are in their physical possession, in their view after being in their possession, or in their physical possession and secured so they cannot be tampered with. In addition, when samples are secured in a restricted area accessible only to authorized personnel, they will be deemed to be in the custody of such authorized personnel.

Field custody documentation consists of both field logbooks and field COC forms.

7.2.1 Field Logbooks

Field logbooks will provide the means of recording the data collecting activities performed. As such, entries will be described in as much detail as possible so that persons going to the site could reconstruct a particular situation 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 a secure location when not in use. Each logbook will be identified by the project-specific document number. The title page of each logbook will contain the following:

- person to whom the logbook is assigned;
- logbook number;
- project name;
- 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, names of all sampling team members present, level of personal protection being used, and the signature of the person making the entry will be entered. The names of visitors to the site, field sampling or investigation team personnel, and the purpose of their visit will also be recorded in the field logbook.

Measurements made and samples collected will be recorded. Entries will be made in ink, and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark. Whenever a sample is collected or a measurement is made, a detailed description of the location of the MTS shall be recorded. The number of the photographs taken of the MTS, if any, will also be noted. All equipment used to make measurements will be identified, along with the date of calibration.

Samples will be collected following the sampling procedures documented in Section 8. The equipment used to collect samples will be noted, along with the time of sampling, sample description, depth at which the sample was collected, volume, and number of containers. Sample identification numbers will be assigned prior to sample collection. Field duplicate samples, which will receive an entirely separate sample identification number, will be noted under sample description.

7.2.2 Sample Labeling

Preprinted sample labels will be affixed to sample bottles prior to delivery at the sampling site. The following information is required on each sample label:

- project;
- date collected;
- time collected;
- location;
- sampler;
- analysis to be performed;
- preservative; and
- sample number.

7.2.3 Field Chain of Custody Forms

Completed COC forms will be required for all samples to be analyzed. COC forms will be initiated by the sampling crew in the field. The COC forms will contain the unique sample identification number, sample date and time, sample description, sample type, preservation (if any), and analyses required. The original COC form will accompany the samples to the laboratory. Copies of the COC will be made prior to shipment (or multiple copy forms used) for field documentation. The COC forms will remain with the samples at all times. The samples and signed COC forms will remain in the possession of the sampling crew until the samples are delivered to the express carrier (e.g., Federal Express), or hand delivered to a mobile or permanent laboratory, or placed in secure storage.

Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. The labels will include sample information such as: sample number and location, type of sample, date and time of sampling, sampler's name or initials, preservation, and analyses to be performed. The completed sample labels will be affixed to each sample bottle and covered with clear tape.

Whenever samples are split with a government agency or other party, a separate COC will be prepared for those samples and marked to indicate with whom the samples are being split. The person relinquishing the samples to the facility or agency should request the representative’s signature acknowledging sample receipt. If the representative is unavailable or refuses, this is noted in the “Received By” space.

7.3 Management of OM&M-Derived Materials and Wastes

Disposable equipment, debris, and decontamination rinsate (e.g., distilled water containing small amounts of solvent) will be containerized during the sampling events, labeled, and staged onsite.

7.4 Packing, Handling, and Shipping Requirements

Sample packaging and shipment procedures are designed to ensure that the samples will arrive at the laboratory, with the COC intact.

Samples will be packaged for shipment as outlined below:

- complete sample label with the following information: sample type, project number, site name, sample identification code, analyses required, date, time sampled, and preservative added (if applicable);
- ensure that sample containers have the sample labels securely affixed to the container with clear packing tape;
- check the caps on the sample containers to ensure that they are properly sealed;
- wrap the sample container cap with clear packing tape to prevent it from becoming loose;
- complete the COC form with the required sampling information and ensure that the recorded information matches the sample labels. NOTE: If the designated sampler relinquishes the samples to other sampling or field personnel for packing or other purposes, the sampler will complete the COC prior to this transfer. The appropriate personnel will sign and date the COC form to document the sample custody transfer;
- using duct tape, secure the outside drain plug at the bottom of the cooler;
- place each sample container or package in individual polyethylene bags and seal;
- place 1 to 2 inches of cushioning material at the bottom of the cooler;
- place the sealed sample containers upright into the cooler;
- place ice in plastic bags and seal; place loosely in the cooler;
- fill the remaining space in the cooler with cushioning material;
- place COC forms in a plastic bag and seal; tape the forms to the inside of the cooler lid;
- close the lid of the cooler, lock, and secure with duct tape;
- wrap strapping tape around both ends of the cooler at least twice; and
- mark the cooler on the outside with the following information: shipping address, return address, "Fragile" labels, and arrows indicating “this side up;” cover the labels with clear plastic tape; place a signed custody seal over the cooler lid.

