

Linda Hanefeld
Remediation and Redevelopment Team Supervisor
Wisconsin Department of Natural Resources
South Central Region
3911 Fish Hatchery Rd
Fitchburg WI 53711

Subject:

Bi-Monthly Progress Report, Madison-Kipp Corporation (MKC) Site, 201 Waubesa Street, Madison, Wisconsin.

Dear Ms. Hanefeld:

On behalf of MKC, this Bi-Monthly Progress Report provides a summary of the activities completed from October 30 through November 12, 2012 as part of the MKC site located at 201 Waubesa Street in Madison, Wisconsin (site).

Tasks Completed – October 30, 2012 through November 12, 2012

The following tasks were completed during the period of October 30 through November 12, 2012 and are presented in chronological order.

- Activities related to the *Site Investigation Work Plan Addenda* and *In-Situ Chemical Oxidation Groundwater Pilot Test Work Plan* are on-going.
- The *In-Situ Chemical Oxidation Groundwater Pilot Test Work Plan* was approved by the Wisconsin Department of Natural Resources (WDNR) in a letter dated November 2, 2012.
- Underground storage tank (UST) closure assessment activities were performed in the southeast parking lot on November 8, 2012. An approximate 1,000-gallon waste oil UST was removed and disposed of off-site. A sample of the soil was collected beneath the UST and submitted for laboratory analysis of diesel range organics and petroleum volatile organic compounds. Tank System Site Assessment (TSSA) reporting will be submitted in accordance with Wisconsin Department of Safety and Professional Services (WSPS) and WDNR rules. Visual and olfactory evidence of a historic release of petroleum products from the UST was observed and as such a Spill Statute Notification Form was submitted by RJN Environmental Services, LLC to the WDNR on November 9, 2012.

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ENVIRONMENT

Date:

November 15, 2012

Contact:

Jennine Trask

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414.277.6203

Email:

Jennine.Trask@arcadis-us.com

Our ref:

WI001283.0006

Imagine the result

- The *Revised Work Plan for Polychlorinated Biphenyl Recommended Activities* was submitted to WDNR and United States Environmental Protection Agency (U.S. EPA) on November 9, 2012.
- Weekly soil vapor extraction (SVE) system monitoring and blower maintenance was performed by MKC personnel. Data collected during the weekly and monthly Operation, Maintenance, and Monitoring (OM&M) is included in Attachment A. The emission tables are also included in Attachment A. A review of the tables indicated the emissions rates are several orders of magnitude lower than the NR445 Emission Threshold Values and therefore, carbon change-out is not currently scheduled. ARCADIS will continue to monitor the need for carbon change-out.

Tasks In-Progress

The following tasks are scheduled to be completed from November 13 through November 28, 2012.

- Investigation activities related to the *Site Investigation Work Plan Addenda* and *In-Situ Chemical Oxidation Groundwater Pilot Test Work Plan* are on-going.
- Coordination activities related to the *Work Plan for Polychlorinated Biphenyl Recommended Activities*, upon WDNR and U.S. EPA approval.
- Preparation of a data summary with the results of the soil boring investigation completed under the site building.
- Preparation of the TSSA report and work plan for investigation activities in the southeast parking lot related to the former UST.
- Perform weekly and monthly SVE system OM&M activities.
- Participate in bi-weekly conference calls with the WDNR.

If you have any questions or require any additional information, please contact us at 414.276.7742.

Sincerely,

ARCADIS U.S., Inc.



Christopher D. Kubacki, PE
Project Engineer



Jennine L. Trask, PE
Project Manager

Attachments:

A SVE Summary Tables

Copies:

David Crass – Michael Best
Bradley Grams & Peter Ramanauskas, EPA Region V (electronic)
Mark Meunier – Madison Kipp
Bob Nauta – RJN Environmental Services (electronic)
Steve Tinker – Wisconsin Department of Justice (electronic)
Mike Schmoller – WDNR (electronic)

Table 1. Phase I SVE System Analytical Data, Madison-Kipp Corporation, Madison, Wisconsin.

Well/Boring Sample Date	Effluent			Influent	Effluent	Influent	Effluent
	3/9/2012	3/10/2012	3/11/2012	3/16/2012	3/16/2012	3/23/2012	3/23/2012
1,1-Dichloroethene	<0.15	<0.3	<0.3	<2.1	<0.03	<1.5	<0.045
1,2,4-Trimethylbenzene	<0.26	<0.52	<0.52	<3.6	0.17 J	<2.6	0.079 J
1,2-Dichloroethane	<0.16	<0.31	<0.31	<2.2	<0.031	<1.6	<0.047
1,3,5-Trimethylbenzene	<0.26	<0.51	<0.51	<3.6	0.069 J	<2.6	<0.077
1,4-Dichlorobenzene	<0.22	<0.44	<0.44	<3.1	0.049 J	<2.2	<0.066
Benzene	<0.09	<0.18	<0.18	<1.3	0.71	<0.9	0.69
Chloroethane	<0.08	<0.16	<0.16	<1.1	<0.016	<0.8	<0.024
Chloroform	<0.16	<0.31	<0.31	<2.2	<0.031	<1.6	<0.047
Chloromethane	5.2	0.86 J	<0.13	<0.91	0.30 J	<0.65	0.65 J
cis-1,2-Dichloroethene	<0.07	<0.14	<0.14	78	0.5	190	14
Dichlorodifluoromethane	<0.19	0.94 J	0.56 J	<2.6	0.55	<1.9	0.44 J
Ethylbenzene	<0.11	<0.22	<0.22	<1.5	0.084 J	<1.1	<0.033
Methylene Chloride	<0.065	<0.13	<0.13	<0.91	0.26 J B	<0.65	0.50 J
Styrene	<0.15	<0.3	<0.3	<2.1	<0.03	<1.5	<0.045
Tetrachloroethene	<0.055	<0.11	<0.11	1,500	14	1,900	38
Toluene	0.23 J	0.32 J	0.22 J	<1.3	0.33	1.0 J	0.14 J
Trichloroethene	<0.15	<0.3	<0.3	76	0.2	130	1.2
Trichlorofluoromethane	<0.17	<0.34	<0.34	<2.4	0.21	<1.7	0.18 J
Vinyl chloride	<0.15	10	13	16	18	37	33
Xylene (total)	<0.11	<0.22	<0.22	<1.5	0.53	<1.1	0.17 J
Xylene, o-	<0.11	<0.22	<0.22	<1.5	0.17 J	<1.1	0.052 J

Only detected constituents are noted. Constituent concentrations are reported as ppbv.

