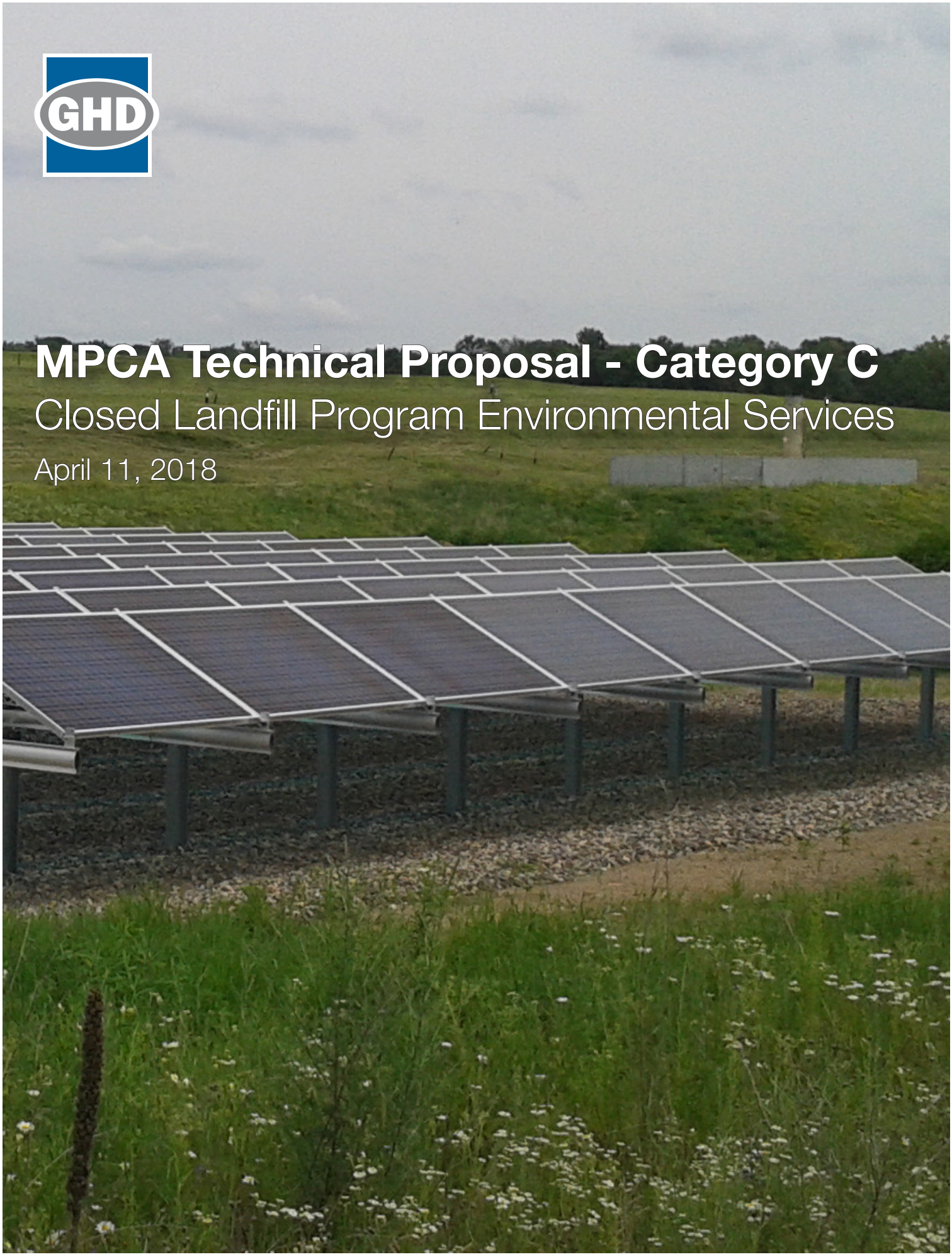

MPCA Technical Proposal - Category C

Closed Landfill Program Environmental Services

April 11, 2018

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April 11, 2018 Reference No. 11156920-98

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

Re: Request for Proposal Response
Remediation Master Contract - Category C
Closed Landfill Program Environmental Services

Dear Ms. Heininger:

GHD Services Inc. (GHD) appreciates the opportunity to respond to the Minnesota Pollution Control Agency (MPCA) Request for Proposal (RFP) in providing environmental services to the MPCA Closed Landfill Program (CLP). GHD is currently under contract with the State of Minnesota to provide these services to the MPCA CLP and has served in this capacity since the late 1990s. Through this work, GHD understands, appreciates, and has worked together with the MPCA in resolving the many unique and interesting technical challenges that the MPCA is posed with in the Closed Landfill Program.

GHD has, and continues to provide, engineering services at numerous landfill sites and other environmental related projects across North America, including Minnesota. GHD has provided engineering services for the MPCA CLP at numerous landfill sites. In addition to providing Engineering/Consulting Contract Services within the CLP, GHD also provides Operation and Maintenance (O&M) Contract Services to the CLP. We believe that this arrangement has, and will continue to provide the MPCA with numerous benefits.

Our objective in the preparation of this proposal is to demonstrate that GHD will continue to provide the experience, qualifications, and cost effective management best suited for the investigation, design, and construction oversight requirements at closed landfills. We believe that the qualifications, experience, and capabilities of the proposed project team will continue to be well suited for solving the unique investigation and design challenges that the selected Contractors will encounter. Some of the key attributes that GHD prides itself on in regards to our proposed services are:

- GHD seeks cost effective and long-term remedial action solutions that lead to reduced operation and maintenance issues and costs. In many cases, the initial lowest cost, quickest, or easiest remedial action may not always be the best, cost-effective, long-term solution.
- GHD's goal is to always provide solution options to the MPCA, rather than just presenting the problems encountered.
- GHD believes in and rigorously practices that Health and Safety is paramount in any project work.
- GHD is a privately held company that has a flat organization structure without multiple area profit centers. This approach allows for the free exchange of ideas and solutions across the company to meet a client's needs and issues.
- GHD seeks long-term client retention and relationships by providing cost effective quality services and products. GHD is not an outside investor driven company that operates on a quarter-to-quarter profit basis.
- GHD prides itself on providing a high level of responsiveness and service to the MPCA's needs and issues.
- GHD is flexible, creative, and adapts readily to the MPCA project needs.

GHD
1801 Old Highway 8 Northwest Suite 114 St. Paul Minnesota 55112 USA
T 651 639 0913 **F** 651 639 0923 **W** www.ghd.com

It is expected that most all work assigned to GHD under this contract will be managed and performed by staff from the GHD St. Paul, Minnesota office. The assigned work will be supported, if needed, with staff from our other regional offices as noted on the provided staff matrix table. GHD's main office is as follows:

GHD Services Inc.
2055 Niagara Falls Boulevard, Suite 3
Niagara Falls, New York 14304
Phone: 716.297.6150
https://www.ghd.com/

Robert Martin of GHD's St. Paul office will service as the main contact for any additional information or questions that the MPCA may have about GHD's proposal. Following is Bob's contact information:

Mr. Robert Martin
GHD Services Inc.
1801 Old Highway 8, Suite 114
New Brighton, Minnesota 55112
General Office: 651.639.0913
Direct: 651.524.6853
Mobile: 651.238.5137

GHD has reviewed and accepts the classification levels and associated hourly rates stated in Rate Schedule 1 and Rate Schedule 2 of the RFP. In addition, GHD has reviewed and accepts the Equipment Rate Schedule and associated cost as stated in the RFP and subsequent addendum.

GHD appreciates and looks forward to continuing our work with the MPCA.

Sincerely,

GHD

Shawn Horn, P.E.

Qualifications & Capabilities

GHD

About the firm

GHD's roots in the USA were established over 80 years ago and today we make a positive impact in communities throughout the country. We serve clients in the markets of water, energy and resources, environment, property and buildings, and transportation. The Americas business has a staff size of over 1800, supported by our global network of more than 9000 people. We are proud to serve local, state, and federal government agencies as well as a broad spectrum of private clients.

GHD is committed to making a difference in the communities that we serve. From our project efforts to our volunteerism and support of local community organizations, we are continuously seeking ways to contribute to the sustainable future of our stakeholders and the environment. Our network of engineers, architects, planners, scientists, project managers and designers collaborate to improve the built, economic and social environment of local communities. In everything we do, we look at projects from a total life-cycle perspective.

GHD is a privately owned firm with active project participation by firm Principals. The Principals' involvement reflects GHD's commitment to problem solving, and ensures that GHD maintains the highest level of corporate quality assurance and quality control on all projects. Our commitment to quality is exemplified by our registration to the ISO 9001:2015 consulting, engineering, and design services. GHD North America has been registered to ISO 9001 since December 1999. GHD's scope of registration to ISO 9001:2015 includes Consulting, Engineering, Project Management, Design Services, and Materials Testing.

GHD has worked on literally thousands of multidiscipline projects throughout North America and internationally. GHD's clients have included hundreds of individual and multiple-site commercial and industrial companies, numerous Fortune 500 corporations, the legal profession, public utilities, branches of governments, and the World Bank, as well as countless cities, towns, and municipalities. Specifically, GHD North America has been actively involved in solid waste management and landfill projects since its inception and has acquired extensive experience in all aspects of solid waste and landfill management. GHD has provided landfill-related services for both solid and hazardous waste streams at over 500 different landfills located across North America.

Since 1984, the GHD St. Paul office has completed a multitude of projects in Minnesota and the surrounding area with project values of up to $30,000,000. GHD's first major project in Minnesota, which continues today, is providing environmental investigation and remediation services at the Twin Cities Army Ammunition Plant in Arden Hills, Minnesota. The St. Paul office currently has 40 staff members that include civil, geological, environmental, and chemical engineers; hydrogeologists; geologists; chemists; biologists; GIS Specialist, and an industrial hygienist. All MPCA CLP projects will be managed and field staffed from GHD's St. Paul office and will be assisted, as needed, with staff from GHD offices located in Buffalo, New York; Niagara Falls, New York; and Detroit, Michigan.

Project Team

Your GHD Team

The primary individuals to be assigned to the Contract are shown in the Team Matrix in this section. Of these individuals, the following professional staff will perform the majority of professional contract duties:

- Robert Martin
- Timothy Ree
- Thomas Hobday
- Charles Ahrens
- Brian Sandberg
- Ronald Frehner

Each individual is located in GHD's St. Paul office and resides within the metropolitan area. Due to his long-running experience in working with the MPCA on its Engineering/Consulting and Operation and Maintenance (O&M) contracts, Robert Martin will serve as the primary Project Manager. Due to the varying scope of services that the MPCA may request, other individuals in our St. Paul office may also serve as Project Managers on certain projects. In these cases, Robert may be consulted to assure that the necessary protocols of the MPCA contractual terms are followed on every project.

Additional St. Paul office staff that will be assigned to the Contract as needed based upon work order tasks and availability, as specified in the Team Matrix. As indicated on this table, if specialty services are needed, we may utilize staff resources from our other U.S offices. Each of the project team members listed on the Team Matrix that will perform or directly supervise field work has received 40-hour OSHA (Hazardous Waste Operations and Emergency Response (HAZWOPER)) training in accordance with 29 CFR 1910.120. Additionally, each individual has with 40-hour OSHA HAZWOPER training has also received annual HAZWOPER refresher training (8-hour OSHA).

A brief summary of select project team member's background and responsibilities is provided on the following pages.

Background and educational details for each team member are detailed in their curriculum vitae (CV), which are linked from the Team Matrix and provided in Appendix A.

Robert Martin

Project Manager/Engineer 4/Engineer 3

Robert is a chemical engineer and has been with GHD since 1991. He has served as the Project Manager for projects completed at more than 55 CLP sites for the Engineering/Consulting Services and Operation and Maintenance of Closed Landfills contracts since 1997. Additionally, Robert has extensive experience in project management, coordination, remediation system designs, installations, operations, and maintenance. He has five years of experience in the chemical manufacturing environment prior to joining GHD.

Timothy Ree, PE

Project Manager/Engineer 4/Engineer 3

Timothy is a geological engineer with a Minnesota PE and has been with GHD 2003. He has provided project management or project engineering support on CLP Landfill sites including the East Mesaba, Koochiching County, Maple, Washington County, and Northeast Otter Tail Closed Landfills. Timothy also has extensive project management, project coordination, engineering, and construction oversight experience at various environmental remediation sites (landfills, manufacturing facilities, fueling stations, etc.) across the U.S. Timothy had 8-years of environmental consulting experience prior to joining GHD.

Eric Hoglund, PE

Engineer 3

Eric is a civil engineer with a Minnesota PE and has been with GHD since 1992. His responsibilities may include Project Management, Scientist III, or Engineer II work. Eric has provided project management, coordination, and engineering work for several CLP sites, including the Grand Rapids, Maple, East Mesaba, Koochiching County, and Pigs Eye Landfills. Additionally, Eric has significant experience in project management, coordination, remediation system designs, and operation and maintenance of closed landfills outside of the MPCA CLP.

Thomas Hobday

Project Manager/Engineer 3/On-Site Inspector

Thomas is a chemical engineer and has been with GHD since 2003. He has provided project engineering and/or construction oversight services for numerous CLP projects including the Houston County, WDE, Northeast Otter Tail, Maple, Bueckers, Kluver, Kummer, WDE, and East Mesaba Landfills. CLP work has included preparation of project specifications and drawings, bid documents, construction quality assurance plans, construction documentation reports, and operation and maintenance manuals. Additionally, through work on CLP contracts, he has extensive experience and familiarity with State of Minnesota contracting and subcontracting procedures and requirements.

Charles Ahrens, PG

Scientist 2 / On-Site Inspector

Charles is a geologist/hydrogeologist with a Minnesota PG and has been with GHD since 1986. His experience includes technical design, coordination, and implementation of remedial investigations and remedial construction design for contaminated soil and groundwater. Charles has extensive experience in geological and hydrogeological investigations, feasibility studies, pilot studies, natural attenuation studies, remedial design, and remedial construction for industrial, state, and municipal clients. He has conducted detailed hydrogeologic investigations, including monitored natural attenuation and large scale aquifer tests. Charles has completed work on several landfills within the CLP, as well as several additional landfills throughout the upper Midwest.

Brian Sandberg, PG

Scientist 2 / On-Site Inspector

Brian is a geologist/hydrogeologist with a Minnesota PG and has been with GHD since 1986. He has coordinated groundwater and geochemical investigations at Federal and State Superfund sites across the United States and Canada. Brian has been involved with numerous closed State and Federal Landfill sites across the upper Midwest. He has conducted detailed hydrogeologic and hydrogeochemical investigations, including monitored natural attenuation. Brian has performed large scale aquifer tests and helped design groundwater containment systems.

Ronald Frehner, PE

Engineer 4

Ronald is a civil engineer with a Minnesota PE and has been with GHD since 1982. He has extensive experience in all facets of landfill investigation, feasibility analysis, design, and operation and maintenance. Ronald will primarily be used as a resource in project conceptual design and unique landfill special projects or issues.

Timothy Braun, PE

Engineer 2/On-Site Inspector

Timothy is an environmental engineer and has been with GHD since 2006. He has provided project engineering and/or construction oversight services for numerous CLP projects including the Koochiching County and East Mesaba Closed Landfills. He also has project coordination, engineering, and construction oversight experience at various environmental remediation sites (landfills, manufacturing facilities, etc.) across the Midwest.

Larry (Buck) Lardy

On-Site Inspector/Field Technician

Buck is an environmental technician and has been with GHD since 1997. He has provided construction oversight services for numerous CLP sites including the Becker County, Grand Rapids, Koochiching County, East Mesaba, and Kluver closed landfills. Additionally, he has extensive experience with operation and maintenance of landfill and remediation systems for CLP and upper Midwest project sites.

Ryan Aamot, PG

Scientist 2/On-Site Inspector

Ryan is a geologist/hydrogeologist with a Minnesota PG and has been with GHD since 2000. He has provided construction oversight, aquifer testing, environmental drilling, and environmental sampling activities at various CLP projects. Ryan has been involved with numerous closed state and federal landfill sites across the upper Midwest.

Additional details and experience for all assigned project staff are included in the individual staff resumes included in the Appendix A and linked in the following matrix.

TEAM LIST: PRIMARY PROJECT STAFF

Contract Staff Name	Contract Classification	Years Exp. GHD / Total	Education	Work Experience	Licenses & Certifications	OSHA Certification	GHD Training/ Certifications	Office Location
Aamot, Ryan	Scientist 2 On-Site Inspector	17 / 19	B.S. Geology	link	Professional Geologist - MN, WI	40 Hr.	link	St. Paul, MN
Ahrens, Charles	Scientist 2 On-Site Inspector	31 / 35	B.A. Geology	link	Professional Geologist - MN, WI	40 Hr.	link	St. Paul, MN
Barnes, Matthew	Scientist 1 Field Technician	7 / 7	B.A. Environmental Studies	link		40 Hr.	link	St. Paul, MN
Blumke, James	Engineer 3	16 / 23	B.S. Civil Engineering	link	Professional Engineer - MN; Certified Groundwater Professional - IA; Licensed Petroleum Release Remediator - SD	40 Hr.	link	St. Paul, MN
Braun, Timothy	Engineer 2 On-Site Inspector	12 / 12	B.S. Environmental Engineering	link	E.I.T. - WI	40 Hr.	link	St. Paul, MN
Coy, Ryan	GIS/CADD Specialist	16 / 18	B.S. Cartography and Geographic Information Systems	link		40 Hr.	link	St. Paul, MN
Frehner, Ronald	Engineer 4	35 / 35	M.A.S. Civil Engineering B.A. Civil Engineering	link	Professional Engineer - GA, IN, IL, KS, MN, MO, NJ, ND, OH, OK, SD, WI		link	St. Paul, MN
Froiland, Shannon	Engineer 2	10 / 10	M.S. Environmental Engineering B.S. Education	link		40 Hr.	link	St. Paul, MN
Hedblom, Johan	Engineer 1 Field Technician	2 / 2	B.S. Chemical Engineering	link		40 Hr.	link	St. Paul, MN
Hobday, Thomas	Project Manager Engineer 2 Engineer 3 On-Site Inspector	14 / 15	B.S. Chemical Engineering	link	E.I.T. - MN	40 Hr.	link	St. Paul, MN
Hoglund, Eric	Engineer 3	25 / 25	B.S. Civil Engineering	link	Professional Engineer - MN, IL	40 Hr.	link	St. Paul, MN
Jenkin, Kiel	Scientist 2 Scientist 1 Field Technician	5 / 6	B.S. Geoscience	link		40 Hr.	link	St. Paul, MN

Contract Staff Name	Contract Classification	Years Exp. GHD / Total	Education	Work Experience	Licenses & Certifications	OSHA Certification	GHD Training/ Certifications	Office Location
Kasprick, Kai	Engineer 1 Field Technician	0	B.S. Environmental Engineering	link		40 Hr.	link	St. Paul, MN
Lardy, Larry	On-Site Inspector Field Technician	20 / 21	A.A.S.	link		40 Hr.	link	St. Paul, MN
Martin, Robert	Project Manager Engineer 3 Engineer 4	26 / 26	B.S. Chemical Engineering	link			link	St. Paul, MN
Ree, Timothy	Project Manager Engineer 3 Engineer 4	14 / 22	B.S. Geological Engineering	link	Professional Engineer - MN	40 Hr.	link	St. Paul, MN
Sandberg, Brian	Scientist 2 On-Site Inspector	20 / 31	M.S. Geology B.S. Geology	link	Professional Geologist - MN, IL; Registered Geologist - AZ; Licensed Geologist - KS	40 Hr.	link	St. Paul, MN
Siekmeier, Mark	GIS/CADD Specialist	23 / 28	B.S. Aerospace Engineering	link			link	St. Paul, MN
Zuckweiler, Margaret	Engineer 3	5 / 16	M.S. Geological Engineering B.S. Geology	link	Professional Engineer - MN		link	St. Paul, MN
TEAM LIST: SECONDARY PROJECT STAFF								
Abdallah, Matthew	Scientist 2	16 / 31	B.S. Environmental Science/Resource Management	link		40 Hr.	link	Detroit, MI
Anderson, Grant	Quality Assurance/ Quality Control Officer	23 / 25	B.S. Chemistry	link			link	St. Paul, MN
Armbruster, Lisa	Engineer 2	10 / 10	B.S. Civil Engineering	link	E.I.T. - NY		link	Buffalo, NY
Atazadeh, Samuel	Field Technician	4 / 9		link		40 Hr.	link	St. Paul, MN
Bentley, Rebecca	Engineer 3	5 / 17	B.S. Civil Engineering	link		40 Hr.	link	Detroit, MI

TEAM LIST: SECONDARY PROJECT STAFF

Contract Staff Name	Contract Classification	Years Exp. GHD / Total	Education	Work Experience	Licenses & Certifications	OSHA Certification	GHD Training/ Certifications	Office Location
Christofferson, Jon	Engineer 4	31 / 41	B.S. Civil Engineering	link	Certified Railroad Emergency Response Tank Car Specialist; Operators Certificate, Type III Landfill - MN	40 Hr.	link	St. Paul, MN
Clark, Julia	GIS/CADD Specialist	2 / 2	Bachelor of Environmental Science (Geospatial Science)	link			link	Eureka, CA
Cook, D'Arcy	Engineer 1	1 / 1	B.S. Chemical Engineering B.A. Arts and Ideas in the Humanities (German, Archaeology)	link			link	Detroit, MI
Cowan, Casey	Engineer 3	13 / 20	B.S. Environmental, Resource & Forest Engineering	link	Professional Engineer - NY		link	Buffalo, NY
Crone, Gordon	Engineer 4	9 / 50	B.S. Electrical Engineering	link	P.E.		link	Buffalo, NY
Dahmer, Thomas	GIS/CADD Specialist	3 / 7	A.A.S. AutoCAD Technology	link			link	Buffalo, NY
Davis, John	Engineer 3	3 / 13	B.E.Ep. Electrical Engineering	link			link	Buffalo, NY
DeMars, Tony	Scientist 2	2 / 37	B.S. Natural Resources & Environmental Studies A.S Natural Resources Technology	link	Professional Wetland Scientist, Certified Wetland Delineator - MN, Ecological Restoration Certificate (University of Minnesota)		link	St. Paul, MN
DiFrancisco, Patrick	GIS/CADD Specialist	8 / 30	Drafting Degree	link			link	Buffalo, NY
Doerflein, Morgan	Engineer 1	1 / 1	B.S. Chemical Engineering	link			link	Detroit, MI

TEAM LIST: SECONDARY PROJECT STAFF

Contract Staff Name	Contract Classification	Years Exp. GHD / Total	Education	Work Experience	Licenses & Certifications	OSHA Certification	GHD Training/ Certifications	Office Location
Ehrhard, Steven	Engineer 1	2 / 2	B.S. Chemical Engineering	link			N/A	Springfield, IL
Estes, Adam	Scientist 2	6 / 10	B.S.	link		40 Hr.	link	Indianapolis, IN
Ezak, Joshua	Engineer 3	12 / 12	B.S. Electrical Engineering B.A. Mathematics Engineering	link		40 Hr.	link	Buffalo, NY
Field, Rob	On-Site Inspector Scientist 2 Scientist 1	31 / 32	B.S. Agricultural Engineering Technology	link		40 Hr.	link	St. Paul, MN
Gabbard, Robert	Engineer 2	5 / 6	B.S. Civil Engineering	link	E.I.T. - IN	40 Hr.	link	Indianapolis, IN
Galley, Mark	GIS/CADD Specialist	9 / 9	A.A.S. Computer Aided Drafting and Design	link			link	Buffalo, NY
Gatrell, Douglas	Engineer 4 Engineer 3	18 / 24	M.S. Civil/ Environmental Engineering B.S. Civil Engineering	link	Professional Engineer - MI, AK, AZ, HI, IN, NV, NM, NY, OH, OR, PA, TN, UT, WA, WI; Registered Technical Service Provider - MI, AK, AZ, HI, IN, NY, OH, OR, PA, UT, WA		link	Detroit, Michigan
Gjersvik, Charles	Scientist 2	11 / 32	M.S. Environmental Studies B.A. Biology	link			link	Springfield, IL
Hamlin, Dyron	Engineer 4	7 / 19	M.S. Chemical Engineering B.S. Chemical Engineering	link	Professional Engineer - AR		link	Little Rock, AR
Horn, Shawn	Engineer 4	32 / 32	B.S. Chemical Engineering	link	Professional Engineer - MN, IA, NE, WI	40 Hr.	link	St. Paul, MN

TEAM LIST: SECONDARY PROJECT STAFF

Contract Staff Name	Contract Classification	Years Exp. GHD / Total	Education	Work Experience	Licenses & Certifications	OSHA Certification	GHD Training/ Certifications	Office Location
Johal, Amarjog	Engineer 3 Engineer 2	0 / 6	M.E. Electrical and Computer Engineering B.T. Electrical Engineering	link	Professional Engineer - Ontario; PG Certificate, Wireless Telecommunications		link	Buffalo, NY
Jones, Jacob	Scientist 2	4 / 8	M.S. Occupational and Environmental Health	link	Certified Industrial Hygienist	40 Hr.	link	Little Rock, AR
Krajna, Andrew	GIS/CADD Specialist	10 / 10	A.A.S. Computer Aided Drafting and Design	link			link	Buffalo, NY
Kramer, Brian	Engineer 4 Engineer 3	25 / 26	M.S. Environmental Engineering Science B.S. Bioengineering	link		40 Hr.	link	Niagara Falls, NY
Kruszona, William	Engineer 3	9 / 41	M.B.A. B.S. Mechanical Engineering	link	Professional Engineer - NY, AZ, CA, IL, ME		link	Buffalo, NY
Kwok, Kimberly	Scientist 2	3 / 10	B.S. Biology	link			link	Indianapolis, IN
Lang, Matt	Engineer 2	5 / 5	B.S. Mechanical & Aerospace Engineering	link			link	Buffalo, NY
Laschinger, Michael	Engineer 3	19 / 31	M.B.A. B.S. Chemical Engineering	link	Professional Engineer - NY, KY, MA, OH, MT		link	Buffalo, NY
Leo, Tim	On-Site Inspector	24 / 25	B.S. Civil Engineering	link			link	Chicago, IL
Lovell, Andy	GIS/CADD Specialist	16 / 16	M.S. Environmental Management and Restoration B.A.S. Parks, Recreation and Heritage	link	Geographic Information Systems Professional		link	San Francisco, CA
Mickle, Ruth	Quality Assurance/ Quality Control Officer	16 / 18	B.A. Chemistry	link			N/A	St. Paul, MN

TEAM LIST: SECONDARY PROJECT STAFF

Contract Staff Name	Contract Classification	Years Exp. GHD / Total	Education	Work Experience	Licenses & Certifications	OSHA Certification	GHD Training/ Certifications	Office Location
Ojinaga, Daniel	Engineer 3 Engineer 2	7 / 11	B.A.S. Civil Engineering - Engineering Management	link			link	St. Paul, MN
Pautler, Jeremy	GIS/CADD Specialist	13 / 13	A.A.S.	link			link	Buffalo, NY
Pestka, Thomas	Engineer 3	23 / 42	B.S.	link			link	Buffalo, NY
Pike, Sean	GIS/CADD Specialist	16 / 16	A.A.S. Computer Aided Drafting and Design	link			link	Niagara Falls, NY
Poole, Lisa	Engineer 3 Engineer 2	20 / 20	B.S. Environmental Engineering	link			link	St. Paul, MN
Pritchard, Gary	Engineer 3 Engineer 2	9 / 11	M.B.A. B.S. Chemical Engineering	link	Professional Engineer - NY; LEED Accredited Professional		link	Buffalo, NY
Pyle, Bob	Engineer 4	28 / 38	B.A.S. Civil Engineering	link			link	Atlanta, GA
Regan, Brian	Engineer 3 Engineer 2	10 / 10	M.S. Civil Engineering B.S. Civil Engineering	link	E.I.T. - NY		link	Buffalo, NY
Rohrich, Christopher	GIS/CADD Specialist	10 / 10	A.A.S. Computer Aided Drafting and Design	link			link	Buffalo, NY
Romzick, Peter	Engineer 4	18 / 36	B.S. Chemical Engineering	link	Professional Engineer - MI; Accredited Lead Verifier for California Air Resources Board Greenhouse Gas Reporting Program		link	Detroit, MI
Roste, Steven	Engineer 1 Field Technician	5 / 5	B.S. Civil Engineering A.S. Engineering	link	E.I.T. - MN	40 Hr.	link	St. Paul, MN

TEAM LIST: SECONDARY PROJECT STAFF

Contract Staff Name	Contract Classification	Years Exp. GHD / Total	Education	Work Experience	Licenses & Certifications	OSHA Certification	GHD Training/ Certifications	Office Location
Schilling, Nicholas	Engineer 3 Engineer 2	9 / 10	B.S. Mechanical & Aerospace Engineering	link	Professional Engineer - NY		link	Buffalo, NY
Shaw, Brendan	Engineer 1	0 / 2	B.S. Chemical & Biomolecular Engineering	link			link	Buffalo, NY
Storlie, Peter	Scientist 2 On-Site Inspector	32 / 32	B.S. Geology	link	Professional Geologist - WI; Licensed Waste Water Treatment Plan Operator - WI, Asbestos Building Inspector - MN, IA, ND, SD		link	St. Paul, MN
Suchan, Brandon	GIS/CADD Specialist	12 / 12	A.A.S.	link			link	Buffalo, NY
Szalach, Dave	GIS/CADD Specialist	22 / 40	B.S. Business Administration - Management A.A.S. Drafting	link			link	Buffalo, NY
Tarkington, Brett	Scientist 2	6 / 25	M.S. Occupational & Environmental Health B.S. Environmental Health Sciences	link	Certified Industrial Hygienist; Certified Hazardous Materials Manager	40 Hr.	link	Little Rock, AR
Thornton, James	Engineer 3	9 / 40	M.B.A. B.S. Civil Engineering	link	Professional Engineer - NY		link	Buffalo, NY
Ushiro, Gary	GIS/CADD Specialist	11 / 30	Certificate of Completion in Computer-Aided Design	link			link	Detroit, MI
Vel, Sube	Engineer 4	14 / 32	M.S. Environmental Engineering B.S. Civil Engineering	link	Professional Engineer - MI		link	Detroit, MI
Voss, Steven	Project Manager Engineer 4	25 / 27	M.S. Civil and Environmental Engineering B.S. Biology	link		40 Hr.	link	St. Paul, MN
Wilsey, Steven	Project Manager Scientist 2	15 / 29	B.S. Biology	link	Certified Hazardous Materials Manager		link	Niagara Falls, NY
Worrall, Julian	Engineer 3 Engineer 4	20 / 27	B.S. Chemical Engineering	link	Professional Engineer - NY		link	Buffalo, NY

MN Solid Waste Experience

Site Name	Description	Site Investigation	Remedial Investigation	Remedial Design
WDE Closed LF - SVE with Low Temperature Vapor Condensation	Tasks included: Background review, site investigation, conceptual design preparation, 30%/95%/100% design documents preparation, bidding assistance, construction monitoring		●	●
Carlton County Landfill - Community Water Supply Assessment	Tasks included: Review of MPCA project files, site visit, technical memorandum on GHD's understanding/assessment of Site conditions, project goals/objectives, potential water supply options with preliminary cost evaluation, potential development of a recently installed deep aquifer well, potential property access issues, and recommended future actions	●	●	
Carlton County Landfill - Residential Water Treatment - Arsenic Removal	Tasks included: Assessment of poorly performing arsenic treatment/removal media, area arsenic level assessment (background or landfill caused), replacement of arsenic treatment media, and new media performance assessment		●	●
Washington County Landfill - Solar Panel Installations	Tasks included: design, bidding assistance, and construction monitoring services for installation of 40kW photovoltaic power generation system.		●	●
Lindenfelser Landfill - Solar Panel Installations	Tasks included: design, bidding assistance, and construction monitoring services for installation of 40kW photovoltaic power generation system.		●	●
Flare Relocation - Watonwan Landfill to Anoka County Landfill	Tasks included: Flare condition/performance assessment, provided bidding assistance, design/acquisition of an oxygen monitoring panel, touch-screen, and new PLC and touch-screen programs, construction monitoring for the flare station relocation work.		●	●
Flare Relocation - Anoka County Landfill to Flying Cloud Landfill	Tasks included: Flare condition/performance assessment provide bidding assistance, construction monitoring for the flare station relocation work.		●	●
Freeway Landfill - Conceptual Closure Design Services	Tasks included: Conceptual landfill closure design services that included providing construction cost estimation.			●
Freeway Landfill - Groundwater Contamination Investigation	Tasks included: Background review, field work plan preparation, drilling work bidding, drilling oversight, and investigation derived waste disposal support.	●		

Site Name	Description	Site Investigation	Remedial Investigation	Remedial Design
Washington County Landfill - Landfill Gas Extraction System Expansion/ Modification	Tasks included: Background/file review, conceptual design preparation, 30/95/100% design preparation, bidding assistance, and construction monitoring		●	●
WDE Closed Landfill - Groundwater Contamination Assessment	Tasks included: Assessment of groundwater contamination north of Coon Creek with new well installations, assist with property access, procure drilling contractor, supervise drilling and installation of monitoring wells, well development oversight, measure site-wide groundwater elevations, evaluate groundwater monitoring results collected by others, preparation of investigation report.	●		
Carlton LF - Residential Water Supply Treatment System	Tasks included: Residential deep well development/sampling, assessment and replacement of residential groundwater treatment systems for arsenic removal, and landscape restoration		●	●
WDE Landfill - Hazardous Waste Pit Removal Action	Tasks included: Background/file review, historical aerial photo research, waste dispsoal facility research, pre-deign investigation work plan prep, bidding assistance for drilling work, drilling oversight, hazardous waste/soil sampling, borehole logging, pre-design investigation reporting, removal action conceptual design preparation, 30% design preparation. A supplementary site investigation work and the preparation of the 65%/95% design is expected to be completed by June 2018.		●	●
WLSSD Landfill - Leachate Collection System Modifications	Investigation, design, and construction oversight for modifications to discontinue operation of the perimeter collection system.		●	●
Houston County Landfill - Landfill gas Migration Mitigation	Investigation, design, and bidding assistance in the modification of the gas collection system from passive to active. Scope of work included background/file review, site visit, remedial alternatives evaluation, conceptual design, 30%/95%/ 100% design and bidding assistance		●	●
Herbst Landfill - Geophysical Investigation Services	Provided geophysical investigation services to better define the extent of subsurface waste using man-portable EM ground conductivity and metal detection survey methods	●		

Site Name	Description	Site Investigation	Remedial Investigation	Remedial Design
Begin Landfill	Provided geophysical investigation services to better define the extent of subsurface waste using man-portable EM ground conductivity and metal detection survey methods	●		
Vadnais Heights Landfill	Provided geophysical investigation services to better define the extent of subsurface waste using man-portable EM ground conductivity and metal detection survey methods	●		
Winona Landfill - Groundwater Contamination Investigation	Conducted a groundwater contamination investigation. Work included: background/file review, conceptual model development, field investigation work plan prep, monitoring well installation oversight and logging, investigation summary report	●		
Crow Wing Landfill - Groundwater Contamination Investigation	Conducted file review, site visit, and field investigation work plan preparation for groundwater investigation and characterization field tasks. The second (future) phase of work will likely include monitoring well installations, aquifer testing, groundwater chemistry monitoring, landfill cover structures assessment/abandonments, and reporting.	●		

Federal & State Agency Experience

GHD has worked extensively with federal, state, and municipal agencies in providing engineering design, construction monitoring, and construction management services. Most of this work is in the area of transportation. Specific to the State of Minnesota, GHD has provided landfill engineering and operation and maintenance services to the MPCA on well over one hundred projects since the late 1990s.

GHD has and continues to provide landfill construction management services for the Ordot Dump federal project located in Guam. Originally built in the 1940s by the US Military, the dump was introducing potentially toxic leachate into the Lonfit River which feeds into Pago Bay and its methane gas emissions were a source of significant air pollution. GHD was engaged as the construction manager for the closure of the dump. This complex infrastructure project required a network of environmental safeguards, including a complete cover system, leachate collection system, gas flare, sewer system improvements, emergency backup generators, security fencing, and roadway. The Ordot Dump closure project has received the Special Recognition Award - Advancing Construction Management for its use of construction management software to support collaboration. The project was also awarded by the Construction Management Association of America at its National Conference in San Diego, taking out the 2016 Project Achievement Award in the Under $50M US Infrastructure category.

Other government related landfill experience GHD has in the State of Minnesota includes working with the City of St. Paul on closure improvements to the Pigs Eye Landfill and the City of Brooklyn Park on the Brooklyn Park Dump closure improvements.

MERLA Experience

Given our broad depth of experience, GHD's team has exceptional knowledge of the Minnesota Environmental Response and Liability Act (MERLA) including the Closed Landfill Program, the Land Recycling Act, the Comprehensive Environmental Response Compensation and Liability Act as amended, the Resource Conservation and Recovery Act, and the National Oil and Hazardous Substances Contingency Plan.

Our team also offers decades of experience with the pertinent state and federal regulations related to remediation at solid waste facilities.

Project Descriptions

Our work

Koochiching Sanitary Landfill

Minnesota Pollution Control Agency, International Falls, Minnesota

Client

Minnesota Pollution Control Agency – Closed Landfill Program

Project

GHD provided the Minnesota Pollution Control Agency (MPCA) remedial investigation, design, and construction oversight services in addressing environmental impacts at a closed sanitary landfill site.

Duration

Remedial Investigation/Design: 2010-2012
Construction Oversight: 2012-2014
Operation & Maintenance: 2014-Present

Challenge

The Koochiching County Closed Sanitary Landfill was operated as an open dump by the City of International Falls (City) beginning in 1937. The site was first permitted to accept waste in 1974 and eventually closed in October 1992. The landfill is approximately 30 acres in size on a 40 acre property and contains approximately 855,000 cubic yards of waste.

Description

GHD conducted a remedial investigation and alternatives evaluation for improvements to the landfill, specifically to mitigate leachate seeps, reduce leachate production, reduce leachate levels in the waste, and reduce long-term operation and maintenance costs.

Based on remedial alternatives evaluation, GHD completed pre-design investigation work and developed a design for the landfill improvements.

During 2011, GHD prepared the design with detailed project specifications and construction drawings for the following major components:

- Landfill surface grading modifications and improvements with a slope stability evaluation
- Stormwater drainage improvements and erosion controls
- Synthetic engineered cover system installation
- Leachate extraction improvements with automated controls and remote monitoring capabilities
- Landfill gas control system modifications

GHD completed the design in a phased approach (i.e., 30 percent, 60 percent, and 95 percent). The final (100 percent) design included a construction quality assurance project plan. GHD then prepared the construction bid documents, assisted with the project bidding, reviewed the bids and contractor qualifications, and recommended a contractor.

In 2012, the MPCA executed a contract with the recommended contractor. The landfill improvements construction work began in April 2012 and was completed in June 2014 at a total cost of $5.16 million.

GHD provided comprehensive construction monitoring and contract administration throughout construction. The most critical aspect of the construction was the leachate collection system. GHD recommended an approach for single pass deep trenching (35 feet below ground surface) through the interior of the landfill and waste to dewater the landfill. This approach allowed a deep trench to be excavated and simultaneously backfilled with aggregate to minimize leachate handling, reduced trench cuttings volume generation, and trench collapse during construction. The adoption of this technology saved the MPCA at least $300,000.

Since construction was completed, GHD has operated, maintained, and monitored the leachate collection and extraction system. No leachate seeps have occurred, and the leachate level within the landfill waste have been substantially lowered by the extraction system.

