MINNESOTA DEPARTMENT OF AGRICULTURE

Minnesota Pollution Control Agency

State of Minnesota

Pollution Control Agency & Department of Agriculture

Remediation Master Contract Proposal

Category C

Closed Landfill Program Environmental Services

submitted by:

Bay West

Customer-Focused Environmental & Industrial Solutions

April 11, 2018

HQ: 5 Empire Drive
St. Paul, MN 55103
24-Hr: (651) 291-0456
Toll Free: 1-800-279-0456
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Cover Letter

Bay West
Customer-Focused Environmental & Industrial Solutions

Section 1: Cover Letter

April 11, 2018

Ms. Mary Heininger
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

RE: Minnesota Pollution Control Agency and Minnesota Department of Agriculture Remediation Master Contract (Category C: Closed Landfill Program Environmental Services)

Dear Ms. Heininger:

Bay West LLC (Bay West) is pleased to respond to the State of Minnesota's Request for Proposal (RFP) for environmental investigations and other response actions at sites throughout Minnesota. It has been our privilege to be an incumbent on the current contract, and we look forward to the opportunity to continue to be of service to the State of Minnesota, the Minnesota Pollution Control Agency (MPCA), and the Minnesota Department of Agriculture (MDA). Our partnership with the State of Minnesota began more than 30 years ago, and we are dedicated to providing its agencies with outstanding, cost-competitive service. We are providing the following information in accordance with the RFP:

Statement on the Category of Service Bay West is Submitting this Response for:

- Category A – Petroleum, Superfund, MDA, Closed Landfill Program Environmental Services
- Category B – Petroleum Only Environmental Services
- Category C – Closed Landfill Program Environmental Services

Statement of Acceptance of the Classification Levels and Rates:

Bay West has thoroughly reviewed the contract conditions and accepts them, including the staffing classification levels and rates, as presented in the RFP. We understand that these terms and conditions will become part of an awarded Contract.

Statement of Acceptance of the Equipment and Supplies List:

Bay West has thoroughly reviewed the equipment and supplies list and accepts the pricing as presented in the RFP. We understand that this list will become part of an awarded Contract.

Bay West's Contact Information, Mailing/Facility Address, Telephone Numbers, and Website:

Bay West LLC, 5 Empire Drive, St. Paul, Minnesota 55103 (Mailing and Facility Address)
24-Hour Phone: 651-291-0456 • 24-Hour Toll Free: 800-279-0456
Website: www.baywest.com • Email: info@baywest.com

Name, Title, Address, Telephone Number, and Email Address of Person Designated to Answer Questions About This Proposal:

Matt Schemmel, Professional Geologist (PG), Point of Contact (POC)/Project Manager
5 Empire Drive, St. Paul, MN 55103
Direct Dial: 651-291-3410
Toll Free: 800-279-0456 • Cell: 651-331-6928
Email: matts@baywest.com

Brief Description of the Capabilities, History, and Structure of the Organization:

Capabilities: Bay West is a leading full-service provider of environmental consulting, engineering, and remediation services, ranging from investigation to corrective action design to response action implementation. We have performed more than 18,750 environmental projects, most of them under State of Minnesota oversight and regulations. We have experience with

environmental investigations and other response actions at sites throughout Minnesota providing environmental services, including risk assessments, sampling, investigations, feasibility studies, removal and response actions, remedial design, response action oversight, and long-term operation and maintenance activities.

Of Bay West's 150-member full-time staff, 96 are available to provide services under this contract; 50 of those are out of our local office in St. Paul, 14 from our Fridley office, and 9 from our Duluth office. All technical staff are 40-hour Occupational Safety and Health Administration (OSHA)-trained to perform work at hazardous waste sites, and experienced in personal protective equipment (PPE) Levels A, B, C, and D. Roles include project managers, engineers, scientists, geologists, on-site inspectors, quality assurance (QA)/QC officers, risk assessors, groundwater modelers, and field technicians.

History: Bay West was founded in Duluth in 1974. During our 44 years as a Minnesota-based business, we have been, and will continue to be, dedicated to providing the best possible environmental services available to the State of Minnesota, the MPCA, and the MDA; this is demonstrated by our 30-plus-year relationship with the State on a wide variety of contracts and projects, including the current Superfund Petroleum and Agriculture Professional Environmental Multi Site Contract, and Statewide Emergency Response Contract. This long relationship translates into no learning curve for Bay West on MPCA/MDA projects.

Structure: Bay West is organized into three units that report directly to the Chief Executive Officer (CEO): Administration, Operations, and Facilities (**Exhibit 1-1**).

Exhibit 1-1

Bay West is headquartered at 5 Empire Drive in St. Paul, Minnesota, and has technical staff and project managers in satellite offices in Fridley and Duluth, MN. Other staff work in locations around the country who will be supporting this contract. Bay West's corporate headquarters and operations in St. Paul are within 5 minutes of the MPCA's and MDA's offices. Bay West's St. Paul office houses the technical, operational, and administrative resources necessary for the performance of this contract. These resources will be delegated to specific work orders. The use of specifically assigned resources assures that personnel will be available to perform this contract locally on a day-to-day basis.

Ed Bacig, Vice President (VP) of Operations, will serve as Principal-in-Charge. He directs company-wide operational resources and will ensure health and safety/ quality control (QC) requirements are met and that all necessary company resources are available to support the program. Matt Schemmel will be the primary point of contact for this contract. He has the authority to commit company resources, thus assuring the State of safe, reliable, and consistently high-quality performance on assigned projects. Mr. Schemmel has over 15 years' experience working under this contract and his staff of project managers, technical personnel, and field staff are available to discuss, inform, and interact with contract users either by telephone, e-mail, or in person.

Additionally, staff at our St. Paul location handle all billing and invoicing for the company and have worked extensively with the State of Minnesota and MPCA/MDA invoicing and billing procedures. Ms. Brigitte Paige, Accounting Manager, and her staff are available to respond to the MPCA/MDA for any questions or information that may be requested concerning billing or invoicing.

Sincerely,

Ed Bacig, PG
Vice President, Operations
ph: 651-291-3414
edb@baywest.com

Matt Schemmel, PG
Environmental Services Group Manager
ph: 651-291-3410
matts@baywest.com

Section 2
Qualifications and Capabilities

Section 2: Qualifications and Capabilities

2.1 Summary of Overall Company Capabilities

Bay West has provided environmental consulting and remediation services to government and industry in Minnesota and nationwide for 44 years. The experience, knowledge, and skills gained during this time will allow Bay West to excel in the activities required to support this contract. As a full-service environmental services provider, Bay West has completed more than 18,750 environmental projects ranging from investigation and corrective action/remedial design to removal action/remediation. Bay West has performed projects addressing impacts to all environmental media (soil, water, air, sediments, and vapor). Most of these projects have been located in Minnesota and the upper Midwest.

Bay West is proud to have a working relationship with the State of Minnesota that spans over 30 years, including being under contract to provide environmental services since 1989. Since it was founded in 1974, Bay West has built a reputation for delivering quality work. Bay West offers the following benefits to the State of Minnesota, MPCA, and MDA on the Remediation Master Contract. Bay West has successfully performed 870 work orders under our Multi-Site Superfund/Petroleum Contract. **Exhibit 2-1** summarizes our environmental service capabilities as outlined in the RFP.

Bay West is headquartered at 5 Empire Drive in St. Paul, MN, and has technical staff and project managers in satellite offices in Fridley and Duluth, MN. In addition, Bay West has subject matter experts and experienced project managers in offices around the country who will be supporting this contract.

"Bay West is a great place to work. From our experienced field and technical staff, to our active and forward-thinking ownership group, we are committed to providing client-focused solutions that consistently meet and exceed our clients' expectations."

-- Matt Schemmel, PG,
PM/Primary POC,
Bay West.

Experienced, Full Service Environmental Firm

As a true full-service environmental firm, Bay West provides exceptional results on both consulting services work orders (e.g., site investigation/characterization, engineering, design, plan preparation) and remedial/corrective action oversight (e.g., remediation system installation, excavation, optimization, operations and maintenance [O&M], and demolition). Bay West's experience as a self-performer of environmental remediation services provides distinct advantages in our ability to execute work orders under this contract. Investigation and design services are eminently constructible, workable and are correct "the first time" because of our staff's in-field project execution experience. Bay West's work often includes innovative or "out of the box" solutions because of the varied and unique work opportunities that our private sector and public sector (MPCA, MDA, USEPA, Department of Defense) clients provide us with.

Exhibit 2-1. Capabilities

Services	Capabilities
Risk Assessment	• Data management system (EQuIS) to facilitate risk evaluations and support decision making • Risk assessor with over 30 years' experience performing human health and ecological risk assessments
Sampling	• In-house groundwater, sediment, soil, and air sampling equipment enhances responsiveness and data quality • Over 20 field staff with experience collecting media samples for MPCA projects • Custom SOPs for all media types • Efficient and cost-effective sampling via State of MN geographically dispersed staff

Exhibit 2-1. Capabilities	
Services	**Capabilities**
Investigations	• Geologists/hydrogeologists experienced in designing and executing investigations in all Minnesota geologic/hydrogeologic settings for VOCs, SVOCs, metals, emerging contaminants (PFAS) • Staff with knowledge and experience in high-resolution investigation techniques including LIF, MIP, HPT, and geophysics • Former State regulators experienced in developing ARARs • Completed CERCLA RIs on over 160 sites and over 200 LSIs for MPCA PRP
Feasibility Studies	• Engineers and scientists experienced in screening technologies, developing alternatives, and estimating cleanup costs for all media • Custom MPCA formats and alternatives • Completed FSs for over 160 sites
Removal and Response Actions	• Experience implementing conventional and innovative removal/response actions including excavation, ISCO, bioaugmentation, SVE, groundwater treatment via GAC and activated alumina • Performed more than $150M in RA activities
Remedial Design	• 12 Engineers with over 280 years of combined experience designing groundwater, soil, vapor, and sediment remedial approaches • Experience with all remediation technologies • Innovative approaches – i.e.: hydraulic fracking to enhance amendment delivery.
Response Action Oversight	• Experienced construction oversight site supervisors ensure work completed per specifications • Trained construction safety specialists resulting in an outstanding safety record with current EMR of 0.69
Long-term O&M	• Treatment system operators experienced with GAC, particulate filtration, activated alumina, ion exchange, oil-water separator systems. • Experienced with MAROS and other techniques to optimize LTM activities. • PFAS and 1,4-dioxane optimization and retrofitting.

Bay West has performed as both consultant and contractor on U.S. Environmental Protection Agency (US EPA)-led Superfund sites. This experience assures the State that Bay West has the experience and knowledge to safely and technically comply with the Federal regulations that are often applicable to State-funded sites. Bay West is experienced with and has a thorough understanding of the Minnesota Environmental Response and Liability Act (MERLA); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); National Oil & Hazardous Substance Contingency Plan (NCP) (as amended by the Superfund Amendments and Reauthorization Act [SARA]); Resource Conservation and Recovery Act (RCRA); Toxic Substances Control Act (TSCA); Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); and the 1992 Land Recycling Act (LRA).

Bay West's full-service experience also results in comprehensive and efficient oversight of outside contractors. Bay West's field-experienced geologists, engineers, scientists, and project managers are aware of activities and implications for successful investigative corrective, and removal/response actions. We quickly solve in-field problems, effectively control subcontractor costs and schedules, and ensure quality work is performed.

Current Multi Site Superfund/ Petroleum Contractor

As a current Multi Site Superfund/Petroleum contractor, Bay West's proven performance minimizes risk and cost, while increasing efficiency and output. Knowledge of workflow procedures, contract requirements, and established working relationships with MPCA/MDA staff ensure exceptional performance. Consistent with our continuous improvement core value, we have been a proponent of, and active participant in, performance reviews with the MPCA under our current contract. We have utilized this feedback to assess, refine, and improve our processes/services to the State.

Bay West has successfully performed 870 work orders under our Multi-Site Superfund/Petroleum Contract.

Technically Innovative

Bay West's professional staff brings a technically innovative and proficient set of skills and capabilities to this contract. We have the demonstrated ability to perform 100 percent (%) of the scope of services sought under this RFP for the Superfund, Petroleum, Closed Landfill, and Agricultural programs. Multi-disciplinary professional staff members include engineers, chemists, GIS/CAD or groundwater modelers, environmental scientists, QA/QC officers, risk assessors, and geologists, who have specialized experience and skills to execute work orders under this contract.

Bay West is familiar with a broad array of site contaminants, remedial technologies, and geologic settings due to our nationwide experience working on complex, high-profile projects. These projects range from the removal of contaminated sediments utilizing innovative dredging/dewatering techniques, to the field design, installation and operation of remediation systems, to the removal of halogenated and non-halogenated volatile organic compounds (VOCs) from groundwater. This diversity of experience translates into a high degree of technical skill which our staff leverages to provide all clients with innovative and cost-effective solutions to their unique environmental challenges.

Skilled Project Management

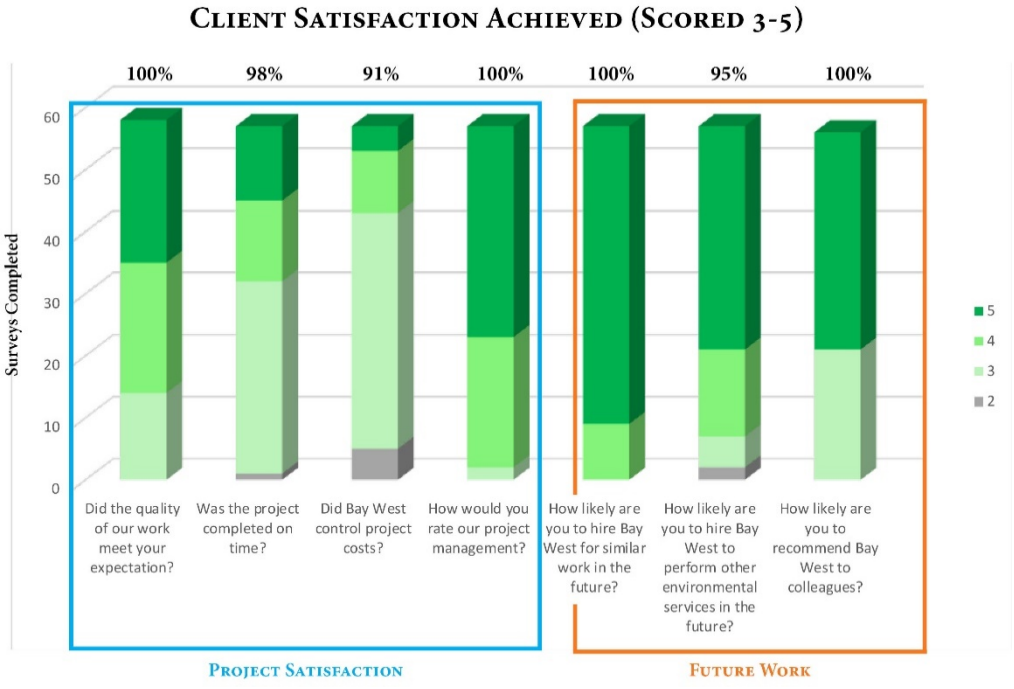
As a long-time State and Federal contractor, Bay West has developed high-quality systems to support the efficient and effective management of our projects. Project managers use these systems and their experience to deliver projects that meet or exceed schedule, budget, regulatory and QC expectations. All Bay West project managers utilize our customized proprietary Project Management System, which provides guidance from initial contract/work order issuance to project reporting and invoicing. Our Corporate QC & Chemical QC Programs ensure proper checks/controls are in place for successful project closeout. Subcontractor QC training ensures successful oversight of investigation and remediation/removal subcontractors. Finally, but most importantly, our Safety & Health Program ensures safety on projects. Bay West's safety record is outstanding with all our ratings significantly better than the industry averages.

Bay West has received the Governor's Safety Award – Meritorious Achievement from the Minnesota Safety Council five times since 2010 and hasn't had a lost work day since 2014.

Customer Focus

As a current Multi Site Superfund/Petroleum Full-Service Emergency Response (ER) contractor, Bay West understands the State's contract requirements, policies, and procedures. This allows Bay West to maximize efficiency and output on State projects while at the same time minimizing risk and costs to the State. The State has been a primary customer throughout Bay West's history and we are dedicated to continuing a high level of customer focus and satisfaction.

Building trust-based relationships with our clients is a cornerstone principle at Bay West and is found at all levels of the company from administrative staff to field staff to technical/professional staff. This customer focus allows Bay West to understand customer needs from the initiation of the project to its completion and final closeout of a project.



Bay West received ratings of "3 - satisfactory" to "5 - excellent" in every rating category on more than 90% of survey responses from State of Minnesota clients.

We take great pride in the work that we have executed under the current master contract, and we believe that our efforts are reflected in our success under this contract is demonstrated by the positive feedback we have received from the State of Minnesota in our customer satisfaction surveys with over 90% of respondents rating Bay West very good or excellent in quality of work and 100% of respondents rating our project management as very good or excellent.

2.2 Resumes of Key Staff

Bay West's staff includes professional engineers (PEs) covering disciplines such as civil, environmental, structural, and chemical, PGs/hydrogeologists, groundwater modelers, risk assessors, certified hazardous materials managers, certified industrial hygienists (CIHs) and certified safety professionals (CSPs), experienced on-site inspectors, environmental scientists, asbestos-trained technicians, University of MN storm water pollution prevention certified-staff, geographic information system (GIS)/computer-aided design (CAD) specialists, and others. Of Bay West's 150-member full-time staff, 96 professional, technical, and field staff are available to provide services under this contract; an additional 12 administrative/ facilities/accounting staff are available to provide non-billable support. Resumes of key staff are available in **Appendix A** at the end of this proposal. Also refer to the included staff matrix table in Section 4 (**Exhibit 4-2**), which shows our staff's experience with the scope of services required for this contract.

2.3 Staff Matrix/ Organization Chart

The Organization Chart (**Exhibit 2-2**) illustrates the management structure for this contract. The responsibilities and authorities of staff under this organizational approach are described on **Exhibit 2-3** (next page).

The Bay West organization is structured to provide for rapid deployment of resources and effective work order management. Bay West has provided the MPCA and MDA with a primary POC (Matt Schemmel) through whom all work orders will be coordinated, designed, and executed.

The Staff Matrix (**Exhibit 2-4**) summarizes the assigned personnel, including their classification, OSHA certification, training, education, years of experience, years with the company, and location. Detailed resumes of the key management, professional, technical, and field supervisory personnel are provided in **Appendix A**.

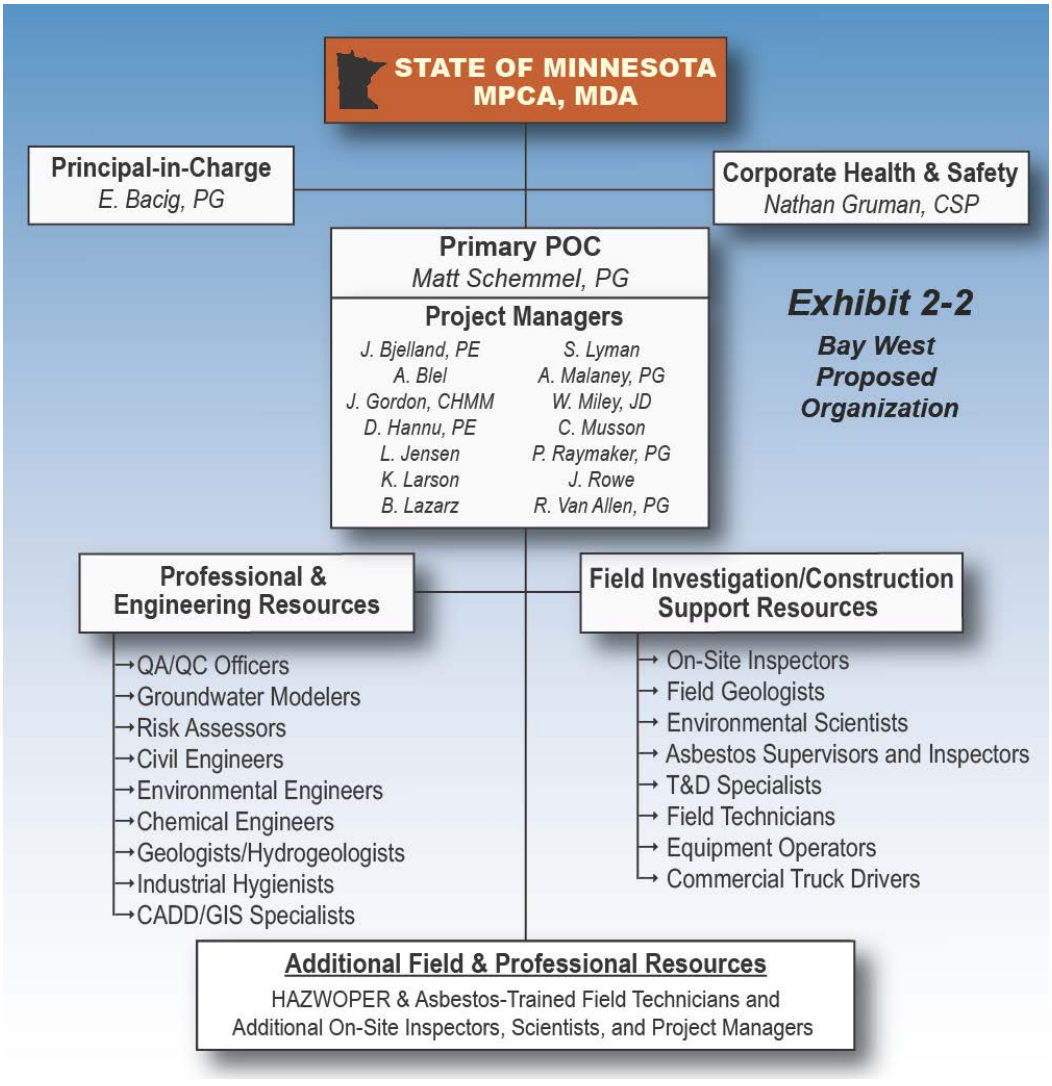


Exhibit 2-3: Key Staff Responsibilities/Authorities	
Principal-in-Charge	Mr. Ed Bacig, PG, principal-in-charge, is VP of Operations for Bay West and therefore has the authority to direct the operational resources of the company. His primary role will be to ensure that Bay West's health and safety and corporate QC requirements are met, and that adequate company resources are available to the program.
Primary POC/Project Manager	The primary POC will be Mr. Matt Schemmel, PG. He will have overall responsibility for execution of this contract, including schedule, budget, and quality aspects. He will be the primary POC for the MPCA's/MDA's assigned project management and contract administrative personnel. He has the authority to sign work orders and commit company resources, thus assuring the State of safe, reliable, and consistently high-quality performance on projects. He will closely coordinate the activities of project managers and subcontractors. Mr. Schemmel has more than 20 years of investigation, remediation, and management experience working with the MPCA and other State agencies.
Senior Technical Reviewers	Mr. Schemmel will rely on Mr. Rick Van Allen, PG, and Mr. Donovan Hannu, PE, to provide senior technical reviews of project reports. Mr. Van Allen has over 24 years of experience in the environmental field and Mr. Hannu has over 28 years of experience managing environmental work in the state of Minnesota. The senior technical reviewers ensure our reports deliver the information in a consistent, well-organized and easy to read format while meeting the project goals and objectives. They have the authority to stop a document from being delivered if it does not meet Bay Wests quality objectives.
Project Managers	Mr. Schemmel will rely on 15 experienced project managers to coordinate project activities; all have experience managing projects under the Superfund, Petroleum, Closed Landfill, and Agriculture Programs. The project managers we've selected are all knowledgeable of and experience working with MPCA and MDA guidance and regulations regarding investigation and cleanup of State- and Federally funded projects, including CERCLA, NCP, MERLA, RCRA, and TSCA projects. Project managers have the authority to direct staff on executing work orders and procuring subcontractors.
Health & Safety Manager	In his role as Bay West's Health and Safety Manager, Mr. Nathan Gruman, CSP, will be responsible for dissemination of guidelines, policies, and procedures in response to new or changing regulations, and for identifying project-specific safety and health concerns or requirements. Project managers are required under Bay West policy to obtain a site-specific Health and Safety Plan in advance of each field action. Mr. Gruman has the authority to oversee the administration and compliance of this activity. Mr. Gruman is supported by a team of safety professionals including Mr. Scott Norman, CIH, CSP, and Mr. Matt Ader, CSP.
Professional & Engineering Resources	We have assembled a group of key professional and engineering personnel to support this contract, including design/remediation engineers, risk assessors, groundwater modelers, and GIS/computer-aided design and drafting (CADD) specialists. These personnel will be used to provide design and data evaluation components to investigation and remediation projects. They are familiar with Federal and State regulations and guidance and are responsible for completing tasks delegated to them by Bay West project managers. These personnel meet or exceed the RFP requirements and have expertise in the core group of services that are anticipated to support this contract.
Technical Support & Field Oversight Resources	Our key technical support and field oversight personnel include on-site asbestos inspectors, geologists, technicians, and waste management specialists. These personnel will perform field work per project plans, assist in specification and documentation reports, and oversee field technicians as necessary to ensure quality data is collected and safe field work is performed.
Additional Field & Professional Resources	Bay West has additional field and technical resources available to perform work under this contract. All have current OSHA certifications for working at hazardous waste sites, and have Superfund, Petroleum, Closed Landfill, and/or Agricultural experience.

Exhibit 2-4

Legend:

AA – Associate of Arts
AAS – Associate of Applied Science
AI – Asbestos Inspector
AMP – Asbestos Management Planner
AS – Asbestos Site Supervisor
BA – Bachelor of Arts
BS – Bachelor of Science
CDL – Commercial Drivers License
CFEI – Certified Fire and Explosion Investigator
CHMM – Certified Hazardous Materials Manager
CQM – Construction Quality Management
CPEA – Certified Professional Environmental Auditor
CPG – Certified Professional Geologist
CSP – Certified Safety Professional
EC – Erosion Control Certificate
EIT – Engineer-in-Training
GIT – Geologist-in-Training
GIS – Geographic Information Systems
JD – Juris Doctor
LA – Lead Abatement
LI – Lead Inspector
MBA – Master of Business Administration
MS – Master of Science
PE – Professional Engineer
PG – Professional Geologist
PMP – Project Management Professional
WDC – Wetland Delineator Certified

Resume?	Staff	Primary Role	40-Hr OSHA Training w/Current Refresher	Licenses/ Registrations	Yrs w/Bay West	Total Yrs Experience	Highest Degree	Location (STP = St. Paul; FRI = Fridley; DUL = Duluth; out-of-state staff listed by state abbreviation)	MPCA/MDA Contract Experience	MPCA Master Contract Billing Classifications (P – Primary)														
										Scientist 1	Scientist 2	Engineer 1	Engineer 2	Engineer 3	Engineer 4	Field Technician	GIS/CADD Specialist	On-Site Inspector	Project Manager	QA/QC Officer (Scientist 2)	Ecological Risk Assessor 2	Ecological Risk Assessor 3	Human Health Risk Assessor 2	Human Health Risk Assessor 3
POINTS OF CONTACT																								
√	Ed Bacig	Principal-in-Charge	√	PG	23	33	BS Geology	STP	√	X	X					X			P	X				
√	Matt Schemmel	POC/Project Manager	√	PG, AI, CQM	10	21	BS Geology	STP	√	X	X					X		X	P					
PROJECT MANAGERS																								
√	Jonna Bjelland	Project Manager/Engineer	√	PE, EC	3	6	MS Civil Engineering	STP	√	X	X	X	X			X		X	P					
√	Alex Blel	Project Manager	√	AI	6	6	BS Env Geoscience	STP	√	X	X					X			P					
√	Donovan Hannu	Project Manager/Senior Engineer	√	PE, EC	6	28	BS Civil Eng	STP	√	X	X	X	X	X	X	X		X	P					
√	Shawn Lyman	Project Manager	√	GIT	7	11	BS Comp Geology	STP	√	X	X					X		X	P					
√	Amanda Malaney	Project Manager	√	PG	13	13	BS Geo/Geophysics	STP	√	X	X					X		X	P					
√	Willy Miley	Project Manager	√	JD	6	13	BA Geology	STP	√	X	X					X		X	P					
√	Chris Musson	Project Manager/Engineer	√		3	6	MS Civil Engineering	STP	√	X	X	X				X			P					
√	Rick Van Allen	Project Manager	√	PG, AI, AMP	8	24	BS Geology	STP	√	X	X					X		X	P					
√	Jeff Gordon	Project Manager	√	CHMM, CDL	18	20	BS Biology	FRI	√	X	X					X		X	P					
√	Laura Jensen	Project Manager	√		4	16	BA Geology	FRI	√	X	X					X			P					
√	Bill Lazarz	Project Manager	√		7	20	BS Geology	FRI	√	X	X					X		X	P					
√	Paul Raymaker	Project Manager	√	PG, CQM	6	12	BS Geoscience	FRI	√	X	X					X		X	P					
√	Jay Rowe	Project Manager	√	AI, LA, LI	3	12	BS Environmental Studies	FRI	√	X	X					X		X	P					
√	Katie Larson	Project Manager	√	PG, EC	1	21	MS Geology	DUL	√	X	X					X			P					
ENGINEERS																								
√	Brent Vizanko	Project Engineer	√	EIT	1	1	BS Chemical Engineering	STP	√	X		X				P								
√	Paul Walz	Senior Remediation Engineer	√	PE, CQM	18	34	BS Chem Eng	STP	√	X	X	X	X	X	P	X			X					
√	Marty Wangensteen	Senior Env. Engineer	√	PE, PG	31	31	MS Civil Eng/Geology	STP	√	X	X	X	X	X	P				X					
√	Emily Widstrand	Project Engineer	√	EIT	1	2	BS Bioproducts and Biosystems Eng	FRI	√	X		X				P								
√	Andrew Peterson	Project Engineer	√	PE, AI	1	6	BS Environmental Engineering	DUL	√	X	P	X	X			X			X					
√	Taylor Pierce	Project Engineer	√	PE, RMM	3	6	BS Geology	CO	√	X	P	X	X			X			X					
√	Dirk Pohlmann	Remediation Engineer	√	PE, PMP	2	20	BS Biosystems Engineering	TN	√	X	X	X	X	X	P	X								
√	Richard Traver	Sediment Engineer	√	PE	3	38	MS Environmental Engineering	NJ	√	X	X	X	X	P		X								
√	John Lux	Project Engineer	√	PE, CFEI	1	40	MS Mechanical Engineering	OH		X	X	X	X	X	P	X			X					
	Caroline Newcombe	Project Engineer	√	PE	3	8	MS Environmental Engineering	STP	√	X	P	X	X			X								
	Marc Ausmus	Project Architect			2	32	Bachelor of Architecture	MN	√	X	X					X			P					
	Stacy Warmack	Structural Engineer	√	PE/SE	2	21	BS Civil/Structural Engineering	UT	√	X	X	X	X	P										
QA/QC & SAFETY																								
√	Nathan Gruman	Corporate Health and Safety	√	PG, CPG, CSP, AI	1	14	BS Geology	STP	√	X	P					X		X						
√	Xiong Yang	Safety Tech	√		6	6	BA Biology & Anthro	STP	√	X	X					P								
√	Matt Ader	Safety	√	CSP	1	10	BS Construction Management	FRI	√	X	P					X		X						
√	Brad Kulberg	QA/QC Mgr	√	PMP, CQM	23	35	BS Electrical Eng	FRI	√	X	X	X	X	X	P				X	X				
√	Eric Malarek	QA/QC Officer	√		3	29	MS Chemistry, MBA	MD	√	X	X					X		X		P				
√	Nancy McDonald	QA/QC Officer	√	CQM	6	28	MS Botany	CA	√	X	X					X		X		P				
	Doug Hickey	CIH/H&S Specialist	√	CSP, CIH, AI, AS	15	33	MIS Industrial Hygiene	STP	√	X	P					X		X	X					

Exhibit 2-4

Legend:

AA – Associate of Arts
AAS – Associate of Applied Science
AI – Asbestos Inspector
AMP – Asbestos Management Planner
AS – Asbestos Site Supervisor
BA – Bachelor of Arts
BS – Bachelor of Science
CDL – Commercial Drivers License
CFEI – Certified Fire and Explosion Investigator
CHMM – Certified Hazardous Materials Manager
CQM – Construction Quality Management
CPEA – Certified Professional Environmental Auditor
CPG – Certified Professional Geologist
CSP – Certified Safety Professional
EC – Erosion Control Certificate
EIT – Engineer-in-Training
GIT – Geologist-in-Training
GIS – Geographic Information Systems
JD – Juris Doctor
LA – Lead Abatement
LI – Lead Inspector
MBA – Master of Business Administration
MS – Master of Science
PE – Professional Engineer
PG – Professional Geologist
PMP – Project Management Professional
WDC – Wetland Delineator Certified

Resume?	Staff	Primary Role	40-Hr OSHA Training w/Current Refresher	Licenses/ Registrations	Yrs w/Bay West	Total Yrs Experience	Highest Degree	Location (STP = St. Paul; FRI = Fridley; DUL = Duluth; out-of-state staff listed by state abbreviation)	MPCA/MDA Contract Experience	MPCA Master Contract Billing Classifications (P – Primary)														
										Scientist 1	Scientist 2	Engineer 1	Engineer 2	Engineer 3	Engineer 4	Field Technician	GIS/CADD Specialist	On-Site Inspector	Project Manager	QA/QC Officer (Scientist 2)	Ecological Risk Assessor 2	Ecological Risk Assessor 3	Human Health Risk Assessor 2	Human Health Risk Assessor 3
	Scott Norman	CIH/H&S Specialist	√	CIH, CSP	1	25	Master Ind. Safety/Ind. Hygiene	FRI		X	P					X		X						
	Peter Jacobs	QA/QC Officer	√	PG	18	30	MS Geochem & Min	MN	√	X	X					X				P				
SCIENTISTS																								
√	Sam Bader	T&D Specialist	√	CDL, CHMM	3	4	BS Reclamation Env. and Conserv.	STP	√	X	X					P								
√	David Berthene	Field Tech/Geologist	√	AI, FG, CDL, GIT	2	2	BS Geology	STP	√	X						P								
√	Lauren Idleman	Geologist/Scientist	√	AI, GIT	2	4	MS Geology	STP	√	X	P					X								
√	Jim Leisz	Project Manager/T&D Specialist	√	CQM, CDL	19	26		STP	√	X	X					X		X	P					
√	Barry Lindsay	Field Tech/On-Site Inspector	√	CHMM, CDL	22	22	MS Geoenv Studies	STP	√	P	P					X		X						
√	John Peper	Geologist/Scientist	√		4	4	BS Geology	STP	√	P						X								
√	Craig Rebischke	Proj Mgr/Env. Scientist	√	CHMM, AI, CDL, AS	17	18	BS Env Science	STP	√		P					X		X	X					
√	Ryan Riley	Field Tech/On-Site Inspector	√	CDL, AI	20	20	BA Earth Science	STP	√	P	P					X		X	X					
√	Preston Schrupp	Field Tech/On-Site Inspector	√	AS, AI	19	20	BS Environmental Science	STP	√	X	P					X		X						
√	Patrick Sweeney	Geologist	√		3	4	BS Geology	STP	√	X	X					P		X						
√	Ben Czeck	Geologist/Scientist	√	GIT, WDC	2	3	MS Env Geology	FRI	√	X						P								
√	Scott Tracy	Senior Technical Advisor	√	CHMM	1	30	BS Nuclear Engineering	FRI	√	X	X					X		X	P					
√	Sam Cook	Field Tech	√	AI,	3	3	BA Env Studies	DUL	√	X						P		X						
√	Brandon Flaada	Geologist	√	AI, CQM	9	21	BS Hydro/Env Geology	DUL	√	X	P					X		X	X					
√	Hillary Oswald	Geologist/Site Sup	√	AI, AS, AAT, CQM	6	9	BA Geol Sci/Env Studies	DUL	√	X	P					X		X						
√	Matt Held	GIS Specialist		GIS	2	18	BA Geography	CO	√	X							P							
√	John Dickerson	Proj. Geologist	√	PG	2	44	BS Geology	FL		X	X					X		X	X					
√	Peter LaGoy	HH/Eco Risk Assessor			7	32	MS Biology	MA	√	X	X										X	X	X	P
√	John Olson	Proj Mgr/Senior Technical Advisor	√	PG, CQM	11	29	MS Geology	NV	√	X	X					X		X	P					
√	James Gatherer	GW Modeler	√	WDC	2	20	B.S. Geology	NY	√	X	P					X								
√	Scott Cobb	GIS	√	GIS, EC	1	5	BA Geography	WA		X							P							
	Joe Erjavec	EQuIS Data Manager			2	17	BS Chem	STP	√	X	X									P				
	Nick Goldsmith	Field Tech	√	AI, AS	1	1	BS Environmental Studies	STP	√	X						P								
	Nathan Kleist	Field Tech	√		1	1	BS Environmental Science	STP	√	X						X								
	Josh Miller	Proj Mgr/Senior Technical Advisor	√	PG, CQM	17	19	BS Geology	STP	√	X	X					X		X	P					
	Steve Pierson	On-Site Inspector	√	CDL, CQM	27	27		STP	√	X						X		P						
	Aaron Roski	ER Project Manager			1	19	BS Environmental Chemistry	STP		X	X					X								
	Andy Smith	Proj. Mgr	√		1	19		FRI																
	Wendy Tindall	Compliance Specialist	√	CPEA	1	17	MS Env Science and Policy	FRI		X	P					X		X	X					
	Gerald Neuerburg	Proj Mgr/On-Site Inspector			20	20	Electrical Construction	MN	√							X		P						
	Nigel Wattrus	Marine Geophysicist	√		4	33	PhD Geophysics	DUL	√		X													
	Christian Tabano	Cost Control/ Scheduling	√	CQM	3	20	BS Bio/Chem	MD	√	X	P					X								
	Brenda Winkler	Proj Mgr/Regulatory Specialist	√	PG, CQM	18	32	BA Geology	MT	√	X	X					X			P					
ADDITIONAL TECHNICAL AND PROFESSIONAL RESOURCES																								
	Tim Ahrens	Project Reporting			7	11	BA Comm/Journalism	STP	√							P								
	Rachel Bloom	Project Reporting			2	9	BA English Literature	STP	√							P								

Exhibit 2-4

Legend:

AA – Associate of Arts
AAS – Associate of Applied Science
AI – Asbestos Inspector
AMP – Asbestos Management Planner
AS – Asbestos Site Supervisor
BA – Bachelor of Arts
BS – Bachelor of Science
CDL – Commercial Drivers License
CFEI – Certified Fire and Explosion Investigator
CHMM – Certified Hazardous Materials Manager
CQM – Construction Quality Management
CPEA – Certified Professional Environmental Auditor
CPG – Certified Professional Geologist
CSP – Certified Safety Professional
EC – Erosion Control Certificate
EIT – Engineer-in-Training
GIT – Geologist-in-Training
GIS – Geographic Information Systems
JD – Juris Doctor
LA – Lead Abatement
LI – Lead Inspector
MBA – Master of Business Administration
MS – Master of Science
PE – Professional Engineer
PG – Professional Geologist
PMP – Project Management Professional
WDC – Wetland Delineator Certified

Resume?	Staff	Primary Role	40-Hr OSHA Training w/Current Refresher	Licenses/ Registrations	Yrs w/Bay West	Total Yrs Experience	Highest Degree	Location (STP = St. Paul; FRI = Fridley; DUL = Duluth; out-of-state staff listed by state abbreviation)	MPCA/MDA Contract Experience	MPCA Master Contract Billing Classifications (P – Primary)														
										Scientist 1	Scientist 2	Engineer 1	Engineer 2	Engineer 3	Engineer 4	Field Technician	GIS/CADD Specialist	On-Site Inspector	Project Manager	QA/QC Officer (Scientist 2)	Ecological Risk Assessor 2	Ecological Risk Assessor 3	Human Health Risk Assessor 2	Human Health Risk Assessor 3
	Guy Buchanan	Site Supervisor	√	CQM	18	22	Natl Dip. Nat Conserv	STP		X	P					X		X						
	Maverick Deschamp	Geologist			1	2	BS Geology	STP	√	X						P								
	Dennis Littfin	Geologist	√	PG, CDL	31	31	BS Geology	STP	√	X	P					X								
	Marty Marchio	Field Tech	√		2	2	BS Environmental Science	STP		X						P								
	Justin Meyer	Field Tech	√		1	1		STP		X						P								
	Andrew Nguyen	Field Tech	√		4	4	BS Env Science	STP		X						P								
	Ann Reuter	Env. Scientist	√		7	9	BA Env Biology	STP	√	X	P					X								
	Brian Schloegel	Field Tech	√	CDL	12	18		STP	√							P								
	Jared Schmaedeke	Field Tech	√		1	3	BS Environmental Science	STP		X						P								
	Derek Stark	Field Tech	√		1	1	BS Environmental Science	STP		X						X								
	Joe Sternberg	Field Tech	√		1	1	BS Civil Engineering	STP		P		X				X								
	Kelly Stober	Field Tech	√		2	2	BS Env Science	STP	√							P								
	Julie Tan	Project Reporting			15	15	BS Psychology/HR Mgmt	STP	√	X						P								
	Jim Twite	Field Tech	√		25	35		STP								P								
	Mao Yang	Field Tech	√		5	5		STP		X						P								
	Jimmy Lyback	Field Tech	√		17	17		FRI	√	P						P								
	Brittany Hoover	Field Tech/Geologist	√		1	1	BS Geology	DUL	√	X						P								
	Sandra Merritt	Field Tech	√	EMT	7	20	Fire Fighter School	DUL								P								
	Cody Solem	Field Tech	√		3	3		DUL																
	Tim Salane	Proj Mgr/QA/QC Officer	√	PE, CQM	15	33	BS Civil Eng	CA	√	X		X	X	X	P				X					
	Marie Swiech-Laflamme	Scientist	√	PG, CQM	3	15	MS Hydrology	NJ			P					X								
	Jake Bradley	GIT	√		1	1	BA Geology	WA		X						P								
	Jon Downie	Geologist	√	GIT	1	6	BS Geology	WA		X						P								
	Jim Hubbell	Site Supervisor	√		27	27	Basic EOD/UXO School	WI		X	X					X		P						

TOTAL PROFESSIONAL, TECHNICAL, AND FIELD PERSONNEL AVAILABLE FOR THIS CONTRACT: 96

2.4 Solid Waste Facilities in Minnesota

Within the last five years, Bay West has completed or is currently working on 10 solid waste facilities in Minnesota. Projects have included site investigations, remedial investigations, and remedial designs. Other tasks have included Phase I and Phase II environmental site assessments (ESAs), file reviews, feasibility studies, alternative drinking water studies, methane monitoring, and vapor intrusion assessments. **Exhibit 2-7** at the end of this section provides a list of the Solid Waste Facility sites as well as other MPCA Superfund and Site Assessment sites in which Bay West has or is currently working on.

2.5 Experience with Federal and State Agencies or Departments

As one of the MPCA/MDA's current Superfund/Petroleum Multi Site and one of the MPCA's current ER contractors, Bay West knows firsthand the importance of effective communication and coordination between ourselves (acting with and on behalf of our clients) and all project stakeholders, including Federal and State agencies and local governmental units. The ER Contract, in particular, places Bay West at the extreme "front end" in the life of a project where effective project coordination and communication with local, State, and in some cases Federal agencies, is critical to its success. As a learning organization, Bay West has applied these same communication and management skills to effectively interface with local, State, and Federal agencies on investigation, remediation, and O&M-type projects.

A list of State, Local and Federal agencies and departments that Bay West has either held contracts with or had direct project experience with is provided in **Exhibit 2-5**. Some of these agencies have been both Bay West's client and regulator. Because of these cooperative relationships, Bay West has become a trusted entity, and we will be able to effectively interface and communicate with other State and Federal agencies during the life of this contract.

Exhibit 2-5: Bay West Government Experience

State

- Minnesota Pollution Control Agency
- State of Minnesota
- Minnesota Department of Agriculture
- Minnesota Department of Administration
- Minnesota Department of Natural Resources
- Minnesota Department of Health
- Minnesota Department of Transportation
- Wisconsin Department of Natural Resources
- South Dakota Department of Environment & Natural Resources
- State of North Dakota

Local

- St. Paul Port Authority
- City of St. Paul
- City of Minneapolis
- City of Duluth
- Hennepin County
- Ramsey County
- Minneapolis Community Planning & Economic Development Agency
- Metropolitan Council Agencies

Federal

- US Environmental Protection Agency (US EPA)
- US Army Corps of Engineers (USACE)
  - Districts of St. Paul, Omaha, Kansas City, Detroit, Louisville, Baltimore, Jacksonville, Los Angeles, Mobile, Tulsa, Sacramento, and Seattle
- Federal Aviation Administration
- US Air Force Civil Engineer Center (AFCEC)
- US Air Reserve
- US Naval Engineering Command
- US Bureau of Reclamation
- US Coast Guard
- US Forest Service
- US Department of Justice
- US Postal Service
- US Air Force
- US Fish & Wildlife
- Veteran's Administration
- Minnesota Air National Guard
- Minnesota Army National Guard

2.6 Knowledge of Minnesota Environmental Response and Liability Act, Closed Landfill Program, the LRA, CERCLA, RCRA, NCP, and pertinent state and federal regulations.

Bay West staff have a combined total of more than 300 years of regulatory compliance experience at both the Federal and State levels. This experience comes from serving as a resource for our commercial/industrial and governmental customers, as well as some of our staff's previous experience as government regulators.

Bay West has worked on CERCLA (and NCP), MERLA, RCRA, TSCA, and LRA projects which have required extensive knowledge and application of these laws and regulations. Bay West has also performed projects under the 1992 LRA which allowed parties who voluntarily cleaned up old sites to receive legal assurances protecting them from State Superfund liability. Because of our varied work experience in Minnesota, Bay West personnel are also knowledgeable in the following regulations (**Exhibit 2-6**):

Exhibit 2-6: Bay West Regulation Expertise

- Closed Landfill Program
- Vapor Best Management Practices (BMPs)
- MDH Well Codes
- Federal Acquisition Regulations (FARs)
- State Fire Codes
- UST/AST Regulations
- Department of Commerce Petrofund
- OSHA regulations
- Department of Transportation regulations (especially pertaining to shipment of hazardous materials)
- Clean Water Act
- Safe Drinking Water Act
- Radon Mitigation and Monitoring
- Various City, County, and Township Building Codes
- Great Lakes Initiative
- Clean Air Act (NESHAP)
- Migratory Birds
- Protection of Wetlands Order
- Fish and Wildlife Coordination Act
- Endangered Species Act
- Groundwater Protection Policies
- Shoreland and Floodplain Management
- Wild and Scenic Rivers Act
- Wilderness Act
- National Historic Preservation Act
- Toxic Substances Control Act

Bay West maintains libraries, electronic media, and computer databases containing extensive resources for Federal and State regulations. In addition, all our professional staff have internet access at their work stations and on their mobile phones which allows them to access the State and Federal government's web pages for updates on the latest regulatory changes. Bay West also provides external and internal training opportunities to our staff to keep them up to date on the current regulations and pending changes in regulations. These training opportunities range from Bay West staff conducting internal and external technical presentations, to internet web training (provided by Interstate Technology and Regulatory Council [ITRC] or other agencies), to attending national and regional conferences. Representative project experience is illustrated below.

As shown in **Exhibit 2-7** (next page), Bay West has worked/is working on the following contaminated sites in the State of Minnesota: Note: This does not include the hundreds of sites Bay West has worked on under the MPCA Petroleum Remediation Program (PRP).

Exhibit 2-7: Bay West Projects in Minnesota	Applicable Regulations				Scope			
	MERLA	CERCLA	RCRA	NCP	RI/FS	PP/ROD	RD/RA	LTM/5yr
Solid Waste Facility Investigations								
Mankato Childrens' Museum	√	√			√		√	
SA#8489 Hoover Dump	√	√			√			√
SR#117 Pigs Eye Lake	√	√			√		√	
SR#66 LeHillier Dump	√	√			√			√
SW#118 Rosemount Demolition Landfill	√	√			√			
SW#134 Begin Demolition Landfill	√	√			√			
SW#136 Herbst and Sons Landfill	√	√			√			
SW#327 Vadnais Heights Demolition Landfill	√	√			√			
Old Beltline Dump Site – St. Louis Park	√	√						√
Carlton County Landfill	√	√					√	√
State of Minnesota Superfund Sites								
SR#3 – General Mills	√	√	√	√	√	√	√	√
SR#35 – Waite Park Wells*	√	√	√	√				√
SR#39 – Ritari Post and Pole*	√	√	√	√	√		√	√
SR#56 – Perham Arsenic Site*	√	√		√			√	√
SR#66 – LeHillier Dump	√	√						√
SR#67 – Arrowhead Refinery	√	√	√	√	√		√	√
SR#72 – NIROP OU1, OU2, OU3	√	√	√				√	√
SR#84 – Baytown Site*	√	√		√				√
SR#117 – Pig's Eye Landfill**	√				√		√	
SR#131 – Superior Plating**	√	√		√	√		√	√
SR#149 – SLR Interlake Duluth Tar	√	√	√	√	√	√	√	√
SR#206 – Pilgrim Cleaners**	√	√			√		√	√
SR#264 – D's Fabric Care**	√	√	√	√	√			
SR#275 & 276 - SLR US Steel*	√	√	√	√	√	√	√	√
SR#295 – Parkway Plaza	√	√			√			
SR#295 – US Cleaners	√	√		√	√			
SR#322 – Chicago Ave Shopping Center	√	√		√	√		√	
SR#328 – Blaine Municipal Well**	√	√		√	√		√	√
SR#351 – Reserve Mining Scrapyard**	√	√	√	√	√	√	√	√
SR#361 – Hibbing Gas Manufacturing	√	√	√	√	√			
SR#375 – Southview Boulevard	√	√		√	√		√	√
SR#381 – Bulinski Point**	√	√		√	√			√
SR#1010 – Minnesota Slip	√	√			√			
SR#1011 – Slip 2	√	√			√			
SR#1012 – Slip C	√	√			√			
SR#1013 – AGP Slip	√	√			√			

Exhibit 2-7: Bay West Projects in Minnesota	Applicable Regulations				Scope			
	MERLA	CERCLA	RCRA	NCP	RI/FS	PP/ROD	RD/RA	LTM/5yr
SR#1014 – Azcon Slip	√	√			√			
SR#1015 – Munger Landing	√	√			√			
SR#1293 – Whiteway Cleaners**	√	√		√	√		√	√
SR#1301 – Doc's Auto Salvage	√	√			√		√	
SR#1338 – Jay Street Gas Holder	√	√	√	√	√		√	
SR#1339 – Former Exclusive Cleaners	√	√		√	√		√	√
SR#1345 – Merit Enterprises	√	√			√			
SR#1358 – Ponds Behind Erie Pier	√	√			√			
SR#1373 – Thomson Reservoir	√	√			√			
SR#1375 – Slip 3	√	√			√			
SR#1401 – Southeast Hennepin	√	√			√		√	
SR#1404 – 55th & Lyndale**	√	√		√	√		√	
SR#1405 – University and Pascal St.**	√	√		√	√		√	
SR#1406 – Hospital Linen**	√	√			√		√	
SR#1416 – Pioneer Metal Finishing	√	√	√		√			
SR#1428 – Mud Lake West	√	√			√			
SR#1450 – Lee's Cleaners and Laundry	√	√			√		√	
SR#1452 – 5308 Lyndale Avenue South	√	√		√	√			
Gopher Ordnance	√	√		√	√			
TCAAP*	√	√	√	√	√		√	
Duluth Air Force Base**	√	√	√	√	√			
Gopher Oil/Delaware**	√						√	
Ashland Oil/Park Penta**	√	√		√	√		√	√
Universal Plating**	√	√	√	√	√			
Heartland**	√	√		√			√	
Joslyn Manufacturing*	√	√		√	√			
Finland**	√	√		√	√	√	√	√
MPCA Site Assessments								
SA#102 – Nicollet Ave	√	√			√			
SA#249 – SE Hennepin Avenue Site	√	√			√			
SA#1207 – Toro Company	√	√			√			
SA#132 – North Midway Plaza	√	√			√			
SA#132 – University Ave and Pascal St	√	√			√			
SA#239 – Former Blvd Cleaners	√	√			√			
SA#248 – Former Hospital Linen	√	√			√			
SA#249 – SE Hennepin Area GW and Vapor	√	√			√			
SA#271 – Gross-Given	√	√			√			
SA#324 – 109 E 26th St	√	√			√			

Exhibit 2-7: Bay West Projects in Minnesota	Applicable Regulations				Scope			
	MERLA	CERCLA	RCRA	NCP	RI/FS	PP/ROD	RD/RA	LTM/5yr
SA#412 – Richfield Gold Eagle	√	√			√			
SA#4562 – N Heights Mine Dump	√	√			√			
SA#4563 – 5405 West Ramsey St	√	√			√			
SA#4603 – Former Blvd Cleaners	√	√			√			
SA#4604 – Midas Muffler	√	√			√			
SA#8489 – Hoover Dump	√	√			√			

** National Priorities List (NPL) Site (also on permanent list of priorities [PLP] List)*
*** PLP Site*
5yr = 5-year review
AOC = Area of Concern
FS = feasibility study
GW = groundwater
LTM = long-term monitoring
NIROP = Naval Industrial Reserve Ordnance Plant
OU = operable unit
PP = proposed plan
RA = response action
RD = remedial design
RI = remedial investigation
ROD = Record of Decision
TCAAP = Twin City Army Ammunition Plant

Section 3
Project Descriptions

Closed Landfill Program Project Example #1: *SW134 Former Begin Demolition Landfill, Plymouth, MN*

Site Description

The Site consists of an ~9-acre former landfill located at 3900, 3901, and 3950 Vinewood Lane North in Plymouth. The Site is currently fully developed with the Cornerstone Auto Dealer, Cottonwood Plaza, and Anchor Bank. There are residential and commercial properties immediately adjacent to and surrounding the Site. Bay West was retained by the MPCA to perform environmental assessment and investigation activities to evaluate the potential risks posed to on- and off-site receptors by the landfill waste at the Site.

Historical sources indicate the Site was a sand/gravel pit from at least the 1960s to 1970s and was used as a sanitary/demolition landfill in the 1970s and 1980s. It appears that mixed municipal waste was accepted at the landfill until the mid-1970s. Previous MPCA staff inspections identified barrels, cans of paint and hazardous materials, garbage, and tires in the waste at the Site.

Tasks Performed

Phase I ESA – In June 2016, Bay West performed a Phase I ESA on the Site that identified RECs, VECs, and HRECs associated with the former municipal and demolition landfill and gas station on the Site. Based on the Phase I ESA findings, it was determined that potential contamination associated with the historical uses of the Site may pose a health and safety risk to surrounding receptors.

Summary Report: Previous Investigation Data – Bay West conducted a regulatory file review of MPCA and Hennepin County files for all available historical investigation data associated with the Site. Based on the information reviewed, Bay West recommended the following assessment activities:

- Conduct a groundwater risk assessment to evaluate the risks posed to receptors from the metals and VOCs groundwater impacts surrounding the Site.
- Conduct a soil gas assessment to evaluate the vapor intrusion risks posed to the Cottonwood Plaza building from VOC soil gas impacts, and on-site and adjacent buildings from potential methane soil gas impacts at the Site.

Phase II Investigation – Bay West completed a Phase II subsurface investigation including: soil boring advancement for soil and groundwater sampling (including PFAS sampling); installation of soil gas monitoring points for landfill gas screening and analytical sampling; groundwater receptor risk assessment; and transportation and disposal of IDW. The results of the Phase II revealed the following:

- PFAS, 1,4-dioxane, 2,3,7,8-TCDD equivalents (dioxins/furans), boron (dissolved), and manganese (dissolved) exceeded the respective screening criteria in groundwater samples at the Site. The identified groundwater contaminants may pose a risk to Well 171087, located approximately 175 feet downgradient on the Little Church site.
- Methane was detected at concentrations up to 60% of total vapor and over 100% of the LEL, and VOCs were detected exceeding the 33x industrial ISVs in soil gas points installed throughout the Site, indicating potential vapor intrusion risks to on- and off-site receptors.

Based on the Phase II ESA results, Bay West recommended additional drinking water and vapor intrusion risk assessment activities at the Site.

Additional Landfill Gas Assessment – In September 2017, the MPCA Emergency Management Unit (EMU) retained Bay West to perform the additional landfill gas assessment activities at the Site. This work is ongoing and includes the following activities:

- Indoor air and port-of-entry monitoring (four events) with a landfill gas meter and CGI at the Cottonwood Plaza and Anchor Bank on the Site, including one round of 24-hour indoor air sampling for methane in these buildings. In addition, landfill gas monitoring was performed in the Cottonwood Plaza crawlspace and at the roof-top passive venting system.
- Landfill gas monitoring (three events) at the permanent soil gas points with a landfill gas meter and CGI, including one round of storm sewer monitoring at the surrounding the Site.
- Off-site methane soil gas analytical sampling and landfill gas screening on city and county right-of-way and private properties surrounding the Site.
- Assisting the MPCA with obtaining property access to perform sub-slab vapor sampling in residential and commercial buildings surrounding the Site.

In addition, after obtaining approval from the MPCA that a conflict of interest does not exist, Bay West was retained by Cottonwood Plaza LLLP to prepare a Landfill Gas Mitigation System Design Plan for the building. Bay West is currently overseeing the mitigation system installation activities.

Geophysical Survey Data Interpretation – In May 2017, Bay West prepared bid specifications for the MPCA to use in retaining a contractor to collect geophysical survey data at the Site.

In January 2018, Bay West analyzed geophysical survey data (electromagnetic ground conductivity and metal detection) paired with soil boring/test pit data and mapped site features (e.g., underground utilities, metal fencing) to evaluate the extent of landfill waste associated with the Site. Bay West created geophysical data models showing the approximate extent of the landfill waste, areas where the extent of waste is unknown, and areas where it appears landfill waste and/or contaminated fluids/groundwater extend off-Site.

Map showing geophysical conductivity (EM31 Quad-Phase) and Metal Detection of the SW#134 Begin Demolition Landfill

Client Contact Information

Mark Umholtz, PM, MPCA Closed Landfill Program

651-757-2308

Staff Assigned to this Contract Who Worked on the Project Example:

- Bill Lazarz, Project Manager
- Rick Van Allen, Project Manager
- Willy Miley, Project Manager/Scientist 2
- Donovan Hannu, Engineer 3
- Nigel Wattrus, Scientist 3
- Ryan Riley, Scientist 2
- Ben Czeck, Scientist 2
- Alex Blel, Scientist 1
- Lauren Idleman, Scientist 1

Subcontracted Tasks:

- Sampling Analysis
- Environmental Drilling

Relevancy to Category C Scope:

- Pre-submittals (Work plans, SSHP)
- Conduct/Oversee Site Assessment Activities
- H&S Air Monitoring
- Landfill Gas Monitoring
- Vapor Intrusion Assessment
- Indoor Air Monitoring
- Surface Water, Groundwater, Air & Vapor Receptor Surveys
- Response Actions – Vapor Mitigation
- Utility Corridor Monitoring
- Arrange for Geophysical Activities
- Reports/Deliverables

Project Completion Date: Ongoing

Project Outcome

Over four weeks in March and April 2018, Bay West obtained property access agreements and performed sub-slab sampling at 15 of 18 properties surrounding the Site. Bay West's expedited project delivery successfully completed the sub-slab sampling before the end of the winter heating season, meeting the MPCA's schedule objective.

Closed Landfill Program Project Example #2: *SW27 Vadnais Heights Demolition Landfill, Vadnais Heights, MN*

Site Description

The approximately 35-acre Site consists of a former landfill located at 655 County Road F East in Vadnais Heights, Ramsey County, Minnesota. The east side of the Site is currently occupied by Vadnais Heights Commons (City-owned event center, fire department, and public works). The central portion of the Site is a community park that includes baseball diamonds, a soccer field, parking lots and two recreational buildings. The west side of the Site is a wetland area. There are residential properties immediately adjacent to and surrounding the Site. Bay West was retained by the MPCA to perform environmental assessment and investigation activities to evaluate the potential risks posed to on- and off-site receptors by the landfill waste at the Site.

Historical sources indicate the Site was operated as a municipal and demolition debris landfill from at least the 1960s through 1970s. Buried municipal waste and construction debris, including potential asbestos-containing material (ACM), have been identified in test pits at the Site. It appears that landfill debris was excavated and moved elsewhere on the Site during construction of the Commons building circa 2010.

Tasks Performed

Phase I ESA – In June 2016, Bay West performed a Phase I ESA on the Site that identified recognized environmental conditions (RECs) and vapor encroachment conditions (VECs) associated with the former municipal and demolition landfill on the Site. A test pit environmental investigation was conducted in connection with the landfill on the Site in 2009. Buried municipal waste and construction debris, including potential asbestos containing material (ACM), was identified in the test pits. It appears the landfill wastes were deposited to a depth up to 15 feet bgs over an area of at least 17 acres. Polycyclic aromatic hydrocarbons (PAHs) and diesel range organics (DRO) were detected in soil at the Site. No soil vapor or groundwater assessment activities were performed as part of the 2009 site investigation. Based on the Phase I ESA findings, it was determined that potential contamination associated with the historical landfill on the Site may pose a health and safety risk to on- and off-site receptors.

Phase II Investigation – In June 2017, Bay West completed a Phase II subsurface investigation including: soil boring advancement for soil and groundwater sampling (including per- and polyfluoroalkyl substances [PFAS] sampling); installation of soil gas monitoring points for landfill gas screening and analytical sampling; groundwater receptor risk assessment; and transportation and disposal of investigation-derived waste (IDW). The results of the Phase II revealed the following:

- DRO exceeded the MPCA unregulated fill criteria and benzo(a)pyrene (BaP) equivalents exceeded the Residential and Industrial SRVs in the soil samples collected at depth in the landfill waste from three soil borings. 2,3,7,8-TCDD equivalents (dioxins/furans) also exceeded the Industrial SRV in one soil boring.
- The soil samples collected at depth within the landfill waste were collected from extended soil intervals (8-20, 2-12, 2-12, and 4-24 ft bgs) due to limited soil recovery and the high volume of soil needed for the various laboratory analysis. The DRO, BaP equivalents, and dioxins/furans soil impacts are potentially as shallow as 2 ft bgs. Based on this information, the DRO, BaP equivalents, and dioxins/furans soil impacts do not appear to pose a risk to on-Site recreational receptors. However, the DRO, BaP equivalents, and dioxins/ furans soil impacts pose a potential risk to on-Site workers performing excavation activities.
- BaP equivalents, 4,4'-DDT (pesticide), PFAS, manganese (dissolved), and 2,3,7,8-TCDD equivalents (dioxins/furans) exceeded the respective screening criteria in the groundwater samples. Based on the groundwater risk assessment, the Site groundwater impacts pose a potential risk to eight domestic wells identified within 500 feet of the Site. Of the eight identified private wells, four wells located north of the Site are at residences currently supplied with municipal drinking water. Bay West's interview with the City of Vadnais Heights indicated that the four domestic wells located immediately south and southwest of the Site along County Road F East are currently in use for domestic drinking water.
- 1,1,2,2-tetrachloroethane, 1,4-dichlorobenzene, and ethylbenzene exceeded the Residential 33x ISVs in four permanent soil gas points. The VOC soil gas impacts pose a potential risk to the concession building on the Site.
- Methane was detected at concentrations up to 70% of total vapor and 10% of the lower explosive limit (LEL), with methane identified in several soil gas points installed throughout the Site, indicating potential vapor intrusion risks to on- and off-site receptors.
- There is approximately 2 feet of topsoil and sand fill above the landfill fill soil and waste in the areas of the Phase II soil borings. The approximate final depth of landfill waste in the soil borings was observed ranging between 9 to 23 ft bgs. Landfill waste was also observed in the soil lithology at 15 of the permanent soil gas monitoring points (installed to maximum depth of 12 ft bgs).

Map of the former Vadnais Heights landfill showing locations of soil borings and permanent soil gas sampling points.

Client Contact Information

Mark Umholtz, Project Manager, MPCA Closed Landfill Program

651-757-2308

Staff Assigned to this Contract Who Worked on the Project Example:

- Rick Van Allen, Project Manager
- Willy Miley, Project Manager/Scientist 2
- Ryan Riley, Scientist 2
- Jim Leisz, Scientist 2
- Alex Blel, Scientist 1
- Lauren Idleman, Scientist 1

Subcontracted Tasks:

- Sampling Analysis
- Environmental Drilling

Relevancy to Category C Scope:

- Pre-submittals (Work plans, SSHP)
- Site Investigations
- H&S Air Monitoring
- Landfill Gas Monitoring
- Evaluate Invoices and Data Reports
- Transportation and Disposal of IDW
- Surface Water, Groundwater, Air & Vapor Receptor Surveys
- Vapor Intrusion Assessment
- Site Access Agreements and Coordination
- Bid Documents
- Reports/Deliverables

Project Completion Date: Ongoing

Project Outcome

Based on Bay West's Phase II investigation results, the MPCA determined there is an uncontrolled methane vapor plume that represents a potential vapor intrusion risk to on- and off-site buildings. In March 2018, the MPCA Emergency Management Unit retained Bay West to perform water well and vapor sampling and vapor extraction system design activities to further evaluate the groundwater and vapor intrusion risks on and surrounding the Site.

Section 4
Scope of Services

Section 4: Scope of Services

4.1 Experience with Category C Scope of Services

As a current Level 3/Category A contractor, Bay West has the right experience and capabilities to perform the investigation, RD, and RA oversight activities required under this contract. We take great pride in the work that we have executed under the current master contract, and we believe that our efforts are reflected in the positive feedback we have received from the State of Minnesota in our customer satisfaction surveys with over 90% of respondents rating Bay West very good or excellent in quality of work and 100% of respondents rating our project management as very good or excellent.

This section describes Bay West's experience related to the Closed Landfill Program, and answers the program-specific RFP requirements, including a point-by-point description of experience in each scope of services area and experience in applicable regulations. **Exhibit 4-1** presents a table of contents for this Scope of Services section. **Exhibit 4-2** aligns our key personnel with their experience as it relates to the Category C scopes of service.