Between March 9 and October 16, 2012, the system operated with the dilution air valve 50 percent open to maintain system operation within maximum range of blower vacuum. On October 16, 2012, the blower was replaced and modified to allow more efficient system performance and operation with the dilution air valve fully closed.

Influent sampling began on 3/16/12 to evaluate the effectiveness of carbon treatment.

System sampling occurred daily for the first three days of startup, weekly for the next three weeks, and monthly thereafter.

< Constituent not detected above noted laboratory detection limit.

-- Not monitored or sampled.

B Compound was found in the blank and sample.

Bold Constituent detected above laboratory detection limit.

J Constituent concentration is an approximate value.

ppbv Parts per billion by volume.

Table 1. Phase I SVE System Analytical Data, Madison-Kipp Corporation, Madison, Wisconsin.

Well/Boring	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
Sample Date	3/30/2012	3/30/2012	4/11/2012	4/11/2012	5/9/2012	5/9/2012	6/14/2012	6/12/2012
1,1-Dichloroethene	<1.5	<0.12	<4	0.16 J	<4	<1.2	<5	<1.4
1,2,4-Trimethylbenzene	5.7 J	2.4	<0.98	<0.021	<4	<1.2	<5	<1.4
1,2-Dichloroethane	<1.6	<0.12	<0.84	<0.018	<4	<1.2	<5	<1.4
1,3,5-Trimethylbenzene	<2.6	0.69 J	<0.89	<0.019	<4	<1.2	<5	<1.4
1,4-Dichlorobenzene	<2.2	<0.18	<0.84	<0.018	<4	<1.2	<5	<1.4
Benzene	<0.9	0.57 J	11	0.15 J	<4	<1.2	<5	<1.4
Chloroethane	<0.8	0.56 J	<1.5	<0.033	<10	<3	<13	<3.5
Chloroform	<1.6	<0.12	<1.1	0.037 J	<4	<1.2	<5	<1.4
Chloromethane	<0.65	0.87 J	<1.6	0.6	<10	<3	<13	<3.5
cis-1,2-Dichloroethene	150	17	240	19	170	230	150	180
Dichlorodifluoromethane	<1.9	0.73 J	<0.94	0.47 J	<10	<3	<13	<3.5
Ethylbenzene	2.2 J	0.66 J	<0.7	<0.015	<4	<1.2	<5	<1.4
Methylene Chloride	<0.65	0.62 J	2.5 J B	0.16 J B	<10	<3	<13	<3.5
Styrene	<1.5	<0.12	<0.52	<0.011	<4	<1.2	<5	<1.4
Tetrachloroethene	890	98	700	0.16 J	440	36	580	<1.4
Toluene	6.1 J	2.7	1.2 J	<0.014	<4	2	<5	2.2
Trichloroethene	100	4.4	110	0.061 J	80	3	71	8.7
Trichlorofluoromethane	<1.7	<0.14	<0.98	0.12 J	<4	<1.2	<5	<1.4
Vinyl chloride	34	31	8.7 J	7.6	<4	3	<5	<1.4
Xylene (total)	10	3.5	<0.75	<0.016	<4	<1.2	<5	1.4
Xylene, o-	3.1 J	1.1	<0.75	<0.016	<4	<1.2	<5	<1.4

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ppbv Parts per billion by volume.

Table 1. Phase I SVE System Analytical Data, Madison-Kipp Corporation, Madison, Wisconsin.

Well/Boring Sample Date	Influent	Effluent	Influent	Effluent	Influent	Effluent
	7/10/2012	7/10/2012	8/14/2012	8/14/2012	9/12/2012	9/16/2012
1,1-Dichloroethene	<7.3	<0.4	<2	<1	<2.4	<0.75
1,2,4-Trimethylbenzene	<7.3	2	<2	3.4	<2.4	<0.75
1,2-Dichloroethane	<7.3	1.2	<2	<1	<2.4	<0.75
1,3,5-Trimethylbenzene	<7.3	0.62	<2	1.3	<2.4	<0.75
1,4-Dichlorobenzene	<7.3	1.5	<2	2	<2.4	<0.75
Benzene	<7.3	0.41	<2	<1	<2.4	<0.75
Chloroethane	<18	<1	<5	<2.5	<6	<1.9
Chloroform	<7.3	0.67	<2	<1	<2.4	<0.75
Chloromethane	<18	1.1	<5	<2.5	<6	<1.9
cis-1,2-Dichloroethene	190	65	51	120	84	110
Dichlorodifluoromethane	<18	<1	<5	<2.5	<6	<1.9
Ethylbenzene	<7.3	1.1	<2	<1	<2.4	<0.75
Methylene Chloride	<18	1.4	<5	<2.5	<6	<1.9
Styrene	<7.3	0.84	<2	<1	<2.4	<0.75
Tetrachloroethene	650	<0.4	250	<1	290	1.9
Toluene	<7.3	12	<2	1.2	<2.4	<0.75
Trichloroethene	96	3.4	27	7.6	38	7.9
Trichlorofluoromethane	<7.3	<0.4	<2	<1	<2.4	<0.75
Vinyl chloride	<7.3	2.4	<2	1.6	<2.4	1.8
Xylene (total)	<7.3	4.1	<2	2.5	<2.4	<0.75
Xylene, o-	<7.3	1.1	<2	<1	<2.4	<0.75

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J Constituent concentration is an approximate value.

ppbv Parts per billion by volume.

