STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

July 6, 2010

APPROVAL

Mr. David M. Share
Director, Environmental Remediation
Olin Corporation
3855 North Ocoee Street, Suite 200
Cleveland, Tennessee 37312

Subject: **Documentation of Compliance with RSR Criteria for Fill and Request for Alternative PMC and DEC Criteria**
Non-Public Properties, Newhall Street Neighborhood
Hamden, Connecticut

Dear Mr. Share:

The Remediation Division of the Connecticut Department of Environmental Protection ("the Department") has reviewed the reports titled "Documentation of Compliance with RSR Criteria for Fill and Request for Alternative PMC and DEC Criteria, Non-Public Properties, Newhall Street Neighborhood, Hamden, Connecticut," dated May 18, 2010, and "Hamden Non-Public Properties, Groundwater Data Evaluation Relative to Fill Leaching Potential, Newhall Street Neighborhood (SRD-128)," dated January 2, 2007 (the "reports"). The reports were prepared by MACTEC Engineering and Consulting, Inc., and were submitted by Olin Corporation in conjunction with Consent Order SRD-128.

The reports provide a discussion on how the cleanup plan for the non-public properties within the Newhall Street Neighborhood Remediation Project in Hamden (the "site") achieves compliance with Sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies (commonly referred to as the Remediation Standard Regulations (RSRs)) promulgated in January 1996. The Department's Remedy Selection Plan for the site, dated October 2007, indicated that amendments to the RSRs were being made, some of which would relate to portions of the remedy selected for the site. In June 2009, the Department decided to postpone the regulation amendment process for the RSRs. As a result, Olin submitted the reports to document that the selected remedy would achieve compliance with the RSRs, with the use of alternative Direct Exposure Criteria (DEC); an alternative means of demonstrating compliance with the DEC; an alternative Pollutant Mobility Criteria (PMC); and, an alternative means of demonstrating compliance with the PMC.

The site encompasses over 300 individual properties, mostly residential, on approximately 15 blocks. A review of the site history reveals that the area was once comprised of wetlands and low-lying areas. Filling of these areas was encouraged by public officials beginning in the late 1800's to eliminate mosquito breeding areas, as the predominant human health concern at

the time was the threat of illness transmitted by mosquito bite. The matrix of the fill subsequently deposited at the site is comprised of a mixture of ash, slag, coal waste, batteries, and other industrial and household-type trash.

The primary contaminants of concern associated with the waste fill in the non-public properties are heavy metals (primarily lead and arsenic), and polycyclic aromatic hydrocarbons (PAHs) which are a group of compounds associated with the byproducts of combustion. Much of the fill contains these contaminants at concentrations that exceed the Residential Direct Exposure Criteria (RDEC) and the Pollutant Mobility Criteria (PMC) of the RSRs.

The remedy selected for the site includes: the excavation of historically deposited waste fill from within the top four feet of soil; backfilling excavated areas with clean soil; restoring all features such as trees, shrubs and fences that are removed or otherwise destroyed during the excavation of waste fill; and management of waste fill deeper than four feet by a combination of local building permits, a soil management protocol, a local zoning district, and a $2 million fund (to be established by Olin Corporation and the Department) to pay for any future costs of handling waste fill in accordance with the soil management protocol. The cleanup plans for the site, and the public properties located within the Newhall Street Neighborhood, are outlined in the Department's Remedy Selection Plan, dated October 2007. The plans and specifications for implementing the site remedy are presented in Olin Corporation's Generic Remedial Action Plan, dated August, 19, 2008 and conditionally approved by the Department on October 6, 2008.

The discussion below outlines the RSR criteria that are applicable to the waste fill, and the demonstration on how the remedy achieves compliance with these criteria.

Soil-

a. Direct Exposure Criteria

Olin proposes to use as alternative DEC the draft 2008 DEC that DEP developed during its RSR amendment advisory committee process. Though DEP postponed the RSR amendment process, Olin proposes to use the draft DEC for this site's primary contaminants, which includes lead at 400 parts per million (ppm) in soil (compared to the RSR value of 500 ppm).