Samples will be packaged by the field personnel and transported as low-concentration environmental samples. The samples will be hand-delivered or delivered by an express carrier within 48 hours of the time of collection. Shipments will be accompanied by the COC form identifying the contents. The original form will accompany the shipment; copies will be retained by the sampler for the sampling office records. If the samples are sent by common carrier, a bill of lading will be used. Receipts or bills of lading will be retained as part of the permanent project documentation. Commercial carriers are not required to sign off on the COC form as long as the forms are sealed inside the sample cooler and the custody seals remain intact.

Sample custody seals and packing materials for filled sample containers will be provided by the analytical laboratory. The filled, labeled, and sealed containers will be placed in a cooler on ice and carefully packed to eliminate the possibility of container breakage.

Additional procedures for packing, handling, and shipping environmental samples are included in the ISGSP Work Plan.

7.5 Laboratory Custody Procedures

7.5.1 General

Upon sample receipt, laboratory personnel will be responsible for sample custody. The original field COC form will accompany all samples requiring laboratory analysis. The laboratory will use COC guidelines described in the USEPA guidance documents. Samples will be kept secured in the laboratory until all stages of analysis are complete. All laboratory personnel having samples in their custody will be responsible for documenting and maintaining sample integrity.

7.5.2 Sample Receipt and Storage

Immediately upon sample receipt, the laboratory sample custodian will verify the package seal, open the package, and compare the contents against the field COC. If a sample container is received broken, the sample is in an inappropriate container, or has not been preserved by appropriate means, Dover/Universal will be notified. The laboratory sample custodian will be responsible for logging the samples in, assigning a unique laboratory identification number to each sample, labeling the sample bottle with the laboratory identification number, and moving the sample to an appropriate storage location to await analysis. The project name, field sample code, date sampled, date received, analysis required, storage location and date, and action for final disposition will be recorded in the laboratory tracking system. Relevant custody documentation will be placed in the project file.

7.5.3 Sample Analysis

Analysis of an acceptable sample will be initiated by worksheets that contain all pertinent information for analysis. The analyst will sign and date the laboratory COC form when removing the samples from storage.

Samples will be organized into sample delivery groups (SDGs) by the laboratory. A SDG may contain up to 20 field samples (field duplicates, trip blanks, and rinse blanks are considered field samples for the purposes of SDG assignment). All field samples assigned to a single SDG shall be received by the laboratory over a maximum of 7 calendar days and must be processed through the laboratory (preparation, analysis, and reporting) as a group.

Each SDG will be self-contained for all of the required quality control samples. All parameters within an SDG will be extracted and analyzed together in the laboratory. These rules for analysis will ensure that the QC samples for an SDG are applicable to the field samples of the same SDG and that the best possible comparisons may be made.

7.5.4 Sample Storage Following Analysis

Samples will be maintained by the laboratory for one month after the final report is delivered to Universal. After this period, the laboratory is responsible for the disposal of the samples. Unused portions of the samples, sample extracts, and associated wastes will be disposed of by the laboratory in accordance with applicable rules and regulations, as specified in their Standard Operating Procedure for waste disposal.

8. Quality Control Requirements

8.1 Quality Assurance Indicators

The overall quality assurance objective for this QA/SAPP is to develop and implement procedures for sampling, COC, laboratory analysis, instrument calibration, data reduction and reporting, internal quality control, audits, preventive maintenance, and corrective action so that valid data will be generated. These procedures are presented or referenced in the following sections of the QA/SAPP. Specific QC checks are discussed in Section 8.2.

Quality assurance indicators are generally defined in terms of five parameters:

1. Representativeness
2. Comparability
3. Completeness
4. Precision
5. Accuracy

Each parameter is defined below. Specific objectives for the site actions are set forth in other sections of this QAPP, as referenced below.

8.1.1 Representativeness

Representativeness is the degree to which sampling data accurately and precisely represent site conditions and is dependent on sampling and analytical variability and the variability of environmental media at the site. The actions have been designed to assess the presence of the chemical constituents at the time of sampling. This QA/SAPP presents field sampling methodologies and laboratory analytical methodologies. The use of the prescribed field and laboratory analytical methods, with associated holding times and preservation requirements, are intended to provide representative data.

8.1.2 Comparability

Comparability is the degree of confidence with which one data set can be compared to another. Comparability between phases of the actions (if additional phases are required) will be maintained through consistent use of the sampling and analytical methodologies set forth in this QA/SAPP and through the use of established QA/QC procedures and the utilization of appropriately trained personnel.

8.1.3 Completeness

Completeness is defined as a measure of the amount of valid data obtained from an event and/or investigation compared to the total amount that was obtained. This will be determined upon final assessment of the analytical results, as discussed in Section 8.6.

