

**RFP 24-75270
TECHNICAL PROPOSAL
ATTACHMENT F**

Instructions: Please supply all requested information in the areas shaded yellow and indicate any attachments that have been included to support your responses.

2.4.1 General Requirements and Definitions

2.4.1.1 Please list any additional terms and definitions used by your company or industry that you would like the State to consider incorporating in the contract. The State will not accept terms and definitions introduced after award during contract finalization and implementation.

None.

2.4.1.2 Please confirm you have carefully reviewed all requirements listed in RFP Section 1.4. Should your company have any exceptions, substitutions, or conditions for the State’s consideration, please list them below. The State will not accept exceptions, substitutions, or conditions introduced after award, during contract finalization and implementation.

August Mack confirms receipt of Addendum #1 posted on September 1, 2023.

2.4.2 Implementation and Schedule

2.4.2.1 Please describe your company’s proposed implementation plan, citing specific tasks, dates, milestones, and meeting cadence.

Following the contract award date, August Mack will coordinate an initial kickoff meeting no later than two (2) weeks after the contract has been awarded. The Kickoff will incorporate all appropriate staff that will be associated with this contact. Following the initial kickoff meeting, August Mack will begin to schedule and coordinate the bi-weekly inspections, GES sampling: monthly, quarterly, and semi-annual sampling, and prepare monthly discharge monitoring reports (DMRs). In addition, August Mack will hold monthly update meetings with IDEM on Site progress. August Mack will also coordinate and establish a routine schedule for the following annual task:

- Task 2e. Jet-washing
- Task 2g. Calibrations
- Task 3b. Annual groundwater sampling

2.4.3 Operation and Maintenance of the Groundwater Extraction System

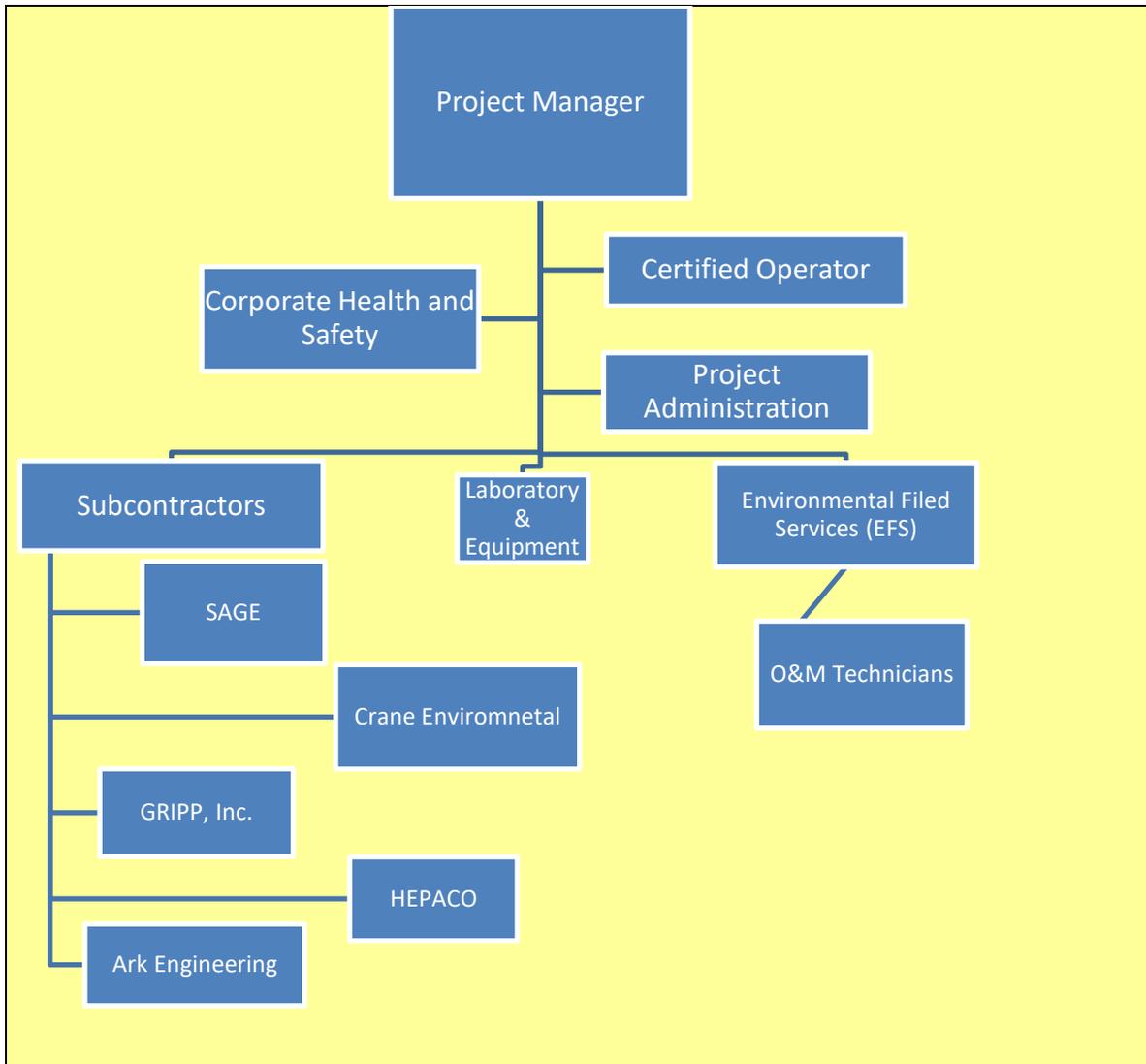
- 2.4.3.1 Please describe your company's experience and capacity to maintain a large network groundwater extraction system, including experience with system troubleshooting and repair.

August Mack's subsidiary, Environmental Field Services (EFS), has operated and maintained numerous groundwater extraction systems over its 35 years of operation and is currently contracted to provide O&M services at the Continental Steel site. August Mack and EFS employ over 200 full-time employees consisting of Engineers, Geologists, Scientists, Equipment Operators, and laborers to execute project work and have ample capacity to continue to O&M services at the Site. We respond timely to alarm conditions and efficiently troubleshoot operational issues.

- 2.4.3.2 Please describe your company's capability for short term response to system shutdown or other upset condition response, including expected response timeframes.

August Mack and EFS offices are within an hour of the Site. A dedicated project manager is assigned to each project under contract and that manager will monitor system operation over the contract period and mobilize personnel as appropriate to respond to system shutdown or other upset conditions. In the event of a shutdown or upset condition August Mack project management team would respond to the alarm within 15-minuts of onset and mobilize a technician within an hour.

- 2.4.3.3 Please provide your company's expected structure for this contract, including project managers, support staff, subcontractors, and other technical personnel.



2.4.3.4 Please describe your company’s standard process for problem resolution, including standard response time. Please describe the escalation process if the standard resolution process cannot resolve an issue.

When a problem is identified, whether it be in the field, with a subcontractor or from a client, it is promptly reported to the August Mack Project Manager. The Project Manager will then assess the issue and resolve it as soon as possible, generally within the hour of problem identification. If resolution to the problem is atypical or warrants higher level consideration, the problem is escalated to the Principal Manager to which resolution of the problem will be resolved as soon as possible. Whether the problem resolution comes from the August Mack Project Manager or Principal Manager, action will be taken within the hour of notification of the problem.

2.4.3.5 Please describe how your company would coordinate with the IDEM project manager to complete non-routine or complex tasks.

Should there be the need to complete non-routine or complex tasks, August Mack intends notifying IDEM via email or phone communication for concurrence prior to executing the task.

2.4.4 Sampling and Analysis

2.4.4.1 Please provide your company's experience and technical capability for groundwater sampling and monitoring.

Throughout its 35 year history, August Mack has conducted groundwater sampling and monitoring at hundreds of facilities throughout the United States. The groundwater sampling and monitoring activities were conducted at Sites pursuing regulatory closure through the Indiana Department of Environmental Management's (IDEM) Leaking Underground Storage Tank (LUST)/Petroleum Remediation Section (PRS), State Cleanup Program (SCP), and Voluntary Remediation Program (VRP), as well as Federal regulatory programs, including Superfund. Groundwater sampling methods utilized include low-flow groundwater sampling (using bladder pumps, centrifugal pumps, and peristaltic pumps), Geoprobe® Direct-Push groundwater sampling techniques, and the use of disposable bailers. Additionally, August Mack has utilized alternative groundwater sampling technologies, including passive diffusion bags (PDBs). August Mack employs a dedicated team of geologists, engineers, and scientists who are well versed in groundwater sampling and monitoring technologies and methods. August Mack recognizes the importance of collecting samples in a manner consistent with maintaining the integrity of samples. Details such as adhering to proper sample collection and handling procedures, preservation requirements (i.e. pH adjustment or temperature regulation), following strict chain-of-custody documentation and keeping account of analytical hold times are stressed during August Mack sampling projects. Sampling is performed in accordance with all applicable data quality objectives (DQO) as presented in IDEM guidance or the project specific Quality Assurance Project Plan (QAPP), which commonly includes the collection of duplicate samples, equipment rinse blanks, field blanks, matrix spike samples and trip blank samples. The degree of quality assurance quality control (QA/C) sample collection is typically dependent upon the project sensitivity.

2.4.4.2 Please provide your company's experience and technical capability for groundwater monitoring reporting, interpretation of results, and trend analysis.

As stated above, August Mack has implemented quarterly, semi-annual, and annual groundwater monitoring programs at hundreds of Sites pursuing regulatory closure across Indiana. August Mack has evaluated laboratory analytical data collected at these Sites and prepared thousands of groundwater monitoring reports in accordance with the established guidelines of State and Federal regulatory programs. As part of the thousands of groundwater monitoring reports, August Mack has evaluated contaminant concentration trends using various statistical methods, including the Mann-Kendall Trend Analysis. August Mack employs a team of geologists, scientists, and engineers who are well versed in data evaluation and statistical methods for evaluating contaminant concentration trends in groundwater.

2.4.5 Project Management

2.4.5.1 Please provide your company's experience regarding management of remediation sites in the state of Indiana, including any work under the Superfund program.

August Mack Environmental, Inc. is a full-service environmental, health and safety (EH&S) consulting firm with over 35 years of experience. August Mack manages remediation sites under the Superfund Program. August Mack has prior experience on Federal project sites, having worked at over 50 Federal facilities across the country. August Mack has completed over 40 projects at Comprehensive Environmental Resource Compensation and Liabilities Act (CERCLA), or Superfund, sites performing excavation and relocation of contaminated materials across the United States.

August Mack also performs regulatory compliance; environmental due diligence and risk management; site investigation/remediation/closure; and sustainability services to the industrial, legal, financial, health care and government sectors throughout North America. Many of our projects are a direct result of requirements imposed on our clients from the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Clean Air Act (CAA) or Clean Water Act (CWA). With more than 30 years of experience, August Mack has a reputation for providing superior customer service and expertise in helping clients achieve effective, efficient, and permanent solutions to their EH&S concerns.

August Mack employs numerous experienced engineers, geologists, environmental scientists, chemists, mitigation specialists and industrial hygienists with extensive technical expertise and knowledge of regulations from the Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA) and state agencies. With offices in Indiana, Michigan, Missouri, Ohio and Pennsylvania, August Mack is able to service the environmental, health and safety needs of clients across the United States, Mexico and Canada.

August Mack's wholly owned subsidiary is Environmental Field Services, Inc. (EFS). EFS performs construction related work including remedial construction and long-term operations and maintenance.

2.4.5.2

2.4.5.3 Please describe your company's experience and capacity to provide comprehensive support for discharge permitting issues, including revision, renewal, and negotiation of permit limits for operations.

August Mack employs numerous Compliance and Water Resources staff that routinely navigate permitting issues with delegated local pretreatment programs as well state and federal regulators. Our staff perform several permit revisions and renewals on behalf of our clients each year and have frequently met with regulators to discuss permit limitations for facilities in Indiana, Ohio, Michigan, and Pennsylvania.

Our team is skilled at communicating with regulators and our operations teams to implement programs which reflect changes in permitted limits in efforts to reduce possible non-compliance at the facility. This has included the development of Action Plans to outline operational or process changes required as a result of changes to the facility's permitted limits.

2.4.5.4 Please describe in detail your company's proposed project management team structure including names, contact information, resumes where possible, and services each individual or group will perform.

August Macks project team for the Continental Steel Superfund project will include the following:

- **Zach Ramey, Practice Leader.** For this scope, Mr. Ramey will act as a project leader and provide oversight, management, and coordination as well as project scoping and technical expertise as required for the work.
- **Jeremiah Miller, Project Manager.** Mr. Miller will act as the Project Manager for this scope of work, providing day-to-day coordination, resource allocation, and oversight. In addition, Mr. Miller will act as the designated Point of Contact for communications between the project team, the contractor, shareholders, and any regulatory agencies.
- **Michael Gagermeier, Health and Safety Manager.** Mr. Gagermeier will act as the manager of health and safety for this project scope, enforcing and managing August Mack's standards for health and safety, including evaluation of on-site hazards and proper rectifications.
- **Dr. Jase L. Hixson, Director of Water Resources.** As an expert in wastewater, Dr.

Hixson will provide permit renewal expertise and consulting for all wastewater-related services.

- **Anthony Henley, Senior Consultant.** Mr. Henley will provide permit renewal expertise and consulting for all wastewater-related services.
- **Andrew Herrmann, Senior Geologist.** (Geological, groundwater reporting.)
- **Andy Tennyson, Senior Analyst.** Mr. Tennyson will provide data management and analysis, as well as quality control of all deliverables.
- **Justen Stutz, Estimator** Mr. Stutz will operator as the manager of operations and maintenance, providing oversight, coordination, and expertise for all aspects of work related to those services.

Contact information and complete resume information for each of these team members will be attached to this document.

2.4.6 Reporting

- 2.4.6.1 Please describe in detail your company's reporting capabilities. What are the standard reports that your company provides to your customers for superfund sites? Please include report examples as an attachment.

August Mack employs a team of Environmental Specialists, Data Management Specialists, Project Administrators, Geologists and Engineers that routinely develop reports for state and federal agencies. Standard reports that August Mack develops include.

- Quality Assurance Project Plans
- Sampling and Analysis Plans
- Monthly Monitoring Reports
- Discharge Monitoring Reports
- Groundwater Monitoring Reports
- Initial and Further Site Investigation Reports
- Remediation/Mitigation Work Plans
- Remediation/Mitigation Implementation Reports
- Expert Witness Reports

Because August Mack maintains a pool of junior and senior staff, the company has the capacity to manage the preparation of many reports simultaneously. Each report that is developed has contributions from Field Staff, Data Management Specialists, Geologists and/or Engineers. Reports that are drafted are then sent through a rigorous review process by Senior and Principal staff to ensure all reports are accurate, consistent, and representative of a high-quality work product that August Mack prides themselves on. An example report is attached for reference.

- 2.4.6.2 Please provide your company's experience providing comprehensive site reporting including groundwater monitoring, O&M reporting, permitting and annual reporting

in support of extended site operation.

As stated above, August Mack employs a team of Environmental Specialists, Data Management Specialists, Project Administrators, Geologists and Engineers that routinely develop reports for state and federal agencies. In addition, August Mack employs numerous Compliance and Water Resources staff that routinely navigate permitting issues with delegated local pretreatment programs as well state and federal regulators.

2.4.6.3 Please describe your company's mechanisms that are in place to ensure a timely submission of time-sensitive reporting deadlines.

All information regarding the scope of work will begin to be tracked in August Mack's internal CRM/Project Management program, Vantagepoint that is used to ensure timely submission of time-sensitive deliverables. The work will be assigned a unique code and all personnel on the established team for the work will be outlined, as well as a timeline for the project. All instances of communication between the contractor and the August Mack team will be recorded in Vantagepoint to ensure accountability of communication. Vantagepoint will be kept updated as the phases of work progress. All information and milestones regarding the work will be tracked in Vantagepoint. Internal workflow will be managed via task assignments delegated from management personnel, allowing for detailed tracking and oversight of the project timeline and on-time submission of all deliverables to the client.

2.4.6.4 Please detail your company's ad hoc reporting capabilities, including how long the state will wait to receive new requests for information.

Upon receiving the ad hoc request August Mack will begin generating a prompt response that will be sent to the state no later than 48 hours. August Mack and EFS employ over 170 full-time employees consisting of Engineers, Geologists, Scientists, Equipment Operators, and laborers to complete ad hoc reports promptly.

Personnel Resumes



Practice Leader
zramey@augustmack.com

Zach is a Practice Leader in August Mack Environmental, Inc.'s Indiana office and has over nine years of environmental consulting experience. He is a Licensed Professional Geologist (LPG) with professional experience and technical expertise in Indiana Department of Environmental Management (IDEM) state cleanup, voluntary remediation, Leaking Underground Storage Tank (LUST), and Brownfields programs. Zach has knowledge of residential, commercial, and industrial site assessments, site investigations, and remediation work with petroleum, metals, and chlorinated solvent subsurface impacts. He has managed dozens of projects with surface soil, subsurface soil, groundwater, and/or vapor impacts, leading to sampling/evaluating these media, remedial evaluation/design/installation, risk analysis, and site closure. Additionally, Zach has managed healthcare construction projects which included underground storage tank (UST) removal, above ground storage tank (AST) installation, and brine system installation.

Project Experience

- Investigated dozens of sites to determine the nature and extent of contamination in surface/subsurface soil, sediment, groundwater, surface water, and air.
- Evaluated, installed, and implemented source-area remediation. Remedial approaches included excavation, electrical resistance heating (ERH), chemical injections, and the use of institutional controls such as Environmental Restrictive Covenants (ERCs).
- Investigated numerous sites for vapor intrusion (VI). Tasks included access negotiations, sub-slab port installation/sampling, exterior soil gas sampling, preferential pathway sampling, data evaluation, mitigation design/installation/operation, and confirmatory sampling.
- Underground Storage Tank (UST) removal/closure.
- Aboveground Storage Tank (AST) system design, permitting, and installation.

Education & Certifications

- B.S., Geology, Indiana University - Purdue University Fort Wayne
- 40-Hour Hazardous Waste Site Operations (HAZWOPER) Training, OSHA and current 8-hour refresher
- Licensed Professional Geologist – Indiana
- UST Decommissioning License

Expertise

- Geologic and Hydrogeologic Investigations
- Soil, Groundwater, and Air Sampling
- Risk Based Closure
- Vapor Intrusion
- Remedial Construction – Soil Excavation and Disposal, UST Removal, and AST Installation.

Professional Experience

August Mack Environmental, Inc.
Practice Leader
2022-Present

Senior Development Services Manager
2012-2022

Project Manager
2018-2021

Staff Geologist
2015-2018

Field Geologist
2012-2015



Development Services Project Manager
jmiller@augustmack.com

Jeremiah serves as a Development Services Project Manager in August Mack’s Indiana office. He has over five years of experience involving subsurface investigation, pilot testing, and Phase I Environmental Site Assessments (ESAs). Jeremiah also has experience with residential, commercial, and industrial site assessments, site investigations, and remediation work with petroleum, metals, and chlorinated solvent subsurface impacts.

Project Experience:

- Managed and performed groundwater sampling activities at multiple sites in Indiana. Responsibilities included collecting samples via dedicated bailer and low flow techniques, interpreting lab results, and preparation of appropriate maps, figures, and tables for quarterly reports. Conducted slug tests and pumping tests to determine hydraulic conductivity and pump efficiency.
- Conducted thorough environmental evaluations of sites in accordance with the ASTM-1507-05 Phase I Environmental Site Assessment (ESA) standard. Activities for the ESAs included but are not limited to: a site inspection, an investigation of historical uses, interviews, environmental document review, and developing a final report with recommendations.
- Performed multiple subsurface investigations utilizing Geoprobe direct push, hand auger and shovels/scoops. Activities include performing field screening and classification of soil borings, collection of field samples and overseeing installation of temporary piezometers and monitoring wells for groundwater sampling.
- Performed vapor intrusion (VI) investigations at multiple commercial and residential buildings. Activities included installing stainless steel sub-slab sampling ports in concrete slab foundations, assembly of port to canister sampling trains, vapor port sub-slab sampling, crawl space air sampling, and outdoor ambient air sampling. VI projects followed Indiana Department of Environmental Management (IDEM) Remediation Closure

Expertise:

- Subsurface investigation and sampling
- Monitoring well installation
- Groundwater sampling and evaluation
- Phase I ESAs
- Vapor intrusion sampling
- Pilot testing
- Slug testing
- CSM development

Professional Experience:

August Mack Environmental, Inc.
Development Services Project Manager
2021-Present

Staff Geologist
2019-2021

Field Specialist
2016-2019

Education & Certifications:

- B.S. Geology, Purdue University
- OSHA 10 Hour Construction, IN
- OSHA 40 Hour Hazwoper, IN
- OSHA Hazwoper Supervisor, IN



Health and Safety Manager mgagermeier@augustmack.com

Michael serves as the Health and Safety Manager for August Mack. He has over 27 years of specialized safety experience and over nine years of safety supervisory management experience, involving extensive knowledge of state and federal environmental, safety, and health laws, including systems, policies, methods, and practices to achieve occupational safety and health strategic objectives. He has extensive background in performing risk analysis studies and audits to reduce workplace accidents.

Project Experience:

- Prepared and updated corporate policies and procedures for all facilities belonging to a multi-national corporation.
- Developed an Emergency Action Plan and Business Continuity Plan for a plastic injection molding corporation.
- Developed risk management and safety recommendations for a tooling company following an ISO45001 Gap Analysis.
- Written dozens of safety plans for a variety of corporations.
- Reviewed and revised Health and Safety manuals for a wide variety of clients.
- Reviewed and revised Hazard Communication programs for industrial and remediation clients.
- Conducted numerous safety investigations with closure of corrective actions.
- Conducted numerous health and safety audits at various industries.
- Developed and presented safety metrics and innovative methods to reduce accidents across all Midwest branches of a company.
- Developed fleet management program

Education & Certifications:

- B.A. International Studies
- M.A. Public Affairs with Concentration in Environmental Management
- Safety Specialist Certificate - ICC
- OSHA 30 Hour General Industry Safety and Health
- Hazwoper 40 hour Training
- Global Harmonization System Training
- GRI Sustainability Coursework
- OSHA 510 construction
- OSHA 30 hour construction

Expertise:

- Instructor for RCRA/DOT Courses
- Instructor for IATA/IMDG Courses
- Instructor for SPCC, SWPPP, and Haz Comm Courses
- Instructed Job Safety Analysis Training
- Managed MSDS/SDS Electronic Platform
- Industrial Hygiene
- Developed Lockout/Tagout Plans and acted as instructor for Lockout/Tagout Course
- Instructor for electrical safety courses

Professional Experience:

August Mack Environmental, Inc.
Health and Safety Manager
2022-Present

Compliance Manager
2020-2022

Nachi Tool America
Safety Coordinator/Operations Coordinator
2015-2020

Aerotek
Regional Safety Manager
2013-2015

Chemtura
Environmental, Health, and Safety Manager
2012-2013

Volt
Safety Manager
2011-2011

ITT Water and Wastewater
EH&S Coordinator
2002-2011



Director of Water Resources
jhixson@augustmack.com

Dr. Jase Hixson is the Director of Water Resources at August Mack. He has a wide range of experience, including academic research, modeling, and industrial operations, all of which have centered around water and the people, organisms, and environments that rely on it. His primary areas of expertise include environmental fate modeling, surface water and groundwater hydrology, and wastewater treatment operations.

Project Experience:

- Operated and consulted for industrial and municipal wastewater treatment plants ranging from 200 gpd to 85.0 MGD. Optimized biological treatment of wastewater through microscopic analysis and a mass-balance approach to determine the most effective method to achieve and maintain regulatory requirements while minimizing operational costs.
- Constructed and evaluated hundreds of surface water, groundwater, and coupled hydrologic models to assess the fate and transport of water and solutes.
- Investigated dozens of sites to determine the nature and extent of contamination, establish remediation strategies, and forecast remediation efficacy. Contaminants of concern included perfluoroalkyl and polyfluoroalkyl substances (PFAS), nutrients, harmful algal blooms (HABs), petroleum, volatile organic compounds (VOCs), acids, caustics, heavy metals, pesticides, herbicides, and wastewater-derived emerging contaminants.
- Developed environmental and paleoenvironmental reconstructions of freshwater systems to identify contamination sources and establish remediation criteria through microscopic analysis of living and fossil diatom assemblages. The results were used to construct and calibrate coupled biologic and hydrologic models capable of simulating the environmental conditions, extent of contamination, and forecast system recovery.

Expertise:

- Environmental fate modeling
- Water/wastewater treatment
- Surface water/groundwater hydrology
- Algae taxonomy

Professional Experience:

August Mack Environmental, Inc.

Director of Water Resources

2022-Current

Hydrogeologist/Geologist

2021-2022

120Water

Technical Advisor to the Director

2020-2021

Bynum Fanyo Utilities, Inc.

Licensed Wastewater Operator

2019-2021

Laboratory Manager

2018-2019

Education & Certifications:

- Ph.D. Environmental Science, Indiana University
- Ph.D. Minor in Geology, Indiana University
- M.S. Earth & Quaternary Systems, Indiana State University
- B.S. Earth & Environmental Sciences/Geosciences/Physics, Indiana State University
- 40-Hour Hazardous Waste Site Operations (HAZWOPER) Training, OSHA and Current 8-hour refresher
- Class C - Certified Wastewater Operator
- Class III - Certified Wastewater Operator



Senior Consultant
ahenley@augustmack.com

Anthony is a Senior Consultant with August Mack Environmental, Inc. He specializes in compliance with the Clean Air Act (CAA), Resource Conservation & Recovery Act (RCRA), Spill Prevention Control & Countermeasures (SPCC), Clean Water Act (CWA), and Emergency Planning and Community Right-to-Know (EPCRA).

Project Experience:

- Prepared SPCC plans for a variety of facilities to comply with regulations.
- Conducted weekly storm water management inspections of a 30-acre construction site to demonstrate compliance with storm water and erosion control regulations. Inspections consisted of inspecting erosion control practices (silt sacks, silt fencing, hay bales, etc.), identifying deficiencies, and recommending corrective actions.
- Advised facilities on applicability to a variety of federal air regulations (e.g. NESHAP, NSPS) and assisted facilities in achieving and maintaining compliance with those regulations.
- Prepared annual and biennial hazardous waste reports for multiple industrial clients to comply with RCRA regulations.
- Conducted industrial hygiene sampling to aid facilities in complying with OSHA standards.
- Coordinated stack testing at numerous facilities to comply with permit requirements and prepared stack test reports to be submitted to the regulatory authority.

Expertise:

- Storm Water Pollution Prevention Plan (SWPPP) preparation
- SPCC preparation
- Storm Water Sampling and Reporting
- Air Permitting and Reporting
- Chemical Reporting
- Industrial Hygiene Sampling
- Tier II Reporting
- Form R Reporting
- Tier II Form R MAERS

Professional Experience:

August Mack Environmental, Inc.
Senior Consultant
2022-Present

Senior Compliance Manager
2017-2022

Compliance Manager
2011-2017

Education & Certifications:

- B.S. Environmental Science, The Ohio State University
- 40-Hour Hazardous Waste Site Operations (HAZWOPER) Training, OSHA and current 8-hour refresher
- Leak Detection and Repair (EPA Method 21) Training
- Opacity Reading Certification (EPA Method 9)



Senior Geology/Reporting Manager
aherrmann@augustmack.com

Andrew Herrmann serves as Senior Geology/Reporting Manager for August Mack Environmental, Inc. He has over 10 years of experience in the investigation and management of contaminated media, including surface water, groundwater, soil, hazardous and non-hazardous waste, asbestos, lead, polychlorinated biphenyls (PCBs), industrial hygiene, and indoor air quality. In his current role, he oversees the coordination and implementation of sites within the leaking underground storage tank (LUST) program, Indiana Brownfields Program, and the State Cleanup Program (SCP). He also has extensive experience in site investigations and remedial work at sites within Indiana's Voluntary Remediation

Program (VRP), Resource Conservation and Recovery Act (RCRA), and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) programs.