Exhibit 4-2: Bay West Staff Scope Experience - Category C

#	List of Category C Services	PMs															Engineers												QA/QC and Safety								
	Primary Classification	Ed Bacig	Matt Schemmel	Jonna Bjelland	Alex Blel	Donovan Hannu	Shawn Lyman	Amanda Malaney	Willy Miley	Chris Musson	Rick Van Allen	Jeff Gordon	Laura Jensen	Bill Lazarz	Paul Raymaker	Jay Rowe	Katie Larson	Brent Vizanko	Paul Walz	Marty Wagensteen	Emily Widstrand	Andrew Peterson	Taylor Pierce	Dirk Pohlmann	Richard Traver	John Lux	Caroline Newcombe	Marc Asmus	Stacy Warmack	Nathan Gruman	Xiong Yang	Matt Ader	Brad Kulberg	Eric Malarek	Nancy McDonald	Doug Hickey	Scott Norman	Peter Jacobs
1	Design remediation systems and strategies for remediation of subsurface contamination. Contaminated subsurface media includes, but is not limited to, soil, solid waste, groundwater, methane, and/or other vapor.	X	X	X		X	X	X	X	X	X		X	X	X	X	X		X	X		X	X	X	X	X	X			X			X				X
2	Oversee or conduct bench scale lab treatability studies, pilot testing and field demos	X	X	X	X	X	X	X		X	X			X	X			X	X	X		X	X	X	X							X					X
3	Prepare corrective action design documents (e.g., CAD design reports, pilot test reports, installation notification reports, monitoring reports, plans, and as-built reports).	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X		X			X			X				X
4	Prepare Health and Safety Plans (HASP).	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
5	Oversee site investigation services for soil boring advancement, and monitoring well installation using both standard drilling methods, and direct push methods.	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X			X			X					X
6	Conduct groundwater, soil, surface water, sediment, and air sampling and monitoring.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X			X			X	X				X
7	Conduct vapor/air monitoring for health and safety and air quality criteria.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X			X	X	X	X	X	X	X	X	X
8	Conduct and/or oversee site assessment activities (Phase I and Phase II), limited site investigations and remedial investigations.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X			X			X			X					X
9	Conduct surface water, ground water, air and vapor receptor surveys.	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X	X	X	X			X			X		X	X					X
10	Arrange for transportation, storage, and proper management of wastes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X			X	X	X	X	X			X	
11	Evaluate the need for and oversee the implementation of alternative drinking water supply, including point-of-use treatment (i.e. filtration).	X	X	X		X	X	X			X		X	X	X	X			X	X			X	X									X	X				
12	Coordinate and cooperate with other State-contracted services such as sampling and analytical, emergency response contractors, and hazardous waste services.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							X	X		X	X				X
13	Oversee subcontractors and state contractors during investigation and cleanups and tank removals	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X			X	X		X	X				X
14	Prepare and evaluate reports (e.g., investigation reports, monitoring reports, free product recovery reports).	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X			X			X	X	X	X	X	X
15	Evaluate invoices and data reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	Collect and manage field and laboratory data for electronic submittal in a format specified by the MPCA	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X			X			X	X		X	X	X			X
17	Evaluate data quality and data verification reports	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X		X	X				X						X	X	X			X
18	Arrange for site access	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X			X					X
19	Coordinate utility locates by contacting the appropriate entity and if applicable coordinate traffic control	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X		X			X			X					X
20	Prepare and evaluate bid specifications	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X			X	X				X
21	Prepare and review Quality Assurance Project Plans (QAPP) and Sampling and Analysis Plans (SAP) in accordance with state and federal requirements.	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X		X	X	X			X						X	X	X	X		X

Exhibit 4-2: Bay West Staff Scope Experience - Category C

#	List of Category C Services	Primary Classification: PMs																Engineers											QA/QC and Safety								
		Ed Bacig	Matt Schemmel	Jonna Bjelland	Alex Blel	Donovan Hannu	Shawn Lyman	Amanda Malaney	Willy Miley	Chris Musson	Rick Van Allen	Jeff Gordon	Laura Jensen	Bill Lazarz	Paul Raymaker	Jay Rowe	Katie Larson	Brent Vizanko	Paul Walz	Marty Wagensteen	Emily Widstrand	Andrew Peterson	Taylor Pierce	Dirk Pohlmann	Richard Traver	John Lux	Caroline Newcombe	Marc Asmus	Stacy Warmack	Nathan Gruman	Xiong Yang	Matt Ader	Brad Kulberg	Eric Malarek	Nancy McDonald	Doug Hickey	Scott Norman	Peter Jacobs
22	Design comprehensive remedial action remedies and remediation systems	X	X	X		X					X								X	X		X	X	X	X	X		X				X					
23	Conduct surface water, ground water, and hydrodynamic modeling.	X	X			X	X				X				X				X	X		X		X	X					X		X					X
24	Conduct third party review and analysis of technical information for the purpose of providing conclusions and recommendations to the State.	X	X	X		X	X	X	X	X	X		X	X	X		X		X	X					X					X			X					X
25	Perform five year reviews/ and site reviews	X	X			X					X		X	X			X		X	X		X		X									X					X
26	Review groundwater remediation technologies and recommend alternatives and optimization options.	X	X	X		X	X				X			X					X	X		X	X	X	X	X		X					X					
27	Provide evaluation and design of energy recovery systems utilizing landfill gas			X					X					X		X										X												
28	Research, evaluate and implement innovative technologies	X	X				X			X	X			X	X			X	X	X	X	X	X	X	X	X	X	X		X			X					
29	Prepare presentations and present information at meetings	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X		X			X	X			x	X
30	Prepare and determine if the Stormwater Pollution Prevention Plan (SWPPP) is being followed and make recommendations if revisions are needed during the life of the construction project.	X	X	X		X					X	X	X	X			X		X			X	X	X			X						X					
31	Prepare Erosion Control Plans and oversee implementation.	X	X	X							X			X			X		X	X		X	X	X	X		X	X					X					
32	Provide technical assistance to the State in the evaluation and interpretation of data and information	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X					X			X	X				X
33	Assist and provide training as requested by the MPCA or MDA. Training must be related to the scope of this contract	X	X			X	X	X			X			X			X													X								
34	Follow MPCA Green practices/procedures for remediation projects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X														
35	Oversee hydrogeologic investigations including fate & transport modeling, capture zone analysis and pump tests		X	X							X			X			X	X	X	X		X					X			X			X					X
36	Complete Capture zone analysis.	X	X								X								X	X		X		X			X						X					
37	Perform aquifer pump tests.	X	X	X							X			X	X				X	X		X		X						X			X					
38	Perform/oversee evaluation of soil borings, test pits, environmental boring and soil testing to determine cover integrity and availability of suitable soils.		X	X					X		X			X	X				X	X		X	X	X		X	X			X			X					
39	Arrange for geophysical activites	X	X			X		X	X		X			X	X		X		X	X		X	X	X			X			X			X					
40	Conduct/oversee studies of hydrogeology, geology and soils utilizing geophysical studies, modeling, and dye trace studies.	X	X						X		X			X		X			X	X			X	X		X							X					
41	Prepare construction cost estimates using standard engineering practices	X	X	X		X			X	X	X		X	X	X			X	X	X	X	X	X	X		X	X						X					X
42	Assist the MPCA during the bidding process.	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X		X	X	X						X				X				
43	Provide project management and construction oversight.	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X					X
44	Prepare construction documentation reports	X	X	X		X	X	X	X	X	X			X	X	X	X		X	X		X	X	X	X	X	X	X	X				X					
45	Prepare Operation and Maintenance Manuals	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X		X	X	X							X				X	X
		42	44	38	24	37	33	31	32	28	44	18	30	42	35	28	33	21	43	42	16	40	36	39	19	16	29	9	6	29	7	5	41	16	7	5	7	28

Exhibit 4-2: Bay West Staff Scope Experience - Category C

#	List of Category C Services	Primary Classification: Scientists																															
		Sam Bader	David Berthene	Lauren Idleman	Jim Leisz	Barry Lindsay	John Peper	Craig Rebischke	Ryan Riley	Preston Schrupp	Patrick Sweeney	Ben Czeck	Scott Tracy	Sam Cook	Brandon Flaada	Hillary Oswald	Matt Held	John Dickerson	Peter LaGoy	John Olson	James Gatherer	Scott Cobb	Joe Erjavec	Nick Goldsmith	Nathan Kleist	Josh Miller	Steve Pierson	Aaron Roski	Andy Smith	Wendy Tindall	Nigel Wattrus	Christian Tabano	Brenda Winkler	Total
1	Design remediation systems and strategies for remediation of subsurface contamination. Contaminated subsurface media includes, but is not limited to, soil, solid waste, groundwater, methane, and/or other vapor.																			X	X					X							X	29
2	Oversee or conduct bench scale lab treatability studies, pilot testing and field demos										X									X						X	X	X					X	26
3	Prepare corrective action design documents (e.g., CAD design reports, pilot test reports, installation notification reports, monitoring reports, plans, and as-built reports).								X	X	X	X	X		X	X				X						X							X	36
4	Prepare Health and Safety Plans (HASP).	X	X	X	X		X	X	X	X	X	X	X	X	X	X			X	X	X			X		X	X	X	X	X		X	X	60
5	Oversee site investigation services for soil boring advancement, and monitoring well installation using both standard drilling methods, and direct push methods.		X	X		X	X	X	X	X	X	X	X	X	X	X				X	X					X							X	43
6	Conduct groundwater, soil, surface water, sediment, and air sampling and monitoring.		X	X		X	X	X	X	X	X	X	X	X	X	X				X	X					X	X	X					X	47
7	Conduct vapor/air monitoring for health and safety and air quality criteria.	X	X	X		X	X	X	X	X	X	X	X		X	X				X				X	X	X	X	X					X	53
8	Conduct and/or oversee site assessment activities (Phase I and Phase II), limited site investigations and remedial investigations.		X	X			X	X	X	X	X	X	X	X	X	X				X						X		X					X	41
9	Conduct surface water, ground water, air and vapor receptor surveys.		X	X		X	X	X	X	X	X	X	X	X	X	X				X						X							X	42
10	Arrange for transportation, storage, and proper management of wastes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X				X	X	X	X	X	X	X			X	55
11	Evaluate the need for and oversee the implementation of alternative drinking water supply, including point-of-use treatment (i.e. filtration).		X			X		X	X	X				X	X					X	X					X	X	X						29
12	Coordinate and cooperate with other State-contracted services such as sampling and analytical, emergency response contractors, and hazardous waste services.	X	X	X	X	X	X	X	X	X	X	X		X	X	X				X				X	X	X	X	X					X	48
13	Oversee subcontractors and state contractors during investigation and cleanups and tank removals		X	X	X	X	X	X	X	X	X	X		X	X	X		X		X				X		X	X	X	X				X	50
14	Prepare and evaluate reports (e.g., investigation reports, monitoring reports, free product recovery reports).		X	X	X		X	X	X	X		X	X	X	X	X				X	X					X		X				X	X	49
15	Evaluate invoices and data reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	X	X	X	X	X		X	X	64
16	Collect and manage field and laboratory data for electronic submittal in a format specified by the MPCA		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X			X							X	51
17	Evaluate data quality and data verification reports		X	X	X		X			X		X	X		X	X				X			X			X	X	X					X	39
18	Arrange for site access		X		X	X	X	X	X	X	X	X	X	X	X	X				X					X	X	X	X				X	X	50
19	Coordinate utility locates by contacting the appropriate entity and if applicable coordinate traffic control		X	X	X	X	X	X	X	X	X	X	X	X	X	X				X						X	X	X					X	46
20	Prepare and evaluate bid specifications				X	X	X	X	X	X		X	X	X	X	X				X						X						X	X	46
21	Prepare and review Quality Assurance Project Plans (QAPP) and Sampling and Analysis Plans (SAP) in accordance with state and federal requirements.				X		X		X	X			X		X				X	X						X		X				X	X	38

Exhibit 4-2: Bay West Staff Scope Experience - Category C

#	List of Category C Services	Primary Classification: Scientists																																			
		Sam Bader	David Berthene	Lauren Idleman	Jim Leisz	Barry Lindsay	John Peper	Craig Rebischke	Ryan Riley	Preston Schrupp	Patrick Sweeney	Ben Czeck	Scott Tracy	Sam Cook	Brandon Flaada	Hillary Oswald	Matt Held	John Dickerson	Peter LaGoy	John Olson	James Gatherer	Scott Cobb	Joe Erjavec	Nick Goldsmith	Nathan Kleist	Josh Miller	Steve Pierson	Aaron Roski	Andy Smith	Wendy Tindall	Nigel Wattrus	Christian Tabano	Brenda Winkler	Total
22	Design comprehensive remedial action remedies and remediation systems									X					X					X						X							X	19
23	Conduct surface water, ground water, and hydrodynamic modeling.								X	X	X		X							X	X					X							X	22
24	Conduct third party review and analysis of technical information for the purpose of providing conclusions and recommendations to the State.			X	X							X	X		X				X	X						X							X	28
25	Perform five year reviews/ and site reviews																									X							X	15
26	Review groundwater remediation technologies and recommend alternatives and optimization options.												X							X	X					X							X	21
27	Provide evaluation and design of energy recovery systems utilizing landfill gas																	X																6
28	Research, evaluate and implement innovative technologies												X							X						X							X	24
29	Prepare presentations and present information at meetings									X			X				X			X		X				X						X	X	38
30	Prepare and determine if the Stormwater Pollution Prevention Plan (SWPPP) is being followed and make recommendations if revisions are needed during the life of the construction project.								X				X							X						X		X					X	21
31	Prepare Erosion Control Plans and oversee implementation.							X		X	X		X													X							X	21
32	Provide technical assistance to the State in the evaluation and interpretation of data and information		X	X	X		X		X	X	X	X	X		X	X			X	X	X					X							X	42
33	Assist and provide training as requested by the MPCA or MDA. Training must be related to the scope of this contract								X	X																								11
34	Follow MPCA Green practices/procedures for remediation projects	X	X	X	X	X	X	X	X	X	X	X		X	X	X				X				X	X	X	X	X						X	44
35	Oversee hydrogeologic investigations including fate & transport modeling, capture zone analysis and pump tests		X						X		X									X	X					X							X	20
36	Complete Capture zone analysis.																			X	X					X							X	13
37	Perform aquifer pump tests.								X	X	X				X					X	X					X							X	20
38	Perform/oversee evaluation of soil borings, test pits, environmental boring and soil testing to determine cover integrity and availability of suitable soils.																			X						X							X	18
39	Arrange for geophysical activites												X							X						X					X		X	22
40	Conduct/oversee studies of hydrogeology, geology and soils utilizing geophysical studies, modeling, and dye trace studies.												X							X	X					X							X	17
41	Prepare construction cost estimates using standard engineering practices												X					X		X						X						X	X	27
42	Assist the MPCA during the bidding process.			X								X	X		X					X						X							X	29
43	Provide project management and construction oversight.						X	X	X	X	X		X		X	X		X		X						X	X	X				X	X	44
44	Prepare construction documentation reports							X	X	X			X					X		X						X						X		31
45	Prepare Operation and Maintenance Manuals							X	X						X					X						X							X	31
		6	19	18	15	14	20	21	28	29	22	21	30	16	27	20	2	6	5	41	15	2	2	7	6	43	14	18	4	3	1	10	41	

Design Remediation Systems and Strategies for Remediation of Subsurface Contamination.

As a full-service firm, Bay West has many engineers trained in multiple fields of study (e.g., chemical, civil, mining, environmental, and electrical). These personnel, along with other technical staff (e.g., geologists, hydrogeologists, chemists, etc.) have designed numerous comprehensive multi-media subsurface remediation systems and remedial actions. Bay West staff includes 5 MN registered Professional Engineers. Bay West professional engineers have experience in the preparation and certification of design documents (plans and specifications) for comprehensive remedies.

Designing the correct remediation systems and actions must include more than engineering calculations. Contractors must be able to physically construct the system and design consideration must be given to efficient operations. Bay West's in-house experience with construction and operations of comprehensive remedial systems provides a method of ground truthing the constructability of designs.

Bay West has extensive experience preparing design documents and bid specifications that allow solicitation of competitive bids in accordance with the State of Minnesota requirements and the FARs. Bay West routinely prepares specification packages in accordance with established policies and guidance developed by organizations such as the CSI and the US Government. Bay West routinely uses standardized specifications available from CSI. Incorporating site specific requirements into standardized specification packages allows Bay West to prepare concise and accurate specifications in a minimal amount of time and for a reduced overall cost.

An important element of the design and specification development process is preparing the cost and price analysis of a proposed remediation system. Given our wide client base (i.e., federal, state, local government, and various industries), Bay West routinely performs environmental work under several types of contracts (e.g., firm-fixed price, time & material, and cost plus fixed fee). To prepare accurate cost estimates for the various types of projects and track costs as work progresses, Bay West uses sophisticated estimating (RACER©) and cost tracking/reporting (e.g., Deltek©) systems. Estimates for equipment, laboratory analytical, waste disposal, and on-site construction work are obtained through subcontractors, suppliers, and/or reference documents such as the RSMeans Cost Works. These estimating tools are used to provide accurate cost and price analyses of approved response actions and to guide specification preparation.

Bay West routinely incorporates "value engineering" into our specification package development. Value engineering allows the consideration of various equivalent construction techniques and materials available for achieving a specific goal or objective. As the alternatives are equivalent, the primary factor in selecting a technique or material is cost. Utilizing our cost estimating software packages and industry cost reference documents, Bay West is quickly able to evaluate various alternatives and incorporate the most cost-effective techniques and materials into the specification package.

Types of projects which Bay West has prepared specifications include excavation and off-site disposal, on-site treatment including stabilization, ex-situ and in-situ bioremediation, chemical oxidation, dual phase extraction system installation. Representative projects involving the preparation of comprehensive remedial action plans/remedies and bid specifications are illustrated below.

Representative Experience:

Superior Plating, Minneapolis, MN – Bay West, per the request of the MPCA in 2015, designed a permanent leachate collection system (LCS) to capture and treat site groundwater contaminated by hexavalent chromium. Bay West prepared design specifications for the permanent LCS incorporating existing components of the temporary LCS, specifically the collection sump, into the design. Integral design components included connecting the existing collection sump to new effluent lines discharging to permanent storage tanks, designing a treatment building capable of housing necessary treatment and discharge controls and associated piping, including necessary components for system controls/telemetry, providing adequate system leak protection, and developing a system which operates semi-autonomously. Additional design considerations addressed by Bay West included system size limitations due to limited available site space to house the permanent system, limited site access, and building aesthetics requirements to conform with intended end us of the surrounding property. Bay West completed bid specification development and bidding in accordance with Department of Administrations (MDA) bidding requirements, procurement of a subcontractor to construct the permanent LCS, and managed and oversaw the successful construction of the permanent LCS.

Southview PCE Site, South St. Paul, MN – Bay West designed, installed, and now operates and maintains a soil vapor extraction system on a former dry cleaner site located in South St. Paul. After completing a focused investigation using MIP

and collecting deep vertical soil gas samples to characterize the vapor plume at the Site, Bay West prepared a Remediation System Detailed Corrective Action Design Report (SDCAD) in accordance with MPCA guidance documents and based on previous pilot testing data. Bay West then prepared detailed bidding specifications through the Minnesota Department of Administration's purchasing department and provided oversight during the installation of the SVE system. After the system was installed and operational, Bay West prepared a Remediation System Operation Monitoring Report (RSOM) documenting the installation and operation. RSOM Reports are currently prepared twice a year documenting the sampling and system operation. Bay West also prepared a O&M Manual for the system.

Oversee, Design, and/or Conduct Pilot Testing, Bench Scale Testing, Field Demos, and Treatability Studies of Remediation Systems or Technologies.

Bay West has designed and executed more than 120 pilot studies for corrective action design projects to assess feasibility and treatability. In Minnesota, Bay West utilizes MPCA Petroleum Remediation Program (PRP) Guidance Documents (7-05 and 7-06), when appropriate Brownfields Program Services guidance documents, and applicable RCRA and MPCA risk-based site evaluation (RBSE) for Superfund sites when performing pilot/treatability/feasibility studies. Bay West has conducted pilot and treatability studies on various types of environmental media including groundwater, soil, soil vapor, and sediments. Depending on the technology being examined, the studies have generally involved laboratory, bench-scale, and/or pilot-scale testing to evaluate the performance of a technology for remediating environmental media under varying operating conditions.

Bay West has designed and conducted bench scale and/or field pilot studies at sites in Minnesota and across the US for our Federal, State, and commercial clients to evaluate the following treatment technologies:

- Air sparging
- Biostimulation/bioaugmentation
- Dual-phase extraction (DPE)
- MPE
- Product recovery systems
- Groundwater extraction
- Surfactant flushing in combination with mobile MPE
- Bubble-less gas transfer
- Chemical oxidation
- SVE
- Hydraulic fracturing and injection

Bay West personnel responsible for conducting a pilot study are involved in the planning and execution of the RI to assure the investigation develops the correct data for use in the pilot study to develop economical and effective site remedies.

Representative Experience:

Holiday Station, Duluth, MN –Bay West performed a pilot test in accordance with the MPCA-approved June 2010 "Pilot Test Work Plan" consisting of the following components:

- Coordinating with the City of Duluth and Western Lake Superior Sanitary District (WLSSD) to obtain permission to temporarily discharge into the sanitary sewer during the test.
- Mobilizing a mobile treatment system (MTS) to the Site. The MTS consisted of a liquid-ring blower, a liquid/vapor separator, a liquid transfer pump, oil/water separator, air stripping equipment, carbon vessels, and a trailer-mounted generator.
- Installing a drop pipe and constructed well head connections for the extraction well and monitoring points.
- Conducting a MPE pilot test for 24 hours a day for 3 days.
- Providing oversight of the MTS including measuring groundwater elevations and vacuum influence at surrounding monitoring wells and vacuum points approximately every 30 to 60 minutes while on-Site.

- Monitoring remediation system performance during the test, including recording flow rates, water levels, volumes, vacuum, air flow, temperature, percent O_2, percent carbon dioxide, and organic vapor PID readings at the extraction manifold. Installing and collecting continuous water level data from down-well transducers.
- Collecting air emission samples during each of the three steps of the test (at 2 and 24 hours for each step, six total air samples). Submitting air samples to a laboratory for analysis of BTEX, and total petroleum hydrocarbons (TPH) as gas (EPA Method 18/TO-3).
- Collecting groundwater samples from the extraction well prior to the pilot test and from the condensate tank after the groundwater had been removed from the well during each of the three steps of the test for laboratory analysis.
- Submitting the water samples to a laboratory for analysis of BTEX, GRO, and DRO. Groundwater samples were also analyzed for iron, calcium, manganese, and total hardness to monitor for indication of possible system fouling during full-scale system operation.
- Collecting two discharge samples from the groundwater treatment system during each of the three steps of the test for laboratory analysis.
- Submitting post-treatment water samples for VOCs, GRO, DRO, oil and grease, potential of hydrogen (pH), lead, Hg, and total suspended solids.
- At the completion of the test, monitoring groundwater elevations and vacuum measurements at the extraction well and surrounding monitoring wells as the potentiometric surface recovered.

The pilot test was evaluated based on the pneumatic and hydraulic response parameters, concentrations and treatability of the recovered air and groundwater contaminants, emission contaminant concentrations, and treatment requirements. Upon completion of the pilot test, Bay West submitted a Pilot Test Report (Guidance Document 7-06).

<u>*Plating Inc, St. Paul, MN*</u> – *Bay West was hired at this Site* to provide environmental assistance to fulfill the requirements of a Stipulation Agreement between our client and the Metropolitan Council regarding the Metropolitan Council Environmental Services (MCES) Industrial Discharge Permit Number 0128.

This facility was struggling with exceedances of effluent concentrations of both zinc and cyanide. Bay West conducted the following activities:

- Collected samples at multiple points in the wastewater treatment system and submitted these samples to Pace Analytical for both zinc and cyanide analysis to establish a reference point of concentrations throughout the wastewater treatment system and to calculate the snapshot efficiencies of the cyanide destruction system and the solids removal for the entire system.
- Reviewed the current operation of the wastewater treatment system and documented the process flow, the working tank volumes, and feed chemistries. Bay West observed the typical operation of the wastewater treatment system and made recommendations for immediate improvements: Operators should immediately determine and correct the cause for all alarms indicating that system subcomponents are operating outside of the set-points (e.g., malfunctioning feed pumps, lack of feed chemistry, oxygen reduction potential [ORP]/pH probes out of calibration) and the cyanide rinse valve on the process line should remain open and in the same position during all operating hours to maintain a consistent flow volume and relatively consistent cyanide concentrations in discharge water.
- Conducted jar testing on the cyanide rinse water using four potential treatment technologies expected to decrease the effluent concentrations of both zinc and cyanide, evaluated the efficiency of each treatment technology and proceeded with additional jar testing to evaluate the treatability effectiveness of selected technologies at different treatment concentrations and parameters.

Throughout the project, Bay West communicated with the MCES to ensure that all the requirements regarding the Stipulation Agreement were met. Bay West completed a detailed work plan for additional jar testing, effluent testing, and system improvement implementation for our client.

<u>*MLAC, University of Minnesota*</u> – Bay West conducted laboratory bench testing to quantify the effectiveness of acid treatment in dissolving solid pipe deposits from various pipe locations within a panning system. Dried deposit samples from the header, drop, and sump room pipes were placed in beakers along with varied concentrations of muriatic acid to dissolve the samples. Initial and final masses of deposits were measured to determine the percentage of mass dissolved in each trial. To mimic site conditions, similar acid dissolution testing was conducted in the presence of source groundwater.

Hydrochloric acid was titrated into the source groundwater to quantify its alkalinity. Muriatic acid was titrated into the source groundwater to observe the relationship between the amount of acid added and pH.

Bay West also conducted hydrogen peroxide treatment jar testing of water collected from a horizontal remediation well. Bay West collected samples of the untreated groundwater and submitted them to the laboratory for BTEX, VOCs, and sulfide analysis. Bay West also internally analyzed the sulfide concentration of the untreated groundwater using the Hach analysis kit in the shop. Hydrogen peroxide treatment jar testing at then completed at 4 treatment concentrations, including one duplicate treatment test. Samples were then collected from each jar test and submitting to the laboratory for BTEX, VOCs, and sulfide analysis. Bay West also internally analyzed the sulfide concentration of each jar test using the Hach analysis kit in the shop.

Finally, Bay West prepared a letter report that discussed the results of the tests.

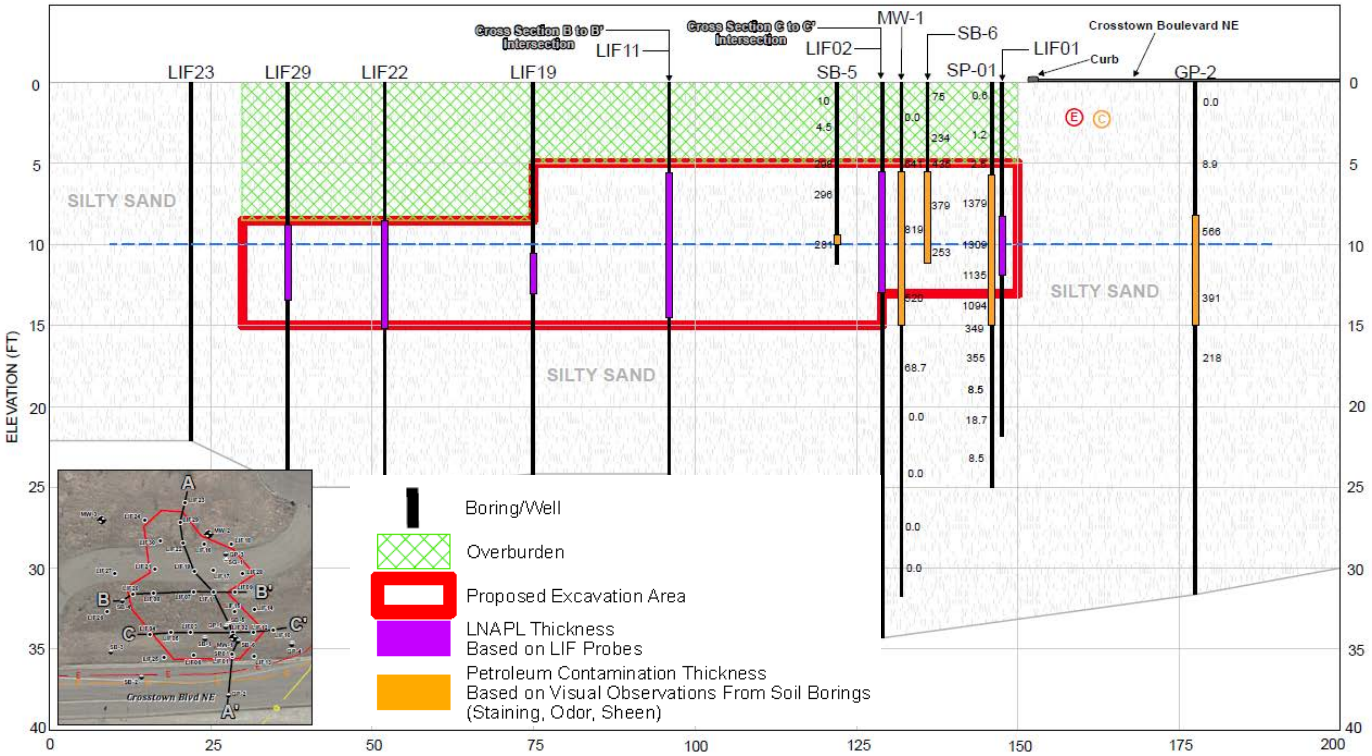
Prepare Corrective Action Design Documents (e.g., CAD Design Reports, Pilot Test Reports, Installation Notification Reports, Monitoring Reports, Plans, and As-Built Reports.

Over our 44-year history of installing and designing corrective action systems, we have prepared and evaluated/reviewed thousands of CAD documents including but not limited to feasibility studies, RA plans, RDs, corrective action design reports, pilot study work plans and pilot study results reports as well as CAD installation worksheets and CAD monitoring worksheets. Bay West's familiarity with MPCA PRP, Superfund, Brownfield, and MDA Program Guidance allows us to prepare reports in the appropriate format and with the correct information to inform the reviewer to determine the constructability, effectiveness, and/or completeness of the proposed corrective action.

Our lengthy experience with installing and operating CAD systems gives us a unique prospective when evaluating CAD documents. It provides us the ability to provide detailed critical reviews of CAD documents and to identify issues that may arise during implementation including: constructability issues, performance issues, and potential O&M issues which may ultimately affect the successfulness of the proposed CAD.

Representative Experience:

Southview PCE Site, South St. Paul, MN – Bay West designed, installed, and now operates and maintains a SVE system on a former dry cleaner site located in South St. Paul. After completing a focused investigation (FI) using a membrane-interface



Bay West used LIF data to define the extent of a LNAPL plume and plan a targeted LNAPL body excavation.

probe (MIP) and collecting deep vertical soil gas samples to characterize the vapor plume at the Site, Bay West prepared a Remediation System Detailed Corrective Action Design (SDCAD) Report in accordance with MPCA guidance documents and based on previous pilot testing data. Bay West then prepared detailed bidding specifications through the Minnesota Department of Administration's purchasing department and provided oversight during the installation of the SVE system. After the system was installed and operational, Bay West prepared a Remediation System Operation Monitoring Report (RSOM) documenting the installation and operation. RSOM Reports are currently prepared twice a year documenting the sampling and system operation. Bay West also prepared a O&M Manual for the system.

Former Central Garage Site, Ham Lake, MN –Bay West completed an FI that included 30 LIF probes to delineate the vertical and horizontal extent of LNAPL. The LIF data identified one continuous LNAPL zone present in the soils above and below the water table. The LNAPL plume extended 90 ft east to west and 120 ft north to south with a maximum thickness of 8.2 ft. Later, Bay West submitted a Remedial Action Alternatives Analysis (RAAA) report. The RAAA report outlined three remediation techniques—excavation, AS/SVE, and multiphase extraction—and rated each technique based on time to completion, cost, and effectiveness. Excavation received the highest overall score due to its effectiveness and brevity of activities. In February 2018, Bay West submitted an Excavation Detailed Corrective Action Design (EDCAD) Report. Items included in the EDCAD included:

- *Reason for proposed corrective action* – The LNAPL composition risks include dissolved phase groundwater contamination and vapor phase soil gas impacts. The dissolved phase groundwater contamination represents a risk to water supply wells surrounding the Site. The soil gas impacts represent a risk of vapor intrusion to buildings surrounding the Site. The LNAPL saturation risk represents a continued LNAPL source of mobile groundwater contamination and soil gas impacts
- *Corrective action goal* – The corrective action goal is to remove the LNAPL body from the Site, preventing it from being a continued source for dissolved-phase groundwater contamination and soil gas impacts.

Excavation will remove nearly 90% of the LNAPL -contaminated soils. Crosstown Blvd NE was widened in 2009, and currently overlies the southern extent of the LNAPL plume. Approximately 11% of the total LNAPL body volume will be left in place due to the roadway and the OSHA sloping requirements.

Approximately 1,600 cubic yards of overburden soils will be segregated from LNAPL-contaminated soils and stockpiled onsite. Overburden soil will not be field screened because the LNAPL body is well-defined by the LIF data. Additional vapor screening may lead to unnecessary disposal of soil due to vapors originating from the contaminated soil beneath it. Furthermore, no post-excavation sampling is recommended because the entire LNAPL body will be excavated based on the LIF data and previous investigation results. The total estimated amount of LNAPL-contaminated soil to be excavated is 2,400 cubic yards.

Prepare Health & Safety Plans (HASPs)

Bay West, as a matter of policy and OSHA requirements, initiates and implements a site-specific HASP prior to commencing any field work. To efficiently prepare HASPs, Bay West has developed several standard HASP formats whose use depends upon the project's complexity and degree of safety and health hazards. Lower risk projects generally require less complex project HASPs generally consisting of a brief scope of work summary and a complete hazard evaluation ranging from 1 to 6 pages long. More complex and hazardous project HASPs will include a complete hazard evaluation as well as a more detailed (10 to 75 pages) write-up regarding:

Bay West has prepared more than 2,700 site-specific HASPs in the last 5 years.

- Project description
- Organization and command
- Hazards (physical, chemical, biological, radiological) analysis and control
- Site control
- PPE
- Air/exposure monitoring
- Decontamination
- Contingency planning
- Activity hazard analyses

The HASP addresses the site-specific hazards and control measures (i.e., engineering, administration, work practices, and PPE) to be taken to protect personnel. This evaluation is prepared based on the initial site-specific information. If actual site conditions vary from the initial information, the plan is modified according to actual site conditions. All project team members review the HASP and participate in a plan are briefed prior to any work commencing. The review and briefing are acknowledged by each worker by signing the HASP.

In addition, all subcontractors must also review and acknowledge the HASP prior to being allowed on site. Bay West ensures all subcontractors on its projects adhere to the HASP and have the proper training required to perform their tasks. Bay West has prepared more than 2,700 site specific HASPs in the last 5 years.

Representative Experience:

MN Superfund Site, Former Finland Air Force Station, Finland, MN–Bay West prepared a HASP for its employees involved in long-term monitoring activities at the Former Finland Air Force Station. Using background information on the site history, geology, and hydrogeology found in the Environmental Remediation Services Contractor Work Plan, the Bay West Safety and Health Specialist prepared a comprehensive HASP to safeguard all personnel during site activities. The HASP required all personnel to read the Work Plan and QAPP prior to conducting on-site work to familiarize themselves with overall project goals and to increase their awareness of potential on-site hazards.

The HASP outlined Background Information, Staff Organization and Responsibilities, Training, Employee Medical Surveillance, Accident Reporting, Hazard Identification and assessment, Hazard Control, PPE, Air Monitoring, Site Control, Decontamination, and Contingency Plan. Daily tailgate meetings were conducted prior to the start of each day to communicate the days planned activities and the safety protocols associated with them. These activities were conducted in Level D up to modified Level D PPE during May through October timeframe. The HASP guided the crews in safely working around the many potential chemical hazards (PAHs, PCBs, and VOCs), physical hazards (slips, trips, falls, inclement weather, heat stress), biological hazards (ticks, poisonous plants), and radiological hazards (ultraviolet radiation). These hazards are typical of long-term monitoring type activities. One H&S point of interest for this site is it is in a very remote location; the nearest hospital is about an hour drive from the site. All field personnel were trained in cardiopulmonary resuscitation (CPR), first aid, and are well versed in the contingency plan portion of the HASP should an emergency arise.

One example of unexpected waste was the discovery of medical waste during excavating. The work was halted, and by following HASP protocols, it enabled the crew to successfully resume the excavating in a timely matter avoiding a costly delay in the excavation schedule. Over the two-year period of the project with almost 3,000 labor hours logged including subcontractors, there were no recordable incidents.

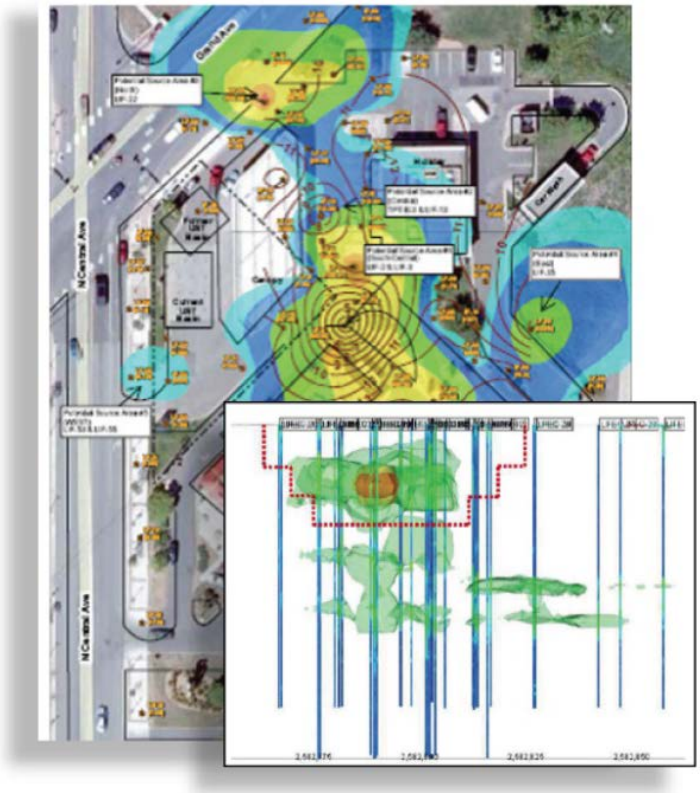
Oversee Site Investigation Services for Soil Boring Advancement and Monitoring Well Installation Using Both Standard Drilling Methods and Direct Push Methods

Bay West has multiple staff members who regularly provide field oversight of SI activities, including Minnesota Registered PGs, and former drill rig operators. This experience allows our personnel to select the most technically sound and cost-effective drilling techniques available to resolve specific environmental issues at a variety of sites.

Bay West has completed subsurface assessments using a wide variety of technologies for different site conditions and objectives. Bay West is experienced in the application of methods that produce fast, reliable results.

Bay West is very familiar with MPCA Guidance Documents and has designed and conducted soil, groundwater, and soil-gas investigations throughout the State to determine the nature and extent of hazardous-substance releases. Bay West recognizes the importance of obtaining the required data in a timely and cost-effective manner. As such, we design investigations to ensure the required data is collected with a minimum number of mobilizations/demobilizations. Bay West communicates the status of investigations to the MPCA project managers as work is being performed. This allows real-time transfer of investigation data, provides a forum for discussing project specifics, and allows decisions to be made regarding adjustments to approved field activities (e.g., location of a specific boring, number of samples collected, etc.) at the time the work is being performed. This saves costs by reducing the amount of time and level of effort required to address investigation issues.

Bay West has utilized the Triad approach to decision-making for hazardous waste sites which offers a technically defensible methodology for managing decision uncertainty that leverages innovative characterization tools and strategies. The Triad refers to three primary components, systematic planning, dynamic work strategies, and real-time measurement systems.



Bay West used state-of-the-art ultraviolet optical screening tools to characterize underground contamination.

Bay West has utilized LIF and MIP direct sensing technology to rapidly characterize and profile underground petroleum, oil, lubricant, and chlorinated solvent contamination using the latest state-of-the-art ultraviolet optical screening tools. LIF probes can be used to identify petroleum saturated soils to target excavation or remedial well design. The MIP is a screening tool with semi-quantitative capabilities acting as an interface between the contaminants in the subsurface and gas phase detectors at the surface. MIP probes also collect electrical conductivity data which allow for in situ characterization of subsurface soil lithology which can be a critical tool for characterizing a remedial site. With direct sensing technology and immediate data processing services, detailed site conceptual models provide accurate, high definition three dimensional (3D) maps using data points delivered immediately to field and office personnel. Data reports include color-coded logs that convey qualitative at-a-glance information. The results of the direct sensing probes can be modeled using 3D software and can be monitored as the SI evolves throughout the day, via a secure web site, in near real-time by all interested parties.

Bay West regularly performs subsurface investigations utilizing push-probe, hollow-stem auger, split-spoon sampling, cable-tool, air-rotary, rotary, and roto-sonic drilling techniques. Bay West has been successful in its subsurface investigation projects because we understand the processes required to conduct scientifically sound subsurface investigations. These processes include:

- Up-front planning, often in the form of a Field Sampling Plan and associated project meetings or communications with the MPCA, MDA, and MDH to determine the specific scope of work and investigation goals.
- Collecting available background information including regional and site geology, hydrogeology, and contaminant characteristics to properly determine which subsurface investigative technique(s) should be utilized.
- Researching all available information to identify subsurface utilities including conducting a utility locate through Gopher One-Call.
- Communicating project goals, objectives, and schedules with drilling and analytical subcontractors.
- Preparing comprehensive work plans, including site-specific HASPs and SAPs, for use by Bay West and subcontractor personnel.
- Obtaining access agreements from property owners and communicating project schedules and goals to property owners at the direction of the MPCA/MDA.

Representative Experience:

SW27 Vadnais Heights Demolition Landfill, Vadnais Heights, MN – Bay West completed a Phase II subsurface investigation for an approximately 35-acre former landfill located in Vadnais Heights, Minnesota. The subsurface investigation included soil boring advancement using direct-push drilling technology for soil and groundwater sampling (including per- and polyfluoroalkyl substances [PFAS] sampling) as well as installation of soil gas monitoring points for landfill gas screening and analytical sampling. Based on soil cores collected from direct push drilling, Bay West was able to determine the stratigraphy and fill composition at the landfill, which consisted of 2 feet of topsoil and sand fill overlying the landfill fill soil and waste. The approximate final depth of landfill waste in the soil borings was observed ranging between 9 to 23 ft bgs. Landfill waste was also observed in the soil lithology at 15 of the permanent soil gas monitoring points (installed to maximum depth of 12 ft bgs).

Southeast Hennepin Area Vapor and Groundwater Site (SA #249/SR 1401), Minneapolis, MN – Bay West completed several SIs at the site, including the advancement of 30 temporary wells via direct push technologies and two temporary wells via HSA to investigate potential TCE and PCE source areas on behalf of the MPCA and EPA. The temporary well locations were dispersed over a large urban area that required extensive utility locate and spatial coordination. Due to the physical properties of solvents, Bay West directed the drilling subcontractor to advance the temporary wells for discrete groundwater sampling at multiple intervals in the unconsolidated aquifer, including one interval screened at the water table interface, and one interval screened directly above the bedrock interface or at refusal. The borings ranged in depth from 35 to 95 ft bgs. Bay West collected continuous soil samples for geologic classification and PID screening. Bay West provided oversight throughout the investigations and ensured that the drilling subcontractor followed proper procedures with borehole sealing, equipment decon, and H&S.

Woody's Auto, Randolph, MN – Bay West conducted an initial site assessment at the Woody's Auto Site located in Randolph, MN. The site assessment included SB advancement, monitoring well installation, and soil gas probing. Two SBs were advanced using direct push technology to a depth of 28 ft bgs to assess the magnitude of soil and groundwater contamination at the Site. Soil samples were screened continuously in 2 ft sections with a PID and headspace analysis sampling was conducted according to MPCA soil sample collection and analysis procedures (Guidance Document 4.04).

To investigate the magnitude of groundwater contamination, possible LNAPL, and vapor intrusion at the Site, four monitoring wells were installed using an HSA rig. MW-1 was advanced to approximately 30 ft bgs. MW-2, MW-3, and MW-4 were advanced to approximately 28 ft bgs. MW-1 and MW-2 well construction consisted of 20-ft screens from 9 to 28 ft bgs with filter pack (red flint sand and gravel) from 6 to 30 ft bgs. Bentonite seals were completed from 4 to 6 ft bgs. A grout seal (Portland cement) was inserted on top of the bentonite seal from 0 to 4 ft bgs. MW-3 and MW-4 had similar well construction except 10-ft screens were installed instead of 20-ft screens. All four monitoring wells were installed as at-grade monitoring wells which consisted of 4-by-4-ft concrete pads, locking cap with expansion plugs, and flush mounted vault covers. Each well cover was installed at least two inches above surrounding grade.

Conduct Ground Water, Soil, Surface Water, Sediment, & Air Sampling/ Monitoring

Bay West understands that proper multi-media sampling is the cornerstone of any environmental project. Our capabilities include the ability to sample groundwater, soil, surface water, sediment, air, soil vapor, sludges, solids, and gases, and to coordinate subsequent laboratory analyses. Bay West has a variety of field and analytical sampling equipment, including PIDs, flame ionization detectors (FIDs), air-sampling pumps, combustible gas/O_2 meters, ionizing-radiation meters, Lumex Hg analyzers, Niton X-ray fluorescence (XRF) analyzers, and flow-through cells that can be used to measure pH, temperature, oxidation-reduction potential, turbidity, specific low-flow conductance, and dissolved-oxygen concentrations. Bay west also maintains inventory of various type of groundwater sampling equipment including, Grundfos submersible pumps with variable speed controllers, QED pneumatic bladder pumps, bailers, peristaltic pumps and battery operated submersible pumps. The proper selection and use of groundwater sampling equipment ensures the collection of the most representative samples and most defendable data.

Bay West's technical staff performs field testing and sample collection in compliance with all applicable state and federal guidance documents and regulations, as well as SAPs prepared by Bay West or others. Bay West SAPs are designed in a manner that allows project objectives to be completed in the most cost-effective manner. Cost savings can be obtained by combining various standard sampling procedures to improve efficiency while still meeting project objectives. As an example, Bay West has utilized immunoassay techniques in conjunction with "fixed-base" laboratory analysis to help support increased field efficiency while still meeting the data quality objectives (DQOs) at a reduced cost.

Through 44 years of environmental sampling, Bay West has gained extensive familiarity with the various methods, procedures, and techniques for sampling a vast array of media. Bay West routinely performs air sampling for indoor air quality, regulatory compliance, and vapor risk assessments or to examine site conditions. Bay West, through performance of numerous subsurface investigations and site assessments, has collected soil samples using various techniques including grab, composite, hand auger, and split-tube sampling.

In the face of challenging sampling situations, Bay West has designed site-specific sampling techniques for the collection of groundwater, surface water, and sediment samples to supplement the standard procedures for sampling these media. Examples of site-specific sampling techniques include collecting surface water and sediment samples in both winter (i.e., through ice) and summer (i.e., on open water) through coring and dredging techniques. Sample plans have also included

reconnaissance and a subsequent round of sampling at the same location requiring marking, recording, and accurate navigation. Bay West utilizes its technical and professional staff to create and implement comprehensive sampling plans. After sample collection, Bay West utilizes a subcontracted laboratory to perform specified sample analyses.

Bay West's professional staff is proficient in reviewing and processing analytical data into usable information using Earthsoft's Environmental Quality Information System (EQuIS) data management software. We utilize EQuIS's data management tools for secure data store storage and archiving, QC, and data deliverable, greatly increasing efficiency and reducing human error often associated with data manipulation and management.

Bay West's in-house QC program adds value to our projects. The program includes an on-line electronic analytical data review and management process in which Bay West's QC Officer is provided with complete laboratory analytical reports, including all QC data. Bay West's QC Officer reviews the report to ensure data meet quality objectives and is appropriately interpreted and qualified. Additionally, Bay West's QC Officer audits laboratories with respect to their internal operations backlog. If either performance or capacity issues are identified during the QC Officer's review, samples may be redirected to an alternate laboratory. Finally, Bay West's QC Officer will work with the analytical laboratory prior to a project to provide the laboratory with specific information required to obtain the desired product (e.g., required method detection limits, unusual matrix) and reviews procedures required to establish a consistent analytical approach for the duration of a project (e.g., utilizing same dilution between sampling events to obtain consistent reporting limits) in order to provide more complete and defensible data.

Bay West maintains excellent working relationships with a variety of MDH-certified laboratories that have State contracts. We evaluate laboratories based on container delivery, electronic data delivery, turnaround time, green and sustainable practices, and overall service. Consequently, we receive great service for our clients that is timely and cost-effective.

Representative Experience:

SW134 Former Begin Demolition Landfill, Plymouth, MN – Bay West completed sampling of various media at an approximately 9-acre former landfill located in Plymouth, Minnesota. As part of Phase II and landfill gas assessment, Bay West collected soil and groundwater samples from soil borings for analysis of per- and polyfluoroalkyl substances (PFAS), dioxins/furans, metals, PCBs, PAHs, and VOCs. Soil gas samples were collected by Bay West from soil gas monitoring points installed by Bay West for landfill gas screening and analytical sampling. Following initial investigation and assessment activities, the MPCA Emergency Management Unit (EMU) retained Bay West to perform the additional landfill gas assessment activities at properties on the site as well as city and county right-of-way and private properties surrounding the Site. Sampling activities included indoor air and port-of-entry monitoring (four events) with a landfill gas meter and CGI, 24-hour indoor air sampling for methane, and landfill gas monitoring at a roof-top passive venting system. Following these activities, Bay West was retained by the property owner to prepare and install a Landfill Gas Mitigation System Design for a building on the site.

Groundwater:

L#13173 Esselman Store, Sauk Rapids, MN – Bay West, working under separate work orders for the MPCA Petroleum Program and the MDA, conducted quarterly groundwater sampling of 14 monitoring wells and 15 private domestic drinking water wells. Bay West uses the low-flow sampling technique to purge and sample the wells. The EPA has developed this technique (EPA 540-S-95-504) to minimize stress on the well and to provide the most representative sample of formation water. The low-flow technique involves purging the well at a low rate (0.1 to 0.5 liters/minute) while maintaining little or no drawdown within the well column. This technique leaves the stagnant water above the well screen in place while drawing directly from the aquifer. This procedure minimizes purge water disposal volume and minimizes the potential for raising the turbidity in the well which could bias both inorganic and organic results.

Once the well draw down was stabilized (ideally less than 0.3 ft), a flow-through cell was connected to the purge line and the following parameters were measured and recorded every 3 to 5 minutes until all had stabilized for three consecutive readings:

- Temperature (± 0.1 unit)
- pH (± 0.1 unit)
- Dissolved Oxygen (10%)
- Oxidation/Reduction Potential (± 10 millivolts)

- Specific Conductivity (5%)
- Turbidity (10% for values greater than 1 Nephelometric Turbidity Unit [NTU])

Once stabilization was achieved and the well drawdown remained stable, sampling commenced. The discharge tube from the pump was disconnected from the flow through cell and the samples were collected directly from the well tubing. The purge water was discharged to the ground surface after sampling after MPCA approval.

Bay West collected the private well samples from the cold water tap prior to any type of water treatment (softener, etc.). Bay West ran the water for 12 to 15 minutes to purge the lines and well, and then collected and prepared the water sample for laboratory analysis. Samples were delivered to the laboratory with chain-of-custody (CoC) documentation. The sample name (based on the MDH unique well number), collection date and time, were placed on the CoC and on each sample bottle. "P2 Priority" was noted on the MDA Lab CoCs, as requested by the lab.

Carbon treatment systems are located at two properties. Bay West collects semi-annual sampling of the GACs, including pre-GAC, mid-GAC, and post-GAC samples to monitor the carbon treatment systems at each property.

Bay West coordinated with two different labs for this complex sampling. A State contract lab was used for nitrate, TKN, MDA List 1 Pesticides, VOCs, and GRO. Bay West also coordinated with the MDA lab for analysis of nitrate, TKN, and LC/GC Pesticides.

QA/QC samples were also collected and consisted of one equipment blank per day (estimated 5 per event) and one blind duplicate sample (one per 10 samples) (estimated 3 per event). Bay West completed the MDA GD29 — Laboratory Data Review Checklist for each non-MDA laboratory report.

Soil Sampling:

L#13173 Esselman Store, Sauk Rapids, MN – In an effort to obtain a better understanding of the shallow groundwater plume and agricultural contaminated soils associated with this Site, Bay West oversaw a state contractor driller advance SBs and install TMWs. All borings followed rules regarding permitting and registration issued by the MDH.

Soil and groundwater sampling was conducted in accordance with MDA Guidance Documents. Boring locations were documented using a global positioning system (GPS) device with sub-meter accuracy. Bay West completed the MDA GD29 — Laboratory Data Review Checklist for each non-MDA laboratory report.

Discrete soil samples were collected for laboratory submittal from the 0.0 – 0.5, 2.0 – 2.5, 4.5 – 5.0, 7.5 – 8.0, and 9.5 – 10.0 ft interval from each boring. The 2.0 – 2.5 ft interval was analyzed by the laboratory and the rest of the samples were frozen and held by the laboratory pending the results of the 2.0 – 2.5 ft interval. Bay West consulted with MDA staff to determine if additional samples should be analyzed by the lab. Soil samples were submitted to a state contract lab for analysis of nitrate, TKN and LC/GC Pesticides.

Surface Water Sampling:

Former Pilgrim Cleaners, Brooklyn Center, MN—A historical release of the dry-cleaning solvent PCE from this former commercial dry cleaner resulted in a groundwater contaminant plume underlying a residential neighborhood. The groundwater periodically intersects a storm sewer line that drains to a small lake resulting in periodic discharges of PCE-contaminated groundwater to the lake. As part of the SI, Bay West conducted several rounds of surface water sampling to assess the lake for the presence of PCE and its breakdown products. Samples were collected at the storm sewer outfall to the lake, from a boat at the center of the lake, and at the outflow from the lake. Surface water analytical results were compared to State of Minnesota surface water quality standards.

Sediment Sampling

SLR AOC, MN – Bay West performed extensive contaminated sediment sampling to support RD at 11 sites throughout the SLR AOC, collecting over 900 sediment samples in the past 5 years, producing over 36,000 analytical results. Bay West utilized a variety of sediment samplers throughout our work in the AOC, including the following: vibracore sampler, push-core sampler, Russian peat corer, hand corer, Bolivia piston sampler, and ponar dredges. Each sampler provides unique advantages to achieve project goals, including the ability to extract an undisturbed sediment profiles up to 20 ft in length for logging and analytical sample collection in predetermined intervals. Bay West is also ready to deploy a variety of boats to use for sediment sample collection, including a 20-ft pontoon boat with a moon pool capable of supporting a vibracore and tripod, an 18-ft aluminum V-hull boat with core-tube port, a light-weight jon boat, and inflatable raft. These boats allow

Bay West to enter any body of water that requires significant travel to reach sample locations. During sample collection, Bay West utilizes electronic data collection on an iPad to efficiently generate field notes and sediment core logs complete with sample core photos and sample location maps.

Air Sampling:

Southeast Hennepin Area Vapor and Groundwater Site (SA #249/SR 1401), Minneapolis, MN – Bay West completed vapor intrusion assessments (VIAs) that included the installation of over 180 sub-slab soil gas vapor ports at the site for laboratory analysis of VOCs to investigate and evaluate breathing risks due to TCE and PCE in soil vapor behalf of the MPCA and EPA. The project is in a dense, urban area that is mixed industrial, commercial, and residential. The location of the site provided a diverse set of building sizes, construction, usage, etc. that required Bay West to have the knowledge and adaptability to deal with a variety of building conditions and tenant requests that affect air sampling methods and placement. Part of a successful sub-slab soil gas pin installation is the upfront communication Bay West has with property owners and/or tenants regarding building information, installation/sampling process, and building assessment objectives. Sub-slab vapor monitoring and soil gas points were installed in accordance with Bay West's standard operating procedures (SOPs) for Ambient Air/Soil-Gas Sampling/Sub-Slab Monitoring/VIA and Sub-Slab Vapor Monitoring Point Installation and Sample Collection. At properties that required vapor intrusion mitigation systems, Bay West performed post-mitigation confirmation sample collection during heating and non-heating seasons that included collection of concurrent sub-slab, indoor air, and outside ambient air samples following pressure-field extension (PFE) diagnostic testing. Bay West conducted VIAs in accordance with the MPCA guidance document "Vapor Intrusion Technical Support Document," the MPCA Site Assessment QAPP, and the current MPCA Vapor Intrusion BMPs.

Woody's Auto, Randolph, MN – Bay West conducted an initial site assessment at the Woody's Auto Site located in Randolph, MN. Five soil gas probes were completed at the Site to evaluate the presence of vapor constituents in the isolated soil strata. The soil gas samples were collected using hollow steel rods instrumented with expendable point holders. The expendable points were driven to the desired depth (4 and 8 ft). The center rod with an expendable point knock out pin attached was lowered through the rod assembly and was used to disconnect the expendable point. A threaded adapter end was connected to the polyethylene tubing and inserted down the probe rod; the threaded adapter was then connected to the terminal end of the rod assembly via threads located in the expendable point holder. The rod assembly was pulled up slightly to ensure complete disengagement of the expendable point. Prior to collection of the soil gas sample, approximately two volumes of the tubing air were extracted using a graduated syringe. The sample was collected by attaching the top end of the tubing to a gas-tight sampling device (i.e., mini-Summa, Summa, or other sealed container) with an in-line vacuum gauge. The sampling device was opened and filled with soil vapor sample. The vacuum gauge was monitored to check progress of canister filling. The sampling device valve was then closed and submitted for laboratory analysis.

Conduct Vapor/Air Monitoring for Health & Safety & Air Quality Criteria

Bay West personnel are very experienced and knowledgeable in Minnesota, EPA, OSHA, and National Institute for Occupational Safety and Health (NIOSH) air sampling methods. Most vapor/air monitoring associated with petroleum and solvent releases is completed to determine if vapors are present in sewer/utility lines or buildings and to monitor the emissions of remediation systems. Due to the potential of human exposure to vapors in buildings, Bay West confirms the results of the direct reading instruments by collecting analytical samples using Summa Canisters or charcoal tubes. When monitoring the emission rates of remediation systems, both in field and laboratory analyses are completed. Bay West also monitors vapors in subgrade structures such as storm sewers and basements, when appropriate.

Bay West maintains an inventory of direct-reading monitoring and sampling equipment including PIDs, FIDs, combustible gas indicators (CGIs), colorimetric indicator tubes, particulate monitors, and compound-specific monitoring devices. Bay West's sampling equipment includes sampling pumps, sampling media (filters, charcoal tubes, etc.), impingers, tedlar sample bags, and flow calibration equipment.

At closed landfills or other release sites with large vapor plumes, Bay West installs permanent soil gas monitoring points for multi-round vapor screening and sampling for landfill gas and other COCs. During environmental drilling and excavating activities at closed landfill sites, Bay West performs explosive atmosphere monitoring in bore holes and excavations to protect worker safety.

Bay West has a CIH on staff that provides program management and the necessary technical oversight to each project. To ensure that each instrument is operating correctly, Bay West tracks the required maintenance and calibration records for

each monitor. Bay West also has procedures in place to ensure that all personnel are trained in the proper calibration and use of sampling and monitoring equipment and methods.

Representative Experience:

Superfund Site SR#131, Former Superior Plating, Minneapolis, MN – In May and June of 2014, the Superior Plating building was demolished, and contaminated soil was excavated by another party. During demolition and excavation Bay West provided perimeter air monitoring and sampling. The scope of services was as follows:

- Prepared a SAP.
- Procured laboratories for analyses that were not on the state contract using the MPCA's Purchasing Manual.
- Collected vapor samples from the four monitoring wells on-site and analyzed them for hydrogen cyanide (HCN) by NIOSH Method 6010. The results were used to evaluate whether additional cyanide sampling would be necessary during the excavation phase of the project.

During the four weeks of demolition operations, Bay West performed the following activities at site visits (approximately 2.5 times per week):

- Observed and documented activities completed and ensured the work was being completed as outlined in the remediation plan submitted by the property owner to the MPCA.
- Performed real-time sampling of ambient air for particulate matter less than or equal to 10 micrometers in size (PM10) and total suspended particulate (TSP) matter using a handheld particle counter. Concentrations were recorded at a rate of once per hour in all four cardinal directions from the site.
- Performed real-time sampling of ambient air for VOCs and HCN using a handheld RAE Systems MultiRAE Plus 4-gas (O_2, LEL, carbon monoxide [CO], and HCN) with PID with 10.6-electronvolt (eV) lamp calibrated to 100 ppm. Concentrations were recorded at a rate of once per hour in all four cardinal directions from the site.
- Looked for evidence of contaminants migrating off site and documented demolition and excavation activities with photographs.
- Prepared daily reports that summarize collected data, findings, and photographs.

In addition to the items above, the following activities were performed at site visits (scheduled at approximately 2.5 times per week) during the five weeks of excavation operations:

- Conducted sampling of ambient air for heavy metals (chromium and nickel) from four locations per day using three-piece 37-millimeter polystyrene cassettes with 0.8 micron mixed cellulose ester (MCE) filters. The samples were collected and analyzed using NIOSH Method 7303.
- Conducted sampling of ambient air for hexavalent chromium from four locations per day using low flow vacuum pumps with 37-millimeter two-piece styrene cassettes containing a 50-micron polyvinyl chloride (PVC) media. Samples were analyzed by OSHA Method ID215 version 2.
- Conducted sampling of ambient air for HCN from four locations per day using low-flow vacuum pumps with solid sorbent tube media. Samples were analyzed by NIOSH Method 6010.
- Conducted sampling of ambient air for VOCs from two locations per day using a summa canister with an 8-hour flow controller. Samples were analyzed by EPA Method TO-15.

Characterization of VOC soil-vapor concentrations that exceed the 10x Residential ISVs. The 10x Residential ISVs are applicable and are the more conservative regulatory action level used for gauging site conditions.

Conduct/Oversee Site Assessment Activities (Phase I & Phase II), Limited Site Investigations, & Remedial Investigations

Bay West has performed more than 1,200 multi-media Phase I Environmental Site Assessments (ESAs) and Phase II subsurface investigations throughout the country, with over 70 of those investigations occurring in the last 5 years. Bay West's multi-disciplinary staff has saved our customers over $2,500,000 by identifying environmental liabilities because of the due diligence we performed. These assessments have been conducted on a wide range of industrial, commercial, manufacturing, transportation corridors, and multi-unit residential properties, as well as government-owned maintenance and storage properties. In addition to being knowledgeable about assessment guidelines established by the American Society

for Testing and Materials (ASTM), Bay West is also experienced with Phase I and Phase II Guidance Documents under the MPCA's Brownfield Program Services and MDA's AgVIC program. Other non-ASTM-scope considerations Bay West has incorporated into Phase I and Phase II projects include items such as asbestos, lead-based paint, mold, Hg screening, and wetlands. Bay West is attentive to the tight schedules and budgets required by our due diligence clients and we pride ourselves on responsiveness, flexibility, attention to the unique characteristics of each property transaction, and attention to changes in guidance.

Bay West has performed more than 35 LSIs in Minnesota over the last 5 years. The primary objective of an LSI is to identify and evaluate potential pathways linking petroleum contamination to potential receptors. These receptor pathways may involve groundwater, vapor migration, surface water, or direct human contact with contaminated soil. As part of the LSI, Bay West performs four primary tasks:

- Determine if emergency conditions exist;
- Review background information to identify potential contaminant sources and other environmental site conditions;
- Perform well, vapor, surface water, and surface soil receptor surveys; and
- Perform a subsurface investigation to determine the magnitude and extent of impacted soil, groundwater, and soil-gas, based upon potential contaminant sources.

If potential pathways exist between the receptors and the contamination, a RI is required. Most commonly, impacted aquifers require an RI, which will consist of a monitoring well network and additional aquifer evaluation. Monitoring wells must be located appropriately to determine the magnitude of contamination in source areas and define the horizontal and vertical extent of the impacted groundwater.

Representative Experience:

SW118 Rosemont Demolition Landfill, Rosemount, MN – Bay West performed a Phase I ESA at an approximately 10-acre former landfill located in Rosemount, Minnesota. The Phase I ESA identified RECs, Vapor Encroachment Conditions (VECs), and Historical Recognized Environmental Conditions (HRECs) associated with former use of the Site as a municipal landfill, demolition debris landfill, and gas station. Based on the Phase I ESA findings, Bay West determined that potential contamination associated with the historical uses of the Site may pose a health and safety risk to surrounding receptors. In March 2017, Bay West performed a Phase II subsurface investigation to evaluate the nature and extent of soil, groundwater, and soil gas contamination associated with the former landfill and gas station on the Site.

Super America, Coon Rapids, MN – To help our client obtain re-financing, Bay West completed a Phase I ESA for this Site in accordance with ASTM Standard Practice E 1527-05. In the Phase I ESA, which was completed by an Environmental Professional as defined in §312.10 part of 40 Code of Federal Regulations (CFR) 312, we identified one recognized environmental condition (REC): four USTs containing gasoline, diesel, and an alcohol-blend gasoline operated at the Site since 1997. Bay West then completed a Phase II Investigation, which consisted of advancing four soil probes near the USTs and dispensers. A petroleum release was detected in the groundwater; Bay West reported this release to the MPCA State Duty Officer, per MN Statute 115.061–Duty to Notify and Avoid Water Pollution.

Bay West then helped our client prepare the scope of services for a Petrofund RFP, then prepared our own proposal for the client using appropriate Petrofund bidding documents. Bay West conducted an LSI that consisted of receptor surveys, additional soil probes, and a VIA. Based on the results of the LSI, Bay West concluded that the groundwater at the site met the MPCA's definition of an aquifer and was impacted at concentrations exceeding the MDH HRLs, so a RI was required. Bay West installed four monitoring wells as part of the RI, sampled the wells on two occasions, and completed an RI Report, which recommended additional groundwater monitoring to verify plume stability. Bay West conducted four additional quarterly sampling events to verify plume stability, then completed an Annual Monitoring Report that recommended site closure. The MPCA concurred and the site was closed.

Conduct Surface Water, Groundwater, Air & Vapor Receptor Surveys

Bay West's engineers, hydrogeologists and environmental scientists have completed hundreds of petroleum release risk assessments/evaluations in accordance with MPCA Guidance Document 4-02. To ensure that all risks associated with a release are evaluated, Bay West has worked with the MPCA, MDA, MDH, and MDNR in many different capacities. Bay West personnel are effective in performing surface water risk evaluations, with extensive experience in developing Oil Spill

Response Plans for the Oil Pollution Act Regulations. Bay West understands the need to quickly identify environmentally sensitive areas within, and adjacent to, a surface water body that may become impacted from a petroleum release.

When performing a groundwater risk evaluation, Bay West cross references individual county well indexes against our current database of drilling subcontractors for additional information about unrecorded well locations not listed on the well indexes. Bay West has also performed a number of human health, environmental, and natural resource baseline risk evaluations on contaminated groundwater sites. As a current contractor on the State of Minnesota's Petroleum Tank and ER contracts, Bay West is proficient in the performance of vapor risk assessments. Bay West has performed countless risk evaluations as part of an LSI, RI, or in performance of ER projects.

For well and vapor receptor information, Bay West conducts a door-to-door survey of all properties within 500 ft of the project site in accordance with MCPA Guidance Document 4-07. This survey is conducted to determine if these properties have:

- Water wells, sumps, basements or other subsurface structures,
- Possible sources of contamination, or
- Vapor problems.

If no one is available at a property, a stamped and addressed postcard is left that summarizes these requests, the purpose of the request, and a statement of assumptions due to no response. A list of property addresses within 500 ft is also submitted to the city utility billing department to confirm the status of their water supply. Copies of all water well logs within ½-mile of the project site, along with the maps of the well locations, are obtained from the County Well Index and from the Minnesota Geologic Survey. Due to Homeland Security issues, the locations of municipal water supply wells are no longer available from these sources; therefore, we contact the city to obtain this information. We also use the MPCA's wellhead protection website to determine if the site is within a Wellhead Protection Area (WPA), Drinking Water Supply Management Area (DWSMA), or Source Water Assessment (SWA) Area.

Bay West staff have also completed numerous Level 1(formerly Tier 1) Screening Assessments in accordance with MPCA Superfund RBSE Guidance Documents. Specifically, Bay West has utilized the MPCA's guidance documents/spreadsheets in conjunction with the sites proposed property use to develop tier-based risk evaluations for various exposure pathways such as the soil-human health pathway using soil reference values (SRVs), soil leaching values (SLVs), and groundwater pathways. Bay West also has experience evaluating the soil/groundwater-air pathway, sediments-human health and ecological pathway, and soil/groundwater-surface water pathway. The risk assessment process includes:

- Hazard identification
- Exposure assessment
- Toxicity assessment
- Risk characterization

Bay West performs hazard identifications to pinpoint potential COCs (indicator chemicals) at the site for detailed assessment. Through the exposure assessment, Bay West identifies how human and ecological receptors are exposed (e.g., ingestion, inhalation, dermal contact), to what extent, and for how long. Bay West also performs fate and transport modeling to assist in the prediction of contaminant concentrations and migration.

For petroleum sites, as soon as a site's general remediation status has been identified, Bay West prepares and mails a Petroleum Release Notification Follow-up letter (MPCA Guidance Document 2-08) to the properties contacted during the 500-ft receptor survey. After the letters have been delivered, a copy of the letter and a list of the properties is submitted to the MPCA as documentation of this work.

Representative Experience:

Former Central Garage Site, Ham Lake, MN – Previous investigation activities included a Phase II ESA and an RI, which were completed between 2009 and 2010. A total of 28 wells were identified within a half-mile radius of the Site, five of which are located within 500 ft of the Site. Under the MPCA's PRP, Bay West completed a FI report that provided an updated and comprehensive site conceptual model. Potential exposure pathways including surface water, groundwater, and vapor receptors were reassessed in relation to the recently identified LNAPL plume.

Surface Water – Other than drainage ditches that may accumulate water during periods of precipitation/melt water, no surface waters were identified with 500 ft of the Site.

Groundwater – A total of 22 wells were identified within a quarter-mile radius of the Site. Bay West completed residential and commercial well sampling for 20 wells located within a quarter-mile radius of the Site in May 2017. A second round of sampling was completed in January 2018. VOCs including toluene and 1,2-dichloroethane (1,2-DCA) were detected in water samples collected from three of the 20 wells. 1,2-DCA was detected at a concentration of 1.3 µg/L in UW#258315, located 1,000 ft north of the Site. The HRL for 1,2-DCA is 1 µg/L. No well construction information was available for the private well. During the 2009 Phase II ESA, 1,2-DCA and 1,2-dibromoethane (EDB) were detected in SB/temporary well advanced within the former dispenser island. 1,2-DCA was detected at a concentration of 300 µg/L, which is greater than the HRL of 1 µg/L. 1,2-EDB was detected at a concentration of 68 µg/L, which is greater than the HRL of 0.004 µg/L.

Depth to groundwater in the SBs was observed at depths ranging from 8 to 16 ft bgs. Water level measurements in the wells has been observed at depths ranging from 9.91 to 13.53 ft bgs, with typical seasonal fluctuations. Groundwater flow at the Site has also fluctuated. During the November 2016 sampling event, groundwater flow was toward the northwest.

According to available wells logs, most wells in the area are completed to depths greater than 100 ft and draw from an aquifer at depths greater than 72 ft. These well logs also indicate the presence of low permeability clay sediments at least 33 ft thick, which would aide in preventing migration of contaminants through the surficial aquifer. There is also evidence that some wells in the area are shallow. The former well located at Erv's Barber Shop (UW#265006) was documented as a shallow sandpoint well according to the MDH. The MDH reported this well was sealed due to high nitrate concentrations.

Petroleum contaminants from this release have impacted groundwater at the Site. Additional well construction information for UW#258315 is required to assess risk to the utilized aquifer. Petroleum contamination has not been detected in monitoring wells MW 2 through MW 5, which are located downgradient and between the nearest private well and the Site.

Vapor – Limited soil gas data is available. Soil gas concentrations greater than 33X ISVs were detected at the Site; therefore, additional action has been recommended to determine potential risk to the residential property directly north of the Site. An access agreement has been personally delivered to the property owner.

Arrange for Transportation, Storage & Proper Waste Management

Due to our transportation, storage and waste management service capabilities, Bay West has performed thousands of projects involving the removal, disposal, and interim storage of recovered free product as well as petroleum impacted soil and water. In addition to these services, Bay West is also a licensed hazardous waste transporter, operates a St. Paul-based 10-day transfer facility, and owns several hazardous waste roll-off boxes. Bay West has full-time T&D coordinators who are responsible for developing sampling plans to thoroughly characterize waste prior to disposal. Bay West's waste management staff has developed an extensive network of disposal facilities and, when needed, licensed transporters, which offers valuable options to customers to meet their specialized needs (i.e., cost or schedule). Bay West reviews T&D provider licenses and permits for compliance with EPA, Department of Transportation (DOT), and state regulations. This is possible because Bay West maintains libraries, electronic media, and computer databases containing resources for Federal and State environmental regulations. Because of the broad-based experience and continuous training in this area, Bay West possesses the knowledge of the regulations necessary to save customers time and money.

Representative Experience:

Former Universal Plating, Minneapolis, MN – Bay West completed waste characterization and disposal activities at the former Universal Plating facility for Hennepin County in preparation for building demolition. As part of this project, Bay West:

- Performed a site assessment and created an inventory that included quantities and types of wastes that remained in the facility.
- Collected samples for waste profiling purposes and created waste profiles based on analytical results.
- Consolidated and repackaged similar waste types into UN-rated waste containers (i.e., drums, totes, roll-off boxes).
- Pressure washed the interior of the facility and collected the generated wash water which contained heavy metals and cyanides.
- Created Uniform Hazardous Waste Shipping Manifests, LDRs and labels/markings for waste containers.

- Coordinated the transportation of project generated hazardous and non-hazardous waste containers to a EPA and State approved waste end disposal facility.
- Performed a pre-demo survey and completed an asbestos assessment report based on building material sample results.
- Performed oversight of asbestos removal activities.
- Completed building pre-demo bid specifications.

Approximately 75 drums, 15 cubic yard boxes, 24 275-gal totes and four 20-yard roll off boxes of hazardous and non-hazardous wastes were generated and sent off site for disposal. The project is ongoing and is currently awaiting the final phase of building demolition.

Evaluate the Need For/Oversee Implementation of Alternative Drinking Water, Including Point-Of-Use Treatment (i.e., Carbon Filtration)

Bay West's engineers and geologists have experience in working with the MDH and the MPCA in the design and installation of water-supply replacement wells or water-supply point-of-use treatment systems at sites impacted by hazardous substances. Bay West has performed hundreds of such projects for the MPCA under the Superfund Multi Site, UST Multi Site and ER Full Service Contracts.

Bay West's knowledge of the water-well code and working relationship with the MDH allows early determination in a water-supply replacement or treatment project of what requirements will necessitate discussion and/or a variance request with the MDH. Bay West is also experienced in designing and installing carbon treatment systems for both residential and community water supplies impacted by volatile and SVOCs.

When a potable water supply is impacted, Bay West realizes that in addition to the MPCA, other stakeholders will be involved. Depending upon the project, these stakeholders may include home owners, business owners, RPs, and other governmental agencies. Bay West recognizes the importance of maintaining open communication with the parties involved under the direction of the MPCA. While completing project activities in accordance with approved work plans, Bay West also recognizes the importance of listening to project stakeholders while advancing the project.

Representative Experience:

Carlton County 2 Closed Landfill, MN – The Carlton County 2 Sanitary Landfill is 29.5 acres and contains approximately 815,000 cubic yards of waste accepted between 1972 and 1993. Water wells at four residences along a road downgradient of the landfill have arsenic concentrations exceeding the Maximum Contaminant Level (MCL) because of the landfill contaminant plume migrating off-site. Previous work had been completed to temporarily provide the residences with a potable water supply; however, Bay West completed additional activities determine a permanent feasible water supply alternative for the four residences with potable water. Bay West performed a screening and evaluation of six water supply alternatives:

- Alternative WS-1 – Continued level of effort (bottled water and sampling)
- Alternative WS-2 – Installation of new drift well and non-community potable water supply system
- Alternative WS-3 – Ground water treatment for residential wells in the form of Granular Activated Alumina (AA) filter units
- Alternative WS-4 – Connect residents to existing Western Lake Superior Sanitary District well
- Alternative WS-5 – Connect residents to city water supply

Based on the water supply alternatives analysis, Alternative WS-1 (limited action) and Alternative WS-5 were not feasible as they did not meet the water supply objective in either the long term or short term. Water supply alternatives WS-2, WS-3, WS-4, and WS-6 met the proposed water supply objectives and, therefore, were considered acceptable alternatives. Of the acceptable alternatives, Alternative WS-3 (groundwater treatment for residential wells) was technically and economically feasible. Bay West recommended that Alternative WS-3 be implemented as the water supply alternative.

Bay West oversaw the installation of granular AA filter units installed at three residences exhibiting arsenic impacts over the MCL in samples analyzed from their private water wells. One resident refused the AA treatment system and opted to continue utilizing bottled drinking water as their water supply alternative. Bay West personnel were on-site during the

construction and implementation of the treatment system utility sheds and system components. To avoid excessive costs associated with continual installation oversight, Bay West personnel performed frequent check-ins on the project status throughout installation.

