

May 9, 2014

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Re: Chestertown Concerns About Hospital's Ivey-Sol Pilot Test Plan
ALWI Project No. KE3N109

Dear Mr. Bauer:

As an element of continuing professional services we are providing to the Town of Chestertown (the Town), Advanced Land and Water, Inc. (ALWI) has summarized our concerns (as well as those of the Town) and current recommendations with respect to the proposed Ivey-Sol pilot test discussed when we met together, on April 15.

On April 24, Mr. George (Bud) Ivey participated in a teleconference with Bob Sipes of the Town and the undersigned, during which several technical questions were asked and addressed. Later that day, Mr. Ivey circulated an email summary of that teleconference. While it serves as a good summary of the technical issues discussed, Mr. Sipes and I both feel it mischaracterizes our overall satisfaction with the pilot testing plan as it now exists. Distinct concerns remain unaddressed.

This letter was prepared to summarize the chief unaddressed concerns and unanswered questions, as of this juncture. They include but are not necessarily restricted to the following:

1. **Financial Assurances / Guarantees-** The Town seeks an enforceable legal means, such as a bond, to fund investigation, remediation and/or replacement of supply well(s) jeopardized or contaminated by the Hospital and/or its remedial efforts, whether in connection with Ivey-Sol or otherwise. We understand that the Town's and Hospital's attorneys may be the ones to address this concern and requirement with greater specificity.
2. **Hydrologic Control During Ivey-Sol Pilot Injection-** Bud Ivey explained that pilot testing could occur and could provide meaningful data, whether or not pump-and-treat remediation continued during pilot testing. The Town would feel more comfortable if the cone-of-depression now apparent on various maps that have been circulated remained a reflection of actual water table conditions during the whole period of Ivey-Sol pilot testing. Keeping that measure of artificial hydrologic control, operational at all times, simply is more protective than not doing so. If the Hospital and/or MDE continue to countenance a pilot test wherein the remedial pump-and-treat is turned off, even briefly the Town is concerned that several and possibly many/most of the now-existing injection, monitoring and/or recovery wells have tops-of-well-screens too deep to see and intercept free-phase liquid hydrocarbon that may be liberated during the Ivey-Sol pilot testing process.
3. **Concern over Efficacy of Ivey-Sol and Released Contaminant Removal (After Injection)-** The Town feels that the representation that Ivey-Sol and its liberated diesel contaminants will be 100% removed during the "pull" phase of "push-pull" deployment lacks substantiation. Best would be a full and accurate understanding of how this is known. The Town conceptualized a program wherein dyed water was "pushed" and then "pulled" to demonstrate the radius of influence and recapture effectiveness, in advance of actual Ivey-Sol deployment. Similarly, we at ALWI thought of using dyed water as the Ivey-Sol dilution agent. In either case, removal of all of the detectable dye (versus not) could help illustrate what otherwise seems a mere representation without clear supporting facts. In its revised work plan, the Hospital should propose precisely how it intends to monitor and thus know, that full Ivey-Sol (and released contaminant) recapture has occurred during the "pull" phase.

This concern lessens but is not eliminated with continuance of the pump-and-treat throughout the push-pull process.

