Use of 3D Visualization of Environmental Data for Public Education

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Recently, software programs have brought 3-dimensional (3D) visualization into mainstream groundwater and contaminant transport modeling. While there are clear benefits to engineers and scientists in utilizing visualization techniques to analyze and interpret data, one of the most important uses of this technology is in the public education area. The use of the 3D visualization techniques allows the scientist to clearly communicate complex subsurface geologic and groundwater concepts to non-technical audiences.

We show examples of several projects in New York State in which groundwater modeling has been combined with 3D visualization to illustrate the configurations of groundwater plumes and the results of potential remediation alternatives to regulatory agency staff and to community groups which participate in the selection of final remedies through a formal public participation process. Each project site had thousands of records describing wells, water levels, water quality, hydrogeology, topography, buildings, modeling output, and other data types that were electronically formatted for input into the 3D visualization models.

A visualization software package which employed actual field data was used to construct the 3D models. This process developed the framework for flow system conceptualization. Numerical groundwater model output was then developed into a series of 3D "stills" either for presentation purposes or to "storyboard" the further development of 3D graphical animations. Animations were developed to illustrate the geologic and hydrogeologic characteristics of the sites, analysis of potential plume migration, and plans for remedial actions. Animations were presented to the public and local politicians to both educate and inform as to site conditions, perceived risk, and potential remedial options. These efforts have clearly served to facilitate regulatory and community negotiations.

Biographies

Nicholas Valkenburg is a Vice President with ARCADIS on Long Island. He is an expert hydrogeologist and has over 30 years experience focusing on defining and remediating soil and groundwater contamination in many parts of the country. For 2 years, Mr. Valkenburg was an adjunct professor at Adelphi University where he taught courses on hydrogeology and groundwater management. He received his B.S. in Earth Science from SUNY at Stony Brook and his M.S in Geology at the University of Toledo

Douglas A. Smolensky is an Associate Vice President with ARCADIS G&M, Inc. in Long Island, New York. He has 25 years experience as an expert hydrogeologist focusing on ground water systems analysis, groundwater modeling, groundwater remediation and program management. Eleven of his twenty-five years experience was with the U.S.G.S. working as a groundwater modeling specialist in the New York District. Mr. Smolensky received both his M.S. and B.S. in geology from Adelphi University.