Table 2. Extraction Well Manifold Monitoring Data, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Well ID	Date	System Manifold			
		Vacuum (in Hg)	Vacuum (in H ₂ O)	Flow Rate (cfm)	VOCs (ppm)
SVE-1	3/9/12	-6.5	-88.4	20	109.7 ¹
SVE-1	3/9/12	-5.5	-74.8	30	47.4 ²
SVE-1	3/10/12	-6	-81.6	30	27.3
SVE-1	3/11/12	-6	-81.6	30	25.1
SVE-1	3/16/12	-5.5	-74.8	20	15.9
SVE-1	3/23/12	-6	-81.6	25	--
SVE-1	3/23/12	-6	-81.6	25	13.5
SVE-1	3/29/12 ³	-3	-40.8	20	--
SVE-1	3/29/12 ⁴	-4	-54.4	30	--
SVE-1	3/30/12	-5	-68.0	25	14.8
SVE-1	4/11/12	-5	-68.0	25	14.1
SVE-1	4/16/12	-5	-68.0	25	--
SVE-1	4/23/12	-5	-68.0	100	--
SVE-1	4/30/12	-5	-68.0	30	--
SVE-1	5/7/12	-5	-68.0	10	--
SVE-1	5/9/12	-5	-68.0	30	4.3
SVE-1	5/14/12	-5	-68.0	30	--
SVE-1	5/21/12	-5	-68.0	10	--
SVE-1	5/30/12	-4	-54.4	20	--
SVE-1	6/4/12	-5	-68.0	30	--
SVE-1	6/11/12	-5	-68.0	30	--
SVE-1	6/12/12	-4.5	-61.2	28	6
SVE-1	6/14/12	-3.5	-47.6	22	--
SVE-1	6/18/12	-2	-27.2	20	--
SVE-1	6/25/12	-2	-27.2	10	--
SVE-1	7/2/12	-2	-27.2	20	--
SVE-1	7/9/12	-2	-27.2	20	--
SVE-1	7/10/12	-2	-27.2	18	12.6
SVE-1	7/16/12	-2	-27.2	20	--
SVE-1	7/23/12	-2	-27.2	20	--
SVE-1	7/30/12	-2	-27.2	20	--
SVE-1	8/6/12	-2	-27.2	20	--
SVE-1	8/14/12	-2	-27.2	19	34.69
SVE-1	8/20/12	-2	-27.2	20	--
SVE-1	8/27/12	-2	-27.2	20	--
SVE-1	9/4/12	-1	-13.6	20	--
SVE-1	9/10/12	-2	-27.2	20	--
SVE-1	9/12/12	-2	-27.2	12	1.02
SVE-1	9/17/12	-2	-27.2	20	--
SVE-1	9/24/12	-2	-27.2	20	--
SVE-1	10/1/12	-2	-27.2	20	--
SVE-1	10/8/12	-2	-27.2	20	--
SVE-1	10/16/12	-3.75	-51.0	30	0
SVE-1	10/22/12	-4	-54.4	30	--
SVE-1	10/29/12	-4	-54.4	30	--

Footnotes on Page 10.

Table 2. Extraction Well Manifold Monitoring Data, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Well ID	Date	System Manifold			
		Vacuum (in Hg)	Vacuum (in H ₂ O)	Flow Rate (cfm)	VOCs (ppm)
SVE-2	3/9/12	-3	-40.8	40	105.8 ¹
SVE-2	3/9/12	-4	-54.4	60	11.5 ²
SVE-2	3/10/12	-3.5	-47.6	55	10.3
SVE-2	3/11/12	-3.5	-47.6	50	8.2
SVE-2	3/16/12	-3.5	-47.6	50	5.3
SVE-2	3/23/12	-3.25	-44.2	40	--
SVE-2	3/23/12	-3.25	-44.2	40	6.1
SVE-2	3/29/12 ³	-1.5	-20.4	25	--
SVE-2	3/29/12 ⁴	-2.5	-34.0	37	--
SVE-2	3/30/12	-3	-40.8	40	6.9
SVE-2	4/11/12	-2.5	-34.0	35	6.3
SVE-2	4/16/12	-2.5	-34.0	40	--
SVE-2	4/23/12	-2.5	-34.0	120	--
SVE-2	4/30/12	-3	-40.8	40	--
SVE-2	5/7/12	-2.5	-34.0	30	--
SVE-2	5/9/12	-3	-40.8	35	2.6
SVE-2	5/14/12	-3	-40.8	50	--
SVE-2	5/21/12	-2.5	-34.0	45	--
SVE-2	5/30/12	-2.5	-34.0	40	--
SVE-2	6/4/12	-3	-40.8	45	--
SVE-2	6/11/12	-2.5	-34.0	45	--
SVE-2	6/12/12	-2.5	-34.0	40	6.6
SVE-2	6/14/12	-3.5	-47.6	25	--
SVE-2	6/18/12	-1	-13.6	20	--
SVE-2	6/25/12	-1	-13.6	20	--
SVE-2	7/2/12	<-1 ⁵	NM	20	--
SVE-2	7/9/12	-1	-13.6	20	--
SVE-2	7/10/12	-1	-13.6	20	8.8
SVE-2	7/16/12	<-1 ⁵	NM	10	--
SVE-2	7/23/12	<-1 ⁵	NM	20	--
SVE-2	7/30/12	-1	-13.6	10	--
SVE-2	8/6/12	<-1 ⁵	NM	20	--
SVE-2	8/14/12	--	-8.4	19	32.36
SVE-2	8/20/12	--	-8.0	20	--
SVE-2	8/27/12	--	-7.0	20	--
SVE-2	9/4/12	--	-6.0	20	--
SVE-2	9/10/12	--	-6.0	20	--
SVE-2	9/12/12	--	-6.5	20	22.26
SVE-2	9/17/12	--	-5.5	20	--
SVE-2	9/24/12	--	-9.0	20	--
SVE-2	10/1/12	--	-8.0	20	--
SVE-2	10/8/12	--	-9.0	20	--
SVE-2	10/16/12	--	>-15.0 ⁷	50	1.6
SVE-2	10/22/12	<-2 ⁵	NM	50	--
SVE-2	10/29/12	<-2 ⁵	NM	50	--

Footnotes on Page 10.

Table 2. Extraction Well Manifold Monitoring Data, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Well ID	Date	System Manifold			
		Vacuum (in Hg)	Vacuum (in H ₂ O)	Flow Rate (cfm)	VOCs (ppm)
SVE-3	3/9/12	-2.25	-30.6	60	85.3 ¹
SVE-3	3/9/12	-3	-40.8	85	5.92 ²
SVE-3	3/10/12	-2.5	-34.0	80	6.1
SVE-3	3/11/12	-2.5	-34.0	75	4.5
SVE-3	3/16/12	-2.5	-34.0	60	1.6
SVE-3	3/23/12	-3	-40.8	60	--
SVE-3	3/23/12	-3	-40.8	60	4.4
SVE-3	3/29/12 ³	-2	-27.2	30	--
SVE-3	3/29/12 ⁴	-2.5	-34.0	50	--
SVE-3	3/30/12	-4	-54.4	50	6.1
SVE-3	4/11/12	-3	-40.8	50	4.9
SVE-3	4/16/12	-2.5	-34.0	50	--
SVE-3	4/23/12	-2.5	-34.0	140	--
SVE-3	4/30/12	-2.6	-35.3	50	--
SVE-3	5/7/12	-3	-40.8	50	--
SVE-3	5/9/12	-3	-40.8	40	5.9
SVE-3	5/14/12	-3	-40.8	50	--
SVE-3	5/21/12	-3	-40.8	50	--
SVE-3	5/30/12	-3.5	-47.6	50	--
SVE-3	6/4/12	-3	-40.8	50	--
SVE-3	6/11/12	-2.5	-34.0	50	--
SVE-3	6/12/12	-2.25	-30.6	50	9.3
SVE-3	6/14/12	-2	-27.2	40	--
SVE-3	6/18/12	-1	-13.6	20	--
SVE-3	6/25/12	-1	-13.6	25	--
SVE-3	7/2/12	-1	-13.6	20	--
SVE-3	7/9/12	-1	-13.6	20	--
SVE-3	7/10/12	-1	-13.6	21	7.6
SVE-3	7/16/12	-1	-13.6	20	--
SVE-3	7/23/12	<-1 ⁵	NM	20	--
SVE-3	7/30/12	-1	-13.6	20	--
SVE-3	8/6/12	<-1 ⁵	NM	25	--
SVE-3	8/14/12	--	-9.8	21	33.73
SVE-3	8/20/12	--	-10.5	30	--
SVE-3	8/27/12	--	-9.0	20	--
SVE-3	9/4/12	--	-8.0	20	--
SVE-3	9/10/12	--	-9.0	20	--
SVE-3	9/12/12	--	-7.0	20	0.88
SVE-3	9/17/12	--	-6.5	20	--
SVE-3	9/24/12	--	-15.0	20	--
SVE-3	10/1/12	--	-7.0	20	--
SVE-3	10/8/12	--	>-15.0 ⁷	20	--
SVE-3	10/16/12	--	>-15.0 ⁷	55	0.2
SVE-3	10/22/12	<-2 ⁵	NM	50	--
SVE-3	10/29/12	<-2 ⁵	NM	55	--

