THE DOCUMENT COMPANY
XEROX

6 July 2009

Todd Caffoe, P.E.
New York State Department of Environmental Conservation
Division of Environmental Remediation
6274 East Avon-Lima Road
Avon, NY 14414-9519

Subject: Sub-Slab Depressurization System As-Built Engineering Report
Xerox Building 801 - Henrietta, NY (NYSDEC Site No. 828069)

Dear Mr. Caffoe:

Enclosed for your review, is the Sub-Slab Depressurization System As-Built Engineering Report for Xerox Building 801 (NYSDEC Site No. 828069). The subject report fulfills the requirement of the Order on Consent dated 21 March 1996.

If you have any questions regarding this submittal, please contact me at (585) 422-5825.

Sincerely,
XEROX CORPORATION

Eliott N. Duffney
Program Manager

cc: K. Anders - New York State Department of Health (Troy)
G. White – Haley & Aldrich of New York

File

SUB-SLAB DEPRESSURIZATION SYSTEM
AS-BUILT ENGINEERING REPORT
XEROX BUILDING 801
(NYSDEC SITE NO. 828069)
HENRIETTA, NEW YORK

by

Haley & Aldrich of New York
Rochester, New York

for

Xerox Corporation
Webster, New York

File No. 32077-104
6 July 2009

HALEY & ALDRICH

Haley & Aldrich of New York
200 Town Centre Drive
Suite 2
Rochester, NY 14623-4264

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Fax: 585.359.4650
HaleyAldrich.com

6 July 2009
File No. 32077-104

Mr. Eliott Duffney
Xerox Corporation
800 Phillips Road, Bldg. 205-99F
Webster, New York 14580

Subject: Sub-Slab Depressurization System As-Built Engineering Report
Xerox - Building 801 Facility

Dear Eliott:

Haley & Aldrich, Inc. is pleased to provide Xerox Corporation with this Sub-Slab Depressurization System As-Built Engineering Report for the Building 801 site in Henrietta, New York. This report summarizes activities performed for the installation of both phases of the Sub-Slab Depressurization System in 2006 and 2007, and is intended to satisfy the requirements described in the Order on Consent dated 21 March 1996.

Please do not hesitate to contact us should you have any questions regarding this report.

Sincerely yours,
HALEY & ALDRICH, INC.

Mark N. Ramsdell, P.E.
Staff Engineer

Glenn M. White
Project Manager

Paul M. Tornatore, P.E
Vice President

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1. INTRODUCTION

This Sub-Slab Depressurization System As-Built Engineering Report has been prepared to document installation activities of the sub-slab depressurization (SSD) system at the Xerox Building 801 facility, located in Henrietta, New York. The work was conducted in general accordance with the Remedial Design/Remedial Work Plan, Xerox Building 801, dated April 2006 and subsequent e-mail correspondence with the New York State Department of Environmental Conservation (NYSDEC) dated 4 August 2006 approving the installation.

This report provides a description of assessment and mitigation activities related to potential soil vapor intrusion including the sub-slab depressurization system installation and presents record drawings. An Engineer's Statement affirming performance of the "construction" of the sub-slab depressurization (SSD) system is included at the end of this report.

1.1 Site Description

Building 801 occupies a portion of the Xerox property located at 1350 Jefferson Road, approximately one half mile west of the intersection of Jefferson and Winton Roads in the Town of Henrietta, Monroe County, New York. The Xerox property is shown on the Project Locus, Figure 1 and Sub-Slab Depressurization System Plans, Figures 2. The property is bounded by undeveloped land on the north, undeveloped and commercial properties on the east and west, and Jefferson Road on the south.

The Xerox property is an irregularly shaped parcel of approximately 86.6 acres comprised of the 50.4 acre original site and 36.2 acres acquired in 1993 which is located to the north of the original site. The main building on the property covers approximately 12 acres and is located on the southern half of the property. Outside the building, the majority of the site is covered by paved parking areas and roadways, while much of the Northern Area is covered by woody vegetation and weed growth.

1.2 Site Remedial Actions

Xerox has performed a variety of remedial actions at this site since the early 1990's. An Interim Remedial Measure (IRM) was implemented at the site in the spring of 1990. The IRM consisted primarily of pumping affected groundwater from five recovery wells through an activated carbon treatment system, and diverting clean surface water and runoff away from areas where chlorinated solvent and petroleum distillates were known to be present. The IRM groundwater recovery pumping and treatment system began operation in 1990 and ceased in 1994 with NYSDEC approval. In late 1994, a more robust IRM was implemented which consisted of the 2-PHASE™ Extraction technology that achieved removal of both groundwater and soil vapor under high vacuum.

A Record of Decision (ROD) naming 2-PHASE™ Extraction as the preferred remedial alternative was subsequently issued by the NYSDEC in April 1995. In addition to 2-PHASE™ Extraction, remediation of surface water, in the form of re-direction of stormwater runoff into a new ditch around the area of contamination was also identified as necessary and completed. The stormwater re-direction activities were completed in 1995 after issuance of the ROD. 2-PHASE™ extraction was performed until mass recovery rates attenuated, indicating the technology had reached the limits of its effectiveness.

Operation of the 2-PHASE™ extraction system was terminated on 14 November 2001 due to asymptotic low mass removal conditions and the lack of substantial rebound that indicated the system had reached the limits of its effectiveness. A total of 9,589 pounds of COCs were removed from the subsurface since the system's inception. Following the shutdown of the 2-Phase Extraction System in November

2001 a Focused Feasibility Study (FFS) was submitted to the NYSDEC to assess supplemental remedial activities.

As a result of the focused feasibility study findings, a pilot study injection of hydrogen release compound (HRC-S) was completed in November 2003 and the site was monitored through September 2005. Pilot study results were reviewed with NYSDEC and a large scale injection of the HRC-S compound was completed in August 2006 as the final remedial action requirement for the site.

Installation of a SSD system was requested by the NYSDEC and NYSDOH during a meeting on 27 July 2006. E-mail correspondence with the NYSDEC dated 4 August 2006 approved the installation of the SSD system in accordance with the Remedial Design/Remedial Work Plan, Xerox Building 801, dated April 2006. The initial phase of the SSD installation was completed in December 2006. Vacuum monitoring and sub-slab vapor sampling was conducted in January and February 2007.

