MEMORANDUM

Date: October 26, 2020

From: Wilmington Environmental Restoration Committee (WERC)

To: Lynne Jennings/EPA, Melanie Morash/EPA, & Garry Waldeck/DEP

Re: WERC Technical Comments on:
Updates to OU1 & OU2 Report
OU1 & OU2 FS Vol. I
Interim Action FS Vol. II
Comparative Analysis Vol. III
EPA Proposed Plan
Olin Chemical Superfund Site - Wilmington, MA

WERC has completed a technical review of the Updates to OU1 & OU2 Report, OU1 & OU2 FS Vol. I, Interim Action FS Vol. II, Comparative Analysis Vol. II, and EPA's Proposed Plan. The following pages contains WERC comments and are grouped as follows:

Remedial Action Objectives
Preferred Plan Summary Table
Preferred Plan
Containment Area
Ammonia and Chromium PRG

The volume of material to review and comment on is large and it is difficult to perform a complete comprehensive review. The review material also included foundational material, for example the soil analysis for the Containment Area and the development of the PRG for the ammonia and chromium in the surface water. This material was presented at the same time as the Proposed Plan. A normal Superfund process would have completed the review and comment on all the RI and FS material before a Plan is put forward. So, the issues WERC raises on the CA and PRG also questions if the alternatives developed are adequate to remediate the contamination and if additional alternatives should be developed and evaluated.

WERC is also very concerned we have been on the outside of the process the past year with the EPA's push to a Proposed Plan. Though material has been shared with us, when WERC provided input, EPA has been very reluctant to actually incorporate WERC issues (Ammonia PRG). WERC appreciates the push to a solution of the Olin Superfund Site after years of slow progress. But we do not want the cost to be forgoing the best Plan for the community.

WERC looks forward to EPA's review of our technical comments and strongly suggest we meet (virtually) to discuss the issues before EPA drafts responses to our comments.

SEMS Doc ID 649969

Olin Chemical Superfund Site

Remedial Action Objectives

DAPL and Groundwater Hot Spots
Remedial Action Objectives

DAPL:

- *Reduce, to the extent practicable, the volume of DAPL and mass of Site contaminants in DAPL that represent a source to groundwater, surface water, and sediments.*
- *Reduce, to the extent practicable, the horizontal and vertical migration of DAPL acting as a source of Site contaminants, including penetration into bedrock.*
- *Prevent potential human exposure by a future resident to DAPL containing Site contaminants at levels that pose an unacceptable risk.*

Groundwater Hot Spots:

- *Reduce, to the extent practicable, the mass of Site contaminants in highly contaminated groundwater (groundwater hot spots).*
- *Reduce, to the extent practicable, the further horizontal and vertical migration of Site contaminants in groundwater hot spots, including penetration into bedrock.*
- *Prevent potential human exposure by a future resident to groundwater containing Site contaminants at levels that pose an unacceptable risk.*

Comment: These are <u>interim</u> RAOs and fail to recognize the value of the aquifer for private and public water supply and DEP designation and must be changed. A long-term RAO must be included for the aquifer.

CERCLA states in 40 CFR 300.430 that "The national goal of the remedy selection process is to select remedies that are protective of human health and the environment, that maintain protection over time, and that minimize untreated waste." It further states that expectations when developing appropriate remedial alternatives include: "(A) EPA expects to use treatment to address the principal threats posed by a site, wherever practicable. Principal threats for which treatment is most likely to be appropriate include liquids, areas contaminated with high concentrations of toxic compounds, and highly mobile materials. And "(F) EPA expects to return usable ground waters to their beneficial uses wherever practicable, within a time frame that is reasonable given the particular circumstances of the site."

An appropriate RAO should be added:

"Restore ground water aquifers to pre-disposal/pre-release conditions, to the extent practicable."