8.1.4 Precision

Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the objectives of the action. To maximize precision, sampling and analytical procedures will be followed. All work for the site actions will adhere to established protocols presented in the QA/SAPP. Checks for analytical precision will include the analysis of matrix spike, matrix spike duplicates, laboratory duplicates, and field duplicates. Checks for field measurement precision will include obtaining duplicate field measurements. Further discussion of precision QC checks is provided in Section 8.4.

8.1.5 Accuracy

Accuracy is a measure of how close a measured result is to the true value. Both field and analytical accuracy will be monitored through initial and continuing calibration of instruments. In addition, reference standards, matrix spikes, blank spikes, and surrogate standards will be used to assess the accuracy of the analytical data.

8.2 Field Quality Control Checks

8.2.1 Field Measurements

To verify the quality of data using field instrumentation, duplicate measurements will be obtained and reported for all field measurements. A duplicate measurement will involve obtaining measurements a second time at the same sampling location.

8.2.2 Sample Containers

Certified-clean sample containers (I-Chem 300 Series or equivalent) will be supplied by the laboratory. Certificates of analysis will be filed in the project file.

8.2.3 Field Duplicates

Field duplicates will be collected from the different site materials to verify the reproducibility of the sampling methods. Field duplicates will be prepared by placing well homogenized aliquots from the same sample location into individual sample containers, which are submitted blind to the laboratory. In general, field duplicates will be analyzed at a 5% frequency (every 20 samples) for the chemical constituents. Table 1 provides an estimated number of field duplicates to be prepared for each applicable parameter and matrix.

8.2.4 Rinse Blanks

Rinse blanks are used to monitor the cleanliness of the sampling equipment and the effectiveness of the cleaning procedures. Rinse blanks will be prepared and submitted for analysis once per day per matrix. Rinse blanks will be prepared by filling sample containers with analyte-free water (supplied by the laboratory) that has been routed through a cleaned sampling device. When dedicated sampling devices are used or sample containers are

used to collect the samples, rinse blanks will not be necessary. Table 1 provides an estimated number of rinse blanks for environmental media samples to be collected during the removal action.

8.2.5 Trip Blanks

Trip blanks will be used to assess whether site samples have been exposed to non-site-related volatile constituents during sample storage and transport. Trip blanks will be submitted at a frequency of once per cooler of aqueous samples to be analyzed for VOCs. A trip blank will consist of a container filled with analyte-free water (supplied by the laboratory) that remains unopened with field samples throughout the sampling event. Trip blanks will only be analyzed for VOCs. Table 1 provides an estimated number of trip blanks to be collected for each matrix and parameter during the soil and groundwater sampling activities.

8.3 Analytical Laboratory Quality Control Checks

8.3.1 General

Internal laboratory QC checks will be used to monitor data integrity. These checks will include method blanks, matrix spikes (and matrix spike duplicates), spike blanks, internal standards, surrogate samples, calibration standards, and reference standards. Project QC limits for duplicates and matrix spikes are identified in Table 2. Laboratory control charts will be used to determine long-term instrument trends.

8.3.2 Method Blanks

Sources of contamination in the analytical process, whether specific analyses or interferences, need to be identified, isolated, and corrected. The method blank is useful in identifying possible sources of contamination within the analytical process. For this reason, it is necessary that the method blank is initiated at the beginning of the analytical process and encompasses all aspects of the analytical work. As such, the method blank would assist in accounting for any potential contamination attributable to glassware, reagents, instrumentation, or other sources that could affect sample analysis. One method blank will be analyzed with each analytical series associated with no more than 20 samples.

8.3.3 Surrogate Spikes

Surrogates are compounds that are unlikely to occur under natural conditions that have properties similar to the analytes of interest. This type of control is primarily used for organic samples analyzed by gas chromatography/mass spectrometry (GC/MS) and gas chromatography (GC) methods and is added to the samples prior to purging or extraction. The surrogate spike is utilized to provide broader insight into the proficiency and efficiency of an analytical method on a sample-specific basis. This control reflects analytical conditions that may not be attributable to sample matrix.

If surrogate spike recoveries exceed specified QC limits, then the analytical results need to be evaluated thoroughly in conjunction with other control measures. In the absence of other control measures, the integrity of the data may not be verifiable and reanalysis of the samples with additional control measures may be necessary.

Surrogate spike compounds will be selected utilizing the guidance provided in the analytical methods.

8.3.4 Laboratory Duplicates

For inorganics, laboratory duplicates will be analyzed to assess laboratory precision. Laboratory duplicates are defined as a separate aliquot of an individual sample that is analyzed as a separate sample. Table 1 presents an estimated number of laboratory duplicates for each applicable parameter.