4. **Better Hydrogeologic Characterization** - We and the Town feel that there is need and basis for better hydrogeologic characterization. As aforementioned, Bud Ivey did not address our continuing concern about the shallowness of groundwater levels and the depths of the existing screens. The Town remains concerned that liberated product will go undetected past one or more monitoring wells because their screens are set too deeply to intercept free-phase liquid hydrocarbon if liberated. The available cross-sections, printed at poorly legible scales and absent reference maps (or not provided to the Town), illustrate this concern plainly.
5. **Timing/Scheduling of Ivey-Sol Pilot Testing**- We understand that the Hospital seeks for testing to occur soon, during the 2014 high-groundwater-levels season. We have recommended to the Town that spring 2014 Ivey-Sol pilot testing occur only while the hydrologic control achieved by current pump-and-treat continues unabated and/or only if several additional monitoring wells with shallower well screens first are installed. We recognize that there may not be time for installing such wells before groundwater levels naturally decline, but Bud-Ivey's suggestion that such additional wells be installed only before more full-blown Ivey-Sol deployment seems unnecessarily risky. They should be installed now. Another option may entail delaying pilot testing until prevailing groundwater elevations are lower in the fall, but this may lessen the remedial efficacy at shallow horizons. In any event, the revised work plan should clearly and unequivocally address how the water table in the contaminated area will be and will remain against the screens of monitoring wells, before, during and after Ivey-sol pilot testing.
6. **Concerns About Plume Extent, Two-Year Travel Time Calculation and Basis** - The Town feels that the extent of the plume is not known with certainty and that the basis for the two-year travel time determination be presented with documentary support. By way of example, the Town feels that the appearance of product in wells across Brown Street and all the way to Monitoring Well 18 on Campus Avenue, following an experimental turn-off of the system by the consultants for the Hospital two years ago, supports its grave concerns and reservations concerning the predictability of underground movement in the aquifer. With respect to travel time, we are concerned that the methods involved with introducing Ivey-Sol with a large quantity of water will have the effect of creating a temporary groundwater mound at the location(s) of injection. This mound may have the effect of steepening groundwater gradient, accelerating groundwater velocity and shortening consequent travel times. Such mounding effects and consequent groundwater velocity acceleration further supports the need for continuous pump-and-treat during Ivey-Sol pilot testing. The revised pilot testing plan should address the temporary groundwater mounding and velocity issue in detail.
7. **Limits on Extensiveness of Pilot Testing**- The Town seeks a clear commitment that the revised pilot testing work plan reflect four (or fewer) wells for pilot testing and not the six as first proposed. Those directly upgradient of the present locus of the pump-and-treat cone-of-depression seem more appropriate test injection locations than do wells of more of a cross-gradient position. The revised work plan should reflect or otherwise address this concern.
8. **Relevant Case Studies and Related Communications**- I have had the opportunity to be copied recently on certain emails between Bob Sipes of the Town and Bud Ivey. Generally these emails related to the Town's request for correlative case history information on the successful use of Ivey-Sol for remedial efforts in other municipal groundwater capture areas and/or source water protection zones. The California case history seems not correlative inasmuch as the aquifer seems not used locally as a municipal supply for the affected jurisdiction. The Connecticut information seems more marketing information than an actual case history. We also understand that Bob Sipes was unsuccessful in his attempts to contact managers of the affected Connecticut system. As such, to us it

seems that the Town's request for correlative information on the successful deployment of Ivey-Sol in like circumstances remains both a reasonable and an unaddressed request.

The Town does not seek to unreasonably delay or restrict the Hospital in cleaning up its spill. The Town respectfully requests that the Hospital and MDE support these reasonable requests to comprehensively address the concerns set forth above. Further, the Town seeks to be an active participant in all further discussions and negotiations regarding Ivey-Sol specifically and the remedial effort in general. The position of the release in the Town's source water protection area warrants this. The Hospital release cannot be treated like any other spill and the Hospital cannot be treated like any other party responsible. The situation is unique and the Town's request and positions need to be respected due to their responsibilities to protect the source of water for the Hospital and Town.

By copy of this letter and on behalf of the Town we respectfully request that the MDE Oil Control Program not to allow Ivey-Sol pilot testing deployment until these issues and concerns are addressed to the full satisfaction of all parties. We also ask the Hospital not to continue to seek such permission until and unless the Town's concerns first are addressed, and not to characterize the thoughts, opinions or determinations of the Town in communication with the agency.

The Town looks forward to the opportunity to continue to work with the Hospital and MDE toward an appropriate and constructive resolution to the satisfaction of all parties. Thank you for your attention.

Sincerely,



MARK W. EISNER, P.G.
President

MWE/tib

Cc: Bud Ivey – Ivey International, Inc.
Chris Ralston – MDE Oil Control Program
Susan Bull – MDE Oil Control Program
John Grace – MDE Source Protection and Appropriation Division
Bob Sipes – Town of Chestertown
Bill Ingersoll – Town of Chestertown
Kenneth Kozel - Shore Health System