> ***"Bay West's hard work and dedication to the project are obvious, and their customer service to the residents that we deal with is excellent."***
> - *From an MPCA PM on the Baytown Project*

Baytown Superfund Site, Baytown Township, MN – The TCE contamination plume extends eastward from the primary source area towards the City of Bayport and the St. Croix River. The plume of contaminated groundwater is approximately 5 miles long and covers approximately 7 square miles. The area of the site includes predominantly low-density residences and agricultural land, but also includes the general aviation Lake Elmo Airport and parts of the cities of Lake Elmo and Bayport. The primary source of the contamination was a metal working facility that operated from 1940 to 1968 at 11325 Stillwater Boulevard N. in Lake Elmo. The property is currently occupied by a convenience store and meat market (Hagberg's Country Market), a gasoline filling station, and other small businesses. Groundwater near the plume is used as a drinking water source for rural residences and commercial buildings and by the City of Bayport for their municipal water supply system. There are over 600 private residential water supply wells within the area of the plume. Sampling of private wells in Baytown Township, West Lakeland Township, City of Bayport, and City of Lake Elmo has identified numerous wells with TCE concentrations exceeding the MDH HRL of 0.40 µg/L.

Based on the residential well sampling data from 2002 through 2008, the MPCA established a sampling plan in 2009, which has been revised as recently as 2015, for tracking TCE concentrations at select private wells. Currently, Bay West samples private water supply wells and installs, changes out, maintains, and removes GAC filter systems for private wells that exceed or may exceed the HRL. Current O&M procedures are conducted in accordance with the MPCA Criteria for Baytown Superfund Site TCE Sampling and GAC Management Plan (last updated August 10, 2015). In 2015, approximately 140 private wells and 82 GAC systems were sampled. In 2016, 107 private wells and 29 GAC systems were sampled. As of January 2017, MPCA maintains GAC filters in 333 homes. Bay West has also been serving as liaison between the MPCA/MDH and affected property owners by providing analytical results, scheduling sampling and GAC system O&M, and answering questions that they may have regarding their water supply.

Coordinate/Cooperate with Other State-Contracted Services, such as Sampling & Analytical, Emergency Response Contractors, and Hazardous Waste Services

Bay West understands the importance of cooperating with other contracting agencies because of the key roles we now fill on Minnesota State contracts. As one of the MPCA's current full-service ER, Superfund Multi Site and PRP Multi Site Contractors, Bay West knows first-hand the critical nature of effective coordination and cooperation between all contract services and has worked directly with the State's contract laboratories, drilling contractors, other ER contractors, and waste/hazardous waste disposal providers. Bay West understands that effective communication and collaboration between all project stakeholders are a critical component to the overall success of a project. Bay West continually strives to facilitate communication between all project stakeholders, so that work is completed as efficiently and cost-effectively as possible.

Being the MPCA's full-service ER contractor also demonstrates Bay West's ability to "hand off" important site information to the follow-on contractor as a matter of course. As a Coast Guard-classified Oil Spill Removal Organization (OSRO) contractor, Bay West can also demonstrate its ability to work cooperatively with local, state and federal agencies (e.g., police, fire, Department of Natural Resources [DNR], EPA and US Coast Guard).

Representative Experience:

MPCA Projects with State Labs and Drilling, MN – After obtaining the necessary access agreement for each site and adjacent properties when necessary, Bay West requests cost estimates from State-contracted drilling companies for the performance of drilling activities. A State Contract Order Form (SCOF) with the list of contracted services to be provided and associated costs was submitted to the successful driller for signatures. Upon its return, the SCOF was signed by a Bay West authorized representative (listed under the MPCA Multi Site Contract) and the MPCA project leader. At that time, Bay West and the drilling subcontractor coordinate the procurement of all necessary permits and scheduled of an on-site utility meet prior to field activities. During field activities, the Bay West Project Manager communicated with field staff regarding progress and issues. The procedures summarized above are also followed for State-contracted analytical

laboratories and State-contracted waste disposal companies. Thorough communication between the Bay West project manager and the project managers for each State contractor resulted in a timely completion of the projects.

Various Disposal Projects, MN – Bay West works with a variety of waste T&D firms daily. Our coordination with these firms is essential to fully perform our obligations within the Minnesota Multi Site contract, the Minnesota ER Contract, the Ramsey County Household Hazardous Waste (managed by Bay West), and our commercial contracts. Bay West manages a wide range of waste streams including lab pack waste, healthcare waste, and large quantity waste streams generated from industrial cleaning, remediation, and ER projects. Bay West understands the complexities of EPA, DOT, and State of Minnesota waste regulations, waste characterization, securing waste approvals, waste storage requirements, and waste transportation regulations. With this knowledge, Bay West is well equipped to work with state-contracted waste management contractors to provide the most economical and appropriate disposal methods in a way that protects the interests of the State of Minnesota.

Oversee Subcontractors/State Contractors During Investigation & Cleanups and Tank Removals

Bay West routinely provides oversight of state contractors/subcontractors (contractors) retained by other parties to implement removal and/or response actions at remediation sites. Oftentimes, Bay West is involved with the project during the initial phases, having played a key role in completing the RI, identifying and evaluating potential response actions, and preparing detailed specifications for the response action selected. As part of this process, Bay West's involvement often extends to providing support during the bidding and contractor-selection process. Once a contractor has been awarded the field work, Bay West provides oversight of construction activities as they occur. General types of activities performed under this function include: communicating project status to the client; verifying that work is performed in accordance with project specifications and the HASP; collecting and analyzing samples to verify effectiveness of the selected remedy; and resolving issues that have the potential to affect the project schedule and/or budget.

Bay West's emphasis on safety extends to projects where Bay West supervises contractors working on a site. Contractors are required to submit a site-specific H&S plan and project work plan (work plan details equipment, materials, personnel and procedures the contractor will use to complete work in accordance with project specifications). The contractor cannot begin work on-site until these plans have been accepted and the required OSHA training and medical monitoring documentation have been provided for all on-site workers that will be on site. Contractor employees are required to be on site during the pre-construction H&S meeting and during the daily "tailgate" meetings. All contractor employees are responsible for understanding the general work rules, including the requirement to comply with safety rules, reporting of injuries, tampering with safety equipment (not allowed), and the prohibition against drugs and alcohol. Contractor compliance with safe work practices and rules is determined through observation by Bay West's Site Supervisor, other subcontractor employees, evaluation of required paperwork submittals (e.g., filling out and filing of confined space entry permits), and accident investigation. Contractor employees found not to be following the general work rules are subject to disciplinary actions, including removal from the job.

Representative Experience:

SW136 Herbst & Sons Demolition Landfill, New Brighton, MN – Bay West completed a Phase II subsurface investigation at an approximately 26-acre former landfill located in New Brighton, Minnesota. Bay West oversaw hallow-stem auger soil boring advancement by a State drilling contractor for the purposes of evaluating the nature and extent of landfill waste and collecting soil and groundwater samples. Bay West also oversaw the installation of four permanent soil gas monitoring points on the Site. In addition, Bay West prepared bid specifications for geophysical survey activities for use by the MPCA in selecting a contractor to conduct the geophysical survey at the Site.

Blaine Municipal Wells (SR #238/LS #14072), Blaine, MN – The MPCA retained Bay West to develop an investigation strategy to identify the source of 1,2-DCA contamination detected in select municipal wells. Bay West completed an extensive historical review of the Superfund site and surrounding leak SIs. Bay West identified a location as a potential source of DCA contamination and completed several subsurface investigations that determined the site was a shallow DCA source.

Bay West defined the area of contamination associated with the leaded fuel release and prepared an EDCAD report. The MPCA approved the EDCAD and hired Bay West to proceed with corrective action soil removal of approximately 8,000

tons of petroleum-contaminated soil. Bay West developed detailed bid specifications for public bidding through MN department of Admin.

An excavation contractor was procured and the MPCA retained Bay West to oversee the soil removal corrective action at the site. Due to the business operations at the site and location of the targeted soil removal, the work was required to be completed on a strict timeline – it was CRITICAL that all excavation, backfilling, compaction, and surface restoration be completed in three-week window in June when business operations were minimal.

Bay West kept the excavation contractor on schedule throughout the pre-planning and coordination process by setting timeline expectations and requesting/reviewing all required excavation plans, SOPs, engineering controls, permits, etc. Bay West reviewed contractor staff qualifications and certifications and verified all project staff met required safety and technical specifications.

Several logistical constraints were identified during planning/coordination. Bay West worked with the excavation contractor to identify solutions, develop alternate plan, and provide MPCA with details for approval. Bay West kept the project on track with significant excavation approach changes.

Bay West provided oversight of the excavation contractor throughout the entire soil removal (excavation, backfill, restoration) and made sure the removal activities were completed in accordance with specifications and that the excavation contractor accommodated property owner spatial and safety requests. Bay West guided excavation progression and determined extent of removal.

Bay West tracked bid pricing metrics (tonnage, haul loads, surface restoration, etc.) throughout the project and verified reported quantities included on contractor invoices were accurate. The excavation of 8,209 tons of petroleum impacted soil was completed on time and within budget, and the project corrective objectives were met.

Prepare/Evaluate Reports (e.g., Investigation Reports, Monitoring Reports, Free Product Recovery Reports)

Bay West's project managers prepare and review hundreds of investigation, monitoring, and free product recovery reports each year for a variety of commercial, State (Municipalities, Counties, MPCA, MDA, and MDH), and Federal government (US Corp of Engineers, EPA, Air Force, Navy, and Army) clients. Report formats range from simple letter reports to complex projects that may involve multiple report volumes. Bay West is proficient and qualified to review these reports because we cumulatively prepare and average over 150 of these reports annually for commercial and government clients. Bay West understands fully the MPCA and MDA requirements for these reports through our work within the current Multi Site contract.

Bay West has invested significantly in its production process, understanding that our clients deserve professional, high-quality reports, delivered accurately and on-time. All reports are subjected to rigorous peer reviews and senior technical reviews to ensure their contents are comprehensive and applicable. Bay West has a highly qualified editorial team devoted exclusively to the review and production of client deliverables. Each report also undergoes a thorough technical editing for grammar, spelling, punctuation, acronyms, and references to be sure that the information is presented professionally. A detailed formatting review ensures reports accommodate the clients' preferences and layouts are easy for clients to read and review. Bay West's high level of client responsiveness requires that it maintains in-house control of its report printing/production processes. In mid-2007, Bay West remodeled its production facility to accommodate a production machine with outstanding quality and the widest range of functions available for in-house document production. Project managers work in tandem with the technical review and report production staff to ensure accuracy and timely delivery of reports. Bay West is dedicated to producing a superior work product and exceeding our clients' expectations.

Representative Experience:

SW134 Former Begin Demolition Landfill, Plymouth, MN – Bay West evaluated the historical data available for the Site and prepared a summary report recommending additional groundwater and soil gas assessment activities to assess potential risks to on- and off-site receptors. In June 2017, Bay West prepared a Phase II subsurface investigation report detailing the soil, groundwater, and soil gas results and associated recommendations for further risk evaluation at the Site. In October 2017 through February 2018, Bay West prepared landfill gas vapor intrusion assessment reports for various rounds of landfill gas monitoring and indoor air and soil gas sampling events we performed at the Site. In addition, Bay West analyzed geophysical survey data paired with soil boring/test pit data and mapped site features (e.g., underground utilities, metal

fencing) to evaluate the extent of landfill waste associated with the Site and identify areas where it appears landfill waste and/or contaminated fluids/groundwater extend off-Site.

Woody's Auto (L #19762), Randolph, MN –Bay West conducted an initial site assessment at the Woody's Auto Site located in Randolph, MN. Bay West completed a summary report summarizing the initial ER activities and how the immediate vapor risks to the Site building have been mitigated by the installation of a SVE system. The summary report recommended additional investigation to determine the extent and magnitude of the release.

Later, an LSI was completed. The LSI identified LNAPL east of the Site. Bay West completed MPCA Guidance Document 2-03: Light Non-Aqueous Phase Liquid Recovery Report (LNAPL report) as an appendix to MPCA Guidance Document 4-06: Investigation Report Form (LSI report). The LNAPL report indicated that approximately 2.5 inches of LNAPL was identified in SB/temporary well east of the Site (SB-06). The LNAPL and LSI report recommended a focus investigation that included the use of LIF technology to delineate the extent of the LNAPL. The LSI report also recommended quarterly groundwater monitoring of the Site's monitoring well network and quarterly discharge sampling of the Site's SVE system.

A grid system of 24 LIF probes were completed and MPCA Guidance Document 7-04: Focused Investigation Report (FI report) was completed. The FI report distinguished that the presence of LNAPL is apparent in two areas: on-Site near the pump island and east of the Site. The FI report discussed the LNAPL composition risks which included dissolved phase groundwater contamination and vapor phase soil gas impacts. The FI report also evaluated the mobility of the LNAPL and that the LNAPL is most-likely following the direction of groundwater flow which is southeast of the Site.

In June of 2017, Bay West completed MPCA Guidance Document 7-08: Remediation System Operation Monitoring Report (RSOM). The RSOM described the operation monitoring events of the SVE system and analytical results of the SVE discharge sampling. Based on the system evaluation, recovery rates appear to have reached asymptotic conditions and additional mass is being removed at a significantly slower rate. Bay West recommended to continue operation and maintenance of the on-Site SVE system to mitigate the station building by maintaining pressure field extension beneath the building.

Bay West is working with the MPCA on FS report to determine the best approach to address the remaining petroleum contamination at the Site.

Evaluate Invoices and Data Reports

Bay West's project managers receive and review hundreds of invoices and data reports from numerous types of contractors each year, including hazardous waste disposal firms, geophysical surveyors, environmental drillers, earth moving contractors, LIF data reports, mobile and fixed based laboratories, trucking firms, vapor mitigation contractors, etc.

Project managers carefully review invoices and data reports for accuracy and ensure the costs are reflective of the agreed upon scope of work and rates. Bay West also ensures: that scope of work change orders, if utilized, are included with invoices and the invoice format; invoice frequency, and pricing are consistent with the pre-established client and subcontractor agreements, purchase orders, and work orders. Additionally, Bay West does not approve subcontractor invoices until we receive proof from the subcontractor that IC-134 forms and prevailing wage documentation has been submitted to the state (if required).

Data reports are carefully reviewed with the overall project goals in mind. In the event a data report lacks the necessary details to be a stand-alone document, Bay West either acquires the necessary information from the contractor or provides a brief written addendum to the report further documenting its purpose, use, and conclusions. Bay West has been very successful at reducing errors in invoices and data reports through effective communication with contractors and vendors at the time of service delivery. Bay West has over 19 years of experience reviewing invoices and data reports under our State of Minnesota Contracts.

Representative Experience:

Blaine Municipal Well, Blaine, MN – The Blaine Municipal Well Contamination Site is a 1,2-DCA groundwater plume located in Blaine, MN. Previous Superfund investigations and groundwater sampling did not identify the source of the contamination. The immediate risk to the Blaine water supply wells was mitigated with the installation of a treatment system for municipal wells #3 and #4 in 2005/2006.

The source and extent of contamination needs to be identified to prevent further impacts to the Blaine water supply aquifers. MPCA retained Bay West to develop a future investigation strategy for identifying the source and extent of DCA contamination in a bedrock aquifer. Between July 2011 and July 2012, Bay West prepared a future investigation strategy report summarizing site activities and conditions to date. The report outlined issues with previous SIs and identified several locations to target as potential shallow DCA source areas. In addition, the report revealed several locations where subsurface geologic strata may have increased vulnerability for contaminate migration and exposed several critical data gaps in the geologic/hydrologic site conceptual model.

The report recommended that the MPCA and Bay West collaborate to develop an investigative path forward for the Site addressing issues and/or theories identified in the Revised Future Investigation Strategy Report. Two main investigative approaches were identified and the MPCA requested Bay West prepare cost and scope estimates for each strategic approach to assist in future Site decisions.

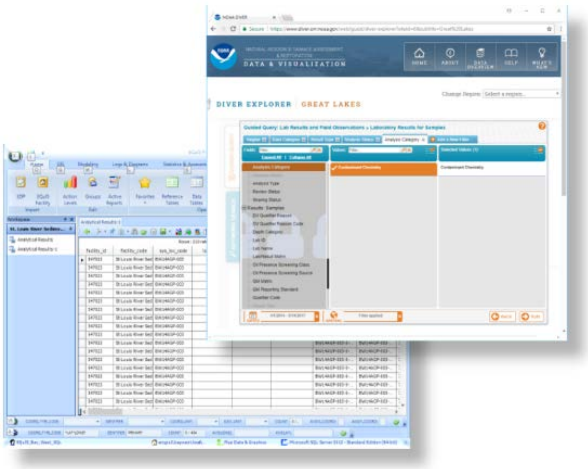
The first option focuses on targeting DCA in the St. Lawrence formation and involves installation of deep monitoring wells. The second option focuses on identifying a shallow DCA source area by completing several modified SIs (MSI) at potential DCA source area properties identified through file reviews and historical investigations.

Collect and Manage Field and Laboratory Data for Electronic Submittal in a Format Specified by the MPCA

Bay West utilizes the same data management software, Earthsoft Inc's Environmental Quality Information System (EQuIS) Professional, to organize, perform QA/QC, and produce deliverables for all our active projects. Bay West is able collect field and COC data using Earthsoft's Edge software with the MPCA field data collection EDGE_MN format in the field, greatly increasing efficiency both in the field and in the office during data processing. Bay West can provide field and laboratory data electronically by simply exporting the data in our EQuIS database to the MPCA electronic data deliverable (EDD) Lab_MN format.

Representative Experience:

SLR AOC, Duluth, MN – Bay West's sediment investigations in the SLR AOC have generated over 36,000 analytical results. Bay West imported these results into our internally managed EarthSoft EQuIS database, an advanced environmental data management and decision support system. QA/QC procedures determined in the SLR AOC QAPP were applied to all records in the EQuIS database. Using software automation, we exported the analytical records into the necessary format for submittal to the SLR AOC Sediment Database and the NOAA Data Integration Visualization Exploration and Reporting (DIVER) database. This automated data export process greatly increases efficiency and reduces human error often associated with data manipulation and management.



Bay West used our internally managed EQuIS database and NOAA's DIVER database to help manage thousands of chemical sample results.

Evaluate Data Quality and Prepare Data Verification Reports

Bay West provides full-service capabilities and breadth of experience; we have the expertise to evaluate field and analytical laboratory data to verify that the intended DQOs of each project are met. Data quality evaluation ranges from field sampling data and field and analytical SOP verification to the validation of laboratory data, including a detailed review of raw data packages in accordance with specific Federal requirements such as those of the DoD or the EPA. Data quality evaluation and verification are only parts of a larger Quality Management System at Bay West, which is designed and continuously updated to meet the demands of a diverse group of State, Federal, and industry clients. In the last five years, Bay West has performed assessments of Data Quality Indicators (DQIs) which include: precision, accuracy/bias, representativeness, comparability, completeness, and sensitivity for hundreds of sample delivery groups which included thousands of samples in accordance with project-specific QAPPs and the associated State and Federal Guidance. For example, project QAPPs for MPCA Multi Site Contract projects typically follow EPA requirements such as the EPA QA/R-5, EPA Requirements for

Quality Assurance Project Plans, reissue May 2006, CIO 2106-G-05 QAPP, EPA Guidance on Quality Assurance Project Plans, January 2012, and the MPCA Quality Management Plan, Revision 4, June 2007. Data verification/validation for MPCA projects is typically conducted according to the MPCA Laboratory Data Review Checklist Guidance, September 2011, the EPA National Functional Guidelines for Data Review, and EPA QA/G-8, Guidance on Environmental Data Verification and Data Validation. Some DQIs, particularly representativeness and comparability, cannot easily be assessed numerically, but require insight from an experienced project team, which Bay West project managers, chemists, data reviewers, and field staff can provide.

Representative Experience:

SLR AOC, Duluth, MN – Bay West's sediment investigations in the SLR AOC have generated over 36,000 analytical results, all of which required data quality and data verification in accordance with the SLR AOC QAPP. Data verification was performed on the organic and inorganic analyses including total metals, PCBs, PAHs (17 and 34 alkylated list), dioxin/furans, and TOC. All data quality and verification results were documented in MPCA Laboratory Data Review Checklists. The areas covered by the data verification process included reviewing CoC records, technical holding times and preservation, laboratory and field QC reporting forms (method blanks, rinsate blanks, surrogates, LCSs, laboratory control sample duplicates [LCSDs], and matrix spike/matrix spike duplicates [MS/MSDs], as appropriate), required analytical methods, reporting limits, case narratives, completeness of results, and data usability (compliance with DQOs).

Sediment Characterization, Proposed Small Craft Harbor, Two Harbors, MN – Bay West assisted the MPCA and the MNDNR in investigating sediment in the Agate Bay area of Lake Superior, located near Two Harbors, MN. Sediment samples were collected and analyzed for a wide array of potential COCs, including metals, VOCs, SVOC, PCBs, and dioxins and furans, as well as waste characterization parameters such as MDA pesticides, TCLP VOCs, TCLP SVOCs, TCLP herbicides and pesticides, flashpoint, and pH. In accordance with the MnTBAP QAPP, Bay West performed data verification on these analyses and completed MPCA Laboratory Data Review Checklists. Overall, no significant data quality discrepancies were observed. All data were verified and found valid and usable.

Arrange for Site Access

Over the past 20 years, Bay West has obtained access at more than 2,000 sites for our State, Federal, and commercial clients. Bay West knows that one of the major keys to the successful completion of any project is to negotiate site access with the current site property owners or adjacent property owners prior to completing any work on-site. This can be difficult in some situations when parties involved may have had a contentious relationship with the property owners or where communication may require translation services. To address this and help alleviate potential future issues, Bay West arranges for access utilizing the following process:

An initial phone call is made to the property owner to arrange a face-to-face meeting to discuss project details and to determine if property owner has any issues or concerns that need to be addressed prior to the start of the project. Property owner contact information is also verified during the phone call.

If the property owner is unavailable by phone Bay West will send a letter to the last known address of the property owner with Bay West's project manager's contact information and Bay West's toll-free number and a request for a call to discuss property access. If the property owner does not respond to a letter, where feasible, Bay West will attempt to contact a residential property owner in person by visiting the property outside of normal working hours.

Once initial contact with the property owner is made, a draft of the access agreement is prepared and reviewed with the property owner to ensure that all parties understand and are comfortable with the agreement.

Finally, with our customer's authorization, Bay West will discuss the scope of work, the duration of activities, and expected communications and reports with the property owner. It is our experience that property owners are very willing to allow access if regular communication and detailed follow through are maintained.

Representative Experience:

Coordinating Site access with Canadian Pacific (CP) Railway for 3 sites – Under the MPCA's PRP, Bay West began petroleum release investigations at three CP Railway sites with an LSI to establish the current site conditions. The MPCA acquired property access agreements for the Sites and adjacent lease properties owned by CP Railway. Bay West was responsible for coordinating Site access with CP Railway. Ten days prior to site work Bay West provided copies of signed

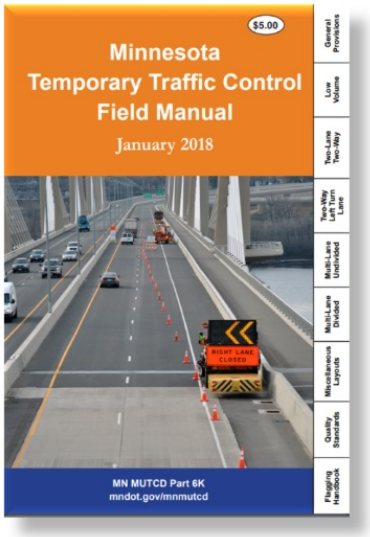
CP Safety Statements and e-RailSafe badge copies for all on-site personnel (include subcontractors), the drilling schedule, and names and cell phone numbers for project manager and field lead. Five days prior to site work, Bay West provided documentation for utility locate call tickets, including CP Call-Before-You-Dig record of call to CP Signals and Communication staff and Gopher State One Call.

- Former Eden Valley Bulk Facility Lots 6, 8, 10, and 12, Eden Valley, MN – CP Railway owns the former bulk facility lots; Leak #18255 was assigned to Lots 8, 10, and 12, and Leak #18256 was assigned to Lot 6. Bay West proposed to advance several SBs and soil-gas points in and around the Sites. Bay West contacted the City of Eden Valley, the Eden Valley – Watkins Independent School District #463, and two private property owners to explain our project goals and obtain signed property access agreements from each. A total of 16 SBs and six soil-gas points were completed to delineate the extent of contamination. We are working with the City of Eden Valley and CP Railway to complete an RI, including the installation of six permanent monitoring wells.
- Former Watkins Bulk Facility Lots 9 and 11, Watkins, MN – CP Railway owns the former bulk facility lot, which was assigned Leak #18261. Bay West proposed to advance several SBs and soil-gas points in and around the Sites. Bay West contacted the City of Watkins, Meeker County, and one private property owner to explain our project goals and obtain signed property access agreements from each. A total of 11 SBs and three soil-gas points were completed to delineate the extent of contamination. We are working with CP Railway to complete a surface soil excavation.

Former Tracy Bulk Facility, Tracy, MN – CP Railway owns the former bulk facility lot, which was assigned Leak#18996. Bay West proposed to advance several SBs and soil-gas points in and around the Sites. Bay West contacted the City of Tracy and two private property owners to explain our project goals and obtain signed property access agreements from each. Six SBs and four soil-gas points were completed to delineate the extent of contamination. Bay West prepared the LSI Report requesting site closure. The MPCA closed the petroleum tank release site file; however, due to the presence of non-petroleum in the soil, the Site was referred to the MPCA's Site Assessment Program.

Coordinate Utility Locates by Contacting the Appropriate Entity &, if applicable, Coordinate Traffic Control

Coordinating utility locates through the Gopher One Call system, property owners and operators, and private utility marking firms is an integral part of Bay West's intrusive investigation and remediation activities. Superior performance in this area significantly reduces the potential for Bay West staff or other contractors to encounter potential utility hazards. Bay West requests site utility meets whenever possible and often supplements the public utility marking with a private utility marking firm. Private utility marking firms will mark the on-site utilities not typically marked by the public utility marking firms. When our work involves work in the highway, road, street or right-of-way, Bay West works closely with the involved contractors and right-of-way authorities to design a safe solution and obtain the necessary permits for the work. Bay West has completed numerous traffic control layouts for a variety of state, county, and city roadway operations using the MnDOT Temporary Traffic Control Field Manual, resulting in safe and effective project execution.



Bay West has used the MnDOT Temporary Traffic Control Field Manual for numerous state, county, and city roadway operations.

Representative Experience:

Central Light Rail Corridor LSIs, St. Paul, MN – Bay West performed four LSIs along the route of the new Central Corridor Light Rail Transit line between downtown St. Paul and downtown Minneapolis. Previous Phase I/Phase II ESAs identified petroleum contamination related to four historical gasoline service stations along the route. All four sites were in heavy traffic areas of downtown St. Paul or along University Avenue. To complete the required soil and groundwater delineation, sampling was required in busy rights-of-way with numerous underground utilities. The most challenging environment was in downtown St. Paul, where District Energy steam lines, fiber optic lines, and numerous other buried utilities were present. Bay West contracted traffic control to close traffic lanes, requested utility locates through Minnesota Gopher State One-Call, and contracted a private utility locator to mark utilities on private property. In areas where utilities were very dense or

critical infrastructure such as fiber optic lines were present, Bay West advanced sampling tools by hand to initially clear the locations prior to completing the borings with direct push technology.

Prepare and Evaluate Bid Documents (e.g. Plans and Specifications) Suitable for Advertisement for Bids.

Bay West has extensive experience preparing design documents and bid specifications that allow solicitation of competitive bids, when appropriate, in accordance with the State of Minnesota and the Federal Acquisition Regulations (FARs). Bay West routinely prepares specification packages in accordance with established policies and guidance developed by organizations such as the Construction Specification Institute (CSI). Bay West is familiar with the bidding specification requirements discussed in the MPCA Contractor and Subcontracting Manual, including guidance for MPCA specification review, public postings, and other upfront State Admin requirements.

Bay West routinely incorporates "value engineering" into our specification package development. Value engineering allows the consideration of various equivalent construction techniques and materials available for achieving a specific goal or objective. As the alternatives are equivalent, the primary factor in selecting a technique or material is cost. Utilizing our cost estimating software packages and industry cost reference documents, Bay West is quickly able to evaluate various alternatives and incorporate the most cost-effective techniques and materials into the specification package.

Our engineers prepare quality specifications for each project. These specifications are detailed technically and clearly define payment quantities/items. We use our experience to add potential items where "unforeseen" changes may occur, then collect unit-based cost estimates for these items. Having clearly defined unit costs for these items allows projects to be quickly completed, with minimal cost overruns, confusion, delays, or payment conflicts at invoice time. The goal of these specifications is to protect our clients. Thorough bidding plans and specifications prepared by Bay West lead to smooth construction and cleanup projects, timing deadlines being met, and few unanticipated change orders and extra costs.

Representative Experience:

Blaine Municipal Wells (SR #238/LS #14072), Blaine, MN – Bay West prepared detailed bid specifications for corrective action soil removal of approximately 8,000 tons of petroleum-contaminated soil on behalf of the MPCA. The specifications were in accordance with the MPCA-approved EDCAD submitted by Bay West. The bid specifications were prepared in the format and conditions of the Minnesota Department of Administrative contractor bidding and procurement requirements.

The excavation site is owned and operated by a school bus transportation company. The soil removal target zone intersected two main traffic entryways, extended underneath the main dispatch/office building, and passed through the bus fueling station. The site operations, removal target depth, shallow groundwater, and strict timeline requirements made for a complex excavation. Bay West prepared the specifications to avoid pricing unknowns and ensure contractors were made aware of logistical limitations and expectations. Bay West hosted a pre-bid meeting with the site property owner to document potential contractor questions and walk through the soil removal target area, identified logistical constraints, and property owner requests/expectations. Bay West prepared an amendment to the specifications to address questions raised during the pre-bid meeting.

Bay West evaluated the bid responses and verified the contractor met qualifications, were within initial project estimated costs ($485,000), and that their bid unit prices added to the provided base price. Bay West provided the MPCA project manager an approval to proceed with Recommendation to Award Letter to contractor. Based on the clear specifications, the project was completed on time and within budget.

Prepare and Review QAPPs and SAPs in Accordance with State and Federal Requirements

Bay West routinely prepares QAPPs (including Uniform Federal Policy for Quality Assurance Project Plans [UFP-QAPPs]) and SAPs for commercial/industrial and State and Federal customers. Bay West recognizes that QAPPs and SAPs are critical planning documents for any environmental data collection operation to document project goals, methodology, procedures, QA/QC requirements, and DQOs. Essentially, the QAPPs and the SAPs are the Quality Assurance system blueprints identifying how Bay West and its subcontractors perform work for a project. Bay West's QA/QC Manager plays an integral role in the QAPP/SAP development to ensure the analytical design is appropriate and optimized for the project. This approach further ensures that the planning documents are sufficiently detailed and thorough. The laboratories are provided a copy of the QAPP/SAP for their review to be involved in its development and prepared for successful project execution.

Bay West has developed detailed QAPPs for several Superfund sites consistent with the Intergovernmental Data Quality Task Force (IDQTF) Uniform Federal Policy for Quality Assurance Project Plans Optimized (UFP-QAPP) Worksheets (DoD, March 2012) and the IDQTF UFP-QAPP Evaluating, Assessing, and Documenting Environmental Data Collection and Use Programs. Part 1: UFP-QAPP Manual. Final, Version 1 (DoD, March 2005); both of which are based on the American National Standards Institute/American Society for Quality E-4 Section 6 (Part B) and comply with EPA Requirements for Quality Assurance Project Plans, March (EPA QA/R5, EPA/240/B01/003, 2001) and the EPA Guidance for Quality Assurance Project Plans, December (EPA QA/G5, EPA/240/R02/009, 2002). These QAPP guidance documents combine both the QA/QC and SAP elements into one document, thereby reducing redundancy, agency review time, and overall project costs. Bay West QAPPs are generally composed of the following 4 sections:

- Project management and objectives – Provides information on project management, communications and responsibilities, historic site conditions, problem definition and background information, instruction for project/task description (including DQOs) and schedule, quality objectives and criteria for measuring data, special training requirements or certifications, and documentation and records
- Measurement and data acquisition – Provides information and guidance on the sampling process design, sampling methods, sample handling, documentation and custody requirements, analytical method requirements, QC requirements, field and laboratory instrument/equipment testing, inspection and maintenance requirements, instrument calibration and frequency
- Assessment and oversight – Provides information and guidance on assessment and RI to ensure that the QAPP is implemented as prescribed, and describes reports to management
- Data validation and usability – Provides information and guidance on the level of data review, data validation and data verification, and usability and reconciliation with Project DQOs.

Under MnTBAP, the MPCA helps community-based projects that require assessment of brownfield properties for reuse and redevelopment. Bay West is one of the selected contractors that the MPCA hires to perform assessments, including Phase I and Phase II ESAs and RAPS, at no cost to the participating communities.

Stakeholders (regulators, data users, data producers, decision makers) are involved in the QAPP planning process, beginning with the generation of the DQOs to ensure that all project conditions and goals are defined adequately and accurately addressed in the QAPP. This systematic planning process results in a product that describes the policies and procedures for ensuring that work processes, products, and services will satisfy project goals and client specifications.

Representative Experience:

Former Texaco Station, Duluth, MN – The City of Duluth received a grant from the MnTBAP for a former gasoline station in Duluth. Bay West was hired by the MPCA MnTBAP to complete a Phase I ESA, Phase II Investigation, and RAP for the Site. Because MnTBAP receives EPA 128(a) funding, all work conducted for MnTBAP needs to be completed in accordance with a EPA-approved QAPP.

Bay West previously completed and received EPA approval for a program-wide QAPP that was intended to cover future work that we would complete for MnTBAP. Because this previous program-wide QAPP was expired, we submitted an update of this programmatic QAPP to the EPA, received their approval, and completed the Phase II and RAP for the City of Duluth.

Perform/Oversee Remedial Action Plans

Bay West has extensive experience developing and executing RA plans, whether designed internally or externally. Bay West's has an array of experienced staff capable of taking projects from initial characterization and design through to the execution and project construction phases. Bay West has implemented RA plans at numerous sites throughout the country utilizing a wide variety of remedial technologies. Due to Bay West's experience with both the design and implementation phases, the field crews provide a distinct advantage in their understanding of the full scope of the project.

Representative Experience:

Old Beltline Dump Site, St. Louis Park, MN – The Old Beltline Dump site is currently a multi-building medical campus owned by Park Nicollet Health Services (PNHS) located on just under 22 acres of land at 3800 Park Nicollet Boulevard in

St. Louis Park, Minnesota. The site was historically used as a dump for household waste in the 1940's though the early 1960's and became known as the Old Beltline Dump site. Currently, the MPCA's Voluntary Investigation and Cleanup (VIC) program provides oversight of activities on the site. In 2008, PNHS agreed to implement an Approved Voluntary Response Action Plan (VRAP) and the MPCA issued a Certificate of Completion for contamination at the site, conditional upon the maintenance of engineering controls by PHHS and an Environmental Covenant and Easement, which requires the maintenance of clean soil cover and vegetation in open spaces and the preparation of an annual report which includes (1) a review of the venting system maintenance records and visual inspection of the two venting systems at the site (one passive and one active) to assure that they are operational, and (2) a summary of any operations or events that required excavation at the site, including information assuring compliance with the Environmental Covenant and Easement and verifying that any such operations or events meet the requirements of the MPCA-approved Contingency Plan for the site. Bay West currently provides the following support for the site:

- Annual inspection of the passive methane venting system;
- Annual reporting on compliance with the Environmental Covenant and Easement;
- Oversight and monitoring of soil disturbance in restricted areas of the site; and,
- Oversight and monitoring of activities that disturb the building slabs at the site.

Jay Street Gas Holder, Duluth, MN – Bay West submitted a RAP to the MPCA for the Jay Street Gas Holder, a gas holder that began operation in 1923 and operated until approximately 1960 when it was demolished and potentially partially buried on the property. The RAP was written based on information obtained during the Phase I and II ESAs completed by Bay West. The City of Duluth held a neighborhood meeting regarding the future development of the Site. Lead-impacted soil is present in the area where the tunnel existed. Rain water and erosion may have transported lead-impacted soil from the ground surface to the tunnel underneath the concrete pad. Bay West submitted a RAP Addendum to the MPCA describing how the potentially lead-impacted soil beneath the concrete foundation of the former gas holder will be addressed.

Bay West submitted a RAP to describe how to address lead-impacted soil underneath a concrete foundation.

Conduct Surface Water, Ground Water, and Hydrodynamic Modeling

Bay West's hydrogeologists have experience constructing numerical groundwater flow models, conducting parameter estimation, and calibrating steady state and transient conditions. This includes model downloads to various presentation graphics products such as Surfer, Arc/GIS, Freehand/Map publisher. Groundwater flow modeling program experience includes Visual MODFLOW, Model CAD, Groundwater Vistas, SLAEM, MLAEM and various other analytical models. Project experience includes constructing single layer and multiple layered models to evaluate groundwater extraction and plume capture scenarios. Project experience also includes developing regional conceptual models, water balances, digital aquifer parameter maps (via Arc/spatial analyst) and utilizing flow models to evaluate hydrologic impacts from urban sprawl and subdivision developments. Regional modeling efforts also included evaluating aerial recharge rates, groundwater/surface-water interactions, and urban and agricultural influences on water resources.

Representative Experience:

Former Wurtsmith AFB, Oscoda, MI – Bay West utilizes a groundwater flow model to demonstrate that pump and treat (P&T) remedial systems are capturing of multiple groundwater plumes at the base. The model was constructed using the US Geological Service MODFLOW three-dimensional groundwater flow modeling software. The groundwater flow model is updated and calibrated on an annual basis using groundwater gauging data collected during annual gauging event, pumping data from the groundwater P&T systems, and precipitation data. A base map depicting the extents of the groundwater plumes is created on an annual basis using the most recent groundwater sampling data. The base map is

imported into the updated groundwater flow model and forward particle tracking is used to demonstrate that groundwater passing through the plume footprints is captured by the P&T systems. The particles are placed within and along the perimeter of the plume footprints and the movement of the particles is predicted based on the groundwater flow model. If all the particles are captured by the groundwater extraction wells, it can be concluded that the P&T systems are capturing the target groundwater plumes.

Conduct Third Party Review and Analysis of Designs, Reports, and Technical Information When Requested by the MPCA for the purpose of Providing Conclusions and Recommendations to the State

Bay West has completed independent third-party reviews of technical information and reports associated with various sites where RIs have taken place, field work is being performed, and response actions proposed. The purpose of the reviews has been to provide an independent evaluation of the work performed, the conclusions drawn from this work, and the validity of the recommendations made regarding future response actions. Typically, the reviews have been requested by the MPCA at complex project sites, where the amount of publicly-available information regarding the specific issues of concern is limited. Bay West assembles a team of individuals experienced in the area to provide a third-party review of technical reports submitted by other parties. Assembling a team of qualified individuals to provide an independent review of work completed is often critical to the overall success of a project. This review may provide:

- Assurances that the conclusions previously submitted are valid.
- Recommendation that a previous conclusion to discount/dismiss an item (e.g., response action) is not valid.
- Alternative conclusions that had not previously been considered.
- Identification of critical data gaps that must be filled prior to drawing a more definite conclusion.
- Recommendations to consider additional alternatives that have not previously been considered.

By assembling a team of individuals to provide third party reviews, Bay West provides a mechanism for the MPCA to obtain expert opinions from multiple resources, while managing the work performed under a single contract vehicle. This allows the MPCA to achieve its objectives while minimizing the level of required internal effort.

Representative Experience:

SLR Superfund Site, Duluth, MN – The SLR Superfund Site (SLR Site) is comprised of two state Superfund Sites: US Steel (USS) Site and St. Louis River/Interlake/Duluth Tar (SLRIDT) Site. Bay West has provided the MPCA with 3rd-party support activities at these Sites for over 15 years. During the past few years, we have helped the MPCA with the following activities associated with these Sites:

- Conducted on-site inspection and split-sample collection during field tasks performed by the RPs;
- Conducted research and then provided a list of ARARs associated with future remedial activities;
- Provided technical review and comments for various iterations of FSs prepared by the RPs, then attended stakeholder meetings to discuss these reports;
- Helped prepare a database to use for background contaminant concentrations throughout SLR.
- Provided additional technical support to the MPCA, as desired.

We are also currently reviewing documents as part of the Five-Year Review process and expect to complete the Five-Year Reviews by September 2018.

Perform Five-Year Reviews and Site Reviews

On behalf of the MPCA, Bay West has performed multiple site reviews and approximately 12 Five-Year Reviews. Five-Year Reviews are required by statute. Section 121 of CERCLA, as amended by SARA, requires that RAs which result in any hazardous substances, pollutants, or contaminants remaining at the site be subject to a five-year review. The NCP further provides that RAs which result in any hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure be reviewed every five years to ensure protection of human health and the environment.

Bay West has prepared Five-Year Reviews in accordance with The Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P, dated June 2001, as well as the subsequent EPA guidance supplements for asbestos, ICs, and vapor intrusion, to answer the following questions:

- Is the remedy functioning as intended by the decision documents?
- Has any other information come to light that could call into question the protectiveness of the remedy?
- Are the assumptions used at the time of remedy selection still valid?

Bay West utilizes the Five-Year Reviews using the EPA January 2016 Five-Year Review Recommended Template to document the Five-Year Reviews process and findings. Bay West's extensive expertise in all phases of RI/FS, RD/RA, and long-term O&M of sites provides a solid framework for the performance of Five-Year reviews and site reviews. Bay West's experience allows us to effectively review existing site data and identify pertinent factors such as protectiveness of a remedy and whether follow up actions are needed.

Representative Experience:

Waite Park Wells, Waite Park, MN – Bay West completed a Five-Year Review evaluating the effectiveness of the implemented remedy, which included soil excavation, solidification/stabilization of waste soil to non-hazardous levels, waste cell construction/capping, leachate collection and detection, groundwater monitoring and gas collection, contingency action plan, post-closure requirements, and ICs. Bay West reviewed historical documents, performed a site inspection, interviewed stakeholders, evaluated exposure assumptions, completed a data review, and prepared a five-year review report.

The Five-Year Review concluded that a protectiveness determination for the Site could not be made until further information is obtained through taking the following action:

- Evaluate the vapor intrusion pathway for all buildings not yet assessed that overlie the plume, and conduct RAs as needed.

In addition, to ensure the Site-wide remedy is protective in the long-term, the following actions needed to be taken:

- Define the extent and magnitude of contaminated groundwater in the shallow and deep aquifers north of the Site and demonstrate its capture. Include an evaluation of any continuing flow to the Sauk River.
- Re-start the on-site P&T system or modify the ROD to select an alternative remedy for groundwater.
- Assess the extent and magnitude of additional source areas and evaluate whether source control actions are necessary to achieve groundwater cleanup goals.
- Review for presence of improperly abandoned wells, and take action as needed.
- Develop and implement an IC work plan for OU1 that ensures that effective ICs are in place and includes long-term stewardship of ICs.

Address issues identified by MPCA.

Review Groundwater Remediation Technologies and Recommend Alternatives and Optimization Options

Due to Bay West's full-service capabilities, we have the expertise to design and install remedial systems, as well as complete the operation and maintenance (O&M) phase and optimization of these systems. Because of our broad-based experience in this area, Bay West has a greater understanding of each type of system, allowing us to optimize system performance more efficiently. Since most O&M projects require long-term commitments of labor, time, and financial resources, Bay West's project management systems and familiarity with the current MPCA Multi Site contracts will allow us to provide the MPCA with accurate project requirements, cost estimates, and dependable scheduling.

Bay West is currently performing and optimizing O&M activities on AS/SVE systems, groundwater extraction & treatment systems, multi-phase extraction systems, free product recovery systems, and in-situ bioremediation systems. Bay West has performed more than 65 O&M projects in the last 10 years. In addition, Bay West has the necessary equipment and expertise to perform O&M activities such as acid treatment of air stripping/tray aeration units, "pigging" of process lines, shock treatment, and redevelopment of wells.

Representative Experience:

Craig Road Landfill, Fairchild AFB, WA – A TCE groundwater plume from a 39-acre former landfill east of Fairchild Air Force Base has been controlled and contained with a 13-well groundwater extraction well network and air stripper treatment system for 27 years. The existing system was adequate for plume capture/containment but was inefficient at mass reduction. A review of the available data indicated that nearly all the TCE mass was contained within the zone of groundwater fluctuation. This was best demonstrated in that TCE concentrations increase by factors of between 10 and 50 during periods of high groundwater level as compared to low groundwater levels.

To improve mass removal, Bay West proposed and implemented a system of source-area dewatering combined with soil vapor extraction. Dewatering was completed by adding pumps to two of the existing monitoring wells in the source area. SVE was implemented with two separate 5-HP blower systems. The system is currently extracting from 12 wells at a combined rate of 220 cubic feet per minute. Prior to implemented the revised system, TCE mass removal was on the order of 3 to 5 lb per year. In the first three months after implementation of the revised system, total TCE mass removal was already 125 lb. Based on TCE mass estimates and removal rates, the remediation is on track to meeting the objectives of decreasing groundwater TCE concentrations to below 5 µg/L by fall of 2021.

Bay West also created a performance model to help track remedial progress, prioritize areas/wells for remedial efforts and optimization of the monitoring program. Wells were segregated into groups based on their past year average concentration and by trend evaluation by Mann-Kendall and by ordinary least squares analysis. Wells with this highest TCE concentrations and the least remedial progress were tracked quarterly and wells with lower TCE concentrations and the better remedial progress were optimized to semi-annual and annual monitoring or sampling were discontinued if the TCE concentrations met criteria for remedial completion

Provide Evaluation and Design of Energy Recovery Systems Utilizing Landfill Gas

Bay West engineers are experienced with the various aspects of landfill gas collection and utilization. Our staff has completed landfill feasibility studies that incorporate site characterization data and gas analysis and capacity estimates to understand underground gas movement and to design cover and leachate collection systems. Our landfill designs incorporate wellfield layouts, gas capture piping and conditioning, as well as flair, industrial heating, and power generation systems. The feasibility studies also include a full economic and regulatory analysis. Our engineers have implemented various aspects of landfill energy recovery systems including regulatory permitting, including both environmental permitting as well as federal state, and local building permitting, completing construction drawings and specifications, well field installation and piping, and system startup and balancing. Bay West has performed more than 60 O&M projects in the last 10 years and performed all aspects of O&M, including the preparation of O&M manuals and the use of remove operation and monitoring systems.

Representative Experience:

Weston Woods, White Bear Township, MN – Bay West provided sampling, monitoring, and design for a landfill gas system interception trench for a housing development at a former dump site. The former dump site was a rural dump in the 1920s through the 1960s, and a township dump that accepted hazardous wastes from several industrial generators during the early 1960s through the early 1970s. A housing developer constructed homes in the area and a small portion of the development was on the former dump site. Bay West prepared a Site Construction Contingency plan (SCCP) in the event the housing developer unexpectedly encountered or unearths hazardous substances or other wastes during site development and construction activities that pose a potential hazard to human health or the environment. Bay West also performed methane and other combustible gas monitoring on methane monitoring points installed throughout the capped consolidated area waste area, as well as soil gas sampling to define extents of gas migrations. In response to detections of methane beyond the methane control area, Bay West designed and installed a gas interceptor trench to provide a long-term gas migration barrier, preventing landfill gas from migrating to utility corridors in a new housing development. A vacuum was applied to the collector pipes to create differential pressure to encourage gas to migrate to the trench. Four vacuum fans (American Fan 1½ horsepower 3450 rpm, 12" W.G.) were installed at intervals along the trench which reduced methane gas levels at various monitoring points throughout the trench.

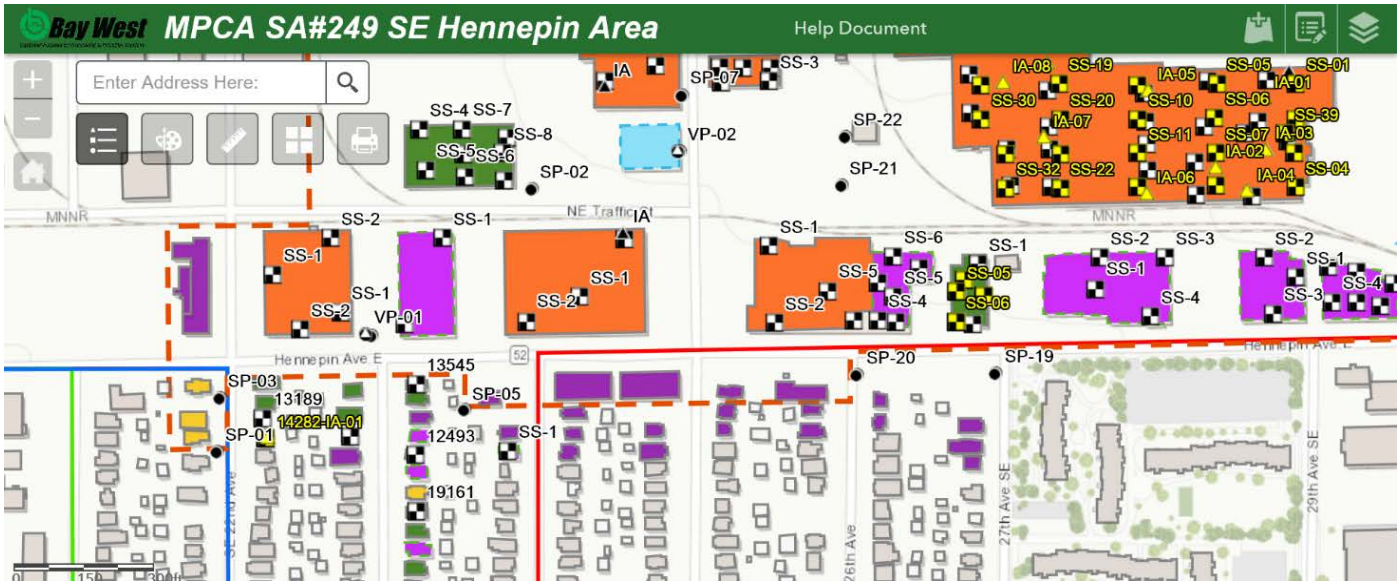
Research, Evaluate, and Implement Innovative or New Technologies

Bay West relies on the research, evaluation and implementation of innovative remedial technologies to assess site characteristics and objectives to create an effective strategy for achieving remediation goals. Bay West has performed assessments of several amendments for physical, biological, and chemical treatment of soil, groundwater, free-phase product, and soil vapor with application in varying site conditions. Bay West is familiar with all phases of the evaluation and implementation of innovative technologies including assessment, bench-scale treatability/feasibility studies, full-scale RD, and in-field implementation of several technologies including HF/substrate injection, surfactant injection/flushing and mobile multiphase recovery, in-situ chemical oxidation, biostimulation/bioaugmentation, biopile soil treatment, air- and bio-sparge technologies, multiphase extraction, and natural attenuation. Bay West's experience in evaluating innovative technologies, or the combination of technologies, allows selection of the most appropriate remedial approach and reagent to work within the site conditions and remedial timeframe.

Representative Experience:

Web Map Applications – Bay West creates project-specific web map applications that provide customizable, collaborative information sharing. Bay West's web map application features the following:

- Toggle data layers to create custom map views
- View field data in near real-time as its being collected
- Manage secure login credentials
- Markup maps with points, lines, and polygons
- Print maps to PDFs with custom map layouts
- Export data layers to Excel



An example of the output generated by the Bay West Web Map application at MPCA site SA#249.

RAS, Atlas 2 Site, F.E. Warren AFB, Cheyenne, WY – Bay West implemented a RAS for USACE to perform pilot tests to evaluate feasibility of HF at the former Atlas 2 facility near Cheyenne, Wyoming. The project scope included: 1) performing a small-scale pre-design HF study in an un-impacted portion of the site; 2) emplacing ZVI via HF to facilitate in situ chemical reduction (ISCR) in three TCE plume hot spots; and 3) emplacing both ZVI and an organic substrate [(lecithin (ELS)] w/bioaugmentation (KB-1 microbes) via HF to facilitate both ISCR and enhanced reductive dechlorination (ERD) in a fourth TCE hot spot. The initial TCE concentration exceeded 5,000 µg/L in three hot spots and 10,000 µg/L in the fourth. The performance objective was to achieve TCE concentration reduction of >60% during the period of performance. Bay West designed a distinct treatment regime for each hot spot, with the overall objective of providing a regime with the lowest life-cycle costs, should the remedy be carried forward for full-scale implementation under the CERCLA process.

Based on Pre-Design Study results, HF well spacing and well design, HF vertical spacing intervals, and guar/borax/ZVI mixtures were developed for the RAS. The RAS included installation of 12 HF wells and one new MW. The HF wells were installed using a 35-ft injection radius for three hot spot areas, and a 45-ft radius for the fourth. Baseline GW samples were collected prior to HF implementation. A total of 102 fractures were initiated and propagated between depths of 155 to 200 ft bgs, emplaced with a total of 1,022,400 lb of ZVI, 4,896 lb of guar, and 490 lb of borax. Additionally, 33,600 lb of ELS and 80 liters of a KB-1 bioaugmentation culture were emplaced in one area to assess whether ERD is a more cost-effective remedial approach. A total of 122,400 gal of water were used as the carrier for ZVI, guar, borax, ELS, and KB-1.

Prepare Presentations and Present Information at Meetings

Bay West has the experience and tools required to prepare professional presentations and presentation materials for site updates, technical presentations, and Restoration Advisory Board (RAB) and community relations support activities. Our staff have prepared and conducted over 300 presentations for public/stakeholders use. We utilize tools such as Microsoft PowerPoint and Net Meeting for on-line/electronic participants. Our in-house, high-capacity publishing/printing hub allows us to rapidly produce magazine-quality written products (including poster-size photographs and graphics) for distribution to our customers/project stakeholders. Our GIS and desk-top publishing capabilities allow us to include web-based project mapping applications, interactive maps/figures/graphical representations into the presentations. We are also experienced in preparing newsletters, written briefings, public notices, and technology updates.

Bay West's staff participates in a practical workshop designed to enhance each participant's ability to provide presentations with clarity and impact. This course covers everything from getting clear on messaging, to designing a formal talk, to delivering powerful presentations with good mechanics.

Representative Experience:

SE Hennepin Vapor Plume, Minneapolis, MN – As part of a large Superfund project with high public visibility, the MPCA asked Bay West to assist with organizing a remediation technology presentation for property owners in the neighborhood. Bay West prepared information regarding solvents and cleanup technologies in layman's terms for an open house technology presentation. Bay West developed presentation materials that summarized the following:

- General information regarding solvents, their chemical properties, and their subsurface behavior.
- The pros and cons of specific solvent cleanup technologies such as excavation, SVE, air sparging, DPE, biological injection, and chemical injection.

The summaries included both written and graphic depictions of key information for each of the above, including a detailed cross-sectional model of a monitoring well, soil, groundwater, and dissolved solvent contamination.

Bay West prepared and presented materials for public information meetings.

During the open house, the room was a divided into different stations and Bay West staff members presented a different cleanup technology at each station and answered several attendees' questions.

Nicollet Avenue and E. Diamond Lake Road (SA #102), Minneapolis, MN – At SA#102, a vapor intrusion risk to a church and school was identified. Bay West assisted the MPCA and MDH in staffing drop-in office hours so that parents of students could ask questions about the vapor intrusion risk. Additionally, Bay West prepared material for and attended several meetings with MPCA. The meetings were attended by different groups of church staff and members of the congregation who had questions about the work the MPCA was performing, the results of the investigation, and the risks associated with the contamination.

Prepare and Determine if the SWPPP is Being Followed and make Recommendations if Revisions are Needed During the Life of the Project

Bay West's engineers, hydrogeologists and environmental scientists have prepared numerous SWPPPs and provided the subsequent SWPPP training to clients in the last five years, including plans completed in accordance with MPCA Guidance Document MN R100001. To ensure that all risks associated with a construction site storm water release are evaluated, Bay West has worked under the direction of, and alongside, the MPCA and DNR to mitigate potential issues with "Special" and

"Impaired" waters and protecting calcareous fens within Minnesota wetlands, when encountered. Bay West personnel are well-versed in performing storm water risk evaluations, with extensive experience in developing SWPPPs under the NPDES General Permit Regulations. Bay West understands the need to quickly identify environmentally sensitive areas within, and adjacent to, a construction site that may become impacted from storm water discharge or runoff.

When preparing a SWPPP, Bay West cross-references individual county parcel identification numbers, investigates additional permit requirements, identifies "special" or "impaired" waters that might be impacted by runoff or discharge, evaluates discharge impacts to protected resources, and uses Bay West's extensive construction experience to provide a SWPPP that protects the environment.

Bay West has extensive experience at construction sites nationwide preparing and working under SWPPPs for Federal DoD, State Environmental and Natural Resources agencies, and local governments to ensure that potential contaminants or materials do not migrate off site and impact the environment.

Representative Experience:

Eureka Recycling, Minneapolis, MN – Bay West has developed and implemented industrial SWPPPs under the MPCA's Industrial Stormwater General Permit program at more than 20 industrial facilities throughout the state of Minnesota. On behalf of Eureka Recycling, Bay West enrolled the facility in the industrial stormwater permit program, developed a site-specific SWPPP, assisted in the implementation of site BMPs, trained Eureka staff on implantation of the SWPPP, and conducted quarterly benchmark monitoring and reporting.

Various Sites, US Air Force Academy, CO, Joint Base McGuire-Dix-Lakehurst, New Jersey, and Elgin AFB, Florida – Bay West has developed and implemented Construction SWPPPs on behalf of the USAF at multiple sites around the nation. Bay West's activities included conducting site evaluation and assessments, determination of nature of construction activity and potential impacts, erosion and sediment control implementation, pollution prevention, inspection and corrective action, and completion of necessary trainings.

Prepare Erosion Control Plans and Oversee Implementation

Erosion/Sediment Control is typically required as part of a National Pollution Discharge Elimination System (NPDES) permit for discharge of stormwater from construction sites. To ensure proper preparation and implementation of Erosion Control Plans, Bay West staff has completed the University of Minnesota Stormwater Pollution Prevention training and certification course. Bay West has performed erosion and sediment control site management during construction projects to prevent water pollution and stream degradation. Bay West has successfully installed and maintained erosion and sediment controls, completed required permitting, notifications, and reporting. To effectively reduce erosion and sedimentation impacts, BMPs were designed, installed, and maintained during land disturbing activities.

Representative Experience:

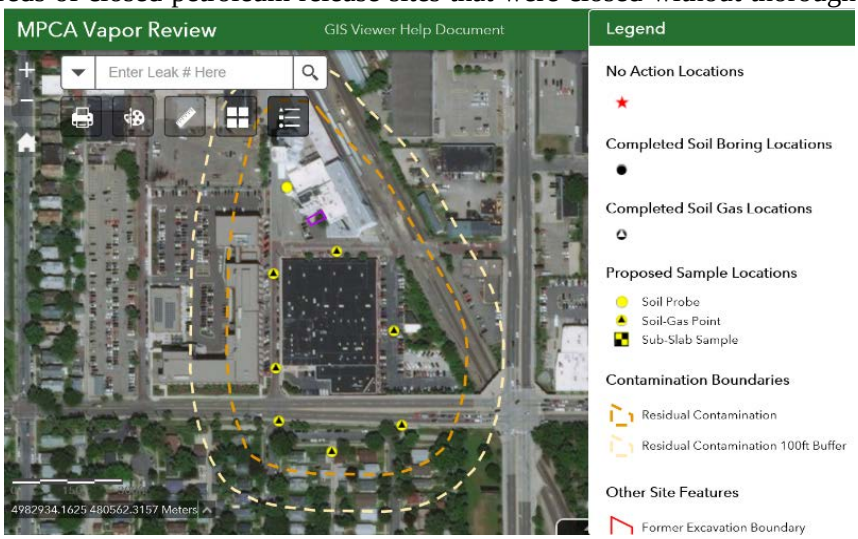
Performance-Based Restoration (PBR), Joint Base Andrews (JBA), Camp Springs, MD – Bay West completed two removal actions in conjunction with the JBA Multi Site PBR. The removal actions consisted of the excavation of lead-based paint-impacted soil at the base of two former water towers. The overall area to be excavated at each site exceeded the Maryland Department of the Environment's (MDE) threshold for an NPDES erosion and sediment control permit. Bay West prepared two erosion and sediment control plans consisting of a site report, plan, and specification in accordance with MDE BMP's. Bay West worked with the MDE Stormwater Management staff to guide the plans through the review and approval process and ensure all aspects of the design were implemented on-site. A MDE-certified Erosion and Sediment Control Inspector was on-site to oversee the installation and maintenance of the BMP's. The excavations are complete, and the sites have been restored with permanent vegetation in accordance with the approved erosion and sediment control plans.

Provide Technical Assistance to the State in the Evaluation and Interpretation of Data and Information

Bay West's experience, gained as both an environmental consultant and an environmental remediation contractor, over our 44-year history gives us unique insight on all project phases to provide high value technical evaluations and interpretations of data and information. Historically our State, Federal and Commercial clients have requested Bay West provide evaluation and interpretation of information ranging from the best approaches for the clean-up of contaminated sites with unique logistical or access issues to providing legal testimony for the clean-up and remediation of a metal recycler.

Representative Experience:

Vapor Reviews of Closed Leak Sites, MPCA – To successfully address the growing public scrutiny on vapor intrusion, the MPCA hired Bay West to begin evaluating hundreds of closed petroleum release sites that were closed without thorough evaluation of the vapor migration pathway, with special attention directed towards sites with LNAPL and other high-risk sites such schools. Throughout this project, Bay West has completed the following activities:



Bay West developed a customized web-based mapping application for the MPCA to display data from vapor file reviews at closed leak sites.

- Obtained the MPCA's copies of leak site files from student workers and/or went the MPCA and scanned the files ourselves, if desired by the MPCA.
- Reviewed these files and, using the previously established criteria and today's vapor guidance, determined if soil-gas sampling is recommended at each of these sites.
- Prepared tables, figures and supporting information that summarize our findings. The tables include property owner information, parcel information, additional non-petroleum contaminants detected, and the rationale for the soil-gas decision. Each figure depicts plume locations, a 100-ft buffer around each plume, and proposed drilling locations. The supporting information includes boring logs, previous plume maps, and recent tables, as available.
- Submitted this information in an individual e-mail labeled with each site's leak number to the MPCA Project Leader.

As the project unfolded, we developed a more efficient way to transmit maps. Instead of creating individual figures for each site, we developed a web mapping application that presents all site figures. We then met with key MPCA personnel to make sure our web mapping application was meeting desired goals. Now, we are working to use this application to not only present the results of the initial file reviews, but to also include the field results conducted by Terracon afterwards.

Blaine Municipal Well, Blaine, MN – The Blaine Municipal Well Contamination Site is a 1,2-DCA groundwater plume located in Blaine, MN. Previous Superfund investigations and groundwater sampling did not identify the source of the contamination. The immediate risk to the Blaine water supply wells was mitigated with the installation of a treatment system for municipal wells #3 and #4 in 2005/2006. The source and extent of contamination needs to be identified to prevent further impacts to the Blaine water supply aquifers. MPCA retained Bay West to develop a future investigation strategy for identifying the source and extent of DCA contamination in a bedrock aquifer.

Between July 2011 and July 2012, Bay West prepared a future investigation strategy report summarizing site activities and conditions to date. The report outlined issues with previous SIs and identified several locations to target as potential shallow DCA source areas. In addition, the report revealed several locations where subsurface geologic strata may have increased vulnerability for contaminant migration and exposed several critical data gaps in the geologic/hydrologic site conceptual model.

Based upon the implementation of this report, the MPCA and Bay West identified the primary source of the 1,2-DCA contamination in the aquifer, developed a cleanup strategy, and implemented the removal of the primary source of the 1,2-DCA contamination in this drinking water aquifer.

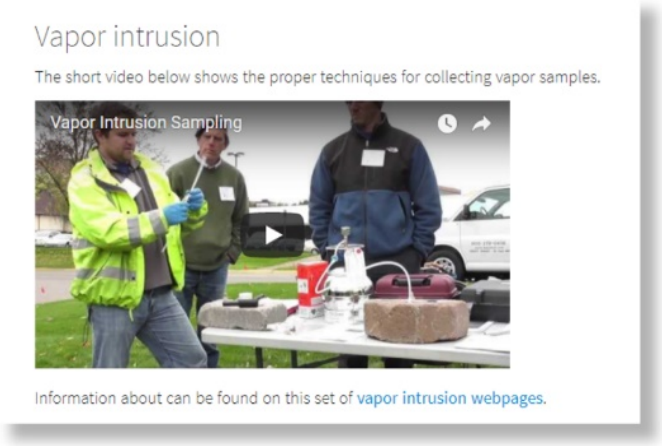
Assist and Provide Training as Requested by the MPCA

Over the past 9 years, Bay West has designed, prepared and conducted 20 different training sessions/classes for our State, Federal, and commercial clients. The training topics have included 8-hour refreshers, DOT Hazardous Materials training, emergency preparedness training including table-top exercises, waste management compliance training, terrorism preparedness training, as well as general H&S and compliance training. In the past 4 years, Bay West has also been providing OSHA Awareness level training and is currently developing a 3-hour chemotherapy drug spill response training and 24-hour HAZWOPER training curriculum. Prior to preparing and conducting training sessions/classes, Bay West meets with the client to determine the specific training needs of the client as it relates to their operations, the number and type of people receiving the training and time and dollar budget for the proposed training sessions. Once the materials are prepared, Bay West reviews the materials with the client prior to providing the training to be sure that all necessary topics have been covered. This process allows Bay West to develop training materials that are tailored specifically to the clients' needs and that meet client expectations for the training. Bay West's training sessions are prepared and presented with a focus on five key elements: training must be directly relevant and applied; flexible; participative; enriching; and provide opportunities to test and explore learning.

Representative Experience:

Vapor Pin Training – The MPCA requested Bay West provide soil vapor sampling demonstrations during MPCA Consultant's Day on October 22, 2013. Bay West meet with the MPCA prior to Consultant's Day to discuss the details of the demonstration. Bay West conducted several demonstrations to small groups of people over a five-hour period. Bay West demonstrated how to install and collect a sample from a sub-slab vapor point. At a second station, Bay West oversaw a driller install a soil gas probe to approximately 8 ft bgs and demonstrated how to collect a sample from the soil gas probe.

A video of the demonstration is currently located on the MPCA PRP website (https://www.pca.state.mn.us/waste/ petroleum-remediation-program) (screen shot at right).



Bay West put on a vapor pin demonstration at the 2013 MPCA Consultants Day.

Follow MPCA Green Practices/Procedures for Remediation Projects

Green investigation and remediation is the practice of applying technologies and approaches that minimize a cleanup project's environmental footprint. It is a holistic approach that, over a broad scope and timeline, incorporates sustainability concepts and life-cycle cost thinking. In addition to Bay West integrating green and sustainable work practices into our corporate culture, we also utilize a set of BMPs developed from our project experience as well as current EPA and state guidance for green investigation and remediation such as the MPCA's PRP Green and Sustainable Remediation (GSR) guidance document (c-prp 1-10), August 2012.

We evaluate all our proposed methods and strategies through each step in our investigation and environmental remediation projects to be sure they are considering the following key elements of green remediation:

- Reduction of total energy usage and maximized usage of renewable energy
- Reduction of air pollutants and air impacts
- Reduction of water usage and water resource impacts
- Protection of the ecosystem and promotion of best practices related to land management
- Reduction of waste generation and improvement of materials management

The following are sustainable environmental remediation practices integrated into Bay West projects:

- To reduce water usage and water impacts, we manage wastewater treatment systems for reuse of previously non-viable ground and surface water.

- To help promote best practices land management and help protect ecosystems, we utilize native seed mixes to help sustain the native plant populations when possible.
- To reduce total energy usage, we reuse non-aqueous phase liquid (NAPL) for use in a fuel-blending process.
- To reduce waste generation, we utilize Green Deconstruction techniques for structures, which divert waste from landfills and provides beneficial reuse of materials.
- Reuse material from deconstructed structures (typically 60%–95% of a deconstructed structure can be reused).

Representative Experience:

Multiple Remediation Projects, MN

Bay West employs Green Practices and Procedures on all its remediation projects. The following practices are frequently and consistently used to maximize the reduction of environmental impacts during investigation and remediation activities:

- Transportation
  - Reduce Vehicle Miles Traveled (VMTs) – Bay West utilizes our strategically widespread office locations, including locations in St. Paul, Minneapolis, and Duluth, for the mobilizations to minimize excessive travel.
  - Anti-idling practices – Bay West turns off vehicle engines when not in active use and complies with the requirements of the clean diesel practices.
  - ULSD fuel purchase – If a diesel vehicle is used, Bay West complies with the requirements of the clean diesel practices on LUST projects.
- Field Work/Laboratory
  - Recommend reusable sampling equipment – Reusable sampling equipment used for remediation projects may include sample coolers, monitoring and measuring equipment, and general tools used to complete the tasks.
  - Green Chemistry for the Lab – Bay West utilizes a state contract lab which has an established program regarding green practices where applicable.
- Project Management
  - Electronic Submission of reporting – Electronic copies of documents, invoices, and forms are electronically submitted as approved by the MPCA.
  - Risk-based decision making – In accordance with the MPCA Programs, Bay West utilizes a risk-based decision-making approach when working on MPCA sites to minimize the level of effort, equipment, and materials necessary to protect human health and the environment.
  - Recycled Content Product Usage – Bay West utilizes field books and paper made from recycled products.

Oversee Hydrogeologic Investigations Including Fate and Transport Modeling

Bay West's hydrogeologists have experience overseeing large scale hydrogeologic investigations including complex multiple aquifer sites and wide ranges of plume constituents. These projects included the design, implementation and interpretation of numerous aquifer pump tests, slug tests, step drawdown tests, tracer tests, and reverse packer tests in a variety of hydrogeologic settings. Hydrogeologic tests are evaluated utilizing manual curve matching and computer assisted programs. Inorganic constituent, hydrocarbons, solvents, and herbicides plume migration and degradation is evaluated using programs such as MOC v3.1, Bioplume III, Aquchem 2010, EQUIS and Phreeqc v3.0. Plume and geochemical models and data are combined with groundwater flow models and other GIS data sets to evaluate site specific remediation alternatives and to evaluate regional NPS impacts and regional geochemical processes.

Representative Experience:

Remedial Action-Operations, Craig Road Landfill, Fairchild AFB, WA – A TCE groundwater plume from a 39-acre former landfill east of Fairchild AFB has been controlled and contained with a 13-well groundwater extraction well network and air stripper treatment system. On an annual basis Bay West performs a capture zone analysis to confirm the remedy remains effective and protective to downgradient receptors. The plume capture analysis consists of three components: Groundwater

Elevation Geostatistical Modeling, Capture Zone Modeling, and Downgradient TCE Concentration Trend statistical evaluation

The groundwater potentiometric surface was geostatistically modeled by Kriging using Surfer® software. Kriging interpolates between data points by using a Gaussian regression process to compute a function of the weighted average of known values. The Kriging used both measured groundwater elevations and calculated drawdowns near the extraction wells. The drawdowns were calculated using a solution developed by Cooper and Jacob (1946).

An analytical capture zone model was developed from approaches described by Todd (1980) and Grubb (1993) to approximate the groundwater divides between the extraction well, natural groundwater flow, and flow to other extraction wells. The flow divides were overlain and interpreted on the groundwater elevation maps.

The most direct evaluation of groundwater capture is to track TCE concentration responses in monitoring wells immediately downgradient of the extraction well network. Concentration trends were evaluated using Mann-Kendall analysis, which is a non-parametric statistical test to determine the confidence that a plume is occurring. Stable or decreasing TCE concentrations below the project action level (PAL) in downgradient wells provide evidence of plume containment.

L#13173 Esselman Store, Sauk Rapids, MN – The Former Esselman Store Site in Sauk Rapids has known petroleum and agricultural groundwater contamination in shallow and deep aquifers. Previous slug test data for groundwater velocities in shallow and deep aquifers was suspected to be inaccurate, so Bay West conducted a series of pump tests to verify groundwater velocities in the aquifers using Van Essen Instruments Micro-Diver® pressure transducers, manual measurement methods, and Aqtesolv 4.0 to analyze the aquifer test data. The first test completed was a multi-step drawdown test. The well was successively pumped at various rates (20 gpm and 40 gpm) for about one hour per rate to determine the yield for the subsequent constant rate test. Following the step test, a four-hour constant rate drawdown test at 50 gpm was completed to determine aquifer properties of the deeper aquifer and to determine well hydraulic properties including maximum sustainable yield, well efficiency, transmissivity, and storativity. The aquifer pump tests provided data that resulted in a better understanding of contaminant transport in the shallow and deep aquifers and was used to update the conceptual site model for the site.