Project Experience:

- Design and installation of industrial wastewater and air pollution control systems.
- Preparation and implementation of RCRA hazardous waste closure plans.
- Design and implementation hazardous waste treatment systems.
- Aboveground and underground storage tank system design, certification, and closure.
- Property acquisition and divestiture assessments.
- Federal, state, and local regulatory permitting for air, wastewater, and solid and hazardous waste.

Education & Certifications:

- B.S. Geology, Ball State University
- B.S. Natural Resources and Environmental Management, Ball State University
- 40-Hour Hazardous Waste Site Operations (HAZWOPER) Training
- Asbestos Building Inspector
- Certified Hazardous Materials Manager (CHMM)
- Department of Transportation (DOT) Hazardous Material Instructor
- Registered Professional Geologist, Indiana
- OSHA 10-Hour Construction Training
- OSHA 30-Hour (General Industry Safety and Health)

Expertise:

- Asbestos Survey and Abatement
- Mold Survey and Remediation
- Property Condition Assessment
- Site Assessment
- Tank Management
- Well Installation and Abandonment
- Vapor Intrusion
- Indiana VRP
- Investigation/Remediation Experience for Federal Sites
- Regulatory Negotiations
- CERCLA Investigations

Professional Experience:

August Mack Environmental, Inc.
Senior Geology/Reporting Manager
2022-Present

Geologist
2014-2022

Patriot Engineering and Environmental, Inc.
Project Manager
2013-2014

August Mack Environmental, Inc.
Field Scientist/Geologist
2009-2013

Corporation for Environmental Management
Environmental Scientist/Industrial Hygienist
2008-2009



Senior Data Manager

atennyson@augustmack.com

Andrew Tennyson is a Senior Data Manager with August Mack Environmental, Inc. He has more than 15 years of experience and specializes in laboratory methodology, site investigation, risk assessment, and environmental data management. In his role as a Senior Analyst, Andy focuses on the presentation, interpretation, and analysis of environmental data for August Mack's compliance, transaction, building sciences, and closure clientele.

Project Experience:

- Designed, managed, and executed soil, groundwater, and vapor investigations throughout Indiana, Illinois, and Ohio including leaking underground storage tank facilities, manufactured gas plants, and other complex industrial sites. Responsibilities included sampling, interpreting analytical results, data validation, and authoring and reviewing milestone reports, and stakeholder interaction.
- Designed and implemented multiple phases of investigative work and coordinated the creation and review of technical documents guiding the performance of non-time critical removal actions for a West Virginia Superfund site, including direct contact with clients, oversight consultants, and state and federal program managers. Investigations included underwater diving reconnaissance, sediment sampling, barge-mounted roto-sonic drilling, dredge design, and upland soil, sediment, surface water, and groundwater sampling.
- Authored and performed quantitative risk analysis for Human Health and Ecological Risk Assessments in support of site closures.
- Provided litigation support for reasonable and necessary costs determination as well as prepared sworn affidavits regarding site investigation subject matter expertise.
- Expertise in analytical methodology and environmental data analysis.

Education & Certifications:

- B.A. Mathematics, University of Maine at Orono
- B.A. Business Administration Minor, University of Maine at Orono
- 40-Hour Hazardous Waste Site Operations (HAZWOPER) Training, OSHA and current 8-hour refresher
- Certified Hazardous Materials Manager
- Registered Water Well Driller, Indiana

Expertise:

- RCRA Project Management
- Superfund Project Management
- Soil and Groundwater Remediation (including Petroleum, Solvent, and MGP sites)
- Risk-Based Assessment and Site Closure
- EPA Superfund - Site Management
- Laboratory Methodology
- Geotechnical / Environmental Drilling Methodologies
- Environmental Well Installation
- Qualitative & Quantitative Risk Assessment
- Vapor Intrusion Assessments / Sub-slab Depressurization System Design
- Environmental Data Management
- Environmental Site Investigations (Phase II)
- Underground Storage Tank (UST) Evaluation, Remediation, and Closure

Professional Experience:

August Mack Environmental

Senior Data Manager, 2022-Current

Senior Analyst, 2018-2022

Data Management Specialist, 2016-2018

Project Manager, 2013-2016

Staff Scientist, 2013-2013

Alt & Witzig Consulting Services

Project Manager, 2008-2013

Drill Coordinator, 2006-2008

Pace Analytical Services

Project Manager/Sales Supervisor, 2005-2006

Project Manager, 2003-2005



Operations & Maintenance Manager

jstutz@augustmack.com

Justen Stutz has over five years of experience in the environmental consulting and construction industry including direct experience in the investigation, remediation, and management of leaking underground storage tanks (LUST) and Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)/Superfund sites. Additional experience includes design and construction of remediation systems, wastewater treatment design and operations, development of remediation work plans, and regulatory negotiation.

Project Experience:

- Operated 20 GPM wastewater treatment system that included pH adjustment, flocculation, particulate and carbon filtration for the removal of PCB's, metals and oil and grease from storm water prior to discharge to the publicly owned treatment works.
- Certified operator in responsible charge of four (4) industrial wastewater treatment systems.
- Designed a trench drain system to intercept PCB impacted storm water. A watershed analysis was conducted to determine the storm water run-off time of concentration and subsequent peak flow. From this evaluation, the trench drain system was sized and a vendor was recommended to supply the trench drain materials.
- Operated and maintained a storm water collection and treatment system including: influent and effluent monitoring, pH adjustment, flocculant addition, changing bag filters and replace/fix operational components.
- Designed and installed a sub-slab and crawl-space depressurization system to prevent vapor intrusion in a residential home.

Education & Certifications:

- B.S. Environmental Engineering, Michigan Technological University
- Indiana Radon Mitigator
- Indiana Secondary Radon Tester
- Industrial Waste Water Treatment Operator (Class B)
- 40-Hour Hazardous Waste Site Operations (HAZWOPER) Training, OSHA and current 8-hour refresher

Expertise:

- Wastewater Treatment Operation
- Remedial System Operation, Maintenance and Analysis
- Storm Water System Operation and Maintenance
- Groundwater Flow Modeling
- Groundwater Treatment and Recovery

Professional Experience:

August Mack Environmental, Inc.
Operations & Maintenance Manager
 2018-Present

Project Engineer
 2017-2018

Staff Engineer
 2014-2017

Field Engineer
 2012-2014

Michigan Technological University
Research Assistant
 2010-2010

Lab Assistant
 2009-2009

Example Report

Second Quarter 2023
Groundwater Monitoring Report
Crescent Oil Company
514 West Wyoming Street
Indianapolis, Indiana 46225
State Cleanup Program Site #201125365

PROJECT #: JX0997.380

PREPARED FOR:

State Cleanup Program
Office of Land Quality
Indiana Department of Environmental Management
100 North Senate Avenue
Indianapolis, IN 46204

PREPARED BY:

August Mack Environmental, Inc.
1302 N. Meridian Street
Suite 300
Indianapolis, IN 46202

ISSUE DATE:

August 25, 2023





317.916.8000 • www.augustmack.com
1302 North Meridian Street, Suite 300 • Indianapolis, Indiana 46202

August 25, 2023

Ms. Anne Weinkauf
State Cleanup Program
Office of Land Quality
Indiana Department of Environmental Management
100 North Senate Avenue
Indianapolis, IN 46204

**Re: Second Quarter 2023
Groundwater Monitoring Report
Crescent Oil Company
514 West Wyoming Street
Indianapolis, Indiana 46225
August Mack Job Number JW0141.380
State Cleanup Site #201125365**

Dear Ms. Weinkauf:

August Mack Environmental, Inc. (August Mack), on behalf of 514 Ventures, Inc., formerly Crescent Oil Company, Inc. (hereinafter “Crescent Oil”), is submitting this Second Quarter 2023 Quarterly Groundwater Monitoring Report for the above-referenced facility. This report includes pertinent Site background information, a description of recent field activities, sampling procedures, laboratory analytical results, and conclusions regarding the sampling event.

BACKGROUND

The Crescent Oil facility (Site) is located at 514 West Wyoming Street in Indianapolis, Indiana. The Site consists of approximately 0.47-acres and includes an approximately 7,500-square foot building. Crescent Oil formerly manufactured industrial metalworking fluids and lubricants at the Site from approximately the 1930s until operations ceased in 2008. A Site Plan depicting the Site boundaries and features is provided as **Figure 1**.

A release was reported to the Indiana Department of Environmental Management (IDEM) on August 1, 2018 (IDEM Virtual File Cabinet (VFC) #82663163). IDEM subsequently assigned Incident #82496. IDEM issued a Notice of Liability (NOL) on November 16, 2018 (IDEM VFC #82650487) under the State Cleanup Program Site #201125365.



A Limited Initial Site Investigation (LISI), a Full Initial Site Investigation (FISI), and three Further Site Investigations (FSIs) have been implemented at the Site. Potential contaminants (PCs) have been reported above the currently applicable IDEM Remediation Closure Guide (R2) Published Levels (PLs) in soil and groundwater at the Site.

Groundwater was horizontally delineated below the R2 Long Term Residential Groundwater (LTRGW) PLs off-Site. In order to vertically delineate impacts on-Site, an investigation was conducted in March 2022 collecting grab groundwater samples at varying depths within 5 feet (ft) of MW-2, MW-5, MW-10, and MW-11. In the Comment Letter dated August 15, 2022 (IDEM VFC #83358316), IDEM stated that only two of the grab groundwater samples from the March 2022 investigation were analyzed within the hold time and that confirmatory sampling was warranted. August Mack conducted additional confirmatory sampling for vertical delineation during Fourth Quarter 2022. A Remediation Work Plan (RWP) is being prepared for the Site and will be submitted under a separate cover. August Mack continues to conduct quarterly groundwater sampling to evaluate plume stability.

GROUNDWATER SAMPLING ACTIVITIES

August Mack mobilized to the Site on June 12, 2023 to conduct Second Quarter 2023 groundwater sampling activities, respectively. Groundwater elevation data was collected from the monitoring well network during each event to assess the hydrogeologic conditions at the Site. The specific field procedures used for measuring groundwater elevations are included in **Attachment A**. Monitoring well information and depth-to-water data for each event are provided in **Table 1**. Potentiometric surface contours from the June 2023 gauging event are depicted on **Figure 2**. The overall flow direction appears to be to the west/southwest towards the White River, which is consistent with previous gauging events.

Groundwater samples were collected from 12 monitoring wells during the Second Quarter 2023 via low-flow sampling.¹ Quality assurance/quality control (QA/QC) samples collected during both sampling events included:

- Duplicate samples (DUP-1-20230613) were collected from monitoring well MW-2;
- Matrix spike/matrix spike duplicate samples from MW-10;
- Equipment blank samples (EB-1-20230614);
- Rinsate blank samples (RB-1-20230614); and
- Trip Blanks (TB-1-20230613).

Low-flow sampling was conducted in accordance with August Mack field procedures included in **Attachment A**. Purge records are included in **Attachment B**. Groundwater

¹ MW-8 was dry during the Fourth Quarter event, and a sample was not collected. It was purged dry during First Quarter low-flow activities. The well was allowed to recharge and a sample was collected via bailer the following day.

samples were analyzed for chlorinated volatile organic compounds (cVOCs) via United States Environmental Protection Agency (US EPA) Method 8260.

GROUNDWATER ANALYTICAL RESULTS

The groundwater analytical results from the Second Quarter 2023 events were compared to the IDEM R2 LTRGW 2023 PLs. Tetrachloroethene (PCE) was detected above the IDEM R2 LTRGW 2023 PL in MW-4, MW-5, and MW-9R. No other PCs were reported above their respective PLs.

A Mann-Kendall trend analysis was performed using analytical results from the last 14 quarters² using ProUCL[®] software and groundwater analytical data from MW-1³, MW-2, MW-4 through MW-8⁴, and MW-9R. Trend analysis was performed for PCE and/or TCE, as applicable. Trend analysis was not performed for MW-3 and MW-10 through MW-12 since these wells do not have consistent detections of PCE or TCE. The following trends for PCE and TCE at the Site were calculated following the second quarter 2023 and observed over the last 14 quarters.

	Summary of Mann-Kendall Trend Analysis	
	Tetrachloroethene (PCE)	Trichloroethene (TCE)
MW-1 ¹	Stable	Decreasing
MW-2	Stable	Decreasing
MW-4	Decreasing	Stable
MW-5	Increasing	NA
MW-6	NA	Decreasing
MW-7	NA	Decreasing
MW-8 ²	Decreasing	NA
MW-9R	Stable	Stable

NA = Not Applicable; results not evaluated due to non-detect or intermittent low-level detections.

Based on the Mann-Kendall analysis, PCE and TCE are either stable or decreasing in the on- and off-Site wells evaluated with the exception of PCE in MW-5, which showed an

² The Mann-Kendall Trend Analysis for MW-6 and MW-7 was calculated using 13 quarters of data due to the wells being installed in May 2020, MW-8 was calculated using 12 quarters of data due to the well being installed in May 2020 and one quarter with no viable sample; and MW-9R was calculated using only nine quarters of data due to the well being installed in May 2021.

³ MW-1 was not sampled during 2Q2022, as such there is no data for that monitoring period.

⁴ MW-8 was not sampled during 4Q2022, as such there is no data for that monitoring period.

increasing trend for the first time in first quarter 2023. However, the concentrations in MW-5 remain within an order of magnitude from the first year of sampling.

The groundwater analytical results are presented on **Table 2** and depicted on **Figure 3**. The lateral extents of contamination for PCE are depicted on **Figure 4** for second quarter 2023. Mann-Kendall graphs depicting the data, as well as the output data from the ProUCL[®] software, are included in **Attachment C**. The laboratory analytical reports are included in **Attachment D**.

SUMMARY AND CONCLUSIONS

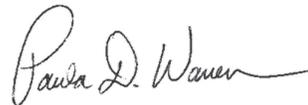
August Mack has completed Second Quarter 2023 groundwater monitoring activities at the Site and will continue to perform groundwater monitoring during the Third Quarter 2023. Based on the analytical data collected during Second Quarter 2023 monitoring events, and historical data collected from monitoring wells installed for a neighboring property (Valspar), cVOC groundwater impacts have been laterally delineated downgradient of the Site. This is the 13th consecutive quarterly groundwater sampling event for the on-Site monitoring wells. August Mack plans to continue quarterly groundwater sampling to evaluate seasonal variability during the 14th quarterly event (3rd Quarter 2023). In addition, exterior soil gas investigations will be completed in third quarter 2023 and will be included in the upcoming quarterly report.

Please feel free to contact us at 317-916-8000 if you have any questions or comments or require additional information regarding this project.

Sincerely,



Steven Faulk
Project Manager

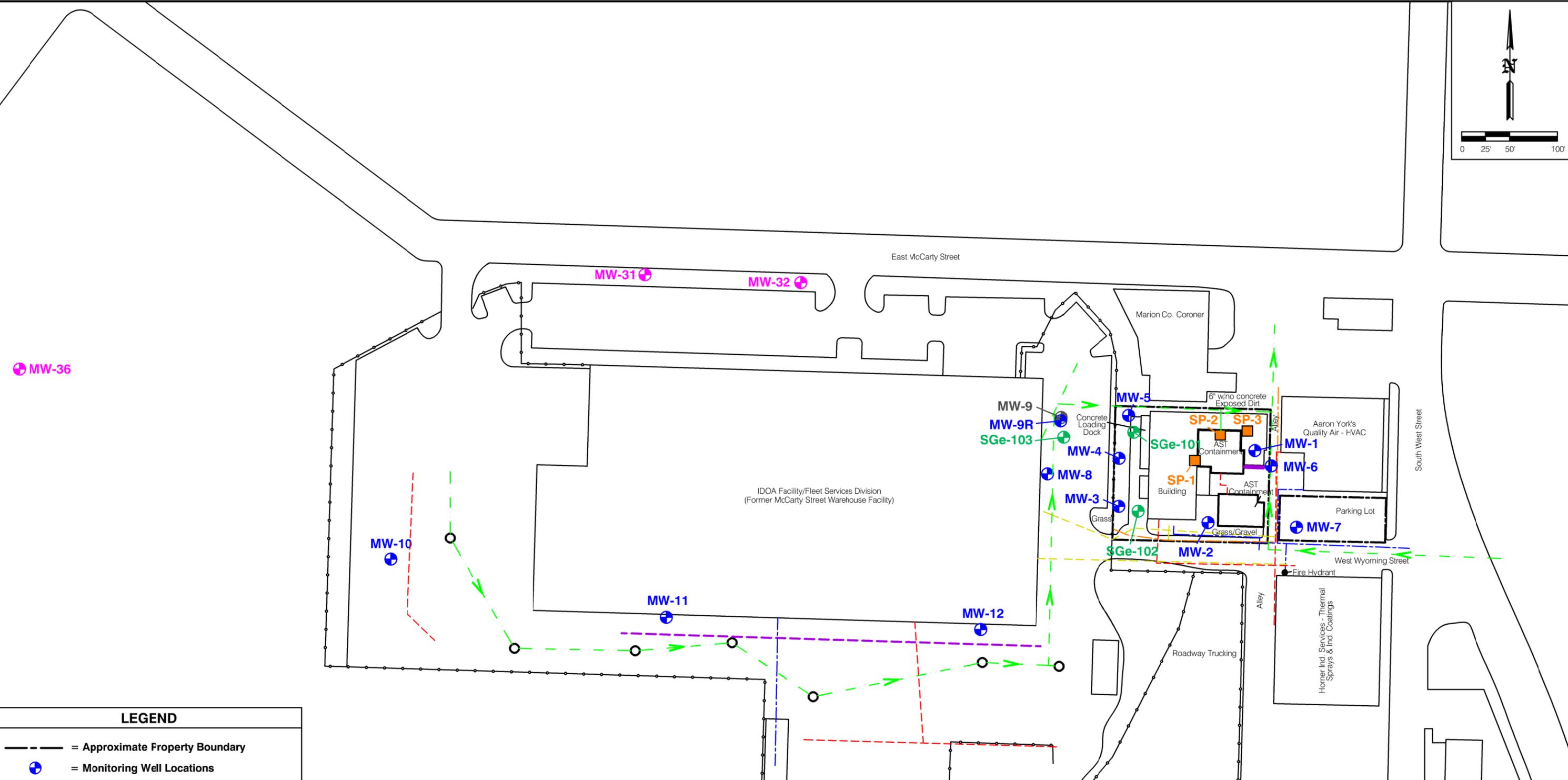
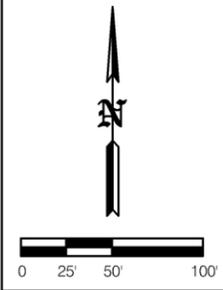


Paula D. Warren, CHMM
Senior Manager

Attachments

FIGURES

- Figure 1:** Site Plan
- Figure 2:** Potentiometric Surface Map (Fourth Quarter 2022)
- Figure 3:** Potentiometric Surface Map (First Quarter 2023)
- Figure 4:** Groundwater Analytical Results Map (Fourth Quarter 2022 and First Quarter 2023)
- Figure 5:** PCE Impacts in Groundwater Extent Map (Fourth Quarter 2022)
- Figure 6:** PCE Impacts in Groundwater Extent Map (First Quarter 2023)



LEGEND

- = Approximate Property Boundary
- ⊕ = Monitoring Well Locations
- ⊕ = Abandoned Monitoring Well Locations
- ⊕ = Valspar Corporate Site Well Location
- = Grated Sump Pit/Catch Basin
- = Fence
- = Electric Line
- = Water Line
- = Sanitary Sewer Line (with flow direction)
- = Gas Line
- = Small Drain/Catch Basin
- = Unknown Utility
- = Manhole Location

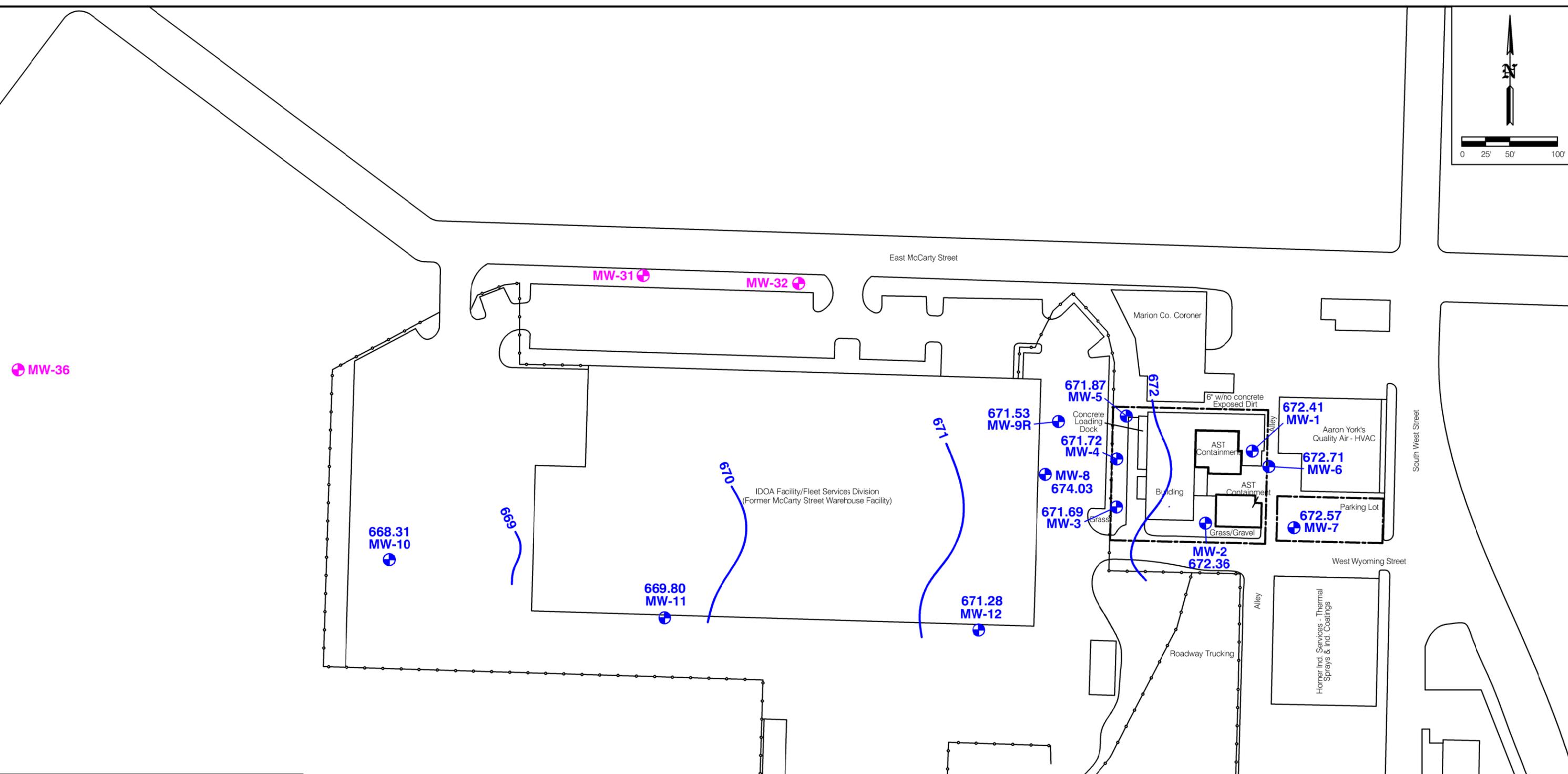
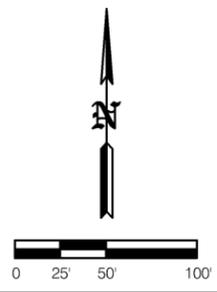
1302 N. MERIDIAN ST., STE. 300 INDIANAPOLIS, INDIANA 46202 (317) 916-3000 (317) 916-8001 FAX



Crescent Oil Co., Inc.
514 W. Wyoming St.
Indianapolis, Indiana

Site Plan

DATE: 07/13/2023	FILENAME: I:/2023/Projects/JX0997/Figures/2Q23_Base.dwg	
DRAWN BY: BA	MODIFIED BY: BA	PROJECT NO.: JX0997.380
GEO REF: Yes	SCALE: 1" = 100'	FIGURE: 1



LEGEND	
	= Approximate Property Boundary
	= Monitoring Well Locations
	= Valspar Corporate Site Well Location
	= Potentiometric Surface Contour
672.41	= Groundwater Elevation Above Mean Sea Level (amsl)
	= Fence

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Crescent Oil Co., Inc.
514 W. Wyoming St.
Indianapolis, Indiana

**Potentiometric Surface Map
(2nd Quarter 2023)**

DATE: 07/13/2023	FILENAME: I:/2023/Projects/JX0997/Figures/2Q23_Base.dwg
DRAWN BY: BA	MODIFIED BY: BA
GEO REF: Yes	SCALE: 1" = 100'

PROJECT NO.: **JX0997.380**

FIGURE: **2**

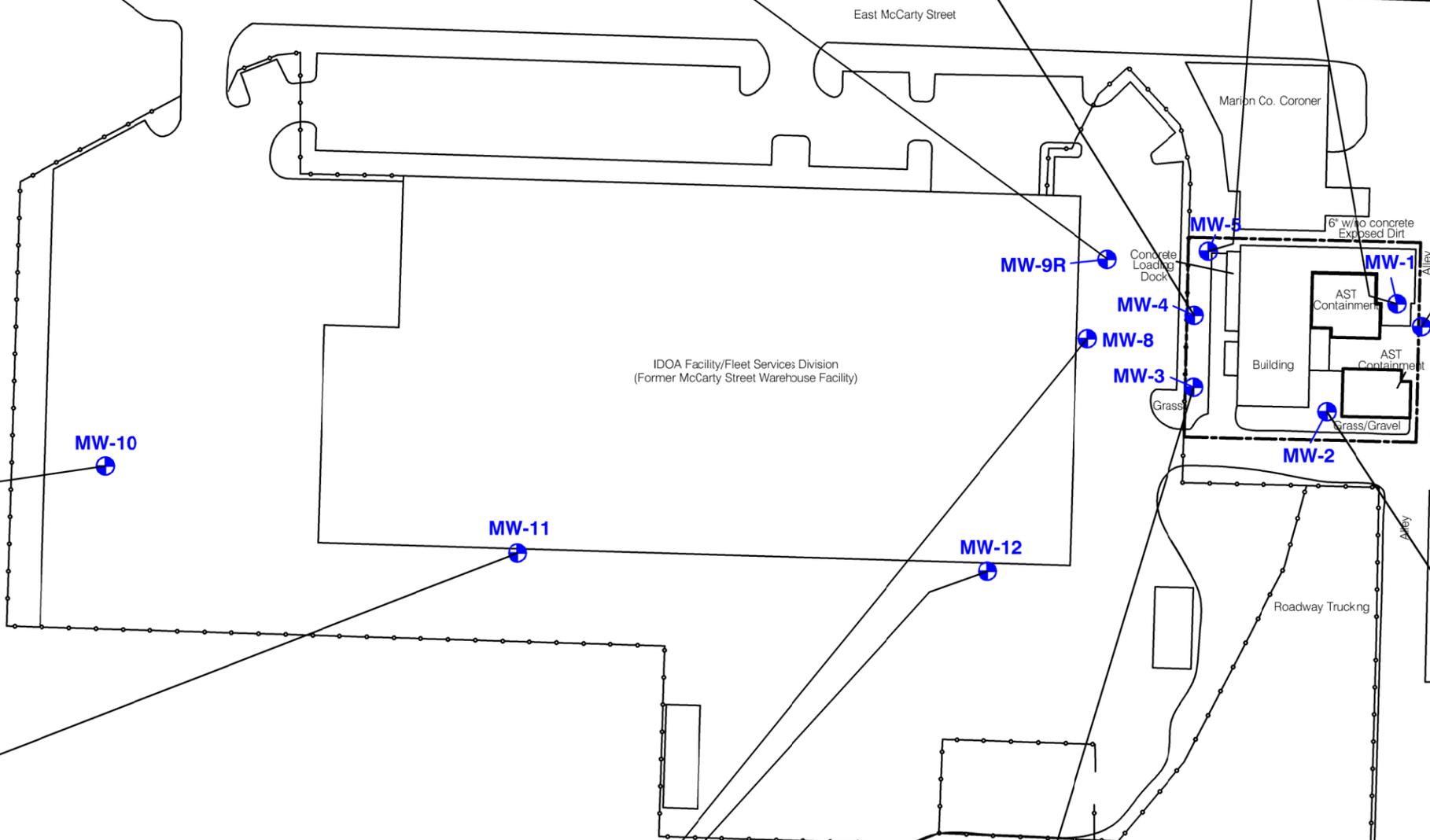
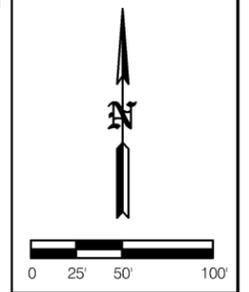
2023 IDEM R2 PLs	Long Term Residential Groundwater PLs
Chlorinated Volatile Organic Compounds (cVOCs) via USEPA Method 8260	
cis-1,2-Dichloroethene [cDCE]	70
trans-1,2-Dichloroethene [tDCE]	100
Tetrachloroethene [PCE]	5
1,1,1-Trichloroethane [1,1,1-TCA]	200
Trichloroethene [TCE]	5
Vinyl Chloride [VC]	2
IDEM = Indiana Department of Environmental Management; NS = Not Sampled	
PLs = Human Health Published Levels; R2 = Risk-Based Closure Guide	
USEPA = United States Environmental Protection Agency; I = Reported value is estimated	
I = MW-9 was originally installed on 5/15/2020, but produced an insufficient water column for sampling. MW-9R installed on 4/29/2021.	
Results and IDEM PLs are reported in micrograms per liter (µg/L).	
IDEM PLs are based on the IDEM R2, Table 1: Human Health Published Levels with updates.	
The following symbol and color denote a screening level exceedance:	
^ = At or Above 2023 IDEM R2 Long Term Residential Groundwater PLs	