Footnotes on Page 10.

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Well ID	Date	System Manifold			
		Vacuum (in Hg)	Vacuum (in H ₂ O)	Flow Rate (cfm)	VOCs (ppm)
SVE-4	3/9/12	-6.5	-88.4	32.5	105.1 ¹
SVE-4	3/9/12	-6.5	-88.4	32	5.1 ²
SVE-4	3/10/12	-6.5	-88.4	30	2.1
SVE-4	3/11/12	-6.5	-88.4	28	5.2
SVE-4	3/16/12	-7	-95.2	28	3.1
SVE-4	3/23/12	-8	-108.8	27	--
SVE-4	3/23/12	-7	-95.2	27	9.7
SVE-4	3/29/12 ³	-3.5	-47.6	25	--
SVE-4	3/29/12 ⁴	-4.5	-61.2	30	--
SVE-4	3/30/12	-7	-95.2	25	10.3
SVE-4	4/11/12	-4	-54.4	20	10
SVE-4	4/16/12	-7.5	-102.0	17	--
SVE-4	4/23/12	-7.5	-102.0	20	--
SVE-4	4/30/12	-7.6	-103.3	27	--
SVE-4	5/7/12	-7	-95.2	18	--
SVE-4	5/9/12	-7	-95.2	18	9.4
SVE-4	5/14/12	-7	-95.2	20	--
SVE-4	5/21/12	-7	-95.2	30	--
SVE-4	5/30/12	-7	-95.2	33	--
SVE-4	6/4/12	-7	-95.2	30	--
SVE-4	6/11/12	-7	-95.2	30	--
SVE-4	6/12/12	-7	-95.2	23	8.3
SVE-4	6/14/12	-5.75	-78.2	23	--
SVE-4	6/18/12	-4	-54.4	17	--
SVE-4	6/25/12	-4	-54.4	18	--
SVE-4	7/2/12	-4	-54.4	18	--
SVE-4	7/9/12	-4	-54.4	20	--
SVE-4	7/10/12	-4.2	-57.1	22	9.8
SVE-4	7/16/12	-5	-68.0	20	--
SVE-4	7/23/12	-4	-54.4	18	--
SVE-4	7/30/12	-4	-54.4	18	--
SVE-4	8/6/12	-4	-54.4	18	--
SVE-4	8/14/12	-4.2	-57.1	27	32.28 ⁶
SVE-4	8/20/12	-4	-54.4	18	--
SVE-4	8/27/12	-4	-54.4	18	--
SVE-4	9/4/12	-4	-54.4	20	--
SVE-4	9/10/12	-4	-54.4	20	--
SVE-4	9/12/12	-4	-54.4	17	1.58
SVE-4	9/17/12	-4	-54.4	20	--
SVE-4	9/24/12	-3.5	-47.6	15	--
SVE-4	10/1/12	-4	-54.4	15	--
SVE-4	10/8/12	-3	-40.8	20	--
SVE-4	10/16/12	-5	-68.0	27	1.4
SVE-4	10/22/12	-5	-68.0	25	--
SVE-4	10/29/12	-5	-68.0	25	--

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Table 2. Extraction Well Manifold Monitoring Data, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Well ID	Date	System Manifold			
		Vacuum (in Hg)	Vacuum (in H ₂ O)	Flow Rate (cfm)	VOCs (ppm)
SVE-5	3/9/12	-6.5	-88.4	35	47.2 ¹
SVE-5	3/9/12	-6.5	-88.4	34	15.0 ²
SVE-5	3/9/12	-0.49	-6.7	0	--
SVE-5	3/10/12	-6.5	-88.4	33	10.8
SVE-5	3/11/12	-6.5	-88.4	32	3.6
SVE-5	3/16/12	-6	-81.6	34	2.9
SVE-5	3/23/12	-7	-95.2	32	--
SVE-5	3/23/12	-6	-81.6	32	3
SVE-5	3/29/12 ³	-4.5	-61.2	30	--
SVE-5	3/29/12 ⁴	-5.5	-74.8	37	--
SVE-5	3/30/12	-7	-95.2	35	2.8
SVE-5	4/11/12	-6	-81.6	27	3.3
SVE-5	4/16/12	-6	-81.6	27	--
SVE-5	4/23/12	-6	-81.6	25	--
SVE-5	4/30/12	-7	-95.2	38	--
SVE-5	5/7/12	-6	-81.6	26	--
SVE-5	5/9/12	-6	-81.6	27	1
SVE-5	5/14/12	-6	-81.6	27	--
SVE-5	5/21/12	-6	-81.6	28	--
SVE-5	5/30/12	-6	-81.6	38	--
SVE-5	6/4/12	-6	-81.6	35	--
SVE-5	6/11/12	-6	-81.6	35	--
SVE-5	6/12/12	-5.25	-71.4	30	3.6
SVE-5	6/14/12	-5	-68.0	29	--
SVE-5	6/18/12	-4	-54.4	22	--
SVE-5	6/25/12	-4	-54.4	22	--
SVE-5	7/2/12	-4	-54.4	22	--
SVE-5	7/9/12	-4	-54.4	22	--
SVE-5	7/10/12	-3.2	-43.5	30	5.3
SVE-5	7/16/12	-4	-54.4	25	--
SVE-5	7/23/12	-4	-54.4	20	--
SVE-5	7/30/12	-5	-68.0	15	--
SVE-5	8/6/12	-4	-54.4	20	--
SVE-5	8/14/12	-4	-54.4	29	28.95 ⁶
SVE-5	8/20/12	-5	-68.0	20	--
SVE-5	8/27/12	-4	-54.4	23	--
SVE-5	9/4/12	-5	-68.0	25	--
SVE-5	9/10/12	-5	-68.0	23	--
SVE-5	9/12/12	-3.75	-51.0	23	1.33
SVE-5	9/17/12	-3	-40.8	25	--
SVE-5	9/24/12	-3	-40.8	25	--
SVE-5	10/1/12	-3	-40.8	25	--
SVE-5	10/8/12	-2	-27.2	25	--
SVE-5	10/16/12	-5.5	-74.8	27	0.6
SVE-5	10/22/12	-6	-81.6	25	--
SVE-5	10/29/12	-6	-81.6	25	--

