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November 5, 2013

*Via Electronic Mail (priscilla.carroll@maryland.gov)  
and First Class Mail*

Priscilla Carroll, Esquire  
Assistant Attorney General  
Office of the Attorney General  
Maryland Department of the Environment  
1800 Washington Boulevard  
Baltimore, Maryland 21230

RE: Case No. 1987-2534-KE  
Chester River Hospital Center

Dear Ms. Carroll:

It was a pleasure speaking with you on Wednesday, October 30<sup>th</sup>. As you know, I represent the Town of Chestertown (the "Town") in the Chester River Hospital Center ("CRHC") matter related to the release of petroleum within and proximal to the Town's source water protection area (SWPA). The initial release of petroleum occurred more than two decades ago, and the Maryland Department of the Environment ("MDE") Oil Control Program (OCP) case number for this matter is 1987-2534-KE.

The CRHC release has impacted the shallow Aquia Formation aquifer from which six of the eight active Chestertown wells produce water for public supply. The fuel oil release is currently being remediated by groundwater extraction and treatment, with monitoring. The remediation activity is upgradient of the Chestertown well field in the SWPA. This remediation approach has kept the contamination from migrating downgradient to the Town's drinking wells since the 1990s.

Recently, CRHC hired a consultant who advocates the use of an innovative technology involving the injection of a surfactant called Ivey-sol into the aquifer within the SWPA and thus, upgradient of the well field. The Town is understandably concerned about this proposed remedial action plan within its SWPA, because of its novelty, aggressiveness and the seeming absence of reasonable and appropriate safeguards associated with its implementation. The Town fears that this innovative technology may potentially jeopardize and contaminate the Town's water source(s) resulting in immediate, substantial and irreparable harm.

MDE Secretary Robert Summers, in an email correspondence with Mayor Margo Bailey said that Ivey-sol will not be implemented as a remediation option until the Town's concerns and questions have been sufficiently addressed by MDE and CRHC's consultant. This letter sets forth the primary Town concerns and questions.

The Town appreciates MDE's time and consideration in responding to the questions listed below. As you will see, MDE's answers and responses may involve various programs and divisions, including but not restricted to, the OCP, the Source Protection and Appropriation Division and the Underground Injection Control (UIC) Division. Please keep in mind that the Town may have follow-up questions, once it receives and reviews MDE's answers. We look forward to MDE's responses to the questions and concerns listed below.

- Is MDE requiring additional conditions and/or restrictions, operational requirements, including monitoring that differ from the initial proposal by CRHC and its consultants? If so, please provide the Town with those changes and reasons for such changes.
- Has MDE's UIC program reviewed this technology? If so, what is the UIC program's assessment of this innovative treatment technology? Does the current proposed Ivey-sol remediation option differ from the initial remediation option proposed by CRHC and its consultants? If so, how has the remediation option changed?
- Is MDE requiring that the Ivey-sol application be covered under a groundwater discharge permit (GDP)? If so, can MDE please explain the permit requirements, as well as, the GDP requirements for a hydrogeologic evaluation, upgradient and downgradient monitoring wells, and for background water quality samples? Will MDE share with the Town the GDP and correspondence to/from the agency relating to the GDP pursuant to the Maryland Public Information Act? If a GDP is required, will a public hearing on the completed GDP be advertised before the permit is released? May the Town participate fully in the formation of draft and final GDP conditions? Will MDE consider a public hearing on this matter so that the public and other parties with an interest in that aquifer can have some input in this process?
- If MDE requires the installation of sentinel monitoring wells, will MDE consider three dimensional groundwater flow in their number, design, positioning and sampling requirements? Inasmuch as Ivey-sol may be of differential effectiveness at differing depths, will MDE also require multi-level piezometers or otherwise require monitoring wells of sufficiently novel design to fully and accurately assess groundwater conditions in three dimensions before and during the application of Ivey-sol?