MW-9R ¹	07/29/2022	12/01/2022	02/15/2023	06/13/2023
cDCE	<5.0	<5.0	<5.0	<5.0
tDCE	<5.0	<5.0	<5.0	<5.0
PCE	110 ^	119 ^	123 ^	98.5 ^
1,1,1-TCA	<5.0	<5.0	<5.0	<5.0
TCE	5.5 ^	<5.0	<5.0	<5.0
VC	<2.0	<2.0	<2.0	<2.0

MW-4	07/28/2022	12/01/2022	02/14/2023	06/13/2023
cDCE	<5.0	<5.0	<5.0	<5.0
tDCE	<5.0	<5.0	<5.0	<5.0
PCE	49.8 ^	51.0 ^	52.6 ^	46.2 ^
1,1,1-TCA	<5.0	<5.0	<5.0	<5.0
TCE	<5.0	<5.0	<5.0	<5.0
VC	<2.0	<2.0	<2.0	<2.0

MW-5	07/29/2022	12/02/2022	02/15/2023	06/14/2023
cDCE	<5.0	<5.0	<5.0	<5.0
tDCE	<5.0	<5.0	<5.0	<5.0
PCE	184 ^	183 ^	189 ^	108 ^
1,1,1-TCA	<5.0	<5.0	<5.0	<5.0
TCE	<5.0	<5.0	<5.0	<5.0
VC	<2.0	<2.0	<2.0	<2.0

MW-1	07/27/2022	12/01/2022	02/14/2023	06/13/2023
cDCE	<5.0	<5.0	<5.0	<5.0
tDCE	<5.0	<5.0	<5.0	<5.0
PCE	<5.0	5.6 ^	5.4 ^	<5.0
1,1,1-TCA	<5.0	<5.0	<5.0	<5.0
TCE	<5.0	<5.0	<5.0	<5.0
VC	<2.0	<2.0	<2.0	<2.0



MW-6	07/28/2022	12/01/2022	02/14/2023	06/13/2023
cDCE	<5.0	<5.0	<5.0	<5.0
tDCE	<5.0	<5.0	<5.0	<5.0
PCE	<5.0	<5.0	<5.0	<5.0
1,1,1-TCA	<5.0	<5.0	<5.0	<5.0
TCE	<5.0	<5.0	<5.0	<5.0
VC	<2.0	<2.0	<2.0	<2.0

MW-7	07/28/2022	12/01/2022	02/14/2023	06/13/2023
cDCE	<5.0	<5.0	<5.0	<5.0
tDCE	<5.0	<5.0	<5.0	<5.0
PCE	<5.0	<5.0	<5.0	<5.0
1,1,1-TCA	9.5	8.1	8.0	8.3
TCE	<5.0	<5.0	<5.0	<5.0
VC	<2.0	<2.0	<2.0	<2.0

MW-2	07/28/2022	12/01/2022	02/14/2023	06/13/2023
cDCE	<5.0	<5.0	<5.0	<5.0
tDCE	<5.0	<5.0	<5.0	<5.0
PCE	4.4 I	<5.0	<5.0	<5.0
1,1,1-TCA	2.9 I	<5.0	<5.0	5.3
TCE	4.4 I	<5.0	<5.0	<5.0
VC	<2.0	<2.0	<2.0	<2.0

MW-10	07/28/2022	11/30/2022	02/14/2023	06/13/2023
cDCE	<5.0	<5.0	<5.0	<5.0
tDCE	<5.0	<5.0	<5.0	<5.0
PCE	<5.0	<5.0	<5.0	<5.0
1,1,1-TCA	<5.0	<5.0	<5.0	<5.0
TCE	<5.0	<5.0	<5.0	<5.0
VC	<2.0	<2.0	<2.0	<2.0

MW-11	07/27/2022	11/30/2022	02/13/2023	06/12/2023
cDCE	<5.0	<5.0	<5.0	<5.0
tDCE	<5.0	<5.0	<5.0	<5.0
PCE	<5.0	<5.0	<5.0	<5.0
1,1,1-TCA	<5.0	<5.0	<5.0	<5.0
TCE	<5.0	<5.0	<5.0	<5.0
VC	<2.0	2.5 ^	<2.0	3.6 ^

MW-8	07/29/2022	11/30/2022	02/15/2023	06/14/2023
cDCE	<5.0	NS	<5.0	<5.0
tDCE	<5.0	NS	<5.0	<5.0
PCE	<5.0	NS	<5.0	<5.0
1,1,1-TCA	<5.0	NS	<5.0	<5.0
TCE	<5.0	NS	<5.0	<5.0
VC	<2.0	NS	<2.0	<2.0

MW-12	07/27/2022	11/30/2022	02/13/2023	06/12/2023
cDCE	<5.0	<5.0	<5.0	<5.0
tDCE	<5.0	<5.0	<5.0	<5.0
PCE	<5.0	<5.0	<5.0	<5.0
1,1,1-TCA	<5.0	<5.0	<5.0	<5.0
TCE	<5.0	<5.0	<5.0	<5.0
VC	<2.0	<2.0	<2.0	<2.0

MW-3	07/27/2022	11/30/2022	02/13/2023	06/12/2023
cDCE	<5.0	<5.0	<5.0	<5.0
tDCE	<5.0	<5.0	<5.0	<5.0
PCE	<5.0	<5.0	<5.0	<5.0
1,1,1-TCA	<5.0	<5.0	<5.0	<5.0
TCE	<5.0	<5.0	<5.0	<5.0
VC	<2.0	<2.0	<2.0	<2.0

LEGEND

- = Approximate Property Boundary
- ⊕ = Monitoring Well Locations
- = Fence

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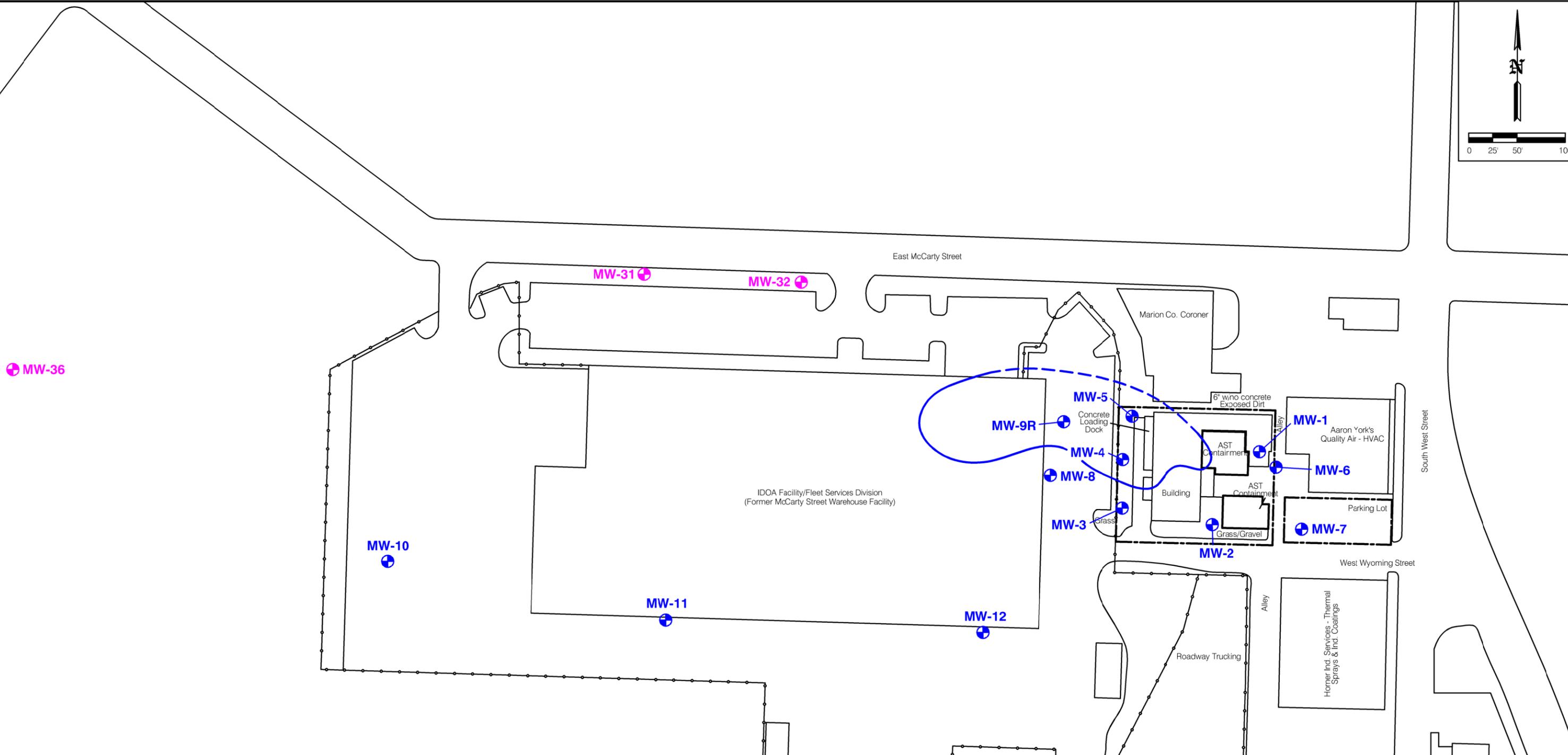
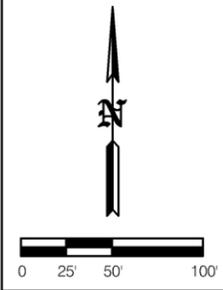
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Crescent Oil Co., Inc.
514 W. Wyoming St.
Indianapolis, Indiana

Groundwater Analytical Results Map
(2nd Quarter 2023)

DATE: 07/13/2023	FILENAME: I:/2023/Projects/JX0997/Figures/2Q23_Base.dwg	
DRAWN BY: BA	MODIFIED BY: BA	PROJECT NO.: JX0997.380
GEO REF: Yes	SCALE: 1" = 100'	FIGURE: 3



LEGEND

- = Approximate Property Boundary
- ⊕ = Monitoring Well Locations
- ⊕ (pink) = Valspar Corporate Site Well Location
- = Fence
- ~ = PCE Concentration Above R2 Long-Term Residential Groundwater Published Level (5 ug/L)
- PCE = Tetrachloroethene

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Crescent Oil Co., Inc.
514 W. Wyoming St.
Indianapolis, Indiana

**PCE Isoconcentration Map
(2nd Quarter 2023)**

DATE: 07/18/2023	FILENAME: I:/2023/Projects/JX0997/Figures/2Q23_Base.dwg
DRAWN BY: BA	MODIFIED BY: BA
GEO REF: Yes	SCALE: 1" = 100'

PROJECT NO.: **JX0997.380**

FIGURE: **4**

TABLES

- Table 1:** Monitoring Well Gauging Data
Table 2: Summary of Groundwater Analytical Results

MONITORING WELL GAUGING DATA
CRESCENT OIL COMPANY

	Date	Top of Casing Elevation (amsl)	Depth to Water [^] (ft)	Groundwater Elevation (amsl)	Measured Well Depth [^] (ft)	Top of Well Screen (ft bg)	Bottom of Well Screen (ft bg)
MONITORING WELLS							
MW-1	10/22/2019	701.22	32.72	668.50	36.00	26.40	36.40
	5/18/2020		31.14	670.08	36.03		
	8/10/2020		30.93	670.29	36.01		
	10/30/2020		31.37	669.85	36.00		
	1/18/2021		30.48	670.74	36.01		
	5/17/2021		33.05	668.17	36.39		
	7/6/2021		32.86	668.36	36.42		
	10/27/2021		29.59	671.63	36.38		
	1/25/2022		28.89	672.33	35.98		
	4/13/2022		NM	NA	NM		
	7/27/2022		28.52	672.70	36.00		
	11/29/2022		29.65	671.57	35.75		
	2/13/2023		29.07	672.15	35.81		
	6/13/2023		28.81	672.41	36.00		
MW-2	10/22/2019	702.07	33.55	668.52	36.11	26.40	36.40
	5/18/2020		31.95	670.12	36.13		
	8/10/2020		31.76	670.31	36.11		
	10/29/2020		32.21	669.86	36.11		
	1/18/2021		31.31	670.76	36.09		
	5/17/2021		34.12	667.95	36.18		
	7/6/2021		34.01	668.06	36.20		
	10/27/2021		30.50	671.57	36.29		
	1/25/2022		29.71	672.36	36.05		
	4/13/2022		28.45	673.62	36.41		
	7/27/2022		29.41	672.66	36.10		
	11/29/2022		30.50	671.57	35.85		
	2/13/2023		29.92	672.15	35.89		
	6/13/2023		29.71	672.36	36.12		
MW-3	10/22/2019	701.08	33.02	668.06	36.15	26.40	36.40
	5/18/2020		31.44	669.64	36.15		
	8/10/2020		31.27	669.81	36.14		
	10/29/2020		31.70	669.38	36.13		
	1/18/2021		30.81	670.27	36.04		
	5/17/2021		34.11	666.97	36.55		
	7/6/2021		33.96	667.12	36.58		
	10/27/2021		30.01	671.07	36.03		
	1/25/2022		29.35	671.73	36.10		
	4/13/2022		28.05	673.03	36.10		
	7/27/2022		29.05	672.03	36.12		
	11/29/2022		29.00	672.08	36.60		
	2/13/2023		29.54	671.54	36.89		
	6/13/2023		29.39	671.69	36.16		
MW-4	10/22/2019	700.84	32.74	668.10	35.55	25.95	35.95
	5/18/2020		31.18	669.66	35.41		
	8/10/2020		31.00	669.84	35.61		
	10/29/2020		31.43	669.41	35.60		
	1/19/2021		30.59	670.25	35.47		
	5/17/2021		33.77	667.07	35.49		
	7/6/2021		33.61	667.23	35.52		
	10/27/2021		29.73	671.11	35.71		
	1/25/2022		29.08	671.76	35.54		
	4/13/2022		28.67	672.17	35.55		
	7/27/2022		27.80	673.04	35.58		
	11/29/2022		29.90	670.94	35.35		
	2/13/2023		29.27	671.57	35.36		
	6/13/2023		29.12	671.72	35.52		

Abbreviations & Notes

amsl = feet above mean sea level

ft = feet; ft bg= feet below grade

NA = Not Applicable; NM = Not Measured

[^] = Measurement taken from top of PVC casing

MONITORING WELL GAUGING DATA
CRESCENT OIL COMPANY

	Date	Top of Casing Elevation (amsl)	Depth to Water [^] (ft)	Groundwater Elevation (amsl)	Measured Well Depth [^] (ft)	Top of Well Screen (ft bg)	Bottom of Well Screen (ft bg)
MONITORING WELLS							
MW-5	10/22/2019	700.64	32.42	668.22	36.48	26.65	36.65
	5/18/2020		30.86	669.78	36.45		
	8/10/2020		30.68	669.96	36.50		
	10/29/2020		31.10	669.54	36.90		
	1/19/2021		30.25	670.39	36.49		
	5/17/2021		33.30	667.34	36.65		
	7/6/2021		33.14	667.50	36.68		
	10/27/2021		29.40	671.24	36.46		
	1/25/2022		28.74	671.90	36.43		
	4/13/2022		27.58	673.06	36.60		
	7/27/2022		28.45	672.19	37.05		
	11/29/2022		28.50	672.14	36.15		
	2/13/2023		28.93	671.71	36.19		
	6/13/2023		28.77	671.87	36.49		
MW-6	5/18/2020	701.68	31.31	670.37	35.46	25.44	35.44
	8/10/2020		31.10	670.58	35.45		
	10/29/2020		31.54	670.14	35.43		
	1/18/2021		30.61	671.07	35.45		
	5/17/2021		33.16	668.52	35.55		
	7/6/2021		33.04	668.64	35.35		
	10/27/2021		29.81	671.87	31.52		
	1/25/2022		28.92	672.76	35.39		
	4/13/2022		27.59	674.09	35.45		
	7/27/2022		28.80	672.88	35.43		
	11/29/2022		29.70	671.98	35.17		
	2/13/2023		29.22	672.46	35.24		
	6/13/2023		28.97	672.71	35.44		
	MW-7		5/18/2020	699.89	29.67		
8/10/2020		29.84	670.05		33.50		
10/29/2020		29.93	669.96		33.75		
1/19/2021		28.98	670.91		33.35		
5/17/2021		31.50	668.39		33.63		
7/6/2021		31.43	668.46		33.65		
10/27/2021		28.20	671.69		33.69		
1/25/2022		27.30	672.59		33.30		
4/13/2022		26.01	673.88		33.50		
7/27/2022		27.01	672.88		33.46		
11/29/2022		28.10	671.79		33.20		
2/13/2023		27.58	672.31		33.23		
6/13/2023		27.32	672.57		33.58		
MW-8		5/18/2020	699.38		29.85	669.53	33.61
	8/10/2020	29.64		669.74	33.60		
	10/29/2020	30.05		669.33	33.55		
	1/19/2021	28.94		670.44	33.54		
	5/17/2021	28.84		670.54	33.60		
	7/6/2021	28.96		670.42	33.62		
	10/27/2021	27.42		671.96	31.65		
	1/25/2022	26.73		672.65	31.91		
	4/13/2022	25.55		673.83	31.90		
	7/27/2022	26.45		672.93	30.00		
	11/29/2022	28.60		670.78	28.70		
	2/13/2023	25.88		673.50	29.89		
	6/13/2023	25.35		674.03	29.36		

Abbreviations & Notes

amsl = feet above mean sea level
 ft = feet; ft bg= feet below grade
 NA = Not Applicable; NM = Not Measured
[^] = Measurement taken from top of PVC casing

MONITORING WELL GAUGING DATA
CRESCENT OIL COMPANY

	Date	Top of Casing Elevation (amsl)	Depth to Water [^] (ft)	Groundwater Elevation (amsl)	Measured Well Depth [^] (ft)	Top of Well Screen (ft bg)	Bottom of Well Screen (ft bg)
MONITORING WELLS							
MW-9R	5/17/2021	699.37	32.57	666.80	35.61	24.75	34.75
	7/6/2021		32.66	666.71	35.71		
	10/27/2021		28.37	671.00	35.37		
	1/25/2022		27.87	671.50	35.00		
	4/13/2022		26.31	673.06	34.90		
	7/27/2022		27.76	671.61	36.05		
	11/29/2022		29.55	669.82	34.75		
	2/13/2023		27.96	671.41	34.87		
	6/13/2023		27.84	671.53	35.08		
MW-10	5/17/2021	698.89	37.05	661.84	45.33	34.75	44.75
	7/6/2021		37.18	661.71	45.33		
	10/27/2021		27.33	671.56	45.42		
	1/25/2022		30.09	668.80	44.75		
	4/13/2022		29.02	669.87	44.95		
	7/27/2022		30.01	668.88	45.00		
	11/29/2022		31.10	667.79	44.25		
	2/13/2023		29.61	669.28	44.67		
	6/13/2023		30.58	668.31	44.87		
MW-11	5/17/2021	699.18	35.99	663.19	40.07	29.75	39.75
	7/6/2021		35.80	663.38	40.04		
	10/27/2021		28.87	670.31	40.41		
	1/25/2022		28.99	670.19	39.93		
	4/13/2022		27.84	671.34	39.91		
	7/27/2022		28.88	670.30	40.00		
	11/29/2022		30.05	669.13	39.70		
	2/13/2023		29.08	670.10	39.76		
	6/13/2023		29.38	669.80	40.44		
MW-12	5/17/2021	699.26	33.59	665.67	36.39	26.25	36.25
	7/6/2021		33.49	665.77	36.40		
	10/27/2021		28.25	671.01	36.23		
	1/25/2022		27.75	671.51	35.82		
	4/13/2022		26.66	672.60	36.02		
	7/27/2022		27.60	671.66	35.95		
	11/29/2022		28.75	670.51	35.60		
	2/13/2023		28.00	671.26	35.74		
	6/13/2023		27.98	671.28	35.93		

Abbreviations & Notes

amsl = feet above mean sea level

ft = feet; ft bg= feet below grade

NA = Not Applicable; NM = Not Measured

[^] = Measurement taken from top of PVC casing

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CRESCENT OIL COMPANY

			Site-Specific Chlorinated Volatile Organic Compounds (cVOCs) via USEPA Method 8260						
			Tetrachloroethene (PCE)	Trichloroethene (TCE)	cis-1,2-Dichloroethene (cDCE)	trans-1,2-Dichloroethene (tDCE)	Vinyl Chloride	1,1,1-Trichloroethane (1,1,1-TCA)	
2023 IDEM R2 Long Term Residential Groundwater PLs (^)			5	5	70	100	2	200	
Sample ID	DUP ID	Date Collected							
MW-1		10/22/2019	<5.0	15.2 ^	<5.0	<5.0	<2.0	<5.0	
		05/18/2020	<5.0	14.4 ^	<5.0	<5.0	<2.0	<5.0	
		08/10/2020	<5.0	13.1 ^	<5.0	<5.0	<2.0	<5.0	
		10/30/2020	<5.0	14.8 ^	<5.0	<5.0	<2.0	<5.0	
		01/18/2021	<5.0	11.0 ^	<5.0	<5.0	<2.0	<5.0	
		05/18/2021	<5.0	15.0 ^	<5.0	<5.0	<2.0	<5.0	
		07/08/2021	<5.0	5.4 ^	<5.0	<5.0	<2.0	<5.0	
		10/28/2021	<5.0	12.3 ^	<5.0	<5.0	<2.0	<5.0	
		01/26/2022	9.5 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		01/26/2022	9.8 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		04/15/2022	Well was Inaccessible						
		07/27/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		12/01/2022	5.6 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		02/14/2023	5.4 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
	06/13/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0		
MW-2		10/22/2019	5.9 ^	19.1 ^	<5.0	<5.0	<2.0	5.9	
		05/19/2020	6.8 ^	18.9 ^	<5.0	<5.0	<2.0	5.3	
		05/19/2020	5.7 ^	18.4 ^	<5.0	<5.0	<2.0	5.3	
		08/10/2020	<5.0	14.9 ^	<5.0	<5.0	<2.0	<5.0	
		08/10/2020	<5.0	14.4 ^	<5.0	<5.0	<2.0	<5.0	
		10/29/2020	5.6 ^	20.2 ^	<5.0	<5.0	<2.0	5.6	
		10/29/2020	5.4 ^	18.6 ^	<5.0	<5.0	<2.0	5.4	
		01/18/2021	5.4 ^	12.0 ^	<5.0	<5.0	<2.0	<5.0	
		01/18/2021	6.0 ^	13.3 ^	<5.0	<5.0	<2.0	<5.0	
		05/19/2021	7.7 ^	21.2 ^	<5.0	<5.0	<2.0	5.7	
		05/19/2021	7.4 ^	20.4 ^	<5.0	<5.0	<2.0	5.6	
		07/08/2021	7.5 ^	20.7 ^	<5.0	<5.0	<2.0	6.0	
		07/08/2021	6.8 ^	20.0 ^	<5.0	<5.0	<2.0	5.6	
		10/29/2021	6.4 ^	17.9 ^	<5.0	<5.0	<2.0	<5.0	
		10/29/2021	6.2 ^	17.7 ^	<5.0	<5.0	<2.0	<5.0	
		01/27/2022	6.5 ^	15.3 ^	<5.0	<5.0	<2.0	<5.0	
		04/15/2022	5.9 ^	13.0 ^	<5.0	<5.0	<2.0	<5.0	
		04/15/2022	6.0 ^	13.2 ^	<5.0	<5.0	<2.0	<5.0	
		07/28/2022	4.4 J	4.4 J	<5.0	<5.0	<2.0	2.9 J	
		07/28/2022	5.6 ^	6.3 ^	<5.0	<5.0	<2.0	<5.0	
	12/01/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0		
	12/01/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0		
	02/14/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0		
	02/14/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0		
	06/13/2023	<5.0	<5.0	<5.0	<5.0	<2.0	5.3		
	06/13/2023	<5.0	<5.0	<5.0	<5.0	<2.0	5.7		
MW-3		10/22/2019	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		10/22/2019	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		05/19/2020	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		08/10/2020	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		10/29/2020	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		01/18/2021	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		05/18/2021	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		07/07/2021	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		10/27/2021	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		01/26/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		04/14/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		07/27/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		11/30/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
		02/13/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
	06/12/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0		
MW-4		10/22/2019	61.8 ^	<5.0	6.2	<5.0	<2.0	<5.0	
		05/19/2020	67.8 ^	7.3 ^	7.1	<5.0	<2.0	<5.0	
		08/11/2020	45.9 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		10/30/2020	60.1 ^	7.3 ^	<5.0	<5.0	<2.0	<5.0	
		01/19/2021	57.1 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		05/18/2021	66.0 ^	6.5 ^	<5.0	<5.0	<2.0	<5.0	
		07/07/2021	47.9 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		10/28/2021	55.6 ^	5.7 ^	7.1	<5.0	<2.0	<5.0	
		01/26/2022	64.3 ^	7.2 ^	10.0	<5.0	<2.0	<5.0	
		04/14/2022	45.7 ^	5.8 ^	11.8	<5.0	2.1 ^	<5.0	
		07/28/2022	49.8 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		12/01/2022	51.0 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		02/14/2023	52.6 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		06/13/2023	46.2 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
MW-5		10/22/2019	63.6 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		05/19/2020	167 ^	6.0 ^	<5.0	<5.0	<2.0	<5.0	
		08/11/2020	76.5 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		10/30/2020	50.0 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		01/19/2021	47.2 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		05/18/2021	42.5 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		07/08/2021	28.4 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		10/28/2021	174 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		01/26/2022	174 ^	6.0 ^	<5.0	<5.0	<2.0	<5.0	
		04/15/2022	205 ^	7.9 ^	<5.0	<5.0	<2.0	<5.0	
		07/29/2022	184 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		12/02/2022	183 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		02/15/2023	189 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
		06/14/2023	108 ^	<5.0	<5.0	<5.0	<2.0	<5.0	

Abbreviations & Notes

E = Reporting limit exceeds PLs due to dilution and/or analytical limitations
 IDEM = Indiana Department of Environmental Management
 J = The reported value is an estimate
 PLs = Human Health Published Levels
 R2 = Risk-based Closure Guide
 USEPA = United States Environmental Protection Agency
 Results and IDEM PLs are reported in micrograms per liter (µg/L).
 IDEM PLs are based on the IDEM R2, Table 1: Human Health Published Levels with updates.