A progress letter was submitted to NYSDEC from Haley & Aldrich on 12 February 2007 and a subsequent meeting with Xerox, NYSDEC and NYSDOH on 12 June 2007 to discuss initial sampling results and future activities for the SSD system. It was agreed to expand the system to the west and delineate the vacuum influence. System expansion work was completed October 2007, post installation vacuum monitoring was recorded, and the proposed sub-slab and indoor air sampling locations were documented in the letter dated 10 December 2007 to the NYSDEC from Haley & Aldrich. Samples were collected in December 2007 and the results were submitted to NYSDEC in the 29 April 2008 memorandum to Xerox from Haley & Aldrich. NYSDEC reviewed the data and concurred with the recommendation that further system expansion was not necessary and that routine monitoring was the appropriate course of action.

This report describes the two phases of SSD system installation.

2. SUB-SLAB DEPRESSURIZATION SYSTEM INSTALLATION

2.1 System Description

Two fans were installed by Crosby-Brownlie of Rochester, NY to depressurize the sub-slab each with multiple suction locations. Suction locations were installed by Nothnagle Drilling of Scottsville, NY in general accordance with the "Remedial Design/Remedial Action Work Plan," dated April 2006. Electrical connections for the two installed fans were completed by Schuler-Haas of Rochester, NY. SSD installation activities were observed and overseen by Mitigation Tech of Brockport, NY and Haley & Aldrich. The suction locations vary from the preliminary SSD system layout in the Work Plan due to site conditions and actual vacuum influence (see Figure 2). Fans are located on the northern exterior wall of the facility (see Figure 2). In addition to the suction points and fans, thirteen permanent test points were installed for testing of sub-slab vacuum. An installation report from Mitigation Tech (a licensed radon contractor) is provided in Appendix A

Construction activities of the SSD system took place between 29 November 2006 and 15 December 2006. After installation, a preliminary round of vacuum tests was performed by Haley & Aldrich and Mitigation Tech.

The two fans (Radonaway HS-5000) were installed at on the northern exterior wall of the former CRC room. The HS-5000 fan is a "high" vacuum, "low" air flow fan (See Equipment Cut Sheet in Appendix C). Each fan is equipped with a 2 inch diameter exhaust vent that extends greater than 2 feet above the roof top.

An additional fan (Fan #3) was installed to the west of the existing systems to expand the vacuum monitoring coverage. This fan and three suction cavities were installed by Crosby-Brownlie in October and November 2007, under the oversight of Mitigation Tech and Haley & Aldrich. See Figure 2 for system locations. The intent of the SSD system expansion was to achieve vacuum coverage on the west side of the foundation barrier (See Figure 2). Utility plans provided by Xerox were reviewed to determine if utilities penetrated the foundation barrier creating a potential vapor migration pathway. No utilities were identified on the plans.

The electrical connection for Fan 3 was completed by Schuler-Haas and included an alarm tie-in by Honeywell to the existing security system within Building 801. This system will automatically notify security in the event any of the three fans loses power or shuts off. If security is alarmed, they are to notify Xerox Environmental and Haley & Aldrich by telephone to inspect the system. If power is restored, the fans should automatically re-start.

2.2 Sub-Slab Vacuum Verification Monitoring

Sub-slab depressurization vacuum verification monitoring was performed at various times during installation phases by using a digital manometer (Infiltec DM1 Digital Micro-Manometer) to determine the difference between the ambient air pressure at a given vacuum test point and the sub-slab pressure at that same point. The procedure consists of zeroing the manometer and then opening the vacuum test point and inserting the tube from the manometer into the vacuum test point. Duct tape/rubber stopper/backer rod is used to create a seal between the manometer hose and the metal vacuum test point sleeve. The resulting reading is the difference between ambient and sub-slab pressure. The design target is a minimum differential pressure of 0.002 inches of water throughout the intended zone of influence.

2.3 Back draft Evaluation

An evaluation of back drafting was performed in order to ensure that combustion byproducts and/or flue gas does not enter the indoor air. There was no natural draft combustion appliance found in the area where the SSD system was located. A forced air heater was found in the former CRC room. This appliance has powered ventilation that runs continuously. Therefore, it was determined the addition of the SSD system would not induce back drafting.

2.4 Smoke Tube Evaluation

Smoke tube evaluation was used to check for leaks through existing sump pits in the former CRC area, concrete cracks, floor joints, and at the suction points (Final NYSDOH CEH BEEI Soil Vapor Intrusion Guidance 4.3.1 (a)).

2.5 Sub-Slab Barriers

Some conditions below the slab act as barriers to a depressurization system (i.e. foundation barriers, footings, sump pits, etc.) The barriers associated with the site are foundation footings to support walls and sump pits. The foundation barriers affecting the SSD system can be found on Figure 2. Suction location S-3 was installed in Room 6691 to compensate for one of these barriers. Sump pits are located throughout the rooms in the former CRC area. Data indicates that the vacuum influence is greater than 0.002 inches of water, in the SSD area. The expansion of the system with Suction locations S-6, S-7, and S-8 on Fan 3, was installed to expand coverage to the west of the foundation barrier between the building additions.

2.6 Sub-Slab Soil Vapor Sampling

Sub slab vapor samples were collected using Tedlar bags and analyzed after both phases of the SSD system installation in order to determine the area affected by site contaminants of concern (COC). Sampling was performed on 31 January 2007 and again in December 2007. This data has been provided to NYSDEC and NYSDOH.

3. SUB-SLAB DEPRESSURIZATION SYSTEM RESULTS

3.1 Sub-Slab Depressurization Vacuum Monitoring

The latest results from the SSD vacuum monitoring performed on 22 May 2009 are presented in Table 1 and displayed on Figure 2. Results show a minimum differential pressure of 0.002 inches of water in the former CRC room and the surrounding area. These readings indicate that the vacuum coverage has expanded since May 2008.

