INTERIM REMEDIAL MEASURES
WORK PLAN
2350 FIFTH AVENUE
NEW YORK, NEW YORK

Prepared For:

2350 Fifth Avenue Corporation
2350 Fifth Avenue
New York, New York 10037

Prepared By:

AKRF Engineering, P.C.
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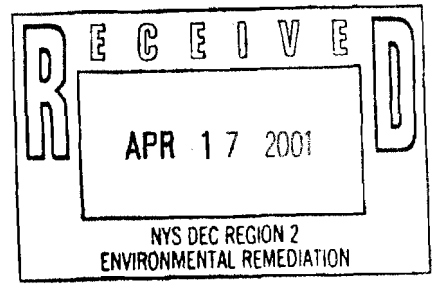
Arnold F. Flemming, P.E. #050411
President

Revised April 2001



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I. INTRODUCTION

This work plan includes enhancements to the existing interim remedial measure (IRM-1) at the 2350 Fifth Avenue site, and also a conceptual design for an additional interim remedial measure (IRM-2). IRM-1 was aimed at preventing impacts on the air within the building. IRM-2 will be aimed at remediating soil and groundwater beneath the building.

II. IRM-1

IRM-1 consisted of three measures:

1. Removal of contaminated insulating material under the slab at the western end of the building (in the area not included as part of the school). This was aimed at eliminating the major reservoir of PCE under the building.

2. Installation of a shallow soil vapor extraction system in the six-inch deep layer between the old building slab and the new floor slab of the school. This was intended to remove PCE remaining in the insulation under the old floor slab, and, by maintaining a negative pressure in the space beneath the floor, prevent any further infiltration of vapors into the building.

3. Sealing all penetrations through the slab including utilities and spaces around floor drains or cleanouts. This closes up a potential pathway for infiltration of vapors into the building.

IRM-1 was implemented in June 1997. A report on the results of the IRM was submitted to NYS DEC in September 1997. The report concluded that all contaminated insulation had been removed from the unrenovated portion of the building, and that the sub-slab vapor extraction system was effective both in reducing PCE concentrations in the building air and in removing PCE from the subfloor insulation. All air monitoring indicated that the average level of PCE in the building air was well below the 15 part per billion DOH guideline for ambient PCE concentrations in residential spaces. The only individual level exceeding the guideline was detected in one space in the September 1997 sampling, just after the ground floor of the building was first occupied.

The vapor extraction system has continued to operate since that time, but has not been closely monitored to measure its effectiveness. In August 1998, MW-3, the well at the former dry cleaning location, was attached to the SVE system. This well was constructed with a screened

section running up to just below the floor so it could serve as a vapor extraction well. A measurement taken at that time indicated that high levels of PCE (over 500 parts per million) were being extracted from the well. This well will be incorporated as part of the IRM-2 system.

This work plan proposes to renovate the system, resume monitoring to measure its effectiveness, and enhance its operation to maximize the removal of PCE from the building.

III. SUB-SLAB VAPOR EXTRACTION SYSTEM

Renovation of the building for use as a school included pouring a new concrete floor slab over about a six inch layer of sand and gravel placed on the old floor slab. Drain pipes were installed beneath the floor by cutting trenches through both the new and old floor slabs, backfilling around the pipes with clean sand and gravel material, and then restoring the upper floor slab. The drain pipe areas provide a direct connection through which vapors from the insulation under the old slab could diffuse upwards into the space between the old and new slabs.

A soil vapor extraction system was installed in the space between the upper and lower slabs to remove PCE from the space below the floor from which it could infiltrate into the building. Installing the system in this location has the effect of removing PCE preferentially from those areas where there are breaks in the old slab which can serve as pathways for vapors to migrate upwards.

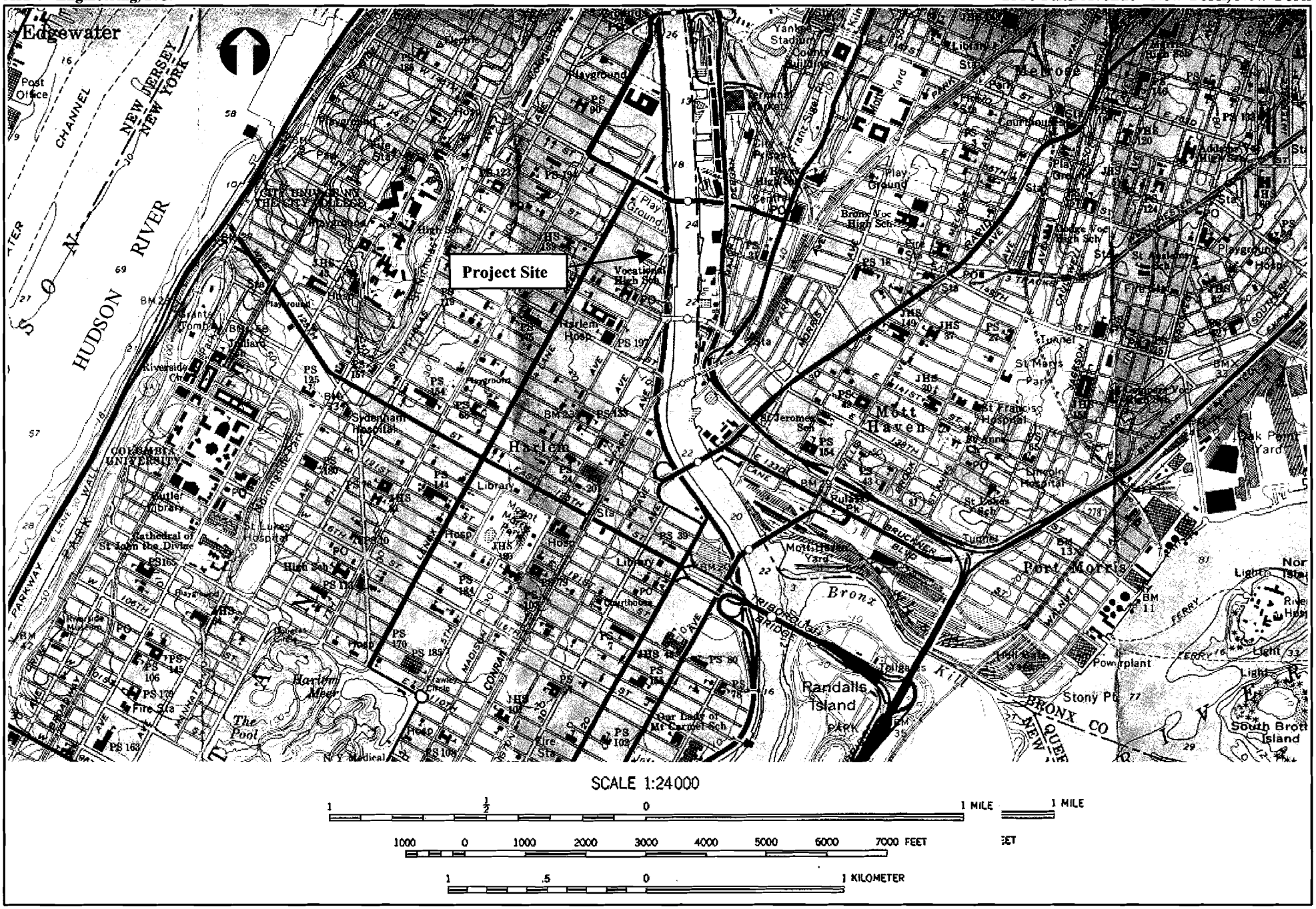
Six horizontal vapor extraction wells were installed as shown in Figure III-1: four extending in from the west wall of the renovated area and two extending in from the south wall of the loading dock. This maintains a negative pressure between the slabs in the entire portion of the school known to be underlain with insulation which may contain PCE.

IV. SYSTEM RENOVATION

To ensure proper operation of the sub-slab vapor extraction system, the system will be renovated as follows:

1. All piping will be inspected and any leaks or worn spots will be repaired.

2. Activated carbon canisters will be checked for breakthrough and replaced as necessary. Breakthrough is defined as an output from the final canister exceeding background levels of volatile organic compounds as measured by the PID. The air samples for the periodic



Source: USGS Topographic Map - Central Park Quadrangle: New York/New Jersey
Dated 1966; Photorevised 1979. Contour Interval 10 feet.
Quadrangle Longitude: 73° 52'30" Quadrangle Latitude: 40° 45'
National Geodetic Vertical Datum of 1929.

FIGURE II-1
LOCATION MAP

PID measurements to forecast carbon bed breakthrough time will be collected in tedlar bags from the valve between the two carbon cannisters and the valve at the end of the two cannisters.

3. Filters will be changed and the blower motor serviced as needed. The air filter must be cleaned or replaced if the pressure drop across the filter, as measured by the magnahelic gauges is 15 inches of water or greater.

