

MEMORANDUM

DRAFT

To: Wilmington Environmental Restoration Committee
From: Stephen G. Zemba, Ph.D., Tom Simmons, and Richard R. Lester
Subject: Initial comments on the RI/FS Workplan
Date: December 23, 2008

We write to provide comments on our preliminary review of the October 2008 RI/FS Workplan for the Olin Chemical Superfund Site. We may upon further review have additional comments. Please feel free to contact us with any questions.

Outlined Plans for the Baseline Risk Assessment Should be Part of the RI/FS Workplan

A recurrent goal in the Field Sampling Plan (FSP) is the collection of data for use in the risk assessment. Without a semi-detailed plan for the risk assessment, however, it is impossible to tell whether the data to be collected will satisfy the needs of the risk assessment. This is especially true for the ecological risk assessment, for which data collection often encompasses parameters that are not directly related to the determination of the extent of contamination. We suggest that semi-detailed outlines of the baseline human health and ecological risk assessments be added to the Workplan.

Risk Management Criteria Should Remain at Least as Stringent as those of the Massachusetts Contingency Plan

Investigation of the Olin Site began under the auspices of the Massachusetts Contingency Plan (MCP). The requirements of the MCP should thus be treated as Applicable or Relevant and Appropriate Requirements (ARARs) for the purpose of the Superfund Remedy, especially since many site and risk management decisions have been motivated by the MCP. The decision-making criteria for determining acceptable levels of risk in human health risk assessments in the Superfund Program are similar to, but differ in specifics, from those used in the MCP. In particular, the acceptable level of incremental cancer risk within the MCP is 10 in a million (risk to the individual), while in the Superfund Program there is an acceptable range of risk between 1 and 100 in a million. It is thus possible that a 100 in a million incremental cancer risk could be deemed acceptable within the Superfund Program. This would be ten times greater than that allowed under the MCP. We understand that the Massachusetts Department of Environmental Protection must concur that the Superfund remedy is consistent with the MCP, but that constraint did not prevent incremental cancer risk estimates greater than 10 in a million (the MCP limit) from getting approved at the Industri-Plex Superfund Site. We want to emphasize that the target risk levels and requirements of the MCP, where more stringent than those of the Superfund Program, should be satisfied by the ultimate remedy. Other requirements of the MCP should be satisfied as well, such as the need to meet drinking water standards in all groundwater areas classified as GW-1 (groundwater considered to be a potential source of drinking water).

ARARs

The Companion Document to the RI/FS Workplan discusses Applicable or Relevant and Appropriate Requirements (ARARs). Several additional items should be included as potential ARARs:

- Massachusetts Surface Water Standards;
- Office of Research and Standards Guideline (ORSG) Levels, in addition to Massachusetts Maximum Contaminant Levels (MCLs), for potential drinking water sources;
- Massachusetts Department of Environmental Protection vapor intrusion guidance; and
- Upper Concentration Limits (UCLs) used within the Massachusetts Contingency Plan (MCP).

Use of Historic Data

We acknowledge that a large amount of data has already been collected at the Olin Site in the course of previous investigations and remedial activities. Beyond guiding the current effort to better determine the nature and extent of contamination, how will historic data be used in the RI/FS? Any historic data that are potentially used in site characterization and/or risk assessment should be subject to data validation to determine if they satisfy the objectives of the Quality Assurance Project Plan (QAPP). Also, historic data should be subject to relevance and data usability criteria. Groundwater or surface water data collected several years ago are probably not relevant for use in the baseline risk assessments as they may not represent current conditions. Past identification of contaminants sets a starting point for RI/FS sampling, demanding at least confirmatory sampling, but does not necessarily indicate the present extent of contamination.

Contaminant List

The list of target contaminants provided in Table 3.1-1 should also allow for the identification of Tentatively Identified Compounds (TICs) for both the volatile organic compound (VOC) and semi-volatile organic compound (SVOC) methods. Appendix A of the FSP lists a number of production related chemicals (both products and feedstocks) that are not covered on the Table 3.1-1 analytical list. It would make sense to carefully go through the Appendix A list to identify additional potential site-related contaminants to include in sampling. Justification for not including any such chemicals from Appendix A should be provided. Also, why is there not a one-to-one correspondence in the lists of products provided in Tables 1 and 2 of Appendix A to the FSP?

