

PREPARED FOR
West Virginia Department of
Environmental Protection

January 7, 2025



West Virginia Department of Environmental Protection

Methane Emission Reduction Program (MERP) Administrator
Technical Proposal
CRFP 0313 DEP2500000004
WVDEP CRFP 25*04

Antea®Group

Understanding today.
Improving tomorrow.

PREPARED BY

Antea Group
119 14th Street NW, Suite 220
New Brighton, MN 55112



Troy S. Bernal
Troy.Bernal@anteagroup.us
+1 225 907 4606

Project # 2024-08-549796

us.anteagroup.com

The logo and ANTEA are registration
trademarks of Antea USA, Inc.

RECEIVED

2025 JAN -7 AM 11:16

WV PURCHASING
DIVISION

Contents

1.0	Executive Summary.....	1
2.0	Introduction	1
3.0	Background and Experience.....	2
3.1	Project Team	2
4.0	Project Team Organization	3
5.0	Project Approach	3
5.1	Community Outreach and Nomination Process	5
5.1.1	Community Engagement Support and Public Facing Website.....	5
5.1.2	Project Delivery Portal for Geospatial Data Management Creation and Maintenance.....	6
5.1.3	Well Nomination Mailers and Data Management	7
5.1.4	Digital Field Form and Field Maps Creation	8
5.1.5	Client Dashboard Creation and Maintenance for Progress Monitoring	9
5.2	MCW Prioritization / Prioritized Well List and MEQ Data Collection.....	9
5.2.1	PRIMO Scoring and Ranking.....	10
5.2.2	Methane Monitoring Field Work Plan (MEQ Data).....	14
5.3	Ancillary Permitting Activity.....	18
6.0	Value Added Services.....	20
7.0	Data Reporting	22
8.0	Project Schedule	22
9.0	Closing.....	23
10.0	Contact Information	23
11.0	References.....	24

Appendices

- Appendix A – Related Project Experience
- Appendix B – Organization Chart and Team Resumes
- Appendix C – Field Equipment Specification
- Appendix D – Project Schedule
- Appendix E – RFP Certification and Signature Pages
- Appendix F – Project References

West Virginia Department of Environmental Protection

Methane Emission Reduction Program (MERP) Administrator Technical Proposal

CRFP 0313 DEP2500000004

*WVDEP CRFP 25*04*

1.0 EXECUTIVE SUMMARY

Antea®Group (Antea Group) and Ramboll Americas Engineering Solutions, Inc.(Ramboll) (herein after referred to as “project team”) presents the following proposal to support the West Virginia Department of Environmental Protection (WVDEP) as an administrator of the Methane Emissions Reduction Program for (MERP) for the nomination, evaluation, prioritization, and emissions verification of marginal conventional wells (MCWs) across the state of West Virginia. This project team will provide plan, and execute a community outreach and nomination process, MCW prioritization process, methane emission quantification (MEQ) for pre- and post-well plugging and abandonment (P&A), and ancillary permitting activities for 400 MCWs. The community outreach and nomination process will be performed by engaging in a multifaceted approach where electronic, written, virtual, and in-person communication efforts will be conducted to engage the larger community with the goal of educating, informing, and supporting stakeholder involvement for all relevant factors for MCW plugging prioritization. Nomination forms will be electronically accessible, and electronic submittal will streamline data management efforts for the selected MCWs during the prioritization process. The MCW prioritization process will be completed by leveraging the U.S. Department of Energy (U.S. DOE) National Energy Technology Laboratory’s (NETL) PRIMO – The P&A Project Optimizer Toolkit, a software tool designed specifically to “help organizations determine which marginal convention wells (MCWs) or other low-producing wells make the best candidates for plugging utilizing MERP funds, while also optimizing subsequent plugging and abandonment (P&A) campaigns for both program impact and efficiency” (U.S. Department of Energy - National Energy Technology Laboratory, 2023). Well screening, methane emission field monitoring, and quantification of emission rates will be performed at a minimum of 400 MCWs. These activities will be performed by qualified measurement specialists (QMS) as defined in the U.S. Department of the Interior (U.S. DOI) Orphaned Wells Program Office’s *Assessing Methane Emissions from Orphaned Wells to Meet Reporting Requirements of the 2021 Infrastructure Investment and Jobs Act: Methane Measurement Guidelines* (U.S. DOI Guidance), dated July 2023. Well screening and MEQ will be performed for pre- and post-plugging quantification in accordance with *Methane Measurement Guidelines for Marginal Conventional Wells* (U.S. DOE NETL Guidance), dated April 17, 2024. All pre- and post-quantification data collected will be evaluated by QMS and entered into a database and storyboard accessible to the WVDEP to provide the WVDEP with continuous status updates as well as provide a prioritized list of the 400 MCWs for future P&A projects. A permitting assessment will be performed on a finalized list of selected MCWs, and a permitting report will be generated that outlines required permits for effective closure of a specific MCW.

2.0 INTRODUCTION

Antea Group and Ramboll (hereon referred to as “project team”) are pleased to present this proposal to the WVDEP in response to their request for MERP Administrator services CRFP 0313 DEP2500000004. Antea Group is a full-service, global consulting firm with 3,000 employees in North and South America and Europe. Ramboll is a global engineering, architecture, and consultancy company with more than 18,000 experts that create sustainable solutions for governments and companies all over the world.

Antea Group's North American Operations Business Group provides environmental, health, safety, and sustainability services to state and local governments and private sector clients through 30 offices nationwide. Antea Group staff includes environmental, chemical, civil, and mechanical engineers, environmental scientists, air specialists, health and safety specialists, environmental management consultants, geologists, hydrogeologists, and toxicologists. Personnel in Antea Group's offices in Pittsburgh, Pennsylvania, and Columbus, Ohio, have consulting experience working in West Virginia and are Licensed Remediation Specialists (LRS). See **Appendix A** for additional details on related project experience.

Ramboll has a globally recognized environmental and health practice, and its 2,700 U.S.-based experts have earned a reputation for technical and scientific excellence, innovation, and client service. Ramboll personnel have permitting experience working in West Virginia. See **Appendix A** for additional details on related project experience.

The project team is pleased to have the opportunity to submit this technical proposal to the WVDEP.

3.0 BACKGROUND AND EXPERIENCE

For the duration of the project, the project team will bring their comprehensive expertise and history of successful P&A program implementation to this opportunity. The project team partnered to support the New York State Department of Environmental Conservation (NYSDEC) and the New York State Office of General Services (NYSOGS) by completing gas well assessments, MEQ pre-plugging and post-plugging, plugging oversight, permitting, program management, construction oversight, and community engagement as it related to the P&A of orphan oil and gas wells across New York State under US DOI's Federal Orphan Well Program. The project team partnership provides expansive knowledge and direct project experience meeting the requirements of the request for proposal (RFP), including community engagement, site assessment, MEQ, and permitting on the local, state, and federal levels.

3.1 PROJECT TEAM

The project team led an award-winning orphan oil and gas well plugging program for NYSOGS and NYSDEC across 12 counties (approximately 4,500 square miles) and provided services including gas well assessment, permitting, community engagement, MEQ (using QMS), program management, and construction oversight.

The project team was an integral part of establishing New York State's methane detection and subsequent MEQ procedures for their orphan well plug and abandonment program, developing field protocols and methodologies to ensure data collection in a safe, effective, and efficient process. Furthermore, this project team, working with NYSDEC/NYSOGS, established a reporting framework and database to accurately document and subsequently present data to the U.S. DOI in an easily useable format.

Field assessments conducted during this program included multi-gas meter monitoring to evaluate workspace safety conditions, methane detection monitoring, quantification testing of methane emissions (both pre- and post-plugging), photo documentation of the work area, evaluation of well conditions, weather and atmospheric data documentation, and oversight of well P&A activities. Additionally, this project team prepared well construction evaluations, plugging plan work orders, air monitoring plans, and sensitive area protection plans. The project team also conducted P&A contractor oversight and collaboration of quality assurance and quality control for successful well plugging completions, environmental impact oversight, tracking of project financials (burn rates), landowner outreach, and regulatory liaison. The project team's data management team performed

Geographic Information System (GIS) mapping for the development of accurate well locations and field staff-supported data collection during field assessments for NYSDEC/NYSOGS.

A complete team of experienced field staff that meets the definition of a QMS was used to collect methane emission rate data voluntarily during NYSDEC/NYSOGS Orphan Well initial grant. This definition, based on the federal guidelines, lays out considerations and responsibilities of the individual conducting the measurements. For accurate and repeatable measurements, this qualified person has a minimum of 20 hours of direct field measurement experience utilizing the devices proposed in this document. Those qualified individuals are trained and experienced in the identification of field conditions that affect measurement, infrastructure that may be present and its contribution to the assessment, and field conditions and safety-related hazards that can be encountered at remote oil and gas operation sites. Furthermore, the project teams' field staff are experienced working with P&A contractors to schedule access to well sites and safely collect methane emission rate quantification data prior to and after oil and gas wells are plugged and abandoned.



*2024 NYS Office of General
Services Division of Design
and Construction
Commissioners
Performance Award*

Additionally, Antea Group has completed methane detection monitoring and emission quantification evaluations for Shell, ConocoPhillips, confidential clients in Colorado, and most recently NYSDEC and NYSOGS for their statewide orphan oil and gas well locations. Ramboll has extensive experience working in large program management for several New York State agencies (NYSOGS, NYSDEC, and New York State Division of Military and Naval Affairs), federal agencies (United States Army Corps of Engineers), and local municipal clients. This project team's experience in implementing and completing an award-winning P&A oil and gas well program provides the WVDEP with a successful project team for managing and implementing the WVDEP's MERP for the plugging of MCWs.

The project team's experience navigating permitting requirements for state and federally funded projects will provide invaluable guidance to the WVDEP through the permitting process, and the team is tailored for successful implementation of the WVDEP's MERP for the plugging of MCWs.

4.0 PROJECT TEAM ORGANIZATION

Utilizing the correct resources is key to a successful project. An organizational chart and resumes of the proposed staff are presented in **Appendix B**. The single point of contact and Project Director will be Troy Bernal of Antea Group. The Project Manager will be Dean Krebs of Antea Group. Additional staff who will fill key roles are identified in the organizational chart.

5.0 PROJECT APPROACH

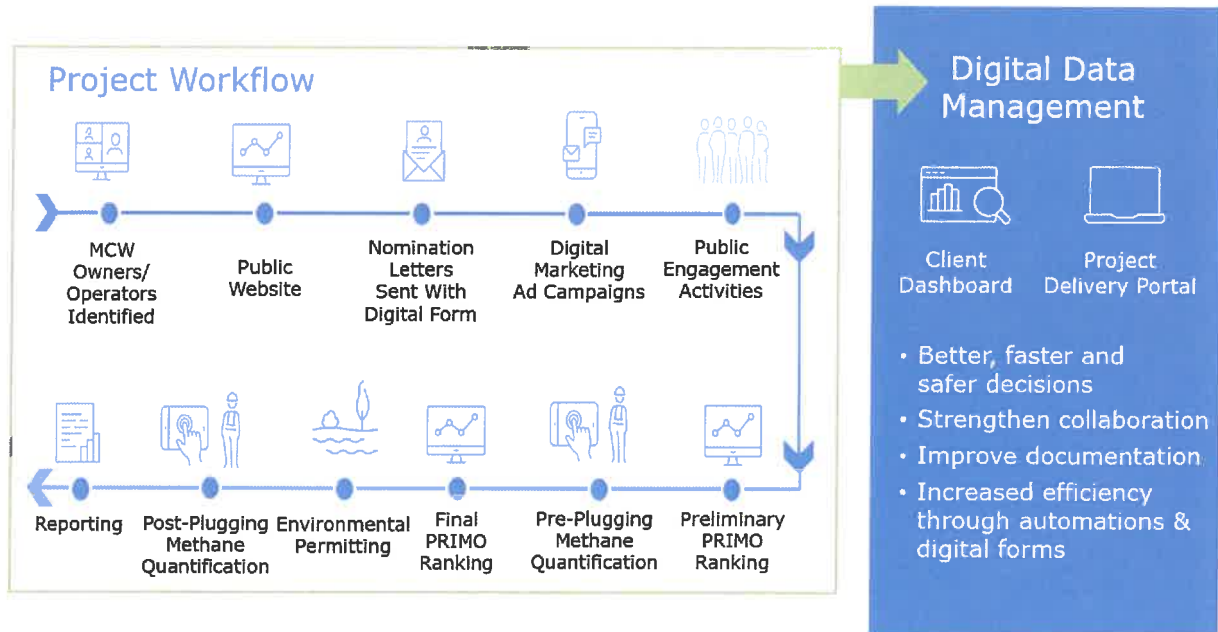
The project approach is broken into three general tasks as outlined below and discussed in more detail in the following subsections. The project team will coordinate and perform the following project workflow:

1. Perform community outreach and subsequent well nomination through the use of a public website for MERP, submission of nomination letters with digital forms, a digital marketing advertising campaign, and several public engagement activities;

2. Conduct pre- and post-plugging MEQ at the 400 MCWs identified by a preliminary and final PRIMO ranking; and
3. Complete permitting review with permit report generation for the 400 MCWs as identified by final ranking.

Monthly technical and financial reports will be provided to the WVDEP throughout the course of the MERP.

The following graphic provides an overview of the sequencing of individual components of the three general tasks that will be completed to meet the objectives of the MERP.



For the above project workflow to function, the project team will leverage our expertise in digitalization and integration technologies to create digital data collection and reporting tools to integrate information from multiple sources to drive consistency and quality as well as enhance efficiency across the program. Using Environmental Systems Research Institute's (Esri) ArcGIS Mobile Applications Suite, our experts will design a digital program to manage all data collected from various sources, including data provided by owner/operators and other third parties.

The digital program will consist of the following components, which will be discussed in more detail in subsequent subsections:

- Community Outreach and Nomination Process
- Community Engagement Support and Public-Facing Website Creation
- Project Delivery Portal for Geospatial Data Management Creation and Maintenance
- Well Nomination Mailers and Data Management
- Digital Field Form and Field Maps Creation
- Client Dashboard Creation and Maintenance for Progress Monitoring

5.1 COMMUNITY OUTREACH AND NOMINATION PROCESS

For the purposes of this RFP, the project team recognizes that there is need for meaningful engagement and collaboration with owners, operators, and additional stakeholders for the effective implementation of this project. Our goal is to create an engaging and accessible outreach program that invites and encourages stakeholders to actively take part in the process of plugging MCWs. The project team believes that this project's success is supported by stakeholder engagement and their acceptance of the project's objectives and proposed actions. Understanding that the project relies heavily on such engagement, we are committed to ensuring the stakeholders understand the value and necessity of their role within the program.

Public engagement is crucial, hinging on the voluntary cooperation of well owners. The project team proposes a multifaceted approach program where electronic, written, virtual, and in-person communication efforts will be conducted to engage the larger community with the goal of educating, informing, and supporting stakeholder involvement for MCW plugging prioritization. This approach will help raise awareness, build trust, and educate stakeholders on the environmental importance and community benefits of nominating wells. By forging a transparent and open communication venue, community support will be bolstered and increase the likelihood of proactive participation. The program's visibility and public acceptance can also drive regulatory support, ensuring robust program implementation. Correlatively, the education of owners/operators on the purpose and performance goals of the MERP, assists the project team in retaining accurate information about potential applicable local or state permits as well as increases the likelihood of accurate information that can inform the project team for proper implementation and protection of human health and the environment. Ultimately, by prioritizing meaningful public engagement and education, successful implementation of MERP will create a legacy of environmental responsibility that can resonate within the community for years to come.

5.1.1 COMMUNITY ENGAGEMENT SUPPORT AND PUBLIC FACING WEBSITE

The project team proposes to participate in four public stakeholder events/meetings, attend one conference hosted by the Gas and Oil Association of West Virginia, and notify up to 10 additional stakeholder associations of the grant program. Additionally, the project team proposes to complete a social media advertising campaign which will be complemented by a strategic collaboration with the WVDEP to utilize their media outlets. The goal of this public engagement is to help increase nominations and community engagement.

In-person stakeholder events/meetings will be held across the state of West Virginia, prior to the nomination process, to support the community of shareholders during the nomination process. Buckley, Wheeling, Morgantown, and Parkesburg have been selected as host destinations for these meetings. These destinations, though adjustable at the discretion of the WVDEP, have been selected as locations best suited to support this effort based on MCW densities, population densities, stakeholder locations, and city infrastructure. These meetings will be attended by project team representatives and will be used to engage in direct coordination with shareholders. With supporting guidance (e.g., website), these meetings can assist in providing understanding of the digital framework of the nomination process and the broader grant program. The project team also intends on providing notice letters to 10 different relevant associations (at the WVDEP's discretion) to extend outreach to potentially different stakeholders within the program.

The project team proposes to utilize digital tools to communicate with public stakeholders as well as program team members. Using an Esri platform, the project team proposes to create a website that will provide a summary of the program, including the program objectives and progress. The website will be a compelling communication tool that combines digital maps with engaging narrative text, vivid images, and multimedia content to forge interactive and informative presentations associated with the program that are tied directly to

geographical data. Interactive maps and analytics will be regularly updated that illustrate the locations of nominated MCWs, pre- and post-abandonment MEQ results, and MCW plugging status, presenting program progress for the public and maintaining up-to-date communication with stakeholders. The website doubles as an educational resource, with the capability to host and display existing WVDEP resources such as videos, infographics, detailed text, and additional embedded content that explain the complexities of methane mitigation and well closure processes, thus making intricate environmental issues more approachable to, and understandable by, a wider audience.

The project team proposes to work directly with the WVDEP to develop the website. This website will facilitate a clear and engaging summary of the MERP, the significance of the work being conducted, and its benefits to the environment and public health. The interactive and multimedia capabilities of the website will enable users to connect more intimately with the subject, fostering greater public understanding and support for the initiative.

The following are links to example websites developed by the project team are provided for reference:

- Resilient NJ – Long Beach Island
 - <https://resilient-nj-long-beach-island-rambollglobal.hub.arcgis.com/>
- Buffalo Coastal Resiliency Study
 - <https://buffalo-coastal-resiliency-study-rambollglobal.hub.arcgis.com/>
- Cattaraugus Creek Integrated Watershed Action Plan
 - <https://storymaps.arcgis.com/stories/369d69e8344a4856ac9729b178445eb0>
- Sterling-Wolcott Integrated Watershed Action Plan
 - <https://storymaps.arcgis.com/stories/7a4c9700cda1482e90adb6e795c3fed9>
- Geographic Response Plan
 - <https://nysdec.maps.arcgis.com/apps/webappviewer/index.html?id=6606cf0fc1b14c4f9a9364126ec006aa>

Task Deliverables:

- Four in-person community meetings;
- Ten stakeholder notifications for relevant associations;
- One public-facing website built within the Esri platform, active for four years;
- Four rounds of revisions to the website;
- One Facebook advertising campaign for the duration of two weeks to increase well nomination participation and strategic media collaboration with the WVDEP; and
- One Gas and Oil Association of West Virginia conference program presentation.

