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New York State Department of Environmental Conservation

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John P. Cahill
Commissioner

February 8, 1999

Ms. Gayle M. Bahn
Olin Chemicals
P.O. Box 248
Lower River Road
Charleston, TN 37310

Re: Olin/Arch Chemicals (#828018a) - 100 McKee Road, Rochester (C)
- **Outstanding FS Issues**
- **Quarterly Reports #16 and #17 (#20 and #21)**

Dear Ms. Bahn:

Thank you, as well as Messrs. Bellotti and Eschner, for meeting with Mary Jane Peachey and me on January 21, 1999. We understand that, under a corporate restructuring, Olin is transferring the Rochester plant and its obligations to a newly-formed company, Arch Chemicals, Inc., and that you are taking over the remedial project management duties for this site from Mr. Bellotti. You stated that Olin/Arch is eager to move this project forward; the Department certainly shares this objective. Toward this end, I briefly reiterated some outstanding FS issues at our meeting. These issues are detailed below (including the text of the 7/11/98 Craft to Bellotti e-mail) and are followed by comments on the recently-received quarterly reports #16 and #17 (apparently misnumbered; actually #20 and #21). With your timely response and resolution of these issues, the RI/FS/ROD process can be completed and our mutual goal of an effective remedy implemented.

Major Outstanding FS Issues:

1. Source Area Remediation

As discussed briefly at our meeting, the Department requires active source remediation at sites with significant source contamination. This policy is consistent with USEPA policies and directives even where groundwater restoration is considered technically impracticable. As noted in USEPA Office of Solid Waste and Emergency Response (OSWER) Directive 9234.2-25, Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration (September 1993; p. 13):

"Remediation of contamination sources is critical to the success of aquifer restoration efforts. Continued releases of contamination from source materials to ground water can greatly reduce the effectiveness of aquifer restoration technologies, such as pump-and-treat, which generally are effective only for removing dissolved contaminants...A demonstration that ground-water restoration is technically impracticable generally should be accompanied by a demonstration that contamination sources have been, or will be, identified and removed or treated to the extent practicable...Even partial removal of contamination sources can greatly reduce the long-term reliance on both active and passive ground-water remediation."

An appropriate and effective remedy demands source (DNAPL) treatment; the FS must objectively evaluate all feasible options. Some source treatment technologies (e.g., chemical oxidation, vapor extraction) appear to have been discounted prematurely in the draft FS and subsequent correspondence. Treatability studies have traditionally been used in the FS process to address uncertainties; both bench-top and pilot-scale studies can be helpful and are frequently used to assess site-specific concerns. Given the complex mixture of VOCs and SVOCs at the Olin/Arch site, thermally-enhanced extraction technologies (e.g., steam-/electrical-/RF-/chemical oxidation-heating coupled with single or dual-phase vapor extraction) should be carefully and thoroughly evaluated. Areas of high contaminant levels, such as at the overburden/bedrock interface, should receive particular attention. Such evaluations will require the physical properties of the contaminants; as requested previously, please provide all properties (e.g., water solubility, boiling point, melting point, density, octanol-water [K_{ow}] and organic carbon [K_{oc}] partition coefficients, vapor pressure, and Henry's law constant) for chloropyridines known and/or available to Olin/Arch.

2. Assessment of Hydraulic Containment

Hydraulic containment of groundwater contamination emanating from the Olin/Arch site has been an ongoing concern and objective since the discovery of offsite contamination in the early 1980s. Olin began pumping from 2" overburden wells in 1983 and added bedrock wells in the late 1980s and the mid-1990s. Treatment capacity has at times been a constraint for the volume of extracted groundwater and optimization of the recovery system. What is the capacity of the plant treatment system and what percentage of the treated wastes is extracted groundwater? If the plant cannot handle present or potential volumes of extracted contaminated groundwater, then groundwater treatment should be addressed in the FS including expansion/modification of the treatment plant.

Given that groundwater extraction and treatment will be a primary remedial technology, key concerns include:

- Has hydraulic containment of contaminated groundwater been achieved?
- What are the criteria to prove containment?
- Has the pumping system achieved steady-state conditions; what are the criteria?
- If the problem is not contained, can the current system be optimized or augmented (can vertical wells provide containment in a highly heterogenous and anisotropic fractured bedrock aquifer or will a blasted trench be necessary)?

