ROUX

PROFESSIONAL PROFILE

Michael Gonshor, P.G., LSRP

Principal Hydrogeologist

TECHNICAL SPECIALTIES

Design, implementation, and management of environmental investigation and remediation projects with extensive experience in investigation and remediation projects involving fractured bedrock and unconsolidated formations; Brownfields redevelopment and real estate transaction projects; preparation and review of expert reports in support of litigation/mediation; data evaluation, interpretation, and presentation for technical projects; evaluation of the fate and transport of constituents in soil and groundwater, including analytical and numerical groundwater flow and transport modeling; evaluation of potential Natural Resource Damages (NRDs) claims; preparation of requests for Classification Exception Areas (CEAs) in New Jersey and Non-Use Aquifer Determinations in Pennsylvania; preparation and presentation of technical reports; extensive experience in client and regulatory agency interface; evaluation of the effectiveness of groundwater remediation systems; implementation and analysis of groundwater monitored natural attenuation projects; and extensive experience with aquifer pumping tests.

EXPERIENCE SUMMARY

Twenty-seven years of experience: Principal Hydrogeologist with Roux Associates, Inc., previously Senior Hydrogeologist/Head of Hydrogeology at RT Environmental Services, Senior Hydrogeologist at Rare Earth Enviroscienses, Project Geologist and Laboratory Analyst at BCM Engineers.

Project Principal/Project Manager for numerous state investigative and remedial projects in New Jersey (ISRA and LSRP projects), Pennsylvania (Act 2, HSCA and Storage Tank programs), as well as projects in Connecticut, Massachusetts, North Carolina, South Carolina, Texas, and Virginia. Also served as project manager and field team leader for several USEPA CERCLA RI/FS and RCRA RFI/CMS projects. Key involvement in several expert reports and litigation/mediation support cases.

CREDENTIALS

B.S. Earth Science, Specializing in Geosciences, The Pennsylvania State University, 1985. Senior Research Paper – *Ground Water Monitoring.*

Graduate Course: Modeling Ground Water Flow - June 1994. Wright State University.

Registered/Licensed Professional Geologist: Pennsylvania, Delaware, North Carolina, South Carolina, Georgia and Virginia.

New Jersey Licensed Site Remediation Professional

PRESENTATIONS

– *The ABCs of ISRA, LSRPs and the NJDEP,* The 2013 New Jersey Environmental Seminar, March 2013

– *Sayreville, NJ Site Redevelopment: A Unique and Challenging Brownfields Project*, Business of Brownfields Conference, April 20, 2010

– *Practical Application of the NJ Soil Cleanup Standards (SESOIL Modeling for Development of Site Specific Impact to Ground Water Standards for Soil)*, June 3, 2009 sponsored by the NJWEA

– 2002 National Brownfields Conference Poster Presentation – *Schuylkill Waterfront Redevelopment – A Success Story*

CONTINUING EDUCATION

– Practical Rock Slope Engineering (PCPG) – August 2-3, 2012

– NJDEP SRRA Implementation: the Final Rule Package (NJDEP) – June 19, 2012

– Geochemistry of Groundwater Remediation (PCPG) – March 25, 2011

– Development of IGW SRS Using SESOIL and AT123D (Environmental Software Consultants) – March 17-18, 2011

– Surface Geophysics for Hydrogeological and Geotechnical Applications (PCPG) – October 12, 2010

– Licensed Site Remediation Professional: Hands-On Experience (NJWEA) – June 16, 2010

– Fate and Transport Analysis Using Quick Domenico, SW Load and PENTOXSD (PCPG) – March 2010

– Applications of Monitored Natural Attenuation for Remediation of Petroleum and Chlorinated Hydrocarbons in Soil and Groundwater (EOS Alliance) – September 24-25, 2009

– Site Remediation Basics (NJDEP) – May 19, 2009

– New Jersey Regulatory Training in Underground Storage Tanks (Rutgers) – March 2009

– Environmental Isotopes in Ground Water Resources and Contaminant Hydrogeology (NGWA) – September 2008

– Fractured Rock Conference: State of the Science and Measuring Success in Remediation (NGWA/EPA) – September 2007

– Borehole Geophysical Logging for Water Resources/Water Supply Applications (NGWA) – August 2006