Complete Capture Zone Analysis

Bay West has performed groundwater capture zone and injection influence analysis for remediation system at six sites at Seymour Johnson Air Force Base, North Carolina, and at the Cornhusker Army Ammunition Plant, in Nebraska. The analyses were performed to confirm plume capture for pump and treat systems, confirm recovery for in situ surfactant wash applications and to estimate injection distribution. These analyses provided for system optimization and resulted in regulatory closure at three sites to date.

Capture zone evaluation was also performed at the Sturgeon River Landing, in Minnesota to evaluate potential impacts to commercial and residential water supply wells. The analysis indicated that the contaminated area was beyond the capture zones of the water supply wells.

The analysis approach used by Bay West or the above sites ranged from evaluation of steady-state or transient analytical models (via spreadsheet calculation), semi-numerical models such as WTAQ-2 (Barlow and Moench 2011) and calibrated numerical flow modeling (via Modflow 2009.1). The models/calculations have been evaluated and approved by the regulatory oversight agencies.

Representative Experience:

Craig Road Landfill, Fairchild Air Force Base, Washington - A TCE groundwater plume from a 39-acre former landfill east of Fairchild Air Force Base has been controlled and contained with a 13-well groundwater extraction well network and air stripper treatment system. On an annual basis Bay West performs a capture zone analysis to confirm the remedy remains effective and protective to downgradient receptors. The plume capture analysis consists of three components: Groundwater Elevation Geostatistical Modeling, Capture Zone Modeling, and Downgradient TCE Concentration Trend statistical evaluation

The groundwater potentiometric surface was geostatistically modeled by Kriging using Surfer® software. Kriging interpolates between data points by using a Gaussian regression process to compute a function of the weighted average of

known values. The Kriging used both measured groundwater elevations and calculated drawdowns near the extraction wells. The drawdowns were calculated using a solution developed by Cooper and Jacob (1946).

An analytical capture zone model was developed from approaches described by Todd (1980) and Grubb (1993) to approximate the groundwater divides between the extraction well, natural groundwater flow, and flow to other extraction wells. The flow divides were overlain and interpreted on the groundwater elevation maps.

The most direct evaluation of groundwater capture is to track TCE concentration responses in monitoring wells immediately downgradient of the extraction well network. Concentration trends were evaluated using Mann-Kendall analysis, which is a non-parametric statistical test to determine the confidence that a plume is occurring. Stable or decreasing TCE concentrations below the PAL in downgradient wells provide evidence of plume containment.

Perform/Oversee Aquifer Pump Tests

Bay West's hydrogeologists have experience completing numerous pump tests to evaluate the hydrogeologic conditions present at a site. These projects generally included the design, implementation and interpretation of numerous aquifer pump tests in a variety of hydrogeologic settings. Test data are evaluated utilizing manual curve matching and computer assisted programs such as Aquifer Test Pro4.2, AquiferWin32 v4.0, and AQTEsolve.

Representative Experience:

WP036, Fairchild Air Force Base, WA – As part of remedial investigation and design activities at a contaminated wastewater lagoon at Fairchild Air Force Base, Bay West designed and implemented an aquifer pump test. The test evaluated hydraulic conductivity, groundwater flow, and groundwater-surface water interaction in and around the lagoon area and determined if lagoon dewatering is a viable remedial approach. Pump testing was conducted on newly installed monitoring wells. During testing of each monitoring well, transducers were placed in neighboring monitoring wells and on a survey rod in the lagoon surface water. During pump testing, transducers monitored groundwater drawdown in the wells and lagoon. This data was platted against elapsed time to determine pumping drawdown and recovery. Hydraulic conductivity and groundwater velocity of the aquifer surrounding the lagoon was calculated using the data generated during the pump test.

L#13173 Esselman Store, Sauk Rapids, MN – The Former Esselman Store Site in Sauk Rapids has known petroleum and agricultural groundwater contamination in shallow and deep aquifers. Previous slug test data for groundwater velocities in shallow and deep aquifers was suspected to be inaccurate, so Bay West conducted a series of pump tests to verify groundwater velocities in the aquifers using Van Essen Instruments Micro-Diver® pressure transducers, manual measurement methods, and Aqtesolv 4.0 to analyze the aquifer test data. The first test completed was a multi-step drawdown test. The well was successively pumped at various rates (20 gpm and 40 gpm) for about one hour per rate to determine the yield for the subsequent constant rate test. Following the step test, a four-hour constant rate drawdown test at 50 gpm was completed to determine aquifer properties of the deeper aquifer and to determine well hydraulic properties including maximum sustainable yield, well efficiency, transmissivity, and storativity. The aquifer pump tests provided data that resulted in a better understanding of contaminant transport in the shallow and deep aquifers and was used to update the conceptual site model for the site.

Perform/Oversee Evaluation of Soil Borings, Test Pits, Environmental Boring and Soil Testing to Determine Cover Integrity and Availability of Suitable Soils

Bay West inspects and maintains closed landfill covers at locations throughout the United States. Bay West staff are trained in performing landfill cap inspections necessary to ensure landfill cover and cap integrity. Bay West has multiple staff members who regularly provide field oversight of site investigation activities, including Minnesota Registered Professional Geologists and former drill rig operators, who are knowledgeable in soil classification. This experience allows our personnel to select the most technically sound and cost-effective drilling techniques available to assess and determine landfill cover integrity and availability of suitable soils.

Bay West has completed subsurface assessments using a wide variety of technologies for different site conditions and objectives. Bay West is experienced in the application of methods that produce fast, reliable results.

Bay West regularly performs subsurface investigations utilizing excavators, push-probe, hollow-stem auger, split-spoon sampling, cable-tool, air-rotary, rotary, and roto-sonic drilling techniques. Bay West has been successful in its subsurface

investigation projects because we understand the processes required to conduct scientifically sound subsurface investigations.

Representative Experience:

SW27 Vadnais Heights Demolition Landfill, Vadnais Heights, MN – Bay West completed a Phase II subsurface investigation for an approximately 35-acre former landfill located in Vadnais Heights, Minnesota. The subsurface investigation included soil boring advancement using direct-push drilling technology for soil and groundwater sampling (including per- and polyfluoroalkyl substances [PFAS] sampling) as well as installation of soil gas monitoring points for landfill gas screening and analytical sampling. Based on soil cores collected from direct push drilling, Bay West was able to determine the stratigraphy and fill composition at the landfill, which consisted of 2 feet of topsoil and sand fill overlying the landfill fill soil and waste. The approximate final depth of landfill waste in the soil borings was observed ranging between 9 to 23 ft bgs. Landfill waste was also observed in the soil lithology at 15 of the permanent soil gas monitoring points (installed to maximum depth of 12 ft bgs).

Cap Construction and Repair, Lackland AFB, TX – Bay West evaluated landfill cover integrity and performed landfill cap repair, inspection, and monitoring activities for three landfill sites at Lackland AFB to ensure compliance with surface water quality risk reduction standards and State permits during cap construction and repair activities. Bay West performed monthly inspections to evaluate the condition and integrity of the landfill caps including:

- Site walks at each landfill site to identify surface defects such as surface depressions, water ponding, erosional features, and cracks.
- Inspections of each landfill site and adjacent off-site areas to ensure erosion control features (silt fences, rip-rap, etc.) are functioning effectively.
- Inspect vegetated areas for ponding and signs of dead or stressed vegetation.
- Photographic documentation of landfill cap conditions to be included in the monthly status reports.
- Conduct routine maintenance and any necessary repairs on erosion control rip-rap, silt-fences, etc. along the landfill perimeter fences.
- Conduct routine maintenance in accordance with the Vegetation Plan for Landfill Construction and Repair, Lackland Air Force Base (May 2002), as necessary.
- Conduct repairs of identified surface defects such as depressions, water ponding, erosion-al features, and cracks to ensure compliance with surface water quality standards and State permits.

Arrange for Geophysical Activities

Bay West personnel have performed electromagnetic (EM), magnetometer, seismic refraction, and GPR surveys at hazardous waste sites throughout Minnesota and the United States. Bay West has performed these surveys to locate buried containers, unexploded ordnance, determine site stratigraphy, fracture orientation and aperture, and determine the extent of soil/groundwater impacts. Bay West has also performed downhole acoustical televiewing of wells to determine geologic properties beneath various sites. Bay West's staff includes PGs registered in the State of Minnesota to perform these surveys.

The application of geophysical tools can be an extremely powerful application at sites with difficult or complex geology (e.g., fractured bedrock). Bay West has utilized geophysical tools to obtain a better understanding of geology and hydrogeology at many sites. Data obtained from geophysical analyses can yield pertinent information and result in significant cost savings to a project. For example, in a fractured bedrock environment, geophysical data can be used to site wells in locations that have a higher fracture density and greater fracture aperture. In this example, one recovery well installed based upon geophysical data may be as effective as ten recovery wells installed by "blind drilling."

Representative Experience:

SW134 Begin Demolition Landfill, MN – Bay West analyzed the geophysical survey data (electromagnetic ground conductivity and metal detection) collected at the SW134 Begin Demolition Landfill to evaluate the extent of landfill waste associated with the Site. Bay West created geophysical data models by mapping the conductivity and metal detection data, soil boring/test pit data, and site features that represent potential data interference (e.g., underground utilities, metal fencing,

historical snow piling areas [i.e., salt loading]). Based on the geophysical data models, Bay West determined the approximate extent of the landfill waste, areas where the extent of waste is unknown, and areas where it appears landfill waste and/or contaminated groundwater extend off-Site.

Former Texaco Station, Duluth, MN – Bay West completed a Phase I ESA at this Site for the Minnesota Targeted Brownfield Assessment Program (MnTBAP). The MnTBAP Program is administered by the MPCA's VIC Program and is funded by the EPA's 128(a) assessment money (Cooperative Agreement number RP-96529810). Our Phase I ESA concluded that the site was a former gas station with USTs; however, there was no record that these USTs were removed.

Bay West then conducted a Phase II Investigation to determine the presence or absence of contamination associated with these former USTs. The first step of the Phase II Investigation was to hire National GPR Service in accordance with the MPCA Subcontracting Manual to perform a geophysical survey of approximately 2,000 feet squared (ft^2) in the area where the USTs were likely located. The geophysical survey did not detect any USTs; however, an area of disturbed soil the same approximate size as a UST basin was identified. We conducted a Phase II Investigation using locations based on the geophysical survey information, then prepared a Phase II Report and Response Action Plan (RAP)/Construction Contingency Plan (CCP) for MnTBAP and their applicant.

Conduct/Oversee Studies of Hydrogeology, Geology, and Soils Using Geophysical Studies, Modeling, and Dye Trace Studies

Bay West's hydrogeologists and geologists have experience overseeing large scale hydrogeologic and geologist investigations including complex multiple aquifer sites and wide ranges of plume constituents. These projects included the design, implementation and interpretation of numerous aquifer pump tests, slug tests, step drawdown tests, tracer tests, and reverse packer tests in a variety of hydrogeologic settings. Hydrogeologic tests are evaluated utilizing manual curve matching and computer assisted programs. Inorganic constituent, hydrocarbons, solvents, and herbicides plume migration and degradation is evaluated using programs such as MOC v3.1, Bioplume III, Aquchem 2010, EQUIS and Phreeqc v3.0. Plume and geochemical models and data are combined with groundwater flow models and other GIS data sets to evaluate site specific remediation alternatives and to evaluate regional NPS impacts and regional geochemical processes.

Bay West personnel have performed electromagnetic (EM), magnetometer, seismic refraction, and ground-penetrating radar (GPR) surveys at hazardous waste sites throughout Minnesota and the United States. Bay West has performed these surveys to locate buried containers, unexploded ordnance, determine site stratigraphy, fracture orientation and aperture, and determine the extent of soil/groundwater impacts. Bay West has also performed downhole acoustical televiewing of wells to determine geologic properties beneath various sites. Bay West's staff includes Professional Geologists registered in the State of Minnesota to perform these surveys. The application of geophysical tools can be an extremely powerful application at sites with difficult or complex geology (e.g., fractured bedrock). Bay West has utilized geophysical tools to obtain a better understanding of geology and hydrogeology at many sites.

Representative Experience:

Three closed landfill sites: SW27 Vadnais Heights Demolition Landfill; SW118 Rosemount Demolition Landfill; and SW134 Begin Demolition Landfill, MN – Bay West prepared bid specifications for the MPCA to use in retaining a contractor to collect geophysical survey data at three closed landfill sites. Bay West analyzed the geophysical survey data (electromagnetic ground conductivity and metal detection) collected at the SW134 Begin Demolition Landfill to evaluate the extent of landfill waste associated with the Site. Bay West created geophysical data models by mapping the conductivity and metal detection data, soil boring/test pit data, and site features that represent potential data interference (e.g., underground utilities, metal fencing, historical snow piling areas [i.e., salt loading]). Based on the geophysical data models, Bay West determined the approximate extent of the landfill waste, areas where the extent of waste is unknown, and areas where it appears landfill waste and/or contaminated groundwater extend off-Site.

Prepare Construction Cost Estimates Using Standard Engineering Practices

Bay West has significant experience preparing construction cost estimates. Existing site data is reviewed, and data gaps are identified. Best case, worst case, and most likely scenarios are modeled, and cost ranges established. Tools such as RS Means, RACER, and Monte Carlo simulations are used to quantify costs and risks. In a Monte Carlo simulation, statistical assumptions are developed for key cost drivers. During a simulation, cost driver values are selected based on their statistical distribution. The values are inputted to a spreadsheet and the price outcome is recorded. A second trial then selects new

costs and the new outcome is recorded. This process continues for a set number of trials to create a statistical analysis of likely cost outcomes. For example, at one site total system installation costs have an 80% probability of being less than $2.47 million and a 0% probability of being less than $2.40 million. The establishment of likely costs provides Bay West with a powerful tool for performing cost analysis and understanding cost risks.

Representative Experience:

Performance-Based Restoration (PBR), JBA, Camp Springs, MA – The JBA PBR project includes the restoration of 21 sites in various stages of the CERCLA process. As part of the PBR project, Bay West completed construction cost estimates for a site impacted with lead-based paint following the re-painting of a historical building on JBA. The construction cost estimates consisted of an evaluation of remedial alternatives with regards to schedule, costs, and resulting risks at the site. The risk evaluation included both a streamlined human health risk evaluation and a screening level ecological risk evaluation when evaluating the available alternatives. The estimates resulted in the selection of the removal action alternative to mitigate the current risks to human health and ecological receptors. Currently, Bay West is working with the USACE, JBA Environmental Restoration Program, and US EPA to complete the public involvement portion of the project. An Action Memorandum and Remedial Action Work Plan will be prepared for the selected alternative once the public involvement period is complete.

St. Louis River Sediment Area of Concern sites, Duluth, MN – To facilitate remedy planning, restoration planning, and end use planning, Bay West completed feasibility studies that required construction cost estimates for 10 SLR AOC sites. Remedial alternatives Bay West developed for the FFSs included construction cost estimates for combinations of capping, dredge and disposal. The total present value costs for the alternatives developed in the FFS were based on the Class 4 classification chart of the Association for the Advancement of Cost Engineering rough order of magnitude (ROM), which are considered Schematic Designs. ROM cost estimates for the FFSs were compiled using a variety of sources, including construction cost data from RS Means estimating software for open shop pricing in Duluth, Minnesota; current Bay West and state contract rates for labor, equipment, and sample analysis; personal communication with vendors; historic cost data from projects similar in size and scope; other FFS documents, presentations, or technical papers that provided estimated or real construction cost data; and available online vendor pricing of materials. Cost estimates for active cleanup alternatives developed by Bay West ranged from $1.6M to $50.7M.

Assist the MPCA During the Bidding Process

Bay West has extensive experience assisting the MPCA in the bidding process by preparing bid specifications that allow solicitation of competitive bids, when appropriate, in accordance with the State of Minnesota and the Federal Acquisition Regulations (FARs). Bay West routinely prepares specification packages in accordance with established policies and guidance developed by organizations such as the Construction Specification Institute (CSI). Bay West is familiar with the bidding specification requirements discussed in the MPCA Contractor and Subcontracting Manual, including guidance for MPCA specification review, public postings, and other upfront State Admin requirements.

Bay West routinely incorporates “value engineering” into our specification package development. Value engineering allows the consideration of various equivalent construction techniques and materials available for achieving a specific goal or objective. As the alternatives are equivalent, the primary factor in selecting a technique or material is cost. Utilizing our cost estimating software packages and industry cost reference documents, Bay West is quickly able to evaluate various alternatives and incorporate the most cost-effective techniques and materials into the specification package.

Our engineers prepare quality specifications for each project. These specifications are detailed technically and clearly define payment quantities/items. We use our experience to add potential items where “unforeseen” changes may occur, then collect unit-based cost estimates for these items. Having clearly defined unit costs for these items allows projects to be quickly completed, with minimal cost overruns, confusion, delays, or payment conflicts at invoice time. The goal of these specifications is to protect our clients. Thorough bidding plans and specifications prepared by Bay West lead to smooth construction and cleanup projects, timing deadlines being met, and few unanticipated change orders and extra costs.

Representative Experience:

Blaine Municipal Wells (SR #238/LS #14072), Blaine, MN – Bay West prepared detailed bid specifications for corrective action soil removal of approximately 8,000 tons of petroleum-contaminated soil on behalf of the MPCA. The specifications were in accordance with the MPCA-approved Excavation Detailed Corrective Action (EDCAD) submitted by Bay West.

The bid specifications were prepared in the format and conditions of the Minnesota Department of Administrative (Admin) contractor bidding and procurement requirements.

The excavation site is owned and operated by a school bus transportation company. The soil removal target zone intersected two main traffic entryways, extended underneath the main dispatch/office building, and passed through the bus fueling station. The site operations, removal target depth, shallow groundwater, and strict timeline requirements made for a complex excavation. Bay West prepared the specifications to avoid pricing unknowns and ensure contractors were made aware of logistical limitations and expectations. Bay West hosted a pre-bid meeting with the site property owner to document potential contractor questions and walk through the soil removal target area, identified logistical constraints, and property owner requests/expectations. Bay West prepared an amendment to the specifications to address questions raised during the pre-bid meeting.

Bay West evaluated the bid responses and verified the contractor met qualifications, were within initial project estimated costs ($485,000), and that their bid unit prices added to the provided base price. Bay West provided the MPCA project manager an approval to proceed with Recommendation to Award Letter to contractor. Based on the clear specifications, the project was completed on time and within budget.

Provide Project Management and Construction Oversite

Bay West has successfully completed project management and construction oversight activities for over 44 years. We have received customer satisfaction surveys from the State of Minnesota with 100% of respondents rating our project management as very good or excellent. Successful project execution is based on the solid technical and management skills exhibited by Bay West personnel combined with field knowledge, experience, and customer interaction. Bay West has 32 project managers qualified to manage MPCA projects and four Project Management Professionals (PMPs), providing significant experience and capability to hand large, complex project workloads. Bay West has performed oversight activities, not only as the prime contractor, but also as a subcontractor for other engineering firms. Because of these roles, Bay West personnel know what to look for and monitor to ensure the successful completion of the project. Bay West's project management systems and familiarity with the current MPCA Multi Site contracts will allow us to provide the MPCA with the following:

- Project coordination – Bay Wests experienced project managers are skilled in project coordination, including coordination between all State contract services such as laboratories, drilling contractors, ER contractors, and waste/hazardous waste disposal providers.
- One or more qualified representatives at the project site at all times when the construction contractor is conducting significant work or when otherwise directed by the MPCA Site Team – Bay West has 30 qualified on-site inspectors who are trained to oversee construction activities, document construction progress, direct on-site contractors, and effectively communicate with the MPCA and Bay West project managers.
- Ensuring that all specifications are met, by reviewing tests including, but not limited to, equipment and material submittals, liner testing, soil compaction, soil gradation, materials placement, elevation grades, and concrete testing – Bay West's 19 engineers are qualified to oversee all aspects of construction, ensuring projects requirements are met.
- Conducting weekly progress meetings, preparing a weekly construction agenda, and distributing a summary of the weekly construction meeting minutes - Bay West frequently facilitates meetings between stakeholders and the MPCA to ensure all parties are working together to achieve the same project goals. Bay West's on-site inspectors and engineers collect detailed information in construction status reports, enabling Bay West project managers
- Reviewing and approving construction contractor invoices - Bay West's project managers receive and review hundreds of invoices from numerous types of contractors each year, including hazardous waste disposal firms, geophysical surveyors, environmental drillers, earth moving contractors, and trucking firms. Project managers carefully review invoices for accuracy and ensure the costs are reflective of the agreed upon scope of work and rates.
- Erosion control measures inspections - Bay West performs erosion and sediment control site management during construction projects to prevent water pollution and stream degradation. Bay West has successfully installed and maintained erosion and sediment controls, completed required permitting, notifications, and reporting.

- Oversee equipment/system start-up and trouble shoot problems with the Contractor/Vendor for repair and newly installed remediation systems - Due to Bay West's full-service capabilities, we have the expertise to design and install remedial systems, as well as complete the O&M phase of these projects. Because of our broad-based experience in this area, Bay West has a greater understanding of each type of system, allowing us to optimize system performance more efficiently.
- Participation in or conduct other public and project management meetings - Bay West has the experience and tools required to prepare professional presentations and presentation materials for site updates, technical presentations, and Restoration Advisory Board (RAB) and community relations support activities. Our staff have prepared and conducted over 300 presentations for public/stakeholders use.

Representative Experience:

Superfund Site SR#131, Former Superior Plating, Minneapolis, MN – Bay West provided project management and construction oversite services for the MPCA at the Former Superior Plating site. Bay West oversaw the demolition of the Superior Plating building and designed a permanent leachate collection system (LCS) to capture and treat site groundwater contaminated by hexavalent chromium. Prior to construction activities beginning, Bay West coordinated access with the Attorney General's Office, railroad, City of Minneapolis, development contractor and the property owner. In addition, Bay West participated in informational meetings with the property owner, developers, MN Attorney General's Office and neighborhood association groups prior to construction to make sure expectations of all parties would be met. For construction activities, Bay West prepared a SAP and procured laboratories for analyses that were not on the state contract using the MPCA's Purchasing Manual to analyze vapor samples from four monitoring wells on-site for hydrogen cyanide (HCN).

During the four weeks of demolition operations, Bay West visited the site approximately 2-3 times per week, dependent on on-going construction activities. Our site inspectors and engineers observed, and documented activities completed and ensured the work was being completed as outlined in the remediation plan submitted by the property owner to the MPCA. Bay West performed real-time sampling of ambient air for particulate matter and total suspended particulate (TSP) matter using a handheld particle counter. Our staff looked for evidence of contaminants migrating off site, documented demolition and excavation activities with photographs, and prepared daily reports that summarize collected data, findings, and photographs.

Following demolition, Bay West designed the permanent leachate collection system. Bay West prepared design specifications for the permanent LCS that included connecting the existing collection sump to new effluent lines discharging to permanent storage tanks, designing a treatment building capable of housing necessary treatment and discharge controls and associated piping, including necessary components for system controls/telemetry, providing adequate system leak protection, and developing a system which operates semi-autonomously. Bay West completed bid specification development and bidding in accordance with Department of Administrations (MDA) bidding requirements, procurement of a subcontractor to construct the permanent LCS, and managed and oversaw subcontractor construction of the permanent LCS.

As part of the oversight Bay West documented all site work and activities with photographs, and prepared daily construction reports that summarize collected data, findings, and photographs. Erosion controls were inspected during construction activities and any deficiencies identified were immediately addressed by the contractor. All documentation was provided to the MPCA. Bay West coordinated with the subcontractor and the MPCA to meet final completion deadlines. As part of documenting system construction, system quality control checks were performed under the guidance of Bay West by the subcontractor to ensure deliverables met specifications. Invoices and payment applications submitted by the contractor were carefully reviewed and approved by Bay West. Upon system completion, the LCS pumps, telemetry and sensors were tested prior any issues identified were corrected. Bay West provided final review of construction deliverables and confirmed, on behalf of the MPCA, that the system successfully met specifications.

Prepare Construction Documentation Reports

Bay West has extensive experience preparing design documents and bid specifications that allow solicitation of competitive bids, when appropriate, in accordance with the State of Minnesota and the Federal Acquisition Regulations (FARs). Bay West routinely prepares specification packages in accordance with established policies and guidance developed by organizations such as the Construction Specification Institute (CSI). Bay West is familiar with the bidding specification

requirements discussed in the MPCA Contractor and Subcontracting Manual, including guidance for MPCA specification review, public postings, and other upfront State Admin requirements. Bay West prepares Construction Completion Reports documenting final construction details and as-builts, deviations from work plans, project outcomes and long-term requirements such as monitoring, land use controls, or O&M.

Representative Experience:

Superior Plating, Minneapolis, MN – Bay West, per the request of the MPCA, designed a permanent leachate collection system (LCS) to capture and treat site groundwater contaminated by hexavalent chromium at the Former Superior Plating site in Northeast Minneapolis, Minnesota. Bay West prepared design specifications for the permanent LCS incorporating existing components of the temporary LCS, specifically the collection sump, into the design. Integral design components included connecting the existing collection sump to new effluent lines discharging to permanent storage tanks, designing a treatment building capable of housing necessary treatment and discharge controls and associated piping, including necessary components for system controls/telemetry, providing adequate system leak protection, and developing a system which operates semi-autonomously. Additional design considerations addressed by Bay West included system size limitations due to limited available site space to house the permanent system, limited site access, and building aesthetics requirements to conform with intended end us of the surrounding property. Bay West completed bid specification development and bidding in accordance with Department of Administrations (MDA) bidding requirements, procurement of a subcontractor to construct the permanent LCS, and managed and oversaw the successful construction of the permanent LCS. During construction, Bay West documented daily construction progress in construction status reports. These reports detailed site conditions, contractors on site, and descriptions of activities completed.

Prepare Operating and Maintenance Manuals

Due to Bay West's full-service capabilities, we have the expertise to design and install remedial systems, as well as the preparation of operating and maintenance (O&M) manuals necessary to complete the O&M phase and optimization of these systems. Because of our broad-based experience in this area, Bay West has a greater understanding of each type of system, allowing us to efficiently prepare O&M manuals that that result in effective system operation and high percentage of uptime.

Bay West is currently executing O&M activities in accordance with O&M manuals on AS/SVE systems, groundwater extraction & treatment systems, multi-phase extraction systems, free product recovery systems, and in-situ bioremediation systems. Bay West has performed more than 65 projects that required preparing or updating O&M manuals in the last 10 years

Representative Experience:

Superior Plating, Minneapolis, MN – Bay West designed and oversaw the construction of a permanent leachate collection system (LCS) to capture and treat site groundwater contaminated by hexavalent chromium at the Former Superior Plating site in Northeast Minneapolis, Minnesota. Bay West prepared an O&M manual that provided the requirements and procedures for operating the LCS. It is served as the primary source of information for operating and maintaining the system, which included routine operation, routine maintenance, scheduled inspections and system troubleshooting. The O&M manual detailed operating instructions, chemical treatment instructions, system checks and maintenance, sampling and analysis, and H2S monitoring system.

Section 5
Scenario C

MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North
St. Paul, MN 55155-4194

Workplan

Project Title: Category C: Closed Landfill Scenario

1. Project Summary:

The owner/operator of a closed landfill wishes to enter the MPCA's Closed Landfill Program. The site meets the definition of a qualified facility according to the Landfill Cleanup Act. It began as a non-permitted dump in 1965 but was permitted by the MPCA in 1972 for the disposal of municipal solid waste. The landfill closed in 1983.

The landfill is in rural Minnesota near a growing city whose east boundary is adjacent to the landfill parcel. A residential housing development exists west of the landfill with the closest homes being about 150 feet from the landfill property boundary. Another residential development is located about a half-mile south along a mid-sized river which flows east. Both developments are served by municipal water and sewer but not all residents were required to connect to city water; some residents still have shallow wells for irrigation purposes. Approximately a quarter mile to the east is a farm that has a private drinking water well that also supplies water to about 75 cattle. The depth of the well is unknown. The City's comprehensive plan guides the city for additional residential development south and west of the landfill, between the existing developments and the landfill.

The Closed Landfill Program is seeking additional information about site conditions before it accepts the landfill into the program and takes over its long-term care. The program is also interested in a long-term remedy for the landfill itself to best protect human health, safety, and the environment.

2. Statement of Problems, Opportunities, and Existing Conditions

The landfill's waste footprint is about 30 acres, but its waste volume is unknown. During the landfill's operation, waste was placed very near the east, south, and west property boundaries – within 20 feet in many locations. The existing landfill cover is rather flat and ponding occurs in multiple locations. It is speculated that the cover material across the site is inconsistent. In fact, some of the cover along the south side is rumored to be gravel. Twenty passive gas vents are scattered across the cover, but the farmer that grows corn on the adjacent property east of the landfill claims his corn within 30 feet of the landfill property grows poorly.

A limited remedial investigation was conducted after the site closed and VOCs and metals were detected at elevated concentrations, some exceeding health risk limits near the landfill. However, few monitoring points were installed further away from the site. Because the landfill is beyond its post-closure care period, monitoring in recent years has been limited. A few residents south of the landfill have complained to the City about "strange odors" emanating from their irrigation wells. Boring logs indicate that the geology is glacial till with sand layers intermixed with clay.

Based on the information provided, Bay West has identified problems and data gaps associated with the Site. Prior to acceptance into the Closed Landfill Program, Bay West recommends assessment of these data gaps with the final objective being to determine an appropriate long-term remedy for the landfill that will be protective of human health and the environment. The data gaps identified based on the information provided include the following:

1. Unknown extent of waste and unknown waste volume: There is a lack of understanding of the vertical and lateral extent of landfill waste at the Site. The extent and estimated waste volume must be better understood to assess the risk to nearby receptors and evaluate long-term remedies.

2. Existing cover condition: The existing cover of the landfill is described as "rather flat" with areas of ponding. The landfill cover plays an extremely important role in limiting the potential for incidental exposure to landfill waste, preventing migration of waste outside the footprint of the landfill, and inhibiting infiltration of precipitation. A poor quality or non-existent landfill cover may expose waste to the elements resulting in runoff of contaminated water and wind-transport of contaminated sediment away from the landfill footprint. The condition of the existing cover must be evaluated to assess its effectiveness.

3. Vapor generation and migration potential: Decomposition of landfill waste can result in the production of gases such as methane and hydrogen sulfide. Past disposal of solvents, petroleum products and other industrial chemicals may also result in chemical vapor risks to nearby receptors. The extent and magnitude of gas generation within the landfill and vapor migration potential must be understood to assess the vapor intrusion risk to nearby structures and proposed developments near the landfill. The distressed crops are an indication

of potential methane migration in this direction, which may mean that the existing passive methane vents are not working. Migration of methane at concentrations exceeding 10% of the lower explosive limit (LEL) requires mitigation.

4. Groundwater quality and risk to receptors: Landfill waste can generate leachate that may contaminate the local groundwater and surface water. Groundwater quality at and near the landfill must be evaluated to assess the risk to nearby water well and surface water body receptors. As describe above in bullet #2, the landfill cover must be evaluated to assess its effectiveness at preventing precipitation infiltration, runoff and wind transport of waste that may impact nearby surface water bodies.

Scenario Assumptions

Bay West has made the following assumptions with respect to this scenario:

- Previous investigation activities did not define the lateral or vertical extent of landfill waste.
- The landfill has an area of 30 acres and is roughly square, with dimensions of approximately 1,100 x 1,100 feet. Waste covers approximately ¾ of the site; significant investigation within the middle of the waste area is not necessary.
- No off-site waste deposition has been occurring.
- Previous groundwater sampling did not adequately delineate the extent or magnitude of groundwater contamination associated with the landfill. Sampling for per- and poly-fluorinated substances (PFAS) has not been conducted.
- No vapor assessment has been completed to evaluate the risk to nearby receptors.
- There are three homes located within 150 feet of the west side of the landfill. These homes each have footprints less than 1,000 ft^2.
- There are three private wells west of the landfill. These wells are not used for drinking water; they are used for irrigation only. There are also two irrigation wells south of the landfill.
- The local surficial aquifer is 20 to 25 feet below grade
- The bedrock aquifer is over 100 feet below grade within dolomite and sandstone.
- The site is located 30 miles from a Bay West office.

3. Goals, Objectives, Tasks, and Subtasks

Bay West has developed the following objectives to assess the problems outlined above with the primary goal of ensuring the landfill does not pose an unacceptable risk to human health and environment. A secondary goal may be to facilitate land use planning and the potential beneficial reuse of the landfill area.

Objective 1: Obtain Access and Evaluate Site History

Task A: Obtain Site Access

Bay West will work with the MPCA to identify on- and off-site property owners and begin the process of obtaining property access using the standard MPCA access agreement (c-rem4-01). If a property owner is not cooperating or responding, Bay West will work with the MPCA (and the Minnesota Attorney General's office, if needed) to gain access to the property.

Specific property access activities may include:

- Obtain contact information for the neighboring property owners on Block 5 and Block 7 either from the MPCA or from County tax records via the internet;
- Assist the MPCA by preparing the standard MPCA agreement for each property;

Following initial contact with property owners by the MPCA, Bay West will conduct follow up interviews for current information regarding any other health or environmental concerns pertaining to their property. If contact information is available, Bay West will reach out to parcel owners, communicate the need for access, and email and mail access agreement for signature or establish time for signature during initial Site mobilization.

Task B: Phase I Environmental Site Assessment

To gain an understanding of the landfill and surrounding area history, under Objective 1 Bay West will complete a Phase I Environmental Site Assessment (ESA) in general accordance with ASTM E 1527-13 Standard Practice for Environmental Site Assessments: Phase I Site Assessment Process. Our Phase I will include a comprehensive search of publicly available records, aerial photographs, and other data sources, a review of all applicable files at the MPCA, and interviews with individuals familiar with the landfill historical operations as well as with local municipal and government staff.

Objective 1 Timeline: Bay West will complete Objective 1 within 30 days of receiving notice to proceed.

Objective 1 Deliverables: The deliverable associated with Objective 1 will be a Phase I ESA report.

Objective 2: Evaluate the Landfill Cover and the Extent/Volume of Landfill Waste

Prior to implementation of any field activities on the landfill site, Bay West would develop a SSHP that would govern all project field work. Bay West will utilize only 40-hour HAZWOPER trained employees with their current 8-hour refresher.

Task A: Landfill Cover Topography Evaluation

Because the landfill cover plays a critical role in containing waste, protecting the public from exposure to waste from runoff and wind-blown deposition, and inhibiting infiltration of precipitation, Bay West proposes to assess the topography and overall condition of the existing landfill cover. This evaluation will be completed in two subtasks, Subtask 1 will be completing a topographic survey of the landfill, and Subtask 2 will be collection of georeferenced high-resolution aerial imagery of the landfill.

Subtask 1: Topographic Survey

Bay West will contract with a state contractor professional survey firm licensed in the state of Minnesota to complete a topographic survey of the landfill. The survey will be referenced to the state plane coordinate system and include a legal description of the site boundaries, maximum 1-foot topographic contours, and the location and identification of other significant features within the footprint of the landfill. The goal of the topographic survey is to obtain highly accurate cover topography to identify low areas (susceptible to infiltration) and erosion and drainage features. The topographic survey will be combined in a site GIS with the geophysical data to aid in evaluating the landfill cover and lateral extent of landfill waste. Bay West will evaluate the landfill cover against the MPCA's Landfill Slope Guidance dated May 28, 2002.

Subtask 2: High-resolution Aerial Imagery

Bay West will utilize our remotely piloted drone to collect high-resolution aerial imagery of the landfill. The drone will be pre-programmed to fly a series of transects across the landfill and neighboring areas. The resulting aerial imagery will be downloaded and georeferenced to real-world coordinates using ArcGIS Drone2Map software. The drone imagery will then be combined in the project GIS with the topographic survey data and geophysical data to aid in evaluating the landfill cover and lateral extent of landfill waste.

Task B: Geophysical Assessment

Bay West proposes to assess the extent and depth of landfill waste at the site using magnetic anomaly/electrical conductivity and metal detection geophysical methods. These geophysical technologies allow for the non-intrusive assessment of lateral and vertical extent landfill waste by assessing the subsurface properties of the landfill materials and native soil with the goal of depicting the lateral extent of anomalies or buried waste. Because the landfill is currently vacant open space, the site is suited particularly well to the use of geophysics due to lack of surface structures which can interfere with geophysical data collection and interpretation. **Figure 2** illustrates the area of the proposed geophysical grid across the assumed landfill footprint. Bay West assumes that the geophysical data collection will be completed by a State contractor. Bay West will develop the geophysical assessment specification and work with the MPCA project manager to procure the services using the MPCA Contractor and Subcontractor Purchasing Manual (February 2018). We will take care to clarify the specific services that the contractor will conduct and that Bay West will conduct to avoid any conflict with the Department of Administration regarding professional services.

Subtask 1: EM31 Soil Conductivity and Magnetic Survey

Bay West proposes to conduct an EM31 survey across the assumed footprint of the landfill and extending slightly beyond the approximate landfill footprint to assess the lateral extent of landfill waste. The EM31 instrument is a towed array instrument that will be pulled across the landfill surface on a trailer using an ATV

on approximately 5-meter transects. Magnetic and conductivity data will be collected using an onboard datalogging system tied to a sub-meter global positioning system (GPS) to allow the conductivity and magnetic anomaly data to be plotted in real-world coordinates and overlain on aerial imagery of the landfill.

Subtask 2: EM61 Metal Detection Survey

Because landfills often contain metallic objects, metal detection geophysical methods are often effective at assessing the lateral extent of landfill waste and are effective at identifying large ferrous objects such as buried drums, tanks, or demolition debris. Metal detection data will be collected using the EM61-MK2 instrument towed by behind an ATV on approximately 2 meter transects which should allow for the clear identification of metallic waste with the landfill. Typically, the EM61-MK2 can detect a buried metal drum at depths greater than 2 to 3 meters and a 1-inch diameter metal pipe at depths up to 1.3 meters.

Subtask 3: Geophysical Data Interpretation

Following collection of the geophysical data, Bay West will create a spatial layer model in GIS software and Krige the conductivity survey data points to create map layers of both the near-surface soil conductivity and apparent magnetic susceptibility. These "heat" maps will graphically depict the location and lateral extent of subsurface anomalies. By extending the limits if the survey beyond the assumed lateral extent of landfill waste, Bay West should be able to clearly define the lateral extent of landfill waste.

Task C: Soil Borings and Test Pits

Geophysical techniques are often quite effective at assessing the lateral extent of landfill waste; however, these techniques do not always reliably delineate the vertical extent of waste. To accomplish vertical delineation of landfill waste, Bay West proposes a program of test borings and test trenches across the assumed landfill footprint and around its perimeter to assess the vertical (and lateral) extent of waste. This soil boring and test trench data coupled with the geophysical data should allow for accurate estimating of the lateral and vertical extent and waste and calculation of the total landfill waste volume.

Subtask 1: Test Trenches

Soil borings typically work well to evaluate the landfill waste profile and thickness; however, the lateral extent of waste, especially at the margins of the landfill are best evaluated by direct observation with test trenches. To assess the lateral extent of waste at the landfill margins and cover thickness, Bay West proposes to complete test trenches around the perimeter of the assumed waste material footprint, as roughly defined by the geophysical assessment. Proposed test trench locations are illustrated on **Figure 2**. Bay West has equipment operators on staff, so we will self-perform the excavation work using Bay West staff and rented excavation equipment procured in accordance with the state purchasing manual. Each test trench will be excavated using a trackhoe excavator to a depth sufficient to assess the presence or absence of landfill waste and the depth of observed waste. Bay West assumes each test trench will be approximately 15 feet long, 4 feet wide, and up to 12 feet deep. Specifically, Bay West proposes to:

- Complete approximately 16 test trenches to depths of approximately 12 feet bgs to penetrate the full landfill profile and encounter underlying native soil. Five test trenches will be completed on each of the four sides of the landfill. They will each begin in non-waste areas and be excavated towards the waste materials to define the edge of the material and further clarify the geophysical assessment results.
- Log the lithology and waste observed in each test pit using the USCS soil classification method. Screen soil excavated in each test pit for organic vapors with a photoionization detector (PID). A combustible gas indicator will also be used to monitor explosive gas conditions and organic vapors potentially emanating from the subsurface during test pitting activities.
- Collect one soil sample from each test pit from the soil interval with the highest organic vapor reading, or if no organic vapors are detected exceeding 10 parts per million (ppm), the soil samples will be collected from intervals exhibiting the presence of landfill waste.
- The soil samples will be submitted for laboratory analysis of GRO, DRO, VOCs, PCBs, PAHs, and RCRA 8 metals.
- Following excavation, each test trench will be backfilled with its original soil and track and bucket compacted with the excavator to original grade.

Subtask 2: Hollow Stem Auger Borings

To assess the landfill cover and thickness, characterize the landfill waste, and evaluate the vertical thickness of landfill waste, Bay West proposes to advance 16 soil borings on an approximately 275-foot spaced grid across the footprint of the landfill using 4 ¼-inch ID hollow stem augers. The proposed boring locations are illustrated on **Figure 2**. Bay West will procure drilling services and laboratory services by developing the drilling and lab specifications and requesting quotes from state contract drilling firms and laboratories using the State Contract Order Form (SCOF). We've selected the hollow stem auger drilling method because this drilling method will penetrate waste and debris more easily than direct-push drilling methods and the volume of cuttings allows for better evaluation of encountered waste. An added benefit of HSA drilling is the collection of blow counts which can be used to measure geotechnical data, including the bearing capacity of the landfill materials to help evaluate the long-term remedial approach and the potential for beneficial reuse of the landfill property. The test boring data will be evaluated against the MPCA's Final Cover Construction guidance #5.09 dated June 2009. Specifically, Bay West proposes to:

- Advance 12 soil borings to depths of approximately 35 feet bgs to penetrate the full landfill profile and encounter underlying native soil.
- Continuously log the lithology and waste observed in the soil borings using the USCS soil classification method. Bay West will closely evaluate and continuously screen and log the top 2 to 3 feet of the landfill profile to evaluate the type and thickness of the landfill cover. Screen the soil borings for organic vapors with a photoionization detector (PID). A combustible gas indicator will also be used to monitor explosive gas conditions and organic vapors potentially emanating from the subsurface during drilling activities.
- Collect two soil samples from each soil boring from the 4-5 ft bgs interval and from the soil interval with the highest organic vapor reading, or if no organic vapors are detected exceeding 10 part per million (ppm), the soil samples will be collected from intervals exhibiting the presence of landfill waste.
- The soil samples will be submitted for laboratory analysis of GRO, DRO, VOCs, PCBs, PAHs, and RCRA 8 metals.
- Set temporary 2-inch diameter well screens in four of the soil borings for the collection of groundwater samples centrally located within the landfill footprint. Submit the groundwater samples for laboratory analysis of GRO, DRO, VOCs, PAHs, dissolved RCRA metals, pesticides, nitrate-nitrite nitrogen, total Kjeldahl nitrogen, and PFAS. Bay West has extensive experience sampling for PFAS in groundwater and understands the technical challenges associated with collecting representative first-round samples for PFAS analysis to show the presence or absence of these compounds. We've generated our own internal SOPs that govern PFAS sampling and analysis procedures and our field staff are experienced with the procedures and the unique equipment requirements. PFAS results during this initial investigation phase will determine the need for PFAS sampling in future activities. For this scenario, Bay West has assumed that PFAS will not be detected in the four groundwater samples collected within the landfill footprint; therefore, we will not propose additional PFAS sampling in later tasks. We are analyzing the water samples for PCBs - it is uncommon for PCBs to be detected in groundwater samples, as these compounds are relatively immobile in the subsurface.

Subtask 3: Near-Surface Soil Evaluation

The farmer that utilizes the field east of the landfill has reported that his crops grow poorly in an area east of and immediately adjacent to the landfill. Poor plant growth can be a result of many factors, including off-site methane gas migration or soil contamination. To begin evaluation of this area, Bay West proposes the following activities:

- Meet with the land owner to identify the area of concern in the farm field.
- Complete a site reconnaissance to assess the landfill condition adjacent to this area and evaluate if runoff from the landfill may be affecting plant growth.
- Collect three near-surface 5-point composite soil samples in the distressed vegetation area for laboratory analysis of GRO, DRO, VOCs, PCBs, PAHs, RCRA 8 metals, MDA List 1 and List 2 pesticides, nitrate-nitrogen, and total Kjeldahl nitrogen. These composite samples will be collected following Minnesota Department of Agriculture guidance document GD 11.

Objective 2 Timeline: Bay West will complete Objective 2 within 60 days of receiving notice to proceed, analytical data will be available approximately two weeks following sample collection.

Objective 2 Deliverables: The deliverables associated with Objective 2 will be boring and test pit logs, photographic logs, field screening results, analytical data, a site topographic survey, georeferenced high-resolution aerial imagery, cross-section maps, and possibly a 3-dimensional visualization of the cover and landfill debris. This information will be provided initially to the MPCA project manager as an email tech memo and incorporated into the final comprehensive project report.

Objective 3: Assess Landfill Gas Generation and Soil Gas Migration Potential

Bay West views the distressed crops as evidence that off-site methane migration from the landfill is likely occurring. To assess the magnitude of decomposition gas generation and the presence of VOCs in the subsurface, Bay West proposes to conduct a soil gas assessment in three tasks. Task A will involve soil-gas sampling within the area of distressed crops, Task B will involve sub-slab sampling within the three residential homes 150 feet west of the landfill, and Task C includes installation of permanent soil gas monitoring points on all four edges of the landfill property line as compliance points.

This work plan does not include. Sub-slab sampling may be completed following collection of receptor-specific soil gas samples, evaluation of vapor intrusion pathway, and assessment of the vapor intrusion risk in accordance with MPCA guidance document c-rem3-06e, Best management practices for vapor investigation and building mitigation decisions.

Task A: Soil Gas Sampling

To assess the potential for landfill decomposition gas migration into the area of distressed crops, Bay West proposes the following:

- Collect six soil gas samples within the area of distressed vegetation. Bay West will procure direct-push drilling services from state contract drilling firms using the SCOF. Soil gas samples will be collected at 8 to 10 feet bgs. Soil gas samples will be collected using batch-certified 1-liter summa canisters equipped with 200 ml/min flow controllers. The soil-gas sampling locations are illustrated on **Figure 3**.
- Submit the soil gas samples for laboratory analysis of VOCs by EPA Method TO-15 and the Minnesota Soil Gas List, using the MPCA Subcontracting Purchasing Manual.
- Perform landfill gas monitoring for total % and % LEL of methane, % O_2, % CO_2, static pressure, and differential pressure using a landfill gas field meter at the six soil gas sampling locations.

Task B: Sub Slab Sampling

The landfill is located approximately 150 feet east of three residential homes. To assess the potential for landfill decomposition gas and VOC intrusion at these homes, Bay West proposes the following:

- Conduct sub-slab sampling and QA/QC within the three residences in accordance with guidance documents Best Management Practices for Vapor Investigation and Building Mitigation Decisions (c-rem3-06e). Sub-slab vapor samples with be collected in 1-liter stainless steel canisters equipped with 200 milliliters per minute (mL/min) flow controllers. Each vapor sample canister will be individually certified by a State contract analytical laboratory. If these residences each have a footprint of less than 1,000 ft^2, Bay West assumes that we'll collect two samples from each residence.
- Submit the six samples for laboratory analysis of methane, % O_2, % CO_2, and VOCs by EPA Method TO-15 and the Minnesota Soil Gas List.
- Perform field monitoring for total % and % LEL of methane, % O_2, % CO_2, static pressure, and differential pressure using a landfill gas field meter at the sub-slab sampling locations.
- Evaluate the VOC data against current MPCA vapor intrusion BMP guidance c-rem3-06e and the landfill gas data against MPCA guidance document c-rem3-04 to determine the next steps.

Task C: Permanent Soil Gas Monitoring Points

To assess the magnitude of landfill decomposition gas generation adjacent to and within the landfill, Bay West proposes the following:

- Install 12 permanent soil gas monitoring points, four on the west side of the landfill, four on the south side of the landfill, two on the north side, two on the east side. The proposed permanent soil gas monitoring point locations are illustrated on **Figure 3**. The soil gas monitoring points will be installed to an approximate depth of 12 feet bgs using direct push technology. Because of the rural location of the landfill, the permanent monitoring points will be completed with above-grade protective casings equipped with locking caps. Bay West will develop the soil gas point specifications based on the data obtained in Objective 2 and procure the drilling and installation services using state contract drilling firms and the SCOF.
- Collect 12 soil gas samples from the permanent monitoring points for laboratory analysis of VOCs by EPA Method TO-15 and the Minnesota Soil Gas List.
- Perform landfill gas monitoring for total % and % LEL of methane, % O_2, % CO_2, static pressure, and differential pressure using a landfill gas field meter at the 12 soil gas monitoring points. This scope of work includes two monthly landfill gas monitoring events, one immediately after the points are installed and a second event approximately 30 days later. Typically, landfill gas monitoring is completed monthly during the winter months (November through April) and quarterly during the summer months.
- Perform landfill gas monitoring using four of the existing passive vents within the landfill footprint. Bay West will evaluate the passive vent construction and, if feasible, fabricate a temporary cap and sampling port to install on each of the vents to allow for landfill gas sampling. The passive vents for sampling will be chosen to obtain representative aerial coverage across the landfill.

Objective 3 Timeline: Bay West will complete Objective 3 within 30 days of receiving notice to proceed, analytical data will be available approximately two weeks following sample collection.

Objective 3 Deliverables: If any vapor risks are identified (especially to the three residences west of the landfill), Bay West will immediately discuss these results with the MPCA and immediately begin the process for installation of sub-slab depressurization systems in applicable residences. Other deliverables associated with Objective 3 will be tables of soil gas screening results and analytical laboratory reports and data summary tables. This information will be provided initially to the MPCA project manager as an email tech memo and incorporated into the final comprehensive project report.

Objective 4: Groundwater Quality Evaluation and Risk to Receptors

Bay West understands that there is a limited amount of groundwater quality data available for the landfill site. To assess the groundwater quality associated with the landfill and risk to nearby receptors Bay West proposes to evaluate groundwater in the landfill area in three tasks. Task A will be completion of a comprehensive groundwater receptor survey, Task B will include sampling all available nearby private wells and the existing three monitoring wells, and Task C will include collecting additional groundwater delineation samples using direct-push technology.

Task A: Groundwater Receptor Survey

Under this task Bay West will conduct a comprehensive groundwater receptor survey, this activity will include the following activities:

- Conduct a well search using available databases including the Minnesota Well Index and local municipal and county records for all water wells within ½-mile of the landfill.
- Complete a receptor survey by mail by sending questionnaire postcards out to all property owners within ½-mile. Based on the postcard survey, Bay West will also conduct a door-to-door well receptor survey with ½-mile of the landfill.
- Verify with city records if receptors within ½-mile of the landfill are connected to city water.
- Obtain and review construction details of wells identified in the receptor survey within ½-mile of the landfill, if available.

Task B: Sample Existing Monitoring Wells and Nearby Private Wells

As previously discussed, Bay West will be analyzing our groundwater samples collected within the waste area during our initial investigation for PFAS. If PFAS was detected during that investigation, the monitoring well and private well samples would also be analyzed for PFAS. The remainder of this workplan assumes that PFAS were not detected during the initial investigation.

To assess groundwater quality near and adjacent to the landfill Bay West will conduct the following activities:

- Measure depth to groundwater at the three existing monitoring wells and if necessary, survey their top of casing elevations, to evaluate groundwater flow direction in the surficial aquifer.
- Collect groundwater samples from the three previously installed monitoring wells located northwest, southeast, and southwest of the landfill. Because the wells have not been sampled for an extended period, Bay West will develop each well prior to sample collection by surging the wells with a block and pumping them with a submersible pump until groundwater runs clear and field water quality parameters have stabilized. After development, the wells will be allowed to equilibrate prior to being sampled with a peristaltic pump. The monitoring well samples will be submitted for laboratory analysis of GRO, DRO, VOCs, PAHs, dissolved RCRA metals, pesticides, nitrate-nitrite nitrogen, TKN.
- Work with the MPCA project manager to obtain access to sample the three identified irrigation wells associated with residential properties west of the landfill. Upon receiving access, collect water well samples from each well. The water samples will be collected from an available discharge location after allowing the water to run for 10 to 15 minutes. The irrigation well samples will be submitted for laboratory analysis of GRO, DRO, VOCs, PAHs, dissolved RCRA metals, pesticides, nitrate-nitrite nitrogen and TKN.
- Work with the MPCA project manager to obtain access to sample the two irrigation wells identified south of the landfill. Upon receiving access, collect water well samples from each well from an available discharge location. The irrigation well samples will be submitted for laboratory analysis of GRO, DRO, VOCs, PAHs, dissolved RCRA metals, pesticides, nitrate-nitrite nitrogen and TKN.
- Work with the MPCA project manager to obtain access to sample the private drinking water well located on the farm east of the landfill. Upon receiving access, collect a water well sample from the well from an available discharge location. The farm well sample will be submitted for laboratory analysis of GRO, DRO, VOCs, PAHs, dissolved RCRA metals, pesticides, nitrate-nitrite nitrogen, TKN. The VOC method may be analyzed using the drinking water method, based upon discussions with MPCA staff.

Task C: Direct Push Groundwater Sampling

To delineate existing groundwater contamination and assist with potentially installing additional permanent monitoring wells, Bay West proposes to conduct a groundwater contamination extent and magnitude assessment with direct-push drilling technology. Bay West will procure direct-push drilling services from state contract drilling firms using the SCOF. This scope of work does not include installing additional permanent monitoring wells. Specifically, Bay West proposes to:

- Collect groundwater samples at three locations approximately 75 to 100 feet west of the landfill between the landfill and residential properties to the west (**Figure 3**). Groundwater samples will be collected using direct-push technology and temporary stainless-steel screen-point samplers. The surficial aquifer is assumed to be approximately 20 to 25 feet below grade. The samples will be collected using a peristaltic pump equipped with dedicated disposable tubing. Groundwater samples will be submitted for laboratory analysis of GRO, DRO, VOCs, PAHs, dissolved RCRA metals, pesticides, nitrate-nitrite nitrogen, and TKN.
- Collect groundwater samples at two locations south of the landfill with direct-push technology to fill the gap in the monitoring wells already located south of the landfill (**Figure 3**). Groundwater samples will be submitted for laboratory analysis of GRO, DRO, VOCs, PAHs, dissolved RCRA metals, pesticides, nitrate-nitrite nitrogen, and TKN.
- Collect groundwater samples at two locations approximately east of the landfill with direct-push technology to assess groundwater quality east of the landfill (**Figure 3**). Groundwater samples will be submitted for laboratory analysis of GRO, DRO, VOCs, PAHs, dissolved RCRA metals, pesticides, nitrate-nitrite nitrogen, and TKN.

Objective 4 Timeline: Bay West will complete Objective 4 within 60 days of receiving notice to proceed, analytical data will be available approximately two weeks following sample collection.

Objective 4 Deliverables: If any risks to private drinking water wells are identified during this sampling, Bay

West will immediately provide these results to the MPCA and then immediately begin acting to reduce the exposure by providing bottled water to these receptors until a long-term alternative water supply plan can be developed.

The other deliverables associated with Objective 4 will be copies of groundwater analytical laboratory reports and data summary tables, and figures illustrating the sample locations. This information will be provided initially to the MPCA project manager as an email tech memo and incorporated into the final comprehensive project report.

Objective 5: Remedy Evaluation and Final Report Preparation

Task A: Remedy Evaluation

Bay West will evaluate the data collected under Objectives 1 through 4 above and present remedial options based on this data and appropriate risk assessment criteria. Various remedy options are presented below based on assumptions of the current condition of the landfill and the results of the assessment activities.

- Based on the results of landfill gas sampling within the footprint of the landfill and in the perimeter permanent sampling points, Bay West will assess if active vapor mitigation is warranted verses the current passive system with 20 vents. The distressed crop vegetation indicates that off-site migration is a likely concern and the proposed development nearby would create additional receptors. Active methane gas collection would likely be designed and completed in conjunction with improvements to the landfill cap. Active mitigation could involve trenching through the landfill to install lateral or vertical slotted piping, which would be manifolded to a central intrinsically safe blower.
- Because of the relatively flat profile of the landfill cover and ponding in several areas, Bay West would propose improving the landfill cover through importation of additional fill material to improve the landfill slope and profile. Improvements to the landfill would be completed in accordance with appropriate MPCA landfill guidance including Document #5.09 Guidance for Soil Construction Standards and Testing Frequencies – Final Cover Construction (June 2009) and Landfill Slope Guidance dated May 2002.
- Based on groundwater sampling results and their proximity to the landfill, request permission from the property owners to seal the irrigation wells located immediately west of the landfill.
- Based on the results of groundwater delineation sampling near the landfill, install several additional surficial aquifer monitoring wells and implement a periodic groundwater monitoring schedule to track migration of landfill contaminants in the surficial aquifer. Measure groundwater elevations and calculate groundwater flow directions and consider modeling the groundwater plume and contaminant travel times.
- Following evaluation of groundwater quality near the landfill, the risk to receptors, and aquifer characteristics, assess the potential need for landfill leachate control or collection.
- Assuming the private drinking water well east of the landfill is shown to not contain contaminants above regulatory limits, implement a periodic monitoring plan to ensure the safety of this drinking water supply for the farm and their cattle.

Task B: Final Report Preparation

Upon completion of the project objectives as described above, Bay West will prepare a comprehensive final report presenting the data collected under this work plan. The final report will include the following:

- A narrative of the project history and project activities in chronological order;
- Tables of analytical results by media and analytical suite with exceedances of applicable or appropriate regulatory criteria;
- A series of figures illustrating sample locations and relevant results with exceedance of regulatory criteria highlighted, potentiometric surface contours, and the estimated extent and magnitude of groundwater contamination. These figures can also be presented on Bay West's web mapping application throughout the project to expedite agency review and streamline additional discussions, if desired.;
- A series of figures synthesizing the geophysical data, landfill cover investigation, topographic survey and high-resolution aerial imagery illustrating the extent of landfill waste and landfill cover conditions;
- Cross-sections of the landfill illustrating the estimated vertical extent of landfill waste and local geologic

conditions from boring logs;

- Conclusions and recommendations for the path forward. This will likely involve design alternatives and costs for active methane gas collection.
- A discussion of various remedial options as described above under Objective 5, Task A.

Objective 5 Timeline: Bay West will complete Objective 5 within 60 days of receiving the final analytical data and geophysical data packages from the geophysical contractor.

Objective 5 Deliverables: The deliverable associated with Objective 5 will be the final comprehensive report synthesizing all the data collected under this work plan as described above.

Figures

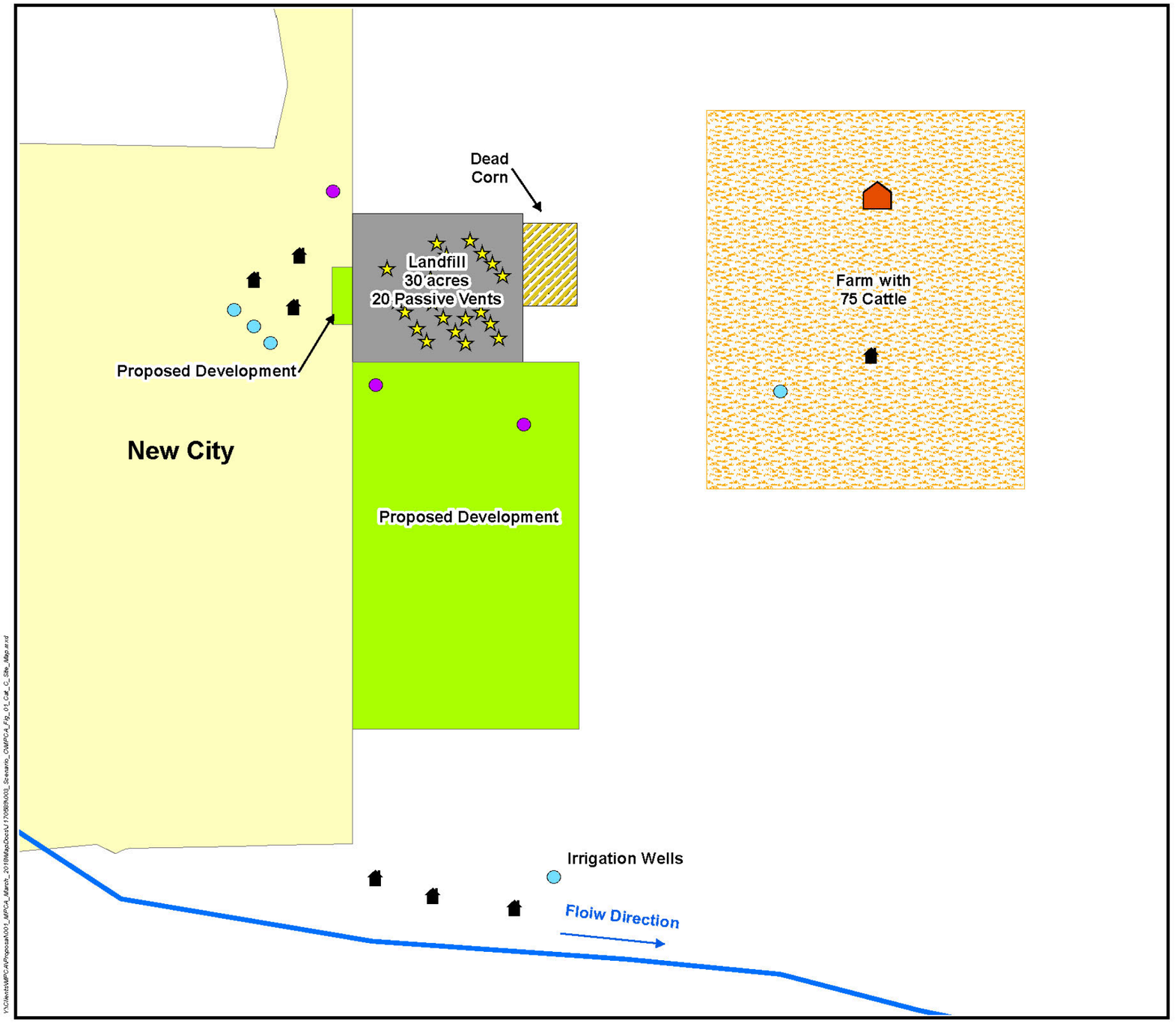
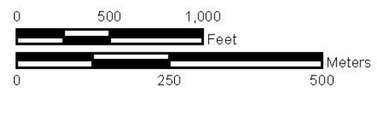


Figure 1

Scenario C Site Map



Farm
Houses
Passive Vent
Private Drinking Water Well
Unused Monitoring Well
Stream
Proposed Development
Dead Corn
farm
landfill
New City

Bay West
Customer-Focused Environmental & Industrial Solutions

Date Drawn: 4/5/2018 Project # J170589

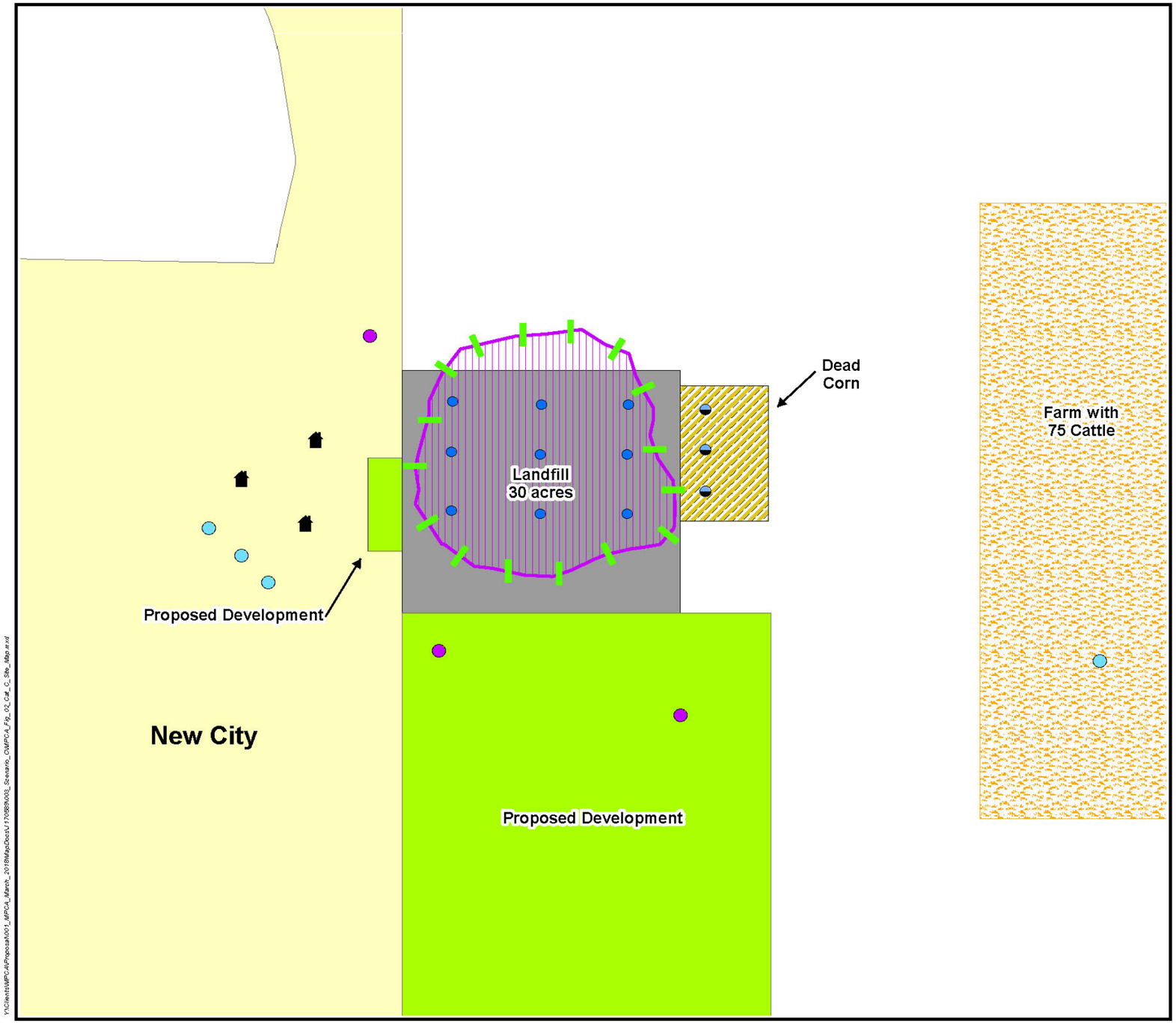


Figure 2

Scenario C Landfill Cover and Waste Extent Evaluation

0 500 1,000 Feet
0 100 200 Meters

- Proposed Test Trench
- Proposed Soil Boring
- Proposed Near-Surface Composite Soil Sample (Distressed Vegetation)
- Houses
- Private Drinking Water Well
- Unused Monitoring Well
- Assumed Extent of Waste Defined by Geophysical Assesment
- Proposed Development
- Dead Corn
- Farm
- Landfill
- New City

Bay West
Customer-Focused Environmental & Industrial Solutions

Date Drawn: 4/9/2018 Project # J170589

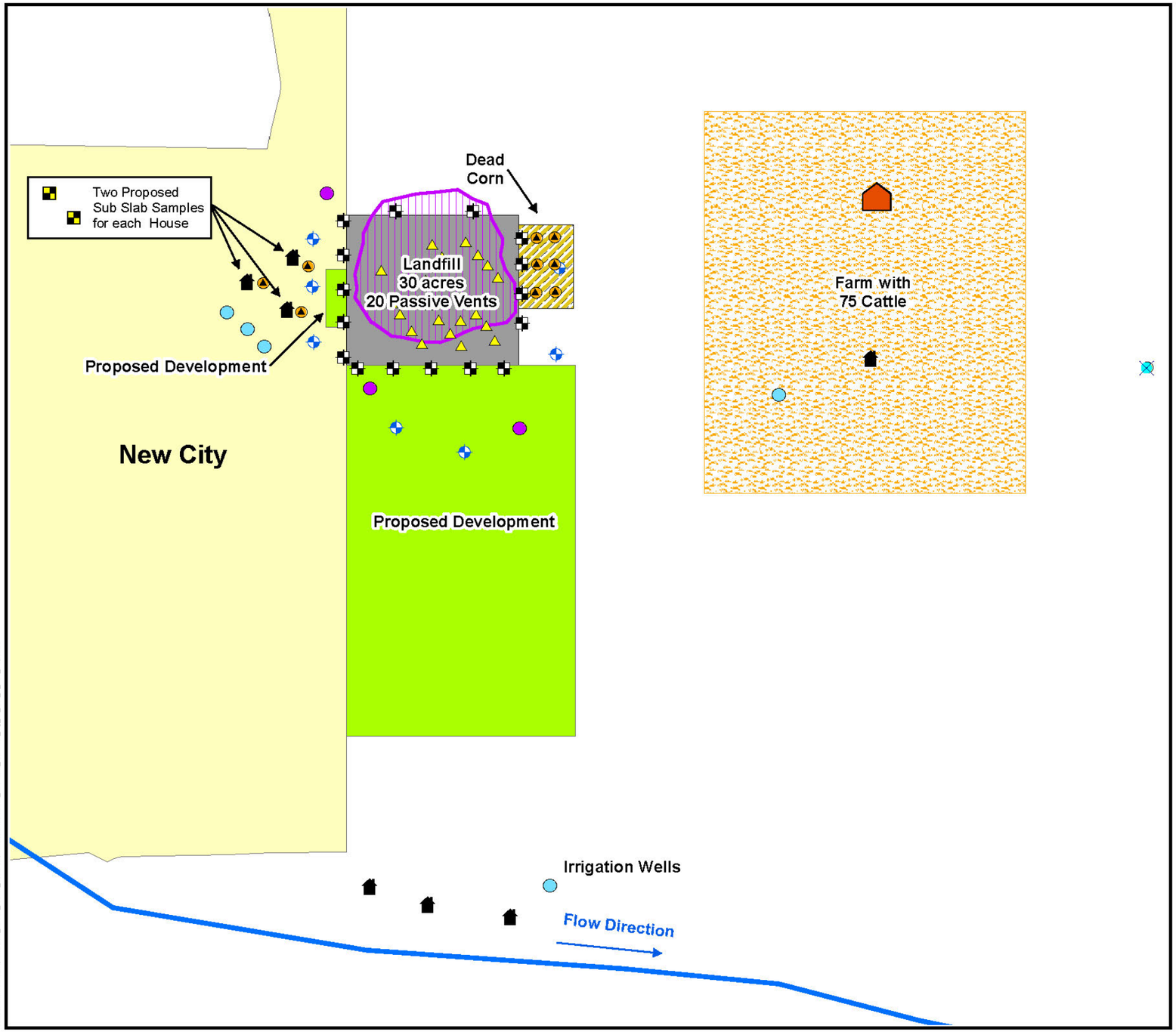


Figure 3
Scenario C
Landfill Gas and Groundwater Evaluation

0 500 1,000 Feet
0 250 500 Meters

- Proposed Sub Slab Sample
- Proposed Receptor-specific Soil Gas Sample
- Proposed Permanent Soil Gas Monitoring Points
- Proposed Direct Push Groundwater Sampling Location
- Farm
- Houses
- Passive Vent
- Private Drinking Water Well
- Unused Monitoring Well
- Stream
- Assumed Extent of Waste Defined by Geophysical Assesment
- Proposed Development
- Dead Corn
- farm
- landfill
- New City

Bay West
Customer-Focused Environmental & Industrial Solutions

Date Drawn: 4/5/2018 Project # J170589

MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North
St. Paul, MN 55155-4194

Attachment B
*Example Scenario Project Spreadsheet

Project title: **Category C: Closed Landfill Scenario**

													2. Subcontracting				3. Equipment			4. Other Expenses		
Project Budget	Engineer 1	Engineer 2	Engineer 3	Engineer 4	Field Technician	GIS/CADD Specialist	On-Site Inspector	Project Manager	QA/QC Officer	Scientist 1	Scientist 2	**Total hours (Extended)**	Drilling State Contractor	Lab Fees State Contractor	Suveyor Purchasing Manual	Geophysical Contractor State Contractor	Owned/Fee Schedule Equipment	Vehicle Mileage	Rental Equipment	Database and File Search		
Objective 1 - Phase I ESA																						
Task A - Phase I ESA					30.00	6.00		6.00		15.00		57.0						$ 35.00		$ 450.00		
Total Hrs for Objective 1	**0.0**	**0.0**	**0.0**	**0.0**	**30.0**	**6.0**	**0.0**	**6.0**	**0.0**	**15.0**	**0.0**	**57.0**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 35.00**	**$ -**	**$ 450.00**	**$ -**	**$ -**
Objective 2 - Evaluate Extent and Volume of Landfill Waste, Evaluate Landfill Cover																						
Task A - Geophysics					30.00	10.00		6.00				46.0				$ 35,000.00		$ 100.00				
Task B - Borings and Test Pits												0.0										
Subtask 1 - Test Trenches					50.00	2.00		10.00			50.00	112.0		$ 6,900.00			$ 1,500.00	$ 130.00	$ 6,000.00			
Subtask 2 - HSA Borings					80.00	2.00		6.00		80.00		168.0	$ 18,000.00	$ 15,550.00			$ 2,000.00	$ 260.00				
Subtask 3 - Surface Soil Eval						1.00		2.00				3.0		$ 2,000.00								
Task C - Landfill Cover Topo												0.0										
Subtask 1 - Topo Survey						4.00		2.00				6.0			$ 7,500.00							
Subtask 2 - Aerial Imagery					8.00	16.00		4.00				28.0						$ 35.00	$ 300.00			
Total Hrs for Objective 2	**0.0**	**0.0**	**0.0**	**0.0**	**168.0**	**35.0**	**0.0**	**30.0**	**0.0**	**80.0**	**50.0**	**363.00**	**$ 18,000.00**	**$ 24,450.00**	**$ 7,500.00**	**$ 35,000.00**	**$ 3,500.00**	**$ 525.00**	**$ 6,300.00**	**$ -**	**$ -**	**$ -**
Objective 3 - Assess Landfill Gas Generation and Soil Gas Monitoring																						
Task A - Permanent Soil Gas Pts					24.00	2.00		6.00				32.00	$ 15,000.00	$ 2,844.00			$ 750.00	$ 150.00				
Task B - Receptor-Spec Sampling					10.00	2.00		8.00				20.00	$ 2,000.00	$ 861.00			$ 350.00	$ 35.00				
Total Hrs for Objective 3	**0.0**	**0.0**	**0.0**	**0.0**	**34.0**	**4.0**	**0.0**	**14.0**	**0.0**	**0.0**	**0.0**	**52.00**	**$ 17,000.00**	**$ 3,705.00**	**$ -**	**$ -**	**$ 1,100.00**	**$ 185.00**	**$ -**	**$ -**	**$ -**	**$ -**
Objective 4 - Groundwater Quality Evaluationand Risk to Receptors																						
Task A - GW Receptor Survey					16.00	2.00		2.00		8.00		28.00										
Task B - Sample Wells					40.00			20.00				60.00		$ 6,000.00			$ 200.00	$ 150.00				
Task C - Direct Push GW Sampling					16.00	2.00		4.00				22.00	$ 3,500.00	$ 4,800.00			$ 122.00	$ 65.00				
Total Hrs for Objective 4	**0.0**	**0.0**	**0.0**	**0.0**	**72.0**	**4.0**	**0.0**	**26.0**	**0.0**	**8.0**	**0.0**	**110.00**	**$ 3,500.00**	**$ 10,800.00**	**$ -**	**$ -**	**$ 322.00**	**$ 215.00**	**$ -**	**$ -**	**$ -**	**$ -**
Objective 5 - Remedy Evaluation and Final Report																						
Task A - Remedy Evaluation		24.00	32.00			16.00		32.00			40.00	144.00										
Task B - Final Report Preparation		16.00	16.00			8.00		40.00			32.00	112.00										
Total Hrs for Objective 5	**0.0**	**40.0**	**48.0**	**0.0**	**0.0**	**24.0**	**0.0**	**72.0**	**0.0**	**0.0**	**72.0**	**256.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Total Project Hours	**0.0**	**40.0**	**48.0**	**0.0**	**304.0**	**73.0**	**0.0**	**148.0**	**0.0**	**103.0**	**122.0**	**838.00**										
Total Project Expenses													$ 38,500.00	$ 38,955.00	$ 7,500.00	$ 35,000.00	$ 4,922.00	$ 960.00	$ 6,300.00	$ 450.00	$ -	$ -

Appendix A: Resumes

Ed Bacig, PG

PRINCIPAL-IN-CHARGE, PROJECT MANAGER

OVERVIEW

Mr. Bacig has 30 years' experience in the environmental industry, ranging from site geologist to project and program manager to owner and vice president of operations. Before coming to Bay West in 1995 as a project manager, he served as a manager for MJ Environmental Consultants Inc., a research assistant at the University of Minnesota, and an exploration geologist with Newmont Exploration Limited.