One criterion for hydraulic containment will be declining levels of contaminants and ultimately attainment of groundwater standards off-site. Since trends in groundwater contaminant concentrations will be critical to evaluating the ongoing effectiveness of hydraulic containment system, quarterly data for chloropyridines and VOCs will be needed for key onsite (e.g., B-17, BR-101, PZ-106, PZ-107) and offsite (e.g., BR-105, BR-105D, BR-106, BR-106D, PZ-104, BR-124D) wells. Semi-annual sampling is indicated at other wells (e.g., B-6, E-1, E-3, SB-3, BR-3, BR-5A, BR-6, BR-7, BR-8, BR-102, NESS-E, NESS-W and well clusters 104, 108, 112, 113, 114). All other monitoring wells installed by Olin should be sampled annually. Graphical analysis of existing and future data would be useful to assess the performance of the onsite hydraulic containment system and the migration patterns of offsite contaminant plumes.

3. July 11, 1998 Electronic Mail (J. Craft to M. Bellotti)

From: James Craft
To: internet:corp.olin.com:mjbellotti
Date: 7/11/98 7:36 AM
Subject: OLIN - Rochester - FS issues

Mike:

I've been remiss in contacting you regarding your 5/11/98 response to my 1/6/98 letter (outstanding FS issues). It appears that considerable disagreement remains between Olin's and the State's technical teams on feasible remedial approaches and other issues. While your summary letter presented a number of arguments against active source area remediation (other than pump-and treat), the State believes that some of the arguments were somewhat one-sided and that some remedial technologies were dismissed prematurely.

However, it is clear that groundwater extraction and treatment will be a primary remedial technology and the foundation of any remedy finally selected. Your proposal to augment the system with source area pumping appears sound; it may be possible to implement dual-phase extraction in this area and increase contaminant removal. Given the major remedial role of groundwater pumping and treatment, perhaps the biggest outstanding issue is: Has hydraulic containment of contaminated groundwater been achieved and what are the criteria to prove it?

Below, I'll touch on some of the major outstanding issues, most of which were raised in the 1/6/98 correspondence. If you could provide some feedback in these issues, I can provide you with a more thorough response in the near future. In the meantime, a working technical meeting might be useful to reach consensus on some of these issues.

Proposed 1998 Environmental Monitoring Plan

The proposed 1998 monitoring plan appears adequate for surface water (quarterly at established canal and quarry locations) but the proposed annual groundwater sampling at just the three newly-installed offsite wells is inadequate. Certainly, a considerable database has been established but clearly, further monitoring is needed to assess the performance of the onsite hydraulic containment system and the migration patterns of offsite contaminant plumes. Since trends in groundwater contaminant concentrations will be critical to evaluating containment system effectiveness, the Department recommends semi-annual (at a minimum; quarterly may become necessary in some areas to assess

trends) groundwater monitoring for chloropyridines and VOCs at key wells (key offsite well clusters include 104, 105, 106, 107, NESS-E, NESS-W; key onsite wells include B-17, B-6, E-1, E-3, SB-3, BR-3, BR-5A, BR-6, BR-7, BR-8, BR-102, BR-101). All other monitoring wells installed by Olin should be sampled annually (provide justification if certain wells are considered unnecessary).

What is Olin's response on this issue?

Remedial Planning Issues

DNAPL Extraction Feasibility - The State maintains that within the unsaturated zone, vacuum (single and dual-phase) extraction technologies and enhancements (soil heating, steam injection, ozonation, etc.) are potential technologies for DNAPL removal particularly in areas where the bedrock hydraulic containment system has dewatered the overburden and bedrock. Your summary report states that a only very small fraction (about 1%) of DNAPL can be removed by vaporization; this estimate appears to reasonable for static equilibrium but not induced dynamic conditions.

Within the saturated zone, the Department concurs that extraction of DNAPL below the water table would be very difficult (although air sparging and dual-phase extraction are potential technologies) but insitu destruction of DNAPL and dissolved-phase contaminants by chemical oxidation is a potential remedial technology. While Olin's discussions with one vendor and a DOE researcher were discouraging, other vendors were more upbeat (e.g., In-Situ Oxidative Technologies, Inc. (609-275-8500) markets the "ISOTEC" process of catalyzed hydrogen peroxide to treat organic contaminants in soil and groundwater). The potential for upgradient injection/infiltration galleries (and if needed, angled or horizontal borings) may obviate the concern, expressed by Olin, that existing and planned buildings may preclude source area remediation.

Effectiveness of the On-site Groundwater Recovery System

Olin stated that the pumping system had not yet achieved steady-state conditions; is the pumping system in equilibrium yet and what are the criteria? Has the system achieved hydraulic containment and how can it be demonstrated.

