

May 5, 2015

Mr. Mostafa Mehran
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118

**Re: Response to ADEQ Correspondence Dated March 30, 2015
Fourth Quarter 2014 Progress Report
Whirlpool Corporation
Fort Smith, Arkansas
EPA No. ARD042755389
AFIN No. 66-00048
CAO LIS 13-202**

Dear Mr. Mehran:

ENVIRON International Corporation (ENVIRON), on behalf of Whirlpool Corporation, is submitting this response to your March 30, 2015, comment letter (received on April 3) providing comments on the Fourth Quarter 2014 Progress Report submitted on February 13, 2015. Arkansas Department of Environmental Quality (ADEQ) comments are provided in italics below and the respective response follows.

1. Section 3, Review of Activities Completed, Fourth Quarter 2014, First Paragraph, Third Sentence:

The samples from the groundwater monitoring wells completed since the issuance of the original remedial action decision document (RADD) were analyzed for the volatile organic compounds (VOCs) only. The samples obtained from the new monitoring wells should be analyzed for monitored natural attenuation (MNA) parameters until stable trends have been established. During future sampling events, analyze the samples from the new monitoring wells for MNA parameters as well as VOCs.

ENVIRON Response: The monitoring wells in existence at the time of the RADD implementation have been sampled and analyzed for VOCs and MNA parameters as required in the December 2013 RADD from the first quarter in 2014 through the first quarter in 2015 (i.e. five consecutive quarterly monitoring events). Concentration trends have been established based upon historic and recent monitoring events. Whirlpool does not believe that quarterly monitoring of all the new monitoring wells installed after the RADD was agreed upon for MNA parameters will provide additional useful information with respect to the occurrence of MNA. Sufficient data and information can likely be obtained through sampling of a subset of wells and with a modified frequency.

ENVIRON is preparing a formal request to submitted under separate cover identifying all of the monitoring wells at the site with proposed changes to the monitoring parameters and frequency.

2. Section 3, Review of Activities Completed, Fourth Quarter 2014, Third Paragraph, Fourth Bullet:

Although some natural attenuation of trichloroethylene (TCE) is occurring in isolated locations (i.e. source area and southwest corner of manufacturing building), the majority of wells show little to no natural attenuation at the site, especially in the northern plume. Please estimate, at the current rate of attenuation, the length of time required for the natural attenuation to reduce the TCE concentrations below the maximum contaminant level (MCL) in the northern plume.

ENVIRON Response: In accordance with the RADD, “Two years after initiating the remediation outlined in this RADD, Whirlpool is required to submit a Technical Review of the remedial activities and status of the remediation at the Whirlpool facility. This Technical Review shall assess the need for necessary further action beyond continued MNA” (RADD, p. 20). Although the evaluation of the effectiveness of MNA is continuing (as required in the RADD), considerable progress has been made evaluating MNA for the north plume. We anticipate concluding in the Technical Review (due at the end of 2015) that MNA will be capable of achieving MCLs in the north plume within typical timeframes considered appropriate for MNA in USEPA guidance documents (Evaluation of the Role of Dehalococcoides Organisms in the Natural Attenuation of Chlorinated Ethenes in Ground Water, Lu, Xiaoxia, Kampbell, Donald and Wilson, John, National Risk Management Research Laboratory, EPA/600/R-06/029, July 2006, p. 17). The following major objectives have been completed for the assessment of the effectiveness of MNA including:

- Source control has been achieved for the north plume which is a major objective for evaluation of the effectiveness of MNA;
- Significant reductions in TCE concentrations have been achieved as a result of groundwater remediation activities (average TCE concentration reductions of 55% in Areas 2 and 3 and Neck Area); and
- *Dehalococcoides* has been detected in MW-41, MW-56, MW-57, MW-58, IW-73 and IW-74 at concentrations ranging from 1.1 cells/mL (1.1×10^3 cells/L) (IW-74 Fourth Quarter 2014) to 21,700 cells/mL (2.2×10^7 cells/L) (IW-73 Third Quarter 2014) suggesting biological degradation of TCE is occurring in certain portions of the north plume.