Outcome

GHD's design achieved the project goals of eliminating leachate seeps along the landfill perimeter, significantly reduced leachate mounding within the landfill, and substantially reduced leachate generation and the subsequent handling, disposal, and operational costs. In addition, the quality of the design and bid documents resulted in one change order that adjusted the overall construction cost to be within 2 percent of the original contract amount.

Key GHD Personnel

- Robert Martin – Project Manager
- Tim Ree – Lead Design Engineer
- Tom Hobday - Engineer (project specifications/ SWPPP)
- Michael Laschinger – Engineer (process engineering)
- William Kruzona – Engineer (mechanical engineer)
- Doug Gatrell – Engineer (civil/peer review)
- Thomas Peska – Engineer (
- Chuck Ahrens – project hydrogeologist, leachate collection system pumping test
- Matt Barnes – Construction oversight (synthetic liner installation)
- Tim Leo – Construction oversight (waste relocation, contaminated soil relocation, installation of synthetic liner, cover soils, perimeter leachate collection system, interior leachate collection system, meter building, access roads, storm water control features, leachate holding pond sediment removal/relocation, and restoration)
- Buck Lardy - Construction oversight (synthetic liner installation, leachate collection system commissioning)
- Ryan Coy – GIS/Drafting
- Chris Rohrich – Drafting
- Sean Pike – Drafting

Tasks Contracted/subcontracted Tasks

- Aerial Historical Photos – Historical Information Gathers
- Test pit excavations – Stevens Drilling & Environmental
- West Central Environmental Consultants – Well sealing/replacements

Photos

Koochiching Sanitary Landfill

Our work

East Mesaba Closed Sanitary Landfill

Minnesota Pollution Control Agency, City of Virginia, Minnesota

GHD has provided comprehensive engineering support to the Minnesota Pollution Control Agency (MPCA) in addressing environmental impacts at a closed sanitary landfill site.

Client

Minnesota Pollution Control Agency – Closed Landfill Program

Duration

Completed in 2014

Cost

$5.49 Million

Challenge

The East Mesaba Closed Sanitary Landfill, located in St. Louis County, Virginia/Missabe Mtn. Township was owned and operated by St. Louis County and the East Mesaba Sanitary Disposal Authority. The Site was first permitted to accept waste on October 18, 1972 and continued operating until April 4, 1994. The landfill is approximately 42 acres in size and contains approximately 720,000 cubic yards of waste.

Description

In 2008, GHD was retained by the MPCA Closed Landfill Program to conduct pre-design investigation for improvements to the landfill, specifically to consolidate the waste limits and relocate waste out of a wetland. The pre-design investigation included:

- Excavation of test pits to determine edge of waste
- Drilling to determine waste and cover thicknesses to be potentially relocated
- Delineation of debris on ground surface surrounding the landfill
- Delineation of the edge of wetlands adjacent to the landfill
- Estimation of waste and cover volumes to be relocated
- Development of a conceptual design for landfill improvements

As part of the pre-design investigation, GHD conducted a cost comparison for relocating waste from selected areas versus constructing a synthetic liner over the selected areas. During 2009 and 2010, GHD prepared the design with detailed project specifications and construction drawings for the following major components:

- Consolidation of the waste footprint from approximately 42 acres to 27 acres by excavating and relocating approximately 335,000 cubic yards of waste and cover material
- Construction of an impermeable liner over the consolidated waste area consisting of 6-inches of topsoil;

8-inches of rooting zone soil; double-sided geocomposite drainage material; double-sided textured 40-mil LLDPE geomembrane liner; and a non-woven, needle-punched geotextile buffer
- Landfill surface grading modifications and improvements with a slope stability evaluation
- Stormwater drainage modifications and improvements including diversion berm sizing and layout, stormwater pond sizing and layout, culverts, and erosion controls to handle the design storm event
- Landfill gas control system modifications
- Access road installation around the perimeter of the landfill including portions over soft peat material
- Excavation of contaminated material outside of the waste limits and relocation within the waste limits

GHD completed the design in a phased approach (i.e., 30 percent, 60 percent, and 95 percent) with MPCA review after each phase. The final (100 percent) design included a construction quality assurance project plan. At the completion of the design, GHD estimated the construction cost to be $5.1 million. We prepared the construction bid documents, reviewed the bids and contractor qualifications, and recommended a contractor. In 2010, the MPCA executed a contract with the recommended contractor with a contract price of $4.58 million. The landfill improvements construction work began in November 2010 and was completed in November 2012 at a total cost of $5.49 million. The increase in cost was caused, in a large part, by delays due to a State of Minnesota government shutdown and temporary suspension of work during the middle of the construction. GHD provided comprehensive construction monitoring and contract administration throughout construction, consisting of:

- Continuous onsite monitoring and inspection of construction work
- Preparation of daily observation reports
- Photographing construction features and progress
- Leading weekly progress meetings and preparation of meeting agendas and minutes
- Preparation and execution of field orders, work change directives, and supplemental agreements
- Review of submittals and shop drawings and preparation of written submittal responses
- Review of field and laboratory testing results to confirm compliance with project requirements
- Compiling and managing record documents
- Reviewing contractor progress payment applications and preparing written recommendations for payment
- Preparation of construction documentation report

Key GHD Personnel

- Robert Martin – Project Manager
- Tim Ree – Lead Design Engineer
- Doug Gatrell – Design Engineer
- Eric Hoglund – Design Engineer
- Ryan Coy – GIS/Drafting
- Chris Rohrich – Drafting
- Sean Pike – Drafting
- Tom Hobday (test pit oversight – landfill cover extents investigation, project specifications)
- Sarah Ill – Construction oversight (waste relocation)
- Tim Braun – Project specifications, Construction oversight (waste relocation, contaminated soil relocation, installation of synthetic liner, cover soils, access roads, storm water control features, gas vents, restoration)
- Matt Barnes – Construction oversight (synthetic liner installation)
- Buck Lardy - Construction oversight (synthetic liner installation)
- Pete Storlie – Construction Oversight

Contracted/subcontracted Tasks

- Aerial Historical Photos – Historical Information Gathers
- Test pit excavations – Stevens Drilling & Environmental
- West Central Environmental Consultants – Well sealing/replacements

Outcome

GHD's design achieved the project goals of consolidating the waste footprint while ensuring positive drainage from the landfill cover; removal of waste from adjacent wetlands and provision of a buffer between wetland and waste areas; minimizing groundwater impacts through installation of an impermeable cover system; and protection of offsite areas through surface water and landfill gas management.

Photo

East Mesaba Closed Sanitary Landfill

Our work

Landfill Site Soccer Complex

PRP Group, Wausau, Wisconsin

GHD completed a soccer complex on a former landfill site under a design-build contract.

Client Contact

Holtz-Krause Steering Committee - Dave Eisenreich (Chair), (715) 571-0151

Duration

2011 through 2013

Cost

$5 million

Challenge

The Holt-Krause PRP Group was looking to meet its obligations for long-term operation and maintenance (O&M) of a Superfund landfill site under a unique partnership with the local community. Instead of the traditional perimeter fence and long-term site maintenance work, the PRP Group wanted to make the property available to the local community while ending their own long term obligations.

This was possible under the Wisconsin Department of Natural Resources (WDNR) Voluntary Pollution Liability Exemption (VPLE) program.

The Holtz-Krause Landfill is a 64-acre site that operated between 1957 and 1980. The site is located in Wausau, Wisconsin and received approximately 2.0 million cubic yards of waste including municipal solid waste, non-combustible waste, demolition material, and wood waste.

Description

GHD developed a $4.9 million soccer complex under a design-build contract. The complex, which has 15 soccer fields and provides one of the best tournament facilities in Wisconsin, opened on April 30, 2015. The project involved the following tasks:

- Pre-design investigation work including:
- Evaluation of existing landfill gas extraction and flaresystem for necessary repairs and replacements
- Evaluation of existing landfill cover
- Interaction with applicable regulatory agencies to comply with requirements for proposed use

- Project specifications and drawings preparation for the following major components:
- Repair and/or replacement of subsurface gas extraction piping as necessary for extraction and proper drainage
- Installation of supplemental gas extraction wells o Retrofit of existing gas extraction wells for flush mount

installations
- Acquisition and installation of a new landfill gas flare system
- Installation of an engineered landfill cover with necessary underdrainage, rooting soil, and irrigation for athletic use
- Installation of athletic complex associated items including a concession/restroom facility, field lighting, playground, parking areas, access paths, and signage. Concession building and field lighting was installed on H-piles driven through the waste into bedrock.

- Project completion in a design-build approach, with a construction quality assurance plan included with the final design

- Construction cost estimate preparation

- Bid document preparation, bidding, award, and contractor management for the individual work items (flare station supply/installation; grading; irrigation; gas extraction well installations; electrical; paving; vegetation; and fencing)

- Comprehensive construction monitoring and contract administration for construction phase including:
- Continuous onsite monitoring for construction work
- Daily observation reports
- Photographic documentation
- Conducting weekly progress meetings
- Preparation and execution of field change orders, work change directives, and change orders
- Submittal review and response
- Management of record documents
- Subcontractor management

- Construction documentation report preparation

- Operation and maintenance manual preparation

All work was performed in accordance with GHD's ISO 9001 quality system.

The work was completed under the Wisconsin Department of Natural Resources (WDNR) Voluntary Pollution Liability Exemption (VPLE) program. Under this closure, all groundwater monitoring was terminated. Environmental liability shifted from the Holtz-Krause PRP Group to the WDNR under the WDNR VPLE insurance coverage program.

Cover maintenance and the maintenance of the landfill gas extraction and flare system are now managed by the City of Wausau with technical support from GHD.

Outcome

GHD was able to assist the Holtz-Krause PRP Group in turning a long term operation and maintenance obligation into a soccer complex providing a strong benefit to the local community, providing one of the best tournament facilities in Wisconsin. This was the first landfill closed under the WDNR VPLE program.

Key GHD Personnel

- Ron Frehner – Project Manager
- Steve Mockenhaupt – Project Coordinator
- Robert Martin – Project Engineer (landfill gas piping improvements/flare replacement)
- Tom Hobday (landfill gas extraction/flare station commissioning) investigation, project specifications)
- Tim Leo (overall project construction oversight)

Contracted/subcontracted Tasks

- Project Construction – Riverview Construction
- Surveying – Rural Engineering Associates
- Gas Well Installations/Piping – Terra Engineering & Construction
- Stadium Lighting – Muska Electrical
- General Electrical Contractor - VanErt Electrical
- Facility Irrigation System - Midwest Irrigation

Photo

Landfill Site Soccer Complex

Scope of Services

Scope of Services Experience

GHD has extensive experience with each item outlined in the scope of services for MPCA's Closed Landfill Program Environmental Services. We have addressed the bullets listed in Section 3 on the following pages.

Scope of Service	Brief Description	# GHD Projects Performed
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.	GHD has completed an extensive number of strategy assessments followed by the preparation of designs for subsurface contamination remediation in soil, sediment, and groundwater. GHD has provided these services to the MPCA CLP at sites such as Becker County Landfill (groundwater), Washington County Landfill (landfill gas migration), Houston County Landfill (landfill gas migration).	1000+
Oversee, design, and/or conduct pilot testing, bench scale testing, field demos and treatability studies of remediation systems or technologies.	GHD's Innovative Technology Group has conducted hundreds of laboratory scale treatability studies and assisted GHD Project Managers in the oversight of pilot testing programs where required. GHD has performed several projects for the MPCA CLP such as bench scale and pilot testing for the treatment of perfluorochemical impacts to groundwater at the Washington County Landfill.	500+
Prepare corrective action design documents (e.g., CAD design reports, pilot test reports, installation notification reports, monitoring reports, plans, and as-built reports).	GHD's design services teams develop engineering design packages for our remedial projects. This work is conducted under our ISO 9001:2015 Quality Management System to ensure consistency of approach, proper peer review, and document management/filing procedures. GHD has provided numerous correction action design packages to the MPCA CLP for sites such as Koochiching County Landfill (landfill cover & leachate collection), East Mesaba Landfill (landfill cover) , Becker County Landfill (groundwater remediation).	1000+
Prepare Health and Safety Plans (HASP).	GHD prepares HASPs for every environmental project where possible contact with hazardous substances exists. Through our Corporate Safety and Health Group, Regional Safety Managers have prepared thousands of site specific HASPs. GHD has prepared well over a hundred HASP for MPCA CLP projects.	1000+
Oversee site investigation services for soil boring advancement, and monitoring well installation using both standard drilling methods, and direct push methods.	GHD has overseen thousands of soil boring/monitoring well installation programs using a full range of drilling methods and has Standard Operating Procedures (SOPs) and mandatory internal training for personnel involved in the activity. GHD has performed these services at numerous MPCA CLP projects such as Koochiching County Landfill, Becker County Landfill, and the WDE Landfill.	1000+

Scope of Service	Brief Description	# GHD Projects Performed
Conduct ground water, soil, surface water, sediment, and air sampling and monitoring.	GHD has conducted thousands of multimedia sampling programs and has Standard Operating Procedures (SOPs) and mandatory internal training for personnel involved in sampling activities. GHD has developed considerable expertise in soil vapor investigations. However, for MPCA CLP project work, GHD has typically arranged this work to be completed by a State Contractor.	1000+
Conduct vapor/air monitoring for health and safety and air quality criteria.	GHD has conducted thousands of real time vapor/air monitoring programs at investigative and remediation projects and has Standard Operating Procedures (SOPs) and mandatory internal training for personnel involved in monitoring activities. Industrial Hygiene and/or Toxicology staff are involved in coordinating programs of this nature where appropriate.	1000+
Conduct and/or oversee site evaluation/assessment activities (Phase I and Phase II), limited site investigations and remedial investigations.	GHD has conducted thousands of site assessment (Phase I and II) programs as part of due diligence for acquisition/divestiture and similarly thousands of limited/remedial investigations under various environmental programs to assess historic environmental impacts.	1000+
Conduct surface water, ground water, air and vapor receptor surveys.	GHD has conducted thousands of multimedia sampling programs and has Standard Operating Procedures (SOPs) and mandatory internal training for personnel involved in sampling activities. GHD has developed considerable expertise in soil vapor investigations, including indoor air evaluations.	1000+
Arrange for transportation, storage, and proper management of wastes.	GHD's Waste Services Group (WSG) is an internal resource team to support our Project Managers in the proper management of wastes. The WSG is managed by certified hazardous material managers (CHMMs) and other environmental professionals with expertise in hazardous materials and waste management regulations, recycling, waste minimization, and resource management activities. GHD has arranged these services with a State Contractor for the MPCA CLP at several project sites such as the Freeway Landfill, WDE Landfill, and Woodlake Landfill.	1000+
Evaluate the need for and oversee the implementation of alternative drinking water supply, including point-of-use treatment (i.e. filtration).	Many projects have required the provision of alternative drinking water supplies. This has been accomplished through point of use treatment as well as bottled water supply. On occasion, new watermains/distribution systems have been designed by GHD and constructed to service affected populations. GHD has assisted the MPCA CLP with these types of services at sites such as the Becker County and Cloquet Landfills	100+

Scope of Service	Brief Description	# GHD Projects Performed
Coordinate and cooperate with other State-contracted services such as sampling and analytical, emergency response contractors, and hazardous waste services.	GHD has substantial experience in coordinating, working with, and managing various State contractors for MPCA Closed Landfill projects that have included services for media sampling, laboratory analysis, drilling, surveying, waste disposal, and electrical repairs/improvements. GHD understands and follows MPCA required contracting procedures.	100+
Oversee subcontractors and state contractors during investigation, cleanups, and construction activities.	GHD has extensive experience working effectively in an oversight role of subcontractors during investigative and remediation programs. Our Project Management and Supervisory training programs provide instruction in how to provide oversight and prepare appropriate documentation. GHD has provided these services to the MPCA CLP well over a hundred times.	100+
Prepare and evaluate reports (e.g., investigation reports, monitoring reports, free product recovery reports).	GHD has extensive experience preparing and evaluating investigative reports. Our professionals are familiar with all relevant state regulatory and guidance documentation. Under our ISO 9001:2015 Quality System, project managers are responsible for client reports, and there are mandatory peer review procedures.	1000+
Collect and manage field and laboratory data for electronic submittal in a format specified by the MPCA.	GHD has developed world class environmental data collection and management systems to efficiently collect field data through iPads and other devices and establish project databases with customized automated reporting functionality to meet individual client requirements and various mandatory regulatory reports. GHD understands, follows, and has substantial experience in the preparation and submission of data to the MPCA EQuIS data management system.	100+
Evaluate data quality and prepare data verification reports.	GHD's chemistry personnel coordinate all laboratory work to ensure data quality objectives are met and data is properly validated. Our Data Solutions Group is available to manage data directly from the analytical laboratory and efficiently effectively prepared laboratory validation reports and data summary tables. Much of this work can be automated providing considerable cost savings as well as enhanced accessibility for all parties.	1000+
Arrange for site access.	GHD routinely assists our clients in arranging access agreements on public and private properties in the course of investigative and remediation projects. GHD recently assisted the MPCA CLP with off-Site access for an environmental groundwater investigation at the WDE Landfill.	1000+

Scope of Service	Brief Description	# GHD Projects Performed
Coordinate utility locates by contacting the appropriate entity and if applicable coordinate traffic control.	GHD's policy is that, prior to the start of any subsurface work, best efforts are made to identify and mark all utilities in the vicinity of the subsurface work. This effort is documented on a Utility Clearance form that is competed and signed by the GHD field representative, client, and property owner. GHD has provided these surface numerous times on MPCA CLP projects.	1000+
Prepare and evaluate bid documents suitable for advertisement for bids, including but not limited to, landfill cover systems, remediation systems, landfill gas systems and erosion repair projects.	GHD has substantial experience in preparing bid documents and providing bidding assistance to the MPCA CLP and Minnesota Department of Administration (MDOA). GHD understands and follows the MDOA unique requirements and procedures in project bidding. GHD has provided these services numerous times for MPCA CLP project sites such as Washington County Landfill, WDE Landfill, Houston County Landfill.	1000+
Prepare and review Quality Assurance Project Plans (QAPP) and Sampling and Analysis Plans (SAP) in accordance with state and federal requirements.	GHD has qualified professionals with experience preparing and/or reviewing Quality Assurance Project Plans and Sampling and Analysis Plans. GHD estimates that we have prepared well over a thousand Quality Assurance Project Plans and Sampling and Analysis Plans.	1000+
Perform/oversee remedial action plans.	GHD estimates that we have provided these services on well over a thousand remedial action construction projects. GHD uses only experienced project management and oversight staff applicable to the type of work being completed. GHD understands that field observation and construction oversight is provided to ensure and document that the project is constructed in accordance with MPCA approved specifications, plans, addenda, change orders, and related documents. Construction oversight is provided by a qualified engineer or inspector familiar with the project documents and knowledgeable with respect to construction practices and CQA/CQC Plan testing as required under the contract. GHD's site inspector maintains records necessary to demonstrate that contractor pay requests represent work completed in accordance with the approved project documents. GHD has provided these services on recent large scale MPCA CLP projects such as the Koochiching County and East Mesaba Landfills	1000+

Scope of Service	Brief Description	# GHD Projects Performed
Conduct surface water, ground water, and hydrodynamic modeling.	GHD enjoys an international reputation for conducting quantitative evaluations that include the application of computer modeling. We regularly deal with large scale investigations and monitoring programs, computer modeling of quantity and quality concerns with groundwater, surface water, soil vapor, risk assessment, the statistical interpretation of data, and three dimensional data visualization. GHD is also experienced in a variety of data analysis and visualization methodologies, including two and three dimensional interpolation. Visualization methodologies are routinely applied to modeling results, which allows GHD to communicate evaluation findings in a clear and effective manner to both clients and regulators.	500+
Conduct third party review and analysis of designs, reports and technical information	GHD regularly provides third party review services of environmental projects for clients. This is often conducted as a strategic review of site documents prepared by others for the purposes of providing recommendations or confirming project approach and the quality, cost and value of the project design elements.	500+
Perform five year reviews and site reviews.	GHD estimates that we have been involved in numerous five year reviews of remediation projects and well over a hundred of site reviews specific to landfills.	100+
Review groundwater remediation technologies and recommend alternatives and optimization options.	GHD provides services in the assessment, plan development, and remediation of contaminated sites. GHD estimates that we have constructed over 500 remediation systems using both traditional and innovative technologies. Construction has been completed at complex chemical plants, manufacturing facilities, refineries, railroad yards, airports, and municipal infrastructures. Typical remedial technologies include: soil vapor extraction, sparging, vapor enhanced recovery, in situ/ex situ enhanced biological treatment, stabilization/solidification/fixation, groundwater extraction, soil flushing, bioreactors, air stripping, carbon adsorption, chemical reduction treatment for heavy metals, product recovery (LNAPL and DNAPL)	500+
Provide evaluation and design of energy recovery systems utilizing landfill gas.	GHD has substantial experience in the feasibility evaluation, design, and construction oversight of Landfill-to-Gas Energy plants, ranging in size from 1.4 MW to 9.6 MW plants. GHD has also developed manuals for both the World Bank and the Canadian government that layout how to assess and develop these types of projects. The United States Environmental Protection Agency (USEPA) later "borrowed" the document from the Canadian government which was used as a template for USEPA's documents on the subject.	100+

Scope of Service	Brief Description	# GHD Projects Performed
Research, evaluate and implement innovative or new technologies.	The goal of GHD's Innovative Technology Group (ITG) is to enhance, integrate, and coordinate existing expertise within the firm in areas of emerging and innovative technologies. The ITG Team stays current with new technologies and expands in house knowledge of innovative technology evaluation tools and applications. We are also active in a number of Interstate Technology & Regulatory Council (ITRC) working groups and partner with institutions of higher learning on research work.	500+
Prepare presentations and present information at meetings.	GHD has a dedicated graphics design department with a staff of talented graphic artists and designers who can provide unique graphic solutions to any project. This department is well equipped with the latest software to create outstanding multi media communications products. Working closely with stakeholder engagement specialists and Project Managers who have the unique understanding of the specific environmental and/or engineering issues for a particular site, this group creates print media, and develop Internet sites, as well as create multimedia graphic presentations including animations, in house video capabilities, and website design/maintenance.	500+
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.	GHD has completed numerous Storm Water Pollution Prevention Plans (SWPPP) for landfills and other remediation projects. GHD's approach is to create the SWPPP document that not only abides by the applicable federal and State regulations, but also considers local ordinances of the municipality and or watershed organizations, as applicable. The GHD Minnesota office has several staff that are certified to prepare SWPPPs and has provide compliance inspection services on several MPCA CLP projects	500+
Assist and provide training as requested by the MPCA.	The GHD Business School is an established training center connected globally to provide internal staff training, manage our technical conferences, and provide training solutions for many of our clients.	100+
Oversee hydrogeologic investigations including fate & transport modeling, capture zone analysis, and aquifer pump tests.	GHD has significant experience in all aspects of hydrogeologic investigations (self-performed or oversight) and strong contaminant fate and transport modeling capabilities. Hydrogeologic work has been conducted both for contaminated site investigations and remedial alternative reviews, but we have also conducted significant drinking water supply investigation and permitting services. GHD has provided these services to the MPCA CLP program at sites such as the Koochiching County Landfill, Becker County Landfill, and the WDE Landfill	250+

Scope of Service	Brief Description	# GHD Projects Performed
Perform/oversee evaluation of soil borings, test pits, environmental boring and soil testing to determine cover integrity and availability of suitable soils.	GHD has performed and coordinated the use of soil boring and test pits to determine the extents, quality, quantity, and characteristics of landfill cover soil materials at well over a hundred sites. GHD has performed these services at several MPCA CLP project sites such as Koochiching County Landfill, East Mesaba Landfill, and the WDE Landfill.	100+
Conduct/oversee studies of hydrogeology, geology and soils utilizing geophysical studies, modeling, and/or dye trace studies.	GHD self performs and arranges for geophysical programs (Electromagnetic, Magnetometer, Ground Penetrating Radar, Downhole, etc) or subcontracts geophysical activities. Our internal experts are also available to review geophysical assessments prepared by others. GHD has provided these services to the MPCA CLP at sites such as Begin Dump, Vadnais Heights Dump, Maple Landfill, and Herbst Dump	500+
Prepare construction cost estimates using standard engineering practices.	GHD has prepared thousands of construction cost estimates for various types of environmental remediation projects. It is GHD's standard practice to provide construction cost estimates at each level of the project design process using standard engineering practices. GHD has provide construction cost estimates to the MPCA CLP for numerous construction projects.	1000+
Assist the MPCA during the bidding process in developing, advertising, distributing plans and specifications and addenda, answer bid questions, conduct pre-bid meetings, evaluate bid submittals, including bidder qualifications, and provide a recommendation for bid award.	GHD has substantial experience in providing bidding assistance to the MPCA CLP and Minnesota Department of Administration (MDOA). GHD understands and follows the MDOA unique requirements and procedures in project bidding. GHD has provided these services numerous times for MPCA CLP project sites such as Washington County Landfill, WDE Landfill, Houston County Landfill.	50+
Provide project management and construction oversight. (Project coordination; Contractor oversight, construction quality control monitoring and testing, lead construction progress meetings, progress reporting, construction contractor invoice review; erosion control measures inspections; oversee and assist with remediation equipment/system start-up and commissioning)	GHD has and will continue to provide experienced project management and oversight staff applicable to the type of work being completed. GHD understands that field observation and construction oversight is provided to ensure and document that the project is constructed in accordance with MPCA approved specifications, plans, addenda, change orders, and related documents. Construction oversight will be provided by a qualified engineer or inspector familiar with the project documents and knowledgeable with respect to construction practices and CQA/CQC Plan testing as required under the contract. GHD's site inspector will keep records necessary to demonstrate that contractor pay requests represent only that work completed in accordance with the approved project documents. GHD has completed this type of work on numerous projects for the MPCA CLP.	1000+

Scope of Service	Brief Description	# GHD Projects Performed
Participation in or conduct other public and project management meetings.	At the direction of the MPCA, GHD is capable to either lead or support the MPCA in conducting a public or project management meetings. GHD has a dedicated graphics design department with a staff of talented graphic artists and designers who can provide unique graphic solutions to any project. This group creates print media, and develop Internet sites, as well as create multimedia graphic presentations including animations, in house video capabilities, and website design/maintenance as needed.	250+
Prepare construction documentation reports.	Following completion of most construction projects, GHD submits a Construction Documentation Report which certifies and demonstrates that the project has been completed in accordance with the approved specifications, plans, addenda, change orders and other related documents. In general, daily records and testing data are incorporated into this report. GHD has prepared numerous construction documentation reports for MPCA CLP construction projects.	500+
Prepare Operation and Maintenance (O&M) Manuals.	In conjunction with preparation of a construction documentation report that has a remediation system, GHD will typically prepares an O&M Manual. The O&M Manual includes the pertinent information for future staff to operate and maintain the finished work in accordance with manufacturer requirements and design considerations. GHD has prepared hundreds of these documents and provided them at numerous times to the MPCA CLP for remediation systems at Koochiching County, Becker County, and Grand Rapids Landfills.	100+

Select GHD Solid Waste Management Experience

Project Name	State/ Province	Site Evaluation	Investigation	Landfill Cover Systems	Remediation Systems	Landfill Gas Systems/ Management	Stormwater/ Surface Water Management	Liner Systems/ Leachate Collection	Leachate Treatment/ Handling	Groundwater/ Hydrogeology	Other/ Miscellaneous Site Improvements	Construction Cost Estimates	Bidding Assistance	Construction SWPPP	Contract Administration	Construction Quality Assurance	Construction Documentation Report	O&M Manual	Third Party Review	Subcontractor Oversight	Alternative Technology Evaluation	Groundwater Remediation Alternatives	Pilot Studies	LFG Gas to Energy
Becker County Closed Landfill	MN	●	●		●		●			●		●	●		●	●	●	●		●		●		
Maple Closed Landfill	MN	●	●	●		●	●				●	●	●		●	●	●							
Northeast Otter Tail Closed Landfill	MN								●			●	●		●	●	●	●						
Washington County Closed Landfill	MN	●	●			●		●			●	●	●		●	●	●	●		●		●	●	
WDE Sanitary Closed Landfill	MN	●	●		●							●	●		●	●				●	●			
Bueckers Closed Landfill	MN					●						●	●		●	●	●			●				
Faribault County Closed Landfill	MN					●						●	●		●	●	●							
Hansen Closed Landfill	MN					●						●	●		●	●	●							
Hudson Closed Landfill	MN		●							●												●		
Jackson County Closed Landfill	MN					●	●				●	●	●		●	●				●				
Kummer Closed Landfill	MN	●				●						●	●		●	●	●			●				
Rock County Closed Landfill	MN					●	●					●	●		●	●	●			●				
Sun Prairie Closed Landfill	MN					●						●	●		●	●	●							

Select GHD Solid Waste Management Experience

Project Name	State/ Province	Site Evaluation	Investigation	Landfill Cover Systems	Remediation Systems	Landfill Gas Systems/ Management	Stormwater/ Surface Water Management	Liner Systems/ Leachate Collection	Leachate Treatment/ Handling	Groundwater/ Hydrogeology	Other/ Miscellaneous Site Improvements	Construction Cost Estimates	Bidding Assistance	Construction SWPPP	Contract Administration	Construction Quality Assurance	Construction Documentation Report	O&M Manual	Third Party Review	Subcontractor Oversight	Alternative Technology Evaluation	Groundwater Remediation Alternatives	Pilot Studies	LFG Gas to Energy
Koochiching County Closed Landfill	MN	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●		●	●			
East Mesaba Closed Landfill	MN	●	●	●		●	●				●	●	●	●	●	●	●							
Kluver Closed Landfill	MN	●					●				●	●	●		●	●	●							
Anoka County Closed Landfill	MN					●						●	●		●	●	●							
Flying Cloud Closed Landfill	MN					●						●	●		●	●	●			●				
Lindenfelser Closed Landfill	MN	●	●								●	●	●		●	●	●	●						
Carlton County Closed Landfill	MN	●																		●		●		
Freeway Closed Landfill	MN	●	●							●		●							●	●				
Highway 96 Dump	MN	●	●	●	●	●			●	●		●			●	●	●			●				
Rosemount Landfill	MN							●				●	●		●	●	●							
Lansing Landfill	MN							●				●	●		●	●	●							
Holtz-Krause Landfill	WI	●	●	●		●	●			●		●	●		●	●	●	●		●				
New Richmond Closed Landfill	WI	●	●	●	●	●	●			●		●	●		●	●	●	●		●				

Select GHD Solid Waste Management Experience

Project Name	State/ Province	Site Evaluation	Investigation	Landfill Cover Systems	Remediation Systems	Landfill Gas Systems/ Management	Stormwater/ Surface Water Management	Liner Systems/ Leachate Collection	Leachate Treatment/ Handling	Groundwater/ Hydrogeology	Other/ Miscellaneous Site Improvements	Construction Cost Estimates	Bidding Assistance	Construction SWPPP	Contract Administration	Construction Quality Assurance	Construction Documentation Report	O&M Manual	Third Party Review	Subcontractor Oversight	Alternative Technology Evaluation	Groundwater Remediation Alternatives	Pilot Studies	LFG Gas to Energy
Tomah Landfill	WI	●	●	●	●	●	●			●		●	●		●	●	●			●				
River Falls Landfill	WI									●		●	●		●	●	●							
Kohler Foundry Waste Landfill	WI	●		●				●	●			●												
Viking Foundry Sand Landfill	IA	●	●	●			●	●	●	●		●	●		●	●	●			●	●			
Alliance Landfill	PA	●				●																		
Arden Landfill	PA	●																						
Blue Ridge Landfill	PA					●																		
Canastota Renewable Energy Facility	NY	●				●																		
Carlton Farms Landfill	MI					●																		
Chaffee Landfill	NY					●																		
Chemical Waste Management	NY	●																						
Chemung County Landfill	NY	●																						
City of Brundidge	AL	●				●						●	●		●									

Select GHD Solid Waste Management Experience

Project Name	State/ Province	Site Evaluation	Investigation	Landfill Cover Systems	Remediation Systems	Landfill Gas Systems/ Management	Stormwater/ Surface Water Management	Liner Systems/ Leachate Collection	Leachate Treatment/ Handling	Groundwater/ Hydrogeology	Other/ Miscellaneous Site Improvements	Construction Cost Estimates	Bidding Assistance	Construction SWPPP	Contract Administration	Construction Quality Assurance	Construction Documentation Report	O&M Manual	Third Party Review	Subcontractor Oversight	Alternative Technology Evaluation	Groundwater Remediation Alternatives	Pilot Studies	LFG Gas to Energy
Clinton County Landfill	NY	●																						
Columbia Ridge Landfill	OR					●																		●
Dallas Fort Worth Landfill	TX																							●
DANC - Aria Energy	NY					●																		
Doepke-Holliday	KS			●		●	●																	
Eagle Valley Landfill	MI																							●
G&H Landfill	MI			●		●	●	●	●															
GROWS Tulley Town Landfill	PA	●				●																		
High Acres Landfill	NY	●	●			●																		
Hilltop Landfill	OH			●			●	●	●			●	●		●	●	●							
Hyland Landfill	NY	●																						
Joliet Landfill	IL			●		●	●	●	●			●	●		●	●	●							
Kelley Run Landfill	PA	●																						

Select GHD Solid Waste Management Experience

Project Name	State/ Province	Site Evaluation	Investigation	Landfill Cover Systems	Remediation Systems	Landfill Gas Systems/ Management	Stormwater/ Surface Water Management	Liner Systems/ Leachate Collection	Leachate Treatment/ Handling	Groundwater/ Hydrogeology	Other/ Miscellaneous Site Improvements	Construction Cost Estimates	Bidding Assistance	Construction SWPPP	Contract Administration	Construction Quality Assurance	Construction Documentation Report	O&M Manual	Third Party Review	Subcontractor Oversight	Alternative Technology Evaluation	Groundwater Remediation Alternatives	Pilot Studies	LFG Gas to Energy
King George Landfill	VA																							●
Mesquite Creek Landfill	TX					●																		●
Metamora Landfill Site	MI					●															●			
Middle Penninsula Landfill	VA					●																		●
Mill Seat Landfill	NY	●				●																		
Modern Landfill	NY	●				●																		
Monroeville Landfill	PA	●																						
Naples Landfill	FL					●																		●
North Sanitary Landfill	OH					●						●	●		●	●	●							
Northern Oaks Landfill	MI					●																		●
Okeechobee Landfill	FL					●																		
Ontario County Landfill	NY	●																						
Pine Tree Acres Landfill	MI					●																		●

Select GHD Solid Waste Management Experience

Project Name	State/ Province	Site Evaluation	Investigation	Landfill Cover Systems	Remediation Systems	Landfill Gas Systems/ Management	Stormwater/ Surface Water Management	Liner Systems/ Leachate Collection	Leachate Treatment/ Handling	Groundwater/ Hydrogeology	Other/ Miscellaneous Site Improvements	Construction Cost Estimates	Bidding Assistance	Construction SWPPP	Contract Administration	Construction Quality Assurance	Construction Documentation Report	O&M Manual	Third Party Review	Subcontractor Oversight	Alternative Technology Evaluation	Groundwater Remediation Alternatives	Pilot Studies	LFG Gas to Energy
Riverbend Landfill	OR										●													●
Rosby Resource Recovery	OH			●			●	●	●	●		●	●		●	●	●							
Seneca Meadows Landfill	NY			●		●			●		●				●									
Stoney Hollow Landfill	OH	●				●																		
Suburban Landfill	OH										●													
Tontitown Landfill	AR																							●
Venice Park Landfill	MI																							●
Wauconda Landfill Site	IL	●	●	●		●	●	●	●	●		●	●		●	●	●							

Scenario C

April 11, 2018 Reference No. 11156920

Project Leader
Minnesota Pollution Control Agency
Closed Landfill Unit
520 Lafayette Road North
Saint Paul, Minnesota 55155
Safety

To Whom It May Concern:

Re: Remedial Investigation and Evaluation Approach
Scenario C Closed Landfill
Rural, Minnesota

GHD Services Inc. (GHD) is pleased to provide this summary of GHD's approach to the completion of a Remedial Investigation and Evaluation for the Scenario C Closed Landfill (Site). The sections that follow summarize the project objectives, site background, and GHD's recommended approach to completing a site investigation and remedial alternatives evaluation.

1. Introduction

1.1 Objectives

GHD understands that the primary objective of this project is to evaluate the Site for potential entry into the Minnesota Pollution Control Agency's (MPCA's) Closed Landfill Program (CLP). Before accepting the Site into the program and taking over long-term care, the MPCA desires additional site information, as well as a potential long-term remedy for the landfill, to provide protection of human health, safety, and the environment.

1.2 Background

The Scenario C Closed Landfill is located in rural Minnesota. The Site began as a non-permitted dump in 1965, but was permitted in 1972 for disposal of municipal solid waste. Waste was accepted at the Site until closure in 1983. The landfill footprint is approximately 30-acres with an unknown volume of waste. The waste footprint extends nearly to the property boundaries (within 20-feet) along portions of the east, south, and west boundaries.

It is speculated that the landfill cover is inconsistent in thickness across the Site, with a potential gravel cover in southern portions of the Site. The existing cover exhibits ponding and generally drains poorly due to insufficient grade.

A map of the Site is included in the attached Figure 1. Adjacent land use includes the following:

- A residential development is located approximately 150-feet west of the Site with shallow irrigation wells

- A residential development is located approximately 0.5-mile south of the Site with shallow irrigation wells
- An easterly flowing river is located approximately 0.5-mile south of the Site
- A farm is located approximately 0.25-mile east of the Site with cropland, cattle, and a private drinking water supply well. The cropland abuts the eastern boundary of the Site.
- Undeveloped land is located to the north of the Site

Future development between the landfill and existing residential developments south and west of the Site is currently included in the City's comprehensive plan.

The existing landfill gas management system consists of twenty (20) passive landfill gas vents. It is unknown if any landfill gas monitoring probes are present at or surrounding the Site. Off-Site migration of landfill gas is suspected due to proximity of the waste footprint to Site boundaries and reported stressed vegetation within the cropland east of the Site.

The groundwater monitoring network consists of three monitoring wells along the east and south Site perimeter. Site geology, indicated by boring logs, is glacial till with sand layers intermixed with clay.

A limited remedial investigation was conducted following Site closure revealing elevated concentrations of volatile organic compounds (VOCs) and metals near the landfill, with some detections exceeding health risk limits (HRLs). Additionally, residents south of the landfill have noted odors in irrigation wells.

1.3 Assumptions

GHD made the following assumptions regarding Site conditions when evaluating the proposed approach to Site assessment:

- The landfill is unlined
- The Site was closed in compliance with the permit requirements and regulations at the time, since the MPCA is considering the Site for inclusion in the CLP
- There is a construction documentation report for the landfill closure detailing the final grades, stormwater management features, passive gas venting system (with construction and boring logs), monitoring well logs, landfill cover materials and thicknesses, landfill waste thicknesses and bottom of waste elevations, and the horizontal extent of the landfill waste footprint

1.4 Approach

To complete the project objectives stated above, GHD would perform services in a three-phased approach as follows:

- **Phase 1:** Preliminary Investigation including file review, Site visit, preliminary investigation work, and provision of a summary report and conceptual site model

- **Phase 2:** Remedial Investigation including assessment of waste extents; groundwater monitoring network upgrades, sampling, and aquifer testing; landfill gas management system upgrades and monitoring; landfill cover evaluation; and provision of a remedial investigation report
- **Phase 3:** Remedial Alternatives Evaluation that will consider and evaluate potential Site remedial actions

Details of the individual work phases are provided in the sections that follow.

