



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL RESPONSE TEAM
Edison, NJ – Cincinnati, OH – Las Vegas, NV – Research Triangle Park, NC

March 21, 2017

MEMORANDUM

SUBJECT: Environmental Response Team Audit of Air Sampling at CTS of Asheville Site

FROM: Christopher T. Gallo
Environmental Scientist
Environmental Response Team

A handwritten signature in black ink, appearing to be "C. Gallo", is written next to the "FROM:" line.

TO: Craig Zeller, P.E.
Remedial Project Manager
Superfund Division
US EPA – Region 4

On August 31, 2016, the US EPA Office of Inspector General (OIG) issued a report titled, *"Progress Made, but Improvements Needed at CTS of Asheville Superfund Site in North Carolina to Advance Cleanup Pace and Reduce Potential Exposure."* This OIG report provided twelve recommendations to the Regional Administration for US EPA Region 4. The focus of this memorandum is OIG recommendation #3 which states:

Direct that sampling at and near the contaminated eastern springs is comprehensive enough to assess all potential exposure pathways, including vapor intrusion, and to monitor the full effects of the TCRA system on ambient air around the perimeter fence and the stream flowing under the fence.

Initially, EPA Region 4 did not concur with this recommendation. Region 4 strongly asserted that sampling at and near the contaminated eastern springs comprehensively assessed all potential exposure pathways, including vapor intrusion. Based on the 2007, 2008 and 2014 sampling on the adjacent properties to the east and west, Region 4 ruled out vapor intrusion as a completed pathway at the site. Region 4 stated that the current ambient air sampling protocol (quarterly at 2 locations), along with the process QC samples collected from the mitigation system, is comprehensive enough to ensure the protection of nearby residents. Further, Region 4 maintains a position that air monitoring locations near occupied dwellings are more appropriate than the perimeter fence line because they are closer to the actual point of exposure. And finally, Region 4 does not believe the eastern stream water poses a risk to human health and the environment, but was willing to consider more frequent water quality monitoring of the stream flowing under the fence.

Subsequent discussions between the OIG and Region 4 produced a proposed resolution in correspondence dated October 5, 2016. Region 4's proposed resolution to OIG recommendation #3 states:

Region 4 will consult with EPA's Environmental Response Team (ERT) regarding the sufficiency of the monitoring of the TCRA system at the eastern springs area. ERT is part of the OSRTI organization and has expertise and experience in vapor intrusion assessment and monitoring. Region 4 has previously utilized ERT expertise regarding the scope and design of the vapor mitigation system. This consultation will focus on the ambient air monitoring program, potential exposure pathways (including vapor intrusion), and system operation and maintenance (O&M) monitoring, and will provide recommendations for improvements (where warranted). Region 4 has already requested that CTS collect two more samples of the stream that flows under the fence, in the 2nd and 4th Quarters of 2017, to better delineate the pre-Interim Action water quality. [Note: CTS has agreed to this request]. Planned Completion Date: March 31, 2017.

Therefore, Region 4 tasked ERT to audit the air sampling procedures and air sampling data provided by the Responsible Party's Environmental Contractor, Amec Foster Wheeler (AFW). The air sampling is being performed under two CERCLA Administrative Orders of Consent (AOC), the 2004 Removal AOC and the 2012 Remedial AOC. ERT asked the Remedial Project Manager for relevant historical data and workplan(s) and conducted a site visit during the week of January 17th, 2017. The workplan titled "Spring Removal Action Report" created by AFW consisted of water and air sampling to be taken quarterly at locations around the mitigation system. Two (2) Indoor and (2) outdoor air samples were taken at a residence adjacent to the mitigation system. Additionally, one (1) outdoor sample was taken at a nearby community during the same time frame as the residential samples. Procedures for conducting the air sampling can be found in the workplan and were consistent with ERT's Standard Operating Procedure (SOP) #1814, Analysis of Volatile Organic Compounds (VOCs) in SUMMA Canister Air Samples by Gas Chromatography/Mass Spectrometry (GC/MS) and SOP #2008, General Air Sampling Guidelines. AFW collected samples at appropriate locations that would most likely be in the direct exposure pathway of the mitigation system. Samples were taken at breathing height, SUMMA Canisters were properly calibrated by the laboratory and properly tested again in the field by AFW and samples were collected 24 hours after placement of the canisters. Quarterly sampling was determined to be sufficiently protective based upon data suggesting that the mitigation system is working properly and no contaminants of concern are migrating off site to the surrounding properties/community. ERT's evaluation of the data, both past and most recent data, as well as a visual inspection of AFW's sampling operation indicated that the air sampling strategy is sufficient and adequate to collect data to inform decisions on the protectiveness of the remedy to sensitive receptors that could be affected by the outflow from the mitigation system (Attached Table #2 with ambient air results).