The following denote the symbol and color of screening level exceedances:

^ = At or Above 2023 IDEM R2 Long Term Residential Groundwater PLs
 1 = MW-9 was originally installed on 5/15/2020, but produced an insufficient water column for sampling. MW-9R installed on 4/29/2021.
 2 = Post-analysis pH measurement reduced analysis holding time to 7 days. Sample analyzed within 1.5 times the reduced hold time, therefore results are
 3 = MW-11 sample from July 2021 was diluted at the laboratory. Results are reported to the Method Detection Limit.

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CRESCENT OIL COMPANY

			Site-Specific Chlorinated Volatile Organic Compounds (cVOCs) via USEPA Method 8260					
			Tetrachloroethene (PCE)	Trichloroethene (TCE)	cis-1,2-Dichloroethene (cDCE)	trans-1,2-Dichloroethene (tDCE)	Vinyl Chloride	1,1,1-Trichloroethane (1,1,1-TCA)
2023 IDEM R2 Long Term Residential Groundwater PLs (^)			5	5	70	100	2	200
Sample ID	DUP ID	Date Collected						
MW-6		05/18/2020	<5.0	20.3 ^	<5.0	<5.0	<2.0	<5.0
		08/10/2020	<5.0	17.0 ^	<5.0	<5.0	<2.0	<5.0
		10/30/2020	<5.0	22.4 ^	<5.0	<5.0	<2.0	<5.0
		01/18/2021	<5.0	16.4 ^	<5.0	<5.0	<2.0	<5.0
		05/19/2021	<5.0	22.3 ^	<5.0	<5.0	<2.0	<5.0
		07/08/2021	<5.0	22.3 ^	<5.0	<5.0	<2.0	<5.0
		10/28/2021	<5.0	21.8 ^	<5.0	<5.0	<2.0	<5.0
		01/26/2022	<5.0	8.0 ^	<5.0	<5.0	<2.0	<5.0
		04/15/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		07/28/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		12/01/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		02/14/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
	06/13/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
MW-7		05/18/2020	<5.0	43.0 ^	<5.0	<5.0	<2.0	15.8
		08/11/2020	<5.0	35.0 ^	<5.0	<5.0	<2.0	13.1
		10/30/2020	<5.0	43.9 ^	<5.0	<5.0	<2.0	16.1
		01/19/2021	<5.0	35.6 ^	<5.0	<5.0	<2.0	12.7
		05/19/2021	<5.0	47.1 ^	<5.0	<5.0	<2.0	16.9
		07/08/2021	<5.0	45.8 ^	<5.0	<5.0	<2.0	19.7
		10/29/2021	<5.0	<5.0	<5.0	<5.0	<2.0	13.9
		01/27/2022	<5.0	<5.0	<5.0	<5.0	<2.0	10.6
		04/15/2022	7.3 ^	<5.0	<5.0	<5.0	<2.0	<5.0
		07/28/2022	<5.0	<5.0	<5.0	<5.0	<2.0	9.5
		12/01/2022	<5.0	<5.0	<5.0	<5.0	<2.0	8.1
		02/14/2023	<5.0	<5.0	<5.0	<5.0	<2.0	8.0
	06/13/2023	<5.0	<5.0	<5.0	<5.0	<2.0	8.3	
MW-8		05/19/2020	12.7 ^	8.4 ^	39.3	<5.0	<2.0	<5.0
		08/11/2020	25.7 ^	<5.0	<5.0	<5.0	<2.0	<5.0
		10/30/2020	53.1 ^	<5.0	<5.0	<5.0	<2.0	<5.0
		01/19/2021	54.0 ^	<5.0	<5.0	<5.0	<2.0	<5.0
		05/21/2021 ²	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		07/07/2021	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		10/28/2021	7.2 ^	<5.0	<5.0	<5.0	<2.0	<5.0
		01/27/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		04/14/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		07/29/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		11/30/2022	Insufficient Water Column for Sampling					
		02/15/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
	06/14/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
MW-9R ¹		05/18/2021	134 ^	<5.0	<5.0	<5.0	<2.0	<5.0
		07/07/2021	83.0 ^	<5.0	<5.0	<5.0	<2.0	<5.0
		10/28/2021	90.7 ^	5.2 ^	<5.0	<5.0	<2.0	<5.0
		01/27/2022	119 ^	8.2 ^	<5.0	<5.0	<2.0	<5.0
		04/14/2022	93.7 ^	<5.0	<5.0	<5.0	<2.0	<5.0
		07/29/2022	110 ^	5.5 ^	<5.0	<5.0	<2.0	<5.0
		12/01/2022	119 ^	<5.0	<5.0	<5.0	<2.0	<5.0
		02/15/2023	123 ^	<5.0	<5.0	<5.0	<2.0	<5.0
	06/13/2023	98.5 ^	<5.0	<5.0	<5.0	<2.0	<5.0	
MW-10		05/17/2021	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		07/07/2021	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		10/27/2021	<5.0	<5.0	8.0	<5.0	2.6 ^	<5.0
		01/25/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		04/14/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		07/28/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		11/30/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		02/14/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
	06/13/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
MW-11		05/17/2021	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		07/06/2021 ³	<44.5 E	<45.8 E	<46.0	<32.5	<28.1 E	<40.3
		10/27/2021	<50.0 E	<50.0 E	<50.0	<50.0	<20.0 E	<50.0
		01/25/2022	<50.0 E	<50.0 E	<50.0	<50.0	<20.0 E	<50.0
		04/13/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		07/27/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		11/30/2022	<5.0	<5.0	<5.0	<5.0	2.5 ^	<5.0
	02/13/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
	06/12/2023	<5.0	<5.0	<5.0	<5.0	3.6 ^	<5.0	
MW-12		05/17/2021	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		07/06/2021	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		10/27/2021	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		01/25/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		04/13/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		07/27/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
		11/30/2022	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0
	02/13/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
	06/12/2023	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	

Abbreviations & Notes

E = Reporting limit exceeds PLs due to dilution and/or analytical limitations
 IDEM = Indiana Department of Environmental Management
 J = The reported value is an estimate
 PLs = Human Health Published Levels
 R2 = Risk-based Closure Guide
 USEPA = United States Environmental Protection Agency
 Results and IDEM PLs are reported in micrograms per liter (µg/L).
 IDEM PLs are based on the IDEM R2, Table 1: Human Health Published Levels with updates.

The following denote the symbol and color of screening level exceedances:

^ = At or Above 2023 IDEM R2 Long Term Residential Groundwater PLs

¹ = MW-9 was originally installed on 5/15/2020, but produced an insufficient water column for sampling. MW-9R installed on 4/29/2021.

² = Post-analysis pH measurement reduced analysis holding time to 7 days. Sample analyzed within 1.5 times the reduced hold time, therefore results are

³ = MW-11 sample from July 2021 was diluted at the laboratory. Results are reported to the Method Detection Limit.

ATTACHMENT A

August Mack Field Procedures

GROUNDWATER LEVEL MEASUREMENTS

Water level measurements were taken from each monitoring well prior to groundwater sampling. After removing the well cap, sufficient time was allowed for the water level to equilibrate with the ambient air pressure. The water level indicator was decontaminated before and after each use with a non-phosphate detergent wash, followed by tap water and distilled water rinses to prevent cross contamination.

Prior to water level measuring, the existing reference point on the well casing was determined. A water level indicator probe was slowly lowered into the well until the sound from the indicator was audible. The probe was then slowly pulled out a few inches and dropped back down at smaller increments until the water level could be determined to within 0.01-feet. The water level was measured based on an existing reference point on the well casing. Following sampling activities, the total depth of the well was then measured and recorded to the nearest 0.01-foot by allowing the measuring tape to contact the base of the well.

LOW-FLOW GROUNDWATER SAMPLING

Low-flow sampling was conducted in general accordance with United States Environmental Protection Agency (U.S. EPA) low-flow sampling procedures (U.S. EPA, 1996) and Indiana Department of Environmental Management (IDEM) Micro-Purge Sampling Guidance (IDEM, Revised 2017). Prior to groundwater sample collection, water level measurements were collected from each well.

Prior to sampling, a secondary containment area was constructed near the well casing. The water quality monitoring equipment was placed inside the secondary containment to prevent direct contact between the equipment and site surface. August Mack utilized a QED Sample Pro Bladder Pump system (or equivalent) to purge the well. The pump was decontaminated prior to purging and sampling using a phosphate-free detergent and triple rinsed using tap water and deionized water. New tubing and bladders were used for each well and discarded after each use. For each well, the pump was slowly lowered into the water column and the submersible pump intake was placed at approximately the midpoint of the water column or the midpoint of the well screen if the well screen was submerged.

In accordance with U.S. EPA guidance and the IDEM Micro-Purge Sampling Guidance, flow rates for well purging and sampling were maintained below 1.0 liter/minute (generally within the range of 100 to 400 ml/min) and drawdown of the aquifer was continually measured. During the well purging, groundwater physical and chemical characteristics were measured using a multi-parameter meter connected to an in-line flow cell. These characteristics included turbidity, dissolved oxygen (DO), temperature, pH, specific conductance, and oxidation reduction potential (ORP).

Once stable conditions were generally achieved, water samples were obtained using the low-flow equipment and collected in laboratory supplied sample containers. The purge water generated during the well sampling was containerized (using 55-gallon steel drums) and properly labeled pending proper disposal. Following sampling, the well was closed and locked.

EQUIPMENT DECONTAMINATION

The submersible pump and water level indicator were decontaminated before and after use with non-phosphate detergent wash, followed by distilled water rinses to prevent cross contamination. All decontamination water generated during the redevelopment and sampling activities was containerized in properly labeled 55-gallon drums and stored on Site pending disposal.

ATTACHMENT B

Purge Records

Purge Record



Well ID: MW-1
Date: 2023-06-13

Project Information:

Operator Name C. Greenberg
Company Name August Mack Environmental, Inc
Project Number JX0997.380/ 2Q23 GW Sampling
Site Name Crescent Oil
Sampling Method Micro Purge

Equipment Information:

Pump Model/Type Geotech bladder
Multimeter Type Aqua TROLL 600
Tubing / Bailer Type LDPE
Tubing / Bailer ID 0.25-in
Tubing / Bailer Length 38 ft

Well Information:

Well Diameter 2 in
Historic Total Well Depth 35.81 ft
Current Total Well Depth 36.00 ft
Initial Synoptic Depth to Water 28.81 ft

Pumping Information:

Average Purging Flow Rate* 248 (ml/min)
Parameter Recording Rate 180 sec
Well Screen Length 10 ft
Pump Placement from TOC 33.81 ft

Micro-Purge Sampling Stabilization Summary

Stabilization Settings	Purge Time	Flow Rate [ml/min]	pH	Cond [μ S/cm @25C]	Turbidity (NTU)	DO [mg/L]	Temp [C]	ORP [mV]	Depth to Water (ft.)
		< 400	+/-0.1	+/-3 %	+/-10 %	+/-10 %	+/-3%	+/-10	
				</=5 NTU					
1	0:00:00	250.00	7.06	2678.82	24.68	1.69	19.00	72.08	28.81
2	0:03:00	240.00	7.07	2669.36	27.08	1.78	18.45	72.03	28.81
3	0:06:00	250.00	7.07	2665.64	15.67	1.83	18.23	71.96	28.81
4	0:09:00	250.00	7.07	2642.13	14.22	1.97	18.12	71.86	28.81
5	0:12:00	250.00	7.07	2626.48	13.51	2.08	18.03	73.14	28.81
6	0:15:00	250.00	7.07	2613.83	9.32	2.16	17.97	74.64	28.81
Variance in last 3 readings			0.00	-0.88%	-9.25%	7.48%	-0.60%	-0.10	0.00
			0.00	-0.59%	-4.98%	5.44%	-0.51%	1.29	0.00
			0.00	-0.48%	-31.02%	3.93%	-0.33%	1.50	0.00

Stabilization Criteria	< 0.3 ft
Logged Drawdown	0.00 ft

Weather Conditions: 67 F, cloudy

Purge Start Time: 12:58

Sample ID: MW-1-20230613

Notes: QA/QC: Not Applicable

Volume Purged: 4 L

Color/Odor: None/none

Comments: None

* = Flow rates measured to the nearest 10 ml during micro purge sampling using graduated cylinder

Purge Record



Well ID: MW-2
Date: 2023-06-13

Project Information:

Operator Name C. Greenberg
Company Name August Mack Environmental, Inc
Project Number JX0997.380/ 2Q23 GW Sampling
Site Name Crescent Oil
Sampling Method Micro Purge

Equipment Information:

Pump Model/Type Geotech bladder
Multimeter Type Aqua TROLL 600
Tubing / Bailer Type LDPE
Tubing / Bailer ID 0.25-in
Tubing / Bailer Length 38 ft

Well Information:

Well Diameter 2 in
Historic Total Well Depth 35.89 ft
Current Total Well Depth 36.12 ft
Initial Synoptic Depth to Water 29.71 ft

Pumping Information:

Average Purging Flow Rate* 128 (ml/min)
Parameter Recording Rate 180 sec
Well Screen Length 10 ft
Pump Placement from TOC 34.30 ft

Micro-Purge Sampling Stabilization Summary

Stabilization Settings	Purge Time	Flow Rate [ml/min]	pH	Cond [μ S/cm @25C]	Turbidity (NTU)	DO [mg/L]	Temp [C]	ORP [mV]	Depth to Water (ft.)
		< 400	+/-0.1	+/-3 %	+/-10 % < /=5 NTU	+/-10 %	+/-3%	+/-10	
1	0:00:00	120.00	7.02	2304.79	0.00	0.63	18.89	83.74	29.71
2	0:03:00	140.00	7.02	2289.50	0.00	0.60	18.18	84.06	29.71
3	0:06:00	120.00	7.01	2300.06	0.00	0.56	17.96	83.32	29.71
4	0:09:00	150.00	7.01	2301.10	0.00	0.56	17.85	83.52	29.71
5	0:12:00	120.00	7.00	2303.92	0.00	0.58	17.81	84.00	29.71
6	0:15:00	120.00	7.00	2305.71	0.00	0.59	17.84	84.38	29.71
Variance in last 3 readings			0.00	0.00	Not Applicable	0.00	-0.01	0.20	0.00
			0.00	0.00	Not Applicable	0.03	0.00	0.47	0.00
			0.00	0.08%	Not Applicable	1.55%	0.20%	0.38	0.00

Stabilization Criteria	< 0.3 ft
Logged Drawdown	0.00 ft

Weather Conditions: 68 F, cloudy/light rain

Purge Start Time: 13:50

Sample ID: MW-2-20230613

Notes: QA/QC: Not Applicable
Volume Purged: 3 L
Color/Odor: None/none
Comments: None

* = Flow rates measured to the nearest 10 ml during micro purge sampling using graduated cylinder

Purge Record



Well ID: MW-3
Date: 2023-06-12

Project Information:

Operator Name C. Greenberg
Company Name August Mack Environmental, Inc
Project Number JX0997.380/ 2Q23 GW Sampling
Site Name Crescent Oil
Sampling Method Micro Purge

Equipment Information:

Pump Model/Type Geotech bladder
Multimeter Type Aqua TROLL 600
Tubing / Bailer Type LDPE
Tubing / Bailer ID 0.25-in
Tubing / Bailer Length 39 ft

Well Information:

Well Diameter 2 in
Historic Total Well Depth 36.89 ft
Current Total Well Depth 36.16 ft
Initial Synoptic Depth to Water 29.39 ft

Pumping Information:

Average Purging Flow Rate* 212 (ml/min)
Parameter Recording Rate 180 sec
Well Screen Length 10 ft
Pump Placement from TOC 34.64 ft

Micro-Purge Sampling Stabilization Summary

Stabilization Settings	Purge Time	Flow Rate [ml/min]	pH	Cond [μ S/cm @25C]	Turbidity (NTU)	DO [mg/L]	Temp [C]	ORP [mV]	Depth to Water (ft.)
		< 400	+/-0.1	+/-3 %	+/-10 % < /=5 NTU	+/-10 %	+/-3%	+/-10	
1	0:00:00	180.00	7.19	2340.82	14.74	0.51	18.96	-231.30	29.39
2	0:03:00	220.00	7.27	2390.98	8.71	0.72	18.26	-245.61	29.39
3	0:06:00	210.00	7.31	2408.72	6.72	0.97	17.98	-243.79	29.39
4	0:09:00	220.00	7.33	2407.60	13.88	1.36	17.87	-235.29	29.39
5	0:12:00	220.00	7.35	2406.47	27.18	1.74	17.71	-229.37	29.39
6	0:15:00	220.00	7.36	2415.07	14.71	1.82	17.99	-228.88	29.39
7	0:18:00	220.00	7.36	2414.42	10.70	1.89	18.13	-227.59	29.39
Variance in last 3 readings			0.02	0.00	0.96	0.28	-0.01	5.92	0.00
			0.00	0.00	-0.46	0.05	0.02	0.49	0.00
			0.00	-0.03%	-27.28%	3.50%	0.78%	1.29	0.00

Stabilization Criteria	< 0.3 ft
Logged Drawdown	0.00 ft

Weather Conditions: 65°F mostly c.oudy

Purge Start Time: 16:11

Sample ID: MW-3-20230612:

Notes: QA/QC: Not Applicable

Volume Purged: 5 L

Color/Odor: None/none

Comments: None

* = Flow rates measured to the nearest 10 ml during micro purge sampling using graduated cylinder

Purge Record



Well ID: MW-4
Date: 2023-06-13

Project Information:

Operator Name C. Greenberg
Company Name August Mack Environmental, Inc
Project Number JX0997.380/ 2Q23 GW Sampling
Site Name Crescent Oil
Sampling Method Micro Purge

Equipment Information:

Pump Model/Type Geotech bladder
Multimeter Type Aqua TROLL 600
Tubing / Bailer Type LDPE
Tubing / Bailer ID 0.25-in
Tubing / Bailer Length 38 ft

Well Information:

Well Diameter 2 in
Historic Total Well Depth 35.36 ft
Current Total Well Depth 35.52 ft
Initial Synoptic Depth to Water 29.12 ft

Pumping Information:

Average Purging Flow Rate* 180 (ml/min)
Parameter Recording Rate 180 sec
Well Screen Length 10 ft
Pump Placement from TOC 33.74 ft

Micro-Purge Sampling Stabilization Summary

Stabilization Settings	Purge Time	Flow Rate [ml/min]	pH	Cond [μ S/cm @25C]	Turbidity (NTU)	DO [mg/L]	Temp [C]	ORP [mV]	Depth to Water (ft.)
		< 400	+/-0.1	+/-3 %	+/-10 % < /=5 NTU	+/-10 %	+/-3%	+/-10	
1	0:00:00	110.00	7.10	2800.80	0.00	0.51	19.05	86.71	29.12
2	0:03:00	190.00	7.10	2814.86	0.00	0.21	17.93	85.18	29.84
3	0:06:00	210.00	7.10	2831.87	0.00	0.12	17.65	83.48	29.84
4	0:09:00	190.00	7.10	2844.45	0.00	0.09	17.51	82.63	29.84
5	0:12:00	190.00	7.10	2845.80	0.45	0.08	17.50	82.12	29.84
6	0:15:00	190.00	7.09	2848.94	0.00	0.07	17.50	81.84	29.84
Variance in last 3 readings			0.00	0.44%	Not Applicable	-20.44%	-0.81%	-0.85	0.00
			0.00	0.05%	Not Applicable	-14.65%	-0.04%	-0.51	0.00
			0.00	0.11%	-100.00%	-12.84%	-0.03%	-0.28	0.00

Stabilization Criteria	< 0.3 ft
Logged Drawdown	0.72 ft

Weather Conditions: 68 F, cloudy

Purge Start Time: 14:38

Sample ID: MW-4-20230613

Notes: QA/QC: Not Applicable

Volume Purged: 3 L

Color/Odor: None/none

Comments: None

* = Flow rates measured to the nearest 10 ml during micro purge sampling using graduated cylinder

Purge Record



Well ID: MW-5
Date: 2023-06-14

Project Information:

Operator Name C. Greenberg
Company Name August Mack Environmental, Inc
Project Number JX0997.380/ 2Q23 GW Sampling
Site Name Crescent Oil
Sampling Method Micro Purge

Equipment Information:

Pump Model/Type Geotech bladder
Multimeter Type Aqua TROLL 600
Tubing / Bailer Type LDPE
Tubing / Bailer ID 0.25-in
Tubing / Bailer Length 37 ft

Well Information:

Well Diameter 2 in
Historic Total Well Depth 36.19 ft
Current Total Well Depth 36.49 ft
Initial Synoptic Depth to Water 28.77 ft

Pumping Information:

Average Purging Flow Rate* 220 (ml/min)
Parameter Recording Rate 180 sec
Well Screen Length 10 ft
Pump Placement from TOC 32.98 ft

Micro-Purge Sampling Stabilization Summary

Stabilization Settings	Purge Time	Flow Rate [ml/min]	pH	Cond [μ S/cm @25C]	Turbidity (NTU)	DO [mg/L]	Temp [C]	ORP [mV]	Depth to Water (ft.)
		< 400	+/-0.1	+/-3 %	+/-10 %	+/-10 %	+/-3%	+/-10	
1	0:00:00	180.00	7.12	2462.63	12.16	3.16	21.00	-6.49	28.77
2	0:03:00	200.00	7.09	2520.46	3.98	2.84	18.81	9.07	28.72
3	0:06:00	290.00	7.09	2552.18	3.53	2.67	18.30	17.26	28.40
4	0:09:00	160.00	7.09	2575.74	2.77	2.57	18.51	21.87	28.40
5	0:12:00	220.00	7.09	2562.80	2.65	2.55	18.23	25.75	28.40
6	0:15:00	210.00	7.09	2583.59	1.48	2.32	17.98	29.64	28.40
7	0:18:00	250.00	7.09	2588.05	0.58	2.22	17.95	33.11	28.40
8	0:21:00	250.00	7.09	2592.56	0.04	2.13	17.90	36.11	28.40
Variance in last 3 readings			0.00	0.81%	-43.95%	-8.99%	-1.35%	3.89	0.00
			0.00	0.17%	-60.85%	-4.25%	-0.22%	3.47	0.00
			0.00	0.17%	-93.00%	-3.90%	-0.27%	3.00	0.00

Stabilization Criteria	< 0.3 ft
Logged Drawdown	-0.37 ft

Weather Conditions: 67 F, partly cloudy

Purge Start Time: 10:15

Sample ID: MW-5-20230614

Notes:

QA/QC: Not Applicable

Volume Purged: 6 L

Color/Odor: None/none

Comments: None

* = Flow rates measured to the nearest 10 ml during micro purge sampling using graduated cylinder

Purge Record



Well ID: MW-6
Date: 2023-06-13

Project Information:

Operator Name C. Greenberg
Company Name August Mack Environmental, Inc
Project Number JX0997.380/ 2Q23 GW Sampling
Site Name Crescent Oil
Sampling Method Micro Purge

Equipment Information:

Pump Model/Type Geotech bladder
Multimeter Type Aqua TROLL 600
Tubing / Bailer Type LDPE
Tubing / Bailer ID 0.25-in
Tubing / Bailer Length 38 ft

Well Information:

Well Diameter 2 in
Historic Total Well Depth 35.24 ft
Current Total Well Depth 35.44 ft
Initial Synoptic Depth to Water 28.97 ft

Pumping Information:

Average Purging Flow Rate* 191 (ml/min)
Parameter Recording Rate 180 sec
Well Screen Length 10 ft
Pump Placement from TOC 33.61 ft

Micro-Purge Sampling Stabilization Summary

Stabilization Settings	Purge Time	Flow Rate [ml/min]	pH	Cond [μ S/cm @25C]	Turbidity (NTU)	DO [mg/L]	Temp [C]	ORP [mV]	Depth to Water (ft.)
		< 400	+/-0.1	+/-3 %	+/-10 % </=5 NTU	+/-10 %	+/-3%	+/-10	
1	0:00:00	180.00	7.03	2641.17	8.29	1.94	20.85	58.71	28.97
2	0:03:00	200.00	7.03	2658.17	4.01	1.61	19.68	62.88	28.97
3	0:06:00	200.00	7.03	2671.41	0.90	1.52	19.35	65.63	28.97
4	0:09:00	190.00	7.04	2676.37	1.50	1.50	19.20	67.95	28.97
5	0:12:00	190.00	7.04	2677.01	1.26	1.48	19.02	70.05	28.97
6	0:15:00	190.00	7.04	2684.93	3.84	1.46	19.17	71.73	28.97
Variance in last 3 readings			0.00	0.19%	67.70%	-1.08%	-0.78%	2.32	0.00
			0.00	0.02%	-15.87%	-1.52%	-0.91%	2.10	0.00
			0.00	0.30%	203.91%	-1.22%	0.76%	1.68	0.00

Stabilization Criteria	< 0.3 ft
Logged Drawdown	0.00 ft

Weather Conditions: 66°F cloudy

Purge Start Time: 12:09

Sample ID: MW-6-20230613:

Notes: QA/QC: Not Applicable

Volume Purged: 4 L

Color/Odor: None/none

Comments: None

* = Flow rates measured to the nearest 10 ml during micro purge sampling using graduated cylinder

Purge Record



Well ID: MW-7
Date: 2023-06-13

Project Information:

Operator Name: C. Greenberg
 Company Name: August Mack Environmental, Inc
 Project Number: JX0997.380/ 2Q23 GW Sampling
 Site Name: Crescent Oil
 Sampling Method: Micro Purge

Equipment Information:

Pump Model/Type: Geotech bladder
 Multimeter Type: Aqua TROLL 600
 Tubing / Bailer Type: LDPE
 Tubing / Bailer ID: 0.25-in
 Tubing / Bailer Length: 36 ft

Well Information:

Well Diameter: 2 in
 Historic Total Well Depth: 33.23 ft
 Current Total Well Depth: 33.58 ft
 Initial Synoptic Depth to Water: 27.32 ft

Pumping Information:

Average Purging Flow Rate*: 116 (ml/min)
 Parameter Recording Rate: 180 sec
 Well Screen Length: 10 ft
 Pump Placement from TOC: 31.77 ft