– Ground Water & Environmental Law Conference (NGWA) – July 2005

– Use of Stable Isotopes in Environmental and Forensic Geochemistry Studies (Battelle) – June 2005

– The New MODFLOW Course (NGWA) – October 2004

– NJDEP Regulatory Vapor Intrusion and Update Seminar - 2004

– PADEP Vapor Intrusion Training - 2004

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– PADEP Land Recycling Program Client Work Shop - 2004
– Natural Attenuation of Chlorinated Solvents in Groundwater (ITRC) – March 1998

KEY PROJECTS

- Project Principal and LSRP for two separate bus garage sites in northern New Jersey. Several and similar AOCs have been identified at both of the sites, including leaking former USTs, floor drains and maintenance areas. Light non-aqueous phase liquid (LNAPL) has also been encountered on groundwater at both sites. RIWPs have been prepared under the LSRP program to delineate soil and groundwater exceedances and the extent of LNAPL. Immediate Response Measures have been implemented at both sites to address LNAPL while remedial investigation activities are being conducted and LNAPL recovery systems are being designed. Appropriate LNAPL and Receptor evaluation forms have been prepared and submitted to the NJDEP. The ultimate goal for both sites is to cost-effectively complete remedial investigation and remedial action activities, which are anticipated to consist of LNAPL recovery, CEAs for groundwater, capping of soil by existing buildings/paving, and institution of Deed Notices.
- Project Principal for an Act 2 soil and groundwater remediation project at a Southeastern Pennsylvania rail yard. Constituents of concern (COCs) included LNAPL on groundwater and volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), and metals in soil and groundwater. Groundwater results and fate and transport modeling conducted by Roux Associates showed that ongoing monitoring (no active remediation) of groundwater was sufficient to demonstrate attainment of Act 2 standards. Releases of Liability for soils and groundwater were received for the site from the PADEP. LNAPL recovery pilot tests were conducted and, based on the pilot test results, an LNAPL remediation plan was prepared. This plan consisted of using high-vacuum, hot-spot LNAPL recovery on a periodic basis, followed by both manual recovery/bailing and a belt skimmer. This remediation approach reduced LNAPL remediation costs by $200,000 to $400,000 compared to a permanently installed, continuously operating LNAPL recovery system recommended by the previous consultant. To date, 10 of the 12 wells which originally contained LNAPL have met the PADEP-approved LNAPL recovery endpoint criteria for the site.
- Senior Hydrogeologist with primary responsibility for geologic/hydrogeologic interpretations at a NJT facility in Kearny, New Jersey. The project included installation and sampling of new site wells, evaluation of new and existing LNAPL and dissolved-phase groundwater data, evaluating fate and transport of dissolved-phase COCs in groundwater, and evaluation of LNAPL recovery pilot test data. Also provided hydrogeologic assistance in evaluating the anticipated capture zone and zone of LNAPL recovery and planning recovery well locations for the LNAPL remediation system.
- Project Manager/Principal for a large UST closure project at a former manufacturing facility in Philadelphia, Pennsylvania. Due to the presence of regulated and unregulated USTs, the PADEP requested the site be entered into the Storage Tank Program rather than the Act 2 program. However, all Act 2 guidance was followed to work toward case closure. USTs were closed at four areas of the site and at one currently operating, multi-UST area. LNAPL associated with a waste oil/waste solvent UST was the primary area of concern prompting LNAPL recovery activities and ground-water monitoring. Fate and transport modeling was conducted to support a request for a non-use aquifer (NUA) determination. The successful application NUA and site-specific standards for this project substantially reduced remediation efforts and costs.
- Project Principal/Principal Hydrogeologist and LSRP for a large ISRA/Brownfields redevelopment project is Sayreville, New Jersey. This project involved reviewing over 20 years of extensive historical investigation and remediation data in a short timeframe to understand the site and prepare appropriate investigation and remediation work plans. This project, comprising 440 acres, is one of the largest Brownfields projects in the State of New Jersey and involves overall project direction of engineering capping activities, groundwater remediation, soil remediation of multiple parcels and multiple areas of concern, and ecological evaluations. To date, work on this project has included numerous planning meetings with the client and Borough Engineer and multiple meetings with NJDEP personnel, including the Commissioner, Assistant Commissioner, Brownfields Development Area (BDA) personnel, Case Manager, Bureau of Environmental Radiation, and Office of Sediment and Dredging Technology. To date, multiple large scale remedial investigation activities have been completed in a very short timeframe, and included completion of several hundred soil borings, groundwater sampling, wetlands sediment sampling, evaluation of the existing and new analytical results, and preparation of Remedial Action Work Plans for several areas of concern.
- Project Principal and LSRP for an ISRA site in northern Sussex County New Jersey. Groundwater beneath the site occurs within the fractured bedrock across three formations, including the Losee Metamorphic Suite, the Leithsville Formation, and the Hardyston Formation with flow and transport generally following bedrock strike. Groundwater conditions at the site were investigated by others for over 14 years, during over 30 separate groundwater monitoring events. Previous reports by others suggested the results did not indicate a decrease in COC concentrations. However, based on a more