LNAPL and Surface Water
Remedial Action Objectives

LNAPL:

- *Prevent migration of LNAPL to East Ditch Stream to prevent exposure by current and future ecological receptors to Site contaminants that would result in potential adverse impacts.*
- *Remove, to the extent practicable, LNAPL that represents a source of Site contaminants to groundwater.*

Surface Waters:

- *Prevent migration of groundwater containing Site contaminants to East Ditch Stream, South Ditch Stream, and Off-Property West Ditch Stream to prevent exposure by current and future ecological receptors to surface water containing Site contaminants that would result in potential adverse impacts.*
- *Prevent migration of groundwater containing Site contaminants to Off-Property West Ditch Stream to prevent potential human exposure by a current or future trespasser to surface water containing Site contaminants at levels that pose an unacceptable risk.*

Comment: WERC agrees with the RAOs for LNAPL. For the RAOs for Surface Water, WERC offers the following comments.

Remove the phrase "by a current or future trespasser" to the second RAO for surface water. The phrase implies only a trespasser would be exposed to the off-property stream. Any worker on the site would also be exposed.

Compliance with the surface water RAOs will be achieved by monitoring the water quality in the stream, not measuring pollutants in the ground water. As such, the RAO should reflect that approach and include surface water objectives, not ground water objectives. A surface water RAO should be added.

"Restore surface water to ambient water quality criteria for the contaminants of concern"

Soil and Sediment
Remedial Action Objectives

OU1/OU2 Soil

- *Prevent potential human exposure by a future resident to soil containing Site contaminants at levels that pose an unacceptable risk.*

Upland Soil (including the Containment Area)

- *Prevent potential human exposure by a future indoor worker or building occupant to indoor air vapors, via a vapor intrusion pathway, containing Site contaminants at levels that pose an unacceptable risk.*
- *Prevent exposure by current and future ecological receptors to upland soil containing Site contaminants that would result in potential adverse impacts.*
- *Prevent leaching of Site contaminants associated with the Containment Area into groundwater, surface water, and sediments at levels that pose unacceptable risks to human health and the environment.*

Wetland Soil and Sediments

- *Prevent exposure by current and future ecological receptors to wetland soil and sediments containing Site contaminants that would result in potential adverse impacts.*
- *Prevent the further migration of wetland soil and sediments containing Site contaminants to nearby wetlands, surface water, drainage features, and adjoining properties that would result in*
  potential adverse impacts.

Comments: WERC agrees with the RAOs for soil and wetlands. WERC offers the following comment for sediments. A RAO should be added for sediments:

"Restore sediments to pre-release/background conditions to the extent feasible, at a minimum to levels that will result in self-sustaining benthic communities with diversity and structure."

Olin Chemical Superfund Site

WERC Preferred Plan
Summary Table

Cleanup Component	EPA Proposed Plan	EPA Proposed Plan Description	WERC Preferred Plan	WERC Preferred Plan Description
DAPL	DAPL-B	DAPL Pool extraction with approximately 20 wells total	DAPL-B	Same as EPA's
Groundwater Hot Spot	GWHS-3	Groundwater hot spot extraction with approximately six wells targeting the 5,000 ng/l NDMA contour	GWHS-4	Groundwater hot spot extraction with approximately 12 wells targeting the 1,100 ng/l NDMA contour
LNAPL	LNAPL-5	Demolition of Plant B, Multi-Phase Extraction (MPE) for LNAPL,	LNAPL-5	Same as EPA's
Surface Water	SW-4	Targeted groundwater extraction to prevent discharge to surface water, on-site treatment at new treatment system	SW-3	Groundwater extraction to prevent discharge of contaminants to surface water, on-site treatment at new treatment system
Containment Area	CA-2	Containment area cap and closing equalization window	New Alternative Option 1 New Alternative Option 2	Investigations are not complete to make decisions on CA. Targeted soil removal to meet upland soil PRG. No containment area cap or closing equalization window. Place contaminated soil from Upland Soil in CA and then construct containment area cap and close equalization window.
Upland Soil	Soil-2	Placement of a soil or asphalt cover system over areas of shallow (0-1 ft) upland soil with concentrations of Site contaminants in excess of the proposed cleanup levels;	Soil-3/Soil-4	Excavation (0-1 ft) (or 0-10 ft) with off-site disposal and clean soil cover for upland soil. Or, place excavated material in Containment Area.
Wetland Soil and Sediment	WSS-2	Excavation with Off-Site Disposal and Restoration of Wetland Soil and Sediments	WSS-2	Same as EPA's
TMPs in Soil	TMP-2	Limited Action for TMPs (Institutional controls, including vapor intrusion evaluations or vapor barriers/sub-slab depressurization systems)	TMP-3, 4, or 5	Treatment or excavation and off-site disposal

