

November 19, 2003

Curt M. Richards
Vice President
Olin Corporation
P.O. Box 248
1186 Lower River Road
Charleston, TN 37310

DISAPPROVAL

RE: Comments on Supplemental Investigation Work Plan
Non-Public Properties Study Area
Hamden, Connecticut
Consent Order No. SRD-128

Dear Mr. Richards:

The Remediation Section of the Bureau of Waste Management (“the Department”) has reviewed the scope of study entitled, “Supplemental Investigation Work Plan, Non-Public Properties Study Area, Hamden, Connecticut,” dated July 2003, prepared for Olin Corporation by Malcolm Pirnie, Inc. and received on July 16, 2003 (“The Supplemental Work Plan”). The Supplemental Work Plan was submitted pursuant to paragraph B.3.b of Consent Order No. SRD-128.

As you are aware, pursuant to paragraph B.1.a, Olin Corporation must perform all investigations that the Commissioner deems necessary to determine the extent and degree of pollution of the non-public properties. Paragraph B.3.b requires that Olin Corporation submit a scope of study to further determine the extent and degree of soil, surface water and ground water pollution resulting from the disposal of waste materials at the site including the location and depths of ground water monitoring wells and soil and surface water sampling.

In general, the proposed scope of study described in the Supplemental Work Plan is not adequate to determine the extent and degree of soil, surface water and ground water pollution resulting from the disposal of waste on the portion of the site encompassed by the non-public properties. Some of the primary concerns we have with the Supplemental Work Plan are the following:

1. The Supplemental Work Plan does not include the proposed location or number of soil samples.
2. The Supplemental Work Plan proposes a sampling protocol that is not capable of determining whether there are additional disposal areas in the non-public properties portion of the site.

3. The parameters that are proposed to be analyzed in soil samples are not adequate to characterize the extent or degree of pollution resulting from waste disposal at the site.
4. There is insufficient information in the Supplemental Work Plan to evaluate whether the proposed locations of monitoring wells are appropriate to determine the extent and degree of ground water pollution resulting from waste disposal.
5. The proposal to evaluate alternative pollutant mobility criteria is insufficient to evaluate the quality of soil water in the vadose zone, a critical issue if Olin Corporation intends to propose less stringent pollutant mobility criteria.

Attached to this letter is a technical memorandum that describes in more detail the Department's comments and questions regarding the Supplemental Work Plan. In accordance with paragraph B.8 of Consent Order No. SRD-128, submit a revised scope of study for supplemental investigation of the non-public properties portion of the site for the Commissioner's review and written approval within 45 days of receipt of this letter. The quality assurance project plan for the scope of study must be submitted for the Commissioner's review and approval within 60 days of receipt of this letter. The revised scope of study and quality assurance project plan must address all of the comments in this Disapproval and the attached memorandum.

In addition, please verify that Raymond J. Horn, Principal Project Engineer, is a qualified individual pursuant to Section 22a-430-3(b)(2) of the Regulations of Connecticut State Agencies (RCSA) who can sign the document certification on behalf of Olin Corporation.

If you have any questions or comments regarding the Department's review of the Supplemental Work Plan, please contact me at (860) 424-3762 or Shannon Windisch Pociu of my staff at (860) 424-3546.

Sincerely,

Elsie B. Patton
Acting Director
Planning and Standards Division
Bureau of Waste Management

EBP:SWP

Attachment

cc: The Honorable Mayor Amento, Town of Hamden
David Silverstone, Regional Water Authority
Elizabeth Hayes, Newhall Coalition, Inc.
Representative Peter Villano

Technical Memorandum
Review Comments on “Supplemental Investigation Work Plan,
Non-Public Properties Study Area, Hamden, Connecticut,”
Prepared by Malcolm Pirnie, Inc.
Submitted by Olin Corporation
July 16, 2003

Section 1. Conceptual Site Model

1. The conceptual site model presented in Section 1.2 of the Supplemental Work Plan should more clearly identify the problem or issue, discuss the data quality objectives, evaluate the existing data in the context of the problem, and must identify data gaps. For this study one of the primary issues is where and what types of waste were disposed on the site. Therefore, the conceptual site model should evaluate the information, whether generated by Olin, DEP, or other responsible parties, on the site history, the types of waste disposed, the chemical and physical characteristics of the waste and how they vary, where such fill came from, the physical placement and location of the fill, and the affect such fill has had on the quality of soil, ground water and surface water. The result of such an evaluation would identify the gaps in your understanding of the extent and degree of pollution and logically lead to a more detailed discussion of the scope of work to collect the data necessary to fully characterize the pollution on the non-public properties.
2. The discussion of geology and hydrology in the conceptual site model contains statements and conclusions from a very limited data set. A conceptual site model should carefully distinguish between facts that are known and assumptions as to what is going on. The conceptual site model should evaluate the data in light of your data quality objectives.
3. The physical descriptions of each of the known fill areas should include a description of the nature of the fill in each area, a discussion of the chemical quality of the fill and a discussion of the data used to estimate the extent of the fill. For example, data from the Tabernacle Church shows that fill is significantly thicker at that site than your have depicted on Sheet 1 of the Supplemental Work Plan. The volume of waste in the neighborhood is something that will be of significance when evaluating remedial options, and therefore, the quality of the data used to estimate that volume should be evaluated in your conceptual site model. In addition, this section should include a discussion of the volume of fill that exists below the water table, including an evaluation of the data used to estimate that volume.
4. The purpose of the comparison of fill and soil with remediation criteria in the conceptual site model is not clear. Information should be provided on the range of sample concentration values, the magnitude of exceedances of criteria, and the location of the exceedances. Further, you should provide a discussion of whether the parameters tested included all the pollutants that may be in the waste or soil on the site and whether the number of samples is sufficient to characterize the variable