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Table 2. Extraction Well Manifold Monitoring Data, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Well ID	Date	System Manifold			
		Vacuum (in Hg)	Vacuum (in H ₂ O)	Flow Rate (cfm)	VOCs (ppm)
SVE-6	3/9/12	-8.5	-115.6	19	37.5 ¹
SVE-6	3/9/12	-8	-108.8	19	3.7 ²
SVE-6	3/10/12	-8	-108.8	20	1.3
SVE-6	3/11/12	-8	-108.8	20	2.8
SVE-6	3/16/12	-7.5	-102.0	16	1.9
SVE-6	3/23/12	-9	-122.4	--	--
SVE-6	3/23/12	-9	-122.4	17	2.2
SVE-6	3/29/12 ³	-6	-81.6	23	--
SVE-6	3/29/12 ⁴	-7	-95.2	24	--
SVE-6	3/30/12	-9	-122.4	17	2
SVE-6	4/11/12	-7	-95.2	17	2.3
SVE-6	4/16/12	-8	-108.8	5	--
SVE-6	4/23/12	-7.5	-102.0	19	--
SVE-6	4/30/12	-9	-122.4	25	--
SVE-6	5/7/12	-6	-81.6	18	--
SVE-6	5/9/12	-6	-81.6	13	0.5
SVE-6	5/14/12	-7	-95.2	15	--
SVE-6	5/21/12	-7	-95.2	25	--
SVE-6	5/30/12	-7	-95.2	24	--
SVE-6	6/4/12	-7	-95.2	20	--
SVE-6	6/11/12	-7	-95.2	20	--
SVE-6	6/17/12	-5	-68.0	15	--
SVE-6	6/23/12	-6	-81.6	15	--
SVE-6	6/12/12	-6.75	-91.8	16	3.1
SVE-6	6/12/12	-6	-81.6	15	--
SVE-6	6/12/12	-6	-81.6	16	--
SVE-6	6/14/12	-6	-81.6	19	--
SVE-6	6/18/12	-5	-68.0	15	--
SVE-6	6/25/12	-5	-68.0	15	--
SVE-6	7/2/12	-5	-68.0	15	--
SVE-6	7/9/12	-5	-68.0	15	--
SVE-6	7/10/12	-4.6	-62.6	21	3.9
SVE-6	7/16/12	-5	-68.0	15	--
SVE-6	7/23/12	-5	-68.0	15	--
SVE-6	7/30/12	-5	-68.0	13	--
SVE-6	8/6/12	-5	-68.0	12	--
SVE-6	8/14/12	-5	-68.0	18	24.71 ⁶
SVE-6	8/20/12	-5	-68.0	12	--
SVE-6	8/27/12	-5	-68.0	8	--
SVE-6	9/4/12	-4	-54.4	12	--
SVE-6	9/10/12	-4	-54.4	12	--
SVE-6	9/12/12	-4.75	-64.6	10	0.79
SVE-6	9/17/12	-4	-54.4	12	--
SVE-6	9/24/12	-4	-54.4	22	--
SVE-6	10/1/12	-4	-54.4	25	--
SVE-6	10/8/12	-3	-40.8	20	--

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Table 2. Extraction Well Manifold Monitoring Data, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Well ID	Date	System Manifold			
		Vacuum (in Hg)	Vacuum (in H ₂ O)	Flow Rate (cfm)	VOCs (ppm)
SVE-6	10/16/12	-6	-81.6	20	0
SVE-6	10/22/12	-6	-81.6	20	--
SVE-6	10/29/12	-6	-81.6	20	--
SVE-7	3/9/12	-6	-81.6	40	96.2 ¹
SVE-7	3/9/12	-5.5	-74.8	30	11.8 ²
SVE-7	3/10/12	-5.5	-74.8	30	10.5
SVE-7	3/11/12	-5.25	-71.4	30	7.3
SVE-7	3/16/12	-5.5	-74.8	30	3.6
SVE-7	3/23/12	-6	-81.6	35	--
SVE-7	3/23/12	-6	-81.6	35	3.4
SVE-7	3/29/12 ³	-3.5	-47.6	20	--
SVE-7	3/29/12 ⁴	-4	-54.4	30	--
SVE-7	3/30/12	-5	-68.0	30	3
SVE-7	4/11/12	-4	-54.4	25	7
SVE-7	4/16/12	-5	-68.0	25	--
SVE-7	4/23/12	-5	-68.0	120	--
SVE-7	4/30/12	-5	-68.0	30	--
SVE-7	5/7/12	-5	-68.0	25	--
SVE-7	5/9/12	-5	-68.0	30	0.6
SVE-7	5/14/12	-5	-68.0	30	--
SVE-7	5/21/12	-5	-68.0	40	--
SVE-7	5/30/12	-4	-54.4	30	--
SVE-7	6/4/12	-5	-68.0	40	--
SVE-7	6/11/12	-4	-54.4	40	--
SVE-7	6/12/12	-4.5	-61.2	35	4
SVE-7	6/14/12	-3.5	-47.6	25	--
SVE-7	6/18/12	-2.5	-34.0	20	--
SVE-7	6/25/12	-2	-27.2	15	--
SVE-7	7/2/12	-2	-27.2	20	--
SVE-7	7/9/12	-1	-27.2	20	--
SVE-7	7/10/12	-2.4	-32.4	16	4.9
SVE-7	7/16/12	-1	-13.6	10	--
SVE-7	7/23/12	-1	-13.6	20	--
SVE-7	7/30/12	-1	-13.6	20	--
SVE-7	8/6/12	-2	-27.2	20	--
SVE-7	8/14/12	-2.3	-31.3	20	25.27 ⁶
SVE-7	8/20/12	-2	-27.2	20	--
SVE-7	8/27/12	-1	-13.6	20	--
SVE-7	9/4/12	-1	-13.6	20	--
SVE-7	9/10/12	-1	-13.6	20	--
SVE-7	9/12/12	-2	-27.2	12	1.12
SVE-7	9/17/12	-1	-13.6	20	--
SVE-7	9/24/12	-2	-27.2	20	--
SVE-7	10/1/12	-2	-27.2	20	--
SVE-7	10/8/12	-2	-27.2	20	--

