



# PFAS Qualifications

## PFAS + GEI

The landscape around PFAS is rapidly changing. Whether there's a need to sample soil or groundwater, create site remediation plans, or gain a better understanding of the criteria to meet the evolving PFAS regulatory requirements, we're here to help.

With decades of experience, GEI's team combines solutions based in science and engineering expertise that effectively manages exposure, risk, and liabilities.

## Evolving Concerns With PFAS

Per- and poly-fluoroalkyl substances (PFAS) are a man-made family of fluorinated organic compounds historically used in many industrial, commercial, and consumer applications including firefighting foams, cookware, metal plating, food packaging, and stain protection coating.

These emerging contaminants are receiving substantial attention from regulators and the public due to their significant impact on water supplies, potential environmental significance at very low (parts per trillion) levels, persistence in the environment, and high mobility in groundwater.

In April 2024, the EPA finalized the rule designating PFAS and PFOS as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This step enhances transparency and accountability in cleaning up PFAS contamination in communities.

The EPA also released its long-awaited proposed National Primary Drinking Water Regulation (NPDWR) to establish legally enforceable levels, called Maximum Contaminant Levels (MCLs), for six PFAS substances including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorononanoic acid (PFNA), hexafluoropropylene oxide dimer acid (HFPO-DA, commonly known as GenX), perfluorohexane sulfonic acid (PFHxS), and perfluorobutane sulfonic acid (PFBS). PFOA and PFOS as individual contaminants, and PFHxS, PFNA, PFBS, and HFPO-DA (commonly referred to as GenX Chemicals) as a PFAS mixture.

Therefore, the liabilities associated with PFAS releases can be substantial, given the potential for contaminating water supplies, impacts on human health, extensive delineation requirements, and the limited availability of remediation technologies.



# Unique Challenges for PFAS

GEI believes there are certain key factors unique to PFAS that should be considered when preparing a programmatic approach for assessment. Beyond the obvious cost implications, these include:

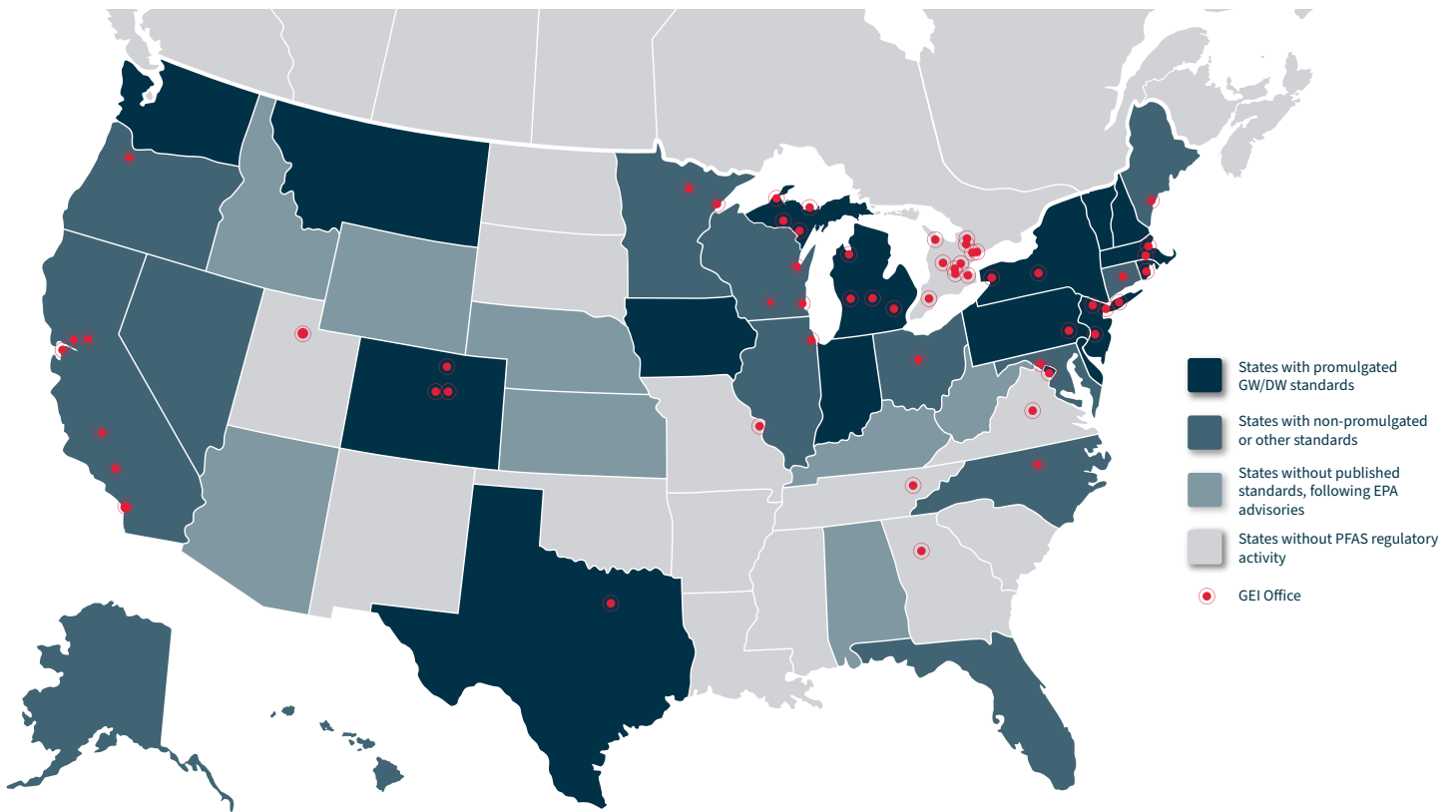
- The lack of regulatory standards for these contaminants in many jurisdictions and media, and the variability in standards among those jurisdictions that have developed standards.
- Extremely low health advisory levels and media standards developed at the state and federal level.
- Unique sampling protocols required for PFAS sampling to limit the potential for cross-contamination by common commercial materials.
- Jurisdictional requirements affecting PFAS analyte lists, data validation requirements, acceptable and unacceptable materials, required detection and reporting levels, and proposed versus enforceable standards.
- PFAS not degrading (or degrading very slowly) leading to commingled plumes and challenges with source identification.