8.3.5 Calibration Standards

Calibration check standards analyzed within a particular analytical series provide insight regarding instrument stability. A calibration check standard will be analyzed at the beginning and end of an analytical series, or periodically throughout a series containing a large number of samples.

In general, calibration check standards will be analyzed after every 12 hours, or more frequently, as specified in the applicable analytical method. If results of the calibration check standard exceed specified tolerances, then samples analyzed since the last acceptable calibration check standard will be reanalyzed.

Laboratory instrument calibration standards will be selected utilizing the guidance provided in the analytical methods summarized in Section 13.

8.3.6 Reference Standards/Control Samples

Reference standards are standards of known concentration and independent in origin from the calibration standards. The intent of reference standard analysis is to provide insight into the analytical proficiency within an analytical series. This includes the preparation of calibration standards, the validity of calibration, sample preparation, instrument set-up, and the premises inherent in quantitation. Reference standards will be analyzed at the frequencies specified within the analytical methods.

8.4 Data Precision Assessment Procedures

Field precision is difficult to measure because of temporal variations in field parameters. However, precision will be controlled through the use of experienced field personnel, properly calibrated meters, and duplicate field measurements. Field duplicates will be used to assess precision for the entire measurement system, including sampling, handling, shipping, storage, preparation, and analysis.

Laboratory data precision will be monitored through the use of matrix spike/matrix spike duplicate and laboratory duplicate sample analyses.

The precision of data will be measured by calculation of the relative percent difference (RPD) by the following equation:

$$RPD = \frac{(A-B)}{(A+B)/2} \times 100$$

Where:

A = Analytical result from one of two duplicate measurements; and
B = Analytical result from the second measurement.

Precision objectives for duplicate analyses are identified in Table 2.

8.5 Data Accuracy Assessment Procedures

The accuracy of field measurements will be controlled by experienced field personnel, properly calibrated field meters, and adherence to established protocols. The accuracy of field meters will be assessed by review of calibration and maintenance logs.

Laboratory accuracy will be assessed via the use of matrix spikes, surrogate spikes, and reference standards. Where available and appropriate, QA performance standards will be analyzed periodically to assess laboratory accuracy. Accuracy will be calculated in terms of percent recovery as follows:

$$\% \text{ Recovery} = \frac{A-X}{B} \times 100$$

Where:

A = Value measured in spiked sample or standard;
X = Value measured in original sample; and
B = True value of amount added to sample or true value of standard.

This formula is derived under the assumption of constant accuracy between the original and spiked measurements. Accuracy objectives for matrix spike recoveries are identified in Table 2.

8.6 Data Completeness Assessment Procedures

Completeness of a field or laboratory data set will be calculated by comparing the number of valid sample results generated to the total number of results generated.

$$\text{Completeness} = \frac{\text{Number valid results}}{\text{Total number of results generated}} \times 100$$

As a general guideline, overall project completeness is expected to be at least 90%. The assessment of completeness will require professional judgment to determine data usability for intended purposes.

9. Instrument/Equipment Testing, Inspection, and Maintenance Requirements

9.1 General

Testing and maintenance schedules have been developed for both field and laboratory instruments. A summary of the testing and maintenance activities to be performed is presented below.

9.2 Field Instruments and Equipment

Prior to any field sampling, each piece of field equipment will be inspected to assure it is operational. If the equipment is not operational, it must be serviced prior to use. All meters that require charging or batteries will be fully charged or have fresh batteries. If instrument servicing is required, it is the responsibility of the appropriate Task Manager or field personnel to follow the maintenance schedule and arrange for prompt service.

Field instrumentation to be used in this study include a PID to measure organic vapors and meters to measure pH, conductivity, turbidity, and temperature. A logbook will be kept for each field instrument. Each logbook will contain records of operation, maintenance, calibration, problems, and repairs. The BBL Task Managers will review calibration and maintenance logs.

Field equipment returned from a site will be inspected to confirm it is in working order. This inspection will be recorded in the logbook or field notebooks as appropriate. It will also be the obligation of the last user to record any equipment problems in the logbook.

Non-operational field equipment will be either repaired or replaced. Appropriate spare parts will be made available for field meters.

9.3 Laboratory Instruments and Equipment

9.3.1 General

All laboratory instruments and equipment repair and maintenance shall be documented. Documentation will include details of any observed problems, corrective measure(s), routine maintenance, and instrument repair (which will include information regarding the repair and the individual who performed the repair).

Preventive maintenance of laboratory equipment generally will follow the guidelines recommended by the manufacturer. A malfunctioning instrument will be repaired immediately by in-house staff or through a service call from the manufacturer.