Vapor Intrusion Data

The vapor intrusion pathway is a potentially relevant concern at locations across the Olin Site, as volatile contaminants have been identified in both groundwater and soil. Although there has been some preliminary examination of the vapor intrusion pathway in previous investigations, evaluation appears to be limited to examination of the Massachusetts Department of Environmental Protection's (DEP) GW-2 groundwater protection standards. The GW-2 standards, however, are not adequate to evaluate the vapor intrusion pathway along multiple

lines of evidence, as they are limited to a relatively simple, and not necessarily conservative (health protective), model of vapor diffusion from a source in groundwater. As an example, the GW-2 standards do not account for the potential presence of a source of volatile contaminants in unsaturated soils. Further, DEP's GW-2 standards strictly apply to groundwater only in areas within 30 feet of an existing building or structure. In future use scenarios, buildings could be constructed at many locations on the Olin site. We assume that vapor intrusion will be included as a pathway in the human health risk assessment. Why are there no current plans to collect data relevant to this pathway? For example, the soil borings planned below existing foundation slabs (FSP, p. 3-2) should consider vapor intrusion potential. We also recommend a soil-gas survey that includes (as a minimum) sampling in the vicinity of historic detections of VOCs in soil at and just above the groundwater table near well locations where VOCs have been previously found.

Background Contamination Levels

Soil: Specific procedures should be provided for how contaminants will be judged relative to background (either natural or site-specific). Will the methods of the MCP be used for this purpose? The FSP, for example, notes on pg. 4-4 the MCP's background value of 20 mg/kg for arsenic. It should be noted in this case that the MCP's background levels are generally set at upper percentiles of distributions, and that mean or median background concentrations are typically lower. How will the background data described on FSP pgs. 3-2/3-3 be used in comparison to site-generated data?

Groundwater: The discussion of groundwater quality at the Industri-Plex Site (FSP, p. 3-5) is irrelevant with respect to Olin as it is not a "background" contributor to flow at Olin (*i.e.*, groundwater does not flow from Industri-Plex toward Olin, which, if it did, might make it a relevant concern). Although conditions may be worse at Industri-Plex, this does not lessen the importance of contamination at the Olin Site. If anything, environmental justice arguments could be made that the surrounding communities are burdened by multiple sites, making the contamination at the Olin site of greater importance because it contributes to a burden/stigma that is larger than it would be in isolation. Both sites affect groundwater quality in the Aberjona watershed. It might be possible, for example, that the geochemical nature of Olin groundwater flowing through Industri-Plex may influence contaminant solubility, dissolution, *etc.* Any relationships between the two sites should be characterized.

Surface Water/Sediment: Data collected in 1996 and 1997 for characterizing background contaminants in surface water and sediment may be too dated to still be relevant—especially in the case of surface water. Many changes and activities have taken place at the Olin Site and its vicinity that could dynamically have changed surface water and sediment quality. We recommend new background sampling to provide data concurrent with the RI/FS.

Soil Sampling

The locations of soil borings planned below existing foundation slabs (FSP, p. 3-2) should consider as potential release points the locations of floor drains, sewer lines, and wastewater discharge lines.

PCBs Sampling

In FSP Figure 4.1-5, the maximum PCB concentration is identified in SWMU-33. The sample name suggests Solid Waste Management Unit, but it appears to be located in a wetland per Figure 2.1-1. None of the proposed sampling locations (Grid cells C3, E7, G7, I5, & I6, Table 4.1-2) are anywhere near the wetland location where PCB-1016 was detected (in grid quadrant P/Q 3/4, per Figure 4.1-6). The PCB sampling strategy seems to presume that PCB releases would have occurred from in-place leaks. Is there evidence for the Conceptual Site Model to support this premise, such as the documented disposal of the transformers? If not, the transformers could have been drained at various locations not related to their use (a not uncommon practice), and the search for PCBs should be more widespread.