The website will be maintained for years 2 through 4. Maintenance allows the website to be updated with monthly well closure lists from the WVDEP. The WVDEP can be given ‘power user’ access to update, if desired.

5.1.2 PROJECT DELIVERY PORTAL FOR GEOSPATIAL DATA MANAGEMENT CREATION AND MAINTENANCE

The project will involve multiple stakeholders, and the project team recognizes the need to develop a system where project data, particularly geospatial information (e.g., parcel information, historic sites, wetland boundaries, well locations, utilities, Light Detection and Ranging [LiDAR] data, elevation data, and environmental data) are stored in a centralized location accessible to all internal stakeholders (i.e., WVDEP, Antea Group, and Ramboll). To facilitate this design, the project team proposes to develop a geospatial data management system where data pertinent to the project can be managed, maintained, visualized, and distributed. To do this, we

propose to use Esri's ArcGIS Online Project Delivery Portal, a cloud-based geospatial infrastructure that can be leveraged across the project for sharing data, making web maps, and creating interactive web applications. ArcGIS Online allows for geospatial data collection and management, data manipulation and visualization, and specialized mapping in support of ongoing well nomination and field data collection. The system will focus on creating a centralized, interoperable GIS tool, designed to manage, display, and disseminate varied datasets pertaining to project management, data, and pertinent environmental and natural resource information to support identification and tracking of necessary permits and approvals.



This application is a powerful project management tool because it provides geospatial data directly to all project team members without requiring specialized GIS software or intensive training. To accomplish this, the project team will purchase an Esri Project Delivery site that will support the number of individuals that need access to the digital data and tools. The project team assumes that the WVDEP has existing ArcGIS Online licenses. However, if needed, user seats can be purchased for an additional fee.

Additionally, the project team will publish relevant geospatial and remote sensing datasets gathered in association with environmental permitting activities, as described in **Section 5.3 Ancillary Permitting Activities**, to the ArcGIS Online Project Delivery Portal. This may include, but is not limited to:

- Publicly available datasets (local and national), including well locations;
- Geospatial data containing relevant habitat information, such as rare or endangered species and publicly available habitat maps;
- Listed species and habitats adjacent to each well location using the free version of the U.S. Fish and Wildlife Service's (FWS) Information for Planning and Consultation (IPaC) project planning tool to evaluate potential species priorities;
- StreamStats produced by the U.S. Geological Survey (USGS);
- Floodplain mapping from the Federal Emergency Management Agency (FEMA);
- The West Virginia State Historic Preservation Office (SHPO) Interactive Map; and
- The U.S. Department of Housing and Urban Development's (HUD) Tribal Directory Assessment Tool.

Task Deliverables:

- One ArcGIS Online Project Delivery Portal created and maintained for four years upon project start date.
- Monthly data publishing and maintenance of the portal for four years.
- Environmental permitting data acquisition and analysis for 400 MCWs.

5.1.3 WELL NOMINATION MAILERS AND DATA MANAGEMENT

To facilitate the well nomination process, the project team proposes to develop a systematic approach for mailing nomination letters to well owners. To do so, the project team will utilize the WVDEP's database for well owner/operator contact information. A clear, informative letter will be designed to articulate the purpose of the MERP and to guide well owners on how to nominate their wells for closure. The nomination letter will invite well owners/operators to respond to a concise questionnaire designed to gather essential information about their wells, providing them with the convenience of an accessible online format to submit their nomination. Once letters are printed, a mailing list will be prepared from the WVDEP's database, with each letter personalized

using mail merge technology to include the specific details of each well owner/operator. The project team will work with a mailing distribution service to handle the bulk dispatch of the letters.

The online nomination process will require a verification step where the well owner/operator will digitally unlock a list of applicable MCWs registered under their name. The well owner/operator will select wells, answer questions (e.g., Is there evidence of gas leakage?), and submit their nominations. Nominations by non-owner/operators will only allow for single well submission and will require the nominee to know the American Petroleum Institute (API) well number. This requirement is intended to reduce mass nominations by those who are not owner/operators. We have considerations in place by requiring a Completely Automated Public Turing test to tell Computers and Humans Apart (CAPTCHA) verification and/or restricting multiple submissions from a single user by means of browser cookies.

Task Deliverables:

- The creation and distribution of up to 1,400 nomination letters to well owners/operators or community parties (e.g., Friends of the Cheat and West Virginia Native American Coalition) for well nominations.
- Data management of mailers and responses.

5.1.4 DIGITAL FIELD FORM AND FIELD MAPS CREATION

In addition to the ArcGIS Online Project Delivery Portal, the project team proposes to use a field data collection application to develop a mobile application to streamline the capturing of field activities, well status updates, and additional observations in the field. The use of digital field forms enables systematic collection and recording of information. The immediacy of real-time reporting via these forms makes critical data readily accessible, enhancing decision-making processes and enabling prompt updates of the online project portal. Additionally, the use of the application can reduce the likelihood of human error and provide consistency in terminology through features such as dropdowns, pre-filled sections, and validity checks, thus increasing data accuracy and completeness. Staff can expedite the documentation process due to features that allow the attachment of photos and videos for verifiable evidence of work performed as well as efficient and effective reference during MEQ activities. Global Positioning System (GPS) functionality embedded within devices lends precision to geotagging, aiding in the creation of accurate well maps. Additionally, information (e.g., land cover classification, utilities, wetlands, and other environmentally sensitive areas) in the geospatial portal will be accessible to field workers.

Digital forms will be integrated into the geospatial portal described above, automating workflows and enhanced communication across teams and stakeholders, allowing for a seamless flow of information.

To execute this scope component, the project team proposes to use the Esri software ecosystem for the field application. With user accessibility at the forefront, the project team will use an application that supports adoption by field users through the use of an Esri Project Delivery subscription, as described above. This provides a platform for creating the application using industry-leading technology while also managing user and data security. This approach also enables integration with the WVDEP GIS infrastructure and technologies.

Task Deliverables:

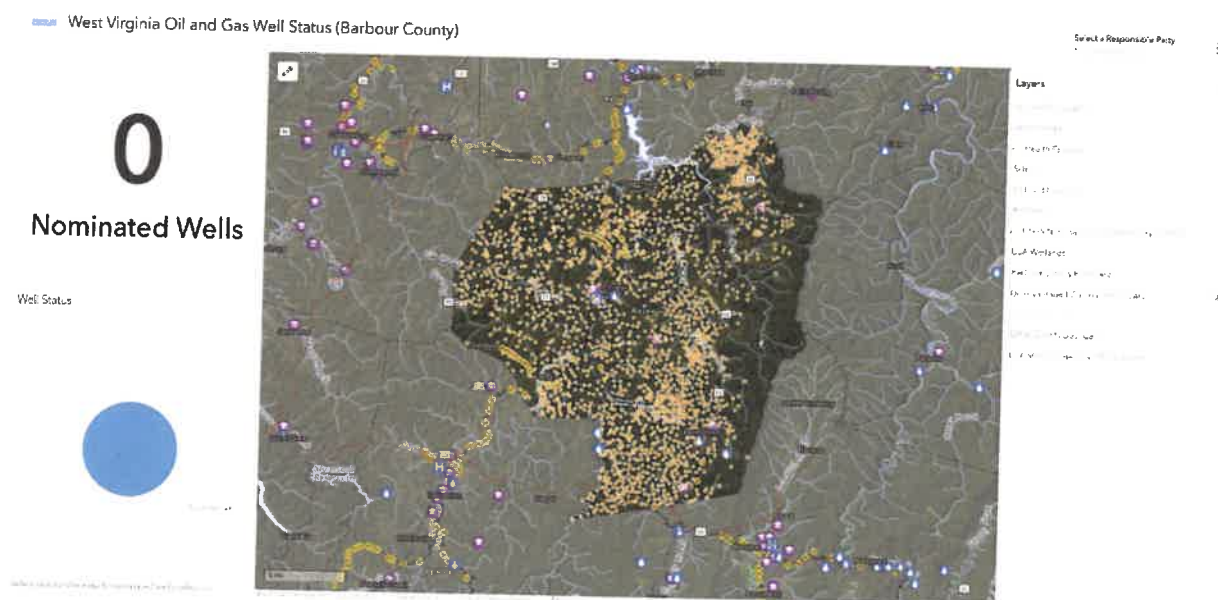
- One custom digital field form to document field activities.

5.1.5 CLIENT DASHBOARD CREATION AND MAINTENANCE FOR PROGRESS MONITORING

The project team proposes to use a client-facing project dashboard to allow WVDEP representatives to monitor project status and updates weekly. This dashboard will include items such as the status of nomination letters sent, responses, wells nominated, field results, environmental permitting requirements, and action items/tasks. A project status client dashboard is a pivotal tool for the WVDEP to monitor the project by presenting real-time updates on critical aspects, such as the dissemination and response status of well nomination letters and the progress of the environmental permitting processes. Centralized data facilitates data-driven decisions, allowing management to swiftly identify and address any project impediments. As a communication and reporting platform, the client dashboard ensures that all parties are well-informed and aligned with the project's objectives, thereby streamlining workflows. Additionally, the incorporation of visual indicators and performance metrics fosters accountability and allows for the evaluation of both individual contributions and overall project achievements. Overall, the client dashboard serves as an indispensable management instrument, providing the WVDEP with the capability to efficiently supervise the comprehensive progress of the project. For this task, the project team proposes to regularly update the dashboard over the four-year duration of this project.

An example of a basic dashboard for one county in West Virginia has been developed. A screen shot of the dashboard is presented below. The dashboard can be accessed through the following link:

- <https://rambollglobal.maps.arcgis.com/apps/dashboards/649946144da04818985e6ebf73be4298>



Task Deliverables:

- One project client dashboard for the WVDEP to monitor progress.

5.2 MCW PRIORITIZATION / PRIORITIZED WELL LIST AND MEQ DATA COLLECTION

The project team recognizes that an effective plan for prioritization and categorization of MCWs through criteria set forth by the Community Benefits Committee (CBC) is crucial for the efficient identification of high priority wells and optimization of resource allocation, which in turn maximizes reduction of methane emissions while eliminating public health risks. An effective plan approach ensures that environmental conditions are addressed transparently and in alignment with the long-term community goals.

A plan for prioritization which implements effective prioritization, data collection, and data entry strategies can ultimately lead to increased investments in high-priority wells and properly identify wells that should be addressed under the grant program. This proper identification leads to the reduction of environmental risks, limits operational costs, and removes project delays or stresses to the project timeline. Additionally, efficiently operated or executed plans could bolster community support and safeguard future investments in legacy environmental projects.

To support a plan which efficiently categorizes high priority wells and optimizes resource allocation, the project team proposes to make use of the PRIMO software tool for two phases of well prioritization and the methane screening and quantification field campaign to underpin the well prioritization list deliverable.

5.2.1 PRIMO SCORING AND RANKING

Following the period of voluntary nomination of MCWs for P&A by the well owner/operator, a process must be introduced to prioritize a subset of the total nominated wells to be further evaluated. It is not feasible or efficient to quantify methane emissions for each nominated well, nor is it impactful to conduct a random sampling across the entire population of nominated wells. A process that can be efficiently executed, that includes a variety of discrete and spatially relevant variables, and that allows flexibility to include new variables as they become apparent from additional information is required. The project team therefore proposes to leverage the open-source, decision-support tool PRIMO to aid in this selection process. The PRIMO tool will be used in two distinct ranking exercises.

The first ranking exercise should occur after the close of the voluntary nomination process, after data and information for each nominated well is utilized to leverage desktop review of the total quantity of nominated wells and the conditional criteria provided by the CBC. The results of the first ranking exercise will be used to determine which wells should be selected for methane screening, potential MEQ, and field condition verification. Once pre-plugging methane data has been collected, a second ranking exercise using PRIMO will be conducted. The results of the second ranking exercise will provide a finalized list of selected MCWs to be submitted to the WVDEP for final approval for P&A funds.

PRIMO was developed under the directive of the U.S. DOE NETL to support the MERP and the National Methane Emissions Reduction Initiative (NEMRI) with the goal to “help organizations determine which marginal convention wells (MCWs) or other low-producing wells make the best candidates for plugging utilizing MERP funds, while also optimizing subsequent plugging and abandonment (P&A) campaigns for both program impact and efficiency” (NETL, 2023). The PRIMO tool is fully customizable, allowing for any number of numerical or truth-based attributes to be considered in the individual impact ranking of wells, as well as increasing the overall efficiency of a proposed P&A project. As such, the project team can include—and appropriately weigh—all attributes that the WVDEP deems pertinent to consider while conducting P&A projects. PRIMO also takes monetary and spatial constraints into consideration. Metrics such as total project budget, mobilization costs, and P&A costs restrict the number of wells which can be considered for P&A. The project team intends to use PRIMO to develop an efficient and effective selection of wells for P&A consideration to maximize the reduction of methane emissions in disadvantaged communities across the population of MCWs in West Virginia while efficiently using project resources.

Input data for the PRIMO tool will be gathered by two primary means. The first method largely relates to information directly tied to a well such as location, age, depth, and historical production value. Some of this information will be provided by the well owner/operator during the nomination process, detailed in **Section**

5.1.4, while additional information will be pulled from the available WVDEP MCW inventories detailed in **Section 5.1.3**. The second data gathering method relates to impact and efficiency decision factors such as proximity to sensitive receptors, distance to access points, proximity to other high priority nominated wells, presence of wetlands, and other relevant attributes. Once all data has been collected, a unified dataset for the input to the PRIMO tool will be synthesized by leveraging cloud-based warehousing techniques to conduct geospatial calculations and other data processing needs that will be repeatable, quick to process, and efficient.

The PRIMO workflow consists of four distinct steps: 1) impact ranking of MCWs; 2) spatial clustering; 3) optimization; and 4) project efficiency calculations.

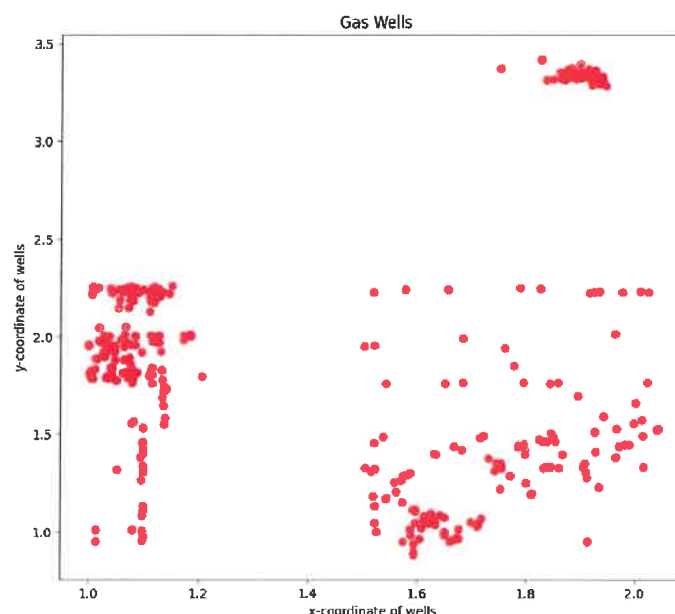
Impact Ranking of MCWs

The priority ranking of MCWs takes into consideration numerical and truth-based impact metrics of a given well including disadvantaged community impact, the number of sensitive receptors within a chosen radius, land use considerations, and production volume. Each of these impact metrics can be solely defined or consist of any number of underlying sub-metrics. The weight given to each sub-metric or metric can be fully customized so that the resulting ranking aligns with the interest of the project.

Each metric and sub-metric can be given customizable weights. Metrics and sub-metrics can be easily added so that the weighting criteria aligns with the goals of the WVDEP (NETL, 2023).

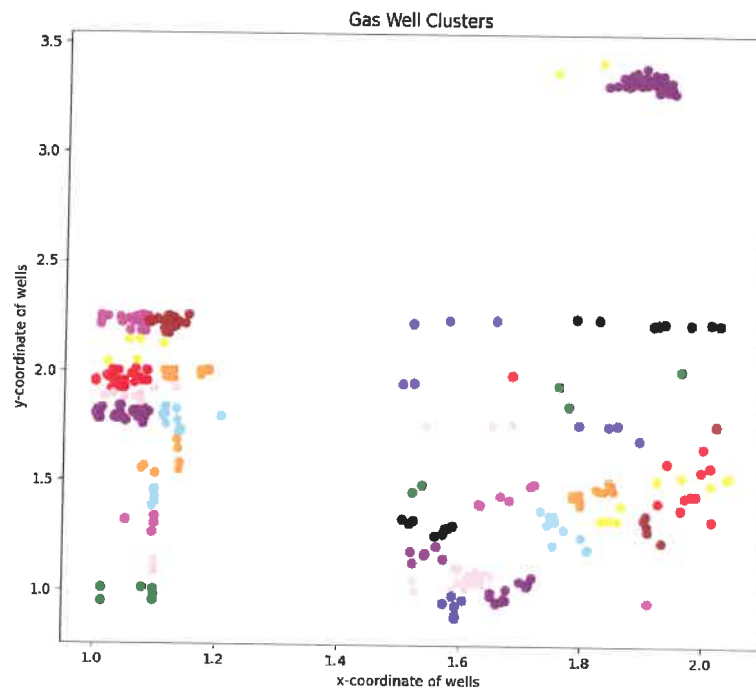
Clustering

Once the impact ranking is complete, the PRIMO tool performs clustering of the wells based on well age, location, and depth. PRIMO leverages agglomerative clustering, where each well starts as its own cluster, and clusters are joined together based on linkage distances. Presented below is an example of spatial clustering of modeled wells (NETL, 2023).



The above graph shows an example of spatial distribution of modeled wells. The distance between wells, distance from the nearest road, and local topology are considered for the clustering and optimization step of the

PRIMO workflow (NETL, 2023). Presented below is an example of well cluster determination in PRIMO (NETL, 2023).