Micro-Purge Sampling Stabilization Summary

Stabilization Settings	Purge Time	Flow Rate [ml/min]	pH	Cond [μ S/cm @25C]	Turbidity (NTU)	DO [mg/L]	Temp [C]	ORP [mV]	Depth to Water (ft.)
		< 400	+/-0.1	+/-3 %	+/-10 %	+/-10 %	+/-3%	+/-10	
					</=5 NTU				
1	0:00:00	110.00	7.05	2253.83	35.70	4.07	19.33	41.59	27.32
2	0:03:00	110.00	7.06	2237.00	26.64	4.03	19.00	46.15	27.32
3	0:06:00	120.00	7.06	2243.53	18.64	4.04	19.03	49.14	27.32
4	0:09:00	140.00	7.06	2242.19	11.50	3.98	18.86	52.11	27.32
5	0:12:00	110.00	7.06	2255.44	10.64	3.96	19.07	53.49	27.32
6	0:15:00	110.00	7.06	2229.35	8.65	3.95	18.89	55.44	27.32
Variance in last 3 readings			0.00	-0.06%	-38.33%	-1.37%	-0.92%	2.97	0.00
			0.00	0.59%	-7.51%	-0.42%	1.10%	1.38	0.00
			0.00	-1.16%	-18.69%	-0.26%	-0.94%	1.94	0.00

Stabilization Criteria	< 0.3 ft
Logged Drawdown	0.00 ft

Weather Conditions: 65 F, partly cloudy

Purge Start Time: 10:48

Sample ID: MW-7-20230613

Notes: QA/QC: Not Applicable
 Volume Purged: 4 L
 Color/Odor: None/none
 Comments: None

* = Flow rates measured to the nearest 10 ml during micro purge sampling using graduated cylinder

Purge Record



Well ID: MW-8
Date: 2023-06-14

Project Information:

Operator Name C. Greenberg
 Company Name August Mack Environmental, Inc
 Project Number JX0997.380/ 2Q23 GW Sampling
 Site Name Crescent Oil
 Sampling Method Micro Purge

Equipment Information:

Pump Model/Type Geotech bladder
 Multimeter Type Aqua TROLL 600
 Tubing / Bailer Type LDPE
 Tubing / Bailer ID 0.25-in
 Tubing / Bailer Length 30 ft

Well Information:

Well Diameter 2 in
 Historic Total Well Depth 29.36 ft
 Current Total Well Depth 29.36 ft
 Initial Synoptic Depth to Water 25.35 ft

Pumping Information:

Average Purging Flow Rate* 155 (ml/min)
 Parameter Recording Rate 180 sec
 Well Screen Length 10 ft
 Pump Placement from TOC 27.35 ft

Micro-Purge Sampling Stabilization Summary

Stabilization Settings	Purge Time	Flow Rate [ml/min]	pH	Cond [µS/cm @25C]	Turbidity (NTU)	DO [mg/L]	Temp [C]	ORP [mV]	Depth to Water (ft.)
	< 400	+/-0.1	+/-3 %	+/-10 %	+/-10 %	+/-3%	+/-10		
1	0:00:00	250.00	6.90	4726.72	326.67	3.33	19.87	-156.34	25.35
2	0:03:00	250.00	7.08	4677.42	256.72	7.18	19.55	-145.04	25.35
3	0:06:00	250.00	7.02	4684.55	1770.10	3.15	18.53	-144.10	25.35
4	0:09:00	170.00	7.16	4698.33	823.55	5.25	18.88	-134.32	25.35
5	0:12:00	130.00	7.19	4707.46	1105.05	5.31	19.39	-133.04	26.28
6	0:15:00	130.00	7.22	4689.73	649.66	5.40	19.18	-131.82	26.28
7	0:18:00	110.00	7.24	4722.68	423.68	5.49	19.66	-131.43	26.20
8	0:21:00	110.00	7.27	4684.88	388.34	5.69	19.52	-128.97	26.20
9	0:24:00	160.00	7.33	4660.96	240.35	6.15	19.09	-134.41	26.15
10	0:27:00	140.00	7.34	4653.72	213.69	6.26	19.12	-132.74	26.15
11	0:30:00	140.00	7.35	4665.90	200.88	6.19	19.48	-123.39	25.91
12	0:33:00	140.00	7.35	4616.90	527.96	6.31	19.36	-123.06	26.45
13	0:36:00	140.00	7.39	4640.10	237.20	6.53	19.15	-141.78	26.45
14	0:39:00	140.00	7.39	4637.73	166.37	6.57	19.05	-139.04	26.45
15	0:42:00	140.00	7.38	4644.92	148.59	6.45	19.49	-135.35	26.45
16	0:45:00	140.00	7.38	4625.35	138.41	6.40	19.15	-143.68	26.45
17	0:48:00	140.00	7.39	4623.80	124.39	6.41	19.11	-147.65	26.45
18	0:51:00	140.00	7.38	4620.81	119.08	6.27	19.28	-147.60	26.45
19	0:54:00	140.00	7.36	4635.14	127.23	5.95	19.59	-137.97	26.45
Variance in last 3 readings			0.00	-0.03%	-10.13%	0.14%	-0.19%	-3.98	0.00
			-0.01	-0.06%	-4.27%	-2.25%	0.85%	0.06	0.00
			-0.02	0.31%	6.84%	-5.06%	1.65%	9.63	0.00

Stabilization Criteria	< 0.3 ft
Logged Drawdown	1.10 ft

Weather Conditions: 63 F, cloudy

Purge Start Time: 08:43

Sample ID: MW-8-20230614

Notes: QA/QC: Not Applicable

Volume Purged: 8 L

Color/Odor: None/none

Comments: None

* = Flow rates measured to the nearest 10 ml during micro purge sampling using graduated cylinder

Purge Record



Well ID: MW-9R
Date: 2023-06-13

Project Information:

Operator Name C. Greenberg
Company Name August Mack Environmental, Inc
Project Number JX0997.380/ 2Q23 GW Sampling
Site Name Crescent Oil
Sampling Method Micro Purge

Equipment Information:

Pump Model/Type Geotech bladder
Multimeter Type Aqua TROLL 600
Tubing / Bailer Type LDPE
Tubing / Bailer ID 0.25-in
Tubing / Bailer Length 37 ft

Well Information:

Well Diameter 2 in
Historic Total Well Depth 34.87 ft
Current Total Well Depth 35.08 ft
Initial Synoptic Depth to Water 27.84 ft

Pumping Information:

Average Purging Flow Rate* 168 (ml/min)
Parameter Recording Rate 180 sec
Well Screen Length 10 ft
Pump Placement from TOC 32.85 ft

Micro-Purge Sampling Stabilization Summary

Stabilization Settings	Purge Time	Flow Rate [ml/min]	pH	Cond [μ S/cm @25C]	Turbidity (NTU)	DO [mg/L]	Temp [C]	ORP [mV]	Depth to Water (ft.)
		< 400	+/-0.1	+/-3 %	+/-10 % < /=5 NTU	+/-10 %	+/-3%	+/-10	
1	0:00:00	160.00	7.27	2011.12	1.01	0.95	18.50	87.97	27.84
2	0:03:00	170.00	7.27	1991.21	0.00	0.95	18.21	86.37	27.79
3	0:06:00	170.00	7.26	1997.88	0.00	0.93	18.17	84.57	27.79
4	0:09:00	170.00	7.26	2005.44	0.00	0.72	18.11	82.54	27.79
5	0:12:00	170.00	7.26	2005.89	0.00	0.68	18.11	80.94	27.79
6	0:15:00	170.00	7.25	2020.43	0.00	0.71	18.06	80.02	27.79
Variance in last 3 readings			0.00	0.38%	Not Applicable	-22.92%	-0.30%	-2.03	0.00
			0.00	0.02%	Not Applicable	-5.07%	-0.03%	-1.60	0.00
			-0.01	0.73%	Not Applicable	4.09%	-0.27%	-0.93	0.00

Stabilization Criteria	< 0.3 ft
Logged Drawdown	-0.05 ft

Weather Conditions: 68 F, cloudy

Purge Start Time: 15:28

Sample ID: MW-9R-20230613

Notes: QA/QC: Not Applicable

Volume Purged: 4 L

Color/Odor: None/none

Comments: None

* = Flow rates measured to the nearest 10 ml during micro purge sampling using graduated cylinder

Purge Record



Well ID: MW-10
Date: 2023-06-13

Project Information:

Operator Name: C. Greenberg
 Company Name: August Mack Environmental, Inc
 Project Number: JX0997.380/ 2Q23 GW Sampling
 Site Name: Crescent Oil
 Sampling Method: Micro Purge

Equipment Information:

Pump Model/Type: Geotech bladder
 Multimeter Type: Aqua TROLL 600
 Tubing / Bailer Type: LDPE
 Tubing / Bailer ID: 0.25-in
 Tubing / Bailer Length: 42 ft

Well Information:

Well Diameter: 2 in
 Historic Total Well Depth: 44.67 ft
 Current Total Well Depth: 44.87 ft
 Initial Synoptic Depth to Water: 30.58 ft

Pumping Information:

Average Purging Flow Rate*: 172 (ml/min)
 Parameter Recording Rate: 180 sec
 Well Screen Length: 10 ft
 Pump Placement from TOC: 38.17 ft

Micro-Purge Sampling Stabilization Summary

Stabilization Settings	Purge Time	Flow Rate [ml/min]	pH	Cond [μ S/cm @25C]	Turbidity (NTU)	DO [mg/L]	Temp [C]	ORP [mV]	Depth to Water (ft.)
	< 400	+/-0.1	+/-3 %	+/-10 %	+/-10 %	+/-3%	+/-10		
1	0:00:00	170.00	7.12	3066.76	63.59	0.33	18.93	-94.92	30.58
2	0:03:00	170.00	7.13	3041.81	44.84	0.21	18.49	-117.99	30.58
3	0:06:00	180.00	7.14	3008.82	40.17	0.21	18.37	-129.14	30.58
4	0:09:00	170.00	7.14	2982.54	36.87	0.22	18.43	-132.05	30.58
5	0:12:00	180.00	7.14	2954.72	28.91	0.23	18.40	-132.46	30.58
6	0:15:00	170.00	7.14	2938.60	27.82	0.23	18.39	-133.13	30.58
7	0:18:00	170.00	7.14	2931.60	27.09	0.23	18.42	-133.91	30.58
Variance in last 3 readings			0.00	-0.93%	-21.59%	3.90%	-0.17%	-0.41	0.00
			0.00	-0.55%	-3.76%	-0.53%	-0.08%	-0.67	0.00
			0.00	-0.24%	-2.63%	-2.21%	0.19%	-0.78	0.00

Stabilization Criteria	< 0.3 ft
Logged Drawdown	0.00 ft

Weather Conditions: 60°F Cloudy

Purge Start Time: 08:58

Sample ID: MW-10-20230613

Notes: QA/QC: Not Applicable

Volume Purged: 6 L

Color/Odor: None/none

Comments: None

* = Flow rates measured to the nearest 10 ml during micro purge sampling using graduated cylinder

Purge Record



Well ID: MW-11
Date: 2023-06-12

Project Information:

Operator Name C. Greenberg
Company Name August Mack Environmental, Inc
Project Number JX0997.380/ 2Q23 GW Sampling
Site Name Crescent Oil
Sampling Method Micro Purge

Equipment Information:

Pump Model/Type Geotech bladder
Multimeter Type Aqua TROLL 600
Tubing / Bailer Type LDPE
Tubing / Bailer ID 0.25-in
Tubing / Bailer Length 40 ft

Well Information:

Well Diameter 2 in
Historic Total Well Depth 39.76 ft
Current Total Well Depth 40.44 ft
Initial Synoptic Depth to Water 29.38 ft

Pumping Information:

Average Purging Flow Rate* 231 (ml/min)
Parameter Recording Rate 180 sec
Well Screen Length 10 ft
Pump Placement from TOC 36.26 ft

Micro-Purge Sampling Stabilization Summary

Stabilization Settings	Purge Time	Flow Rate [ml/min]	pH	Cond [$\mu\text{S}/\text{cm}$ @25C]	Turbidity (NTU)	DO [mg/L]	Temp [C]	ORP [mV]	Depth to Water (ft.)
		< 400	+/-0.1	+/-3 %	+/-10 %	+/-10 %	+/-3%	+/-10	
					</=5 NTU				
1	0:00:00	230.00	7.27	2616.83	8.13	0.15	20.44	-275.09	29.38
2	0:03:00	240.00	7.27	2628.96	4.06	0.13	19.78	-274.66	29.47
3	0:06:00	230.00	7.27	2642.47	3.62	0.12	19.74	-274.48	29.47
4	0:09:00	230.00	7.27	2626.70	6.35	0.14	19.63	-269.38	29.47
5	0:12:00	230.00	7.27	2630.22	8.36	0.12	19.39	-269.99	29.47
6	0:15:00	230.00	7.27	2625.11	6.48	0.10	19.21	-268.08	29.47
Variance in last 3 readings			0.00	-0.60%	75.25%	22.67%	-0.55%	5.11	0.00
			0.00	0.13%	31.64%	-16.31%	-1.23%	-0.61	0.00
			0.00	-0.19%	-22.55%	-18.34%	-0.93%	1.91	0.00

Stabilization Criteria	< 0.3 ft
Logged Drawdown	0.09 ft

Weather Conditions: 64 F, cloudy

Purge Start Time: 15:15

Sample ID: MW-11-20230612

Notes: QA/QC: Not Applicable

Volume Purged: 7 L

Color/Odor: None/none

Comments: None

* = Flow rates measured to the nearest 10 ml during micro purge sampling using graduated cylinder

Purge Record



Well ID: MW-12
Date: 2023-06-12

Project Information:

Operator Name: C. Greenberg
 Company Name: August Mack Environmental, Inc
 Project Number: JX0997.380/ 2Q23 GW Sampling
 Site Name: Crescent Oil
 Sampling Method: Micro Purge

Equipment Information:

Pump Model/Type: Geotech bladder
 Multimeter Type: Aqua TROLL 600
 Tubing / Bailer Type: LDPE
 Tubing / Bailer ID: 0.25-in
 Tubing / Bailer Length: 37 ft

Well Information:

Well Diameter: 2 in
 Historic Total Well Depth: 35.74 ft
 Current Total Well Depth: 35.93 ft
 Initial Synoptic Depth to Water: 27.98 ft

Pumping Information:

Average Purging Flow Rate*: 168 (ml/min)
 Parameter Recording Rate: 180 sec
 Well Screen Length: 10 ft
 Pump Placement from TOC: 33.36 ft

Micro-Purge Sampling Stabilization Summary

Stabilization Settings	Purge Time	Flow Rate [ml/min]	pH	Cond [μ S/cm @25C]	Turbidity (NTU)	DO [mg/L]	Temp [C]	ORP [mV]	Depth to Water (ft.)
	< 400	+/-0.1	+/-3 %	+/-10 %	+/-10 %	+/-3%	+/-10		
1	0:00:00	220.00	6.64	3195.13	0.00	0.16	19.38	9.84	27.98
2	0:03:00	130.00	6.68	3119.33	0.00	0.19	19.04	-51.82	27.98
3	0:06:00	150.00	6.66	3094.87	0.13	0.18	19.16	-89.73	27.85
4	0:09:00	150.00	6.65	3631.09	33.99	0.34	19.24	-251.25	27.85
5	0:12:00	80.00	6.66	3030.18	16.39	1.22	19.34	-212.49	27.85
6	0:15:00	180.00	6.72	2943.30	19.35	1.35	19.14	-193.11	27.85
7	0:18:00	180.00	6.73	2867.65	22.90	1.40	18.98	-185.73	27.85
8	0:21:00	180.00	6.75	2805.25	34.16	1.46	18.92	-179.88	27.85
9	0:24:00	180.00	6.77	2741.32	60.36	1.42	18.84	-181.09	27.85
10	0:27:00	180.00	6.80	2683.00	82.75	1.47	18.85	-186.34	27.85
11	0:30:00	180.00	6.83	2647.03	104.69	1.50	18.88	-187.81	27.85
12	0:33:00	180.00	6.86	2689.11	0.17	1.60	19.14	-183.85	27.85
13	0:36:00	180.00	6.89	2653.18	0.03	1.44	19.17	-185.34	27.85
14	0:39:00	180.00	6.92	2631.09	0.00	1.45	19.08	-181.34	27.85
15	0:42:00	180.00	6.96	2597.39	0.00	1.49	19.01	-180.76	27.85
Variance in last 3 readings			0.03	-1.34%	-80.13%	-9.98%	0.19%	-1.49	0.00
			0.03	-0.83%	-100.00%	0.35%	-0.47%	4.00	0.00
			0.03	-1.28%	Not Applicable	3.18%	-0.37%	0.58	0.00

Stabilization Criteria	< 0.3 ft
Logged Drawdown	-0.13 ft

Weather Conditions: 60 F cloudy

Purge Start Time: 13:40

Sample ID: MW-12-20230612

Notes:

QA/QC: Not Applicable

Volume Purged: 11 L

Color/Odor: None/none

Comments: None

* = Flow rates measured to the nearest 10 ml during micro purge sampling using graduated cylinder

ATTACHMENT C

Mann Kendall

MANN-KENDALL TREND TEST SUMMARY

	Summary of Mann-Kendall Trend Analysis	
	Tetrachloroethene (PCE)	Trichloroethene (TCE)
MW-1 ¹	Stable	Decreasing
MW-2	Stable	Decreasing
MW-4	Decreasing	Stable
MW-5	Increasing	NA
MW-6	NA	Decreasing
MW-7	NA	Decreasing
MW-8 ²	Decreasing	NA
MW-9R	Stable	Stable

Abbreviations & Notes

Trends are reported as the Mann-Kendall Test Value (S) at the 95% confidence level.

NA = Not Applicable; results not calculated.

¹MW-1 was not sampled during 2Q2022, and so there is no data is available for that monitoring period.

²MW-8 was not sampled during 4Q2022, and so there is no data is available for that monitoring period.

The following denote the color of trend significance:

Significant Evidence of Decreasing Trend =

Insufficient Evidence to Identify Significant Trend =

Significant Evidence of Increasing Trend =

Decreasing
Stable
Increasing

Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.2 7/17/2023 1:22:04 PM
 From File Pro UCL Input.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

MW-1 Tetrachloroethene

General Statistics

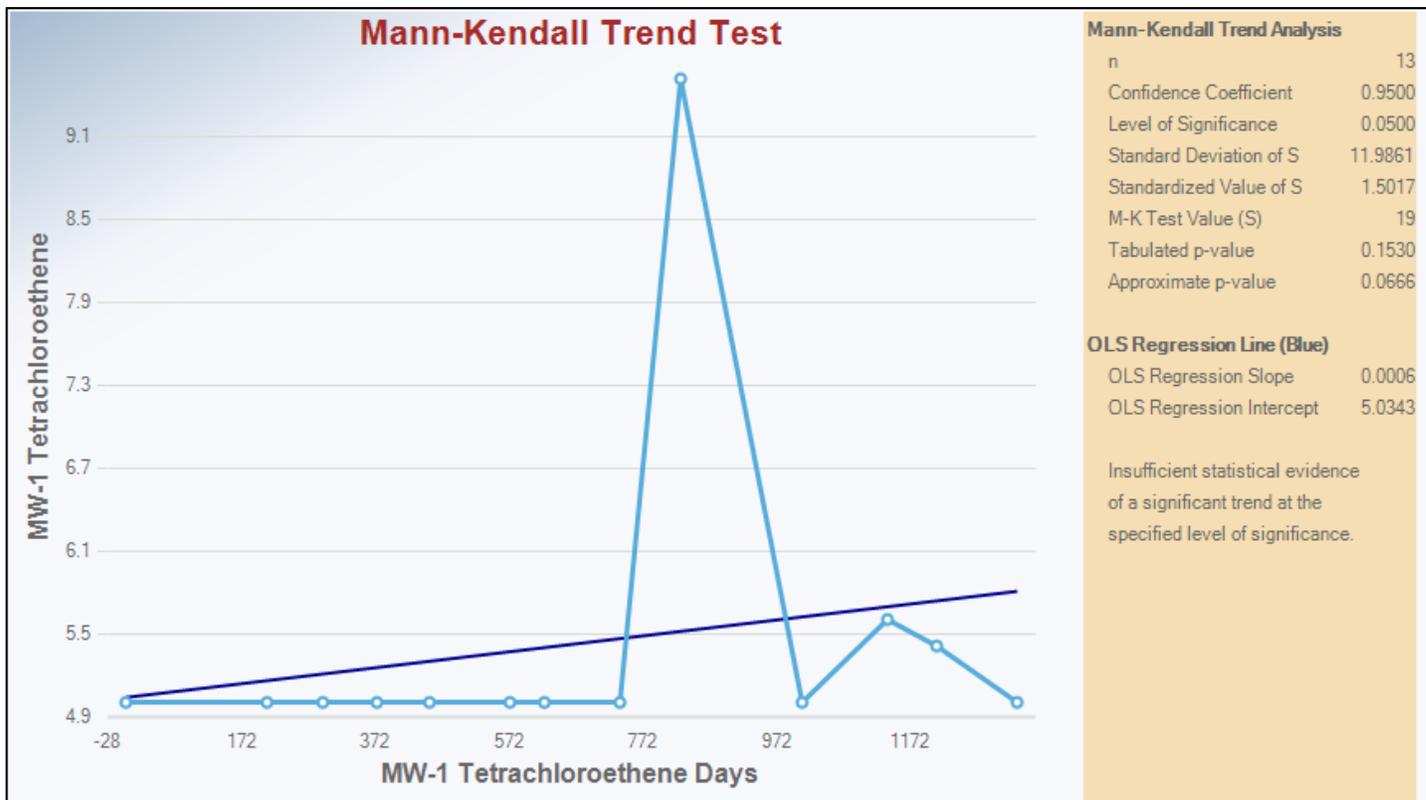
Number of Events Reported (m) 13
 Number of Missing Events 0
 Number or Reported Events Used 13
 Number Values Reported (n) 13
 Minimum 5
 Maximum 9.5
 Mean 5.423
 Geometric Mean 5.331
 Median 5
 Standard Deviation 1.24
 Coefficient of Variation 0.229

Mann-Kendall Test

M-K Test Value (S) 19
 Tabulated p-value 0.153
 Standard Deviation of S 11.99
 Standardized Value of S 1.502
 Approximate p-value 0.0666

Date	Event Duration (Days)	Result (ug/L)
10/22/2019	0	<5.0
05/18/2020	209	<5.0
08/10/2020	293	<5.0
10/30/2020	374	<5.0
01/18/2021	454	<5.0
05/18/2021	574	<5.0
07/08/2021	625	<5.0
10/28/2021	737	<5.0
01/26/2022	827	9.5
07/27/2022	1009	<5.0
12/01/2022	1136	5.6
02/14/2023	1211	5.4
06/13/2023	1330	<5.0

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.2 7/17/2023 1:21:52 PM
 From File Pro UCL Input.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

MW-1 Trichloroethene

General Statistics

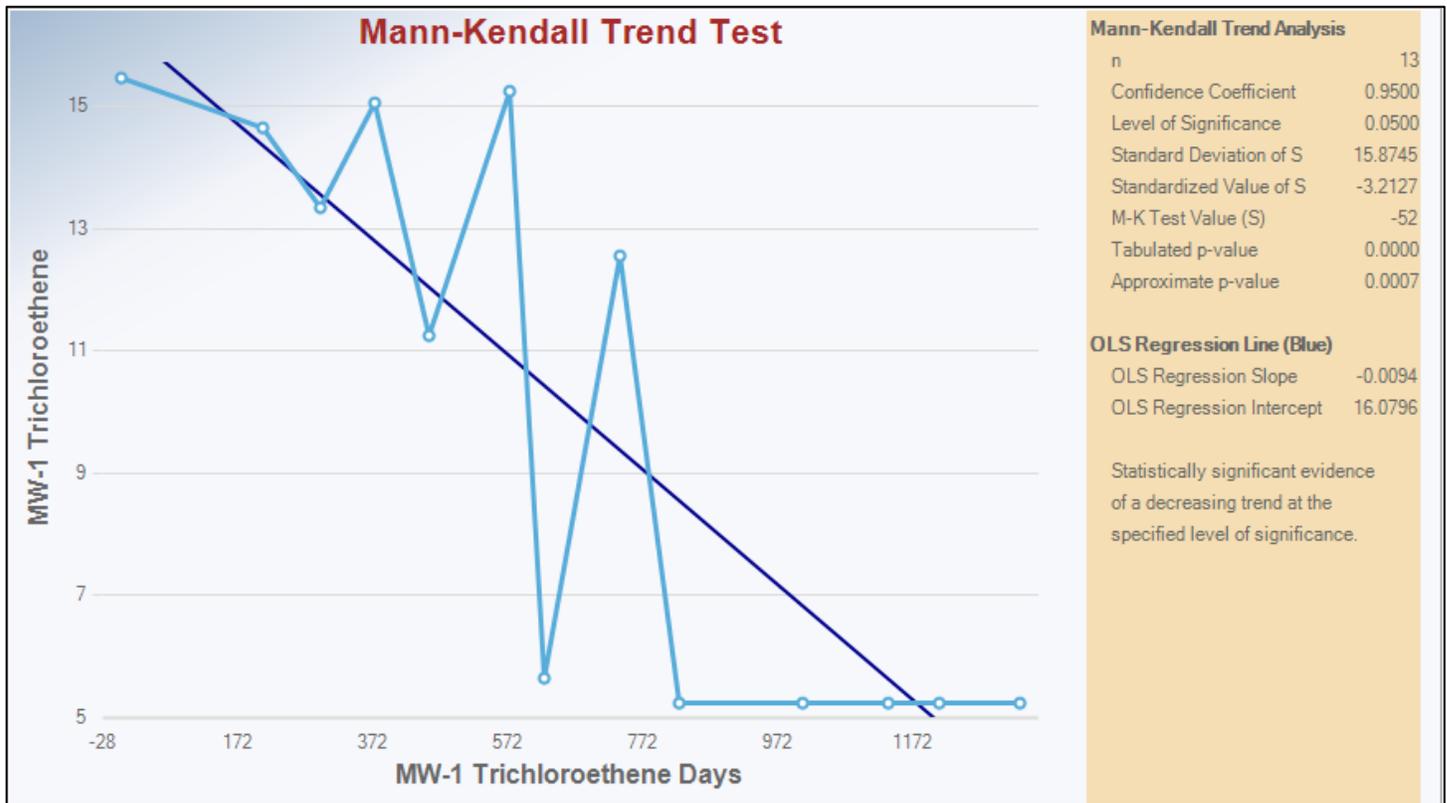
Number of Events Reported (m) 13
 Number of Missing Events 0
 Number or Reported Events Used 13
 Number Values Reported (n) 13
 Minimum 5
 Maximum 15.2
 Mean 9.708
 Geometric Mean 8.621
 Median 11
 Standard Deviation 4.613
 Coefficient of Variation 0.475

Mann-Kendall Test

M-K Test Value (S) -52
 Tabulated p-value 0
 Standard Deviation of S 15.87
 Standardized Value of S -3.213
 Approximate p-value 6.5747E-4

Date	Event Duration (Days)	Result (ug/L)
10/22/2019	0	15.2
05/18/2020	209	14.4
08/10/2020	293	13.1
10/30/2020	374	14.8
01/18/2021	454	11.0
05/18/2021	574	15.0
07/08/2021	625	5.4
10/28/2021	737	12.3
01/26/2022	827	<5.0
07/27/2022	1009	<5.0
12/01/2022	1136	<5.0
02/14/2023	1211	<5.0
06/13/2023	1330	<5.0

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.2 7/17/2023 1:22:19 PM
 From File Pro UCL Input.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