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Table 2. Extraction Well Manifold Monitoring Data, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Well ID	Date	System Manifold			
		Vacuum (in Hg)	Vacuum (in H ₂ O)	Flow Rate (cfm)	VOCs (ppm)
SVE-7	10/16/12	-3.5	-47.6	40	0.7
SVE-7	10/22/12	-3.5	-47.6	30	--
SVE-7	10/29/12	-2	-27.2	45	--
SVE-8	3/9/12	-7	-95.2	30	34.2 ¹
SVE-8	3/9/12	-7	-95.2	30	7.2 ²
SVE-8	3/10/12	-7	-95.2	31	4.3
SVE-8	3/11/12	-6.5	-88.4	33	6.7
SVE-8	3/16/12	-6.5	-88.4	32	2.4
SVE-8	3/23/12	-7	-95.2	35	--
SVE-8	3/23/12	-7	-95.2	35	2.5
SVE-8	3/29/12 ³	-5	-68.0	29	--
SVE-8	3/29/12 ⁴	-5.5	-74.8	35	--
SVE-8	3/30/12	-6	-81.6	37	2.9
SVE-8	4/11/12	-6	-81.6	27	2
SVE-8	4/16/12	-6	-81.6	25	--
SVE-8	4/23/12	-6	-81.6	25	--
SVE-8	4/30/12	-6	-81.6	40	--
SVE-8	5/7/12	-6	-81.6	25	--
SVE-8	5/9/12	-6	-81.6	27	0.5
SVE-8	5/14/12	-6	-81.6	27	--
SVE-8	5/21/12	-6	-81.6	38	--
SVE-8	5/30/12	-6	-81.6	38	--
SVE-8	6/4/12	-7	-95.2	35	--
SVE-8	6/11/12	-6	-81.6	35	--
SVE-8	6/12/12	-5.5	-74.8	28	3.4
SVE-8	6/14/12	-5	-68.0	27	--
SVE-8	6/18/12	-3	-40.8	18	--
SVE-8	6/25/12	-4	-54.4	20	--
SVE-8	7/2/12	-4	-54.4	18	--
SVE-8	7/9/12	-4	-54.4	20	--
SVE-8	7/10/12	-3.9	-53.0	24	4.3
SVE-8	7/16/12	-4	-54.4	22	--
SVE-8	7/23/12	-4	-54.4	20	--
SVE-8	7/30/12	-4	-54.4	20	--
SVE-8	8/6/12	-4	-54.4	18	--
SVE-8	8/14/12	-4	-54.4	27	23.24 ⁶
SVE-8	8/20/12	-4	-54.4	25	--
SVE-8	8/27/12	-4	-54.4	22	--
SVE-8	9/4/12	-4	-54.4	22	--
SVE-8	9/10/12	-4	-54.4	25	--
SVE-8	9/12/12	-4	-54.4	21	1.95
SVE-8	9/17/12	-4	-54.4	22	--
SVE-8	9/24/12	-3	-40.8	22	--
SVE-8	10/1/12	-3	-40.8	25	--
SVE-8	10/8/12	-3	-40.8	22	--

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Table 2. Extraction Well Manifold Monitoring Data, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Well ID	Date	System Manifold			
		Vacuum (in Hg)	Vacuum (in H ₂ O)	Flow Rate (cfm)	VOCs (ppm)
SVE-8	10/16/12	-5	-68.0	40	0
SVE-8	10/22/12	-5	-68.0	30	--
SVE-8	10/29/12	-5	-68.0	32	--
SVE-9	3/9/12	-9.5	-129.2	13	196.1 ¹
SVE-9	3/9/12	-9	-122.4	15	172.1 ²
SVE-9	3/10/12	-9	-122.4	15	144.5
SVE-9	3/11/12	-9	-122.4	15	131.2
SVE-9	3/16/12	-9	-122.4	15	26.3
SVE-9	3/23/12	-9.5	-129.2	17	--
SVE-9	3/23/12	-10	-136.0	17	29.7
SVE-9	3/29/12 ³	-7	-95.2	13	--
SVE-9	3/29/12 ⁴	-8.5	-115.6	17	--
SVE-9	3/30/12	-9	-122.4	17	30.6
SVE-9	4/11/12	-8.5	-115.6	13	5
SVE-9	4/16/12	-9	-122.4	7	--
SVE-9	4/23/12	-9	-122.4	4	--
SVE-9	4/30/12	-9	-122.4	22	--
SVE-9	5/7/12	-9	-122.4	8	--
SVE-9	5/9/12	-8	-108.8	13	4.3
SVE-9	5/14/12	-8	-108.8	10	--
SVE-9	5/21/12	-8	-108.8	25	--
SVE-9	5/30/12	-8	-108.8	25	--
SVE-9	6/4/12	-8	-108.8	22	--
SVE-9	6/11/12	-8	-108.8	22	--
SVE-9	6/12/12	-8	-108.8	18	6.9
SVE-9	6/14/12	-7.25	-98.6	17	--
SVE-9	6/18/12	-6	-81.6	12	--
SVE-9	6/25/12	-6	-81.6	14	--
SVE-9	7/2/12	-6	-81.6	12	--
SVE-9	7/9/12	-6	-81.6	15	--
SVE-9	7/10/12	-5.5	-74.8	17	12
SVE-9	7/16/12	-6	-81.6	15	--
SVE-9	7/23/12	-6	-81.6	15	--
SVE-9	7/30/12	-6	-81.6	13	--
SVE-9	8/6/12	-6	-81.6	12	--
SVE-9	8/14/12	-5.7	-77.5	20	28.9 ⁶
SVE-9	8/20/12	-6	-81.6	15	--
SVE-9	8/27/12	-5	-68.0	15	--
SVE-9	9/4/12	-5	-68.0	15	--
SVE-9	9/10/12	-5	-68.0	15	--
SVE-9	9/12/12	-5.5	-74.8	14	1.76
SVE-9	9/17/12	-5	-68.0	12	--
SVE-9	9/24/12	-5	-68.0	12	--
SVE-9	10/1/12	-5	-68.0	12	--
SVE-9	10/8/12	-5	-68.0	12	--

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Table 2. Extraction Well Manifold Monitoring Data, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Well ID	Date	System Manifold			
		Vacuum (in Hg)	Vacuum (in H ₂ O)	Flow Rate (cfm)	VOCs (ppm)
SVE-9	10/16/12	-7	-95.2	20	0.2
SVE-9	10/22/12	-7	-95.2	15	--
SVE-9	10/29/12	-7	-95.2	20	--

Start system at 1:15 pm on March 9, 2012.