# How GEI Can Help

GEI's National PFAS Team can help navigate this complex issue by leveraging our well-established technical expertise and reputation for trusted advice related to numerous other environmental issues, including legacy oil and gas site investigation and remediation. Our Team is experienced at:

- Regulatory review and application.
- Human health and ecological risk assessment.
- Field sampling of soil, groundwater, and other media.
- Preparing and implementing sampling plans, including expanded use of blank samples to identify potential sources of cross-contamination.
- Chemical analysis recommendations.
- Laboratory analytical data quality review and validation.
- Assessment and implementation of remediation technologies.
- Strategic planning and client advocacy.
- PFAS Forensic Conceptual Site Modeling.
- Enforcements and litigation support.

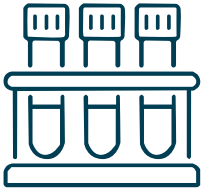
**Map of States with PFAS Regulatory Activity for Groundwater and/or Drinking Water (2024)**



GEI's National PFAS Team meets frequently to track regulatory and technical updates, develop and share operating procedures and best practices, ensuring we provide consistent and high-quality service to our clients nationwide.

# PFAS Services

GEI's PFAS experts deliver practical solutions grounded in leading-edge regulatory, science, and engineering expertise. We understand the significant challenges associated with PFAS releases, including the non-existent or very slow degradation of PFAS leading to commingled plumes and the resulting difficulties with source identification, as well as the high degree of public concern and regulatory scrutiny associated with PFAS, 1,4 dioxane and PPCPs.



## Sampling

GEI's environmental professionals have first-hand experience sampling a variety of environmental media for PFAS including soil, groundwater, sediment, and fish tissue to assess the migration of PFAS from a release area to human and ecological receptors. Where PFAS is a contaminant of concern, GEI will use its knowledge and experience to sample using appropriate field methods and at targeted locations to support the client's decision-making for a specific project site.

Our personnel include technical staff experienced in a broad range of subsurface sampling methods which may be tailored for specific project sites. If data suggests a potential for groundwater contamination, groundwater monitoring wells may be installed as part of the scope to facilitate collection of representative groundwater samples.