3.2 Record Drawings / As-built Photographs

A plan showing the overall layout of suction and vacuum test points and sub-slab vacuum testing results prepared by Haley & Aldrich is included (See Figure 2). Photographs are included in Appendix B showing typical configurations of the system.

3.3 Operation and Monitoring

Vacuum monitoring will be performed annually by appropriate personnel. During vacuum monitoring events, a visual inspection of the system shall also be performed including the inspection of the integrity of the pipes. Operation will be documented during monitoring events as outlined in the Site Management Plan (SMP).

4. CERTIFICATION

Haley & Aldrich of New York hereby states that, to the best of its knowledge, the installation activities, described in this report, entitled *Sub Slab Depressurization System As-Built Engineering Report, Xerox Building 801, Henrietta, New York*, have been performed in accordance with the Work Plan reference documents.

Based on observation of the work, participation in project planning and progress meetings, review of testing data, review of record drawings, and review of other construction documents, this report is a true and accurate summary of the work performed. The conclusions are based solely on the scope of services conducted by Haley & Aldrich of New York and sources of information referenced in the report.

The undersigned certifies that all construction activities were completed substantially in accordance with the NYSDEC approval and were personally witnessed by the NYS Professional Engineer (or by a person under his direct supervision).

Mark N. Ramsdell

7/6/09

Mark N. Ramsdell, P.E.
Haley & Aldrich of New York

Date

REFERENCES

1. "Remedial Design/Remedial Action Work Plan, Xerox Building 801," prepared by Haley & Aldrich of New York, dated April 2006.

2. "Email Approval to Proceed" prepared by New York State Department of Environmental Conservation, dated August 4, 2006.

3. "Sub-Slab Vapor Delineation/Mitigation Progress, Xerox Building 801," letter prepared by Haley & Aldrich of New York, dated 12 February 2007.

4. "Sub-Slab Mitigation System Monitoring, Xerox Corporation, Building 801" prepared by Haley & Aldrich of New York, dated 10 December 2007.

5. "Sub-Slab Vapor Mitigation System Monitoring, Xerox-Henrietta Site (#828069)" letter prepared by New York State Department of Environmental Conservation, dated January 4, 2008.

6. "Sub-Slab Soil Vapor and Indoor Air Sampling Data – December 2007" memorandum prepared by Haley & Aldrich of New York, dated 29 April 2008.

7. "Sub-Slab Vapor Mitigation System Monitoring, Xerox-Henrietta Site (#828069)" letter prepared by New York State Department of Environmental Conservation, dated June 3, 2008.

G:\Projects\32077\104_2009 Bldg 801_VI Management\As-Built Report\2009-0706-HANY-Sub-Slab Depressurization System As-Built Engineering Report-F.doc

Xerox B801
SSD Fan Vacuum Readings

Date	Time	Name	Initials	Range	Fan 1			Fan 2		Fan 3			COMMENTS
					S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	
3/4/2008	13:40	Ethan Lee	EGL	**>5 IN.W.C. <50 In.W.C.**	24.0	24.5	24.0	43.0	45.0	5.0	4.0	4.5	
5/22/2008	10:00	Christina Ondak	CSO	**>5 IN.W.C. <50 In.W.C.**	25.0	25.0	24.0	45.0	46.0	5.0	4.5	4.5	
3/20/2009	10:30	Mark Ramsdell	MNR	**>5 IN.W.C. <50 In.W.C.**	24.0	24.0	24.0	46.0	46.0	NA	3.5	3.5	Alarm this AM, systems OK
5/5/2009	9:30	Mark Ramsdell	MNR	**>5 IN.W.C. <50 In.W.C.**	22.5	22.5	22.5	48.0	46.0	NA	NA	4.0	Audible Water in S-4
5/22/2009	11:00	Dave Nostrant	DMN	**>5 IN.W.C. <50 In.W.C.**	22.5	22.5	22.5	47.0	46.0	4.0	3.5	4.0	Audible Water in S-4
				>5 IN.W.C. <50 In.W.C.									
				>5 IN.W.C. <50 In.W.C.									
				>5 IN.W.C. <50 In.W.C.									
				>5 IN.W.C. <50 In.W.C.									
				>5 IN.W.C. <50 In.W.C.									
				>5 IN.W.C. <50 In.W.C.									
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				>5 IN.W.C. <50 In.W.C.									
				>5 IN.W.C. <50 In.W.C.									

Notes:
- **Take Weekly Readings, Email results monthly**
- **If reading is out of range call immediately**
- **See Figure for suction point and fan locations**

Questions/Comments:
Eliott Duffney - Xerox Environmental - 422-5825 - Eliott.Duffney@xerox.com
Mark Ramsdell - Haley&Aldrich - 321-4262 - MRamsdell@HaleyAldrich.com

Xerox B801
SSD System Vacuum Test Point Readings

Vacuum Test Location ID (Sampling Location ID)	Vacuum Measurement (in. wc)	Vacuum Measurement (in. wc)	Vacuum Measurement (in. wc)	Vacuum Measurement (in. wc)	Vacuum Measurement (in. wc)	Vacuum Measurement (in. wc)
Date of Reading	**3/4/2008**	**3/6/2008**	**5/22/2008**	**5/22/2009**		
T-1 (SP-5)	0.030		0.038	0.052		
T-2		0.161	0.151	0.135		
T-3		0.899	0.806	0.863		
T-4 (SP-1)	Could not open	0.039	0.039	0.047		
T-5 (SP-2)		0.025	NR	0.027		
T-6 (SP-3)		-0.005	0.021	0.002		
T-7		0.107	0.108	0.116		
T-8		0.183	0.19	0.244		
T-9		0.015	0.016	0.017		
T-10		0.276	0.279	0.197		
T-11 (SP-4)		0.021	0.01	0.011		
T-12		0.047	0.064	0.112		
T-13		0.001	0.013	0.005		
T-14 (SP-10)	0.016		0.018	0.013		
T-15 (SP-9)	0.001		0.001	0.001		
T-16 (SP-13)	0.961		0.971	0.955		
T-17 (SP-13A)	0.002		0.002	0.005		
T-18 (SP-13B)	NR	NR	NR	0.003		
T-19 (SP-14)	0.027		0.03	0.037		
T-20 (SP-14A)	NR	NR	NR	0.001		
T-21 (SP-7)	NR	NR	NR	0.001		
SP-6	0.000		0.002	0.004		
SP-6A			0.002	0.002		
SP-6B	0.000		0	0		
SP-8		NA	NR	NA		
SP-11	0.000		0.001	0.002		
SP-12	0.001		0.001	0.003		
SP-12A	0.000		0	0.001		
SP-12B	0.001		0	0.005		
Recorded By:			CSO	DMN		