- According to the Ivey-sol consultant, the chances of success would be greatly increased by installing injection extraction wells intended for that purpose as was the case in Monroe, Connecticut. If this is correct, can injection extraction wells be considered? Please provide the Town with MDE's assessment regarding this matter.
- Has MDE determined that the Ivey-sol remediation activity may be implemented without a GDP? If so, please explain why a surfactant-enhanced aquifer remediation treatment involving a discharge to the groundwater does not require a GDP?
- Will MDE require pump and treat during the implementation of the Ivey-sol remediation? If not, please explain the specific technical basis for this determination? How will the hydraulic control be maintained without pump and treat?
- The overall number and positioning of wells seems insufficient for a full characterization of the potential effects of this innovative remediation approach. This innovative approach, combined with the plans for suspending the pump and treat, calls into question whether deployment of this technology would be under conditions of appropriate hydraulic control. Please comment.
- Injection of a chemical surfactant within its SWPA and under conditions of questionable hydraulic control could potentially increase the risk of one or more of the Town's supply wells. How will MDE oversee and monitor the Town's sources of drinking water and the portion of the aquifer between the proposed Ivey-sol deployment area and the Town's wells? Please describe the frequency of sampling and reporting for this remedial action. Also, please explain how the Town's water system will be protected from immediate, substantial and irreparable harm regarding this innovative groundwater remediation technology.
- The Town would appreciate clarification regarding the residence time and how it relates to the potential time over which an adverse impact could materialize, be it more or less than the stated residence time. MDE seemingly understands that the residence time for Ivey-sol product will be 24 hours, but notes that the remediation action plan does not define the residence time. How does MDE know the 24 hour residence time for Ivey-sol and why wasn't the residence time included in the remediation action plan?
- In an October 17, 2013 letter to Scott Burleson, MDE expressed a concern that liquid petroleum hydrocarbons (LPH) and/or high-concentration dissolved-phase hydrocarbons could be liberated and caused to migrate in a manner that could elude recapture. The Town appreciates MDE's concern, and asks if the pathway of such migration is known or even predicted? How does the Ivey-sol remediation plan address uncertainty in pathway and recapture capability of such fugitive LPH and dissolved hydrocarbon contaminants?



- The Town's hydrogeological consultant, Advanced Land and Water, Inc. ("ALWI"), concurred with MDE (on a concern raised in an October 17<sup>th</sup> letter) that the plan seems insufficiently detailed in identifying injection wells, monitoring wells, and seems silent on the hydrogeological basis for the specifics of plan design.
- According to the August 8, 2013 memorandum from Dane Bauer to Christopher Ralston, the CRHC team is recommending that the pump and treat process be shut down during the Ivey-sol application. However, CRHC's consultant has not been able to conclude that shutting down the pump and treatment system would in any way benefit the Ivey-sol process? If that is the case, why shut it off? What are the other types of source control measures being implemented in lieu of pump and treat?
- The primary concern of surfactant-enhanced aquifer remediation is the environmental effects of residual surfactants in the groundwater following Surfactant-Enhanced Aquifer Remediation (SEAR) treatment<sup>1</sup>. Our research clearly indicates that most surfactants approved and routinely used for subsurface injection are food or cosmetic grade chemicals. Is the Ivey-sol surfactant based on food or cosmetic grade chemicals? The SEAR Manual also states that biodegradability and toxicity information should be used to assess the environmental safety of the surfactant prior to subsurface use. Has MDE evaluated the use of biodegradability and toxicity information to assess the environmental safety of the surfactant prior to the subsurface use? If so, can MDE provide the Town with the scope and breadth of MDE's review and evaluation of these issues?
- Dane Bauer's August 8, 2013 memorandum stated that: "an EPA approved Ivey-sol field test which is essential as a performance monitoring tool during the application process" (see page 4 of 6). Is this remediation activity being monitored by EPA or does this statement reference an EPA approval process?
- There are several test studies of the Ivey-sol surfactant discussed in EPA's Technology Innovation and Field Site Division Contaminated Site Clean-Up Information (Clu-In) database. In one of the very few cited test studies, the Ivey-sol surfactant injection included an aggressive power vacuuming (APV) or high power extraction at an interstate truck stop in Monee, Illinois. Why is the CRHC's consultant considering a 'push and pull' option instead of APV? What is the difference between the current 'push and pull' option considered in Chestertown and a high power extraction option? Which option provides a lesser likelihood for migration? Is push and pull the most appropriate and best method of Ivey-sol deployment? If there is a problem with the prior APV method, how could the Ivey-sol