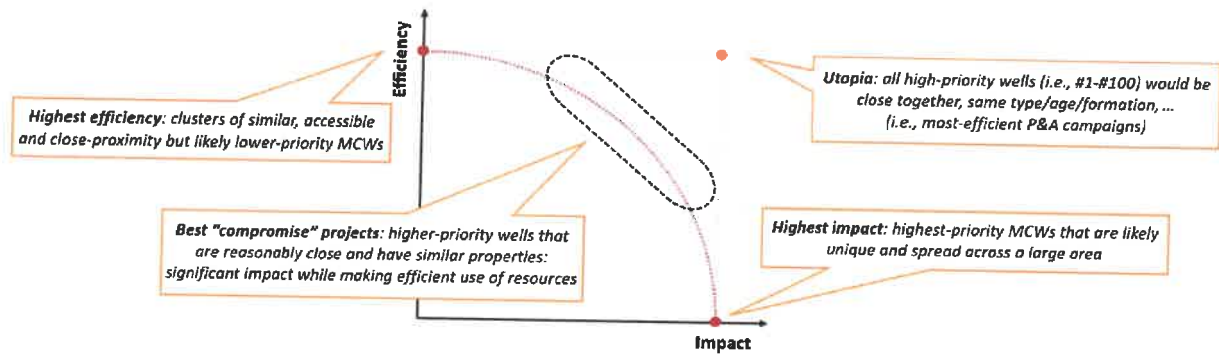
Each colored group above represents a potential P&A project that can be assessed. Wells can be clustered by any number of factors, including location, age, depth, or any other determination made by the WVDEP to refine prioritization within the project.

The main purpose of the clustering step is to reduce the computation time required to complete the optimization step (NETL, 2023).

Optimization

The optimization process of the PRIMO tool will maximize the number of high-impact wells selected for P&A while taking into consideration the project budget, the estimated cost for P&A, the mobilization costs, and the distance between clusters of wells. P&A campaigns often have two implementation extremes when considering which wells to select for P&A. One end strategy is to spread the budget across as many wells as possible. This method would target wells that are easy to access, are clustered together, and have low mobilization costs. This results in the highest number of wells P&A but has the potential to leave out the wells with the highest methane emissions or sensitive receptor impact due to inaccessibility, uniqueness, and distance from other high-impact wells. The other end strategy is to specifically target the high-impact wells, which can result in inefficient use of budget and leave many wells without P&A.

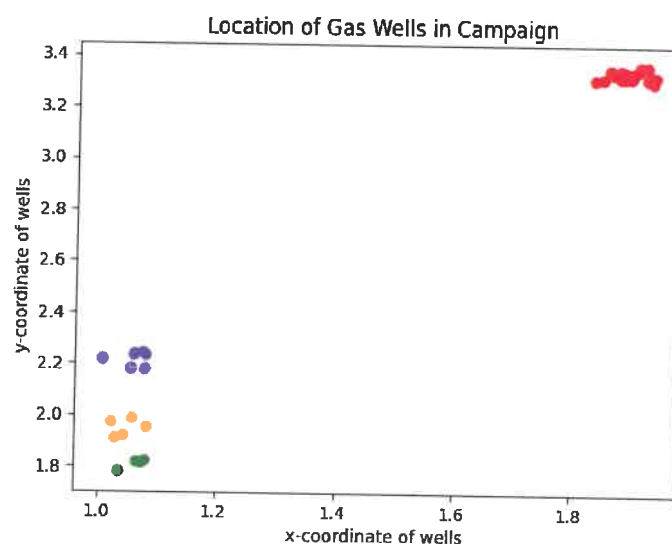
Below is a graphic of optimization considerations and optimal well clustering (NETL, 2023).



The project team will utilize the optimization process in PRIMO to identify P&A clusters where the amount of methane emissions, sensitive receptor risk, and community impact is reduced the most, thus creating significant beneficial impact while making efficient use of resources.

Project Efficiency Calculations

The final step of the PRIMO tool is to calculate an efficiency score for each P&A project. Similar to the impact scores, any number of attributes can be considered as metrics or sub-metrics for this calculation, with customizable weights set for each metric or sub-metric in accordance with the goals of the project. Potential efficiency metrics include the number of wells in a project, the distance between wells, and site-specific considerations such as perceived permit type requirements, property access issues, infrastructure, the number of distinct well owner/operators, and the average depth. Presented below is an example of a P&A well project clusters selection (NETL, 2023).



The PRIMO ranking tool by design allows quick repeatable scoring as new variables are added or updated. It is proposed that two distinct ranking processes will occur during the project.

The resulting output from leveraging the PRIMO tool for this scope is a large component of executing a high impact, high value, and deliberate P&A project across such a large inventory of possible MCWs. This process will

optimize the maximize number of high-impact wells identified for P&A while considering all monetary, spatial, and regulatory constraints.

Task Deliverables:

- One preliminary well categorization list.
- Two custom PRIMO well categorization and prioritization lists.

Task Assumptions:

- Categorization criteria established by the CBC is contained within PRIMO as available categorization matrix.
- No other additional software is required in order to categorize wells.

5.2.2 METHANE MONITORING FIELD WORK PLAN (MEQ DATA)

Following the initial PRIMO preliminary well categorization and prioritization, the project team proposes to conduct single-phase well screening consistent with U.S. DOE NETL Guidance for the 400 wells that have been nominated and/or include some or several components that the CBC has determined to be well conditions requiring elevated prioritization (e.g., proximity to hospitals, production history, and land use).

A single-phase approach to methane screening and emission quantification provides the most streamlined manner that methane detections can be quantified, evaluated and quickly entered into PRIMO. Well screening and MEQ performed as two separate phases, where technically plausible, causes lag time in data collection, has a higher potential for operational disruptions, and is relatively cost-inefficient, with increased operational costs (duplicative field visits to well sites), equipment and resource consumption, and potential project inefficiency (downtime). A single-phase field campaign allows the project team the efficiency of streamlined comprehensive data collection, simplified operational planning, and reduced mobilization costs while still ensuring the accuracy and value are provided through field efforts. By consolidating efforts into one structured phase, the approach ensures that critical information is retained in the most efficient way possible, benefiting both the stakeholders and the WVDEP. Within this single-phase methane monitoring field work plan, the following two activities are included: well screening and MEQ Subsequent work after the single-phase methane field work include MCW Prioritization and Methane Emission Quantification (Post-plugging).

MCW Screening

A project health and safety plan will be developed before field work begins. Each on-site project team member is trained and compliant with 29 Code of Federal Regulations (CFR) Part 1910.120. Field staff will be equipped with a four gas personal meter recording oxygen (O₂), hydrogen sulfide (H₂S), carbon monoxide (CO,) and the lower explosive limit (LEL) of ambient air conditions surrounding the well to assess whether the breathing zone is safe to conduct field activities. If hazardous ambient air conditions or other hazards exist and the well site is unacceptable for screening in standard Level D personal protective equipment (PPE), the well site will be documented as a Type 3 or Type 4 well per U.S. DOI Guidance and reevaluated with the WVDEP prior to additional screening efforts. Due to the remote nature of the work, Antea Group project team members will implement the Alone Worker Program which allows for frequent communication between field staff and project management personnel to ensure work safety. Field staff will strictly follow a specific scope of work limiting activities to a specific work area and check in at a minimum of



once every two hours via available cellular phone service, satellite phone, or other applicable messaging device. The Alone Worker Program raises awareness and promotes safe work practices for employees who work alone. The project team acknowledges it is necessary for some employees to work alone in a diverse range of environments; therefore, the Alone Worker Program training includes hazard identification/risk assessment, control measures, and risk reduction.

Methane screening services will be provided at MCW locations in accordance with U.S. DOI Guidance and U.S. DOE NETL Guidance. Staff will locate, identify, and assess wellhead and ancillary equipment condition, potential emission points on equipment, and surrounding land surface adjacent to the MCW site. Initially, the well site will be screened with an optical gas imagery (OGI) camera to identify potential methane emission points from the on-site wellhead, equipment, and surrounding land surface. The use of an OGI camera during the screening phase will help guide the field screening effort using a remote methane leak detector (RMLD). MCW sites generally have production equipment on-site (separators, tanks, flowlines, etc.) which require screening for methane emissions; therefore, OGI camera imagery can assist with focusing the screening effort on potential leak points more efficiently. The wellhead and other potential emission points identified from the OGI screening will be further assessed and the presence of detectable methane gas verified using an RMLD. Each potential emission point will be screened for three to five minutes to account for intermittent release of methane gas.



The QMS will record conditions and document results from the screening effort utilizing electronic field forms as detailed in **Section 5.1.4** and nomenclature consistent with U.S. DOI Guidance and U.S. DOE NETL Guidance (“not detected,” “detected,” and “detected and may be high”). Background conditions will be evaluated and documented at least 25 feet from the well site with both the OGI camera and RMLD prior to screen. Product sheets, including specifications for both the OGI camera and RMLD, are included in **Appendix C**.

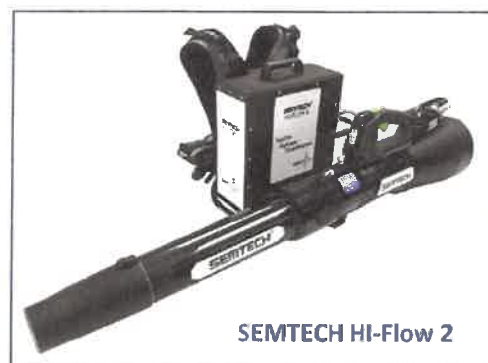


*Remote Methane Leak Detector –
Complete Solution (RMLD-CS)*

Methane Emission Quantification (Pre-Plugging)

If the presence of detectable methane gas is confirmed at a well site, the QMS will begin MEQ measurements consistent with U.S. DOI Guidance and U.S. DOE NETL Guidance. There are several primary methodologies currently recognized for MEQ within U.S. DOE NETL Guidance, including near-field, remote sensing, and direct source measurements. Near field and remote sensing methodologies produce a level of uncertainty in the data collected and do not record data at a rate of 1 gram per hour (g/hr) or lower; therefore, these methods are not acceptable approaches for collecting methane emission data per the guidance documents. However, direct source measuring techniques meet the criteria outlined in the guidance documents and are recommended for this project. Two primary methods of collecting methane emission data using direct source measurements are through dynamic/static chambers and high-flow volume sampling.

The project team prefers using the high-flow sampling method due to effectiveness, efficiency, and safety. The chamber-based method can create significant safety concerns, creating elevated methane conditions within the chamber up to and above the LEL and incurring increased costs due to the extra expense and time to manufacture a variety of chambers for legacy infrastructure (Type 2) and exceptional circumstances infrastructure (Type 3) well-type apparatus (as defined in U.S. DOI Guidance) as well as increased field staff mobilization and chamber transportation costs. The project team will use a SEMTECH HI-Flow 2 sampler (see product sheet provided in **Appendix C**) that can collect and quantify methane emissions from leaking point sources instead of building confining chambers to collect methane concentrations and flow rates for methane emission rate quantification.



The following single-phase approach scope of work will be conducted by project team personnel who meet training/experience requirements of a QMS to properly monitor and quantify methane emission rates for selected well sites pre-P&A activities.

Establish safe work zones for the emission measurement area using field safety equipment:

- Locate, and identify wellhead and ancillary equipment conditions.
- Set up a portable weather station and collect current weather data including wind speed and direction, temperature, and barometric pressure (note methane measurements will not be collected during high wind, precipitation events, or snow/ice conditions that prevent accurate field measurements).
- Assess potential emission points on equipment using an OGI camera, and surrounding land surface adjacent to the MCW site.
- Screen wellhead and additional identified emissions points using an RMDL to verify the presence of methane gas.
- Prepare for and conduct methane emission rate quantification if methane gas was detected during the screening phase outlined in the second bullet above. If methane gas is not detected, the well will be documented as a “not detected” well with an emission rate of less than 1 g/hr and will not be further evaluated for methane gas.
- Collect and document methane emission rates (concentrations and flow rates) using a high-flow sampling device (SEMTECH HI-Flow 2). Per U.S. DOI and U.S. DOE NETL Guidance for equipment measuring methane emissions, the device detects methane emissions at 1 g/hr or lower with “relatively high accuracy.” The high-flow sampling device proposed for this field effort has a documented precision and accuracy of 5%.
- Collect methane emissions with the SEMTECH HI-Flow 2 sampler over a 30-minute to one-hour period to establish a mean concentration of stabilized methane emission rate in accordance with U.S. DOI Guidance and U.S. DOE NETL Guidance. A stable, accurate methane emission rate can be established relatively quickly for a continuous consistent methane leak; however, the majority of non-operational wells generally emit methane at a noncontinuous, inconsistent rate, therefore requiring a longer



measurement time of 30 minutes to one hour to record a stable, accurate methane emission rate. Emission rate stabilization will be verified by determining if emissions rates vary by a factor of 10 or less. This will be assessed by determining if the ratio of current measurement to the mean emission rate of sampling is less than 10. If emissions rate variability exceeds 10 over the recording period, additional measurements will be collected until the emission rate variability is less than 10. The QMS will monitor real-time methane concentration recordings via the integrated SEMTECH HI-Flow live dashboard and determine if the leak rate has been stable (if emissions rates vary by a factor of 10 or more) for a minimum of 10 minutes per leak point.

- Measurement protocol will be repeated for well sites with multiple leak point sources identified in the screening phase, and the methane emission results will be summed for the entire well site and recorded as the methane emission rate.
- Data collected during each MEQ event is digitally stored on the SEMTECH HI-Flow 2 sampler and downloaded daily for assessment and backup storage. Additionally, the following data will be recorded for each well site assessed:
 - Date and time of the measurement(s).
 - Name and affiliation of the QMS(s).
 - Observations from the audio, visual, and olfactory (AVO) inspection.
 - Background methane concentrations and how/when the measurement was taken.
 - Location of the well using mapping datum WGS84, with latitude and longitude recorded in decimal degrees (five to seven decimal places).
 - Administrative unit (e.g., national forest, park, refuge, or Bureau of Land Management public land) on which the well is located or, if private land, the property owner.
 - Well serial number/information such as API or US Well Number.
 - Condition of the well, with digital photos taken from four directions and looking down from above, as possible.
 - Abnormal site conditions.
 - Documentation of challenges and solutions.
 - Weather information, including air temperature, most recent precipitation date and amount (inches), wind direction and speed, and barometric pressure.
 - Total methane emitted from the well over time. Units will be in g/hr of methane.
 - Number of leaks, if multiple leaks are present, from a single well due to the presence of legacy infrastructure and/or soil emissions.
 - Any uncertainty in the measurement (e.g., by making multiple measurements at the site, including concerns related to site conditions).
 - Interval emission rates to ensure stable flow conditions to satisfy the factor of 10 for variability.
 - Equipment and techniques used.
 - Equipment calibration data.

Five percent of the wells assessed will be randomly selected for a duplicate measurement to assess the precision of the field efforts.

Identical processes will be performed both in the pre-plugging and post-plugging quantification phase.

Well Prioritization

Following well screening and pre-plugging MEQ, well sites will be prioritized utilizing well screening data, MEQ data, and information collected before and during site assessments.

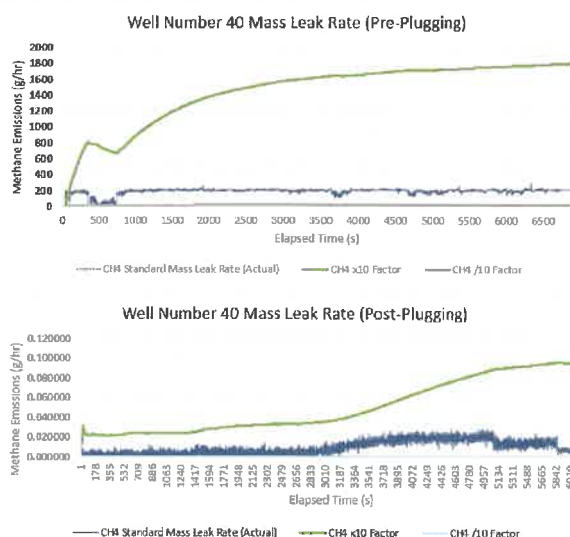
The project team will consult with WVDEP and the CBC for reprioritizing wells based on non-detect and detected concentrations of methane as well as MEQ rates, and/or presence of other noxious gasses (i.e. H₂S).

Impact rankings of MCWs, Spatial Clustering, Optimization, and Project Efficiency Calculations will again be performed through the PRIMO software as specified in **Section 5.2.1** in order to develop a finalized list of MCW prioritization.

Methane Emission Quantification (Post-Plugging)

After P&A efforts coordinated by the WVDEP are completed for each well, the project team of QMS will perform post-plugging MEQ. Post-plugging MEQ will be conducted periodically as well clusters of 20 or more are closed and abandoned, in order to maintain efficiency measures to reduce extra costs being incurred. The WVDEP can request that selective well clusters smaller than 20 be quantified on an as needed basis, if necessary.

The QMS will use previously recorded well coordinates to locate each former well location. Field safety practices will be conducted as described in the sections above. However, the QMS will measure over time intervals of 15 to 30 minutes to confirm methane emissions reduction instead of the 30-minute to one-hour sampling period used during pre-plugging quantification. It is assumed that surface equipment will be removed during P&A activities and therefore will not need to be assessed post-plugging, although any surface soils quantified during the pre-plugging assessment will be measured with the SEMTECH HI-Flow 2 sampler to verify emission reduction. Field documentation and data collection will be consistent with the pre-plugging quantification phase as described above and will meet the requirements of U.S. DOI Guidance and U.S. DOE NETL Guidance. If methane is detected above an emission rate of 1 g/hr, immediate notification will be provided to the project team and the WVDEP. Post-plugging data will be recorded and compared to the collected pre-plugging data to assess methane reduction. Post-plugging data will be provided to the WVDEP as data is regularly updated on the provided dashboard.



Task Deliverables:

- Screening of 400 MCWs;
- MEQ (pre- and post-plugging) of 400 MCWs; and
- Data recording and field verification of 400 MCWs.

Task Assumptions:

- Mobilization, screening, MEQ, and demobilization is estimated to be approximately four wells per day;

5.3 ANCILLARY PERMITTING ACTIVITY

Closure of MCWs will require access to the well locations with the necessary equipment to safely and permanently plug the well to eliminate future methane emissions. Conducting the various components of the well closure activities may require approval from federal, state, and/or local authorities due to the nature of the

work (e.g., well plugging) or the location of the work (e.g., proximal to sensitive features or protected areas). Given the importance of addressing MCWs in an environmentally responsible manner, the identification of the appropriate regulatory approvals is a critical step in the process. The project team's approach for identifying potentially applicable permits and obtaining the requisite approvals in a timely and organized fashion to support owner/operators in the closure of MCWs is presented below.