9.3.2 Instrument Maintenance

Maintenance schedules for laboratory equipment will adhere to the manufacturer's recommendations. Records will reflect the complete history of each instrument and specify the time frame for future maintenance. Major repairs or maintenance procedures will be performed through service contracts with the manufacturer or qualified contractors. Paperwork associated with service calls and preventative maintenance calls will be kept on file by the laboratory.

Laboratory Systems Managers are responsible for the routine maintenance of instruments used in the particular laboratory. Any routine preventative maintenance carried out will be logged into the appropriate logbooks. The frequency of routine maintenance will be dictated by the nature of samples being analyzed, the requirements of the method used, and/or the judgment of the Laboratory Systems Manager.

All major instruments will be backed up by comparable (if not equivalent) instrument systems in the event of unscheduled downtime. An inventory of spare parts will also be available to minimize equipment/instrument downtime.

10. Instrument Calibration and Frequency

10.1 Field Instruments and Equipment

Field personnel are responsible for ensuring that a master calibration/maintenance log is maintained following the procedures specified for each measuring device. Each log will include, at a minimum where applicable, the following:

- name of device and/or instrument calibrated;
- device/instrument serial/identification number;
- frequency of calibration;
- date(s) of calibration(s);
- results of calibration(s); and
- name of person(s) performing calibration(s).

Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications.

Equipment to be used during the field sampling will be examined to certify that it is in operating condition. This includes checking the manufacturer's operating manual to ensure that all maintenance requirements are being observed. Field notes from previous sampling events will be reviewed to ensure that any prior equipment problems are not overlooked and that any necessary repairs to equipment have been carried out.

Calibration of field instruments will be performed at the intervals specified by the manufacturer, or more frequently as conditions dictate. Field instruments will include a PID, pH meter, thermometer, nephelometer, and specific conductivity meter. In the event that an internally calibrated field instrument fails to meet calibration/checkout procedures, it will be returned to the manufacturer for service.

Calibration of field instruments is governed by the specific Standard Operating Procedures (SOPs) presented in the OM&M Plan. All readings and calibrations will be recorded in the field notebook.

10.2 Laboratory Instrument and Equipment

When analyses are conducted according to the USEPA SW-846 methods, the calibration procedures and frequencies specified in the applicable method will be followed. For analyses governed by SOPs, see the appropriate SOP for the required calibration procedures and frequencies. Records of calibrations will be filed and maintained by the laboratory. These records will be subject to a QA audit. For all instruments, the laboratory will maintain trained repair staff with in-house spare parts or will maintain service contracts with vendors.

All standards used in the calibration of equipment are traceable, directly or indirectly, to National Institute of Standards and Technology (NIST). All standards received shall be logged into standard receipt logs maintained by the individual analytical groups. Each group shall maintain a standards log that tracks the preparation of standards used for calibration and QC purposes.

11. Data Management

The purpose of data management is to ensure that all of the necessary data are accurate and readily accessible to meet the analytical and reporting objectives of the project. The field investigation will encompass a large number of samples and analytes from a large geographic area. From the large amount of resulting data, the need arises for a structured, comprehensive, and efficient program for management of data.

The data management program established for the project includes field documentation and sample QA/QC procedures, methods for tracking and managing the data, and a system for filing all site-related information. More specifically, data management procedures will be employed to efficiently process the information collected so that the data are readily accessible and accurate. These procedures are described in detail in the following sections.

The data management plan has three elements: 1) sample designation system, 2) field activities, and 3) sample tracking and management.

11.1 Sample Designation System

A concise and easily understandable sample designation system is an important part of the project sampling activities. It provides a unique sample number that will facilitate both sample tracking and easy resampling of select locations to evaluate data gaps, if necessary. The sample designation system to be employed during the sampling activities will be consistent, yet flexible enough to accommodate unforeseen sampling events or conditions. A combination of letters and numbers will be used to yield a unique sample number for each field sample collected, as outlined in Section 6.2.1.

11.2 Field Activities

Field activities designed to gather the information necessary to make decisions regarding the offsite areas require consistent documentation and accurate record keeping. During site activities, standardized procedures will be used for documentation of field activities, data security, and QA. These procedures are described in further detail in the following subsections.

11.2.1 Field Documentation

Complete and accurate record keeping is a critical component of the field investigation activities. When interpreting analytical results and identifying data trends, investigators realize that field notes are an important part of the review and validation process. To ensure that the field investigation is thoroughly documented, several different information records, each with its own specific reporting requirements, will be maintained, including the following:

- field logs; and
- chain-of-custody forms.

A description of each of these types of field documentation is provided below.