The primary route of human exposure to the contaminants in the waste fill is from direct contact. More specifically, soil particles adhered to fingers or carried through the air as dust may contact food items and be unintentionally ingested. Waste fill located within the top four feet from ground surface is available for routine current contact by residents through activities such as lawn care, gardening, playing, tree/shrub planting, installation of fences, construction of walkways, patios and decks, and similar activities. The site remedy will remove waste fill located within the top four feet from ground surface, and restore the properties to original grade with clean, natural fill and topsoil from a borrow source approved for use by the Department in a letter to Olin dated June 23, 2010.

Waste fill present in soil deeper than four feet does not present a current, routine exposure risk. Though it may present a future exposure concern if contacted during deep excavations below four feet, such as excavations for a home addition or a below-ground swimming pool. The site remedy for this potential future exposure to waste fill below four feet is a combination of local building permit, a soil management protocol associated with the building permit, a local design district, and a $2 million fund to pay for any future costs of handling waste fill in accord with the Soil Management Protocol. Collectively, this is a control that ensures the deep waste fill will be property managed if and when unearthed in the future and prevents human contact with the deep waste fill.

The 2008 draft DEC is an alternate DEC, and the remedies are an alternative method of demonstrating compliance with the alternative DEC, pursuant to Section 22a-133k-2(d)(2) of the RSRs, which states, in part, "the Commissioner may approve an alternative direct exposure criterion and an alternative method for determining compliance with such criterion provided it is demonstrated to the satisfaction of the Commissioner…that the application of such alternative criterion at the subject release area will protect human health and the environment…".

b. Pollutant Mobility Criteria

Generally, contaminants in soil may pose a threat to the environment by the ability of contaminants to leach into underlying groundwater. A significant number of soil samples were collected from the site, and many contained contaminant concentrations at levels that exceed the Pollutant Mobility Criteria (PMC) of the RSRs. The objective of the PMC is to reduce the potential for contaminants found in soil located above the water table to be mobilized and transferred to groundwater and surface water, thereby protecting the quality of these resources. Although there is an abundance of laboratory data showing the waste fill has the potential to leach contaminants, in this case, Olin requested an evaluation of the net impact the fill has on groundwater quality due to facts such as the waste fill is wide spread throughout the site, has been in place for upwards of 100 years, and has been largely available to infiltration of precipitation. In addition, recent groundwater sampling demonstrates that the groundwater quality in the non-public properties portion of the site is relatively unaffected by the waste fill.

The alternative PMC and alternative method of demonstrating compliance with the PMC for GB areas, as requested by Olin, is Section 22a-133k-2(d)(5) of the RSRs, which states, in part, "the Commissioner may approve an alternative pollutant mobility criterion and an alternative method for determining compliance with such criterion at such release area, provided it is demonstrated to the Commissioner's satisfaction that the application of such criterion will ensure that soil water at the release area, after dilution with ground water derived from infiltration on the parcel, will not exceed the ground-water protection criterion for such substance."

For contaminants in soil that exceed the PMC, the alternative method compared groundwater monitoring results to the Groundwater Protection Criteria (GWPC) of the RSRs. The main portion of the site (the areas south of Mill Rock Park and Rochford Field) is located in an area where groundwater is classified as GB, denoting groundwater quality that is presumed to be impaired and not suitable for drinking without treatment. Analytical testing of groundwater from the down gradient area of this portion of the site found all but two contaminants meet the GWPC. The two exceptions are PAHs and extractable total petroleum hydrocarbons (ETPH).

The 95% upper confidence level (UCL) was calculated for ETPH concentrations detected in down gradient groundwater samples, and compliance with the GWPC is achieved for the constituent. ETPH collectively represents compounds found in petroleum products such as motor oil and asphalt. As for PAHs detected in groundwater, the 95% UCL calculation did not demonstrate compliance with the GWPC. Again, PAHs are associated with the byproducts of combustion. This group of contaminants characteristically has an affinity for soil particles and is not prone to dissolve in groundwater. Additionally, the frequency with which PAHs were detected in groundwater beneath the site was inconsistent. PAH impact to groundwater may be attributed to numerous sources other than the waste fill. For example, storm water that runs off paved surfaces typically accumulates PAHs from vehicle fluids that have dripped on the pavement, and/or the pavement itself. The down- gradient monitoring wells for evaluating groundwater quality within the site were installed within public rights of way, and immediately adjacent to paved streets and parking lots, due to access constraints within the site. The storm water runoff from the paved surfaces is directed to catch basins that allow PAH impacted storm water to infiltrate the ground, in the immediate vicinity of the monitoring wells. Regardless of the actual source of the PAHs in groundwater, and the conjecture of sources beyond the waste fill, the concentrations are very low, and do not exceed two times the respective GWPC. Also, to the extent PAHs in groundwater are attributable to the waste fill, the removal of the top four feet of waste fill throughout the site (totaling approximately 100,000 cubic yards of waste fill), and replacement with clean, natural fill and topsoil from a borrow source approved for use by the Department will cause an improvement in groundwater quality. As such, the Department is satisfied that the remedy will ensure that soil water, after dilution with ground water derived from infiltration on the site, will not exceed the groundwater protection criteria for PAHs.