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<sup>1</sup> According to the Naval Facilities Engineering Command Technical Report (TR-2206-ENV0) Surfactant-Enhanced Aquifer Remediation (SEAR) Design Manual Section 4.2.5 Environmental Acceptability. [http://www.cluin.org/download/contaminantfocus/dnapl/treatment\\_technologies/sear\\_design.pdf](http://www.cluin.org/download/contaminantfocus/dnapl/treatment_technologies/sear_design.pdf)



consultant assure the Town that the push and pull option will not also pose a problem, given the proximity to a drinking water source? Can the Ivey-sol consultant provide the Town with a site remediation experience or study of the Ivey-sol push and pull remediation option having the same proximity to a primary drinking water source?

- According to Clu-In, Ivey-sol non-ionic surfactant (SPT) was also considered at a telephone facility in Northern California in a Situ Surfactant Flushing and Multi-Phase Extraction of diesel ranged organics (DRO) constituents. Unfortunately, the results were not available on Clu-In. Did this remedial activity involve push and pull? Can the CRHC consultant share the results of that particular project?
- Does the plan include specific wells showing location and installation details to be used for monitoring, injection, and extraction, as well as sentinel wells? A site map that includes the following would be helpful: design specifications and detailed sampling plans/histories showing these wells, the Town's production wells, sentinel wells, and groundwater contour. Has MDE required such information? If so, may the Town receive a copy?
- The Material Safety Data Sheet (MSDS) for the Ivey-sol chemical(s) discusses high temperature and pH as having a potential influence on this chemical. Has MDE evaluated the potential Ivy-sol chemical degradation if exposed to those variables? If so, what are the byproducts? Should the remediation action plan include monitoring pH and temperature? Will MDE be requiring close, frequent and well distributed monitoring for the full range of Ivey-sol constituents and potential byproducts? If so, please advise the Town as to those monitoring plans.
- Does the remedial action plan account for the volume of Ivey-sol injected in the process and the volume of Ivey-sol recovered? If so, will the recovery efforts include measuring Ivey-sol byproducts? How will MDE decide whether the remedial activity is successful?
- What are the measurable endpoints for this treatment option? Will endpoints be used to determine whether pump and treat is no longer warranted? What happens if these endpoints are not achieved? Please inform the Town how MDE will determine that the current pump and treat approach is no longer required?
- Has CRHC or its consultant posted any type of legal instrument that provides financial assurance in the event that the Town's water supply is negatively impacted? If Ivey-sol is so safe, can we get a letter from the vendor and hospital stating that they assume liability if any chemical or byproduct from it reaches the water system? If the process is going to be so effective can we get a similar letter from the hospital referencing the oil?



Priscilla Carroll, Esquire  
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The Town of Chestertown appreciates MDE's time and consideration on this important matter. If you have any questions, please contact me at 410-659-7769 or email me at [mforlini@fblaw.com](mailto:mforlini@fblaw.com). We look forward to the Department's response.

Sincerely,



Michael V. Forlini

cc: Mayor Margo G. Bailey  
Mr. William S. Ingersoll  
Mr. Robert Sipes  
Mr. John Beskid  
Mr. Andrew Bullen  
Mr. Dane Bauer  
Mr. Kunal Gangopadhyay  
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