In 2004, he became an owner and vice president of Bay West. Since then, he has championed key efforts including life coaching for employees, out of which was born the Bay West Way of Being, which focuses on integrity and healthy habits both at work and home. These efforts led to Bay West being named a National Standard Top Workplace. Mr. Bacig holds a BS in Geology from the University of Minnesota Duluth and maintains Professional Geologist registrations in Minnesota and Wisconsin.

PROJECT EXPERIENCE

Project Manager, Minnesota Pollution Control Agency, St. Louis/Interlake/Duluth Tar Site, MN – Currently manages a sediment, biota, fish, and surface water assessment project at this NPL site located on a bay in Lake Superior. Developed data quality objectives and environmental media sampling strategies for this complex riverine environment. Through an innovative sampling program, Bay West was able to cost effectively sample/process (for sediment solids, biota, fish tissue, and plant tissue) more than 1,800 gallons of sediment for toxicity and chemical analyses. Utilized MIS systems to track field work and sampling activities relative to the budget. Forecasting and effective change management allowed for rapid State approval (contract modification) of expanded sampling program with no downtime for sampling crew.

Project Manager, USEPA Region 5/Hennepin County, Docs Auto Superfund Site, Minneapolis, MN – Managed remediation of former scrap yard contaminated by lead and heavy metals. Work needed to be completed within 18-month restricted timeframe to allow redevelopment plans to proceed at this downtown site. Rapid response TO included excavation and stabilization of more than 2,500 cy of lead-contaminated soil; consolidation of more than 70 abandoned drums; building demolition; characterization; and T&D of HTRW. Worked with multiple public stakeholders (USEPA, three-state environmental programs, county, and redevelopment agency, and pollution control agency), as well as concerned citizens to negotiate a risk-based remediation approach. Completed RI, RAP, and RAP implementation. Project received the "Mayor's Award" for quality and timeliness. Utilized Primavera to resequence project activities to meet customer's need for schedule acceleration due to third party's proposed property development construction schedule.

Project Manager, Minnesota Pollution Control Agency, Ritari Superfund Site Cell Design/Installation, Sebeka, MN – Managed site characterization, geotechnical testing, remedial design, RAP preparation, and remedial action oversight of a multilayer waste cell cap. Managed preparation of design specifications to excavate/consolidate soil contaminated with PCP and dioxin/furans and to construct a cap, venting system, and groundwater monitoring system. Developed preliminary cost budget for design/construction that allowed State to allocate funds. Managed change requests on behalf of the State from contractors working directly for the State.

Training/Certifications

- *USACE Construction Quality Management for Contractors*
- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*

Education

- *BS Geology*

Registrations & Licenses

- *Registered Professional Geologist, MN (#30703), WI (#570-013)*

Work History

- *30 years' experience*
- *23 years with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
P	***Project Manager***
X	*QA/QC Officer*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Bacig is the principal-in-charge, VP of Operations, for Bay West and therefore directs the operational resources of the company. His primary role is to ensure that Bay West's health and safety and corporate QC requirements are met and that adequate company resources are available for the program.

Matt Schemmel, PG

PRIMARY POINT OF CONTACT (POC) & PROJECT MANAGER
ENVIRONMENTAL SERVICES GROUP MANAGER

OVERVIEW

Mr. Schemmel has 20 years of experience managing remedial investigation and remediation projects. Investigations and remedial actions include soil excavations, Phase I and II ESAs, vapor intrusion, sediment investigations, tank removal oversight, subcontractor bidding and coordination, groundwater and soil sampling, data review, report preparation, system installation and design, and client and regulatory contact.

Mr. Schemmel manages Bay West's Minnesota Department of Administration's Multisite contract; within which he networks with Minnesota Pollution Control Agency (MPCA), Minnesota Department of Health (MDH), and Minnesota Department of Agriculture (MDA) project leaders and technical staff to execute work orders in a client focused efficient manner.

TECHNICAL EXPERIENCE

Mr. Schemmel's over 20 years of experience started in the field conducting environmental investigations including tasks such as: sampling monitoring wells, sampling and performing maintenance of remediation systems, overseeing drilling operations; installation of soil-vapor extraction, groundwater air sparging, multi-phase extraction systems; field screening of soil samples; oversight of the removal of USTs; soil gas sampling, indoor air, and vapor intrusion air sampling; collecting samples of materials as part of asbestos surveys, mercury vapor screening, lead paint screening, and performing anthrax and methamphetamine sampling at various facilities.

He has prepared remedial investigation reports for the numerous State programs documenting soil, vapor, sediment and groundwater conditions at over 200 sites. He is responsible for all phases of projects, including proposal and work plan development, budget management, field supervision, report preparation, technical review, and reimbursement applications. Mr. Schemmel has also prepared QAPPs for brownfield sites, as well as conducted Phase I and II ESAs related to corridors and multi-parcel property transactions.

PROJECT EXPERIENCE

Project Manager, RI/RA, Various Former Dry Cleaner Sites, MN, Commercial Customers – Managed investigation & remedial actions associated with cleanup of former dry cleaner sites. Activities included historical document review, soil & groundwater sampling, soil-gas vapor intrusion assessments, soil excavation, soil vapor extraction & multi-phase extraction system design, installation, operation, sampling, and maintenance.

Project Manager, Various Petroleum Release Sites – Managed/conducted investigation of >200 petroleum release sites in Minnesota. Activities included sampling/performing maintenance of recovery systems, overseeing soil drilling operations, design/installation of soil vapor extraction, multi-phase extraction systems, tank removal oversight; soil gas, indoor air, and vapor intrusion air sampling.

Project Manager, Former Spur #4139 – Managed groundwater remediation trench and vapor extraction system to prevent migration of contaminants into a surface water; prepared CAD modifications to enhance system for removing free product; installed monitoring wells and conducted groundwater monitoring; installed, operated, and abandoned dual phase extraction system;

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *Certified Asbestos Building Inspector, MN #A17941*
- *DOT HazMat Training (49 CFR 172.704)*
- *USACE Construction Quality Management for Contractors*
- *Niton XRF Spectrum Analyzer Training Certified*
- *ASTM 1527-13 Environmental Professional*
- *FEMA NIMS ICS Trainings (100, 200, 300, 400, 700, 800)*
- *eRailsafe*
- *ITRC LNAPL Training*
- *First Aid/CPR Certified*

Education

- *BS Hydro/Environmental Geology, University of Minnesota-Duluth, 1997*

Registrations & Licenses

- *Certified Professional Geologist, MN (#42592), TX (#408), UT (#5263532-2250)*

Professional Memberships

- *Minnesota Groundwater Association (MGWA)*
- *American Institute of Professional Geologists (AIPG)*

Professional Experience

- *21 years' experience*
- *10 years with Bay West*

Matt Schemmel, PG (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Schemmel is a project manager with over 20 years of experience conducting/managing RIs for state programs documenting soil, vapor, & groundwater conditions. Mr. Schemmel has managed Multisite projects for over 15 years and been Bay West's POC for over 5 years.

Mr. Schemmel frequently performs project management activities on MPCA projects, including:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

conducted LIF investigation and 3D plume modeling; managed 30,000 cy soil excavation and large-scale construction dewatering activities; coordinated conference calls and meetings between several state agencies including MPCA & MnDOT.

Project Manager, Egan Oil Bulk Plant – Managed LSI which identified shallow soil contamination followed by a tank removal and building demolition. Coordinated meetings with Egan Oil and the City of Anoka to identify Petrofund-eligible costs versus development-related costs. Conducted a pre-demolition hazardous materials survey for the on-site building and prepared contractor bidding specifications for the demolition of the on-site building and loading rack and removal of the seven USTs.

Project Manager, Warba Tire – Managed 10-year-old leak site to closure in two years by performing LNAPL recovery tests and a LIF investigation which identified a LNAPL body which was targeted for excavation.

Project Manager, Limited Area-Wide Brownfields Inventory Assessment, Gary-New Duluth and Western Port Area Neighborhood, Duluth, MN – Mr. Schemmel managed a brownfield inventory project within areas of approximately 1,322 and 747 acres. The projects identified properties which could be considered brownfields or potential blighted properties. Mr. Schemmel attended meetings, prepared detailed reports and property cut sheets, and managed the overall budgets.

Project Manager, Phase I/II ESA, MnDOT TH 71 Corridor, Browerville, MN – Mr. Schemmel was the project manager for the approximately 0.79-mile TH 71 corridor. MnDOT plans called for the reconstruction of TH 71 in conjunction with utility construction (water main and sanitary sewer replacements) conducted by the City of Browerville. A total of 76 sites with "medium" or "high" environmental risk were identified.

The Phase II ESA evaluated potential groundwater and/or soil from the potential sites of concern. Impacted groundwater and indications of soil contamination were identified in one location, and recommendations were provided to the client to address potential impacts encountered during construction.

Project Manager, Phase I/II ESA, MnDOT TH 22 Corridor, Gaylord, MN) – Mr. Schemmel managed a Phase I and II ESA for a MnDOT project consisting of mill and overlay for the approximately 2-mile TH 22 corridor. The purpose of the investigation was to ascertain the presence and magnitude of potential soil and/or groundwater impacts from potential sites of concern identified as having a "medium" or "high" environmental risk during the performance of the Phase I ESA. Three areas of soil and/or groundwater contamination were identified during the Phase II, and recommendations were provided to MnDOT to address potential impacts encountered during construction.

Former Spur Sites, Murphy Oil USA, Inc., Various Cities, MN – Mr. Schemmel has conducted investigations and remedial activities at numerous former Spur gas stations located throughout MN, WI, and MI. Mr. Schemmel started out conducting field activities such as soil and groundwater sampling, remediation system monitoring and sampling, and soil excavation oversight. Over the years, Mr. Schemmel took on more management activities such as work plan preparation, data analysis, and report preparation. Remedial activities at these numerous sites have ranged from simple monitoring well sampling to complex LIF (ROS-T) probe investigations, excavations, and remedial system design, installation, optimization, and abandonment.

Training/Certifications

- *Fundamentals of Engineering Certificate (Dec. 2010)*
- *40-Hr OSHA Training w/Current Refresher*
- *Ramsey County Hazardous Waste Training*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 700, 800)*
- *MWSWAT, SEDCAD, ArcGIS, AutoCAD, CAL3QHC, MOBILE6, MINNOISE, XPSWMM*
- *First Aid/CPR Certified*

Education

- *MS Civil Engineering, University of Minnesota–Twin Cities, 2010*
- *BS Environmental Science, Loyola University Chicago, 2008*

Registrations & Licenses

- *Certified Professional Engineer, MN (#55407)*

Professional Experience

- *7 years' experience*
- *3 years with Bay West*

Jonna Bjelland, PE

PROJECT MANAGER/ENGINEER

OVERVIEW

Ms. Bjelland has over seven years of experience as an environmental engineer. Ms. Bjelland has worked on brownfield redevelopment, environmental assessment services and due diligence, water and waste water compliance, groundwater remediation design and implementation, air quality monitoring and compliance, sediment investigation, air and noise modeling, stormwater management and design, landfill design and permitting, and general compliance and water quality projects.

TECHNICAL EXPERIENCE

Ms. Bjelland's experience initially focused around due diligence investigative work and landfill compliance, construction, and permitting. Field experience included sampling monitoring wells; overseeing drilling operations; field screening of soil samples; overseeing the removal and management of impacted soils; soil gas sampling, indoor air, and vapor intrusion air sampling; and overseeing landfill cell expansion projects.

Ms. Bjelland's recent work has included groundwater remediation projects assisting in site investigation, operations and maintenance of existing systems, and designing and overseeing the construction of new systems. She has been involved with developing bid specifications, bidding, selecting bidders, and completing construction oversight at numerous sites. Ms. Bjelland works on multiple vapor investigation and remediation projects, including managing existing vapor extraction system operations and maintenance. She has worked across the state developing SPCC plans for various industries. She has prepared remedial investigation reports and focused feasibility studies for sites having soil, vapor, sediment, and groundwater impacts. Currently, Ms. Bjelland manages and assists with the management of multiple site investigation and operations and maintenance projects.

PROJECT EXPERIENCE

Superior Plating Permeant Leachate Capture and Treatment System, MPCA, Minneapolis, MN – Assisted with the design of a permanent leachate collection system (LCS) at the former Superior Plating Site in Minneapolis, MN. The system was designed to capture and treat site groundwater contaminated by hexavalent chromium. Prepared design and bid specifications, assisted in bidding and procuring a subcontractor for construction, managed and oversaw the successful construction of the system, and developed a system operations and maintenance manual.

Former Esselman Store, MPCA and MDA, Sauk Rapids, MN – Assisted ongoing investigation at the Former Esselman Store for both petroleum and agricultural contamination in soils and groundwater on behalf of both the MPCA and MDA. Assisted in coordinating sampling with residents, scheduling and coordinating field events, data interpretation and analysis, investigation report writing, and developing a drinking water supply alternatives analysis.

Spill Pollution Control and Countermeasure Plan (SPCCP) Preparation, Multiple Sites across Minnesota, Great River Energy, MN – Assisted with the preparation and implementation of multiple SPCC plans for Great River Energy. Project sites were located throughout Minnesota.

Stormwater Pollution Prevention Plan (SWPPP) Preparation, Molex, Saint Paul, MN – Reviewed and updated the site-specific SWPPP for Molex–Saint

Jonna Bjelland, PE (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Engineer 1*
X	*Engineer 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Ms. Bjelland Frequently performs project management type activities on MPCA projects. She has experience with the following:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

Paul. Managed Molex–Saint Paul's Industrial Stormwater Permit, compliance, and reporting.

OTHER EXPERIENCE

Phase I and II Investigator and Field Support, Site Assessment and Remediation, Wilder Square Remediation, Saint Paul, MN, with Liesch, A Terracon Company – Wilder Square is a multifamily apartment building with 136 apartments and paved parking and drives. The site is approximately 2.6 acres. Assisted with the completion of the Phase I and II Environmental Site Assessment work, assisted with the preparation of the response actions plan, oversaw implementation of response actions. and prepared the final implementation report for the property. Oversaw response action implementation in the field including excavation, removal, and management of impacted soil and buried debris from green space areas and the importation of clean fill soils for backfill.

Lyon County Regional Landfill, Lynd, MN, with Liesch, A Terracon Company – Assisted in completing the 2013 annual permit reporting for Lyon County Regional Landfill. Provided construction oversight and quality control, including ensuring contractor compliance with necessary construction permitting during cell expansion completed in 2014. Additionally, completed required reporting documenting cell expansion completion.

Senior Staff Engineer, Liesch, A Terracon Company, Saint Paul, MN – Performed and managed Phase I and II ESAs, petroleum investigations, brownfield redevelopment, municipal solid waste landfill design and permitting, waste water compliance, air quality monitoring and compliance, air and noise modeling, stormwater management and modeling, and general compliance and water quality projects.

- City of Saint Paul, Lilydale Regional Park: RAP/CCP development and implementation. Field oversight during implementation including confirmation sampling. Completion of the final implementation report documenting response actions.
- Landfill annual permit reporting, landfill annual groundwater reporting, construction oversight/quality control and reporting, permit application and renewal, leachate modeling, stormwater modeling and design, and groundwater monitoring. Some landfills Ms. Bjelland has worked on include Lyon County, Morrison County, St. Louis County, Polk County, DKV, Burnsville Sanitary, Hoffman Demo, Valley Demo, Spruce Ridge, Voyageur Industrial, Vonco II, SKB Environmental, SRC Inc., and General Waste Keewatin.
- Bongards: Assisted in permitting and monitoring relating to on-site spray field irrigation.
- Minneapolis Airport Commission: Assisted with glycol management and stormwater monitoring.
- Target Corporation: Air and noise modeling for campus expansion.
- Beaupre Industries: Phase I ESA and reporting. Stormwater pond dredging implementation and management.
- Cassidy Turley, Ryan Companies, Luther Auto Dealership, City of Hastings, and Blackwater Investment Group: Multiple Phase I and II ESAs.
- Saint Paul Port Authority: Multiple Phase I and II ESAs, including Midway Stadium, Gillette Manufacturing, and downtown Saint Paul Macy's.
- Remmele Metals: Sara Title III Reporting and SPCCP/SPPP.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *Radiation Safety Training for Portable XRF Analyzers*
- *DOT HazMat Training (49 CFR 172.704)*
- *30-Hour OSHA*
- *Confined Space*
- *MN Asbestos Inspector*
- *Industrial Storm Water Regulations Training*
- *NRPP Radon Mitigation – Residential Measurement and Residential Mitigation Certified*
- *FEMA NIMS ICS Trainings (100, 200, 700, 800)*

Education

- *BS Environmental Geoscience, University of St. Thomas, 2012*

Professional Memberships

- *American Institute of Professional Geologists (AIPG)*

Professional Experience

- *6 years' experience*
- *6 years with Bay West*

Alexandra Blel

PROJECT MANAGER

OVERVIEW

Ms. Blel has performed a wide variety of office tasks and fieldwork. Office activities have included supporting management of vapor intrusion sites, contracting, cost estimating, sampling plan development, and authoring/compiling various state and federal environmental reports, including remedial investigations, feasibility studies, characterization reports, asbestos and regulated waste reports, Phase I ESA proposals and reports, and work plans. Primary field responsibilities have included conducting sediment investigations, overseeing vapor mitigation system installations, collecting vapor intrusion samples, coordinating vapor intrusion sample collection, responding to spills, and collecting occasional groundwater sampling.

TECHNICAL EXPERIENCE

Ms. Blel is a geologist with 6 years of experience in the environmental consulting industry. Throughout those six years, Ms. Blel has gained experience as a field technician/staff scientist/project manager on a variety of projects including petroleum leak sites, solvent sites, and brownfields sites. Ms. Blel has managed and assisted in the management of MPCA projects in accordance with the contract and purchasing manual. Ms. Blel has conducted field investigations involving soil boring advancement, monitoring well installation, sampling and monitoring of remediation systems, and air sampling and mitigation system oversight associated with vapor intrusion projects. Ms. Blel also has a diverse understanding of reporting associated with remediation sites, including report preparation utilizing MPCA guidance documents, including analyzing contaminant trends, and assisting with remediation plans and site recommendations.

Ms. Blel has authored/compiled various federal environmental reports for the USEPA and USAF, including remedial investigation reports and remedial action objective reports.

Ms. Blel has NRPP radon measurement and mitigation training and has experience in overseeing of vapor mitigation systems installation. Ms. Blel is knowledgeable about MPCA best management practices as applied to vapor intrusion and is experienced in sub-slab sampling and performing depressurization measurements.

Ms. Blel has performed multiple remedial investigations related to sediments on St. Louis River AOC sites. Particular experience is in sampling of sediments using various techniques including vibracore, hand push methods (piston and check valve samplers), direct push (Geoprobe), and auger. Ms. Blel has also performed investigative and quality assurance sampling of soils and groundwater.

PROJECT EXPERIENCE

MDH-BioWatch Network Monitoring Program, Daily Ambient Air Monitoring – Provided technical support for daily air sample collection 24/7/365. Authored monthly and quarterly status reports and in-house SOPs. Scheduled field technicians for daily air sample collection. Authored proposals for continuous sample collection.

SA#132 University Avenue and Pascal Street, MPCA, St. Paul, MN – Collected soil gas samples in the site of concern containing potential PCE-impacted soils. Assisted in obtaining resident access agreements for future sub-slab vapor sampling. Provided mitigation system installation oversight, as well as

Alexandra Blel (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Ms. Blel frequently performs project management activities on MPCA projects. She has experience with the following:

- *Compiling work plans and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling fieldwork and preparing equipment and staff for fieldwork;*
- *Compiling invoices and budget status reports; and*
- *Compiling project completion reports and annual monitoring reports.*

mitigation system confirmation air sampling. Field duties included sub-slab air sampling, indoor/outdoor air sampling, and differential pressure extension across the sub-slab using the micro-manometer. Office duties included laboratory data collection, authored project summary reports, coordinated sub-slab vapor sampling, and soil and groundwater drilling activities. Assisted in project invoicing and vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures.

SA#249 SE Hennepin Area Groundwater and Vapor, MPCA, Minneapolis, MN – Proposal for drilling and vapor intrusion assessments (VIAs). Drilling coordination and field activities. VIAs for commercial and residential properties. Property Summary Reports (PSRs). Groundwater sampling coordination and field activities. Groundwater, soil, and soil gas investigation coordination, oversight, field activities, and reporting.

L#79007 Vapor Reviews, MPCA – Review leak site files to assess risk for vapor intrusion and prepare tables and figures summarizing findings.

SR#1404 55th Street and Lyndale Avenue, MPCA – Collected soil gas samples in the site of concern containing potential PCE impacted soils. Assisted in obtaining resident access agreements for future sub-slab vapor sampling. Provided mitigation system installation oversight, as well as mitigation system confirmation air sampling. Field duties included: Sub-slab air sampling, indoor/outdoor air sampling, differential pressure extension across the sub-slab using the Micro-manometer. Office duties included: Laboratory data collection, authored project summary reports, sampling coordination. Assisted in project vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures.

St Louis River Area of Concern, MPCA, Duluth, MN – Conducted multiple sediment investigations over three Sediment Assessment Areas within the AOC over water and ice. Led the sediment sample processing area for the removal of dredge material containing potentially contaminated sediment including metals, PCBs, PAHs, dioxin/furan, TOC, and grain size of sediment collected from 90 sediment core samples from within the Duluth harbor. Coordinated with Site Supervisor, Field Coordinator, and Project Chemist. Investigation events were conducted as part of the remedial investigation/feasibility design project phase. Conducted multiple sediment investigations over three Sediment Assessment Areas within the AOC over water and ice. Collaborated with the MPCA and USEPA on implementation of a benthic bioaccumulation/toxicity study for the Scanlon Reservoir, Thomson Reservoir, and Mud Lake West SAAs. Collaborated with MPCA and UW-Superior LSRI to design and implement a sediment toxicity study within the Munger Landing SAA.

Naval Industrial Reserve Ordnance Plant, Minneapolis, MN – Provided field support for the annual groundwater sampling event. Assisted in groundwater sample collection for greater than 100 monitoring wells using the high-flow Grundfos Pump. Provided office support for the annual groundwater sampling event by assisting with QA/QC of the samples collected. Job duties included monitored well water levels, calibration of YSI, and QA/QC sample collection.

USACE – Omaha District, Ellsworth AFB, South Dakota – Screened impacted soil using the XRF analyzer. Discrete soil samples were collected and screened for metals using the XRF; incremental samples were collected for lab analysis. Visual survey of areas designated in work plan using the GPS. Job duties included calibrating and using the XRF, and using the GPS.

Donovan Hannu, PE

PROJECT MANAGER
GROUP MANAGER, ENVIRONMENTAL SERVICES

OVERVIEW

Mr. Hannu is a Registered Civil Engineer with over 27 years of experience investigating, remediating, and helping clients develop contaminated property. He has managed a wide variety of investigation, cleanup and development projects at sites contaminated with petroleum, PAHs, and metals from sources such as railroad tracks, USTs, dry cleaners, fill material, and off-site sources.

TECHNICAL EXPERIENCE

Mr. Hannu has managed a wide variety of development projects at sites contaminated with petroleum, PAHs, and metals from sources such as railroad tracks, USTs, dry cleaners, fill material, and off-site sources. This technical experience not only allows projects to move forward in a timely and cost-effective manner, but also helps him anticipate future project requirements.

Mr. Hannu's experience ranges from a field technician performing all aspects of field sampling, to a project engineer developing investigation work plans, strong communication skills of important issues between the parties that need to know this information, and developing complex corrective action strategies, and finally to a senior project manager who directs project staff while keeping projects within established timelines and budgets.

Over the past 27 years, Mr. Hannu has either managed or provided key technical support for numerous investigation, cleanup and development projects throughout Minnesota. He brings a unique combination of construction and environmental experience, which allows him to effectively communicate the consequences of critical environmental results. Mr. Hannu has managed the investigation of approximately 300 sites contaminated with petroleum, solvent, metals, or heavy hydrocarbons. He has conducted feasibility studies at numerous sites with contaminated soil and groundwater that evaluated alternative remediation techniques and recommended appropriate technologies. He has also prepared many Response Action Plans (RAPs) and Contingency Plans.

He has prepared detailed bidding plans and specifications, operation, maintenance, and monitoring manuals, and directed the installation of approximately 100 active remediation systems and numerous excavation projects. These systems have utilized bioventing, vapor extraction, air sparging, thermal vapor combustion, building ventilation, free product recovery, natural attenuation, enhanced biodegradation, groundwater recovery and treatment, and dual-phase extraction for sites with solvent, petroleum, and metal contamination. He has also successfully prepared bidding specifications for complex excavation projects with several types of soil, each requiring distinct handling and disposal procedures, without any cost overruns or delays. He focuses bidding specifications on collecting unit prices for many unanticipated, but potential items, with the goal of eliminating undefined contractor change orders. Instead, contractor invoicing goes smoothly and as planned, protecting both his clients and the contractors.

Mr. Hannu uses this experience to currently provide senior technical review of a majority of Bay West's workplans and reports prepared by our other project managers for the MPCA.

Training/Certifications

- *Licensed Professional Civil Engineer, IA, MI, MN, ND, SD, WI, MD, KS, NE*
- *40-Hr OSHA Training w/Current Refresher*
- *Certified Stormwater Pollution Prevention Plan (SWPPP) Designer*
- *Registered PECFA Site Assessor, WI*
- *DOT HazMat Training (49 CFR 172.704)*
- *BNSF and CN Contractor Safety*
- *e-RAILSAFE*
- *NCEES (National Council of Examiners for Engineering and Surveying)*
- *8-Hour Refresher OSHA Training for Workers at Hazardous Waste Sites*
- *Respirator Fit Tested (Quantitative)*
- *Bio Hazard Sampling Training*
- *FEMA NIMS ICS Trainings (100, 200, 700)*
- *First Aid/CPR Certified*

Education

- *BS Civil Engineering*

Professional Experience

- *27+ years of experience*
- *6+ years with Bay West*

Donovan Hannu, PE (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Engineer 1*
X	*Engineer 2*
X	*Engineer 3*
X	*Engineer 4*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Hannu frequently performs project management activities on MPCA projects. He has experience with the following:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

PROJECT EXPERIENCE

Project Manager, Vapor Review Project, MPCA – Mr. Hannu is managing a team that is helping the MPCA assess vapor intrusion risk at higher-risk petroleum release sites that were closed before the vapor intrusion assessment guidance documents were prepared. We obtain MPCA files for the closed sites, review key information to identify plume size and magnitude, conclude if additional vapor assessment is necessary, and (if so) develop a proposed scope for this assessment. In addition, we identify any recalcitrant compounds that may have been detected during the original investigation. To date, we have reviewed over 300 closed sites for the MPCA. We have also developed a web mapping application for the MPCA and another consultant to quickly view project results, with the eventual goal of turning it over for use on the MPCA's website.

Project Manager, St. Louis River/Interlake/Duluth Tar Superfund Site MN, MPCA – Prepared Draft ARARs on behalf of MPCA for new Feasibility Studies. Provided technical review support on the new Feasibility Studies. Conducted Five-Year Reviews which included the evaluation of the effectiveness of the implemented remedies, then developed recommendations and follow-up actions for sites.

Project Engineer, Superior Plating, MN, MPCA – Initially reviewed historical MnDOT design drawings of the bridge abutment and identified drainage piping as the source of a leak near this site (under a bridge at the surface) contaminated with hexavalent chromium after years of previous consultants attempting to identify the leak source. Recommended modification of current leachate collection system by extending French drains to prevent additional leachate from entering the railroad ROW. During excavation of these extensions, samples were collected, and waste characterized as non-hazardous. Later, during site redevelopment, prepared the bidding specifications for the new groundwater collection system and directed the installation of this unique $750,000 system.

Project Manager/Engineer, Solvent Cleanup, Sunstone Hotels, Rochester, MN – Directed the site investigation and cleanup of a large PCE release existing in a deep bedrock and municipal drinking water aquifer, which involved workplan preparation, directing the investigation, managing the long-term monitoring efforts, conducting pilot testing, and design/installation of a dual-phase extraction system. Site was successfully sold to the city and redeveloped.

Project Manager/Engineer, Children's Museum, Mankato, MN – The City of Mankato was awarded a Minnesota Technical Brownfield Assistance Program (MnTBAP) grant. Mr. Hannu managed the completion of a Phase I ESA and a Phase II Investigation, prepared a Response Action Plan (RAP), and helped communicate these results to the City of Mankato on behalf of MnTBAP, leading to a successful development.

SE Hennepin Vapor Plume, Minneapolis, MN – Organized a remediation technology presentation for property owners in the neighborhood regarding solvents and cleanup technologies in layman's terms for an open house technology presentation. Developed presentation materials that summarized General information regarding solvents, their chemical properties, and their subsurface behavior; the pros and cons of specific solvent cleanup technologies such as excavation, soil-vapor extraction (SVE), air sparging, dual-phase extraction (DPE), biological injection, and chemical injection; and both written and graphic depictions of key information

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *USACE Construction Quality Management for Contractors*
- *Niton XRF Spectrum Analyzer Certification*
- *FEMA NIMS ICS Trainings (100, 200, 700)*
- *Confined Space Entry/Rescue Training*
- *Advanced Chemical Vapor Intrusion Mitigation course*
- *First Aid/CPR Certified*

Education

- *BS Comprehensive Geology, University of Wisconsin – Eau Claire (2006)*

Professional Memberships

- *Minnesota Groundwater Association (MGWA)*

Work History

- *12 years' experience*
- *7 years with Bay West*

Shawn Lyman

PROJECT MANAGER/GEOLOGIST

OVERVIEW

Mr. Lyman has 12 years of experience in the environmental and mineral exploration industries. For the past four years, he has been managing projects for Bay West and serving as a technical support for proposals, investigation/remedial reporting, and project planning and coordination. Mr. Lyman also has a strong background in field operations with diverse experience working on a variety of projects and conditions throughout the country.

TECHNICAL EXPERIENCE

Mr. Lyman's experience started as a mineral exploration geologist in Alaska, including remote bedrock/fault mapping, soil/rock sampling, exploration resource drilling, and deep bedrock monitoring well installs. Mr. Lyman served as a project geologist and managed the planning/coordination of various exploration and resource programs around the state of Alaska. Mr. Lyman's 5-year experience working on and coordinating large scale exploration programs in remote locations and severe conditions provided him with valuable experience in forecasting project resources, identifying problems and solutions, adaptability, and the importance of health and safety.

Mr. Lyman started as a field Geologist for Bay West in 2010 and worked on a variety of Federal, State, and Commercial projects. He gained extensive experience completing investigations, remediations, well installations, and oversight of drilling and heavy equipment sub-contractors. Mr. Lyman has field experience in all aspects of soil, groundwater, and vapor sampling procedures and techniques and has provided oversight on a variety of drilling techniques. He is well versed on regulatory guidance and writing of technical investigation and remedial reports.

Mr. Lyman has managed projects for Bay West since 2014, including numerous MPCA multi-site projects under the Petroleum Remediation and Site Assessment programs. Mr. Lyman's projects include a diverse mix of contaminates, pathway impacts (soil, groundwater, vapor, surface water), and receptor risks (vapor intrusion, water supply wells, surface water). Mr. Lyman manages and assists on all phases of the project including proposal preparation, budget management/forecasting; subcontractor procurement and management, field staff training and oversight, data management and analysis, technical support/review, and report preparation.

Mr. Lyman manages large scale solvent vapor intrusion projects and is experienced in coordination and communication with residential and commercial property owners and tenants. His knowledge of vapor guidance and VIA project volume and variety, provides him with the resources and ability to deal with complex vapor intrusion sites and sampling conditions.

PROJECT EXPERIENCE

Project Manager, SA#249/SR1401: SE Hennepin Area Groundwater and Vapor, Minneapolis, MN, MPCA – Mr. Lyman has managed SA#249/SR1401 for four years. The site contaminates of concern are TCE and PCE. Bay West completed large scale vapor intrusion assessment in a dense, urban area that is mixed industrial, commercial, and residential. Bay West has installed over 150 vapor pins at properties that have a diverse set of building sizes,

Shawn Lyman (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Lyman frequently performs project management activities on MPCA projects. He has experience with the following:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

construction, usage, etc. and has collected over 250 sub-slab vapor samples during various seasonal conditions. Mr. Lyman managed the area-wide soil and groundwater Site investigations and Site Inspections, aimed at identifying potential TCE source areas and defining the extent of groundwater contamination. The soil and groundwater investigations to date have included advancement of 32 temporary wells (via DP and HSA) for collection of discrete groundwater samples at multiple intervals in the unconsolidated aquifer and groundwater sampling at 18 permanent monitoring wells.

Project Manager, SR#3: General Mills, Minneapolis, MN, MPCA – Mr. Lyman has been managing the project since 2014. Project activities have included residential/commercial building vapor intrusion assessment, sub-slab, indoor air, and outdoor air vapor sampling, vapor mitigation system installations, and oversight of environmental consultants and subcontractors on numerous sub-slab depressurization system installs and sub-slab vapor sampling events.

Project Manager, SR#328/LS1404: Blaine Municipal Wells, Blaine, MN, MPCA – The MPCA retained Bay West to develop an investigation strategy to identify the source of 1,2- dichloroethane (DCA) contamination detected in select municipal wells. Mr. Lyman completed an extensive historical review of the Superfund site and surrounding leak site investigations and identified a location as a potential source of DCA contamination. Mr. Lyman managed several subsurface investigations at a historical leak site location that determined the site was a shallow DCA source. Bay West defined the area of contamination associated with the leaded fuel release and Mr. Lyman prepared an Excavation Detailed Corrective Action (EDCAD) report. Mr. Lyman prepared detailed specifications and procured an excavation subcontractor through the Dept. of Admin. Mr. Lyman managed the removal of 8,200 tons of petroleum contaminated soil at a site that had critical schedule and logistical operational constraints. The excavation was completed with minimal disruptions to business operations, on time and within budget, and the corrective objectives were met.

Project Manager, LS#14345: Sturgeon River Landing, Side Lake, MN, MPCA –Mr. Lyman took over the managing of the project in 2014 and has run the semi-annual monitoring of the monitoring and domestic well network. Mr. Lyman prepared a Focused Investigation Work Plan and is in the process of starting the LIF/MiHPT tiered investigation aimed at defining the complex dissolved phase LNAPL plume that has migrated at depth in a rural area with domestic well networks.

Project Manager, SA#1207: Toro Facility Bloomington, MN, MPCA – Mr. Lyman has managed the Toro Facility Bloomington Vapor investigation since 2015. Work tasks have included multiple soil gas sampling events along commercial and residential streets and vapor intrusion assessment and sub-slab vapor sampling at residential properties.

Project Manager, LS#18746: Former Melrude Store, Melrude, MN, MPCA –

Mr. Lyman managed the petroleum investigations at the site that included a LSI, RI with monitoring well installations, continued groundwater monitoring, and data evaluation and reporting.

Mineral Exploration Geologist, Millrock Resources, Inc and NovaGold Resources, Inc., Various Locations, Alaska – Gold exploration program planning, high grade rock and soil sampling; lithology interpretation; helicopter reconnaissance; mountainous fault zone and bedrock mapping and interpretation, exploration drilling oversight; supervised monitoring well and exploration drilling programs; oversight of numerous deep monitoring well installs, responsible for environmental compliance, data interpretation and evaluation, and technical report writing.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *USACE Construction Quality Management for Contractors*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 700, 800)*
- *First Aid/CPR Certified*
- *Niton XRF Spectrum Analyzer Training Certified*

Education

- *B.S., Geology — University of Minnesota – Twin Cities (2002)*
- *B.S., Geophysics — University of Minnesota – Twin Cities (2002)*

Registrations & Licenses

- *Professional Geologist (PG) MN (#49016)*

Professional Memberships

- *Minnesota Groundwater Association (MGWA)*

Work History

- *13 years' experience*
- *13 years with Bay West*

Amandy Malaney, PG

PROJECT MANAGER

OVERVIEW

Ms. Malaney is a Professional Geologist with 13 years of experience in the environmental consulting industry. She has 4 years of project management experience on projects including petroleum leak sites, solvent sites, and brownfields sites. Ms. Malaney offers a strong collection of experience and skills in project planning and site management.

TECHNICAL EXPERIENCE

Ms. Malaney's 13 years of experience started in the field conducting environmental investigations including tasks such as sampling monitoring wells; sampling and performing maintenance of remediation systems; overseeing drilling operations; field screening of soil samples; oversight of the removal of USTs; soil gas sampling, indoor air, and vapor intrusion air sampling; and collecting samples of uncharacterized materials.

For the past four years, Ms. Malaney has managed numerous MPCA multi-site project including solvent sites with vapor intrusion risks, a metal plating site, and short and long-term petroleum leak sites. She has implemented the most current MPCA vapor intrusion guidance, coordinated sub-slab depressurization system installations, attended public information sessions with the MPCA, worked with property owners and tenants on access and scheduling, and prepared work plans and reports. She manages all phases of the projects including proposal preparation, budget management, subcontractor procurement and management, field staff training and oversight, data management and analysis, report preparation, and technical review.

PROJECT EXPERIENCE

Project Manager, SR#1404: 55th and Lyndale Avenue South Site, Minneapolis, MN, MPCA – Ms. Malaney has managed SR#1404 for four years. The site consists of two separate solvent sources. The sites have been merged due to their overlapping plumes. Ms. Malaney assisted with obtaining access and managed sub-slab sampling at over 30 residential and commercial properties. Commercial properties included several large buildings with unique construction that required the implementation of non-standard vapor intrusion sampling techniques. Worked with property owners and their lawyers, tenants, and MPCA to select sampling locations and worked with MPCA and MDH to evaluate results. Managed SSD system installation at 11 residential properties using MPCA Purchasing Manual or SSD System Installation State Contract. Managed soil and groundwater investigation.

Superfund Site, Naval Industrial Reserve Ordnance Plant (NIROP), Fridley, MN – Bay West has conducted operation and maintenance of the NIROP air stripper treatment system since 2000. Ms. Malaney has been the Bay West project manager since November 2016. The treatment system runs 24/7/365 and requires 20-30 hours of work per week by engineers and technicians. Ms. Malaney coordinates and manages the field work, procures and manages subcontractors, manages the budget, plans for repairs to minimize system downtown, and works with other parties involved with the site.

Project Manager, SR#1405: University Avenue and Pascal Street Site, St. Paul, MN, MPCA – Ms. Malaney has managed SR#1405 for four years. Ms. Malaney assisted with obtaining access and managed sub-slab sampling at over 30 residential and commercial properties. Managed SSD system installation at seven residential properties and five commercial properties using MPCA Purchasing Manual or SSD System Installation State Contract.

Amanda Malaney, PG (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Ms. Malaney frequently performs project management activities on MPCA projects. She has experience with the following:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

Effectively scheduled investigation and mitigation work with multiple tenants operating different business. Additionally, the unique construction of the commercial buildings required working closely with the subcontractor to identify solutions. Managed soil and groundwater investigation.

Project Manager, SR#131: Superior Plating, Minneapolis, MN, MPCA – Ms. Malaney was involved in the project during emergency response operations conducted by the MPCA and managed activities conducted under the multi-site contract. Ms. Malaney managed the collection, sampling, treatment and disposal of contaminated water; managed a soil and groundwater investigation; and managed the design and construction of a long-term treatment system including coordination with other involved parties.

Project Manager, SA#102: Diamond Lake Road and Nicollet Ave. Site, Minneapolis, MN, MPCA – Ms. Malaney managed the investigation of a solvent release that was discovered during a Phase II ESA. She managed vapor, soil and groundwater investigations at the site. Part of the vapor investigation included assessing and sampling a large commercial building that contains a school and church. Ms. Malaney prepared material for and participated in meetings with the MPCA at the church and school.

Project Manager, SA#4563: Ramsey Street. Site, Duluth, MN, MPCA – Ms. Malaney managed the vapor intrusion of solvents that were discovered during work at the Former Holiday Gas Station. Work included sub-slab vapor sampling and sub-slab depressurization system installation and follow-up sampling.

Project Manager, L#17591: Former Holiday Gas Station, Duluth, MN, MPCA – Ms. Malaney managed the ongoing investigation and monitoring of the site including monitoring well sampling, monitoring well installation, LNAPL product recovery, data evaluation and reporting.

Project Manager, Fuller Avenue Vapor Intrusion Investigation, St. Paul, MN, MPCA – Ms. Malaney attended property owner meetings with the MPCA, managed petroleum vapor intrusion assessment activities at two large commercial buildings and coordinated subcontractor planning for vapor mitigation system installation. Managed a Limited Site Investigation.

Project Manager, Jay Street Gas Holder, Duluth, MN – Ms. Malaney managed a Phase I and II ESA on a City of Duluth property that previously housed a gas holder. The Phase II ESA identified VOC, petroleum, metals, and asbestos risks in soil that needed to be addressed prior to the construction of residential buildings. Ms. Malaney managed the response actions. The response action involved field soil screening, soil excavation, post-excavation sampling, soil disposal and backfilling. Ms. Malaney worked with the City of Duluth and the developer, One Roof, to complete the project.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *MDH Asbestos Inspector*
- *DOT HazMat Training (49 CFR 172.704)*
- *First Aid/CPR Certified*

Education

- *BA Geology, University of St. Thomas*
- *JD, Hamline University School of Law*

Registrations & Licenses

- *Attorney License, Minnesota (#0397784)*

Professional Experience

- *13 years' experience*
- *6 years with Bay West*

Willy Miley, JD

PROJECT MANAGER

OVERVIEW

Mr. Miley is a geologist and lawyer with 13 years of industry experience conducting various due diligence assessments, remedial investigations, corrective actions, and compliance audits. He has three years of project management experience on projects including Phase I Environmental Site Assessments, brownfields sites, and vapor intrusion investigations. Mr. Miley also has extensive experience with regulatory file reviews and data analysis.

TECHNICAL EXPERIENCE

Mr. Miley's over 10 years of experience started in the field conducting environmental investigations including tasks on commercial, state, and federal projects such as: overseeing drilling operations; sampling and performing maintenance of remediation systems; installation of soil-vapor extraction, groundwater air sparging, multi-phase extraction systems; sampling monitoring wells and field screening of soil samples; oversight of the removal of USTs; and soil gas sampling, indoor air, and vapor intrusion air sampling.

Mr. Miley has prepared various technical documents such as Phase I/II ESAs, RAPs, RIs, FSs, QAPPs, SAPs, and CSMs. For the past two years, Mr. Miley has managed several MPCA multi-site projects including solvent sites with vapor intrusion risks and closed landfill investigations. He has implemented the most current MPCA vapor intrusion guidance, coordinated sub-slab depressurization and crawlspace ventilation system installations, worked with property owners and tenants on access and scheduling, and prepared work plans and reports. He manages all phases of the projects including proposal preparation, budget management, subcontractor procurement and management, field staff training and oversight, data management and analysis, report preparation, and technical review.

PROJECT EXPERIENCE

Project Manager, SW#134 Former Begin Demolition Landfill, Plymouth, MN, MPCA – Mr. Miley managed a Phase I ESA and file review, preparing bid specifications for a geophysical survey, and Phase II subsurface investigation to evaluate potential risks associated with the SW#134 former municipal and demolition debris landfill, which is currently fully developed as a shopping center with surrounding residential and commercial properties. The site was transferred to the MPCA Emergency Management Unit (EMU), and Bay West is currently performing on- and off-site landfill gas vapor intrusion and drinking water risk assessment activities. Mr. Miley has provided project management support including work plan and cost proposal development, securing property access agreements, and coordinating field work for the EMU investigation.

Project Support, SR#295 US Cleaners, Minneapolis, MN, MPCA – Mr. Miley provided project management support for a vapor intrusion assessment at a strip mall with a day care, clinic, and active drycleaner. He prepared the work plan and cost proposal, and the sampling and analysis plan for split sampling with the private property owner's consultant, and oversaw the previous data evaluation and current field activities and reporting. This project also involved performing a field methods audit on the property owner's consultant.

Project Manager, Former Northwestern Granite, Edina, MN – Mr. Miley managed a Phase I ESA, vapor intrusion assessment, MPCA brownfields program support, and sub-slab depressurization system installation oversight for this approximately 20,000-square foot brownfield redevelopment site.

Willy Miley, JD (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Miley frequently performs project management activities on MPCA projects. He has experience with the following:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

Project Manager, SA#271 Former Gross Given, St. Paul, MN, MPCA – Mr. Miley managed a vapor intrusion assessment surrounding the solvent groundwater and vapor plume at the SA#271 site. This project included sub-slab sampling at the Madina Academy pre-school, located at 115 Wabasha Street.

Staff Geologist, ATC Associates Environmental Consultants – Managed project and performed NEPA aspects reviews for over 75 nation-wide US Postal Service processing facilities to determine if consolidation activities would trigger the need for further environmental assessment. Performed numerous UST compliance inspections and report preparation for USPS vehicle maintenance facilities across the country; managed preparation of UST O&M plans for over 150 nation-wide USPS facilities.

Environmental Analyst, DPRA Environmental Consulting – Performed Environmental Site Assessments for numerous residential, commercial, industrial, transportation corridor, and department of defense sites throughout the United States. Conducted Remedial Investigations and Corrective Actions for several petroleum, solvents, and pesticide contaminated sites throughout Minnesota. Conducted Subsurface Investigation field activities and report preparation for numerous sites throughout the Midwest US. Provided oversight for petroleum storage tank removal, various remedial action and construction excavation activities, water well and remediation system installation, and soil boring advancement. Conducted regulatory file reviews for numerous sites at the MPCA, WI DNR, and National Records Administration Archive, Chicago, IL.

Staff Geologist/Field Technician, Meisch and Associates Environmental Consultants – Prepared Phase I ESA, Subsurface Investigation, and Remedial Site Monitoring reports. Conducted various field activities including: soil, air, soil gas, and groundwater sampling, classified soil borings and prepared well logs, excavation oversight, and constructed groundwater remediation systems and monitored operation and maintenance. Created data tables, geologic cross-sections, maps, and other figures for project reports.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *NRPP Radon Measurement and Mitigation Training*
- *Michigan DEQ Certified Storm Water Operator and Soil Erosion and Sedimentation Control Inspector*
- *FEMA NIMS ICS Trainings (100, 200, 800)*
- *MDNR & WDNR Boater Safety Training*
- *Inland Waterways Spill Responder Training*
- *First Aid/CPR Certified*

Education

- *MS Civil Engineering, Environmental Track*
- *BS Physics (Chemistry Minor)*

Work History

- *6+ years' experience*
- *4 years with Bay West*

Chris Musson

PROJECT MANAGER – PROJECT ENGINEER/SCIENTIST

OVERVIEW

Mr. Musson has over six years of project management and project support experience. He is especially knowledgeable in contaminated sediments and has experience working in nearly all aspects of the sediment investigation and remediation process. He has implemented 17 sediment site investigations over the past six years and worked as a field engineer on multiple Great Lakes Area of Concern sediment remediation projects. During construction phases, he has led quality assurance initiatives, directed site activities, and has served as a client representative. His expertise with ensuring quality objectives were achieved led to exceptional feedback during a USEPA quality audit on a $70-plus million-dollar sediment remediation project on the Grand Calumet River. Within the sediment investigation arena, he has developed sampling and investigation plans, led field sampling activities, developed and implemented quality assurance and control procedures, and compiled investigative reports.

Mr. Musson is also the Bay West project manager for the Perham Arsenic Site. He has successfully managed the groundwater pump and treat system on behalf of the Minnesota Pollution Control Agency for the past several years. Successful management involves routinely coordinating with the plant operator, field personnel, and MPCA managers to ensure regular maintenance and optimization activities are conducted.

PROJECT EXPERIENCE

Perham Arsenic Site

Currently manages the Perham Arsenic Site groundwater pump-and-treat system on behalf of the MPCA. Management activities include routine coordination with Bay West and MPCA staff, preparing plans and specifications and RFQs for various maintenance and optimization activities, securing subcontractors, invoicing, and creating budget and monthly status reports.

St. Louis River AOC

Conducted RI/FS assessment for ten sites located within the AOC. Developed and implemented toxicity and bioaccumulation studies for four of these sites. Participated in all sampling and analysis activities. Compiled RI and FS documents with the sediment investigation team.

Grand Calumet River AOC – Implemented the construction quality assurance program for a 70+ million-dollar sediment remediation and wetland restoration project, which included the hydraulic removal of 160,000 cubic yards of contaminated sediment and mechanical excavation of a contaminated 40-acre wetland.

Menominee River AOC – Served as the client representative and directed construction activities during the removal of coal tar impacted sediments near a public boat launch in Marinette, WI. The project included mechanical excavation within a cofferdam throughout the winter months.

River Raisin AOC – Implemented the construction quality assurance program during the removal of 110,000 cubic yards of PCB-contaminated sediment. The project included hydraulic dredging and pumping of sediments to a confined disposal facility 2 miles away along the Lake Erie shoreline.

Chris Musson (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Engineer 1*
X	*Engineer 2*
X	*Field Technician*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Musson frequently performs project management activities on MPCA projects. He has experience with the following:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

Environmental Engineer, Natural Resource Technology, Inc. (NRT), Milwaukee, WI, November 2011–June 2014 – Implemented Construction Quality Assurance (CQA) plans for NRT and our joint venture partners on environmental construction projects with an overall objective to: provide a quality product to our clients; uphold the integrity and quality reputation of our company and our joint venture partners; and limit liability that could arise from project impacts.

Served as a client representative and/or general contractor during construction phases, which included: interfacing with contractors/subcontractors on a daily basis regarding all on-site construction activities; ensuring that all on-site activities and constructed site features met the requirement of contract documents, e.g., Construction Quality Assurance Project Plans (CQAPPs), plans and specifications, permits, etc.; and understanding the client's project goals and working with contractors/subcontractors to obtain them.

Managed and performed on-site daily CQA tasks, which included: collecting samples; monitoring and managing real-time data; participating in daily/weekly meetings with project team members, regulators, and clients; documenting/reporting of all CQA activities; communicating with the on-site construction team to plan future site activities and foresee/avoid potential obstacles; communicating with off-site project management to keep all levels of project personnel informed of general daily activities and any conflicts/deviations from the work plan. Also assisted in site investigations and long-term environmental monitoring.

Water Quality Team Member, AmeriCorps State and National Program, Knoxville, TN, August 2006–June 2007 – Assisted in watershed-based research, data collection, educational outreach, and restoration projects for various public agencies such as the Knox County Engineering and Public Works Department, City of Knoxville, and Tennessee Department of Environmental Conservation. Developed, organized, and implemented educational programs introducing watershed science topics into middle and high school educational curriculum.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *Registered Professional Geologist, MN #40404*
- *MN Certified Asbestos Inspector, #AI9055*
- *MN Certified Asbestos Management Planner, #AM9055*
- *Asbestos Inspector Training and Annual Refreshers*
- *Asbestos Management Planner Training and Annual Refresher*
- *USACE Construction Quality Management for Contractors*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 301, 700)*
- *First Aid/CPR Certified*

Education

- *BS Geology, 1993*

Professional Experience

- *24 years' experience*
- *8 years with Bay West*

Rick Van Allen, PG

PROJECT MANAGER

OVERVIEW

Mr. Van Allen, PG, is a certified Professional Geologist with 24 years of project management, technical, compliance, and site assessment experience. He has a broad environmental background, is well versed in the Minnesota VIC and PBP Programs, guidance, and requirements, and has successfully managed numerous projects under both programs.

TECHNICAL EXPERIENCE

Mr. Van Allen has prepared asbestos and lead-based paint assessment bid specifications to ensure compliance with demolition and renovation regulatory requirements. Mr. Van Allen developed air monitoring plans and conducted real-time and time-weighted average air monitoring for asbestos, particulates, and metals in air to ensure compliance with OSHA and NIOSH S&H requirements and guidelines. He performed all aspects of planning, including facility inspection, product research, regulation review, and preparation of SPCC plans. He also conducted waste characterization sampling, hazard categorization, and completed waste profile documentation to obtain approval for disposal of waste at appropriate facilities.

PROJECT EXPERIENCE

Project Manager, Hobb's Barbeque, Minneapolis, MN, MPCA – Completed a Phase I ESA for the purchaser of this closed petroleum leak site. Historical use of the site as a scrap yard resulted in lead contamination in surface soil. Prepared a RAP that addressed the lead and petroleum contamination to facilitate redevelopment of the property. Wrote a DEED cleanup grant application resulting in an award of over $100,000 in grant funding for the project.

Technical Lead/Field Team Leader, Multi-acre Property Site Assessment, City of St. Louis Park, MN – Developed a work plan, coordinated subcontractors, and served as field lead to assess a multi-acre property in St. Louis Park contaminated with lithium process waste. Also scoped and assisted with completion of a magnetometer survey on the same property to assess the site for buried containers and debris.

Project Manager, Former Pilgrim Cleaners, Brooklyn Park, MN, MPCA – Over several years Bay West completed investigation and source remediation activities at this long-time dry-cleaning facility. As the MPCA looks to delist the site, Management of final risk assessment work on the project which includes directing soil-gas sampling to evaluate the site's vapor intrusion risk to neighboring residential properties and surface water quality issues associated with storm sewer discharges of impacted groundwater to a nearby small lake.

Limited Site Investigations, Central Corridor Light-Rail Sites, St. Paul, MN – The MPCA hired Bay West to conduct Limited Site Investigations at four petroleum release sites along the proposed Central Corridor Light Rail route. Mr. Van Allen managed these four investigations, which included directing the utility clearance, receptor survey, soil probe, and vapor instruction assessment activities, then preparing LSI Reports. The MPCA issued closure letters for all four sites after a single round of assessment work.

Field Lead, Former Scrap Yard and Grain Facility, St. Paul, MN – Prepared an FS and RAP Plan to remediate this 20+ acre facility located along the Mississippi River in St. Paul. This multi-million-dollar project resulted in successful remediation of the site to residential land use standards.

Rick Van Allen, PG (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Van Allen frequently performs project management activities on MPCA projects. He has experience with the following:

- *Compiling work plans and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

Project Manager, Arsenic Removal, Various Residential Properties, Minneapolis, MN – Prepared detailed work plans and completed extensive soil sampling, oversight, direction, administrative support, and documentation of arsenic removal activities on 66 residential properties in Minneapolis, MN.

Technical Lead/Field Team Leader, Multi-acre Property Site Assessment, St. Louis Park, MN – Developed a work plan, coordinated subcontractors, and served as field lead to assess a multi-acre property in St. Louis Park contaminated with lithium process waste. Also scoped and assisted with completion of a magnetometer survey on the same property to assess the site for buried containers and debris.

Due Diligence, Various Phase I ESAs – Completed over 100 due diligence projects for numerous private clients. Tasks associated with the Phase I ESAs included performing site reconnaissance, researching regulatory databases and historical records, contacting and interviewing property and regulatory representatives, writing technical reports, conducting asbestos inspections, and conducting noise surveys. Follow-up tasks with Phase II Investigations involved advancing soil probes and/or installing wells, collecting soil-gas samples, preparing Phase II Investigation reports, and working with the MPCA to obtain appropriate liability assurance letters, as applicable for each site.

Twin Cities Army Ammunition Plant (TCAAP) Arden Hills, MN – Mr. Van Allen prepared a complex Field Sampling Plan (FSP) and QAPP to direct field assessment activities at TCAAP on behalf of a private developer client. After a rigorous approval process of the planning documents by Army, EPA Region 5, and the MPCA, Mr. Van Allen directed the subsequent field effort. The fieldwork included coordinating and overseeing 2 simultaneous drilling crews and associated environmental staff as they completed more than 300 borings and collected more than 600 soil, groundwater, and soil-gas samples. A multi-volume environmental assessment report was prepared summarizing the history of the TCAAP transfer property, and the results of the assessment work completed, which included conclusions and recommendations based on the proposed land use.

Project Manager, Fort Bragg Multi-Site Environmental Investigation – Mr. Van Allen managed the investigation at multiple sites on Fort Bragg located in Fayetteville, NC. Four sites were UST- or spill-related petroleum releases that required hollow stem auger drilling and monitoring well installation and sampling to define the extent and magnitude of the releases. Three out of the four sites were successfully closed in the State's petroleum program within one year. The third UST site qualifies for closure but was not funded under the contract. Mr. Van Allen also developed and implemented a work plan and QAPP to conduct a Remedial Investigation and Feasibility Study on a pesticide release on the former installation golf course. A significant portion of the scope of work included assessing four former firing and bombing ranges on the installation for the presence of unexploded ordnance using EM-61 geophysical methods and visual surveys.

Brownfield Redevelopment, Two Harbors, MN – Mr. Van Allen managed the work plan, RAP development and implementation of soil response actions at the site of the Castle Danger Brewery in Two Harbors, MN. The property was the location of former railroad activities and demolished buildings with asbestos and lead-impacted soil that required excavation and off-site disposal to facilitate construction of the new brewery and subsequent expansion. The project was partially funded through the successful award of site investigation and cleanup grant funding from MN DEED and was nominated twice for Minnesota Brownfields awards in the Small City Impact category.

Training/Certifications

- *40-hour OSHA Training w/Current Refresher*
- *FEMA NIMS ICS Trainings (100, 200, 300, 400, 700, 800)*
- *DOT HazMat Training (49 CFR 172.704)*
- *Confined Space Entry/Rescue Training*
- *8-Hr OSHA Supervisor Training*

Education

- *BS Biology*

Registrations & Licenses

- *Certified Hazardous Materials Manager (CHMM) Accreditation*
- *DOT Hazardous Materials Endorsement*

Professional Memberships

- *Alliance of Hazardous Material Professionals (AHMP)*

Professional Experience

- *20 years' experience*
- *18 years with Bay West*

Jeff Gordon, CHMM

PROJECT MANAGER

OVERVIEW

Mr. Gordon has 18 years of experience with collection/ consolidation, manifesting, and tracking transportation and disposal of hazardous, nonhazardous, universal and special wastes along with 7 years of experience managing facility decommissioning projects that generate large volumes of hazardous and non-hazardous wastes.

TECHNICAL EXPERIENCE

Mr. Gordon has 12 years of experience as a regulatory specialist on Federal, State, and commercial projects and 18 years of experience with collection/consolidation, manifesting, and tracking T&D of hazardous, nonhazardous, universal and special wastes. He has project management of over 100 industrial service cleaning projects involving tasks such as confined space entry, corrosive and flammable above ground storage tank (AST) cleaning and remediation, pressure washing, vacuum truck chemical removal, chemical transfers via pneumatic pumps, waste characterization sampling and report writing. He is also ER Team Leader–Lead on-call for 24-hour/7-day shift every 5 weeks. Coordinates and schedules team of 6-7 spill responders. Project set-up, spill effort/strategy coordination, secures contract and developed Health and Safety Plans. Manages and oversees subcontractors. OSHA hazardous material collection, labeling and spill/ER training.

In a previous role, before becoming a T&D Coordinator, Mr. Gordon was Site Supervisor for Ramsey County's HHW Program. He directly supervised 6–8 technicians on daily activities that included collections of HHW from Ramsey County participants both at Bay West's drop-off site and at remote locations on Fridays and Saturdays, consolidation of collected wastes at Bay West via lab packing and bulking activities, preparation of inventories and disposal coordination of the collected wastes through several vendors, and creation of manifests, LDRs and DOT labels for final shipments.

PROJECT EXPERIENCE

Waste Disposal Oversight/Regulatory Specialist, Bay West, Inc., US EPA Region 5, Weston Solutions, Various Sites (MN, WI, IA, OH, MI) – Provides on-site regulatory specialist services under the direction of EPA On-Scene Coordinators during response actions for the characterization, packaging, labeling, manifesting, transportation, and disposal of a wide variety of waste streams at multiple Superfund Sites, including an asbestos tile removal and disposal at a former rubber shingle manufacturer (Ogilvie, MN). Managed waste disposal of waste and hazardous materials resulting from task orders under the contract.

Disposal Coordinator, Bay West, Inc., State of Minnesota, Investigation/ Remediation/Response and HHW Management Contract, Ramsey County (MN) – Supports T&D activities for >200 State and County projects each year. Generates and/or reviews disposal and shipping documents encompassing waste profile, approvals, manifests, bill of lading, and LDR's. This includes obtaining pricing estimates and gaining disposal facility acceptance of waste in compliance with US EPA and DOT regulations. Assists in management the Ramsey County, MN's Household Hazardous Waste Program, which collects >50 tons waste/year. Assists in managing crew of technicians who serve >24,000 County residents annually. Generates and/or reviews disposal and shipping documents encompassing waste profiles, approvals, manifests, bills of lading, and LDRs.

Jeff Gordon, CHMM (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Gordon frequently performs project management type activities on MPCA projects. He has experience with the following:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

Waste Disposal Oversight, Bay West, Inc., Ken's Metals, Minneapolis (MN) – Oversight of inventorying and waste disposal for over 180 containers (i.e. drums, small containers, tanks and vats) of metal processing materials and subsequent consolidation and removal of 151 containers of hazardous waste from the site. In 2010, remedial actions were implemented including lead and asbestos abatement, removal of hazardous building materials and non-hazardous building foundations and excavation of 294 tons of hazardous building, and 475 tons of contaminated soil.

Project Manager/Site Supervisor, Great River Energy-Stanton Station Decommission, Stanton, ND – Tasks included cleaning, neutralization, and waste disposal of their demineralization system, which consisted of two above-ground acid and caustic storage tanks (ASTs) and associated chemical lines. The cleaning included concentrated chemical removal via pneumatic pumps and vacuum trucks, vertical confined space entry to remove sludge and solid build-up, interior neutralization of the ASTs and chemical lines, and containerization of waste chemicals. Finally, project-generated wastes were sampled, characterized, and profiled for waste disposal.

Project Manager, Hennepin County – Former Universal Plating Facility Decommission, Minneapolis, MN – Bay West completed waste characterization and disposal activities at the former Universal Plating facility for Hennepin County in preparation for building demolition. As part of this project, Bay West performed a site assessment and created an inventory that included quantities and types of wastes that remained in the facility. Collected samples for waste profiling purposes and created waste profiles based on analytical results. Consolidated and repackaged similar waste types into UN-rated waste containers (i.e.: drums, totes, roll-off boxes). Pressure washed the interior of the facility and collected the generated wash water which contained heavy metals and cyanides. Created shipping manifests, land disposal restrictions (LDRs) and labels/markings for waste containers. Coordinated the transportation of project generated hazardous and non-hazardous waste containers to an EPA and State approved waste end disposal facility. Performed a pre-demo survey and completed an asbestos assessment report based on building material sample results. Performed oversight of asbestos removal activities. Completed building pre-demo bid specifications.

Project Manager, MPCA – Former J&D Services Site Clean-Up, Aurora, MN – Managed the initial evaluation, waste characterization sampling, drum consolidation over-packing and transportation of more than 450 drums of petroleum and other hazardous waste drums including ASTs that were being stored at a site in northern Minnesota. Other tasks included managing staff and subcontractors, creating waste profiles, manifests and land disposal restrictions (LDRs) for waste shipments and final report writing.

Project Manager/Site Supervisor, MPCA-Former Penz Property – Oversight, waste characterization, and preparation of wastes for shipment. Tasks included waste consolidation, chemical transfers of fuels from storage tanks, drum overpacking and lab-packing of numerous wastes located throughout a 22.2-acre Site.

Site Supervisor, MPCA AST Tank Removal, Northshore Mining-Silver Bay, MN – Performed oversight for several contractors in the removal of historic petroleum-based waste in an underground storage tank that was removed from the ground.

Site Supervisor, MPCA, Superior Plating Chromium Contaminated Water/Ice Spill Cleanup – Management and oversight of the spill clean-up project of chromium contaminated water and ice at the former Superior Plating facility. Used vacuum truck to remove over 2000 gallons of contaminated ice/water.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *FEMA NIMS ICS Trainings (100, 200, 300, 700)*
- *Minnesota/National Incident Management Systems (MnIMS)*
- *OSHA – 10-Hour Construction Industry Outreach*
- *FEMA NIMS ICS Trainings (100, 200, 300, 700)*
- *2.1.4.1.2 Class A/B Operator*
- *Process Safety Management Audit Course*
- *DOT HazMat Training (49 CFR 172.704)*
- *First Aid/CPR Certified*

Education

- *BS Geology*

Professional Experience

- *16 years' experience*
- *4 years with Bay West*

Laura Jensen

PROJECT MANAGER

OVERVIEW

With over 16 years of experience in the environmental field, Ms. Jensen offers a comprehensive knowledge of environmental regulations and policies applicable to industrial compliance and environmental remediation projects. She has 12 years of project management experience on projects including petroleum leak sites, solvent sites, hazardous waste sites, and agricultural chemical sites. Ms. Jensen offers a diverse skill set including effective leadership and team management, efficient time management, and clear and concise communication. She has worked with several regulatory agencies including the USEPA, MPCA, and MDA, and with commercial clients, private industry, contractors, and local governments.

TECHNICAL EXPERIENCE

Ms. Jensen has managed numerous MPCA multi-site projects including short and long-term petroleum sites, solvent sites with vapor intrusion risks, and a groundwater site with a solvent plume covering seven square miles and affecting four major groundwater aquifers. She manages all phases of the projects including proposal preparation, budget management, subcontractor procurement and management, site safety and health plan preparation, field staff training and oversight, data management and analysis, report preparation, and technical review.

Ms. Jensen is proficient in analyzing data and technical writing. She has prepared various technical documents such as LSIs, RIs, FIs, FIs, EDCADs, CCADs, FYRs, and UFP-QAPPs. She has also developed operating procedures for waste management, inspection checklists for various programs, conducted SWPPP training events, and performed compliance audits and site visits to identify regulatory compliance issues.

PROJECT EXPERIENCE

Project Manager, MPCA SR#84, Baytown Township Groundwater Contamination Site, Lake Elmo, MN – Ms. Jensen has managed SR#84 for four years. She currently prepares detailed work plans and cost proposal for routine sampling of over 600 homes and several businesses within the tetrachloroethene (TCE) plume that are served by private wells. Responsibilities include well sampling, maintenance and sampling of whole-house granular activated carbon (GAC) filters, directing subcontractors on GAC maintenance and new installations, overseeing field crews and subcontractors, database management, and reporting.

Project Manager, MPCA Superfund, Former Duluth Dump #1, Duluth, MN – For six years, Ms. Jensen prepared detailed work plans and cost proposals for long-term monitoring of groundwater, surface water and residential wells. Duties included performing and overseeing monitoring events, well repair and installation oversight, waste disposal coordination, and mentoring field staff. Reporting requirements included discussion of site observations, data analysis, and risk assessment.

Project Manager, MPCA Leak#17515, Former Central Garage Ham Lake, MN – Ms. Jensen has managed Leak#17515 for two years. In 2016 she conducted a Focused Investigation (FI) that included 30 LIF probes to delineate the LNAPL plume. Because of the FI, a remedial action alternative analysis recommending excavation as the effective corrective action was submitted. The conceptual site model was also updated, and 20 private wells within a ¼-mile of the site were sampled for VOCs. An EDCAD has been prepared and

Laura Jensen (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Ms. Jensen frequently performs project management activities on MPCA projects. She has experience with the following:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

excavation activities are anticipated to begin in the summer of 2018. Additional receptor sampling and risk evaluation is also anticipated.