4. All meters and gauges will be checked and replaced as necessary.

5. The vacuum lines for the SVE wells will be checked for restrictions due to influx of silt. The SVE lines will be cleaned, as necessary, to maintain the effectiveness of the system.

Thereafter, the system will operated and monitored in accordance with the procedures specified in the operation and maintenance plan (Appendix A). A quarterly progress report will be prepared and submitted to the NYS DEC (see Operations and Maintenance Plan). A copy of all completed Weekly Log forms and Maintenance/Repair Event Description forms will be included in the quarterly progress reports. These forms will contain all gauge readings, all actions taken regarding the system, and any changes made to it during the previous quarter. The quarterly progress report is discussed in further detail in the attached Operations and Maintenance Plan.

V. MONITORING

A regular monitoring program will be implemented for both air quality within the building, and levels of contaminants being collected by the vapor extraction system. Sampling will be performed over a three-month period prior to any enhancement in the operation of the SVE system to establish baseline indoor air quality conditions. Sampling will then continue during operation of the enhanced system. After the system is turned off, post-remedial sampling will be performed as described below (see section VII).

Ambient air sampling will be performed bimonthly (once every two months). The sampling will be performed using six liter SUMMA passivated canisters in accordance with USEPA test method TO-14. Samples will be collected over an eight-hour period at the five locations where the highest PCE concentrations were observed in earlier testing episodes.

The building HVAC system will be in normal operation during sample collection.For each sample, the start time, end time, maximum and minimum temperature, final ambient and

interior temperature, final flow controller reading, and final vacuum shall be recorded. A duplicate sample will be collected at one of the sampling locations. A background sample of the ambient air outside the building will be collected at the same time as the sampling program. An identification tag will be attached to each cannister for shipment to the laboratory.

Samples will be analyzed for PCE and its decomposition products (trichloroethene, 1,1 - dichloroethene, trans-1,2 dichloroethene, and vinyl chloride) by a New York State ELAP-approved laboratory following USEPA method TO-14. The results of the sample, duplicate, and background analyses and all QA/QC data will be transmitted to DOH and DEC in the quarter progress report.

Levels of volatile organic compounds being collected by the SVE system will be measured weekly using a photoionization detector. These samples will not be sent to a laboratory for analysis. The weekly sampling of the system will be performed by collecting grab samples in tedlar bags from the sampling valve located on the activated carbon side of the blower but before the activated carbon collectors. An overall sample will be collected with the entire system in operation, and separate samples will be collected from each leg of the system by closing the valves controlling all the other legs, then running the system for about 20 minutes before collecting the sample. The two short legs which run from the loading dock under the hallway near the hot water heater room will be run together, since each individually does not produce enough air flow to prevent the blower from overheating.

VI. IRM-1 ENHANCEMENT

Each of the six horizontal wells which constitutes the vapor extraction system is valved so it can be controlled separately. When all the legs of the system are closed off except for one, the vacuum in that leg increases from about 5 inches of water to about 20 inches of water. This increases the radius of effectiveness of the open leg, changes the pattern of air flow beneath the floor, and may draw increased PCE from locations further from the collection pipe.

Following the initial evaluation of the system, the effectiveness of the system will be enhanced by "pulsing" the system by turning various combinations of pipes on and off periodically to vary the pressure distribution in the space under the building. Initially, when the system is being pulsed, levels of volatile organics will be measured hourly and then daily to determine the drop-off rate of contaminant collection. Each leg will be run until collection levels have dropped off by 90 percent from the initial level. Then the next leg will be pulsed. At least two complete cycles of pulsing will be performed.

Further enhancements to IRM-1 will be proposed if collected levels of PCE have not already declined or do not decline over a reasonable time period. DOH indoor air guidelines for

residences are not applicable to this building, which is occupied for commercial or community facility uses. Since average ambient levels within the building have not exceeded the DOH residential guideline since the initial implementation of the IRM, and no individual area measurements have exceeded the guideline since 1997, any measured indoor level which exceeds the guideline will constitute an increase in indoor ambient air levels and will be investigated. If such increases persist over two consecutive monitoring periods, then modifications to the IRM will be proposed.

VII. POST-REMEDIATION TESTING

When the sub-slab vapor extraction system is not collecting significant levels of PCE, ambient air testing in the building will be performed to confirm that PCE levels in the sub-slab insulation are no longer significantly impacting air quality in the building. Testing will not begin until the vapor extraction system has been turned off for at least two weeks. At least four rounds of air testing will be performed to assess the effects of different ventilation conditions and different meteorological conditions. Quarterly post-remediation monitoring will be performed for a period of two years following termination of the SVE operation.

VIII. IRM-2 CONCEPTUAL PLAN

Interim Remedial Measure 2 is intended to remediate the PCE contamination under the building. This is in two forms: contaminated soil in the vadose zone and contaminated soil/groundwater in the saturated zone. The contaminated soil in the vadose zone is miscellaneous fill material. The soil just below the groundwater level to which most of the PCE is bound is organic silt or clay. PCE contamination in the vadose zone soil was found only at one location (M-3) and is believed to be limited to the source area. PCE contamination was found at about the level of the groundwater interface at locations within about 30 feet of the source area. The Phase I Focused Remedial Investigation will determine whether PCE has spread further downgradient.

For PCE-contaminated soil in the vadose zone, soil vapor extraction is a presumptive remedy and will be utilized for IRM-2. For soil/groundwater in the saturated zone, air sparging or pump-and-treat would be the most common remedies, but neither would be very effective in the organic clay/silt soil. In this type of soil, the radius of effectiveness of sparging points would be very limited. Furthermore, because of the high organic carbon content (up to 3.5 percent total organic carbon) the partition coefficient greatly favors absorption of PCE onto the soil, so pump-and treat would be very inefficient. Since the area of contamination is relatively limited, the proposed treatment is local lowering of the groundwater level by pumping, if feasible,

accompanied by soil vapor extraction to remove PCE from the unsaturated soil.

Pilot studies proposed as part of Phase 1 of the Focused Feasibility Study will provide the data required to develop an engineering design for the proposed soil/groundwater vapor extraction remediation system, including well spacings and locations, pumping rates, emission control systems, etc. The detailed design will be submitted to DEC for review and approval prior to construction of the system.