Production-Oriented Sampling

FSP, p. 4-6, states: "Sample analyses for nonyl phenol, DMF, phthalic anhydride, and formaldehyde will be conducted based on their location of use as outlined in Table 4.1-2." If these chemicals were transported to other places *via, e.g.*, landfilling, wastewater discharge, or other means of transport, should not more samples be analyzed for these parameters? Figures 4.1-5 and 4.2-5 seem to indicate a number of instances in which maximum concentrations of chemicals were found in areas not seemingly related to production activities. We recommend sampling more extensive areas than just the immediate vicinity of production areas for any and all chemicals at the Olin Site. The search for production-related chemicals has historically been limited. As examples, hydrazine and formaldehyde were looked for in only 8 surface & 20 to 22 subsurface samples (Tables 4.1-1 and 4.2-1), which represent only a small fraction of the samples analyzed for VOCs. Ironically, formaldehyde was found in most (15 of 22) subsurface samples, so why limit the proposed production-related sampling to only a fraction of the proposed soil samples (Plant A and part of Plant B)? Also, the parameter phthalic anhydride is included in Table 4.1-2 but not indicated as a parameter in *any* samples. Given various process treatment and disposal practices, we recommend a more inclusive approach of performing analyses for all production-related analytes on all samples unless a compelling case can be made regarding production/waste handling procedures that it was not likely a chemical could have been transported to places other than production areas.

Surface Water Sampling

We concur that new surface water data should be collected given the many changes that have occurred at the site—older, historic data are not suitable for use in risk assessment and possibly not for site characterization, either. With regard to the discussion of n-nitrosodimethylamine (NDMA) detects characterized as false positives (FSP, p. 3-4), more intense (spatially) and

frequent (temporally) sampling may be justified to provide a higher degree of proof/evidence. The meaning of the NJ qualifier should be explained in the text. Since NDMA is not a sorbed constituent, sediment sampling does not reflect groundwater flow (this is true per the conceptual site model for most constituents that have semi-significant transport distances). So, perhaps the major ion signatures would be better used for fingerprinting the relationship between surface water and potential groundwater discharge sources? Also, there should be a direct correspondence between the parameters/constituents examined in OU1 and OU2 surface water and sediments (FSP, pg. 3-4+). Supporting data and rationales should be provided for any chemicals examined and/or found in OU1 that are not looked at in OU2.

Surface water sampling (Section 4.4) proposes the collection of four samples, presumably for confirmation purposes. More samples have been taken in the past (text indicates these samples are still being collected). Problematically, the historic nature/extent shown in Figure 4.4-3 indicates a detect of NDMA at the farthest downstream location. The level downstream may be low enough to indicate no need to sample further, but given the unusual nature of this compound, one cannot claim to have established nature and extent until a condition of “non-detect” is reached. Why are four samples proposed specifically for the RI if they are already being collected routinely in an existing sampling program?

Groundwater Sampling and Characterization

Preliminary review suggests a potential flaw in the Conceptual Site Model (CSM) of contaminant behavior. It is presently believed that contaminants dissolve into groundwater from pools of dense, aqueous phase liquids (DAPL) that are trapped on the bedrock surface. This model is inferred from site investigation data that are incomplete and require considerable judgment and interpretation. It is equally plausible that the pools of DAPL are in fact connected and continuing to move through bedrock fractures. If so, contaminants could continue migration into the Maple Meadow Brook aquifer in a manner inconsistent with the current CSM. Further characterization to confirm the nature of DAPL, its relationship to bedrock, and potential transport within fractures is necessary.

The work plan provides for groundwater level measurements that presumably will be converted to ground water elevations based on previous elevation surveys to establish the direction of flow in the onsite saturated soils. The ground water monitoring event also will provide for induction logging in multi-level piezometers for the purpose of establishing the top of and the thickness of the DAPL layer.

