Memorandum For: **Ms. Lee Ann Smith, Chair**
POWER Action Group
Protecting Our Water and Environmental Resources
CTS of Asheville Superfund Site
235 Mills Gap Rd., Asheville, Buncombe County, NC

From: **Frank Anastasi, P.G., Community Technical Advisor**
(PA PG-2605; WY PG-2001; NC Provisional License P-0001)

Date: **July 3, 2015**

Subject: **Review of AMEC Foster Wheeler's Springs Area Removal Action Report, March 23, 2015, and April 26, 2015 Addendum**

Introduction

AMEC prepared the Springs Removal Action Report, March 23, 2015, to document the work it conducted and initial results it achieved to mitigate releases of volatile organic compounds (VOCs), especially trichloroethylene (TCE), into the air. The VOCs come from contaminated ground water flowing from the CTS of Asheville Superfund Site that discharges at the springs on adjacent property, just southeast and downhill from the site. AMEC Foster Wheeler (AMEC) performed the work on behalf of CTS Corporation in response to U.S. Environmental Protection Agency's (EPA's) July 10, 2014 letter that followed EPA's evacuation of residents at the Springs Area because of high levels of TCE in both indoor and outdoor air at several nearby residences.

The CTS site contains a significant quantity of residual hazardous waste as a light, non-aqueous phase liquid (LNAPL). The LNAPL is primarily petroleum, but has considerable TCE content (up to 35%). It is present near the Rice property in the soil beneath part of the former manufacturing building foundation and nearby, an area AMEC estimates at about one acre.

AMEC previously reported the LANPL was up to 45 feet think, extending about 40 feet below the water table. Free-phase (mobile) LNAPL was found in some locations (up to three feet in one well), but much of the LNAPL is adsorbed to soil particles and fills pore spaces within the soil. Table 5 from AMEC's NAPL Investigation Report (attached) shows the contaminants present in the NAPL.

Existing data demonstrates that dense NAPL (DNAPL) is also present at the CTS site, although to date AMEC has not investigated the bedrock to characterize DNAPL.

VOC Collection and Treatment System Installation

AMEC's September 2, 2014 Work Plan for the removal action was approved within one week by EPA. Field work to prepare the springs area and install the VOC collection and treatment systems began on September 10, and the systems began operating on October

21, 2015. AMEC Figures 2, 3, and 4 show the location and construction details. Construction activities are summarized as follows.

- Vegetation was cleared from the area and a non-woven geotextile fabric was placed on the ground surface. The geotextile was covered with about two feet of ballast stone, followed by a second layer of geotextile fabric. A 40-millimeter thick polyethylene liner (cover) was then placed over the stone and geotextile layers, with seams sealed and edges anchored with stakes and sandbags.

- Nine "sparge" points were installed at seven locations within springs/stream channels to enable air to be blown into the water to promote volatilization of VOCs from the water. At each location, slotted plastic pipe was placed into shallow, geotextile-lined stone sumps dug into the springs/stream channel. The sparge points were connected to a pipeline leading to an air compressor/blower.

- Twelve vapor extraction points were installed beneath the polyethylene liner (cover). These extraction points, consisting of geotextile-wrapped slotted PVC pipes, were connected to a pipeline leading to a vacuum blower.

- A trailer-mounted treatment system was connected to the air supply and vacuum extraction pipelines. The system consists of a vacuum blower (180 cubic feet per minute (cfm) capacity), 40 cfm air compressor/blower, moisture separator, dual vapor-phase carbon canisters with sampling ports, and a control panel equipped with remote telemetry system and alarms. The discharge-end of the extraction pipeline leads from the second carbon canister to a silencer and exhausts above the trailer.

After construction was completed, the area was fenced and warning signs were posted. The system was started up and tested October 17 – 20. When activated, the blower creates a vacuum under the liner, drawing air (containing the VOC vapors) into the slotted PVC collection points, through the pipeline, and into the carbon canisters where the VOCs are trapped. The blower connected to the sparge points pumps air into the sumps, promoting volatilization of more VOCs from the water.

A sparge pressure of about 22 inches of water was established with the compressor operating at 40 cfm, and a blower operating at about 175 cfm produced a vacuum of about 0.03 inches of water at the extraction points. Full-scale operation commenced October 21.

Air Monitoring

<u>Ambient Air at Springs Area Boundary</u>

On October 23, two ambient air sampling canisters were placed at the fenceline at locations AAS-05 and AAS-06 (see attached AMEC Figure 2). Concentrations of TCE were reported at 0.42 ug/m3 and 0.50 ug/m3 for those samples (EPA's recommended maximum level (RML) is 2 ug/m3).

Collected and Treated Air in Removal System

Samples were taken of the air collected from under the cover (influent) and the treated air (effluent) after the carbon canisters, during operation. Reported influent TCE concentrations were 3,300 and 4,700 ug/m3. TCE was found in only one of eight effluent samples (2.3 ug/m3, in sample EFF-1 on January 7, 2015, collected after the first canister but before the second canister). TCE was not found in any of the final effluent samples (after the second carbon canister). Several VOCs were detected in final effluent samples, however. The highest concentrations were 18,000 ug/m3 of cis-1,2-dichloroethene (DCE) and 760 ug/m3 of vinyl chloride (VC) in sample EFF-2 on December 2, 2014; and 5,500 ug/m3 of TCE and 240 ug/m3 of VC in sample EFF-2 on February 12, 2015. The complete results for influent and effluent samples are shown in attached AMEC Table 2.