IX. SCHEDULE FOR INTERIM REMEDIAL MEASURES

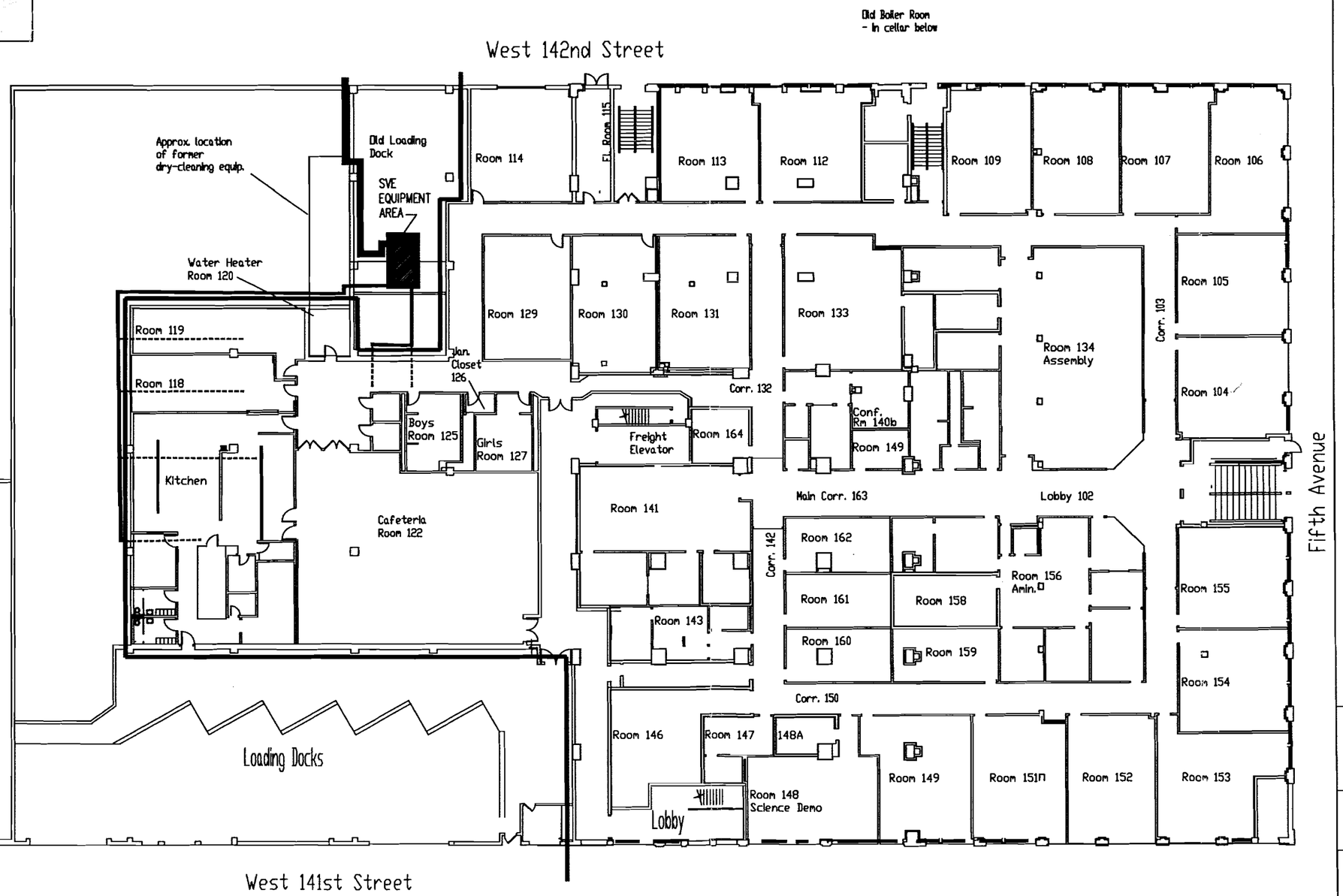
IRM-1 Enhancement

Weeks after start	Task
3	System Renovation
4-21	System Evaluation
22-50	Enhanced Operation
51-57	Post-Remediation Testing

Quarterly air testing will continue for two years following termination of system operations.

IRM-2

Weeks after start	Task
4	Pilot test
5-10	System design
12-15	DEC review of design
16-22	System installation
22-24	Testing
25-	System operation



prepared for:
2350 FIFTH AVENUE CORPORATION
for submission to:
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION

prepared by:
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LAST EDITED BY: M. McGoogan				
FILE NAME: 2350 5TH AVE BASE MAP FORMAT: ACAD				
FILE LOCATION: Missy'sFiles/2350 Fifth Ave./Figures				
2	12/JUNE/00		MM	
1	12/MAY/97	AF	ED	PRELIMINARY ISSUE
ISSUE	DATE	ORIG	BY	DESCRIPTION
LOCATION: NEW YORK CITY, USA				PROJECT NUMBER: 8010
SCALE: see bar scale				

0 30 FT

BASE MAP SOURCES:
Riverpoint, Inc., 7 Hillside Ave, New Rochelle, NY 108
drawn by Birger Elvenis from drawings and digital file
provided by Kirshenbaum & Tambasco, P.C., 22 Feb.,

KEY:

2" DIAM. PERFORATED SCH 80 PVC PIPE INSTALLED IN THE FILL LAYER UNDER THE N CONCRETE SLAB

3" DIAM. SCH 40 PVC PIPE

4" DIAM. ALUMINUM DUCT

SHALLOW INTER-SLAB SOIL VAPOR EXTRACTION SYSTEM AS BUILT PLAN

2350 FIFTH AVE, NEW YORK, NY

ISSUE: 2

DRAWING NUMBER: III-

APPENDIX A
VAPOR EXTRACTION SYSTEM OPERATION AND MAINTENANCE PLAN

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2350 FIFTH AVENUE
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Prepared For:

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Revised April 2001

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I. BACKGROUND

In 1997, due to the prior use of a portion of the building for dry cleaning, a shallow soil vapor extraction system was installed in the six-inch deep fill layer between the old building slab and the new floor slab. This system uses a blower to extract perchloroethylene (also known as 'perc' or PCE) from under the floor slab, creating a vacuum (pressure less than atmospheric) under the floor slab. Vapors are pulled through piping to an activated carbon adsorption system which removes the PCE before the air is released outside the building.

II. OVERVIEW OF SYSTEM FUNCTION AND COMPONENTS

The system consists of the following components (bold items are components requiring regular inspection and maintenance):

- six lengths of perforated pipe under the north west corner of the building (Rooms 119, Room 120, two in kitchen and two in hallway outside Room 125). These are not visible.
- four magnahelix vacuum gauges; one for the two pipes in the hallway outside Room 125, located in Room 120; one for the pipes in Rooms 118 and 119, located near the north wall of Room 118; and one gauge each for the two pipes in the kitchen.
- visible white PVC piping which connect the perforated pipes to the Blower in the Old Loading Dock (outside the former school portion of the building)
- The **Blower** (with associated **gauges**, **air filter** and **alarms**) provides the suction to extract air containing PCE from the perforated pipes and exhaust that air out of the building after passing through two drums connected in series containing **Activated Carbon** which adsorbs the PCE. There are audible and visible alarms located in the former school principal and former custodian offices.

III. PERSONNEL AND TRAINING

Only personnel trained by AKRF Engineering, P.C. shall be authorized to operate and maintain the system. Daily system maintenance may be performed by the tenant or an employee working in the building, if such a person is available. Weekly monitoring of PCE levels entering and leaving the system will be undertaken by AKRF personnel, as will handling system outages and repairs.

The trained on-site individual, if one is available, will be responsible for the daily operation and maintenance of the system. This individual, as well as all AKRF personnel responsible for system maintenance, will be provided with a copy of the system manufacturer's maintenance manual,

describing general upkeep requirements and operational procedures. A copy of this literature has been included in Appendix 1. However, the trained on-site individual will not be responsible for any system repairs beyond what is described in Section IV Operation of the System. If further attention is necessary, the on-site individual will contact AKRF.

IV. OPERATION OF THE SYSTEM (By trained on-site individual, if available)

STARTING/STOPPING THE SYSTEM AND ALARM

The system is controlled by a single START/STOP switch on the blower. The blower uses a large amount of power and has its own three-phase supply. The alarm is on a separate power supply (i.e., will have power even if power to the system is off). The alarm goes off whenever the blower is not functioning. Therefore, the alarm will go off if the power supply is interrupted. As soon as power is restored the system can be restarted by pressing STOP then START.

If the system has stopped, but there is power elsewhere in the building, check the appropriate three-phase circuit breaker. If the system has tripped the circuit breaker, reset the circuit breaker reset and restart the system. If it trips again, allow the system to cool off for one hour before a second attempting to restart the system. If the system trips again, AKRF should be consulted.

If the blower is not running and will not restart after pushing the STOP and then the START button, and the circuit breaker has not tripped, the system should be allowed to cool off for one hour and another attempt to restart made at that time. If the sytem can not be restarted again, AKRF should be consulted.

READING THE GAUGES

When the system has been running for at least five minutes, the gauges should be read and entered on the attached **System Log**, included in Appendix 2. Reading should start from closest to the perforated pipe and progress toward the blower the activated charcoal unit. The numbering used below is physically marked on each gauge.

1. The first gauge is a flowmeter, measuring air flow from the perforated pipe in standardized cubic feet per minute (SCFM). Typical flow is approximately 200 SCFM. If the flow is below 150 SCFM or above 250 SCFM, AKRF should be informed.

2. The second gauge measures the pressure (vacuum) before the air enters the filter. The pressure is indicated in "inches of water" (in. H_20).

3. The third gauge (on the other side of the air filter) measures the air pressure (vacuum) after the air has passed through the filter. If this level is more than 15 inches higher than the second gauge, it indicates the filter is probably becoming clogged. The system should be shut off and the filter changed. See discussion of air filter replacement and cleaning below.

4. The fourth gauge (on the other side of the blower) measures the temperature of the air after it leaves the blower. Temperatures of approximately 100^0 to 120^0 F are typical. If the temperature exceeds 140^0 F, AKRF should be contacted, since PVC pipe can be damaged by higher temperatures. The blower will automatically shut off at higher temperatures (somewhat above 200^0 F), to prevent overheating of the motor. If the blower shuts off, the alarm will sound.

5. The fifth gauge (before the drum) is another pressure gauge. If this gauge is above 55 inches of water, it indicates the piping or drum may be clogged and AKRF should be informed.

AIR FILTER REPLACEMENT AND CLEANING

The air filter should be replaced weekly, or earlier if a pressure drop (indicated by difference between pressure reading gauges on each side of the air filter) in excess of 15 inches is noted. To remove the air filter, shut off the system and release the clips on the filter assembly. Filters simply drop in, but the filter gasket and O-ring must be present. Old filters, if not visibly damaged (e.g., ripped) can usually be cleaned with warm water and mild detergent and left to air dry. If, after restarting the system with a supposedly clean filter there is still a pressure drop of more than 15 inches, another clean filter should be tried. If there is a pressure drop of more than 15 inches with any filter, the system should be left operating but AKRF should be informed.

VACUUM GAUGE READINGS

If the system is operating within acceptable ranges, the four vacuum gauges should be read (two are in the kitchen and one each in Rooms 118, and 120). The readings (in inches of water) should be noted on the System Log and AKRF notified of any which are zero.