3. Section 3, Review of Activities Completed - Fourth Quarter 2014, Shallow Offsite Groundwater Investigation and Vapor Point - Investigation, Second Paragraph, Second Sentence:

The report states that it is evident that water from the Basal Transmissive Zone flowed along preferential pathways through the completion intervals of ¾ inch monitoring wells into the above silty sand layer. No justification for this conclusion is presented. Please provide the rationale for this statement.

ENVIRON Response: Attachment E of the 2014 Fourth Quarter Progress Report provides the results of laboratory analysis of soil samples collected during the shallow offsite

groundwater investigation. Attachment E includes a summary table, Figure 1 depicting the soil sample locations and Figure 2 providing a cross-section depicting well construction details for monitoring wells MW-55 and MW-56 and DP-64 and DP-65. The cross section depicts how the semi-confined aquifer in the Basal Transmissive Zone is connected to the silty sand encountered in DP-64 and DP-65. The ¾ inch diameter wells at the site including MW-55 and MW-56 are scheduled to be replaced (pending property access) with two inch diameter wells constructed to only monitor the Basal Transmissive Zone and preclude connection to the shallower silty sand. The TCE impacts in the groundwater in the Basal Transmissive Zone are anticipated to have impacted the shallower silty sand due to the connection of these two units. This condition will continue to be monitored.

4. Section 4, Quantity of TCE:

While it is agreed this represents a reasonable estimation of the quantities of dissolved TCE in the groundwater, please provide an estimation of the quantity and distribution of the remaining TCE present as NAPL and sorbed onto soil particles.

ENVIRON Response: Investigation and assessment of the presence of NAPL in Area 1 has been performed based upon performance of approximately 30 soil borings, 19 large diameter soil borings, 16 monitoring wells and 41 permanent injection wells. No free product has been observed while performing these borings or while installing various swells. Many monitoring wells in Area 1 have been monitored for as long as 25 years (i.e. MW-25); however, no free product has been observed during this extensive monitoring effort.

Given no free product has been detected, we agree with the request to use a model of data to run several calculations to derive a reasonable range of the quantity of TCE in soil based upon TCE concentrations in soil as a result of previous investigations. Remediation performed has removed some soil containing TCE in the Vadose and saturated zones as result of the large diameter borings and TCE has been removed from saturated soils as a result of the in situ chemical oxidation performed in Area 1.

Estimated average minimum and maximum quantities of TCE sorbed to saturated soil were calculated for the Site using the results of the Fourth Quarter groundwater monitoring event and historical soil sampling results through the end of 2014.

No TCE or other constituents of concern were detected in saturated or unsaturated (Vadose) soil at the northeast corner. TCE has been detected in groundwater at the northeast plume up to approximately 600 micrograms per liter (µg/L) (MW-87). The geologic conditions and TCE concentrations in the north plume are similar to those found in the northeast plume, therefore, the relationship between dissolved and sorbed concentrations in the north plume are expected to be similar to those in the northeast plume. We have conservatively assumed that some TCE has adsorbed to saturated soil in the north and south plumes at locations where groundwater TCE concentrations are greater than 100 µg/L. Similarly, no sorbed TCE is assumed present at locations within the north or south plumes where the TCE concentration is 100 µg/L or less.

Saturated soil samples from the Basal Transmissive Zone have not been collected from within the north plume, monitoring well-specific ratios of TCE concentrations in saturated soil to groundwater concentrations within Area 1 (i.e. south plume) were determined to assess the quantity of TCE potentially adsorbed to saturated soil in the north plume. These ratios were calculated by comparing the average saturated soil sampling results from the respective boring for monitoring well installation in or near Area 1 with the groundwater sampling results from the respective well (MW-85, MW-86, MW-92, MW-93, MW-94, MW-95, and MW-172) (Table 3 in Attachment A). The ratio of average saturated soil TCE concentration to the groundwater TCE concentration for each well was calculated ($C_{\text{soil}}/C_{\text{groundwater}} = \text{Ratio } C_{\text{soil}}/C_{\text{groundwater}}$) followed by calculating the geometric mean of these ratios in order to estimate the average ratio to be used for subsequent calculations ($C_{\text{soil}} = C_{\text{groundwater}} \times \text{Ratio } C_{\text{soil}}/C_{\text{groundwater}}$). Ratio $C_{\text{soil}}/C_{\text{groundwater}}$ was calculated to be 0.14. This ratio was used to calculate saturated soil TCE concentrations in the north and south plumes (i.e. $0.14 \times 1,500 \mu\text{g/L} = 210 \mu\text{g/kg}$, see Table 4).