Olin Chemical Superfund Site

EPA's Proposed Plan

WERC's Preferred Approach

- Cleanup and not coverup of site contamination
- Address problems now, rather than leave them in place and monitor
- From long site history, WERC (and the community) has little trust in future owner/operator to adhere to institutional requirements

Bundling alternatives together

- EPA states in the FS Vol. III - Comparative analysis, p. 3: *Due to the number and complexity of the remedial alternatives (34) considered to address the risks posed by Site-related contaminants, EPA sought to simplify and consolidate the cleanup components to promote public understanding of the interrelationship between the various cleanup components and to reduce the number and extent of comparative analyses required.*
- Consolidating the cleanup components does not promote public understanding of the interrelationship between the various cleanup components, instead it bundles different site contaminants and issues that have alternatives that are not interrelated, and does not allow each to be optimized.
- WERC, as the public's representative, requests that EPA decouple the alternatives, which will provide greater public understanding of the alternatives and reasons for each selection. Thus, WERC has decoupled some of the grouped alternatives in our comments.
- The evaluation of bundled alternatives also muted the evaluation of individual alternatives. For example, evaluating LNAPL with surface water produced what is best for the combination, but not for each individual (LNAPL and surface water). This is more of an issue for the evaluation of the bundled alternative of Upland Soils, Containment Area, Wetlands and stream sediment group. The evaluation should be performed for each individual alternative without the forced bundling to truly see and determine the best alternatives.

DAPL and Groundwater Hot Spots

***EPA Selected Alternative**: Alternative **DAPL/GWHS-3**: (DAPL-B and GWHS-3) DAPL extraction (approx. 20 wells), groundwater hot spot extraction targeting **5,000 ng/L NDMA (approx. 6 wells)**, on-site treatment at new treatment system.*

- *Construction and operation of a DAPL extraction system, conceptualized with four wells in the Off-Property Jewel Drive DAPL pool, four wells in the Containment Area DAPL pool, and 12 wells in the Main Street DAPL pool;*
- *Construction and operation of a groundwater extraction and treatment system, conceptualized with six wells, targeting the 5,000 ng/L NDMA contour, to remove and treat the mass of contaminants in groundwater hot spots; and*

- *On-site treatment of extracted DAPL and hot spot groundwater in a new, multi-phase treatment system.*

Capital Cost: $15.6 million
Annual O&M Cost: $24.6 million
Present Worth Cost $35.5 million
Construction Time: 2-3 years
Time to Achieve RAOs: 8 years

WERC Preferred Alternative: Alternative **DAPL/GWHS-4**: (DAPL-B and GWHS-4) DAPL extraction (approx. 20 wells), groundwater hot spot extraction targeting **1,100 ng/L NDMA (approx. 12 wells)**, on-site treatment at new treatment system.

- Construction and operation of a DAPL extraction system, conceptualized with four wells in the Off-Property Jewel Drive DAPL pool, four wells in the Containment Area DAPL pool, and 12 wells in the Main Street DAPL pool;
- Construction and operation of a groundwater extraction and treatment system, conceptualized with 12 wells, targeting the 1,100 ng/L NDMA contour, to remove and treat the mass of contaminants in groundwater hot spots; and
- On-site treatment of extracted DAPL and hot spot groundwater in a new, multi-phase treatment system.