DRUM MAINTENANCE

No daily maintenance of the drum or exhaust ducting is required beyond a visual inspection that all connections are present and no air leaks are visible or audible (e.g., hissing at one of the connections). If connections are damaged, AKRF should be contacted. When spent carbon drums must be shipped off-site, they must be properly manifested. Copies of all manifests will be included in the quarterly reports to the New York State Department of Environmental Conservation (NYSDEC).

The individual who performs the daily maintenance activities will complete a **Maintenance/Repair Event Description** form, included in Appendix 2, any time system maintenance takes place.

V. WEEKLY OPERATION AND MAINTENANCE

The drums containing the activated carbon will be tested by AKRF to see if the air coming out of the drum contains levels of PCE which indicate breakthrough has occurred. The intake and output of each drum will be tested using a photoionization detector. If detectable levels of PCE (i.e. about 1 part per million) are present in the output from the first drum, it will be replaced. It is anticipated that drums will last 2 months or more, but weekly testing will be carried out. AKRF will also measure the level of PCE entering the drum to determine how much PCE is in the air removed from under the floor. The OVM will be calibrated with isobutylene in accordance with the manufacturers recommendations. Calibration procedures vary, depending on the model utilized.

A **Weekly Log** will be kept with both PID measurements recorded. Any problems or abnormalities would be described on an addtional sheet. Electricity use and draw and the number of hours the system was operated over the previous week should be read and recorded on the Weekly Log. A copy of the Weekly Log form is included in Appendix 2.

The alarm system will be tested by cutting off the power to the blower and checking the visible and audible alarms in the former principal's and former custodian's offices. The proper operation of this system should be indicated on the Weekly Log.

AKRF will review the System Log and any Maintenance/Repair Event Description forms from the past week, if an on-site individual has been performing daily maintenance, and make any necessary adjustments to the valves regulating flow from individual perforated pipes. The AKRF representative will complete a Maintenance/Repair Event Description form for any such activities he/she performs, in addition to the form completed by the on-site individual. The AKRF representative will discuss any adjustments or modifications made to the system, and any downtime for the previous week. A copy of Weekly Log forms and Maintenance/Repair Event Description forms will be included in the quarterly reports submitted to the NYSDEC.

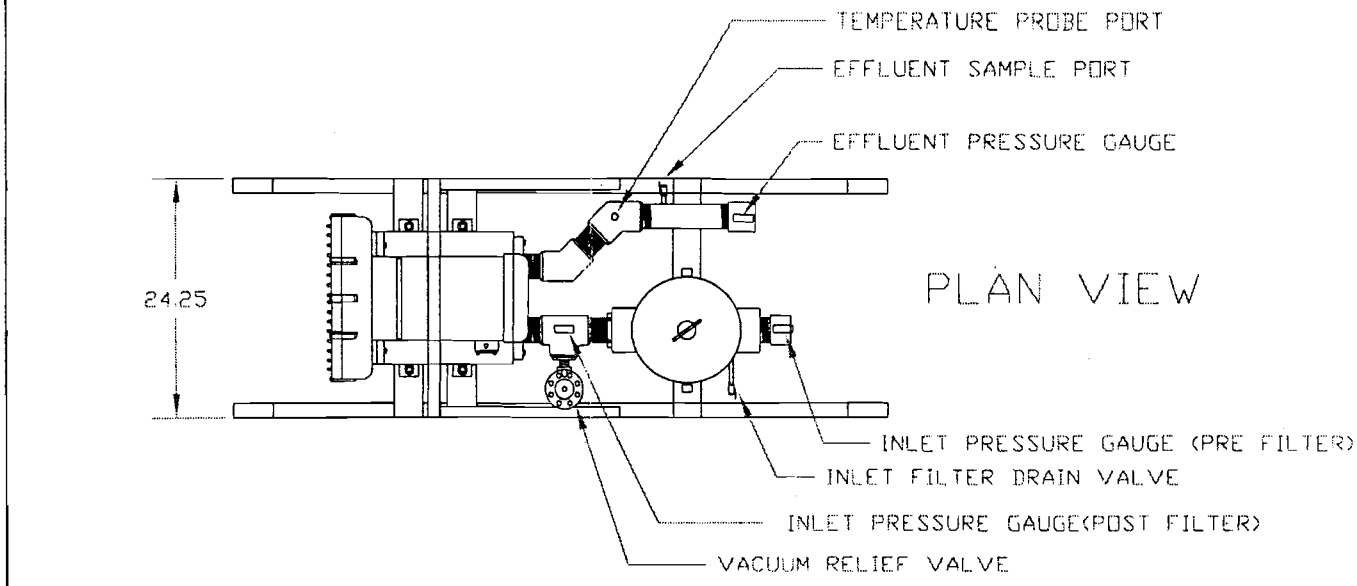
VI. ACTIONS TO BE TAKEN WHEN SYSTEM IS INOPERATIVE

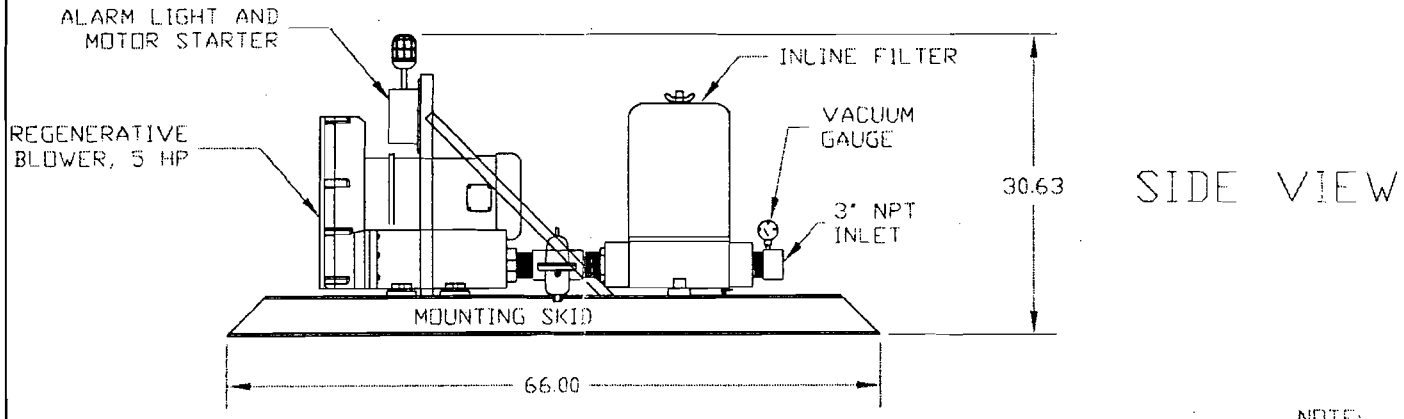
If the system has been shut off and AKRF is not able to restart the system within 48 hours, a representative daily air quality sample shall be collected from within the building and analyzed, with results available within 24 hours of sample collection. The sample may be analyzed for PCE using either a portable GC/MS or appropriate laboratory method. Any sample above the NYSDOH ambient air guideline of 15 parts per billion shall immediately be reported to NYSDOH and NYCDOH. Also, if daily sampling indicates an increasing trend approaching the 15 ppb guideline notification must be given.

VI. PROGRESS REPORTS

As stated above, AKRF will prepare a progress report and submit it to the NYSDEC four times each year. The report will contain a summary of the system performance over the past quarter as well as System Log Forms, Weekly Log Forms, and Maintenance/Repair Description Forms that have been completed during that three month period. Any manifests for carbon drum disposal or other documents generated during the quarter will also be included.

APPENDIX 1
MANUFACTURER'S MANUAL TO SVE SYSTEM





NOTE:
1. ALARM LIGHT AND MOTOR STARTER DELETED FROM PLAN VIEW FOR CLARITY.

