

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

Re: Response to ADEQ Correspondence Dated September 14, 2015
Second Quarter 2015 Progress Report – August 2015
Whirlpool Corporation
Fort Smith, Arkansas
EPA No. ARD042755389
AFIN No. 66-00048
CAO LIS 13-202

Dear Mr. Mehran:

Date October 16, 2015

Ramboll Environ US Corporation (Ramboll Environ), on behalf of Whirlpool Corporation, is submitting this response to Arkansas Department of Environmental Quality's (ADEQ) September 14, 2015, comment letter on Ramboll Environ's Second Quarter 2015 Progress Report dated August 14, 2015. ADEQ comments are provided in italics below and the respective Whirlpool response follows.

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Groundwater Monitoring Report

1. **3.3.2.1 Chemical Lines of Evidence:** *The determination of monitored natural attenuation (MNA) parameters in the monitoring wells where Trichloroethene (TCE) concentrations are below 5 µg/L (plume boundary wells) provides critical background information for the evaluation of MNA processes. ADEQ requires MNA parameter sampling in the new wells to continue until background levels and trends for MNA parameters can be established.*

Ramboll Environ Response: Whirlpool will sample all new wells for volatile organic compounds (VOCs) and MNA parameters during future monitoring events subject to any future ADEQ-approved changes.

2. **3.3.2.2 Geochemical Lines of Evidence:** *Comparison of cis-1,2-dichloroethene (cis-1,2 DCE) and dissolved oxygen (DO) concentration distributions appear to indicate a limiting factor in the progression of reductive dechlorination to be elevated DO concentrations that suppresses the growth of anaerobic Dehalococcoides (DHC) bacteria. This should be considered when evaluating the potential effectiveness of anaerobic biodegradation for the remediation of groundwater.*

Ramboll Environ Response: We agree with the comment that elevated DO concentrations are a limiting factor in reductive dechlorination and suppresses the growth of DHC. These geochemical conditions regarding anaerobic biodegradation will be further evaluated as part of the Two Year Effectiveness Report.

3. **4.1.1 Statistical Analysis of Temporal Trends, Sixth Paragraph, First Bullet, Fifth Paragraph:** *It should be noted that with the exception of IW-77, six other monitoring wells with increasing trends are located at the boundary or distal portions of the northern plume. This indicates that the northern plume is expanding at its downgradient boundary. Please include a discussion of the plume boundary implications of the increasing TCE concentrations in these wells.*

Ramboll Environ Response: The six monitoring wells referred to above have exhibited increasing concentration trends based on the statistical analysis of concentration data collected from 2009 through second quarter 2015 consist of MW-55, MW-56, MW-57, MW-61, MW-66 and MW-67. Only MW-61, MW-66 and MW-67 are plume boundary wells. Monitoring wells MW-55, MW-56, MW-57, MW-61 and MW-67 were formerly ¾ inch diameter wells and were replaced with 2 inch diameter wells in June and July 2015 per the ADEQ approved "Replacement of Temporary Monitoring Wells Work Plan, December 2014."

Specific discussion of each well is provided below:

MW-61 has continued to exhibit TCE concentrations above the RAL. MW-193 was installed downgradient of MW-61 at the location of soil probe DP-58 during the week of September 14, 2015. MW-193 was sampled as part of the fourth quarterly sampling event in October 2015 to assess the plume boundary. In addition, a work plan was submitted to ADEQ on August 25, 2015 outlining an In-Situ Chemical Reduction (ISCR) Pilot Test to assess ISCR effectiveness to increase the reductive dechlorination capacity of the saturated zone to reduce trichloroethene (TCE) concentrations in groundwater at the plume boundary at MW-61. The injection of the ISCR reagents was completed the week of September 28, 2015 and monitoring and evaluation of this remediation pilot test is ongoing. MW-61 will continue to be monitored and trends evaluated during future groundwater monitoring events.

MW-55R was not sampled during any quarterly sampling events in 2014 and early 2015 due to access limitations, as previously reported. Access to this location was obtained after the second quarterly sampling event in 2015. MW-55R was sampled during the third quarter groundwater sampling event and TCE was detected at a concentration of 8.2 µg/L which is less than the last TCE concentration measured in October 2013 (13 µg/L). MW-55R will continue to be monitored and trends evaluated during future groundwater monitoring events.

MW-56R is located more centrally in the northern plume. The TCE concentration detected during the second quarter (495 µg/L) was similar to previous detections since

October 2012 with TCE concentrations ranging from 307 µg/L to 618 µg/L. In addition, analytical results from the third quarter 2015 indicate TCE detected in MW-56R at 156 µg/L (lower than previous results since October 2012). MW-56R will continue to be monitored and trends evaluated during future groundwater monitoring events.

MW-57R is located more centrally in the northern plume. The TCE concentration detected in the second quarter (194 µg/L) was similar to previous detections since October 2012 with TCE concentrations ranging from 120 µg/L to 308 µg/L. Analytical results from the third quarter 2015 sampling event indicate TCE detected in MW-57R at 409 µg/L which is higher than previous results. MW-57R will continue to be monitored and trends evaluated during future groundwater monitoring events.

MW-66 has had TCE concentrations ranging from 1.6 µg/L (March 2011) to 3.5 µg/L (March 2014). Analytical results from the third quarter 2015 sampling event indicate TCE concentration of 3.3 µg/L which is similar to and within the range of concentrations observed since March 2011. MW-66 will continue to be monitored and trends evaluated during future groundwater monitoring events.

MW-67R has exhibited decreasing concentrations over the past three quarterly sampling events; 1.3 µg/L (January 2015), 0.77 µg/L (April 2015), and <0.17 µg/L (July 2015 [MW-67R]). Prior to 2015, TCE results for MW-67 were non-detect. MW-67R will continue to be monitored and trends evaluated during future groundwater monitoring events.