Capital Cost: $19.3 million
Annual O&M Cost: $26.5 million
Present Worth Cost: $40.5 million
Construction Time: 2-3 years
Time to Achieve RAOs: 8 years

Reasons:

- More NDMA mass removal,
- Does more to prevent expected further migration of NDMA into aquifer and bedrock, making final clean-up more feasible,
- Additional extraction wells are mostly in the same area and this alternative has similar implementation as EPA selected alternative,
- The target concentration of 1,100 ng/l is still two orders of magnitude above target cleanup levels for NDMA.
- Marginal cost increase of 14 percent (Present Worth)
- The Construction Time and Time to Achieve RAOs is the same as EPA selected alternative.
- Better achieves RAOs

GWHS alternatives 2-4 include new prohibition on use of GW in OU3 GW study area unless demonstrated that it will not pose an unacceptable risk, cause further migration of plume or interfere with the institutional control remedy. As an interim action, WERC agrees, will residents and property owners be provided with water by Olin PRPs to replace their well water?

Further Analysis

WERC agrees with EPA that long term effectiveness is considerably better for alternative 4 than for alternative 3.

EPA rated both Alterative 3 and 4 as very good for Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment, but did not note any difference in the effectiveness of the two alternatives. WERC disagrees with this assessment, as EPA acknowledges that alternative 4 will remove more source material in this critical 8 year window. The mobility of the contaminant plume is a critical issue, and Olin has delayed time after time any removal of the source material, resulting in a considerable amount of contamination migrating into the fractured bedrock throughout the site and well beyond. Every year delay in removing source contamination results in more contamination migrating into the bedrock, where it is far more difficult to remove or treat.

EPA rated Alternative 3 as "good" and alternative 4 as "fair" for short term effectiveness based on "increasing impacts to the environment from well drilling and associated construction activities and piping installations." However, in the next paragraph, EPA acknowledges that risks to the community, workers, and the environment of all the alternatives are modest and can be minimized with BMPs. The extraction well placements for Alternative 4 are not so far from those in Alternative 3, and thus there would not be significantly increased impact from well drilling and piping activities.

EPA also rated Alternative 3 as "good" and Alternative 4 as "fair" for implementability, however the only difference noted is that "the additional extraction wells…may posed installation challenges." EPA's nine Implementability perspectives are:

- *the ability to construct and operate the technology,* (the same for 3 and 4 - although there will be more wells in alternative 4)
- *the reliability of the technology,* (the same for 3 and 4)
- *the ease of implementing future remedial actions, if needed,* (better for 4, in that more contamination will have been removed from the groundwater)
- *the ability to monitor effectiveness of the remedy,* (the same for 3 and 4)
- *the ability to obtain approvals from other agencies,* (the same for 3 and 4)
- *coordination with other agencies,* (the same for 3 and 4)
- *the ability of off-site treatment, storage, and disposal services,* (the same for 3 and 4, as the treatment train will already be established, and arrangements for residuals will have been made)
- *the availability of necessary equipment and specialists, and* (the same for 3 and 4)
- *the availability of prospective technologies.* (the same for 3 and 4)

In summary, Alternative 4 has better long-term effectiveness, better reduction of contaminant mobility and volume, with only slightly greater impacts from drilling, well installation and construction, as would be expected from a more aggressive plan to remove source material from the GWHSs. The additional effort to install additional wells now will proportionately reduce the number of wells needed in the final cleanup plan, and improve the feasibility of the final cleanup plan by removing source material now that will otherwise migrate deep into fractured bedrock and be more difficult to remove.