SVE SKID

AKRF, INC.
ENVIRONMENTAL CONSULTANTS
117 EAST 29TH STREET
NEW YORK, NY

FIGURE 1

DRAWN BY: Dana Browne
DATE: JULY 31, 1997
CHECKED BY:
SCALE: NONE
FILE NAME: C:\PROGRAM FILES\AUTOCADLT\MY ACAD DRAWINGS\PR4786\PR4786 SVESKID.DWG

REVISIONS

NO	DATE	DESCRIPTION

205 BROADWAY STREET
DURHAM, NC 27701
(919) 682-2054

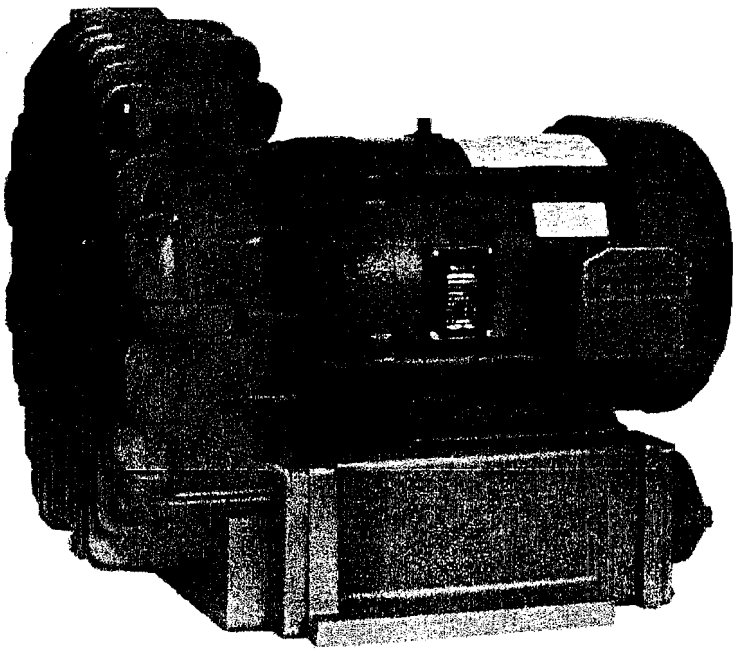
PRODUCT RECOVERY MANAGEMENT

ENVIRONMENTAL SERVICES

EN 707 & CP 707 Three-Phase Explosion-Proof Regenerative Blower

FEATURES

- Manufactured in the USA – ISO 9001 compliant
- Maximum flow: 295 SCFM
- Maximum pressure: 85 IWG
- Maximum vacuum: 87 IWG
- Standard motor: 5.0 HP, explosion-proof
- Cast aluminum blower housing, cover, impeller & manifold; cast iron flanges (threaded); teflon lip seal
- UL & CSA approved motor with permanently sealed ball bearings for explosive gas atmospheres Class I Group D minimum
- Sealed blower assembly
- Quiet operation within OSHA standards



MOTOR OPTIONS

- International voltage & frequency (Hz)
- Chemical duty, high efficiency, inverter duty or industry-specific designs
- Various horsepowers for application-specific needs

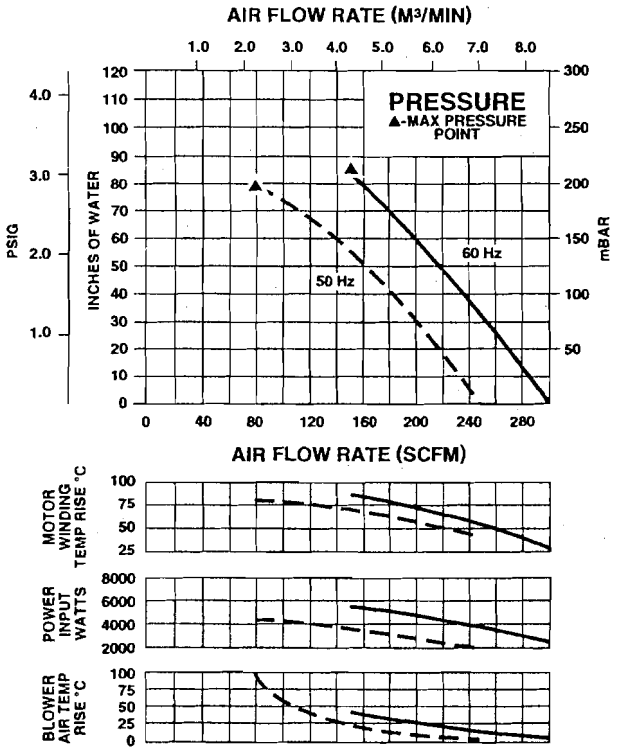
BLOWER OPTIONS

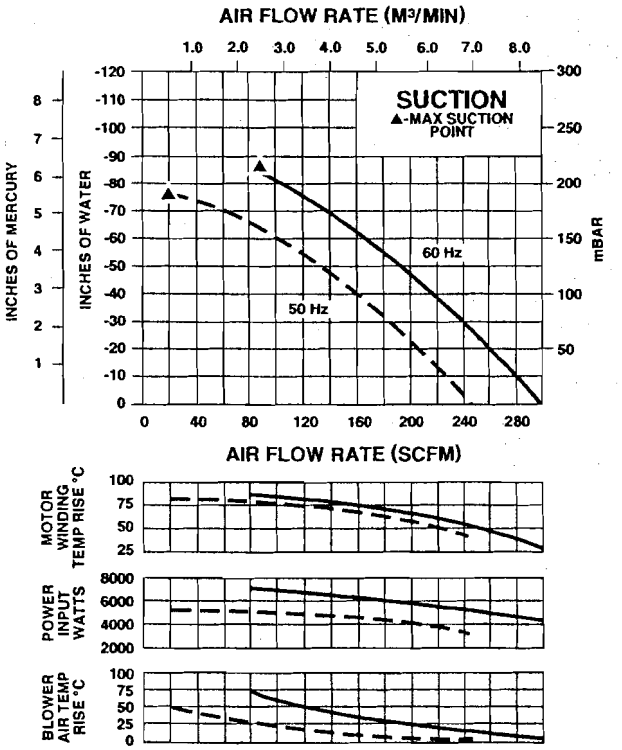
- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

ACCESSORIES (See Catalog Accessory Section)

- Flowmeters reading in SCFM
- Filters & moisture separators
- Pressure gauges, vacuum gauges & relief valves
- Switches – air flow, pressure, vacuum or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)
- Variable frequency drive package

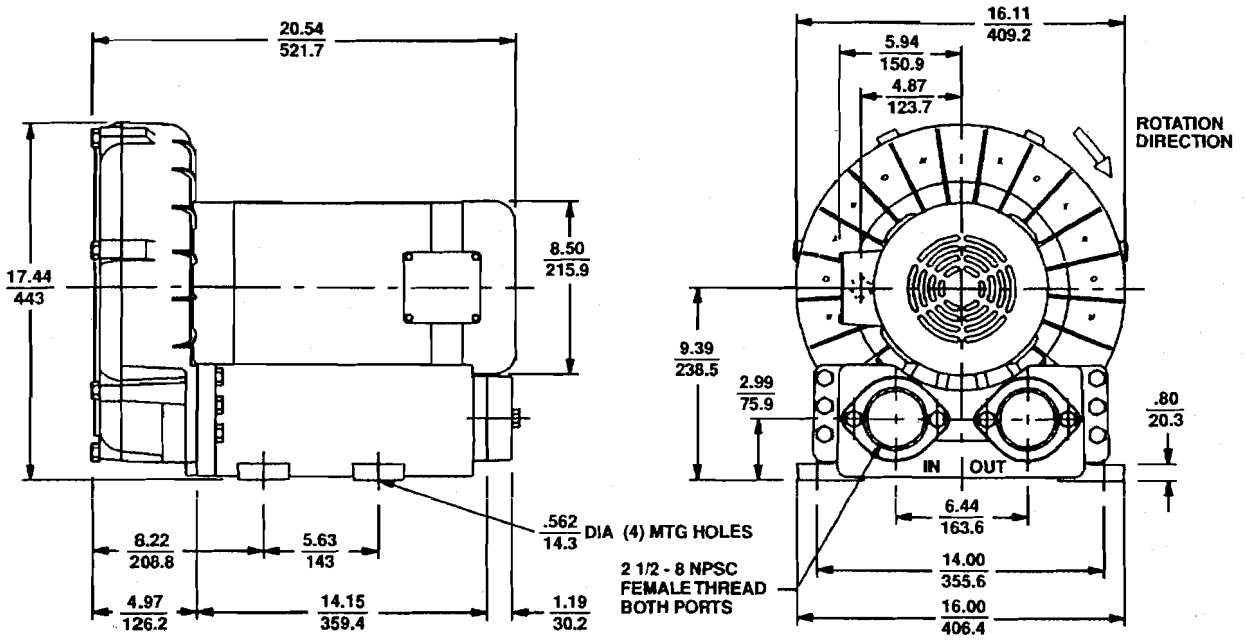
BLOWER PERFORMANCE AT STANDARD CONDITIONS





EN 707 & CP 707 Three-Phase Explosion-Proof Regenerative Blower

Scale CAD drawing available upon request.