Project Manager, MPCA Leak#18255, #18261, & #18996, Former CP Railway Sites, Eden Valley, Watkins, and Tracy, MN – Under the MPCA's PRP, Ms. Jensen began these petroleum release investigations with an LSI to establish the current site conditions. The investigations required site access with Canadian Pacific Railway, and off-site access from the city, county and several private property owners. Soil borings and soil gas points were advanced in and around the sites to define the extent of contamination. Ms. Jensen prepared investigation reports which resulted in the closure of L#18996. A full remedial investigation is in process for L#18255 and a surface soil excavation remains at L#18261.

Project Manager, MPCA SR#206, Pilgrim Cleaners, Brooklyn Park, MN – Ms. Jensen has managed site activities regarding the vapor intrusion of tetrachloroethene (PCE) for three years. Project management activities included the coordination of sub-slab vapor sampling, preparation of sub-slab depressurization (SSD) system bid specifications, oversight of SSD system installations, public meetings, property access agreements, and property summary reports. A total of 49 properties are included within the vapor intrusion area of concern. Of those 49 properties, 10 do not require mitigation based on sub-slab sampling results, 13 have vapor mitigation systems installed, 8 are scheduled for sub-slab sampling this spring and the remaining 18 require sub-slab sampling pending access agreements.

Project Manager, MPCA SR#1293, Whiteway Cleaners, Minneapolis, MN – Ms. Jensen has managed site activities regarding the vapor intrusion of tetrachloroethene (PCE) for three years. Project management activities included the coordination of sub-slab vapor sampling, preparation of SSD system bid specifications, oversight of SSD system installations, public meetings, property access agreements, and property summary reports. A total of 17 properties are included within the vapor intrusion area of concern. Of those 17 properties, 8 do not require mitigation based on sub-slab sampling results, 4 have vapor mitigation systems installed, and the remaining 5 require sub-slab sampling pending access agreements.

Project Manager, Environmental Compliance for a Washer Fluid Manufacturer, St. Paul, MN – Ms. Jensen performed a comprehensive compliance audit and has conducted several facility site walks. She developed an Industrial SWPPP, BMP development, sampling strategy, performed employee training, collected stormwater samples, performed monthly inspections and completed annual reports. Other areas of compliance support include annual air emission reporting and monthly air emission inventory calculations, and chemical inventory review and Tier II, Form R, and P2 reporting. She also assisted in AST registrations, labeling, and developed a tank inspection checklist.

Project Manager, Environmental Compliance for a Metal Finishing Facility, Minneapolis, MN – Ms. Jensen performed a comprehensive environment compliance review of the facility and facility records for compliance with Federal, State and local environmental regulations to evaluate current conditions and compliance status. Ms. Jensen conducts weekly hazardous waste and monthly AST inspections and provides compliance support including annual air emission reporting, chemical inventory review for Tier II, Form R, and P2 reporting, NPDES discharge reporting, waste management, and water use documentation. She also developed and trained employees on waste management procedures.

Training/Certifications

- *ITRC LNAPL Training*
- *USGS Terrestrial Crude Oil Spills Symposium*
- *MPCA Soil Vapor Intrusion Workshop*
- *Site Remediation and Training Technologies*
- *Inland Oil Spill Response Training*
- *Midwest HazMat Conference*
- *Contractororientation.com compliant for railroad work*
- *Erailsafe clearance*
- *Cold Zone HazMat Conference*
- *FEMA NIMS ICS Trainings (100, 200, 300, 400, 700, 800)*
- *40-Hr OSHA Training w/Current Refresher*
- *Boom Deployment/On-Water Response Training*
- *DOT HazMat Training (49 CFR 172.704)*
- *First Aid/CPR Certified*

Education

- *BS Geology*

Work History

- *19 years' experience*
- *7 years with Bay West*

Bill Lazarz

PROJECT MANAGER
ENVIRONMENTAL SERVICES GROUP MANAGER

OVERVIEW

Mr. Lazarz has over 19 years of experience managing environmental assessments, remedial investigations, remedial design and implementation, regulatory compliance, hydrologic evaluation, vapor intrusion investigation and mitigation, ER, and OSRO services. His work includes overseeing the investigation and clean-up of hazardous materials and petroleum product releases; reviewing MSDS to determine appropriate clean-up activities, managing and overseeing excavation of contaminated soil, sample collection, coordinating waste disposal and regulatory reporting for site closure. In addition to an ability to prepare technical reports, plans, specifications, and bidding documents, Mr. Lazarz has developed cost estimates and work plans, prepared health and safety plans, and has scheduled and completed investigations, sampling events, and implementation. He has extensive experience managing contractors, technical reporting to MPCA and WDNR, and created billing invoices.

Mr. Lazarz has knowledge of hazardous/solid waste rules, policies and guidance and has managed hundreds of projects requiring knowledge of CERCLA, RCRA, TSCA, and SARA regulations. Mr. Lazarz has over 15 years of experience managing MPCA and commercial projects and is an environmental group manager at Bay West, where he uses his ability to work in a fast-paced environment and utilize his decision-making skills to manage personnel and subcontractors for successful project completion.

PROJECT EXPERIENCE

Solvent and Petroleum Vapor Investigation and Mitigation, MN – Mr. Lazarz managed the remedial investigation and mitigation at dozens of sites under the Minnesota Department of Administration Superfund, Site Assessment, Multisite and Emergency Response programs. Mr. Lazarz managed the investigation, subcontractor bidding specifications and contract award, and SSDS system installation utilizing the Purchasing Manual.

SR #131 – Project Manager, Former Superior Plating, Minneapolis, MN – Mr. Lazarz managed the investigation, cleanup and remedial treatment of a hexavalent chromium release from a former plating facility in railroad right-of-way (ROW). Additional tasks included working with the MN Attorney General's Office to coordinate access with the railroad. Worked closely with railroad environmental and safety personnel to complete investigation and remedial excavation on the railroad ROW. As part of the remedial treatment system optimization, a permanent treatment system building was designed and constructed to store, treat and discharge leachate water. As part of the sampling plan, Mr. Lazarz has overseen the PFAS sampling of the area-wide monitoring network.

SR# 1339 – Project Manager, Former Dry Cleaner Site, Worthington, MN – Managed investigation and remedial actions associated with the former dry cleaner site. Activities included historical document review, soil and groundwater sampling, soil-gas vapor intrusion assessments, sub-slab depressurization system installation, and dewatering design and installation. Detailed reports were prepared documenting and evaluating all data generated from the site in accordance with the MPCA BMPs.

University of Minnesota – Project Manager, UMore PCB Investigation and Cleanup, Rosemount, MN – Mr. Lazarz managed the investigation and

Bill Lazarz (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Lazarz frequently performs project management activities on MPCA projects. He has experience with the following:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

cleanup of a PCB release from a former transformer recycling facility at the UMore property. Mr. Lazarz coordinated and executed the investigation and excavation of the PCB contaminated soil to the regulatory cleanup objective. Confirmation sampling was completed to verify the excavation removed the PCB contaminated soil and the site was backfilled and restored.

Project Manager, Hazardous Waste Remedial Excavation, St. Cloud, MN – Mr. Lazarz managed the corrective action soil removal of styrene resin contaminated soil and hazardous waste disposal. Project tasks included permitting, coordinating access with offsite property owners, disposal of >480 tons of hazardous waste and site security and access management.

Project Manager, Former Gas Station, MPCA – Managed an LIF investigation to identify the magnitude and extent of LNAPL present at the site. After delineating the LNAPL and reviewing remedial action alternatives, installation of deep monitoring wells was completed using hollow-stem-augers (HSA) to place well screens within the same narrow aquifer unit to identify if the contamination from the site has the potential to impact the nearby city wells.

Hazardous Waste Remedial Excavation, Project Manager, Minneapolis, MN – Mr. Lazarz managed the excavation and disposal of contaminated soil as the result of a rail tank-car off-loading release of potassium hydroxide. Mr. Lazarz arranged access to the adjoining University of Minnesota property and coordinated the vegetation removal and disposal. Approximately 114 cubic yards of hazardous waste was excavated, containerized and disposed of from the Site. Excavated areas were backfilled, graded, seeded and erosion controls were applied. Acidic solution was applied to neutralize inaccessible areas and rinse water was containerized and shipped for disposal.

Former Atlas Site - Project Manager, 1,2 DCA Contamination Phase I and City Water Connection, Eagan, MN – Mr. Lazarz managed the Phase I investigation of possible sources of 1,2 DCA and gamma logging of the supply well at a former soft drink production facility. Mr. Lazarz coordinated the permitting and connection of the facility to City water.

Carlton County Closed Landfill - Project Manager, Arsenic Contamination – Mr. Lazarz managed the well sampling and alternative water supply analysis for arsenic concentrations in four wells at a closed landfill site. Investigation and remedial activities included: sampled the private shallow drift wells; sampled the private deep bedrock wells; installed and abandoned a test well north of the Burlington Northern Santa Fe (BNSF) railroad along Schmitz Road to evaluate aquifer capacity; reviewed well construction logs and video logs of the deep bedrock wells; conducted a bench scale test for arsenic removal; and Prepared a Water Supply Alternative Analysis Report. A treatment system consisting of granular Activated Alumina (AA) filter units were installed at the existing private deep bedrock wells to remove arsenic from each residences water supply.

L#19833 - Project Manager, Twin Lakes LNAPL Recovery and Investigation – Mr. Lazarz managed the LNAPL recovery and treatment, supply well abandonment and site investigation activities at a former power plant site. A mobile oil/water separator and carbon filtration system was used to recover the LNAPL from the facility, the remaining water was discharged to the City's treatment system. A site investigation was performed to evaluate the magnitude and extent of soil and groundwater contamination at the Site.

Training/Certifications

- *40-Hour OSHA Training w/Current Refresher*
- *First Aid/CPR Certified*
- *DOT HazMat Training (49 CFR 172.704)*
- *USACE Construction Quality Management for Contractors Certification*
- *FEMA NIMS ICS Trainings (100, 200, 700)*

Education

- *BS Geoscience, Winona State University, 2006*

Registrations & Licenses

- *Certified Professional Geologist, MN (#51597)*

Work History

- *12 years' experience*
- *6 years with Bay West*

Paul Raymaker, PG

PROJECT MANAGER

OVERVIEW

Mr. Raymaker has 12 years of experience managing environmental projects, performing environmental project management field work, report preparation, and data analysis.

TECHNICAL EXPERIENCE

Mr. Raymaker's over 10 years of experience started in the field conducting environmental investigations including tasks on commercial, state, and federal projects such as: overseeing drilling operations; sampling and performing maintenance of remediation systems; installation of soil-vapor extraction, groundwater air sparging, multi-phase extraction systems; sampling monitoring wells and field screening of soil samples; oversight of the removal of USTs; and soil gas sampling, indoor air, and vapor intrusion air sampling. He has provided hands-on training in soil logging and sampling, groundwater sampling, and various other field tasks to field personnel.

Mr. Raymaker has prepared various technical documents such as Phase I/II ESAs, RIs, FSs, QAPPs, SAPs, RACRs, and CSMs. Mr. Raymaker has managed a wide variety of projects from Petrofund reimbursement-eligible LSIs for homeowners to the St. Louis River Area of Concern sediment investigation. He is responsible for all phases of projects, including proposal and work plan development, budget management, field supervision, report preparation, technical review, and reimbursement applications.

PROJECT EXPERIENCE

Project Manager, St. Louis River Area of Concern, Duluth, MN - Development along the St. Louis River (SLR) over the past 130 years has contributed to contaminated sediments, prompting the designation of 73 miles of the lower SLR as 1 of 43 Great Lakes Areas of Concern (AOCs). Bay West completed RIs and FFSs for 11 sites throughout the St. Louis River Area of Concern through multiple work orders to identify the nature and extent of contaminated sediments, and to develop and evaluate a range of remedial action alternatives to mitigate risk to human health and the environment. The RIs and FFSs will be used to aid cleanup of these sites to help the SLR AOC attain restoration goals for beneficial use impairment reduction. Mr. Raymaker was responsible for preparing and managing project budgets, preparing project invoices, managing office and field teams, authoring project documents, and client communications throughout the project.

Project Manager, TH12-22 Corridor Phase I/II ESA, Litchfield, MN – In preparation of a new storm sewer and traffic signals to be constructed within the ROW, Bay West completed a Phase I/II to assist MnDOT with soil and groundwater management decisions during construction. 63 sites were reviewed and ranked to identify potentially contaminated properties. Bay West then advanced 19 soil borings at locations throughout the Project Area to determine the presence and magnitude of soil and groundwater contamination. Mr. Raymaker was responsible for preparing and managing the project budget, preparing project invoices, managing office and field teams, and communicating changes and findings throughout the project.

Project Manager, CSAH 101 Corridor Phase I ESA, Hennepin County, MN – In preparation for reconstruction of the approximately 1.5-mile CSAH 101 corridor in Minnetonka, Mr. Raymaker oversaw and managed project Phase I ESA activities. Project deadlines and requirements revolved around frequently

Paul Raymaker, PG (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Raymaker frequently performs project management activities on MPCA projects. He has experience with the following:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

changing corridor construction activities, requiring regular communication between Mr. Raymaker and the Hennepin County PM. 71 sites were reviewed within a 500-ft. buffer of the corridor to identify sites with potential soil and/or groundwater contamination that may impact reconstruction activities. Mr. Raymaker was responsible for preparing and managing the project budget, preparing project invoices, and communicating changes and findings throughout the project.

Project Manager, SR#117 Pigs Eye Lake, St, Paul, MN – Pigs Eye Lake is located adjacent to the southern portion of the Pigs Eye landfill. The Landfill includes the former Pig's Eye Dump and a closed sludge ash disposal facility. Bay West assembled historical sediment data from the lake and investigated a 24-acre portion of Pig's Eye Lake and emergent lacustrine wetlands. The investigation included collection of sediment cores for characterization and laboratory analysis of grain size, select metals, PCBs, PFCs (including PFOS and PFOA). Mr. Raymaker completed data mining, figure preparation, Field Sampling Plan preparation, organized field activities, and authored a report consisting of documentation of field and analytical results and a conceptual site model. Mr. Raymaker also generated invoices for the project and communicated findings to the MPCA project manager.

Project Manager, L#19417 Kuglin Residence, Rochester, MN

Bay West conducted a fuel oil spill investigation beneath the concrete basement floor at the Site following a release of approximately 200 gallons of fuel oil during bathroom renovation activities. Subsequently, Bay West excavated impacted soil to the maximum extent practicable, installed passive and active sub-slab venting systems, including the installation of an active VE system equipped with a ½ horsepower blower, to reduce vapor intrusion risk. These activities required frequent clear communication between the homeowner and MPCA PM to accommodate the homeowner while navigating the site to closure.

Project Manager, Limited Site Investigation, Various Locations, MN – Mr. Raymaker managed 15 Limited Site Investigations (LSI) at various locations throughout Minnesota. Project management duties included directing field activities, assisting in preparation of and reviewing LSI Reports. Budget management of these projects was critical to ensure maximum reimbursement of project costs through the Petrofund. Mr. Raymaker completed these projects on time and under budget.

Jason “Jay” Rowe

PROJECT MANAGER

OVERVIEW

Mr. Rowe has experience managing and coordinating a variety of environmental site investigation projects, including Phase II environmental site assessments (ESAs), limited site investigations (LSI), remedial Investigations (RI), vapor Intrusion assessments, soil, soil-gas and regulated waste inspections of buildings and bridges. Mr. Rowe has experience managing a variety of remediation and mitigation projects, including soil vapor extraction (SVE) systems, contaminated soil excavations, and sub-slab depressurization systems.

PROJECT EXPERIENCE

Project Manager, Leaking Underground Storage Tank Sites, MPCA, MPCA LUST Sites – Mr. Rowe has managed site investigation and associated corrective action activities on over 20 leaking underground storage tank (UST) sites under the MPCA petroleum remediation program (PRP). Project management activities on these sites included obtaining property access agreements, purchasing manual documents, and coordinating utility locates and meets (public and private) prior to initiation of site investigation, completed health and safety plans, and corrective action.

Technician 1, Operation and Maintenance of Closed Sanitary Landfills, Minnesota Pollution Control Agency – Mr. Rowe collected data from gas monitoring wells using the gas emission monitor (GEM), calibrated GEM, collected condensate levels, completed flare daily logs, problem solved flare shutdown alarms, checked leachate tank levels, coordinated leachate hauling activities, and coordinated snow removal. Landfills included Oronoco, Albert Lea, Ironwood, Watonwan, and Winona.

Project Manager/Asbestos Inspector, Asbestos and Regulated Waste Inspections, MnDOT – Mr. Rowe has conducted asbestos and regulated waste inspections for demolition and renovation projects involving building and bridge structures. Mr. Rowe has experience managing subcontractors (coring and traffic control companies) during inspections and completed the asbestos and regulated waste inventory reports.

Project Scientist, Site Remediation, Oil and Pipeline Company, Multiple Sites, North Dakota – Mr. Rowe performed oversight of clean-up involving crude oil releases. He performed confirmation sampling, boom installation, recovery well installation, skimmer pump installation, and soil removal documentation.

Project Scientist, Site Remediation, Railroad Companies, Sites: MN, IA, SD, IL, WI – Mr. Rowe preformed site investigations and cleanup activities of petroleum- and metal-contaminated sites. He has performed oversight of monitoring well installations, conducted groundwater and soil sampling, soil borings, oversight of maintenance pit excavations/removal, oversight of asbestos buried debris removal, and property access agreements for property owners near the rail yards.

Project Manager, Former Hospital Linen, Site Assessment, Minnesota Pollution Control Agency – Mr. Rowe managed the site activities regarding mitigation of tetrachloroethylene (PCE) contamination to residential and commercial properties. Project management activities on the site included obtaining property access agreements, coordinating sub-slab sampling events, coordinating sub-slab depressurization installations, coordinating site pressure field extension testing, coordinating post- mitigation sampling, writing

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *MN Certified Asbestos Inspector (AI10710*
- *WI Certified Asbestos Inspector (AII-226472)*
- MN Certified Lead Risk Assessor *(RAI-005)*
- MN Certified Lead Inspector *(II-005)*
- *First Aid/CPR Certified*

Education

- *BS Environmental Studies, St. Cloud State University – Saint Cloud, 2005*
- *AA Liberal Arts, Normandale Community College – Bloomington, MN, 2002*

Work History

- *14 years’ experience*
- *3 years with Bay West*

Jay Rowe (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Rowe frequently performs project management activities on MPCA projects. He has experience with the following:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

project summary reports, bid specifications, and completing the health and safety plan.

Project Manager, Bridal Veil Open Space Project, Superfund Site, Minnesota Pollution Control Agency, Minneapolis, Minnesota – Mr. Rowe managed the site activities regarding the bio-remediation of pentachlorophenol (PCP). Project management activities included the coordination the upstream and downstream sampling, oversight of the of the on-site storm sewer inceptor clean-out, oversight of herbicide and seeding applications, and general property maintenance.

Project Scientist, Site Remediation Work, Railroad Companies, Multiple Sites, Minnesota, Iowa, South Dakota, Illinois, and Wisconsin – Mr. Rowe preformed site investigations and clean-up activities of petroleum and metal contaminated sites. He has performed oversight of monitoring well installations, conducted groundwater and soil sampling, soil borings, oversight of maintenance pit excavations/removal, oversight of asbestos buried debris removal, and property access agreements for property owners near the rail yards.

Project Scientist, Emergency Response, Fuel Oil Release Karlstad, Minnesota – Mr. Rowe performed initial assessment and cleanup activities for a residential fuel oil release which included hand auger below the basement floor slab, soil sampling, supply well sampling, and fuel oil removal in the basement. Mr. Rowe completed the summary report summarizing the site activities and recommendations.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *Certified Stormwater Erosion and Stormwater Management Certification.*
- *MSHA Part 48 Experienced Miner Training: Surface, Coal, Metal and Non-Metal*
- *First Aid/CPR Certified*

Education

- *MS Geology, Washington State University, 1997*
- *BS Geology, University of Minnesota Duluth, 1994*

Registrations & Licenses

- *Professional Geologist, Minnesota Board of Architecture, Engineering, Land Surveying Landscape Architecture, Geoscience and Interior Design; License #43623*
- *Certified Professional Geologist, American Institute of Professional Geologists; License #CPG-11065*

Professional Memberships

- *Minnesota Groundwater Association*
- *American Institute of Professional Geologists*
- *Society of Mining, Metallurgy and Exploration*

Professional Experience

- *21 years' experience*
- *1 year with Bay West*

Katie Larson, PG

PROJECT MANAGER

OVERVIEW

Ms. Larson has 20 years of experience in hydrogeology, geology, permitting, and remediation. Experience includes regulatory, tribal and consulting experience. Recent consulting experience includes project management and technical oversight of multidisciplinary projects primarily related to environmental assessments; environmental permitting and compliance; environmental and natural resource monitoring; contracting and proposal preparation; and health and safety compliance. Project Management experience includes railroad, oil and gas, mining, commercial, government, and finance clients in Minnesota, Wisconsin, Michigan and Alaska. Client Service Manager experience includes Target, Cliffs Natural Resources, Essar and Enbridge for Golder and CN Railroad and Enbridge for SEH.

TECHNICAL EXPERIENCE

Mr. Larson has managed a wide variety of Brownfields projects at sites contaminated with petroleum, PAHs, PCBs and metals from sources such as railroad tracks, USTs, dry cleaners, fill material, and off-site sources. This technical experience not only allows projects to move forward in a timely and cost-effective manner, but also helps her anticipate future project requirements.

Mr. Larson's experience ranges from a field technician performing all aspects of field sampling, to a project manager developing investigation work plans, strong communication skills of important issues between the parties that need to know this information, and developing complex corrective action strategies, and finally to a senior project manager who directs project staff while keeping projects within established timelines and budgets

PROJECT EXPERIENCE

Project Manager, Steelton Yard Limited Site Investigation (DM&IR) – Duluth, Minn. Project manager and project geologist who managed a Limited Site Investigation (LSI) following detection of diesel related compounds detected during a Phase II Environmental Site Assessment (ESA) related to a 50,000-gallon above ground diesel tank. Managed and conducted field work, prepared and submitted the LSI to Minnesota Pollution Control Agency.

Project Manager, Biwabik Yard Limited Site Investigation (DM&IR) – Biwabik, MN. Project manager and project geologist who managed a Limited Site Investigation (LSI) following detection of diesel related compounds detected during a Phase II Environmental Site Assessment (ESA). Managed and conducted field work, prepared and submitted the LSI to Minnesota Pollution Control Agency.

Project Geologist, Tank Removal and Vapor Intrusion Assessment (Duluth Technology Village Duluth) – Duluth, MN. Geologist for six Stoddard solvent tanks removed from the site during construction of the Technology Village. Coordinated emergency tank removal and excavation of soil impacted with Stoddard solvent. Oversaw a vapor intrusion assessment.

Project Manager, Nuiqsut Spill Response and Assessment (Northwest Company) – Nuiqsut, AK. Project management for emergency response, cleanup and investigation activates at a diesel spill in the North Slope Borough of Alaska. Wrote an emergency response summary letter which documented the emergency response activities and wrote the Remedial Action Plan for the

Katie Larson, PG (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Ms. Larson frequently performs project management activities on MPCA projects. She has experience with the following:

- *Compiling work plans, and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

site. Coordinated procurement services including writing bid specifications for cleanup contractors and obtaining bids for cleanup, hauling and soil treatment. Cleanup included excavation of petroleum contaminated gravel and a tundra burn. Wrote the Cleanup Report for the project.

Staff Geologist, Mining and Petroleum Site (University of Alaska Anchorage) – Soldotna, AK. Staff geologist for a petroleum cleanup in Soldotna. Conducted a file review of the project and determined additional site characterization was required to identify the extent and magnitude of diesel contamination. Prepared an Alaska Department of Environmental Conservation (ADEC) approved Sampling and Analysis Plan. Supervised field work and included a tank removal assessment, test pits and groundwater sampling at existing wells on the site. Prepared a baseline results letter and remedial actions alternative letter for the site.

Staff Geologist, Third Street Widening Project (CRW) – Fairbanks, AK. Staff geologist who conducted a Phase I Corridor Study for the Alaska Department of Transportation and Public Facilities Project. The Phase I Environmental Site Assessment (ESA) identified three petroleum properties and a drycleaner along the proposed right-of-way. Prepared petroleum and non-petroleum Sampling and Analysis Plans for the Phase II investigation. Oversaw the installation of 15 soil borings and five temporary wells at four properties along the corridor. Completed the Phase II ESA which documented TCE contamination in the groundwater at the drycleaner site.

Staff Geologist, 84th and Spruce (CRW) – Anchorage, AK. Staff geologist for a street project planned by the Municipality of Anchorage crossed an area of the site with PCB and lead contaminated soil. Phase I and II Environmental Site Assessments (ESAs) were conducted at the site to determine the extent and magnitude of lead and PCB contaminated soil that would be encountered during the road project. Completed a Sampling and Analysis Plan for the Phase II ESA Report and supervised the drilling of soil borings and test pits for the project. She also completed the Phase II ESA report and developed the Remedial Action plan for the project.

Project Manager, St. Paul Yard Phase II Environmental Site Assessment (Canadian Pacific) – St. Paul, MN. Project manager who conducted the field work and wrote the reports for a Phase II Environmental Site Assessment (ESA) conducted at Canadian Pacific's St. Paul Yard.

Project Manager, Phase I and II Environmental Site Assessments for Lease Properties (Canadian Pacific) – Alvarado, Lake Bronson, Karlstad, Lancaster and Viking, MN. Project manager and senior project geologist responsible for conducting the field work and wrote the reports for five Canadian Pacific (CP) yards for various CP facilities in Northwestern Minnesota. Phase II Environmental Site Assessments (ESAs) were conducted at three of the properties. Wrote the work plan for the Phase II ESAs, managed field work and wrote Phase II ESA reports.

Amsoil Arena Phase I and II Environmental Site Assessment (Duluth Entertainment and Convention Center) – Duluth, MN. Project manager on the Phase II Environmental Site Assessment (ESA). Conducted a Phase II Environmental Site Assessment to determine if petroleum impacted soil may be encountered during the construction phase of the project. Used HSA borings and direct push probes to assess subsurface conditions.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 700)*
- *First Aid/CPR Certified*

Education

- *BS Chemical Engineering, University of Minnesota, 2017*

Registrations & Licenses

- *Engineer in Training*

Work History

- *1 year experience*
- *1 year with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Engineer 1*
P	***Field Technician***
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Vizanko exemplifies new, up-and-coming talent who is always learning new field techniques and improving his technical writing ability. In the first 8 months of working, Mr. Vizanko has moved swiftly to project coordinator for multiple projects and become the go-to resource for vapor intrusion sampling.	

Brent Vizanko, EIT

FIELD TECHNICIAN, SCIENTIST, ENGINEER

OVERVIEW

Mr. Vizanko has experience in water conservation and vapor intrusion sampling and reporting. He also has experience with large and small system operation and maintenance work including weekly, monthly, and yearly sampling events as well as monitoring and site inspections. Brent has worked independently on water conservation efforts in the ready-mixed concrete industry with upwards of 10% yearly water savings in an extremely regulated sector. At Bay West he has quickly become the expert on Vapor Intrusion field sampling while also writing Property Summary Reports and RAP implementation reports once sampling is complete. He is experienced with report writing and documentation and is comfortable manipulating data and numbers in various formats. He is also quick to learn new software and techniques and is always striving to be efficient.

PROJECT EXPERIENCE

Project Coordinator, MPCA Vapor Review, Minneapolis, MN – Work with internal team as well as MPCA employees to review past leak site files and determine if further sampling is needed. Project coordination includes training new employees, corresponding with MPCA about new files to review, and tracking progress.

Project Coordinator/Technical Expert, Stratasys Inc., Eden Prairie, MN – Worked with the 3D printing company, Stratasys, to provide expertise on proper wastewater disposal. Work has included writing work plan and cost proposal, coordinating special agreements, and continual evaluation of project success.

Field Engineer, EPA California Wildfire Response, Napa, CA – Worked with the USEPA to provide oversight for the removal of household hazardous waste from fire damaged homes in Santa Rosa, CA.

Office Specialist, MPCA L#17515 Former Central Garage, Ham Lake, MN – Wrote EDCAD for the historic leak site in Ham Lake, MN. Project included determining areas for excavation, calculating excavation volumes, and communicating the excavation process effectively.

Field Engineer, O&M, NIROP, Fridley, MN – Worked with a team of engineers and scientists to maintain a large water remediation site. Duties included: collecting well water samples, responding to alarms and system failures, and weekly site maintenance.

Field Engineer, O&M, MLAC, Minneapolis, MN – Worked with a team of engineers and scientists to maintain a small water collection and treatment facility. Duties included: biweekly site inspections, regular well monitoring and water sampling, and yearly system cleaning.

Field Engineer, O&M, Superior Plating, Minneapolis, MN – Assisted with on-site maintenance of a mid-scale, groundwater treatment site. Duties included: tank water sampling, site inspection and walkthrough, and oversight of construction sub-contractor.

Field Engineer, Sampling, MPCA Vapor Intrusion Monitoring, Minneapolis, MN – Helped with residential and commercial sub-slab vapor sampling along with mitigation system install and monitoring. Project included proper Summa can deployment, and data collection.

Paul Walz, PE

SENIOR ENGINEER, PROJECT MANAGER

OVERVIEW

Mr. Walz brings 33 years environmental/chemical engineering experience, including 16 years managing HTRW projects valued up to $4.7M. He has managed over $23M of TOs for USACE contracts and expedited closures of HTRW sites by implementing innovative technologies and/or regulatory negotiations. Designed, prepared detailed specifications, conducted competitive bidding, and provided oversight of the construction, start-up, O&M of systems using these technologies. Has designed and managed soil, GW, soil vapor and indoor air sampling programs at numerous sites.

PROJECT EXPERIENCE

Sr. Project Manager, LTO/LTM GW Treatment System, Cornhusker AAP, NE, USACE Omaha, $4.7M, FFP/PBR (F2 #3) – Managed PBC LTO/LTM of a 750-gpm GW extraction and treatment system designed to remove explosives. Over four follow-on TOs, designed/coordinated injection of amendments into GW to promote anaerobic biological degradation of explosives to reduce time required for site/life cycle costs.

Sr. Project Manager, LTO/LTM GW Treatment System, Scott AFB, IL, USACE Omaha, $3.9M – Managed remediation of soil and GW contaminated with petroleum, solvents, PCBs, and hydraulic fluids that resulted from historic maintenance activities at eight sites. Work included investigation/bench scale pilot studies in anticipation of future chemical oxidation treatment and injection of biostimulation amendments. Prepared FSs, PPs, RODs. Participated in TPP meetings with USACE, USAF, IEPA, and USEPA. Presented at public meetings related to the PPs.

Sr. Project Manager, Treatment System O&M, Naval Industrial Reserve Ordnance Plant (NIROP), MN, US Navy, $1.5/year T&M PBC – Managed O&M/optimization of a 1,000-gpm GW recovery/treatment system to mitigate TCE beneath a site immediately adjacent to public water supply intake and Federal waterway. Met 100% of performance criteria and saved >$300K by analyzing costs and restructuring maintenance labor. Saved >$300K by reducing levels of management and accessing local personnel to perform both routine project activities and specialized tasks. Successful O&M/optimization work since 1999 has contributed to an >80% reduction in the TCE plume, expediting closure per ROD requirements.

Sr. Project Manager, Data Synthesis, Evaluation, and Interpretation (DSEI), Former Atlas "D" Missile Site 4, FE Warren AFB, WY, USACE Omaha, $545K, FFP/PBC – Managing PBC to compile a database of GW (analytical, elevation, field data), lithology, geophysical, hydrophysical, survey, and other data from a >90-mile-area from multiple sources (e.g., USACE, USGS, WSEO, WDEQ, industrial, stock, oil/gas, residential, municipal boreholes/wells). Once compiled, will evaluate the data and verify/refine/update the CSM to assess environmental conditions and address questions/problem statements posed by stakeholders (including USACE, USEPA, State and local agencies) that comprise the TPP.

Sr. Project Manager, Feasibility of Hydraulic Fracturing, Former Atlas "D" Missile D Site 2, FE Warren AFB, WY, USACE Omaha, $3M – Managing PBC to assess the efficacy of substrate emplacement (ZVI and EHC) via hydraulic fracturing techniques to remediate TCE in four high-concentration plumes. Prepared UFP-QAPP, APP/SSHP, IDW Plan, and Work Plans.

Training/Certifications

- *Engineering & Design Quality Management, USACE Huntsville*
- *USACE Construction Quality Management for Contractors*
- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *First Aid/CPR Certified*

Education

- *BS Chemical Engineering, 1983*

Registrations & Licenses

- *Professional Engineer (MN #23767; WI #31407; IA #13578; IL #062-050-281)*

Work History

- *34 years' experience*
- *18 years with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Engineer 1*
X	*Engineer 2*
X	*Engineer 3*
P	***Engineer 4***
X	*Field Technician*
X	*Project Manager*
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Walz has performed project management activities on MPCA projects.	

Training/Certifications

- *USACE Construction Quality Management for Contractors*
- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*

Education

- *MS Geology, University of Minnesota, 1988*
- *MS Civil Engineering, University of Minnesota, 1992*

Registrations & Licenses

- *Professional Geologist, MN #23080*
- *Professional Engineer, MN #23080*

Work History

- *31 years' experience*
- *31 years with Bay West*

Marty Wangensteen, PE, PG

SENIOR ENGINEER, PROJECT MANAGER

OVERVIEW

Mr. Wangensteen is Vice President and Manager of Federal Programs with 31 years' experience in the environmental field. He has 21 years' experience as than $310M for the US Air Force, USACE, USAEC, AFCEC, GSA, Navy, EPA, USANG, and MPCA. Mr. Wangensteen is a former Program Manager for the State of Minnesota Multi-Site Superfund and Petroleum Contract. His experience includes establishing safety and QC standards, directing labor and equipment resources, overseeing schedules, negotiating subcontracts and teaming agreements, evaluating/mitigating risks, and supporting environmental programs.

Mr. Wangensteen has overseen management of >700 Federal and State projects at >75 active and inactive federal installations throughout the country, under CERCLA, RCRA, and UST programs. He has interfaced with regulators in 43 states, 9 EPA regions, and other stakeholders including Tier I/II, RAB, and Tribal groups. He has managed all types of contracting vehicles, including FFP, T&M, cost reimbursement, and performance-based contracting.

Mr. Wangensteen is a registered Professional Engineer and Professional Geologist and holds graduate degrees in Civil Engineering and Geology.

PROJECT EXPERIENCE

Program Manager, Fixed Price Remediation w/Insurance (FPRI), USACE Omaha, $110M Capacity, Firm Fixed Price (FFP)/Performance-Based Contract (PBC) – Managed program activities for the two base-wide task orders (TOs) awarded under this contract. Supervised PMs, negotiated TOs, and managed work. Interfaced with Remedial Cost Containment Insurance provider to formulate insurance coverage strategies for competitively bid TOs; developed, presented, and finalized RA technical approach on TO bids; established bidding strategy for setting final insurance deductibles, self-insured retentions, and attachment points.

- Seymour Johnson AFB, NC, 16-Site PBR TO, $12.2M, 2005-2015
- Holston Army Ammunition Plant, TN, 25-Site PBR TO, $6.7M, 2005-2011, FFP/PBR

Program Manager, HTRW ERSC, USACE Louisville District, $225M Capacity, CR/FFP PBC – Manages Bay West's ERSC program, supervising QC reviews of scoping and pricing; assists in development of programmatic, TO-wide planning documents; and participates in updates and kickoff meetings/con calls with USACE. Relevant TOs include:

- Ft. AP Hill, VA, 2013-present, $147K, FFP PBC, FS, PP, and ROD for USACE Baltimore
- US Army Garrison West Point, NY, 2010-2014, FFP PBC, and Landfill O&M/LTM for USACE Baltimore

Program Manager, HTRW/MMRP Multiple Award Task Order Contracts (MATOCs) & Single Award Task Order Contracts (SATOCs) and USACE ERSC, Nationwide for USACE Omaha, $230M Total Capacity, Cost Reimbursable/FFP PBC – Managed program staff assigned to five ID/IQ contracts involving HTRW and munitions response. Provides program and project support for >100 FFP HTRW and MMRP TOs totaling >$120M involving PA/SIs, RI/FSs, RD/RAs, LTO/ LTM, and construction support. Oversees implementation of record keeping, administrative, QC, and S&H programs. Reviews work plans, reports, and schedules. Provides technical support as needed, including monitoring of

Marty Wangensteen, PE, PG (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Engineer 1*
X	*Engineer 2*
X	*Engineer 3*
P	***Engineer 4***
X	*Field Technician*
X	*Project Manager*
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Wangensteen is a senior technical advisor and assists Bay West's project managers with technical advice on challenging projects.	

subcontractor scopes. Participates in USACE and Tier I/II meetings. Relevant TOs have included:

- *Joint Base Andrews, MD* Base-wide PBR, $27.9M, FFP/PBR
- *Cornhusker Army Ammunition Plant, NE,* LTO/LTM, $4.7M, FFP/PBC
- *Keesler AFB, MS,* RA, $480K, CR FFP PRR PBR
- *Dover AFB, DE,* USAF Air Mobility Command TO, which included report preparation, presentation material development, and data analysis.
- Site Assessments at CONUS AF installations nationwide, including: *Westover Joint ARB MA; Niagara Falls Air Reserve Base, NY; and Pittsburgh ARB, PA*

Program Manager, HTRW/MEC ERSC, USACE Sacramento, Omaha, and Tulsa Districts, 2009-2014, $120M Total Capacity, CR/FFP PBC – Managed program staff assigned to this ID/IQ contract with shared capacity between three districts. Oversaw technical, safety & health, and QC to ensure compliance with contract requirements.

Program Manager, 60-Site Performance-Based Remediation, Fairchild AFB, WA, 2013-Ongoing, $14.9M, AFCEC, FFP PBC – Program Manager for this 60-site AFCEC PBR contract that includes investigation, design, remedial action, remedial construction, and environmental remediation activities. Supported the PMP, IMS, and MPS. Identified disconnects and risks in IMS and worked with project team to develop acceptable solutions. This 10-yr contract includes Installation Restoration Program and MMRP sites.

Training/Certifications

- *40-hour OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 700)*
- *First Aid/CPR Certified*

Education

- *BS Bioproducts and Biosystems Engineering, U of M*

Registrations & Licenses

- *EIT, Certificate #150806, 2016*

Work History

- *2 years' experience*
- *2 years with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Engineer 1*
P	***Field Technician***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Ms. Widstrand frequently performs project management assistant type activities on MPCA projects. She has experience with the following:

- *Overseeing subcontractors and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers and reviewing COC procedures;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Assisting with preparing project completion reports and annual monitoring reports.*

Emily Widstrand, EIT

FIELD TECHNICIAN, SCIENTIST, ENGINEER

OVERVIEW

Ms. Widstrand has 2 years of experience working on remedial investigation, hazardous waste and emergency response projects. Investigations and remedial actions include operation and maintenance of a Ground Water Treatment Facility at an EPA Superfund Site, Sub-slab vapor investigation and sampling, Phase I and II ESAs, groundwater and soil sampling, environmental compliance inspections, data review, and report preparation.

TECHNICAL EXPERIENCE

Ms. Widstrand has worked on both federal and state remediation projects performing various investigation and cleanup activities, including initial and follow-up sampling, permitting and compliance sampling, and treatment system monitoring and inspections. She has also worked in a consulting capacity for private industries by performing routine hazardous waste compliance inspections. She has experience using a variety of air monitoring and groundwater sampling equipment including PID, Multi-gas meter, bladder and peristaltic pump, YSI and MP-50 compressor.

PROJECT EXPERIENCE

Operating Engineer, O&M, US Navy, Minneapolis, MN – Ms. Widstrand has maintained the operation of a groundwater treatment system comprised of nine groundwater extraction wells and four air stripping units, responsible for treating an average of 262,800,000 gallons of TCE-contaminated water each year, with yearly TCE removal of approximately 450 pounds. Other job duties included coordinating site maintenance with various subcontractors, ordering spare parts, compiling monthly, quarterly and annual reports, performing permit compliance sampling and troubleshooting day-to-day operation issues at the Ground Water Treatment Facility.

Field Engineer, Groundwater Sampling, US Air Force, Spokane, WA – Ms. Widstrand has been involved in conducting routine groundwater monitoring at the Fairchild Air Force Base site in Spokane, WA. Duties included daily equipment calibration and decontamination, use of dedicated bladder, bladder and peristaltic pumps to collect VOCs and metals samples, field testing samples for iron, sample QC and packaging/shipment, and spreadsheet data entry. She has also assisted with soil sampling, including oversight of drillers, logging soil borings, collecting soil samples and screening soils for lead.

Field Technician, various MPCA Vapor Intrusion Areas of Concern – Ms. Widstrand has been responsible for scheduling sampling events with property owners and other field staff. She has conducted vapor intrusion building surveys, basement mapping, initial sub-slab and follow-up sampling, mitigation system installation oversight and post-mitigation follow-up sampling. She has also been responsible for drafting property summary reports and summary letter reports for the MPCA, as well as organizing and compiling laboratory and sampling data into proper formats.

Staff Professional, Compliance Inspector, Pioneer Metal Finishing, New Hope, MN – Ms. Widstrand has conducted weekly hazardous waste storage inspections and monthly tank, floor, and storm water inspections. Inspections included assessing drums and totes for leaks/damage and proper storage and labeling, inspecting floors for spills and damage to concrete or protective surfaces, assessing tanks for proper labeling and containment, and inspecting outside areas of building for any potential impacts to storm water or surrounding environment. She has worked with the company to address and correct any issues that were identified.

Andrew Peterson, PE

PROJECT ENGINEER

OVERVIEW

Mr. Peterson is a Licensed Professional Engineer in Minnesota and Indiana with over six years of environmental consulting experience. He has constructed groundwater flow and chemical fate and transport models, performed remedial investigations, designed and constructed remediation systems, designed and implemented in situ chemical injections, performed cost benefit analysis to evaluate remedial approaches and prepared numerous reports for sites in state and federal regulatory programs during his career.

PROJECT EXPERIENCE

Coal Tar Impacted Superfund Site, Dover, Ohio – In 2012, I performed system upgrades on a groundwater pump-and-treat system that was not maintaining hydraulic control of the shallow overburden aquifer due to an unexpected volume of coal tar accumulating in the systems interceptor trench. To address this issue, I worked with a project team to reconfigure and modify the existing system, which was designed as a groundwater capture system, to recover both coal tar and groundwater from the interceptor trench. The operations and maintenance technician and I completed the field activities including the installation of two belt skimmers, removal of a 1,500-gallon tar holding tank, removal of three above ground storage tanks, reconfiguration of the groundwater filtration system, installation of electrical services, and construction of two onsite treatment buildings. Ultimately, the belt skimmers removed approximately 100 gallons of tar per day, allowing the groundwater capture system to maintain hydraulic control of the shallow overburden aquifer, as required by the Record of Decision issued for the site.

MODFLOW Fate and Transport Model – In 2013 and 2014, I constructed a groundwater flow and chemical fate and transport model for a former manufactured gas plant site. The model was constructed using a combination of site-specific data and parameters documented in studies of the area. Both the groundwater flow and fate and transport models were calibrated using average groundwater elevation and chemical concentration data collected from the onsite monitoring well network, which included over eighty monitoring wells. Average pumping rates, flows from two nearby rivers, and annual precipitation values were used to simulate the steady state flow conditions. The calibrated flow model was then used with the fate and transport model to simulate the steady state extents of the dissolved phase plume. Several simulations were run to determine if the dissolved phase impacts would reach a municipal well field located down gradient from the site. Upon the completion of the project, I drafted a report summarizing the model construction and the results of the simulations. I also presented a summary of the model construction and simulation results to the client and fielded questions about the modeling report and presentation. The model identified areas of the site that required further investigation and will be used to evaluate remedial options for the site.

Copley Square OU1 Remedial Action – In 2013, I acted as the Site Engineer on a modified ZVI injection project implemented at the Copley Square Superfund Site in Copley, OH. As the Site Engineer, I prepared project submittals prior to mobilizing to the site. These plans included the development of the Injection Plan, Health and Safety Plan, Environmental Protection Plan, Site Restoration Plan as well as other project submittals. While the project was being implemented from May 2013 to October 2013, I relocated to Copley and managed daily activities. My responsibilities included managing

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 700)*
- *Confined Space Entry Training*
- *Full Face Respirator Fit test*
- *DOT Shipping Training*
- *National Groundwater Association Visual Modflow Short Course*
- *Speaker OEPA Brownfield Conference (2014)*
- *Speaker Battelle Chlorinated Conference (2014)*
- *First Aid/CPR Certified*

Education

- *BS Environmental Engineering, Michigan Technological University, Houghton, MI*

Registrations & Licenses

- *Professional Engineer MN License #53990, IN License # PE11600389*

Work History

- *6 years' experience*
- *2 year with Bay West*

Andrew Peterson, PE (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Engineer 1*
X	*Engineer 2*
X	*Field Technician*
X	*Project Manager*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Peterson frequently performs project management type activities on MPCA projects. He has experience with the following:

- *Compiling work plans and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

subcontractors and onsite injection personnel, submitting daily reports to the client, providing weekly updates to USEPA, managing project budgets and accounts, developing change orders, estimating required injection materials, coordinating injection material purchase and delivery, completing QA/QC testing, and maintaining health safety documentation. The project was completed with no injuries using only three out of five of the onsite personnel used to develop the unit rates submitted to the client. Additionally, I identified and received USEPA approval for an alternate product that resulted in significant savings and increased profits. Following the completion of the project, I coauthored an abstract titled Insitu Dechlorination Using a Combination of Zero Valent Iron and Soybean Oil, which was selected at both the 2014 OEPA Brownfield Conference and the 2014 Battelle Chlorinated Conference.

Coal Tar Impacted Superfund Site, Fairmont, West Virginia – In 2015 and 2016 I worked with and engineering team to develop two removal actions (RAs) at a coal tar impacted Superfund Site in Fairmont, West Virginia. The site is a former coal tar distillation facility that is located adjacent to a former coking facility. The two RAs include an uplands RA that addresses on-site soils, groundwater, sediments, and surface water, and a river RA that addresses impacted sediments in the Monongahela River. During my time working on this project, I worked with a project team to draft Remedial Design Work Plans, Field Sampling Plans, Quality Assurance Project Plans, Health and Safety Plans, Preliminary and Intermediate Design documents, as well as other technical and project related reports. My primary role was to draft the text of the design documents and associated specifications and plans, to assist the drafting department with producing the report figures, and to coordinate with the investigation team in developing investigation plans that will facilitate the completion of the RA Final Design submittal packages.

Former Air Force Base, Michigan – Since 2016 I have been developing project reports and plans for a former Air Force Base in the Base Realignment and Closure Program. The former base includes several Installation Restoration Program (IRP) sites where remediation systems, institutional controls, long-term monitoring and in situ treatment methods are curreting being implemented to address environmental impacts.

I draft Annual Reports including Long-Term Monitoring Reports to document sampling results at IRP sites where natural attenuation is the selected remedy and Annual Reports for IRP sites where active remediaiton activities are occuring. I also draft Remedial Action Work Plans for implementing remedial actions at IRP sites as well as the Explanation of Significant Differences and Record of Decision Ammendments needed to incorporate the Remedial Actions into the IRP site decision documents.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 700, 800)*
- *First Aid/CPR Certified*

Education

- *BS Geology, University of Wisconsin–Eau Claire, 2012*
- *BGeoE Geological Engineering, University of Minnesota–Minneapolis, 2012*

Registrations & Licenses

- *Professional Engineer, MN #54816*
- *National Radon Proficiency Program Residential Measurement Provider (107950 RT)*
- *National Radon Proficiency Program Residential Mitigation Provider (107951 RMT)*

Work History

- *6 years' experience*
- *3 years with Bay West*

Taylor Pierce, PE

PROJECT ENGINEER

OVERVIEW

Ms. Pierce has 5 years of environmental experience covering a broad range of activities in the field and in the office. Field activities include vapor intrusion characterization, site characterization, and monitoring. Office activities include investigation and monitoring report development, remedial technologies feasibility report development, sampling and analysis plans, bid specification and solicitation work, SPCC plan development, and the CERCLA process.

PROJECT EXPERIENCE

State of Minnesota (Minnesota Pollution Control Agency)

- *SR#1339 Former Exclusive Cleaners, Worthington, MN* – Proposal for excavation, vapor work, groundwater and soil investigations; Property Summary Reports (PSRs); field work coordination for system sampling, reporting; field work coordination for focused investigation, reporting.
- *L#19833 Former Dairyland Power, Klukow Enterprises, Twin Lakes, MN* – LSI coordination and reporting; well evaluation proposal, bid process, coordination and reporting.
- *SA#249 SE Hennepin Area Groundwater and Vapor, Minneapolis, MN* – Proposal for drilling and Vapor Intrusion Assessments (VIAs); drilling coordination and field activities; VIAs for commercial and residential properties; PSRs; groundwater sampling coordination and field activities; groundwater, soil and soil gas investigation coordination, oversight, field activities and reporting.
- *SR#3 General Mills* – VIAs for residential properties.
- *SR#206 Pilgrim Cleaners, Brooklyn Center, MN* – VIAs for residential properties; sub-slab depressurization (SSD) system installation oversight, confirmation sampling.
- *SR#1293 White Way Cleaners, Minneapolis, MN* – Post-mitigation confirmation sampling.
- *SA#132 University Ave and Pascal St, St. Paul, MN (North Midway)* – SSD system installation oversight for two commercial buildings; post-mitigation confirmation sampling; VIAs for residential properties.
- *SA#102 Nicollet Avenue and Diamond Lake Road Vapor Intrusion Site, Minneapolis, MN* – SSD system work oversight.
- *L#79007 Vapor Reviews* – Review leak site files to assess risk for vapor intrusion and prepare tables and figures summarizing findings; coordinate batch reviews, scanning of documents at MPCA, project status.
- *SA#248 Former Hospital Linen, St. Paul, MN* – VIAs for residential properties; proposal for additional VIAs, SSDS installs and sampling and historical reviews; bid specifications for SSDS; oversight on four residential SSDS installations.
- *L#19762 Woody's Cenex, Randolph, MN* – SVE System O&M visit and well sampling; proposal for LIF, System O&M, MW sampling and MW installs; coordinate quarterly groundwater monitoring and system O&M visits; LIF evaluation and Focused Investigation (FI) reporting; Remediation System Operation Monitoring Report (RSOM).
- *L#17515 Former Central Garage* – LIF oversight.
- *Superior Plating* – Construction oversight.
- *Crosslake TCE Investigation (Incident #101519)* – Emergency response private well sampling and coordination; summary report.

Taylor Pierce, PE (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Engineer 1*
X	*Engineer 2*
X	*Field Technician*
X	*Project Manager*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Ms. Pierce frequently performs project management type activities on MPCA projects. She has experience with the following:

- *Compiling work plans and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

- *Emergency Response, Residential Home in Norwood Young America* – Respond to fuel oil release into basement.
- *Emergency Response, On water in Rochester* – Respond to on-water diesel release.

State of Minnesota (Minnesota Department of Transportation)

- *Trunk Highway 14 Bypass, Nicollet, MN* – Oversight of Regulated Waste Removal

Federal

- *Air Force Civil Engineer Center Base-Wide PBR Contract, Fairchild AFB, WA* – Provide data analysis and technical support for PBR as USAF Base. Activities include supporting and coordinating investigations, monitoring, remedial action, and reporting.

Commercial

- *Former Croix Convenience, Andover, MN (private client)* – Prepared Limited Site Investigation (LSI) report.
- *Bad River Band of Lake Superior, Tribe of Chippewa Indians, Odanah, WI (private client)* – Prepared sampling and analysis plans for potentially hazardous materials investigative sampling including asbestos-containing material (ACM), lead-paint, polychlorinated biphenyls (PCBs), petroleum; prepared Phase II reports documenting investigative results.
- *AW Bead Blasting, St. Paul, MN* – Excavation coordination, oversight and confirmation sampling.
- *Jay Street Gas Holder Site, One Roof Community Housing/Duluth Economic Development Authority, Duluth, MN* – Bid specification preparation for lead-impacted soil removal and treatment; cost estimating; RAP development; RAP implementation coordination; RAP implementation reporting.
- *Former LaFargeHolcim Site, St. Paul Port Authority, St. Paul, MN* – Phase II coordination, field activities, and reporting.
- *3rd Street Reconstruction, City of Cloquet, Cloquet, MN* – Construction Contingency Plan development.
- *Great River Energy, Maple Grove, MN (private client)* – Site visits; prepared Spill Prevention, Control and Countermeasure (SPCC) plans for multiple facilities including substations and power generation facilities.
- *Executive Aviation* – System O&M and RSOM reporting.
- *Import Auto* – LSI field work; project management; proposal for additional work; Petrofund application (initial).
- *Erickson Soil, Freedom Store #61* – Monitoring report for additional investigation; project management; Petrofund application (supplemental).

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *USACE Construction Quality Management Training*
- *Radiation Worker Training*
- *Battelle Phytoremediation Project Design and Implementation Short Course*
- *Battelle Natural Attenuation of Metals Short Course*
- *EPA Seminar on Monitored Natural Attenuation*

Education

- *BS, Biosystems Engineering*
- *BS, Industrial Engineering*

Registrations & Licenses

- *Professional Engineer (TN #00108119, MI #6201064644)*

Work History

- *20 years' experience*
- *2 years with Bay West*

Dirk Pohlmann, PE, PMP

SENIOR ENGINEER

OVERVIEW

Mr. Pohlmann has 20 years' experience in environmental services, specializing in remediation technologies including natural attenuation, phytoremediation, in situ enhanced bioremediation and bioaugmentation, air sparge/soil vapor extraction, in situ chemical oxidation, and in situ chemical reduction. Mr. Pohlmann has managed laboratory, pilot scale, and interim/full-scale remedial applications and authored/co-authored 29 papers and professional presentations regarding remedial technologies.

PROJECT EXPERIENCE

Sr Engineer & Assistant Project Manager, Base-Wide PBR Contract, Former Wurtsmith AFB, MI – Provided technical oversight for remedial design/implementation activities for 21 IRP and four MMRP sites. Manages and provides technical oversight of the FT-02 240 gpm liquid GAC PFOA/PFOS treatment system. Reviews/manages six active pump and treat systems & provide annual conclusions/recommendations for further system optimizations. Cost: $12.6M

Civil Engineer, Air Force Civil Engineer Center Base-Wide PBR Contract, Joint Base Charleston, SC – Provided technical oversight for ongoing remedial design and implementation of activities for VOC and/or metals impacted groundwater at sites SMWU 10 (LF010), SMWU 14 (TU014), SMWU 24 (SA024), SS027, and SMWU 36. Evaluated historical results and remedial actions and provided remedial options for achieving site restoration goals. Provided technical oversight for ongoing remedial implementation for VOC impacted groundwater at SS-27. Reviewed RA-O and provided current progress conclusions and recommendations for further system optimizations. Cost: $7M

Civil Engineer, Air Force Civil Engineer Center Base-Wide PBR Contract, Fairchild AFB, WA – Primary Author of the OU1 Record of Decision Amendment (RODA) at the Fairchild AFB, Spokane, Washington to amend the land use controls (LUCs), cleanup levels (CULs), and the groundwater treatment technology to include in situ chemical oxidation (ISCO). Developed the groundwater treatment alternative and cost and present net worth estimates for the three ROD-A elements. Cost: $14.9M

Civil Engineer, Former Atlas "D" Missile Site 2, FE Warren AFB, PBC, Cheyenne, WY – Primary Author of the remedial action study (RAS) to evaluate the feasibility of hydraulic fracturing (HF) at the Site to increase the distribution potential of injected substrate for the treatment of TCE. Coordinated the RAS design and implementation plan with TO teaming partners AMEC Foster Wheeler and FRx, Inc. Cost: $940K

Civil Engineer, USACE PBC Environmental Investigations PBC, Ft. Campbell, KY – Managed the design and implementation of remedial activities for VOC-impacted groundwater at sites FCPB-10 (Old OB/OD Area) and FCPB-43 (Chromium Plating Shop). Evaluated remedial options for RDX/HMX and TCE plumes at FCPB-10 and FCPB-43, respectively. Wrote and implemented enhanced anaerobic biodegradation works plans and evaluated and reported the treatment effects of the remedial actions. Cost: $9.6M

Civil Engineer, USACE Pilot-Scale Treatability Study, West Virginia Ordnance Works, WV – Conducted pilot testing to determine the effectiveness of two carbon sources (HRC and EVO) for the in situ treatment of nitroaromatics in

Dirk Pohlmann, PE (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Engineer 1*
X	*Engineer 2*
X	*Engineer 3*
P	***Engineer 4***
X	*Field Technician*
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Pohlmann has 20 years' experience in environmental services, specializing in remediation technologies including natural attenuation, phytoremediation, in situ enhanced bioremediation and bioaugmentation, air sparge/soil vapor extraction, in situ chemical oxidation, and in situ chemical reduction.	

the Pond 13 Area groundwater. Sources evaluated for treating 2,4,6-Trinitrotoluene (TNT), 2,4-Dinitrotoluene (2,4-DNT), 2,6-DNT, 2-Amino-4,6-DNT (2-A-4,6-DNT), and 4-A-2,6-DNT. Info gained was used to further optimize the remedial approach to accelerate cleanup and reduce costs. Cost: $9.6M

Civil Engineer, USACE Groundwater Remediation Evaluation and Planning, Redstone Arsenal, AL – Evaluated site-specific groundwater conditions for RSA-083 in support the corrective measure study report for TCE, DCE, VC, 2,4,-DNT, and perchlorate. Developed detailed remediation options and provided cost estimates and scoping to be used for programing future remedial activities. Cost: $9.7M

Civil Engineer, USACE Environmental Remediation Services, Shaw AFB, SC – Designed, implemented, and managed corrective measure remedies; laboratory, pilot scale, and interim/full-scale remedial applications; and remedy performance evaluations/reports. Developed work plan for bench-scale testing of four technologies (ISCO, in situ enhanced bioremediation, in situ chemical reduction, and air sparge/soil vapor extraction) for remediation of TCE-impacted groundwater at Operable Unit-2D. Cost: $8.0M

Civil Engineer, USACE Site Investigation and Remediation Activities, Ft. Gillem, GA – Conducted bench-scale testing of ISCO and ISCR to determine effectiveness in remediating TCE-impacted groundwater. Also evaluated the system's effectiveness by calculating mass removal rates and estimating potential TCE mass. Coordinated with USACE and Georgia regulators during the treatment evaluation process, which resulted in BRAC closure. Cost: $13M

Civil Engineer, MAG-1 Site Bioaugmentation, Joint Base McGuire-Dix-Lakehurst, NJ – Reviewed site data to evaluate the current geochemical site conditions and bioremediation progress, system operations and optimization alternatives. Interfaced with the SERDP/ESTCP pilot study team. He also presented periodic progress updates and path forward options to the JB MDL, NJDEP, and AIG/Chartis cost cap insurance staff.

Civil Engineer, USACE Environmental Remediation Services/Long Term Removal Action (ERS/LTRA), Myrtle Beach AFB, SC – Supervised environmental investigations and remedial action implementation. He provided the technical details which allowed for the termination and dismantling of one pump-and-treat system in favor of a monitored natural attenuation approach, greatly reducing the total project cost. During implementation of the selected remedy at a fire training area, he discovered, delineated, and excavated a previously unknown DNAPL source area, which prevented failure in the implementation of the selected remedy.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*

Education

- *B.S., Civil Engineering, New Jersey Institute of Technology, 1975*
- *Master of Science in Environmental Engineering, New Jersey Institute of Technology, 1977*
- *Executive Management Training–Penn State School of Business, 1993*

Registrations & Licenses

- *Registered Professional Engineer, State of New Jersey, 1980, #26,300*
- *Registered Professional Engineer, State of Louisiana, 2014, #38714*

Work History

- *38 years' experience*
- *3 years with Bay West*

Richard Traver, PE

SENIOR SEDIMENT ENGINEER

OVERVIEW

From 2007–2014 Mr. Traver served as a CH2M HILL Principal Technologist, Sr. Project Engineer and Regional Sediment Technology Practice Lead for the Northeast Environmental Services Business Group located in Philadelphia, PA. His responsibilities covered all technical aspects dealing with concept engineering, design engineering, procurement, installation and system commissioning of groundwater, sediment and soil treatment technologies with special emphasis on contaminated (i.e., soil, sediment, sludges, petroleum coke, etc.) material handling and conveyance systems. He is experienced in the provision of both design/build client support and 100% design/construct contracts. Mr. Traver responsibilities involved the coordination of assignments of process design engineers (chemical, mechanical, structural, electrical, civil) to the delivery orders, participates in technical and cost proposal development, performs on-site supervision of system installation, shakedown, start-up and commissioning field verifications. He also conducts technical QA/QC audits on large, complex and highly visible process engineering projects and served as CH2M HILL's Principal Technologist for Dredging & Contaminated Sediment Management along with large-scale material handling projects.

Mr. Traver has over 38 years diversified experience in the areas of research & development, design, engineering, integration/fabrication and field operations of thermal and physical/chemical treatment technologies used for remediation of chemical, radioactive and munitions impacted soils, sediments and groundwater. Specific areas of expertise for Mr. Traver deal with contaminated sediment dredging, dewatering and difficult bulk material handling operations. He also served 14 years with the U.S. Environmental Protection Agency's Office of R&D as in-house principal technical consultant for soils washing, soils flushing, thermal carbon regeneration, high temperature incineration and contaminated underwater response operations.

In support of process dredge material handling, dewatering and water treatment system engineering, fabrication and operation, Mr. Traver served as VP and General Manager of the Bergmann USA Division of Linatex Corporation, an international leading equipment manufacturer of soil/sediment washing systems utilizing screening, sizing, dense media/gravity separation and water treatment systems along with anti-wear/anti-abrasion/noise suppression materials for the mineral processing and aggregate production industries. One example of Mr. Traver's "hands-on" experience was his role as the Sr. Field Project Engineer for the emergency response installation of a 2,000 gpm phosphoric acid Pondwater treatment system and 16,800', double-walled HPDE pipeline/multiple pump stations which processed and transferred more than 500,000,000 gallons of pH 2.1 water for the Florida DEP, part of a $25 million emergency response project.

PROJECT EXPERIENCE

Sr. Project Engineer, SLRAOC, Duluth MN – Mr. Traver assisted Bay West completing RIs and FFSs for 11 sites throughout the St. Louis River Area of Concern through multiple work orders to identify the nature and extent of contaminated sediments, and to develop and evaluate a range of remedial action alternatives to mitigate risk to human health and the environment. The RIs and FFSs will be used to aid cleanup of these sites to help the SLR AOC attain restoration goals for beneficial use impairment reduction. Mr. Traver was responsible for preparing and estimating engineering estimates for the remedy alternatives.

Richard Traver, PE (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Engineer 1*
X	*Engineer 2*
P	***Engineer 3***
X	*Field Technician*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Traver has over 38 years diversified experience in the areas of research & development, design, engineering, integration/fabrication and field operations of thermal and physical/chemical treatment technologies used for remediation of chemical, radioactive and munitions impacted soils, sediments and groundwater.

Sr. Project Engineer, Principal Technologist/Sr. Project Engineer, CH2M HILL, Environmental Services Business Group, Philadelphia, PA, BHP Billiton, Newcastle Sediment Remediation Project, Newcastle, NSW, Australia – Preparation of design for dredge material off-loading, debris screening/removal and feedstock preparation for processing 790,252 m^3 of contaminated sediments for specialized solidification/stabilization operations for subsequent beneficial use as grade change and landfill cap material for light industrial development. Accelerated project schedule requirements necessitated daily sediment transfer production requirements of 3,000 m^3/day. Comprehensive evaluation of six alternatives assessing different area locations along with differing "means & methods" for dredge material handling, preparation, transportation and placement.

Sr. Project Engineer, Arlington County, Parcel 15 Voluntary Remediation Program (VRP), Arlington Industrial Area (AIA) – Assist in the development of detailed remedial scope consisting of, excavation of approximately 50,000 yd^3 of soil containing lead at various concentrations (impacted soil, contaminated soil, non-hazardous soil, and hazardous soil), dewatering, on-site water treatment and discharge, soil staging, excavated soil sampling, relocation and reuse of non-hazardous soil as general fill material, on-site stabilization of hazardous soil, soil relocation and placement and compaction in on-site Placement Areas, backfilling and site grading. Oversight of on-site exploration test pits for visual observation of diverse soil/urban legend fill materials, field XRF screening of various lead contaminated samples, in-house and commercial lead stabilization treatability evaluations and development of detailed Remedial Action Work Plan (RAWP) and scope of work for commercial bidding of environmental soils excavation, screening, stabilization and beneficial reuse of non-hazardous materials for general fill and contour purposes. Recreational turf soccer fields were constructed upon the stabilized material fill areas.

Sr. Project Engineer, CTO222, Contaminated Sediment Dredging, Dewatering & Residuals Management, SMU 13, Naval Amphibious Base Little Creek, Virginia Beach, Virginia, NAVFAC-Mid-Atlantic LANTDIV CLEAN III Program – CH2M Hill was under contract with the US Navy at their Amphibious Landing Base in Virginia Beach, VA for the development of a Feasibility Study and draft Remedial Action Work Plan for the dredging, dewatering and disposal for approximately 50,000 cy of sediments that exhibit heavy metal contamination (up to 2,500 mg/kg total Pb) resulting from past "grit blasting" activities associated with ship maintenance and repair operations. The primary Abrasive Blasting Material (ABM) was "Black Beauty." Technical assistance for the development of sediment sampling, bench-scale dewaterability testing, and stabilization treatability. Responsible for preparation of RAWP for dredging, sediment dewatering, full-scale stabilization operations and final off-site disposal options as non-hazardous waste matrix material.

Sr. Project Engineer, Caraustar Paper Mill Lagoon Closure, Rittman, OH – Caraustar Paper Mill made paperboard (cereal box type) from recycled paper and cardboard (often had clay coating cardboard) using 10 large ponds for lagoon-based stormwater and process wastewater treatment with discharge to River Styx. Total estimated sludge volume is 820,000 cy. Caraustar has had many NPDES violations (TSS, etc.) and currently discharge from Ponds to local POTW per a consent order. Provision of technical guidance for the development of sediment sampling, bench-scale dewaterability testing, and stabilization treatability. Responsible for preparation of RAWP for dredging, sediment dewatering, full-scale stabilization operations and final off-site disposal options as non-hazardous waste matrix material.

John J. Lux, Jr., PE

MECHANICAL ENGINEER

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *10-Hour OSHA Construction Safety*
- *8-Hour OSHA Site Supervisor*
- *NRC Radioactive Materials User*
- *Department of Energy Radiological Worker Training, 1985-1994*
- *Department of Energy Cost Schedule Control System, 1992*
- *Resource Conservation and Recovery Act Regulations, 1992*

Education

- *B.S. Mechanical Engineering, 1978*
- *M.S. Mechanical Engineering, 1981*

Registrations & Licenses

- *Registered Professional Engineer, OH*
- *Certified Fire and Explosion Investigator*

Professional Memberships

- *Tau Beta Pi, Honorary Engineering Society*
- *American Society of Mechanical Engineers*
- *American Society of Heating, Refrigeration, and Air Conditioning Engineers*

Work History

- *44 years' experience*
- *<1 years with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Engineer 1*
X	*Engineer 2*
X	*Engineer 3*
P	***Engineer 4***
X	*Field Technician*
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Lux is a mechanical engineer specializing in mechanical remediation systems including landfill gas extraction systems.	

OVERVIEW

Mr. Lux is a professional engineer with experience in engineering and design of landfill gas facilities, simulation and optimization analysis, conceptual design, and alternative evaluation. He is a recognized engineering expert for evaluating, engineering, modifying, and troubleshooting high hazard HVAC systems in chemical, biological, and nuclear applications. He has completed engineering forensic investigations, prepared reports, and participated in depositions and trials.

PROJECT EXPERIENCE

Principal, JLA Engineering, Inc., OH – Provided product/process development expertise, facilities engineering/design, technical analyses, and regulatory compliance evaluation to commercial, institutional, governmental, and industrial clients in 33 states. Work included simulation and optimization analysis, conceptual design, alternative evaluation to meet economic and performance targets, and testing. Completed engineering, design, and field coordination to make operative an incorrectly constructed landfill gas extraction facility that was used for boiler fuel at an industrial facility. Project was successfully completed despite all documentation, including O&M, having been previously destroyed. Completed engineering forensic investigations, prepared reports, and participated in depositions and trials.

Senior Engineer, Liebert Corporation – Completed design, component selection, and built first prototype of new telecommunications cooling unit that uses outside air in economizer mode. Solved critical product reliability issue on modular product line. Compiled advanced refrigeration system analysis method and implemented state of the art data acquisition system for steady-state thermal and transient vibration measurements

Research Scientist, Battelle Laboratories – Designed and reduced to hardware a new, gas-fired, residential sized, absorption heat pump system using lithium bromide as the working fluid. Work involved conception and design of novel heat exchangers and flow components that were subsequently patented. Reduced to hardware and supervised field construction of novel method to extend the storage life of frozen sugar beets prior to processing into granulated sugar. Work involved using computer model data and designing a system to freeze sugar beets using cold outside air and maintain the frozen state into the Spring in Fargo, ND.

Technical Consultant, Science Applications International Corporation – Selected by US Dept. of Energy HQ to serve as lead investigator to analyze and improve HVAC systems design for the new Pit Disassembly and Conversion Facility (PDCF) and Mixed Oxide (MOX) Fuel Fabrication Facility (MFFF) at the Savannah River Site. Provided conceptual design and equipment selection for state-of-the-art vacuum cleanup system to handle enriched uranium particulate at Oak Ridge Y-12 plant. Performed engineering analysis on HVAC systems and provided design recommendations to improve room air balance in transuranic materials processing operation at Savannah River.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *Licensed Asbestos Inspector, MN #AI10528*
- *CPR, AED, and First Aid for Adults*
- *Six Sigma Yellow Belt Training Certificate – University of St. Thomas (MN)*
- *Fall Protection Competent Person*
- *Excavation and Trenching* Competent Person
- *OSHA-510 Training*
- *OSHA 30-Hour Training*
- *DOT HazMat Training (49 CFR 172.704)*

Education

- *BS Geology, University of Minnesota*

Registrations & Licenses

- *Professional Geologist, MN (#48625), Certified Professional Geologist (#11688), Certified Safety Professional (#32032)*

Professional Memberships

- *Minnesota Groundwater Association (MGWA)*
- *American Institute of Professional Geologists (AIPG)*
- *American Society of Safety Engineers (ASSE)*

Professional Experience

- *19 years' experience*
- *1 year with Bay West*

Nathan Gruman, PG, CPG, CSP

CORPORATE HEALTH AND SAFETY DIRECTOR

OVERVIEW

Mr. Gruman is a professional geologist and certified safety professional with over fourteen years of environmental, health, and safety experience working throughout the United States for public/private industry, local, state, and federal government organizations. Mr. Gruman's environmental experience includes large-scale emergency response; spill response; environmental remediation; abatement and demolition oversight; and waste characterization, management, and disposal. As a health and safety profession, Mr. Gruman has extensive experience working on large-scale projects that required the coordination of multiple disciplines, meeting client-specific requirements, and ensuring personnel providing services were properly trained and equipped for their tasks.

Mr. Gruman has managed numerous Brownfield redevelopment projects involving the coordination of the pre-demolition abatement of hazardous materials; demolition of buildings and infrastructure; and short- and long-term remediation of impacted soil, groundwater, and soil-vapor due to impacts from past land-use.

PROJECT EXPERIENCE

Safety Program Development, Minneapolis Park and Recreation Board

Work with a team of safety consultants to provide direction to Minneapolis Park and Recreation Board for development and implementation of their safety program.