Residential Air

Air samples were collected after the system was operating at three residences in November 2014 and in January and February 2015. TCE was not found at levels above the EPA RML of 2 ug/m3 in any sample collected in crawlspaces, indoors, or outdoors at the residences. The highest levels reported were for samples collected in November, 2014: 1.9 ug/m3 outdoors between the springs and the residences; 0.47 - 1.5 ug/m3 in crawlspaces at all residences; and 0.40 - 1.4 ug/m3 indoors at all residences. AMEC Table 3 presents the complete results of the air sampling.

Surface Water Monitoring

Water was sampled from the streamflow at the downstream fenceline below the springs area treatment system before construction and after the system was operating. 461 ug/L of TCE was found in the sample collected before construction; TCE was reported at 34.5 ug/L in the sample collected after the system had been operating about one week (AMEC Table 4).

Other VOCs increased in the surface water after the treatment system began operating. DCE went from 161 ug/L before to 1,270 ug/L after; VC went from 3.2 ug/L before to 10.6 ug/L after. An email between EPA technical staff and the RPM shows EPA's evaluation of the data indicated no unacceptable risks from potential recreational exposure to the surface water flowing from the treatment area (EPA email copy attached).

Additional Information - Springs Removal Action Report Addendum

AMEC prepared an Addendum in April 2015 in response to comments from EPA and North Carolina Department of Environment and Natural Resources (NCDENR) on the March 23, report. AMEC reported the following:

- AMEC estimated mass removal of 19 pounds of VOCs and 7 pounds TCE from January 7 through April 17, 2015, or about 6 pounds of VOCs per month.

- AMEC prepared a graphical depiction of the reduced concentrations of TCE since the treatment system began operating (AMEC Figure attached).

- AMEC acknowledged that levels of TCE and VC in the surface water leaving the springs area with the system operating exceed the National Recommended Water Quality Criteria (NRWQC, general standards for surface water). TCE in the water at 34.5 ug/L, with NRWQC of 2.5 ug/L; VC in the water at 10.8 ug/L, with NRWQC of 0.25 ug/L. While 1,130 ug/L of DCE was reported in the water, there is no NRWQC for DCE (the drinking water standard for DCE is 70 ug/L, and EPA's Regional Screening Level for DCE in tap water is 3.6 ug/L).

- AMEC agreed to continue quarterly monitoring of ambient air at the Springs Area. EPA agreed that indoor air and crawlspace air monitoring could be discontinued based on ambient air monitoring showing reduced levels of TCE.

- AMEC agreed that the treatment system at the Springs Area would continue operating "while contaminated groundwater continues to discharge to the springs area at concentrations that might create an unacceptable indoor air risk to residents adjacent to the springs."

- AMEC agreed to a request from the property owner that the white plastic piping of the treatment system be painted a neutral color.

Observations

Based on the information available for review, and discussions with EPA's RPM Craig Zeller, I have the following observations and comments.

1. The work was performed in accordance with the approved work plan and standard/required field operating procedures, with a few minor deviations:

- Additional sparge points were installed to accommodate increased spring flow compared to what had been expected;

- A second geotextile-material layer was substituted for wood mulch to cover the ballast stone layer and underlie the polyethylene liner/cover; and

- A 20-foot tall exhaust stack was not installed for the treatment system air discharge based on acceptable ambient air quality measured at the Springs Area.

2. Air monitoring has demonstrated that operation of the treatment and collection system achieved the goal of reducing levels of TCE in the air to below the EPA's action level (2.0 ug/m3) for the residential areas adjacent to the former CTS plant site acceptable

levels. As AMEC acknowledged in the Report Addendum, however, the system will have to be operated for an extended period (as long as the highly-contaminated ground water discharges from the CTS site to the Springs Area). Air monitoring, therefore, will have to be continued also for the duration of system operations (at this point, one might assume for the foreseeable future).

3. Other interim actions, such as installation of a subsurface, permeable, reactive-barrier wall and/or a ground water collection system, may have to be implemented before appreciable reductions in contaminated-ground-water discharge can be achieved.

4. A major source of the contaminated ground water that discharges to the Springs Area is the large mass of TCE-containing LNAPL that is present beneath part of the former CTS plant site. Recovery and/or destruction of this LNAPL will likely be necessary before the ground water quality improves significantly, so one would hope to see source-area LNAPL remedial action implemented as soon as possible. [The Source Area FFS report due by the end of July 2015 will mark a critical step toward this goal.]

5. The extent of discharge of contaminated ground water from bedrock to the Springs Area, and thus contribution of VOCs from deep ground water, is uncertain. MW-11B, a flowing artesian well located just southeast (downstream) of the Springs Area, demonstrates upward flow of deep ground water from the bedrock. Historically, ground water samples from MW-11B contained extremely high levels of TCE (35,000 ug/L), indicating the potential presence of dense NAPL (DNAPL) TCE in the bedrock. Prospects for timely ground water remediation, and mitigating impacts to the Springs Area with lasting results, may be limited without addressing the bedrock ground water contamination/DNAPL TCE situation.