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thorough evaluation of historical trends, Roux Associates determined that there were long-term decreasing trends. Based on our evaluation of this extensive historical data, supplemented by strategic additional groundwater monitoring well installation and sampling, it was demonstrated that the CVOCs in bedrock groundwater were limited to the site and could be addressed by natural remediation and establishing a CEA for case closure. The existing and new data was also used to evaluate and strategically reduce potential future NRD claims.

- Project Principal and LSRP for a dry cleaner site in southern New Jersey. Site investigation activities identified the dry cleaning solvent PCE in soil. Subsequent remedial investigation activities conducted by Roux Associates successfully delineated the horizontal and vertical extent of PCE and degradation products in soil and determined that groundwater beneath the site was greater than 30 feet below ground surface. Based on the soil results, soil type, and depth to groundwater, SESOIL modeling was conducted in accordance with NJDEP guidance to determine if groundwater investigation activities were warranted. At the time, use of SESOIL modeling in New Jersey was new methodology. As such, I worked closely with NJDEP personnel (on non-project related basis) to understand NJDEP's expectations on application of the model. The SESOIL modeling demonstrated that groundwater was not anticipated to be affected due to the release at the site and, as such, no groundwater investigations were warranted. Vapor intrusion investigations were also conducted at the site which determined that, at least in part, indoor air concentrations were related to ambient conditions. A plan was developed and implemented to eliminate the ambient conditions to determine if there was a component of vapor intrusion at the site. As of early 2011, an SIR/RIR was completed and vapor intrusion evaluation conducted. Planned remediation includes capping of soil by existing buildings and paving, and institution of a Deed Notice.
- Principal Hydrogeologist for a groundwater investigation and preparation of an Expert Report for a release of gasoline at a major petroleum company service station. Responsibilities included design and supervision of an aquifer pumping test, analyzed aquifer-test data sets to determine flow characteristics, conducted a detailed analysis of site and regional hydrogeology and fate and transport analysis of gasoline constituents in groundwater. Worked closely with the client and counsel throughout the project and prepared an Expert Report on the remedial investigation activities and fate and transport analysis. The key objectives of the fate and transport analysis and hydrogeologic evaluation were to evaluate the potential impact of the release on regional supply wells and the contribution of other regional sources to regional groundwater impact.
- Project Principal for an ISRA site located in southern New Jersey involving benzene in groundwater. Evaluated over 10 years of existing groundwater monitoring data collected by others. Determined that continued monitoring was unnecessary and that establishing a CEA and natural attenuation was appropriate for site closure with no further monitoring. Site-specific hydraulic conductivities were estimated by slug testing and were used in the fate and transport analysis to greatly reduce the size of the CEA over using existing monitoring results. Also evaluated potential NRD claims for the site and determined that by reducing the size of the CEA, potential NRD claims were greatly reduced. The cost to prepare the CEA was more than offset by the reduction in long-term monitoring costs and further offset by reduction in potential future NRD claims.
- Project Principal for an ISRA site in Bergen County, New Jersey. The entire site underwent an extensive investigation and remediation from 1986 through 1993. The NJDEP issued a Restricted Use No Further Action and Covenant Not to Sue (NFA/CNS) for the site and CEA for several AOCs. One remaining issue was the presence of TCE in groundwater which required further investigation. To address this issue, the existing site data was reviewed and a review of potential nearby sites was conducted, which determined that the TCE was from an upgradient source. As such, no remedial action was required. Prepared a detailed Remedial Action Report describing the findings of the historical data and demonstrating that TCE was from an upgradient source. A revised CEA was prepared addressing the TCE and reducing the size of the previous CEA prepared by others to formally close the ISRA case. The revised CEA was recommended to limit the size and duration of the CEA to strategically reduce potential future NRD claims. NJDEP approved case closure for the entire site in 2007.
- Project Principal/Hydrogeologist for an ISRA groundwater investigation and remediation project for a chemical company in northern New Jersey. Tertiary butyl alcohol (TBA) was found in groundwater at and downgradient of the site as a result of periodic ongoing discharges from an above ground tank farm. Reviewed and evaluated over 15 years of historical groundwater monitoring data to develop a thorough understanding of site conditions and fate and transport of TBA in groundwater. Due to its solubility, the TBA plume was over 1.5 miles in length and approximately 1 square mile in area. A significant issue was the impact of the TBA on two municipal well fields. One was impacted to the extent it had to be taken out of service. A three-dimensional groundwater flow and transport model was constructed and calibrated for the region to be used for multiple purposes, including designing a groundwater recovery system to remediate the plume, evaluate if the second municipal well field may be impacted above state standards in the future, evaluate the remedial timeframe and time it would take to