Estimated average minimum and maximum quantities of TCE sorbed to saturated soil were calculated based upon the distinct areas within the plumes and average saturated thickness. Modified versions of Table 1 and 2 from Attachment F of the 2014 Fourth Quarter Progress Report are included in Attachment A (Table 1 is modified to include a column for the thickness of unsaturated soil, Table 2 is modified to remove estimates from previous quarters). The volume of saturated soil, density of soil, ratio of saturated soil and groundwater concentrations, and the minimum and maximum TCE concentrations in groundwater based upon the plume boundaries were used to calculate the mass of TCE sorbed to saturated soil within the north and south plumes.

Northern plume parameters:

- Plume area of approximately 500,000 square feet (ft²) consisting of 299,500 ft² for the portion of the plume with TCE concentrations ranging from 5 µg/L to 100 µg/L; 200,300 ft² for the portion of the plume with TCE concentrations ranging from 100 µg/L to 1,000 µg/L or greater;
- Average saturated thickness of 3.7 feet (see Attachment A, Table 1);
- Soil TCE concentration ratio of zero for the portion of the plume with TCE concentrations ranging from 5 µg/L to 100 µg/L and a TCE soil concentration ranging from zero to 140 µg/kg for the portion of the plume with TCE concentrations ranging from 100 µg/L to 1,000 µg/L or greater (i.e. $0.14 (\text{ratio } C_{\text{soil}}/C_{\text{groundwater}}) \times 1,000 \mu\text{g/L} = 140 \mu\text{g/kg}$); and
- TCE specific gravity of 1.465.

Southern plume parameters:

- Plume area of approximately 900,000 ft² consisting of 519,800 ft² for the portion of the plume with TCE concentrations ranging from 5 µg/L to 100 µg/L; 380,500 ft² for

the portion of the plume with TCE concentrations ranging from 100 µg/L to greater than 1,000 µg/L;

- Average saturated thickness of 8.3 feet (see Attachment A, Table 1);
- Soil TCE concentration ratio of zero for the portion of the plume with TCE concentrations ranging from 5 µg/L to 100 µg/L and a TCE soil concentration ranging from zero to 210 µg/kg for the portion of the plume with TCE concentrations ranging from 100 µg/L to 1,500 µg/L or greater (i.e. $0.14 \text{ (ratio } C_{\text{soil}}/C_{\text{groundwater}}) \times 1,500 \text{ µg/L} = 2210 \text{ µg/kg}$); and
- TCE specific gravity of 1.465.

Based on the plume information listed above, the following ranges of the quantities of TCE distributed throughout saturated soil in the north and south plumes were calculated (the dissolved phase quantity of TCE is excluded from the quantities listed below):

Plume Location	Estimated Minimum Volume	Estimated Maximum Volume
Northern Plume	Less than 0.1 gallon	1 gallon
Southern Plume	Less than 0.1 gallon	6.5 gallons

Therefore the total average estimated minimum and maximum quantities of TCE sorbed to saturated soil associated with the north and south plumes combined ranges from approximately less than 1 to 8 gallons of TCE. These estimated quantities illustrate the limited volume of TCE sorbed to saturated soil.

TCE has been detected in unsaturated soils primarily along the linear drainage feature and within Area 1. The quantity and distribution of TCE in the unsaturated zone outside of these areas is expected to be negligible based upon membrane interface probe (MIP) results. Estimated average minimum and maximum quantities of TCE sorbed to unsaturated (Vadose Zone) soil were calculated for the source area using historical soil sampling results through the end of 2014. Calculations are presented in Attachment A, Table 5.

Linear drainage feature parameters:

- Area of approximately 6,500 ft² (325 feet x 20 feet);
- Average unsaturated thickness of 18.5 feet (see Attachment A, Table 1);
- Average soil TCE concentration ranging from 10 to 50 mg/kg; and
- TCE specific gravity of 1.465.

Area 1 parameters:

- Area of approximately 26,000 ft² (325 feet x 80 feet);
- Average unsaturated thickness of 18.5 feet (see Attachment A, Table 1);
- Average soil TCE concentration ranging from 0.1 to 0.5 mg/kg; and
- TCE specific gravity of 1.465.