The first step in the permit evaluation processes is to develop a permit matrix that includes the range of potentially applicable permits and approvals that could conceivably apply to the closure activities anticipated at a particular well. The permit matrix will be organized by federal, state, and local authorities having jurisdiction and will outline the particular permit/approval, associated conditions that trigger the approval requirement, timelines typically associated with obtaining the approval, and estimated fees associated with the permit. The permit matrix will serve as a library of potential regulatory requirements that can be applied to the site-specific circumstances associated with a particular well and can also serve as the basis for permit tracking. A holistic view of permit requirements for the collection of selected MCWs will help identify any longer-lead approvals that might be anticipated and serve as a mechanism to organize permit conditions, reporting requirements, expiration dates, and other salient details that could be helpful for the well owner/operator.

With the permit matrix developed, the next step in the process is to develop an understanding of the potential access routes, equipment needs, preparatory activities (e.g., tree clearing), and other practical matters associated with implementation. This will be accomplished through close coordination with the owner/operator. This step in the process supports the identification of a proposed limit of disturbance (LOD) that will be used to establish the area that may be subject to regulatory review, such as the "Action Area" (per Section 7 of the Endangered Species Act [ESA]) and the "Area of Potential Effect" (per Section 106 of the National Historic Preservation Act [NHPA]). Importantly, initial identification of the LOD provides a means to conduct impact avoidance and minimization, which is a mandatory step that must be demonstrated when seeking most regulatory approvals. The processes of avoidance and minimization are necessarily iterative as environmental constraints are identified and the LOD is refined (and vice versa). The goal of the exercise is to identify the least environmentally damaging practical alternative for achieving the closure of MCWs.

Concurrent with the identification of viable implementation scenarios for the candidate MCWs, including a proposed LOD, initial screening for sensitive species, regulated habitats (e.g., wetlands) and other protected resources will be conducted for the area anticipated to be impacted by closure of the MCW. The environmental screening exercise will be conducted using desktop resources including, but not limited to, aerial photographs, West Virginia online GIS mapping, National Wetland Inventory maps produced by the U.S. FWS, StreamStats produced by the USGS, floodplain mapping from FEMA, the West Virginia SHPO Interactive Map, the U.S. HUD's Tribal Directory Assessment Tool, and similar publicly available resources.

The information gathered from the initial evaluation of potential resource constraints will be used to finalize the impact avoidance and minimization efforts and select an optimal LOD. The proposed LOD will generally serve as the Action Area and Area of Potential Effects to facilitate an evaluation of the potential impacts to regulated or protected resources. The potential for impacts will then inform the identification of the necessary approvals or permits that may be needed for the project. Permits and approvals from the permit matrix that are identified as applicable for effective closure of a specific MCW will be outlined in a summary report for the well owner/operator's reference. The identification of the Action Area and Area of Potential Effects through the establishment of the LOD via this process will also facilitate the development of a concurrence letter from resource agencies and support subsequent permit applications (if required).

Recognizing that the owners/operators of MCWs may not be specialists in environmental permitting, the project team is committed to supporting both the project proponent (owner/operator) and resource agencies to help streamline the permit application process.

Our team understands that the categorization of wells may also be influenced by the outcome of the permitting evaluation, as it is expected that some MCWs will have more environmental constraints and regulatory hurdles to overcome when compared to others. For example, MCWs that are designated as “locations of concern” by virtue of their proximity to sensitive or protected resources may be selected for early progress to ensure that the process to obtain any needed approvals can begin. Conversely, MCWs with limited constraints may be prioritized based on how conducive the circumstance may be for a timely closure operation. The project team will assess the relative timeframes associated with implementation based on the type and volume of environmental approvals identified. This assessment will be included in the tracking matrix developed for the assessed wells to inform a superior, holistic, and programmatic view of the expected timeframes associated with permitting and implementation. In addition, if ranking and assessment results in a large number of sites with similar or equal rankings, the project team is prepared to support a more granular approach to differentiate well sites based on additional factors such as permitting requirements, timeframes, site accessibility, etc.

Task Deliverables:

- Four hundred permit reports.

Task Assumptions:

- The pricing provided in the proposal is based on 400 MCWs.

6.0 VALUE ADDED SERVICES

In addition to the prioritization criteria sourced from well owners/operators and publicly available data sources, The project team has the capacity for consideration of additional variables that may factor significantly in project cost and efficiency. These variables can be evaluated during the project team’s preliminary methane assessment and weighted for input into the PRIMO prioritization ranking system. The ranked output by PRIMO can increase in granularity, and in turn a greater stratification in well ranking, making it so that wells with the same score can occur less frequently when the optimization process is presented with a large number of nominations and few ranking criteria. Additional prioritization criteria would further differentiate nominated wells to avoid shared scores and limit the potential for a high-impact or highly efficient well to be overlooked in the ranking process.

Additional considerations can be grouped broadly into well access, well condition, permitting potential, and receptor concern. The following table highlights additional variables that the project team can consider during the well assessment process.

Well Access	
Is an access road present?	If an existing access road is not present, construction of an access road will add significant time and costs for a given well or well cluster.
If an access road is present, is the condition of the access road suitable for heavy equipment traffic?	Existing access roads not suitable for heavy equipment traffic may require enhancement with gravel or timber/composite mats to allow repeated traffic in all weather conditions.

Well Access	
Does a water body need to be crossed to access the well?	If an existing water crossing is not present, construction of a water crossing road will add significant time and costs for a given well or well cluster.
If an existing water crossing is present, is it suitable for heavy equipment traffic?	Enhancement of an existing water crossing may incur significant civil costs.
Is the topography of the well area and/or access area significantly steep?	If topography is steep in the access or work areas, additional matting or earth moving may be required to provide a level surface for plugging operations.
Does the well project require dewatering?	If the well is located near to or within a body of water, dewatering may be required during plugging operations.
Does access to the well require crossing through agricultural land, requiring future reclamation?	Repairing and reseeding agricultural land following well plugging may add significant cost to a well project. Working around harvest times may impact project efficiency.
Does access to the well require the removal of significant tree cover?	Ground cover and tree density/size will factor in clearing costs for a potential access road or within the well area.

Well Condition	
Is the condition of well infrastructure significantly degraded?	Additional time may be required to prepare the well for plugging if the well is in disrepair.
Is there water discharging to the ground surface from the well? Has that discharge created a wetland protected area?	Artesian conditions may complicate plugging efforts and impact project efficiency. Wetland-protected areas will include further considerations for permitting and reclamation efforts.
Is there evidence of brine or oil discharge from the well leaching into surface water bodies?	Additional emphasis may be placed on wells that are observed to be discharging brine or leaching oil into surface water bodies.
Is there other infrastructure present that would require removal/repair before or after well plugging?	Additional time may be required if other infrastructure needs to be removed prior to work or be repaired following it

Permitting Potential	
Is the footprint of the work area large enough to warrant stormwater permitting?	If the disturbance area exceeds one acre, stormwater permitting may be required prior to operations.
Is the work area located within a federally designated wetland?	Additional costs may be incurred if permitting is required for work within a designated wetland.
Is the work area located within a federally designated floodplain?	Additional costs may be incurred if permitting is required for work within a designated floodplain.

Permitting Potential	
Is the work area near or intersected by a rail crossing?	Project efficiency may be impacted for notice or permitting requirements if the work area is intersected by a rail line or crossing.
Receptor Concerns	
Does methane detected at the well reach levels which could be unsafe for surrounding receptors or workers?	Methane risk may necessitate safety precautions during well plugging that could add to project costs.
Is the well discharging brine or oil to ground surface in an area of public well water, potentially polluting nearby public or private drinking water?	Wells which are impacting local public or private drinking water could add additional costs for environmental investigations, considerable reclamation, and involvement of potential receptors.

7.0 DATA REPORTING

The project team will collect and store field data utilizing a RMLD and a SEMTECH HI-Flow 2 internal data logging tools and a Juniper Cedar CT8XT tablet (or equivalent). OGI-driven leak point evidence will be provided as needed. Individual well reports will be prepared summarizing field activities, providing methane emissions rates (g/hr), and classifying wells per U.S. DOI Guidance (not detected, detected, or detected and may be high) and will include tables, graphs, GPS coordinates, weather data, site maps, etc., by utilizing available applications specified in **Section 5.1.3** for necessary field verification of site conditions. Data will be stored as specified in **Section 5.1.4** and provided to the WVDEP via client dashboard and weekly updates as detailed in **Section 5.1.5**.

Data will be updated weekly to the client dashboard, and monthly updates will be conducted for the public storyboard. A completed list of prioritized MCW projects, with efficiency considerations, will be provided to the WVDEP once the methane quantification and PRIMO evaluations have been completed. Permitting details for each well will be provided in individual permit reports along with the complete list of prioritized MCW projects.

8.0 PROJECT SCHEDULE

The project team have availability to provide full project support including QMS to begin work upon acceptance of this proposal and finalization of contract between the project team and the WVDEP. Upon acceptance of the proposal and finalization of contracts, the project team will engage in community outreach, begin establishing the well nomination infrastructure, and begin implementation of the Well Prioritization Plan. See **Appendix D** for the proposed project schedule, which presents the full project timeline from Q1 2025 to Q4 2028. See **Appendix E** for RFP Certification and Signature Pages. See **Appendix F** for project references and additional experience details.

9.0 CLOSING

Thank you for the opportunity to provide this proposal to support the WVDEP. We believe that by collaborating with our clients, we can design the service approach and deliverables that best meet their needs. Should you desire any changes or modifications to this proposal, please contact us; we strive to ensure our service approach is the most successful option.

Our client relationships are very important to us, and we aim to provide you with the highest quality of service and prompt response to your environment, health, and safety needs. We look forward to speaking with you further about this proposal.



January 7, 2025

Troy S. Bernal, M.S.
Project Director/Senior Consultant
+1 225 907 4606
Troy.Bernal@anteagroup.us
Antea Group



January 7, 2025

Dean Krebs, P.E.
Project Manager
+1 763 360 6777
Dean.Krebs@anteagroup.us
Antea Group

10.0 CONTACT INFORMATION

USA Headquarters

119 14th Street NW, Suite 220
New Brighton, MN 55112

Toll Free	+1 800 477 7411
International	+1 651 639 9449

11.0 REFERENCES

- U.S. Department of Energy - National Energy Technology Laboratory. (2023). PRIMO - The P&A Project Optimizer Toolkit.
- U.S. Department of Energy - National Energy Technology Laboratory. (2024). *Methane Measurement Guidelines for Marginal Conventional Wells*.
- U.S. Department of the Interior Orphaned Wells Program Office. (2023). *Assessing Methane Emissions from Orphaned Wells to Meet Reporting Requirements of the 2021 Infrastructure Investment and Jobs Act: Methane Measurement Guidelines*.

Appendix A – Related Project Experience

NEW YORK STATE ORPHAN OIL & GAS WELL PLUGGING PROGRAM



2024 NYS Office of General Services Division of Design and Construction
Commissioners Performance Award

Under the provisions of the Bipartisan Infrastructure Law, the United States Department of the Interior (USDOI) allocated \$25 Million to New York State (NYS) for the decommissioning of orphan oil and gas wells across the state. To support the NYS Office of General Services (NYSOGS) and Department of Environmental Conservation (NYSDEC), Ramboll and Antea formed a multifaceted team of technical specialists skilled in gas well assessment, permitting, program management, and community engagement. The team effort began with landowner engagement consisting of property ownership/contact information verification, postal service mailers, and establishment of a call center to respond to mailer inquiries. Additionally, the team conducted several targeted outreach campaigns as a follow up to mailers to further explain the program's advantages, highlighting the reduction of greenhouse gas (GHG) emissions as well as protection of ground and surface waters. The outreach effort played a pivotal role in garnering support and attaining necessary executed access agreements.

Once access agreements were obtained, a schedule of well inspections was established in coordination with property owners, contractors, and the consultant team. Efforts were made to schedule collocated wells to minimize travel costs and associated GHG emissions. Preliminary site inspections were completed across 12 counties (approximately 4,500 square miles) utilizing digital applications to capture various field observations, measurements and details including imagery, access/site constraints, utility locations, methane presence, permit-related site conditions, proximity to sensitive environmental receptors (wetlands and waterbodies), landowner requirements and reclamation/construction requirements. Utilizing connected workflows between digital field data collection and desktop analysis, automated inspection reports were produced in ArcGIS Pro and submitted to the agencies for review.

Federal and state permitting requirements that were evaluated included, but are not limited to, Sections 401 and 404 of the Clean Water Act, Article 15 Title 5 and Article 5 of the Environmental Conservation Law (ECL) – Excavation & Fill in Navigable Waters and Stream Disturbance, Article 24 of the ECL – Freshwater Wetlands, 6 New York Codes, Rules and Regulations (NYCRR) Part 50, and State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (GP-0-20-001). Wetland delineations and mussel surveys were completed within the anticipated limits of disturbance in support of permitting requirements. Additional coordination

FIRM – RAMBOLL/ANTEA

Client

New York State Office of General Services, Design and Construction & New York State Department of Environmental Conservation

Location

Multiple Communities, Western New York State

Project Period

2022 – Present

Services

- Program Management
- State & Federal Permitting
- Health and Safety
- Field Assessment
- Methane Quantification (Antea)
- Department of Interior Reporting (Antea)
- Site Access
- Wetland Delineations
- Erosion and Sediment Control Plans
- Construction Oversight and proposal review
- Site reclamation plans and verification
- QA/QC review of contractor documentation
- Individual well cost tracking
- **Relevancy**
- Large-scale program management
- Landowner engagement
- Multi-Agency engagement
- Permit identification
- Data Collection
- Disadvantaged Communities
- Justice 40

was completed to achieve agreement from State and federal agencies including Federal & State Preservation Laws (36 Code of Federal Regulations 800; 9 NYCRR Part 428; Sections 3.09 and 14.09 of the NYS Parks, Recreation and Historic Preservation Law) and U.S. Fish and Wildlife Service Endangered Species Act Section 7. Federal and state permit applications were submitted, tracked, and managed throughout the program, and requisite permits were obtained for each site where a well was closed.

Erosion and Sediment Control (ESC) plans were developed for each well based on field inspection documentation and Light Detection and Ranging (LiDAR) imagery. Contractor work scopes and site designs were developed for selected well closure sites that summarized site access routes, operational restrictions, permitting requirements, ESC requirements, and site preparation and restoration requirements. Work scopes/designs were submitted for agency review and subsequently issued by the agency to the contractor.

To aid in prioritization of well readiness for plugging and abandonment (P&A), various summaries were developed, tracked and managed for agency use, including screening level concentrations of methane and hydrogen sulfide; estimated abandonment costs; Disadvantaged Community (DAC) status; status of individual local, state and federal permits; work scope/design status; access agreement status; railroad access requirements; local highway and traffic control requirements; and property owner restrictions.

Utilizing inspection observations and the site summaries, the agencies classified each well into categories of low, medium, or high priority. With agency priority established, the agency contractor set the P&A schedule and the team pivoted to a construction support role that began with methane emissions quantification (MEQ). Pre-plugging MEQ was completed by Qualified Measurement Specialists (QMS) following procedures as defined by the U. S. Department of Interior, Methane Measurement Guidelines, dated July 2023.¹ Upon completion of pre-abandonment MEQ, contractor P&A began and construction oversight was performed. Oversight included collecting and managing daily methane checks, compiling daily reports, and monitoring material usage throughout project duration. In addition, weekly site visits were completed to document work scope/design compliance, restoration, evaluate SWPP compliance, and to address inquiries or requirements from property owners.



Upon completion of P&A activities, post-abandonment MEQ was completed and results reported to the agencies. Contractor closure reports were reviewed, edits recommended, and reports submitted for agency review and approval.

¹ "Assessing Methane Emissions from Orphan Wells to Meet Reporting Requirements of the 2021 Infrastructure Investment and Jobs Act: Methane Measurement Guidelines" U.S. Department of the Interior, July 2023.

RESILIENT NEW YORK INITIATIVE



Recommended flood and ice-jam mitigation projects that local municipalities can undertake to make their community more resilient to future floods.

In November of 2018, New York State (NYS) announced the Resilient New York Initiative in response to devastating flooding in communities across the State in the preceding years. A total of 48 high-priority flood prone watersheds across New York State were selected to be addressed through this initiative.

For the Resilient New York Initiative, the New York State Office of General Services (OGS), in collaboration with the New York State Department of Environmental Conservation (NYSDEC), implemented an assessment of flood and ice jam hazard mitigation alternatives using current and future predicted flood flows resulting from climate change for the watershed. This includes the mainstem of the Buffalo Creek and confluence with select tributaries. This work was undertaken to inform the direction of flood response efforts and potential hazard mitigation plans. To date the Ramboll team has completed over 14 studies in Erie, Niagara, Cattaraugus, Madison and Oneida counties and will continue to work with NYSOGS and NYSDEC to perform flood studies west of Rome, New York.

Each study identifies the causes of flooding within the watershed and develops, evaluates, and recommends effective and ecologically sustainable flood and ice-jam hazard mitigation projects. Proposed flood mitigation measures are identified and evaluated using hydrologic and hydraulic modeling to quantitatively determine flood mitigation recommendations that would result in the greatest flood reductions benefits. In addition, the studies incorporate the latest climate change forecasts and assess ice-jam hazards where jams have been identified as a threat to public health and safety. Scope includes data collection and stakeholder engagement, field assessment and characterization of high-risk areas, and development of flood hazard mitigation alternatives and reporting.

Studies are completed using advanced modeling techniques and field assessments to identify priority projects in the flood-prone watersheds, develop state-of-the-art studies to reduce flooding and ice jams, and to improve ecological habitats in the watersheds.

The overarching purpose of the initiative is to recommend a suite of flood and ice-jam mitigation projects that local municipalities can undertake to make their community more resilient to future floods. The projects are intended to be affordable, attainable through grant funding programs, able to be implemented either individually or in combination in phases over the course of several years, achieve measurable improvement at the completion of each phase, and fit with the community way of life.