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restore the first municipal well field, and support the request for a CEA. The model was successfully calibrated to simulate flow and transport and achieve its stated objectives. Also assisted client with evaluation of potential NRD issues related to groundwater.

- Project Principal/Project Manager for an ISRA soil and groundwater investigation and remediation at an industrial site in central New Jersey. Trichloroethene (TCE) and other chlorinated volatile organic compounds (CVOCs) were released to the surface during historical site operations. Source-area TCE concentrations ranged from 5,000 to 9,000 µg/l within the weathered bedrock of the Passaic Formation. Roux Associates work included evaluation of approximately 8 years of historical soil and groundwater data, installation and sampling of wells in both the weathered and competent bedrock, and bedrock coring to determine rock quality/extent of the weathered bedrock zone. Key findings of the geologic/hydrogeologic evaluation were that CVOCs were found to occur at the highest concentration within the weathered bedrock. Groundwater yield in the weathered bedrock zone was very low (<1 gpm) and flow and transport direction follows the bedrock topography. Project objectives were to re-establish a working and improved relation with the NJDEP, evaluate and use all existing data as a whole and to establish a cost-effective technically sound strategy for the site. The findings and recommended work plan were presented to the NJDEP case management team. Based on existing site data, it was determined that we will use a combined remedial approach consisting of in-situ active source area treatment with the remaining downgradient groundwater remedy constituting natural attenuation. The NJDEP acceptance of natural attenuation for groundwater substantially decreased project costs.
- Senior Hydrogeologist with primary responsibility for constructing and calibrating a three-dimensional groundwater flow model using MODFLOW and geologic/hydrogeologic interpretations for support of CERCLA cost recovery project for an NPL Site in central New Jersey. The groundwater-flow model and site investigation activities demonstrated that our client's site operations were not the cause of the extensive plume of chlorinated VOCs in groundwater at and near the site. Also reviewed, evaluated, and commented on the plaintiff's consultant's technical reports and groundwater flow model. Additional project activities included the planning and oversight of remedial investigations to identify the source and fate and transport of chlorinated VOCs in soil and groundwater, and review of published regional geologic and hydrogeologic information. The results of the groundwater flow and fate and transport modeling and geologic/hydrogeologic interpretations were presented to the NJDEP, attorneys, and consultants for the opposing party.
- Senior Hydrogeologist/Project Manager for a New Jersey Superfund Site remediation cost-recovery mediation/ litigation case on behalf of insurance companies to help demonstrate the in-appropriate/over designed groundwater recovery system implemented by the USEPA. Reviewed and evaluated extensive documentation regarding the investigations and the USEPA's remedial design, to determine practicability and cost-effectiveness of the design. Used USEPA's groundwater flow model to design a more effective and efficient groundwater recovery scenario for the site. Prepared and presented Expert Reports which were used in a mediation case on behalf of insurance companies to help demonstrate the in-appropriate/over designed groundwater recovery system implemented by the USEPA, which is expected to save the insurance companies several million dollars in cost recovery being pursued by USEPA.
- Technical manager and groundwater modeler for an ISRA soil and groundwater investigation and remediation project for a circuit-board manufacturing facility in New Jersey. Soil and groundwater at the site were impacted by waste-water sludge lagoons and an unlined sulfuric-acid pit which resulted in lowering the pH of the underlying groundwater and leaching of metals from the formation to the groundwater. The impacted aquifer, the Potomac-Raritan-Magothy (PRM) aquifer, was a significant concern as this aquifer is a major source of water supply in New Jersey. Constructed and calibrated a three-dimensional groundwater flow model using MODFLOW. The flow model was used to determine optimum recovery well placement and pumping rates to maximize mass recovery while minimizing flow rate and the number of wells necessary to achieve hydraulic control of the plume. Verified calibration of the groundwater flow model after the groundwater recovery system was installed; model calibration was verified with no revisions to the original calibrated model.
- Project Principal/Principal Hydrogeologist for the Millennium Center Brownfields redevelopment project in Conshohocken, Pennsylvania. This redevelopment project encompasses over 26 acres on multiple parcels of land. The project area consisted of multiple heavy industrial operations since the turn of the early 1900s, including foundries, steel fabrication, battery manufacturing, coal gas manufacturing, machinery repair, and concrete production. Redevelopment consists of mixed commercial, residential, and recreational uses. Constituents of concern included metals, PAHs, PCBs and chlorinated solvents, as well as asbestos containing materials and abandoned drums. Cooperation with Federal, State and Local agencies helped secure grants and loans for investigation and remediation activities. Pennsylvania's Act 2 Statewide Health, Site-Specific, Background and Special Industrial Area Standards were applied as appropriate to reduce overall investigation and remediation costs. In addition,