I trust that this memorandum helps POWER and the community understand the Springs Area Removal Action and important considerations that surround it. I will continue to review the results of air monitoring and reported system operations, and keep you informed of significant developments.

Frank Anastasi

TABLE 2

Summary of Analytical Results of Influent and Effluent Air Samples

Mills Gap Road Groundwater Contamination Site

Asheville, North Carolina

Amec Foster Wheeler Project 6690-03-9450

Compound	Influent Samples		Effluent Samples							
	INF-1 (10/23/14)	INF-1 (1/7/15)	EFF-1 (10/30/14)	EFF-2 (10/30/14)	EFF-1 (12/2/14)	EFF-2 (12/2/14)	EFF-1 1/7/15)	EFF-2 (1/7/15)	EFF-1 (2/12/15)	EFF-2 (2/12/15)
Acetone		56 J	25 J	58				14 J		
Benzene	130	32 J	25	76			3.8 J	8.4		
2-Butanone		16 J	5.3 J	18 J				3.0 J		
Chlorobenzene									15 J	11 J
Chloroethane			8.1	7.8						
Cumene	30 J	110	140	130			4.4 J	18		
Cyclohexane				3.0 J						
Dichlorodifluoromethane			3.3 J	3.2 J						
1,1-Dichloroethane	38 J	18 J			90	44			17 J	12 J
1,1-Dichloroethene	72 J	50	3.2 J		270	160			88	82
cis-1,2-Dichloroethene	15,000	6,900	3.9 J		28,000	18,000	2.6 J	11	7,300	5,500
trans-1,2-Dichloroethene	140	69			380	270			65	48
Ethanol			22 J	24 J						
Ethyl Acetate			4.4 J	5.0 J			13	14		
n-Heptane	130									
n-Hexane	56 J									
Methylene Chloride		42	4.7 J	4.9 J			19	18		
n-Nonane	35 J									
n-Octane	80 J									
Propene	160			2.5 J						
Styrene									7.5 J	
Tetrachloroethene								2.0 J		
Tetrahydrofuran	51 J				340					
1,1,1-Trichloroethane	240	210 J								
Trichloroethene	3,300	4,700					2.3 J			
Toluene	130	24 J	18	33			12	16	14	11 J
Vinyl chloride	360	130	540	450	660	760	240	240	250	240
m,p-Xylenes	66 J			3.0 J						

Notes:

Prepared By: SEK 2/27/15

Checked By: RMC 3/02/15

1. Concentrations are in micrograms per cubic meter ($\mu g/m^3$).
2. Constituents detected above the method detection limit (MDL) are shown; refer to laboratory analytical report for list of constituents.
3. Blank cells indicate constituent not detected in sample above the MDL.
4. J - concentration is estimated (greater than the MDL, but less than the laboratory reporting limit).

TABLE 3
Summary of 2014/2015 Springs Area Air Sample Laboratory Analytical Results with Risk Assessment Evaluation Summary
Mills Gap Road Groundwater Contamination Site
Asheville, North Carolina
Amec Foster Wheeler Project 6690-03-9450

AMBIENT AIR SAMPLES

Location	Date	Sample ID	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
Upwind of 261/271 Mills Gap Road	4/24/2014	AAS-03	2.2	0.49	<0.011	<0.011
Between springs and 261/271 Mills Gap Road	4/24/2014	AAS-06	3.6	0.83	0.011 J	<0.011
Between springs and 261/271 Mills Gap Road (duplicate)	4/24/2014	FD-04 (AAS-06)	3.7	0.85	0.013 J	<0.011
Between springs and 261/271 Mills Gap Road	10/24/2014	AAS-06	0.50	0.83	0.011 J	0.018 J
Between springs and 261/271 Mills Gap Road	11/5/2014	AAS-06	1.8	3.3	0.033 J	0.11
Between springs and 261/271 Mills Gap Road (duplicate)	11/5/2014	FD-13 (AAS-06)	1.9	3.4	0.036	0.12
Between springs and 261/271 Mills Gap Road	1/14/2015	AAS-06	0.67	0.92	0.010 J	0.056
Between springs and 261/271 Mills Gap Road (duplicate)	1/14/2015	FD-14 (AAS-06)	0.86	1.1	0.010 J	0.061
Between springs and 261/271 Mills Gap Road	2/19/2015	AAS-06	0.96	1.2	0.013 J	0.025 J
Between springs and 261/271 Mills Gap Road (duplicate)	2/19/2015	FD-19 (AAS-06)	1.1	1.3	0.013 J	0.027 J
Upwind of 275 Mills Gap Road	4/24/2014	AAS-04	6.4	1.3	0.017 J	<0.010
Between springs and 275 Mills Gap Road	4/24/2014	AAS-05	16	3.5	0.036 J	0.019 J
Between springs and 275 Mills Gap Road	10/24/2014	AAS-05	0.42	1.7	0.019 J	0.038 J
Between springs and 275 Mills Gap Road	11/5/2014	AAS-05	1.9	6.1	0.055	0.15
Between springs and 275 Mills Gap Road	1/14/2015	AAS-05	0.78	1.8	0.017 J	0.032 J
Between springs and 275 Mills Gap Road	2/19/2015	AAS-05	0.15	0.19	<0.0086	0.0097 J