nature of the fill. In addition, please indicate whether the samples were analyzed at a fixed laboratory or were screened using x-ray fluorescence. Again, a discussion of data quality objectives and whether the data meet those objectives must be provided. Please explain how you are differentiating among “soil”, “sand” and “native soil” in the discussion. Also, note that the results of two soil samples collected from native soil underlying fill areas are insufficient to determine whether metals other than lead and arsenic have impacted the native soil throughout the non-public properties portion of the site.

5. The purpose of the comparison of ground water to criteria is, again, not clear. Please note that Olin’s ground water samples were only grab samples collected from temporary geoprobe borings and can be used as an initial screening. For determining compliance with the Remediation Standard Regulations (“RSRs”, RCSA 22a-133k-1 through 3), sampling permanent monitoring wells for a full suite of parameters is required. Also, in the Supplemental Work Plan please describe how the drought conditions that existed at the time Olin collected the grab groundwater samples from the geoprobe borings may have affected the sample results. The conceptual site model should describe what types of impacts that the various waste materials might have on ground water quality, how those impacts may vary with different hydrologic conditions, and then evaluate the existing data to determine if it is appropriate to determine whether such impacts have occurred. Again, the existing data needs to be evaluated with respect to the data quality objectives and the purpose of the investigation. Assumptions should be clearly identified as well as data gaps that exist in our understanding of the impact that waste disposal at the site has had on ground water quality.

Section 2. Scope of Work

Purpose and Approach

6. The statement of the purpose of the scope of study in Section 2.1 should be revised to reflect that the purpose is to define the three-dimensional extent and the physical and chemical nature of waste materials disposed on the site and to determine the extent and degree of soil, surface water and ground water pollution resulting from such waste.
7. Since the conceptual site model is not adequately described it is not clear that the approach described in Section 2.2 will achieve the purpose of the investigation described in Comment 6 above. In general, the Department agrees that 1) additional delineation of the perimeters of the five known areas of fill is necessary; 2) an investigation of the properties outside the known fill areas to determine if fill is present is necessary; 3) characterization of the surface soils within known fill areas is necessary; 4) characterization of the hydrogeology and ground water quality is necessary. However, we believe that additional characterization of the chemical quality and physical nature of the waste may be necessary. Further, we believe that characterizing the surface soils outside the known fill areas is also necessary as a

component of the investigation to determine whether other fill areas exist on the site. In addition, you should identify that the evaluation of an alternative pollutant mobility criteria is not necessary for determining the extent and degree of soil, surface water or ground water pollution but is instead something that you want to investigate with respect to the evaluation of remedial alternatives. In addition, you should identify whether there are any other investigation needs for evaluating possible remedial actions.

8. Please note that if ground water polluted by the waste disposed on the site migrates off the site, your investigation must characterize the extent of that plume. If that plume discharges to surface water beyond the extent of the non-public properties, then you will have to sample surface water. You may want to propose a surface water-sampling program that is developed after the ground water investigation is conducted. A phased approach to the issue of whether the waste disposed on the site has affected surface water quality is acceptable.

Fill Perimeter Investigation

9. The proposal to investigate only those properties that that you have highlighted as intersecting the edge of fill as currently understood should be revised. For example, there is existing data that indicates waste is present on 214, 300 and 304 Morse Street and these properties are not highlighted. In addition, 216, 220, 279, 283, 311, 315, and 319 Morse Street, as well as 61, 69 and 73 Marlboro Street need to be included in the perimeter investigation.
10. The Department agrees that the investigation of the perimeter of the known disposal areas should be an iterative process, however, the Supplemental Work Plan should be revised to include the locations that you propose to initiate the effort.
11. The proposal to analyze surficial soils in the fringes of the fill areas for only lead and arsenic should be revised. While testing for indicator parameters is appropriate for screening purposes, the determination that waste or polluted soil resulting from waste disposal is not present on the site is such a critical decision that we must have a high degree of confidence in the data used to make that decision. Therefore, the samples that document the edge of the fill must include samples that are analyzed for the full suite of compounds that can reasonably be found in the waste materials. In addition, you should evaluate the need to include analyzing polynuclear aromatic hydrocarbons (PAHs) in the screening samples.
12. Please provide the rationale for sampling the 0 to 6-inch samples on the fringe of the disposal area, and then analyzing the 18 to 24-inch sample only if lead or arsenic exceeds the direct exposure criteria in the surface soil sample. Shouldn't the sampling depth be tied to the depth that the known fill pinches out? Further, do not assume that if a surface soil sample meets RSR criteria, then waste material or soil or ground water pollution is not present at greater depth at the site.