Table 3. Comparative Analysis of Remedial Alternatives

ALTERNATIVES BY MEDIUM	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness	Implementability	Capital Cost	O&M Cost	Total (Net Present Value)
Alternative DAPL/GWHS-**1**: No action alternative	**X**	**X**	**N/A**	**N/A**	**-**	**+ +**	$0	$0	$0
Alternative DAPL/GWHS-**2**: DAPL extraction (approx. 5 wells), groundwater hot spot extraction targeting 11,000 ng/L (approx. 2-3 wells), on-site treatment at new treatment system alternative	✓	✓	**-**	**+**	**+**	**+**	$10,253,755	$21,701,568	$22,518,229
Alternative DAPL/GWHS-**3**: DAPL extraction (approx. 20 wells), groundwater hot spot extraction targeting 5,000 ng/L (approx. 6 wells), on-site treatment at new treatment system alternative	✓	✓	**+**	**+ +**	**+**	**+**	$15,625,318	$24,620,268	$35,497,565
Alternative DAPL/GWHS-**4**: DAPL extraction (approx. 20 wells), groundwater hot spot extraction targeting 1,100 ng/L (approx. 12 wells), on-site treatment at new treatment system alternative	✓	✓	**+ +**	**+ ++**	Change - To +	Change - To +	$19,289,931	$26,519,632	$40,464,350

X fails
√ passes
-- poor
- fair
+ good
++ very good
+++ better

LNAPL and Surface Water

***EPA Selected Alternative**: Alternative **LNAPL/SW-3: (LNAPL-5 and SW-4)** Demolition of Plant B, Expanded MPE for LNAPL, targeted groundwater extraction to prevent discharge to surface water, on-site treatment at new treatment system.*

- *An estimated three to five MPE wells installed within the LNAPL footprint, including beneath the Plant B building foundation to remediate LNAPL, the smear zone, and dissolved-phase Site contaminants that would otherwise impact East Ditch Stream;*
- *Treatment of recovered LNAPL and soil vapor via a skid-mounted treatment system that includes an oil/water separator to remove the LNAPL and vapor-phase GAC to treat the soil vapor;*
- *Off-site disposal of LNAPL at an appropriate off-site permitted facility;*
- *Construction and operation of a new groundwater extraction and treatment system, with extraction wells along Off-Property West Ditch Stream, at locations upgradient (west and northwest) of the weir at the upstream location of South Ditch Stream, and midway along South Ditch Stream between the weir and discharge location where South Ditch Stream meets East Ditch Stream, to intercept and treat the overburden groundwater plume discharging contaminated groundwater into these streams;*
- *Re-routing of groundwater treated by Plant B from the three wells along East Ditch Stream to the new groundwater treatment system (the same one as the groundwater hot spot treatment system); and*
- *Decommissioning and demolition of the Plant B groundwater treatment system.*

Capital Cost: $2.3 million
Annual O&M Cost: $7.4 million
Present Worth Cost: $6.6 million (Is this correct? Usually PW is greater than Annual Cost.)
Construction Time: 2-3 years
Time to Achieve RAOs: 30 years

WERC Preferred Alternative: Alternative **(Not Evaluated) (LNAPL-5 and SW-3)** Demolition of Plant B, Expanded MPE for LNAPL, groundwater extraction to prevent discharge of contaminants to surface water, on-site treatment at new treatment system alternative

- An estimated three to five MPE wells installed within the LNAPL footprint, including beneath the Plant B building foundation to remediate LNAPL, the smear zone, and dissolved-phase Site contaminants that would otherwise impact East Ditch Stream;
- Treatment of recovered LNAPL and soil vapor via a skid-mounted treatment system that includes an oil/water separator to remove the LNAPL and vapor-phase GAC to treat the soil vapor;
- Off-site disposal of LNAPL at an appropriate off-site permitted facility;
- Construction and operation of a groundwater extraction system, with extraction wells adjacent to East Ditch Stream, South Ditch Stream, and Off-Property West Ditch Stream, to intercept and treat the overburden groundwater plume discharging contaminated groundwater into these streams; and
- Treatment and discharge of extracted groundwater at a newly constructed, on-site, groundwater treatment system (the same one as the groundwater hot spot treatment system).
- Decommissioning and demolition of the Plant B groundwater treatment system.