2. Phase 1 – Preliminary Investigation

The Preliminary Investigation phase would commence with a kick-off meeting or conference call between MPCA and GHD personnel to discuss and confirm project goals and objectives, readily available Site information, the overall project approach, and the desired investigation schedule.

Following the kick-off meeting, the Preliminary Investigation would then proceed with information gathering, Site visit(s) with completion of preliminary field investigations, and preparation of a summary report. Additional details are provided below.

2.1 Information Gathering

Prior to any field investigation activities, GHD will acquire available information to gain a better Site understanding and to focus further investigation activities.

2.1.1 Background/File Review

For this task, GHD will perform a review of relevant historical project files in both MPCA and owner possession. Items of interest would include investigation and closure reports, plan drawings, analytical data, monitoring well construction and stratigraphy logs, landfill gas vent construction logs, and groundwater contour maps.

2.1.2 Historical Aerial Photograph Search

For this task, GHD will research and obtain available historical aerial photographs of the Site from Historical Information Gatherers (HIG), the United State Geological Survey (USGS), United States Department of Agriculture (USDA), University of Minnesota Map Library, the county, and the city.

After acquiring relevant historical aerial photographs, GHD will georeference these historical photographs. Georeferencing will allow a comparison of historical aerial photographs directly with other historical aerial photographs to better understand landfill operations over time. In addition, it will allow a comparison to present-day maps and photographs to assist in accurately determining the landfill orientation, fill timing/methods, approximate waste volume, and horizontal extents.

2.1.3 GIS LIDAR Topographical Data and Base Plan Preparation

This task will consist of acquisition of publicly available geographic information system (GIS) and light detection and ranging (LIDAR) topographical data for the Site and surrounding area. The data will be

used to prepare the initial base plan for the Site showing; topography, landfill property boundaries, adjacent parcels, property ownership, implied waste disposal and cover limits, passive gas vents, landfill gas probes (if any), groundwater monitoring and water supply wells, implied landfill gas compliance boundary (based on property boundary), implied groundwater compliance boundary (minimum 200-feet from edge of waste), survey monuments, public and private utilities, and Site access roads and trails.

2.1.4 Geologic and Hydrogeologic Information

For this task, GHD will acquire literature and information on regional and Site-specific geology and hydrogeology from the Minnesota Geological Survey (MGS), USGS, and the Minnesota Department of Health (MDH) County Well Index.

2.2 Preliminary Conceptual Site Model and Work Plan

Following acquisition of the data noted above, GHD will prepare a preliminary conceptual Site model and a work plan for the preliminary field investigation. At this time, a health and safety plan for the preliminary investigation would also be prepared.

The preliminary conceptual Site model and work plan will be presented to the MPCA for review and approval prior to commencement of the preliminary field investigation.

GHD will also confirm with the MPCA that the necessary access agreements are in place for the preliminary investigation work and will acquire keys for Site and well access.

2.3 Preliminary Field Investigation

Following work plan approval, GHD will continue the preliminary investigation with a Site visit to acquire additional Site-specific information. The proposed work plan for the preliminary field investigation will include the items specified in the following sections.

2.3.1 Passive Landfill Gas Vents

GHD will verify and measure the location of each passive gas vent; assess the condition of the vents; measure total depth and groundwater/leachate liquid level (if any); measure landfill gas concentration; and measure gas emission/flow rate.

2.3.2 Groundwater Monitoring Wells

GHD will inspect Site related groundwater monitoring wells for well condition, markings, and to measure groundwater elevation and total well depth. The location of each well will be measured and recorded.

2.3.3 Landfill Cover

The landfill cover will be inspected and assessed for the following:

- General condition of cover
- Settlement locations

- Effectiveness of surface water control features
- Landfill gas stressed vegetation and/or odors, with assessment of stressed areas via shallow bar punches to monitor for the presence of landfill gas
- Cover vegetation and presence of deep-rooted plants and noxious weeds
- Presence of erosion
- Perimeter leachate seeps

2.3.4 Perimeter and Off-Cover Assessment

GHD will monitor the landfill perimeter and off-cover areas for potential areas of landfill gas migration. Potential gas migration will be identified by stressed vegetation and/or landfill gas odors. In areas of potential gas migration, including the stated area of damaged corn east of the Site, hand bar punches and landfill gas monitoring will be completed to provide a preliminary assessment.

2.3.5 Surveying

GHD will measure, or arrange to have measured, the location and top of casing elevations of passive landfill gas vents, landfill gas monitoring probes (if any), groundwater monitoring wells, and water supply wells. Installation of a permanent survey monument will also be considered for use in future remedial investigations or remedial actions.

2.3.6 Site and Equipment Access

GHD will assess the Site and surrounding areas for vehicle, drill rig, or other heavy equipment access that may be necessary for future remedial investigations or remedial actions. Proposed access routes will be identified along with any brushing, grubbing, or modifications necessary to use the proposed routes. The location and condition of fencing and gates will be recorded.

2.4 Preliminary Investigation Report

At the completion of the preliminary investigation, GHD will provide a summary report presenting the findings of the file/data review, results of the preliminary field investigation/Site visit, and an updated conceptual Site model. The updated conceptual Site model will discuss and present the following:

- Landfill waste extents
- Depth of waste
- Estimated volume of waste
- Estimated landfill gas generation rate
- Separation distance from bottom of waste to water table
- Landfill cover extents, condition, material types, and thicknesses

- General condition of the landfill cover in preventing precipitation infiltration into the waste mass, including cover type/condition, settlement/ponding areas, surface water conveyance system, deep rooted plants, and noxious weeds
- General effectiveness of the landfill cover based on moisture conditions in the waste mass (evaluated by the amount of groundwater or perched water in the waste mass/passive gas vents)
- Condition and effectiveness of the landfill gas venting system for containment within the applicable Site compliance boundary
- Condition and effectiveness of the landfill surface water management/conveyance system
- Landfill gas migration extents
- Landfill gas compliance boundary
- Landfill gas compliance monitoring network
- Area and Site geology
- Depth to groundwater, aquifer and aquitard units
- Groundwater flow direction(s), horizontal gradients, and velocity
- Groundwater vertical gradients
- Groundwater compliance boundary location
- Suitability and effectiveness of the groundwater compliance boundary monitoring network
- Geologic and landfill cross sections both parallel and perpendicular to groundwater flow

3. Phase 2 – Remedial Investigation

The second phase of the Site evaluation will be a detailed remedial investigation. The goal of the remedial investigation will be to provide an adequate Site monitoring network (for groundwater and landfill gas), fill in data gaps identified in the Preliminary Investigation, and to collect additional Site data and information necessary to provide a complete Site evaluation for CLP acceptance and admittance.

The scope of work for the Remedial Investigation phase will be based upon the results and recommendations of the Preliminary Investigation. It is anticipated that the Remedial Investigation would include the services detailed in the following sections.

3.1 Landfill Investigations

3.1.1 Landfill Waste Extents

During the Remedial Investigation phase, the landfill waste extents will be located and surveyed. If the existing Site conditions are favorable and no significant interferences are present, a geophysical survey would be completed to determine the landfill waste extents. GHD can either arrange this work with a

MPCA contractor or self-perform as GHD has the equipment, personnel capability, and experience to perform this work.

If the Site conditions are not favorable for a geophysical survey, the edge of waste would be located by means of test pit excavations. Cover depths and materials at the edge of the landfill would also be observed during test pit excavations. Test pit excavations would be completed by an approved subcontractor with oversight by GHD personnel.

3.1.2 Landfill Cover

To further evaluate and document the condition of the landfill cover, cover borings will be completed. It is assumed that borings will be completed by an existing State Contracted driller, with direction and oversight provided by GHD personnel. Approximately two (2) borings per acre will be completed. Each borehole will be logged for depth of cover, material type(s), and location (coordinates).

3.1.3 Landfill Gas Monitoring Probes

This task will consist of the installation of permanent landfill gas monitoring probes. The gas probe monitoring network will be located and designed to adequately monitor the Site perimeter for landfill gas migration beyond the landfill compliance boundary. The location and construction of any existing probes will be accounted for in the design of the network. Gas probes will be installed in nested configurations allowing monitoring for landfill gas migration over the entire vertical waste horizon (above the water table).

Landfill gas monitoring probes will be installed with a minimum of two nested probe locations on each side of the landfill site. Each gas probe nest will contain two to three probes based on the depth of landfill waste in the vicinity. It is assumed that gas probe installations will be performed by an existing State Contracted driller. GHD personnel will provide oversight of the installations.

3.1.4 Landfill Gas Monitoring

For this task, GHD will conduct landfill gas monitoring at all Site passive gas vents and landfill gas monitoring probes (newly installed and existing). Four rounds of landfill gas monitoring will be completed on a weekly basis.

Passive gas vents will be monitored for gas composition (Methane, Carbon Dioxide, Oxygen, and balance gases) and flow rate.

Landfill gas probes will be monitored for static pressure and gas composition (Methane, Carbon Dioxide, Oxygen, and balance gases).

Additionally, the weather conditions and barometric pressure will be recorded at the time of monitoring.

3.2 Groundwater Investigations

3.2.1 Groundwater Monitoring Well Installation

This task will involve installing nested monitoring wells at an additional 3 to 5 locations at and near the Site. Off-Site locations will be based on the groundwater flow direction and groundwater velocity.

Prior to well installations, groundwater data from the Preliminary Investigation will be augmented with groundwater vertical aquifer profiling (VAP) using direct-push probes at approximately 10 locations. The VAP will be performed to provide an initial three-dimensional profile to verify the most appropriate locations and spacing for the new monitoring wells.

Monitoring well installation and VAP will be performed by a State Contracted driller with GHD observation and oversight. VAP groundwater samples will be collected by the driller. GHD personnel will log the soils in accordance with ASTM D2488 standards and complete stratigraphic and well construction logs for each well installation.

Each new monitoring well will be surveyed and developed prior to any sampling activities. It is assumed that drill cuttings will be collected and thin-spread on the landfill cover. Development water will be collected and discharged to the landfill surface.

3.2.2 Aquifer Testing

This task involves hydraulic testing, via single well response tests, at all new and select existing monitoring wells. Test results will be used to determine the hydraulic conductivity of the aquifer, which will be used to estimate the groundwater flow velocity.

3.2.3 Groundwater Monitoring

For this task, GHD will conduct two rounds of groundwater monitoring/sampling 6 to 8 weeks apart. Samples will be collected at existing monitoring wells, new monitoring wells, residential water supply wells, and residential irrigation wells.

Groundwater levels and total well depths will be measured at each monitoring well location prior to sample collection.

The anticipated monitoring and analytical parameters will include the following:

- Field parameters (pH, conductivity, temperature, oxidation reduction potential (ORP), turbidity, and dissolved oxygen)
- General chemistry parameters (e.g. major cations and anions, nitrogen)
- Cyanide
- Metals
- Semi-volatile organic compounds (SVOCs)
- Volatile organic compounds (VOCs) including 1,4 dioxane

- Perfluorochemicals (PFCs)

Samples will be collected by GHD personnel. GHD assumes that sample analysis will be completed by a State Contracted laboratory.

3.2.4 Surface Water Monitoring

GHD will conduct surface water monitoring of the river located south of the Site. Samples will be collected in two locations, one up-gradient and one down-gradient of the point where potential landfill impacted groundwater discharges to the river. The groundwater discharge point to the river will be determined by evaluation of groundwater hydraulic monitoring and VAP data.

Two rounds of surface water sampling will be completed in conjunction with groundwater monitoring (6 to 8 weeks apart). Surface water will be monitored for the field and analytical parameters identified in Section 3.2.3.

Samples will be collected by GHD personnel. GHD assumes that sample analysis will be completed by a State Contracted laboratory.

3.3 Remedial Investigation Report

Following completion of the remedial investigation activities noted above, GHD will prepare a Remedial Investigation Report. The report will present the findings of the Phase 2 Remedial Investigation and will provide an updated conceptual Site model. Additionally, the report will present and recommend remedial action alternatives to be considered and evaluated.

An initial draft of the Remedial Investigation Report will be prepared and provided to the MPCA for review and comment. GHD will then meet with MPCA personnel to discuss the report and confirm the remedial action alternatives to be evaluated. Following the meeting, GHD will update the report as necessary, and will finalize the Remedial Investigation Report.

4. Phase 3 – Remedial Alternatives Evaluation

Phase 3 will consist of the preparation of a Remedial Alternatives Evaluation Report to consider any long-term remedies for the landfill that may be necessary to best protect human health, safety, and the environment.

The Remedial Alternatives Evaluation will likely consider one or more, or a combination of the following remedial actions, based on the findings of the Remedial Investigation:

- No further action
- Existing cover improvements in select areas to address ponding, surface water drainage, or cover material or thickness deficiencies
- Installation of a new synthetic cover with minor waste consolidation and grading

- Installation of a new synthetic cover with significant waste consolidation. This would include relocation of waste near the property boundaries to create a waste-free buffer zone. Waste would be placed in settlement and other areas to improve slope and surface water drainage.
- Improvements and/or modifications to the passive landfill gas venting system if off-Site migration is present
- Active landfill gas extraction and/or flaring for landfill gas migration and odor control
- Groundwater remediation/control if required. This may include passive and/or active methods of control or treatment with potential discharge to nearby municipal sewer system.
- Purchase of adjacent property or properties to increase buffer and compliance zones
- Potential deed restrictions or institutional controls on nearby development
- Potential groundwater use restrictions
- Extension and/or connection of residents impacted by the landfill to the municipal water supply
- Installation of point-of-entry treatment systems for residents on private water supply wells impacted by the landfill
- Closure of irrigation wells if found to be significantly impacted

5. Conclusion

Following GHD's three-phase approach noted above for the Scenario C Landfill, the MPCA will have the information necessary to determine if the Site is suitable for inclusion in the CLP or what remedial actions may require implementation to allow entry into the CLP.

Should there be any questions or comments to GHD's proposed approach, please contact the undersigned.

Sincerely,

GHD

Robert Martin

TH//

April 11, 2018 Reference No. 11156920

Project Leader
Minnesota Pollution Control Agency
Closed Landfill Unit
520 Lafayette Road North
Saint Paul, Minnesota 55155

To Whom It May Concern:

Re: Example Work Plan
Remedial Investigation Services
Scenario C Closed Landfill
Rural, Minnesota

GHD Services Inc. (GHD) is pleased to provide this example work plan for completion of Remedial Investigation services for the Scenario C Closed Landfill (Site). The sections that follow detail the project objectives, site background, and summarize the proposed scope of services. The services will be completed in a three-phase approach as follows:

- Phase 1: Preliminary Investigation (Section 2)
- Phase 2: Remedial Investigation (Section 3)
- Phase 3: Remedial Alternatives Evaluation (Section 4)

1. Introduction

1.1 Objectives

GHD understands that the primary objective of this project is to evaluate the Site for potential entry into the Minnesota Pollution Control Agency's (MPCA's) Closed Landfill Program (CLP). Before accepting the Site into the program and taking over long-term care, the MPCA desires additional site information, as well as a potential long-term remedy for the landfill, to provide protection of human health, safety, and the environment.

1.2 Background

The Scenario C Closed Landfill is located in rural Minnesota. The Site began as a non-permitted dump in 1965, but was permitted in 1972 for disposal of municipal solid waste. Waste was accepted at the Site until closure in 1983. The landfill footprint is approximately 30-acres with an unknown volume of waste. The waste footprint extends nearly to the property boundaries (within 20-feet) along portions of the east, south, and west boundaries.

It is speculated that the landfill cover is inconsistent in thickness across the Site, with a potential gravel cover in southern portions of the Site. The existing cover exhibits ponding and generally drains poorly due to insufficient grade.

A map of the Site is included in the attached Figure 1. Adjacent land use includes the following:

- A residential development is located approximately 150-feet west of the Site with shallow irrigation wells.
- A residential development is located approximately 0.5-mile south of the Site with shallow irrigation wells.
- An easterly flowing river is located approximately 0.5-mile south of the Site.
- A farm is located approximately 0.25-mile east of the Site with cropland, cattle, and a private drinking water supply well. The cropland abuts the eastern boundary of the Site.
- Undeveloped land is located to the north of the Site.

Future development between the landfill and existing residential developments south and west of the Site is currently included in the City's comprehensive plan.

The existing landfill gas management system consists of twenty (20) passive landfill gas vents. It is unknown if any landfill gas monitoring probes are present at or surrounding the Site. Off-Site migration of landfill gas is suspected due to proximity of the waste footprint to Site boundaries and reported stressed vegetation within the cropland east of the Site.

The groundwater monitoring network consists of three monitoring wells along the east and south Site perimeter. Site geology, indicated by boring logs, is glacial till with sand layers intermixed with clay.

A limited remedial investigation was conducted following Site closure revealing elevated concentrations of volatile organic compounds (VOCs) and metals near the landfill, with some detections exceeding health risk limits (HRLs). Additionally, residents south of the landfill have noted odors in irrigation wells.

1.3 Assumptions

GHD made the following assumptions regarding Site conditions when preparing this work plan:

- The landfill is unlined.
- The Site was closed in compliance with the permit requirements and regulations at the time, since the MPCA is considering the Site for inclusion in the CLP.
- There is a construction documentation report for the landfill closure detailing the final grades, stormwater management features, passive gas venting system (with construction and boring logs), monitoring well logs, landfill cover materials and thicknesses, landfill waste thicknesses and bottom of waste elevations, and the horizontal extent of the landfill waste footprint.
- The landfill resides 100 miles away from GHD offices.

2. Objective 1: Preliminary Investigation

2.1 Task A: Preliminary Meeting

The Preliminary Investigation phase will commence with a meeting or conference call between MPCA and GHD personnel to discuss and confirm project goals and objectives, readily available Site information, the overall project approach, and the desired investigation schedule.

2.2 Task B: Information Gathering

Prior to any field investigation activities, GHD will acquire available information to gain a better Site understanding and to focus further investigation activities. Subtask details for this task are included below.

2.2.1 Subtask B.1: Background/File Review

For this task, GHD will perform a review of relevant historical project files in both MPCA and owner possession. Items of interest will include investigation and closure reports, plan drawings, analytical data, monitoring well construction and stratigraphy logs, landfill gas vent construction logs, and groundwater contour maps.

2.2.2 Subtask B.2: Historical Aerial Photograph Search

For this task, GHD will research and obtain available historical aerial photographs of the Site from Historical Information Gatherers (HIG), the United State Geological Survey (USGS), United States Department of Agriculture (USDA), University of Minnesota Map Library, the county, and the city.

After acquiring relevant historical aerial photographs, GHD will georeference these historical photographs to allow a comparison over time to better understand landfill operations. In addition, it will allow a comparison to present-day maps and photographs to assist in accurately determining the landfill orientation, fill timing/methods, approximate waste volumes, and horizontal extents.

2.2.3 Subtask B.3: GIS LIDAR Topographical Data and Base Plan Preparation

This task will include acquisition of publicly available geographic information system (GIS) and light detection and ranging (LIDAR) topographical data for the Site and surrounding area. The data will be used to prepare the initial base plan for the Site showing; topography, landfill property boundaries, adjacent parcels, property ownership, implied waste disposal and cover limits, passive gas vents, landfill gas probes (if any), groundwater monitoring and water supply wells, implied landfill gas compliance boundary (based on property boundary), implied groundwater compliance boundary (minimum 200-feet from edge of waste), survey monuments, public and private utilities, and Site access roads and trails.

2.2.4 Subtask B.4: Geologic and Hydrogeologic Information

For this task, GHD will acquire literature and information on regional and Site-specific geology and hydrogeology from the Minnesota Geological Survey (MGS), USGS, and the Minnesota Department of Health (MDH) County Well Index.

2.3 Task C: Preliminary Conceptual Site Model and Work Plan

Following acquisition of the data noted above, GHD will prepare a preliminary conceptual Site model and the work plan for the preliminary field investigation. A health and safety plan for the preliminary investigation will also be prepared.

The preliminary conceptual Site model and work plan will be presented to the MPCA for review and approval prior to commencement of the preliminary field investigation.

GHD will also confirm with the MPCA that the necessary access agreements are in place for the preliminary investigation work and will acquire keys for Site and well access.

2.4 Task D: Preliminary Field Investigation

Following work plan approval, GHD will complete the preliminary field investigation services with a Site visit to acquire additional Site-specific information. The Preliminary Field Investigation will be completed in a single mobilization, with travel time and costs included in Subtask D.1. Subtask details for the Preliminary Field Investigation are included in the sections below.

2.4.1 Subtask D.1: Passive Landfill Gas Vents

GHD will verify and measure the location of each passive gas vent; assess the condition of the vents; measure total depth and groundwater/leachate liquid level (if any); measure landfill gas concentration; and measure gas emission/flow rate.

Travel time and expenses for the preliminary field investigation services (Task D) are included in this subtask.

2.4.2 Subtask D.2: Groundwater Monitoring Wells

GHD will inspect Site related groundwater monitoring wells for well condition, markings, and to measure groundwater elevation and total well depth. The spatial location of each well will be measured via GPS.

2.4.3 Subtask D.3: Preliminary Landfill Cover Assessment

The landfill cover will be inspected and assessed for the following:

- General condition of cover
- Settlement locations
- Effectiveness of surface water control features
- Landfill gas stressed vegetation and/or odors, with assessment of stressed areas via shallow bar punches to monitor for the presence of landfill gas
- Cover vegetation and presence of deep-rooted plants and noxious weeds
- Presence of erosion
- Perimeter leachate seeps

2.4.4 Subtask D.4: Perimeter and Off-Cover Assessment

GHD will monitor the landfill perimeter and off-cover areas for potential areas of landfill gas migration. Potential gas migration will be identified by stressed vegetation and/or landfill gas odors. In areas of potential gas migration, including the stated area of damaged corn east of the Site, hand bar punches and landfill gas monitoring will be completed to monitor for the presence of landfill gas.

2.4.5 Subtask D.5: Delineation of Site Features

GHD will measure the location and top of casing elevations of passive landfill gas vents, landfill gas monitoring probes (if any), groundwater monitoring wells, and water supply wells. Installation of a permanent survey monument is included in this task.

2.4.6 Subtask D.6: Site and Equipment Access

GHD will assess the Site and surrounding areas for vehicle, drill rig, or other heavy equipment access that will be necessary for future remedial investigations or remedial actions. Proposed access routes will be identified along with any brushing, grubbing, or modifications necessary to use the proposed routes. The location and condition of fencing and gates will be recorded.

2.5 Task E: Preliminary Investigation Report

At the completion of the preliminary investigation, GHD will provide a summary report presenting the findings of the file/data review, results of the preliminary field investigation/Site visit, and an updated conceptual Site model. The updated conceptual Site model will discuss and present the following:

- Landfill waste extents
- Depth of waste
- Estimated volume of waste
- Estimated landfill gas generation rate
- Separation distance from bottom of waste to water table
- Landfill cover extents, condition, material types, and thicknesses
- General condition of the landfill cover in preventing precipitation infiltration into the waste mass, including cover type/condition, settlement/ponding areas, surface water conveyance system, deep rooted plants, and noxious weeds
- General effectiveness of the landfill cover based on moisture conditions in the waste mass (evaluated by the amount of groundwater or perched water in the waste mass/passive gas vents)
- Condition and effectiveness of the landfill gas venting system for containment within the applicable Site compliance boundary
- Condition and effectiveness of the landfill surface water management/conveyance system
- Landfill gas migration extents

- Landfill gas compliance boundary
- Landfill gas compliance monitoring network
- Area and Site geology
- Depth to groundwater, aquifer and aquitard units
- Groundwater flow direction(s), horizontal gradients, and velocity
- Groundwater vertical gradients
- Groundwater compliance boundary location
- Suitability and effectiveness of the groundwater compliance boundary monitoring network
- Geologic and landfill cross sections both parallel and perpendicular to groundwater flow

3. Objective 2: Remedial Investigation

The second phase of the Site evaluation will be a detailed remedial investigation to provide an adequate Site monitoring network (for groundwater and landfill gas), fill in data gaps identified in the Preliminary Investigation, and to collect additional Site data and information necessary to provide a complete Site evaluation for CLP acceptance and admittance.

The scope of work for the Remedial Investigation phase provided in this work plan is based upon the following assumed results and findings of the Preliminary Investigation:

- Landfill cover materials are favorable for performance of a geophysical survey, with no significant interferences present.
- The depth of landfill waste was determined through analysis of historical aerial photographs and passive gas vent construction logs.
- Drill rig access for borings, gas probe installations, vertical aquifer profiling, and monitoring well installations does not require significant brushing or grubbing, and does not require construction of access roads.
- No landfill gas monitoring probes are currently installed at the Site.
- The groundwater monitoring network will require installation of nested monitoring wells at 5 additional locations, with 2 wells per location.

3.1 Task A: Remedial Investigation Work Plan

This task will include the preparation of a Remedial Investigation Work Plan based upon the findings of the Preliminary Investigation. The work plan will define the scope of work for the Remedial Investigation. The work plan will be provided to the MPCA for review and approval prior to commencing the Remedial Investigation.

The proposed work items for the Remedial Investigation are detailed in the sections that follow.

3.2 Task B: Landfill Investigations

This task will include all investigation work necessary to evaluate and assess the landfill, including the extent of waste, landfill cover, quantity of landfill gas, and migration monitoring. Subtask details are provided in the following sections.

3.2.1 Subtask B.1: Landfill Waste Extents

This task will consist of the completion of a geophysical survey determine the horizontal landfill waste extents. GHD will supply the equipment and personnel to complete this task. Following completion of the survey, the Site base plans will be updated with the geophysical survey data.

3.2.2 Subtask B.2: Landfill Cover

This task will include completion of landfill cover borings to evaluate the condition and materials of the landfill cover. Borings will be completed using direct-push methods. For cost estimation purposes, a 4-foot boring depth is assumed. Borings will be completed by an existing State Contracted driller, with direction and oversight provided by GHD personnel. Two borings per acre will be completed. GHD personnel will log the soils in accordance with ASTM D2488 standards and complete stratigraphic logs for each boring. The location of each boring will be measured after completion.

Drill cuttings will be thin-spread at each boring location.

3.2.3 Subtask B.3: Landfill Gas Monitoring Probes

This task will include installation of permanent landfill gas monitoring probes around the Site perimeter, to allow monitoring of landfill gas migration beyond the compliance boundary. Gas probes will be installed at eight (8) locations (two locations on each side of the Site). Gas probes will be installed in nested configurations allowing monitoring of landfill gas migration over the entire vertical waste horizon (above the water table). Each nest will consist of three gas probes. For cost estimation purposes; it is assumed that gas probes will be installed according to the following schedule:

- Shallow probe to be screened from 4-feet below ground surface (bgs) to 12-feet bgs
- Intermediate probe to be screened from 14-feet bgs to 21-feet bgs
- Deep probe to be screened from 23-feet bgs to 30-feet bgs

Gas probe installation will be performed by an existing State Contracted driller using hollow-stem auger methods. GHD personnel will provide oversight of the installations. GHD personnel will log the soils in accordance with ASTM D2488 standards and complete stratigraphic and probe construction logs for each installation. The location and top-of-casing elevation for each probe will be measured following installation.

3.2.4 Subtask B.4: Landfill Gas Monitoring

For this task, GHD will conduct landfill gas monitoring at all Site passive gas vents and landfill gas monitoring probes (newly installed and existing). Four rounds of landfill gas monitoring will be completed

on a weekly basis. Landfill gas monitoring will be completed with a landfill gas monitor (e.g. Landtec GEM-2000) provided by the MPCA.

Passive gas vents will be monitored for gas composition (Methane, Carbon Dioxide, Oxygen, and balance gases) and flow rate.

Landfill gas probes will be monitored for static pressure and gas composition (Methane, Carbon Dioxide, Oxygen, and balance gases).

Weather conditions, including temperature, barometric pressure, and wind speed/direction will be recorded at the time of monitoring.

3.3 Task C: Groundwater Investigations

This task will include all investigation work necessary to evaluate and assess the landfill impact to groundwater. Services will include groundwater monitoring well installations, aquifer testing, groundwater monitoring, and surface water monitoring. Subtask details are provided in the following sections.

3.3.1 Subtask C.1: Vertical Aquifer Profiling

Groundwater data acquired during the Preliminary Investigation will be augmented with groundwater vertical aquifer profiling (VAP) using direct-push probes at 10 locations. For cost estimation purposes, VAP borings will be advanced to an assumed 50-feet bgs. The VAP will be performed prior to well installations, and will provide an initial three-dimensional profile of the aquifer. The VAP data will be used to determine the most appropriate locations, screen intervals, and spacing for the new monitoring wells.

VAP will be performed by a State Contracted driller with GHD observation and oversight. VAP groundwater samples will be collected by the driller. For cost estimation purposes, an assumed 3 samples will be collected from each boring at 10-foot intervals. Samples will be analyzed by a State Contracted laboratory for the following parameters:

- Volatile organic compounds (VOCs)
- Chloride

Drill cuttings will be collected and thin-spread on the landfill cover. The location of VAP borings will be measured following completion of each boring.

3.3.2 Subtask C.2: Groundwater Monitoring Well Installation

This task will involve installing nested monitoring wells at 5 locations at and near the Site. Two wells will be installed at each location. Well locations will be based on the groundwater flow direction and groundwater velocity. For cost estimation purposes; it is assumed that monitoring wells will be installed according to the following schedule:

- Shallow well to be screened from 15-feet bgs to 25-feet bgs
- Deep well to be screened from 45-feet bgs to 50-feet bgs

Monitoring well installation will be performed by a State Contracted driller with GHD observation and oversight. GHD personnel will log the soils in accordance with ASTM D2488 standards and complete stratigraphic and well construction logs for each well installation.

The location and top of casing of each new monitoring well will be measured following installation. Monitoring wells will be developed by the drilling contractor prior to sampling. Drill cuttings will be collected and thin-spread on the landfill cover. Development water will be collected and discharged to the landfill surface.

3.3.3 Subtask C.3: Aquifer Testing

This task involves hydraulic testing, via single well response tests (falling and rising head tests), at all new and existing monitoring wells. Test results will be used to determine the hydraulic conductivity of the aquifer, which will be used to estimate groundwater flow velocity.

Tests will be completed by installing a pressure transducer with data logger into each well, then proceeding with slug testing (slug introduction and slug removal) and monitoring of the resultant water level changes.

3.3.4 Subtask C.4: Groundwater Monitoring

For this task, GHD will conduct two rounds of groundwater monitoring/sampling 6 to 8 weeks apart. Samples will be collected by GHD personnel at three existing monitoring wells, ten new monitoring wells, one residential water supply well, and three residential irrigation wells.

Prior to sampling, a Sampling and Analysis Plan will be prepared detailing the sample collection, quality assurance and quality control, and laboratory analysis protocols. Details of the sample collection procedures and analytical parameters are provided below.

Groundwater levels and total well depths will be measured at each monitoring well location prior to sample collection. Each well will be purged until stabilization with a minimum of three well volumes removed.

The monitoring and analytical parameters will include the following:

- Field parameters (pH, conductivity, temperature, oxidation reduction potential (ORP), turbidity, and dissolved oxygen)
- General chemistry parameters (e.g. major cations and anions, nitrogen)
- Cyanide
- Metals
- Semi-volatile organic compounds (SVOCs)
- VOCs including 1,4 dioxane
- Perfluorochemicals (PFCs)

Laboratory analysis of samples will be completed by a State Contracted laboratory. Quality Assurance and Quality Control (QA/QC) samples will be completed on the following schedule:

- One Matrix Spike/Matrix Spike Duplicate (MS/MSD) for every twenty samples
- One duplicate for every ten samples
- One rinsate blank for every ten samples

3.3.5 Subtask C.5: Surface Water Monitoring

GHD will conduct surface water monitoring of the river located south of the Site. Sampling will be conducted in accordance with the Sampling and Analysis Plan referenced in Section 3.3.4. Samples will be collected as grab samples by GHD personnel in two locations, one up-gradient and one down-gradient of the point where potential landfill-impacted groundwater discharges to the river. The groundwater discharge point to the river will be determined by evaluation of groundwater hydraulic monitoring and VAP data.

Two rounds of surface water sampling will be completed in conjunction with groundwater monitoring (6 to 8 weeks apart). Surface water will be monitored for the field and analytical parameters identified in Section 3.2.4. Sample collection will progress from down-gradient to up-gradient locations to prevent contamination of successive samples.

Laboratory analysis of samples will be completed by a State Contracted laboratory. QA/QC samples will be collected in accordance with the schedule identified in Section 3.2.4.

3.4 Task D: Remedial Investigation Report

3.4.1 Subtask D.1: Draft Remedial Investigation Report

Following completion of the remedial investigation activities noted above, GHD will prepare a draft Remedial Investigation Report for MPCA review. The report will present the findings of the Remedial Investigation and will provide an updated conceptual Site model. The report with GHD's interpretation of the Remedial Investigation data/information would include:

- Geophysical data and landfill waste extents
- Landfill cover assessment
- Landfill gas monitoring data
- Drilling/construction logs for borings, probes, and wells
- Groundwater investigation data and summary tables (VAP, aquifer testing, water levels)
- Laboratory reports and summary tables
- Cross-sections
- Recommended remedial action alternatives to be considered and evaluated

The draft report will be provided to the MPCA within 4 weeks of completion of the Remedial Investigation field work.

3.4.2 Subtask D.2: Remedial Investigation Report Meeting

GHD will meet with MPCA personnel following submittal and review of the draft Remedial Investigation Report.

3.4.3 Subtask D.3: Final Remedial Investigation Report

This task will involve incorporation of MPCA comments into the Remedial Investigation Report. The report will then be finalized and provided to the MCPA.

4. Objective 3: Remedial Alternatives Evaluation

4.1 Task A: Draft Remedial Alternative Evaluation Report

This task will consist of the preparation of a Remedial Alternatives Evaluation Report to consider any long-term remedies for the landfill that may be necessary to best protect human health, safety, and the environment.

The remedial alternatives to be considered will be identified in the Remedial Investigation Report and will likely consider one or more, or a combination of the following remedial actions:

- No further action.
- Existing cover improvements in select areas to address ponding, surface water drainage, or cover material or thickness deficiencies.
- Installation of a new synthetic cover with minor waste consolidation and grading.
- Installation of a new synthetic cover with significant waste consolidation. This would include relocation of waste near the property boundaries to create a waste-free buffer zone. Waste would be placed in settlement and other areas to improve slope and surface water drainage.
- Improvements and/or modifications to the passive landfill gas venting system if off-Site migration is present.
- Active landfill gas extraction and/or flaring for landfill gas migration and odor control.
- Groundwater remediation/control. This may include passive and/or active methods of control or treatment with potential discharge to nearby municipal sewer system.
- Purchase of adjacent property or properties to increase buffer and compliance zones.
- Deed restrictions or institutional controls on nearby development.
- Groundwater use restrictions.
- Extension and/or connection of residents impacted by the landfill to the municipal water supply.

- Installation of point-of-entry treatment systems for residents on private water supply wells impacted by the landfill.
- Closure of irrigation wells if significantly impacted.

For each proposed remedial action alternative, GHD will provide a preliminary estimate of capital and operation and maintenance (O&M) costs for consideration.

5. Project Schedule

GHD's project schedule is provided on Figure 2. The schedule will be refined as necessary following completion of the individual objectives and based on contractor availability/schedule.

6. Remedial Investigation Cost

GHD's cost in providing the investigation services for this work plan are presented in Table 1. Costs for the Remedial Investigation phase (Objective 2) are based upon the assumptions listed in the applicable sections. The costs for the Remedial Investigation field work and reporting are based on GHD professional judgement and an anticipated scope to achieve the project goals, based on the assumptions provided in Section 3.

Should you have any questions about this work plan, please contact the undersigned.

Sincerely,

GHD

Robert Martin

TH/md/misc

Encl.