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capping of soils was incorporated site development plans to further limit the extent of required soil remediation. Incorporating development plans as capping resulted in over $200,000 savings in soil remediation costs for two parcels.

- Project Principal/Project Manager for an Act 2 soil and groundwater investigation at a 388-acre former limestone quarry in Southeastern Pennsylvania. As part of the terms of the property transaction and site redevelopment activities, the seller was required to obtain site closure for soils and groundwater in a limited timeframe. This project involved an expedited review and evaluation of extensive existing soil data, review regional geologic and hydrogeologic data, multiple client and regulatory agency meetings, meeting with the USGS to evaluate regional geologic and hydrogeologic conditions, and implementing soil and groundwater investigative activities. One major complexity to this project was that the groundwater, which occurs within the fractured and karstic limestone bedrock, is known to be regionally impacted with chlorinated VOCs from multiple sites. This regional impact, in conjunction with the complex nature of groundwater flow within limestone bedrock, presented a challenge to thoroughly understand regional flow and transport of chlorinated VOCs. Roux Associates designed and evaluated Electrical Resistivity Imaging (ERI) surveys which successfully identified water-bearing faults and fractures to target for deep bedrock well installation. This saved considerable time and expense in well installation activities. The regulatory agency meetings helped ensure the project would be completed, the Final Report approved and closure obtained with minimal agency comments.
- Project Principal for an Act 2 soil and groundwater investigation and remediation project at a former metal fabricating facility. The project involved soil and groundwater investigations targeting the former septic system which was determined to be the source of TCE in soil and groundwater. Focused remedial investigations showed that the source area was limited to the overburden at the top of the competent bedrock with lower concentrations in the shallow fractured bedrock aquifer. Several remedial technologies were evaluate including in-situ chemical oxidation, enhanced biodegradation, and air sparging. Chemical oxidation was identified as the most cost-effective technology to clean up the source area within the required schedule for our client to achieve their business objectives. The chemical oxidation technology was implemented and has successfully reduced TCE concentrations from over 40,000 µg/l in the source area to non-detect. This was accomplished in one injection event which was based on bench scale treatability work and limited pilot testing. Six months after remediation, concentration rebound was minimal, rebounding to under 50 µg/l in the source area. Natural attenuation was accepted to address bedrock groundwater. The remedial action plan and request for a non-use aquifer determination for the site was approved.
- Project Manager for the Act 2 investigation and remediation of a railcar equipment manufacturer. The manufacturing process includes chrome plating of the parts. Breaches in the vapor control equipment resulted in a release of hexavalent chromium to the soil and groundwater. The investigations included soil and groundwater characterization. High concentrations of hexavalent chromium were detected in the soil beneath the floor of the building; moderate concentrations were detected in the groundwater at the location of the release. Groundwater quality at the property boundary, the point of compliance under Act 2, met the PADEP cleanup standards. The remedy selected for this site included engineering and institutional controls for soil and no further action for groundwater.
- Senior Hydrogeologist in charge of review of technical reports prepared by others for an Act 2 project in York, Pennsylvania. Work was completed by others as part of "taking" of the property by the township. Reviewed and commented on the technical reports, recommendations, and proposed cleanup costs. As part of this review, it was determined that the impact to soils and groundwater was minimal and by applying Act 2 regulations and standards, remediation to meet applicable statewide health standards would be minimal and thus cleanup costs could be reduced by approximately 50 to 90 percent. Following review of the reports prepared by others, we prepared a results summary report and work plan, submitted the plan to the PADEP (south-central region), and subsequently met with PADEP official and gained their concurrence on the work necessary to take the site through the Act 2 program.
- Prepared and implemented the scope of work for the groundwater investigation for the closure of the hazardous waste storage pads at a RCRA facility in Massachusetts. Responsibilities included preparing scope of work and cost estimates, scheduling, subcontractor coordination, oversight of field activities, and preparation of the technical report of the investigation results. Responsibilities also included interaction with the Massachusetts Department of Environmental Protection to obtain work plan approvals as well as agency meetings to present the investigation findings and recommendations. Constituents of concern included chlorinated VOCs in the overburden, weathered bedrock and deep bedrock, including the presence of dense non-aqueous phase liquid (DNAPL) within the weathered bedrock at the top of the competent bedrock surface. The DNAPL was found to be serving as an ongoing source to dissolved-phased chlorinated VOCs in the underlying fractured bedrock of the Dighton and Rhode Island Formations. Soil borings, well borings, and coring data were evaluated and used to construct a bedrock surface elevation contour map. This evaluation showed that the extent of the source area

