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MEMO

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Date:
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ARCADIS Project No.:
NY001416.0003.0001A

Subject:
GM-38 Area System Design Optimization

Background

This memo has been prepared to summarize the various groundwater model simulations conducted during the planning, design, and optimization of the GM-38 Area Remedial System.

During the period June 2002 through April 2003, numerous groundwater flow, particle tracking, and contaminant transport simulations were conducted for both the Navy and Northrop Grumman Corporation.

The GM-38 Area Remedial System (System) was designed to be a groundwater contaminant mass removal system installed in an area of elevated concentrations of total volatile organic compounds (TVOCs) in the vicinity of monitoring well cluster GM-38. Although large areas of the aquifer south of the former Northrop Grumman plant are impacted, significantly elevated TVOC concentrations (greater than 500 µg/L) have been observed in the vicinity of well cluster GM-38. The System was originally conceived of as a short-term (less than 5 years of operation) mass removal and containment remedy for an area impacted by TVOC concentrations in excess of 1,000 µg/L. However, it became apparent through the various modeling simulations that the system could effectively contain and remove TVOC mass at levels of 500 µg/L or greater with only a minor increase in the expected pumping period.

System Design and Optimization

Following is a summary of the various simulations conducted. Although a discussion of the assumptions and results of these simulations are not presented here in detail, various memos documenting these efforts

have been prepared. The list below (memos and simulations) is presented in chronological order and briefly describes the conditions simulated and the model results. Taken together this timeline documents the design and optimization effort conducted for the GM38 Remedial System.

June 2002

1. Conducted a 30-year groundwater flow and transport simulation of a 2-well remedial system to determine the effect of the remedial system on movement of TVOC impacts in excess of 1,000 µg/L.

    - Determined that the system effectively mitigated impacts above 1,000 µg/L.

2. Additional modeling runs were conducted to determine the effect of 5 and 15 year pumping periods with respect to removal of TVOC impacts in excess of 1,000 µg/L.

    - Determined that a 2-well system was capable of mitigating impacts above 500 µg/L in 5 to 10 years while operation for 10 to 15 years would mitigate impacts above 100 µg/L.

3. Modeled the addition of a third remedial well approximately 100 ft west of Bethpage Water District (BWD) Supply Wells 6915 and 6916.

    - Determined that the addition of this well only affected TVOC concentrations impacting BWD 6915 and 6916, wells which are already equipped to treat for VOC impacts.

December 2002

1. Various simulations were conducted to optimize the screen zone, pumping rate and well location for the 2-well system previously evaluated. In addition, simulations to assess potential interference between the remedial wells and a numerous recharge gallery configurations were evaluated. Recharge of treated water through injection wells and existing recharge basins was evaluated.

    - Determined that the interference resulting from the use of injection wells or the existing recharge basin would be negligible.

April 2003

1. At the request of other parties (water purveyors and their consultants) ARCADIS modeled the addition of a third remedial well located on Hempstead Turnpike, west of New Island Hospital.

    - Determined that the third remedial well offered no significant benefit in mass removal. The predicted performance of the 2-well system did not allow significant mass to migrate towards the third well, therefore, there was no opportunity for the third well to remove mass

associated with the GM-38 Area. Of note, any impacted groundwater that did migrate to the new well was at concentrations well below those defined removal goals for the System, and therefore was not targeted for containment/removal.

Conclusion

Ultimately the modeling efforts presented above resulted in the recommendation of the 2-well System currently under construction. It is ARCADIS' opinion that the design of this system with respect to the number, location, screen setting and pumping rates for the remedial wells has been fully evaluated and optimized to best meet the goals defined for this mass removal remedial system.