Field Logs

The personnel performing the field activities will keep field logs that detail all observations and measurements made during the remedial investigation. Data will be recorded directly into site-dedicated, bound notebooks, with each entry dated and signed. To ensure at any future date that notebook pages are not missing, each page will be sequentially numbered. Erroneous entries will be corrected by crossing out the original entry, initialing it, and then documenting the proper information. In addition, certain media sampling locations will be surveyed to accurately record their locations. The survey crew will use their own field logs and will supply the sampling location coordinates to the Database Administrator.

Chain-of-Custody Forms

COC forms are used as a means of documenting and tracking sample possession from time of collection to the time of disposal. A COC form will accompany each field sample collected, and one copy of the form will be filed in the field office. All field personnel will be briefed on the proper use of the COC procedure. A more thorough description of the COC forms is located in the SOPs (ISGSP Work Plan).

11.2.2 Data Security

Measures will be taken during the field investigation to ensure that samples and records are not lost, damaged, or altered. When not in use, all field notebooks will be stored at the field office or locked in the field vehicle. Access to these files will be limited to the field personnel who utilize them.

11.3 Sample Management and Tracking

A record of all field documentation, as well as analytical and QA/QC results, will be maintained to ensure the validity of data used in the site analysis. To effectively execute such documentation, carefully constructed sample tracking and data management procedures will be used throughout the sampling program.

Sample tracking will begin with the completion of COC forms. The completed COC forms associated with samples collected accompany the samples. Copies of all completed COC forms will be maintained in the field office. The laboratory shall verify receipt of the samples via fax or e-mail within two days of receipt.

When analytical data are received from the laboratory, the incoming analytical data packages should be reviewed against the information on the COCs to confirm that the correct analyses were performed for each sample and that results for all samples submitted for analysis were received. Any discrepancies noted must be promptly followed-up with the laboratory.

12. Data Review, Validation, and Verification

12.1 General

After field and laboratory data are obtained, the data will be subject to the following:

- reduction, or manipulation mathematically, or otherwise into meaningful and useful forms;
- review;
- organization, interpretation, and reporting; and
- data validation, if warranted.

12.2 Field Data Reduction and Review

Information collected in the field through visual observation, manual measurement, and/or field instrumentation will be recorded in field notebooks or data sheets and/or on forms. Such data will be reviewed by the appropriate Task Manager for adherence to the OM&M Plan and this QA/SAPP and for consistency. Concerns identified as a result of this review will be discussed with the field personnel, corrected if possible, and, as necessary, incorporated into the data evaluation process.

Field data calculations, transfers, and interpretations will be conducted by the field personnel and reviewed for accuracy by the appropriate supervisor. Logs and documents will be checked for the following:

- general completeness;
- readability;
- usage of appropriate procedures;
- appropriate instrument calibration and maintenance;
- reasonableness in comparison to present and past data collected;
- correct sample locations; and
- correct calculations and interpretations.

12.3 Laboratory Data Reduction and Review

12.3.1 Laboratory Data Reduction

The calculations used for data reduction will be specified in each of the analytical methods referenced previously. Whenever possible, analytical data will be transferred directly from the instrument to a computerized data system. Raw data will be entered into permanently bound laboratory notebooks. The data entered will be sufficient to document all factors used to arrive at the reported value.

Concentration calculations for chromatographic analyses will be based on response factors. Quantitation will be performed using either internal or external standards.

Inorganic analyses will be based on regression analysis. Regression analysis is used to fit a curve through the calibration standard data. The sample concentrations will be calculated using the resulting regression equations. Non-aqueous values will be reported on a dry-weight basis. Unless otherwise specified, all values will be reported uncorrected for blank contamination.

12.3.2 Laboratory Data Review

Data will be subject to multi-level review by the laboratory. The group leader will review all data reports prior to release for final data report generation. The quality assurance manager will review the final data reports, and the laboratory director will review a cross section of the final data reports prior to shipment.

If discrepancies or deficiencies exist in the analytical results, then corrective action will be taken in accordance with laboratory policy. Deficiencies discovered as a result of internal data review, as well as the corrective actions to be used to rectify the situation, will be documented in the case narrative.

12.4 Data Validation and Verification

All data generated for health and safety and engineering design/control purposes will be subjected to the data validation and verification procedures outlined in Section 13, if warranted. Data generated for disposal purposes will not be reviewed. Initially a data usability review will be performed on the data.

13. Validation and Verification Methods

13.1 Data Validation and Verification

Data validation entails a review of the QC data and the raw data to verify that the laboratory was operating within required limits, the analytical results were correctly transcribed from the instrument read outs, and which, if any, environmental samples were related to any out-of-control QC samples. The objective of data validation is to identify any questionable or invalid laboratory measurements.