## Site Investigation

GEI has experience investigating numerous sites. We develop a conceptual model of the site including anticipated subsurface lithology and, if contamination is found, the likely contaminant distribution and migratory pathways relative to areas for new construction and/or acquisition.

The purpose of our hydrogeologic investigations and fate and transport studies is to collect data about groundwater characteristics, potential contaminants and the extent of contamination in subsurface environments that support risk assessment and remedial design.



## Advisory Services

GEI stays on top of the evolving knowledgebase and regulatory interpretations on the occurrence and toxicity of developing contaminants. GEI environmental professionals are helping regulatory agencies and trade associations prioritize and develop guidance for environmental practitioners and the regulated community. We are active with subcommittees that are focused on PFAS field sampling procedures, fate and transport, laboratory methods and certification, and risk communications.



## Treatment / Remediation

The GEI project team has significant experience designing and achieving approval for remediation designs. Project personnel have collectively completed over 150 remedial designs. By focusing on the end-use and consulting with our clients, we can determine which alternative allows for the highest and best use of the site.

GEI's capabilities include construction, modification, operation, and maintenance of groundwater extraction and treatment systems; free product recovery systems; chemical injection systems for use of chemical oxidants or oxygenating/deoxygenating compounds; soil vapor and dual-phase extraction systems and sub-slab depressurization systems. We have completed remedial designs for a broad range of contaminated sites, including preparation of plans, specifications, and bid documents; assisted in contractor selection; obtained necessary permits; successfully negotiated with state and federal agencies; implemented remedial actions; and conducted long-term monitoring of sites. We also have served as the general contractor for remediation implemented as part of site redevelopments ranging from small facilities to large former industrial brownfield redevelopments.

## Project Highlights

As the needs to address PFAS continue to evolve, GEI is here with the knowledge, expertise, and experience to help. Here are a few projects that we're proud to part of.



On behalf of a major petroleum refinery, GEI developed and implemented a sampling plan to investigate the presence of PFAS at the terminal facility in Colorado. This project involved identifying and implementing site-specific sampling procedures to prevent cross contamination of samples on an active oil and gas facility. GEI is also assisting the client in advocacy with the regulatory agency in limiting the scope of the sampling and evaluating the potential for a commingled plume.



GEI was involved with investigation and delineation of PFAS in groundwater at a major Superfund site. This project included developing and implementing a pilot study utilizing an injectable carbon-based product into a series of trenches to mitigate the potential downgradient migration of PFAS in groundwater. The application was the first use of this product to address PFAS in the United States. The successful application saved the PRP group over \$1M because it allowed for continued application of the planned (VOC-based) remediation at the site without a ROD amendment, 12 groundwater recovery wells and the associated treatment system to be decommissioned, and the remaining groundwater extracted from the site to be discharged to a sanitary sewer without further treatment.



On behalf of a Michigan client, GEI supported the investigation of industrial chemicals and processes throughout the client's facility to identify PFAS sources, eliminate or replace them, and significantly reduce PFAS concentrations in wastewater discharges.



In New Hampshire, a utility client is installing 13-miles of overhead, underground, and underwater electric transmission cable. GEI designed and implemented subsurface investigation to assess the potential of encountering PFAS in soil, groundwater, and surface water. GEI provided expert testimony on the potential impact of any contaminants in sediment disturbed during construction. The evaluation concluded that unacceptable conditions were unlikely and GEI experts further supported the effort by providing expert testimony in hearings, responding to community concerns about issues including PFAS, nutrients, and bacteria. Our collaboration with the team resulted in the client successfully moving forward with construction.



GEI provided expert services to the Town of Barnstable, Massachusetts, in addressing PFOS contamination in the Hyannis Water System. We confirmed that the contamination at the Mary Dunn Well Field was caused by firefighting foam used at the Barnstable County-owned Fire Training Academy (FTA). PFOS was first detected in the Mary Dunn Wells in 2009 when the Silent Spring Institute tested the Town's wells for various contaminants, including PFOS. Subsequent sampling in 2015 revealed PFOS levels as high as 1.6 µg/L. In response, the Town demanded that the County reimburse treatment costs and take all necessary actions to remediate the PFOS contamination originating from the FTA. The Town and County reached a Settlement Agreement in 2015.
