Figure 1
Scenario C Closed Landfill

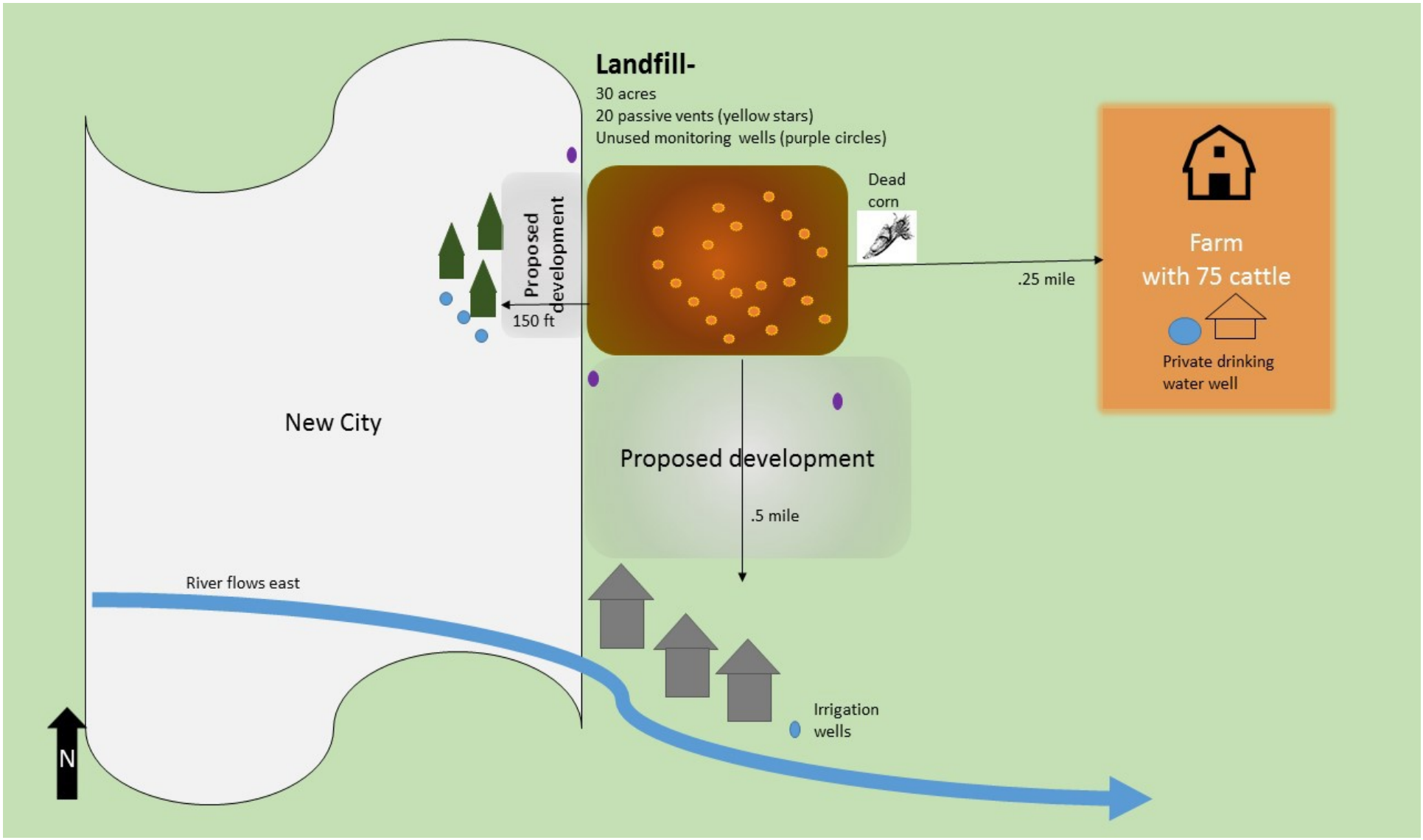
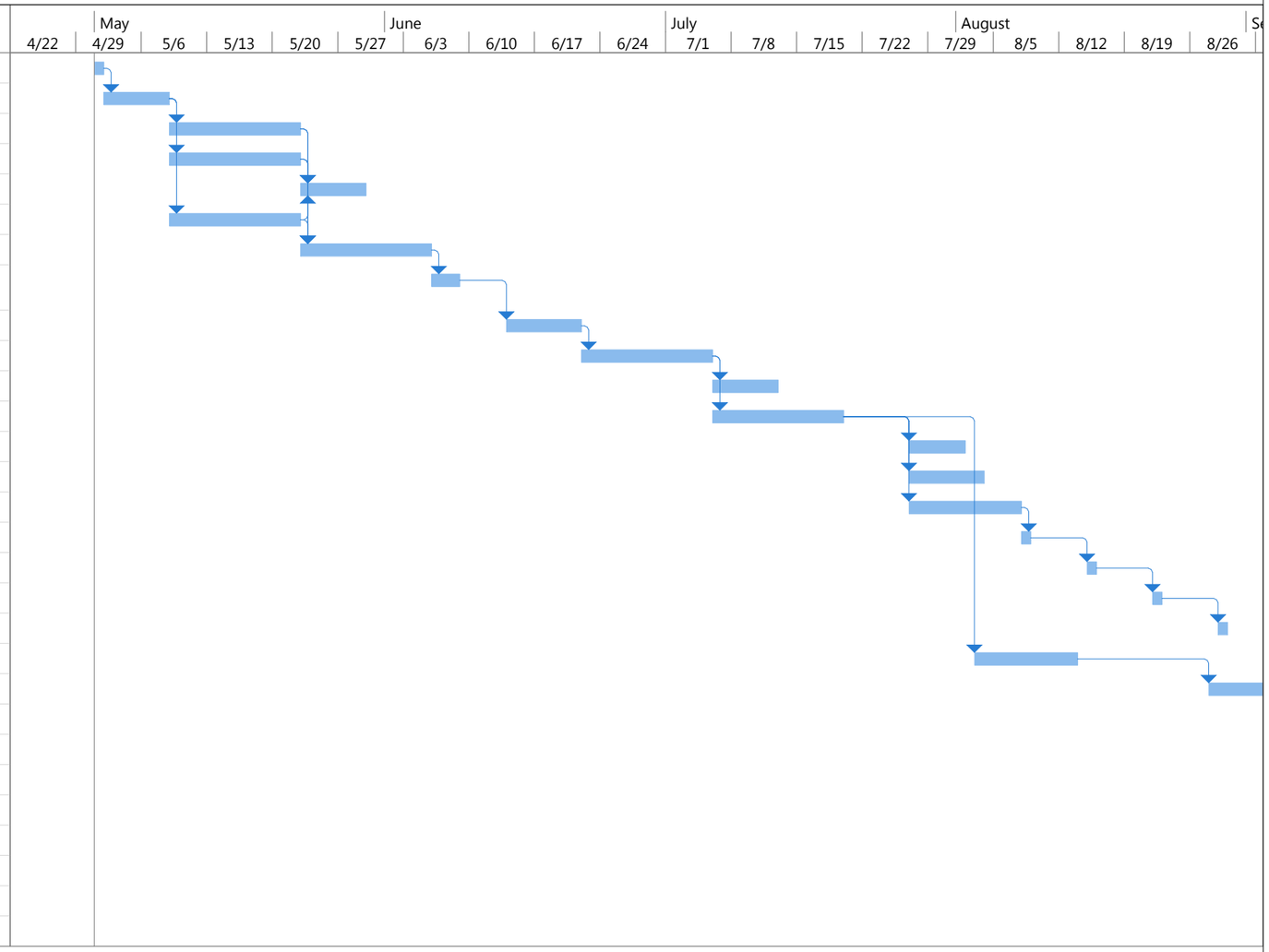


Figure 2
Preliminary Project Schedule
Remedial Investigation Services
Scenario C Closed Landfill

ID	Task Name	Duration	Start	Finish
1	Work Order Effective Date	1 day	Tue 5/1/18	Tue 5/1/18
2	Preliminary Meeting	5 days	Wed 5/2/18	Tue 5/8/18
3	Project Background/File Review	10 days	Wed 5/9/18	Tue 5/22/18
4	Aerial Photograph Search and Georeferencing	10 days	Wed 5/9/18	Tue 5/22/18
5	Base Plan Preparation	5 days	Wed 5/23/18	Tue 5/29/18
6	Geologic and Hydrogeologic Information	10 days	Wed 5/9/18	Tue 5/22/18
7	Work Plan and Preliminary Conceptual Model	10 days	Wed 5/23/18	Tue 6/5/18
8	MPCA Work Plan/Preliminary Conceptual Model Review	3 days	Wed 6/6/18	Fri 6/8/18
9	Preliminary Investigation Field Work	6 days	Thu 6/14/18	Thu 6/21/18
10	Preliminary Investigation Report	10 days	Fri 6/22/18	Thu 7/5/18
11	MPCA Review of Preliminary Investigation Report	5 days	Fri 7/6/18	Thu 7/12/18
12	Remedial Investigation Workplan	10 days	Fri 7/6/18	Thu 7/19/18
13	Landfill Waste Extents Survey	4 days	Fri 7/27/18	Wed 8/1/18
14	Landfill Cover Assessment (borings)	6 days	Fri 7/27/18	Fri 8/3/18
15	Landfill Gas Probe Installations	8 days	Fri 7/27/18	Tue 8/7/18
16	Landfill Gas Monitoring Round 1	1 day	Wed 8/8/18	Wed 8/8/18
17	Landfill Gas Monitoring Round 2	1 day	Wed 8/15/18	Wed 8/15/18
18	Landfill Gas Monitoring Round 3	1 day	Wed 8/22/18	Wed 8/22/18
19	Landfill Gas Monitoring Round 4	1 day	Wed 8/29/18	Wed 8/29/18
20	Vertical Aquifer Profiling	7 days	Fri 8/3/18	Mon 8/13/18
21	Groundwater Monitoring Well Installations	6 days	Tue 8/28/18	Tue 9/4/18
22	Aquifer Testing	2 days	Wed 9/5/18	Thu 9/6/18
23	Groundwater/Surface Water Monitoring Round 1	3 days	Fri 9/7/18	Tue 9/11/18
24	Groundwater/Surface Water Monitoring Round 2	3 days	Wed 10/24/18	Fri 10/26/18
25	Draft Remedial Investigation Report	20 days	Mon 10/29/18	Fri 11/23/18
26	MPCA Review of Draft Remedial Investigation Report	5 days	Mon 11/26/18	Fri 11/30/18
27	Meeting/Conference Call with MPCA	1 day	Mon 12/3/18	Mon 12/3/18
28	Final Remedial Investigation Report	3 days	Tue 12/4/18	Thu 12/6/18
29	Draft Remedial Alternatives Evaluation Report	15 days	Tue 12/4/18	Mon 12/24/18



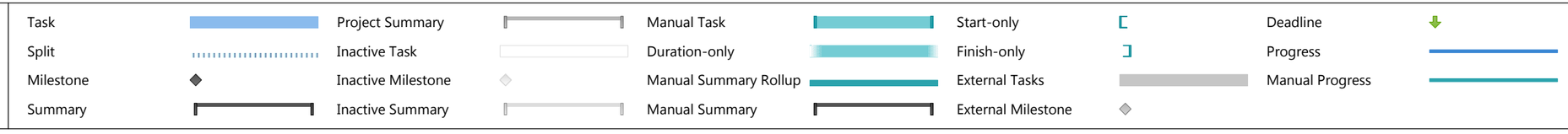


Figure 2
Preliminary Project Schedule
Remedial Investigation Services
Scenario C Closed Landfill

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10	Preliminary Investigation Report	10 days	Fri 6/22/18	Thu 7/5/18
11	MPCA Review of Preliminary Investigation Report	5 days	Fri 7/6/18	Thu 7/12/18
12	Remedial Investigation Workplan	10 days	Fri 7/6/18	Thu 7/19/18
13	Landfill Waste Extents Survey	4 days	Fri 7/27/18	Wed 8/1/18
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18	Landfill Gas Monitoring Round 3	1 day	Wed 8/22/18	Wed 8/22/18
19	Landfill Gas Monitoring Round 4	1 day	Wed 8/29/18	Wed 8/29/18
20	Vertical Aquifer Profiling	7 days	Fri 8/3/18	Mon 8/13/18
21	Groundwater Monitoring Well Installations	6 days	Tue 8/28/18	Tue 9/4/18
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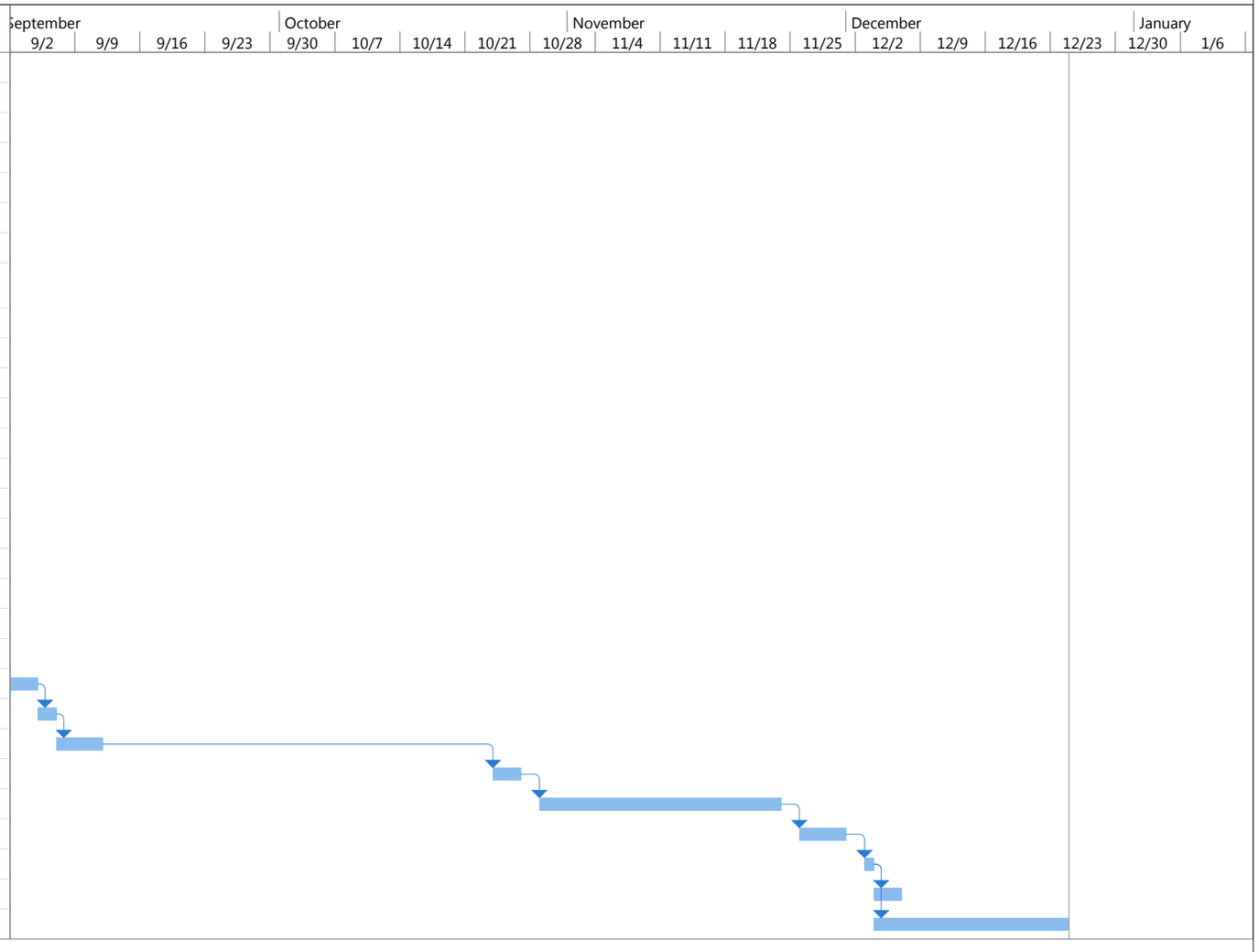

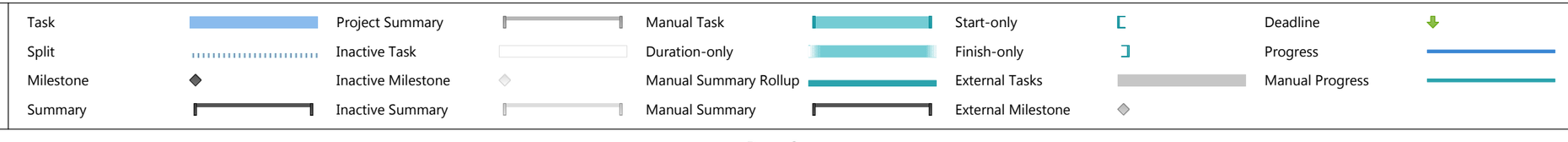

Table 1
Work Plan Budget

Site Name: Scenario C Closed Landfill
Project: Remedial Investigation Services
Site Location: Rural, Minnesota
Contractor: GHD Services Inc.

		1. Personnel (hours)																	
Objective/Task	Frequency	Project Manager ($137.52/hr)	Engineer III ($137.52/hr)	Engineer II ($97.48/hr)	Engineer I ($78.09/hr)	Scientist II ($97.48/hr)	Scientist I ($78.09/hr)	On-Site Inspector ($137.52/hr)	QA/QC Officer ($97.48/hr)	Field Technician ($78.09/hr)	GIS/CADD Specialist ($78.09/hr)	Time Total (hours)	2. Subcontractors ($)	3. State Contractors ($)	4. Materials & Rental Equipment ($)	5. Other Expenses: Lodging ($100/night)	Meals ($36/day)	Mileage ($0.545/mile)	Totals (Extended) ($)
Objective 1 - Preliminary Investigation																			
Task A - Preliminary Meeting	***One Time***	***5.0***	***0.0***	***4.0***	***0.0***	***4.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***13.0***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ 16.35***	***$ 1,483.79***
Task B - Information Gathering		***16.0***	***0.0***	***26.0***	***10.0***	***20.0***	***4.0***	***0.0***	***0.0***	***0.0***	***20.0***	***96.0***	***$ -***	***$ -***	***$ 500.00***	***$ -***	***$ -***	***$ 32.70***	***$ 9,872.16***
Subtask B.1 - File Review	One Time	8.0	0.0	12.0	6.0	6.0	0.0	0.0	0.0	0.0	0.0	32.0	$ -	$ -	$ -	$ -	$ -	$ 32.70	$ 3,356.04
Subtask B.2 - Historical Aerial Photos	One Time	3.0	0.0	8.0	4.0	4.0	0.0	0.0	0.0	0.0	10.0	29.0	$ -	$ -	$ 500.00	$ -	$ -	$ -	$ 3,175.58
Subtask B.3 - Base Plan Preparation	One Time	2.0	0.0	6.0	0.0	4.0	0.0	0.0	0.0	0.0	10.0	22.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,030.74
Subtask B.4 - Geologic and Hydrogeologic Information	One Time	3.0	0.0	0.0	0.0	6.0	4.0	0.0	0.0	0.0	0.0	13.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,309.80
Task C - Work Plan and Preliminary Conceptual Model	***One Time***	***8.0***	***0.0***	***10.0***	***4.0***	***16.0***	***0.0***	***0.0***	***0.0***	***0.0***	***8.0***	***46.0***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ 4,571.72***
Task D - Preliminary Field Investigation		***10.0***	***0.0***	***16.0***	***0.0***	***3.0***	***0.0***	***0.0***	***0.0***	***45.0***	***4.0***	***78.0***	***$ -***	***$ -***	***$ 1,131.00***	***$ 600.00***	***$ 288.00***	***$ 261.60***	***$ 9,334.33***
Subtask D.1 - Passive Landfill Gas Vent Inspections	One Time	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	0.0	16.0	$ -	$ -	$ 54.00	$ 600.00	$ 288.00	$ 261.60	$ 2,571.90
Subtask D.2 - Groundwater Monitoring Well Inspections	One Time	1.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	5.0	$ -	$ -	$ 27.00	$ -	$ -	$ -	$ 515.66
Subtask D.3 - Preliminary Landfill Cover Assessment	One Time	3.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	19.0	$ -	$ -	$ 150.00	$ -	$ -	$ -	$ 1,928.34
Subtask D.4 - Perimeter and Off-Cover Assessment	One Time	2.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	13.0	$ -	$ -	$ 150.00	$ -	$ -	$ -	$ 1,400.37
Subtask D.5 - Delineation of Site Features	One Time	1.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	10.0	4.0	17.0	$ -	$ -	$ 750.00	$ -	$ -	$ -	$ 2,175.74
Subtask D.6 - Access Assessment	One Time	1.0	0.0	2.0	0.0	1.0	0.0	0.0	0.0	4.0	0.0	8.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 742.32
Task E - Preliminary Investigation Report	***One Time***	***12.0***	***2.0***	***20.0***	***25.0***	***12.0***	***6.0***	***0.0***	***0.0***	***0.0***	***18.0***	***95.0***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ 8,871.05***
Objective 1 Totals		**51.0**	**2.0**	**76.0**	**39.0**	**55.0**	**10.0**	**0.0**	**0.0**	**45.0**	**50.0**	**328.0**	**$ -**	**$ -**	***$ 1,631.00***	**$ 600.00**	**$ 288.00**	**$ 310.65**	**$ 34,133.05**
Objective 2 - Remedial Investigation																			
Task A - Remedial Investigation Work Plan	***One Time***	***18.0***	***0.0***	***30.0***	***20.0***	***20.0***	***5.0***	***0.0***	***0.0***	***0.0***	***18.0***	***111.0***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ 10,707.23***
Task B - Landfill Investigations		***16.0***	***0.0***	***22.0***	***20.0***	***34.0***	***88.0***	***0.0***	***0.0***	***52.0***	***10.0***	***242.0***	***$ -***	***$ 26,500.00***	***$ 3,626.00***	***$ 1,100.00***	***$ 540.00***	***$ 850.20***	***$ 53,550.70***
Subtask B.1 - Landfill Waste Extents Survey	One Time	4.0	0.0	6.0	0.0	30.0	0.0	0.0	0.0	24.0	4.0	68.0	$ -	$ -	$ 2,500.00	$ 400.00	$ 216.00	$ 141.70	$ 9,503.58
Subtask B.2 - Landfill Cover Assessment	One Time	4.0	0.0	10.0	4.0	4.0	40.0	0.0	0.0	0.0	3.0	65.0	$ -	$ 5,000.00	$ 440.00	$ 300.00	$ 144.00	$ 130.80	$ 11,599.83
Subtask B.3 - Landfill Gas Probe Installations	One Time	4.0	0.0	6.0	10.0	0.0	48.0	0.0	0.0	0.0	3.0	71.0	$ -	$ 21,500.00	$ 550.00	$ 400.00	$ 180.00	$ 141.70	$ 28,670.15
Subtask B.4 - Landfill Gas Monitoring	Four rounds	4.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	28.0	0.0	38.0	$ -	$ -	$ 136.00	$ -	$ -	$ 436.00	$ 3,777.14
Task C - Groundwater Investigations		***21.0***	***0.0***	***0.0***	***0.0***	***40.0***	***136.0***	***0.0***	***7.0***	***102.0***	***6.0***	***312.0***	***$ -***	***$ 81,100.00***	***$ 4,045.00***	***$ 2,000.00***	***$ 936.00***	***$ 795.70***	***$ 115,400.14***
Subtask C.1 - Vertical Aquifer Profiling	One Time	4.0	0.0	0.0	0.0	10.0	60.0	0.0	0.0	0.0	3.0	77.0	$ -	$ 14,750.00	$ 162.00	$ 600.00	$ 252.00	$ 261.60	$ 22,470.15
Subtask C.2 - Groundwater Monitoring Well Installations	One Time	4.0	0.0	0.0	0.0	10.0	50.0	0.0	0.0	0.0	3.0	67.0	$ -	$ 30,000.00	$ 745.00	$ 500.00	$ 180.00	$ 152.60	$ 37,241.25
Subtask C.3 - Aquifer Testing	One Time	4.0	0.0	0.0	0.0	12.0	16.0	0.0	0.0	0.0	0.0	32.0	$ -	$ -	$ 274.00	$ 100.00	$ 72.00	$ 119.90	$ 3,535.18
Subtask C.4 - Groundwater Monitoring	Two rounds	6.0	0.0	0.0	0.0	4.0	8.0	0.0	5.0	96.0	0.0	119.0	$ -	$ 30,750.00	$ 2,778.00	$ 800.00	$ 432.00	$ 261.60	$ 44,845.40
Subtask C.5 - Surface Water Monitoring	Two rounds	3.0	0.0	0.0	0.0	4.0	2.0	0.0	2.0	6.0	0.0	17.0	$ -	$ 5,600.00	$ 86.00	$ -	$ -	$ -	$ 7,308.16
Task D - Remedial Investigation Report		***27.0***	***4.0***	***42.0***	***20.0***	***34.0***	***12.0***	***0.0***	***0.0***	***0.0***	***29.0***	***168.0***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ 16,435.09***
Subtask D.1 - Draft Remedial Investigation Report	One Time	18.0	4.0	30.0	16.0	30.0	12.0	0.0	0.0	0.0	24.0	134.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 12,934.92
Subtask D.2 - Meeting/Conference Call	One Time	4.0	0.0	4.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	12.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,329.92
Subtask D.3 - Final Remedial Investigation Report	One Time	5.0	0.0	8.0	4.0	0.0	0.0	0.0	0.0	0.0	5.0	22.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,170.25
Objective 2 Totals		**82.0**	**4.0**	**94.0**	**60.0**	**128.0**	**241.0**	**0.0**	**7.0**	**154.0**	**63.0**	**833.0**	**$ -**	**$ 107,600.00**	**$ 7,671.00**	**$ 3,100.00**	**$ 1,476.00**	**$ 1,645.90**	**$ 196,093.16**
Objective 3 - Remedial Alternatives Evaluation																			
Task A - Draft Remedial Alternatives Evaluation Report	***One Time***	***16.0***	***6.0***	***28.0***	***18.0***	***8.0***	***4.0***	***0.0***	***0.0***	***0.0***	***16.0***	***96.0***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ 9,502.14***
Objective 3 Totals		**16.0**	**6.0**	**28.0**	**18.0**	**8.0**	**4.0**	**0.0**	**0.0**	**0.0**	**16.0**	**96.0**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 9,502.14**
Project Totals		**149.0**	**12.0**	**198.0**	**117.0**	**191.0**	**255.0**	**0.0**	**7.0**	**199.0**	**129.0**	**1257.0**	**$ -**	**$ 107,600.00**	**$ 9,302.00**	**$ 3,700.00**	**$ 1,764.00**	**$ 1,956.55**	**$ 239,728.35**

APPENDIX 1

Curricula Vitae

Primary Project Staff

RETURN TO TEAM LIST

Ryan Aamot
Geologist

Qualified: Bachelor of Science - Geology (B.Sc.) 1999

Connected: Registered Professional Geologist: Minnesota and Wisconsin

Professional Summary: Ryan has over 15 years of experience in the environmental consulting industry and became a licensed professional geologist in 2008. Ryan has a strong commitment to safety while producing high quality results in the field and in the office.

Project Manager

Ryan has contributed to multiple projects for several clients. Specific project experience and locations are listed below:

- Project management, coordination, system operation, maintenance and monitoring, reporting, and agency negotiations associated with remediation of landfill gas and groundwater contamination on a Former Landfill Site (Federal Superfund Site) in Tomah, Wisconsin.
- Project management, coordination, monitoring, and reporting associated with lease site investigations for railroads.

Hydrogeologist

Project Hydrogeologist
New Richmond Landfill (NR2492) | New Richmond, WI

In charge of groundwater data collection and interpretation along with project updates to the clients and associated state agencies.

- Responsible for the coordination and supervision associated with the long-term groundwater monitoring programs
- Assist with monitoring program development, data evaluation, and report preparation
- Coordinate and conduct the field work associated with the installation and sampling of the monitoring well network
- Coordinate and conduct the field work associated with the residential well sampling
- Single well response testing – data collection and interpretation
- Prepare and conduct project presentations to the PRP group

Project Hydrogeologist
Old New Richmond Landfill (NR310) | New Richmond, WI

In charge of groundwater data collection and interpretation along with project updates to the clients and associated state agencies.

- Responsible for the coordination and supervision associated with the long-term groundwater monitoring programs
- Assist with monitoring program development, data evaluation, and report preparation
- Coordinate and conduct the field work associated with the installation and sampling of the monitoring well network
- Coordinate and conduct the field work associated with the residential well sampling
- Single well response testing – data collection and interpretation
- Prepare and conduct project presentations to the PRP group

Drilling/Well Installation

Field Geologist
Honeywell-Golden Valley | Honeywell | Golden Valley, MN

Responsible for lining up, overseeing, and the overall quality of work of GHD's subcontractors. In charge of groundwater and soil gas data collection.

- Coordination of sub-contractors for drilling, surveying, and waste disposal activities
- Coordinating access for drilling and monitoring well installation
- Oversight of direct push, hollow-stem auger, and rotosonic drilling methods

- Installation of overburden and bedrock monitoring wells including development
- Perform and coordinate the setup of the groundwater monitoring program
- Coordinate the installation and sampling of soil gas probes
- Coordinate and oversight of a chemical injection program
- Assist with monitoring program development, data evaluation, and report preparation

Field Geologist
Minnegasco | Center Point Energy | Minneapolis, MN

Field Geologist for industrial site in Minneapolis, Minnesota.

- Coordination of sub-contractors for drilling
- Perform and coordinate the setup of the groundwater monitoring program
- Perform and coordinate the installation and sampling of soil gas probes
- Assist with monitoring program development, data evaluation, and report preparation

Phase II

Field Geologist

Field Geologist for numerous Phase II Environmental Site Assessments throughout the multiple states.

- Coordination of sub-contractors for drilling, surveying, and waste disposal activities
- Coordinating access for drilling and monitoring well installation
- Oversight of direct push, hollow-stem auger, and rotosonic drilling methods
- Installation of overburden and bedrock monitoring wells including development
- Perform and coordinate the setup of the groundwater monitoring program
- Coordinate the installation and sampling of soil gas probes
- Oversight of test pit excavations
- Assist with monitoring program development, data evaluation, and report preparation

Landfill Cap

Field Geologist

Field Geologist for numerous landfill cap construction projects.

- Oversight of regrading and capping activities
- Oversight of installation of a geosynthetic clay barrier, very flexible polyethylene liner, drainage geocomposite, vegetative frost protection layer, and surface water drainage system
- Oversight of drum and soil excavation
- Oversight of installation of gas probes and gas vents
- Oversight of installation of erosion control
- Daily activity documentation and record keeping

Other related areas of interest

Recognized (Certifications/Trainings)

- 40-Hour HAZWOPER OSHA Training (per 29 CFR 1910.120)
- 8-Hour HAZWOPER Refresher OSHA Training (per 29 CFR 1910.120), Annually
- Railroad Worker Protection (RWP) Training, Railroad Education, Annually
- e-RAIL SAFE Certification, NAPBS, Biennially

Work history

2000 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1999 - 2000	Minnesota Pollution Control Agency, Detroit Lakes, MN
1998	Minnesota Board of Water and Soil Resources, Brainerd, MN

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Charles E. Ahrens

Senior Geologist/Hydrogeologist

Qualified: University of Montana, B.A. – Geology, 1981

Connected: Licensed Professional Geologist: Minnesota; Registered Professional Geologist: Wisconsin; Member, National Ground Water Association

Professional Summary: Chuck is a Senior Geologist/Hydrogeologist with more than 25 years in technical design, coordination, and implementation of remedial investigations and remedial designs for contaminated soil and groundwater sites. Chuck has worked on projects throughout the United States and has extensive experience in geological and hydrogeological investigations, feasibility studies, pilot studies, natural attenuation studies, vapor intrusion evaluations, remedial design, and remedial construction for industrial, state, and municipal clients.

Site Investigation/Remediation

- Project Manager/Hydrogeologist: Groundwater and soil remediation at a superfund site in Wausau, Wisconsin. Project included VOC remediation through soil vapor extraction,groundwater plume definition, groundwater modeling, vapor intrusion evaluation, and a pump and treat groundwater remedy.
- Project Geologist/Hydrogeologist: Investigation and remediation of a multi-layer aquifer at a former municipal and industrial landfill near Eau Claire, Wisconsin. Project included groundwater plume definition studies, downhole natural gamma logging, electromagnetic induction (EM) surveying to map a perched groundwater system, soil vapor monitoring, vapor extraction pilot testing, aquifer testing, and design of groundwater containment remedy.
- Project Hydrogeologist: Designed and implemented hydrogeological investigations to define groundwater contaminant plume migration from two municipal landfills in northern Minnesota. Projects included monitoring well and surface water monitoring, receptor survey, natural attenuation study, aquifer testing, and design of hydraulic containment remedies.
- Project Geologist/Hydrogeologist: Investigation and remediation of a shallow drinking water aquifer at a grain storage facility in Nebraska. Project included source area investigation, vapor intrusion study, groundwater plume definition, aquifer testing, and design of groundwater extraction remedy.
- Project Geologist/Hydrogeologist: Soil and groundwater investigation at an industrial disposal site in Woodbury, Minnesota. Project included EM survey to delineate waste areas, groundwater plume definition, groundwater containment performance evaluation, soil vapor sampling, soil vapor extraction pilot studies, natural attenuation study, cap permeability testing, and HELP modeling.
- Project Hydrogeologist: Soil and groundwater investigation and remediation at a wood treating site in northern Wisconsin. Project included soil and groundwater investigations, pentachlorophenol remediation and long term monitoring.
- Project Geologist/Hydrogeologist: Soil and groundwater investigation at a former locomotive maintenance yard in Iowa. Project included soil and groundwater investigations, laser induced fluorescence (LIF) surveys to delineate sources and extent of diesel impact, and LNAPL mobility study.
- Project Manager/Hydrogeologist: Long term groundwater monitoring at a closed landfill in River Falls, Wisconsin. Project also included landfill gas monitoring, VOC plume definition, and residential well monitoring.
- Geologist/Hydrogeologist: Performed dual phase vacuum extraction pilot study, Hydrogen Releasing Compound (HRC) pilot study, and Hydrogen Membrane pilot study at a former ammunition plant near Minneapolis, Minnesota.
- Project Geologist/Hydrogeologist: Groundwater, sediment and soil investigation at capacitor manufacturing plant in Bridgeport, Connecticut. Project included definition of chlorinated solvent and PCB plume in groundwater, aquifer testing, groundwater modeling, sewer smoke testing and sewer sampling, sediment sampling in Bridgeport Harbor, and investigation of tidal influences on groundwater flow at the harbor-side property.
- Project Hydrogeologist: Charles City, Iowa. Performed packer testing for vertical contaminant and flow delineation in a limestone aquifer. Performed pumping tests in conjunction with tracer dye injection to show that groundwater flow is controlled by

discreet fracture zones and solution cavities within the limestone.

- Project Geologist/Hydrogeologist: Groundwater and soil investigation for a RI/FS at a truck assembly plant in St. Paul, Minnesota. Project included soil borings in former solid waste disposal area, bedrock monitoring wells, aquifer testing, and investigation of shallow groundwater/ storm sewer interaction. Implemented soil removal remedy.
- Hydrogeologist: Groundwater remediation of chlorinated volatiles at a manufacturing plant in Nebraska. Project included pilot study for enhanced anaerobic bioremediation. Pilot study consisted of repeated injections of molasses/nutrient solution into an array of injection wells and groundwater monitoring of upgradient and downgradient wells.
- Hydrogeologist: Joplin, Missouri. Provided litigation support through oversight of hydrogeological investigations. Investigations included monitoring well installations in limestone bedrock, downhole geophysical investigations, vertical delineation of hydraulic conductivity, and aquifer testing.
- Senior Geologist. Performed DNAPL investigation and detailed stratigraphic logging at a chemical manufacturing plant in Calvert City, Kentucky.
- Project Geologist: Designed, performed, and interpreted EM survey to detect improperly buried hazardous waste containers on residential property in St. Paul, Minnesota.
- Hydrogeologist: Performed a high volume aquifer recharge test for a groundwater remediation system at a former ammunition plant in St. Paul, Minnesota.
- Geologist: Performed soil boring investigation for areal distribution of DNAPL at a chemical plant waste landfill in Niagara Falls, New York. Project included drilling through saturated hazardous waste immediately adjacent to the Niagara River, collecting samples of DNAPL at the interface of the waste and underlying clay, and constructing a topographic map of the top of the clay.
- Project Geologist/Hydrogeologist: Groundwater, soil, surface water, and sediment investigation for RI/FS at a large pesticide waste landfill near Toone, Tennessee. Project included angled soil borings beneath waste trenches, installation of piezometer nests in perched groundwater adjacent to landfill, extensive monitoring well network installation, aquifer testing, regional stream and sediment sampling, stream flow measurement, groundwater seep survey, and implementation of groundwater containment system.

Other related areas of interest

Certifications/Training

- ITRC, "Light, Non-Aqueous-Phase Liquids: Science, Management, and Technology", Classroom Training, Austin, Texas, November 2015
- Northern Illinois University, "Assessing Ground Water Movement and Contaminant Migration Through Aquitards", Short Course, Midwest Geosciences Group, Naperville, Illinois, May 2007
- University of Minnesota, College of Continuing Education, "Advances in Pumping and Slug Testing for Improved Site Characterization", Short Course, Midwest Geosciences Group, St. Paul, Minnesota, May 2003
- University of Minnesota, College of Continuing Education, "Improving the Description and Characterization of Glacial Successions for Environmental and Engineering Projects", Workshop, Midwest Geosciences Group, Waverly, Minnesota, October 2004
- NGWA, "Advanced Data Analysis Techniques for Evaluating and Quantifying Natural Attenuation", Denver, Colorado, November 5-6, 2009
- Waterloo Center for Groundwater Research, "Dissolved Organic Contaminants in Groundwater", Short Course, Arlington, Virginia, May 1994
- Princeton Groundwater "The Princeton Remediation Course", Orlando, Florida, November 1996

Work history

1986 – present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1985	Braun Intertec, St. Paul, MN
1982 - 1984	Azimuth Inc., Missoula, MT

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Matthew Barnes
Field Technician

Qualified: Bachelor of Arts - Environmental Studies (B.A.), 2010

Professional Summary: Matt has over 4 years of experience as a field technician, providing the quality and attention to detail clients demand. His broad range of field experience, which include but is not limited to groundwater sampling, soil sampling, construction oversight, emergency response and closed landfill operation and maintenance show his versatility. In the office he prepares operation and maintenance reports for multiple sights. Matt has excellent communication, organizational skills, and never afraid to take on a new challenge.

Reporting

- Preparation of a Health and Safety Plan for mobilization of personnel, materials, and equipment to and from the site, water level monitoring activities, groundwater sampling activities, operation and maintenance (O&M) of remediation system, site inspections/site reconnaissance, and decontamination of personnel and equipment for a container corporation located in Auburn, Michigan.
- Detailed preparation of multiple monthly operation and maintenance reports for the Minnesota Pollution Control Agency.

Construction Oversight Activities

Field Technician
Koochiching County landfill | MPCA | International Falls, MN

Matt provided construction oversight of a synthetic liner system, which included a geomembrane liner, and composite drainage installation. His attention to detail ensured the client the job was done according to the scope of work.

Field Technician
East Mesaba landfill | MPCA | Virginia, MN

Matt provided construction oversight of a synthetic liner system, which included geotextile cushion, geomembrane liner, and composite drainage installation. His thorough inspection of contractor ensured quality of work.

Emergency Response Activities

Field Technician
Ellendale Train Derailment | Canadian Pacific | Ellendale, MN

Matt assisted in the emergency response of a train derailment. Duties included: swift response and mobilization to derailment site, contribute to site health and safety implementation, conduct real-time air monitoring using a four-gas meter, and conducting site inspections. Matt's ability to assist with the stressful and chaotic demands of an emergency response while upholding the high Health and Safety standards of GHD allowed for the job to be completed swiftly and safely.

Site Supervisor Activities

Field Technician
Highway 96 Site | Arconic Inc. |Whirlpool | White Bear Lake Township, MN

Matt took over the Site Supervisor activities which include conducting weekly inspections, preparing and submitting monthly health and safety summaries to client, collecting quarterly MCES samples, preparing quarterly MCES discharge reports, coordination and oversight of extraction well rehabilitation and maintenance, and coordination and execution the bi-annual residential sampling events. His preparation and foresight add value to the project team.

Operation and Maintenance

Field Technician
Multiple Closed landfill sites | MPCA | Minnesota

Matt monitors and maintains multiple active gas extraction systems. His mechanical aptitude and attention to detail ensures the continuing operation of the flare systems. Activities include; landfill gas monitoring, gas probe monitoring, preventative maintenance on the gas extraction systems, well head maintenance, landfill cap maintenance, solar flare installation, system troubleshooting, and leachate extraction system maintenance.

Other Field Activities

- Groundwater sampling
- Surficial soil sampling (Geoprobe)
- Residential well sampling
- Fluid level monitoring
- Soil gas sampling
- Landfill gas monitoring with Gem-500, Gem-2000, and Gem-2000+
- Air quality measurements with PID and FID
- Soil vapor testing with SUMA canisters

Other related areas of interest

Recognized (Certifications/Trainings)

- 40-Hour HAZWOPER OSHA Training (per 29 CFR 1910.120), 2011 - Present
- Union Pacific Railroad E-Railsafe Certification, 2012 - Present
- **53235: Basic Electricity for the Non-Electrician** – American Trainco - 2015

Work history

2011 – present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN

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James M. Blumke

Project Manager/Project Engineer

Qualified: Bachelor of Science - Civil Engineering, Emphasis in Environmental Engineering (B.S.) 1995

Connected: Licensed Professional Engineer: Minnesota, since 2003, Certified Groundwater Professional: Iowa, since 2002, Licensed Petroleum Release Remediator: South Dakota, since 2001, American Society of Civil Engineers (ASCE), since 1995, National Groundwater Association (NGWA), since 2001

Professional Summary: Jim is a senior engineer with over 20 years of experience in environmental and geotechnical engineering and project management. Demonstrating an excellent safety record and project communications, as well as providing clients with the best overall value, are what helps Jim with all of his work products, including Phase I / II environmental site assessments and investigations, alternatives evaluations and feasibility studies, remedy selection and remediation system design, operation, maintenance, monitoring, and system optimization, preparation of specifications and bidding documents, providing resident engineer construction oversight and contract administration, soil, groundwater, and geotechnical investigation and foundation design, engineering loss inspections and insurance evaluations.

