May 27, 2014

Mr. Mostafa Mehran
Technical Branch
Hazardous Waste Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

SUBMITTED VIA ELECTRONIC AND OVERNIGHT MAIL

Re: Final Remedy Work Plan – Response to 4/25/2014 ADEQ Comments
Whirlpool Corporation
Fort Smith, Arkansas
CAO LIS 13-202
EPA No. ARD042755389
AFIN No. 66-00048

Dear Mr. Mehran:

On behalf of Whirlpool Corporation, ENVIRON International Corporation (ENVIRON) offers the following response to your letter dated April 25, 2014. As always, Whirlpool and ENVIRON welcome ADEQ's comments and feedback. Whirlpool remains fully committed to achieving the goals of the RADD, which requires a science-based, data-driven process. Close cooperation between ADEQ and Whirlpool is an important element of that process and will help secure an appropriate remedy to address, as needed, those on-site and off-site conditions that are the subject of the investigation and RADD.

Over the past several months, Whirlpool has been gathering significant amounts of additional data to supplement the information available at the time of the approval of the RADD and subsequent submission of the Work Plan. The ongoing adaptive remedy is designed to determine the most effective remedial actions and to ensure that new information is taken into account as the adaptive remedies are developed. This process of continually gathering the facts is a proven approach to constantly improve the scope of knowledge and make the remediation actions more effective, both on and off the Whirlpool property. Thus, for example, as addressed in a separate letter of this date to your colleague, Mr. Jay Rich, Whirlpool will be conducting additional investigation over the next several weeks to further delineate an area of on-site soil contamination identified on the Whirlpool property in recent field and analytical work. The data obtained during that investigation will be used not only to develop a remedy plan for the contaminated soil, but to further refine the planned ISCO treatments in Areas 1. All of the elements of the remediation plan work in concert to achieve the RADD's goals; and we anticipate that future plans will continue to be updated beyond what is outlined below and been discussed to this point. This is the essence of the adaptive remedy approach.

We look forward to continuing to communicate and work with ADEQ as the implementation of the remediation continues over the next several months.

A more detailed response follows for each of ADEQ's comment your April 25, 2014, letter.

Section 1.1.4, Historical Bench Scale and Pilot Studies, Second Paragraph, 6th Sentence

ADEQ Comment: *ADEQ requests that Whirlpool evaluate the issue of persistent TCE both adsorbed onto soil particles as well as globules trapped within pore spaces, and how the current treatment system addresses each.*

ENVIRON Response: While it is understood that the issues of persistent TCE both adsorbed onto soil particles and as globules trapped within pore spaces are important to remedy success, to date these conditions have not been identified on-site. However because of the level of TCE identified around Area 1 we believe that a treatment remedy in this area which addresses persistent TCE is warranted. Based on the previous and final performance monitoring to be completed this week (week of May 26) for Area 1 from the adaptive remedy first injection round, a second ISCO event is commencing this week, and the oxidant to be utilized in Area 1 near MW-25 will be Modified Fenton's reagent (hydrogen peroxide and chelated iron) activated sodium persulfate (MASP). The first round of ISCO injection utilized base activated sodium persulfate (BASP) as determined by the results from the bench scale testing. However given the potential for persistent TCE in Area 1coupled with subsurface conditions, MASP will be utilized in this area. MASP was tested during the February 2014 bench scale study along with two other oxidants. While all oxidants tested performed well, MASP bench results demonstrated the greatest ability to oxidize TCE adsorbed to soil of all of the oxidants tested for the site. However, because MASP has additional safety concerns associated with its use and does not treat contaminants over as long of a time period as BASP does, it will be used only at Area 1 during this round of injection and BASP will continue to be used in the neck and Areas 2 and 3. Injecting MASP into Area 1 near that area of higher on-site TCE concentrations should validate the effectiveness of MASP in the longer term treatment remedy for Area 1.

Section 2.3.3, Adaptive Remedy Implementation

ADEQ Comment: *ADEQ requests that Whirlpool perform sufficient injections in the upcoming phase of work to effectively treat each of the three areas identified in the RADD.*

ENVIRON Response: The primary goal of the remediation effort to be accomplished by the adaptive remedy is effective and sustainable treatment in both the long and short term. The first ISCO injection event served as a foundation of the overall adaptive remedy strategy and was undertaken with this goal in mind. As is the case in such an approach, successful remediation is a continual building upon each step of the process which includes steps to manage variables from the use of in-situ chemical oxidation (ISCO) technology such as daylighting, or movement into unintended areas both on and off site. Information gained from this first injection event has been used to scale up treatment in the areas identified in the RADD as part of the adaptive remedy Work Plan submitted on February 24, 2014.

As part of the adaptive remedy a second ISCO injection event commencing this week includes ISCO injections in multiple locations in Areas 2 and 3 (50 injection locations for the second ISCO injection event) and supplemental injections to be performed in the neck area (31 injection locations in the neck area) . The combined injection locations exceed the total

number of injection locations presented in the RADD (i.e. 81 injection points compared to 69 injection points required in the RADD). Based on the performance of the first round, the second ISCO injection event should provide sufficient coverage throughout Areas 2 and 3 and in the neck area. As shown on the attached Figure 1, these 81 points provide more than adequate spatial coverage over the areas in question while adequately dealing with surface and subsurface intrusions including utilities which preclude work in certain areas. This expanded program is consistent with the principals of the adaptive implementation process. Performance monitoring will enable us to determine the effectiveness of the second ISCO injection event performed in Areas 2 and 3 and the neck area. As data is collected during the adaptive remedy process, subsequent ISCO events will be considered, as appropriate.