GEI is involved with the development and implementation of a pilot study at a Minnesota landfill aimed at evaluating cost-effective treatment for PFAS-containing leachate currently disposed by spray field application.

GEI has designed and/or implemented groundwater investigations at over 50 New York sites, in accordance NYSDEC requirements, aimed at assessing and delineating the presence of emerging contaminants, including PFAS and 1,4-dioxane.




# Partial Project Summary

PROJECT NAME	SERVICE	PROJECT LOCATION	CLIENT	NATURE OF PFAS SERVICES
Preliminary Site Investigation Report Evaluating the Presence of PFAS		California (various locations)	Confidential	Performed sampling of soil, groundwater, stormwater, and wastewater for 31 PFAS compounds as proposed in the preliminary work plans previously approved by the regional Water Boards. Summarized the results and delivered final reports to the regional Water Boards.
SRSNE Superfund Site		Connecticut	PRP Group	Sampling site GW, local POTW, and river to provide data to support CT DEEP approval for groundwater discharge to sanitary sewer. Design/implement pilot study to assess liquid activated carbon to mitigate PFAS migration in groundwater.
Eversource Seacoast Reliability Project		New Hampshire	Eversource Energy	Sampling soil, groundwater, surface water, and sediment in the downgradient PFAS plume of Pease Air Force Base to support installation of a new electric transmission line.
Town of Norwood PFAS Investigation		North Carolina	Chambers Engineering	Develop and implement a work plan to investigate the presence and range of PFAS concentrations in raw water and at various locations throughout the municipal water treatment system; provide data to comply with new Federal MCL initial testing requirement; develop an engineering report to evaluate remedial options, if necessary.
Litigation Support		Ohio	Law Firm	Review of expert reports submitted on behalf of the Plaintiff's claim alleging releases from the Facility may present an imminent and substantial endangerment to health and/or the environment, in violation of the Resource Conservation and Recovery Act.
PFAS Peer Review		New York	Law Firm	Peer review of another consultant's calculations of proposed allowable PFOA and PFOS allowable levels for land-disposed paper sludge residuals.
Former Cookson Site		New Hampshire	Platform	Investigation of presence and extent of PFAS in groundwater.
Brown County Landfill		Minnesota	Brown County, MN	Demonstration Research Project to look at pretreatment for the cleaning of leachate and PFAS concentrations reductions due to wetland or compost filtering of the leachate.
National Grid NY Sites		New York	National Grid	Prepared a work plan to sample for PFAS at multiple sites. The work plan included a FSP, QAPP, and procedure for selecting representative monitoring wells at each site. GEI selected monitoring wells to be sampled at 28 of the sites and implementing the sampling, evaluation, and reporting activities at these sites.
ConEd/O&R New York Sites		New York	ConEd/Orange & Rockland Utilities	Prepared a work plan to sample for PFAS at multiple sites. The work plan included a FSP, QAPP, and procedure for selecting representative monitoring wells at each site.
Groundwater Sampling for ECs		New York	Utility Company	Prepare and implement work plan for investigating PFAS and 1,4-Dioxane in groundwater at three facilities, and report to NYSDEC.
NYSEG Sites EC Sampling		New York	New York State Electric and Gas (NYSEG)	Prepared site-specific work plans for PFAS sampling at two sites. Collected groundwater samples for analysis, validated laboratory results, and prepared reports of findings.
Former Landfill EC Sampling		New York	Nixon Peabody	Prepare and implement work plan for investigating PFAS and 1,4-Dioxane in groundwater, and report to NYSDEC.
Rosen Superfund Site EC Sampling		New York	Nixon Peabody	Prepare and implement work plan for investigating PFAS and 1,4-Dioxane in groundwater at three, and report to NYSDEC.