Annual O&M Cost: ?
Present Worth Cost: ?
Construction Time: 2-3 years
Time to Achieve RAOs: 30 years

Reasons:

- The PRG selected for Ammonia is not protective of aquatic life. (See separate comment)
- Need supporting analysis to determine if the proposed extraction wells will intercept enough groundwater to allow streams to meet WQ standards Ammonia and Chromium PRG). EPA compared the alternatives without evaluating the performance of each alternative to meet the PRG.
- Unknown cost increase. (Group of Alternatives not evaluated by EPA).
- Construction Time and Time to Achieve RAOs is the same as EPA selected alternative.
- Better achieve RAOs

Soil and Sediment

OU1/OU2 Soil

EPA Selected Alternative*: Alternative* ***SOIL/SED-2 (CA-2, Soil-2, WSS-2 and TMP-2****)– Containment Area Cap, Upland Soil Covers, Excavation with Off-Site Disposal and Restoration of Wetland Soil and Sediments, Limited Action for TMPs (Institutional Controls, including Vapor Intrusion Evaluations or Vapor Barriers/Sub-Slab Depressurization Systems),*

- *Placement of a permanent cap over the Containment Area, the design and footprint of which will be*
  determined during the Remedial Design (RD) phase;
- *Closure of the existing slurry wall equalization window by grouting in place;*
- *Placement of a soil or asphalt cover system over areas of shallow (0-1 foot [ft]) upland soil with concentrations of Site contaminants in excess of the proposed cleanup levels;*
- *Excavation of wetland soil and sediment (0-1 ft) with concentrations of Site contaminants in excess of*
  the proposed cleanup levels;
- *Post-excavation confirmatory sampling to document limits of impacts and confirm achievement of the*
  Remedial Action Objectives (RAOs) and proposed cleanup levels; and
- *Off-site disposal of all excavated material at an appropriate off-site permitted facility.*
- *Institutional Controls, including Vapor Intrusion Evaluations or Vapor Barriers/Sub-Slab Depressurization Systems*

Capital Cost: $5.6 million
Annual O&M Cost: $1.1 million
Present Worth Cost: $6.1 million
Construction Time: 2 years
Time to Achieve RAOs: 2 years

WERC Preferred Alternative: Alternative **(Not Evaluated)**

Containment Area: CA-3, Targeted Soil Removal **(Option 1)**

- Targeted excavation of soil within the Containment Area (Only soil with contamination above PRG. This alternative not specifically examined)
- Installation of sheet pile wall at some locations, as necessary
- Excavation dewatering, as necessary
- Dewatering/stabilization of excavated soil, as necessary
- Off-site disposal of excavated soil
- Containment area cap (Is the Cap needed if the soils above PRG are removed and disposed offsite?)

Containment Area: New Alternative **(Option 2)**

- Place on site contaminated soils from Upland Soils, TMP Soils, Wetlands, and Sediments and place in Containment area.

- Placement of a permanent cap over the Containment Area, the design and footprint of which will be determined during the Remedial Design (RD) phase;
- Closure of the existing slurry wall equalization window by grouting in place;

Upland Soil: Soil-3 or Soil-4, Excavation and Off-site Disposal (or onsite if CA used)

- Excavation of upland soil from 0-1 ft (or 0-10 ft) with concentrations of Site contaminants in excess of the proposed cleanup levels.

Wetland Soil and Sediment: WSS-2 Excavation and Off-Site Disposal (Same as EPA Selected Alternative) (or Onsite if CA used)

- Excavation of wetland soil and sediment (0-1 ft) with concentrations of Site contaminants in excess of
  the proposed cleanup levels.