CRAWLSPACE AIR SAMPLES

Address	Date	Sample ID	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
261 Mills Gap Road (crawlspace)	4/24/2014	CAS-06	10	0.26	<0.012	<0.012
261 Mills Gap Road (crawlspace duplicate)	4/24/2014	FD-05 (CAS-06)	10	0.26	<0.010	<0.011
261 Mills Gap Road (crawlspace)	11/5/2014	CAS-06	0.47	1.1	0.015 J	0.040
261 Mills Gap Road (crawlspace)	1/14/2015	CAS-06	0.18	0.24	<0.0081	0.0099 J
261 Mills Gap Road (crawlspace)	2/19/2015	CAS-06	0.11	0.097	<0.0090	<0.0095
261 Mills Gap Road (crawlspace duplicate)	2/19/2015	FD-20 (CAS-06)	0.10	0.097	<0.011	<0.011
271 Mills Gap Road (crawlspace)	4/24/2014	CAS-04	2.3	0.54	<0.011	<0.012
271 Mills Gap Road (crawlspace)	11/5/2014	CAS-04	0.85	2.1	0.031 J	0.079
271 Mills Gap Road (crawlspace)	1/14/2015	CAS-04	0.36	0.51	<0.0079	0.021 J
271 Mills Gap Road (crawlspace)	2/19/2015	CAS-04	0.45 J	0.59 J	0.0080 J	0.014 J
275 Mills Gap Road (crawlspace)	4/24/2014	CAS-05	14	2.7	0.034 J	0.013 J
275 Mills Gap Road (crawlspace)	11/5/2014	CAS-05	1.5	4.7	0.050	0.084
275 Mills Gap Road (crawlspace)	1/14/2015	CAS-05	0.40	0.74	<0.0083	0.010 J
275 Mills Gap Road (crawlspace)	2/19/2015	CAS-05	0.13	0.16	<0.0092	<0.0098

TABLE 3
Summary of 2014/2015 Springs Area Air Sample Laboratory Analytical Results with Risk Assessment Evaluation Summary
Mills Gap Road Groundwater Contamination Site
Asheville, North Carolina
Amec Foster Wheeler Project 6690-03-9450

INDOOR AIR SAMPLES

Address	Date	Sample ID	TCE	cis-1,2-DCE	trans-1,2-DCE	VC	TCE Hazard Quotient**	TCE Cancer Risk (Adult)	TCE Cancer Risk (Child)
261 Mills Gap Road (indoor)	4/24/2014	IAS-06	87*	0.21	0.013 J	<0.011	42	2E-04	6E-05
261 Mills Gap Road (indoor)	11/5/2014	IAS-06	0.40	0.85	0.015 J	0.033 J	0.2	8E-07	3E-07
261 Mills Gap Road (indoor)	1/14/2015	IAS-06	0.23	0.30	<0.010	<0.011	0.1	5E-07	2E-07
261 Mills Gap Road (indoor duplicate)	1/14/2015	FD-15 (IAS-06)	0.16	0.19	<0.0084	<0.0089	0.1	3E-07	1E-07
261 Mills Gap Road (indoor)	2/19/2015	IAS-06	0.095	0.082	<0.0090	<0.0096	0.1	2E-07	7E-08
261 Mills Gap Road (indoor duplicate)	2/19/2015	FD-21 (IAS-06)	0.10	0.087	<0.0084	<0.0089	0.1	2E-07	7E-08
271 Mills Gap Road (indoor)	4/24/2014	IAS-04	2.6	0.63	<0.011	0.021 J	1	5E-06	2E-06
271 Mills Gap Road (indoor)	11/5/2014	IAS-04	0.73	1.6	0.030 J	0.071	0.4	2E-06	5E-07
271 Mills Gap Road (indoor)	1/14/2015	IAS-04	0.36	0.44	<0.0084	0.018 J	0.2	8E-07	2E-07
271 Mills Gap Road (indoor)	2/19/2015	IAS-04	0.37	0.44	<0.010	0.020 J	0.2	8E-07	3E-07
275 Mills Gap Road (indoor)	4/24/2014	IAS-05	11	2.4	0.032 J	0.018 J	5	2E-05	8E-06
275 Mills Gap Road (indoor duplicate)	4/24/2014	FD-03 (IAS-05)	11	2.5	0.027 J	0.026 J	5	2E-05	8E-06
275 Mills Gap Road (indoor)	11/5/2014	IAS-05	0.91	3.1	0.046	0.068	0.4	2E-06	6E-07
275 Mills Gap Road (indoor duplicate)	11/5/2014	FD-12 (IAS-05)	1.4	4.7	0.059	0.10	0.7	3E-06	1E-06
275 Mills Gap Road (indoor)	1/14/2015	IAS-05	0.30	0.60	0.014 J	0.0094 J	0.1	6E-07	2E-07
275 Mills Gap Road (indoor)	2/19/2015	IAS-05	0.11	0.14	<0.0088	0.0096 J	0.1	2E-07	8E-08

Notes:
1. Concentrations are in micrograms per cubic meter ($\mu g/m^3$).
2. TCE = trichloroethene; cis-1,2-DCE = cis-1,2-dichloroethene; trans-1,2-DCE = trans-1,2-dichloroethene; VC = vinyl chloride
3. J - Concentration is estimated.
4. '<' - Constituent not detected above the indicated method detection limit.
6. * - Elevated result possibly attributable to new carpet or other indoor activities.
7. ** - For both adult and child/adult.
8. The risk evaluation is based on the current recommended default exposure values (OSWER Directive 9200.1-120, dated February 6, 2014).