Vacuum measured with inline vacuum gauge in units of in Hg. Vacuum converted to in H₂O for comparison.

Extraction well flow rate measured with inline air flow meter.

VOCs measured with a PID (calibrated to 100 ppm isobutylene).

- 1 Vacuum measured at well head at 12:55 pm.
- 2 Vacuum measured at well head at 5:30 pm.
- 3 System restarted with make-up air valve open 100 percent to reduce backpressure on blower.
- 4 Make-up air valve closed to 50 percent open to continue operation of system consistent with previous settings.
- 5 Vacuum measured at well head indicates influence is still being achieved at this well.
- 6 PID results were analyzed from tedlar bag approximately four hours after collection due to instrument malfunction.
- 7 Gauge reading above calibrated range.
- <-1 or <-2 Vacuum reading below minimum gauge reading of 1 or 2 inches of mercury, respectively.
- Not monitored.
- cfm Cubic feet per minute.
- in Hg Inches of mercury.
- in H₂O Inches of water column.
- NM Not measurable.
- PID Photoionization detector.
- ppm Parts per million.
- VOCs Volatile organic compounds reported as isobutylene.



Table 3. Estimate of Post-Carbon Emissions, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Date	Total VOC Concentration ¹	System Flow Rate	Emission Rate ²
	µg/m ³	cfm	lb/hr
3/9/2012 ³	16.03	450	--
3/10/2012	43.89	450	7.39E-05
3/11/2012	47.07	450	7.93E-05
3/16/2012	154.42	450	2.60E-04
3/23/2012	418.29	450	7.05E-04
3/30/2012 ⁴	887.68	450	1.50E-03
4/11/2012	101.77	450	1.71E-04
5/9/2012	1,250.95	450	2.11E-03
6/12/2012	775.20	450	1.31E-03
7/10/2012	400.50	450	6.75E-04
8/14/2012	633.45	450	1.07E-03
9/16/2012	516.30	450	8.70E-04
10/16/2012 ⁵	496.55	450	8.36E-04

Average Emission Rate = 8.04E-04 lb/hr

NR 445 Emission Threshold = 5.7 lb/hr

¹ Total VOC concentration was based on the sum of all detected analyte concentrations in post-carbon effluent samples for dates shown. When compounds are not detected above the laboratory reporting limit, emissions are calculated using 1/2 the reporting limit.

² Emission rates were determined using the following equation:

$$\text{Emission Rate} = \text{Conc.} * \text{Flow Rate} * 60 \text{ min/hr} * (1 \text{ m}^3/35.31 \text{ ft}^3) * (1 \text{ lb}/4.54 \times 10^8 \text{ } \mu\text{g})$$

³ Phase I SVE system began operation on 3/9/12.

⁴ System was shut down between 3/24/12 and 3/29/12.

⁵ System was shut down between 10/13/12 and 10/16/12.

cfm Cubic feet per minute.

lb/hr Pounds per hour.

µg/m³ Micrograms per cubic meter.

VOC Volatile organic compound.



Table 4. Estimate of Post-Carbon Emissions of cis-1,2-Dichloroethene, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Date	Total cis-1,2-DCE Concentration ¹	System Flow Rate	Emission Rate ²	Percent of NR 445 Emission Threshold ⁵
	µg/m ³	cfm	lb/hr	%
3/9/2012 ³	0.14	450	--	--
3/10/2012	0.28	450	4.72E-07	2.84E-07
3/11/2012	0.28	450	4.72E-07	2.84E-07
3/16/2012	2.0	450	3.37E-06	2.03E-06
3/23/2012	57	450	9.60E-05	5.78E-05
3/30/2012 ⁴	69	450	1.16E-04	7.00E-05
4/11/2012	75	450	1.26E-04	7.61E-05
5/9/2012	930	450	1.57E-03	9.44E-04
6/12/2012	720	450	1.21E-03	7.31E-04
7/10/2012	260	450	4.38E-04	2.64E-04
8/14/2012	460	450	7.75E-04	4.67E-04
9/16/2012	420	450	7.07E-04	4.26E-04
10/16/2012 ⁶	170	450	2.86E-04	1.72E-04

Average Emission Rate = 4.44E-04 lb/hr

NR 445 Emission Threshold = 166 lb/hr

¹ VOC concentration was based on the detected analyte concentration in post-carbon effluent samples for dates shown. When compound was not detected above the laboratory reporting limit, emissions were calculated using 1/2 the reporting limit.

² Emission rates were determined using the following equation:

$$\text{Emission Rate} = \text{Conc.} * \text{Flow Rate} * 60 \text{ min/hr} * (1 \text{ m}^3/35.31 \text{ ft}^3) * (1 \text{ lb}/4.54 \times 10^8 \text{ } \mu\text{g})$$

³ Phase I SVE system began operation on 3/9/12.

⁴ System was shut down between 3/24/12 and 3/29/12.

⁵ Post-carbon emissions presented as a percentage of the threshold level using the following equation:

$$\text{Percent of Threshold} = (\text{Emission rate} / \text{NR 445 Emission Threshold}) * 100$$

⁶ System was shut down between 10/13/12 and 10/16/12.

cfm Cubic feet per minute.
 lb/hr Pounds per hour.
 µg/m³ Micrograms per cubic meter.
 cis-1,2-DCE cis-1,2-Dichloroethene



Table 5. Estimate of Post-Carbon Emissions of Tetrachloroethene, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Date	Total PCE Concentration ¹	System Flow Rate	Emission Rate ²	Percent of NR 445 Emission Threshold ⁵
	µg/m ³	cfm	lb/hr	%
3/9/2012 ³	0.19	450	--	--
3/10/2012	0.38	450	6.32E-07	1.78E-06
3/11/2012	0.38	450	6.32E-07	1.78E-06
3/16/2012	93	450	1.57E-04	4.42E-04
3/23/2012	260	450	4.38E-04	1.24E-03
3/30/2012 ⁴	660	450	1.11E-03	3.14E-03
4/11/2012	1.1	450	1.85E-06	5.23E-06
5/9/2012	240	450	4.04E-04	1.14E-03
6/12/2012	9.4	450	1.58E-05	4.47E-05
7/10/2012	2.7	450	4.55E-06	1.28E-05
8/14/2012	6.8	450	1.15E-05	3.24E-05
9/16/2012	13.0	450	2.19E-05	6.19E-05
10/16/2012 ⁶	280	450	4.72E-04	1.33E-03

Average Emission Rate = 2.20E-04 lb/hr

NR 445 Emission Threshold = 35.4 lb/hr

¹ VOC concentration was based on the detected analyte concentration in post-carbon effluent samples for dates shown. When compound was not detected above the laboratory reporting limit, emissions were calculated using 1/2 the reporting limit.