## Partial Project Summary (continued)

PROJECT NAME	SERVICE	PROJECT LOCATION	CLIENT	NATURE OF PFAS SERVICES
Environmental Support related to Aircraft Hangar Maintenance		Michigan	Burns & McDonnell	PFAS characterization in soils at Michigan National Guard base.
NuStar Denver Terminal		Colorado	Valero	Work plan and groundwater sampling for PFAS analyses, including QA/QC samples. The site is an active bulk fueling terminal surrounded by a refinery and bulk fuel storage facilities.
MacDermid Facility		Michigan	MacDermid Performance Solutions	Soil and groundwater sampling for PFAS in former waste disposal lagoons. Also conducted sampling of wastewater and raw product samples to identify, isolate and remove sources of PFOS and PFOA from the facility. Finally, sampled the effectiveness of granular activated carbon and ion exchange resin beds to determine a method for removal of PFAS compounds from the wastewater discharge to meet regulatory requirements.
Fill Area Redevelopment		Wisconsin and Michigan	Confidential	Sampled soil and groundwater to determine the extent of impacts in planned construction areas. Analyses included Michigan 24-compound PFAS list. Once delineated, remedial options were identified. Groundwater was containerized in frac-tanks for onsite treatment using bag filters and GAC. Collected treated groundwater samples for PFAS analyses. Submitted a successful WDNR Development at Historic Fill Site or Licensed Landfill Exemption Application.
Barnstable PFOS		Massachusetts	Town of Barnstable, MA	Expert services to the Town of Barnstable regarding PFOS contamination of the Hyannis Water System operated by the Town.
PFAS Leaching Model for Biosolids		Michigan	Confidential	Develop model to estimate PFAS partitioning between P&P residuals and groundwater.
O'Hare Soil Sampling		Illinois	American Airlines	Characterize PFAS presence in soils to assess management/disposal options.
Bourne Switching Station		Massachusetts	Eversource Energy	Characterize PFAS presence in soils for potential reuse on same property (JBCC).
Paper Sludge Residual Partition Model		Michigan	Confidential	Model to estimate PFAS partitioning between P&P residuals and groundwater.
Airport PFAS Investigation and Management		Confidential	Confidential Law Firm	Investigate PFAS in soil and groundwater; source area forensics; management of impacted media; develop Conceptual Site Model of PFAS sources and migration pathways.
PFAS Investigation		New Jersey	ITRAN Rubber	Assess and delineate extent of PFAS associated with ongoing LSRP support at a rubber molding facility.
Management of PFAS-Impacted Soil at Airport		Massachusetts	Epsilon Associates & Airport Solutions Group	LSP services to support redevelopment and expansion of existing access road and infrastructure through a PFAS-impacted area at Barnstable Municipal Airport.
Silresim Superfund Site		Massachusetts	Mass DEP	Groundwater sampling from monitoring and extraction wells for PFAS analyses. Prepared a field sampling plan and QAPP for State approval prior to initiating field activities. The site contains an active groundwater treatment plant for VOC remediation.
PFAS Strategy (Privileged & Confidential, AWP)		U.S. and Canada	Confidential	Data collection and risk screening/site prioritization for North American asset portfolio; assist in developing corporate management strategy.

## Partial Project Summary (continued)

PROJECT NAME	SERVICE	PROJECT LOCATION	CLIENT	NATURE OF PFAS SERVICES
Fire Response Water Treatment		Michigan	Confidential	Design, construct, operate treatment system to address ~540,000 gal of PFAS-impacted stormwater and firefighting water from fire at commercial building where PFAS-containing chemicals were stored.
Green Bay Sludge Testing		Wisconsin	Green Bay Water Utility	Green Bay Water Utility purifies water from Lake Michigan by adding a chemical flocculant. The resultant solids (sludge) settle in a lagoon. The sludge is periodically dredged and land-applied on local farm fields. To promote transparency with landowners, GBWU analyzes this sludge for PFAS. GEI was retained to compose a document that explains the PFAS results to landowners.
Project OX		Michigan	Confidential	Industrial effluent treatment, including evaluation of various treatment technologies.
PFAS forensic conceptual site modeling			Confidential	Created a forensic csm analysis of soil and groundwater PFAS analytical data to identify potential sources and transport pathways.

## Key Team Members

Our team analyzes the distribution of PFAS in the environment, assess the risks they pose, creates solutions, and supports efforts to reduce future impacts.

This integrated approach is critical for managing exposure, risks, and potential liabilities associated with these emerging contaminants.