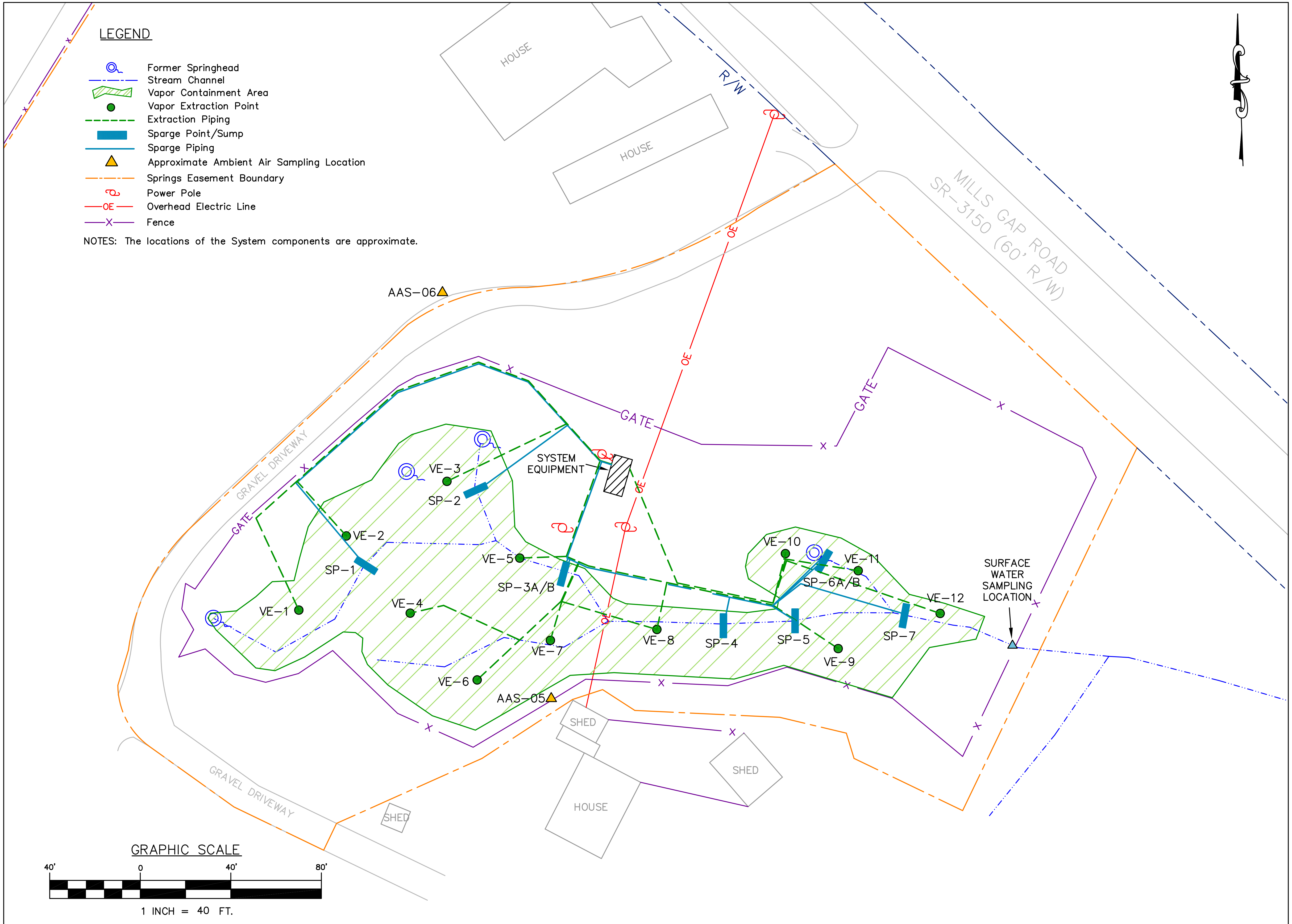
Prepared By: SEK 3/02/15
Checked By: RMC 3/05/15

TABLE 4
Summary of Analytical Results of Surface Water Samples
Mills Gap Road Groundwater Contamination Site
Asheville, North Carolina
Amec Foster Wheeler Project 6690-03-9450

Compound	**SW-1 (9/11/14)**	**SW-1 (10/30/14)**	**FD-1 (SW-1) (10/30/14)**
Benzene	0.44 J	1.9 J	1.7 J
2-Butanone		10 J	
1,1-Dichloroethane	0.38 J	2.8 J	2.8 J
1,1-Dichloroethene	1.2	3.2 J	3.3 J
cis-1,2-Dichloroethene	161	1,270	1,310
trans-1,2-Dichloroethene	1.2	9.3	9.2
Methylcyclohexane	5.9 J		
Methylene chloride		6.3 J	6.0 J
Toluene		3.0 J	3.1 J
1,1,1-Trichloroethane	5.1	11.1	11.1
Trichloroethene	461	34.5	33.6
1,1,2-Trichlorotrifluoroethane	0.27 J		
Vinyl chloride	3.2	10.6	10.8
o-Xylene		2.7 J	2.5 J

Notes:
1. Concentrations are in micrograms per liter (μg/L).
2. Constituents detected above the method detection limit (MDL) are shown; refer to laboratory analytical report for list of constituents.
3. Blank cells indicate constituent not detected in sample above the MDL.
4. J - concentration is estimated (greater than the MDL, but less than the laboratory reporting limit).