In reference to this site having elements of Vapor Intrusion as outlined by EPA's Vapor Intrusion Guidelines, the evidence does not support a conclusion that contaminants are traveling underneath properties. The data do not suggest an increase of TCE or daughter compounds inside homes adjacent to the mitigation system above what was observed in the data of the outdoor air sampling (Attached Table #2 with indoor air sampling results, see below for summary).

<u>January 2017 Results (in ppm)</u>	TCE	cis-1,2-DCE	tran-1,2-DCE	VC
Ambient Air Sample	0.971	0.682	*<0.0793	*<0.0511
Indoor Air Sample	0.890	0.572	*<0.0793	*<0.0511
*Below detection limit				

Environmental Response Team's Conclusions:

1. The quarterly air sampling strategy is adequate and efficient in providing health-based contaminant data for assessing risk in the air exposure pathway for community/residences and providing assurance that the mitigation system continues to operate properly.
2. The data do not suggest that contaminants are migrating underneath properties causing for CTS of Asheville to be treated as a Vapor Intrusion Site.

The Region should continue to provide oversight and maintain good communication of the data to the community stakeholders.

TABLE 2
Summary of January 2017 and Historical Laboratory Analytical Results with Risk Assessment Evaluation Summary ("Springs Area" Residences)
CTS of Asheville, Inc. Superfund Site
Asheville, North Carolina
Amec Foster Wheeler Project 6252-16-2012