Based on the source area information listed above, the estimated ranges of the quantities of TCE distributed throughout unsaturated soil were calculated and provided below:

Location	Estimated Minimum Volume	Estimated Maximum Volume
Linear Drainage Feature	12 gallons	60 gallons
Area 1	1 gallon	3 gallons

Therefore the total average estimated minimum and maximum quantities of TCE sorbed to unsaturated soil associated with the site are approximately 13 to 63 gallons of TCE. These ranges are consistent with volumes that might be found after use of TCE for degreasing in the degreaser building, incidental releases associated with degreasing operations, and daily cleaning and mopping of the cleaning room over the 20 year period that TCE was approved for use at the site. These estimated quantities further substantiate no misuse or careless handling of TCE occurred at the location.

5. Fourth Quarter 2014 Groundwater Monitoring Report, 3. 3.1VOC Results, Onsite Wells, 3rd Paragraph, Second Sentence:

The TCE concentration of 270,000 µg/L in September 2011 at MW-25 was the highest in the RADD-required wells. The highest historical value for all wells is 533,000 µg/L detected in the MW-86 in May 2014. Please clarify.

ENVIRON Response: The sentence referred to MW-25 which was specifically identified for monitoring in the RADD (i.e. RADD-required wells). MW-86 was installed after the RADD was finalized to monitor the effectiveness of remediation in Area 1. We now understand that ADEQ considers all monitoring wells to be regulated by the RADD regardless of the date of installation. Therefore, no distinction between RADD or non-RADD wells will be presented in subsequent quarterly reports.

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If you have any questions or comments please contact me at your earliest convenience.

Sincerely,

ENVIRON International Corporation



Michael F. Ellis, PE
Principal

LIST OF ATTACHMENTS

Attachment A: TCE Mass Estimate

ATTACHMENT A TCE Mass Estimate

TABLE 1
THICKNESS OF SATURATED SOILS IN PLUMES
Whirlpool Facility - Fort Smith, Arkansas

Plume	Well ID	Ground Elevation	Top of Saturated Soils	Bottom of Saturated Soils	Saturated Soil Interval	Unsaturated Soil Interval
North	IW-72	472.2	450.2	446.4	3.8	22.0
North	IW-73	472.1	NA ²	NA ²	NA ²	NA ²
North	IW-74	472.3	454.3	446.3	8.0	18.0
North	IW-75	472.8	NA ²	NA ²	NA ²	NA ²
North	IW-76	473.2	NA ²	NA ²	NA ²	NA ²
North	IW-77	473.8	454.8	445.8	9.0	19.0
North	IW-78	474.2	NA ²	NA ²	NA ²	NA ²
North	IW-79	474.1	NA ²	NA ²	NA ²	NA ²
North	IW-80	473.7	454.7	446.7	8.0	19.0
North	MW-23	475.8	453.8	447.8	6.0	22.0
North	MW-24	476.6	453.6	447.1	6.5	23.0
North	MW-27	475.7	451.7	447.4	4.3	24.0
North	MW-28	470.6	447.1	445.9	1.2	23.5
North	MW-31	476.1	448.1	447.1	1.0	28.0
North	MW-32	475.7	NA ²	NA ²	NA ²	NA ²
North	MW-33	474.9	NA ²	NA ²	NA ²	NA ²
North	MW-35R	474.0	NA ²	NA ²	NA ²	NA ²
North	MW-36	473.4	NA ²	NA ²	NA ²	NA ²
North	MW-39	475.6	450.1	447.6	2.5	25.5
North	MW-40	473.4	450.1	447.1	3.0	23.3
North	MW-41	472.3	453.3	445.8	7.5	19.0
North	MW-42B	471.8	449.8	446.3	3.5	22.0
North	MW-43	471.0	451.0	446.3	4.7	20.0
North	MW-46R	466.5	450.5	445.8	4.7	16.0
North	MW-50	463.2	451.2	445.6	5.6	12.0
North	MW-55	465.5	447.5	446.8	0.7	18.0
North	MW-56	463.4	445.4	444.9	0.5	18.0
North	MW-57	463.1	447.1	446.5	0.6	16.0
North	MW-58	462.9	446.3	445.9	0.4	16.6
North	MW-60	461.0	447.2	445.6	1.6 ³	13.8
North	MW-61	459.8	445.5	444.7	0.8 ³	14.3
North	MW-62	464.5	446.0	444.2	1.8	18.5
North	MW-63	464.0	444.7	444.5	0.2 ³	19.3
North	MW-65	474.1	453.6	445.7	7.9	20.5
North	MW-66	462.7	450.7	446.5	4.2 ³	12.0
North	MW-67	459.4	448.4	445.2	3.2 ³	11.0
North	MW-68	470.0	448.0	446.5	1.5	22.0
North	MW-70	471.7	NA ²	NA ²	NA ²	NA ²
North	MW-71	471.5	NA ²	NA ²	NA ²	NA ²
North	RW-69	471.5	449.5	445.5	4.0	22.0
Average Thickness (feet)					3.7	19.3

