Message

From: Scharf, Steven (DEC) [steven.scharf@dec.ny.gov]
Sent: 11/30/2016 1:14:35 PM
To: Stein, Carol [Stein.Carol@epa.gov]
CC: Alvey, Robert [Alvey.Robert@epa.gov]; Wilkie, Henry (DEC) [henry.wilkie@dec.ny.gov]
Subject: RE: In Situ Treatment of Deep (600-700" BGS) groundwater aquifer contamination

Carol,

I regret to inform you that, as of close of business yesterday, Henry and I are no longer working on the Northrop Grumman and NWIRP Bethpage projects. We will close out some of the items that we are working on. Henry will continue in the DEC efforts to extinguish the RCRA permit(s). The Project is being transferred to Remedial Bureau D, with Bill Daigle the Bureau Chief, Don Hesler the Section Chief and Jason Pelton the project manager.

If you have any questions, please contact Henry or myself at your earliest convenience.

Thanks,

Steve

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From: Stein, Carol [mailto:Stein.Carol@epa.gov]
Sent: Tuesday, November 29, 2016 3:26 PM
To: Wilkie, Henry (DEC) <henry.wilkie@dec.ny.gov>; Scharf, Steven (DEC) <steven.scharf@dec.ny.gov>
Subject: Fw: In Situ Treatment of Deep (600-700" BGS) groundwater aquifer contamination

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Good afternoon Henry and Steve - I hope this rainy day is treating you well.

I am forwarding to both of you the detailed email I received from Rob Alvey regarding the potential technical feasibility for using in situ treatment at certain hotspots of deep groundwater aquifer contamination in the Navy/Bethpage study area. We were looking to explore this as a possible alternative for some of the groundwater contamination, due to the potential consequences that could result from some of the other plume remediation alternatives which involve removing large amounts of groundwater from the aquifer.

We would be interested in discussing this with you at your convenience, regarding whether there has been sufficient delineation of the plume at this time to consider this type of remedy, and whether this sounds like a potentially good idea to you.

Thanks,
Carol

From: Alvey, Robert
Sent: Monday, November 28, 2016 2:02 PM
To: Stein, Carol
Cc: Metz, Chloe; Cutt, Diana
Subject: RE: In Situ Treatment of Deep (600-700" BGS) groundwater aquifer contamination

Hello Carol,

This concept is to use new in-situ technologies to prevent contamination of currently impacted public supply wells where a significant known source of VOC contamination exists upgradient. The technology to inject fluids into extremely deep (over 1000 feet) well is already common as the Underground Injection Control program provides regulations for injecting wastes at depths. Many of the technologies for remediating "deep groundwater" have also been established. I am not familiar, however, with too many Superfund sites where the impacted groundwater in unconsolidated formation approaches a depth of the plume reaching over 700 feet. I don't see a "fatal flaw" that would render this concept impossible.

What IS useful is an initial discussion with Steve and Henry as to whether both Navy and Northrop Grumman's hydrogeologists have sufficient delineation of the plumes and can provide an initial assessment of specific areas of groundwater within the plumes that would feasibly impact the Massapequa Water District wells. We were not involved with the selection of locations for the outpost monitoring wells, and it would be useful to assess what wells upgradient of those outpost wells have already been installed. This might also be discussed with ORD – Diana Cutt as to someone who is the EPA expert in these in-situ technologies. It might be helpful to prepare a CSM with a cross section through one of the Massapequa wells.

Regards, Rob

From: Stein, Carol
Sent: Monday, November 28, 2016 8:55 AM
To: Alvey, Robert <Alvey.Robert@epa.gov>
Subject: RE: In Situ alternative Northrop-Grumman Navy

Thank you Rob for putting together this analysis. If we are going to recommend in-situ treatment for the Navy/Bethpage plume, it would be helpful to have some assurance that it would work at deep plumes such as that found in the Navy/Bethpage study area. Do you have examples of sites where it has worked at plumes going down 600 to 700 ft bgs?

From: Alvey, Robert
Sent: Friday, November 25, 2016 3:53 PM
To: Stein, Carol <Stein.Carol@epa.gov>
Subject: In Situ alternative Northrop-Grumman Navy

Hi Carol, I put together a follow-up conceptual alternative approach rather than just full plume capture.

Let me know if you want more.
Rob

Introduction

An extensive, deep, and widespread plume of VOC contaminants in groundwater in Nassau County has impacted and threatens to impact a number of public supply wells providing drinking water to over 250,000 residents. The area is also a designated Sole Source Aquifer. In 2016, NYS released an evaluation of alternatives specifically to capture and treat the full groundwater plume to prevent further downgradient migration. The time frame for the alternatives was estimated to require 200 years of pumping and ultimately the discharge or disposal of over 700,000,000,000 gallons of water. The alternates presented in the report only considered full plume capture and treatment options. The purpose of this memo is to suggest that other potential actions may provide the benefit of preventing impact to public supply wells at lower cost and without the significant disruption of groundwater flow paths.