Investigation of Properties Outside the Known Fill Areas

13. You must provide greater detail on the investigation of properties outside the known fill areas to determine the presence of fill. You are proposing, as a first step, only to inspect the properties outside the known areas of fill and map the areas where bare soil or fill is observed. You would then recommend further investigation. Please provide an explanation as to how the results of your inspection would be used to recommend additional investigation. We believe that your initial steps should include a boring program, soil sampling and analysis. While the analytical protocols can include screening for indicator parameters, to document that an area is beyond the extent of any waste, samples should be analyzed for the full suite of compounds that may be present in the waste.

Characterization of Bare Spots Within the Fill Area

14. The analytical program for samples collected from surface soils within the known fill areas should be expanded to include PAHs.

Pollutant Mobility Criteria Method

15. The scope of work must provide a more detailed discussion of the rationale for the column studies and the hydrologic model. Under RCSA Section 22a-133k-2(d)(3) the Commissioner may approve an alternative pollutant mobility criteria provided it is demonstrated that the alternative criteria will ensure that soil water in the unsaturated zone will not exceed the ground water criteria for the substances of concern. It is our understanding that the hydrologic model that you are proposing to use does not evaluate the chemical and physical processes in the unsaturated zone.
16. The scope of work must provide the rationale for the column studies or, in other words, a conceptual model for the unsaturated zone. That rationale should explain how the data generated by the studies will be used to evaluate what the range of concentrations of pollutants in the soil water is likely to be, given the variability of the fill material and the variability of soil conditions on the site.
17. In addition, describe how the column locations will be selected and how the variety of fill compositions will be represented. In cases where the fill thickness exceeds five feet, how will the portion of the fill profile to be tested be determined? Analyses of physical parameters such as permeability, porosity, and bulk density cannot be completed on homogenized, duplicate fill cores because the fill structure will have been altered. More detailed information on the artificial precipitation (i.e., chemical characteristics) and application rate must be provided. The leachate generated during the column testing must be analyzed for all constituents of concern attributable to the fill materials.

Groundwater Investigation

18. The conceptual site model for groundwater flow makes assumptions about the direction of flow, and based on those assumptions you have proposed locations for monitoring wells. Please provide more detail on the data you have used to make your assumptions on the direction of flow.
19. Detailed information on the rationale for placement and depth of deeper wells within proposed monitoring well clusters as well as the construction of the proposed monitoring wells must be provided.
20. You have proposed a number of wells that are intended to monitor upgradient background ground water quality. Yet those wells are all downgradient of known waste on the public properties. Such wells should not be considered suitable for characterizing background. Please explain how you will characterize background conditions.
21. The analysis of the four quarterly rounds of monitoring data must include metals, semi-volatile and volatile organic compounds, pesticides, ETPH, and leachate indicator parameters. Parameters that do not exceed criteria cannot be dropped from the analytical list for the second two rounds of sampling.

Section 3. Report Deliverables

22. Please submit a Quality Assurance Project Plan (QAPP) within 15 days of providing a revised Supplemental Work Plan to DEP for review.
23. The purpose of the QAPP is not “to describe the investigation activities in sufficient detail such that the data generated will be of a known and acceptable level of quality and accuracy.” The detailed investigation activities must be addressed in the Supplemental Work Plan. The QAPP documents the planning, implementation, and assessment procedures of, and how specific quality assurance and quality control activities will be applied during a particular project. Refer to the U.S. Environmental Protection Agency’s December 2002 document, *Guidance for Quality Assurance Project Plans* (EPA QA/G-5), for further information.
24. In the QAPP, please identify and describe what functional data validation procedures will be used.
25. Additional information on the *RapidScreen* dioxin/furan assay, such as the specified target point, must be provided in the QAPP.

Section 4. Project Schedule

26. You must revise the project schedule shown in Figure 3. The Bare Spots Investigation should occur as soon as possible. The Department will require more than 1 month to review the final investigation report. The scheduling of public availability sessions will be determined by the Department as part of the Public Involvement Plan for the site.

Other Comments

27. The description of the regulatory status is incomplete. Please note that unilateral Order No. SRD-128 was issued by the Department to Olin Corporation and three other potentially responsible parties on July 10, 2001 and was subsequently appealed by all parties. Consent Order No. SRD-128, included in Appendix A to this Supplemental Work Plan, was accepted as a final decision of the hearing officer on April 16, 2003, and is the enforcement document that is currently in effect.
28. All drill cuttings and development water must be containerized and disposed at an off-site location. No well development or purge waters may be discharged to the ground surface.
29. Please identify the five fill areas by name on Sheets 1, 2 and 3. All existing and proposed soil sampling and boring locations must be shown on sheets. Ground water contours must be depicted on the sheet showing existing and proposed ground water monitoring well locations.