Notes: 1 = Saturated thickness calculated from soil description in boring log.
2 = NA - Boring log not available
3 = No saturated soil observation recorded in boring log during drilling. Interval inferred based on soil description.

TABLE 1
THICKNESS OF SATURATED SOILS IN PLUMES
Whirlpool Facility - Fort Smith, Arkansas

Plume	Well ID	Ground Elevation	Top of Saturated Soils	Bottom of Saturated Soils	Saturated Soil Interval	Unsaturated Soil Interval
South	ITMW-1	474.6	450.6	444.1	6.5	24.0
South	ITMW-10	478.6	451.6	446.1	5.5	27.0
South	ITMW-11	474.0	457.5	444.5	13.0	16.5
South	ITMW-12	474.7	456.7	444.7	12.0	18.0
South	ITMW-13	475.4	450.4	446.4	4.0	25.0
South	ITMW-14	475.7	455.7	445.7	10.0	20.0
South	ITMW-15	474.8	454.0	444.8	9.2	20.8
South	ITMW-16	476.5	458.5	445.3	13.2	18.0
South	ITMW-17	476.1	454.1	447.1	7.0	22.0
South	ITMW-18	473.9	457.9	444.9	13.0	16.0
South	ITMW-19	474.3	457.8	445.3	12.5	16.5
South	ITMW-2	475.1	457.1	445.6	11.5	18.0
South	ITMW-20	475.7	453.2	447.4	5.8	22.5
South	ITMW-21	474.4	449.4	446.4	3.0	25.0
South	ITMW-3	472.8	451.6	444.6	7.0	21.2
South	ITMW-4	477.6	458.1	447.1	11.0	19.5
South	ITMW-5	476.6	452.1	446.1	6.0	24.5
South	ITMW-6	481.1	455.4	445.6	9.8	25.7
South	ITMW-7	479.7	NA ²	NA ²	NA ²	NA ²
South	ITMW-9	479.5	460.2	446.3	13.9	19.3
South	MW-22	473.9	450.9	449.9	1.0	23.0
South	MW-25	474.7	446.7	445.0	1.8	28.0
South	MW-26	476.1	451.1	446.9	4.2	25.0
South	MW-29	475.1	452.1	447.1	5.0	23.0
South	MW-30	479.2	446.7	443.7	3.0	32.5
South	MW-37	474.0	457.0	445.5	11.5	17.0
South	MW-38	474.9	NA ²	NA ²	NA ²	NA ²
South	MW-92	473.9	451.9	444.9	7.0	22.0
South	MW-93	478.0	456.0	443.5	12.5	22.0
South	MW-94	478.0	455.0	445.0	10.0	23.0
South	MW-95	478.0	452.0	445.0	7.0	26.0
South	MW-172	473.4	459.4	445.8	13.6	14.0
Average Thickness (feet)					8.3	21.8

- Notes:** 1 = Saturated thickness calculated from soil description in boring log.
2 = NA - Boring log not available
3 = No saturated soil observation recorded in boring log during drilling. Interval inferred based on soil description.