The monitoring wells and piezometers that are included in the proposed water level gauging plan should be resurveyed to a common datum to insure that accurate elevations are assigned to each reference point. The water levels should be recorded within close time proximity to establish a “snapshot” in time that is reflective of groundwater flow at the site under the same conditions (*i.e.*, constant variables).

The water levels in the multilevel piezometers should be gauged at all elevations if they are screened at discrete depths that represent shallow and deep aquifer conditions (using terminology in the RI/FS work plan) to establish vertical gradients. This information can be used to assess the recharge areas and groundwater discharge areas (*i.e.*, wetlands) and to assess the potential for groundwater to flow beneath surface water features (*i.e.*, East and South Ditches and the wetlands along South Ditch).

Monitoring Well Installations

The RI/FS workplan should provide for the installation of monitoring wells on-site and off-site within the bedrock. Care should be taken to employ proper drilling techniques to prevent the “dragging down” of contaminants into the bedrock in areas where the overburden aquifer is contaminated. The bedrock monitoring wells should be installed in areas where there is known contamination and in the area of the multilevel piezometers. The purpose of the bedrock wells will be threefold: to identify the potential vertical migration into the bedrock by the DAPL; to assess the structural integrity of the bedrock (fracture assessment using RQD – rock quality designation); and to assess the hydraulic flow capacities of the bedrock using downhole hydraulic conductivity (K) testing through a packer test zone isolation methodology. The bedrock monitoring wells may also be used in future aquifer pump tests to determine the hydraulic connectivity of the fractures. All of the data can then be used to assess whether the bedrock is a contributing factor to groundwater flow and contaminant migration, whether the direction of groundwater flow is different in the bedrock and the overburden, whether the bedrock discharges groundwater (and potential contaminants) to the Maple Meadow buried valley aquifer, and lastly (although this is by no means a complete list) whether the bedrock contributes recharge to the overburden under pumping conditions at the MWSW (municipal water supply wells).

We recommend grouting in those monitoring wells that are screened across the overburden bedrock interface and replacing them as noted above. This will minimize the potential conduits for contaminant transfer between the overburden and the bedrock aquifers. It would also be informative to drill through the landfill to assess the leakage of contaminants through the bottom and to establish hydraulic head within the landfill and the underlying overburden/glacial till and bedrock units.

Bedrock Topography

The RI/FS Work plan references two cross sections of the bedrock topography that indicate the presence of bedrock depressions that are acting as DAPL “traps”. The cross sections depict these traps on the property. No cross sections have been provided for off-property bedrock topography where substantial pools of DAPL have been previously identified. Additional work should be conducted through the drilling and confirmation of the bedrock surface to establish the presence of bedrock depressions on and off the property and to assess the orientation of the bedrock

depressions and any linearity associated with the depressions in the bedrock surface that may be transport conduits for the DAPL. Additional assessment (*i.e.*, seismic refraction and a subsurface boring program) should ensue to establish whether these troughs are associated with fractures in the bedrock that may influence the direction and orientation of the troughs.

The RI/FS should assess the feasibility of utilizing surface resistivity to determine the presence of the DAPL since the work plan states that the DAPL plume conductance properties have been a reliable indicator of the presence of DAPL in previous assessments and will continue to be used in the future RI/FS.

Maple Meadow Brook Aquifer

Some bedrock borings proposed at locations on the east side of the Maple Meadow Brook Aquifer seem to have been selected to assess the bedrock contribution to the headwaters of surface water tributaries. However, only two sets of additional monitoring well triplets are proposed downgradient in the Maple Meadow Brook Aquifer—on either side of the bridge crossing on Route 38, which is approximately 1,000 feet downgradient from the closest monitoring wells (GW-65S, D and R, installed in the overburden on a forested crossing over the brook). One of these monitoring wells, GW-65D (a deep well), indicated the presence of n-nitrosodimethylamine (NDMA) and bis-2-ethylhexyl-phthalate (BEHP) and is located at what appears to be the south wall of the buried valley aquifer, although the shape and width of the aquifer in this area remains unknown. These monitoring wells are at the edge of the MACTECH inferred extent of ground water impacts as shown on Figure 6.1-1 in the RI/FS Work Plan. A gravimetric survey should be conducted to establish the shape and dimensions of the buried valley aquifer. Also, additional monitoring wells should be installed along the approximately 1,000 foot zone of no data, to assess the propagation of contaminants downgradient in the buried valley aquifer (towards the drinking water supplies of Reading and North Reading) and to confirm the width of the buried valley aquifer. This information can be used to ensure that the contaminants are not bypassing the previous and proposed monitoring wells through a heretofore unmapped portion of the aquifer.