MW-2 Tetrachloroethene

General Statistics

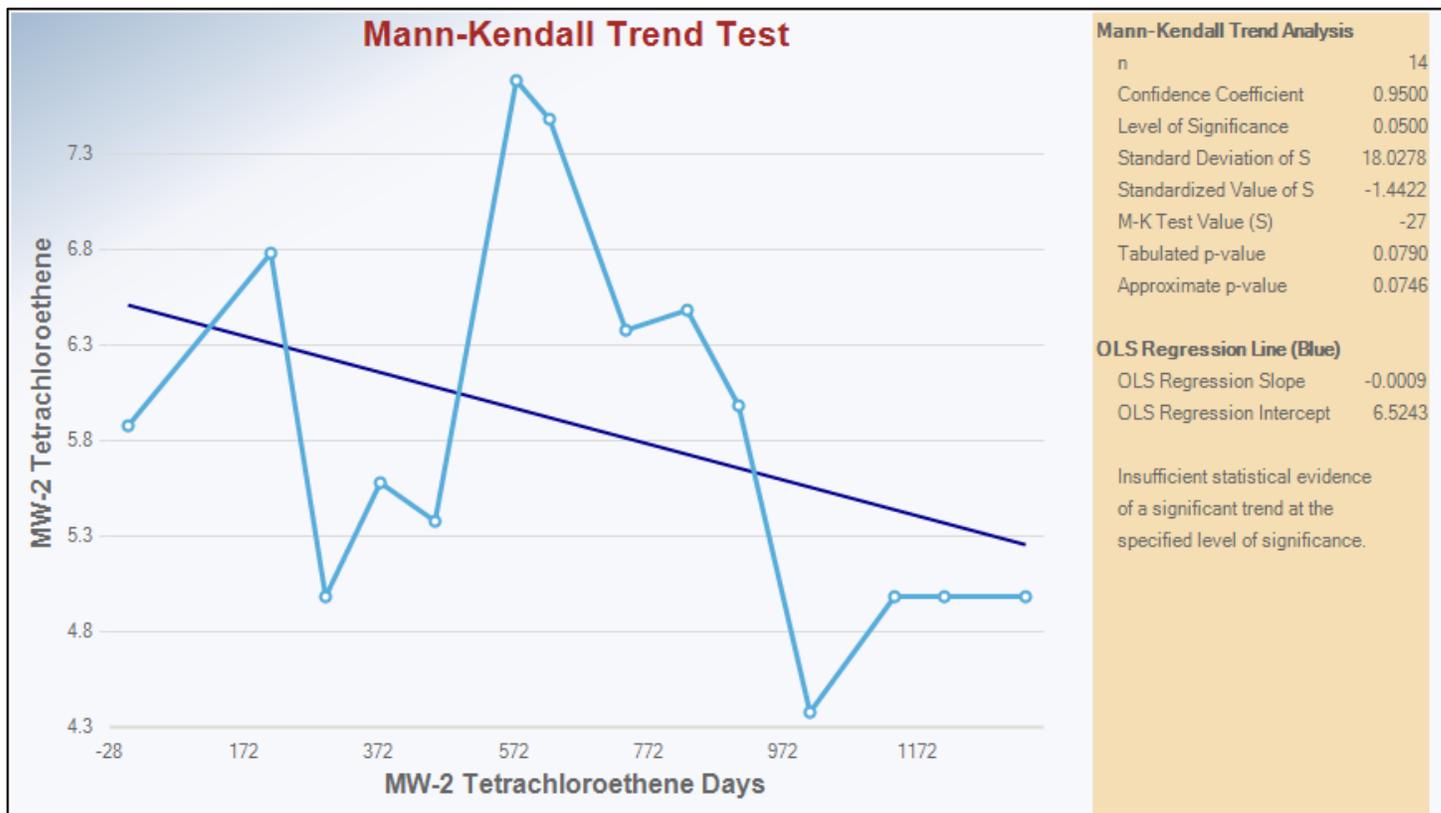
Number of Events Reported (m) 14
 Number of Missing Events 0
 Number or Reported Events Used 14
 Number Values Reported (n) 14
 Minimum 4.4
 Maximum 7.7
 Mean 5.871
 Geometric Mean 5.794
 Median 5.75
 Standard Deviation 1.002
 Coefficient of Variation 0.171

Mann-Kendall Test

M-K Test Value (S) -27
 Tabulated p-value 0.079
 Standard Deviation of S 18.03
 Standardized Value of S -1.442
 Approximate p-value 0.0746

Date	Event Duration (Days)	Result (ug/L)
10/22/2019	0	5.9
05/19/2020	210	6.8
08/10/2020	293	<5.0
10/29/2020	373	5.6
01/18/2021	454	5.4
05/19/2021	575	7.7
07/08/2021	625	7.5
10/29/2021	738	6.4
01/27/2022	828	6.5
04/15/2022	906	5.9
07/28/2022	1009	4.4
12/01/2022	1136	<5.0
02/14/2023	1211	<5.0
06/13/2023	1330	<5.0

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.2 7/17/2023 1:22:12 PM
 From File Pro UCL Input.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

MW-2 Trichloroethene

General Statistics

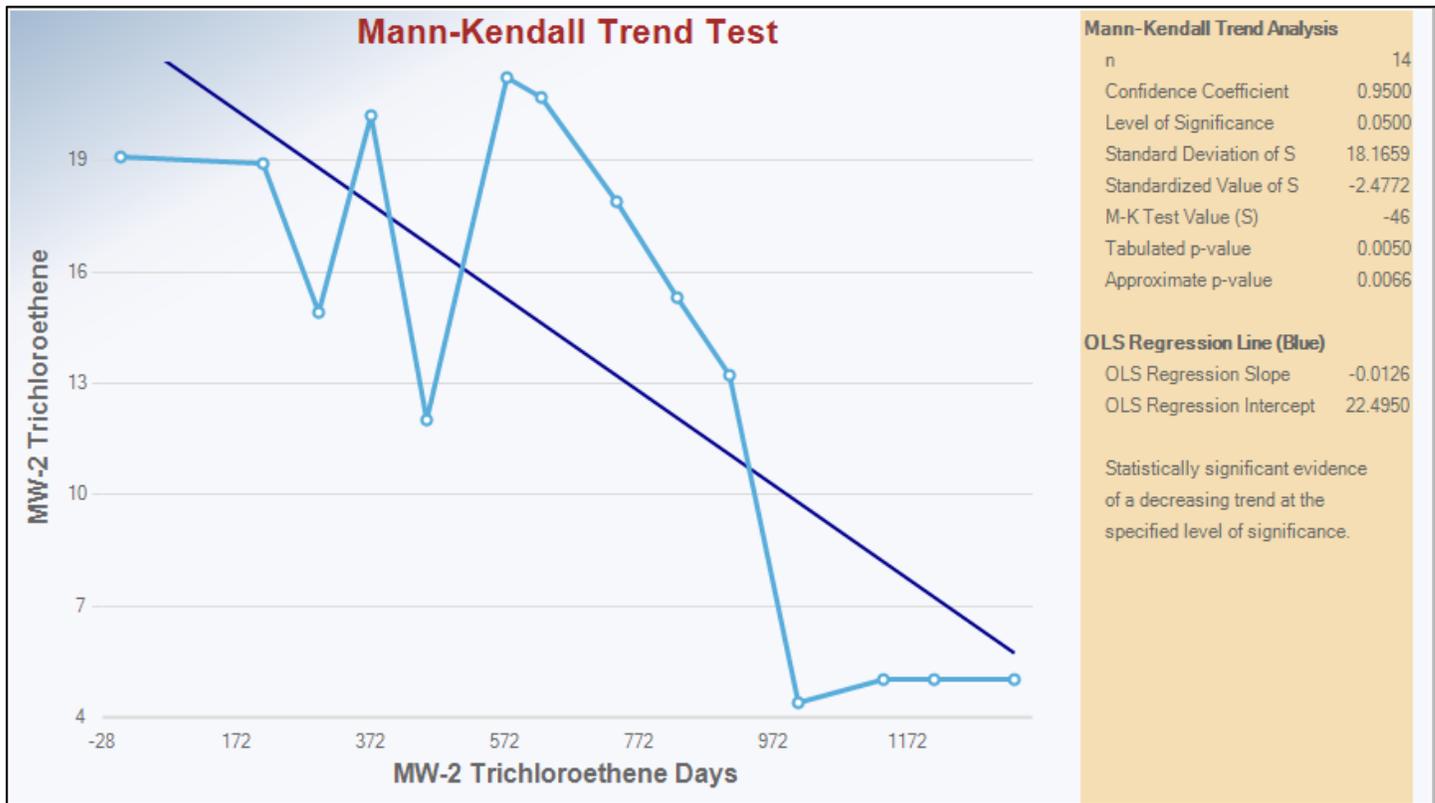
Number of Events Reported (m) 14
 Number of Missing Events 0
 Number or Reported Events Used 14
 Number Values Reported (n) 14
 Minimum 4.4
 Maximum 21.2
 Mean 13.77
 Geometric Mean 11.9
 Median 15.1
 Standard Deviation 6.457
 Coefficient of Variation 0.469

Mann-Kendall Test

M-K Test Value (S) -46
 Tabulated p-value 0.005
 Standard Deviation of S 18.17
 Standardized Value of S -2.477
 Approximate p-value 0.00662

Date	Event Duration (Days)	Result (ug/L)
10/22/2019	0	19.1
05/19/2020	210	18.9
08/10/2020	293	14.9
10/29/2020	373	20.2
01/18/2021	454	12.0
05/19/2021	575	21.2
07/08/2021	625	20.7
10/29/2021	738	17.9
01/27/2022	828	15.3
04/15/2022	906	13.0
07/28/2022	1010	4.4
12/01/2022	1136	<5.0
02/14/2023	1211	<5.0
06/13/2023	1330	<5.0

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.2 7/17/2023 1:22:34 PM
 From File Pro UCL Input.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

MW-4 Tetrachloroethene

General Statistics

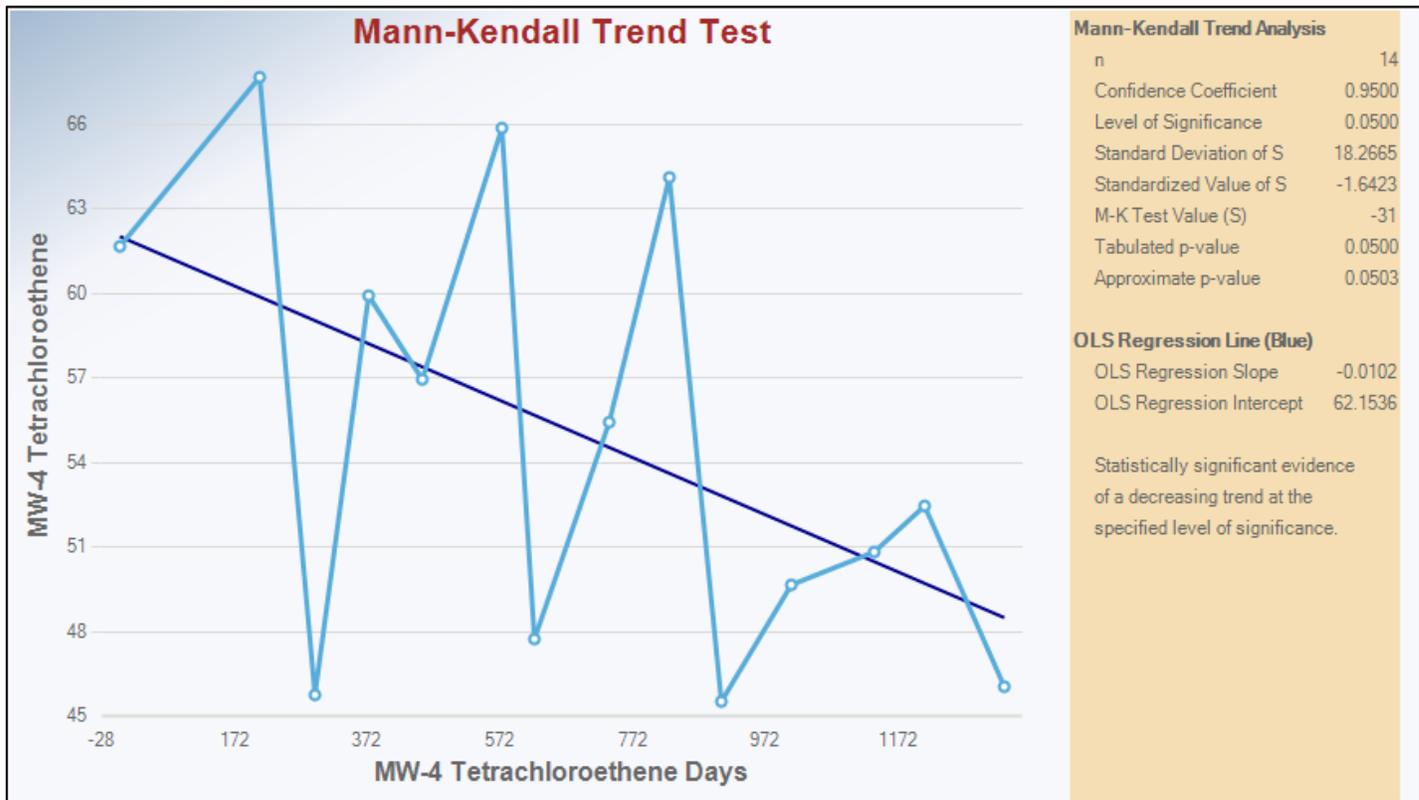
Number of Events Reported (m) 14
 Number of Missing Events 0
 Number or Reported Events Used 14
 Number Values Reported (n) 14
 Minimum 45.7
 Maximum 67.8
 Mean 55.13
 Geometric Mean 54.62
 Median 54.1
 Standard Deviation 7.816
 Coefficient of Variation 0.142

Mann-Kendall Test

M-K Test Value (S) -31
 Tabulated p-value 0.05
 Standard Deviation of S 18.27
 Standardized Value of S -1.642
 Approximate p-value 0.0503

Date	Event Duration (Days)	Result (ug/L)
10/22/2019	0	61.8
05/19/2020	210	67.8
08/11/2020	294	45.9
10/30/2020	374	60.1
01/19/2021	455	57.1
05/18/2021	574	66.0
07/07/2021	624	47.9
10/28/2021	737	55.6
01/26/2022	827	64.3
04/14/2022	905	45.7
07/28/2022	1010	49.8
12/01/2022	1136	51.0
02/14/2023	1211	52.6
06/13/2023	1330	46.2

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.2 7/17/2023 1:22:26 PM
 From File Pro UCL Input.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

MW-4 Trichloroethene

General Statistics

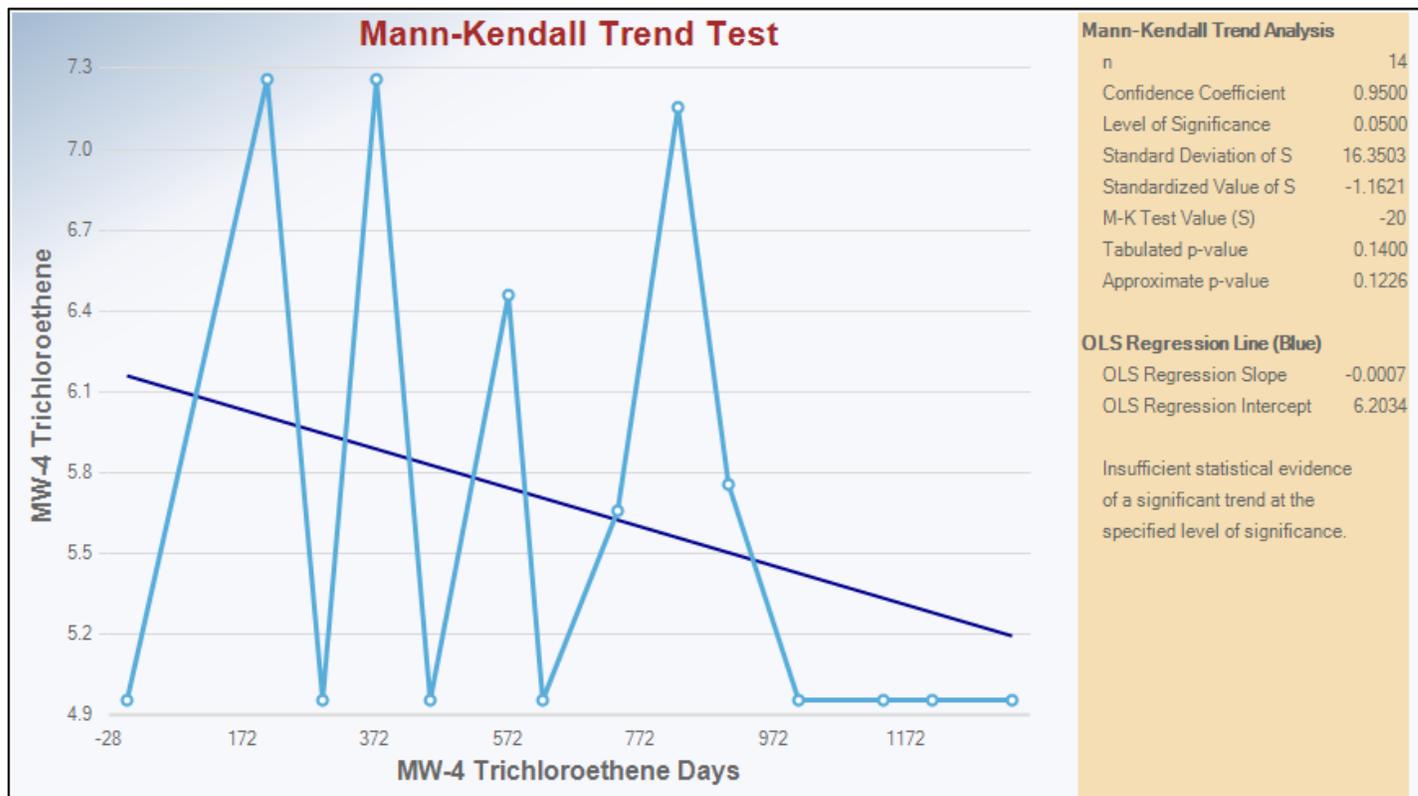
Number of Events Reported (m) 14
 Number of Missing Events 0
 Number or Reported Events Used 14
 Number Values Reported (n) 14
 Minimum 5
 Maximum 7.3
 Mean 5.7
 Geometric Mean 5.631
 Median 5
 Standard Deviation 0.958
 Coefficient of Variation 0.168

Mann-Kendall Test

M-K Test Value (S) -20
 Tabulated p-value 0.14
 Standard Deviation of S 16.35
 Standardized Value of S -1.162
 Approximate p-value 0.123

Date	Event Duration (Days)	Result (ug/L)
10/22/2019	0	<5.0
05/19/2020	210	7.3
08/11/2020	294	<5.0
10/30/2020	374	7.3
01/19/2021	455	<5.0
05/18/2021	574	6.5
07/07/2021	624	<5.0
10/28/2021	737	5.7
01/26/2022	827	7.2
04/14/2022	905	5.8
07/28/2022	1010	<5.0
12/01/2022	1136	<5.0
02/14/2023	1211	<5.0
06/13/2023	1330	<5.0

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.2 7/17/2023 1:22:41 PM
 From File Pro UCL Input.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

MW-5 Tetrachloroethene

General Statistics

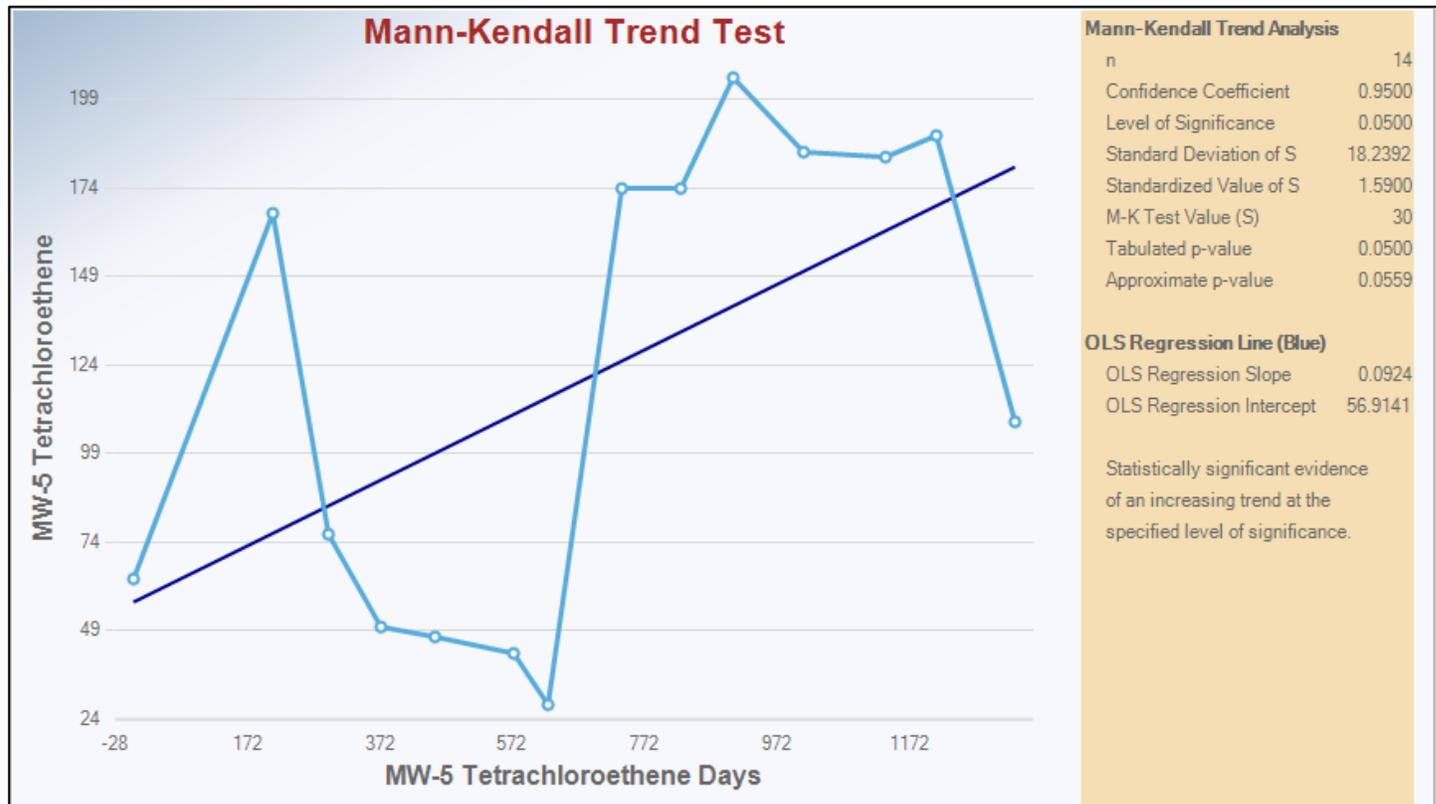
Number of Events Reported (m) 14
 Number of Missing Events 0
 Number or Reported Events Used 14
 Number Values Reported (n) 14
 Minimum 28.4
 Maximum 205
 Mean 120.9
 Geometric Mean 99.91
 Median 137.5
 Standard Deviation 66.73
 Coefficient of Variation 0.552

Mann-Kendall Test

M-K Test Value (S) 30
 Tabulated p-value 0.05
 Standard Deviation of S 18.24
 Standardized Value of S 1.59
 Approximate p-value 0.0559

Date	Event Duration (Days)	Result (ug/L)
10/22/2019	0	63.6
05/19/2020	210	167
08/11/2020	294	76.5
10/30/2020	374	50.0
01/19/2021	455	47.2
05/18/2021	574	42.5
07/08/2021	625	28.4
10/28/2021	737	174
01/26/2022	827	174
04/15/2022	906	205
07/29/2022	1011	184
12/02/2022	1137	183
02/15/2023	1212	189
06/14/2023	1331	108

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.2 7/19/2023 5:27:55 PM
 From File WorkSheet.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

MW-6 Trichloroethene

General Statistics

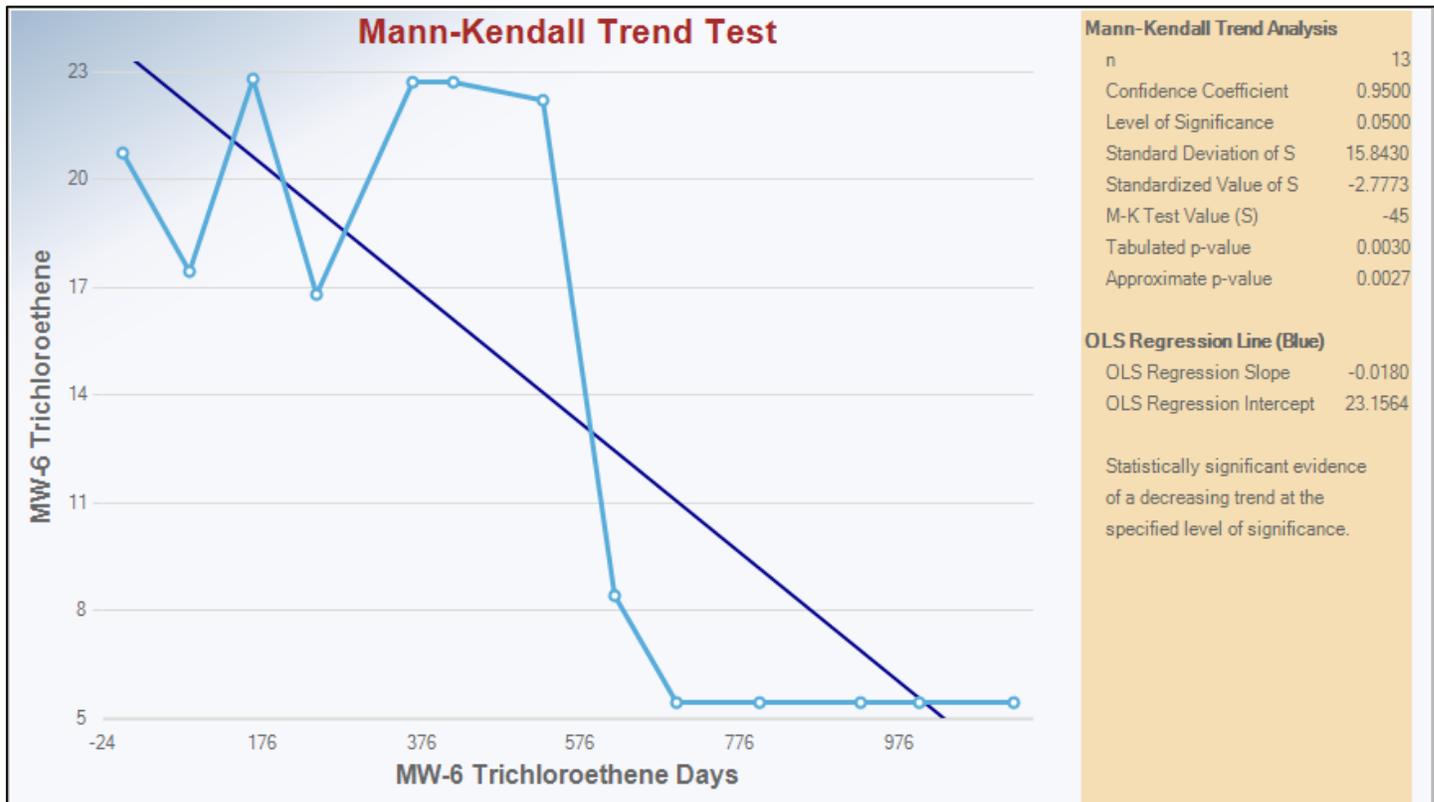
Number of Events Reported (m) 13
 Number of Missing Events 0
 Number or Reported Events Used 13
 Number Values Reported (n) 13
 Minimum 5
 Maximum 22.4
 Mean 13.5
 Geometric Mean 11
 Median 16.4
 Standard Deviation 7.965
 Coefficient of Variation 0.59

Mann-Kendall Test

M-K Test Value (S) -45
 Tabulated p-value 0.003
 Standard Deviation of S 15.84
 Standardized Value of S -2.777
 Approximate p-value 0.00274

Date	Event Duration (Days)	Result (ug/L)
05/18/2020	0	20.3
08/10/2020	84	17.0
10/30/2020	165	22.4
01/18/2021	245	16.4
05/19/2021	366	22.3
07/08/2021	416	22.3
10/28/2021	528	21.8
01/26/2022	618	8.0
04/15/2022	697	<5.0
07/28/2022	801	<5.0
12/01/2022	927	<5.0
02/14/2023	1002	<5.0
06/13/2023	1121	<5.0