FIRM - RAMBOLL

Client

New York State Office of General Services, Design and Construction

Location

Multiple Communities, New York State

Project Period

2019 – Present

Services

- Community and stakeholder engagement
- Flood risk assessment
- Data collection
- Field assessment and characterization of high-risk areas
- Development of flood hazard mitigation alternatives and reporting

Relevancy

- Large-scale program management
- Public outreach, landowner engagement
- Agency engagement
- Field assessments

LAKE ONTARIO COASTAL RESILIENCY AND ECONOMIC DEVELOPMENT INITIATIVE (REDI)



In response to the extended pattern of flooding along the shores of Lake Ontario as well as the Niagara and St. Lawrence Rivers, the Lake Ontario Coastal Resiliency and Economic Development Initiative (REDI) was created to address immediate and long-term coastal resiliency and economic development needs. REDI aimed to develop a new vision for rebuilding the Lake Ontario, Niagara River and St. Lawrence River shorelines, including protecting public facilities and enhancing natural features and processes.

Ramboll assembled a team of over 100 engineers, scientists, planners, and landscape architects to develop engineering solutions across 500 miles of shoreline, over an intensive 13-week period. Work performed by Ramboll:

- Multi-agency coordination across 11 NY State agencies to facilitate overall project collaboration
- 25 stakeholder and 15 planning committee meetings
- Engineering visits, data collection, risk evaluation of over assets
- Preliminary engineering to develop over 300 project proposals
- REDI commission engagement to select 132 projects for funding from a \$300M program
- Developed five region-specific reports to highlight selected projects and 49 artistic renderings to support community engagement

Ramboll's engineering teams worked with regulatory and technical state experts to discuss the vast array of engineering project profiles and potential Natural and Nature Based Solutions and Blue-Green Infrastructure projects for water and wastewater projects, transportation projects, ports, and marinas. Ramboll developed 28 engineering reports providing design alternative analyses, recommendations, corresponding 10% designs, cost estimates and next steps to advance engineering and permitting processes and support fast track implementation of projects. Ramboll provided program management, design-build, site investigation, wetland permitting, threatened & endangered species monitoring, SEQR and permitting support for 20 dredging sites over a two-year period. This intensive program required close collaboration between Ramboll and NYSOGS to manage the numerous contractors involved in the project, implement dredging and sediment management, track budget progress with simple spreadsheet applications, report on project status to the Executive Chamber and NYSOGS leadership, manage all aspects of permitting and agency engagement, engage with stakeholders in design and field operations, and help to promote a culture of safety during all field operations. In order to complete this project within schedule and budget expectations, site commonalities were leveraged to create efficient/repeatable workflows while also being mindful and adaptive to the unique aspects of each site.

FIRM - RAMBOLL

Client

New York State Office of General Services

Location

Lake Ontario, Niagara River, and St. Lawrence River, New York

Project Period

2019 – 2022

Services

- Program management
- Community engagement
- Asset risk assessment
- Project identification
- Preliminary site/civil design
- Artistic renderings
- Coastal management guidance
- Engineering Report development
- Design-Build
- Sediment beneficial reuse
- Materials management
- Permitting, SEQR, SHPO
- Site investigation (sediment)
- Wetland permitting
- Construction management, oversight and inspection
- Rare, threatened and endangered species surveys and monitoring

Relevancy

- Large-scale program management
- Public outreach, landowner engagement
- Agency engagement
- Construction management
- Site access and permitting management across portfolio of sites
- Data dashboard development

INACTIVE LANDFILL INITIATIVE



Ramboll in partnership with Parsons Engineering Sciences, Inc. assisted NYSDEC and NYSDOH to evaluate more than 1,750 inactive landfills located throughout the state and to develop a prioritized approach to sampling the landfills to evaluate potential impacts to drinking water primarily focused on PFAS and 1,4-dioxane. The partnership jointly developed plans for the overall program, including a Field Activities Plan, Health and Safety Plan (HASP), Quality Assurance Project Plan (QAPP), and Private and Public Well Sampling Plan. The team also developed a ranking system for prioritization of landfills for investigation.

Key components of the program included file reviews, location verification, site inspections, database development, site ranking and prioritization, monitoring well installation, groundwater and surface water sampling and analysis, receptor identification and residential water sampling and analysis. Ramboll installed monitoring wells at 55 landfills, sampled groundwater and surface water at 76 landfills, and sampled over 70 residences, all based on the results of the prioritization that was developed during the initial phase of the project.

A geospatial database was maintained to catalog locations, ownership, tax parcel IDs, geology, and historic information. Ramboll inspected 375 landfills across 22 counties (20,000 square miles) with a two-person team. Data was collected using Esri Mobile apps and uploaded to Ramboll servers via an ArcGIS Enterprise site, ensuring integrated workflows between desktop GIS systems, our centralized server, and field-based users. This setup allowed for near real-time communication between our project team and field crews. Automated inspection reports were generated for each site visit on demand, due to our connected workflows to collect, store, and QC data collection which drove efficiency and maintained consistency in the content and layout across multiple sites and multiple inspection teams

A ranking system was developed to prioritize for further evaluation based on potential risk of exposure to human receptors via drinking water. The ranking system considered proximity of potential receptors to the landfill, landfill characteristics, geologic setting, landfill condition, and additional criteria such as documented history of PFAS disposal, proximity to watersheds and primary/sole source aquifers, type of landfill closure implemented, and reasonable future use. If a landfill ranking score exceeded a predetermined threshold, a work plan for investigation was developed and submitted to NYSDEC for approval and implementation. Investigations consisted of a combination of sampling existing wells, installing new wells, sampling of wells, seeps, surface water, and sediment. Associated activities included negotiating access agreements, identifying access to the areas for equipment and clearing of vegetation. If groundwater concentrations exceeded action levels, a receptor evaluation was developed that identified potential downgradient human receptors, specifically private and public wells. With New York State Department of Health

FIRM - RAMBOLL

Client

Parsons Engineering Sciences, Inc.

Location

Western and Central New York

Project Period

2017 – 2020

Services

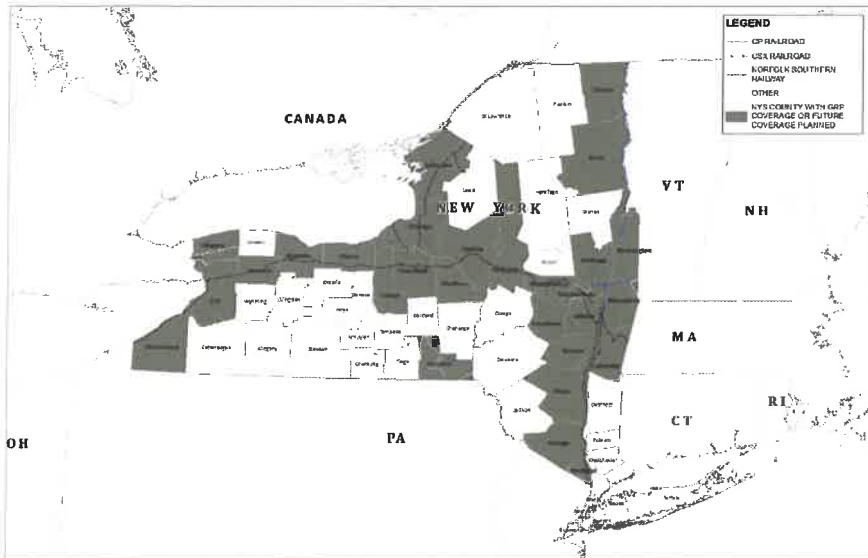
- Program management
- Community engagement
- Project identification
- Condition assessment
- Site investigation
- Data management
- Receptor evaluations

Relevancy

- Large-scale program management
- Public outreach, landowner engagement
- Agency engagement
- Site access and permitting management across portfolio of sites
- Data dashboard development
- Receptor exposure evaluation
- Ranking and prioritization

(NYSDOH) and NYSDEC approval of the evaluation, letters were developed by Ramboll and sent to property owners offering free analysis of well water. A digital library containing pertinent documentation was developed and submitted to the NYSDEC.

GEOGRAPHIC RESPONSE PLANS – CRUDE-BY-RAIL



Until 2015, the majority of crude oil transportation in the United States has occurred via waterways on oil tankers and barges, therefore, most existing Geographic Response Plans (GRPs) focus on the protection of nearshore environments. The development of crude oil extraction from the Bakken formation has resulted in a significant increase in the volume of crude oil being transported via railroads. Executive Order 125 directed NYS agencies to strengthen the state's preparedness for incidents involving the transportation of crude oil.

In collaboration with NYSDEC, Ramboll devised a comprehensive approach to enhance emergency preparedness across New York State for counties affected by crude-by-rail transportation due to increased risks associated with Bakken crude oil. The process included meetings with individual county response personnel with a focus toward identifying potential ecological and human receptors and infrastructure that could be affected in the event of a derailment and spill. Ramboll developed detailed GRPs leveraging ArcGIS for map-based contingency planning. Each map was accompanied by a notifications page, offering first responders' immediate access to crucial resources for incident response.

Ramboll also created over 250 spill response strategies through a combination of remote sensing techniques and further refining these strategies in the field with real-time data collected via Esri's Field Maps and Survey123. The process allowed for instantaneous data-to-report transformation, increasing efficiency.

Recognizing the need for specialized equipment, NYSDEC and Ramboll facilitated over 30 emergency response trailers to counties and regional staff along crude-by-rail routes. These trailers were stocked with essential spill-response items such as booms, sorbents, and damming materials. To ensure effective use of these resources, Ramboll created and delivered tailored trainings sessions dealing with practical applications of the GRPs and trailer equipment.

Ramboll provided over 500 GRP documents to 28 NYS counties and equipped them with knowledge and tool necessary to effectively manage and mitigate environmental risks by rail accidents. By creating an accessible online application using Esri technology, Ramboll provided a repository and emergency response tool for the public to use on demand.

- Organized stakeholder meetings with county response teams to align ecological and population protection efforts with over 500 Geographic Response Plans (GRPs) created.
- Developed a versatile and accessible GIS application, ensuring county-wide access to critical response information on either desktop or mobile device.
- Formulated and implemented over 250 tailored response strategies for first responder use on demand.

FIRM – RAMBOLL

Client

New York State Department of Environmental Conservation

Location

New York State

Project Period

2015 – ongoing

Services

- Organize and deliver local stakeholder meetings with regulatory and county personnel
- Identification of ecological and human receptors
- GIS Online Public Applications and database management
- Yearly emergency response trainings for any crude by rail county.

Relevancy

- Data management
- Curated datasets
- Public GIS application development
- Agency engagement
- Public outreach, stakeholder engagement
- Large-scale program
- Mobile data collection

- Supplied Emergency Response Trailers across 28 counties and developed trainings to help first responders use the tools safely.

PLUGGING and ABANDONMENT (P&A) ACTIVITIES - LOUISIANA OIL AND GAS FIELDS



Antea Group provided various services to an Integrated Oil client to locate, assess, decommission, and plug and abandon oil and gas assets within the White Castle, Weeks Island, and Gibson Louisiana oil and gas fields.

Majority of well heads and flow line were located using ground penetrating radar and metal detectors throughout overgrown wetland environments. Once assets

FIRM – ANTEA GROUP

Client

Integrated Oil Company

Location

Various Oil Fields throughout Louisiana

Project Period

2015 through 2018

Services

- Plugging and Abandonment (P&A) activities
- P&A activities
- Decommissioning of surface assets
- Environmental and Human Health Risk Assessments
- Pit assessments and closures
- Surface Remediation
- Naturally Occurring Radioactive Materials (NORM)
- Site Restoration

Relevancy

- Working incident free in difficult terrain
- Oversight and management of multiple subcontractors
- Continual engagement with regulatory agencies

Value Added for Client:

- Eliminated methane and hydrogen sulfide emissions from inactive wells
- Continuous communication with stakeholders and regulatory agencies reduced additional mobilizations; therefore, providing minimal impacts to the environment and reducing overall project costs.

were located, initial site assessments were conducted to inventory remaining equipment, pits, and miscellaneous waste. In addition, baseline concentrations were established for all environmental media including soil, surface and groundwater, and air quality surrounding the well head. Environmental and human health risk assessments were conducted to develop necessary correction actions plans in unison with P&A activities. Applicable permits were acquired from the Louisiana Department of Environmental Quality (LDEQ) and the Louisiana Department of Natural Resources (LDNR) prior to conducting decommissioning and remediation activities. Antea Group performed P&A; remediation of production pits, removal of flow lines, heater treaters, storage tanks, and production pipe; naturally occurring radioactive material (NORM) remediation of impacted environmental media; and site restoration. Antea Group had continuous communication with stakeholders and regulatory agencies during work implementation to ensure all necessary planned/approved activities were completed to eliminate remobilization into sensitive habitats. In addition, best management practices were implemented to minimize impacts to the environment and sensitive habitat. All activities were conducted in accordance Louisiana Administrative Code (LAC) Title 43:XIX Office of

Conservations – General Operations, Subpart 1. Statewide Order No. 29 and LDEQ's Risk Evaluation/Corrective Action Program (RECAP).

COLORADO OIL AND GAS CONSERVATION COMMISSION PROJECTS



FIRM – ANTEA GROUP

Client

Colorado Oil and Gas Conservation Commission (COGCC)

Location

Colorado

Project Period

2020 – 2021

Services

- Plugging and Abandonment
- Site Characterization
- Soil Gas Survey

Relevancy

- Owner representative for the State of Colorado
- Working within abandoned oil and gas wells State program
- Managing scope change in the field

Antea Group provided P&A oversight and remediation evaluation services for multiple abandoned wells in Mesa County, CO in 2021. To start, Antea Group field staff completed visual inspections at each well site in conjunction with noted observations recorded on the respective sites initial Form 27. If the presence of hydrocarbons was anticipated based on those visual or olfactory observations, a photoionization detector (PID) was used to screen soils and evaluate hydrocarbon impacts in the field prior to sampling at each location. Field screening data was utilized to help guide subsequent soil and water sampling on site. Antea Group prepared a report documenting the results of the field screening, soil sampling, water sampling, and soil gas surveys. A supplemental Form 27 was also delivered to the COGCC. After the well abandonment surface assessment was completed, Antea Group coordinated, managed, and provided technical oversight of the P&A of the abandoned wells. Once P&A was completed, site restoration activities were implemented to reduce erosion and runoff.

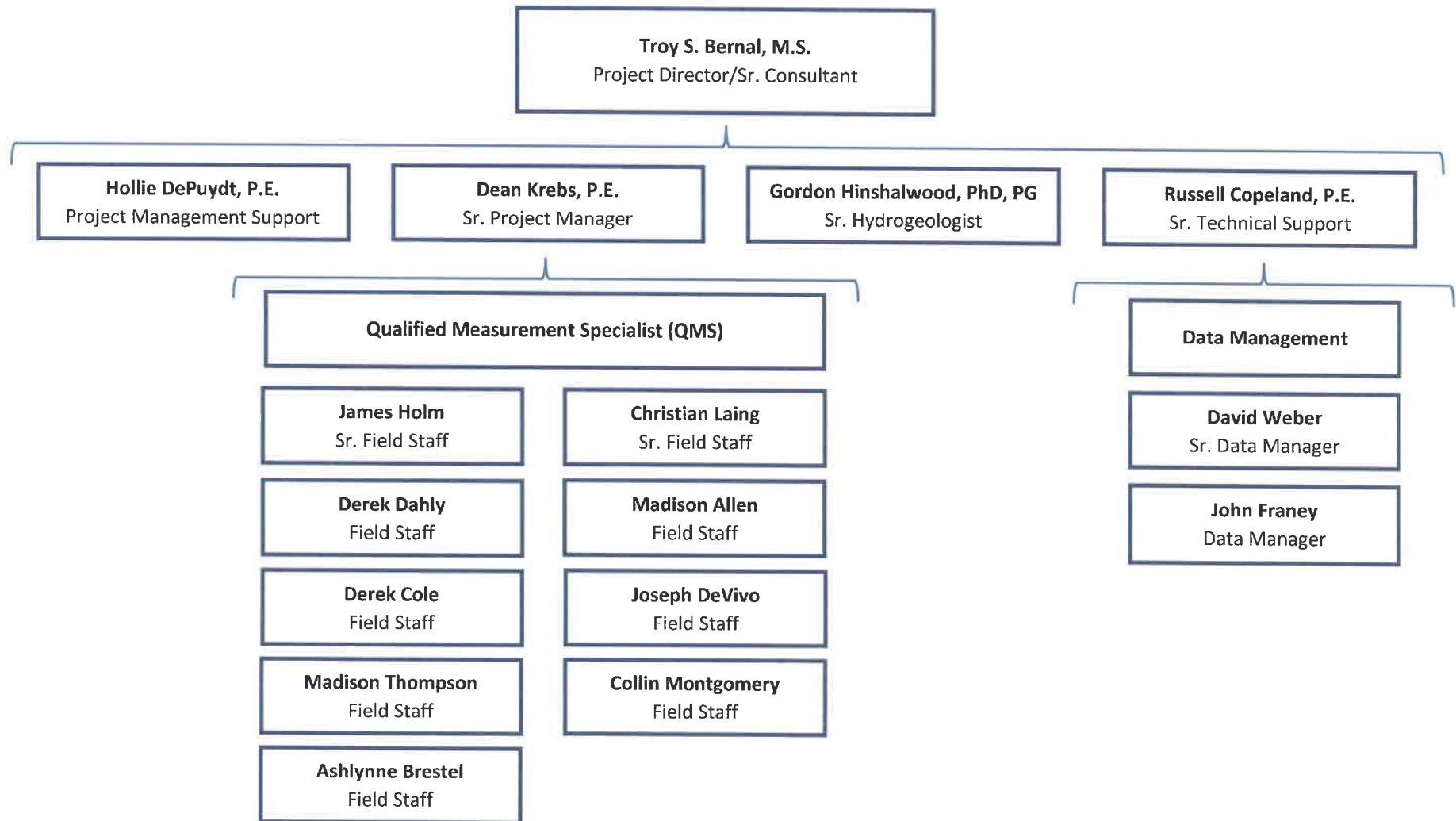
Additionally, Antea Group provided site characterization services for former well injection sites located nearby. Antea Group staff completed a file review of previous photologs, and reports offered by the COGCC as well as other publicly available aerial photos for sample location selection. Antea utilized a direct push probe mobile rig to conduct cost effective site wide sampling to help define and delineate any potential subsurface impacts. Following the multiple mobilization efforts, Antea Group submitted a comprehensive report summarizing a total of thirty-eight soil borings across the site and including adjacent structures of interest (abandoned wells and pit).