4. **4.1.1 Statistical Analysis of Temporal Trends, Sixth Paragraph, Third Bullet, Last-:** *As with the northern plume, these wells with increasing trends are located at the southern plume boundary or distal portion of the southern plume indicating the southern plume continues to expand. Please include a discussion of the plume boundary implications of the increasing TCE concentrations in these wells.*

Ramboll Environ Response: Of the 34 wells within the southern plume, three wells (MW-38, ITMW-6 and ITMW-10) have exhibited increasing concentration trends based on the statistical analysis of concentration data collected from 2009 through the second quarter 2015.

MW-38 is located in Area 1 and has little impact on the southern plume boundary or distal portion of the plume boundary based upon the following:

- MW-38 is 1,100 feet from the southeastern corner of the south plume with only 2 to 2.5 feet change in the hydraulic gradient comparing the location of MW-38 with the southern corner of the south plume (i.e. low gradient results in minor groundwater flow);
- Adjacent wells ITMW-11 and ITMW-15 exhibited no TCE impact and a TCE concentration of 101 µg/L, respectively, indicating that migration of TCE impacted groundwater in the immediate vicinity of MW-38 is insignificant; and
- TCE concentrations in MW-38 have been trending downward during the six months between October 2014 and April 2015 (Second Quarter Groundwater Monitoring

event) with the TCE concentration in MW-38 decreasing from 6,970 µg/L in October 2014 to 3,060 µg/L April 2015.

We acknowledge an increasing trend for TCE concentrations at ITMW-10 based upon 25 years of monitoring; however, assessment of the TCE concentrations trends for down-gradient wells ITMW-4, ITMW-6 and ITMW-9 may be more informative among the existing network of wells, in terms of the potential for further migration of TCE impacts in the south plume.

Statistical analysis of TCE concentrations at ITMW-4 and ITMW-9 indicate a decreasing and stable trend, respectively, suggesting further migration is limited at these specific locations. Historically, TCE was detected in ITMW-4 at a concentrations ranging from 6 µg/L to 93 µg/L between December 1996 and September 2002. Since October 2011, TCE concentrations have decreased significantly with TCE concentrations detected in ITMW-4 at qualified (i.e. estimated) concentrations ranging from 1.6 µg/L to 4.8 µg/L. Similarly, at ITMW-9 TCE has been detected at concentrations ranging from 7 µg/L to 230 µg/L since December 1996 and more recently (since October 2011) concentrations have ranged from 75.3 µg/L to 150 µg/L, but the concentrations remain statistically stable based upon the Mann-Kendall test.

Although TCE concentration trends at ITMW-6 are considered to be increasing, TCE has been historically detected in ITMW-6 at concentrations ranging from 6 µg/L to 25 µg/L between December 1996 and February 1999. Since October 2013, TCE has been detected in ITMW-6 at concentrations ranging from 2.7 µg/L to 4.4 µg/L. We considered the detection of TCE at 3.7 µg/L during the subject second quarter monitoring event consistent with historical data, and although the concentration trend is statistically increasing based upon the Mann-Kendall test, the actual TCE concentrations remain low (i.e. less than 5 µg/L).

The extent of the south plume was assessed during the plume boundary investigation in August 2014 which confirmed the south plume groundwater impacts do not extend to the southern or eastern property boundaries. Sentinel wells were installed along the southern, eastern and western property boundaries in late September 2015 and these wells were sampled during the fourth quarterly sampling event during the first week of October 2015 (Fourth Quarter Monitoring event). A summary report for the sentinel well installation will be compiled and submitted for ADEQ review approximately four weeks after receipt of the final laboratory results for the sentinel wells.

5. **5 ISCO Remedial Effectiveness, Second Paragraph, Third Sentence:** *TCE concentrations have increased in the monitoring wells MW-93, MW-94 and MW-95 located outside of the injection area and down-gradient beneath the former Whirlpool manufacturing building. Please include a discussion of Whirlpool plans to delineate and treat the TCE plume beneath the Whirlpool manufacturing building.*

Ramboll Environ Response: We acknowledge that the TCE levels in MW-93, MW-94 and MW-95 increased over the period from fourth quarter 2014 through the second quarter 2015. The third quarter 2015 sampling results indicate a decrease in TCE levels in each of these wells from the second quarter 2015 sampling event. These wells will continue to be monitored during monitoring events and trend evaluations will be conducted based on ongoing results.

A significant amount of investigation and remediation has been completed to date. As required by the RADD, this data will be further evaluated as part of the Two Year Effectiveness Report to assess risks associated with the impact characterized at the site and whether further investigation or remediation is appropriate.

6. **Attachment E Status of Residential Property Deed Restriction, Figure 1:** *This figure does not indicate any color coding for the property at 5921 Ferguson Street. It should denote blue. The deed restriction is provided as Exhibit ZZ and has been properly recorded. Please revise Figure 1 to reflect proper color coding for the property identified as 5921.*

Ramboll Environ Response: Figure 1 has been updated as requested and is included an attachment to this response to comment letter.

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Yours sincerely,



Michael F. Ellis, PE

Principal

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LIST OF ATTACHMENTS

Figure: Status of Residential Property Deed Restrictions

FILE: D:\GIS\PROJECTS\WHIRLPOOL\DOCS\20150215_misc\Figure 1 - Property Info 20150922.mxd



TCE Isoconcentration Line (2015 Q2)
 5 µg/L

Status of Property Deed Restriction

- Deed Restriction Filed
- Deed Restriction Not Filed
- Parcel Boundary
- City of Fort Smith Property

Notes
 Deed Restriction Status as of June 19, 2015