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.2 7/19/2023 5:28:46 PM
 From File WorkSheet.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

MW-7 Trichloroethene

General Statistics

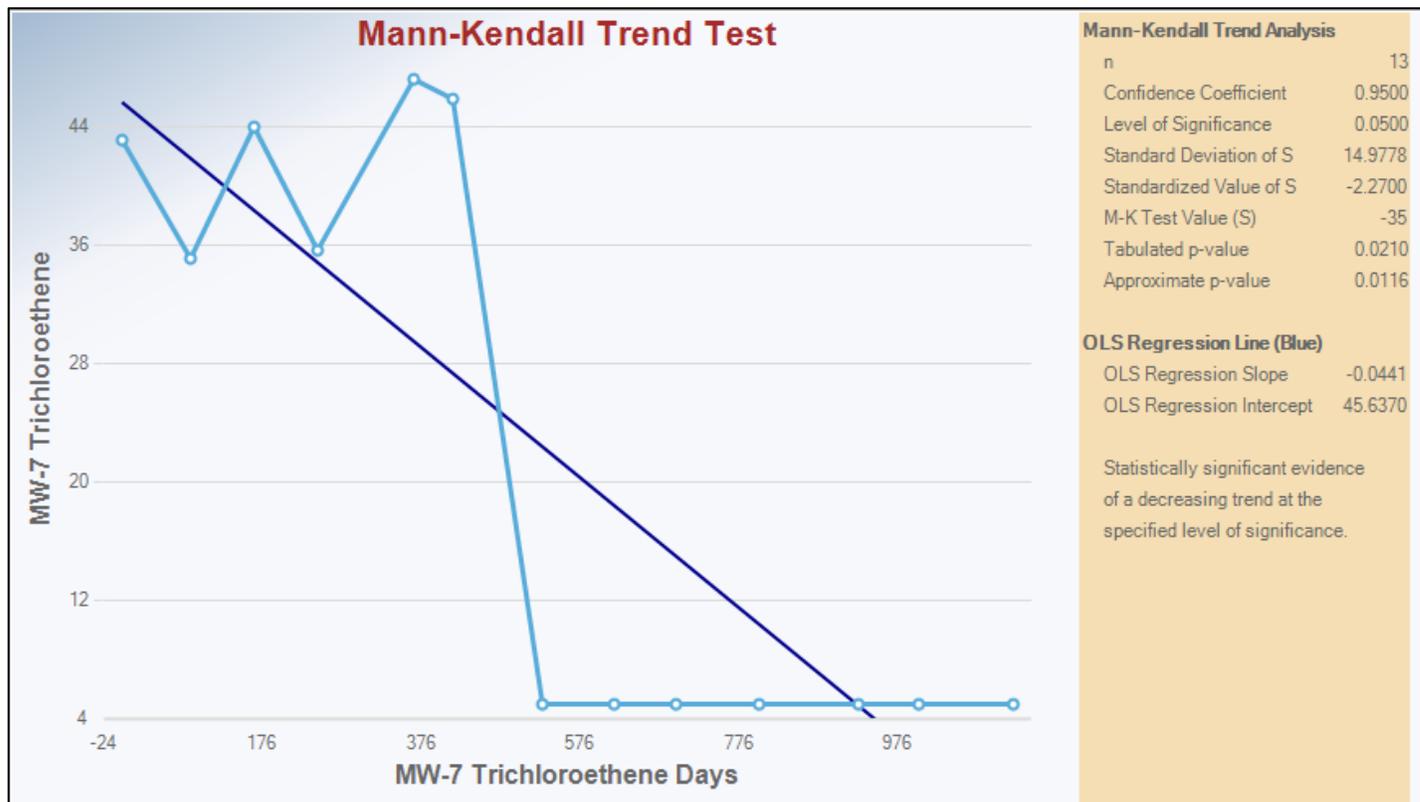
Number of Events Reported (m) 13
 Number of Missing Events 0
 Number or Reported Events Used 13
 Number Values Reported (n) 13
 Minimum 5
 Maximum 47.1
 Mean 21.95
 Geometric Mean 13.27
 Median 5
 Standard Deviation 19.35
 Coefficient of Variation 0.881

Mann-Kendall Test

M-K Test Value (S) -35
 Tabulated p-value 0.021
 Standard Deviation of S 14.98
 Standardized Value of S -2.27
 Approximate p-value 0.0116

Date	Event Duration (Days)	Result (ug/L)
05/18/2020	0	43.0
08/11/2020	85	35.0
10/30/2020	165	43.9
01/19/2021	246	35.6
05/19/2021	366	47.1
07/08/2021	416	45.8
10/29/2021	529	<5.0
01/27/2022	619	<5.0
04/15/2022	697	<5.0
07/28/2022	801	<5.0
12/01/2022	927	<5.0
02/14/2023	1002	<5.0
06/13/2023	1121	<5.0

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.2 7/19/2023 5:32:07 PM
 From File WorkSheet.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

MW-8 Tetrachloroethene

General Statistics

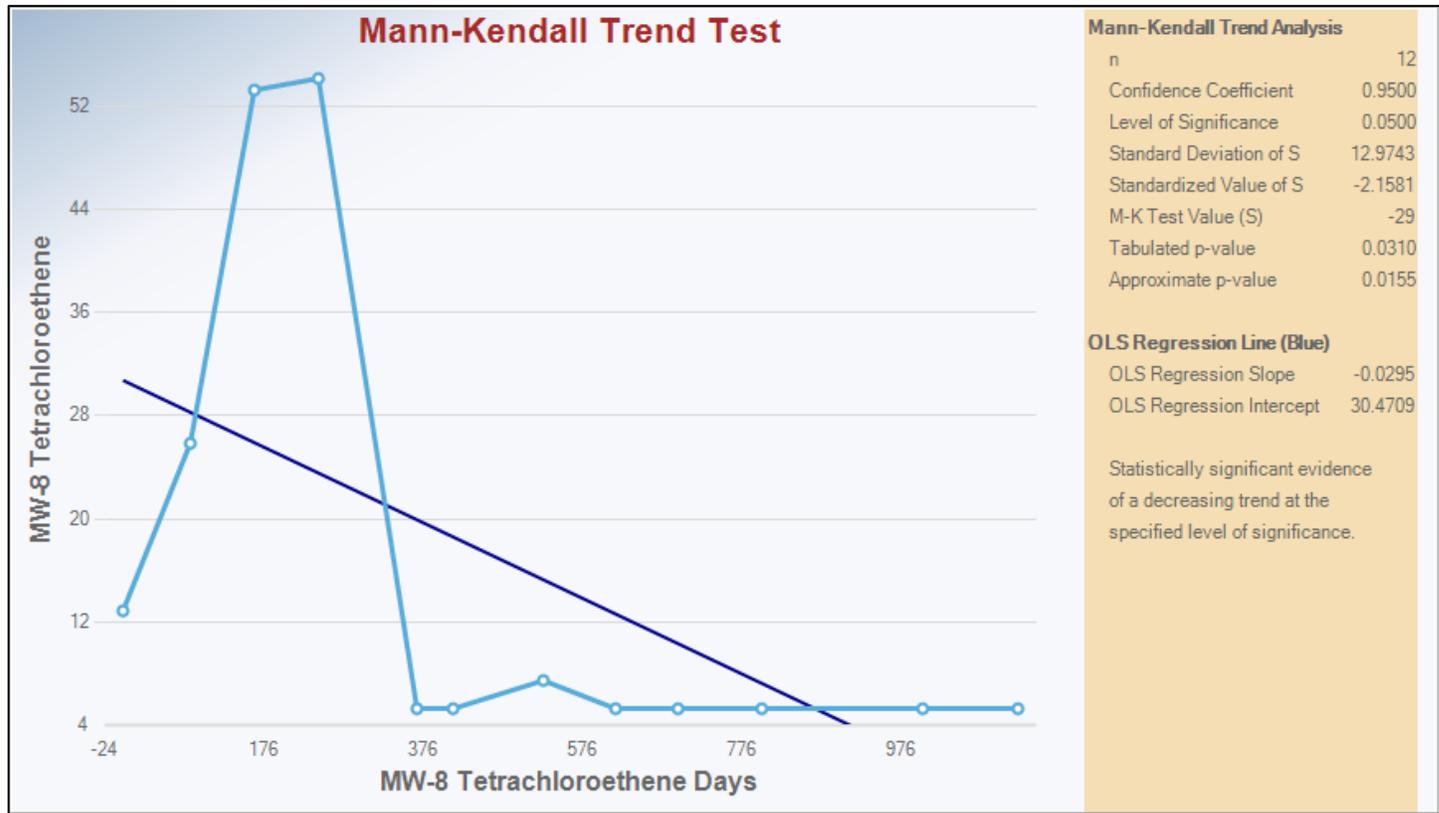
Number of Events Reported (m) 12
 Number of Missing Events 0
 Number or Reported Events Used 12
 Number Values Reported (n) 12
 Minimum 5
 Maximum 54
 Mean 15.64
 Geometric Mean 9.479
 Median 5
 Standard Deviation 18.7
 Coefficient of Variation 1.196

Mann-Kendall Test

M-K Test Value (S) -29
 Tabulated p-value 0.031
 Standard Deviation of S 12.97
 Standardized Value of S -2.158
 Approximate p-value 0.0155

Date	Event Duration (Days)	Result (ug/L)
05/19/2020	0	12.7
08/11/2020	84	25.7
10/30/2020	164	53.1
01/19/2021	245	54.0
05/21/2021	367	<5.0
07/07/2021	414	<5.0
10/28/2021	527	7.2
01/27/2022	618	<5.0
04/14/2022	695	<5.0
07/29/2022	801	<5.0
02/15/2023	1002	<5.0
06/14/2023	1121	<5.0

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.2 7/19/2023 3:34:39 PM
 From File WorkSheet.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

MW-9R Tetrachloroethene

General Statistics

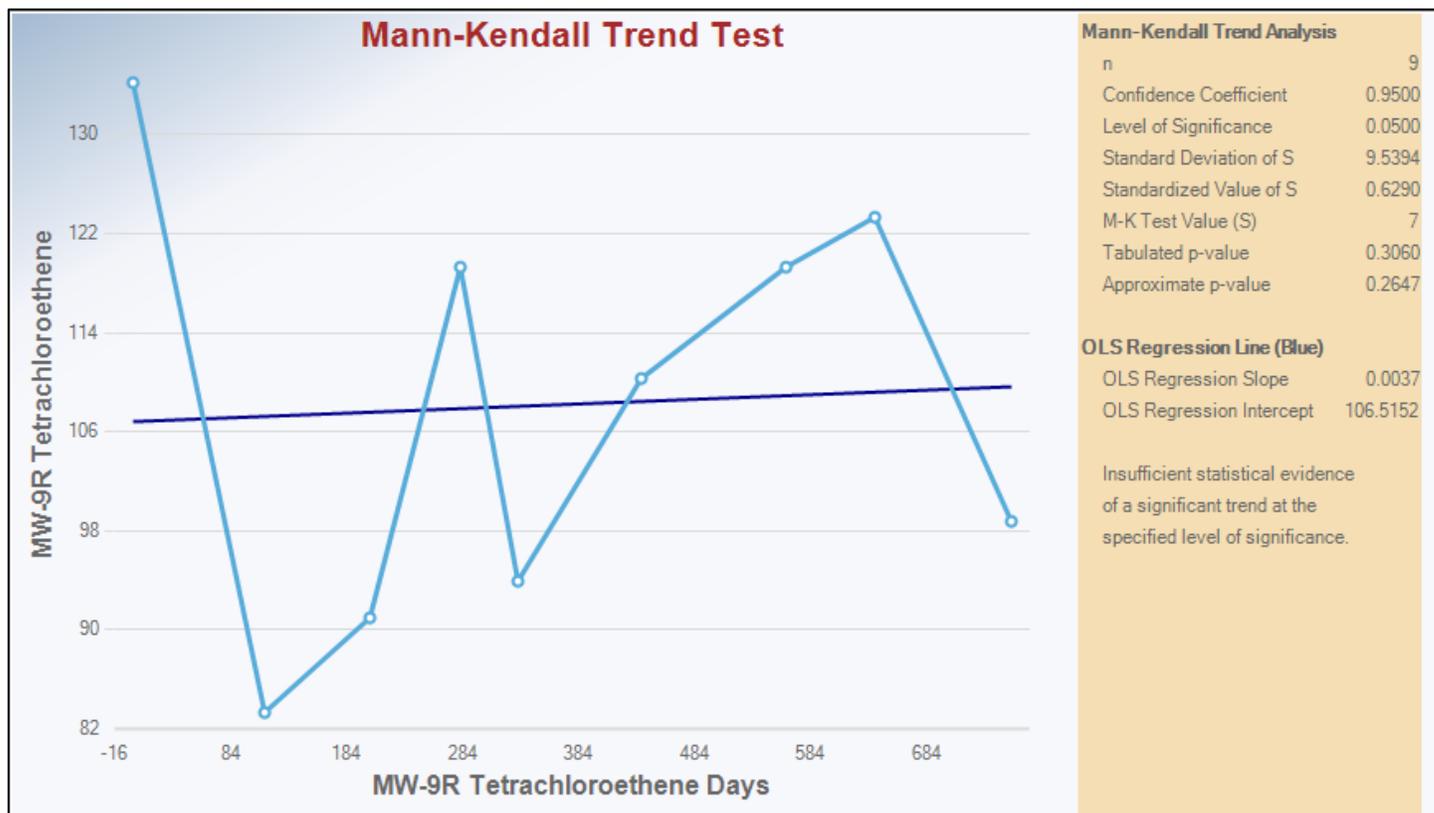
Number of Events Reported (m) 9
 Number of Missing Events 0
 Number or Reported Events Used 9
 Number Values Reported (n) 9
 Minimum 83
 Maximum 134
 Mean 107.9
 Geometric Mean 106.6
 Median 110
 Standard Deviation 17.2
 Coefficient of Variation 0.159

Date	Event Duration (Days)	Result (ug/L)
05/18/2021	0	134
07/07/2021	113	83.0
10/28/2021	204	90.7
01/27/2022	281	119
04/14/2022	331	93.7
07/29/2022	437	110
12/01/2022	562	119
02/15/2023	638	123
06/13/2023	756	98.5

Mann-Kendall Test

M-K Test Value (S) 7
 Tabulated p-value 0.306
 Standard Deviation of S 9.539
 Standardized Value of S 0.629
 Approximate p-value 0.265

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

User Selected Options
Date/Time of Computation ProUCL 5.2 7/19/2023 3:35:14 PM
From File WorkSheet.xls
Full Precision OFF
Confidence Coefficient 0.95
Level of Significance 0.05

MW-9R Trichloroethene

General Statistics

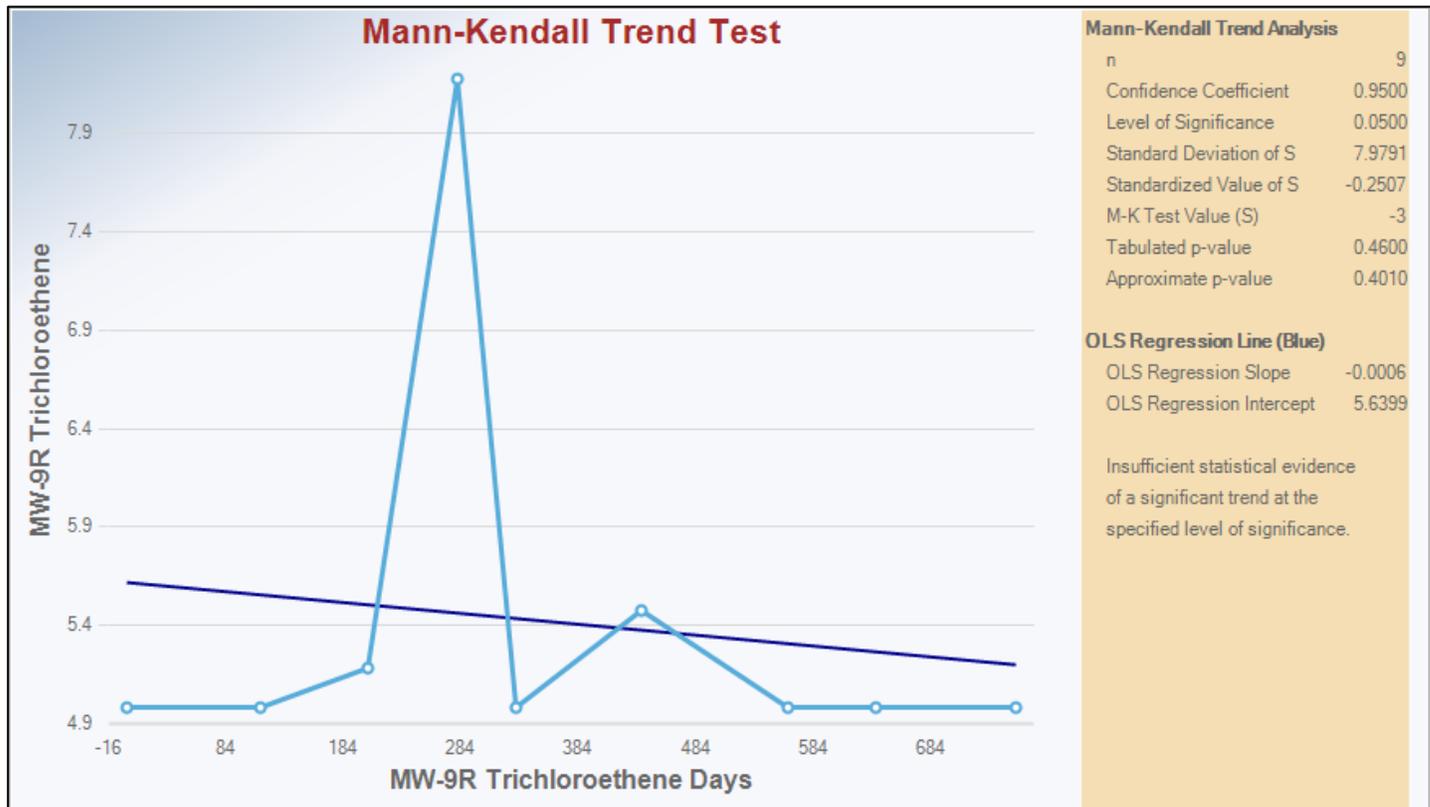
Number of Events Reported (m) 9
Number of Missing Events 0
Number or Reported Events Used 9
Number Values Reported (n) 9
Minimum 5
Maximum 8.2
Mean 5.433
Geometric Mean 5.362
Median 5
Standard Deviation 1.051
Coefficient of Variation 0.193

Date	Event Duration (Days)	Result (ug/L)
05/18/2021	0	<5.0
07/07/2021	113	<5.0
10/28/2021	204	5.2
01/27/2022	281	8.2
04/14/2022	331	<5.0
07/29/2022	437	5.5
12/01/2022	562	<5.0
02/15/2023	638	<5.0
06/13/2023	756	<5.0

Mann-Kendall Test

M-K Test Value (S) -3
Tabulated p-value 0.46
Standard Deviation of S 7.979
Standardized Value of S -0.251
Approximate p-value 0.401

Insufficient evidence to identify a significant trend at the specified level of significance.



ATTACHMENT D

Laboratory Analytical Report

June 20, 2023

Steve Faulk
August Mack Environmental, Inc.
1302 North Meridian Street
Suite 300
Indianapolis, IN 46202

RE: Project: JW0997-Crescent Oil SGe
Pace Project No.: 50346891

Dear Steve Faulk:

Enclosed are the analytical results for sample(s) received by the laboratory on June 09, 2023. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Indianapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Allison Martinez
allison.martinez@pacelabs.com
(317)228-3118
Project Manager

Enclosures

cc: Andy Tennyson, August Mack Environmental Consultants



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: JW0997-Crescent Oil SGe

Pace Project No.: 50346891

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268

Illinois Accreditation #: 200074

Indiana Drinking Water Laboratory #: C-49-06

Kansas/TNI Certification #: E-10177

Kentucky UST Agency Interest #: 80226

Kentucky WW Laboratory ID #: 98019

Michigan Drinking Water Laboratory #9050

Ohio VAP Certified Laboratory #: CL0065

Oklahoma Laboratory #: 9204

Texas Certification #: T104704355

Wisconsin Laboratory #: 999788130

USDA Foreign Soil Permit #: 525-23-13-23119

USDA Compliance Agreement #: IN-SL-22-001

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: JW0997-Crescent Oil SGe

Pace Project No.: 50346891

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50346891001	SGe-103-2.5-5.0	Solid	06/09/23 09:40	06/09/23 14:00
50346891002	SGe-102-5.0-7.5	Solid	06/09/23 11:00	06/09/23 14:00
50346891003	SGe-101-0-2.5	Solid	06/09/23 11:40	06/09/23 14:00

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: JW0997-Crescent Oil SGe

Pace Project No.: 50346891

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50346891001	SGe-103-2.5-5.0	EPA 8260	SLB	9	PASI-I
		SM 2540G	QAK	1	PASI-I
50346891002	SGe-102-5.0-7.5	EPA 8260	SLB	9	PASI-I
		SM 2540G	QAK	1	PASI-I
50346891003	SGe-101-0-2.5	EPA 8260	SLB	9	PASI-I
		SM 2540G	QAK	1	PASI-I

PASI-I = Pace Analytical Services - Indianapolis

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SUMMARY OF DETECTION

Project: JW0997-Crescent Oil SGe

Pace Project No.: 50346891

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50346891001	SGe-103-2.5-5.0					
SM 2540G	Percent Moisture	11.3	%	0.10	06/19/23 14:05	N2
50346891002	SGe-102-5.0-7.5					
SM 2540G	Percent Moisture	15.1	%	0.10	06/19/23 14:05	N2
50346891003	SGe-101-0-2.5					
SM 2540G	Percent Moisture	16.1	%	0.10	06/19/23 14:05	N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: JW0997-Crescent Oil SGe

Pace Project No.: 50346891

Sample: SGe-103-2.5-5.0 **Lab ID: 50346891001** Collected: 06/09/23 09:40 Received: 06/09/23 14:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5035A VOA		Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	mg/kg	0.0049	1		06/14/23 21:05	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.0049	1		06/14/23 21:05	156-60-5	
Tetrachloroethene	ND	mg/kg	0.0049	1		06/14/23 21:05	127-18-4	
1,1,1-Trichloroethane	ND	mg/kg	0.0049	1		06/14/23 21:05	71-55-6	
Trichloroethene	ND	mg/kg	0.0049	1		06/14/23 21:05	79-01-6	
Vinyl chloride	ND	mg/kg	0.0049	1		06/14/23 21:05	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%	75-135	1		06/14/23 21:05	1868-53-7	
Toluene-d8 (S)	99	%	65-148	1		06/14/23 21:05	2037-26-5	
4-Bromofluorobenzene (S)	100	%	63-132	1		06/14/23 21:05	460-00-4	
Percent Moisture		Analytical Method: SM 2540G Pace Analytical Services - Indianapolis						
Percent Moisture	11.3	%	0.10	1		06/19/23 14:05		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: JW0997-Crescent Oil SGe

Pace Project No.: 50346891

Sample: SGe-102-5.0-7.5 **Lab ID: 50346891002** Collected: 06/09/23 11:00 Received: 06/09/23 14:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5035A VOA		Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	mg/kg	0.0042	1		06/14/23 21:35	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.0042	1		06/14/23 21:35	156-60-5	
Tetrachloroethene	ND	mg/kg	0.0042	1		06/14/23 21:35	127-18-4	
1,1,1-Trichloroethane	ND	mg/kg	0.0042	1		06/14/23 21:35	71-55-6	
Trichloroethene	ND	mg/kg	0.0042	1		06/14/23 21:35	79-01-6	
Vinyl chloride	ND	mg/kg	0.0042	1		06/14/23 21:35	75-01-4	
Surrogates								
Dibromofluoromethane (S)	105	%	75-135	1		06/14/23 21:35	1868-53-7	
Toluene-d8 (S)	98	%	65-148	1		06/14/23 21:35	2037-26-5	
4-Bromofluorobenzene (S)	101	%	63-132	1		06/14/23 21:35	460-00-4	
Percent Moisture		Analytical Method: SM 2540G Pace Analytical Services - Indianapolis						
Percent Moisture	15.1	%	0.10	1		06/19/23 14:05		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: JW0997-Crescent Oil SGe

Pace Project No.: 50346891

Sample: SGe-101-0-2.5 **Lab ID: 50346891003** Collected: 06/09/23 11:40 Received: 06/09/23 14:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5035A VOA		Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	mg/kg	0.0061	1		06/14/23 22:06	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.0061	1		06/14/23 22:06	156-60-5	
Tetrachloroethene	ND	mg/kg	0.0061	1		06/14/23 22:06	127-18-4	
1,1,1-Trichloroethane	ND	mg/kg	0.0061	1		06/14/23 22:06	71-55-6	
Trichloroethene	ND	mg/kg	0.0061	1		06/14/23 22:06	79-01-6	
Vinyl chloride	ND	mg/kg	0.0061	1		06/14/23 22:06	75-01-4	
Surrogates								
Dibromofluoromethane (S)	108	%	75-135	1		06/14/23 22:06	1868-53-7	
Toluene-d8 (S)	101	%	65-148	1		06/14/23 22:06	2037-26-5	
4-Bromofluorobenzene (S)	92	%	63-132	1		06/14/23 22:06	460-00-4	
Percent Moisture		Analytical Method: SM 2540G Pace Analytical Services - Indianapolis						
Percent Moisture	16.1	%	0.10	1		06/19/23 14:05		N2

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: JW0997-Crescent Oil SGe

Pace Project No.: 50346891

QC Batch:	739213	Analysis Method:	EPA 8260
QC Batch Method:	EPA 8260	Analysis Description:	8260 MSV 5035A Volatile Organics
		Laboratory:	Pace Analytical Services - Indianapolis

Associated Lab Samples: 50346891001, 50346891002, 50346891003

METHOD BLANK: 3391042 Matrix: Solid

Associated Lab Samples: 50346891001, 50346891002, 50346891003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	mg/kg	ND	0.0050	06/14/23 12:24	
cis-1,2-Dichloroethene	mg/kg	ND	0.0050	06/14/23 12:24	
Tetrachloroethene	mg/kg	ND	0.0050	06/14/23 12:24	
trans-1,2-Dichloroethene	mg/kg	ND	0.0050	06/14/23 12:24	
Trichloroethene	mg/kg	ND	0.0050	06/14/23 12:24	
Vinyl chloride	mg/kg	ND	0.0050	06/14/23 12:24	
4-Bromofluorobenzene (S)	%	100	63-132	06/14/23 12:24	
Dibromofluoromethane (S)	%	104	75-135	06/14/23 12:24	
Toluene-d8 (S)	%	98	65-148	06/14/23 12:24	

LABORATORY CONTROL SAMPLE: 3391043

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	mg/kg	0.05	0.048	96	66-133	
cis-1,2-Dichloroethene	mg/kg	0.05	0.045	90	64-131	
Tetrachloroethene	mg/kg	0.05	0.045	91	62-135	
trans-1,2-Dichloroethene	mg/kg	0.05	0.046	92	63-131	
Trichloroethene	mg/kg	0.05	0.046	93	64-135	
Vinyl chloride	mg/kg	0.05	0.050	101	54-134	
4-Bromofluorobenzene (S)	%			101	63-132	
Dibromofluoromethane (S)	%			100	75-135	
Toluene-d8 (S)	%			98	65-148	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3391044 3391045

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		50346639004 Result	Spike Conc.	Spike Conc.	Result						
1,1,1-Trichloroethane	mg/kg	ND	0.06	0.05	0.056	0.051	96	101	61-143	11	20
cis-1,2-Dichloroethene	mg/kg	ND	0.06	0.05	0.053	0.047	90	94	56-140	13	20
Tetrachloroethene	mg/kg	ND	0.06	0.05	0.050	0.046	85	93	40-157	8	20
trans-1,2-Dichloroethene	mg/kg	ND	0.06	0.05	0.053	0.047	90	95	51-146	11	20
Trichloroethene	mg/kg	ND	0.06	0.05	0.054	0.049	92	98	34-168	10	20
Vinyl chloride	mg/kg	ND	0.06	0.05	0.059	0.053	100	105	49-148	11	20
4-Bromofluorobenzene (S)	%						100	101	63-132		
Dibromofluoromethane (S)	%						100	99	75-135		
Toluene-d8 (S)	%						99	99	65-148		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: JW0997-Crescent Oil SGe

Pace Project No.: 50346891

QC Batch: 739941

Analysis Method: SM 2540G

QC Batch Method: SM 2540G

Analysis Description: Dry Weight/Percent Moisture

Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50346891001, 50346891002, 50346891003

SAMPLE DUPLICATE: 3394772

Parameter	Units	50346834001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	11.1	11.3	2	5	N2

SAMPLE DUPLICATE: 3394773

Parameter	Units	50346899008 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	9.2	8.5	8	5	N2,R1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: JW0997-Crescent Oil SGe

Pace Project No.: 50346891

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

N2 The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

R1 RPD value was outside control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: JW0997-Crescent Oil SGe

Pace Project No.: 50346891

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50346891001	SGe-103-2.5-5.0	EPA 8260	739213		
50346891002	SGe-102-5.0-7.5	EPA 8260	739213		
50346891003	SGe-101-0-2.5	EPA 8260	739213		
50346891001	SGe-103-2.5-5.0	SM 2540G	739941		
50346891002	SGe-102-5.0-7.5	SM 2540G	739941		
50346891003	SGe-101-0-2.5	SM 2540G	739941		

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SAMPLE CONDITION UPON RECEIPT FORM

Date/Time and Initials of person examining contents: 6/9/23 1430 LR

1. Courier: FED EX UPS CLIENT PACE USPS OTHER _____

2. Custody Seal on Cooler/Box Present: Yes No
 (If yes)Seals Intact: Yes No (leave blank if no seals were present)

3. Thermometer: **1 2 3 4 5 6 A B C D E F G**
 4. Cooler Temperature(s): 0.9/0.9
 (Initial/Corrected) RECORD TEMPS OF ALL COOLERS RECEIVED (use Comments below to add more)

5. Packing Material: Bubble Wrap Bubble Bags
 None Other _____

6. Ice Type: Wet Blue None

7. If temp. is over 6°C or under 0°C, was the PM notified?: Yes No
 Cooler temp should be above freezing to 6°C

All discrepancies will be written out in the comments section below.