Value Added for Client:


- Reduced number of abandoned oil and gas wells in State program
- Assessed out of scope sites within same mobilization reducing project costs

Appendix B – Organization Chart and Team Resumes

Antea Group Organization Chart



SUMMARY OF KEY ANTEA GROUP PERSONNEL

 <p>Troy S. Bernal Senior Consultant Antea Group</p>	<p>Role Project Director/ Sr. Consultant</p>	<p>Education BS, Environmental Science MS, Environmental Toxicology</p>	<p>Registrations FEMA ICS 100, 200, 300, 400, 700 & 800</p>
--	---	--	--


Troy S. Bernal is a Senior Consultant for Antea Group. Mr. Bernal has over 23 years of environmental consulting experience. His primary areas of expertise include plug and abandonment of oil and gas wells, site assessment and remediation, emergency response/management and preparedness, industrial hygiene, expert testimony, and environmental and human health risk assessments. Mr. Bernal's primary clients include oil and gas, railroad, petrochemical/chemical, manufacturing, maritime and insurance companies. Mr. Bernal has completed numerous plug and abandonment projects for the oil and gas industrial sector. His involvement has included preparations of well designs, civil project plans, air monitoring and sensitive protection plans, emergency response plans and closure reports. Field services have included contractor oversight and collaboration of quality assurance and quality control for successful project completions, environmental impact oversight, tracking of project financial (burn rates), environmental assessment and remediation, landowner outreach, and regulatory liaison. Additionally, Mr. Bernal has prepared and completed methane emission detection and quantification plans as well as testing per the Department of Interior (DOI) and the American Carbon Registry and (ACR) guidelines. Mr. Bernal also has expertise in Environmental Investigations and Remediation, Emergency Spill Response, Incident Management, Industrial Hygiene Evaluations, Human Health and Environmental Risk Assessment, and Litigation Support.

 <p>Hollie DePuydt, PE Project Manager Antea Group</p>	<p>Role Project Management Support</p>	<p>Education BS, Chemical Engineering</p>	<p>Registrations Registered Professional Engineer</p>
--	---	--	--


Hollie DePuydt is a licensed Professional Engineer with over 18 years of experience in our St. Paul, Minnesota office. She specializes in site investigation and remediation, Phase I and II Environmental Site Assessments (ESA), and stormwater and wastewater permitting. Hollie successfully manages these projects with various clients and regulatory agencies to ensure minimal business interruptions, compliance with applicable orders, and environmental regulations. The collaboration with federal, state, and local regulators as well as various reimbursement program authorities. Mrs. DePuydt also has expertise in Environmental remediation, wastewater discharge permitting, landfill management and stormwater permitting.


 <p>Dean A. Krebs, PE Senior Engineer Antea Group</p>	<p>Role Sr. Project Manager</p>	<p>Education BS, Geological Engineering</p>	<p>Registrations Registered Professional Engineer</p>
--	--	--	--

Dean Krebs, a Senior Environmental Engineer, is a Registered Professional Engineer with more than 30 years of experience in remedial investigations, environmental assessments, soil and groundwater remediation, compliance services, and project/program management.. His responsibilities have included all aspects of client /portfolio management, including business development, resourcing, budgeting and technical review. He has extensive experience managing complex portfolios of Spill Prevention, Control and Countermeasure (SPCC), Storm Water Pollution Prevention plans and gas well abandonment in addition to managing Antea Group's Engineering Program. Mr. Krebs managed a large plug and abandonment portfolio of orphaned gas wells in rural upstate New York. His team assessed fugitive methane emissions using high flow methane meters on abandoned oil and gas wells in accordance with established federal guidelines. His team conducted oversight during well plugging and abandonment activities which included implantation of health and safety protocols, documentation of daily activities, material use, and ensuring subcontractors were complying with regulatory requirements. Mr. Krebs also has expertise in remedial excavations, remedial system installation, and SPCC plan execution.

 <p>Gordon Hinshalwood, PhD, PG Senior Professional Antea Group</p>	<p>Role Sr. Hydrogeologist</p>	<p>Education PhD, Earth Sciences MS, Environmental Science BS, Biochemistry</p>	<p>Registrations New York State Professional Geologist, Registration No [REDACTED], New York Academy of Science, Scientists Without Borders</p>
---	---	--	--


Gordon Hinshalwood has 30 years of professional experience in environmental consulting. His expertise includes investigation and remediation of contaminated sites in a variety of hydrogeological settings in both the industrial and petroleum sectors. As a portfolio manager, Gordon managed the environmental liability of an approximately 60 site portfolio of retail gasoline service stations and terminals for a major petroleum corporation. As a senior technical resource, he has provided technical support to remediation teams managing projects in the northeastern US (NY, NJ, PA, MD, DE, MA, CT, and RI) and beyond (CA, NV, GA, MI). Gordon's expertise includes cost and strategic management of remediation portfolios, the application of innovative and biologically based remedial solutions to petroleum hydrocarbon LUST sites, and the development of new delineation and remediation strategies for both current and emergent contaminants. In this capacity he has developed protocols for implementing bio-stimulation technologies and monitored natural attenuation at spill sites and partnered with government and academic institutes to advance the use of novel bioremediation technologies. Gordon currently acts as a supporting hydrogeologist on plugging and abandonment efforts for several orphan oil and gas wells in New York State.

	Role	Education	Registrations
 Russell D. Copeland, PE Senior Project Manager Antea Group	Sr. Technical Support	MS, Agricultural and Biosystems Engineering BS, Civil Engineering BA, Dual-degree Engineering Program	Registered Professional Civil Engineer No. [REDACTED]
<p>Russell D. Copeland, a Senior Project Manager, has twenty-nine years of diverse civil and environmental engineering experience. He specializes in innovative groundwater and soil remediation technologies. Russell D. Copeland is an analytical, accurate, detail-oriented, and innovative problem-solver who is knowledgeable in a variety of technical software including AutoCAD, Surfer, Voxler, Equus, and Microsoft Office and Project. Russell has additional experience with data management, contractor coordination, and reporting for a large mercury investigation and remediation project along a natural gas pipeline. Russell also had additional expertise for implementation of remedial system design, fate and transport modeling, and in-situ remediation.</p>			


	Role	Education	Registrations
 James E.N. Holm Project Professional Antea Group	Sr. Field Staff	BS, Environmental Science	Qualified Measurement Specialist (QMS)
<p>As a Project Professional for Antea Group, James Holm has experience conducting Oil and Gas well installation and abandonment, Preliminary Assessments/Phase One Site Assessments, Site Investigations, Remedial Investigations and Remedial Actions. He has been involved with the design, construction and operation of soil and groundwater remediation systems, and stormwater management systems. Additionally, has been involved with curation of permitting applications and submissions as well as writing, editing, and submitting Environmental remediation reports. James is a qualified measurement specialist for use of Remote Methane Leak Detectors, Optical Gas Cameras, and SEMTECH HI-FLOW Methane Quantification & Methane Verification sampling utilizing 40 CFR 60 Subpart OOOOb & ACR compliant sampling practices. James additionally has performed multiple site evaluations and design assistance for oil and gas well redevelopment and abandonment on various sites, including oversight, assistance with plugging structures, estimating, and site owner/project team coordination.</p>			


 <p>Christian Liang Project Professional Antea Group</p>	<p>Role Sr. Field Staff</p>	<p>Education BS, Geology</p>	<p>Registrations Qualified Measurement Specialist (QMS) Geologist-In-Training Certification # [REDACTED]</p>
---	--	---	---


Christian Laing has three years of environmental consulting experience and has assisted in a multitude of projects from multiple service lines, including Health and Safety and Environmental Liability Management. As a Project Professional, Christian performs field work at client sites, completes reports, and helps coordinate field work for other field staff. Christian has completed a variety of environmental services and has experience with contractor oversight in many contexts. Christian's client support spans multiple industries and includes a large amount of work in the oil and gas industry. Christian is a qualified measurement specialist for use of Remote Methane Leak Detectors, Optical Gas Cameras, and SEMTECH HI-FLOW Methane Quantification & Methane Verification sampling utilizing 40 CFR 60 Subpart OOOOb & ACR compliant sampling practices. Christian has additionally performed multiple site evaluations and design assistance for oil and gas well redevelopment and abandonment on various sites, including oversight, assistance with plugging structures, estimating, and site owner/project team coordination.


 <p>Derek Dahly Project Professional Antea Group</p>	<p>Role Field Staff</p>	<p>Education BA, Geology</p>	<p>Registrations Qualified Measurement Specialist (QMS) Geologist-In-Training Certification # [REDACTED]</p>
--	------------------------------------	---	---

Derek Dahly has two and a half years of environmental consulting experience and has assisted in a multitude of projects varying from different service lines, including Health and Safety, Environmental Liability Management, and GIS mapping. As a Staff Professional, Derek performs field work at client sites, completes reports, helps coordinate field work for other field staff, and supports the Digital Solutions team with GIS needs. Derek has completed a variety of environmental services and has experience with contractor oversight in many contexts. Derek's client support spans multiple industries and includes a large amount of work in the oil and gas industry. Derek is a qualified measurement specialist for use of Remote Methane Leak Detectors, Optical Gas Cameras, and SEMTECH HI-FLOW Methane Quantification & Methane Verification sampling utilizing 40 CFR 60 Subpart OOOOb & ACR compliant sampling practices. Derek has also performed drafting and reviewing of well plugging designs for oil and gas wells using well boring lithological records and regional geologic trends, well installation and drilling oversight in multiple states, GIS mapping of well locations and other related site features.

 <p>Madison Allen Staff Professional Antea Group</p>	<p>Role Field Staff</p>	<p>Education BS, Environmental Sciences BA, Biological Sciences</p>	<p>Registrations Qualified Measurement Specialist (QMS)</p>
<p>Madison Allen is a staff professional and is just beginning her career as an environmental professional. She is located in our Charlotte, North Carolina office and supports various sectors within Antea Group. She graduated from North Carolina State University with a dual major, receiving a BS in Environmental Sciences and a BA in Biological Sciences. Madison has performed oversight methane/gas well abandonments including communicating directly with drillers and other contractors, completing daily deliverables for delivery to the regulatory agency. Assessment of fugitive methane emissions using a high flow methane analyzer in an oil and gas setting, in accordance with established state and federal guidance. Madison is a qualified measurement specialist for use of Remote Methane Leak Detectors, Optical Gas Cameras, and SEMTECH HI-FLOW Methane Quantification & Methane Verification sampling utilizing 40 CFR 60 Subpart OOOOb & ACR compliant sampling practices.</p>			


 <p>Derek Cole Staff Professional Antea Group</p>	<p>Role Field Staff</p>	<p>Education BS, Geology</p>	<p>Registrations Qualified Measurement Specialist (QMS)</p>
<p>Derek Cole has three years of environmental consulting experience and has assisted in a multitude of projects from multiple service lines, including Health and Safety and Environmental Liability Management. As a Staff Professional, Derek performs field work at client sites, completes reports, and helps coordinate field work for other field staff. Derek has completed a variety of environmental services and has experience with contractor oversight in many contexts. Derek's client support spans multiple industries and includes a large amount of work in the oil and gas industry. Derek is a qualified measurement specialist for use of Remote Methane Leak Detectors, Optical Gas Cameras, and SEMTECH HI-FLOW Methane Quantification & Methane Verification sampling utilizing 40 CFR 60 Subpart OOOOb & ACR compliant sampling practices.</p>			

 <p>Joey J. DeVivo III Staff Professional Antea Group</p>	<p>Role Field Staff</p>	<p>Education BS, Environmental Science AS, Sciences</p>	<p>Registrations Qualified Measurement Specialist (QMS)</p>
<p>Experienced in contractor oversight, drilling oversight, well abandonment, soil sampling, ground and surface water sampling with Antea Group. Served three years in the U.S. Army as a combat infantryman, deploying twice to Afghanistan, supporting OEF in 2012-2013 and support SOF in 2014-2015 responsible for accountability of vehicle, radio encryption, hazardous material transport (ammunition), and small arms maintenance and training. Assisted with detainment team training. Mechanic from 2015-2022 in various positions from lube technician to B-level mechanic before transitioning to Antea Group. Joey is a qualified measurement specialist for use of Remote Methane Leak Detectors, Optical Gas Cameras, and SEMTECH HI-FLOW Methane Quantification & Methane Verification sampling utilizing 40 CFR 60 Subpart OOOOb & ACR compliant sampling practices. Joey has performed pre and post closure methane quantification sampling, site assessment and health and safety oversight at multiple OOG wells during supporting efforts of NY Well abandonment program as part of the Bipartisan Infrastructure Law.</p>			


 <p>Collin Montgomery Staff Professional Antea Group</p>	<p>Role Field Staff</p>	<p>Education BS, Environmental Science</p>	<p>Registrations Qualified Measurement Specialist (QMS) Geographic Information Systems (qGIS-LTR 2)</p>
<p>Collin Montgomery is a Staff Professional in the Greater New England Office who environmental consulting experience in remediation activities including the collection of soil, groundwater, and vapor samples, data management and data interpretation, and basic report writing. Collin is a qualified measurement specialist for use of Remote Methane Leak Detectors, Optical Gas Cameras, and SEMTECH HI-FLOW Methane Quantification & Methane Verification sampling utilizing 40 CFR 60 Subpart OOOOb & ACR compliant sampling practices. Joey has performed pre and post closure methane quantification sampling, site assessment and health and safety oversight at multiple OOG wells during supporting efforts of NY Well abandonment program as part of the Bipartisan Infrastructure Law.</p>			

 <p>Ashlynn Brestel Staff Professional Antea Group</p>	<p>Role Field Staff</p>	<p>Education BS, Agricultural Business and Soil Corp Science</p>	<p>Registrations Qualified Measurement Specialist (QMS) LDAR Field Competency</p>
--	------------------------------------	---	--

Ashlynn Brestel is a Staff Professional who comes to Antea Group with a Bachelor of Science in Agricultural Business and Soil and Crop Science. She has environmental consulting experience in environmental consulting activities such as groundwater sampling, and experience in Leak Detection and Repair for oil and gas production facilities. She also has consulting experience in agronomy and irrigation water management, including multiple seasons of plant and soil sampling. Ashlynn is a qualified measurement specialist for use of Remote Methane Leak Detectors, Optical Gas Cameras, and SEMTECH HI-FLOW Methane Quantification & Methane Verification sampling utilizing 40 CFR 60 Subpart OOOOb & ACR compliant sampling practices. Ashlynn has performed pre and post closure methane quantification sampling, site assessment and health and safety oversight at multiple OOG wells during supporting efforts of NY Well abandonment program as part of the Bipartisan Infrastructure Law.

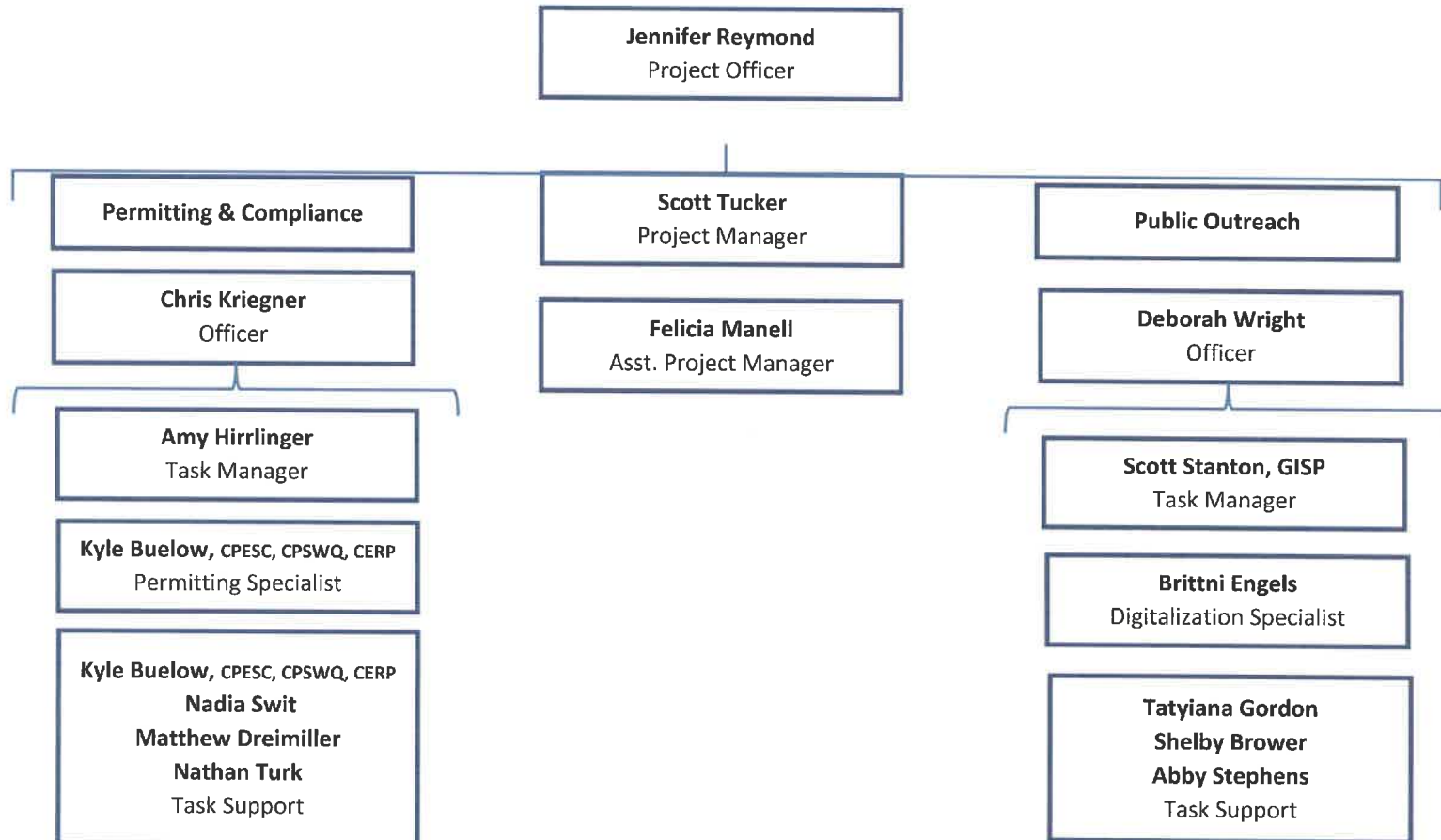
 <p>Madison Thompson Staff Professional Antea Group</p>	<p>Role Field Staff</p>	<p>Education BS, Watershed Science</p>	<p>Registrations Qualified Measurement Specialist (QMS) ETA Visible Emissions Evaluator</p>
--	------------------------------------	---	--

Madison Thompson is a Staff Professional at Antea Group who served as a Sergeant in the ARMY Reserves. She recently has environmental consulting experience as a qualified opacity emissions evaluator, a Leak Detection and Repair (LDAR) technician for Oil and Gas clients, and experience in remediation activities including the collection of groundwater, monitoring well plug and abandonment oversight, Underground Storage Tank (UST) and Above Ground Storage Tank (AST) removal oversight, data management, and technical report writing. Madison is a qualified measurement specialist for use of Remote Methane Leak Detectors, Optical Gas Cameras, and SEMTECH HI-FLOW Methane Quantification & Methane Verification sampling utilizing 40 CFR 60 Subpart OOOOb & ACR compliant sampling practices. Madison has performed pre and post closure methane quantification sampling, site assessment and health and safety oversight at multiple OOG wells during supporting efforts of NY Well abandonment program as part of the Bipartisan Infrastructure Law.