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and DNAPL were limited by localized depression in the bedrock surface which was targeted for remedial activities.

- Senior Hydrogeologist in charge of interpreting and presenting hydrogeologic information for a permit to deepen a large quarry in Pennsylvania. Interpreted regional geologic and hydrogeologic conditions, and evaluated how increased dewatering due to deepening would potentially affect regional groundwater elevations. Of particular concern was if the increased regional cone of depression may induce flow of contaminated groundwater from area CERCLIS Sites into the quarry. Also presented findings to the Township's Environmental Advisory Council in a public meeting.
- Senior Hydrogeologist/Project Manager for a soil and groundwater investigation and remediation project in Southington, Connecticut involving chlorinated VOCs, primarily TCE, in overburden and fractured bedrock. The overburden consisted of approximately 10 feet of silty clay with a very low yield. Bedrock beneath the site consisted of the New Haven Arkose, part of the Newark Supergroup (referred to as the Newark Basin in New Jersey), which is similar to the Brunswick Group in New Jersey. At the site, the New Haven Arkose consists of north-south striking alternating sequence of mudstone, siltstone and sandstones. Site investigation activities consisted of overburden and bedrock well installation and sampling, and deep bedrock coring to identify site-specific strike, dip, and fracture frequency and orientation. In addition, a bedrock aquifer test was conducted which demonstrated that the hydraulic conductivity along strike was 5 to 10 times that perpendicular to strike. This information, along with the observed distribution of CVOCs in the bedrock was used to optimize the groundwater recovery system and increase mass removal rates while decreasing the total pumping rate needed to capture the plume. The remediation system included recovery from an overburden recovery trench and source area bedrock recovery wells. An air-sparging/soil vapor recovery system was implemented which demonstrated it was a cost-effective alternative remedial technology for the overburden zone. Through optimization of existing remedial systems and the implementation of additional remedial technologies, we were able to sufficiently reduce long-term project costs.
- Analyzed numerous aquifer-test data sets to determine flow characteristics using both manual and computer programs such as Aqtesolv®. Data analysis methods used include more common methods such as Theis (1935) and Cooper-Jacob (1946) methods for pumping tests and the Bouwer and Rice (1976) method for slug tests, to less common methods such as Warren-Root (1963) and Kazemi, et. al. (1969) straight-line methods for pumping tests in fractured bedrock and the KGS Model (Hyder et al. 1994) for slug tests. The aquifer flow characteristics were integral to the construction of groundwater flow and fate and transport models.

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