Prepared By: SEK 2/27/15
Checked By: RMC 3/02/15

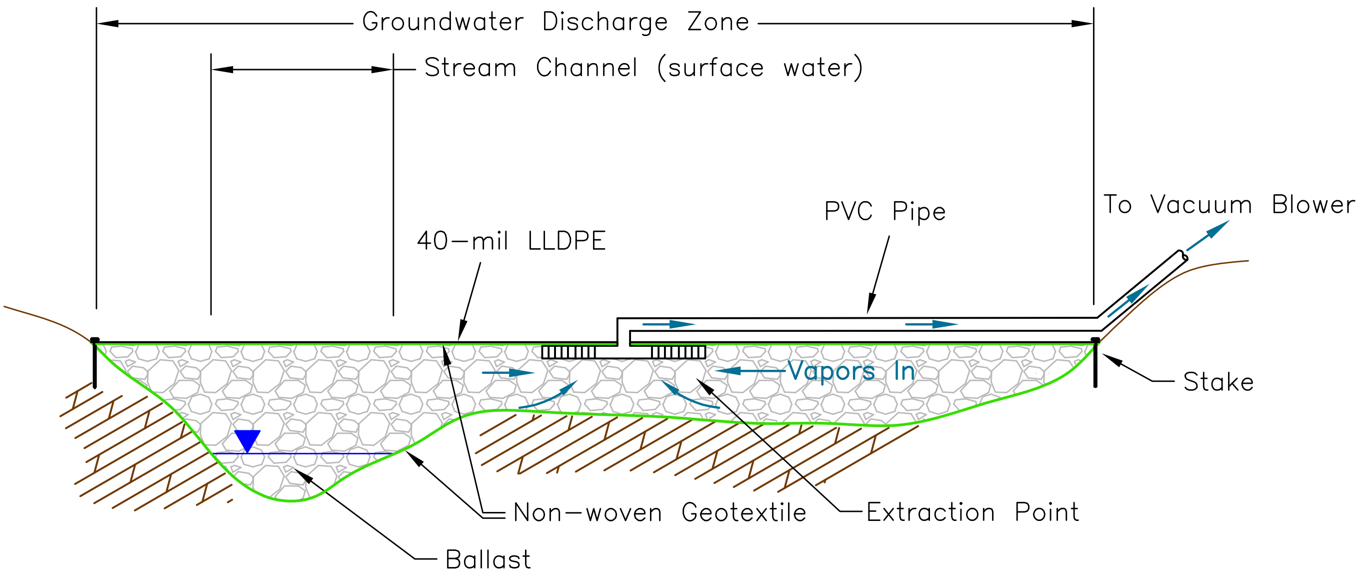


amec foster wheeler

SPRINGS REMOVAL SYSTEM LAYOUT
MILLS GAP ROAD GROUNDWATER CONTAMINATION SITE
ASHEVILLE, NORTH CAROLINA

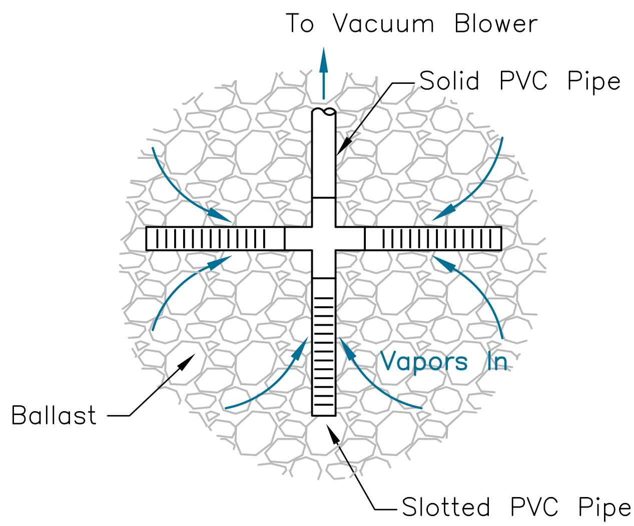
DRAWN: SEK	ENG CHECK: --	DATE: MARCH 2015	JOB: 6690-03-9450
DFT CHECK: MEW	APPROVAL: MEW	SCALE: 1"=40'	FIG: 2

REFERENCE: SURVEY PREPARED BY FREELAND & ASSOCIATES.