NR = Not able to get a reading

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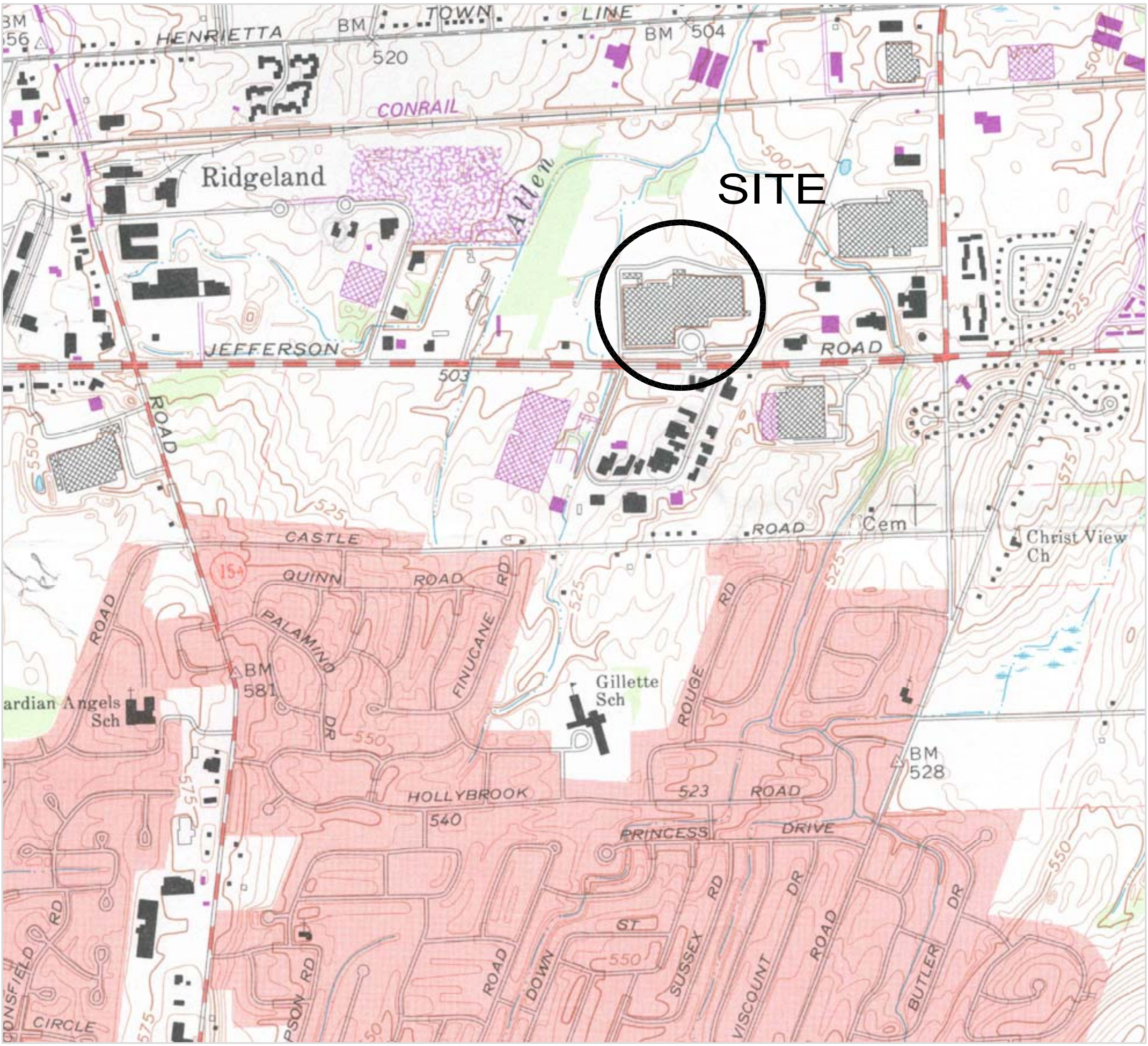

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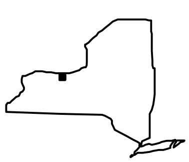


QUADRANGLE LOCATION: PITTSFORD, N.Y.