Has verification of the MODFLOW model been attempted with comparison of modeled data to actual pumping drawdown data and to seasonal changes in water levels?

Regarding the groundwater flux calculations, please provide the values (cross-sectional area, K, hydraulic gradient) in the calculations. What is the flux (volume/time) of groundwater under the site? How does this volume compare to the volume extracted by the groundwater containment system?

The plant treatment system is said to be at capacity; what is the capacity of the system? During negotiations over the RI/FS work plan some years ago, Olin stated that the plant carbon beds would be used for groundwater treatment and hence would not be addressed in the FS; was the groundwater volume underestimated or has the plant waste stream increased or both?

What is the status of stormwater management at the Olin plant?

Physical/Chemical Properties of Chloropyridines

Basic physio-chemical data (e.g., solubilities, partitioning coefficients, vapor pressures, Henry's constants, densities, viscosities, and boiling points) for chloropyridines were again requested in order to:

- assess *soil cleanup objectives*
- *human (public and worker) health risk factors;*
- *bioaccumulation in fish species*;
- *contaminant fate and transport* and;
- *the feasibility of remedial technologies.*

Olin's previous response was that the requested data are not likely to be useful for this purpose. It is not clear which of the above purposes is referenced but the needs are real. Solubility in water, for example, is a key parameter which can be used to estimate partitioning coefficients which, in turn, are used to determine soil cleanup objectives and to assess fate and transport (both needed for the Record of Decision). Solubilities are also useful to estimate maximum potential concentrations in groundwater and proximity to source areas. Parameters such as vapor pressure, Henry's constant, and boiling point are used in remedy feasibility and selection analysis. To complete a feasibility study without the main contaminants' physiochemical properties appears inconceivable; how was Olin's proposed choice of air stripping for groundwater treatment evaluated without these parameters? To present the findings of this study to the public without such basic properties also appears inconceivable. Most of these properties could be readily obtained by a reasonably equipped laboratory and frankly it's difficult to believe that the company that produces these chemicals is unaware of their physiochemical properties. These data are needed; if Olin is unable to determine or unwilling to provide these properties, please provide specific explanations.

Given the apparent inertness of chloropyridines as stressed by Olin at our February meeting, the potential for the bioaccumulation of these compounds is a concern. Is Olin aware of or has Olin conducted any studies in this regard? This issue may require some further study and further points to the need for data on fundamental properties.

Other Source Areas

Data indicate distinct source areas in the vicinity of the lab sample disposal area and BR-101 (these areas are upgradient of the main source area and groundwater concentrations isopleths show closure about these points). It is agreed that analytical data to date have not defined these source areas; further characterization efforts (e.g, a tight soil gas and soil sampling grid) appear necessary in the remedial design phase. Are any monitoring points available to assess groundwater quality in the lab sample source area?

Finally, in a telephone conversation last January, you noted the occurrence of chloropyridines at the Beehler-Radford (#828054) site as part of your consultant's investigation of possible other sources of chloropyridines to the Erie Barge Canal. You also noted that Olin has detailed disposal records; could you provide the disposal locations and estimated amounts of Olin wastes?

Quarterly Reports "#16 and #17" (#20 and #21)

The 3rd and 4th quarter reports for 1998, which were received on 1/22/99, appear to have been misnumbered (#16 and 17 should be #20 and 21, respectively). Henceforth these reports should provide an operation and maintenance summary for the remedial systems in place including the total groundwater recovered and treated (cumulative and quarterly), estimates of mass removed, the pump rate at each pumping well, and any downtime or problems with the groundwater recovery system and its individual components. Also, any anomalies in reported data should be emphasized and explained. For example, the extremely high levels of chloroform (430 ppm), carbon tetrachloride (310 ppm), and carbon disulfide (98 ppm) at PZ-106 should be explained (a DNAPL source must exist nearby; has a spill occurred recently?) and an interim remedy proposed (e.g., pumping the well to prevent migration). Similarly, BR-101 continues to show high levels of toluene (26 ppm), chlorobenzene (14 ppm), methylene chloride (12 ppm), among other contaminants; this area must be addressed in the FS. Regarding the 11/98 bedrock piezometric map, why is groundwater elevation data from BR-6 and BR-6A missing; this area is critical to hydraulic containment.

Please provide a written response within 30 days on each of these issues. I look forward to working with you in quest of an effective remedy at the Olin/Arch site.

Sincerely,

James Craft

James H. Craft
Engineering Geologist

c: M.J. Peachey, S. Shost, NYSDOH; J. Moloughney, J. Albert, MCDOH; M. Desmond, M. Bellotti, Olin