TABLE 1
THICKNESS OF SATURATED SOILS IN PLUMES
Whirlpool Facility - Fort Smith, Arkansas

Plume	Well ID	Ground Elevation	Top of Saturated Soils	Bottom of Saturated Soils	Saturated Soil Interval	Unsaturated Soil Interval
Area 1	ITMW-12	474.7	456.7	444.7	12.0	18.0
Area 1	ITMW-18	473.9	457.9	444.9	13.0	16.0
Area 1	ITMW-19	474.3	457.8	445.3	12.5	16.5
Area 1	MW-25	474.7	446.7	445.0	1.8	28.0
Area 1	MW-172	473.4	459.4	445.8	13.6	14.0
Average Thickness (feet)					10.6	18.5

- Notes:** 1 = Saturated thickness calculated from soil description in boring log.
2 = NA - Boring log not available
3 = No saturated soil observation recorded in boring log during drilling. Interval inferred based on soil description.

TABLE 2
ESTIMATED QUANTITY OF TCE IN GROUNDWATER
Whirlpool Facility - Fort Smith, Arkansas

GROUNDWATER	Volume of Water						TCE Concentration		Mass of TCE		Volume of TCE	
	Date	Plume Area (square feet)	Saturated Thickness (feet)	Total Porosity ²	Plume Area (cubic feet)	Gallons	Liters	Estimated Avg. Min. Concentration Assumed to be Present Throughout the Respective Section of Plume (µg/L)	Estimated Avg. Max. Concentration Assumed to be Present Throughout the Respective Section of Plume (µg/L)	Min. Kg.	Max. Kg.	Min. Vol. (Gallons)
North Plume												
October 2014 - 5 to 100 µg/L	299,500	3.7 ¹	0.4	444,458	3,324,546	12,583,406	5	100	0.1	1.3	0.0	0.2
October 2014 - 100 to 1,000 µg/L	199,900	3.7 ¹	0.4	296,652	2,218,954	8,398,741	100	1,000	0.8	8.4	0.2	1.5
October 2014 - > 1,000 µg/L	400	3.7 ¹	0.4	594	4,440	16,806	1,000	1,500	0.0	0.0	0.0	0.0
October 2014 Subtotal	499,800								0.9	9.7	0.2	1.8
South Plume												
October 2014 - 5 to 100 µg/L	519,800	8.3 ¹	0.4	1,727,815	12,924,058	48,917,558	5	100	0.2	4.9	0.0	0.9
October 2014 - 100 to 1,000 µg/L	261,500	8.3 ¹	0.4	869,226	6,501,810	24,609,353	100	1,000	2.5	24.6	0.4	4.5
October 2014 - > 1,000 µg/L	119,000	8.3 ¹	0.4	395,556	2,958,759	11,198,902	1,000	1,500	11.2	16.8	2.0	3.0
October 2014 Subtotal	900,300								13.9	46.3	2.5	8.4
Northeast Plume												
October 2014 - 5 to 100 µg/L	187,600	4.4 ¹	0.4	330,926	2,475,329	9,369,122	5	100	0.0	0.9	0.0	0.2
October 2014 - 100 to 1,000 µg/L	69,200	4.4 ¹	0.4	122,069	913,075	3,455,987	100	1,000	0.3	3.5	0.1	0.6
October 2014 - > 1,000 µg/L	0	4.4 ¹	0.4	0	0	0	1,000	1,500	0.0	0.0	0.0	0.0
October 2014 Subtotal	256,800								0.4	4.4	0.1	0.8

Notes:

1 = Saturated thickness estimated from Fourth Quarter 2014 RADD sampled wells and new 4th Quarter well completions (see Table 1).

2 - Total Porosity estimated from Freeze and Cherry (1979).

RADD = Remedial action decision document

TCE - Trichloroethylene

µg/L - Micrograms per liter

TABLE 3
SATURATED SOIL AND GROUNDWATER TCE CONCENTRATIONS
Whirlpool Facility - Fort Smith, Arkansas

Well ID	TCE Groundwater (µg/L)	TCE Saturated Soil (µg/kg)	Ratio of Soil to Groundwater Concentration ¹
South Plume			
MW-85	1,970	238	0.12
MW-86	533,000	137,000	0.26
MW-92	2,160	33	0.02
MW-93	18,200	2,524	0.14
MW-94	11,100	1,043	0.09
MW-95	22,300	4,470	0.20
MW-172	3,010	2,900	0.96
Geometric Mean			0.14
Northeast Plume			
MW-87	594	ND	-
MW-88	ND	ND	-
MW-89	11.3	ND	-
MW-90	ND	ND	-
MW-91	319	ND	-
MW-96	ND	ND	-
MW-97	ND	ND	-
MW-98	ND	ND	-
MW-99	ND	ND	-
Geometric Mean			-

Notes:

1 = No saturated soil samples have been collected from the basal transmissive zone in the north plume. Because the geologic conditions and TCE concentrations are similar to those found in the northeast plume the relationship between dissolved and sorbed concentrations in the north plume are expected to be similar to those in the northeast plume.