	Yes	No		Yes	No	N/A
USDA Regulated Soils? (HI, ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		<input checked="" type="checkbox"/>	All containers needing acid/base preservation have been pH CHECKED?: Exceptions: VOA, coliform, LLHg, O&G, RAD CHEM, and any container with a septum cap or preserved with HCl. Circle:			
Short Hold Time Analysis (48 hours or less)? Analysis:		<input checked="" type="checkbox"/>	HNO3 (<2) H2SO4 (<2) NaOH (>10) NaOH/ZnAc (>9) Any non-conformance to pH recommendations will be noted on the container count form			<input checked="" type="checkbox"/>
Time 5035A TC placed in Freezer or Short Holds To Lab			Time: <u>1446</u>	<u>Present</u>	<u>Absent</u>	<u>N/A</u>
Rush TAT Requested (4 days or less):		<input checked="" type="checkbox"/>	Residual Chlorine Check (SVOC 625 Pest/PCB 608)			<input checked="" type="checkbox"/>
Custody Signatures Present?	<input checked="" type="checkbox"/>		Residual Chlorine Check (Total/Amenable/Free Cyanide)			<input checked="" type="checkbox"/>
Containers Intact?:	<input checked="" type="checkbox"/>		Headspace Wisconsin Sulfide?			<input checked="" type="checkbox"/>
Sample Label (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	<input checked="" type="checkbox"/>		Headspace in VOA Vials (>6mm): See Containter Count form for details	<u>Present</u>	<u>Absent</u>	No VOA Vials Sent
Extra labels on Terracore Vials? (soils only)		<input checked="" type="checkbox"/>	Trip Blank Present?		<input checked="" type="checkbox"/>	
			Trip Blank Custody Seals?:			<input checked="" type="checkbox"/>

COMMENTS:

June 21, 2023

Steve Faulk
August Mack Environmental, Inc.
1302 North Meridian Street
Suite 300
Indianapolis, IN 46202

RE: Project: JX0097-Crescent Oil 2Q23
Pace Project No.: 50347227

Dear Steve Faulk:

Enclosed are the analytical results for sample(s) received by the laboratory on June 14, 2023. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Indianapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Allison Martinez
allison.martinez@pacelabs.com
(317)228-3118
Project Manager

Enclosures

cc: Andy Tennyson, August Mack Environmental Consultants



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268

Illinois Accreditation #: 200074

Indiana Drinking Water Laboratory #: C-49-06

Kansas/TNI Certification #: E-10177

Kentucky UST Agency Interest #: 80226

Kentucky WW Laboratory ID #: 98019

Michigan Drinking Water Laboratory #9050

Ohio VAP Certified Laboratory #: CL0065

Oklahoma Laboratory #: 9204

Texas Certification #: T104704355

Wisconsin Laboratory #: 999788130

USDA Foreign Soil Permit #: 525-23-13-23119

USDA Compliance Agreement #: IN-SL-22-001

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50347227001	MW-12-20230612	Water	06/12/23 14:25	06/14/23 12:00
50347227002	MW-11-20230612	Water	06/12/23 15:35	06/14/23 12:00
50347227003	MW-3-20230612	Water	06/12/23 16:30	06/14/23 12:00
50347227004	MW-10-20230613	Water	06/13/23 09:20	06/14/23 12:00
50347227005	MW-7-20230613	Water	06/13/23 11:05	06/14/23 12:00
50347227006	MW-6-20230613	Water	06/13/23 12:25	06/14/23 12:00
50347227007	MW-2-20230613	Water	06/13/23 14:05	06/14/23 12:00
50347227008	MW-4-20230613	Water	06/13/23 14:55	06/14/23 12:00
50347227009	MW-9R-20230613	Water	06/13/23 15:45	06/14/23 12:00
50347227010	MW-8-20230614	Water	06/14/23 09:40	06/14/23 12:00
50347227011	MW-5-20230614	Water	06/14/23 10:40	06/14/23 12:00
50347227012	MW-1-20230613	Water	06/13/23 13:15	06/14/23 12:00
50347227013	DUP-1-20230613	Water	06/13/23 08:00	06/14/23 12:00
50347227014	TB-1-20230612	Water	06/12/23 08:00	06/14/23 12:00
50347227015	RB-1-20230614	Water	06/14/23 11:00	06/14/23 12:00
50347227016	EB-1-20230614	Water	06/14/23 11:05	06/14/23 12:00

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50347227001	MW-12-20230612	EPA 5030/8260	SLB	9	PASI-I
50347227002	MW-11-20230612	EPA 5030/8260	SLB	9	PASI-I
50347227003	MW-3-20230612	EPA 5030/8260	SLB	9	PASI-I
50347227004	MW-10-20230613	EPA 5030/8260	SLB	9	PASI-I
50347227005	MW-7-20230613	EPA 5030/8260	SLB	9	PASI-I
50347227006	MW-6-20230613	EPA 5030/8260	SLB	9	PASI-I
50347227007	MW-2-20230613	EPA 5030/8260	SLB	9	PASI-I
50347227008	MW-4-20230613	EPA 5030/8260	SLB	9	PASI-I
50347227009	MW-9R-20230613	EPA 5030/8260	SLB	9	PASI-I
50347227010	MW-8-20230614	EPA 5030/8260	SLB	9	PASI-I
50347227011	MW-5-20230614	EPA 5030/8260	SLB	9	PASI-I
50347227012	MW-1-20230613	EPA 5030/8260	SLB	9	PASI-I
50347227013	DUP-1-20230613	EPA 5030/8260	SLB	9	PASI-I
50347227014	TB-1-20230612	EPA 5030/8260	SLB	9	PASI-I
50347227015	RB-1-20230614	EPA 5030/8260	SLB	9	PASI-I
50347227016	EB-1-20230614	EPA 5030/8260	SLB	9	PASI-I

PASI-I = Pace Analytical Services - Indianapolis

REPORT OF LABORATORY ANALYSIS

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SUMMARY OF DETECTION

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50347227002	MW-11-20230612					
EPA 5030/8260	Vinyl chloride	3.6	ug/L	2.0	06/20/23 23:24	
50347227005	MW-7-20230613					
EPA 5030/8260	1,1,1-Trichloroethane	8.3	ug/L	5.0	06/21/23 01:57	
50347227007	MW-2-20230613					
EPA 5030/8260	1,1,1-Trichloroethane	5.3	ug/L	5.0	06/21/23 02:58	
50347227008	MW-4-20230613					
EPA 5030/8260	Tetrachloroethene	46.2	ug/L	5.0	06/21/23 03:29	
50347227009	MW-9R-20230613					
EPA 5030/8260	Tetrachloroethene	98.5	ug/L	5.0	06/21/23 03:59	
50347227011	MW-5-20230614					
EPA 5030/8260	Tetrachloroethene	108	ug/L	5.0	06/21/23 05:00	
50347227013	DUP-1-20230613					
EPA 5030/8260	1,1,1-Trichloroethane	5.7	ug/L	5.0	06/21/23 06:02	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Sample: MW-12-20230612		Lab ID: 50347227001		Collected: 06/12/23 14:25	Received: 06/14/23 12:00	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Indiana		Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/20/23 22:53	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/20/23 22:53	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/20/23 22:53	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/20/23 22:53	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/20/23 22:53	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/20/23 22:53	75-01-4	
Surrogates								
Dibromofluoromethane (S)	104	%.	82-128	1		06/20/23 22:53	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	79-124	1		06/20/23 22:53	460-00-4	
Toluene-d8 (S)	98	%.	73-122	1		06/20/23 22:53	2037-26-5	

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: MW-11-20230612		Lab ID: 50347227002		Collected: 06/12/23 15:35	Received: 06/14/23 12:00	Matrix: Water		
8260 MSV Indiana		Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/20/23 23:24	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/20/23 23:24	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/20/23 23:24	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/20/23 23:24	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/20/23 23:24	79-01-6	
Vinyl chloride	3.6	ug/L	2.0	1		06/20/23 23:24	75-01-4	
Surrogates								
Dibromofluoromethane (S)	105	%.	82-128	1		06/20/23 23:24	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	79-124	1		06/20/23 23:24	460-00-4	
Toluene-d8 (S)	97	%.	73-122	1		06/20/23 23:24	2037-26-5	

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Sample: MW-3-20230612	Lab ID: 50347227003	Collected: 06/12/23 16:30	Received: 06/14/23 12:00	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Indiana		Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/20/23 23:55	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/20/23 23:55	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/20/23 23:55	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/20/23 23:55	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/20/23 23:55	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/20/23 23:55	75-01-4	
Surrogates								
Dibromofluoromethane (S)	102	%.	82-128	1		06/20/23 23:55	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	79-124	1		06/20/23 23:55	460-00-4	
Toluene-d8 (S)	98	%.	73-122	1		06/20/23 23:55	2037-26-5	

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Sample: MW-10-20230613		Lab ID: 50347227004		Collected: 06/13/23 09:20	Received: 06/14/23 12:00	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Indiana		Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 00:25	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 00:25	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/21/23 00:25	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/21/23 00:25	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 00:25	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 00:25	75-01-4	
Surrogates								
Dibromofluoromethane (S)	104	%.	82-128	1		06/21/23 00:25	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	79-124	1		06/21/23 00:25	460-00-4	
Toluene-d8 (S)	97	%.	73-122	1		06/21/23 00:25	2037-26-5	

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Sample: MW-7-20230613	Lab ID: 50347227005	Collected: 06/13/23 11:05	Received: 06/14/23 12:00	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Indiana		Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 01:57	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 01:57	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/21/23 01:57	127-18-4	
1,1,1-Trichloroethane	8.3	ug/L	5.0	1		06/21/23 01:57	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 01:57	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 01:57	75-01-4	
Surrogates								
Dibromofluoromethane (S)	109	%.	82-128	1		06/21/23 01:57	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	79-124	1		06/21/23 01:57	460-00-4	
Toluene-d8 (S)	97	%.	73-122	1		06/21/23 01:57	2037-26-5	

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Sample: MW-6-20230613	Lab ID: 50347227006	Collected: 06/13/23 12:25	Received: 06/14/23 12:00	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Indiana		Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 02:27	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 02:27	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/21/23 02:27	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/21/23 02:27	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 02:27	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 02:27	75-01-4	
Surrogates								
Dibromofluoromethane (S)	108	%.	82-128	1		06/21/23 02:27	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	79-124	1		06/21/23 02:27	460-00-4	
Toluene-d8 (S)	96	%.	73-122	1		06/21/23 02:27	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: MW-2-20230613 Lab ID: 50347227007 Collected: 06/13/23 14:05 Received: 06/14/23 12:00 Matrix: Water								
8260 MSV Indiana Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis								
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 02:58	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 02:58	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/21/23 02:58	127-18-4	
1,1,1-Trichloroethane	5.3	ug/L	5.0	1		06/21/23 02:58	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 02:58	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 02:58	75-01-4	
Surrogates								
Dibromofluoromethane (S)	108	%	82-128	1		06/21/23 02:58	1868-53-7	
4-Bromofluorobenzene (S)	98	%	79-124	1		06/21/23 02:58	460-00-4	
Toluene-d8 (S)	95	%	73-122	1		06/21/23 02:58	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Sample: MW-4-20230613	Lab ID: 50347227008	Collected: 06/13/23 14:55	Received: 06/14/23 12:00	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Indiana		Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 03:29	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 03:29	156-60-5	
Tetrachloroethene	46.2	ug/L	5.0	1		06/21/23 03:29	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/21/23 03:29	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 03:29	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 03:29	75-01-4	
Surrogates								
Dibromofluoromethane (S)	106	%	82-128	1		06/21/23 03:29	1868-53-7	
4-Bromofluorobenzene (S)	98	%	79-124	1		06/21/23 03:29	460-00-4	
Toluene-d8 (S)	98	%	73-122	1		06/21/23 03:29	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: MW-9R-20230613 Lab ID: 50347227009 Collected: 06/13/23 15:45 Received: 06/14/23 12:00 Matrix: Water								
8260 MSV Indiana Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis								
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 03:59	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 03:59	156-60-5	
Tetrachloroethene	98.5	ug/L	5.0	1		06/21/23 03:59	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/21/23 03:59	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 03:59	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 03:59	75-01-4	
Surrogates								
Dibromofluoromethane (S)	107	%	82-128	1		06/21/23 03:59	1868-53-7	
4-Bromofluorobenzene (S)	100	%	79-124	1		06/21/23 03:59	460-00-4	
Toluene-d8 (S)	97	%	73-122	1		06/21/23 03:59	2037-26-5	

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Sample: MW-8-20230614	Lab ID: 50347227010	Collected: 06/14/23 09:40	Received: 06/14/23 12:00	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Indiana		Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 04:30	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 04:30	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/21/23 04:30	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/21/23 04:30	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 04:30	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 04:30	75-01-4	
Surrogates								
Dibromofluoromethane (S)	109	%.	82-128	1		06/21/23 04:30	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	79-124	1		06/21/23 04:30	460-00-4	
Toluene-d8 (S)	98	%.	73-122	1		06/21/23 04:30	2037-26-5	

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: MW-5-20230614 Lab ID: 50347227011 Collected: 06/14/23 10:40 Received: 06/14/23 12:00 Matrix: Water								
8260 MSV Indiana Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis								
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 05:00	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 05:00	156-60-5	
Tetrachloroethene	108	ug/L	5.0	1		06/21/23 05:00	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/21/23 05:00	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 05:00	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 05:00	75-01-4	
Surrogates								
Dibromofluoromethane (S)	105	%	82-128	1		06/21/23 05:00	1868-53-7	
4-Bromofluorobenzene (S)	98	%	79-124	1		06/21/23 05:00	460-00-4	
Toluene-d8 (S)	95	%	73-122	1		06/21/23 05:00	2037-26-5	

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: MW-1-20230613 Lab ID: 50347227012 Collected: 06/13/23 13:15 Received: 06/14/23 12:00 Matrix: Water								
8260 MSV Indiana Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis								
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 05:31	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 05:31	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/21/23 05:31	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/21/23 05:31	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 05:31	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 05:31	75-01-4	
Surrogates								
Dibromofluoromethane (S)	111	%.	82-128	1		06/21/23 05:31	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	79-124	1		06/21/23 05:31	460-00-4	
Toluene-d8 (S)	97	%.	73-122	1		06/21/23 05:31	2037-26-5	

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Sample: DUP-1-20230613		Lab ID: 50347227013		Collected: 06/13/23 08:00	Received: 06/14/23 12:00	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Indiana		Analytical Method: EPA 5030/8260						
		Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 06:02	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 06:02	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/21/23 06:02	127-18-4	
1,1,1-Trichloroethane	5.7	ug/L	5.0	1		06/21/23 06:02	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 06:02	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 06:02	75-01-4	
Surrogates								
Dibromofluoromethane (S)	112	%.	82-128	1		06/21/23 06:02	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	79-124	1		06/21/23 06:02	460-00-4	
Toluene-d8 (S)	96	%.	73-122	1		06/21/23 06:02	2037-26-5	

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: TB-1-20230612 Lab ID: 50347227014 Collected: 06/12/23 08:00 Received: 06/14/23 12:00 Matrix: Water								
8260 MSV Indiana Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis								
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 06:32	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 06:32	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/21/23 06:32	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/21/23 06:32	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 06:32	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 06:32	75-01-4	
Surrogates								
Dibromofluoromethane (S)	108	%.	82-128	1		06/21/23 06:32	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	79-124	1		06/21/23 06:32	460-00-4	
Toluene-d8 (S)	97	%.	73-122	1		06/21/23 06:32	2037-26-5	

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Sample: RB-1-20230614	Lab ID: 50347227015	Collected: 06/14/23 11:00	Received: 06/14/23 12:00	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Indiana		Analytical Method: EPA 5030/8260						
		Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 07:03	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 07:03	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/21/23 07:03	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/21/23 07:03	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 07:03	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 07:03	75-01-4	
Surrogates								
Dibromofluoromethane (S)	109	%.	82-128	1		06/21/23 07:03	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	79-124	1		06/21/23 07:03	460-00-4	
Toluene-d8 (S)	98	%.	73-122	1		06/21/23 07:03	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: EB-1-20230614		Lab ID: 50347227016		Collected: 06/14/23 11:05	Received: 06/14/23 12:00	Matrix: Water		
8260 MSV Indiana		Analytical Method: EPA 5030/8260 Pace Analytical Services - Indianapolis						
cis-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 07:34	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	1		06/21/23 07:34	156-60-5	
Tetrachloroethene	ND	ug/L	5.0	1		06/21/23 07:34	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1		06/21/23 07:34	71-55-6	
Trichloroethene	ND	ug/L	5.0	1		06/21/23 07:34	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1		06/21/23 07:34	75-01-4	
Surrogates								
Dibromofluoromethane (S)	109	%.	82-128	1		06/21/23 07:34	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	79-124	1		06/21/23 07:34	460-00-4	
Toluene-d8 (S)	96	%.	73-122	1		06/21/23 07:34	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

QC Batch: 740200 Analysis Method: EPA 5030/8260
 QC Batch Method: EPA 5030/8260 Analysis Description: 8260 MSV
 Laboratory: Pace Analytical Services - Indianapolis
 Associated Lab Samples: 50347227001, 50347227002, 50347227003, 50347227004, 50347227005, 50347227006, 50347227007, 50347227008, 50347227009, 50347227010, 50347227011, 50347227012, 50347227013, 50347227014, 50347227015, 50347227016

METHOD BLANK: 3395555 Matrix: Water
 Associated Lab Samples: 50347227001, 50347227002, 50347227003, 50347227004, 50347227005, 50347227006, 50347227007, 50347227008, 50347227009, 50347227010, 50347227011, 50347227012, 50347227013, 50347227014, 50347227015, 50347227016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	06/20/23 21:52	
cis-1,2-Dichloroethene	ug/L	ND	5.0	06/20/23 21:52	
Tetrachloroethene	ug/L	ND	5.0	06/20/23 21:52	
trans-1,2-Dichloroethene	ug/L	ND	5.0	06/20/23 21:52	
Trichloroethene	ug/L	ND	5.0	06/20/23 21:52	
Vinyl chloride	ug/L	ND	2.0	06/20/23 21:52	
4-Bromofluorobenzene (S)	%	100	79-124	06/20/23 21:52	
Dibromofluoromethane (S)	%	106	82-128	06/20/23 21:52	
Toluene-d8 (S)	%	98	73-122	06/20/23 21:52	

LABORATORY CONTROL SAMPLE: 3395556

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	55.7	111	76-127	
cis-1,2-Dichloroethene	ug/L	50	50.7	101	76-125	
Tetrachloroethene	ug/L	50	45.5	91	73-132	
trans-1,2-Dichloroethene	ug/L	50	49.0	98	74-125	
Trichloroethene	ug/L	50	51.8	104	75-127	
Vinyl chloride	ug/L	50	55.2	110	48-133	
4-Bromofluorobenzene (S)	%			103	79-124	
Dibromofluoromethane (S)	%			104	82-128	
Toluene-d8 (S)	%			99	73-122	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3395557 3395558

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		50347227004 Result	Spike Conc.	Spike Conc.	MSD Conc.								
1,1,1-Trichloroethane	ug/L	ND	50	50	57.6	56.1	115	112	63-138	3	20		
cis-1,2-Dichloroethene	ug/L	ND	50	50	51.3	49.4	103	99	59-141	4	20		
Tetrachloroethene	ug/L	ND	50	50	54.0	50.3	107	99	43-149	7	20		
trans-1,2-Dichloroethene	ug/L	ND	50	50	50.7	50.2	101	100	63-133	1	20		
Trichloroethene	ug/L	ND	50	50	55.8	52.6	112	105	52-145	6	20		
Vinyl chloride	ug/L	ND	50	50	55.4	53.2	111	106	43-139	4	20		
4-Bromofluorobenzene (S)	%						103	107	79-124				

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3395557 3395558												
Parameter	Units	50347227004 Result	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	Spike Conc.								
Dibromofluoromethane (S)	%.							99	101	82-128		
Toluene-d8 (S)	%.							99	100	73-122		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALIFIERS

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: JX0097-Crescent Oil 2Q23

Pace Project No.: 50347227

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50347227001	MW-12-20230612	EPA 5030/8260	740200		
50347227002	MW-11-20230612	EPA 5030/8260	740200		
50347227003	MW-3-20230612	EPA 5030/8260	740200		
50347227004	MW-10-20230613	EPA 5030/8260	740200		
50347227005	MW-7-20230613	EPA 5030/8260	740200		
50347227006	MW-6-20230613	EPA 5030/8260	740200		
50347227007	MW-2-20230613	EPA 5030/8260	740200		
50347227008	MW-4-20230613	EPA 5030/8260	740200		
50347227009	MW-9R-20230613	EPA 5030/8260	740200		
50347227010	MW-8-20230614	EPA 5030/8260	740200		
50347227011	MW-5-20230614	EPA 5030/8260	740200		
50347227012	MW-1-20230613	EPA 5030/8260	740200		
50347227013	DUP-1-20230613	EPA 5030/8260	740200		
50347227014	TB-1-20230612	EPA 5030/8260	740200		
50347227015	RB-1-20230614	EPA 5030/8260	740200		
50347227016	EB-1-20230614	EPA 5030/8260	740200		

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WO#: 50347227

Request Document

Submitting a sample via this chain of custody constitutes acknowledgment

Important fields must be completed accurately. https://info.pacelabs.com/hubfs/pas-standard-terms.pdf.

Section A

Section B

Required Client Information:

Required Project Information:

Company: August Mack-IN
Address: 1302 North Meridian Street
Suite 300, Indianapolis, IN 46202
Email: sfaulk@augustmack.com
Phone: 317-916-8000
Requested Due Date: 7 DAY TAT

Report To: Steve Faulk
Copy To:
Purchase Order #
Project Name: JX0997 - Crescent Oil 2Q23
Project #:

Company Name
Address:
Pace Quote:
Pace Project Management: allison.martinez@pacelabs.com,
Pace Profile # 11055 / 7

Page: 1 of 2

Regulatory Agency
State / Location IN

Table with columns: ITEM #, MATRIX CODE, COLLECTED (START, END), PRESERVATIVES (Unpreserved, H2SO4, HNO3, HCL, NaOH, Na2S2O3, Methanol, Other), ANALYSES TEST (Y/N), Requested Analysis Filtered (Y/N), Residual Chlorine (Y/N). Contains 12 rows of sample data.

Table with columns: ADDITIONAL COMMENTS, RELINQUISHED BY / AFFILIATION, DATE, TIME, ACCEPTED BY / AFFILIATION, DATE, TIME, SAMPLE CONDITIONS. Includes handwritten notes and signatures.

Table with columns: SAMPLER NAME AND SIGNATURE, PRINT Name of SAMPLER (Corinne Greenberg), SIGNATURE of SAMPLER, DATE Signed (6/14/23), TEMP in C, Received on Ice (Y/N), Custody Sealed (Y/N), Cooler (Y/N), Samples Intact (Y/N).

SAMPLE CONDITION UPON RECEIPT FORM



Date/Time and Initials of person examining contents: MCS L114123 1508

1. Courier: FED EX UPS CLIENT PACE USPS OTHER _____
2. Custody Seal on Cooler/Box Present: Yes No (leave blank if no seals were present)
3. Thermometer: 1 2 3 4 5 6 A B C D E F G
4. Cooler Temperature(s): 1.5 / 1.5
5. Packing Material: Bubble Wrap Bubble Bags
 None Other _____
6. Ice Type: Wet Blue None
7. If temp. is over 6°C or under 0°C, was the PM notified?: Yes No
 Cooler temp should be above freezing to 6°C

All discrepancies will be written out in the comments section below.

	Yes	No	Yes	No	N/A
USDA Regulated Soils? (HI, ID, NY, WA, OR, CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		—			
Short Hold Time Analysis (48 hours or less)? Analysis:		—			—
Time 5035A TC placed in Freezer or Short Holds To Lab			Time:		
Rush TAT Requested (4 days or less):		—			
Custody Signatures Present?		—			
Containers Intact?		—			
Sample Label (ID/s/Dates/Times) Match COC? Except TCs, which only require sample ID		—			
Extra labels on Terracore Vials? (soils only)		—			
All containers needing acid/base preservation have been pH CHECKED? Exceptions: VOA, coliform, LLHg, O&G, RAD CHEM, and any container with a septum cap or preserved with HCl. Circle: HNO3 (<2) H2SO4 (<2) NaOH (>10) NaOH/ZnAc (>9) Any non-conformance to pH recommendations will be noted on the container count form					
Residual Chlorine Check (SVOC 625 Pest/PCB 608)		Present		Absent	N/A
Residual Chlorine Check (Total/Amenable/Free Cyanide)					—
Headspace Wisconsin Sulfide?					—
Headspace in VOA Vials (>6mm): See Containter Count form for details		Present		Absent	No VOA Vials Sent
Trip Blank Present?		—			
Trip Blank Custody Seals?		—			

COMMENTS:

Client requested sample ID on 50347227009 reflect MW-9R-20230613. AMM 6/15/2023