TYPICAL VAPOR CAP DETAIL (PROFILE VIEW)

Not To Scale



TYPICAL EXTRACTION POINT DETAIL (PLAN VIEW)

Not To Scale

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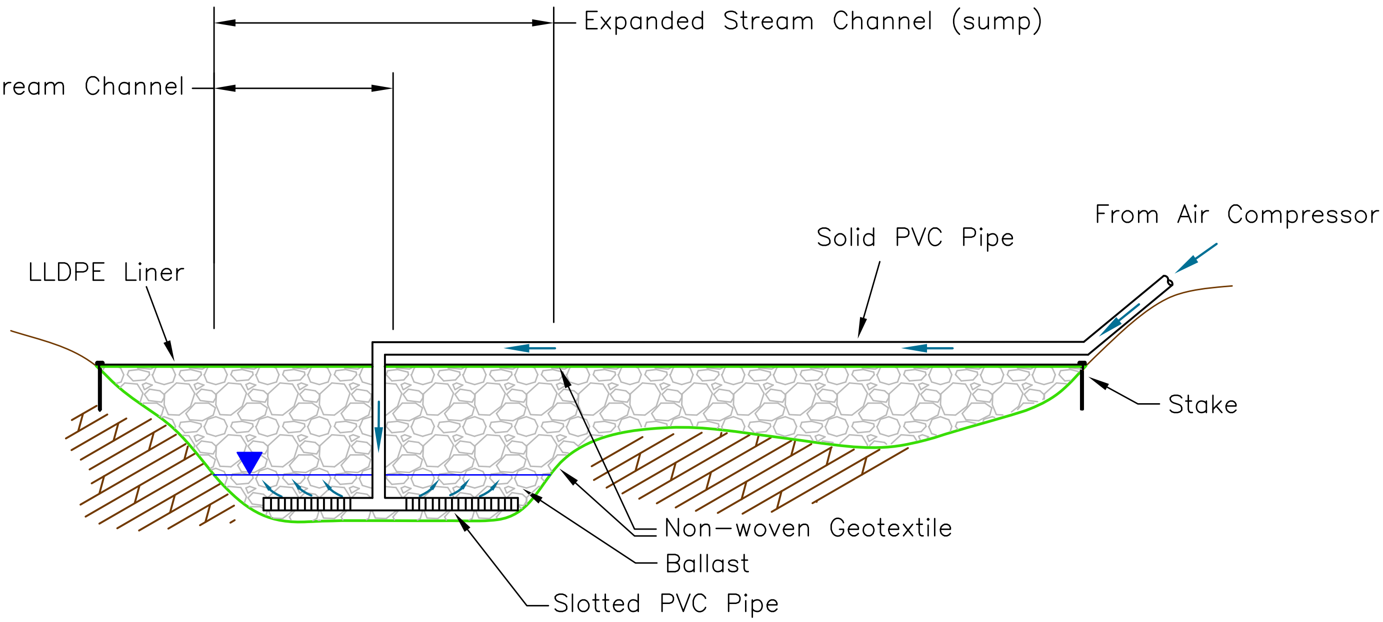
VAPOR REMOVAL SYSTEM DETAILS
MILLS GAP ROAD GROUNDWATER
CONTAMINATION SITE
ASHEVILLE, NORTH CAROLINA

DRAWN: SEK	DATE: MARCH 2015
DFT CHECK: MEW	SCALE: NTS
ENG CHECK: ––	PROJ: 6690039450
APPROVAL: MEW	FIG: 3

REFERENCE:



TYPICAL SPARGE SUMP (PROFILE VIEW)