TMP: TMP-3, or 4 or 5, Treatment or Excavation and Offsite Disposal (or Onsite if CA used)

- Installation and operation of Air Sparging and Soil Vapor Extraction (TMP-3), or
- an in-situ thermal treatment System (TMP-4), or
- Excavation and Off-site Disposal (TMP-5)

Annual O&M Cost: ?
Present Worth Cost: ?
Construction Time: 2-3 years
Time to Achieve RAOs: 30 years

Reasons:

Containment Area:

- The Containment Area will not adequately contain groundwater even after capping and closing the equalization window.
- Decisions on Containment Area groundwater (OU3) must wait until final OU3 decisions are made.
- Treatment of groundwater in the Containment Area after decisions on OU3 are made would be expected.
- See attached memo on Containment Area concerns

Upland Soil:

- Excavation and removal of soil is much preferred over institutional controls
- Institutional controls leave compliance to the future owners/operatives of the site and town oversight. As time goes on, compliance and memory of the site issues will be lost. In addition, one of the current proposals for site redevelopment would be give regulatory control to the National Surface Transportation Board, removing local control and environmental oversight. Following the NIOSH hierarchy, and EPA's waste management hierarchy, Institutional controls should be a solution of last resort, when no preventative alternatives are feasible.
- Excavation and off-site disposal remove the risk now and removes the risk of future compliance issues.

Wetland Soil and Sediment:

- Agree with EPA Selected Alternative

TMP:

- Treatment or excavation and off-site disposal is much preferred over institutional controls
- Institutional controls leave compliance to the future owners/operatives of the site and town oversight. As time goes on, compliance and memory of the site issues will be lost.
- Treatment or excavation and off-site disposal removes the risk now and removes the risk of future compliance issues.

Olin Chemical Superfund Site

Containment Area

WERC has reviewed the Interim Action Feasibility Study for the Olin Superfund Site dated August 3, 2020. This document includes Supplemental Characterization of Containment Area Soil dated March 20, 2020. WERC has several major concerns with the current understanding and EPA's Proposed Plan to remediate.

1. Soil data for the Containment Area has not been presented to the Public in a timely fashion to make an informed decision. The major findings from the Supplemental Characterization Memorandum are

- *Results from the composite soil samples collected from each of the 12 borings did not exceed the RCRA Waste Characteristics. The results indicate a RCRA C cap would not be necessary for the CA.*
- *RSLs were exceeded for BEHP, arsenic, and hexavalent chromium.* Except for arsenic, these findings are similar to the other areas on the site. No analysis was performed in the FS document to compare the monitoring results to PRG.
- *As requested by EPA, samples collected during this investigation were also analyzed for the full list of OU1/OU2 RI compounds (as presented in Tables 2 and 3). This data will be further evaluated in conjunction with data to be collected during Data Gaps Work Plan and will be considered when implementing the final remedy for the CA.* WERC is uncertain what the last statements mean. What further analysis was done? Why is this analyzed with the Data Gap Work Plan? Is additional analysis ongoing?

2. The Containment Area does not adequately control groundwater, OU3. Though the Cap will prevent contact with the contaminated soil, the Cap will not prevent the continued migration of groundwater into the CA from the north and the migration of groundwater out of the CA to the south. The head difference in the water table between inside and the outside of the CA will continue the movement of groundwater. Whether the transport of groundwater is through the fractured bedrock, or via the weathered bedrock and bottom of the slurry wall, or through the slurry walls is unknown, but not necessarily needed. None of the CA alternatives adequately recognize the inadequacy of the CA to control groundwater. Because the final OU3 FS is in the future, any decision on the CA is premature now.

3. EPA needs to decide if the CA functions as a true containment area or not. If the CA truly functions as a containment area, then contaminated soils and sediments from the site (Upland Soils, TMP Soils, Sediments, and Wetland Soils) should be added to the CA and then a Cap placed. This is standard practice for site cleanups. If the CA does not adequately function as a Containment Area as WERC believes,[1] then the contaminated soils (those above PRG) in the CA should be removed and clean fill placed. No Cap would be needed.

[1] WERC provided an analysis demonstrating communication across the slurry wall when Olin performed the pulse test.

4. Because the alternatives for the FS were developed and prepared before the Supplemental Characterization Memo was completed, neither of these alternatives noted in Comment 3 were included for the evaluation. The FS should be revised and include two alternatives, in one alternative the CA receives contaminated soil from the site and then a Cap is placed on the CA, the second alternative is to excavate the soil in the CA above the PRG and dispose off-site.