DIMENSIONS: IN / MM
TOLERANCES: .XX ± .1 / 2.5
(UNLESS OTHERWISE NOTED)

A 0.75" NPT CONDUIT CONNECTION AT 12 O'CLOCK POSITION

SPECIFICATIONS

MODEL	EN707F72MXL		EN707F86MXL	CP707FW72MXLR
Part No.	038710		038711	038974
Motor Enclosure – Shaft Material	Explosion-proof – **CS**		Explosion-proof – **CS**	Chem XP – **SS**
Horsepower	5.0		5.0	Same as EN707F72MXL – 038710 except add Chemical Processing (CP) features from catalog inside front cover
Phase – Frequency [1]	Three - 60 Hz		Three - 60 Hz	
Voltage [1]	230	460	575	
Motor Nameplate Amps	14	7	5.7	
Max. Blower Amps [3]	15.8	7.9	6.3	
Inrush Amps	152	76	61	
Starter Size	1	0	0	
Service Factor	1.0		1.0	
Thermal Protection [2]	Class B - Pilot Duty		Class B - Pilot Duty	
XP Motor Class – Group	I-D, II-F&G		I-D, II-F&G	
Shipping Weight	174 lb (79 kg)		174 lb (79 kg)	

1 Rotron motors are designed to handle a broad range of world voltages and power supply variations. Our dual voltage 3 phase motors are factory tested and certified to operate on both: **208-230/415-460 VAC-3 ph-60 Hz** and **190-208/380-415 VAC-3 ph-50 Hz**. Our dual voltage 1 phase motors are factory tested and certified to operate on both: **104-115/208-230 VAC-1 ph-60 Hz** and **100-110/200-220 VAC-1 ph-50 Hz**. All voltages above can handle a ±10% voltage fluctuation. Special wound motors can be ordered for voltages outside our certified range.

2 Maximum operating temperature: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F rated motors or 120°C for Class B rated motors. Blower outlet air temperature should not exceed 140°C (air temperature rise plus inlet temperature). Performance curve maximum pressure and suction points are based on a 40°C inlet and ambient temperature. Consult factory for inlet or ambient temperatures above 40°C.

3 Maximum blower amps corresponds to the performance point at which the motor or blower temperature rise with a 40°C inlet and/or ambient temperature reaches the maximum operating temperature.

Specifications subject to change without notice. Please consult your Local Field Sales Engineer for specification updates.

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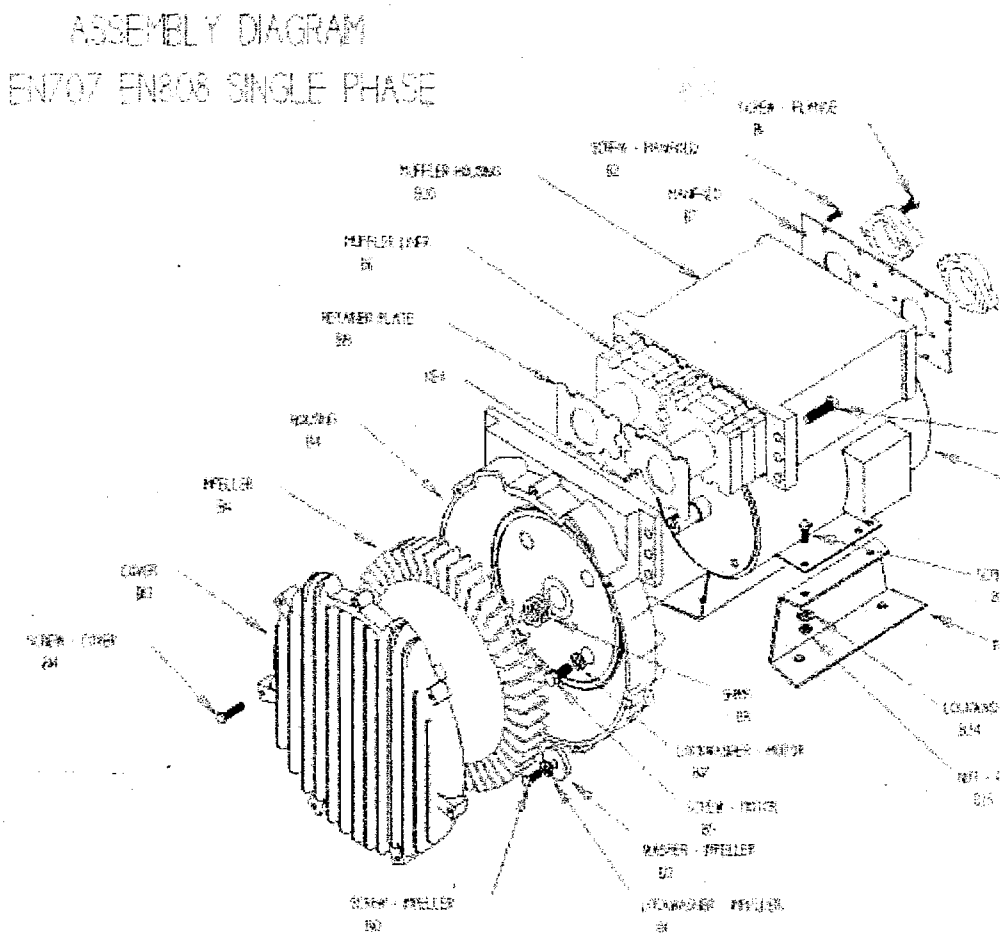
Assembly Drawing



Product Listing

50 Years of Commitment AMETEK ROTRON ISO 9001 Certified

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Maintenance Instructions

When properly piped, filtered, and applied, little or no routine maintenance is required. Keep the filter clean. Also, all standard models in the DR, EN, CP, and HiE series have sealed bearings that require no maintenance. Bearing should be changed after 15,000 to 20,000 hours, on average. Replacement bearing information is specified on the chart below.

Bearing Part Number	Size	Seal Material	Grease	Heat Stabilized
510217 510218 510219	205 206 207	Polyacrylic	Nye Rheotemp 500 30% +/- 5% Fill	Yes - 325 F
510449 516440 516648	203 202 307	Buna N	Exxon Polyrex Grease	NO
516840 516841 516842 516843 516844 516845 516846 516847	206 207 208 210 309 310 311 313	Buna N	Exxon Polyrex Grease	NO

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Service & Parts Manual

EN 707/808

Service and Parts Manual			Parts Breakdown			
		Model:	EN707FL5WL	EN808FL5WL	EN707FL5MWL	EN808FL5MWL
		Part No.:	038480	038481	038712	038732
			OBSOLETE	OBSOLETE		
Item No.	Qty. Req'd	Description				
M3	1	Key Motor Shaft	510212	510632	510212	510632
B1	4	Screw, Flange	155095	155025	155067	155067
B2		Screw, Manifold	(13 pcs) 120214	120214	Not Used	Not Used
B3	2	Flange	511480	511614	511614	511614
		Screen, Flange Guard	Not Used	Not Used	Not Used	Not Used
B4	1	Housing	516752	516760	516752	550083
B5	4	Screw, Hsg /Motor	251792	251792	251792	251792
B6	36	Muffler Material	(40 pcs) 515493	515405	550030	(38 pcs) 550020
	2	Matting, Fiberglass	516665	516662	550075	550075
B7		Manifold Plate	551264	523432	Not Used	Not Used
B8	*	Shim .002"	272703	272703	272703	272703
	*	Shim .005"	272704	272704	272704	272704
	*	Shim .010"	272705	272705	272705	272705
	*	Shim .020"	272706	272706	272706	272706
	*	Shim .030"	Not Used	Not Used	Not Used	Not Used
B9	1	Impeller	515461	516453	515461	550072
B10	1	Bolt, Impeller	251791	155095	251791	155095
B11	1	Lockwasher, Impeller	251787	251787	251787	251787
B12		Washer, Impeller	Not Used	Not Used	Not Used	Not Used
B13	1	Cover	515462	516447	515462	516447
B14	7	Screw, Cover	(7 pcs) 120215	140016	120215	(8 pcs) 140016
B15	1	Eye Bolt	Not Used	Not Used	Not Used	140019
B16	1	Spacer, Impeller Bolt	478336	478336	478336	478336
		Shaft Sleeve	Not Used	Not Used	Not Used	Not Used
B17		Lockwasher, Housing	Not Used	Not Used	Not Used	Not Used
B18	1	Screen, Muffler Retaining, Right (**)	515492	515604	550025	515407
	1	Screen, Muffler Retaining, Left (**)	515491	515603	550027	515408
B19	6	Bolt, Muffler Hsg/Hsg	120251	155025	120251	155025
B19A	4	Bolt, Muffler Hsg/Hsg	Not Used	Not Used	120214	120214
B20	1	Muffler Housing	515481	515606	(w/manifold) 550024	(w/manifold) 550019
		Muffler Discrete	Not Used	Not Used	Not Used	Not Used
		Bolt, Motor/Muffler	Not Used	Not Used	Not Used	Not Used
	4	Lockwasher, Motor/Muffler	Not Used	Not Used	Not Used	120203
	4	Washer, Motor/Muffler	Not Used	Not Used	Not Used	155029

Product Listing

		Spacer, Motor/Muffler	Not Used	Not Used	Not Used	Not Used
B21		Heat Slinger	Not Used	Not Used	Not Used	Not Used
B22		Guard Heat Slinger	Not Used	Not Used	Not Used	Not Used
B23	4	Bolt, Mounting Rail	120129	120129	120129	120129
B24	4	Lockwasher, Rail	251787	251787	251787	251787
B25	4	Nut, Rail	251789	251789	251789	251789
B26	2	Rail Mounting	595301	595301	595301	595301
	1	Lip Seal	516691	516691	516691	516691