Project Engineering/Evaluations and Inspections

- Provided project engineering, coordination, and management, including client and regulatory agency contact, scope and budget development, scheduling, business planning, supervising and project control for various projects throughout United States. Responsibilities include:
  - Project engineering for several railroad lease site properties located throughout Nebraska, Arkansas, Kansas, Iowa, and Minnesota consisting of pre-design investigation work plans, data analysis, engineering design drawings and specifications, bid document preparation, and engineering oversight activities.
  - Project coordination and permitting assistance for various gas pipeline hydrostatic integrity testing (hydro-test) for new and existing pipeline and maintenance projects located in Minnesota and Wisconsin.
  - Project engineer for remedial alternatives and pre-design investigations related to slope stability evaluation and groundwater clean-up of petroleum compounds at a former bulk crude facility located in Howard, Kansas.
  - Engineering site inspection and evaluation assessment for a pre-cast concrete parking structure with masonry stone architectural siding related to an insurance claim investigation.
  - Emergency response coordination and project engineering support for a railroad engine car derailment near wetlands located in Mankato, Minnesota. Activities included Army Corps of Engineers (ACOE) permit completion notices and LNAPL investigation and clean-up.
  - Assisted in development of guidance documents for a major utility related to pipeline projects located in Minnesota, Wisconsin, South Dakota, North Dakota, and Michigan.
  - Engineering site inspection and evaluation assessment for a metal frame warehouse structure related to a builder risk insurance policy claim investigation.
  - Project engineering for a former railroad yard in Iowa, consisting of pre-design investigation work plans, data analysis, engineering design drawings and specifications, bid document preparation, and engineering oversight activities.
  - Project management and engineering support for several petroleum release sites in South Dakota and Iowa for a major (national) petroleum corporation.
  - Project engineering and coordination for a highly sensitive railroad project involving petroleum, metals, VOCs, and PAHs impacts adjacent to federal Superfund site. Assisted with strategy development, provided investigation and report preparation services to obtain closure.
  - Litigation support services including project engineering and coordination of investigative and clean-up activities related to floating oils containing PCBs and chlorinated solvents at an industrial property located in Chicago area, Illinois.
  - Emergency response coordination and project support for a railroad car derailment along a river in the southwest Twin Cities metro area.

- Project Engineer for response action plan development and remedial construction of a former 20-acre Minnesota State Superfund dump site in the twin cities metropolitan area. Provided pre-design investigation and design services, bid document preparation including drawings and specifications, engineering oversight and construction contract administration services, and construction completion report preparation related to response action plan implementation.
- Project engineering and coordination, including NPDES permit DMR reporting and operations and maintenance (O&M) oversight, for a soil vapor extraction (SVE) and groundwater pumping/air stripper treatment system for an iron foundry site impacted with chlorinated VOCs enrolled in the Illinois Site Remediation Program (SRP).
- Resident Project Engineer for remedial construction of a former 230-acre dump (Minnesota Closed Landfill Program) in the twin cities metropolitan area. Provided oversight engineering and construction contract administration services during construction activities, which included waste excavation and relocation, stream bank stabilization and erosion control installation, placement of landfill cover cap and grading, topsoil placement, and landscaping.
- Project engineering and coordination for a former landfill site in Minnesota, consisting of pre-design investigation work plans, data analysis, engineering design of landfill cover, drawings and specifications, bid document preparation, and engineering oversight activities.
- Project coordination and engineering support for investigations conducted for the evaluation of remedial alternatives related to a former industrial site impacted with chlorinated solvents in Sioux Falls, South Dakota.
- Project coordination and on-site liner inspection of a geosynthetic liner on a closed landfill near Detroit Lakes, Minnesota.
- Project engineering support for design of groundwater treatment system, including engineering drawings and construction specifications, for an industrial site in Rockaway Borough, New Jersey.
- Project engineering and coordination for a dual-phase extraction (DPE) treatment system for a railroad petroleum fueling site in northeastern Iowa.
- Project engineering support for remedial investigations conducted at a former industrial site contaminated with metals, PCBs, and VOCs in Kenilworth, New Jersey.
- Analysis of pumping test data and engineering support for use in designing a groundwater treatment system to remediate chlorinated solvents for a site in Arizona.
- Project engineering support for a focused feasibility study for design and implementation of an in situ oxidation remedy at a site in southwestern Minnesota.

Decommissioning of Environmental Systems

- Project engineer for the environmental decommissioning of a 200,000-square-foot manufacturing facility which contained metal plating operations, thermal-treatment processes, and hydraulic oil systems (ASTs, USTs) in the State of Minnesota. Responsibilities include:
  - Assisted with facility walkthrough and preparation of workplan upon identification of areas requiring environmental closure.
  - Provided project coordination and engineering oversight during environmental cleaning of chemical process systems.
  - Provided confirmation sampling services upon removal of environmental systems.
  - Analyzed data and compared to applicable regulatory criteria, and made recommendations regarding further investigation and closure.
  - Conducted remedial investigative and cleanup activities associated with facility decommissioning.
  - Provided engineering oversight of facility restoration process.
  - Prepared a written report describing the facility findings, the decommissioning activities, and the closure of environmental systems and permits.

Remedial Investigations/Corrective Action Designs (RI/CAD)

- Conducted numerous site investigations for petroleum (UST) and VOCs sites throughout the States of Minnesota, Iowa, and South Dakota. Responsibilities include:
  - Performed site history analyses related to surface and subsurface conditions, and developed programs of contaminant investigation.
  - Prepared and evaluated engineering proposals and site Health and Safety Plans.

- Directed field exploration programs and, as necessary, made modifications based on conditions encountered.
- Analyzed field and analytical data, performed literature review and calculations for compounds of concern, modeled contaminants in soil and groundwater.
- Made engineering recommendations, based on toxicity characteristics and exposure pathways, regarding risk to human health and environmental welfare.
- Prepared written RI/CAD reports presenting the findings, conclusions, and recommendations of the site investigation.
- Provided engineering oversight of corrective action design activities, including sites requiring soil excavation, vapor extraction, groundwater pump-and-treat, and several natural attenuation with monitoring treatment systems.
- Provided engineering oversight and supervision of investigative soil boring and monitoring well installations.
- Developed monitoring programs for remediation systems, evaluated system performance, and prepared summary reports with additional recommendations.
- Prepared a Focused Alternative Analysis and Response Action Work Plan report consisting of descriptions of potential remedial technologies applicable to the site, including selection of the proposed remediation with implementation plan and engineering cost estimate.

Environmental Site Assessments

- Conducted Phase I/II Environmental Site Assessments (ESAs), in the State of Minnesota, on various industrial and commercial properties, and in accordance with applicable ASTM standards and site-specific work scopes provided by client. Responsibilities include the following:
  - Conducted literature searches and personal interviews, reviewed aerial photographs and other published materials related to subject properties, and performed site history analyses.
  - Performed investigative site walkthroughs in order to identify areas of potential environmental concern.
  - Reviewed regulatory data and physiographic/hydrogeologic setting information in order to identify and assess potential concerns, and completed an engineering evaluation of the data.
  - Prepared soil and groundwater investigation plans, as necessary, based on the engineering evaluation of the data.
  - Prepared written Environmental Site Assessment reports presenting the findings, conclusions, and recommendations of the property assessment.

Geotechnical Engineering Investigations

- Conducted numerous Geotechnical Engineering investigations on various commercial, industrial, and residential sites throughout the State of Minnesota. Responsibilities include the following:
  - Communicated with other design professionals to determine their geotechnical design input needs, and developed scopes of work.
  - Formulated field exploration and laboratory testing programs, and prepared engineering proposals.
  - Directed and/or modified field exploration program, as required upon evaluation of the conditions being encountered.
  - Classified and evaluated subsurface conditions, analyzed field and laboratory data.
  - Performed engineering calculations using test results and available data in order to make engineering recommendations regarding foundation type and size, bearing capacity, settlement, soil corrections and site grading, and slope stability.
  - Prepared plans, logs, test results, and specifications/guidelines based on the engineering evaluation of the data.
  - Prepared written geotechnical reports presenting the findings, conclusions, and recommendations of the geotechnical investigation.
  - Performed materials testing and construction observation per engineering plans/specifications, and evaluated data and prepared summary reports.
  - Performed slope stability evaluations and buoyancy (uplift) assessment calculations.

On-Site Wastewater Treatment Systems

- Performed site evaluations, designs, and installation engineering oversight for on-site sewage treatment systems in the State of Minnesota. Responsibilities include:
  - Conducted literature review and gathered/estimated site information, performed preliminary calculations (peak and average flows) in order to approximate treatment system sizing and developed conceptual design alternatives.

- Developed programs of site investigation, prepared engineering cost proposals, modified program as necessary based on conditions encountered.
- Conducted soil classification and percolation testing as part of site evaluations.
- Performed calculations for the preliminary design of settlement tanks, pump sizing, soil treatment system/effluent polishing sizing, and completed rough sketch/layout of treatment system.
- Completed engineering evaluation of data, finalized hydraulic calculations, performed costs analysis, and selected system components (settlement tanks, dosing chamber, pumps, piping, and appurtenances, polishing filters), and verified that treatment system met applicable codes/standards.
- Completed plans/specifications and drawings as part of finalized design documents.
- Provided engineering oversight and construction supervision during treatment system installation.
- Prepared written summary reports that included construction observation and system "as-built" documents.

Environmental Medial Sampling/Coordination

- Performed soil, groundwater, surface water, gas/stack air, and industrial wastewater sampling and coordination of sampling events in accordance with approved monitoring plans. Provided field oversight and direction during investigative activities in accordance with approved work plans. Responsibilities include:
  - Reviewed work plans and monitoring plans, coordinated sampling teams, and subcontracted analytical laboratories.
  - Performed field oversight of investigative activities on many petroleum release sites in accordance with approved work plans. Screened, logged, and sampled soils. Sampled groundwater and surface water, gathered risk assessment data.
  - Reviewed NPDES discharge permits issued by Agency, coordinated and performed industrial wastewater sampling/analysis per applicable permit requirements.
  - Performed NPDES groundwater compliance monitoring for several Minnesota cities in accordance with Agency guidelines.
  - Performed remediation system gas/air stack sampling, groundwater monitoring well sampling, and residential potable well sampling in accordance with approved monitoring plans.

Remediation Construction Technician Services

- Provided construction technician services on remedial system installation projects. Assisted with the installation of treatment systems per engineering design drawings and plans/specifications. Work includes:
  - Provided cleanup technician services on a 40,000-cubic-yard soil solidification/ stabilization project on a Minnesota State Superfund site. Contaminants of concern were lead and PCBs.
  - Assisted with the field installation of a large-scale groundwater pump-and-treat system and single recovery well soil vapor extraction system on a Minnesota State Superfund Site. Tetrachloroethylene (PERC) was the contaminant of concern.
  - Installed a small-scale soil vapor extraction system with single recovery well and trailer mounted thermal oxidation treatment unit on a petroleum site in Southern Minnesota.
  - Installed soil borings and monitoring wells at several petroleum (UST) release sites using hollow stem auger (HSA) and push probe drilling machines, in accordance with State regulations and the approved work plans.
  - Performed operation, maintenance, and monitoring of remediation systems at several petroleum and VOCs release sites.

Summer Internship

- Assisted with direct level surveying for staff gage placement in surface waters, performed staff gage elevation monitoring and stream flow measurements, assisted with data evaluation and development of rating curves for several points along stream
- Performed stream, lake, and groundwater sampling as part of a nutrient assessment study
- Developed/published a 27-page household hazardous waste (HHW) guide for the County
- Assisted with inspecting the County HHW facility during its construction
- Assisted with review of private development plans and with wetland determinations

James M. Blumke

Other related areas of interest

Recognized (Certifications/Trainings)

- 40-Hour HAZWOPER OSHA Training (per 29 CFR 1910.120), and 8-hour refresher, annually
- e-RAILSAFE System Bade Certification, NAPBS, biennially
- Railroad Roadway Worker Protection (RWP) Training, Railroad Education, annually
- LNAPL Training, Science, Management, and Technology (ITRC, 1.6 CEUs), 2015
- Erosion and Stormwater Management Certification – Design of Construction SWPPP and Construction Installer BMPs (University of Minnesota, 1.8 CEUs), December 2013
- LNAPL Training, Parts 1, 2, and 3: LNAPL Behavior; Improved Analysis of LNAPL Characterization & Recoverability; Evaluating Remedial Technologies and Project Goals (ITRC, 0.675 CEUs), 2013
- Advanced Techniques for Evaluating and Quantifying Natural Attenuation (National Groundwater Association, 1.5 CEUs), 2009
- Assessing Ground Water & Contamination Migration Through Aquitards: Field Investigation to Hydrogeologic Characterization (MidWest Geosciences Group, 2.4 CEUs), 2007
- Construction Dewatering and Ground Water Control: Design and Application (National Groundwater Association, 1.6 CEUs), 2005
- Improving the Description and Characterization of Glacial Successions for Environmental and Engineering Projects (Midwest Geosciences Group, 0.8 CEUs), 2004
- Project Management: Effective Management of Professional Services Projects (EICE, 0.6 CEUs), 2004
- Advances in Pumping and Slug Testing for Improved Site Characterization (Midwest Geosciences Group, 1.6 CEUs), 2003
- Risk Based Corrective Action Computer Training (IDNR, 1.5 CEUs), 2002
- Groundwater Pollution and Hydrology (Princeton Groundwater, 3.7 CEUs), 2002
- Nuclear Density Testing and Radiological Safety Training, 1999
- American Society of Civil Engineers (ASCE)
- National Groundwater Association (NGWA)

Publications

- "McLeod County Office of Planning, Zoning, and Environmental Services: Residential Household Hazardous Waste Guide", September 1994.

Work history

2001 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1996 - 2001	Agassiz Environmental Systems, Chisago City, MN
1995 - 1996	Envirostaff, Inc., Burnsville, MN
1994	McLeod County of Planning, Zoning & Environmental Services, Glencoe, MN

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Timothy J. Braun
Engineer

Qualified: Bachelor of Science - Environmental Engineering (B.S.), 2004

Connected: Engineer in Training: Wisconsin

Professional Summary: Tim has worked his entire 9-year professional career with GHD working extensively in the area of soil and groundwater remediation the Midwest. Areas of professional practice include: construction oversight, landfill remediation, groundwater contamination cleanup.

Landfill

Field Engineer

Tim has over 7 years of experience on multiple landfill projects for several clients throughout the United States. Specific project experience and locations are listed below:

- Field engineer responsible for construction oversight and QA/QC for waste consolidation, landfill gas venting, and synthetic landfill cover installation with construction administration and oversight at a closed landfill located near Virginia, Minnesota.
- Field engineer responsible for construction oversight and QA/QC for foundry sand consolidation and synthetic cover installation with construction administration and oversight at a foundry sand landfill located in Cedar Falls, Iowa.
- Field engineer responsible for operation, maintenance, and monitoring of two landfill gas extraction systems with enclosed ground flares located near St. Cloud and St. Michael, Minnesota. Responsibilities include preparation of monthly operation and maintenance reports, database management, coordination of field staff and subcontractors for operation and maintenance activities, engineering support, and invoice review.
- Engineer responsible for design, Construction Quality Assurance (CQA), and contractor oversight for the repair and installation of a 22-foot culvert including new aprons riprap, erosion control, and access road improvements at a closed landfill in Laverne, Minnesota.

Environmental Investigation, Remediation, and Risk Assessment

Support Engineer

Tim has over 7 years of experience on remediation projects for several clients throughout the United States. Specific project experience and locations are listed below:

- Support engineer assisting with operation, monitoring, and maintenance of a LNAPL and groundwater extraction/treatment system with compliance monitoring and reporting at a former wood treatment facility located in Siren, Wisconsin.
- Field engineer assisting with construction administration and oversight of building demolition, hazardous waste characterization/treatment/disposal, soil excavation/treatment/disposal, and leachate collection/treatment/disposal at a former metal plating facility located in Minneapolis, Minnesota.
- Support engineer assisting with remediation system operation, maintenance, and compliance monitoring with reporting at a Superfund site located in Lemont, Illinois.
- Project coordinator responsible for investigation and reporting of petroleum release down a mainline railroad in Maxwell, Nebraska. Nebraska Department of Environmental Quality issued a letter stating no further remedial action is required.
- Support engineer assisting with vacuum-enhanced LNAPL recovery pilot testing, LNAPL mobility and recoverability evaluations, and design and construction of expanded LNAPL recovery system with operation, maintenance, monitoring, and reporting for a petroleum contaminated railroad site located in North Platte, Nebraska.
- Support engineer assisting with bioslurp LNAPL recovery pilot testing, and LNAPL mobility and recoverability evaluations with reporting for a petroleum contaminated railroad site located in North Platte, Nebraska.
- Support engineer assisting with air sparging/soil vapor extraction remediation system construction and operation, maintenance, and compliance monitoring; municipal storm sewer relining; and routine groundwater monitoring and sampling with reporting

for a former drum recycling facility in Auburn Hills, Michigan.

- Field engineer responsible for oversight of decommissioning of former fluorescent lamp recycling facility and environmental assessment for final closure of facility in Kaiser, Missouri.
- Field coordinator responsible for air sampling plan, equipment calibration and maintenance, and reporting for long-term air monitoring system at the GM Powertrain Facility in Bedford, Indiana.
- Field engineer responsible for inspection, investigation, and preparation of storm water pollution prevention plans and spill prevention, control and countermeasure plans at two salt water disposal facilities in Tioga and Keene, North Dakota.
- Field engineer responsible for inspection, investigation, and preparation of storm water pollution prevention plans and spill prevention, control and countermeasure plans at an operations facility in Williston, North Dakota.
- Field Engineer responsible for coordinating, management, and oversight of waste excavation of a potentially contaminated wetland area in Auburn Hills, Michigan.
- Coordinated management of waste documentation for inspections of exposed waste including descriptions and photographs using ipads at a superfund site southwest of Louisville, Kentucky.

Field Activities

Field Staff

Tim has over 8 years of experience on multiple projects for several clients throughout the United States. Specific project experience and locations are listed below:

- Performed environmental sampling and other field activities, including:
  - Water quality monitoring, including stream flow measurements, water sampling, and in situ testing
  - General support for survey data collection
  - Construction oversight of stormwater runoff plans during a highway construction project
  - Collection of influent, effluent, and process waters from wastewater treatment plants
  - Collection, processing, maintenance, and calibration for air monitoring
  - Collection of soil and sediment samples utilizing composite grid and linear techniques, and grab samples utilizing a variety of sampling equipment
  - Collection of stockpile soil samples
  - Monitoring of groundwater and LNAPL elevations
  - Inspection, operation, maintenance, and monitoring of four landfill gas extraction systems and enclosed ground flare units, including monitoring and adjustment of gas extraction wells, monitoring of gas probes, and condensate liquid level measurements
  - Groundwater extraction and treatment system inspection, operation, and maintenance
  - Inspection, operation, and maintenance of leachate collection systems including leachate sampling, monitoring of liquid levels, and maintenance of load-out equipment
  - Surface water and sediment sampling
  - Sampling of landfill gas condensate at landfill gas extraction and flare systems
  - Sampling of groundwater monitoring wells
  - Sampling and characterization of hazardous and non-hazardous wastes for disposal and cleanup confirmation

Other related areas of interest

Recognized (Certifications/Trainings)

- Railroad Education – Roadway Worker Protection, 2017
- eRailSafe System Badge (CSX, BNSF, CP, UP, CN), recertified 2017
- Erosion and Stormwater Management - Construction Site Management, University of Minnesota, Recertified 2015
- Erosion and Stormwater Management – Design of Construction SWPPP, University of Minnesota, Recertified 2015
- Construction Administration, ASCE Continuing Education Seminar, 2012
- Geosynthetic Design of Waste Containment Systems, Geosynthetic Education Institute, 2011
- Quality Control/Quality Assurance of Geosynthetics, Geosynthetic Education Institute, 2011

Work history

2006 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN

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Ryan Coy
Environmental Scientist

Qualified: Bachelor of Science - Cartography and Geographic Information Systems (B.Sc.)

Professional Summary: Ryan's professional skills give clients and colleagues confidence that the end products they receive are of the highest quality, delivered on time and on budget, and according to scope. Ryan possesses strong project management, targeted communication, organization, and people skills. He has over 14 years of experience as an environmental scientist, working on a wide variety of projects ranging from GIS solutions to groundwater monitoring, from environmental compliance to due diligence, and has excelled with each new challenge presented to him.

Water

Project Manager
Corrective Measures Implementation | IBM | Rochester, MN

Ryan prepares an annual evaluation of the corrective measure (a groundwater extraction system) at the Site for submittal to the Minnesota Pollution Control Agency (MPCA). Ryan also helped IBM negotiate a Corrective Action Agreement (CAA) and Environmental Covenant with the MPCA.

Project Manager
Groundwater Monitoring Program | IBM | Rochester, MN

Ryan manages a groundwater monitoring program for the Site, which includes over 50 monitoring locations. The project includes the preparation of an annual monitoring plan, three sampling events, the preparation of summary reports, and meeting with the client to evaluate the data. Since taking over this project, Ryan has drastically reduced costs for the client, without sacrificing quality or safety.

Project Manager
Stormwater Program | IBM | Rochester, MN

Ryan prepares a Stormwater Program Plan for the Site to allow IBM to meet internal environmental requirements. Ryan also helped IBM identify changes they could make at the Site to allow them to qualify for the No Exposure Exclusion and therefore avoid coverage under the State Industrial Stormwater General Permit.

Project Manager
Groundwater Monitoring Program | Orbital ATK | Elk River, MN

Ryan manages a groundwater monitoring program at the Orbital ATK Proving Ground. Ryan has achieved significant savings for the client on two different occasions by convincing the MPCA to agree to reduce sampling requirements at the Site. Ryan prepared compelling analyses of the data showing reduced sampling would continue to be protective to human health and the environment.

Environmental Compliance

Project Scientist

Ryan has contributed to several projects related to environmental compliance. Examples are listed below:

- Preparation of Title V air permit applications
- Air emission calculations
- Preparation of Risk Management Plans (RMPs) for anhydrous ammonia terminals
- Emergency Planning and Community Right-to-Know Act (EPCRA) Tier II Reporting
- Preparation of Spill Prevention, Control and Countermeasure (SPCC) Plans

Due Diligence

Auditor

Ryan has completed several Phase I Environmental Site Assessments.

Geographic Information Systems (GIS)

GIS Specialist

Ryan is an expert in GIS and has made valuable contributions to hundreds projects with his thorough understanding of the theoretical concepts of spatial analysis and geographic information science. Examples of how Ryan has utilized GIS are listed below:

- Preparation of an Emergency Response Atlas for a major railroad client that linked maps of economic and environmentally sensitive receptors along their track corridors with data and contact information for each receptor. The atlas helps emergency responders make timely and informed decisions
- Preparation of Electronic Data Access Tool (e:DAT) projects that provide clients quick and easy access to Site data by integrating analytical and hydrogeologic databases with GIS data, aerial photos, borehole logs, reports, site photos, and other project information
- Completion of a variety of GIS solutions for litigation, environmental monitoring, and publicly sensitive projects where layouts and thematic mapping have been completed

- Taking historical maps and other data sources lacking clear spatial context and accurately aligning them with present-day features to provide a snapshot of historical conditions and accurate locations of potential historical impacts
- Data acquisition, editing, geoprocessing, and spatial analytics
- Georeferencing and orthorectification of aerial photography
- Datum transformations and coordinate projections
- Spatial data collection using a Global Positioning System (GPS)

Field Work

Environmental Scientist

Ryan has worked in the field extensively, performing several tasks including those listed below:

- Groundwater sampling
- Residential well sampling
- Surface water sampling
- Soil sampling
- Fluid level monitoring
- Air sampling
- Vertical surveying
- Environmental oversight

Work history

2001 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
2000	Mapping Specialists, Ltd., Madison, WI
1999	United States Geological Survey (USGS) - Upper Midwest Environmental Sciences Center, La Crosse, WI

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Ronald Frehner

Principal/Vice President

Qualified: M.A.Sc. Civil Engineering, 1985, B.A.Sc. Civil Engineering, 1982

Connected: Registered Professional Engineer: Georgia, Indiana, Illinois, Kansas, Minnesota, Missouri, New Jersey, North Dakota, Ohio, Oklahoma, South Dakota, Wisconsin

Professional Summary: Ron has worked his entire 35-year professional career with GHD working extensively in the area of soil and groundwater remediation throughout North America. Areas of professional practice include: voluntary cleanup programs, regulatory permitting, expert testimony, remedy selection, and brownfield development. Ron is an expert in the remediation of closed landfills and chlorinated solvent remediation.

Landfill

Project Principal

Ron has over 30 years of experience on multiple landfill projects for several clients throughout the United States. Specific project experience and locations are listed below:

- Landfill cap and active gas collection design with MNA, Tomah, Wisconsin.
- Evaluation of closure and post-closure costs at 18 landfills throughout the United States.
- Site investigation, cap design, and construction oversight, Brockman Landfill, Ottawa, Illinois.
- Site Investigation, remedial alternative analysis for VOC groundwater contamination at closed landfill and landfill closure in River Falls, Wisconsin.
- Design of new disposal cell with leachate collection, SKB, Austin, Minnesota.

Soil/Sediment Remediation

Project Principal

Ron has years of experience on projects related to soil/sediment remediation including soil vapor extraction, design and implementation, and technical support. Specific project experience and locations are listed below:

- Lead stabilization, Chicago, Illinois.
- Technical support for anhydrous ammonia spill at CP derailment in Minot, North Dakota.
- Thermal desorption of VOC-contaminated soil, Chicago Heights, Illinois.
- Design and implementation of drum removal and wetland remediation for PCB and lead contamination in Detroit area.
- Soil removal of nitrate contamination at former fertilizer plant, Maysville, Kentucky.
- Landfarm remediation of oil tar Port Stanley, Ontario.
- Design and Implementation of RI/FS, IRM, RAP, representation at public meetings and post closure permit application for remediation of PCB and lead contamination at the Union Compressed site in Duluth, Minnesota.
- Design and Implementation of RI/FS, and Remedial Action Plan (RAP) for PCB remediation at the Twin Cities Army Ammunition Plant (TCAAP), Minnesota.
- Soil vapor extraction of VOCs, New Richmond, Wisconsin.

Brownfields

Project Principal

Ron was part of the design team that developed a multi-use facility (soccer fields) on former landfills sites listed below:

- Development of soccer fields on former landfill, Wausau, Wisconsin.
- Development of soccer fields on former landfill, Glenview, Illinois.
- Development of soccer fields on former landfill, Woodstock, Illinois.

Groundwater Investigation and Remediation

Project Principal

Responsible for the design and implementation of multiple groundwater remediation systems and has also completed several site investigations with VOC concerns. Specific project experience and locations are listed below:

- Design and Implementation of a Hydrogeologic Investigation over an 18-square-mile area, preparation of a Groundwater Remedial Program Plan for TCAAP, Minnesota.
- Site Investigation for pentachlorophenol groundwater contamination, Bell Pole, Lumby, British Columbia.

- Develop groundwater remedy for 10-square-mile VOC plume, Manitoba, Canada.
- Design and Implementation of RI/FS, IRM and RD/RA for vinyl chloride and VOC groundwater contamination, representation at public meetings, Highway 96 Dump, White Bear Township, Minnesota.

Superfund Sites

Project Principal

Ron has worked at over 30 Superfund Sites throughout his profession career located throughout the United States. His experience ranges from predesign investigation, technical assistance to PRP groups, RD/RA for soil and groundwater contamination by VOCs, RD/RAs, and participation in consent order negotiations. Specific project experience and locations are listed below:

- RD/RA for soil and groundwater contamination by VOCs at former Thiokol facility in Rockaway Borough, New Jersey (Region 2).
- RD/RA for soil and groundwater contamination by VOCs at former Thiokol facility in Denville, New Jersey (Region 2).
- Predesign Investigation, Remedial Design for landfill cap and groundwater remediation at the Woodstock Landfill Superfund Site, and Record of Decision Amendment, Woodstock, Illinois (Region 5).
- RD/RA for emergency removal of PCB, lead and dioxin contaminated soils at scrap yard in Elgin, Illinois (Region 5).
- Technical Trustee for Potential Responsible Party (PRP) Group during RD/RA of VOC groundwater remedy in East Bethel, Minnesota (Region 5).
- Technical assistance to PRP group during good faith negotiations, Fultz Landfill Superfund Site, Byesville, Ohio (Region 5).
- Technical assistance to PRP group during good faith negotiations and RD/RA for PCB, PAH, and lead contamination at scrap yard, South Andover Superfund Site, Andover, Minnesota (Region 5).
- LNAPL Remediation for PRP Group at Lenz Oil Site in Lemont, IL (Region 5).
- LNAPL Remediation at Pentawood Superfund Site in Siren, WI for WDNR (Region 5).
- Participation in Consent Order negotiations, Design and Implementation of Remedial Investigation (RI), preparation of Feasibility Study (FS), conceptual design of interim remedial measures (IRMs), representation at public meetings, implementation of remedial design/remedial action (RD/RA) and administration of Interim Remedial Measures for Wauconda Landfill Superfund site, Wauconda, Illinois (Region 5).

Voluntary Clean-up Sites

Project Principal

Ron has had a role with over 30 voluntary clean-up sites in the United States. These clean ups involved site investigation with various contaminations and was also involved in the remediation of largest cleanup in Illinois completed under the Site Remediation Program, which was located in Oak Park, Illinois.

Resource Conservation and Recovery Act (RCRA)

Project Principal

Ron has prepared a hazardous waste management report (Part B permit application) for Schenectady Chemicals and FMC Corporation in New York State. He has also been part of the design of the Remedial Facility Investigation (RFI) in Rochester, Minnesota, and completed a RCRA evaluation at wood treating site, Grenada, Mississippi.

Expert Witness Experience

Project Principal

Ron has been part of numerous litigations in the role of expert witness. Listed below is a summary of the cases he was a part in:

- Expert witness on solid waste landfill tipping fee costs, Minnesota.
- Expert witness on remedy selection at pipeline terminal for Williams Pipeline, Des Moines, Iowa.
- Expert witness on consistency with National Contingency Plan for a Response Action in Louisiana.
- Expert witness testimony on methane migration at Old State Street Dump for Port Authority, St. Paul, Minnesota.
- Expert Testimony for PCB and lead contamination remediation in Mahtomedi, Minnesota.
- 2001-2002 expert witness on PCB contamination issues at former Westinghouse Transformer Repair Shop in Minneapolis.
- Expert witness on cost allocation, BJ Carney site, Minnesota.

Decommissioning/Demolition

Project Principal

Ron was part of the planned and design team for the decommissioning/demolition of two former manufacturing buildings, which were located in Chicago Illinois and Pottstown Pennsylvania.

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Other related areas of interest

Published Refereed Papers

- Warith, Mostafa A., Frehner, Ronald, and Yong, Raymond N., 1990. Bioremediation of Organic Contaminated Soil at a Former Oil Gasification Site. Paper submitted to the Canadian Geotechnical Journal. January 1990
- Frehner, Ronald, 1989. Hazardous Substances in Sanitary Landfills. Sanitary Landfill Leachate and Gas Management Seminar, University of Wisconsin. December 4-7, 1989

Papers Presented and Published in Conference Proceedings

- Frehner, R., 1995. Technical Considerations Under Superfund, Clean Water Act and Toxic Substances Control Act. Presented at the Environmental Regulation Course by Executive Enterprises, Minneapolis, Minnesota. June 1995 (and on several other occasions in 1993 and 1994 for Superfund)
- Guy, B.T., Watson, T.A., and Frehner, R., 1993. Site Remediation at a Wood Preservation Facility in Central British Columbia, Canada. Paper presented at Second USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology, Washington, DC. May 1993
- Frehner, R., 1992. Wastewater Treatment/Effluent Options Under the Clean Water Act. Presented at Environmental Regulation Course by Executive Enterprises, Minneapolis, Minnesota. July 1992

Work history

1982 – present	Principal/Vice President GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
	Named Principal/Vice-President, 1992

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Shannon Froiland
Engineer

Qualified: Master of Science - Environmental Engineering (M.S.), Bachelor of Science - Education (B.S.)

Connected: Minnesota Army National Guard, Society of Women Engineers (SWE), American Veterans (AMVETS)

Professional Summary: Shannon possesses a wide variety of skills in the areas of compliance and remediation that give clients confidence in her work on their projects. Work standards are described as attentive to detail, excellent organization, targeted communication, and careful time management. Her work history spans across a variety of experiences including engineering, agriculture, education, and military which provides her with the perspectives to naturally collaborate with clients, contractors, and agencies.

Environmental Compliance

- Air permit applications, emission calculations, and reporting.
- Hazardous waste generator compliance management.
- Stormwater sampling, reporting, and management.
- Air Permit Applications and Reporting (Connecticut, Iowa, Indiana, Minnesota, Mississippi, Missouri, New Mexico, Nebraska, Louisiana, Washington).
- Toxic Release Inventory (TRI) reporting using TRI-ME Web.
- National Pollutant Discharge Elimination System (NPDES) permitting.
- Storm Water Pollution Prevention Plans (SWPPP).
- Spill Prevention, Control, and Countermeasure Plans (SPCC).
- Phase I Environmental Assessment reports.
- Data management (Potential to Emit, Actual Emission, 12-month rolling sums, etc.).
- Assist in writing Comprehensive Nutrient Management Plans (CNMPs) - Wisconsin.
- Assist in performance of Agricultural Engineer Evaluations.
- Confined Animal Feeding Operation (CAFO) Permit Application - Wisconsin.
- Health and Safety Plans.

Environmental Oversight

- Demolition and Superfund site clean-up.
- Quality control of landfill liner installation.
- Excavation oversight of dig and haul remediation.

Laboratory Research (University of ND)

- Conducted research on the transport and subsequent remediation of *n*-hexadecane in concrete using bioremediation, photoremediation, and adsorption techniques. Extracted and quantified *n*-hexadecane concentrations from concrete utilizing gas chromatography.

Aquaculture Facility Operation

- Construction, startup, and operation of a 300,000-gallon, indoor, recirculating Tilapia grow-out facility.

Field Experience

- Site inspection for SPCC, SWPPP, compliance evaluations.
- Excavation oversight.
- Water level monitoring.
- Inspection and maintenance of remedial air stripping operation.
- Ozone treatment system inspection and maintenance.
- Remediation discharge sampling.
- Groundwater sampling.
- Quality control of landfill liner installation.

Work history

2007 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1992 - present	Army National Guard
2006 - 2007	Boston Scientific, Plymouth, MN

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Johan Hedblom
Engineer

Qualified: Chemical Engineering (B.S.Ch.E.), Chemistry minor

Professional Summary: Johan uses his skills to provide services across a variety of different projects. His main focus has been in the operation and maintenance of closed landfill and groundwater remediation sites. Other areas of experience include coordination, remediation system design, and troubleshooting of remediation systems. With an interest in expanding his experience and ability to learn quickly, Johan has taken part in various other projects at GHD. He has a background of laboratory research and development at 3M, and an ability to effectively use ArcGIS software that enhances his diverse skill set.

Landfills

Engineer

Johan has experience in a variety of closed landfill projects throughout Minnesota. Project experiences are given below with a focus on project coordination, field activities, and reporting.

- Project coordination:
  - Operation, maintenance, and monitoring of landfill gas extraction systems with flares, groundwater treatment systems, and leachate management systems.
  - Remote monitoring of flare systems, and groundwater treatment systems.
  - Oversight and quality assurance for installation and maintenance of remediation systems.
  - Site improvements including access roads, and surface water control
  - Preparation of work scopes, contracts, bidding of work and subcontractor coordination
  - Troubleshooting, locating, and purchasing items for maintenance/repairs (meters, tanks, lamps, hardware, etc.).
  - Sampling of leachate to meet discharge permit reporting requirements.
  - Support field staff in system operations and troubleshooting.
- Design and specification services
  - Drafting of air monitoring, drum removal, and sampling and analysis plans.
  - Drafting specifications for the installation of gas extraction wells, gas collection piping, and cover repairs.
- Field Activities:
  - Quality Assurance:
    - Groundwater extraction well and pump rehabilitations
    - Installation of gas extraction wells, and gas extraction system piping
  - Groundwater extraction and treatment system inspection, operation, and maintenance.
  - Inspection, operation, and maintenance of gas extraction systems including flare stations, gas extraction well monitoring and adjustment, gas vents, and gas probe monitoring.
  - Inspections of Sites, photovoltaic arrays, flare systems, and leachate systems.
  - Gas well modifications and repairs.
  - Measurement of water levels at various well sites.
  - On-Site troubleshooting of system issues.
- Reporting:
  - Monthly and quarterly operation and maintenance reporting.
  - Health and safety plans for closed landfill construction, operation, maintenance, and monitoring projects including development of job safety analyses.
  - Construction documentation for projects including active gas extraction system.
  - Investigation documentation for the sampling investigation of a hazardous waste pit.
  - Site inspections, routine operations reporting.
  - Data processing and compilation for reports.
  - Usage and equipment reporting.
  - Creating report figures with ArcGIS.

Johan Hedblom

Groundwater Treatment

Engineer

Johan has gained experience in operations at contaminated groundwater sites and Superfund sites. His experiences include project coordination, field work, and reporting as shown below.

- Project coordination:
  - Specifying and purchasing tank system for containment of hydrogen peroxide.
  - Preparation of work scopes, contracts, bidding of work and subcontractor coordination.
  - Acquiring necessary parts and chemicals for maintenance activities.
  - Coordination of deliveries to site.
  - Job safety analysis development for field tasks.
  - Organizing and leading quarterly groundwater sampling events.
- Field Activities:
  - Inspecting and troubleshooting a UV and hydrogen peroxide treatment system.
  - Routine maintenance work on reactor system.
  - Transfer of chemicals.
  - Inspection and operation of treatment site including observation of wells, adjustment of flows, and remote monitoring.
  - Groundwater sampling including high flow, low flow, bailing, and no-purge sample methods.
  - Surface water sampling.
  - GPS locating of various site features.
  - Collecting water samples and field parameters.
- Reporting:
  - Annual reporting of groundwater analysis at a former plating facility.
  - Wastewater treatment facility discharge permit reporting.
  - Interpretation of data and development of figures including ArcGIS work.

Product Development

Technical Aide

Johan has 3 years of experience developing personal protective equipment with 3M. Research and development of products was done with an emphasis on gas and vapor filtration with specific experiences listed below:

- Fabrication of prototype products in a laboratory setting using ultrasonic welding equipment.
- Supported 5-year product launch of an organic vapor filtration cartridge with the first NIOSH approved End of Service Life Indicator in a cartridge.
- Led the development of a new optical sensor construction through the use of spin coating techniques.
- Challenged respirator cartridges against a variety of environmental conditions and organic vapors.
- Analyzed optical sensors with spectrophotometry.
- Managed aging experiments of respirator cartridges.
- Conducted research on the construction of liquid crystal displays in welding masks.

GIS

GIS Intern

Johan has 2 years of experience related to ArcGIS on projects related to storm water sewers, sanitary sewers, and water utilities with the City of Eagan. Specific project experiences are listed below:

- Compiled a report on the condition of 20 percent of the total storm sewer inlets/outlets within Eagan each summer.
- Digitized updates to ArcGIS database according to record plans or modifications done in the field.
- Worked with GPS to locate and label specific attributes of utilities in ArcGIS.
- Inspected and assessed storm sewer utility conditions, photographed, documented, and assigned work orders for repair when necessary.

Other related areas of interest

Recognized (Certifications/Trainings)

- OSHA 40-hour Hazardous Waste Operations and Emergency Response, 2015
- OSHA 30-hour Construction Safety and Health, 2015
- e-Rail Safe Training, 2015

Work History

2015 – present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
2012 – 2015	3M, Maplewood, MN
2011 – 2012	City of Eagan, Eagan, MN

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Thomas Hobday
Project Manager

Qualified: Chemical Engineering (B.S.Ch.E.), Environmental Engineering minor

Connected: Member of American Institute of Chemical Engineers and Engineer-in-Training: Minnesota

Professional Summary: Tom has over 14 years of experience in the design, management, coordination, and operation and maintenance of various remediation systems. Areas of expertise include remediation system design; operation, maintenance, and troubleshooting of remediation systems (gas extraction, water treatment, etc.); and control systems.