The properties located in the north area of the site (Augur, Remington & Harris Streets) were evaluated independently for compliance with the PMC as the groundwater flow regime beneath that area is generally toward the north, toward Pine Swamp. Also, the groundwater quality is classified as GAA, denoting a groundwater that is contributing to a drinking water supply area. In such areas, the Department's goal is to maintain high quality drinking water and protect a public resource. In this area of the site, groundwater quality meets the GWPC. The alternative PMC and alternative method of demonstrating compliance with the PMC in a GAA area is provided under Section 22a-133k-2(d)(3) of the RSRs, which states, in part, "the Commissioner may approve an alternative pollutant mobility criterion and an alternative method for determining compliance with such criterion, provided it is demonstrated to the Commissioner's satisfaction that the application of such criterion will ensure that soil water at the release area will not exceed the ground-water protection criterion for such substance."

For both portions of the site, the 95% UCL of the concentrations of leachable substances in the waste fill are proposed as the alternative PMC.

Groundwater and Surface Water -

Groundwater beneath the main portion of the site is not utilized for drinking purposes. As stated earlier, the groundwater beneath this area is classified as GB denoting a water quality that is presumed degraded and not suitable for drinking without treatment. As such, the environmental goal for groundwater quality, under the applicable sections of the RSRs, is to achieve compliance with the Surface Water Protection Criteria (SWPC). A small fraction of groundwater samples obtained from beneath the site show a modest exceedance of the SWPC. However, groundwater flowing from the site travels at a slow rate over a significant distance before discharging to a surface water body. Given the extensive time and distance the groundwater must flow, constituents in groundwater naturally attenuate (degrade) and are diluted prior to discharge. Thus, substances detected in groundwater from the main portion of the site are compliant with the SWPC.

For the north portion of the site with the GAA groundwater classification, the environmental goal under the applicable sections of the RSRs is to achieve compliance with the GWPC. As stated earlier, substances in groundwater obtained from the north area of the site show compliance with the GWPC.

The Department hereby approves the reports, and the alternative criteria and alternative means of demonstrating compliance with the RSRs as presented therein.

In accordance with paragraph B.3.f of Consent Order SRD-128, within 30 days of the date of this letter, Olin must submit a plan for post-remedial groundwater monitoring for the Commissioner's review and approval, and a schedule for performing the approved monitoring. Since compliance with the applicable groundwater and surface water criteria has been demonstrated prior to the remedy construction, the purpose of the post remediation groundwater monitoring will be to demonstrate the trend in groundwater quality following cleanup of waste fill.

Nothing in this approval shall affect the Commissioner's authority to institute any proceeding, or take any action to prevent or abate pollution, to recover costs and natural resource damages, and to impose penalties for violations of law. If at any time the Commissioner determines that the approved actions have not fully characterized the extent and degree of pollution or have not successfully abated or prevented pollution, the Commissioner may institute any proceeding, or take any action to require further investigation or further action to prevent or abate pollution. This approval relates only to pollution or contamination identified in the above referenced report.

In addition, nothing in this approval shall relieve any person of his or her obligations under applicable federal, state and local law.

If you have any questions pertaining to this approval, please contact Raymond Frigon, Jr. of my staff at (860) 424-3797.

Sincerely,

Patrick F. Bowe
Director
Remediation Division
Bureau of Water Protection and Land Reuse

PFB:rlf

c:
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