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
Between springs and 261/271 Mills Gap Road	4/16/2015	AAS-06	0.93 J	1.1	<0.019	0.16
Between springs and 261/271 Mills Gap Road	7/16/2015	AAS-06	0.20	0.26	<0.013	<0.013
Between springs and 261/271 Mills Gap Road (duplicate)	7/16/2015	FD-26 (AAS-06)	0.21	0.26	<0.013	0.028 J
Between springs and 261/271 Mills Gap Road	10/21/2015	AAS-06	2.4	3.1	0.035	0.062
Between springs and 261/271 Mills Gap Road	11/21/2015	AAS-06	7.7	6.0	0.047	0.057
Between springs and 261/271 Mills Gap Road (duplicate)	11/21/2015	FD-29 (AAS-06)	9.2	7.1	0.057	0.066
Between springs and 261/271 Mills Gap Road	12/2/2015	AAS-06	2.65	1.16	<0.0793	<0.0511
Between springs and 261/271 Mills Gap Road (duplicate)	12/2/2015	FD-30 (AAS-06)	2.59	1.13	<0.0793	<0.0511
Between springs and 261/271 Mills Gap Road	1/13/2016	AAS-06	0.73	0.45	<0.016	<0.017
Between springs and 261/271 Mills Gap Road	4/13/2016	AAS-06	1.7 J	1.2 J	<0.014	<0.014
Between springs and 261/271 Mills Gap Road	4/13/2016	FD-34 (AAS-06)	0.19 J	0.12 J	<0.0091	<0.0094
Between springs and 261/271 Mills Gap Road	7/13/2016	AAS-06	1.2	1.2	0.016 J	0.014 J
Between springs and 261/271 Mills Gap Road	7/13/2016	FD-35 (AAS-06)	1.2	1.2	0.016 J	<0.013
Between springs and 261/271 Mills Gap Road	9/29/2016	AAS-06	1.1	1.7	0.021 J	<0.013
Between springs and 261/271 Mills Gap Road	9/29/2016	FD-38 (AAS-06)	1.0	1.6	0.017 J	<0.012
Between springs and 261/271 Mills Gap Road	1/19/2017	AAS-06	0.366	0.144	<0.0793	<0.0511
Between springs and 261/271 Mills Gap Road	1/19/2017	FD-40 (AAS-06)	0.403	0.148	<0.0793	<0.0511
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	8/7/2008	MG-25-AMB2	8.60	2.29	<0.264	<0.171
Between springs and 275 Mills Gap Road	4/1/2009	AA-1*	15.87	3.12 J	<1.64	<1.06
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
Between springs and 275 Mills Gap Road	4/16/2015	AAS-05	1.6	2.2	<0.047	<0.049 J
Between springs and 275 Mills Gap Road	7/16/2015	AAS-05	0.80	1.6	0.020	0.079
Between springs and 275 Mills Gap Road	10/21/2015	AAS-05	7.5	8.2	0.066	0.10
Between springs and 275 Mills Gap Road	11/21/2015	AAS-05	5.6	4.5	0.035	0.034 J
Between springs and 275 Mills Gap Road	12/2/2015	AAS-05	6.51	3.20	<0.0793	0.0573
Between springs and 275 Mills Gap Road	1/13/2016	AAS-05	0.46	0.28	<0.010	<0.011
Between springs and 275 Mills Gap Road	4/13/2016	AAS-05	0.25	0.15	<0.0091	<0.0095
Between springs and 275 Mills Gap Road	7/13/2016	AAS-05	1.6	1.6	0.020 J	0.016 J
Between springs and 275 Mills Gap Road	9/29/2016	AAS-05	2.7	2.8	0.027 J	0.017 J
Between springs and 275 Mills Gap Road	1/19/2017	AAS-05	0.971	0.682	<0.0793	<0.0511

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CTS of Asheville, Inc. Superfund Site
Asheville, North Carolina
Amec Foster Wheeler Project 6252-16-2012

CRAWLSPACE AIR SAMPLES

Address	Date	Sample ID	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
261 Mills Gap Road	12/13/2007	MGSC23	2.63	0.860	<0.198	<0.128
261 Mills Gap Road	4/24/2014	CAS-06	10	0.26	<0.012	<0.012
261 Mills Gap Road (duplicate)	4/24/2014	FD-05 (CAS-06)	10	0.26	<0.010	<0.011
261 Mills Gap Road	11/5/2014	CAS-06	0.47	1.1	0.015 J	0.040
261 Mills Gap Road	1/14/2015	CAS-06	0.18	0.24	<0.0081	0.0099 J
261 Mills Gap Road	2/19/2015	CAS-06	0.11	0.097	<0.0090	<0.0095
261 Mills Gap Road (duplicate)	2/19/2015	FD-20 (CAS-06)	0.10	0.097	<0.011	<0.011
261 Mills Gap Road	4/16/2015	CAS-06	0.52	0.62	<0.0098	0.042
261 Mills Gap Road	12/2/2015	CAS-06	0.893	0.376	<0.0793	<0.0511
271 Mills Gap Road	4/24/2014	CAS-04	2.3	0.54	<0.011	<0.012
271 Mills Gap Road	11/5/2014	CAS-04	0.85	2.1	0.031 J	0.079
271 Mills Gap Road	1/14/2015	CAS-04	0.36	0.51	<0.0079	0.021 J
271 Mills Gap Road	2/19/2015	CAS-04	0.45 J	0.59 J	0.0080 J	0.014 J
271 Mills Gap Road	4/16/2015	CAS-04	0.32	0.38	0.29	0.031 J
275 Mills Gap Road	12/13/2007	MGSC25	20.3	5.67	<0.198	<0.128
275 Mills Gap Road	8/7/2008	MGSC25	7.42	1.53	<0.264	<0.171
275 Mills Gap Road	4/24/2014	CAS-05	14	2.7	0.034 J	0.013 J
275 Mills Gap Road	11/5/2014	CAS-05	1.5	4.7	0.050	0.084
275 Mills Gap Road	1/14/2015	CAS-05	0.40	0.74	<0.0083	0.010 J
275 Mills Gap Road	2/19/2015	CAS-05	0.13	0.16	<0.0092	<0.0098
275 Mills Gap Road	4/16/2015	CAS-05	0.33	0.37	<0.010	<0.011
275 Mills Gap Road	12/2/2015	CAS-05	4.10	1.56	<0.0793	<0.0511
275 Mills Gap Road (duplicate)	12/2/2015	FD-31 (CAS-05)	4.15	1.53	<0.0793	<0.0511