Project Manager
New Richmond Closed Landfill |
New Richmond, WI | Ongoing

Project Manager and Engineer for the operation, maintenance, and monitoring of a landfill gas and soil vapor extraction system; residential well and groundwater monitoring; and annual reporting.

Project Manager
Holtz-Krause Closed Landfill Operational Support | Wausau, WI | Ongoing

Project Manager, providing support to client for the operation of the landfill gas extraction and flare system including data review, reporting, and semi-annual maintenance visits.

Project Coordinator/Project Engineer
Closed Landfill Program| MN | Ongoing

Over 14 years of experience as a Project Coordinator and Project Engineer on over 45 landfill projects through the Minnesota Pollution Control Agency's Closed Landfill Program for both the Operation and Maintenance and Landfill Design contracts. Specific project experience is noted below:

- Project coordination
  - Operation, maintenance, and monitoring of landfill gas extraction systems with enclosed ground flares, groundwater treatment systems, leachate management systems, and passive landfill gas management systems
  - Oversight and quality assurance for installation, operation, and maintenance of a vapor extraction and volatile organic recovery (VEVOR) system
  - Installation and monitoring of landfill gas monitoring probes, gas extraction wells, and vapor extraction wells and air intrusion points
  - Installation of passive gas vents
  - Installation of solar powered landfill gas vent flares
  - Lift station operation, repairs, and maintenance
  - Support services for flare stack testing
  - Site improvements including access roads, clearance of access trails, woven wire fence, diversion berm drains, tree planting, surface water control, access gates, and fence abandonment
  - Design, operation, maintenance, and monitoring of a pilot test for the treatment of perfluoro-chemical contaminated groundwater using ion exchange resins
  - Preparation of work scopes, contracts, bidding of work and subcontractor management for numerous projects
  - Coordination of system sampling requirements for several projects
  - Subcontractor coordination and oversight; for projects including drilling, crane/transport, insulation, leachate system cleaning, lift station cleaning, tank cleaning, waste disposal, among others
  - Engineering support and system troubleshooting for complex and routine problems with site systems
- Design and specification services
  - Removal and installation of a 12,000-gallon leachate storage tank, leachate load-out system, and concrete load-out pad
  - Installation of vapor extraction and volatile organic recovery system for a hazardous waste pit
  - Installation of passive gas vents and abandonment of former passive venting system

  - Cover repairs and improvements (fill, grading, aeration, seeding, fertilizing, mulching, etc.)
  - Leachate collection and pump-out system
  - Installation of solar PV arrays with utility grid interconnection
  - Flare station relocations, assembly, disassembly, refurbishment, and start-up
- Field activities
  - Construction Quality Assurance
    - 40-kW Solar Photovoltaic array installations
    - Flare station relocations, refurbishment, disassembly and assembly
    - Replacement of a 12,000-gallon underground storage tank and installation of load-out pump, piping, and controls
    - Installation of vapor extraction and volatile organic recovery system
    - Reinstallation of a 5-foot diameter culvert previously washed out
    - Test pit excavations for delineation of waste limits and depth
    - Abandonment of former water wells
  - Flare station blower/motor replacement
  - Performance of surface waste survey
  - Groundwater extraction and treatment system inspection, operation, and maintenance
  - Monitoring of passive gas vents and gas monitoring probes
  - Inspection, operation, maintenance, and monitoring of gas extraction system and enclosed ground flare units, including monitoring and adjustment of gas extraction wells, monitoring of gas probes, and condensate liquid level measurements
  - Inspection, operation, maintenance, and monitoring of leachate management systems, including pump removals/replacement, tank inspections and cleaning, jetting, manhole modifications, and confined space work
  - Sampling of gas condensate at gas extraction and flare systems
  - On-site start-up of a candlestick flare including gas monitoring, adjustment of gas wells, installation of heat trace and insulation, and provision of remote monitoring capabilities
  - Abandonment of former gas vents
  - Coordination of field staff and subcontractors
  - Collection of landfill gas (gas vents and probes) data
- Reporting
  - Monthly Operation and maintenance reporting
  - Quarterly operation and maintenance reporting
  - Semi-annual groundwater quality reporting
  - Health and safety plans for various types of projects including construction oversight, operation, maintenance, and monitoring, and excavation
  - Construction documentation for various types of projects including passive and active gas vents and groundwater treatment systems
  - Site inspection reports
  - Annual reporting
  - Quality assurance plans
  - Management plans
  - Semi-annual usage and equipment reporting
  - Stormwater Pollution Prevention Plans
  - Bid documents
  - Permit review
  - Pilot test evaluation reporting

Project Engineer
Buckeye Wastewater Treatment Plant | Buckeye, IA | Ongoing

Project Engineer assisting in the design and installation of a wastewater treatment plant for the adjustment of pH, dissolved oxygen, and temperature. Performed the system startup and engineering support for system operation and controls.

Other related areas of interest

Recognized (Certifications/Trainings)

- Design of Storm water Pollution Prevention Plans, University of Minnesota, 2007
- e RAILSAFE Training, 2008
- Roadway Worker Protection (RWP) On Track Safety Training, 2009

Work history

2003 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
2002	Anderson Windows, Bayport, MN

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Eric Hoglund

Qualified: Bachelor of Science - Civil Engineering (B.S.), 1992

Connected: Registered Professional Engineer: Minnesota, Illinois

Professional Summary: Eric's project management skills give clients confidence that their projects are being carefully managed for budget, schedule, and scope while delivering a high quality end product. Effective task management, timely reporting, targeted communication, good organization, and excellent people skills – Eric demonstrates them all. Eric has over 25 years of experience in environmental investigation, design, remediation, operation and maintenance and construction projects.

Project Manager

Project Manager
Manufactured Gas Plant | CenterPoint Energy | Minneapolis, MN | Ongoing

Project Manager and engineer for the investigation and remediation (soil, soil vapor & groundwater) of a MGP Site. Tasks included establishment of site specific clean up goals, excavation, processing under a temporary structure, on-site treatment (thermal desorption) and beneficial reuse, excavation and restoration of the Mississippi River bank, off-Site disposal of DNAPL and LNAPL, construction and O&M of a collection trench and groundwater treatment facility and groundwater monitoring & reporting and redevelopment of the Site into a City park, streets and parking lots.

Project Manager
Manufactured Gas Plant | Oak Park, IL | 1998 - 2008

Project Manager for the investigation, remediation (soil and groundwater) and closure (obtained No Further Remediation letters under the IEPA Site Remediation Program) for over 50 residential properties surrounding a former MGP site. Pre-excavation confirmation samples were used to minimize project schedule and costs.

Project Manager
Active Industrial Facility | Golden Valley, MN | Ongoing

Project Manager and engineer for the investigation and remediation (soil, soil vapor and groundwater) and O&M of a groundwater extraction system and groundwater monitoring & reporting at an active industrial facility

Project Manager
Bruno Coop | Bruno, NE | Class 1 Railroad | Ongoing

Project Manager for the investigation, remediation (soil, soil vapor & groundwater) and O&M of a groundwater treatment system and groundwater monitoring & reporting.

Project Manager
Woodstock Landfill | City of Woodstock | Woodstock, IL | Ongoing

Project Manager and engineer for the design and closure of a 40 acre landfill, redevelopment of landfill into soccer field complex and groundwater monitoring/reporting.

Project Manager
Nationwide | Class 1 Railroad | Ongoing

Project Manager for system wide Stormwater program. New and updated SWPPPs for rail yards

Project Manager
Nebraska | Class 1 Railroad | Ongoing

Project Manager for the investigation, LIF delineation active recovery and reporting for two LNAPL plumes at a major railroad switching yard.

Project Manager
Augusta, GA | Ongoing

Project engineer for the investigation, remediation and RCRA closure of a 90-acre inactive artificial sweetener manufacturing facility.

Project Manager
Rosemount, MN | 2011 - 2013

Project Manager and engineer for the design and construction of a new solid waste cells at an active 236-acre industrial waste landfill.

Project Manager
Quincy Landfill | Quincy, IL | PRP Group | Ongoing

Project Manager and engineer for the landfill O&M and FS for an on-Site leachate treatment system.

Project Manager
Austin, MN | 2011 - 2013

Project Manager and engineer for the design and construction of a new solid waste cell at an active 40-acre industrial waste landfill.

Project Manager
Skokie, IL | 2006 - 2007

Project Manager for the investigation, remediation (soil and groundwater), closure (NFR letter) and site redevelopment. Pre-excavation confirmation samples were used to minimize project schedule and costs.

Project Manager
Glenview, IL | 2003 - 2005

Project Manager for the redevelopment of a landfill into a multi-sport facility for a private high school.

Project Manager
Roseville and Sauk Center, MN | 2006- 2007

Project Manager for the design and construction of stormwater treatment systems at two bulk fuel storage facilities.

Project Manager
Various locations | Class 1 Railroad | 2012 - 2013

Project Manager for five Phase I / Phase II investigations of railroad properties in Minnesota and Iowa.

Project Manager
Sheldon, IA | Class 1 Railroad | 2014

Project Manager for the emergency response, remediation and closure (NFR letter) for derailment site.

Project Manager
White Bear Township, MN | 2000 - 2005

Project Manager and engineer for the investigation, design, waste consolidation, permeable landfill cover construction and groundwater remediation & reporting.

Project Manager
Rosemount, MN | 2003

Project Manager and engineer for the investigation, design, dewatering, and landfill cover construction for a 4 acre process water lagoon.

Project Manager
Brockman Landfill | Ottawa, IL | PRP Group | 2000 - 2015

Project Manager and engineer for the design, closure and groundwater monitoring program. Obtained regulatory approval for using processed mine spoils as barrier layer in landfill cap resulting in project cost reductions.

Project Manager
Crouse Landfill | Phillipsburg, NJ | Mallinckrodt | Ongoing

Project Manager and engineer for the investigation, permitting and closure of landfill. Obtained regulatory approval for screening waste material and Beneficial Reuse Determination of screened soils resulting in project cost reductions.

Project Manager
Production Water Injection Sites | Bakken Oil Field, ND | 2013 - 2014

Project Manager for the investigation of releases and preparation of SPCCs and SWPPPs at 5 salt water injection sites.

Project Manager
Chicago Heights, IL | BASF | 2009 - 2012

Project Manager for the investigation and remediation (soil and groundwater) for a former industrial facility. Pre-excavation confirmation samples were used to minimize project schedule and costs.

Project Engineer

Project Engineer
St. Paul, MN | TCAPP | Ongoing

Project engineer for the retrofit design to allow for brownfield re-development of an existing groundwater collection system at a 100 acre closed ammunition plant.

Project Engineer
Marissa, IL | 2014

Project engineer for the design of a groundwater collection system at a coal fired power plant.

Project Engineer
Carlin, IL | Ongoing

Project engineer for the design of a groundwater collection system at an active coal mine.

Project Engineer
Saint Paul, MN | 2001 - 2002

Project engineer for the investigation, design, waste consolidation, soil stabilization, stream restoration and landfill cover construction for a 230 acre landfill in the floodplain of the Mississippi River.

Project Engineer
Chicago, IL | 2011

Project engineer for the investigation and remediation (soil stabilization) for a metal foundry site.

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Kiel Jenkin

Project Geologist/Hydrogeologist

Qualified: B.S. Geoscience – Geology, 2012

Connected: Department of Homeland Security, Transportation Security Administration, Transportation Worker Identification Credential (TWIC). Member, Geological Society of America, South-Central Section. Member, Baton Rouge Geological Society

Professional Summary: Kiel has worked as a project geologist and health and safety subject matter expert on several multi-million dollar projects. His experience and responsibilities encompass all aspects of environmental project management, primarily in the oil and gas sector.

Field Geologist
Former Texaco Amarillo Refinery| Chevron | Amarillo, Texas| 2013-2014

Oversight of soil borings, create and maintain soil boring logs and data, oversight of drilling subcontractors, interpret soil data for well installation. Lead geologist for CEMC soil and groundwater investigations. Preparation of investigation reports, work plans, sampling regimes, geologic cross-sections, potentiometric groundwater maps, constituent concentration maps, as well as data tabulation and interpretation, project support, organize personnel and resources, work with clientele and subcontractors.

Project Geologist
Former Pure Oil Refinery | Chevron | Muskogee, Oklahoma | 2014-2015

Lead geologist for CEMC soil and groundwater investigations. Preparation of investigation reports, work plans, sampling regimes, geologic cross-sections, potentiometric groundwater maps, constituent concentration maps, as well as data tabulation and interpretation, project support, organize personnel and resources, work with clientele and subcontractors.

Project Geologist
Former Pure Oil Refinery | Chevron | Ardmore, Oklahoma | 2015

Investigation and health and safety oversight of field crew during Chevron 2015 site investigation and characterization events. Preparation of investigation reports, work plans, sampling regimes, geologic cross-sections, potentiometric groundwater maps, constituent concentration maps, as well as data tabulation and interpretation, project support, organize personnel and resources, work with clientele and subcontractors.

Project Coordinator
B&C Land Site | Glenn Springs Holdings | Vacherie, LA

Management of design, installation, construction, data, and coordination of groundwater data collection/management effort. Preparation of investigation reports, work plans, sampling regimes, geologic cross-sections, potentiometric groundwater maps, constituent concentration maps, as well as data tabulation and interpretation, project support, organize personnel and resources, work with clientele and subcontractors.

Geologist
Big Hill | Chevron | Big Hill, Texas | Date

Subcontractor oversight and geologic consultation for saltwater disposal cavern/well depressurization effort.

Site Supervisor
Velma, OK Oilfield | Chevron | Velma, Oklahoma | Date

Investigation, characterization, and documentation of all known oil and gas lines, and oversight of subcontractor and site personnel during a major line tracing event in preparation for Chevron decommissioning effort in Velma, OK oilfield.

Work history

2013 - present	GHD (formerly Conestoga-Rovers & Associates), Baton Rouge, LA
2012 - 2013	Morco Geological Services, Carlsbad, NM
2011 - 2012	Southeast Minnesota Water Resources Center, Winona, MN

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Kai Kasprick
Engineer

Qualified: Bachelor of Science in Environmental Engineering, Northwestern University, 2016

Connected: Member of the Order of the Engineer

Professional Summary: Kai possesses strong organizational and time management skills that ensure work is completed to a high degree of detail and on schedule. Kai has experience in a variety of environmental engineering topics, including regulatory permitting, waste minimization and treatment, and environmental compliance.

Environmental Compliance

Project Engineer

Throughout various projects across the United States, Kai has gained experience in environmental compliance and regulatory permitting. Specific project experiences are listed below.

- Air permit application preparations and modifications, emission calculations, and reporting
- Hazardous waste generator compliance management
- Toxic Release Inventory (TRI) reporting
- National Pollutant Discharge Elimination System (NPDES) permitting
- Storm Water Pollution Prevention Plan (SWPPP) preparations and modifications
- Spill Prevention, Control, and Countermeasure Plan (SPCC) preparations and modifications
- Data management (Emission calculations, 12-month rolling sums, etc.)

Field Experience

Project Engineer

- Surface sampling
- Remediation discharge sampling
- Groundwater sampling

Other related areas of interest

Recognized (Certifications/Trainings)

- 40-Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training

Work history

February 2018 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
2013-2018	Northwestern University, Evanston, IL

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Larry (Buck) Lardy
Field Technician

Qualified: Diploma - Environmental Technician

Professional Summary: Buck has over 18 years of experience as an operation and maintenance technician with GHD. Areas of expertise include operation, maintenance, and troubleshooting of various remediation systems (groundwater treatment, gas extraction, condensate/leachate management).

Construction Oversight Activities

On-Site Supervisor
Becker Co. Landfill | MPCA | Detroit Lakes, MN

Provided construction oversight of a groundwater extraction system which included three extraction wells, pump control/manfold building, treatment channel and retention pond. He conducted daily inspections and quality assurance of work in progress, weekly progress meetings and ongoing communication with the Project Manager.

Field Technician
Koochiching Co. Landfill | MPCA | International Falls, MN

Provided construction oversite for installation of a synthetic liner, composite drainage and cover materials.

Operation and Maintenance

Field Technician
Closed Landfill Program | ongoing

Over 16 years of experience in the operation and maintenance of multiple closed landfills throughout the State of Minnesota. Tasks include:

- Operation, maintenance, and monitoring of landfill gas extraction systems with enclosed ground flares, groundwater treatment systems, leachate management systems, and passive landfill gas management systems
- Installation of passive gas vents
- Installation of solar powered landfill gas vent flares
- Lift station operation, repairs, and maintenance
- Electrical/Control troubleshooting and repairs
- Support services for flare stack testing
- Site improvements including access roads, clearance of access trails, woven wire fence, diversion berm drains, tree planting, surface water control, access gates, and fence abandonment
- Subcontractor coordination and oversight; for projects including crane/transport, insulation, leachate system cleaning, lift station cleaning, tank cleaning, waste disposal, among others
- Cover repairs and improvements (fill, grading, aeration, seeding, fertilizing, mulching, etc.)
- Leachate collection and pump-out system
- Flare station relocations, assembly, disassembly, refurbishment, and start-up
- Electrical/Control troubleshooting, repairs
- Lift station operation, repairs and maintenance
- Conducting site improvements including access roads, grading and water diversion, wire fence and gate repairs/installations, tree planting, site mowing and brush removal, invasive species control (mechanical and chemical) building repairs and upkeep
- Excavation of sub-grade control valves and piping for repairs and backfilling sand works
- Excavation/removal of beaver dam construction
- Sand blasting, priming and painting of monitoring wells and ballards
- Bollard, marker post installation
- Sampling of LFG condensate

Field Technician
Groundwater Treatment Facility | CenterPoint Energy | Minneapolis, MN | ongoing

Lead operator for a groundwater extraction and treatment facility. Duties include:

- Operation, maintenance, troubleshooting and reporting
- LNAPL and DNAPL handling and disposal
- Managing activated carbon vessels
- Building security

Other Field Activities

- PCB remediation
- Asbestos abatement
- Landfill cover systems
- Access road, culverts, and rip rap installation
- Fluid level monitoring
- Air quality measurements (PID, FID)
- Groundwater sampling
- Surficial soil sampling
- Soil gas sampling

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Larry (Buck) Lardy
Field Technician

Other related areas of interest

Recognized (Certifications/Trainings)

- 4-Hour HAZWOPER OSHA Training, Refresher, 2016
- Licensed Pesticide Applicator, Minnesota, 2016
- Union Pacific Railroad - E-Railsafe Certification, 2015

Work history

1997 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1996 - 1997	Freeborn County Planning and Zoning, Albert Lea, MN

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Robert Martin

Project Manager/Project Engineer

Qualified: Chemical Engineering, (B.S.) 1991

Professional Summary: Robert has worked extensively over 25 years in soil and groundwater remediation throughout the United States with a focus towards issues related to closed unlined landfills. He demonstrates effective skills in remedy selection and implementation; remediation system design, operation, maintenance, monitoring, and optimization; construction oversight/management and contract administration. Robert possesses strong project management skills, effective communication, and superior organization to meet and exceed client needs and expectations while focusing on project budget, scope, and schedule.

Project Manager/Engineer
Multiple Closed Landfills | Minnesota Pollution Control Agency | MN | 1997 - present

- Project manager for remedial alternatives evaluation, design, engineering specification/bid document preparation, and construction administration for landfill cover improvements and leachate collection/extraction at a 33 acre closed landfill located near International Falls, Minnesota. A 35-foot deep leachate collection trench was excavated through the interior portion of the landfill. The recommendation for utilizing single-pass trenching technology to construct the trench saved significant project costs for effectively extracting leachate from interior of landfill and waste. This approach allowed a deep trench to be excavated and simultaneously backfilled with aggregate to minimize leachate handling, reduced trench cuttings volume generation, and trench collapse during construction. This was the first project which utilized single-pass trenching through waste at a landfill.
- Project manager responsible for pre-design investigation, design, engineering specifications/bid document preparation, and construction administration for waste consolidation, landfill gas venting, and synthetic landfill cover installation at a 42 acre closed landfill located near Virginia, Minnesota.
- Project manager responsible for design, engineering specifications/bid document preparation, construction administration, and operation/maintenance contractor management for a vapor extraction and volatile organic recovery system from within a hazardous waste cell at a 73 acre closed landfill located in Anoka, Minnesota.
- Project manager currently responsible for the operation and maintenance of seven closed landfills with active remediation systems. Five of these sites have active landfill gas extraction systems with enclosed flares, two of the sites have leachate extraction/collection systems, and two have groundwater extraction and treatment systems.
- Project manager responsible for the design and construction management for the installation of two 40kW photovoltaic power generation arrays at two closed landfills.
- Project manager for the evaluation of previous cost estimates associated with landfill improvements, waste consolidation, landfill gas venting, leachate collection, and synthetic landfill liner and cover installation at a 140 acre closed landfill located in Burnsville, Minnesota. Additionally, managed development of three conceptual designs for alternate landfill improvement evaluations with cost estimates. Projected improvement costs were estimated to range from approximately $28.5M to $75.6M dollars
- Project manager/engineer responsible for the assessment and relocation of various enclosed landfill flare stations from Sites with limited landfill gas production to higher gas producing closed landfills.
- Project manager/engineer responsible for bench and field pilot tests in the treatment of perfluorochemical contaminated groundwater using ion exchange resins.

Project Manager/Project Engineer
Radiation Technology Inc. Superfund Site | Orbital-ATK | Rockaway Township, NJ | Ongoing

Project manager/engineer responsible for remedial design investigation at a federal Superfund site at a former rocket motor testing facility in Morris County, New Jersey. Remedial design investigation tasks included bedrock well installations, groundwater monitoring, wetlands delineation, hydraulic packer testing, downhole geophysics in a fractured bedrock system, and bioinjection bench and field pilot studies to evaluate in-situ treatment of perchlorate.

Project Engineer
New Richmond Closed Landfill | New Richmond, WI | Ongoing

Project engineer responsible for pre-design investigation, design, construction management, and operation/maintenance of active landfill gas extraction system at a closed landfill in New Richmond Wisconsin.

Project Engineer
Holtz-Krause Closed Landfill | Wausau, WI | Ongoing

Project engineer responsible for pre-design investigation, design, construction management, and operation/maintenance of active landfill gas extraction and flaring system at a closed landfill in Wausau, Wisconsin.

Project Engineer
Buckeye Wastewater Treatment Plant | Buckeye, IA | Ongoing

Project engineer responsible for providing design and construction assistance to install a wastewater treatment plant for the adjustment of pH, dissolved oxygen, and temperature.

Project Manager/Project Engineer
Denville Technical Park Site | Alliant Techsystems, Inc. | Denville, NJ | 2004 - 2005

Responsible for predesign investigation, design, and construction administration for the construction of a groundwater extraction and soil vapor extraction remediation system at a former rocket motor/propellant research and manufacturing facility.

Project Engineer
Former Superior Plating Facility | First & University Investors LLC | Minneapolis, MN | Ongoing

Project engineer responsible for operation, maintenance, and monitoring of a groundwater remediation system for the reduction of VOCS in groundwater via ultraviolent light and oxidation using 35% hydrogen peroxide.

Work history

1991 – present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1981 – 1988	3M Company, Cordova, Illinois

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Timothy D. Ree

Project Manager/Project Engineer

Qualified: Geological Engineering, Emphasis in Geo-Environmental Engineering (B.S.) 1994

Connected: Licensed Professional Engineer: Minnesota

Professional Summary: Tim has worked extensively over 22 years in soil and groundwater remediation throughout the United States. He demonstrates effective skills in remedy selection and implementation; remediation system design, operation, maintenance, monitoring, and optimization; construction oversight/management and contract administration. Tim possesses strong project management skills, targeted communication, and good organization to meet and exceed client needs and expectations while focusing on project budget, scope, and schedule.

Landfill

Project Engineer
Multiple Closed Landfills | Minnesota Pollution Control Agency | MN | 2006 - 2016

- Professional certifying project engineer responsible for design and engineering specification/bid document preparation for landfill gas collection system expansion with construction administration and oversight at a closed landfill located near Lake Elmo, Minnesota.
- Responsible for evaluating previous cost estimates associated with landfill improvements, waste consolidation, landfill gas venting, leachate collection, and synthetic landfill liner and cover installation at a closed landfill located in Burnsville, Minnesota. Additionally, developed three conceptual designs for alternate landfill improvement evaluations with cost estimates.
- Professional certifying project engineer responsible for remedial alternatives evaluation and design and engineering specification/bid document preparation for landfill cover improvements and leachate collection/extraction with construction administration and oversight at a closed landfill located near International Falls, Minnesota. A leachate collection trench was excavated through the interior portion of the landfill and was 35 feet deep. The recommendation for utilizing single-pass trenching technology to construct the trench saved significant project costs for effectively extracting leachate from interior of landfill and waste. This approach allowed a deep trench to be excavated and simultaneously backfilled with aggregate to minimize leachate handling, reduced trench cuttings volume generation, and trench collapse during construction. This was the first project which utilized single-pass trenching through waste at a landfill.
- Professional/certifying project engineer responsible for pre-design investigation, design, and engineering specifications/bid document preparation for waste consolidation, landfill gas venting, and synthetic landfill cover installation with construction administration and oversight at a closed landfill located near Virginia, Minnesota.
- Professional certifying project engineer responsible for design and engineering specifications/bid document preparation for a vapor extraction and volatile organic recovery system in a hazardous waste pit waste within a closed landfill located in Anoka, Minnesota.
- Responsible for pre-design investigation for waste relocation and landfill cover improvements at a closed landfill in Maple Township, Minnesota.
- Responsible for design, engineering specifications/bid document preparation, and construction project administration for leachate collection system improvements at a closed landfill in Otter Tail County, Minnesota.

Environmental Investigation, Remediation, and Risk Assessment

Project Manager/Project Engineer
Penta Wood Products Superfund Site | Wisconsin Department of Natural Resources | Siren, WI | 2014 - 2016

Responsible for taking over operation, monitoring, and maintenance of a LNAPL and groundwater extraction/treatment system with compliance monitoring, reporting, and hazardous waste management at a former wood treatment facility. Based on review of historical site and system data, USEPA approved a recommendation to modify the system operations saving significant project costs. Subsequently obtained USEPA approval for shutting down the remediation system as part of a pilot

study to select an alternate remedy for long-term remedial action.

Project Manager/Project Engineer
Former Great Lakes Container Site | Mallinckrodt US LLC | Auburn Hills, MI | 2005 - 2016

Project manager/project engineer responsible for air sparging/soil vapor extraction remediation system construction and operation, maintenance, and compliance monitoring; municipal storm sewer relining; and routine groundwater monitoring and sampling with reporting. Temporarily shutdown remediation system to pursue Michigan Department of Environmental Quality approval of completion of performance of response activities.

Project Manager/Project Engineer
Lenz Oil Superfund Site | Lenz Oil RD/RA Group | Lemont, IL | 2003 - 2016

Responsible for reporting pre-design data collection activities to change remedy selected in Record of Decision from excavation to in situ remediation (vacuum enhanced recovery) to address an LNAPL and dissolved VOC groundwater plume. Subsequently, USEPA issued an Explanation of Significant Differences to formally change the remedy; significant project cost savings were realized by client. Additionally, responsible for remediation system design, engineering specifications/bidding documents preparation, bid evaluation and contractor recommendation, construction administration and oversight, and operation, maintenance, and compliance monitoring with reporting. Shutdown system in anticipation of second Explanation of Significant Differences for implementing long-term monitored natural attenuation remedy.

Project Engineer
Former Manufacturing Facility | PRP Group | St. Louis Park, MN | 2016

Professional certifying project engineer responsible for design, testing, and construction of soil vapor extraction and sub-slab depressurization system for a commercial building in St. Louis Par, Minnesota. The system design and implementation was completed on an expedited basis in less than two months to address potential vapor intrusion of PCE.

Project Manager/Project Engineer
Denville Technical Park Site | Alliant Techsystems, Inc. | Denville, NJ | 2004 - 2005

Responsible for construction administration of groundwater extraction and soil vapor extraction remediation system at a former manufacturing facility. Subsequently responsible for operation and maintenance of groundwater extraction and soil vapor extraction remediation system.

Brownfield

Project Engineer
Former Superior Plating Facility | First & University Investors LLC | Minneapolis, MN | 2013 - 2014

Responsible for design and engineering specification/bid document preparation for building decommissioning/demolition, hazardous waste characterization/treatment/disposal, soil excavation/treatment/disposal, and leachate collection/ treatment/disposal including construction administration and oversight at a former metal plating facility.

Railroad

Project Manager/Project Engineer
Multiple Sites | Class I Railroad Client | NE | 2007 - 2016

- Responsible for design and construction oversight for two petroleum UST removal projects located in North Platte, Nebraska.
- Responsible for vacuum-enhanced LNAPL recovery pilot testing, LNAPL mobility and recoverability evaluations, and design and construction of expanded LNAPL recovery system with operation, maintenance, monitoring and reporting for a petroleum contaminated site located in North Platte, Nebraska. Significant project cost savings were realized by the client based on the results of the LNAPL mobility and recoverability evaluations, which significantly reduced the scope of the LNAPL recovery system expansion.
- Responsible for bioslurp LNAPL recovery pilot testing, and LNAPL mobility and recoverability evaluations with reporting for a petroleum contaminated site located in North Platte, Nebraska.
- Responsible for characterizing reporting for a petroleum fuel release on a mainline railroad track located in Maxwell, Nebraska. Nebraska Department of Environmental Quality issued a letter stating no further remedial actions are required at the site.

Oil and Gas

Project Manager/Project Engineer
Multiple Sites | Oil and Gas Clients | HI, OR, and PA | 1995 - 2004

- Responsible for design of soil vapor and dual extraction remediation systems for three retail automobile fueling stations in Pittsburgh, Pennsylvania.
- Responsible for UST decommissioning, site characterization, remediation system design and installation (groundwater pump and treat, soil vapor extraction, dual extraction, groundwater sparging, free product recovery), operation and maintenance,

soil excavation, routine groundwater monitoring and sampling, and risk assessment at 22 retail automobile fueling stations in Oregon.

- Responsible for site characterization and remediation system design at three decommissioned petroleum UST sites in Oregon.
- Responsible for coordinating site characterization and environmental compliance services with reporting for ten retail automobile fueling sites in Hawaii.

Emergency Spill Response, Management, and Planning

Project Manager/Project Engineer
Train Derailment Site | Class I Railroad Client | Northfield, MN | 2008

- Responsible for providing emergency response services for a soil cleanup of sulfuric acid release due to a train derailment. Services included liaison with regulatory agencies and development of confirmation sampling/analyses plan and reporting.

Other related areas of interest

Recognized (Certifications/Trainings)

- e-RAILSAFE System Badge Certification, expires 2017
- OSHA 40-hour Hazardous Waste Site Operations, 1995
- OSHA 8-hour Supervisor Course in Hazardous Materials and Site Investigations, 1996
- OSHA 8-hour HAZWOPER Refresher Training, 2015
- Construction Administration, ASCE Continuing Education Seminar, 2008
- Geosynthetic Design of Waste Containment Systems, Geosynthetic Education Institute, 2012
- Quality Control/Quality Assurance of Geosynthetics, Geosynthetic Education Institute, 2012

Work history

2003 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1998 - 2003	Martin S. Burck Associates, Inc., Hood River, OR
1995 - 1998	SECOR International, Inc., Portland, OR

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Brian S. Sandberg

Project Manager/Senior Hydrogeologist

Qualified: Master of Geology (M.S.) 1986, Bachelor of Science (B.S.) 1984 of Geology

Connected (professional affiliations): Professional Geologist: MN and IL, Registered Geologist: AZ, Licensed Geologist: KS, and Member of National Groundwater Association

Professional Summary: Brian has over 30 years of experience managing and conducting hydrogeologic studies across North America. Brian experience includes Federal and State Superfund Sites (including landfills, manufacturing facilities, solvent recycling facilities, explosives manufacturing, and manufactured gas plants); Ferrous and Non-ferrous mining sites; Water supply studies and due diligence. Brian has conducted remedial investigations, feasibility studies, and remedial actions in a variety of complex hydrogeologic environments across North America. Brian's work involves aquifer analysis, geophysics, geochemistry, and monitored natural attenuation (abiotic and biotic). Brian has conducted and assessed bioinjection and in-situ treatment programs to remediate chlorinated solvents and perchlorate. Brian is a member of the ITRC Characterization and Remediation in Fractured Bedrock and Advanced Site Characterizations Tools team.

Remedial Investigation

Project Manager/Hydrogeologist

Brian has over 25 years of experience related to implementing remedial investigations for Superfund sites, aboveground tank facilities, including petroleum, CERCLA listed former solvent recycling facilities, electronic facilities, and manufacturing throughout the United States. Specific project experiences are listed below:

- Project Hydrogeologist: Remedial Investigation at a state Superfund site in central Phoenix. Involved in the preparation of a remedial design work plan, sampling and analysis monitoring plan and quality assurance project plan for a former electronic facility. Participated in negotiations with the State regulatory agency. Provided technical support for litigation.
- Project Manager/Hydrogeologist: Multi-phased Remedial Investigation at an aboveground tank facility in Spring Valley, Minnesota. Responsible for management and supervision of field geologists, drilling contractors, and construction subcontractors. Project involved petroleum and dissolved product plume definition studies and hydrogeologic interpretation of a multiple aquifer system. Prepared and implemented an Interim Response Action (IRA). The IRA involved the installation of bedrock extraction well, groundwater collection trench, and soil excavation.
- Project Manager/Hydrogeologist: Remedial Investigation and Feasibility Study at a CERCLA listed closed municipal landfill in Tomah, Wisconsin. Responsible for conducting a detailed aquifer profiling system, examining the fate and transport of chlorinated solvents including natural biodegradation. Based on these studies, USEPA approved a monitored natural attenuation remedy for the groundwater operable unit.
- Project Hydrogeologist: Remedial Investigation at a CERCLA listed, former solvent recycling facility, in Gaston, North Carolina. Responsible for the implementation of the RI and supervision of drilling contractors and assisted in hydrogeologic interpretation and report preparation.
- Project Hydrogeologist: Remedial Investigation at an existing manufacturing facility in Eden Prairie, Minnesota. Coordinated an investigation to identify the extent of groundwater contamination and potential soil contamination. Activities included installing monitoring and test extraction wells, soil gas sampling, aquifer testing, and report preparation.

Remedial Design Investigations

Project Hydrogeologist

- Project Hydrogeologist: Pre-design investigation for a state Superfund site that involved the development of a large scale groundwater containment system for a dissolved chlorinated solvent plume associated with an electronic industrial facility in Phoenix, Arizona. The field activities involved the installation of a test extraction well, multi-level piezometers, and plume delineation wells; groundwater sampling; geophysical logging; and a 24-hour aquifer pumping test. The predesign investigation determined the lateral extent of the dissolved plume, the subsurface stratigraphy, the hydraulic parameters of the regional aquifer, and the placement and proposed pumping rates for the long-term extraction wells.
- Project Hydrogeologist: Remedial Design investigation at a federal Superfund site in Rockaway Borough, New Jersey. Coordinated a hydrogeologic investigation to delineate the extent of groundwater contamination and collect aquifer hydraulic data for developing a groundwater extraction and treatment system.

- Project Hydrogeologist: Remedial Design investigation at a federal Superfund site in Grand Rapids, Michigan. Evaluated hydrogeologic condition of a water table aquifer impacted by petroleum and chlorinated chemical compounds. Responsible for performing aquifer hydraulic analysis and groundwater modeling. Obtained a monitored natural attenuation remedy. Conducted enhanced in-situ biodegradation to accelerate the groundwater remediation for eventual site closure.
- Project Hydrogeologist: Remedial Design investigation at a federal Superfund site in at a former rocket propellant facility in Morris County, New Jersey. Conducted hydraulic packer testing, downhole geophysics in a fractured bedrock (meta-granite) system. Performed bioinjection pilot studies to evaluate in-situ treatment of perchlorate. Examined abiotic treatment of chlorinated solvents via iron oxides.
- Project Hydrogeologist: Environmental investigation at a Rocket Propellant facility in Winnipeg, Manitoba. Evaluated hydrogeologic conditions of a regional municipal aquifer impacted with chlorinated solvents. Performed aquifer analysis and assisted in the design of a multi-extraction well system.
- Project Hydrogeologist: Remedial Design for a federal Superfund site of a contaminated municipal well field in Morris County, New Jersey. Responsible for conducting necessary studies for designed a multi-well groundwater extraction system for two distinctly separate VOC plumes. Responsible for coordinating activities including monitoring well installation, constant rate aquifer pumping tests, groundwater sampling, and report preparation.

Environmental Investigation

Project Manager/Hydrogeologist

- Project Manager/Hydrogeologist: Environmental investigation at a Medical Center constructed on a former landfill in Minneapolis, Minnesota. Responsible for the management and supervision of field geologists and drilling contractors. Projects involved monitoring well installation, soil borings, groundwater sampling, and hazardous waste characterization of landfill debris.
- Project Manager: Environmental investigation of a closed municipal landfill Hastings, Minnesota. Responsible for management and supervision of field geologists and drilling contractors. Project involved delineating extent of solid waste, verify existence of clay cap, and monitor for the presence of methane gas. Results of the investigation were to determine proper landfill closure and develop a methane monitoring system.
- Project Manager: Environmental investigation and hazardous waste characterization of coal tar contaminated soils in Minneapolis, Minnesota. Responsible for the management and supervision of environmental technicians and analytical subcontractors. Projects involved chemical testing of 20,000 cubic yards of soil for organic compounds, heavy metals, and oral and dermal toxicity analysis. Prepared a feasibility analysis for soil remediation and assisted in the design of fully enclosed vault.
- Project Hydrogeologist: Environmental Investigation at an open dump site in Minneapolis, Minnesota. Responsible for the management and supervision of field geologist and drilling contractors. Project involved monitoring well installation, subsurface delineation of petroleum and PCB contamination, and report preparation.
- Project Hydrogeologist: Environmental investigation at a wood treating plant in Lumby, British Columbia. Conducted hydrogeologic evaluation of groundwater extraction system, verifying hydraulic containment of wood treating compounds. Performed groundwater modeling and aquifer flushing analyses to verify groundwater capture and estimate groundwater cleanup times.

Remedial Investigation/Feasibility Study

Project Hydrogeologist

Brian has experience with implementing and assisting in the development of remedial investigation/feasibility studies. His experience includes the following:

- Project Hydrogeologist: Remedial Investigation/Feasibility Study (RI/FS) at a former private dump site in White Bear Township, Minnesota. Responsible for the implementation of the RI and assisted in the development of the FS. Project involved monitoring well installation and groundwater sampling. Designed and implemented a groundwater extraction system. Other activities included removal of buried drums and subsequent hazardous waste characterization of their contents.
- Project Hydrogeologist: Remedial Investigation/Feasibility Study at a wood treating plant in Louisville, Kentucky. Project involved characterization of multiple groundwater system and detailed characterization of subsurface soils and identifying the extent of non-aqueous phase liquids.

Hydrogeologic Investigation

Project Manager/Hydrogeologist/Coordinator

Brian has a diverse background in hydrogeologic investigations as a project manager, hydrogeologist and coordinator. These projects include mining and water supply studies. The following provides his experience:

- Project Hydrogeologist: Hydrogeologic investigation at a federal Superfund site located at an existing airport facility in Tucson, Arizona. The activities involved conducting a groundwater investigation to

delineate the horizontal and vertical extent of a dissolved chlorinated solvent plume, determining the hydraulic parameters of the water table aquifer and developing a groundwater containment system to capture the dissolved plume. Field activities included well installation, a 72-hour pumping test, and data analysis. As part of this project a Technical Impracticability waiver application was submitted for portions of the site impacted by non-aqueous phase liquids (NAPLs).