**Jeffrey Holden, P.E.**  
GEI's PFAS Team Leader

Mr. Holden is an environmental engineer with extensive experience in the investigation of PFAS contamination and the design and implementation of remedial systems. He stays up to date on the latest national PFAS regulations, has been responsible for PFAS investigations in multiple states, is a member of the ITRC PFAS working group, has delivered numerous PFAS-related presentations to businesses and conferences, and designed and implemented a pilot study to evaluate the first application of PlumeStop® in the US aimed at in-situ PFAS mitigation in groundwater.



**Jim Cloonan, P.E.**  
Market Growth Leader

Mr. Cloonan is a senior project manager with experience in the design of air, wastewater, ground water, and hazardous waste treatment systems. Mr. Cloonan is responsible for preparing Feasibility Studies under CERCLA, Corrective Measure Studies under RCRA, remedial design under CERCLA, and for conceptual and detailed designs for hazardous waste and groundwater remediation systems.

**50+**

Team  
Members

## Key Team Members (Continued)



**Faith Zangl-Wiese, P.E., P.G.**  
**Hydrogeology**

Ms. Zangl-Wiese has diverse engineering and hydrogeology experience encompassing beneficial use, environmental compliance and monitoring, landfill design, and geotechnical investigations. She has PFAS experience partition modeling between paper mill wastewater residuals and surface/groundwater during land application at various paper mills in Michigan and New York for beneficial reuse.



**Solidea Bonina, Ph.D.**  
**Senior Environmental Consultant**

Dr. Bonina's expertise is in environmental engineering focusing particularly on analytical methodology development and sediment pollution and remediation advancing solutions to environmental issues and public health impairments from legacy and emerging contaminants (e.g., per- and polyfluoroalkyl substances [PFAS] polycyclic aromatic hydrocarbons, polychlorinated biphenyls [PCBs], semivolatile organic analysis, target phenols, metals, etc.).



**Robert Gensemer, Ph.D.,**  
**Vice President and Senior Ecotoxicologist**

Dr. Gensemer specializes in the development of risk-based remedial goals and the development and revisions of water quality and other environmental regulatory standards. His primary technical specialties include ecological risk assessment and management, ecotoxicology, and applying scientific advances in support of regulatory change. He is a member of the ITRC team that continues to update the Technical and Regulatory Guidance report for PFAS, and recently helped author a new section of this report related to surface water quality.



**Ryan R. Holem**  
**Biologist/Toxicologist**

Mr. Holem has field and laboratory-based toxicological experience with chlorinated compounds (e.g., dioxins, PCBs), metals, nutrients, and PFAS (e.g. PFOS) including projects on the Mississippi and Tennessee Rivers. In recent years, Mr. Holem has presented at scientific conferences on the topic of PFAS-based fish consumption advisories and was a co-author on the publication "Spatial and Temporal Trends of Poly-and-Perfluoroalkyl Substances in Fish Fillets and Water Collected from Pool 2 of the Upper Mississippi River."



**William Silverstein, P.E., LSRP**  
**Senior Consultant**

Mr. Silverstein's technical specialties include chemical and environmental engineering; solid and hazardous waste and remediation project management; remediation systems design, permitting and construction management; underground storage tank management; cost estimation/allocation, compliance management, and litigation support.



**J. Michael Hawthorne, PG**

Mr. Hawthorne specializes in the development of strategic plans for management of environmental liabilities as well as the creation of forensic conceptual site models to better understand source, fate, and transport of PFAS and other contaminants as well as associated potential liabilities. He is a member of the PFAS Coalition and supports GEI's PFAS clients in enforcement and litigation support work as well as routine projects.



**Steve Michalanko,**  
**Senior Ecologist**

Mr. Michalanko is a Senior Scientist and Ecologist with experience evaluating ecological risks/toxicology from environmental hazards. Mr. Michalanko's background both as an ecologist and environmental toxicologist provides full-spectrum support for all ecological components involved in remedial investigations and environmental toxicology issues.



**Kathi Stetser, LSRP**

Kathleen Stetser is a senior scientist and a senior member of the PFAS team who leads much of GEI's environmental liability management work in the Eastern U.S. She has a particular expertise with complex technical and regulatory projects requiring a high degree of scientific and regulatory knowledge and experience, and is highly experienced in enforcement and litigation support projects.









## GEI Consultants

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GEOTECHNICAL  
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