Model	Part No.	Motor	Wiring Diagram	Specific Parts	Bearing, Rear (M1)	Bearing, Impeller End (M2)
EN707FL5MWL	038712	529761	M + L			
EN808FL5MWL	038732	529761	M + L	B19 Washer 155029 4 pcs Lockwasher 120203 4 pcs		
Discontinued						
EN707FL5	038480	529761	M + L		Call Factory	Call Factory
EN808FL5	038481	529761	M + L	Eyebolt 140019	516840	516844

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APPENDIX 2
SYSTEM LOG FORM, WEEKLY LOG FORM, AND MAINTENANCE/REPAIR DESCRIPTION FORM

SYSTEM LOG

	Flowmeter (SCFM)	Prefilter Pressure (in. $H_2$0)	Postfilter Pressure (in. $H_2$0)	Temperature (°F)	Pressure (in. $H_2$0)	Comments (indicate if there are additional sheets)
Safe range	150-250 SCFM		Less than/equal to 15 in. $H_2$0 greater than prefilter pressure.	Less than 140°F Typical is 100-120 °F.	Less than/equal to 55 in. $H_2$0	
Action required if outside safe range	Contact AKRF		Shut off system, change filter.	Contact AKRF	Contact AKRF	
DATE:						

WEEKLY LOG

Date	Precarbon PID measurement (ppm)	Postcarbon PID measurement (ppm)	Comments (indicate if additional pages are attached)

MAINTENANCE/REPAIR EVENT DESCRIPTION

Date: _____

Personnel Name: _____

Describe maintenance/repair event, including the event which indicated the need for maintenance/repair and what was done to remedy it:

APPENDIX 3
SITE SPECIFIC HEALTH AND SAFETY PLAN

Health and Safety and Community Air Monitoring Plan

2350 Fifth Avenue
Manhattan, New York

Prepared By:

AKRF Engineering, P.C.
117 East 29th Street
New York, New York 10016
(212) 696-0670

Revised April 2001

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1. INTRODUCTION

The site is located on the west side of Fifth Avenue between West 141st and West 142nd Streets in Manhattan. The entire site is occupied by a building comprising three connected sections: a two-story section along Fifth Avenue, a three-story section in the center of the site, and a one-story section on the western portion of the site. Old Sanborn insurance maps show that the building was originally constructed as an ice cream factory. Following its use as an ice cream factory, the building was occupied by a commercial laundry from 1970 to 1994. The laundry included a dry cleaning operation utilizing tetrachloroethene (PCE) as a cleaning solvent. The dry cleaning operation was located near the northern side of the one-story portion of the building, just west of the West 142nd Street loading dock. In 1995-1996, most of the building on the site, with the exception of the far western portion, was renovated for use as a New York City public school. Currently, the renovated eastern portion of the ground floor is being used by a local church. A small area of the second floor is used as an office by the property owner.

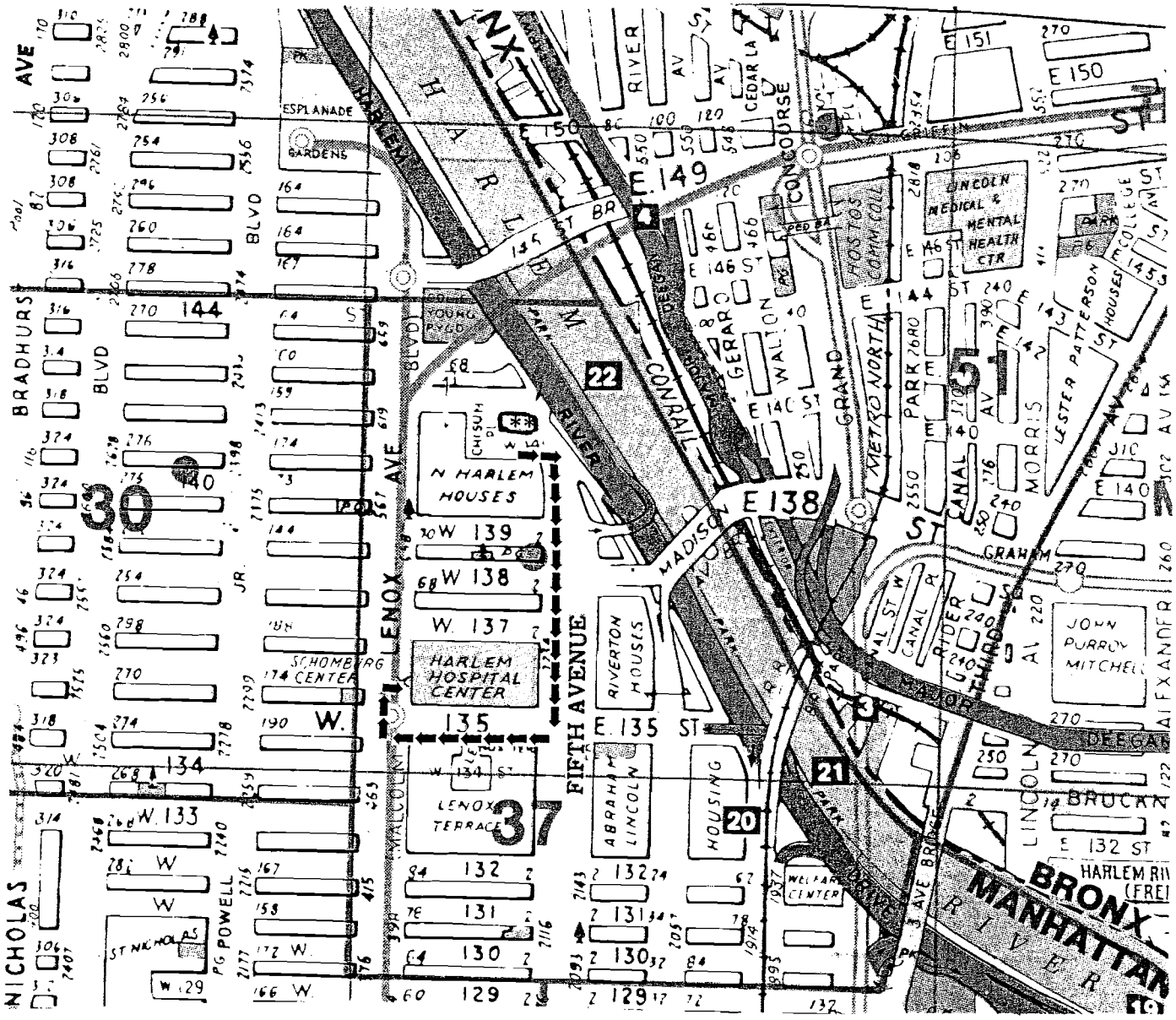
Prior testing programs on the site have shown that building materials -- primarily insulation under the floor slab -- and soil under the building in both the unsaturated and saturated zones are contaminated with PCE.

The purpose of this Health and Safety Plan (HASP) is to protect field personnel and others during soil vapor extraction (SVE) system operations, as well as drilling activities and activities involving soil disturbances on the site. It is in conformance with the various Occupational Safety and Health Administration (OSHA) standards and other applicable regulations governing site investigation operations, and all AKRF, Inc. policies and procedures on health and safety. It has been prepared to establish practices and procedures to protect the health of AKRF personnel and others during all activities associated with the upkeep of the SVE system.

2. HEALTH AND SAFETY GUIDELINES AND PROCEDURES

A. HAZARD EVALUATION

The testing performed by Riverpoint in April 1997 found contamination of the sub-slab insulation with PCE. Samples of cork and/or Styrofoam from the western part of the building contained PCE concentrations ranging from 1000 to 100,000 ppb. (Samples from the cores were analyzed on-site using a portable gas chromatograph equipped with an electron capture detector. No samples were sent for laboratory analysis to confirm the field analyses, so the analysis results can only be considered reliable to within an order of magnitude.) PCE contamination in the fill material beneath the insulation was limited to the area around the former location of the dry cleaning machines. At sampling location C-3, which is at the former location of the dry cleaning equipment, PCE levels exceeded New York State DEC's recommended cleanup objective of 1400 ppb at almost every



** PROJECT SITE

➡➡ ROUTE TO HOSPITAL

FIGURE 1

HOSPITAL LOCATION MAP

depth from just below the slab down to 20 feet below the grade of the building floor. At other locations in this area, levels exceeding the cleanup objective were found at depths of 7 to 10 feet below the grade of the building floor, and at one location (C-29) at depths of 15 to 20 feet below the floor grade. These depths are potentially at or below the groundwater level.

B. DESIGNATED PERSONNEL

AKRF will appoint one of its personnel as the Health and Safety Officer (HSO). This individual will be responsible for the implementation of the HASP. The HSO will have a 4-year college degree in occupational safety or a related science/engineering field, and 2 years of experience in implementation of air monitoring and hazardous materials sample programs. The HSO will have completed a 40-hour training course that meets OSHA requirements of 29 CFR Part 1910, Occupational Safety and Health Standards.