- Project Hydrogeologist - Detailed water supply study in a fractured granite aquifer for a proposed large scale dairy operation in northern Wisconsin. Conducted long term aquifer pumping tests, residential well monitoring, geochemistry evaluation, and fractured aquifer analysis.
- Project Manager/Hydrogeologist: Multi-phased hydrogeologic investigation at an existing ferrous mine site in northern Minnesota. Conducting aquifer testing and geophysical studies at a six square mile tailings basin facility, coordinated hydrogeologic modeling and evaluated the fate and transport of mineral-enhanced groundwater to nearby surface water bodies.

Other related areas of interest

Recognized (Certifications/Trainings)

- Member of the Interstate Technology Regulatory Council – Characterization and Remediation in Fractured Bedrock - 2015 -2017
- Estimating Rates of Groundwater Recharge, NGWA short course, San Antonio, Texas, March 2015.
- Improving Hydrogeologic Analysis of Fractured Bedrock Systems, Midwest Geosciences Group Short Course, Madison, Wisconsin, June 2011.
- Advanced Aquifer Testing Techniques Featuring AQTESOLV, Midwest Geosciences Group Short Course, Boston, Massachusetts, April 2009.
- Advanced Data Analysis Techniques for Evaluating and Quantifying Natural Attenuation for Remediation of Contaminated Sites, NGWA Short Course, San Francisco, California, March 2007.
- Estimating Times of Remediation Associated with Monitored Natural Attenuation and Contaminant Source Removal, NGWA short course, Orlando, Florida, 2002.
- IBM PC Applications in Groundwater Pollution and Hydrology, NGWA Short Course, San Francisco, California, 1992.
- Dense Non Aqueous Phase Liquids (DNAPLs) Short Course, Waterloo Centre for Groundwater Research, 1989
- NGWA Groundwater Geochemistry Short Course, San Francisco, California, 1988
- Intermediate Hazco Training Certification (40 hours), Hazco, Inc., Dayton, Ohio, 1987

Publications and Presentations

- Reid, J.R., Sandberg, B.S., and Millsop, M.D., 1986, Bank Recession Causes and Rates; Past, Present and Future, Lake Sakakawea, ND: University of North Dakota, Engineering Experiment Station, Bulletin 86 01 EES 01.
- Sandberg, B.S. and Reid, J.R., "Prediction of Bank Recession, Lake Sakakawea, North Dakota". Presented to the North Dakota Academy of Science, 1986.
- Sandberg, B.S. and Reid, J.R., "Empirical Modelling of Shoreline Erosion", Geological Society of American Abstracts with Programs Annual Meeting, San Antonio, 1986.
- Sola, D.V. and Sandberg, B.S., "Packer Testing in a Thick Bedrock Aquifer" National Water Well Association Abstracts with Programs, Annual Meeting, Minneapolis, Minnesota, 1987.
- Reid, J.R., Sandberg, B.S., and Millsop, M.D., 1988, Bank Recession Processes, Rates, and Predictions, Lake Sakakawea, North Dakota, USA, Journal of Geomorphology, Vol. 1, No. 2.

Work history

1990 – present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1989 - 1990	Braun Environmental Laboratories, Inc.
1986 - 1989	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1975 - 1979	U.S. Coast Guard – Machinery Technician 3rd Class Petty Officer

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Mark Siekmeier
Database Administrator

Professional Summary: For more than 20 years, Mr. Siekmeier has managed the analytical data for over 100 GHD projects. Success in these projects has required the ability to manipulate data from a variety of sources and formats into consistent and reliable relational databases. In addition, Mark has more than 25 years of experience working in network administration. This work has included planning and implementing numerous transitions from one operating platform to another, along with end user training and support.

Analytical Data Management

Database Administrator

On various projects Mark has completed the following tasks in a time efficient manner to provide the client with value through organizing their analytical data in a more useful and efficient format.

- Overseeing the compilation of historical data and metadata into a searchable relational database
- Auditing external databases for accuracy and completeness
- Automating analytical data manipulation from electronic lab deliverables
- Designing and implementing project specific applications for the collection and electronic submittal of project data
- Implementing digital document management for paper documents and providing electronic transmittal for legal discovery
- Customization, deployment, and training of e:Monitor application for electronic field data collection

Network Administration

IS Technician

During this time Mark has implemented and supported numerous systems and software. This work has improved the efficiency and work products that GHD employees use to provide service to our clients:

- Microsoft Windows 7, XP, 2000, NT, 98, 95, DOS
- Windows server 2008, Windows Server 2003, Exchange, MSDE, MS SQL
- Novell, Linux, Mac, Laserfiche document management
- Designing, implementing, and supporting remote offices with 1 to 20 staff at project sites
- Designed and provided disaster recovery services
- Supported remote PLC connectivity and maintenance for various projects

Work history

1993 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1991 - 1993	Fetterly & Gordon, P.A., Minneapolis, MN
1989	General Dynamics, San Diego, CA

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Margaret Zuckweiler
Environmental Engineer

Qualified: Masters of Science - Geological Engineering, University of Wisconsin-Madison 2001 Bachelors of Science - Geology University of North Dakota – Grand Forks 1998

Connected: Licensed Professional Engineer (P.E.): Minnesota, July 2008 - present. ASCE Membership – 2011 - present

Professional Summary: Margaret has worked 14 years working extensively in the area of landfill engineering, compliance, and agricultural engineering. Areas of professional practice include: landfill design and engineering, facility compliance and permitting, and SPCC/SWPPP preparation.

Landfill

Project Manager/Design Engineer

Margaret has over 14 years' experience on multiple landfill projects for several clients throughout the United States. Specific project experience

- Design, engineering plans, specifications/bid document preparation, and construction project administration for active landfills in MN, WI, IA, ND, and OH.
- Preparation of permit application for renewal including, engineering design for liner, leak detection, leachate collection, distribution (recirculation) and removal, cover system design, and stormwater controls. Preparation of permit application documents also included, O & M plans, Financial Assurance estimates and documentation.
- Preparation of annual reporting and quarterly monitoring documents for multiple landfills for operating, groundwater monitoring, leachate recirculation monitoring and leachate land application monitoring for multiple landfill sites.
- Hydrogeologic investigation designs for multiple landfill expansions. Included planning, negotiations with regulatory agency and coordination/onsite supervision of the installation of the groundwater wells.
- Construction documentation reports for the following landfill construction projects:
  - Double liner constructed leachate storage pond in central Minnesota.
  - MSW/Industrial clay composite and geocomposite liners for landfills located throughout Minnesota and in Iowa.
  - Clay and geocomposite cover systems for MSW and industrial landfills throughout Minnesota.
- Hydrogeologic Evaluation of Landfill Performance (HELP) analysis for multiple landfills for landfill design verification.
- Leachate land application area design hydraulic loading, nutrient loading and soil investigations in MN.

Project Coordinator

- Corrective Action System (CAS) expansion design – two additional extraction wells to capture VOC contamination from unlined/closed landfill cell at an active landfill in central Minnesota.
- Land application of CAS water. Atomization designed to remove VOCs and hydraulic loading rate calculations to ensure surface water runoff was not generated as the application areas were surrounded by wetlands.

Transfer Station

Project Manager/Design Engineer

- Preparation of permit application for renewal for five MSW transfer stations located throughout Minnesota in accordance with MPCA requirements.
- Preparation of a permit application for a new transfer station located on reservation land in northern Minnesota in accordance with EPA requirements.

Landfill Field Services

- Construction Quality Assurance (CQA) and contractor oversight of approximately 2.5 million square feet of geomembranes for landfill leachate ponds liners, MSW, Industrial and Demolition Landfill Cell liners, and MSW and Industrial Landfill Covers.
- Construction Quality Assurance (CQA) and contractor oversight for clay liner installation, leachate collection line, drainage layer placement
- Trained personnel on CQA on landfill liner installation and CQA practices.

- Installation of groundwater monitoring wells at multiple landfills in multiple states.
- Project Coordination/construction CQA observation of passive gas vents installation (40+) in closed areas of four landfills located in Minnesota
- Construction oversight of gas probe well installations at three landfills located in Minnesota.

EAW Preparation

Project Manager/Design Engineer

- Preparation of Environmental Assessment Worksheets (EAWs) associated for multiple projects in the Midwest.
- Preparation of two Environmental Impact Statements for Landfills in MN.

Compliance/Closure/Stormwater

Project Manager/Project Coordinator

- Wastewater lagoon pilot study/solidification plan and construction oversight for lagoon closure near Paducah, Kentucky
- Stormwater design to improve best management practices at an industrial facilities in New Brighton, Minnesota
- Project Management/Project coordination for site visits at industrial, landfill, and municipal sites and preparation of over 50 SWPPPs and included recommendations for stormwater best management practice improvements, structural improvements and identification of potential sampling locations.
- Project Management/Project coordination for compliance assistance with NPDES/SDS requirements for Minnesota Clients regarding the Multi Sector Industrial Stormwater Permit issued in April 2010 sampling requirements/ new inspection requirements and upgrades to stormwater best management practices required for clients sites.
- Project coordination of the development of Spill Control and Countermeasure Plans (SPCC) for industrial, landfill, and municipal clients that required compliance with SPCC regulations.

Agricultural Engineering

Project Manager/Design Engineer

- Manure management plan development for feedlots ranging in size from 500 animal units (AU) to 40,000 AU located in ND, SD, CO, MN, IA, and WI.
- Preparation of Permit Applications for three large feedlots located in Eastern Colorado.
- Compliance assistance regarding operations, engineering, air quality, ground and surface water for feedlots in CO, SD, IA, and MN.
- Air and water quality monitoring plan design and coordination for finishing feedlots housing 20,000 finishers located in eastern Colorado.
- Liner repairs at Sow Facility in eastern Colorado.
- Quarterly and annual reports detailing water balance calculations for waste lagoons, groundwater monitoring, air quality monitoring, and soil and manure analytical results.
- Evaluation of an animal waste impoundment facility for degradation of the lining system, performance of the delivery systems, and adequacy of the digester covers.

Expert witness experience

Project Manager/Design Engineer

- Expert witness on groundwater, geology and engineering controls for one sow farm and two large hog finishing sites in eastern Colorado.

Other related areas of interest

Recognized (Certifications/Trainings)

- 40 Hour HAZWOPER OSHA Training (per 29 CFR 1910.120)
- 8 Hour HAZWOPER Refresher OSHA Training (per 29 CFR 1910.120), Annually
- Professional Engineering Licensure (State of MN 2008 - present)

Work history

2012 – present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
2001 – 2012	Liesch Associates, Inc. Minneapolis, MN
1999 – 2001	UW-Madison, Madison, WI

Secondary Project Staff

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Matthew S. Abdallah

Qualified: Bachelor of Science (BSc) - Environmental Science/Resource Management, State University of New York at Plattsburgh, 1993

Professional Summary: Matthew possesses skills that give clients confidence that their health and safety risks are being carefully managed. Effective Field Construction Management and implementation of environmental projects including asset, budget and project schedule management with targeted communication, good organization, and excellent people skills. His work history spans 22 years in construction and related environmental projects with experience in implementing projects with a strong focus on Health, Safety, and Environment (HSE) planning.

Design/Build Projects

Site Construction Manager
Groundwater Collection Upgrades for G&H Landfill-Groundwater Treatment Plant | Utica, MI

Construction Upgrade to improve landfill groundwater collection system utilizing one pass trenching technologies to depths to 35 feet. System included collection laterals, sumps, pumps, force mains with associated ancillaries and appetences. Responsible for managing the following: Health & Safety, administration controls, project schedule, equipment, operators, laborers, subcontractors and vendors while coordinating with design managers. Projected value: $1,960,000.00

Site Construction Manager
Stormwater Management Construction Ardagh Glass Company | Seattle, WA

Construction of storm water sediment controls in tidal waters of the Pacific Ocean. System included roof water collection upgrades, limestone filter media and a Concrete Vortech sediment collection basin. Responsible for managing the following: Health & Safety, administration controls, project schedule, equipment, operators, laborers, subcontractors and vendors while coordinating with design managers. Projected value: $165,000.00

Assistant Construction Manager
Wastewater Treatment Plant | Detroit, MI

Construction of a wastewater treatment plant as part of a Coke manufacturing operation. Responsible for administration controls; coordinating with design managers; managing design/build schedule with over 300 line items with a duration of 60 weeks; procurement of major components; management of civil, mechanical, electrical, piling, demolition contractors and initiate process startup. Management of crew/subcontractor Health & Safety. Projected value: $11,000,000.00

Remedial Construction Management

Site Construction Manager
Contaminated Soil and Water Encapsulation - P66 | Wilmington, NC

Construction of two 300-linear feet sheet pile walls in tidal waters of the Atlantic Ocean. Sheet pile installation was completed by barge and crane during tidal conditions. Responsible for managing the following: Health & Safety, administration controls, project schedule, equipment, operators, laborers, subcontractors and vendors while coordinating with design managers. Projected value: $520,000.00

Assistant Construction Manager
In-situ Permeable Reactive Barrier (PRB) Remedial Implementation | Utica, MI

Assistant Construction manager/Superintendent of for Implementation and Installation of an in situ PRB wall 24 feet below grade via one pass trenching excavation. Responsibilities included: Management of the following: Day to Day crew efforts, heavy equipment, procurement of materials, submittals, weekly cost tracking while maintaining profit margin, Procurement of materials construction of roads, and on site infrastructure. Management of crew/subcontractor Health & Safety. Contract Value: $538,000.

Assistant Construction Manager
SMC Remedial Implementation | Northfolk, NE

Assistant Construction manager/Superintendent of for Implementation and Installation of a Soil Vapor Extraction System that required 250 feet of lateral drilling below an operating pharmaceutical plant. Responsibilities included: Management of the following: Day to Day crew efforts, heavy equipment, procurement of materials, submittals, weekly cost tracking while maintaining profit margin, and waste characterization, profiling and approvals. Liaison with plant personnel, client project manager and public; Procurement of process equipment and subsurface materials for horizontal extraction wells; Management of project contracted licensed surveying requirements. Management of crew/subcontractor Health & Safety. Contract Value: $1,259,000**.00**

Construction Manager
CVO-Racer Trust | Ypsilanti, MI

Remediation, treatment and disposal of buried paint sludge under two separate contracts. One contract was underneath the existing building that required shoring, underpinning via helical piers. The second contract was up gradient of a sheetpile capture wall protecting a nearby pond and watershed. Management responsibilities included the following: Contractor daily management, oversight and ensuring compliance with executable contract; Managing Waste Characterization, profiling and approval; documenting progress through Topo and point survey efforts; and, SESC requirements. Liaison with contractors, owner and prospective purchaser of the property. Management of crew/subcontractor Health & Safety. CRA contract Value: $490,000 Project contract Value: $2,919,433.00

Assistant Construction Manager/Co-Superintendent
Cortese Landfill Remediation Project | Narrowsburg, NY

Implementation and Installation of an Insitu Soil Vapor Extraction System Lump Sum Project. Responsibilities included: Management of the following: Day to Day crew efforts, heavy equipment, procurement of materials, submittals, weekly cost tracking while maintaining profit margin, and waste characterization, profiling and approvals. Liaison with client's engineer, client project manager and public; Procurement of process equipment and subsurface materials for extraction wells; Responsible for managing and coordinating new installation of 15000 Volt electrical power that required over 700 feet of new power lines, poles with tree trimming. Management of project contracted licensed surveying requirements. Management of crew/subcontractor Health & Safety. Contract Value: $2,465,058.00

Construction Manager
Barrels Inc. | Lansing, MI

Soil remediation as part of industrial re-development project. Responsibilities included: liaison with six attorneys part of PRP group; contract negotiation; schedule and budget management; equipment and materials procurement; employee management; investigation and surveying management; permit management; and project documentation. Management of crew/subcontractor Health & Safety. Contract Value: $1,478,000.00

Construction Manager
Arkema Site Wide PCB Remediation | Riverview, MI

PCB Remediation at a Decommissioned chemical plant. Responsibilities included: specification development, bid review and selection; RAP; contractor and schedule management; invoicing review and submittal to client; groundwater treatment and management during freezing conditions; waste (TSCA and non-TSCA) management including transporter inspection and manifest signing and organization; Site Health and Safety Officer for nine crew members; project documentation for agency reporting purposes. Contract Value: $1,000,000.00

Construction Manager
Shell Oil Company | Byron, CA

Oil and tar soil and groundwater contamination remediation project. Project was located on a site for a green energy redevelopment project. Responsibilities included: budget and schedule development; remote employee management; team leader for site activities; management for local government encroachment and road permits; management of submittals, progress and geotechnical reports; weekly review of project documentation; peer supporter for CRA site employees; multiple site visits to ensure efficient production; and client and future owner liaison. Management of crew/subcontractor Health & Safety. Contract Value: $761,000.00

Field Construction Manager
McInerney Farms Site | Elmira, NY

Remote buried paint sludge soil and groundwater remediation project in a flood zone of Seeley Creek. Responsibilities included: employee supervision; TSCA waste management; Schedule, submittal, change order and contract schedule management; equipment and materials procurement; client and engineer liaison; and project documentation. Contract value $3.6 million Total value (w/change orders) $5.4 million

Construction Manager
Chemox injections and application | various sites in Michigan

Construction manager for the injection of potassium permanganate at various locations including vertical as well as trench injections. Responsibilities included developing design/build approach; developing estimate; procuring labor, equipment and materials.

Construction Manager
LNAPL Collection/Treatment | City of Northville, MI

Construction of a LNAPL collection and treatment system. Project highlights include the following: new access road construction; construction of a treatment building in city park; horizontal drilling under railroad to obtain site power; installation of barrier wall along Rouge River including sheetpile, batter and H-piles, and tieback supporting rods; installation of collection trench; pumping stations construction while encountering artesian groundwater; installation of treatment system consisting of an oil agglomeration tank, SS OWS; effluent tank; transfer pump; bag filter canisters and filters, and primary and secondary carbon vessels; and site restoration for public use including the construction of a bike path. Project Value: $750,000.00.00

Site Manager
SVE System Construction | Milford, MI

Design and implementation of a Soil Vapor Extraction unit to lower the concentrations of TCE. Core responsibilities include the following: assisted with the design of the SVE unit; equipment, materials, and labor procurement; construction oversight; construction budget management; operation and maintenance of the unit; and liaison with the client and CRA pertinent personnel. Project Value: $88,000.00.00

Site Manager
Drum Removal, Contaminated Soil and Groundwater Cleanup | Auburn Hills, MI

Excavation of 30,000 cubic yards (cy) of TSCA, RCRA, and non-hazardous soils from a former drum recycling operation. A portion of the work was performed in a wetland area using mats and swamp equipment. Responsibilities include the following: waste characterization, sampling, profiling, and manifesting; groundwater treatment plant operation and maintenance; operator and laborer supervision; equipment decontamination oversight; and overall assistance to the site superintendent with respect to regulatory compliance. Project Value: $14,000,000.00

U.S. EPA Superfund Site Environmental Construction Manager
Sumpter Township, MI

Represented client during the remediation of an abandoned drum site encompassing approximately 4 acres that was impacted with inorganics, VOCs, SVOCs, and PCBs. Core responsibilities included: remedial action plan preparation; contractor oversight; daily air monitoring and sampling; soil verification sampling following MDEQ guidelines; daily field documentation; correspondence with residents, client, and the U.S. EPA representative; and preparation of a closure report.

Environmental Construction Manager
Facility Closure | Former DaimlerChyrsler Corporation Headquarters | Highland Park, MI

Represented owner during remedial investigations and facility closure of this site. Responsibilities included contractor oversight, predemolition environmental inventories of 27-multiple story buildings, verification/investigation sampling per MDEQ guidance documents, coordination of UST and hydraulic hoist removal and remediation, deactivation and demolition oversight of the multi-story buildings, and completion of approved environmental closures under MDEQ Part 201 guidelines and requirements.

Demolition and Site Restoration Management
MDEQ Dependable Kellering Site | Detroit, MI

Site Manager and Client Representative responsible for supervision during the building deactivation, demolition, asbestos-containing material (ACM) abatement, and site restoration. Core responsibilities included: correspondence with contractor and MDEQ project manager; deactivation, demolition, and ACM abatement oversight; field documentation including daily field reports, unit price tracking, and photographing stages of the project; contractor submittal review; and preparation of summary report documenting activities completed at the site.

Environmental Construction Manager
U.S. Postal Service | Detroit, MI

Performed construction management during closure of underground storage tanks at various United States Postal Service locations in Michigan.

Environmental Construction Manager
Chrysler Foundry | Indianapolis, IN

Responsible for coordination of activities to limit the liabilities associated with facility closure. Activities included containment of hazardous materials and functioning as owner's on-site representative for coordination of construction activities. Also functioned as liaison between owner and abutting property owners.

Environmental Remediation Technician
J.T. Baker, Inc. | Phillipsburg, NJ

Functioned as an engineering technician, while employed for O'Brien and Gere Engineers Inc. Related projects include: environmental remediation of river sediments contaminated with DDT, landfill closure, contaminated soils delineation, excavation water filtration system construction, supervising site pilot test, and vegetation restoration.

Groundwater/Soil Treatment Systems

Repair and Maintenance of Treatment Plants and Facilities
Various sites, Michigan

Manager of landfill cells and treatment system repairs. Responsibilities include troubleshooting; developing schedules and estimates; coordinating repair; procuring labor, equipment, and materials.

Dual-Phase System Construction
Pontiac, MI

Site manager for the installation of dual phase units in the collection of vapors and impacted groundwater. Responsibilities include: rigging, loading and utilizing crane contractors to set units; installing associated electrical and piping networks; decommissioning and dismantling units. Project Value: $250,000.00

Multi-Phase System Construction
Dearborn, MI

Construction manager for the installation of Multi Phase Extraction (MPE) unit for the in situ collection of vapors and impacted groundwater. Responsibilities include: rigging, loading and utilizing crane contractors to set units; installing associated electrical and piping networks;

decommissioning and dismantling units. Project Value: $250,000.00

Assistant Construction Manager
Barrier Wall Installation | Ypsilanti, MI

Responsible for the immediate response action to prevent DNAPL and PCB oil from migrating into the Tyler Pond watershed basin. Responsibilities included the following: Coordinating the temporary disconnect of the overhead 13,200 volt overhead powerlines; Coordinating tree removal; Procuring, management and oversight of sheetpiling installation that included hot rolled sheets with alternating continuously welded seams with bentonite paste sealed seams; and, site restoration. Project Value: $475,000.00

Assistant Construction Manager
Funnel and Gate System | Bay City, MI

Responsible for the construction of an in situ funnel and gate groundwater treatment system. The funnel consisted of a water tight sheet pile wall. The gate/treatment zone consisted of two cells of zero valent iron (ZVI) that was homogeneously mixed with manufactured sand. Monitoring wells were installed prior to the gate, within an intermediate sand zone between the ZVI cells, and at the effluent of the in situ gate. Other management responsibilities at the site include the following: crowning mound area with impervious clay fill; and, land balancing a bermed area to minimize surface runoff and erosion. Project Value: $420,000.00

Field Construction Manager
Funnel and Gate System | Bay City, MI

Responsible for the design and construction of an in situ funnel and gate groundwater treatment system. The funnel consisted of 200 LF of water tight sheet pile wall. The gate/treatment zone consisted of two cells of activated carbon. Monitoring wells were installed prior to the gate, within an intermediate sand zone between the carbon cells, and at the effluent of the gate. Project Value: $580,000.00.

Groundwater Treatment Plant Operator
Groundwater Remediation | Flint, MI

Responsible for the operation and maintenance of an industrial wastewater treatment system where the primary concern was polychlorinated biphenyls (PCBs). The treatment system consisted of recovery wells and ancillary piping, holding tanks, coalescers, UV/Oxidation, circular clarifiers, filter press, granular activated carbon absorption, and three chemical feed systems. The system was controlled by a personal computer (Steeplechase) and monitored remotely utilizing the PC Anywhere program. During installation of the treatment system, responsibilities included assisting with construction management and contractor supervision.

Project Superintendent
Cloverville Pumphouse Site | Michigan Department of Environmental Quality (formerly the Michigan Department of Natural Resources) | Cloverville, MI

Coordinated construction activities associated with soil vapor extraction system, as well as a groundwater pump and treat system for the remediation of benzene, toluene, ethylbenzene, xylene (BTEX) and lead-contaminated soil and groundwater. Core responsibilities included subcontractor coordination, site inspections, liaison between MDEQ and neighboring abutters and town officials, associated permitting, project budgeting, and procurement of construction materials.

Air Projects

Soulbrain | Plymouth, MI

Air Scrubber pilot unit installer for a facility that produces batteries. Pilot unit was plumbed and connected to permanent air scrubber to study emissions to meet MDEQ air quality division permit requirements.

Remedial Investigation

Groundwater Sampling
General Motors | Livonia, MI

Responsible for quarterly groundwater sampling for hexavalent and trivalent chromium. Core responsibilities included: field screening, sampling, data management, and preparation of quarterly groundwater sampling reports for a 2-year period.

PCB-Impacted Soil Remediation
General Motors | Livonia, MI

Responsible for the construction oversight of PCB-impacted soil remediation that included excavation of impacted soil, off-site disposal, transportation to GM approved PCB disposal facility, manifest logging and record keeping, soil verification sampling following the MDEQ-VSR guidelines, data management, and the completion of construction summary reports.

Soil and Groundwater Sampling
BASF Riverview | Riverview, MI

Site Manager and Client Representative responsible for supervision of remedial investigation activities which included: geophysical survey, performance of 13 offshore soil borings, installation of 31 monitoring wells, low-flow sampling of 69 monitoring wells, slug testing of 38 monitoring wells, and performance of 10 test pilots. Additional responsibilities included analytical data management, geophysical and hydrogeological data interpretations, analytical data evaluation, and coordination of project meetings, maintaining project schedules, project summary reporting, and interaction with the Michigan Department of Environmental Quality.

Field Technician
Wright-Bernet Broom Factory | Hamilton, OH

Functioned as a field technician to assess the extent of groundwater and subsurface soil impact. Responsible for supervising Geoprobe explorations, on-site mobile laboratory, classifying soils, surveying existing wells, and determining approximate groundwater flow.

Environmental Technician
BASF, Inc. | Detroit, MI

Performed stormwater discharge sampling at a chemical plant. Responsibilities included installation of SIGMATM water samplers, collecting samples at specified intervals, determining discharge rates, and completions of field notes and quarterly sampling reports.

Delwal Corporation | Novi, MI

Responsible for researching and investigating specific segments of an environmental site assessment to include Sanborn map review; aerial photograph research; site walkover; and photographing site and surrounding area.

Williams International | UST Closure | Walled Lake, MI

Assisted client with assessment of the extent of groundwater and soil impact from two USTs at their industrial site in Walled Lake, Michigan. Supervised field work, completing soil boring and groundwater sampling to classify soils to delineate the associated contamination in order for the client to obtain a Type C "no action" closure of the site.

Other related areas of interest

Recognized (Certifications/Trainings)

- Commercial Motor Vehicle Endorsement/Chauffer's License Endorsement
- RCRA/DOT Certification
- Construction Documentation Technology (CDT) Certification
- MDEQ Waste Treatment Plant Operators Certification
- MDEQ-SESC Management - Construction Site Soil Erosion and Sedimentation Control Certification Michigan Department of Natural Resources and Environment Water Bureau, License I-10-0593
- Warehouse & Rough Terrain Forklift Certification Code of Federal Regulations - 29CFR 1926.602(d)/ 1910.178(l)
- TROXLER Nuclear Testing Equipment Certification
- HDPE Fusion, P.P.I/TR-33/2005, ASTM F1290, ASTM D2657, and ASTM D2657
- Excavation Hazards Training for the Competent Person (29 CFR 1926, Subpart P)
- Confined Space Entry Certification and Training
- 6-Hour Defensive Driving Certification Conestoga-Rovers & Associates (CRA)
- 40-Hour HAZWOPER Certification with Annual 8-Hour Refresher

Work history

2001 - present	GHD (formerly CRA Services the US Construction Division of Conestoga-Rovers & Associates), Plainwell/Plymouth, MI
2000 – 2001	Malcolm Pirnie, Inc.
1994 - 2000	GZA GeoEnvironmental, Inc.
1993 - 1994	O'Brien and Gere Engineers Inc.
1986 - 1994	McDonald-Douglas F-16 & Boeing KC-135 Air Refueler

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Grant D. Anderson
Project Chemist

Qualified: Bachelor of Science - Chemistry (B.S.) - June 1992, University of Minnesota

Professional Summary: Grant manages all tasks related to analytical requirements for a wide variety of remediation and compliance projects. These tasks include: analytical lab service procurement/coordination, data validation, quality assurance project plan (QAPP) preparation and quarterly monitoring report preparation. He excels at getting the job done accurately and efficiently.

Project Chemist

Grant has 20+ years of experience managing the chemistry workload for the St. Paul, Des Moines, Green Bay, Chicago and surrounding offices. Clients vary from large Railroad and Fortune 500 companies to small local property transactions.

Grant communicates with laboratories and their project managers on a day to day basis. Grant is the go between for GHD Project Managers and the Laboratories. His keen eye for detail and breadth of experience helps projects move along smoothly from start to finish. Below are some examples of project related tasks:

- Responsible for reduced data quality assessment and full validation of U.S. EPA CLP, SW-846 and non-standard analytical data.
- Procurement and contracting of laboratory services for environmental investigations.
- QA/QC officer for numerous Superfund and RCRA investigation and remedial action projects.
- Development of state and federally approved Superfund and RCRA Quality Assurance Project Plans (QAPPs).
- Coordination of IRDMIS and ERIS data entry for USACE projects.
- Manager for field equipment (maintenance and calibration).
- Prepared cost estimates for conducting environmental sampling programs.
- Performed on-site laboratory analyses using purge and trap gas chromatography (GC).
- Operated Geoprobe sampling van.
- Performed laboratory analyses utilizing high performance liquid chromatography (HPLC) and graphite furnace atomic absorption (GFAA).

Project Chemist
Large Computer Manufacturing Facility Site | Rochester, MN

Grant is the QA/QC officer in charge of laboratory coordination, data validation and assessment and Quality Assurance Project Plan (QAPP) preparation on this long term project.

Project Chemist
Tucson International Airport Authority Superfund Site | Tucson, AZ

Grant was the QA/QC officer in charge of laboratory coordination, data validation and assessment and Quality Assurance Project Plan (QAPP) preparation.

Project Chemist
Class I Railroad - Derailment | Dubuque, IA

Grant is the project chemist for emergency response projects. Grant is in charge of laboratory coordination, data validation and assessment on a round the clock schedule.

Work history

1994 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1992 - 1994	Terracon Environmental Inc., St. Paul, MN
1992	CIMA Labs Inc., Brooklyn Park, MN

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Lisa Armbruster

Civil/Structural Engineer

Qualified (Education): B.S., Civil Engineering, 2007

Connected (professional affiliations): Intern Engineer (EIT): NY

Professional Summary: Lisa has over 9 years of experience as a civil/structural engineer, with projects in both industrial and wastewater facilities. She has completed various structural designs including reinforced concrete foundations, retaining walls, reinforced masonry buildings, and various steel support structures. Lisa is familiar with multiple design guides, building codes, and works with many different disciplines throughout the phases of each project.

Municipal

Civil/Structural Engineer
Secondary Treatment System Improvements Bath Electric Gas and Water Systems | Village of Bath | Bath, NY | 2015

Lisa provided structural design and detailing of concrete modifications made to the existing digester tanks. The design included the analysis of the existing tank structure, design of new concrete supports to extend the walls of the tank, and adding additional slide gates and walkways to the tank.

Civil/Structural Engineer
Metropolitan Syracuse WWTP Secondary Bypass Disinfection System Improvements | Onondaga County Department of Water Environment Protection | Syracuse, NY | 2015

Lisa provided the structural design and detailing of various improvements to be made to an existing concrete bypass tank. This included the analysis of the existing tank which was supported on piles, where additional concrete, slide gates, an 84-inch diameter opening to the tank wall, and a stainless steel baffle wall and trough system were added to the tank. She also designed and detailed a reinforced concrete foundation for a new pre-engineered precast concrete building, supports on piles as well.

Civil/Structural Engineer
Parking Garage Demolition | City of Lockport | Lockport, NY | 2013

This project included the demolition of an existing, abandoned parking garage structure, which also served as a retaining wall for the adjacent street. Lisa analyzed the existing structure and designed a reinforced concrete buttress system to support the retaining wall, where the existing supports were to be removed. She also detailed a new parking lot that was to take its place, along with miscellaneous handrail, and sidewalks that were to be installed.

Civil/Structural Engineer
Auburn Wastewater Treatment Facility | City of Auburn | Auburn, NY | 2012

This project included modifications to an existing ORF tank at the City of Auburn Wastewater Treatment Facility. Lisa was responsible for the structural design and detailing of a various concrete modifications to the existing ORF tanks, including both concrete repair work and demolition work, as well as the design and detailing of various stainless steel structures, including baffle walls, walkway, ladder and guardrail.

Civil/Structural Engineer
Shadagee Road Pump Station | Town of Eden | Eden, NY | 2009

This project included the construction of a 900 SF reinforced masonry block building, with basement. Lisa's specific responsibilities included the structural design of the block building, elevated floor slab on the first level which support vehicular loads, a room truss system that support a 1,500 pound monorail system, basement retaining wall, and an exterior retaining wall made of block and a geotextile reinforcing fabric.

Industrial

Civil/Structural Engineer
Hydrochloric Acid Burner Installation | North East US Chemical Plant (Confidential Client) | Niagara Falls, NY | 2014

This project included the installation of a new hydrochloric acid producing facility. The entire process included two diked areas for 100,000+ gallons of containment, a 100 ft. tall open steel tower, a pre-engineered building foundation, and various equipment, tanks and pipe supports and foundations. Lisa was responsible for the design of these foundations and super structures. She calculated the structural design loads using concrete and steel design manuals, as well as local building codes and plant specifications. She designed the steel tower, stairways, platforms, pipe and conduit supports, foundations, pads, sumps, and containment dikes.

Civil/Structural Engineer
Joliet Facility Power and Control System Upgrades | Oil and Gas (Confidential Client) | Elwood, IL | 2013

This project included the design and installation of a new electrical power distribution and control system. Lisa completed the structural design loads, using concrete design manuals and local building codes. She also completed the design and details for the structural steel

supports, foundation for an elevated pre-engineered building as well as the stairways, platforms and miscellaneous equipment foundations. Lisa also reviewed and approved material submittals throughout the construction phase.

Civil/Structural Engineer
Wood Treatment Facility | Bell Pole Lumber | Sidney, NB | 2013

This project included the installation of a brand new treatment facility for wood utility poles. Lisa was responsible for the design and detailing of a pre-engineered building reinforced concrete foundation, with a floor slab that sat approximately 3 ft. below grade. She calculated the structural design loads, designed the reinforced concrete foundation retaining walls and footings, floor slab, tank pad foundations, and spread footing foundations for two large 120 ft. long bullet tanks. Lisa also designed the exterior concrete loading ramps, which were designed for chemical containment and had a built in leak detection system below the slab.

Environmental

Civil/Structural Engineer
Groundwater Treatment System | Freescale Semiconductor | Phoenix, AZ | 2012

This project included the design of a below grade groundwater treatment facility. The open structure consisted of a reinforced concrete retaining wall, extending approximately 7 ft. below grade, and reinforced masonry walls extending approximately 8 ft. above grade. This structure housed two large storage tanks, two future tanks, and various pumps and electrical equipment. Tasks included calculating the structural design loads, reactions on the retaining walls and foundations, and design of the containment structure, tank foundation pads, floor slab with drainage, and stairways.

Landfill Gas to Energy

Civil/Structural Engineer
Waste Management Landfill Gas to Energy Riverbend Facility | Waste Management | McMinnville, OR | 2009

Lisa completed the structural design of an 8,900 SF single story, reinforced masonry block building to house several turbine engines, which convert landfill methane gas into electrical energy. She completed the structural design calculations and details for the building structure, foundation, roof with monorail supports, steel supports for various pieces of equipment, the regrading plan for drainage around the building, gravel driveway details, architectural details for a handicap accessible bathroom, and project specifications.

Work history

June 2007 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY

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Samuel Atazadeh

CQA Field Technician

Qualified: General Studies, North Hennepin Community College, 2006 2008

Professional Summary: Sam has 8 years of field experience with a wide variety of expertise. Sam is resourceful and flexible, able to adapt to changing priorities and maintains a positive attitude, strong work ethic and strong people skills. He communicates effectively with project team members and creatively develops procedures to streamline efficiency and reduce project costs.

Sam has served in the field technician/CQA role at numerous sites involving drilling, general construction, landfill cap construction and O&M activities. He also has completed extensive Emergency Response training and been actively engaged in several train derailment response actions and pipeline releases.

Sam has traveled throughout the United States and Canada and has worked on a variety of sites including industrial facilities, service stations, refineries, terminals, pipelines, nuclear power plants, commercial and residential properties, Resource Conservation and Recovery Act (RCRA), brownfield sites, and rail yards.

Viking Pump Foundry Sand Landfill
Cedar Falls, IA | July 2014 – February 2015

Sam was the CQA field technician for a 6-acre landfill cell construction project in Cedar Falls, IA. Activities conducted by Sam included:

- General construction oversight
- Excavation, compaction, Geosynthetic liner installation
- Oversight of excavation, soil placement, liner testing
- Groundwater monitoring well sampling

CSX Derailment | CSX | Mount Carbon, WV | February - March 2015

- Air monitoring
- Providing live data to client
- Site safety

Canadian Pacific Derailment | CP | Reno, MN | January 2016

- Air Monitoring
- Site Safety

Canadian Pacific Derailment | CP
Dubuque, IA | February 2015

Field duties included:

- Air monitoring
- Providing live data to client
- Surface soil sampling
- Surface river water sampling

Field Activities

Environmental Drilling
SKB Landfill | SKB | Lansing, MN USA | April - May 2014

Sam conducted field sampling for projects following health and safety protocols and ISO: 9001 equipment guidelines:

- Groundwater sampling and surficial soil sampling
- Groundwater well installation (commercial property)
- Drilling Oversight

Environmental Field Work
MinnTac Mine | MinnTac | Virginia, MN USA | February - March 2014

Sam conducted field sampling for projects following health and safety protocols and ISO: 9001 equipment guidelines.

Groundwater Treatment System
Superior Plating | Superior Plating | Minneapolis, MN USA | June 2014 - present

Sam conducted field Leachate Collection System Daily Inspections. Other daily tasks include the following:

- Project Oversight
- Groundwater level monitoring
- Groundwater sampling
- Emergency Response for contaminant release

Field Sampling Activities
Multiple Projects | Multiple Clients | Throughout USA | 2013 - present

Sam conducted field sampling for projects following health and safety protocols and ISO: 9001 equipment guidelines. Sampling experience included:

- Groundwater, surficial soil, and soil gas sampling
- Residential and commercial well sampling
- Soil vapor testing with SUMMA canisters

Pennsylvania DOT Drainage Assets Survey Data & Inspection of Bucks County
Philadelphia | October 2015 – December 2015

Health and Safety Officer on site during Drainage Assets Survey & Inspection. Complete Drainage Survey Daily

sent to Client. He has been a valuable asset through promoting safe work environments on the field.