PROJECT EXPERIENCE PRIOR TO BAY WEST LLC

Minnesota Department of Transportation (MnDOT), 35W Bridge Reconstruction—Developed the environmental training program for contractor on-boarding.

MnDOT, Central Corridor Light Rail project—Assisted in development of the environmental investigation program, provided technical review and oversight for the development and implementation of the Response Action Plan, and oversaw contractors for MnDOT/Met Council during redevelopment activities.

Minnesota Department of Transportation, Multiple Sites, Asbestos and Regulated Waste Inspections for road expansion/improvement projects Brownfield Redevelopment, Multiple Sites, Minnesota—Managed numerous projects involving the coordination of the pre-demolition abatement of hazardous materials; demolition of buildings and infrastructure; well abandonment oversight; and short- and long-term remediation of impacted soil, groundwater, and soil-vapor due to impacts from past land-use.

Project Manager, 1515 Central Avenue, Minneapolis, MN – Conducted initial site investigation, prepared findings and brownfield grant applications, and acquired approximately $1,000,000 in clean-up funds for redevelopment of a 10-acre site in northeast Minneapolis. During redevelopment, directly oversaw contractor work, managed change orders, and executed project within 3 months of grant award.

Nathan Gruman, PG (MN), CPG, CSP (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Field Technician*
X	*On-Site Inspector*
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr Gruman is a safety professional that assists our MPCA/MDA projects by preparing, reviewing, and implementing safety plans. *Mr. Gruman is familiar with sampling and monitoring programs and procedures.*	

Throughout his professional career, Mr. Gruman has:

- Assessed crane pick plans;
- Coached employees on safe behaviors;
- Collected, tracked, and analyzed safety metrics and other data;
- Conducted ergonomic assessments;
- Conducted hazardous waste and hazardous materials assessments;
- Conducted industrial hygiene monitoring for particulates and noise;
- Conducted respirator fit testing and respiratory protection training;
- Conducted safety audits of construction and industrial sites;
- Developed corrective action items;
- Developed Site-Specific Safety Plans;
- Lead safety committees;
- Managed company safety gear and personal protective equipment;
- Managed third party verification systems (i.e. ISNetworld, Avetta, Browz, and VeriForce);
- Responded to, and investigated, safety incidents and injuries;
- Vetted subcontractor safety programs;
- Written toolbox talks and safety tips various topics;
- Written, reviewed, modified, and maintained corporate health and safety policies and protocols; and
- Trained employees on:
  - Fall protection;
  - Emergency/spill response,
  - Hazard Communication Training, including:
    - Asbestos
    - Benzene
    - Globally Harmonized Systems
    - Lead
    - Silica
  - Confined space entry;
  - Air monitoring equipment usage;
  - Trenching and excavation safety;
  - Respiratory protection; and
  - Hearing Conservation.

Training/Certifications

- *40-hr OSHA Training w/Current Refresher*
- *FEMA NIMS ICS Trainings (100, 200, 700, 800)*
- *DOT HazMat Training (49 CFR 172.704)*
- *First Aid/CPR Certified*

Education

- *BA BSE (Biology, Society, and Environment), and Anthropology, University of Minnesota*

Work History

- *6 years' experience*
- *6 years with Bay West*

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
P	***Field Technician***
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Yang's primary role is with the biowatch program, ensuring the program runs smoothly with 24 hours a day and 365 days a year of continuous air sampling. *Mr. Yang's secondary role is with the health and safety team supporting field staff with needed safety equipment and supplies.*	

Xiong Yang

FIELD TECHNICIAN II/HEALTH AND SAFETY TECHICIAN

OVERVIEW

Mr. Yang began at Bay West as a Household Hazardous Waste Technician and have been involve with Storm-water sampling, Biowatch air monitoring, Emergency Respond, and has become part of the Health and Safety Team over the last 6 years. Mr. Yang is the designated Radiation Safety Officer, manages the air monitor equipment, respirators, fit testing, and safety related supplies. Other tasks include managing safety data sheet database, filing training records, creating training materials. Within the Biowatch program, Mr. Yang perform daily air sample collection, equipment maintenance, write reports, and conduct training and refreshers. As part of the ER team and hazardous waste technician, Mr. Yang has work with a wide variety of chemicals.

PROJECT EXPERIENCE

Health and Safety Technician

Database management – SDS online database, training records and certification, and training assignments.

Training – Conduct air monitor training, assist with 8-hour HAZWOPER refresher, assist with 40-hour HAZWOPER refresher.

Air monitoring equipment – Troubleshoot, weekly maintenance, calibration, recertification, creating training material and conducting training on PID, FID, 4-Gas meters, Lumex, and draeger tube.

Respirators – Cleaning, decontamination, scheduled performance check, fit testing face mask, and equipment maintenance.

Radiation Safety Officer – Radiation Safety Program, Radiation safety training, equipment registration, radiation compliance.

Environmental Technician

Biowatch ambient air monitoring – Field work includes daily air sampling, strict standard of procedure and chain custody, Quality assurance audits, Standard of Procedure audits, equipment maintenance and trouble shoot, inventory and supplies managements. Office work includes data entry, writing reports, training, refresher and record keeping. Compliance with local, state and federal regulation.

Storm-water sampling – Setting up passive collector, colleting water sample after a rain event, proper storage of samples.

Household Hazardous Waste – Collect, sort, label and storage of household hazardous waste. Interact and educate customers on common and misconception of household hazardous waste.

Emergency Responder – Emergency response to chemical spills. Assessing, cleanup, decontamination, labeling, sorting and transporting of hazardous waste. Has work with corrosive, petroleum products and various miscellaneous chemicals. Usage of containment boom and absorbent boom.

Matt Ader, CSP

FIELD SAFETY SUPPORT & SAFETY TRAINING

OVERVIEW

Mr. Ader has over ten years of experience coordinating safety on large projects, as well as developing and delivering customized safety training across a wide range of topics.

In his professional career, Mr. Ader has conducted construction safety audits, performed heavy equipment inspections, developed and assessed crane pick plans, provided summaries of corrective action items, tracked safety metrics and data, responded to and investigated incidents, developed site-specific safety plans, reviewed and enacted activity hazard analyses, oversaw safety gear and personal protective equipment purchases and usage, coached employees on safe behavior, managed air monitoring and dust sampling equipment and personnel, vetted subcontractor safety programs and site-specific safety plans, and conducted fit testing for respirators.

Mr. Ader has a broad range of training courses that he has taught to employees, including OSHA 10-hour and 30-hour construction outreach courses; First Aid/CPR/AED Use for Adults; HAZWOPER 8-hour, 24-hour, and 40-hour courses; confined space entry; trenching and excavation safety; fall protection and rescue; respiratory protection; rough terrain forklift operations; aerial lift and scissor lift operation; hazardous plants and wildlife; fire protection and prevention; fire extinguisher use; electrical safety; and numerous others.

PROJECT EXPERIENCE

Safety Program Development, Minneapolis Park and Recreation Board – Conducted numerous job hazard analyses and inspections of maintenance facilities. Identified applicable safety training requirements for all job categories. Developed guidelines for safety committee.

- *First Aid/CPR/AED Use for Adults, Assorted Clients in Florida, Washington, South Dakota, Wisconsin, and Minnesota, 2009–2017*
- *OSHA 10-Hour and 30-Hour Construction Outreach Courses, Assorted Clients in Florida, Washington, Wisconsin, Iowa, and Minnesota, 2009–2017*
- *HAZWOPER 8-Hour, 24-Hour, and 40-Hour Courses, Assorted Clients, Minnesota, 2016–2017*
- *Emergency Spill Response Courses, Assorted Clients, Minnesota, 2017*
- *Chemical Spill Response Guide, Cantel Medical, 2017*
- *HazCom Assessment—Pioneer Metal Fabricators, Minnesota, 2017*
- *Q4 Health and Safety Metrics Analysis, Shutterfly Inc., 2016–2017*

Throughout his professional career, Mr. Ader has completed the following:

- Wrote, reviewed, modified, and maintained corporate health and safety policies and protocols;
- Conducted safety audits of construction and industrial sites;
- Developed and enforced corrective action items;
- Collected, tracked, and analyzed safety metrics and other data;
- Responded to and investigated safety incidents and injuries;
- Developed site-specific safety plans;
- Developed, reviewed, and enacted activity hazard analyses;

Training/Certifications

- *Construction Health and Safety Technician, Board of Certified Safety Professionals*
- *OSHA Authorized Construction Trainer*
- *Instructor-Trainer, First Aid/CPR/AED Use for Adults*

Education

- *BS Construction Management, Construction Safety and Risk Control Minor*

Registrations & Licenses

- *Certified Safety Professional (#33904)*

Work History

- *10 years' experience*
- *1 year with Bay West*

Matt Ader, CSP (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Field Technician*
X	*On-Site Inspector*
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Ader is a safety professional that assists our MPCA/MDA projects by preparing, reviewing, and implementing safety plans. Mr. Ader is familiar with sampling and monitoring programs and procedures.	

- Managed company safety gear and personal protective equipment;
- Coached field employees on using, bump testing, calibrating, interpreting, and troubleshooting problems on air monitoring gear;
- Coached employees on safe behaviors;
- Managed air monitoring and dust sampling equipment and personnel;
- Performed air sampling and dust monitoring on construction sites;
- Conducted noise exposure sampling on industrial and construction sites;
- Vetted subcontractor safety programs and site-specific safety plans;
- Worked with third-party verification systems such as ISNetworld, PICS, Browz, and First Verify;
- Conducted fit testing for respirators;
- Led safety committees;
- Wrote toolbox talks on various topics;
- Conducted ergonomic assessments;
- Conducted hazardous waste and hazardous materials assessments; and
- Developed chemical spill cleanup guidelines.

Mr. Ader has taught to individuals and classes of up to 80 personnel on a broad range of training topics, including the following:

- OSHA 10-hour and 30-hour construction outreach courses;
- First Aid/CPR/AED Use for Adults;
- HAZWOPER 8-hour, 24-hour, and 40-hour courses;
- Fall protection, prevention, and rescue;
- Fire protection and prevention and fire extinguisher use;
- Emergency spill response, HazCom, and GHS training;
- Confined space entry;
- Air monitoring equipment usage;
- Trenching and excavation safety;
- Respiratory protection;
- Rough terrain and industrial forklift safety;
- Aerial lift and scissor lift safety;
- Toxic plants and hazardous wildlife; and
- Electrical safety.

Brad Kulberg, PMP

CORPRATE QC

OVERVIEW

Mr. Kulberg is a Senior Project Manager, Program Manager, Regulatory Specialist, and Quality Control Manager. His responsibilities include oversight and management of environmental programs and projects. His 35 years of environmental experience include both project management and field work.

TECHNICAL EXPERIENCE

Mr. Kulberg has managed dozens of Federal environmental projects for the US Army Corps of Engineers, US Air Force, US Navy, and US Army. He served as project manager for several Superfund sites around the Midwest. He also has extensive experience with State and municipal customers, including the State of Minnesota and its agencies (i.e., MN Pollution Control Agency, MN Dept. of Health, MN Dept. of Agriculture), Hennepin County, University of Minnesota, and dozens of other Counties and Cities around Minnesota. Served more than 20 years with Bay West's emergency response team in different roles including lead on-call and responder.

PROJECT EXPERIENCE

Contract QC Supervisor, PBR/FFP HTRW/MEC ERSC, USACE-Omaha District – Manages QC for two ID/IQ contracts (total capacity $160M). Evaluates performance objectives and works with USACE and Bay West PMs to determine appropriate methods and procedures. Coordinates inspections and testing with the site QC Supervisors assigned to the field. Relevant TOs have included:

- *Joint Base Andrews, MD, 2011-Present, $27.*
- *Cornhusker AAP, NE, 2014-2017, $4.8M*
- *Joint Base Charleston–Weapons/Air, SC, 2015-Present, $15.7M*

Contractor QC Supervisor, PBC/Fixed Price Remediation with Insurance (FPRI), USACE Omaha District — Provided corporate management of QC activities on this PBC contract that included two Basewide PBR TOs totaling >$18M (detailed below). Responsible for work plan and report QC review; project schedule and quality audits; and evaluation of continuous improvement initiatives.

Contractor QC Supervisor, 60-Site PBR Contract, 2014-Present, Fairchild AFB, WA, $14.9M Capacity, AFCEC—Program QC for this 60-site AFCEC PBR contract that includes investigation, design, remedial action, remedial construction, and environmental remediation activities. This 10-yr contract includes IRP and MMRP sites.

Coauthor, Incremental Sampling Technical Paper, 2009 – Cheryl Groenjes of USACE-Omaha presented a Technical Paper at the 2009 UXO/Countermine/Range Forum on incremental sampling. Mr. Kulberg participated in drafting and review of lessons learned during incremental sampling on the Nevada Test and Training Range.

Training/Certifications

- *Registered Project Management Professional (PMP#1302512) Active*
- *DOT HazMat Training 49 CFR 172.704*
- *Federal Contracting Training*
- *USACE CQM for Contractors Training*
- *Niton XRF Spectrum Analyzer Certified*
- *USACE Manager/Supervisor Training*
- *40-Hr OSHA Training w/Current Refresher*
- *First Aid/CPR Certified*
- *OSHA Lead Standard Training 29 CFR 1926.62*

Education

- *BS Electrical Engineering*

Professional Experience

- *35 years' experience*
- *23 years with Bay West*

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Engineer 1*
X	*Engineer 2*
X	*Engineer 3*
P	***Engineer 4***
X	*Project Manager*
X	*QA/QC Officer*
***(P) Bold** indicates primary role*	

Primary Role Qualifications
Mr. Kulberg is Bay West's Quality Manager and ensures that all work is done in accordance with our quality manuals. Mr. Kulberg is familiar with sampling and monitoring programs and procedures.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *8-Hr OSHA Supervisor Training*
- *10-Hr OSHA Construction Safety Training*
- *First Aid/CPR Certified*
- *X-ray Fluorescence Nitron Training*
- *Disaster Site Worker Training*

Education

- *MBA, University of Central Florida, 1997*
- *BA, Chemistry, Rutgers University, 1987, including for EM 200-1-15:*
  - *10 semester hours of physics*
  - *12 semester hours mathematics, including coursework in integral calculus and differential equations.*

Professional Memberships

- *American Chemical Society*

Work History

- *30 years' experience*
  - *20 years' DoD experience*
  - *10 years' lab experience*
- *3 years with Bay West*

Peer Reviews

Data Validation: As part of the Environmental Data Quality Workgroup, Mr. Malarek peer reviewed the Draft and Draft Final DoD General Data Validation Guidelines, 02/09/18 for analytical data for Final release.

Eric Malarek

PROGRAM CHEMIST

OVERVIEW

Mr. Malarek has 30 years environmental experience performing project chemistry support/management at sites nationwide. He has 20 years of experience on PBC HTRW and MMRP projects for DoD Defense (US Army, USACE, USAF, and US Navy); thus, he has extensive experience interacting with local, state, and federal regulatory agencies in all 10 USEPA Regions and 20 States on CERCLA, RCRA, HTRW, and MMRP sites. Overall experience with public and commercial accounts with special strengths gleaned from key project positions on large federal sites for remedial investigation (RI), removal action (RA), remedial design (RD), feasibility study (FS), remediation feasibility investigation (RFI), site investigation (SI), corrective actions (CA), environmental baseline study (EBS), and long-term monitoring or management (LTM) projects and programs.

TECHNICAL EXPERIENCE

Mr. Malarek has 30 years of total environmental experience performing project chemistry support and management at sites nationwide. 20 years of experience on PBC HTW and MMRP projects for DoD Defense (US Army, USACE, USAF, and US Navy) and extensive experience interacting with local, state, and federal regulatory agencies in all 10 USEPA Regions and 20 States. His hands-on experience includes overseeing and providing broad range of environmental project consulting, quality assurance oversight and training, data validation, data management, field sampling, laboratory and field auditing, laboratory analytical solicitations and costing, and chemistry technical support (problem solving) and is familiar with remedial process chemistry and fate & transport for organics/inorganics. He supports Bay West's EQuIS data management system, including ADR.NET, SEDDs, and ERPIMS EDDs and is experienced in writing/implementing UFP-QAPPs, lab scopes, and project QC data valuations. Supported large federal investigations and removal actions under CERCLA and RCRA, at both HTRW and MMRP sites.

PROJECT EXPERIENCE

Program Chemist, Bay West LLC, 21-Site Basewide PBR, Joint Base Andrews, MD, USACE Omaha, $27.2M, FFP/PBC (F3 #3), 2015-Ongoing – Prepared/implemented UFP-QAPP and performing data management/validation to support completion of PBR activities to achieve SC at 11 ERP and 10 CRP sites. Clarified stakeholder comments during planning phase documents related to QA and chemistry and provided continual oversight during field sampling operations including field-lab coordination (bottle field supplies), sample and data verification (sample login reviews), and lab analysis to keep project within scheduled timelines and prescribed scope. Work includes RIs, CSM updates, FSs, EE/CAs, RAs, optimized exit strategies OESs, and RODs. Contaminants include VOCs (TCE, PCE), SVOCs (PAHs, PCBs, pesticides), metals, and petroleum compounds, depending on the site COPCs.

Eric Malarek (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***QA/QC Officer***
***(P) Bold** indicates primary roles*	

Primary Role Qualifications

Mr. Malarek has 30 years environmental experience performing project chemistry support/management at sites nationwide. He has 20 years of experience on PBC HTRW and MMRP projects for DoD Defense (US Army, USACE, USAF, and US Navy). His hands-on experience includes overseeing and providing broad range of environmental project consulting, quality assurance oversight and training, data validation, data management, field sampling, laboratory and field auditing, laboratory analytical solicitations and costing, and chemistry technical support (problem solving).

Emerging Contaminants: Mr. Malarek is experienced with method/technical evaluation, contamination source assessment, and evaluation/validation of emerging contaminants including PFOA/PFOS (537 Modified), 1,4-Dioxane (8260/ 8270SIM), and Perchlorates (6850).

Program Chemist, Multi-Installation, Basewide PBR, Wurtsmith AFB and KI Sawyer, MI, Reese AFB, TX, and Chanute AFB, IL, AFCEC, $12.6M, 2015-Ongoing, FFP/PBC - Prepared/approved/implements Site-Wide UFP-QAPP for work under this multi-installation BRAC PBR. Developed project-specific MQOs, sample login reviews, and provides data report summaries to support completion of RAO and LTM activities. Provides chemistry and QA oversight for field sampling, reporting, and lab analysis to keep project on schedule and scope. Contaminants include VOCs, PFOAs, metals, anions, and dissolved gases in water, soil, and air, based on each site's COPCs.

Program Chemist, Umatilla Chemical Depot, OR, USACE Omaha, $46M, 2016–Ongoing, FFP PBC – Preparing UFP-QAPP support RD/RA for large MMRP RA. Selecting appropriately qualified and certified labs, developing sampling and analytical methodologies, and project-specific MQOs. Clarified stakeholder comments during planning phase documents related to QA and chemistry and provided continual oversight during field sampling operations including field-lab coordination, sample and data verification and validation, and lab analysis to keep project within scheduled timelines and prescribed scope. Contaminants include explosives and munition constituent metals in soil.

Program Chemist, Joint Base-McGuire, Dix (JBMDL), Lakehurst, NJ, USACE Louisville, $2.55M, 2015-2017, FFP PBC — Prepared/ implements UFP-QAPP to support Interim Removal Action, RI, and FS for eight MRSs, including three small arms ranges for lead and PAH soil characterization under the MMRP program. Clarified stakeholder comments during planning phase documents related to QA and chemistry and provided continual oversight during field sampling operations including field-lab coordination, sample and data verification and validation, lab analysis, and data usability reports to keep project within scheduled timelines and prescribed scope. Contaminants include munition constituent metals, explosives, and PAHs in soil, depending on the site COPCs.

Program Chemist QA/QC, Peterson Air Force Base, CO, USACE–Omaha, 2015-2017, FFP/PBC - Preparing UFP-QAPP including selection of appropriately qualified and certified labs, selecting appropriate sampling and analytical methodologies, project-specific MQOs, coordination and oversight of lab and field activities (bottle orders, shipments, lab analysis and deliverables), performing sample and data verification (sample login reviews), performing data management/validation, notification to PM of QA non-conformances, directing or monitoring correction actions, and providing data report summaries to support RA activities for elevated concentrations of benzo(a)pyrene at SR501 and of lead at SR501a that are present in soil. The potential exists for receptors to be exposed to these MC at concentrations exceeding their respective RGs and the objective of the RA is to prevent receptor exposure to these constituents in concentrations exceeding the RGs.

Program Chemist QA/QC, King Salmon Air Station, Alaska, USACE – Omaha, 2016-Ongoing, - Responsibilities included preparing UFP-QAPP including selection of appropriately qualified and certified labs, selecting appropriate sampling and analytical methodologies, project-specific MQOs and directing or monitoring correction actions to support RD/RA work and obtain UU/UE for the MRS. If MEC/MD are detected it must be removed and disposed of. If MC are detected in soil above screening criteria for metals or explosives or above ADEC petroleum cleanup standards for GRO/DRO/RRO, benzene, toluene, ethylbenzene, and total xylenes (BTEX), or PAHs, then further delineation of the extent of contamination will be required.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *First Aid/CPR Certified*
- *USACE Construction Quality Management for Contractors*
- *ERPToolsX Training*

Education

- *MS Botany, 1983*
- *BA Biology, 1981*

Work History

- *28 years' experience*
- *6 years with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***QA/QC Officer***
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Ms. McDonald has 24 years' environmental analytical chemistry and QC experience.	

Nancy McDonald

PROJECT CHEMIST/SCIENTIST II

OVERVIEW

Ms. McDonald has 24 years environmental analytical chemistry and data validation experience, including 19 years working on DoD and other Federal projects. She has served as a Sr QA Chemist for environmental consulting companies. She is familiar with numerous EPA methods. She has reviewed, reorganized, and resolved data quality issues in >1000 lab reports. Ms. McDonald supports the Bay West's chemical data management systems including EQuIS, ERPIMs, and SEDD/ADR networks including data compilation, troubleshooting, and uploading. Ms. McDonald has coordinated EPA performance evaluation samples, conducted internal audits, prepared for external audits, and performed data validation and reviews.

TECHNICAL EXPERIENCE

24 years' environmental analytical chemistry and QC experience. Developed/written/reviewed >25 UFP-QAPPs; validated/reviewed >500 Level IV lab reports and >25 Data Quality Summary Reports. Nancy provides project chemist support including sample and data management and data validation. Expertise in Bay West's data management systems including EQuIS, ERPIMs, and SEDD/ADR. Expertise in QA documents, USEPA methods/regulations, DoD Quality Systems Manual & specialized methodologies.

PROJECT EXPERIENCE

Bay West LLC:

2014: Bay West LLC, Project Chemist/Data Validation, Pig's Eye Landing, MN, MPCA – Coordinated lab work for fieldwork on this $600K cleanup of Minnesota's largest unpermitted landfill. She performed data validation and generated analytical results tables.

2012 to Ongoing: Bay West LLC, Project Chemist/Data Validation, Ritari State Superfund Site, MN, MPCA – Supported field activity and data Compilation Report preparation. She validated lab reports and updated historical analytical results tables.

2015 to Ongoing: Bay West LLC, Project Chemist/Data Validation, Minnesota Targeted Brownfield Assessment Program (MNTBAP) – Wrote the program-wide QAPP for this program developed by the MPCA due to the availability of grant funds to conduct environmental assessments at eligible brownfield sites proposed for redevelopment or reuse. This program is funded with support from the EPA through national brownfield legislation.

2014 to Ongoing: Bay West LLC, Project Chemist/Data Validation, St. Louis River Sediment Area of Concern for MPCA – Wrote the project-wide QAPP and assisted with the remedial investigation (RI) site-specific work plan for this project. She validated lab reports and assisted with preparation of analytical results tables.

2012-Ongoing: Bay West LLC, Project Chemist/Data Validation Base-wide PBR, Joint Base Andrews, MD, PBR/FFP, for USACE Omaha – Project Chemist for multi-site PBR activities to achieve site closure at 11 ERP and 10 CRP sites at JBA Naval Air Facility Washington. Prepares/reviews site-specific QAPPs to augment/update the Basewide QAPP. Performs reviews and data validation for VOCs, SVOCs, PAHs, pesticides, herbicides, metals, and MNA parameters.

Sam Bader, CHMM

TRANSPORTATION AND DISPOSAL SPECIALIST

OVERVIEW

Mr. Bader has over 6 years of environmental experience, which includes managing hazardous waste collections; field data collection and analysis; surveys of endangered species; and identification of native and alien plants, their life cycles, and ecological requirements. He has a strong knowledge of Department of Transportation regulations, RCRA requirements and regulations, USEPA waste codes, manifesting, and Land Disposal Restrictions, all of which assist in the overall quality control of waste materials. His role at Bay West is a Project Manager/T&D Coordinator where he is responsible for waste profiling, manifest printing, laboratory packing, drum pickups, and cost estimates. He also assists with HHW, industrial services, and emergency response projects as needed.

TECHNICAL EXPERIENCE

Mr. Bader has performed mercury surveys as part of spill remediation and cleanup projects for commercial customers by collecting waste samples for laboratory testing. He has performed field tests using a portable Lumex device and has decontaminated and removed hazardous debris from laboratories and commercial and residential sites.

Mr. Bader manages hazardous waste by directly overseeing 1–2 employees daily while being responsible for evaluating, segregating, packaging, and shipping waste based on chemical compositions and the severity and reactivity of waste while completing health and safety plans and conducting projects according to Federal, State, and local regulations.

Mr. Bader acts as a site supervisor for an emergency response team at Bay West and is on call for a 24-hour/7-day shift every 5 weeks. He helps complete health and safety plans for the response. Mr. Bader works with the customer and a crew of 1–7 employees to ensure that the spill is contained and cleaned to the customer's satisfaction.

Mr. Bader manages more than 10,000 tons of hazardous waste, nonhazardous waste, universal waste, and special wastes through Bay West's 10-day temporary storage facility.

PROJECT EXPERIENCE

Waste Disposal Oversight, Bay West, Larson Family Realty, Lake Elmo, MN – Evaluates, segregates, inventories, and packages over 60,000 different chemicals and shipped for disposal over a 1-month period.

Disposal Coordinator, Bay West, Saint Paul, MN – Supports T&D activities for more than 200 State and County projects each year. Generates and/or reviews disposal and shipping documents encompassing waste profile, approvals, manifests, bills of lading, and LDRs. This includes obtaining pricing estimates and gaining disposal facility acceptance of waste in compliance with USEPA and DOT regulations.

Site Supervisor, Triangle Warehouse, Minneapolis, MN – Conducts characterization, repacking, consolidation, manifesting, and tracking the T&D of more than 300 abandoned drums.

Training/Certifications

- *Certified Hazardous Material Management (CHMM) (#19029)*
- *40-Hr OSHA Training w/Current Refresher*
- *Confined Space Entry/Rescue Training*
- *DOT HazMat Training (49 CFR 172.704)*
- *Commercial Driver's License—Class B with Hazardous Materials Endorsement*
- *FEMA NIMS ICS Trainings (100, 200, 700)*
- *Boom Deployment/On-Water Response Training*
- *First Aid/CPR Certified*

Education

- *BS in Reclamation Environment and Conservation; Minor in Environmental Conservation*

Registrations & Licenses

- *Certified Hazardous Materials Manager Accreditation*

Professional Experience

- *6 years' experience*
- *3 years with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
P	***Field Technician***
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Bader specializes in managing hazardous waste and ensures the proper containerizing, labeling, loading, hauling, and disposal of both hazardous and nonhazardous wastes.	

David Berthene, GIT

GEOLOGIST, FIELD TECHNICIAN & SCIENTIST

OVERVIEW

Mr. Berthene serves as a field geologist providing environmental fieldwork of various tasks within our State, Federal, emergency response, and transport and disposal services. Mr. Berthene has field experience in data collection, water and soil quality sampling, laboratory packing of hazardous materials, and transportation and storage of hazardous materials

PROJECT EXPERIENCE

Chemist, Clean Harbors – Package/handle hazardous waste to OSHA, DOT, and RCRA standards. Communicate effectively with customers so they are compliant with USEPA and OSHA regulations, as well as solve any problems on-site. Transport hazardous waste based on DOT regulations.

Environmental Field Technician, Soil and Groundwater Sampling, Roger Bothe Farms LSI, Cottage Grove, MN – Provided field support for a limited scope investigation (LSI). Using direct push technology, drilled five soil borings to groundwater depth. Duties included logging soil cores; soil, water, and vapor sample collection; and preparing samples for shipment to lab for analysis. The purpose of the LSI was to delineate the release of 500 gallons of diesel fuel.

Environmental Field Technician, Analysis of Historical Leak Site Files, MPCA Vapor Pilot Project File Review – Performed file reviews of historical leak sites in the state of Minnesota. Compiled leak site data of the site's previous address, parcel ID, current owner, soil composition, groundwater elevation, previous sampling and lab results, and remediation actions. Using the sites' historical data, made a scope of recommendation for the delineation of potential soil vapor.

Geologist, Peterson Air Force Base, Colorado Springs, MN – Provided field support for soil sampling at Peterson AFB and the Air Force Academy. Hand augured 13 soil borings. Borings were augured to a depth of 1 ft below ground surface and samples were taken at 6 and 12 inches. Soil samples taken at 6 and 12 inches were combined and homogenized. Soils were logged using the Unified Soil Classification System. Soil samples were tested for SVOCs.

Environmental Field Technician, Lab Packing Hazardous Chemicals for Disposal, Medivators Inc., Minneapolis, MN – Communicated with the lead contact on-site regarding what and how much waste is being transported for disposal. Organize the waste for disposal into compatible DOT shipping classes. Log all chemicals, quantity, and container size for each lab pack and apply all required RCRA disposal codes to the lab pack. Generated manifests and obtained the generator's signature once all lab packs are within shipping and disposal compliance.

Environmental Field Technician, MPCA, University Ave and Pascal St., St. Paul, MN – Collected soil vapor samples beneath residential/commercial buildings containing potential PCE-impacted soils. Assisted in communicating with residential owners for scheduling resampling dates and times. Field duties included sub-slab air sampling, indoor/outdoor air sampling, and differential pressure extension across the sub-slab using the micro-manometer. Office duties included sampling coordination.

Environmental Field Technician, MPCA, White Way Cleaners, Minneapolis, MN – Collected soil vapor samples beneath residential/commercial buildings containing potential PCE-impacted soils. Field duties included sub-slab air sampling and indoor/outdoor air sampling.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *CDL Class B Permit with Airbrakes and HazMat endorsements*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 700, 800)*
- *Minnesota Department of Health Asbestos Inspector (No. AI13772)*
- *First Aid/CPR Certified*

Education

- *BS Geology, University of Wisconsin-River Falls, 2014*

Registrations & Licenses

- *FG/GIT (#147156/MN)*

Professional Experience

- *2 years' experience*
- *2 years with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
P	***Field Technician***
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Berthene frequently performs project management support activities on MPCA projects.	

Lauren Idleman, GIT

GEOLOGIST, FIELD TECHNICIAN & SCIENTIST

OVERVIEW

Ms. Idleman has over three years of environmental experience including sampling various media, data interpretation, and reporting. Her fieldwork experience includes soil, groundwater, sediment, and vapor sampling, excavation oversight, and well installation oversight. She has worked on multiple MPCA jobs including performing Phase I and Phase II site assessments and preparing associated reports, landfill investigations, and vapor intrusion investigations. Prior to joining Bay West, Ms. Idleman spent two years working in environmental remediation in New Jersey.

PROJECT EXPERIENCE

Geologist, Bay West LLC, Joint Base Andrews, Maryland – Site lead for various activities at several sites included in a multi-site performance-based remediation contracts with USACE. Site Lead for Remedial Actions and Operations (RA-O) activities including groundwater sampling, land use control monitoring, landfill inspections, landfill gas monitoring, landfill maintenance, and remedial injections at two CERCLA regulated sites.

Geologist, Bay West LLC, SR 1404 Vapor Assessment – Assisted with vapor intrusion investigation at residential and commercial properties. Worked on vapor assessment at residential and commercial properties. Duties included assisting with project management, contacting property owners to schedule fieldwork, installing and sampling sub-slab points, collecting indoor and outdoor air samples, collecting soil gas samples, conducting vapor surveys, and assisting with reporting tasks.

Geologist, Bay West LLC, Former Esselman Store – Responsible for groundwater and private well sampling via low-flow purging. Sampling and reporting were conducted jointly with the Minnesota Department of Agriculture. Responsible for reporting and data management.

Geologist, Bay West LLC, Petroleum Remediation, Fairchild Air Force Base, Airway Heights, WA –Ms. Idleman planned, coordinated, and conducted fieldwork including soil, sediment, and groundwater sampling, well gauging, and well development and slug tests at these and other sites at Fairchild Air Force Base. She was solely responsible for the reorganization, expansion, and maintenance of an inventory of all groundwater wells installed at the base. Ms. Idleman also served as lead author on documents that include UFP-QAPP Workplans and RI reports including the coordination of baseline Human Health and Ecological Risk Assessments.

Geologist, Bay West LLC, SW27 Vadnais Heights Landfill Phase II Investigation, Vadnais Heights, MN – Performed a Phase II landfill field investigation which initially included installation of soil borings and permanent soil gas points, soil gas sampling, vapor surveys, groundwater and soil sampling, and fill characterization.

Geologist, Bay West LLC, SW134 Begin Demo Landfill Investigation, Plymouth, MN – Performed a Phase I landfill field investigation which initially included installation of soil borings and permanent soil gas points, soil gas sampling, vapor surveys, groundwater and soil sampling, and fill characterization. Performed routine indoor vapor surveys and soil gas point sampling.

Geologist, Bay West LLC, SR249 Vapor Project, Minneapolis MN – Assisted with vapor intrusion investigation at residential and commercial properties. Duties included installing and sampling sub-slab points, collecting indoor and outdoor air samples, and conducting vapor surveys.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *Asbestos Inspector (Certificate No. 5LM02071809II)*
- *First Aid/CPR Certified*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 700)*

Education

- *Master of Science, Geology, U of M, 2013*
- *Bachelor of Arts, Geology, Colgate University – Hamilton, NY, 2010*

Registrations & Licenses

- *Geologist in Training (#153958)*

Professional Memberships

- *Geological Society of America*

Work History

- *3.5 years' experience*
- *1.5 years with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Field Technician*
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Ms. Idleman frequently performs project management assistant type activities on MPCA projects.	

Training/Certifications

- *NIMS training: FEMAICS-100, ICS-200, IS-700, and IS-800 (2006)*
- *49 CFR 172, Subpart H Training/Current Certification*
- *16-Hr 40 CFR 262 Training*
- *8-Hr LDR Training (40 CFR 268)*
- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *Class B Driver's License, Hazmat Endorsement*
- *Confined Space Entry Training per CFR 1910.146*
- *Forklift Operator Certified*
- *CDL w/HazMat Transportation Endorsement*
- *FEMA NIMS ICS Trainings (100, 200, 700)*
- *Fire Extinguisher Training*
- *First Aid/CPR Certified*

Professional Experience

- *26 years' experience*
- *19 years with Bay West*

Jim Leisz

PROJECT MANAGER

OVERVIEW

Mr. Leisz has 25 years of experience with hazardous waste management in compliance with USEPA, DOT, RCRA, CERCLA, TSCA, and LDR regulations. Managed >200 hazardous waste projects from Federal- and State-regulated sites, including sites regulated by US EPA and States of Minnesota, Wisconsin, Washington, Oregon, and Idaho.

Mr. Leisz has working knowledge of the following disposal techniques: combustion and incineration, treatment, land disposal, demolition, fixation, injection, degradation, burial, detonation, recycling, reclamation, and re-utilization. He has prepared T&D/waste management plans and reports for hazardous waste management for Government and commercial customers. Utilizes and provides training on waste management software (Prime Vendor) to prepare T&D documentation, track shipments, etc.

Mr. Leisz has experience maintaining computer waste tracking, gaining disposal facility acceptance in compliance with US EPA DOT regulations, and conducting field tech training. He maintained knowledge of regulations pertaining to Government and commercial waste sites, including RCRA, CERCLA, TSCA, LDR, and US DOT, as well as state and local waste disposal requirements. He has extensive experiencing managing waste through numerous subcontractors, including Clean Harbors, Pioneer Tank Lines, Veolia Environmental Services, Waste Management, Tradebe Environmental Services, Advanced Disposal, Republic Services, Waste Connections, Adler Containers.

Mr. Leisz has coordinated the transportation and disposal of wastes generated by more than 500 emergency spill responses over the past 18 years. Mr. Leisz also has experience pricing waste streams and labpacks and gaining disposal facility acceptance of waste in compliance with US EPA DOT regulations. He, in addition, has participated in enforcement actions for Counties requiring sampling and reporting of illegal/noncompliant waste management activities.

On average, Mr. Leisz concurrently manages $.5M - $1M transportation and disposal work generated through Bay West's Federal and industrial customers. He has overseen collection/disposal of 385,000 container/drums to date. Reviewed/certified all manifests, profiles, and other documentation. He also performs/ensures training of all personnel in proper waste handling requirements, manages permits/licenses for collection/drop-off facilities, compliance reporting, and 10-Day Transfer Facility. Mr. Leisz has managed the 10-Day Transfer Facility for Hazardous Waste and the HHW Facility for over 20 years.

PROJECT EXPERIENCE

Transportation & Disposal Manager, State of Minnesota Investigation/Remediation/Emergency Response Contracts – Supports T&D activities for >200 State projects each year. Generates and/or reviews disposal and shipping documents encompassing waste profile, approvals, manifests, bill of lading, and LDRs. Coordinated transportation and disposal of wastes generated by more than 500 emergency spill responses over the last 16 years.

Transportation & Disposal Manager, RA, Holston AAP, TN, USACE Omaha District – Coordinated T&D for soil and debris contaminated by metals, VOCs, and SVOCs at active AAP. Reviewed waste profiles and determined disposal method. Prepared T&D documentation and tracked/confirmed proper disposal. Performed T&D activities according to SAP and SSHP.

Jim Leisz (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Leisz specializes in managing hazardous waste and ensures the proper containerizing, labeling, loading, hauling, and disposal of both hazardous and non-hazardous wastes.	

Transportation & Disposal Manager, Clandestine Drug Lab Response Contract, Drug Enforcement Administration – Managed all hazardous waste generated from this $2.5M contract for the Upper Midwest. Averaging 20 TOs/month, Bay West performed response actions at illegal methamphetamine (meth) drug labs and related sites immediately following completion of legal enforcement actions. Waste management was performed according City of St. Paul Environmental Testing & Consulting Services BWP100318 Page 24 July 28, 2010, to contract Sampling & Analysis Plan and Site Safety & Health Plan. He ensures proper field screening/ characterization; reviews manifests; oversees interim waste storage at Bay West's 10-Day Transfer Facility.

Transportation & Disposal Manager, Pigs Eye Landfill Remediation/State Superfund Site, MPCA, MN – Managed waste generated from $0.6M cleanup of Minnesota's largest unpermitted landfill. Performed all work according to the Sampling & Analysis Plan and Site Safety & Health Plan. Managed sampling, manifesting preparation and review, and T&D of >500 drums of hazardous waste (PCBs, corrosives, paint waste, lead-acid batteries).

Transportation & Disposal Manager, Site Remediation/Waste Management, US Space & Missile Defense Command, ND – Managed a $300,000 remediation and T&D of hazardous materials generated during the cleanup of a former dump site. He characterized, manifested, and coordinated T&D of abandoned drums of unknowns, asbestos, and contaminated soils.

Program Manager, HHW Program, Ramsey County – Manages the County's HHW Program, operated by Bay West, which collects more than 50 tons of waste each year. Generates and/or reviews disposal and shipping documents encompassing waste profile, approvals, manifests, bill of lading, and LDR's. Obtains pricing estimates and gains disposal facility acceptance of waste in compliance with all federal, state and local environmental and DOT regulations. Manages crew of technicians who serve >24,000 participants annually.

Transportation & Disposal Manager, UTC Aerospace Systems, Burnsville/Eagan, MN – UTC manufactures components for commercial, regional, business and military aircrafts as well as international space programs. Manages hazardous and universal waste disposal needs along with evaluation of hazardous waste generated at the Burnsville facility and previously at the Eagan facility. Manages characterization and sorting that occurs in the waste accumulation area for various waste streams, which are then evaluated, bulked and compacted into proper containers for shipping. Manages biannual lab-packing, labeling, hazardous waste manifest creation, and hazardous waste shipping in accordance with all federal, state and local environmental and DOT regulations. Secures approvals for waste disposition and coordinates end facility shipments.

Training/Certifications

- *Certified Hazardous Material Management Accreditation*
- *Heavy Equipment Operator Training*
- *40-Hr OSHA Training w/Current Refresher*
- *CDL w/HazMat Transportation Endorsement*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 300, 400, 700, 800)*
- *Boat Handling and Boom Deployment Training/On-Water Spill Response*
- *Lead Auditor Certification (ISO-14000)*
- *Confined Space Entry/Rescue Training*
- *Fire Extinguisher Training*
- *FID, PID Training*
- *START Annual Training*
- *First Aid/CPR Certified*

Education

- *MS Geoenvironmental Studies, Shippensburg University*
- *BS Geography/Business, University of Wisconsin–River Falls*

Work History

- *22 years' experience*
- *22 years with Bay West*

Barry Lindsay, CHMM

SCIENTIST

OVERVIEW

Mr. Lindsay supervises emergency response projects and performs sample collection, project management, and other field activities. He is experienced in hazardous waste handling, sampling, containerization and disposal, and underground storage tank removal and cleaning. His experience also includes training in various aspects of environmental compliance for federal facilities.

PROJECT EXPERIENCE

Bay West LLC, St. Paul, MN

T&D Specialist, Windows Manufacturer, Bayport (MN) – Conducts hazardous and non-hazardous waste characterization, labeling, inspections, DOT shipments, and emergency response. Assists with coordination of waste procedures, consolidation of both hazardous and non-hazardous wastes, and prepared, labeled and loaded all hazardous waste shipments and half of the non-hazardous wastes. Assists with waste consolidation and waste sampling for shipments.

T&D Specialist, Ramsey County, HHW Program (MN) – Assists with County's HHW Program, operated by Bay West, which collects more than 50 tons of waste each year. Generates and/or reviews disposal and shipping documents encompassing waste profile, approvals, manifests, bill of lading, and LDR's. Collects and evaluates waste chemicals from participants of the HHW Program. Packages, inventories and documents waste collected in accordance with all EPA, Minnesota Hazardous Waste Rules, Ramsey County, USDOT and MnDOT regulations. Assists in managing crew of technicians who serve >24,000 participants annually.

T&D Specialist, EcoLab, Eagan (MN) – Conducts characterization of chemical containers accumulated in waste storage rooms for this manufacturer of cleaning chemicals and sorting into chemical compatibility groups based on DOT shipping requirements. Conducts on-site disposal services including inventory recording, packaging of materials into DOT-approved waste containers, creating waste manifest/label/land disposal restrictions. Loads wastes onto trucks which are then transported to Bay West's licensed 10-day hazardous waste storage trailer until being shipped to end facilities to be processed.

Project Manager/Site Supervisor, WDNR, I-94 West Mile Marker 25 (WI) – Supervised the collection and containerization of latex and oil-based paints after a tractor trailer accident caused the spill. Supervised the segregation of the waste based on container condition and packaging into drums for disposal. All debris was removed from median; liquid paint remaining in the ditch was marked with cones and a floor-dri dike was created at the west end of the spill.

Site Supervisor, Clandestine Lab Chemical Lab packing, US DEA, Various Sites – Response team leader performing under Bay West's US DEA contract for cleanup of chemicals/wastes from clandestine (meth) drug labs. Completed >100 responses around the Midwest. The majority of responses were performed in Level B PPE.

Site Supervisor, WDNR, Siren (WI) – Supervised ER team while performing separation and identification of abandoned waste on the side of the road in Burnett County, Wisconsin. Supervised the packaging of on-site waste and collection of impacted soil or vegetation.

Site Supervisor, WDNR, Colby (WI) – Supervised surveys and subsequent mercury screening of three unmarked buildings in Colby, WI. Supervised

Barry Lindsay, CHMM (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Field Technician*
X	*On-Site Inspector*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Lindsay frequently performs sampling type activities on MPCA projects. He has experience with the following:

- *Following work plans, and field sampling plans;*
- *Overseeing state and subcontractors;*
- *Corresponding with project managers and scientists to ensure execution of the field work in accordance with the approve work plan;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Properly documenting field work with clear and accurate notes.*

additional inspection and vapor sampling that revealed mercury beads in dirt on the floor. Conducted cleanup of mercury using a specialized mercury vacuum and Hudson sprayer to mist the area with a vapor suppressant/amalgam. Contaminated soil was removed from the vacuum, deposited in a DOT-approved container and arranged for disposal.

ER Team Leader – Lead on-call responder with expertise in emergency spill situations. Coordinates/schedules a team of 6–7 spill responders. Project set-up, spill effort/strategy coordination, secures contract and HASP development assistance for ER projects. OSHA hazardous material collection, labeling and spill/ER training. Trained in boom deployment and/or recovery operations.

Methamphetamine Sampling Project, Various Locations, MN – Site Supervisor and sampling technician. Collected air and wipe samples for various clandestine methamphetamine labs located around the state.

Clandestine Lab Chemical Lab Packing, US DEA – Response team leader performing under Bay West's US DEA contract for cleanup of chemicals/wastes from clandestine drug labs ("meth" labs). Completed >100 responses around the Midwest. The majority of responses were performed in Level B PPE.

Rohner's Auto Enforcement Action, MN, MPCA – Environmental Sampler/Foreman performing and supervising sampling of soil water and auto fluff for hazardous waste characterization analysis as part of agency enforcement action.

Schwartzman Company Enforcement Action, MN, MPCA – Performed/supervised sampling of soil and various containers of paint and solvents for hazardous waste characterization analysis as part of agency enforcement action. Sampling data was used during State's civil action against Schwartzman Co. and helped the State in receiving a temporary injunction requiring Schwartzman to remove 17,500 cy of shredder waste.

Emergency Response, MPCA ER Contract, MN – Responded to numerous spills involving oil, petroleum and hazardous substances. Duties included performing and overseeing spill cleanup in all levels of PPE (including Levels A/B for spills ranging from petroleum to corrosives to unknowns) and performing co-ordination of site cleanup projects and evaluation field work, such as sample collection and data analysis.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 700)*
- *First Aid/CPR Certified*
- *Confined Space Trained*

Education

- *BS Environmental Geology, University of Wisconsin, Madison*

Work History

- *5 years' experience*
- *4 years with Bay West*

John Peper

GEOLOGIST, FIELD TECHNICIAN, & SCIENTIST

OVERVIEW

Mr. Peper will serve as a geologist and an environmental technician and provide technical support for a variety of tasks under our commercial and emergency response services such as field testing and obtaining data for determining sources and methods of controlling and remediating pollutants in air, water, and soil.

TECHNICAL EXPERIENCE

Mr. Peper has over four years of experience conducting environmental field work and technical writing. Mr. Peper has experience in environmental investigation including soil, soil-gas, groundwater sampling, monitoring/injection well placement, design, and installation, excavation oversight, and data management/reporting. He has experience working with or on behalf of State of Minnesota (MPCA) and federal (U.S. Army Corps of Engineers – USACE) government agencies and is practiced at complying with federal and state regulations, guidance, QA/QC, and health and safety plans.

Mr. Peper has led field efforts on several LSIs for the MPCA and commercial clients involving drilling (Geoprobe) oversight, receptor surveys, and soil, soil-gas, and groundwater sample collection. He has written several investigation reports and assists in generating state/commercial work plan-cost proposals, bid documents, access agreements, and project coordination and management.

Mr. Peper has been the geologist, site supervisor, and site safety & health officer on numerous federal investigation projects. Project responsibilities included project coordination, geologic characterization, data management/ evaluation, report writing, well installation (monitoring and injection), groundwater and soil sampling, remedial excavation and grid sampling, injection, well sealing/abandonment, restoration, site/equipment inspections, client/subcontractor communication, and overall project oversight. He is an experienced sampler and has provided vigilant oversight of subcontractors on state and federal sites. He has authored various Long-Term Monitoring Reports, Remedial-Action and Operations Reports, Technical Memos, Remedial Investigation Reports, Conceptual Site Model Reports, etc. to completion and to the satisfaction of the clients.

PROJECT EXPERIENCE

Environmental Field Technician, Groundwater Sampling, Ritari Post and Pole Superfund Site, MPCA, Sebeka, MN – Performed groundwater sampling of monitoring wells using bladder pumps. Collected water quality parameters to monitor aquifer quality and stability. Prepared samples for lab analysis following aquifer stability.

Environmental Field Technician, Groundwater Sampling, Andersen Windows and Doors, Bayport, MN – Performed groundwater sampling of monitoring wells using dedicated well pumps. Collected water quality parameters to monitor aquifer quality and stability. Prepared samples for lab analysis following well stability. Aided in completion of cost analysis of project budget.

Geologist, Andrews Air Force Base, United States Army Corps of Engineers (USACE) – Omaha District, Camp Springs, MD – Performed soil sampling and groundwater sampling of monitoring well networks associated with five remedial action areas within the facility. Utilized low-flow sampling techniques and water quality parameter monitoring to determine aquifer stability prior to

John Peper (continued)

RFP-Specific Experience

Billing Classifications	
P	***Scientist 1***
X	*Field Technician*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Peper frequently performs project management assistant type activities on MPCA projects. He has experience with the following:

- *Compiling work plans and field sampling plans;*
- *Overseeing subcontractors and documenting contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers and reviewing COC procedures to ensure appropriate analysis;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Assisting with preparing project completion reports and annual monitoring reports.*

sampling. Assisted with landfill inspections/repairs and landfill gas monitoring at locations associated with one of the long-term groundwater monitoring sites. Authored technical reports following completion of field events.

Geologist, Investigation – Sediment Sampling, St. Louis River Area of Concern (SLR AOC), Duluth, MN – Conducted multiple sediment investigations over three Sediment Assessment Areas within the AOC over water and ice. Led the sediment sample processing area for removal of dredge material containing potentially contaminated sediment including metals, PCBs, PAHs, dioxin/furan, TOC, and grain size. Coordinated with Site Supervisor, Field Coordinator, and Project Chemist. Investigation events were conducted as part of the remedial investigation/feasibility design project phase. Data was compiled and summarized into multiple Remedial Investigation reports.

Field Technician, Vapor Intrusion Remediation, MPCA-General Mills, Minneapolis, MN – Sampled homes in the Minneapolis MN area for potentially harmful intrusive vapors. Collected samples using Suma canisters and delivered them to the lab to be analyzed. Completed and submitted Property Summary Reports to each client summarizing the results of the vapor study.

Geologist, Field Investigation – Sediment Sampling, Pig's Eye Lake, St. Paul, MN – Led a sampling team that sampled the sediment within Pig's Eye Lake former landfill for removal of material containing potentially contaminated sediment including metals, PCBs, PAHs, dioxin/furan, TOC, and grain size. Acted as the Site Supervisor and Lead Sampler while coordinating with the Project Manager and Project Chemist to complete the project despite unforeseen setbacks.

Geologist, Groundwater Sampling, Former Southside Quickstop, St. Stephen, MN – Performed groundwater sampling of monitoring wells using various pumps and purging methods well pumps. Collected water quality parameters to monitor aquifer quality and stability. Prepared samples for lab analysis and coordinated monthly Granulated Activated Carbon System sampling of the residence adjacent to the Former Quickstop property.

Field Technician, Remediation – Vapor Mitigation, St. Paul, MN – Oversaw the installation and completion of functioning Pressure Field Extension points to remediate the presence of hazardous vapors within residence homes across St. Paul, MN. Helped finalize paperwork and reports of completed homes.

Geologist, Remedial Investigation and Long-Term Monitoring, Joint Base Charleston Naval Weapons Stations – Site lead for various activities at several sites included in a multi-site performance-based remediation contracts with USACE and AFCEC.

Site Lead for Long-Term Monitoring activities including conducting/coordinating groundwater sampling, land use control monitoring, landfill inspections, landfill maintenance, well installation and abandonment at four separate RCRA regulated sites. Mr. Peper planned, coordinated and conducted fieldwork. Upon receipt of analytical data, Mr. Peper also evaluated data and wrote the semi-annual/annual groundwater monitoring reports including recommendations for further actions.

Site Lead for investigations and remedial actions at four RCRA-regulated sites (both Corrective Action and Post-Closure) in support of site closures or optimized exit strategies. These included soil investigations of PAHs, metals and VOCs and groundwater investigations of VOCs, metals and 1,4 dioxane. Remedial actions include MNA, limited excavations, and in situ injection.

Training/Certifications

- *Certified Hazardous Materials Manager, #12218*
- *Completed and passed NRPP Examinations for Radon Measurement and Radon Mitigation*
- *Asbestos Inspector/Supervisor License MN and ND*
- *Asbestos air monitoring course*
- *Asbestos Inspector WI*
- *Lead Inspector Training*
- *Erosion and Stormwater Management Certification*
- *8-Hour OSHA Supervisor Training*
- *FEMA NIMS ICS Trainings (100, 200, 300, 400, 700, 800)*
- *DOT HazMat Training (49 CFR 172.704)*
- *USACE Construction Quality Management for Contractors*
- *40-hour OSHA HAZWOPER Certificate w/Current Refresher*
- *BNSF Railway Hazardous Materials Responder Course*
- *First Aid/CPR Certified*
- *Cold Weather Oil Spill Response Training*
- *Boom Deployment/On-water Response Training*
- *Oil Response Training Fastwater Practical Course*
- *Confined Space Entry/Rescue Training*
- *Fire Extinguisher Training*
- *Fall Protection Training*

Education

- *BS Environmental Science, University of Minnesota-Twin Cities, 2001*

Work History

- *18 years' experience*
- *17 years with Bay West*

Craig Rebischke, CHMM

FIELD TECHNICAIN & SCIENTIST

OVERVIEW

Mr. Rebischke has over 19 years of experience supervising projects, performing sample collection during site cleanup, and other field activities. He has operated equipment with remedial action tasks associated with soil and groundwater impacted by contaminants, as well as with tank removals.

PROJECT EXPERIENCE

Field Oversight U.S. EPA/Weston Solutions. Northern California Wildfires, Sonoma County (CA) – Tasks included identifying potential ACM, sampling of PACM and oversight of contractors during the removal of identified asbestos containing materials. Responsible for utilizing particulate monitoring equipment during the removal of asbestos containing material, ensuring contractors were removing the materials that were identified, and documenting the activities at the site.

Field Supervisor, Bay West LLC Universal Plating, Minneapolis (MN)- Sampled multiple drums that were abandoned at the site to determine the hazard classes, pumped out multiple tanks/baths into DOT-approved containers and performed a complete facility decontamination for demolition. Project was on-going for approximately two years with multiple phases.

Field Technician/ T&D. Bay West, LLC Pioneer Metals, Minneapolis (MN)- Performed cleanup of multiple plating lines containing high hazard chemicals. Responsible for the tracking of all waste generated during the process; approximately 160 containers were generated during the five-month period.

Site Supervisor/Equipment Operator, Bay West, Inc., EPA Region 5, Asbestos Remediation, Western Minerals/WR Grace Superfund Site (MN) – Supervised remediation of asbestos-contaminated soils at >100 residential properties and park. Operated skid steer as well as supervised decontamination utilizing dozers, skid steers and excavators. Oversaw implementation of erosion control on the entire park area and residential areas.

Field Oversight, Bay West, Inc., Shaw (subcontracted via E&I's USACE Omaha Total Environmental Restoration Contract [TERC]), TCAAP Cleanup, Arden Hills (MN) – Excavation oversight of 40,000 yd^3 of soil containing MEC, projectiles, asbestos, lead, copper, antimony, and arsenic. Over 20,000 yd^3 of lead-contaminated soil were stabilized on site using an innovative method of mixing a chemical reagent with a paddle aerator. More than 25,000 pounds of material was screened by hand to remove 6,000 pounds of shell casings, projectiles and live rounds. Performed statistical analysis on asbestos that had co-mingled with MEC and lead-contaminated soil in order to minimize MEC risk. Worked with regulators to gain approval for on-site stabilization without additional MEC work, saving more than $100,000. Quantities of contaminated soil were found to be several times amounts originally estimated. Oversaw the sequence of work across multiple TCAAP sites to increase production rate and minimize downtime.

Project Lead, Bay West, Inc., US EPA, St. Louis Park Solvent Plume, St. Louis Park (MN) – Performed/supervised sampling as part of a vapor intrusion investigation of a Superfund site. Performed sampling during installation of sub-slab probes, sampling of the sub-slab using tedlar bags and summa canisters, and chemical interference clearing utilizing the EPA's TAGA. Also performed indoor air sampling.

Project Lead, Bay West, Inc., EPA START Contract, Various Sites, MN – Performing air monitoring at numerous excavation and removal sites for the

Craig Rebischke, CHMM (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Field Technician*
X	*On-Site Inspector*
X	*Project Manager*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Rebischke frequently performs project management assistant type activities on MPCA projects. He has experience with the following:

- *Compiling work plans and field sampling plans;*
- *Overseeing state and subcontractors and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, and reviewing COC procedures to ensure appropriate analysis;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Assisting with preparing project completion reports and annual monitoring reports.*

EPA, serving as the lead for sites located in Minnesota as a sub-contractor through Weston for the EPA START contract. During these activities, he has established very solid relationships with EPA and state personnel in the Upper Midwest. Other duties include scheduling staff for EPA-related projects and providing budget status reports.

Staff Professional, Newfields, Minneapolis, MN – Responsible for coordinating and reporting the results of the storm water sampling events for the Minneapolis/ Saint Paul airport. Project lead tasks included collecting samples from the outfall, documenting observations, and providing chain of custody evidence for laboratory analysis for target analytes.

Field Lead, Minnesota Power, Hibbard Energy Center, Duluth, MN – Coordinated teams for screening and subsequent mercury spill cleanup after a contractor removed a switchbox from service. One team swept the building with a Lumex meter and restricted access to areas with visible mercury or elevated concentrations. The second team donned Level C PPE and recovered elemental mercury using a merc-vac. The team applied a mercury suppression solution (HgX) to capture remaining vapors. The waste materials were packaged and properly disposed.

Project Lead, US EPA/Weston Solutions, Rhinelander, WI – A farmer had been placing bait piles on his property to kill predator species that had been affecting his deer population. A number of agencies raided several properties to look for evidence of chemicals of concern and to take evidence into custody for further evaluation. Project lead tasks included sampling all unknown chemicals and properly placing into sealed evidence containers and placing onto a chain of custody form for submission to the EPA criminal investigator division. Monitored around the bait piles, documented, and properly handled evidence as a criminal act.

Field/ER Technician, WDNR, Lacrosse, WI – Categorized 12 abandoned drums, conducted sampling, and operated equipment. Drums were dumped on the side of a hill in a location that provided a challenging removal. A pully system was set-up in order to get the drums down, and extreme caution was used to ensure worker safety.

Lead START Field Personnel, Vapor Intrusion Investigation, Highway 7 and Wooddale Avenue – Involved in the installation of sub-slab probes, sampling of the sub-slab using tedlar bags and summa canisters, chemical interference clearing utilizing the EPA's TAGA, indoor air sampling, and oversight of data management.

Team Leader/Group Supervisor, Hurricane Katrina Environmental Oversight EPA, Various Sites, LA – Responsible for the sampling activities involving sediment deposition from the flood waters. Other roles while in Louisiana included the data management of displaced cylinders and tracking and disposal.

ER Response Team Member/Site Foreman/Field Technician, HTRW Emergency Response, MPCA ER Contract, MN – Performed for more than 200 spills involving oil, petroleum, and hazardous substances, ranging in size from short-term train derailments to multi-million-dollar asbestos remediation projects. Duties included performing and overseeing spill cleanup in all levels of PPE, including Levels A and B for spills ranging from petroleum to corrosives to unknowns. Specialized experience includes mercury assessments and meth lab response. Performed on-site coordination of site cleanup projects and site evaluation field work, such as sample collection and data analysis.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *USACE Construction Quality Management for Contractors*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 700)*
- *TVA-1000B FID Training*
- *Niton XRF Spectrum Analyzer Certified*
- *CDL w/HazMat Transportation Endorsement*
- *Entry/Rescue Training*
- *Confined Space Trained*
- *First Aid/CPR Certified*

Education

- *BA Earth Science*

Registrations & Licenses

- *Asbestos Building Inspector, MN (#AI4054)*

Work History

- *21 years' experience*
- *20 years with Bay West*

Ryan Riley

FIELD TECHNICIAN & SCIENTIST

OVERVIEW

Mr. Riley has 19 years of experience conducting groundwater, soil, and air sampling activities (collection, field analysis, and preservation/packaging for lab analysis of water, soil, air, and other hazardous material [PFAS, VOC, PAH, and metals, etc.]) in support of remedial investigations, MIP, and LFI investigations. Project Manager for a groundwater pump and treat treatment system.

PROJECT EXPERIENCE

Field Sampler, Bay West, Inc., MPCA, Whiteway Cleaners Superfund Site Subsurface Investigation, Minneapolis (MN) – Assisted in investigation of 750,000-sf facility contaminated by PCE. Sampled geoprobe borings and monitoring wells to define soil & groundwater contamination. On-site activities include bimonthly system operation and maintenance, quarterly system air samples and periodic residential indoor air sampling.

Field Sampler, Bay West, Inc., Ritari Post and Pole Superfund Site, Sebeka (MN) – Developed the cost proposal for groundwater sampling project and performed as site supervisor during groundwater sampling events and monitoring well installation. Additional activities include periodic communication with residences adjacent to the property to collect residential water supply samples.

Field Sampler, Bay West, Inc., MPCA, Reserve Mining Superfund Site Remediation, Silver Bay (MN) – Lead sampler during the drum removal and contaminated soil sampling activities associated with a landfill on the former Reserve Mining property. Activities include soil, drum, and water sampling and documentation by using a computer database to itemize and list all soil, drum, and water samples collected along with a drum inventory.

Baytown Superfund Site, MPCA, Baytown, MN – Coordinates sampling events by maintaining a calling database and scheduling sampling events with the residents. Additional activities include conducting sampling events and training other Bay West personnel on sampling procedures at Baytown.

Groundwater System O&M, Perham Arsenic Superfund Site, Perham, MN – Performed the groundwater sampling, system sampling and O&M activities for the groundwater recovery and treatment system at a Federal Superfund site. Also assists with coordination of site activities, oversight of well installation subcontractor coordination and report presentation. This project is under Bay West's RAC with US EPA Region V.

Field Technician, Marathon Ashland Oil/Park Penta/Sonford Products, Saint Paul Park, MN – Performed O&M of a groundwater extraction/free product recovery system. Activities included monthly and quarterly sampling of groundwater monitoring and residential water supply wells near the site. Periodic communication with the clients to update them on the status of projects.

Site Supervisor, US Navy Groundwater Treatment System, NIROP Superfund Site, Fridley, MN – Followed the site's QAPP as it pertained to GW sampling and system sampling and maintenance activities. Additional activities include problem solving of the remediation system along with issues which arise in the field and system checks using telemetry. Supervised piping installation, acid treatment of air stripper units (ASUs) and chemical treatment of recovery wells during redevelopment activities. Coordinated and supervised field sampling

Ryan Riley (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Field Technician*
X	*On-Site Inspector*
X	*Project Manager*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Riley frequently performs project management-type activities on MPCA projects. He has experience with the following:

- *Compiling work plans and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

activities during the quarterly and annual projects which consisted of gauging and/or sampling >150 monitoring and recovery wells.

Environmental Scientist, Former Stromquist Motors, PRP Storage Tank Site, MN – Performs monthly O&M activities for SVE system. Performs field screening of system emissions using FID and collects emission samples for laboratory analysis using charcoal tubes.

Site Supervisor, Former Exclusive Cleaners, Worthington, MN – Performed a limited site investigation, sub-slab installation and indoor air and sub-slab sampling activities. The site investigation included communication with the City of Worthington to obtain permits to drill in the Right-of-Way and coordination with adjacent businesses to collect air samples. Mr. Riley also wrote the Investigation Report for the site.

Site Supervisor/Regulatory Contact, Southview Boulevard and 10th Avenue PCE Site, South Saint Paul, MN – Site Supervisor and MPCA contact for the installation of a soil vapor extraction system and groundwater sampling activities. Additional activities involved solving problems which arose during the well installation, SVE installation and soil vapor extraction system. Wrote the Southview Field Activities and Data Compilation report. On-going activities include operation and maintenance of the soil vapor extraction system, communication with the business and residences adjacent to the site to coordinate residential/commercial indoor air, soil gas and system air sampling.

Site Supervisor/Environmental Scientist, SR#131 Superior Plating, Minneapolis, MN – Site Supervisor for pump and treat system operation and maintenance and groundwater sampling activities. Additional activities include chemical treatment of containerized groundwater prior to discharge to sanitary sewer. Sampling for PFAS in a 15-well network.

Project Manager, BAE Systems, Minneapolis, MN – Project manager for maintenance activities of a pump and treat groundwater treatment system. Activities include project management, client communication and scheduling of personnel for air stripper unit tray cleaning and operational activities.

Site Supervisor/Environmental Scientist - SA#249 SE Hennepin Area GW and Vapor Sampling – Minneapolis, MN – Conduct sub-slab sample port installation and sampling activities. Additional activities include inspection of sub-slab depression system (SSDS) during subcontractor installation.

Site Supervisor/Environmental Scientist - SA#248 Former Hospital Linen – St. Paul, MN – Conduct sub-slab sample port installation and sampling activities. Additional activities include inspection of SSDS during sub-contractor installation.

Field Technician, L#19762 Woody's Cenex – Randolph, MN - Provide operation and maintenance activities and air sampling for a soil vapor extraction system. Additional activities include sub-slab sampling from two sample locations and groundwater sampling from five wells located on site. Conduct additional investigations at surrounding residential supply wells.

Site Supervisor, SW#118, SW#134, SW#136, and SW#327 Landfills, various cities, MN – Conduct soil and water investigation. Additional activities included communicating with site contacts to access the site, determination of boring locations, supervising the drilling sub-contractor, collection of landfill gas meter readings from permanent soil gas locations, collection of ambient air samples and installation of sub-slab sample locations.

Training/Certifications

- *40-Hour OSHA HAZWOPER certificate with Current Refresher*
- *USACE Construction Quality Management for Contractors*
- *USACE 30 Hours of Construction Safety and Health Training*
- *BNSF and CN Contractor Safety*
- *e-RAILSAFE*
- *Certified Asbestos Site Supervisor (MN) AS4025*
- *Certified Asbestos Inspector (MN) AI4025*
- *Excavation and Trenching Competent Person*
- *Skid-Steer Loader Operator Training*
- *Confined Space Entry/Rescue Training*
- *DOT Hazardous Materials Training*
- *Niton XRF Spectrum Analyzer Certification*
- *START III Annual Training*
- *HAZCOM Refresher*
- *CPR/First Aid Certification*
- *Class B commercial drivers license w/tanker and hazardous endorsements*
- *NIMS Certification: ICS-100, ICS-200, ICS-700, ICS-800*
- *Fall Protection Training*
- *Boom Deployment/On-water Response Training for Extreme cold weather and open water*

Education

- *BS Environmental Science*

Professional Experience

- *21 years' experience*
- *19 years with Bay West*

Preston Schrupp

SENIOR FIELD TECHNICIAN, SITE SUPERVISOR, SCIENTIST

OVERVIEW

Mr. Schrupp has 20 years of experience supervising projects, performing sample collection, and other field activities. He has operated equipment with remedial action tasks associated with soil and groundwater impacted by contaminants, as well as with tank removals. Working knowledge of OSHA, NIOSH, USDOT, and USACE safety procedures and guidelines. Oversees projects in accordance with Site Safety & Health Plan. Working knowledge of CERCLA, RCRA, and TSCA regulations gained from experience supervising HTRW remediation in USEPA Region 5 Superfund Site projects. 10 years H&S experience on HTRW Federal projects. SSHO for >15 HTRW projects involving PPE Levels D to B, ranging from investigation to remediation/O&M. Sites under his supervision experienced no safety incidents.

TECHNICAL EXPERIENCE

Mr. Schrupp has supervised a wide variety of development projects at sites contaminated with petroleum, strong chemicals, PAHs, and metals from sources such as railroad tracks, USTs, dry cleaners, fill material, and off-site sources.

Mr. Schrupp's experience ranges from a field technician performing all aspects of field sampling, to a SSHO/Field manager that implements investigation work plans that keeps projects within established timelines and budgets.

PROJECT EXPERIENCE

Equipment Operator/Field Support, Comprehensive Site Evaluation (CSE) Phase II ESA, Clear AFB, AK – Mr. Schrupp operated equipment for sites that required removal of lead-contaminated soil. Work included decommissioning of several sites. Scope included facility decontamination/decommissioning, soil excavation, and sampling.

Site Supervisor/Equipment operator, TCAAP, MN, USACE Omaha District – Mr. Schrupp operated equipment and supervised remediation and decommissioning of several sites and buildings. Scope included facility decontamination/decommissioning, soil excavation, well installation/sampling/ abandonment, and tank removals.

Equipment Operator/Field Support, Asbestos Remediation, Puget Sound Naval Ammunition Depot, WA – Mr. Schrupp operated equipment for removal of surface debris and ACM transite from the tidal zone. Ancillary work included an asbestos survey of debris piles discovered during the preliminary site assessment. Aided in park restoration back to pre-investigation conditions upon completion of site operation for the City of Bremerton.

Field Support, CSE Phase II ESA, Arnold AFB, USACE Omaha District, TN – Mr. Schrupp performed CSE Phase II activities related to munitions and explosives of concern and munitions constituents, as well as related hazardous substances on range areas that are no longer operational. He performed sampling and sample QC oversight. Work included walking 130 miles of transects to visually inspect for evidence of munitions debris.

Site Supervisor, CMC Heartland, Minneapolis, MN – Mr. Schrupp supervised remediation of arsenic-contaminated soils at >150 residential properties. He implemented CQC and work plans, including equipment and resource tracking, QC testing and inspection, documentation/ submittals, and safety.

Preston Schrupp (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Field Technician*
X	*On-Site Inspector*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Schrupp frequently performs project management-type activities on MPCA projects. He has experience with the following:

- *Compiling work plans and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting of contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Compiling invoices and budget status reports;*
- *Compiling project completion reports and annual monitoring reports.*

CQC/Field Support, Site Excavation, Former Finland AF Station, MN, USACE Omaha District – Conducted on-site reviews of quality, cost, and schedule performance and evaluated project status to anticipate/ mitigate potential cost/schedule impacts during remediation activities. Work included excavation/off-site disposal of 32 tons of contaminated (asbestos laden) soil.

Site S&H Officer, Fence-to-Fence Site Restoration, Seymour Johnson AFB, NC, USACE Omaha, 2005–2015, $12.26M, FFP/PBC with Cost Cap Insurance (F2 #3) – Led site safety including daily equipment checks, safety meetings and safety reporting for a project involving source removal, chemox and surfactant injection and landfill cap construction. Operated equipment with remedial action tasks associated with soil and GW impacted by chlorinated VOCs and other contaminants. Participated in security and flightline training per requirements to ensure proper safety planning and communication with flightline operations.

Site S&H Officer, Site Restoration/Closure, USACE Mobile District, Holston AAP, TN, 2004–2011, $6.79M, FFP/PBC with CCI – Managed site safety for project involving coal tar removal and plant maintenance including on-site water sampling and sink hole fillings. SSHO duties included compliance with SSHP, daily equipment checks, safety meetings, preparation safety reports. Attended explosives training and incorporated explosives safety planning in AHAs and SSHO. Notified base personnel when working close to explosives area to ensure proper safety protocol. Completed project with no safety incidents despite working close to explosives throughout the project duration.

Site S&H Officer, Water Security System Upgrade, Cannon AFB, NM, USACE Omaha, 2007–2010, $3.8M, FFP/PBC – Performed SSHO duties for the upgrade of a potable water system to meet military/Federal standards. Scope included RF telemetry install & integration, water contaminant monitoring system, upgrade of chlorination system, repair/interior recoating of elevated water storage tanks, & installation of command centers for SCADA and Command systems. Conducted weekly safety meetings and daily equipment checks and developed safety reports. Completed project with no safety incidents.