Supplemental Groundwater Modeling

Hydrology at the Olin Site is quite complex and dynamic, as changes in well pumping have demonstrably affected groundwater quality in the Town of Wilmington water supply wells over a relatively short period of time. Active pump and treat remediation is ongoing at the site, and an ill-defined groundwater divide across the site property complicates the flow of overburden groundwater across multiple watersheds. Further characterization of contaminant nature and extent will provide additional data to evaluate present “static” conditions. However, any number of plausible conditions could change groundwater flow patterns, and hence possibly the associated migration of contaminants. The present treatment system could be discontinued, pumping of the Town wells or other wells could be initiated, capping of areas could affect recharge patterns, surface water flows may be changed, *etc.*

To address these complexities and provide an ability to predict various water management options, we suggest the development of a hydrologic flow model for the site. We also recommend the collection of additional data to help establish and calibrate the model, including potential pump tests (perhaps using Town wells), hydraulic conductivity measurements, *etc.* We do not endorse the current plan to collect no additional site characterization data, and do not agree with the statement on FSP p 3-5 that reads, “The geologic, geochemical, and hydrogeologic conditions at the Site have been well characterized and do not require additional specific characterization in the RI to meet objectives stated in the SOW.”

Community Relations Support Plan

The Community Relations Support Plan (CRSP) is very generic, and although it provides a list of property owners that may need to be contacted for access (based presumably on historical contamination patterns, so there may be others), specific stakeholder groups such as WERC, the Town of Wilmington, Industri-Plex Site representatives, and known parties with potential interest in the Olin Site are not named. Although this is technically EPA’s responsibility in its Community Relations Plan, we suggest that the CRSP also develop such a list of relevant stakeholder contacts. Also, provisions could be included for more active stakeholder participation in technical meetings held in conjunction with EPA.



Minor comments

Table 3.1-1 Looking at the asterisk (*) footnote, the petroleum hydrocarbon fractions should also be designated as MCP constituents. A 2nd footnote for chemicals identified in Olin processes should be added, along with a 3rd footnote for chemicals that have drinking water maximum contaminant levels (MCLs).

Table 4.2-1 Some VOCs/PAHs on the parameter lists repeat due to EPH/VPH, 8360/8270. How will conflicts in results (if any) be resolved? Also, why doesn't the same overlap appear in Table 4.1-1, *i.e.*, why are there not target analytes reported for the EPH/VPH method? Might be because none were detected ...

p. 4-5, Fig. 4.1-6 If one is laying out grids, should there be at least one sampling point in each grid?

p. 4-5 Numbers of samples do not add up. Text claims 78 surface samples. Dark bullets account for 80 total samples. Open sub-bullets under the first bullet account for only 30 of the claimed 33 samples. This latter comment (30 v. 33) applies also to the text on p. 4-9.

Table 4.1-1 & 4.1-2 presumably reflect, and should indicate, only parameters detected at least once. Lists of parameters sought but not detected might also be helpful to readers.

p. 4-12 , Section 4.3.3 claims that "Samples will be analyzed for nonyl phenol, DMF, phthalic anhydride, and formaldehyde as outlined in Table 4.1-2." Table 4.1-2 in fact does indicate analysis for these parameters for the areas "Wetland Area South of South Ditch" or "Lower South Ditch Floodplain Soil." As before, the phthalic anhydride is not indicated for *any* soil samples in Table 4.1-2.