HALEY & ALDRICH

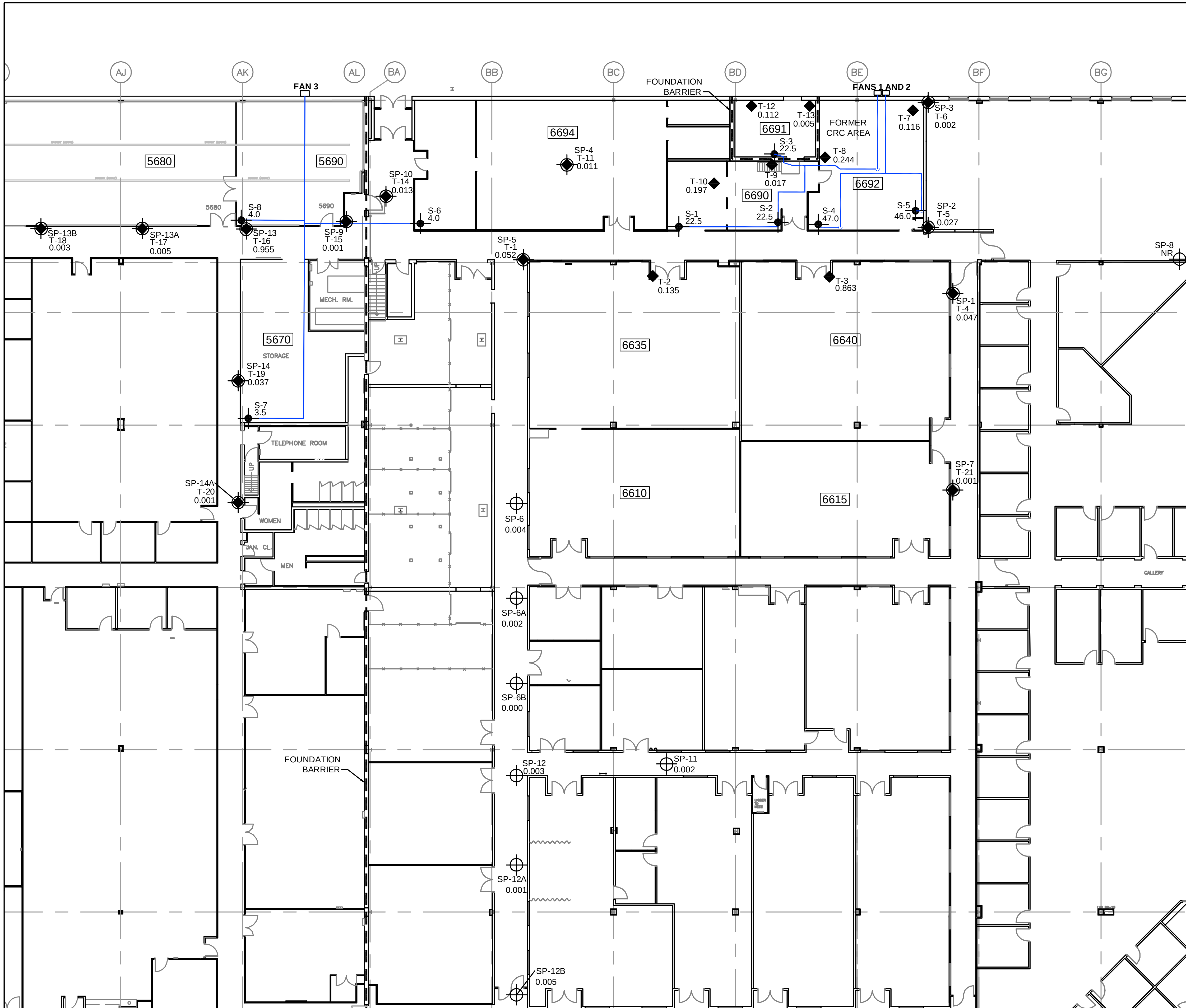
XEROX CORPORATION
BUILDING 801
HENRIETTA, NY

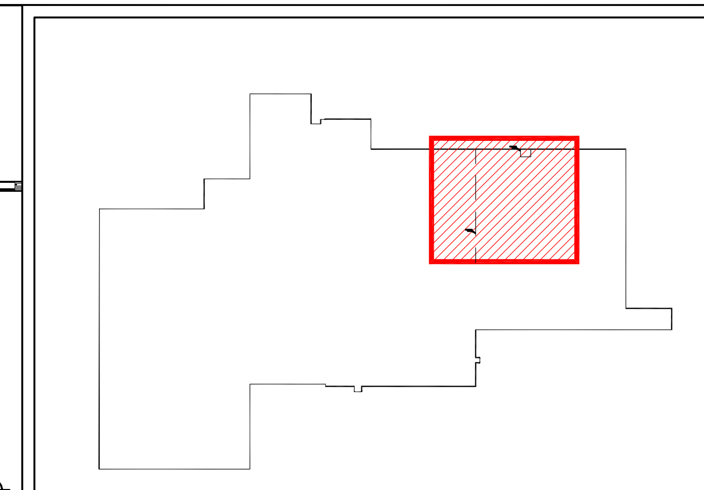
PROJECT LOCUS

SCALE: 1" = 2000'

FEBRUARY 2001

FIGURE 1

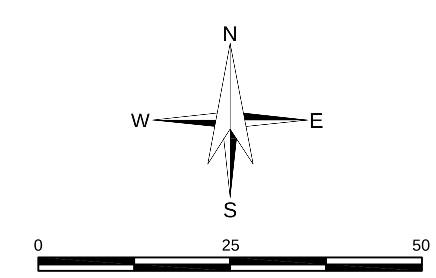




SITE KEY: NOT TO SCALE

LEGEND:

- S-1 SUCTION LOCATION
- T-2 VACUUM TEST LOCATION
- SP-6 FORMER SAMPLING LOCATION
- 0.000 VACUUM READING (IN.W.C) (MAY 2009)
- EXISTING PIPING
- FOUNDATION BARRIER



HALEY & ALDRICH

XEROX CORPORATION
BUILDING 801
HENRIETTA, NEW YORK

DRAFT

RECORD DRAWING
SUB-SLAB DEPRESSURIZATION SYSTEM

SCALE: AS SHOWN
MAY 2009

FIGURE 2

G:\32077 - XEROX\CAD\DRAWINGS\32077-SUB-SLAB-AS_BUILTS_R2.DWG

APPENDIX A
MITIGATION TECH INSTALLATION REPORT

mitigation tech *radon correction specialists*

STATEMENT OF WORK

January 29, 2007

Mr. Mark Ramsdell
Haley & Aldrich of New York
20 Town Center Dr., Suite 200
Rochester, NY 14623
Via fax: 585-486-8225

Re: Xerox Corporation. Bldg. 801, Henrietta, NY
Sub-slab Depressurization System for Soil Vapor Intrusion Mitigation

<u>Summary of work completed 12-06-06</u>

This is to certify that our firm designed, supervised the installation of and tested the performance of two sub-slab depressurization systems at this location, as summarized below and corresponding to the attached reference drawing.