The second ISCO injection event (commencing this week) will also include oxidant injection in Area 1. Ten additional injection points will be performed in the vicinity of MW-25. As described in the previous comment, MASP was selected for the second ISCO event in Area 1 to remediate impacted soil and groundwater in the vicinity of the location exhibiting the highest TCE concentrations on the site (i.e. MW-25). Because MASP has demonstrated the greatest ability to oxidize TCE adsorbed to soil of all the oxidants tested for the site, this injection event will verify the potential reduction of rebound and the ability to reduce persistent TCE in the on-site area of highest identified TCE concentration. This injection will provide critical information on the linear drainage feature in the vicinity of Area 1 as requested in the May 12, 2014 letter from ADEQ concerning soil contamination in Area 1.

ADEQ Comment: *However, Area 1 requires more injection points to meet the objectives of the Final Remedy Work Plan discussed above. Please submit the information requested previously in order to implement a remedy that satisfies the purpose of the Final Remedy Work Plan.*

ENVIRON Response: ENVIRON agrees with the need to meet the objectives of the Final Remedy Work Plan from February 24, 2014 that includes an adaptive remedy approach being implemented at the Whirlpool site. The Final Remedy Work Plan from February 24, 2014 indicated that the number of injection points would be adjusted when information gathered at each phase of the remedy determines adjustments are necessary to enhance treatment effectiveness. As discussed above, the ultimate goal of the ISCO injection events is effective treatment.

As discussed in the separate ENVIRON response to ADEQ's May 12, 2014 letter, a linear drainage feature was identified both within and outside of the bounds of Area 1. The findings of the work completed over the last six months has clarified and refined the scientific understanding that was not available before the RADD was finalized. Such ongoing gathering of information, and appropriate adjustments of the remedies based upon this insight is a common process for any effective remediation effort.

The integration of the findings from these activities in the adaptive remedy suggests an adjustment to the remedy for Area 1 including a better understanding of the linear drainage feature and how best to incorporate that finding into an effective treatment regime. While the remedy approach in Area 1 is being discussed with ADEQ, MASP is being injected in

this area to assess the issue addressed in the previous response to comment in this correspondence and potential enhance TCE destruction at the area of highest on-site impact.

Most importantly this work in Area 1 is being conducted concurrently with expanded oxidant injections in Areas 2 and 3 and the neck area which cut off the onsite groundwater impact from the neighborhood to the north. By cutting off the neck of the plume there will be minimal additional contribution of TCE impact to groundwater north of the site, allowing Natural Attenuation to continue reducing TCE mass in Areas 2 and 3 while adapting changes to treatment of the on-site Area 1.

Section 2.4, Monitored Natural Attenuation

ADEQ Comment: *"The type and quantity of oxidant and reducing agent will be determined by bench testing of impacted aquifer materials. The aquifer materials will also be tested to determine the nature of natural attenuation occurring at the facility." The intention was to acquire soil samples from the aquifer material for bench scale investigation to determine the natural attenuation at the site. If the groundwater monitoring MNA data prove to be insufficient, testing of soil samples may be required in the future to identify methods or materials which would enhance the natural attenuation processes at the site.*

ENVIRON Response: ENVIRON agrees and if groundwater monitoring data incorporated into the adaptive remedy program during the coming quarters does not validate that natural attenuation is sufficient, other methods to enhance MNA will be considered.

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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

Figure 1: Second 2014 Injection Event Locations

FILE: D:\GIS\PROJECTWHIRLPOOL\DOCs\20140506_JuneISCOFigure 4 - Workplan - Second 2014 Injection Event Locations - 20140512.mxd

Proposed Injection Well (IW)
Temporary Injection Point (IP)
Existing Monitoring Well (MW)
101 Existing Injection Well (IW)
101 Existing Injection Well to Sample/Monitor
Proposed Treatment Areas 1, 2 and 3
Injection Work Area
Approximate Property Boundary

MW-39

Area 3

Temporary IP's	40
Existing IW's	10
Volume - Up to 14,000 gal	

IW-77
IW-80
MW-36
121 122 123 120 117 118 119 124 115 114 116 131 113

Area 2

MW-34
MW-65
IW-78
MW-35R
IW-79
Injection Array 2

MW-31
MW-32
MW-33
MW-23
MW-27

101 108 109 102 107 112 130 110 103 106 111 104 105

Temporary IP's	20
Existing IW's	11
Volume - Up to 8,200 gal	

Injection Array 1

MW-24
ITMW-16

ENVIRON WORK PRODUCT
Attorney Client Privileged

ITMW-17
ITMW-15
MW-38
ITMW-13
ITMW-11
MW-37
ITMW-12

MW-25

Temporary IP's	10
Volume - Up to 3,000 gal	

128 125 129 126 127

Area 1

Injection Array 3

ITMW-19
ITMW-18

Note
The number and location of iinjection points and final injected volume(s) are approximate and will be adjusted as needed based on field conditions

0 35 70
Feet
1 inch = 35 feet

ENVIRON

DRAFTED BY: KTS | DATE: 05/13/2014

SECOND 2014 INJECTION EVENT LOCATIONS

Whirlpool Facility - Fort Smith, Arkansas

Figure 1

PROJECT: 3433253A