Olin Chemical Superfund Site

Ammonia and Chromium PRG

WERC has reviewed Olin's memo AWQC for Ammonia (November 26, 2019) and the memo PRGs for Soils, Sediments, and Surface Water (May 15, 2020) and have several concerns with the selected ammonia PRG of 15 mg/l. As proposed, the criteria for the PRG would not be protective of aquatic life in the streams.

Our concerns and supporting reasons are listed as follows:

1. Use of Spring Temperature Data: The ammonia criteria is a function of pH and temperature. Higher temperatures require a lower criteria for ammonia to be protective of aquatic life. Using temperature data for March and April is not appropriate. The values of 9.2 C (49 F) for the East Stream and 6.9 C (44 F) for the South Stream were used. If no summer data is available, a default of 20 C (68 F) should be used.

2. Use of mean values of pH and Temperature Data: To determine the ammonia criteria, the mean of the pH data and the mean of the temperature data were developed and used. (See Table 1 AWQC for Ammonia (2019)). The mean value should not be used. Using a mean of the data would produce a criteria that protects aquatic life only about half the time. An extreme value (typically 90 percentile or max value) should be used to be protective all the time. The standard for chronic criteria is based on one exceedance every three years.

For pH:
- East Stream: Use 8.9 instead of 7.1.
- South Stream: Use 8.9 instead of 6.4.

For Temperature: (Note: see Comment #1 above)
- East Stream: Use 14.3 instead of 9.2.
- South Stream: Use 11.7 instead of 6.9.

3. On page 4 of PRGs for Soils, Sediments, and Surface Water (May 15, 2020) it states the following:

This memorandum identified a CCC of 14 mg/L for the East Ditch and 19 mg/L for the South Ditch. USEPA has identified a single site-specific ammonia PRG for surface water at the site of 15 mg/L.

Using a value of 15 mg/l for the ammonia criteria would not be protective in the East Stream. Given the values, a value of 14 mg/l should be used instead of 15 if a single value is to be used.

4. Compliance. In Table 2.1-13 of OU1 and OU2 Feasibility Study (Vol. I) dated April 24, 2020 a footnote states the following:

Surface Water PRG compliance = geometric or arithmetic mean ≤ PRG based on data distribution (lognormal or normal, respectively).

The ammonia (and chromium) criteria is a not-to-exceed chronic value. Any exceedances above the criteria is harmful to aquatic life. Compliance cannot be based on having an arithmetic average of the values be below the criteria: all values need to be below the criteria. It is even more troubling that it appears that geometric means would even be considered for compliance.

5. The chronic concentration for ammonia criteria should be around 1.9 mg/l for a pH of 7 and temperature of 20° C. This is the criteria value used for cleanup at the Halls Brook Holding Area Pond for Industi-Plex Superfund site. The methodology used to develop the PRG for ammonia for the Olin Superfund Site should follow the methodology used for Halls Brook Holding Area Pond.

6. Chromium: Though we have not seen the details of the development of the PRG for chromium, we suspect many of the above comments apply to how the criteria was developed. The chromium criteria is a function of hardness, and it appears the average, rather than an extreme hardness value was used from the available data. Also, compliance to the criteria is based on a mean of the values rather than a not-to-exceed value.

7. The location of the discharge for the treated water for this site has not been specified. If as suspected, the discharge is to an onsite surface water, such as the East Stream, then a NPDES permit will be required for the discharge. The NPDES permit will have concentration limits set for many pollutants, including ammonia. First, the treatment system will be operating 365 days a year, and the stream will have flow through the summer months. So, summer conditions will be used to set the NPDES limit. Also, for this location the PRG for ammonia and chromium will need to meet the NPDES limit set.

The development of the PRGs should be based on the science, not a negotiated process between Olin and USEPA. The overall goal of the project is to remediate the site and mitigate impacts from the site to ecological and human health. Allowing PRGs that are not actually protective of aquatic life; would negate the whole effort.