<u>Typical System Configuration:</u>

- North exterior wall mounted vacuum fan
- Excavated sub-slab cavity (2-3 per system)
- Piping and valves
- Magnahelic vacuum gauge
- Remote test points
- Miscellaneous sealing
- Overload protection switching

General fan coverage area	Type	Average Static Pressure
East of BE, 18 to 16.5	Radonaway HS-5000	45 wci
West of BE, 18 to 16.5	Radonaway HS-5000	23 wci

--continued --

Test Point Readings

Test point	Differential reading in wci	
T-1	.021	
T-2	.019	
T-3	.891	
T-4	.046	
T-5	.039	
T-6	-.002	(no influence)
T-7	.073	
T-8	.293	
T-9	.044	
T-10	.191	
T-11	.005	
T-12	.033	
T-13	N/A	(defective point)

Notes:

1. A footer just west of test points T-5 and T-6 appears to create a substantial barrier to sub-slab vacuum influence to areas east of the footer.
2. Smoke testing performed at conclusion of installation.
3. See attached drawing for suction and test point locations

Please contact me with any questions.

Thank you.

Nicholas E. Mouganis EPA listing # 15415-I; NEHA ID# 100722

APPENDIX B
SYSTEM PHOTOS

Vacuum Monitoring –Manometer

SSD – Typical Stack to Fan with Manometer

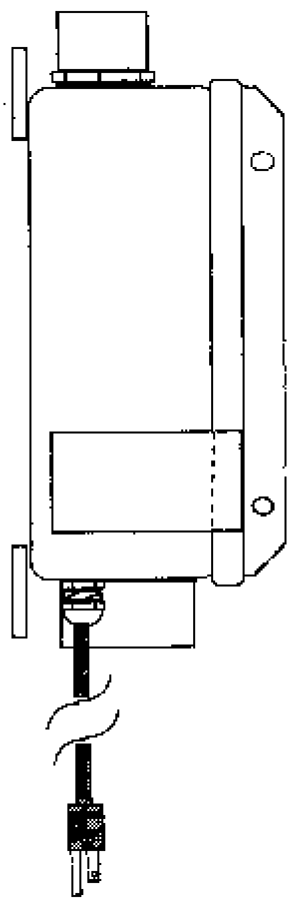
Northern Exterior Wall – SSD Fans and Exhaust

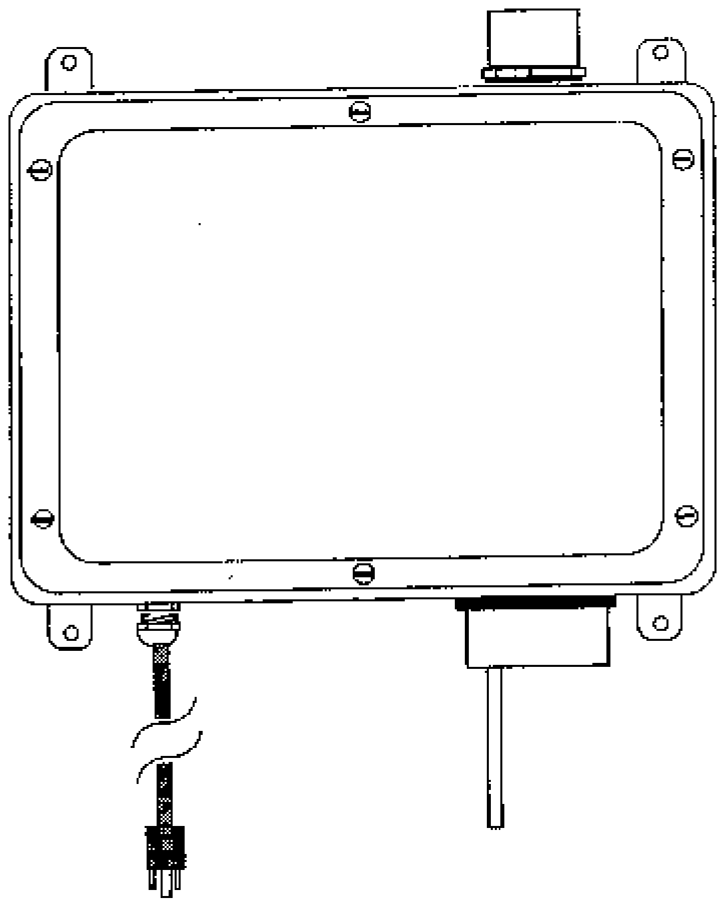
Roof – Location of Exhaust Relative to Other Roof Exhausts

APPENDIX C
EQUIPMENT CUT SHEETS

HS SERIES INSTALLATION INSTRUCTIONS

BY RadonAway™





RadonAway, Inc. Ward Hill, MA. P/N IN007 Rev E

RadonAway Ward Hill, MA.

HS Series Fan Installation Instructions

Please Read and Save These Instructions.

DO NOT CONNECT POWER SUPPLY UNTIL FAN IS COMPLETELY INSTALLED. MAKE SURE ELECTRICAL SERVICE TO FAN IS LOCKED IN "OFF" POSITION. DISCONNECT POWER BEFORE SERVICING FAN.

1. **WARNING!** Do not use fan in hazardous environments where fan electrical system could provide ignition to combustible or flammable materials.

2. **WARNING!** Do not use fan to pump explosive or corrosive gases.

3. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.

4. **WARNING!** Normal operation of this device may affect the combustion airflow needed for safe operation of fuel burning equipment. Check for possible backdraft conditions on all combustion devices after installation.

5. **NOTICE!** There are no user serviceable parts located inside the fan unit. **Do NOT attempt to open.** Return unit to the factory for service.

6. All wiring must be in accordance with local and national electrical codes.

7. **WARNING!** In the event that the fan is immersed in water, return unit to factory for service before operating.

8. **WARNING!** Do not twist or torque fan inlet or outlet piping as Leakage may result.

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.