No data validation is proposed at this time. However, data will be reviewed for usability. If validation should become warranted, the data will be validated using the most recent versions of the USEPA's and NYSDEC's data validation guidance documents. These procedures and criteria may be modified, as necessary, to address project-specific and method-specific criteria, control limits, and procedures.

Data validation will consist of data screening, checking, reviewing, editing, and interpretation to document analytical data quality and to determine whether the quality is sufficient to meet the data quality objectives. Data validation will include a review of completeness and compliance, including, but not limited to, the elements provided in Table 4.

The data validator will verify that reduction of laboratory measurements and laboratory reporting of analytical parameters is in accordance with the procedures specified for each analytical method and/or as specified in this QA/SAPP. Any deviations from the analytical method or any special reporting requirements apart from that specified in this QA/SAPP will be detailed on COC forms.

Upon receipt of laboratory data, the following procedures will be executed by the data validator:

- evaluate completeness of the data package;
- verify that field COC forms were completed and that samples were handled properly;
- verify that holding times were met for each parameter. Holding time exceedences, should they occur, will be documented. Data for all samples exceeding holding time requirements will be flagged as either estimated or rejected. The decision as to which qualifier is more appropriate will be made on a case-by-case basis;
- verify that parameters were analyzed according to the methods specified;
- review QA/QC data (i.e., make sure duplicates, blanks, and spikes were analyzed on the required number of samples, as specified in the method; verify that duplicate and matrix spike recoveries are acceptable);
- investigate anomalies identified during review. When anomalies are identified, they will be discussed with the Project Manager and/or Laboratory Manager, as appropriate; and
- if data appears suspect, investigate the specific data of concern. Calculations will be traced back to raw data; if calculations do not agree, the cause will be determined and corrected.

Deficiencies discovered as a result of the data review, as well as the corrective actions implemented in response, will be documented and submitted in the form of a written report addressing the following topics as applicable to each method:

- assessment of the data package;
- description of any protocol deviations;
- failures to reconcile reported and/or raw data;
- assessment of any compromised data;
- overall appraisal of the analytical data; and
- table of site name, sample quantities, matrix, and fractions analyzed.

It should be noted that qualified results do not necessarily invalidate data. The goal to produce the best possible data does not necessarily mean producing data without QC qualifiers. Qualified data can provide useful information.

Resolution of any issues regarding laboratory performance or deliverables will be handled between the laboratory and the data validator. Suggestions for reanalysis may be made by the QAM at this point.

Tables

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engineers, scientists, economists

Table 1

Universal Instruments Corporation
Former Dover Electronics Site
Kirkwood, NY

OM Soil and Decontamination Water Sampling Program

Environmental and Quality Control Analyses

Parameter	Estimated Environmental Sample Quantity	Field QC Analyses						Laboratory QC Sample						Total
		Trip Blank		Rinse Blank		Field Duplicate		Matrix Spike		Matrix Spike Duplicate		Lab Duplicate		
		Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	
Decon Water Samples														
PCBs		NA	--	1/day		NA	--	NA	--	NA	--	NA	--	
TCL Volatile Organics		1/cooler		1/day		NA	--	NA	--	NA	--	NA	--	
TCL Semivolatile Organics		NA	--	1/day		NA	--	NA	--	NA	--	NA	--	
TAL Inorganics		NA	--	1/day		NA	--	NA	--	NA	--	NA	--	
Ignitability		NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	
Reactive Cyanide/Sulfide		NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	
Corrosivity		NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	
Soil Samples														
PCBs		NA	--	1/day		1/20		1/20		NA	--	NA	--	
TCL Volatile Organics		NA	--	1/day		1/20		1/20		NA	--	NA	--	
TCL Semivolatile Organics		NA	--	1/day		1/20		1/20		NA	--	NA	--	
Total Inorganics		NA	--	1/day		1/20		1/20		NA	--	NA	--	
TCLP VOCs		NA	--	NA	--	1/20		1/20		NA	--	NA	--	
TCLP SVOCs		NA	--	NA	--	1/20		1/20		NA	--	NA	--	
TCLP Inorganics		NA	--	NA	--	1/20		1/20		NA	--	NA	--	
Ignitability		NA	--	NA	--	1/20		1/20		NA	--	NA	--	
Reactive Cyanide/Sulfide		NA	--	NA	--	1/20		1/20		NA	--	NA	--	
Corrosivity		NA	--	NA	--	1/20		1/20		NA	--	NA	--	

Notes:

1/day = One rinse blank per day or one per 20 samples, whichever is more frequent. Rinse blanks not required when dedicated sampling equipment is used.
1/cooler = One trip blank per cooler of volatile organic sampling of aqueous media.
1/20 = One per 20 samples if over 10 samples collected.
Freq = Frequency
NA = Not Applicable
No. = Number
QC = Quality Control