The HSO will be responsible for training personnel that will be responsible for system monitoring and other on-site upkeep activities. The HSO will be present on-site during the conduct of all field operations involving drilling or other subsurface disturbance, and will be responsible for all health and safety activities and the delegation of duties to the field crew. The HSO has stop-work authorization, which he/she will execute on his/her determination of an imminent safety hazard, emergency situation, or other potentially dangerous situation. If the HSO must be absent from the field during activities involving a subsurface disturbance, he/she will designate a replacement who is familiar with the health and safety plan, air monitoring, and protection equipment.

C. TRAINING

All those who are responsible for SVE system monitoring and other on-site system operation and maintenance activities must recognize and understand the potential hazards to health and safety. All system upkeep personnel must attend a training program, whose purpose is to:

- Familiarize them of the process description; the remediation system and its components; the elements of the process control system; the operation procedures for start-up, continuous operation, shut down, and emergency shut-down; maintenance, service, and repair operations at the site;
- Familiarize them with the O&M Manual;
- Make them aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;
- Make them aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

All those who enter the work area while intrusive activities are being performed must recognize and understand the potential hazards to health and safety. All field personnel must attend a training program, whose purpose is to:

- Make them aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;
- Make them aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Each member of the field crew will be instructed in the above objectives before he/she goes onto the site. The HSO will be responsible for conducting the training program.

D. MEDICAL SURVEILLANCE PROCEDURE

All AKRF, Inc. and subcontractor personnel performing field work involving drilling or other subsurface disturbance and all personnel responsible for SVE system operations and maintenance at the site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120 (f). A physicians medical release for wok will be confirmed by the HSO before an employee can begin site activities. The medical examination will, at a minimum, be provided annually and upon termination of hazardous waste site work.

E. SITE WORK ZONES

During any activities involving drilling or other subsurface disturbance, the work area must be divided into various zones to prevent the spread of contamination, ensure that proper protective equipment is donned, and provide an area for decontamination.

The Exclusion Zone is defined as the area where PCE-contaminated materials are generated as the result of drilling, sampling, or similar activities. The Contamination Reduction Zone (CRZ) is the area where decontamination procedures take place and is located next to the Exclusion Zone. The Support Zone is the zone area where support-facilities-such as vehicles, a field phone, fire extinguisher, and first aid supplies-are located. The emergency staging area (part of the Support Zone) is the area where all workers on site would assemble in the event of an emergency. These zones shall be designated daily, depending on that day's activities. All field personnel will be informed of the location of these zones before work begins.

Control measures such as "Caution" tape and traffic cones will be placed around the perimeter of the work area when work is being done in the areas of concern to prevent entrance onto the area with exposed soil.

Site work zones do not need to be specified for SVE system operations and maintenance activities.

F. AIR MONITORING

An Organic Vapor Meter (OVM) will be used to perform air monitoring during all sampling, drilling and well installation, as well as SVE system operations and maintenance activities. The purpose of the air monitoring program is to avoid or minimize exposure of the field personnel and the public to potential environmental hazards in the soil and groundwater. Results of the air monitoring will be used to determine the appropriate response action, if needed. The OVM will be calibrated with isobutylene in accordance with the manufacturers recommendations.

Work Zone Air Monitoring

Real time air monitoring will be done, with the OVM, whenever soil removal or drilling is being performed, and whenever entering the room containing the SVE equipment. When activities involving subsurface disturbances take place, measurements will be taken prior to commencement of work and for at least 1 minute every 60 minutes during the work. These measurements will be made as close to the workers as practical and at the breathing height of the workers. The HSO shall set up the equipment and confirm that it is working properly. His/her designee may oversee the air measurements during the day. The initial measurement for the day will be performed before the start of work and will establish the background level for that day. The final measurement for the day will be performed after the end of work. The action levels and required responses are listed in Table 1.

TABLE 1 Work Zone Ambient Air Monitoring Action Levels

ACTION LEVEL	RESPONSE ACTION
Less than 20 ppm above background	Continue work in Level D
Between 20 and 100 ppm above background	Upgrade to Level C
More than 100 ppm above background*	Stop work. Resume work when source of vapors is abated and readings are less than 100 ppm above background

** OSHA's 8-hour time-weighted-average Permissible Exposure Limit (PEL) for PCE is 100 ppm*

Community Air Monitoring

During all outdoor or indoor ground-intrusive activities, perimeter air monitoring will be performed as follows. Air quality will be continuously monitored at the downwind perimeter of the work area, or if inside, on the perimeter of the work area nearest occupied spaces of the building. The action levels and required responses are listed in Table 2.

TABLE 2 Community Air Monitoring Action Levels

ACTION LEVEL	RESPONSE ACTION
Less than 5 ppm above background *	Continue work
More than 5 ppm but less than 25 ppm above background	Implement vapor emission response plan
More than 25 ppm above background	Stop work. Perform downwind monitoring in accordance with vapor emission response plan.

** The NYSDEC Short Term Guidance (SGC) concentration for PCE is 11.7 ppm*

Vapor Emission Response Plan

When vapor concentrations at the downwind edge of the work area exceed 5 ppm over background then work will be temporarily suspended. Work may be resumed if:

1. Concentrations at the downwind edge of the work area fall below 5 ppm over background; OR,

2. Concentrations measured 200 feet downwind or at half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the downwind concentrations measured 200 feet downwind or at half the distance to the nearest downwind residential or commercial structure, whichever is less, exceed 5 ppm over background, then all work will be halted. If the concentrations measured at the downwind location persist above 5 ppm over background after the cessation of work, then monitoring will be performed within 20 feet of the nearest downwind residential or commercial structure. The major vapor emission response plan will be put into effect if levels measured in the 20-foot zone either:

1. Exceed 10 ppm over background; OR,
2. Exceed 5 ppm over background for a period greater than 30 minutes.

Major Vapor Emission Response Plan

The safety officer will contact the local police authorities (32nd precinct - (212) 690-6311)) and all contacts listed below under Emergency Response and inform them of the situation. Air monitoring will be conducted in the 20-foot zone at 30-minute intervals. Air monitoring may be halted or modified if two successive readings are below 5 ppm over background.

G. PERSONAL PROTECTION EQUIPMENT

The personal protection equipment required for various kinds of site investigation tasks are based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, Appendix B, "General Description and Discussion of the Levels of Protection and Protective Gear."

AKRF field personnel and other site personnel shall wear Level D personal protective equipment. During activities such as drilling, well installation, or sampling where is a chance of contact with contaminated materials modified Level D equipment will be worn. The protection will be upgraded to Level C if the results of the air monitoring indicates that Level C equipment is warranted.

Level D
Respiratory Protection: None
Protective Clothing: Coveralls, work shoes

Modified Level D
Respiratory Protection: None
Protective Clothing: Coveralls, work shoes, gloves

Level C
Respiratory Protection: Air purifying respirator with organic vapor cartridges.
Protective Clothing: Same as modified Level D

H. GENERAL WORK PRACTICES

To protect the health and safety of the field personnel, all field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance. These guidelines should also be followed by operations and maintenance workers in the room containing SVE equipment.

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited, except in designated areas on the site. These areas will be designated by the HSO.

- Workers must wash their hands and face thoroughly on leaving the work area and before eating, drinking, or any other such activity. The workers should shower as soon as possible after leaving the site.
- Contact with contaminated or suspected surfaces should be avoided.
- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat stress.

I. EMERGENCY PROCEDURES AND EMERGENCY RESPONSE PLAN

The field crew and operations and maintenance personnel will be equipped with emergency equipment, such as a first aid kit and disposable eye washes. In the case of a medical emergency, the HSO will determine the nature of the emergency and he/she will have someone call for an ambulance, if needed. If the nature of the injury is not serious—i.e., the person can be moved without expert emergency medical personnel—he/she should be driven to a hospital by on-site personnel. There will be an on-site field phone. The location of the nearest hospital, Harlem Hospital Center, is one quarter mile south of the site at Fifth Avenue and 135th Street. The route to the hospital is shown in Figure 1. Telephone numbers are:

Ambulance 911

All emergencies shall be reported to:
Inner City Redevelopment - (212) 234-5000
Joseph Karten, Project Manager

New York State DEC Region 2 - (718) 482-4891
Vaim Brevdo, Project Manager

3. ACKNOWLEDGMENTS OF HASP

Below is an affidavit that must be signed by all workers who enter the site. A copy of the HASP must be on-site at all times and will be kept by the HSO.

AFFIDAVIT

I, _____ (name), of _____ (company name), have read the Health and Safety Plan (HASP) for the site at 2350 Fifth Avenue. I agree to conduct all on-site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from the site.

Signed _____ Date _____