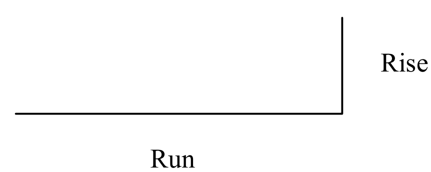
1.5 CONDENSATION & DRAINAGE

(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 of Run*		
	@ 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

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

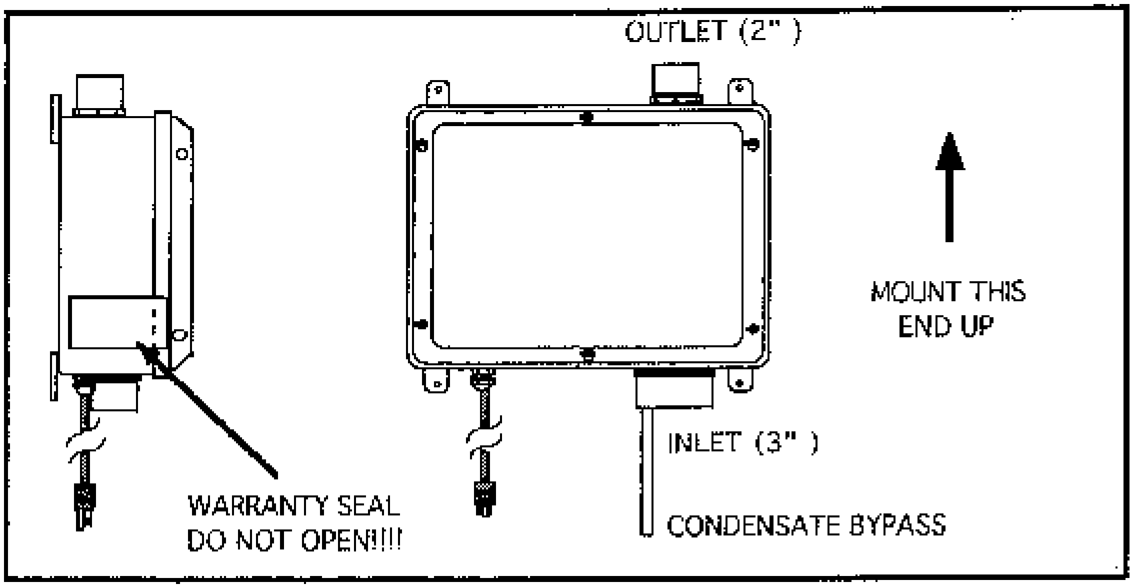
The DynaVac plugs into a standard 120V outlet. All wiring must be performed in accordance with the National Electrical Code and state and local building codes.

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.

Addendum

PRODUCT SPECIFICATIONS

Model	Maximum Static Suction	Typical CFM vs Static Suction WC (Recommended Operating Range)						Power* Watts @ 115 VAC
		0"	10"	15"	20"	25"	35"	
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):
HS3000, HS5000 --- 2.0" PVC Pipe
HS2000 --- Main feeder line of 3.0" or greater PVC Pipe
Branch lines (if 3 or more) may be 2.0" PVC Pipe
Outlet ducting: 2.0" PVC
Storage temperature range: 32 - 100 degrees F.
Thermally protected
Locked rotor protection
Internal Condensate Bypass

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the HS Series Fan for shipping damage within 15 days of receipt. Notify **RadonAway of any damages immediately**. Radonaway is not responsible for damages incurred during shipping. However, for your benefit, Radonaway does insure shipments.

There are no user serviceable parts inside the fan. **Do not attempt to open.** Return unit to factory for service.

Install the HS Series Fan in accordance with all EPA standard practices, and state and local building codes and state regulations.

WARRANTY

Subject to any applicable consumer protection legislation, RadonAway warrants that the HS Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of one (1) year from the date of manufacture (the "Warranty Term"). Outside the Continental United States and Canada the Warranty Term is one (1) year from the date of manufacture.

RadonAway will replace any Fan which fails due to defects in materials or workmanship. The Fan must be returned (at owner's cost) to the RadonAway factory. Proof of purchase must be supplied upon request for service under this Warranty.

This Warranty is contingent on installation of the Fan in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not include damage in shipment unless the damage is due to the negligence of RadonAway.

RadonAway is not responsible for installation, removal or delivery costs associated with this Warranty.

EXCEPT AS STATED ABOVE, THE HS SERIES FANS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.

For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping cost to and from factory.

RadonAway
3 Saber Way
Ward Hill, MA 01835
TEL. (978) 521-3703
FAX (978) 521-3964

Record the following information for your records:

Serial No.____
Purchase Date_________________________________

BULLETIN NO. A-27

Magnehelic® Differential Pressure Gage

OPERATING INSTRUCTIONS

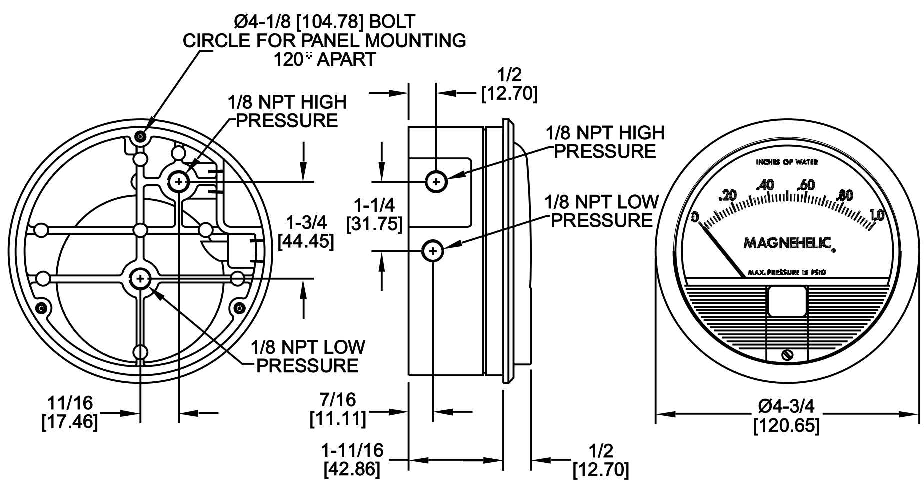
SPECIFICATIONS

Dimensions: 4-3/4" dia. x 2-3/16" deep.
Weight: 1 lb. 2 oz.
Finished: Baked dark gray enamel.
Connections: 1/8" NPT high and low pressure taps, duplicated, one pair side and one pair back.
Accuracy: Plus or minus 2% of full scale, at 70°F. (Model 2000-0, 3%; 2000-00, 4%).
Pressure Rating: 15 PSI (0,35 bar)
Ambient Temperature Range: 20° to 140°F (-7 to 60°C).
Standard gage accessories include two 1/8" NPT plugs for duplicate pressure taps, two 1/8" NPT pipe thread to rubber tubing adapters, and three flush mounting adapters with screws.