TCE = Trichloroethylene

µg/L = Micrograms per liter

µg/kg = Micrograms per kilogram

ND = Not detected

TABLE 4
ESTIMATED QUANTITY OF TCE IN SATURATED SOILS
Whirlpool Facility - Fort Smith, Arkansas

SOIL	Volume of Soil					Groundwater TCE Concentration		Saturated Soil TCE Concentration		Mass of TCE		Volume of TCE	
	Date	Plume Area (square feet)	Saturated Thickness (feet)	Saturated Soil Volume (cubic feet)	Soil Density (pounds per cubic feet)	Saturated Soil Mass (kg)	Estimated Avg. Min. Concentration Assumed to be Present Throughout the Respective Section of Plume (µg/L)	Estimated Avg. Max. Concentration Assumed to be Present Throughout the Respective Section of Plume (µg/L)	Estimated Avg. Min. Concentration Assumed to be Present Throughout the Respective Section of Plume (µg/kg)	Estimated Avg. Max. Concentration Assumed to be Present Throughout the Respective Section of Plume (µg/kg)	Min. Kg.	Max. Kg.	Min. Vol. (Gallons)
North Plume													
October 2014 - 5 to 100 µg/L	299,500	3.7 ¹	1,111,145	120	60,480,778	5	100	0	0	0.0	0.0	0.0	0.0
October 2014 - 100 to > 1,000 µg/L	200,300	3.7 ¹	743,113	120	40,448,414	100	1,000	0	140	0.0	5.7	0.0	1.0
October 2014 Subtotal	499,800									0.0	5.7	0.0	1.0
South Plume													
October 2014 - 5 to 100 µg/L	519,800	8.3 ¹	4,319,538	120	235,116,948	5	100	0	0	0.0	0.0	0.0	0.0
October 2014 - 100 to > 1,000 µg/L	380,500	8.3 ¹	3,161,955	120	172,108,501	100	1,500	0	210	0.0	36.1	0.0	6.5
October 2014 Subtotal	900,300									0.0	36.1	0.0	6.5

Notes:

1 = Saturated thickness estimated from Fourth Quarter 2014 RADD sampled wells and new Fourth Quarter well completions (see Table 1)

2 = Total porosity estimated from Freeze and Cherry (1979)

RADD = Remedial action decision document

TCE = Trichloroethylene

µg/L = Micrograms per liter

TABLE 5
ESTIMATED QUANTITY OF TCE IN SOURCE AREA VADOSE ZONE SOILS
Whirlpool Facility - Fort Smith, Arkansas

SOIL	Volume of Soil					Unsaturated Soil TCE Concentration		Mass of TCE		Volume of TCE	
	Date	Estimated Area (Square Feet)	Unsaturated Thickness (Feet)	Unsaturated Soil Volume (Cubic Feet)	Soil Density (Pounds per Cubic Feet)	Unsaturated Soil Mass (Kg.)	Estimated Avg. Min. Concentration Assumed to be Present Throughout the Respective Section of Source Area (mg/kg)	Estimated Avg. Max. Concentration Assumed to be Present Throughout the Respective Section of Source Area (mg/kg)	Min. Kg.	Max. Kg.	Min. Vol. (Gallons)
Source Area											
Linear Drainage Feature	6,500	18.5 ¹	120,315	120	6,548,871	10	50	65	327	12	60
Area 1	26,000	18.5 ¹	481,260	120	26,195,483	0.1	0.5	3	13	1	3
Source Area Subtotal	32,500		601,575		32,744,353			68	341	13	63

Notes:

1 = Unsaturated thickness estimated from Fourth Quarter 2014 RADD sampled wells and new Fourth Quarter well completions (see Table 1)

RADD = Remedial action decision document

mg/kg = Milligrams per kilogram

kg = Kilograms

TCE = Trichloroethylene