Table 2

New York City Department of Sanitation
Conversion of Eight Marine Transfer Stations

Initial Soil and Groundwater Sampling Program

Analytical Quality Control Limits[1]

Parameter	Accuracy - % Recovery		Precision - RPD	
	MS/MSD	Surrogate	MS/MSD	Duplicate[2]
Soil				
Volatile Organics	70-140	75-125	30	--
Semivolatile Organics	40-120	30-140	30	--
PCBs	50-140	30-150	30	--
Metals	80-120	--	--	20
Groundwater				
Volatile Organics	70-140	75-125	30	--
Semivolatile Organics	40-120	30-140	30	--
PCBs	50-140	30-150	30	--
Metals	80-120	--	--	20

Notes:

1 The listed QC limits are based on USEPA guidance and are advisory. However, frequent failures to meet the QC limits warrant investigation of the laboratory

2 Duplicate control limits apply to laboratory duplicates. Field duplicate limits are 100% RPD for all parameters.

MS = Matrix Spike
MSD = Matrix Spike Duplicate
RPD = Relative Percent Difference

Table 3

New York City Department of Sanitation
Conversion of Eight Marine Transfer Stations

Initial Soil and Groundwater Sampling Program

Sample Containers, Preservation, and Holding Times

Parameter	Method[1]	Bottle Type	Preservation	Holding Time[2]
Soil				
Volatile Organic Compounds	8260	2-EnCore™ samplers 1-40ml glass vial	Cool to 4°C	48 hours to preservation 14 days to analysis
Semivolatile Organic Compounds	8270	1-8oz glass jar with Teflon®-lined lid	Cool to 4°C	14 days to extraction 40 days to analysis
PCBs	8082			14 days to extraction 40 days to analysis
Inorganics (except mercury)	6010	1-4oz widemouth glass jar	Cool to 4°C	180 days to analysis
Mercury	7471			28 days to analysis
TCLP-Volatiles	1311/8260	1-4oz glass jar with Teflon®-lined lid	Cool to 4°C	14 days to TCLP extraction 14 days to analysis
TCLP-Semivolatiles	1311/8270	1-8oz glass jar with Teflon®-lined lid	Cool to 4°C	14 days to TCLP extraction 7 days to extract prep 40 days to analysis
TCLP-Metals (except mercury)	1311/6010	1-4oz widemouth glass jar	Cool to 4°C	180 days to TCLP extraction 180 days to analysis
TCLP-Mercury	1311/7470			28 days to TCLP extraction 28 days to analysis
Reactive Cyanide	SW-846 Chapter 7.3	1-8oz widemouth glass jar	Cool to 4°C	7 days to analysis
Reactive Sulfide	SW-846 Chapter 7.3			14 days to analysis
Ignitability	1010			7 days to analysis
Corrosivity	9045			48 hours to analysis
Water				
Volatile Organic Compounds	8260	2-40ml glass vials with Teflon®-lined lid	HCl to pH<2 Cool to 4°C	14 days to analysis
Semivolatile Organic Compounds	8270	2-1 liter amber glass bottle with Teflon®-lined lid	Cool to 4°C	7 days to extraction 40 days to analysis
PCBs	8082	2-1 liter amber glass bottle with Teflon®-lined lid	Cool to 4°C	7 days to extraction 40 days to analysis
Inorganics (except mercury)	6010	500ml plastic bottle	HNO3 to pH<2 Cool to 4°C	180 days to analysis
Mercury	7470			28 days to analysis

Notes:
1 = USEPA. Office of Solid Waste and Emergency Response. *Test Methods for Evaluating Solid Waste.* SW-946 3rd ed. Washington, D.C. 1996.
2 = All holding times are measured from date of collection.

TCLP = Toxicity Characteristic Leaching Procedure
ml = milliliter
oz = ounce

Table 4

New York City Department of Sanitation
Conversion of Eight Marine Transfer Stations

Initial Soil and Groundwater Sampling Program

Data Validation Checklist

Review for Completeness	
1.	All chain-of-custody forms included.
2.	Case narratives.
3.	QA/QC summaries of analytical data, including supporting documentation.
4.	All relevant calibration data, including supporting documentation.
5.	Instrument and method performance data.
6.	Documentation showing laboratory's ability to attain specified method detection limits.
7.	Data report forms of examples for calculations of concentrations.
8.	Raw data used in identification and quantification of the analysis required.
Review of Compliance	
1.	Data package completed as described above.
2.	QAPP requirements for data production and reporting have been met.
3.	QA/QC criteria have been met.
4.	Instrument type and calibration procedures have been met.
5.	Initial and continuing calibration have been met.
6.	Data reporting forms are completed.
7.	Problems and corrective actions documents.