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Asheville, North Carolina
Amec Foster Wheeler Project 6252-16-2012

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	4/24/2014	IAS-06	87**	0.21	0.013 J	<0.011	42	2E-04	6E-05
261 Mills Gap Road	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	1/14/2015	IAS-06	0.23	0.30	<0.010	<0.011	0.1	5E-07	2E-07
261 Mills Gap Road (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	2/19/2015	IAS-06	0.095	0.082	<0.0090	<0.0096	0.1	2E-07	7E-08
261 Mills Gap Road (duplicate)	2/19/2015	FD-21 (IAS-06)	0.10	0.087	<0.0084	<0.0089	0.1	2E-07	7E-08
261 Mills Gap Road	4/16/2015	IAS-06	0.58	0.70	<0.0099	0.046	0.3	1E-06	4E-07
261 Mills Gap Road	12/2/2015	IAS-06	0.797	0.299	<0.0793	<0.0511	0.4	2E-06	6E-07
271 Mills Gap Road	4/24/2014	IAS-04	2.6	0.63	<0.011	0.021 J	1	5E-06	2E-06
271 Mills Gap Road	11/5/2014	IAS-04	0.73	1.6	0.030 J	0.071	0.4	2E-06	5E-07
271 Mills Gap Road	1/14/2015	IAS-04	0.36	0.44	<0.0084	0.018 J	0.2	8E-07	2E-07
271 Mills Gap Road	2/19/2015	IAS-04	0.37	0.44	<0.010	0.020 J	0.2	8E-07	3E-07
271 Mills Gap Road	4/16/2015	IAS-04	0.31	0.35	0.016 J	0.030 J	0.1	6E-07	2E-07
275 Mills Gap Road	8/7/2008	MGIA25	6.82	1.49	<0.264	<0.171			
275 Mills Gap Road	4/24/2014	IAS-05	11	2.4	0.032 J	0.018 J	5	2E-05	8E-06
275 Mills Gap Road (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	11/5/2014	IAS-05	0.91	3.1	0.046	0.068	0.4	2E-06	6E-07
275 Mills Gap Road (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	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	2/19/2015	IAS-05	0.11	0.14	<0.0088	0.0096 J	0.1	2E-07	8E-08
275 Mills Gap Road	4/16/2015	IAS-05	0.30	0.37	<0.0099	<0.010	0.1	6E-07	2E-07
275 Mills Gap Road	12/2/2015	IAS-05	4.05	1.75	<0.0793	<0.0511	1.9	8E-06	3E-06
275 Mills Gap Road (duplicate)	12/2/2015	FD-32 (IAS-05)	3.92	1.71	<0.0793	<0.0511	1.9	8E-06	3E-06
275 Mills Gap Road	1/19/2017	IAS-05	0.890	0.572	<0.0793	<0.0511	0.4	2E-06	6E-07

Notes:

1. Concentrations are in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).
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. 'c' - Constituent not detected above the indicated method detection limit.
5. * - concentrations calculated from results in parts per billion by volume (ppbv).
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).
9. The risk evaluation did not include historical sample results, as the historical samples were collected prior to the current USEPA risk assessment guidance.

Prepared By: SEK 1/23/17
Checked By: RMC 1/24/17