Caution: For use with air or compatible gases only.

For repeated over-ranging or high cycle rates, contact factory.

Not for use with Hydrogen gas. Dangerous reactions will occur.



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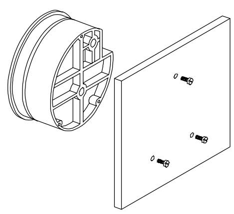
www.dwyer-inst.com
e-mail: info@dwyer-inst.com

MAGNEHELIC® INSTALLATION

1. Select a location free from excessive vibration and where the ambient temperature will not exceed 140°F. Also, avoid direct sunlight which accelerates discoloration of the clear plastic cover. Sensing lines my be run any necessary distance. Long tubing lengths will not affect accuracy but will increase response time slightly. Do not restrict lines. If pulsating pressures or vibration cause excessive pointer oscillation, consult the factory for ways to provide additional damping.

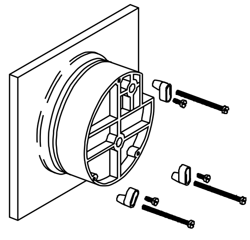
2. All standard Magnehelic gages are calibrated with the diaphragm vertical and should be used in that position for maximum accuracy. If gages are to be used in other than vertical position, this should be specified on the order. Many higher range gages will perform within tolerance in other positions with only rezeroing. Low range Model 2000-00 and metric equivalents must be used in the vertical position only.

3. Surface Mounting



Locate mounting holes, 120° apart on a 4-1/8" dia. circle. Use No. 6-32 machine screws of appropriate length.

4. Flush Mounting



Provide a 4-9/16" dia. opening in panel. Insert gage and secure in place with No. 6-32 machine screws of appropriate length, with adapters, firmly secured in place. To mount gage on 1-1/4"-2" pipe, order optional A-610 pipe mounting kit.

5. To zero the gage after installation

Set the indicating pointer exactly on the zero mark, using the external zero adjust screw on the cover at the bottom. Note that the zero check or adjustment can only be made with the high and low pressure taps both open to atmosphere.

Operation

Positive Pressure: Connect tubing from source of pressure to either of the two high pressure ports. Plug the port not used. Vent one or both low pressure ports to atmosphere.

Negative Pressure: Connect tubing from source of vacuum or negative pressure to either of the two low pressure ports. Plug the port not used. Vent one or both high pressure ports to atmosphere.

Differential Pressure: Connect tubing from the greater of two pressure sources to either high pressure port and the lower to either low pressure port. Plug both unused ports.

When one side of the gage is vented in dirty, dusty atmosphere, we suggest an A-331 Filter Vent Plug be installed in the open port to keep inside of gage clean.

A. For portable use of temporary installation use 1/8" pipe thread to rubber tubing adapter and connect to source of pressure with rubber or Tygon tubing.

B. For permanent installation, 1/4" O.D., or larger, copper or aluminum tubing is recommended. See accessory bulletin S-101 for fittings.

Ordering Instructions:

When corresponding with the factory regarding Magnehelic® gage problems, be sure to include model number, pressure range, and any special options. Field repair is not recommended; contact the factory for repair service.

MAINTENANCE

Maintenance: No lubrication or periodic servicing is required. Keep case exterior and cover clean. Occasionally disconnect pressure lines to vent both sides of gage to atmosphere and re-zero. Optional vent valves, (bulletin S-101), should be used in permanent installations.

Calibration Check: Select a second gage or manometer of known accuracy and in an appropriate range. Using short lengths of rubber or vinyl tubing, connect the high pressure side of the Magnehelic gage and the test gage to two legs of a tee. Very slowly apply pressure through the third leg. Allow a few seconds for pressure to equalize, fluid to drain, etc., and compare readings. If accuracy unacceptable, gage may be returned to factory for recalibration. To calibrate in the field, use the following procedure.

Calibration:

1. With gage case, held firmly, loosen bezel, by turning counterclockwise. To avoid damage, a canvas strap wrench or similar tool should be used.
2. Lift out plastic cover and "O" ring.
3. Remove scale screws and scale assembly. Be careful not to damage pointer.
4. The calibration is changed by moving the clamp. Loosen the clamp screw(s) and move slightly toward the helix if gage is reading high, and away if reading low. Tighten clamp screw and install scale assembly.
5. Place cover and O-ring in position. Make sure the hex shaft on inside of cover is properly engaged in zero adjust screw.
6. Secure cover in place by screwing bezel down snug. Note that the area under the cover is pressurized in operation and therefore gage will leak if not properly tightened.
7. Zero gage and compare to test instrument. Make further adjustments as necessary.

Caution: If bezel binds when installing, lubricate threads sparingly with light oil or molybdenum disulphide compound.

Warning: Attempted field repair may void your warrenty. Recalibration or repair by the user is not recommended. For best results, return gage to the factory. Ship prepaid to:

Dwyer Instruments, Inc.

Attn: Repair Dept.

102 Indiana Highway 212

Michigan City, IN 46360

Trouble Shooting Tips:

•G*age won't indicate or is sluggish.*

1. Duplicate pressure port not plugged.
2. Diaphragm ruptured due to overpressure.
3. Fittings or sensing lines blocked, pinched, or leaking.
4. Cover loose or "O"ring damaged, missing.
5. Pressure sensor, (static tips, Pitot tube, etc.) improperly located.
6. Ambient temperature too low. For operation below 20°F, order gage with low temperature, (LT) option.

•Pointer stuck-gage can't be zeroed.

1. Scale touching pointer.
2. Spring/magnet assembly shifted and touching helix.
3. **Metallic particles clinging to magnet and interfering with helix movement.**
4. Cover zero adjust shaft broken or not properly engaged in adjusting screw.

We generally recommend that gages needing repair be returned to the factory. Parts used in various sub-assemblies vary from one range of gage to another, and use of incorrect components may cause improper operation. After receipt and inspection, we will be happy to quote repair costs before proceeding.

Consult factory for assistance on unusual applications or conditions.

Use with air or compatible gases only.

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