 <p>John Franey Project Manager Antea Group</p>	<p>Role Data Manager</p>	<p>Education MS, Geophysics BS, Geophysics</p>	<p>Registrations Qualified Measurement Specialist (QMS) ETA Visible Emissions Evaluator</p>
<p>John is a Project Manager and lead of the AI & Data Engineering team. John enjoys blending field data with powerful statistical methods and cloud-based workflows to provide new insights. John has a background in machine learning, Python development, data analytics, sedimentology, stratigraphy, and geophysical processing. John has performed Integration of geospatial maps, data analytics, and key insights into unified PowerBI dashboards and currently heads AI and Data Engineering projects for additional data management utilization</p>			



 <p>David Weber, PG Senior Project Manager Antea Group</p>	<p>Role Sr. Data Manager</p>	<p>Education BS, Geology</p>	<p>Registrations State of Wyoming Professional Geologist Drilling Supervisor / Monitoring Technician license for the state of Nebraska</p>
<p>David Weber is a Professional Geologist with extensive work experience over 11 years as lead technical geologist on behalf of a large statewide underground storage tank portfolio in Wyoming, several complex underground storage tank site projects in Colorado and surrounding areas and is the lead Environmental Liability Management contact for the Colorado region across several client industries including state agencies, railroad, oil and gas, and insurance. David's emphasis is in site assessment and characterization, high resolution site characterization technologies, 3D modeling, and remedial selection and scoping. David has successfully managed projects including retail underground storage tank sites, historical railcar releases, and oil and gas production release characterization.</p> <p>Along with his technical geology skillset, David also brings a substantial technology background to help find innovative ways to gather, assess, and present complex data. David led a digital field technology service line, helped develop a statewide drinking water program solution using newer hardware and software solutions, and leads the company wide drone services program to provide aerial data collection for client sites. David's background in technology helps to leverage these services into all facets of the remedial work, bridging our technology group with the technical group for the benefit of not only the client, but also the business.</p>			




Ramboll Organization Chart







SUMMARY OF KEY PERSONNEL

Ramboll Project Team

 Jennifer Reymond Project Officer Ramboll	Years with firm: 15 Other experience: 13	Education: BS, Civil & Environmental Engineering	Registrations: Lead Risk Assessor (USA), NYSDOL Asbestos Project Designer
<p>Jennifer Reymond is a Project Officer with more than 28 years of experience in Ramboll’s Site Solutions practice area, with responsibility for leading project teams involving remediation designs and construction administration services, hazardous materials, site investigations, and feasibility studies on both private and public projects. Ms. Reymond served as the the Contract and Project Officer responsible for a large abandoned gas well decommissioning program administrated by the NYSOGS and the NYSDEC, that addressed over 400 abandoned natural gas wells in New York State. She has managed Term Agreements with multiple agencies within New York State for over 22 years, and has been involved with numerous large-scale programs for State and Federal agencies. Ms. Reymond is a Subject Matter Expert in remediation, hazardous materials, and feasibility studies, and specializes in public sector large program management and execution.</p>			
 Christopher Kriegner Permitting & Compliance Ramboll	Years with firm: 20 Other experience: 0	Education: MA, Biology; BS Biology	Registrations: Project Management Professional
<p>Mr. Kriegner has more than 20 years of regulatory compliance and natural resource consulting experience in the areas of ecological study, biological evaluations, habitat characterization, coastal ecology, land use planning, environmental permitting, and impact assessment. A certified ecologist, he is an expert in wetlands, federal and state regulations, compliance, natural and nature-based solutions, restoration, sensitive species, and coastal resiliency. Mr. Kriegner’s work includes leveraging the latest science, agency guidance, and best practices in support of project planning, design and construction.</p> <p>He has regulatory permitting experience in more than a dozen states and has managed many projects requiring extensive right-to-build approvals, including federal state and local permits for work in undeveloped areas, capital improvement and linear infrastructure project, remediation (ranging from site investigation to closure), restoration, dredging, stream and shoreline stabilization and similar activities. As part of these projects, Chris routinely engages with project stakeholders on charged topics to facilitate candid but consensus-generating conversations to achieve collective goals. His experience includes addressing compliance with state wetland regulations as well as Clean Water Act Section 404 and 401, Section 10 of the Rivers and Harbors Act, Endangered Species Act, Magnuson-Stevens Act, NEPA, CERCLA, Coastal Zone Management Act, Floodplains, Chesapeake Bay Preservation Act, Forest Conservation, Migratory Bird Treaty Act, NPDES, and other regulations. Mr. Kriegner is recognized for his leadership of efficient and effective interdisciplinary teams, high quality work, and execution of large, complex, and high-profile projects.</p>			

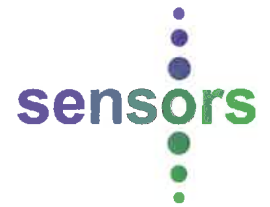
 <p>Deborah Wright Public Outreach Ramboll</p>	Years with firm: 40 Other experience: 2	Education: Education: BS, Geology	Registrations: Professional Geologist, NY
	Deborah Wright, PG has extensive experience designing, implementing and managing hydrogeologic investigations, Remedial investigations and feasibility studies (RI/FS), Interim Remedial Measures (IRMs) and remedial design programs throughout New York as well as other states. She is currently managing Ramboll's Standby Engineering Contract with the NYSDEC which is a multi-year, multi site program. Ms. Wright has managed all aspects of investigation and remediation projects in connection with MGP, hazardous waste disposal, petroleum losses and landfill closures. Most recently she provided this expertise to the Rochester REDI-Grant Projects, Rochester, New York.		
 <p>Scott Tucker Project Manager Ramboll</p>	Years with firm: 21 Other experience: 2	Education: Education: BS, Geology	Registrations: Professional Geologist, NY
	Mr. Tucker is a Project Manager with over 23 years of environmental experience including management of programs across multiple geographies including Orphan Gas Well, Inactive Landfill Investigations, as well as individual site focused Remedial Investigations and Feasibility Studies (RI/FS), Corrective Action, and Interim Remedial Measures (IRMs). His project management experience includes implementation of regulatory agency programs across multiple regulatory regions of New York, such as the New York State Orphan Oil & gas Well Plugging Program and the Inactive Landfill Initiative. The orphan gas well program was completed over a two year period covering 12 counties, and his co-manager responsibilities included coordination of well inspections, wetland delineations, permitting, contractor work order development, contractor oversight and reporting. The inactive landfill program was completed over a three year period covering 22 counties and included completion of site inspections, associated reporting, follow up investigations, investigation reporting and follow up private and public water system sampling. His responsibilities included arranging access to landfills, arranging access for water system sampling, writing reports, and coordinating with regulatory agencies.		
 <p>Felicia Manell Asst. Project Manager Ramboll</p>	Years with firm: 6 Other experience: 13	Education: AAS, Business Administration	Registrations: Cert. Asbestos Inspector, OSHA 8,10,30 & 40 Certifications
	Felicia Manell is a Construction Manager in the Site Solutions practice area with more than 15 years of professional experience. Her experience includes program management responsibilities for OGS, Division of Military and Naval Affairs (DMNA), Office of Child and Family Services (OCFS) and Department of Corrections (DOCCS). Ms. Manell's extensive project and Program experience includes, project management, scope development, accelerated project delivery, site investigation, design conception, construction administration, and management of various design build projects. Mrs. Manell is recognized for her ability to drive results, multitask, organize, and manage programs, which was on display as a co-manager during the the award winning New York State Orphan Oil & Gas Plugging Program.		

 <p>Amy Hirrlinger Environmental/ Wetlands Ramboll</p>	<p>Years with firm: 7 Other experience: 3</p>	<p>Education: MS, Environmental Sciences and Policy; BS Biology</p>	<p>Registrations: Professional Wetland Delineator, VA; Forest Conservation Qualified Professional, MD</p>
<p>As a Managing Consultant in the Biodiversity and Ecosystems practice area, Amy supports an array of environmental projects relating to natural resource evaluations, due diligence, permitting, and restoration. Amy performs wetland delineations and reporting, environmental permitting for large-scale public utility projects and private clients, forest conservation planning, wetland and waterway impact assessment, ecological health assessment, due diligence natural resource and sensitive species evaluations, biodiversity uplift assessment, wildlife management planning, shoreline restoration design, environmental sampling and testing, and expert support for exposure assessment and Superfund cost allocation.</p>			
 <p>Kyle Buelow, CPESC, CPSWQ, CERP Environmental/ Wetlands Ramboll</p>	<p>Years with firm: 32 Other experience: 0</p>	<p>Education: MPS, Environmental Resource Engineering; BS Natural Resources</p>	<p>Registrations: Cert. Ecological Restoration Practitioner; Cert. Prof in Erosion & Sediment Control & Stormwater Quality; Envision Sustainability Prof Cred.</p>
<p>Kyle Buelow is an experienced ecologist who leads efforts to evaluate natural resources; coordinate with environmental regulators; design, construct, and monitor wetland and stream mitigation and restoration projects; and manage stormwater and other water resources. He provides solutions to difficult technical challenges through innovative designs that are practical, feasible and responsive to clients. His work is integral to the successful completion of federal, municipal, commercial and industrial projects while maintaining and enhancing the ecology of the site and surrounding areas. His leadership has been critical to the success of projects completed under Term Agreements with OGS & DASNY for over 20 years including large-scale programs like the Lake Ontario Resiliency & Economic Development Initiative and the Shoreline Studies in the St. Lawrence River Area of Concern at Massena Akwesasne, Massena, NY.</p>			

 <p>Scott Stanton GIS Manager Ramboll</p>	<p>Years with firm: 12 Other experience: 2.5</p>	<p>Education: BS, Geography</p>	<p>Registrations: GISP</p>
 <p>Brittnei Engels Scientist Ramboll</p>	<p>Years with firm: 9 Other experience: 0</p>	<p>Education: BA, Environmental Studies; MS, Environmental Sustainability</p>	<p>Registrations: FAA Part 107 Certificate</p>
<p>Scott Stanton, U.S. Digital Manager (East) at Ramboll, brings nearly 15 years of GIS expertise, specializing in project management, digitalization, and automation. He is adept at managing and leading complex GIS projects, ensuring innovative, client-focused solutions. Mr. Stanton's skills in managing databases, the Esri suite (including desktop, field and online), stakeholder engagement, and automation have ensured projects needing a digital focus are executed efficiently with a streamlined workflow. His notable projects include project management and stakeholder engagement for NYSDEC's Inland Geographic Response Plans, project management and digital design and automation for Corvias' compliance management, developing automated field processes for the US Army Corps, coordinating NYSDEC's landfill initiative, and leading GIS efforts for NYSOGS.</p> <p>Brittnei Engels is an environmental sustainability professional with over nine years of experience specializing in environmental compliance, digitalization, and innovation. She focuses on implementing remote sensing applications to optimize environmental problem-solving and supports business development, sales, and project operations within Ramboll's innovation team, Galago. Brittnei leads Ramboll's small Unmanned Aircraft Systems (sUAS) program in the United States and is a certified Federal Aviation Administration (FAA) Remote Pilot. She integrates advanced technologies like AI-powered drones into client solutions, addressing environmental challenges and enhancing compliance strategies.</p>			

Appendix C – Field Equipment Specification

SEMTECH HI-FLOW 2



Accurate Quantification of Fugitive Methane

SEMTECH HI-FLOW 2 is a robust, portable, battery powered, high volume sampler for the most accurate quantification of fugitive methane emissions. Our combination of the Analyzer and the Sampler (with a variety of sampling adapters) allows the entire fugitive methane emission to be captured, diluted, and quantified accurately.

HI-FLOW 2 utilizes state-of-the-art Tunable Diode Laser Absorption Spectroscopy (TDLAS) and a high-output fan which together facilitates 3-5x lower detection limit (0.0005 CFM) and a 3x increase in maximum leak rate (25 CFM) when compared to the historical Bacharach device. SEMTECH's TDLAS tuned specifically to methane (unlike non-dispersive spectroscopy techniques) eliminates the known problems of interferences from other gases present in up, down and mid-stream applications. Moreover, our HI-FLOW 2 addresses potential poisoning and saturation of found in other solutions that use non-optical-based low-cost sensors.

Analyzer incorporates the advanced gas sensing technology, control electronics, and battery pack in a portable control module which can be carried, placed on the floor, or mounted to a backpack.

Classified to
Hazardous Location
Class 1, Division 2,
Group D, T4



Complies with
EPA 40 CFR Part 60 –
NPS 0000b

Handheld Sampler includes a high-output sampling fan and total flow rate monitor in a ergonomic handheld device.

GPS and Geofences

Web-based software

Calibration Certificate

Sensors, Inc.
6812 State Road
Saline, Michigan 48176
PH: +1 734-429-2100
FX: +1 734-429-4080
Email: sales@sensors-inc.com

Sensors Europe GmbH
Feldheider Str. 60
40699 Erkrath, Germany
PH: +49 (0) 2104-14188-0
FX: +49 (0) 2104-14188-14
Email: sales@sensors-europe.eu

Website: sensors-inc.com



SEMTECH HI-FLOW 2

Benefits

- Methane specific advanced gas sensor technology (10 ppm to 100% with integrated diluter) (and 0 to 8% with no dilution)
- Battery – LiFEPO4 (spare battery included) rated to 12.8V with 96 Wh capacity and a run time of 4 to 6 hours per battery at 50% duty cycle (*Charge time: ca 4 hours*)
- Built-in Wi-Fi communication utilizing an SBC Linux framework with web-based GUI for interactive full control on user preferred display (tablet, mobile, laptop, etc...)
- GPS for location data recording during testing
- Built-in scripts for regulatory compliance, sampling protocols, and periodic pre and post checks and audits
- SQL data management architecture with advanced pre-loaded queries for automated report generation (supports measurement campaigns, geofencing, and compliance management)
- API ready (for IoT applications)
- Integrated flow and sampling system, configurable up to ~30CFM
- Ergonomic handheld with balanced weight distribution
- Flexibility with industry accepted sampling adapters / nozzles / hoses
- Umbilical from sampler to analyzer (conveys sample, power, fan control, and serial interface)
- 2 controls on the sampler handle for sampling and fan speed control
- 4 tri-colored LED lights for handsfree feedback of system operation with configurable fan speed
- PWM controlled fan with manual lock with on/off control



Accessories

- Oval nozzle and extension tube
- Tools
- Charger 14.46 V 2A
- Backpack
- Umbilical harness
- First Use/Safety Guide
- Sampling Collection Bag (*optional*)
- 6' hose, cam and groove connectors (*optional*)
- Pelican Case (*optional*)

SPECIFICATIONS

Total Flow Rate*	5-30 CFM (upper limit dependent on accessories)
Measurable Leak Rate*	0.0005 to 25 CFM (0.015 to 700 lpm) (LDL 0.6 g/hr)
Leak Rate Accuracy	<5% of full scale or 15% of point, whichever is lower (for volume or mass rate)
Flow Rate Accuracy	< ±2.5% (with density correction)
TDL Accuracy	< ±2.5% p.t.
Background Correction	Recommended pre- and post- correction with a precision of 2 ppm
Hazardous Classification	Class 1, Division 2, Group D, T4
Complies With	EPA 40 CFR Part 60, NSPS OOOOb ACR - carbon registry methodology
W x D x H	Analyzer: 12 x 12 x 5.7 in. (30 x 30 x 14.5 cm) / Sampler: 26.3 x 7.5 x 10.5 in. (66.8 x 19 x 12.7 cm)
Weight	Analyzer: 17.5 lbs. (7.9 Kg) / Sampler: 10.8 lbs (4.9 Kg)
Connection	Wi-Fi
Data Output	Customizable csv files / compressed zip files with configuration data.
Memory	4000 2-hour tests; >10 Gigabytes database (recommended annual cleanup)
Batteries	LiFEPO4 (with spare battery included) rated 12.8V, with capacity of 96 Wh Run Time: 4 to 6 hours (per battery) at 50% duty cycle Charging Time: ca 4 hours

*Inlet restrictions on the handheld sampling unit will reduce the maximum achievable flow.



RMLD-CS™

Remote Methane Leak Detector Complete Solution

Recognize the potential for increased safety, significant productivity gains and time-savings with the new RMLD-CS. Remote detection allows utility services personnel and first responders to quickly scan an area for suspected gas leaks at a safe distance.

The HEATH Remote Methane Leak Detector - Complete Solution (RMLD-CS) is a highly advanced technology, capable of detecting methane leaks from a remote distance utilizing the same TDLAS (tunable diode laser absorption spectroscopy) technology as the current RMLD. This instrument eliminates the separate receiver and transceiver, combining them into one hand-held instrument that is lightweight, portable and field rugged. The RMLD-CS makes it possible to detect leaks without having to travel the entire length of the pipe line, thus creating safer surveys in areas that may be difficult to reach such as busy roadways, yards with dogs, fenced off areas and other hard to access places. It operates under a variety of field conditions including a wide temperature range, light rain and fog. Its rugged design will stand up to normal field use and operating conditions and its sensitivity or range is not affected by reasonable amounts of dust on the instrument's window.

The RMLD-CS includes many new features including:

- ➔ Rechargeable and replaceable battery
- ➔ Dual battery charger
- ➔ Mobile App support
- ➔ Ergonomic housing
- ➔ Lightweight
- ➔ Graphical user interface
- ➔ Internal data logging
- ➔ WiFi
- ➔ GPS
- ➔ Bluetooth BLE
- ➔ Color camera
- ➔ Color display




**HEATH
CONSULTANTS**
Your Safety...Our Commitment

9030 Monroe Road, Houston, TX 77061
www.heathus.com PH:713.844.1300

Heath Consultants Incorporated operates under a continual product improvement program and reserves the right to make improvements and/or changes without prior notification.