Not To Scale

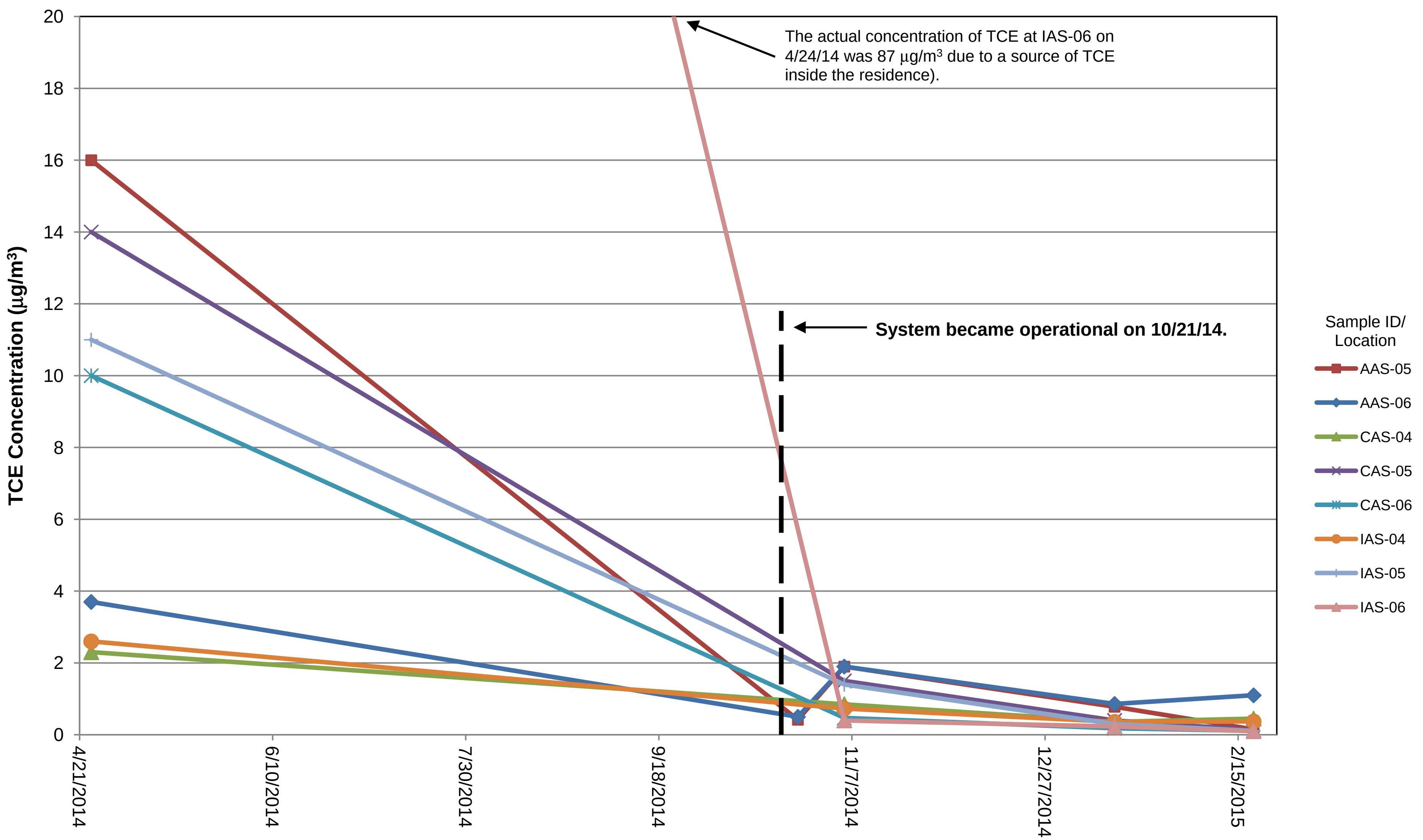
amec foster wheeler

SPARGE SUMP DETAIL
MILLS GAP ROAD GROUNDWATER
CONTAMINATION SITE
ASHEVILLE, NORTH CAROLINA

DRAWN: SEK	DATE: MARCH 2015
DFT CHECK: MEW	SCALE: NTS
ENG CHECK: --	PROJ: 6690039450
APPROVAL: MEW	FIG: 4

REFERENCE:

TCE Concentrations in Air Samples Collected in the Area of the Springs
Mills Gap Road Groundwater Contamination Site
Asheville, North Carolina
Amec Foster Wheeler Project 6690-03-9450



Zeller, Craig

From: Hodoh, Ofia
Sent: Wednesday, April 08, 2015 4:19 PM
To: Zeller, Craig; Adams, Glenn; Thoms, Sharon
Cc: Koporec, Kevin; Bentkowski, Ben; Miller, Angela; Haire, Stacey; Rigger, Don; Young, Nestor
Subject: Re: CTS of Asheville - Spring Removal Action Report

Craig,

Concerning the surface water pathway, TCE, VC and 1,2-DCE were screened against the National Recommended Water Quality Critera (NRWQC) human health consumption for water plus organism. The maximum level of TCE at 34.5 ug/L exceeds its NRWQC (2.5 ug/L); VC at 10.8 ug/L exceeds its NRWQC (0.025 ug/L); and cis-1,2-DCE at 1,310 ug/L exceeds its tapwater RSL (3.6 ug/L) and the MCL (70 ug/L). In the absence of a NRWQC, the tapwater RSL was used as the screening value for cis-1,2-DCE.

Utilizing very conservative exposure assumptions, the cancer risk for TCE (2E-06) and VC (5E-05) were within the EPA acceptable risk range of 1E-06 to 1E-04 for the recreational receptor, based on the combined ingestion and dermal pathway. The child non-cancer HI was less than 1.0, for cis-1,2-DCE, TCE and VC. The ambient air sample collected on 10/24/14 (between the springs and Mills Gap Road) indicate that TCE and VC are below EPA's acceptable risk range. EPA's IRIS no longer supports the derivation of inhalation toxicity value for the cis and trans isomers of DCE.

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From: Zeller, Craig
Sent: Wednesday, April 8, 2015 2:39 PM
To: Adams, Glenn; Hodoh, Ofia; Thoms, Sharon
Cc: Koporec, Kevin; Bentkowski, Ben; Miller, Angela; Haire, Stacey; Rigger, Don; Young, Nestor
Subject: FW: CTS of Asheville - Spring Removal Action Report

TSS Folks –

The Springs Removal Action Report for CTS/Rice Family Compound is attached. I have one specific question for you. Table 4 shows the analytical results for surface water as it exists the remediation system. As expected, TCE has been reduced from 461 ppb to 34.5 ppb (e.g. the good news). Also as expected, as we degrade TCE, we are producing Cis-1,2 DCE and Vinyl Chloride. Cis concentrations went from 161 ppb to 1,270 ppb. VC concentrations went from 3.2 ppb to 10.6 ppb. Is this a concern from a Human Health (e.g. air and/or recreational scenario) and/or Eco scenario? In other words, how does it compare to our screening values?

Thanks for your input.