Background

Due to the historic discharges of extensive quantities of industrial solvents (VOCs)- primarily from the former Grumman facility in Bethpage, the groundwater in this area of Nassau County, NY, has been significantly impacted. Some public supply wells have been impacted and the plume of dissolved contaminants has spread extensively both downgradient and deep within the Magothy Aquifer, the sole source of the drinking water supply for this area.

Investigations under NYSDEC have led to a series of Record of Decisions, including the implementation of containment systems designed and operating to prevent the further off-property release of the VOCs from the former Grumman facility (OU-1). An additional Record of Decision for OU-2 included a provision to require the Responsible Parties fund the construction and operation of wellhead treatment systems at public supply wells when they become impacted from the migrating plume downgradient of the initial source. Additional treatment of "hot spot" areas of downgradient contamination was also stipulated in the ROD and is being implemented. An additional containment system was constructed to mitigate groundwater concerns on the eastern side of the former Grumman property (OU-3).

In order to plan design and construction of treatment facilities, the Responsible Parties have also been required to install "Outpost" monitoring wells upgradient of the public supply wells in the area. These wells are designed to enable monitoring of the specific zone of groundwater that is flowing towards the screen inlets of the public supply well. The purpose of the outpost monitoring wells is to provide a roughly 5- year advanced warning if the public supply well is to be impacted by VOCs so that a treatment system can be constructed.

Groundwater Full Plume Capture and Treatment Alternatives

In late 2014 NYS passed legislation requiring preparation of a report on alternative methods to capture the full extent of the groundwater plume, treat and discharge the water in an effort to prevent future contamination of downgradient public supply wells. Various estimates and alternative methods of full plume capture, treatment and disposal were presented. The report was released for public comment in July 2016. Overall, the alternatives presented projected up to a 200-year time frame for complete plume capture, the withdrawal of an estimated 700 billion gallons of freshwater from the aquifer system, and a cost projected to be possibly $500,000,000.

Basis of Conceptual "Alternate"

All of the alternatives addressed in the 2016 report could only consider full plume capture scenarios due to the specific wording of the legislation. The conceptual alternative being suggested does NOT provide full plume capture and treatment. Instead, the goal is to prevent future impact to current public supply wells that operate without treatment by employing in situ monitoring and treatment. This would only require treatment for the portion of the groundwater that flows to and is projected to reach the intake screens of the threatened public supply wells.

The ultimate source of the water that reaches the limited screened intervals of public supply and other pumping wells on Long Island is precipitation. A portion of this precipitation does not become contaminated as it enters the

groundwater and flows towards a well screen. Another portion co-mingles partially with a contaminant plume and flows towards the well screen. Only a portion of the lateral extent of the groundwater plume is drawn into the pumping well. Some bypasses it with additional dilution and dispersion as it continues to flow downgradient. The ultimate discharge of the groundwater plumes from the former Northrop-Grumman/ Navy facilities is the ocean water.

The "outpost" monitoring wells currently installed are examples of types of selective screen zone monitoring needed to provide advance warning that the downgradient public supply well can be expected to be impacted from the groundwater plume. These outpost wells are designed with the intent to provide a five-year "window" of time for the design and construction of a treatment system in the event sampling from the outpost well detects contamination from the migrating plume of VOCs from the former Northrop-Grumman/Navy facility. A benefit of an in situ approach for remediation of the plume is the beneficial use of the freshwater aquifer without specific installation of a treatment system on the public supply well. Further, an in situ approach eliminates the significant stresses proposed on the groundwater gradient from pumping that would change the flow direction in a regional area, potentially diverting the flow direction of other groundwater plumes and also rendering the established groundwater monitoring locations obsolete.

Based on updated modeling of the travel times and zones of the groundwater flow towards the screen zone of the public supply well, additional wells can be installed for use in monitoring and injection of VOC mitigating agents. The full, but limited volume of groundwater can be treated based on the level of contaminants detected. As the levels of contaminants change, the in situ treatments can be adjusted economically. Further, the proposed distance of the in situ treatments can be far enough away from the actual screen inlet of the public supply well so as not to impact the integrity of the well.

A recent analysis of over 2,000 groundwater decision documents revealed the growth of in situ remedial action as the selected groundwater treatment for over half of all decision documents. Technologies addressed include EISB (Enhanced In Situ Bioremediation), ISCO (In Situ Chemical Oxidation), CBI (Activated Carbon-Based Injectate), ZVI (Zero-Valent Iron) in addition to ISTT (In Situ Thermal Treatment) and ISS (In Situ Stabilization/Solidification). Certainly, as science progresses over the next 200 years, there will be additional methodologies of treatment that will enter the market. It is noted that the remedial action for the VC groundwater plume associated with the former Hooker Chemical/Ruco Polymers NPL Superfund site adjacent to the former Northrop-Grumman/Navy Facility was primarily an in situ air sparging system under an enhanced in-situ bioremedial action ROD.

The November 2016 Federal Remediation Technologies Roundtable included a presentation on In-Situ Monitoring Issues and Best Practices by Linda Fiedler and Jed Costanza with EPA's OSTRI. It may be of interest to contact EPA's ORD and OSTRI's expertise for a conceptual assessment of in situ remediation potential and economics for this site.