² Emission rates were determined using the following equation:

$$\text{Emission Rate} = \text{Conc.} * \text{Flow Rate} * 60 \text{ min/hr} * (1 \text{ m}^3/35.31 \text{ ft}^3) * (1 \text{ lb}/4.54 \times 10^8 \text{ } \mu\text{g})$$

³ Phase I SVE system began operation on 3/9/12.

⁴ System was shut down between 3/24/12 and 3/29/12.

⁵ Post-carbon emissions presented as a percentage of the threshold level using the following equation:

$$\text{Percent of Threshold} = (\text{Emission rate} / \text{NR 445 Emission Threshold}) * 100$$

⁶ System was shut down between 10/13/12 and 10/16/12.

cfm Cubic feet per minute.
 lb/hr Pounds per hour.
 µg/m³ Micrograms per cubic meter.
 PCE Tetrachloroethene.



Table 6. Estimate of Post-Carbon Emissions of Trichloroethene, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Date	Total TCE Concentration ¹	System Flow Rate	Emission Rate ²	Percent of NR 445 Emission Threshold ⁵
	µg/m ³	cfm	lb/hr	%
3/9/2012 ³	0.41	450	--	--
3/10/2012	0.80	450	1.35E-06	2.40E-06
3/11/2012	0.80	450	1.35E-06	2.40E-06
3/16/2012	1.1	450	1.85E-06	3.30E-06
3/23/2012	6.5	450	1.09E-05	1.95E-05
3/30/2012 ⁴	24	450	4.04E-05	7.21E-05
4/11/2012	0.3	450	5.56E-07	9.91E-07
5/9/2012	16	450	2.69E-05	4.80E-05
6/12/2012	47	450	7.92E-05	1.41E-04
7/10/2012	19	450	3.20E-05	5.70E-05
8/14/2012	41	450	6.91E-05	1.23E-04
9/16/2012	43	450	7.24E-05	1.29E-04
10/16/2012 ⁶	27	450	4.55E-04	8.11E-04

Average Emission Rate = 6.59E-05 lb/hr

NR 445 Emission Threshold = 56.1 lb/hr

¹ VOC concentration was based on the detected analyte concentration in post-carbon effluent samples for dates shown. When compound was not detected above the laboratory reporting limit, emissions were calculated using 1/2 the reporting limit.

² Emission rates were determined using the following equation:

$$\text{Emission Rate} = \text{Conc.} * \text{Flow Rate} * 60 \text{ min/hr} * (1 \text{ m}^3/35.31 \text{ ft}^3) * (1 \text{ lb}/4.54 \times 10^8 \text{ } \mu\text{g})$$

³ Phase I SVE system began operation on 3/9/12.

⁴ System was shut down between 3/24/12 and 3/29/12.

⁵ Post-carbon emissions presented as a percentage of the threshold level using the following equation:

$$\text{Percent of Threshold} = (\text{Emission rate} / \text{NR 445 Emission Threshold}) * 100$$

⁶ System was shut down between 10/13/12 and 10/16/12.

cfm Cubic feet per minute.
 lb/hr Pounds per hour.
 µg/m³ Micrograms per cubic meter.
 TCE Trichloroethene.



Table 7. Estimate of Post-Carbon Emissions of Vinyl Chloride, Phase I SVE System, Madison-Kipp Corporation, Madison, Wisconsin.

Date	Total VC Concentration ¹	System Flow Rate	Emission Rate ²	Emission Rate ²	Percent of NR 445 Emission Threshold ⁵
	µg/m ³	cfm	lb/hr	lb/yr	%
3/9/2012 ³	0.19	450	--	--	--
3/10/2012	27	450	4.55E-05	0.398	0.05
3/11/2012	34	450	5.73E-05	0.502	0.06
3/16/2012	45	450	7.58E-05	0.664	0.08
3/23/2012	84	450	1.41E-04	1.239	0.15
3/30/2012 ⁴	79	450	1.33E-04	1.166	0.14
4/11/2012	19	450	3.20E-05	0.280	0.03
5/9/2012	7.7	450	1.30E-05	0.114	0.01
6/12/2012	3.5	450	5.89E-06	0.052	0.01
7/10/2012	6	450	1.01E-05	0.089	0.01
8/14/2012	4	450	6.74E-06	0.059	0.01
9/16/2012	5	450	7.58E-06	0.066	0.01
10/16/2012 ⁶	2	450	3.20E-06	0.028	0.00

Average Emission Rate = -- 0.421 lb/yr

NR 445 Emission Threshold = -- 830 lb/yr

¹ VOC concentration was based on the detected analyte concentration in post-carbon effluent samples for dates shown. When compound was not detected above the laboratory reporting limit, emissions were calculated using 1/2 the reporting limit.

² Emission rates were determined using the following equation:

$$\text{Emission Rate} = \text{Conc.} * \text{Flow Rate} * 60 \text{ min/hr} * (1 \text{ m}^3/35.31 \text{ ft}^3) * (1 \text{ lb}/4.54 \times 10^8 \text{ } \mu\text{g}) * 24 \text{ hr/day} * 365 \text{ days/yr}$$

³ Phase I SVE system began operation on 3/9/12.

⁴ System was shut down between 3/24/12 and 3/29/12.

⁵ Post-carbon emissions presented as a percentage of the threshold level using the following equation:

$$\text{Percent of Threshold} = (\text{Emission rate} / \text{NR 445 Emission Threshold}) * 100$$

⁶ System was shut down between 10/13/12 and 10/16/12.

cfm Cubic feet per minute.
 lb/yr Pounds per year.
 lb/hr Pounds per hour.
 µg/m³ Micrograms per cubic meter.
 VC Vinyl Chloride.