06/20

SPECIFICATIONS

Detection Method	Tunable Diode Laser Absorption Spectroscopy (TDLAS)
Measurement Range	1 to 50,000 ppm-m
Sensitivity	5 ppm-m at distances from 0 to 50 ft (15m)
Detection Distance	100ft (30m) nominal. Actual distance may vary due to background type and conditions.
Beam Size	Conical in shape with a 22" diameter at 100 ft (55 cm at 30 m)
Detection Alarms Modes	Digital Methane Detection(DMD): Audible tone relative to concentration when detection threshold exceeded Adjustable Detection Alarm Level 1 to 999 Real Time(RT): Continuous audio chirp relative to concentration.
System Fault Warning	Unique audible pitch and indication on the display.
Self Test & Calibration	Built-in Self Test and Calibration function verifies operation and adjusts laser wavelength for maximum sensitivity. Calibration results are stored on the device and can be downloaded by the user. Test gas cell integrated within carrying case.
Compliance	 EMC (EN61000-6-2, EN6100-6-4)
Intrinsic Safety	Pending
Laser Eye Safety	IR Laser: Class I, Spotter : Class 2 Do not stare into beam or view directly with optical instrument.
Communications	Bluetooth 4.2 BLE, WiFi, USB Dual Mode
Display	3.5" LCD
Operating Temperature	0° to +122° F (-17° to 50° C)
Humidity	5 to 95% RH, non-condensing
Enclosure (Inst.)	IP54 (Water Splash and Dust Resistant)
Instrument Weight	≈ 3 lbs.
Battery	Removable, rechargeable, Li-ion battery pack, 12-15 VDC
Battery Run Time	8 hours at 32° F
Battery Charging	External, in-line, 110-240 Vac, 50/60 hertz, international
Charge Time, Maximum	2 - 3 hours
Charging Indicator	Integrated into dual battery charger

ORDERING DETAILS



RMLD-CS - HPN 105301

Includes carry strap, case, battery charger, power supply, USB cable, one battery pack, gas calibration test cell.



Battery Pack - HPN 105384
Li-ion replacement battery.



Battery Charger Base - HPN 105358
Battery Charger Cable - HPN 105359
Charges two batteries at a time.

Heath Consultants Incorporated operates under a continual product improvement program and reserves the right to make improvements and/or changes without prior notification.



Your Safety...Our Commitment

9030 Monroe Road, Houston, TX 77061
www.heathus.com PH:713.844.1300

06/20



FLIR G-SERIES™

Gx320, G620, Gx620 Optical Gas Imaging (OGI)
Cameras for Hydrocarbons



The FLIR Gx320, G620, and Gx620 OGI cameras are used to detect hydrocarbons, methane (CH₄), and other Volatile Organic Compound (VOC) emissions from multiple stages of the oil and gas supply chain, as well as other industrial markets. Designed with your safety and efficiency in mind, these cooled, high-resolution cameras can detect environmentally harmful gases from safe distances. Reduce inspection time by scanning large areas without interfering or shutting down large-scale operations. Featuring innovative gas quantification analytics inside the camera and a rotating, color LCD touch screen, these FLIR hydrocarbon OGI cameras are ideal for detecting gas emissions in complex systems including refineries, petrochemical facilities, natural gas well pads, compression stations, and power generation plants. Combined with FLIR Ignite™ software, the FLIR Gx320, G620, and Gx620 cameras allow you to easily upload images and videos to the cloud where you can edit, organize, store, and share data.



www.flir.com/GSeries

SUPERIOR GAS VISUALIZATION AND QUANTIFICATION

Detect gas leaks accurately in real-time

- Quantify gas leaks in-camera, eliminating the need for a secondary device
- Auto-adjust the level and span of your image with 1-Touch Level/Span
- Certified and classified for use in hazardous environments
- Meets many regulatory compliance standards, including U.S. EPA OOOOa

IMPROVED SOFTWARE INTEGRATION

Record and report findings efficiently with the FLIR ecosystem

- Effortlessly edit and store images in the cloud, and wirelessly transfer files using the included FLIR Ignite cloud service
- Easily incorporate with third-party software solutions
- Built in Wi-Fi and Bluetooth® allow you to connect to smartphones or tablets
- Conveniently navigate large areas with FLIR Inspection Route and GPS log on board

BETTER ERGONOMICS FOR OPERATION

Comfortably interact with the camera

- Expand inspection capabilities with quick and easy exchangeable lens options
- View targets from any direction with rotating 10.16 cm (4 in) LCD touchscreen
- Efficiently operate with improved touchscreen Graphical User Interface (GUI)
- Advanced features to streamline the inspection process, including Multi-REC (recording mode)

For more information contact: Sales@TeledyneFLIR.com
or to find your local support number, visit: flir.com/contactsupport

www.teledyneflir.com

SPECIFICATIONS

	Gx320	Gx620	G620
IR Resolution	320 × 240 pixels	640 × 480 pixels	
Focus	Manual Focus		Autofocus, Manual focus
Detector Pitch	30 µm	15 µm	
Thermal Sensitivity/NETD	<10 mK at 30°C (86°F)	20 mK at 30°C (86°F)	
Gas Sensitivity	CH ₄ : <9.6 ppm x m Hydrocarbons (multiple): <4 ppm x m (ΔT = 10°C, Distance = 1 m)	CH ₄ : <29 ppm x m Hydrocarbons (multiple): <4 ppm x m (ΔT = 10°C, Distance = 1 m)	
Hazardous Location Compliance	ATEX/IECEX, Ex ic nC op is IIC T4 Gc II 3 G ANSI/ISA-12.12.01-2013, Class I Division 2 CSA 22.2 No. 213, Class I Division 2		None

Detector and Optical Data

Detector Type	Focal plane array (FPA), cooled InSb
Spectral Range	3.2 µm to 3.4 µm
Sensor Cooling	Stirling Microcooler (FLIR MC-3)
Digital Image Enhancement	High sensitivity mode (HSM), noise reduction filter
Available Lenses	24° × 18° (23 mm); 14.5° × 10.8° (38 mm)
F-Number	1.59

Image Presentation

Display	4", 640 × 480 pixel rotatable, touchscreen LCD
Viewfinder	Built-in, tiltable OLED, 800 × 480 pixels
Image Presentation Modes	IR image, visual image, high sensitivity mode (HSM)
Color Palettes	Arctic, White hot, Black hot, Iron, Lava, Rainbow, Rainbow HC
Zoom	1–8× continuous, digital zoom
Laser Pointer	Class 2

Measurement & Analysis

Measurement Temperature Range	-20°C to 350°C (-4°F to 662°F)
Accuracy	±1°C (±1.8°F) for temperature range (0°C, to 100°C, 32°F to 212°F) or ±2% of reading for temperature range (>100°C, >212°F)
Image Analysis	10 spots, 5 boxes with max/min/average, 1 line (horizontal or vertical), measurement corrections

Annotations

Voice	60 seconds with Bluetooth on still images and video
Text	Text from predefined list or soft keyboard on touchscreen

Communication & Data Storage

FLIR Inspection Route	Enabled in the camera
MultiREC Recording	Record multiple files automatically in customizable order
GPS	Location data automatically added to every still image; first frame in video from built-in GPS; data logging feature
Compass	Yes
Cloud Services (via Wi-Fi)	FLIR Ignite for direct, secure image uploading, organizing, storage, and sharing (required firmware available)
Storage Media	Removable SD card
Image File Formats	Standard JPEG, measurement data included. Infrared-only mode.
Communication Interfaces	USB 2.0, Bluetooth via headset, Wi-Fi, HDMI
Video Out	HDMI; DVI

Video Recording and Streaming

Radiometric IR Video Recording	RTRR (.csq)
Non-Radiometric IR or Visual Video	H.264 to memory card
Radiometric IR Video Streaming	Over UVC
Non-Radiometric IR Video Streaming	H.264 (AVC) or MPEG4 over RTSP (Wi-Fi); MJPEG over UVC and RTSP (Wi-Fi)

Environmental & Certifications

Operating Temperature Range	-20°C to 50°C (-4°F to 122°F)
Storage Temperature Range	-30°C to 60°C (-22°F to 140°F)
Encapsulation	IP54 (IEC 60529)
Shock	25 g (IEC 60068-2-27)
Vibration	2 g (IEC 60068-2-6)

Additional Information

Battery Type	Rechargeable Li-ion battery; 7.4 V, charged in camera or separate 2-bay charger
Battery Operating Time	>2.5 hours at 25°C (68°F) and typical use
Battery Charging Time	2.5 hours to 95% capacity, charging status indicated by LEDs
Camera Size	251.6 mm × 164.5 mm × 170.9 mm (9.9 in × 6.48 in × 6.73 in)
Camera Weight	3 kg (6.18 lb)
Mounting Interfaces	UNC ¼"-20

Box Contents

Packaging	Infrared camera with lens, battery; 2 pcs., battery charger, power supply including multi-plugs, hand strap, neck strap, lens cap, lens cap strap, memory card, HDMI-HDMI cable, USB cable, screwdriver TX20, printed documentation, and hard transport case
-----------	--

Specifications are subject to change without notice.
For the most up-to-date specs, go to www.teledyneflir.com

For more information contact: Sales@TeledyneFLIR.com
or to find your local support number, visit: flir.com/contactsupport

This product is subject to United States export regulations and may require US authorization prior to export, reexport, or transfer to non-US persons or parties. Diversion contrary to US law is prohibited.

For assistance with confirming the Jurisdiction & Classification of Teledyne FLIR, LLC products, please contact exportquestions@flir.com.

©2022 Teledyne FLIR, LLC. All rights reserved.

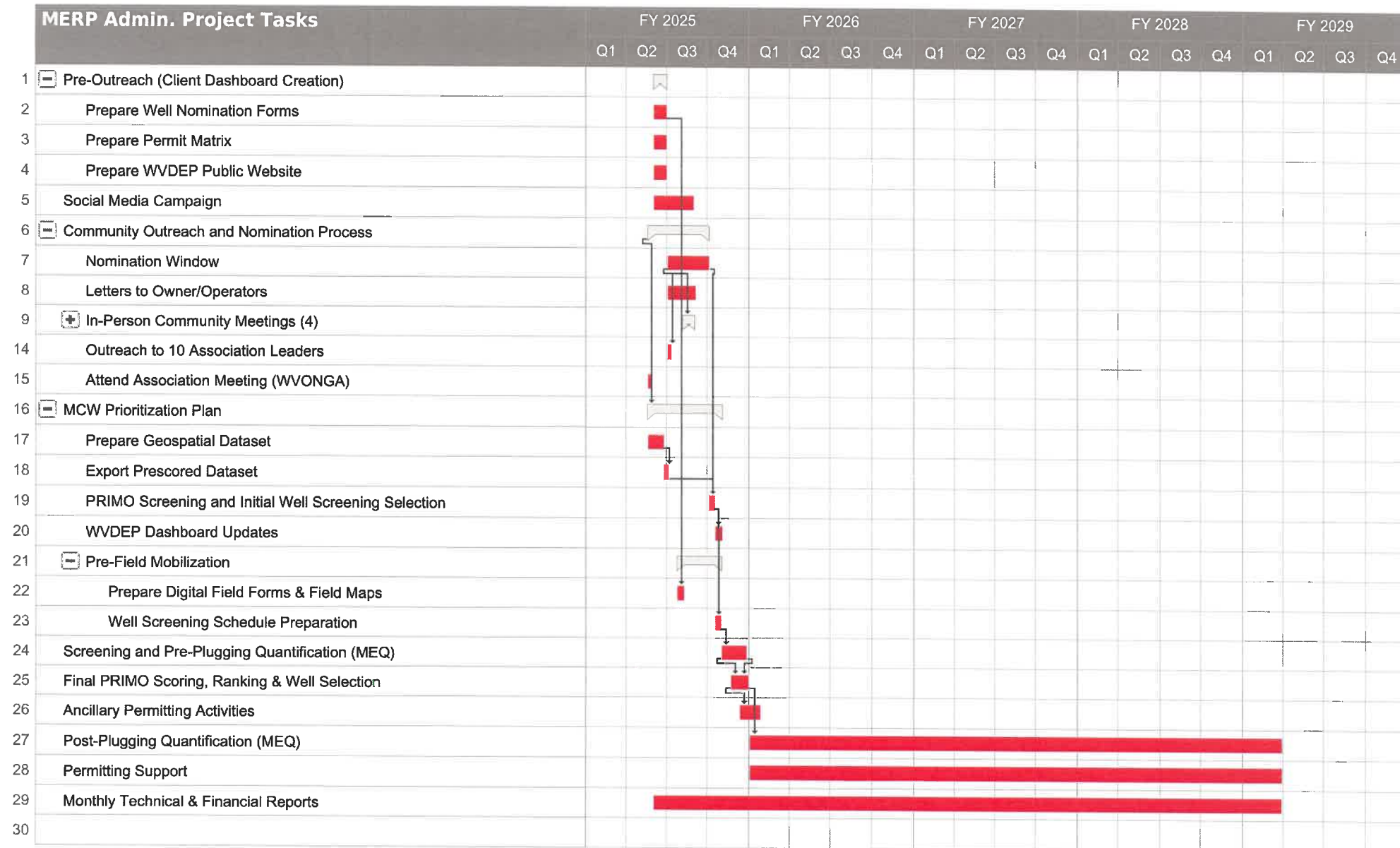
Revised 03/01/23
GSeries_Datasheet-LTR 21-0000



www.teledyneflir.com

Appendix D – Project Schedule

MERP Program Administrator RFP



Appendix E – RFP Certification and Signature Pages

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CRFP DEP25*04

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

(Check the box next to each addendum received)

<input checked="" type="checkbox"/> Addendum No. 1	<input type="checkbox"/> Addendum No. 6
<input type="checkbox"/> Addendum No. 2	<input type="checkbox"/> Addendum No. 7
<input type="checkbox"/> Addendum No. 3	<input type="checkbox"/> Addendum No. 8
<input type="checkbox"/> Addendum No. 4	<input type="checkbox"/> Addendum No. 9
<input type="checkbox"/> Addendum No. 5	<input type="checkbox"/> Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

_____ Antea USA Inc _____
Company
_____  _____
Authorized Signature
_____ 01/05/25 _____
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

Revised 6/8/2012



Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Request for Proposals
Service - Prof

Proc Folder: 1542680			Reason for Modification: Addendum #1 issued to publish agency responses to vendor submitted questions and extend the bid open..... See Page 2 for complete info
Doc Description: DEP OOG - MERP Administration			
Proc Type: Central Master Agreement			
Date Issued	Solicitation Closes	Solicitation No	Version
2024-12-09	2025-01-07 13:30	CRFP 0313 DEP2500000004	2

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code:

Vendor Name : Antea USA Inc.

Address :119

Street :14th St NW Suite 220

City :New Brighton

State :MN **Country :** United States **Zip :** 55112

Principal Contact : Troy Bernal

Vendor Contact Phone:2259074606 **Extension:**

FOR INFORMATION CONTACT THE BUYER
Joseph E Hager III
(304) 558-2306
joseph.e.hageriii@wv.gov

Vendor Signature X		FEIN# 411561791	DATE 01/05/25
---------------------------	--	------------------------	----------------------

All offers subject to all terms and conditions contained in this solicitation

Reason for Modification:

Addendum #1 issued to publish agency responses to vendor submitted questions and extend the bid opening until 1/7/2025 @ 1:30 PM ET.

ADDITIONAL INFORMATION

The West Virginia Department of Administration, Purchasing Division is issuing this solicitation as a request for proposal ("RFP"), as authorized by W. Va. Code 5A-3-10b, for the West Virginia Department of Environmental Protection to provide administrative services for the Agency's Methane Emission Reduction Program (MERP) grant for the plugging of certain Marginal Conventional Wells (MCWs) per the attached specifications and terms and conditions.

***Online responses have been prohibited for this solicitation, if you have questions contact the Buyer - Josh Hager - Joseph.E.HagerIII@wv.gov

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION REAP OFFICE 601 57TH ST SE CHARLESTON WV 25304 US	STATE OF WEST VIRGINIA VARIOUS LOCATIONS AS INDICATED BY ORDER No City WV 99999 US

Line	Comm Ln Desc	Qty	Unit of Measure	Unit Price	Total Price
1	Well Nomination, Prioritization	1000.00000	HOURL		

Comm Code	Manufacturer	Specification	Model #
71141102			

Extended Description:
Requirements listed in Sections 4.2.1.1 and 4.2.1.3 of the RFP.

Paid hourly.

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION REAP OFFICE 601 57TH ST SE CHARLESTON WV 25304 US	STATE OF WEST VIRGINIA VARIOUS LOCATIONS AS INDICATED BY ORDER No City WV 99999 US

Line	Comm Ln Desc	Qty	Unit of Measure	Unit Price	Total Price
2	Methane Emissions Quantification (MEQ) Testing	800.00000	EA		

Comm Code	Manufacturer	Specification	Model #
77121506			

Extended Description:
Requirements listed in section 4.2.1.2 of the RFP.

Paid per-well.

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION REAP OFFICE 601 57TH ST SE CHARLESTON WV 25304 US	STATE OF WEST VIRGINIA VARIOUS LOCATIONS AS INDICATED BY ORDER No City WV 99999 US

Line	Comm Ln Desc	Qty	Unit of Measure	Unit Price	Total Price
3	Permitting	400.00000	EA		

Comm Code	Manufacturer	Specification	Model #
71141102			

Extended Description:
 Requirements listed in section 4.2.1.4 of the RFP.

 Paid per-well.

SCHEDULE OF EVENTS		
Line	Event	Event Date

	Document Phase	Document Description	Page 4
DEP2500000004	Final	DEP OOG - MERP Administration	

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

Appendix F – Project References

Project References

NYDEC/NYSOGS Orphan Oil & Gas Well Plugging Program	
NYSDEC	<p>Catherine Dickert Director Mineral Resources +1 (518) 402-8076 Catherine.Dickert@dec.ny.gov</p>
NYSOGS	<p>Bridget O'Hanlon, P.E. Deputy Commissioner (518) 474 - 2006 bridget.ohanlon@ogs.ny.gov</p>
	<p>Kurt Arnold Business Unit Leader (518) 473-3820 kurt.arnold@ogs.ny.gov</p>