Site S&H Officer, Tank/Soil Remediation, Former Stead AFB, NV, USACE Omaha, $199K, 2007–2009, FFP/PBC – SSHO for removal of 6 fuel oil tanks and surrounding contaminated soil from former military housing areas. Performed safety inspections, documentation/submittals, and QC to ensure cleanup per the PWS, work plan, and SSHP. Completed project with no safety incidents.

Site Supervisor/Equipment Operator, RI/FS and EE/CA, Keesler AFB, MS, USACE Tulsa, 2012–2014, $1.1M, CR/PBC (F2 #5) – Operated heavy equipment during the remediation of PAH-impacted soils at an active AFB. Work required working around active utilities (fiber communications, electric, water, gas lines). There were numerous abandoned utilities left in place that make excavation more complex. This required extra attention while the Base had ongoing military training. Implemented CQC and work plans, including equipment and resource tracking, QC testing and inspection, documentation/submittals, and safety.

ADDITIONAL SITE EXPERIENCE

Katrina and California Wildfires responses for EPA

FAFB groundwater sampling/operating heavy equipment/XRF lead soils/soil sampling

Antigo groundwater sampling/injection of vegetable oil for treatment of solvents in the groundwater

Clean up of plating facilities – Pioneer Metals, Joyners, and Universal

Patrick Sweeney

FIELD TECHNICIAN II/SCIENTIST I

OVERVIEW

Mr. Sweeney is a field technician for Bay West performing a variety of tasks for our industrial and commercial services such as field testing and obtaining data for use by personnel in determining sources and methods of controlling and remediating pollutants in air, water, and soil. He also serves on Bay West's team of Emergency Spill Responders, assessing and responding to and recovering a wide range of hazardous materials.

PROJECT EXPERIENCE

Environmental/Field Technician, Bay West LLC – Performs all duties related to the collection of pharmaceutical waste for Regions Hospital which includes labeling and segregating waste containers and the use of an internal waste management program that stores all waste pro-files, manifests, LDR's, and other waste ship-ping information for all waste generators. Assists with "out the door" Emergency Response (ER) activities including determining ER equipment needs, loading ER equipment in an efficient and correct manner, and performing in clean-up activities as directed by the ER site supervisor. Completes essential paperwork in a timely and proper manner. Performs all assigned field work in a timely and cost-effective fashion, in accordance with the project work order and other project documents. Understands and complies with Bay West's corporate and project specific health and safety plans and procedures. Properly maintains environmental investigation and remediation field equipment. Communicates directly with Site Supervisors and Team Leader on ways to improve Bay West techniques, operations and functions.

Environmental Field Technician, Groundwater Sampling, Former Antigo Air Force Base, USACE–Omaha District, Antigo WI – Conducted groundwater sampling activities involving wells with historical VOC contamination. Tasks included bailing monitoring wells, completing water duct checks, and preparing samples for lab testing. Performed site-wide monitoring well gauging as part of long-term monitoring activities.

Environmental Field Technician, Vapor Intrusion Assessment, Hospital Linen, MPCA – Performed sub slab installation and sub slab sampling activities.

Environmental Field Technician, Sediment Sampling, St. Louis River Area of Concern, Duluth, MN – Performed sediment sampling using a hand core sediment sampler and prepared sediment samples for laboratory analysis. Assisted in characterizing and describing sediment using the Unified Soil Classification System (USCS).

Environmental Field Technician, Well Installation, Former Atlas V Missile Site, FE Warren Air Force Base, USACE–Omaha District, Cheyenne, WY -- Installation of wells into bedrock for groundwater sampling and environmental hydrofracking.

Environmental Field Technician, Aquafer Testing and Well Sampling, Fairchild Air Force Base, Spokane, WA – Oversaw the installation of wells into bedrock and unconsolidated materials, conducted a series of pumping tests and slug tests to determine aquafer characteristics, and sampled groundwater for petroleum constituents.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 700, 800)*
- *MSHA-certified*
- *Asbestos Inspector (MN)*
- *First Aid/CPR Certified*

Education

- *BS Geology, UW–River Falls, 2014*

Work History

- *4 years' experience*
- *3 years with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
P	***Field Technician***
X	*On-Site Inspector*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Sweeney frequently performs sampling-type activities on MPCA projects. He has experience with the following:

- *Following work plans and field sampling plans;*
- *Overseeing subcontractors;*
- *Corresponding with PMs and scientists to ensure execution of the field work in accordance with the approved work plan;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Properly documenting field work with clear and accurate notes.*

Training/Certifications

- *Minnesota Board of AESLAGID Geologist in Training*
- *Minnesota Certified Wetland Delineator (#1300)*
- *40-Hr OSHA Training w/Current Refresher*
- *8-Hour OSHA Refresher Training*
- *FEMA NIMS ICS Trainings (100, 200, 301, 700)*
- *First Aid/CPR Certified*

Education

- *MS Environmental Geology, University of Hawaii at Manoa, Honolulu, 2014*
- *BS Geology, University of Saint Thomas, St. Paul, 2011*

Professional Memberships

- *Wetland Professional Association*
- *American Institute of Professional Geologists*
- *Minnesota Brownfields*

Professional Experience

- *4 years' experience*
- *2 years with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	*Field Technician*
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Czeck frequently performs project management activities on MPCA projects.	

Ben Czeck, GIT

GEOLOGIST, FIELD TECHNICIAN & SCIENTIST

OVERVIEW

Mr. Czeck has over four years of experience in the environmental consulting industry and an educational background in geology and environmental science. Mr. Czeck's strengths include managing numerous projects, both in the office and the field, at the same time while developing creative solutions to environmental challenges and putting in the extra effort to complete the task at hand safely and successfully.

He has over six years of academic research experience where he has gained experience teaching college-level geology courses, publishing in peer-reviewed scientific journals, writing grant proposals, planning and executing outreach events to raise public interest in the sciences, working with journalists to discuss research for popular press articles, and presenting research at national scientific conferences.

TECHNICAL EXPERIENCE

Mr. Czeck manages vapor intrusion and Petrofund projects, including cost proposal and work plan development, budget management, field supervision, report preparation, technical review, and reimbursement applications. He has over 4 years of experience completing all aspects of Phase I/II Environmental Site Assessments with experience on multisite/area-wide ESAs, corridors, and property transactions. Mr. Czeck has prepared quality assurance project plans, response action plans, construction contingency plans, work plans, and cost proposals for multiple projects at the Federal, State, and commercial levels.

His field background includes wetland delineations; cultural resource surveys; sampling monitoring wells; overseeing soil drilling operations; installation of soil vapor extraction systems; field screening of soil samples; soil gas, indoor air, and vapor intrusion air sampling; collecting samples of materials as part of asbestos surveys, mercury vapor screenings, and lead paint screenings; overseeing groundwater injection pilot studies using various remedial action techniques; surveying monitoring well elevations; acting as an emergency responder for spills and releases of chemicals of concern to the environment; and performing site walks for Phase I ESAs and multisite Federal proposals.

PROJECT EXPERIENCE

Minnesota Pollution Control Agency Project Experience, Bay West, St. Paul, MN – Assistant Project Manager, SR#206; Technical Writer, Lead Field Geologist, and Task Manager, SA#240/SR#1339, Worthington, MN; Technical Writer and Lead Field Geologist, SA#249/SR#1401, Minneapolis, MN; Technical Writer and Lead Field Geologist, Multiple Vapor Intrusion Sites, MN; Technical Writer, L#79007 Vapor Pilot Project File Review, MN; Technical Writer, Solid Waste Landfill Phase I ESAs; Lead Field Geologist and Technical Writer, L#19833, Twin Lakes, MN.

Federal Project Experience, Bay West, St. Paul, MN – Technical Writer, Lead Field Geologist, and Task Manager, Joint Base Charleston, Charleston, SC; Proposal Site Walk, Kansas City Multisite Long-Term Monitoring Plans, Kansas City area, MO; Cost Proposal Work, Jeffersonville Quartermaster Depot, Jefferson, IN; Lead Field Geologist, Cornhusker Army Ammunition Plant, Grand Island, NE; Lead Field Geologist, Naval Industrial Reserve Ordnance Plant, Fridley, MN; Field Geologist, Naval Surface Warfare Center, Indian Head, MD; Field Geologist, Seymour Johnson Air Force Base, Goldsboro, NC.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*

Education

- *BS Nuclear Engineering and Journalism*
- *MS Coursework, Environmental Health*

Professional Memberships

- *Minnesota Association of Soil & Water Conservation Districts (MASWCD) Washington D.C. Leadership Institute*
- *Leadership Training Program, MASWCD*

Work History

- *30 years' experience*
- *1 year with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Tracy is a senior technical advisor and assists Bay West's project managers with technical advice on challenging projects.	

Scott Tracy, CHMM

SENIOR TECHINCAL ADVISOR

OVERVIEW

Mr. Tracy has more than 30 years of project management and environmental remediation experience in the professional engineering and consulting field, specializing in property transfer and development/redevelopment issues.

TECHNICAL EXPERIENCE

Mr. Tracy's experience includes extensive project management work and technical support of Phase I and Phase II Environmental Site Assessments (ESA) and site remediation projects, Brownfield redevelopment, risk management, water quality assessments, National Environmental Policy Act (NEPA) assessments, pre-acquisition contamination assessments, regulatory agency liaison activities, community outreach programs, grant funding identification and applications, liability release assurances, completion of ESAs and Environmental Assessment Worksheets and TSCA and RCRA hazardous waste management. He has been an invited speaker on a wide range of development and redevelopment-related issues and has extensive experience working with private developers, municipalities, state regulatory agencies, and citizen stakeholders with regards to property transfer, development and redevelopment projects.

PROJECT EXPERIENCE

Makaala Center Redevelopment Site, Hilo, HI – As senior project manager for the Makaala Center Redevelopment Site in Hilo, Hawaii, Mr. Tracy was asked to assist Target in evaluating a 20-acre brownfield site for redevelopment into a retail shopping center. Mr. Tracy helped with assessing the property, negotiating with regulators on appropriate response actions, organizing public meetings, and managing impacted soil in accordance with approved plans. The assessment approach implemented at the site has since been held up as an example of how to properly screen for dioxin at sites in Hawaii by the US EPA.

Twin City Army Ammunition Plant Redevelopment Site, Arden Hills, MN – As project manager for the TCAAP Redevelopment Site in Arden Hills, Minnesota, Scott assisted the City and the site development team in evaluating various development scenarios, quantifying environmental liabilities, and developing supplemental site assessment activities for a 680-acre portion of the site being accessed by the Army. The site is a NPL site. Scott coordinated completion of RI work plan development, QAPP development, collection of soil, groundwater and soil vapor samples, and assisted with negotiations with regulators and the Army on environmental credits for the property.

Logan and 57th Redevelopment Site, Brooklyn Center, MN – As project manager for the Logan and 57th Redevelopment Site in Brooklyn Center, Scott worked with the City of Brooklyn Center and the MPCA to investigate a release of perchloroethylene from a former dry cleaner that impacted groundwater and created a soil vapor intrusion concern for a residential area of the city. Mr. Tracy oversaw site investigation work plan development, provided public meeting support, and worked with the MPCA to develop appropriate action levels for sub-slab vapor concentrations.

Schafer Superfund Site, Minneapolis, MN – As project manager for the Schafer Superfund Site in Minneapolis, Mr. Tracy worked with MnDOT to implement a RAP for the cleanup of a state Superfund site. Site activities have included stormwater management and erosion control design, contoured excavation of lead-impacted soil, on-site stabilization of soil, and site restoration activities.

Sam Cook

FIELD TECHNICAIN & SCIENTIST

OVERVIEW

Mr. Cook has experience performing environmental fieldwork including ambient air monitoring/sample collection, hazardous waste handling, and emergency spill response capability. He has worked identifying and sorting hazardous waste for proper disposal. Additionally, he has participated in multiple emergency response spill cleanups including a mercury spill and an oil/diesel spill.

PROJECT EXPERIENCE

Environmental Technician, Bay West, St. Paul, MN – Performs ambient air sample collections and maintenance of equipment while coordinating with the MPCA and MDH. Also works in the household hazardous waste receiving and sorting area where products are identified and sorted for further disposal. Additionally, he works on an emergency response spill team in which he assists in the cleanup and disposal of accidental spills of hazardous materials.

Environmental Technician, Air Sample Collections, Minnesota Pollution Control Agency, Minneapolis/St. Paul, MN – Daily tasks include but are not limited to collection of filter media, decontamination, chain of custody, and delivery to MDH within a designated timeframe. During the collection process, all data is entered into a logbook as well as a handheld electronic device (date, time, filter number, etc.). Each sample is double bagged and wiped down with bleach for decontamination and to prevent cross contamination. Daily sample data is entered into a database daily and uploaded onto an online shared database weekly. Backup files are made weekly as well. Aside from daily sample collection, other responsibilities are site maintenance, air collector maintenance and repairs, and inventory upkeep of project supplies. Site maintenance includes keeping the area clear of trash, weeding vegetation, and repairing minor fence deficiencies. The air sample collectors are cleaned of dust and debris on a weekly basis along with replacement of disposable parts such as gaskets and filter on an annual or as-needed basis. All supplies are tracked through a database and updated when consumed. Dependability and consistency are required for this work as the samples must be collected within specific time slots to meet SOP requirements for a 24-hour sample period.

Hazardous Waste Technician, Hazardous Waste Collection and Sorting, Ramsey County, St. Paul, MN – Daily tasks include setting up the collection site with the appropriate equipment and containers, receiving waste from country residents, sorting the waste, and prepping waste for disposal. Sorting different classes of waste includes bulking like items together into drums as well as loading bins with the appropriate paints and chemicals for shipment for further processing and disposal. For some products, additional identification methods such as pH testing is required to ensure proper sorting. All work performed is completed while utilizing the proper protective equipment to ensure personal safety as well as team member safety at all times.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *Permit Required Confined Space Entry Training*
- *DOT HazMat Training (49 CFR 172.704)*
- *FEMA NIMS ICS Trainings (100, 200, 700, 800)*

Education

- *BA Environmental Studies, University of Minnesota-Duluth, 2013*

Professional Experience

- *3 years' experience*
- *3 years with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	***Field Technician***
X	*On-Site Inspector*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Cook frequently performs project management assistant activities on MPCA projects. Has experience with the following:

- *Compiling work plans and field sampling plans;*
- *Overseeing state and subcontractors, and documenting contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, and reviewing COC procedures to ensure appropriate analysis;*
- *Scheduling fieldwork and preparing equipment and staff for fieldwork*

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *MSHA 24-Hour New Miner Training w/Current Refresher*
- *Licensed Asbestos Inspector, MN and WI*
- *Pipeline Safety Training, Enbridge*
- *Superior Refining Contractor Safety Training*
- *FEMA NIMS ICS Trainings (100, 200, 300, 400, 700, 800)*
- *Certified e-RAILSAFE*
- *Transportation Worker Identification Credential*
- *CN Railway Dangerous Goods Responder*
- *DOT HazMat Training (49 CFR 172.704)*
- *BNSF Railway HazMat Responder*
- *First Aid/CPR Certified*

Education

- *BS Hydrogeology/Environmental Geology, University of Minnesota, Duluth*

Professional Experience

- *21 years' experience*
- *9 years with Bay West*

Brandon Flaada

GEOLOGIST, FIELD TECHNICIAN & SCIENTIST

OVERVIEW

Mr. Flaada has 21 years of experience with various aspects of environmental investigation and remediation projects for the State of Minnesota, as well as other State, Federal, and commercial customers. His experience includes all aspects of environmental work including project management roles, site supervisory roles, and emergency response roles. This diversity between office and field tasks comes from many years of working on sites ranging from Phase I and II Environmental Site Assessments, emergency response projects, remedial investigations including PRP and Brownfields programs, and hazardous material surveys.

TECHNICAL EXPERIENCE

In his 21 years of environmental experience, Mr. Flaada has developed strong field investigation, sampling, and surveying skills through his work on a diverse list of project types. This knowledge base allows him to be a site supervisor, on-site inspector, project manager, and mentor for younger staff on all aspects of environmental work. Mr. Flaada strives to teach younger staff the importance of strong and accurate note taking and documentation in the field, so the project can flow efficiently from planning to sampling to report writing. Being able to manage projects and write various types of reports has taught him the importance of taking one's time in the field to get a clear and accurate depiction of not only what was done, but where, when, and why as well.

Mr. Flaada has worked on remedial investigation sites that included monitoring well installation and sampling, LNAPL free product monitoring and recovery, and remediation system installation and O&M. He has also worked on large Phase II investigation sites that included multiple soil borings and test pits to investigate former commercial and industrial sites. Some of these investigations have led to small and large-scale remediation projects including soil excavations to remove petroleum-, coal tar-, or lead-impacted soil. Mr. Flaada has also performed numerous hazardous material surveys for asbestos, lead, and mercury and has also been involved with asbestos abatement projects. Through his work and training since joining Bay West, he has also developed effective emergency response skills on projects including petroleum releases to ground and water, mercury releases in commercial and industrial settings, and hydraulic fluid releases to ground.

Mr. Flaada is a staff professional in Bay West's Environmental Group and is knowledgeable of State and USEPA guidance, including RCRA, TSCA, SARA, and US DOT regulations.

PROJECT EXPERIENCE

Hydrogeologist/Staff Professional for Duluth Office, Bay West, Duluth, MN – Responsibilities include field technician, site supervisor, on-site inspector, and report writing roles on several Superfund Sites, brownfield projects, UST removal projects, LUST investigations, VIC investigations, pre-demolition/hazardous material surveys, Phase I and Phase II ESAs, industrial cleaning projects, and Emergency Response projects.

Phase I ESAs, Former Gas Plant, Hibbing, MN; Goodfellas, Eveleth, MN – Various commercial and light industrial properties in Hibbing, MN; various commercial and light industrial properties in Virginia, MN and Duluth, MN; Former SMDC facility in Virginia, MN.

Brandon Flaada (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Field Technician*
X	*On-Site Inspector*
X	*Project Manager*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Flaada frequently performs project management activities on MPCA projects. He has experience with the following:

- *Compiling work plans and field sampling plans;*
- *Performing vendor subcontracting per requirements specified within the MPCA Contractor and Subcontracting Purchasing Manual and documenting contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers, appropriate analysis, proper pricing, and timely reporting;*
- *Scheduling fieldwork and preparing equipment and staff for fieldwork;*
- *Compiling invoices and budget status reports; and*
- *Compiling project completion reports and annual monitoring reports.*

Phase II ESAs: Drake Marble Redevelopment Project, St. Paul, MN; Irathane/IRA, Hibbing, MN; Former Area 2 Shops – Cliffs LLC, Hoyt Lakes, MN; Former Knox Locomotive Fueling Area – Cliffs LLC, Hoyt Lakes, MN; Former Taconite Harbor Locomotive Fueling Facility, Cliffs LLC, Schroeder, MN; Former Gas Manufacturing Plant Redevelopment Project, Virginia, MN; Former Murphy Oil property, Aurora, MN

Superfund Projects: On-Site Inspector at US Steel, Morgan Park, MN; Scientist II at Former Arrowhead Refinery, Hermantown, MN; Reserve Mining, Silver Bay, MN; Field Technician II at Former Finland Airforce Station, Finland, MN; Former Naval Industrial Reserve Ordinance Plant, Fridley, MN.

EPA START Projects: Atlas Cement, Morgan Park, MN; Bayfront Properties, Duluth, MN

Asbestos/Hazardous Materials Surveys and Inspections: Former Horace Mann Elementary, Virginia, MN; United Taconite Administration Building, Forbes, MN; numerous residential and commercial properties in Virginia, MN, Hibbing, MN, Eveleth, MN, Gilbert, MN, Mountain Iron, MN, and Duluth, MN; MN DNR office in Cloquet, MN; various MNDOT properties

Petroleum Release Investigations and Corrective Action: Former Koch Refinery Bulk Storage Facility, Minneapolis, MN; Former Spur #4139, Duluth, MN; Holiday Station Store, Duluth, MN; Freedom Mobil Store, Chisholm, MN; Grand Marais HS, Grand Marais, MN; Mesabi East HS, Aurora, MN; Various LUST sites at Former Cliffs LLC, Hoyt Lakes, MN; Former Reserve Mine, Silver Bay, MN; Sturgeon River Landing, Side Lake, MN; Pequaywan Inn, Duluth, MN; Marcell Repair, Marcell, MN

Non-Petroleum Release Investigations and Corrective Action: Former Gas Manufacturing Plant Redevelopment Project, Virginia, MN; Drake Marble Redevelopment Project, St. Paul, MN; Irathane/IRA, Hibbing, MN; Former MN Power Substation, Grand Rapids, MN; Former Arrowhead Refinery, Hermantown, MN; US Steel Superfund Site, Morgan Park, MN; MN Power TSD Facility, Duluth, MN; MN Power Hibbard Renewable Energy Center, Duluth, MN; D's Fabric Care, Cloquet, MN

UST Removal Oversight: Various petroleum fueling and commercial properties in WI; Numerous petroleum fueling stations around the Twin Cities, MN, Gilbert, MN, Virginia, MN, and Duluth, MN; Gilbert HS, Gilbert, MN; Grand Marais HS, Grand Marais, MN; Various MN DOT garages in MN

Hydrogeologist, NTS, Inc. – Responsibilities included field technician, site supervisor, and report writing roles on several Superfund Sites, brownfield projects, UST removal oversight projects, LUST investigations, VIC investigations, predemolition/hazardous material surveys, and Phase I and Phase II ESAs.

Hydrogeologist, DPRA, Inc. – Responsibilities included field technician and report writing roles on several Superfund Sites, brownfield projects, UST removal oversight projects, LUST investigations, VIC investigations, and Phase I and Phase II ESAs in MN and WI.

Driller's Helper, Bergerson-Caswell, Inc. – Responsibilities included assisting drillers in all aspects of environmental and residential subsurface drilling including direct push-probe, hollow-stem auger, geotechnical, air rotary, and mud rotary. Also performed numerous environmental monitoring well and domestic well abandonments.

Hillary Oswald

GEOLOGIST, FIELD TECHNICIAN, SCIENTIST

Training/Certifications

- *Asbestos Building Inspector, MN, WI, MI and ND*
- *Asbestos Supervisor, MN, WI and ND*
- *Asbestos Air Monitoring Technician*
- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *Niton XRF Spectrum Analyzer Training Certified*
- *USACE Construction Quality Management for Contractors Certification*
- *FEMA NIMS ICS Trainings (100, 200, 700, 800)*
- *First Aid/CPR Certified*

Education

- *BS, Geological Sciences - University of Minnesota – Duluth, 2009*
- *BA, Environmental Studies - University of Minnesota – Duluth, 2009*

Work History

- *9 years' experience*
- *6 years with Bay West*

OVERVIEW

Ms. Oswald has nine years of experience providing geological field support for various environmental assessments including contaminated soil excavation oversight and monitoring well installation oversight. Ms. Oswald has experience preparing Phase I and Phase II reports and has assisted in Phase II subsurface investigations. She has prepared soil boring logs and classified subsurface soils, as well as prepared hydrographs, groundwater contour maps and other aspects of technical reporting and installation oversight, and petroleum contaminated soil excavations.

PROJECT EXPERIENCE

Geologist, Site Supervisor/Site H&S Officer, Bay West LLC, Warba Tire and Former Gas Station (Spur #1780), MN/WI, MPCA – Responsible for implementation of the SSHP, i.e. hazard evaluation, hazard reduction measures, and communication with the Safety and Health Department in cases where unexpected hazards arise. Projects scopes include LSIs and groundwater sampling.

Geologist, Cornhusker Army Ammunition Plant (CHAAP), United States Army Corps of Engineers (USACE)–Omaha District, Grand Island, NE – Provided field support in the advancement and sampling of 40 direct push borings for the purpose of collecting groundwater samples to further define the extent of groundwater contaminant plumes. Assisted with temporary monitoring well development and groundwater sample collection while collecting field water quality parameters. Provided temporary monitoring well surveying and ultimately assisted in temporary monitoring well abandonment.

Geologist, Holston Army Ammunition Plant (HSAAP), USACE – Omaha District, Holston, TN – Assisted in groundwater sampling of permanent monitoring wells throughout the two facilities associated with the site as part of long-term monitoring activities. Performed facility-wide monitoring well gauging as part of long-term monitoring activities. Implemented low-flow sampling techniques to achieve stable water quality parameters prior to collecting groundwater samples from selected monitoring wells. Also assisted with monitoring well inspections at various monitoring wells across the site.

Geologist, Andrews Air Force Base (AFB), USACE – Omaha District, Camp Springs, MD – Performed semiannual groundwater sampling of monitoring well networks associated with two remedial action areas within the facility. Utilized low-flow sampling techniques and water quality parameter monitoring to determine aquifer stability prior to sampling. Also assisted with landfill inspections/repairs and landfill gas monitoring at locations associated with one of the long-term groundwater monitoring sites.

Geologist, Antigo AFB, USACE–Omaha District, Antigo, WI – Oversaw the installation of monitoring wells associated with various remedial action investigation areas across the site. Visually classified soil according to USCS soil classification system and performed headspace monitoring of soils with-in the monitoring well borehole. Determined the appropriate depth for installing a monitoring well which would produce sufficient volumes of groundwater for sampling. Performed site-wide monitoring well gauging as part of long-term monitoring activities. Implemented low-flow sampling techniques to achieve stable water quality parameters prior to collecting groundwater samples from selected monitoring wells.

Hillary Oswald (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Field Technician*
X	*On-Site Inspector*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Ms. Oswald frequently performs project management assistant type activities on MPCA projects. She has experience with the following:

- *Compiling work plans and field sampling plans;*
- *Overseeing subcontractors and documenting contracting procedures;*
- *Corresponding with laboratories to ensure delivery of proper sample containers and reviewing COC procedures to ensure appropriate analysis;*
- *Scheduling field work and preparing equipment and staff for field work;*
- *Assisting with preparing project completion reports and annual monitoring reports.*

Environmental Scientist/Project Manager, Carlson McCain, Inc. – Scheduled and conducted field work for various site assessments and investigations, including associated soil, groundwater and/or air sampling in accordance with Minnesota Rules and guidelines. Prepared technical reports with associated graphs and maps depicting site conditions. Correspondence with clients and state officials.

Site Supervisor, Tank Removal, Silver Bay, MN – Identified residential properties where abandoned fuel oil tanks were likely located, contacted the property owners and proceeded with tank removal oversight, field screening and soil sampling, and reporting for >25 sites.

Geologist, Castle Danger Brewery Phase I and Phase II, Two Harbors, MN – Prepared a Phase I ESA Report involving review of historical documents and current/past property uses. Reviewed city directories, as well as aerial photos and fire insurance maps, to document historical and current property uses. Conducted site reconnaissance to document the present uses and condition of the property.

Oversaw the completion of limited Phase II subsurface investigation of a vacant lot for the proposed Castle Danger Brewery development. Following completion of Phase II activities, provided oversight during excavation of the building footprint to inspect subsurface soils for evident of contamination or asbestos-containing materials. During excavation oversight, observed and confirmed the presence of asbestos-containing materials within unearthed building debris. Conducted oversight during asbestos-contaminated material removal. Following completion of all field activities, prepared an Implementation Report summarizing findings of the Phase II and excavation oversight activities

Asbestos Inspector, University of Minnesota - Duluth, Duluth, MN – Performed asbestos inspections for various houses in Minnesota near the campus, as well as various buildings associated with campus. Coordinated access to structures to inspect building materials for suspect asbestos and PCB containing materials. Collected bulk samples for asbestos and PCB analysis. Performed associated reporting documenting inspection findings.

Staff Scientist, Town & Country Oil (L#3807), MPCA – Performed site-wide monitoring well gauging as part of long-term monitoring activities. Conducted semi-annual groundwater monitoring activities associated with the site monitoring well network. Implemented high-flow sampling techniques to achieve stable water quality parameters and required well purge volumes prior to collecting groundwater samples from selected monitoring wells. Responsible for implementation of the SSHP.

Geologist, 5405 West Ramsey Street (SA#4563), MPCA, Duluth, MN – Conducted a source investigation to determine extent and magnitude of known contaminant plume including: advancement of soil borings for soil and groundwater sample collection; advancement and collection of soil-gas samples; installation and collection of permanent sub-slab soil-gas sample points and semi-annual groundwater monitoring. Prepared report following field activities summarizing all field investigation and findings.

Matt Held

GIS ANALYST

OVERVIEW

Mr. Held has 19 years of experience as planning, designing, implementing, and maintaining large, complex GIS environments. Has managed GIS analysts and developers to complete multifaceted GIS projects, developed/deployed field data collection systems, and specializes in spatial & 3D analysis, and generating environmental prediction models.

TECHNICAL EXPERIENCE

GIS experience using ESRI Suite (ArcGIS Pro, 10x, 9x, 8x, Portal, Collecter, ArcSDE, ArcServer, ArcIMS, ArcPad, ArcInfo 7x on UNIX, ArcView 3x, Spatial Analyst, 3D Analyst, Geostatistical Analyst extensions), Python, SQL Server, Oracle, AutoCAD, Trimble Pathfinder/Terrasync

PROJECT EXPERIENCE

GIS Specialist, Multiple TOs, USACE/USAF, FFP/PBC

Supported >$100M in USACE Omaha and USAF projects under Bay West's contracts, including: $27.9M Basewide PBR at Joint Base Andrews, MD (F2, #1); $15M Basewide PBR at Joint Base Charleston, SC; $2.5M MMRP IRA/RI/FS at Joint Base-McGuire, Dix, Lakehurst, NJ; $3M landfill maintenance at USAG West Point (F2, #2); and $4.7M in situ RA/LTO/LTM at Cornhusker AAP (F2, #4).

Performs data collection, database generation/maintenance/quality checks, field data collection, figure preparation. Works on Ph 1, Ph 2, TCRA, IRA, RI/FS and other investigations.

Develops multiple field data collection systems to achieve specific project goals.

Generates custom prediction and geostatistical models.

Manages enterprise GIS systems that control flow of data from field collection to display on interactive GIS websites.

OTHER EXPERIENCE

Senior GIS Analyst, CB&I Federal Services (Shaw Environmental), Denver, CO

Managed teams of technical personnel in support of Military Munitions Response Program. Worked on Phase 1, Phase 2, TCRA, IRA, RI/FS and other investigations. Developed multiple field data collection systems to achieve specific project goals.

Generated custom prediction and geostatistical models. Able to produce detailed air atmospheric dispersion models for the release of chemical warfare agents. Proficient at producing density prediction models for munitions concentration using kriging and other interpolation methods.

Associate GIS Analyst, CH2M Hill, GeoBase Office, Buckley AFB, CO

Implemented enterprise GIS architecture for the GeoBase program at the 460th Space Wing at Buckley Air Force Base.

Successfully developed and maintained an interactive GIS website that provided GIS services to all installation personnel. Developed and taught training course on the utilization of GIS to the general base population.

Training/Certifications

- *Training on ArcSDE Administration for Oracle*
- *Programming ArcGIS using Python*
- *Trimble RTK Surveying*
- *First Aid/CPR Certified*

Education

- *BA Geography, 1996*
- *GIS Certificate, 2001*

Work History

- *19 years' experience*
- *2 years with Bay West*

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
P	***GIS/CADD Technician***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Held is Bay West's primary GIS specialist. He manages all MPCA site maps and geospatial data as well as the online web-mapping portal. He has managed GIS analysts and developers to complete multifaceted GIS projects, developed/deployed field data collection systems, and specializes in spatial & 3D analysis, and generating environmental prediction models.

John W. Dickerson, RPG

SENIOR GEOPHYSICIST/GEOLOGIST

OVERVIEW

John Dickerson has more than 40 years of experience planning, conducting, interpreting, and supervising near-surface geological and geophysical investigations, including more than 20 years of experience conducting geophysical investigations for ordnance and explosives response actions. He has experience with all geophysical methods, including magnetic, electromagnetic, electrical, and gravity data acquisition and interpretation. He has strong quality control and quality assurance management and oversight experience. He has been responsible for proposal development; design and implementation of geotechnical and geophysical data collection, reduction, and interpretation processes; preparation of work plans and remedial design documents; implementation of quality control plans; project costing, base-lining, staffing, and scheduling; risk evaluation; cost and schedule control tracking and variance analyses; management of field operations; technical and periodic progress and project status reporting; presentation of project results to customers and the public; preparation of final project reports; and comparative studies of detection capabilities of geophysical instrumentation.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *8-Hour OSHA Refresher Course*
- *10-Hour OSHA Construction Safety*
- *8-Hour OSHA Site Supervisor*
- *NRC Radioactive Materials User*
- *Department of Energy Radiological Worker Training, 1985–1994*
- *Department of Energy Cost Schedule Control System, 1992*
- *Resource Conservation and Recovery Act Regulations, 1992*

Education

- *BS Geology, Mesa College, CO, 1984*

Registrations & Licenses

- *Registered Geophysicist*
- *Professional Geologist (CA #1023)*

Work History

- *44 years' experience*
- *2 years with Bay West*

TECHNICAL EXPERIENCE

Mr. Dickerson's experience includes electromagnetic and magnetic mapping of potential unexploded ordnance locations; electromagnetic surveys to map geologic controls for groundwater interfaces; gravity surveys to map bedrock topography; resistivity, electromagnetic, magnetic, and seismic surveys for tunnel and cache detection; resistivity, magnetic, electromagnetic, and seismic surveys to map radioactive waste disposal pits; radiologic surveys to detect and map uranium processing waste sludge and tailings; magnetic, electromagnetic, and seismic refraction surveys to map backfilled stream channels; resistivity, electromagnetic, magnetic, and seismic surveys to map landfill boundaries, buried debris, and environmental contaminants; resistivity and electromagnetic surveys to delineate flow paths in shallow groundwater systems; well-site geology for extraction and monitoring well installation; and geologic outcrop mapping and stream deposit sampling.

PROJECT EXPERIENCE

Earth Tech/Tyco/AECOM, Colton, CA – Well-site geology for extraction and monitoring well installation; ground water monitoring and reporting; frequency-domain EM mapping at a former chemical/pesticide plant to detect brine spills; EM surveys to map landfill boundaries and paleochannels at Air Force Plant; magnetic and EM surveys to map landfill boundaries on multiple Air Force bases (Edwards, Norton, and Eglin) and at Barragada Battlefields, Guam, Puerto Rico Dump, Saipan, and asphalt contaminated sites with potential UXO presence on Tinian. EM surveys to map geologic controls for groundwater interfaces; and gravity survey to map bedrock topography underlying Phoenix Sky Harbor Airport.

RUST Geotech, Grand Junction, CO – Resistivity, magnetic, EM, and seismic surveys to map radioactive waste disposal pits at Idaho National Engineering Laboratory; EM and magnetic surveys for the DOE Grand Junction Projects Office to detect and map waste disposal trenches; magnetic, EM, and seismic refraction surveys to map backfilled stream channels at a former radium processing site (in support of the USEPA); resistivity, EM, magnetic, and seismic surveys to map landfill boundaries, buried debris, and potential unexploded ordnance locations at Los Alamos National Laboratory; radiologic

John W. Dickerson, RPG (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Field Technician*
X	*On-Site Inspector*
X	*Project Manager*
X	*QA/QC Officer*
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Dickerson has more than 40 years of experience planning, conducting, interpreting, and supervising near-surface geological and geophysical investigations, including more than 20 years of experience conducting geophysical investigations for ordnance and explosives response actions.

mapping, various DOE sites; multi-method geophysical background characterization and initial range specifications for the 40-acre U.S. DOE Rabbit Valley Geophysical Performance Evaluation Range; resistivity and EM surveys to delineate flow paths in shallow groundwater systems; co-developed a neural network microcomputer code to discriminate conductive subsurface targets; and radiologic surveys to detect and map uranium processing waste.

U.S. Department of Energy Technical Measurements Center, Grand Junction Projects Office – Presented Research and Development project results to U.S. DOE; developed baselines, budgets, scopes of work, staffing, scheduling, cost-schedule-control tracking/analysis and reporting; implemented work plans, performance appraisals, and technical review of project results; conducted magnetic, EM, and ground-penetrating radar surveys to locate underground bunkers; evaluated use of off-the-shelf EM methods to delineate waste pit and landfill boundaries; and utilized magnetic and EM surveys to detect and map underground storage tanks.

DOE Grand Junction Projects Office in support of the U.S. Army Belvoir Research, Development, and Engineering Center, Fort Belvoir, Virginia – Comparative studies of detection capabilities of geophysical instrumentation; geophysical surveys for detection of drug smuggling tunnels along U.S.–Mexico border in Texas, Arizona, and California; geologic mapping (structure, petrology, sediment sampling) and borehole surveys for detection of military infiltration tunnels in support of the Eighth U.S. Army, Demilitarized Zone, Republic of Korea, in support of EUSA-TNT.

MEC Response Program – Responsible for evaluation and performance validation protocols; proposal development; preparation of work plans and remedial design documents; design and implementation of geophysical data collection, reduction, and interpretation; implementation of quality control plans; development of standard operating procedures for EM surveying, magnetic surveying, and third-party quality assurance; project costing, base-lining, staffing, and scheduling; risk evaluation; cost/schedule control tracking and variance analyses; management of field operations; technical/periodic progress/project status reporting; and presentation of project results to customers and the public.

Interfaced with regulators, the USACE, stakeholders, and subcontractors to plan and execute response activities. Projects included the following:

- *Joint Base San Antonio, Camp Bullis, San Antonio, TX*
- *Southwest Proving Grounds RI/FS, Hope, AR*
- *Former Camp Robinson RI/FS, Little Rock, AR*
- *Kansas Army Ammunition Plant MEC Clearance, Parsons, KS*
- *FE Warren OB/OD and Maneuver Training Area RI/FS, Cheyenne, WY*
- *Luke AFB, Former EOD Range RI/FS, Gila Bend, AZ*

Training/Certifications

- *40-Hr OSHA Training with current Refresher*
- *First Aid/CPR Certified*

Education

- *MS Biology, 1987*
- *BS Biology, 1981*

Professional Memberships

- *Member, Society for Risk Analysis*
- *Editorial Advisory Board, REMEDIATION: The Journal of Environmental Cleanup Costs, Technologies, and Techniques*

Work History

- *32 years' experience*
- *7 years with Bay West*

Peter LaGoy

HUMAN HEALTH AND ECOLOGICAL RISK ASSESSOR & SCIENTIST

OVERVIEW

Mr. LaGoy has more than 30 years performing human health & ecological risk assessments associated with hazardous waste sites and operating facilities and development of clean-up criteria for remediation projects at those sites. He has performed risk assessment on >100 Federal projects located nationwide, including for USACE. He has managed/prepared HTRW sites-specific risk assessment, exposure assessments, and quantitative toxicological assessments, and has critically evaluated effects of toxic chemicals and ionizing radiation on human health and the environment.

PROJECT EXPERIENCE

Risk Assessor, US Environmental Protection Agency, Various State Agencies – Prepared over 150 site-specific human health and ecological risk assessments to address human health concerns at hazardous waste sites. Projects have included abandoned properties, landfills at military bases, western mining waste sites, former service stations, RCRA hazardous waste lagoons, residences, schools, former tannery properties, and operating industrial facilities, and have addressed a wide range of chemicals, including VOCs arsenic, chromium, lead, mercury, PAHs, petroleum, pesticides, asbestos and PCBs. Work has involved presenting results to clients, regulators, and citizen groups. Prepared over a dozen ecological risk assessments for sites located throughout the country. Prepared detailed ecological evaluations for Superfund sites, and several State-led sites. Evaluated effects on terrestrial & aquatic receptors using literature review and field studies.

Risk Assessor, MMRP Remedial Investigation, Deer Lodge Local Training Area, MT, $3.1M, FFP PBC, for USACE Omaha (Team Project #1 and PPQ Project #5) – Supported performance of an RI/FS at the Deer Lodge LTA. Prepared a Human Health Risk Assessment and Ecological Risk Assessment for three areas. Chemicals of concern were munitions constituents, most notably explosive constituents and metals. Work included preparation of PMP, PIP, performance of geophysical surveys (analogue and DGM) on >280 transect miles, and a MetalMapper pilot study on 1.67 acres.

Risk Assessor, MMRP RI/FS, Fort Riley, KS, USACE Omaha, $151K, FFP/PBC – Prepared a Human Health Risk Assessment and Ecological Risk Assessment for the former small arms range at the Kinder Grenade Range. Chemicals of concern were metals, most notably lead. As part of this effort, he used EPA's ProUCL model to calculate UCLs for several metals.

Risk Assessor, MMRP Supplemental Site Investigation, Former Mather AFB, CA, $1.4M, USACE Omaha – Scope included investigating and remediating a former OB/OD pit and surrounding kick-out area at this BRAC site. Prepared a Human Health Risk Assessment to address dioxins and furans (PCDDs/PCDFs), selected metals, and selected SVOCs.

Risk Assessor, MMRP Remedial Investigation, McEntire Joint National Guard Base, SC, USACE Omaha $108K, FFP/PBC – As part of an Engineering Evaluation/Cost Analysis (EE/CA), prepared a Screening Level Human Health Risk Assessment and Ecological Risk Assessment to address metals in soil at the small arms range. Work included assessing local area background levels of metals and responding to comments.

Risk Assessor, Multi-Site Soil and Groundwater Remediation, Scott AFB, IL, USACE Omaha, $3.9M, FFP PBC – Prepared Human Health Risk

Peter LaGoy (continued)

RFP-Specific Information

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Ecological Risk Assessor 2*
X	*Ecological Risk Assessor 3*
X	*Human Health Risk Assessor 2*
P	***Human Health Risk Assessor 3***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. LaGoy has more than 30 years performing human health & ecological risk assessments associated with hazardous waste sites and operating facilities and development of clean-up criteria for remediation projects at those sites. He has performed risk assessment on >100 Federal projects located nationwide, including for USACE. He has managed/prepared HTRW sites-specific risk assessment, exposure assessments, and quantitative toxicological assessments, and has critically evaluated effects of toxic chemicals and ionizing radiation on human health and the environment.

Assessments and Screening Level Ecological Risk Assessments for two areas (SS-15 and SS-16). Chemicals of concern were PCE and TCE at one site and PCBs and chlorinated benzenes at the other. Work included performance-based remedial action for 6 ERP sites involving investigation, site characterization, RD, RA, and LTM at sites contaminated with petroleum, solvents, PCBs, PAHs, & metals.

Risk Assessor, Remedial Investigation, at Selected IRP Sites, USACE Sacramento, Hawthorne Army Ammunition Plant, NV, $3.4M, FFP PBC – Prepared a Human Health Risk Assessment to address dioxins and furans (PCDDs/PCDFs) and metals as part of Installation Restoration Program.

Risk Assessor, MMRP RI/FS, Charles Melvin Price Support Center, IL, for USACE Omaha District, $500K, FFP PBC – Lead risk assessor for IL Tier I human health and ecological risk assessments for soil and groundwater contaminated with munitions and metals. Prepared baseline risk assessment including the development of Tier I target levels for munitions constituents.

Risk Assessor, Coos Bay Air National Guard Station, Coos Bay, OR, USACE Omaha District, FFP PBC – Evaluate risks associated with the future use of a former skeet range for a tribal community center. Chemicals of concern were predominately PAHs. Prepared a risk assessment following State of Oregon and USEPA Superfund guidance, including an evaluation of background. Site-specific cleanup levels were also developed, and used to direct remediation to address the requirements of the tribe and state Department of Environmental Quality.

Risk Assessor, Westover AFB/POL Area, MA, Soil/Groundwater Investigation, USACE New England District – Risk assessor for Site Closure under State and Federal regulations. Conducted human health and ecological risk assessments for residual fuel oil/metals in soil and groundwater. Coordinated work with USACE and MA DEP.

Risk Assessor, Former Burning Ground of the Hingham Annex, MA, Soil/Groundwater Investigation, USACE New England District – Risk assessor for MA DEP Site Closure under State and Federal regulations. Conducted human health and ecological risk assessments for residual explosives, metals, and fuel in soil and groundwater. Coordinated work with USACE and MA DEP.

Risk Assessor, Ft. Devens Army Base, MA, Base-Wide Environmental Restoration, USACE, New England District – Risk assessor for multiple MA DEP Site Closures, under state and Federal regulations. Conducted human health and ecological risk assessments for residual fuel oil, metals and PCBs in soil, groundwater, and sediments. Results reduced sampling effort through over excavation and limited disposal costs through on-base disposal.

Risk Assessor/Project Manager, Sudbury Annex, Base-Wide Investigation, MA, USACE New England District – Lead risk assessor of human health and ecological risk assessments of soil, groundwater, surface water, and sediments contaminated by VOCs, SVOCs, metals, munitions, and poison gas, assessing over 60 areas of potential concern.

Training/Certifications

- *USACE Construction Quality Management for Contractors*
- *40-Hr OSHA Training w/Current Refresher*
- *DOT HazMat Training (49 CFR 172.704)*
- *ASTM Risk-Based Corrective Action at Petroleum Release Sites*
- *NGWA Advanced Techniques for Evaluating and Quantifying Natural Attenuation*

Education

- *MS Geology; University of Southwest Louisiana, 1990*
- *BS, Geology, Gustavus Adolphus College, 1985*

Registrations & Licenses

- *Registered Professional Geologist (MN #46520; NC #2236)*

Work History

- *29 years' experience*
- *11 years with Bay West*

John Olson, PG

PROJECT MANAGER

OVERVIEW

Mr. Olson has 29 years of experience in the design and modeling of GW investigation and remediation projects. He completed >20 HTRW RCRA facility CERCLA/ERP SIs, 15 AF MMRP investigations, and >30 GW investigations/treatment projects for the Federal Government. Supported Government projects as a geologist, performing field work (sampling, monitoring), preparing plans (work plans, PMPs, sampling and analysis plans), reports (RI/FS, RA Plans, etc.), and designs (conceptual site designs).

PROJECT EXPERIENCE

Project Geologist, 21-Site PBR, Joint Base Andrews, MD, USACE Omaha, $27.9M, PBC/FFP – Providing technical support on ERD injection and bio-augmentation at SS27 (work plan preparation, injection design, report prep and review). Also providing technical support on the Barrier and Gate system at LF05 (report pre-/post-review, injection design, technical interpretations).

Project Geologist, Fairchild AFB PBR Contract, AFCEC, $14.9M, FFP PBC – Site lead for remediation of large TCE plume in fractured basalt aquifer. Evaluated geologic/hydrogeologic data to update the CSM to include: hydraulic capture zone analyses of existing extraction & treatment system; TCE mass model development, fate & transport assessment, and performance models; and investigation of off-site plumes from potential 3rd party sources. Managed treatment system O&M and supported remedial design for addition of SVE and ISCO remedies.

Project Geologist, Data Synthesis, Evaluation, and Interpretation (DSEI), Former Atlas "D" Missile Site 4, WY, USACE Omaha, $490K, FFP PBC – Developed comprehensive database and updated CSM for a 12-mile-long TCE plume in a complex sedimentary bedrock aquifer. Evaluated/interpreted data from 200+ documents spanning >50 years, including geochemistry/contaminant chemistry, isotopes, age dating, geologic, geophysical/hydrophysical logging and aquifer hydraulic testing. Managed database development that currently has >700 wells, 5,000 geologic records, and >20,000 sample records. Prepared comprehensive report summarizing/evaluating data in terms of revised CSM and data gap assessment.

Project Geologist, Hydraulic Fracturing, Atlas Site 2 Missile Base, WY, USACE Omaha, $3.01M, FFP PBC – Geologic lead on pilot tests for hydrofracking and enhanced reductive dichlorination injections for a TCE plume in an interlayered sedimentary rock aquifer. Designed/managed installation of pilot test wells in accordance with USACE Geologic Scope of Services, supported UIC submittals, plan/report preparation, and geologic interpretation.

Project Geologist,19-Site MMRP Burial Pit Investigation & Removal Action, Eglin AFB, FL, USACE Omaha, $5.7M, FFP PBC – Provided technical oversight of planning documents and reports, evaluated visual transect, environmental sampling, geophysical mapping, and intrusive excavation data from 19 MRSs. Prepared planning documents and CSE Phase II report. Prepared MRSPP worksheets and participated in AF QA panel review.

Project Geologist, MMRP Remedial Investigation, Deer Lodge Local Training Area, MT, USACE Omaha, $3.1M, FFP PBC – Supported preparation of PMP and UFP-QAPP for RI/FS. Designed MC sampling and chemistry aspects of the QC program to provide quality data on which to base risk assessments and decisions on the path forward. Team member Trevet supported this project.

John Olson, PG (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
X	*Scientist 2*
X	*Field Technician*
X	*On-Site Inspector*
P	***Project Manager***
***(P) Bold** indicates primary role*	

Primary Role Qualifications

Mr. Olson has 29 years' experience in the design and modeling of GW investigation and remediation projects. He completed >20 HTRW RCRA facility CERCLA/ERP SIs, 15 AF MMRP investigations, and >30 GW investigations/treatment projects for the Federal Government. Supported Government projects as a geologist, performing field work (sampling, monitoring), preparing plans (work plans, PMPs, sampling and analysis plans), reports (RI/FS, RA Plans, etc.), and designs (conceptual site designs).

Project Geologist,16-Site Basewide PBR, Seymour Johnson AFB, NC, USACE Omaha, $12.26M, PBR/FFP – Developed Conceptual Site Model; Supervised hydrogeologic investigations. Performed QA/QC review/inspection of system data to optimize multiphase extraction, biosparge, surfactant and chemical-oxidation systems; prepared plans, managed predesign investigation and recommended remedial alternatives. Supported regulatory closure of 16 sites via NFA, NFAR, and LTM.

Project Geologist, Feasibility Study, Fort A.P Hill, VA, USACE Louisville, $147K, PBC/FFP – Prepared focused feasibility study, proposed plan and decision documents for an MRS that is now occupied by a regional corrections facility. Developed institutional analysis with input from stakeholders.

Project Geologist, Multi-site PBC, ERS Support, Seymour Johnson AFB, NC, USACE Omaha, $663K, PBC/FFP – Managed design implementation of investigation and remediation/or OES for 12 sites. Updated CSMs; designed/implemented remedial actions via excavation, in situ soil washing, mobile multiphase extraction and enhanced bioremediation (via sulfate-nitrate reduction) of petroleum-contaminated soil and GW at 5 sites. SC achieved at two sites reduced LCCs at the others. Evaluated potential remedies; recommended approach based on minimized LCC/minimized mission disruption.

Project Geologist, Former Antigo Air Station, USACE Omaha, $1.1M FFP/PBC – Evaluated EVO injection pilot test and MNA data for a TCE-contaminated GW in relatively deep heterogeneous till.

Project Geologist, GW/Soil Remediation, Site SS-33, Seymour Johnson AFB, NC, USACE Omaha, $443K, FFP/PBC – Managed design/implementation of hydrogeologic investigations and enhanced bioremediation remedy for petroleum contamination. Designed injection system, reagent dosage, and performance monitoring program. Developed/evaluated remediation pilot tests, RD, RIP, and RA-O. Implementation has already reduced plume area by 80% and source concentrations by 74% to 90%.

Project Geologist, IRP Support, Fort Carson, CO, USACE Omaha, $434, CR/PBC – Supported plan development/review for open ditch/stream survey to support Storm Water Program, completing RCRA Facility Investigations at Industrial Wastewater Treatment Plant, and filling data gaps as part of a Corrective Measures Study.

Project Geologist, Remedial Investigations, USACE Omaha and Sacramento, Multiple TOs, FFP/CR PBC – Prepared/reviewed work plans, sampling and analysis plans, QAPPs, EE/CAs, removal action work plans for Site Assessments at CONUS AF installations nationwide, including: Westover Joint ARB MA; Niagara Falls Air Reserve Base, NY; and Pittsburgh ARB, PA.

Project Geologist/Project Manager, In-Situ Remediation Bldg 203 LUST Site, Former Waverly Radar Station for USACE Omaha – Manages/oversaw corrective action of ISCO remediation (persulfate injection) of a LUST site. Coordinated field efforts and land owner access and prepared corrective action plan and reports. Post injection monitoring has demonstrated a benzene concentration decrease of 99.7% and a complete removal of the other BTEX constituents.

Training/Certifications

- *Modeling, data visualization and data analysis related software including: AQTESOLV (analytical solutions to aquifer tests), MODFLOW, MODPATH, MT3D-MS, RT3D, GMS, AutoCAD, ArcGIS, ArcHydro, MapWindow, KT3D, Surfer, MS Access, MS Excel, 2 and 3-D geostatistical tools*
- *40-Hr OSHA Training w/Current Refresher*
- *30-Hour OSHA Construction Industry Outreach Training*
- *Federal Wetland Delineator Certification; Rutgers University*

Education

- *B.S. Geology, State University of New York at New Paltz, 1994*

Professional Memberships

- *National Ground Water Association*

Work History

- *20 years' experience*
- *2 years with Bay West*

James Gatherer

GROUNDWATER MODELER

OVERVIEW

James Gatherer is a hydrogeologist with more than 19 years of experience in environmental consulting, aquifer assessments, including groundwater and solute transport modeling, subsurface site characterization, soil and groundwater sampling, drilling supervision, analytical data interpretation and technical and scientific report writing.

TECHNICAL EXPERIENCE

Aquifer Assessment Studies—Assessed and predicted the response to aquifer pumping at a variety of industrial and federal sites as part of CERCLA remedial investigations and optimization studies of existing extraction well pump and treat systems. Analyses have been completed using analytical and numerical modeling tools such as AQTESOLV, and MODFLOW/MODPATH/MT3DMS. Models have been used to assess groundwater capture zones, the assessment and optimization of remedial pump-and-treat systems, contaminant transport times to sole source drinking water aquifers, and for assessing the potential extent of contaminant plumes. Modeled constituents have included volatile organic compounds, perfluorinated compounds, explosives constituents and metals. Site characteristics have included unconfined and confined aquifers and leakage through confining clay layers. Two- and 3-dimensional models have been used for investigations at large-scale Superfund sites, landfills, military sites, and industrial facilities. Studies have received concurrence and approval from the Michigan Department of Environmental Quality, New York State Department of Environmental Conservation, Maine Department of Environmental Protection, Washington State Department of Ecology, US EPA Center for Subsurface Modeling Support, and Regions I, IV and X.

Geographic Information Systems and Relational Database Systems—Worked with federal and industrial clients to develop specialized Geographic Information System and data visualization tools to assist site decision-makers with complex environmental programs. Developed 2-D and 3-D tools to illustrate contaminant movement and distribution, potential for impact at downgradient boundaries, and contaminant trends with time. Have an in-depth knowledge of ArcGIS and MS Access.

Site Characterization/Remedial Investigations—Project geologist/ hydrogeologist for numerous hydrogeological investigations related to local, state and federal government sites, landfills, commercial properties, and industrial facilities. Responsibilities have included preparation of work plans, scheduling, coordinating field activities, sampling, monitoring well installation observation, hydrogeologic interpretations, groundwater flow and contaminant transport, groundwater pumping tests, slug tests, rock coring, borehole testing (e.g. in-well salt tracing methods) and borehole geophysics (e.g. acoustic televiewer, caliper, gamma, spontaneous potential, single point resistance, fluid resistivity, flowmeter), fate and transport modeling, data and trend analysis, hydrogeological interpretation and conceptual model design, review and selection of remediation alternatives, report preparation and budgeting. Site conditions range from bedrock and unconsolidated aquifers, saturated and unsaturated conditions, and under static and pumping groundwater conditions. Characterizations have established the baseline model for remedy evaluation and effective closure.

James Gatherer (continued)

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	***Scientist 2***
X	*Field Technician*
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Gatherer is a senior groundwater modeler who works on complex contaminant groundwater projects.	

PROJECT EXPERIENCE

Former Esselman, Sauk Center, MN (MPCA) – This project involved the development of groundwater pump test to identify well yield for a possible replacement water well.

Former Southside Quik Stop, St. Stephens, MN (MPCA) – This project involved the development of groundwater pump test work plan to identify well yield for a possible replacement water well.

Former Wurtsmith Air Force Base, Oscoda, Michigan, Air Force Center for Engineering and the Environment – This project involved the simulation of groundwater flow and contaminant transport of various chlorinated solvent, hydrocarbon and perfluorinated compound plumes present at the site. Modeling efforts have focused on optimizing the groundwater extraction strategies to limit plume movement. MODFLOW and MODPATH are being used to identify flow patterns, plume concentrations, and extraction well capture zones. Data collected to support the modeling effort included the design, implementation, and interpretation of several long-term pumping tests of the extraction well networks while monitoring surface water flow, and observation wells. Analysis of pumping test data using MODFLOW and traditional analytical methods resulted in refined extraction well pumping regimes. Interpretation of permeameter tests and slug tests was also performed to characterize the aquifer and streambed hydraulic properties (interaction between groundwater and surface water).

Well Inventory, Monitoring Well Survey and Repair, Joint Base McGuire-Dix-Lakehurst, New Jersey, New Jersey Transit – Led an effort to compile a comprehensive inventory of all installation site monitoring wells (~1,300 wells) based on reviews of historical document sources. Other tasks included database/GIS spatial analysis, preparation of associated reports, ERPIMS upload, geodatabase preparation, well repair, coordination/supervision of drillers.

Hazardous Waste Landfill, Niagara Falls, New York, The Linde Group – Completed a groundwater flow model of an industrial landfill and surrounding areas to assess the feasibility of de-watering the waste layer, thereby significantly reducing lifetime treatment costs of impacted groundwater. The potential effects on neighboring landfills was also assessed. Efforts completed to support the modeling and remedial re-design effort included the design and implementation of a long-term (six months to one year) pumping test, extracting groundwater from weathered bedrock beneath waste layer to determine the feasibility of de-watering the waste layer by his method; this pilot test included monitoring of flow in leachate collection trenches and water levels in six observation wells using transducers.

Fort Drum, New York, Department of the Army – This project involved the simulation of groundwater flow and contaminant transport of an approximately one-mile long dissolved phase BTEX plume. The groundwater flow model was able to show that overburden groundwater flow patterns, previously poorly understood, were strongly influenced by a high permeability esker-like structure with a concurrent absence of a low permeability unit located between overburden and bedrock aquifer systems. The solute transport model demonstrated that the BTEX plume had reached equilibrium conditions and would not migrate significantly further than it has even with a continuing source, thus averting the need for an expensive hydraulic capture remedy, freeing up resources to focus on mass removal and source area treatment. Also completed were 3-dimensional visualizations of the dissolved phase plume in relation to other site features such as the LNAPL pool, stratigraphy, wells, topography, rivers, etc.

Training/Certifications

- *40-Hr OSHA Training w/Current Refresher*
- *Geographic Information Systems via Central Washington University, June 2012*

Education

- *BA Geography, Central Washington University, 2012*

Registrations & Licenses

- *Certified Erosion and Sediment Control Lead*

Professional Memberships

- *Inland NW Associated General Contractors of America*

Professional Experience

- *5 years' experience*
- *1 year with Bay West*

RFP-Specific Experience

Billing Classifications	
X	*Scientist 1*
P	***GIS/CADD Technician Analyst***
***(P) Bold** indicates primary role*	
Primary Role Qualifications	
Mr. Cobb is one of Bay West's primary GIS support staff for Bay West's MPCA/MDA projects.	

Scott Cobb

GIS SPECIALIST

OVERVIEW

Mr. Cobb has 5 years of experience planning, designing, implementing, and maintaining large, complex GIS environments. He has completed multifaceted GIS projects and developed/deployed field data collection systems, and he specializes in spatial & three-dimensional analysis and field GPS equipment. Mr. Cobb also has drone flight experience.

TECHNICAL EXPERIENCE

Mr. Cobb's software expertise includes ESRI Products (ArcGIS Pro, 10x, Collecter, ArcSDE, ArcServer, Spatial Analyst, 3D Analyst, Geostatistical Analyst extensions, Drone2map, Survey123), Trimble Pathfinder/Terrasync, DJI Drone Apps, Adobe Premiere, and Adobe Photoshop.

PROJECT EXPERIENCE

USACE, Umatilla Chemical Depot, Umatilla, OR – Serves as Bay West's Senior GIS Analyst on this 355-acre project located in northeast Oregon. Responsibilities include providing GIS figures, creating maps for real-time data collection in the field, processing GPS data, updating a project-wide status map, and managing project database. Also QCs soil removal volumes to ensure compliance with project specifications through precise GPS mapping using sub-foot data collection. Assists in soil sample collection activities, maintains project equipment, and provides on-site IT support. IT duties include managing, backing up, and troubleshooting and repairing project staff's computers. Also assists payroll with the training of new employees. Operates the site's drone. Drone operations are used in ensure proper function of sift operations, munitions demolition, and documenting daily proceedings

Abstractor/GIS Technician/Real Property Appraiser, Chelan County Assessor – Provide excellent customer service. Update the PACs database. Maintain and update county parcel map. Research ownership information.

Student GIS Technician, Central Washington University – Collected data on campus features and utilities. Produced maps for various clients. Maintained and updated campus maps. Provided data to other campus departments.

Student Computer Support Technician, Central Washington University – Provided computer support for all departments on campus. Built, delivered, and set up new computer systems. Diagnosed and troubleshot problems. Provided outstanding customer service.

Student Field Technician, Central Washington University, Yakama Nation – Designed and implemented field surveys. Collected data points on location. Processed field data using GIS software. Synthesized findings into analysis and presentation.

Appendix B – Acronyms and Abbreviations

Acronyms and Abbreviations

% ..... percent
µg/L ..... micrograms per liter
µg/m^3 ..... micrograms per cubic meter
3D ..... three dimensional
AAF ..... Army Airfield
AAP ..... Army Ammunition Plant
ACM ..... asbestos-containing material
AEC ..... US Army Environmental Command
AFB ..... Air Force Base
AFCEC ..... Air Force Civil Engineer Center
Ag-Chem ..... agricultural chemicals
AHERA ..... Asbestos Hazard Emergency Response Act
AOC ..... Area of Concern
AOI ..... Area of Interest
ARAR ..... Applicable or Relevant and Appropriate Requirement
AS ..... air sparge
AST ..... above ground storage tank
ASTM ..... American Society for Testing and Materials
ASU ..... air stripper unit
BAAP ..... Badger Army Ammunition Plant
Bay West ..... Bay West LLC
bgs ..... below ground surface
BERA ..... Baseline Ecological Risk Assessment
BMP ..... Best Management Practice
BTAG ..... Biological Technical Assistance Group
BTEX ..... benzene, toluene, ethylbenzene, and xylene
BTV ..... background threshold value
CA ..... California
CAD ..... computer-aided design
CADD ..... computer-aided design and drafting
CCAD ..... Conceptual Corrective Action Design
CCP ..... Construction Contingency Plan
CD ..... compact disc
CERCLA ..... Comprehensive Environmental Response, Compensation, and Liability Act
CFR ..... Code of Federal Regulations
CGI ..... combustible gas indicator
CIH ..... Certified Industrial Hygienist
CMS ..... Corrective Measures Study
CO ..... carbon monoxide
CO ..... Colorado
CO_2 ..... carbon dioxide
CoC ..... chain-of-custody
COC ..... contaminant of concern
COPC ..... contaminant of potential concern
CP ..... Canadian Pacific
CPR ..... cardiopulmonary resuscitation
CSI ..... Construction Specification Institute
CSM ..... conceptual site model
CSP ..... Certified Safety Professional
CVOC ..... chlorinated volatile organic compound
DCA ..... dichloroethane
DEED ..... Department of Employment and Economic Development
DGM ..... Digital Geophysical Mapping
DIVER ..... Data Integration Visualization Exploration and Reporting
DNR ..... Department of Natural Resources
DNT ..... dinitrotoluene
DoD ..... Department of Defense
DOT ..... Department of Transportation
DPE ..... dual-phase extraction
DQI ..... Data Quality Indicator

DQO ..... Data Quality Objective
DRO ..... diesel range organics
DWSMA ..... Drinking Water Supply Management Area
EDB ..... dibromoethane
EDCAD ..... Excavation Detailed Corrective Action Design
EDD ..... electronic data deliverable
EDTA ..... ethylene diamine tetraacetic acid
EE/CA ..... Engineering Evaluation/Cost Analysis
EM ..... electromagnetic
EMP ..... electromagnetic profiling
EPA ..... Environmental Protection Agency
EQuIS ..... Environmental Quality Information System
ER ..... emergency response
ERD ..... enhanced reductive dechlorination
ESA ..... Environmental Site Assessment
eV ..... electronvolts
FAR ..... Federal Acquisition Regulation
FFS ..... Focused Feasibility Study
FI ..... Focused Investigation
FID ..... flame ionization detector
FIFRA ..... Federal Insecticide, Fungicide, and Rodenticide Act
FS ..... feasibility study
ft ..... feet or foot
ft^2 ..... feet squared
FUDS ..... Formerly Used Defense Site
GAC ..... granular activated carbon
gal ..... gallons
GCP ..... Golf Course Pesticide
GIS ..... geographic information system
GLERL ..... Great Lakes Environmental Research Laboratory
gpm ..... gallons per minute
GPR ..... ground-penetrating radar
GPS ..... global positioning system
GRO ..... gasoline range organics
GSR ..... Green and Sustainable Remediation
GW ..... groundwater
H&S ..... health and safety
HASP ..... Health and Safety Plan
HAZWOPER ..... hazardous waste operations and emergency response
HCN ..... hydrogen cyanide
HDPE ..... high-density polyethylene
HDPE ..... high-density polyethylene
HF ..... hydrofracturing
Hg ..... mercury
HHRA ..... Human Health Risk Assessment
HMX octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
HRL ..... health risk limit
HSA ..... hollow stem auger
I-29 ..... Interstate 29
IA ..... Iowa
IAB ..... in situ anaerobic biodegradation
IC ..... institutional control
IDQTF ..... Intergovernmental Data Quality Task Force
ISCO ..... in situ chemical oxidation
ISCR ..... in situ chemical reduction
ISV ..... intrusion screening value
ITRC ..... Interstate Technology and Regulatory Council
JBA ..... Joint Base Andrews
JD ..... juris doctor
JP-4 ..... jet propellant fuel number four
kHz ..... kilohertz
lb ..... pounds
LCS ..... laboratory control sample
LCSD ..... laboratory control sample duplicate
LDR ..... Land Disposal Restriction
LEL ..... Lower Explosive Limit
LIF ..... laser-induced fluorescence
LNAPL ..... light non-aqueous phase liquid

LRA ..... Land Recycling Act
LS..... leak site
LSI ..... Limited Site Investigation
MA ..... Massachusetts
MCE..... mixed cellulose ester
MCES..... Metropolitan Council Environmental Services
MD ..... Maryland
MDA ..... Minnesota Department of Agriculture
MDEQ..... Michigan Department of Environmental Quality
MDH ..... Minnesota Department of Health
MDNR ..... Minnesota Department of Natural Resources
MERLA ..... Minnesota Environmental Response and Liability Act
MHz ..... megahertz
MIP ..... membrane-interface probe
MLAC..... Minnesota Library Access Center
MN ..... Minnesota
MnDOT..... Minnesota Department of Transportation
MNDNR..... Minnesota Department of Natural Resources
MnTBAP..... Minnesota Targeted Brownfield Assessment Program
MPCA ..... Minnesota Pollution Control Agency
MPE ..... Multi-Phase Extraction
MS/MSD..... matrix spike/matrix spike duplicate
MSI ..... modified site investigation
MT ..... Montana
MTBE ..... methyl-tert-butyl ether
MTS ..... mobile treatment system
MW ..... monitoring well
NAPL ..... non-aqueous phase liquid
NC..... North Carolina
NCP..... National Oil & Hazardous Substance Contingency Plan
NESHAP.....National Emission Standards for Hazardous Air Pollutants
NIOSH.....National Institute for Occupational Safety and Health
NIROP .....Naval Industrial Reserve Ordnance Plant
NOAA.....National Oceanic and Atmospheric Administration
NPDES .....National Pollutant Discharge Elimination System
NPL.....National Priorities List
NTU.....Nephelometric Turbidity Unit
NV .....Nevada
O&M.....Operations and Maintenance
O_2.....oxygen
ORP .....oxygen reduction potential
OSHA .....Occupational Safety and Health Administration
OSRO .....Oil Spill Removal Organization
OSWER .....Office of Solid Waste and Emergency Response
OU .....operable unit
P&T .....pump and treat
Pa .....protactinium
PA/SI .....Preliminary Assessment/Site Inspection
PAH .....polynuclear aromatic hydrocarbon
PAL.....project action level
PBR.....performance-based restoration
PCB.....polychlorinated biphenyl
PCDD/F .....polychlorinated dibenzo-p-dioxins/dibenzo furans
PCE.....tetrachloroethylene
PCP .....pentachlorophenol
PE .....Professional Engineer
PFAS.....per- and polyfluoroalkyl substances

PFE..... pressure-field extension
PFOA ..... perfluorooctanoic acid
PG ..... Professional Geologist
pH..... potential of hydrogen
PID ..... photoionization detector
PLM ..... polarized light microscopy
PLP..... permanent list of priorities
POC..... point of contact
PP ..... Proposed Plan
PPE..... personal protective equipment
ppm ..... parts per million
PRP ..... Petroleum Remediation Program
PVC..... polyvinyl chloride
QA..... quality assurance
QAPP ..... Quality Assurance Project Plan
QC..... quality control
RA ..... remedial action
RAAA ..... Remedial Action Alternatives Analysis
RAB ..... Restoration Advisory Board
RAGS..... Risk Assessment Guidance for Superfund
RAP..... Response Action Plan
RAS..... Remedial Action Study
RBSE ..... risk-based site evaluation
RCRA..... Resource Conservation and Recovery Act
RD..... Remedial Design
RDX hexahydro-1,3,5-trinitro-1,3,5-triazine
REC..... recognized environmental condition
RFP ..... Request for Proposal
RI ..... remedial investigation
RL ..... reporting limit
ROD ..... Record of Decision
RP..... responsible party
RSL ..... regional screening level
RSOM ..... Remediation System Operation Monitoring Report
SAP ..... Sampling and Analysis Plan
SARA .....Superfund Amendments and Reauthorization Act
SACM.....suspect asbestos-containing materials
SB .....soil boring
SCADA.....Supervisory Control and Data Acquisition
scfm .....standard cubic feet per minute
SCOF .....State Contract Order Form
SDCAD.....System Detailed Corrective Action Design Report
SD DENR .....South Dakota Department of Environment and Natural Resources
SI.....site investigation
SLERA .....screening level ecological risk assessment
SLR.....St. Louis River
SLRIDT .....St. Louis River/Interlake/Duluth Tar
SLV.....soil leaching value
SOP.....standard operating procedure
SQT.....sediment quality target
SRV .....soil reference value
SSD.....sub-slab depressurization
SSV.....sediment screening value
SVE.....soil vapor extraction
SVOC .....semi-volatile organic compound
SWA .....Source Water Assessment
SWMU.....solid waste management unit
SWPPP .....Stormwater Pollution Prevention Plan
T&D.....transportation and disposal
TCAAP .....Twin City Army Ammunition Plant
TCE.....trichloroethylene
TCLP .....toxicity characteristic leaching procedure
TKN.....Total Kjeldahl Nitrogen
TMW .....temporary monitoring well
TN.....Tennessee
TNT .....trinitrotoluene

TPH ..... total petroleum hydrocarbons
TSCA ..... Toxic Substances Control Act
TSP..... total suspended particulate
UFP-QAPP..... Uniform Federal Policy for Quality Assurance Project Plan
USACE ..... US Army Corps of Engineers
USAF ..... US Air Force
US EPA..... US Environmental Protection Agency
USS ..... US Steel
UST.....Underground Storage Tank
VIA .....vapor intrusion assessment
VIC .....Voluntary Investigation and Cleanup
VMT .....Vehicle Miles Traveled
VOC.....volatile organic compound
VP .....Vice President
WA .....Washington
WI .....Wisconsin
WLSSD.....Western Lake Superior Sanitary District
WPA .....Wellhead Protection Area
XRF .....X-ray fluorescence
ZVI .....zero-valent iron