Construction Oversight Environmental Health & Safety

Acting Health and Safety Office (EHS)
Kinder Morgan Dakota Bulk Terminal | Kinder Morgan St. Paul, MN |
March 2015 - October 2015

Activities conducted by Sam include:

- Educating team members to make safety a priority to prevent injuries and accidents
- Daily safety briefings
- Confined space entry and hot work permits
- Familiar with stop work authority
- Documenting Site Safety Plans (SSPs), JHAs, and Standard Operating Procedures (SOPs)

Other related areas of interest

Recognized (Certifications/Trainings)

- 40-Hour HAZWOPER OSHA Training (per 29 CFR 1910.120)
- 8-Hour HAZWOPER Refresher OSHA Training (per 29 CFR 1910.120), Annually
- General Safety (10 hours) API Worksafe
- Union Pacific Railroad E Railsafe Certification, 2014
- Railroad Contractor Safety Training (UPRR, BNSF, CSX, CPR, NS, CN)
- Coke Refinery Training
- Enbridge Pipeline Training
- MSHA Certificate Training
- Transportation Worker Identification Credential (TWIC)
- Crude by rail emergency response - Security and Emergency Response Training Center
- DOT Hazardous Materials Shipping and Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
- Department of Transportation (DOT) Hazardous Materials Shipping

Work history

2013 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
2008 - 2013	Matrix Environmental LLC, Maple Grove, MN

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Rebecca Bentley
Engineer

Qualified: B.S., Civil Engineering, 2000

Connected: American Society of Civil Engineers; Associated General Contractors; Engineering Society of Detroit; National Future City

Professional Summary: Rebecca has 19 years of experience in geotechnical and construction materials engineering, including design of foundations, slope stability and excavations; geotechnical instrumentation using seismic equipment, vibrating wire strain gauges and piezometers, pneumatic piezometers, tilt meters and inclinometers; construction inspections related to earthwork operations, shallow and deep foundations, concrete, masonry, pavement and reinforcing steel; Subsurface exploration and laboratory testing for assessing design of foundations, retaining walls, slope stability and excavations.

Geotechnical Services Team Leader
Freedom-Detroit Access Pipeline | Wolverine Pipeline Company | Wayne and Washtenaw Counties, MI

Coordination and project management for a 35-mile length of planned pipeline construction to include direct bore, horizontal direction drilling and open cut installation. Coordinated and managed over 6,000 linear feet of geotechnical drilling field scope of work including two drilling crews and field staff. Defined and managed geotechnical laboratory program for geotechnical testing to provide engineering recommendations for pipeline construction. Effective communication and efficient use of resources assured the geotechnical investigation scope was completed safely, on time and within budget.

Geotechnical Quality Assurance Manager
Former Bean Lumber Mill | Caterpillar, Inc. | Glenwood, AR

Coordination and project management for the capping of 90,000 cubic yards of arsenic-impacted lumber ash from a former lumber mill cogeneration plant. Managed the implementation of the project Quality Assurance Plan for lumber ash placement and compaction, clay liner placement and compaction, vegetation seeding, gas vent construction and miscellaneous site activities. Provided documentation of on-site engineering staff geotechnical testing and construction oversight. Provided final lumber ash cap certification report.

Geotechnical Engineer
Memphis Terminal Upper Tank Farm Slope Monitoring | ExxonMobil Pipeline Company | Memphis, TN

Provided project estimates for ongoing slope stability monitoring for a 700-foot long, 50-foot tall steep slope adjacent to several project tanks. Managed implementation of scopes of work including installation of slope monitoring survey points, sheet pile monitoring points, quarterly survey monitoring, inclinometer installation and monitoring. Provided temporary and permanent slope stability repair recommendations due to ongoing erosion of the near 1H:1V slope. Project includes quarterly site visits, clear communication with vendors, contractors and client to assure recommended monitoring program were implemented per design and intent.

Geotechnical Project Coordinator
Proposed Natural Gas Plant | Indeck Energy, LLC | Niles, MI

Provided project estimate for a preliminary geotechnical investigation for a proposed $1 billion natural gas energy plant. Provided field oversight of CPT sounding and deep SPT borings. Defined and managed geotechnical laboratory program for the technical testing to provide engineering recommendations for the plant foundations, floor slab support, lateral earth pressures and pavement design.

Project Geotechnical Superintendent
Ann Arbor Waste Water Treatment Plant Renovations | Walsh Construction | Ann Arbor, MI

Provided geotechnical and structural instrumentation using vibration monitors, inclinometers and piezometers for a waste water treatment plant demolition and reconstruction. Installed and maintained automatic data logging system to monitor artesian water conditions throughout the 3-year demolition and construction phases of the project.

Field Engineer
I-75/Dix – Toledo Bridge | Dan's Excavating | Brownstown Township, MI

The project involved construction of a bridge overpass over northbound and southbound I-75. Instruments installed and monitored included 8 vibrating wire settlement cells and 11 vibrating wire piezometers. Data was collected with automated data logger 24 hours per day, 7 days per week, and all reports posted on a project-specific website. Installed all instruments, documented as-built data, collected baseline readings and all subsequent data reduction for project.

Field Engineer
Waste Disposal Site | Gibbstown, NJ

Site involved a landfill cap over organic silt and clay. Long-term total and differential settlement would be detrimental to the cap liner system. Design drawings called for surcharging the site with soil to compress underlying soft soils prior to placing final cap system. The settlement time was accelerated with wick drain installation. Managed the instrumentation program overseeing all instrument installation per specifications. Collected baseline readings and subsequent readings, as well as converting raw data into tabulated data and graphs of movement versus time. Provided documentation for all instrument as-built data.

Project Manager
New Medical Building | University of Michigan | Ann Arbor, MI

Project consisted of the construction of a new building that connected two existing, adjacent buildings. Provided budget estimates and updates throughout the project and coordinated field staff for construction materials testing services. Also provided caisson construction inspection and slurry testing during caisson construction operations. Provided engineering recommendations for foundation undercutting procedures and depths when unsuitable foundation bearing soils were encountered during shallow foundation construction.

Project Manager
Engineering and Computer Science Building | University of Michigan| Ann Arbor, MI

Provided initial construction materials testing budget estimates and coordinated field staff for construction materials testing and inspection services throughout the project. The project consisted of a new building with two underground levels. Removal of large surcharge loads "bulked" underlying clean sands during foundation construction. Coordinated implementation of pre and post-foundation concreting surcharge application testing for soil bearing verification, as well as dynamic cone penetrometer testing to compare with previous pressure meter testing.

Field Engineer
Center for Forensic Psychiatry | Barton Malow Co. | Ypsilanti, MI

Provided engineering observation and monitoring services during pressure grouting operations. Pressure grouting was used to stabilize voided, loose sands beneath newly constructed footings. Services included monitoring grouting pressures, quantities, and existing structure uplift.

Field Engineer
Industrial Plant Expansion | Geismar, LA

Field engineer for oversight of the subsurface exploration for a geotechnical engineering analysis at a plant expansion in Geismar, Louisiana near the Mississippi River. The plant expansion consisted of heavily loaded tanks, compressors, pipe racks and condensing towers. The drilling and sampling program had to consider high groundwater table and contaminated soil and groundwater. Double-cased boreholes were advanced from 50 to 100 feet below grade. Coordinated with plant engineers for precise location of existing utilities.

Field Engineer
Industrial Facility | Detroit, MI

An existing 30-foot diameter tank was founded on concrete piles with no as-built records. The existing tank was approximately in service for 50 years and the design engineers needed to be sure the existing piles would meet the current building codes. The existing tank was demolished, and a new 45-foot diameter tank with a larger capacity was built within the same footprint. Two soil borings to bedrock were completed, along with non-destructive dynamic tests on the existing piles after the upper 5 feet were exposed. High-strain dynamic tests were completed on three instrumented test piles. Static load tests for both new steel H-piles and the existing concrete piles included vertical, horizontal, and combined horizontal with a vertical load. Provided the inspection oversight along with technicians under my direction for all load tests and pile installation.

Assistant Project Manager
Gateway Project | Walter Toebe, Inc. | Detroit, MI

Assistant project manager for concrete quality assurance and quality control testing on the largest single contract let to-date by the Michigan Department of Transportation in Detroit, Michigan. The project entails 2.66 miles of concrete road reconstruction, 3.0 miles of retaining wall construction, and 24 structure rehabilitations on I-75 from Clark Street to 14th Street and on I-96 from I-75 to south of Martin Luther King Boulevard in the city of Detroit, Wayne County. Concrete inspection and testing services being provided include casting beams and testing them for flexural strength, performing slump, air content, and temperature testing on freshly mixed concrete delivered to the project. Strength specimens (cylinders) are also being cast, with field curing, final curing, and performing compressive strength testing after 28 days of curing on cylinders. Separate cylinders are being cast at the direction of MDOT field personnel, which are delivered to MDOT's Sterling Heights, Michigan facility after 28 days of final curing. Approximately 50,000 cubic yards of concrete was delivered to the site.

Field Engineer
Rio Algom Mine | BHP Billinton | Grants, NM

Field engineer and construction oversight and testing for the excavation of a 2-mile long diversion channel and construction of adjacent 2-mile long earthen embankment in New Mexico. The project consisted of the excavation of a 250-foot wide diversion channel, and construction of an adjacent earthen embankment. The 2-mile long diversion

channel and embankment were designed to prevent mountain run-off from reaching the uranium mine's mill tailings pile. Provided geotechnical testing and on-site inspection services during engineered fill placement of approximately 275,000 cubic yards of embankment fill. Provided extensive field density testing for engineered fill soils placed, as well as laboratory soils testing in support of field activities. The soil from cut areas was very dry, and required watering of approximately 300,000 gallons per day. Provided testing to assure fills were placed in accordance with project specifications for water content and compaction. Provided engineering services throughout the project related to survey staking and grading for the channel and embankment areas.

Instrumentation Engineer
Port Huron Waste Water Treatment Plant | Fort Gratiot, MI

Provided geotechnical and structural instrumentation using vibration monitors, inclinometers and tiltmeters for waste water treatment plant in Fort Gratiot, Michigan. Services included performing tiltmeter, inclinometer and remote vibration monitor readings related to new construction activities adjacent to existing site structures/buildings.

Instrumentation Engineer
Grand River over Rouge River Bridge | Dan's Excavating | Farmington Hills, MI

Provided vibration monitoring services for the Grand River over Rouge River bridge replacement in Farmington Hills, Michigan. Services included monitoring of nearby commercial and residential buildings during bridge demolition and reconstruction. Vibration monitoring plan included warning light systems and vibration monitors working concurrently at multiple locations.

Field Engineer
Cranbrook Art School Addition | Christman Corp. | West Bloomfield, MI

Performed construction materials testing and evaluation services for new art school museum addition in West Bloomfield, Michigan. Services included foundation soil testing after basement surcharge removal over clean sand. Correlations were made for bearing tests completed prior to foundation concreting and after foundation concrete surcharge was replaced. Services also included inspection of existing building underpinning procedures in clay, as well as performing a condition assessment and subsequent conditions monitoring observation during construction of the adjacent, existing school building.

Field Engineer
Cider Mill Crossing Manufactured Home Development | Tyrone Twp., MI

Provided construction materials testing and engineering observation services for roadway reconstruction at a manufactured home development in Tyrone Township, Michigan. Services included extensive written and video documentation of existing conditions and new construction procedures. Provided engineering recommendations for subgrade stabilization including use of geofabric and geogrid materials where subgrade materials were not suitably stable. Also provided quality control testing and observation for roadway base and asphalt construction.

Other related areas of interest

Recognized (Certifications/Trainings)

- Certified MCA Level 1 Concrete Field Testing Technician
- Certified ACI Level 1 Concrete Field Testing Technician
- Certified MCA Concrete Strength Testing Technician
- Certified MDOT Density Technology
- Certified Troxler Density Gauge
- Newly Hired Inexperienced Miners Training
- Radiation Training

Work History

2012 - present	GHD (formerly Conestoga-Rovers & Associates), Plymouth, MI
2007 - 2012	Inspec-Sol Engineering, Inc. (CRA Family of Companies)
2005 - 2007	CRA Engineering, Inc. (CRA Family of Companies)
2000 - 2005	Soil and Materials Engineers, Inc.

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Jon L. Christofferson
Associate

Qualified: Bachelor of Civil Engineering (B.C.E.), 1976

Connected: Certified Railroad Emergency Response Tank Car Specialist, Operators Certificate, Type III Landfill, State of Minnesota

Professional Summary: Jon is an Associate and has been with the GHD (formerly CRA) since 1986. Jon has over 35 years of environmental engineering and management experience and has conducted or supervised numerous environmental projects of all types, including hazardous waste (RCRA) investigation and permitting, Superfund (CERCLA) remediation, voluntary and brownfield cleanups, environmental auditing, and Phase I/Phase II environmental site assessments. Jon currently serves as a regional manager for GHD's railroad and mining projects. Prior to joining GHD, Jon was mining engineer and subsequently the environmental manager for the ore and stone mining division of a major steel corporation. In this position, he was responsible for the environmental affairs for an iron mining operation that handled approximately 100 million long tons of material per year and two lime stone quarries.

Environmental Site Assessment and Due Diligence

Senior Project Manager/Assessor

Provided day-to-day management of the completion of Phase I Environmental Site Assessments (Phase I/II) at numerous sites in over 40 states and Canada. Work has included:

- Environmental compliance auditing, liability assessment, and property transfer evaluation.
- Auditing of waste management facilities.
- Cost estimation of environmental liabilities.

Environmental Investigation, Remediation, and Risk Assessment

Senior Project Manager

Served as Project Manager and provided day-to-day management, from work plans to final reporting. Budget and cost control with successful cost savings on numerous projects, including solutions providing significant reduction in environmental liability. Work has included:

- Delineation investigations and mobility studies at petroleum releases sites using Laser Induced Fluorescence (LIF), Rapid Optical Screening Tool (ROST) or Ultraviolet Optical Screening Tool UVOST technologies.
- State Voluntary and Brownfield Program assessment, closures, and assurances.
- Hazardous waste evaluation, management, and personnel training.
- Representation of PRP groups and negotiations at NPL Superfund sites.
- Superfund (CERCLA) site investigations, design and closure, remedial design/remedial action (RD/RA).
- Investigation of buried waste by geophysical techniques and excavation.
- Conduct RCRA Facility Investigation (RFI) and Corrective Measure Studies (CMS).
- Technical assistance and testimony related to environmental litigation.
- Solid waste management; landfill design, permitting, operation, source separation, and industrial waste incineration.
- Remedial Facility Construction, groundwater extraction, treatment, and discharge systems.
- State and federal water and air permitting and development of monitoring and compliance programs including design, installation, and operation of air quality and water quality monitoring networks.
- Investigation and remedial design related to light and dense non-aqueous phase liquids (NAPL).
- Underground Storage Tank (UST) investigation and corrective action.
- On-site incineration/thermal treatment of soils and debris at a NPL Superfund site.
- In situ groundwater remediation using water injection and NAPL recovery at a NPL Superfund site.
- Preparation of RCRA Part B permit applications; detection and compliance, monitoring, and corrective action.
- Water resource/hydrology studies and field work including USGS and Minnesota DNR water appropriation reporting.
- Management of environmental compliance programs.
- Preparation of environmental review studies (EAW/EIS).

- Compliance with DOT regulations and personnel training.
- PCB in use, on-site detoxification and waste management/disposal.
- Industrial plant coordinator, Toxic Substance Control Act (TSCA).

Railroad Transportation and Emergency Spill Response

Senior Project Manager

Served as Project Manager and provided day-to-day management, including railroad worker safety, work plans and final reporting. Budget and cost control with successful cost savings on numerous projects, including solutions providing significant reduction in environmental liability. Work has included:

- Investigation and remediation of railroad properties under both state and federal regulatory and voluntary programs. Studies have involved historical research, Phase I and II Environmental Site Assessments, risk assessments, petroleum release investigations, RCRA corrective action, and remedial design/remedial action at a federal NPL Superfund site.
- Hazardous materials emergency response for railroad tank car derailments and releases.
- Development of geographic information systems (GIS) based emergency response plans for the railroad industry.

Mining and Resource Development

Senior Project Manager

Served as Project Manager and provided day-to-day management, including project and regulatory reporting for projects such as:

- Mining engineering, operation and planning.
- Due diligence of mining properties and estimation of liabilities.
- Water quality assessments.
- Tailings basins studies.
- Reclamation of industrial and mining land.
- Participation and comment preparation regarding state and federal hearing and environmental rule making process.

Other related areas of interest

Recognized (Certifications/Trainings)

- Railroad Roadway Worker Protection (RWP) training
- Certified Tank Car Specialist

Papers Presented and Published in Conference Proceedings

- "Enhanced Recovery of Oily NAPL at a Wood Treating Site Using the CROW Process" (with Fahy, L.J.; Johnson, L.A.; Horn, S.G., and Sola, D.V.). Proceedings: HMC/Superfund 1992 Convention, Washington, DC

Presentations

- "Spill and Release Reporting", Environmental Regulation Course, presented by J. Christofferson, October 23-25, 1995, The Westin Hotel Cincinnati, Cincinnati, Ohio
- "The Resource Conservation and Recovery Act (RCRA)". Environmental Regulation Course, presented by J. Christofferson, June 26-28, 1995, Radisson Hotel, St. Paul, Minnesota
- Presentation to the "1990 Minnesota Department of Health Water Well Conference", D. Dempsey and J. Christofferson, November 1990

Work history

1986 - present	Associate, GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
	Named Associate, 1995
1976 - 1986	U.S. Steel Corporation, Mt. Iron, MN

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Julia Clark
GIS/Spatial Analyst

Qualified: Bachelor of Environmental Science (Geospatial Science), Humboldt State University, 2015

Connected: North Coast GIS Users Group – Member; Urban and Regional Information Systems Association – Member.

Professional Summary: Julia is a Spatial Analyst with experience using Geographic Information Systems (GIS) in county, state, non-profit, and educational institutions. She has conducted geoprocessing analysis as well as generated cartographic presentations and spatial models for a range of areas including Transportation, Planning, Environment, Water, and Agriculture.

GIS Analyst
Transportation Mapping | Humboldt County Association of Governments | Eureka, CA

Utilized cartographic design principles and data version management to assist in the updating of the Regional Transportation Plan and Regional Bike Plan maps.

Environmental Scientist / GIS Analyst
Eureka Stormwater Resource Plan | Humboldt Community Service District | Eureka, CA

Conducted smoke-testing of sewer networks to identify potential leaks in connections to residential units; collected field data for stormwater resource locations using sub-meter GPS receiver and ArcGIS Collector.

GIS Analyst
Eureka Stormwater Resource Plan | City of Eureka | Eureka, CA

Assisted in the development of a Eureka Area Storm Water Resources Plan, including: data acquisition and evaluation, multi-criteria analysis to identify optimal locations for projects, and field work involving storm water data collection.

GIS Analyst
Humboldt Bay Trail South | County of Humboldt | Eureka, CA

Provided mobile GPS data collection resources and support to field biologists and botanists conducting environmental surveys. Managed data versioning and transfers between engineering plan sets and GIS. Assisted in the development of permitting and report map sets.

GIS Analyst
Soil Sampling and Remediation Project | Confidential Client | Southern Arizona

Provided mapping services for a large soil sampling and remediation project in Southern Arizona. Responsible for using aerial imagery and parcel data to plan sampling areas for field teams, producing maps for property owners indicating sample results, proposed remediation activities and of work completed.

GIS Analyst
Manhattan Beach Street Improvements| City of Manhattan Beach | Manhattan Beach, CA

Utilized cartographic design principles in combination with appropriate data representation to prepare large-scale posters for public comprehension of the project location and plan.

GIS Analyst
Obstruction Removal Environmental Assessment | Border Coast Regional Airport Authority | Del Norte, CA

This project removes tree obstructions to meet FAA airport approach and take-off regulations. Obstruction removal included actual removal, trimming and laying trees down within the airports airspace. The GIS effort supported field surveys of sensitive plants, ESHA, and tree habitats. Performed spatial analysis on the field findings producing supporting figures for CEQA and NEPA.

GIS Analyst
Agricultural Regulatory Compliance | Multiple Clients | Humboldt County, CA

Provided GIS analysis for agricultural regulatory compliance projects in Humboldt County. Performed remote sensing analysis, extensive data management, mobile data collection management, and cartographic map design.

GIS Analyst
Dune Vulnerability and Adaptation Study | Friends of the Dunes | Humboldt County, CA

Conducted shoreline analysis for a portion of the coast of Humboldt County. Georectified historic aerial imagery,

generated shoreline features, and analysed the extent of shoreline change for dune vulnerability assessment.

GIS Analyst
Climate Hazard Adaptation Study | City of Eureka | Eureka, CA

Assisted in the preparation of a grant submittal for the City of Eureka regarding Climate Hazard Adaptation. Provided data management, and cartographic storytelling.

GIS Analyst
Salt River Ecosystem Restoration | Humboldt County Resource Conservation District | Humboldt, CA

Provided GIS analysis for the Salt River Ecosystem Restoration Project. Produced supporting figures for landowner outreach meetings, design plans, and property owner analysis.

GIS Analyst
Eel River Estuary and Centerville Slough Enhancement Project | Eureka, CA

Analyzed habitat change, conducted agricultural impacts analysis, and generated cartographic products for an environmental restoration project on the Eel River.

GIS Analyst
Low Impact Development and Stormwater Outfall Improvement | Tolowa Dee-ni' Nation, CA

Provided GIS analysis for a grant proposal for conducting low impact development (LID) for the Tolowa Dee-ni' Nation. Performed data management and map design.

GIS Analyst
Low Impact Development Planning and Construction | City of Trinidad | Trinidad, CA

Provided GIS analysis for a grant proposal for conducting low impact development (LID) for the City of Trinidad. Performed data management and map design.

GIS Analyst
Local Assistance Geodatabase | California Department of Transportation | Eureka, CA

Developed and implemented the framework of a new GIS system for Caltrans District 1 Local Assistance projects. Responsible for determining data needed for the proposed uses, writing python scripts for automatic updates, improving data management to prevent future issues, and training staff in the use of interactive web maps.

GIS Analyst
Biofuel Water Impact | Action Aid USA | Arcata, CA

Produced cartographic elements and provided data analysis services for academic research project surrounding the impact of biofuels expansion on water resources and poverty in countries with significant biofuel crop production. Evaluated water and pollution impacts, and identified areas of significance for future studies.

GIS Instructor
North Coast Regional Land Trust | Arcata, CA

Trained non-profit staff by honing their GIS skills beyond basic mapping, and counselled on both data management and map design

Spatial Sciences Undergraduate
Global Habitat Suitability | Humboldt State University | Arcata, CA

Developed a global habitat suitability model for specific vegetation species. Estimated movement of suitable habitat based on global climate change data and accounting for spatial uncertainty.

GIS Technician
County of Humboldt | Eureka, CA

Digitized spatial data records; reorganized and edited GIS database; recorded historical changes of spatial information.

GIS Instructional Assistant
Humboldt State University | Arcata, CA

Assisted University students with GIS lab work involving transformations, projections, and use of ArcGIS and related software. Facilitated different teaching techniques for different learning abilities of students, and promoted an environment for cooperative and self-empowered learning.

Work history

2015 – present	GHD, Eureka, CA
2015	Local Assistance Division, California Department of Transportation, Eureka, CA
2015	Action Aid USA, Arcata, CA
2015	North Coast Regional Land Trust, Arcata, CA
2015	Planning and Building Division, County of Humboldt, Eureka, CA
2014 – 2015	Institute for Spatial Analysis, Humboldt State University, Arcata, CA
2014 – 2015	Learning Center, Humboldt State University, Arcata, CA
2013 – 2014	Campus Center for Appropriate Technology, Humboldt State University, Arcata, CA

2011-2013	California Student Sustainability Coalition, CA
2009-2012	Culinary Arts Department, Glendale Community College, Glendale, CA
2009	Habitat Works, Los Angeles, CA
2007 – 2008	The Movie Club Inc., Los Angeles, CA

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D'Arcy Cook
Junior Engineer

Qualified: University of Michigan, B.S.E., Chemical Engineering, 2017; B.A., Arts and Ideas in the Humanities, Specializations in German and Archaeology, 2017

Connected: Tau Beta Pi Honor Society of Engineers (TBP), American Institute of Chemical Engineers (AIChE)

Professional Summary: D'Arcy is a recent graduate from the University of Michigan College of Engineering, summa cum laude. She has experience consulting and working with customers through her work as a manager at the Computer Showcase at her University. She gets projects done in a timely and thorough manner, and is always ready and willing to learn whatever is necessary to get a job done well. She also has a great deal of experience with written and technical communication, having written a large number of technical and other papers throughout her degrees, as well as giving a number of oral presentations.

Air Permitting/Compliance

Junior Engineer
Greenhouse Gas Emission Inventory Verification | Multiple Projects | California | 2017

D'Arcy verified the calculations the clients had submitted to the ARB for the cap and trade policy on greenhouse gas emissions. She also updated the verification plan and report to remain current.

Biofuels

Project Manager
Algae Biofuels | University of Michigan | Ann Arbor, MI | 2015

D'Arcy managed a team of four engineers including herself in modeling a theoretical ethanol fuel plant utilizing an algae strain patented by Algenol in Florida. She and her team produced a 70 page technical proposal and gave both progress and final oral presentations. She also managed interactions among the engineers throughout the four month long project, actively working with them to maintain a healthy teamwork environment.

Archaeological Pigment Analysis

Chemical Analyst
Pigment Analysis of Ancient Roman Wall Painting Fragments | Kelsey Museum of Archaeology | Ann Arbor, MI | 2016-2017

D'Arcy performed several chemical analysis techniques on the fragments from the Kelsey, including Fourier Transform Infrared Spectroscopy (FTIR), X-Ray Diffraction (XRD), Polarized Light Microscopy (PLM), and multispectral imaging. She worked directly with the conservation lab in the Kelsey to learn and perform the techniques, expanding the knowledge of the Kelsey's collection.

Computer/Technology

Student Manager
Store Management and Sales Consulting | University of Michigan Computer Showcase | Ann Arbor | 2014-2017

D'Arcy was part of the management team for a 10 billion dollar store, who fostered a team spirit and trained new recruits. She managed communication with customers over email, over the phone, and in person, actively working with them to find computers that suited their lives, as well as to fix any problems they may have had along the way. She is incredibly good at finding solutions to complicated customer problems, finding an answer that benefitted both the store and the customer.

Programmer
CMISST | University of Michigan Transportation Institute (UMTRI) | Ann Arbor, MI | 2013

D'Arcy structured crash data in XML format to assist statisticians in analysis of traffic and crash patterns. She was very self-sufficient, organizing her own time and project direction, and developed skills in data organization and programming.

Other related areas of interest

Skills

- Programming Languages: C++, MATLAB, SQL, XML, Javascript
- Computer Programs: ASPEN, COMSOL, Microsoft Office (Word, Excel, PowerPoint, Visio)
- Spoken Languages: German (Fluent)

Honors

- Tau Beta Pi Engineering Honor Society
- Omega Chi Epsilon, Chemical Engineering Honors Society
- College of Engineering Dean's List
- James B. Angell Scholar

Work history

2017 – present	GHD (formerly Conestoga-Rovers & Associates), Waterloo, ON
2014 – 2017	University of Michigan Computer Showcase, Ann Arbor, MI
2013	UMTRI, Ann Arbor, MI

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Casey W Cowan, PE

Project Manager

Qualified: B.S., Environmental, Resource & Forest Engineering, 1996

Connected: Registered Professional Engineer, New York

Professional Summary: Casey is a Civil Engineer, and an excellent client advisor and project manager on complex multi-disciplined engineering design projects. He consistently strives to exceed client expectations by managing tasks and budgets effectively, and communicating to the project team. Casey has completed numerous engineering service and construction projects for municipal water and wastewater upgrades, including distribution systems, collection systems, pumping stations, and treatment process/mechanical systems. He has also completed studies and designs for storm water management, and solid waste landfill construction and capping projects.

Municipal Water

Design Manager
Water Filtration Plant and Lower Pumping Station Improvements | City of Auburn | Auburn, NY

Casey served as lead engineer and coordinated the design team completing upgrades to a 350 HP, 6 mgd high service pump station. Managed a multi-discipline design team on a project that required a complex bypass pumping system to provide temporary water service to the City while the station is offline for piping and valve replacements. Successfully prepared a high quality design that resulted in construction bids that are within a tight project budget.

Design Manager
Colonel Ward High Service Pumping Improvements | City of Buffalo | Buffalo, NY

Served as lead engineer and manager coordinating the design team for two new 20 mgd 750 HP high service pumps, a new pump pit and 48-inch suction pipe, electro hydraulic valves, 36-inch steel discharge piping, and PLC/SCADA upgrades. Helped the client with obtaining a $500,000 incentive from New York State Energy Research and Development Authority (NYSERDA) for energy savings related to operation of the new pumps. Also assisted the client with performing the work under an energy services contract.

Senior Project Engineer
Colonel Ward Water Treatment Plant Chlorination System Replacement | City of Buffalo | Buffalo, NY

Served as senior project engineer and construction administrator for designing replacement chlorine equipment at the 160 mgd Treatment Plant, including a new system to emergencies shutdown the one ton chlorine cylinders, an automatic cylinder changeover system, chlorine evaporators, automatic gas feeders, educators, replacement of chlorine piping and valves, and PLC/SCADA control upgrades.

Project Engineer
Colonel Ward Water Treatment Plant Filter Gallery Rehabilitation | City of Buffalo | Buffalo, NY

Casey was responsible for the design of filtration improvements at the 160 mgd Water Treatment Plant. Improvements included 240 motorized filter valves; 40 filter venturi flow controllers; three new backwash flow venturi's; level, turbidity, and loss of head instrumentation for 40 filter beds; PLC/SCADA automation; glass enclosures; HV units and ventilation fans; dehumidifiers; 5kV electrical switchgear; and all new electrical and lighting for the filtration building.

Municipal Wastewater

Project Manager
WWTP Phase 3 Rehabilitation | Niagara Falls Water Board | Niagara Falls, NY

Casey is managing a $6 million project to replace various systems at the WWTP, including new sludge and scum collection equipment, plant water pumps and controls, polymer pumps and controls, replacement of carbon filter media and support gravel, and other instrumentation and SCADA upgrades. He managed the development of plans and specifications for public bid and is currently providing construction administration assistance.

Project Manager
2016 Operations and Maintenance Project | Niagara County Sewer District No. 1 | Niagara County, NY

Project Manager for the development of contract plans and specifications to address several miscellaneous operations and maintenance (O&M) items throughout the District. Improvements included: replacing two clarifier skimming pumps; new controls for the clarifier skimming pumps and pit; return sludge screw pump gearboxes and motors; a 3,000 gallon ferric chloride double wall tank, a new grit collection and dewatering concrete pad; and plant drain line flushing connections and isolation valves.

Design Manager
Metro WWTP Secondary Bypass Disinfection System Improvements | Onondaga County Department of Water Environment Protection | Syracuse, NY

Casey designed $20 million in upgrades to meet new SPDES permit requirements for fecal coliform discharge limits. He led client meetings and the design team to complete a complex design of a 2 million gallon bypass disinfection contact tank, dewatering pump station, chemical storage and feed building, and modification of existing bypass contact tank.

Design Manager
Oak Orchard WWTP Infrastructure Improvements | Onondaga County Department of Water Environment Protection | Clay, NY

Lead engineer and design manager for miscellaneous WWTP process and mechanical improvements. Led client meetings and coordinated the design team for new bar screens, blower, primary sludge collection, sludge transfer system, administration building renovation, site lighting, and HVAC unit replacements.

Project Manager
WWTP Emergency Repairs | Niagara Falls Water Board | Niagara Falls, NY

Casey is the Project Manager for the emergency repair and replacement of equipment submerged by floodwater in July 2013. Casey attended emergency response meetings and coordinated designs for the replacement of four main influent 250 HP pumps, 17 sludge/grit pumps, valve motor actuators, flow meters, and design of new MCC and PLC / SCADA control system. He successfully obtained a 2014 APWA Project of the Year Award for the NFWB, which recognized their outstanding performance in emergency response/ recovery.

Project Manager
Vanderbilt Pumping Station Flow Evaluation | Erie County Department of Environment and Planning | Depew, NY

Managed a study to troubleshoot under performance of pumping capacity and develop recommended solutions. Study includes instrumentation and programming for automatic data logging of the station's operation parameters. Assisted the client with discovering several factors effecting station performance.

Project Manager
Smith Street Drain CSO Controls | Buffalo Sewer Authority | Buffalo, NY

Casey served as Project Manager for detailed design to reduce CSO discharges into the Buffalo River in accordance with the BSA's CSO LTCP. The project includes inline. real time control storage of overflows within a 16 ft. wide by 10 ft. high concrete sewer. He is assisting BSA in optimizing the upgrades, reducing capital cost, and long term O&M while achieving LTCP goals.

Project Manager
WWTP Rehabilitation, Phase 2A | Niagara Falls Water Board | Niagara Falls, NY

Led client meetings and the project design team for replacement of two 200 HP 14,000 gpm vertical turbine backwash pumps, VFDs, and PLC / SCADA upgrades. Demonstrated successful implementation through commissioning and startup of the new system, while keeping the project under budget.

Project Manager
South Buffalo Pump Station VFD Upgrades | Buffalo Sewer Authority | Buffalo, NY

Led client meetings, coordinated the project design team, and served as construction administrator for 4 new VFDs at a 100 mgd 80 year old pump station. The project included new VFDs, rebuilding the original motors, bar screen panels, bubbler lever system, PLC control upgrades, and 4160V switchgear. Demonstrated successful implementation through commissioning and startup of the new system, while keeping the project under budget.

Project Manager/Senior Project Engineer
WWTP Rehabilitation Phases 1 and 2 | Niagara Falls Water Board | Niagara Falls, NY

Led client meetings and coordinated the project design team automation of the filter controls at a 85 mgd physical chemical WWTP, including replacing 28 filter effluent flow meters / rate control valves, replacement of filter process valves, filter loss of head and level instrumentation, HV equipment, mechanical bar screens, rapid mixers, grit pumps, grit classifiers, and PLC/SCADA controls.

Design Manager / Senior Project Engineer
Vanderbilt Pumping Station, Depew Pumping Station and Overflow Retention Facility Upgrades | Erie County Department of Environment and Planning | Depew, NY

Served as lead engineer and coordinated the design team for several improvements in Erie County Sewer District No. 4, including new 185 HP pumps, valve chamber, flow meter chamber, VFDs, generator, and PLC upgrades; to restore hydraulic capacity of two pump stations and an overflow retention facility (ORF).

Work history

December 2004 – present	GHD (formerly CRA Infrastructure & Engineering, Inc.), Buffalo, NY
2002-2004	O'Brien & Gere Engineers, Inc., Williamsville, NY
1997-2002	EMCON / The IT Group, Mahwah, NJ and Tonawanda, NY

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Gordon Crone, P.E.

Qualified: Electrical Engineering, University of Alabama

Professional Summary: Electrical Engineer and Electrical Design with over 40 years of electrical engineering design experience on industrial, commercial, institutional, and municipal projects. He has extensive experience in the design of high and low voltage power supply and distribution systems, UPS systems, motor and motor controls, lighting, grounding, TVSS systems, wiring, and heat tracing systems. He has been lead electrical engineer for numerous projects His duties include engineering studies with particular emphasis on Short Circuit/Protective Devise Coordination and Arc Flash Studies, design, cost estimating, equipment procurement, bidding and construction document preparation, construction support and start up.

Experience

- Currently working on a major modernization project on the Distribution System (115KV, 34.5KV & 4.16KV components) for the Village of Springville, NY
- Involved in a wide range of projects that include Medium/High Voltage components, energy conservation studies, for all types of facilities
- Experienced in all phases of engineering including: systems selection/design, construction contract administration, feasibility studies, cost-benefit studies, electrical engineering studies including fault current analysis, arc flash studies, motor starting disturbance analysis, ground system analysis and power system coordination

Major Projects Completed

Niagara Falls Water Board | Niagara Falls, NY

- Wastewater Treatment Plant 115 kV Substation Renovation

Village of Akron | Akron, NY

- 115 KV Bulk Power Substation

Town of Lewiston | Lewiston, NY

- Water Pollution Control Center – Electrical Renovations

Buffalo Sewer Authority – South Buffalo Pumping Station | Buffalo, NY

- Electrical Renovations

SUNY at Binghamton | Binghamton, NY

- Design Electrical System for a new Dormitory Complex

SUNY at Buffalo | Buffalo, NY

- North Campus - Fine Arts Center
- North Campus – HPER Phase I

Short Circuit/Coordination/Arc Flash Studies Completed for:

- Exxon-Mobile – various AF/PDC Studies
- Wolverine Pipeline Co – various AF/PDC Studies
- Erie County Water Authority - Ball Pumping Station
- Flexo Corp.
- Kaleida Buffalo General Hospital
- Niagara Falls Water Board, Niagara Falls, NY – Wastewater Treatment Plant 115 kV Substation Renovation
- Glenn Springs Holding – Multiple Sites
- City of Buffalo Water Authority – Multiple Sites
- SUNY at Buffalo-South Campus – 23 kV Service Upgrade, SUC/AB – Elmwood Campus
- Hudson Correctional Facility, Collins Correctional Facility, Watertown Correctional Facility

Work history

2008 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY
2002 – 2008	Mach Architecture & Engineering, Buffalo, NY
1971 - 2002	Gordon L. Crone, P.C., Buffalo, NY
1971 – 1978	Wilson Klaes, Brucker, and Warden, P.C., Buffalo, NY
1967 – 1971	Walter H. Sherry, P.C., Buffalo, NY

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Thomas Dahmer
Drafter

Qualified: A.A.S. AutoCAD Technology, Erie Community College, 2006

Professional Summary: Tom has 2 years of experience as a Civil Drafter. He utilizes Civil 3D for various municipal and industrial projects.

Industrial Pipelines

Civil Drafter
Pipe Support (Erosion Control) |
Confidential Client | Various Locations, Ohio

Lead Civil Drafter responsible for the drafting of the following engineering plans:

- Pipe support drawing
- Section drawing
- Details

Civil Drafter
Sending/Receiving Scraper Traps |
Confidential Client | Patoka, IL

Lead Civil Drafter responsible for the drafting of the following engineering plans:

- Project base maps
- Site plan
- Demolition plan
- Detail drawings

Civil Drafter
Truck Access (Truck Gate) |
Confidential Client | Lockport, IL

Lead Civil Drafter responsible for the drafting of the following engineering plans:

- Project base maps
- Site plan
- Demolition plan
- Detail drawings

Civil Drafter
Leach Plant and Disposal System |
Confidential Client | Romulus, MI

Civil Drafter responsible for the drafting of the following engineering plans:

- Project base maps
- Site Plan
- Site Improvements and Utility Modifications

Civil Drafter
Brine Pond Expansion | Confidential Client |
Romulus, MI

Civil Drafter responsible for the drafting of the following engineering plans:

- Project base maps
- Site Plan
- Sheet Pile and Soldier Pile Plans
- Details

Civil Drafter
16-inch Batch Product Project |
Confidential Client | Romulus, MI

Tom is assisting with the detailed design of a 35-mile 16-inch batch product pipeline. The following engineering plans included in the project:

- Project base maps
- Grading Plans
- Plan and Profiles
- SESC Drawings
- FAA and third party permitting figures
- Details

Water and Wastewater Systems

Civil Drafter
Water System Improvements - Green Street and Depot Street | Town of Eden | Eden, NY

Civil Drafter responsible for base maps for West Church Street, Sunset Drive and Erie Street.

Civil Drafter
Waterline Improvements Project |
Town of Eden | Eden, NY

Tom assisted with the drafting of detailed drawings to facilitate the installation of 20,000 LF of 8-inch and 12-inch watermains. The design consisted of plan and profiles, interconnections and details. Tom produced the following engineering plans:

- Base maps
- Reviewing base maps created by other drafters
- Plan and profile sheets

Civil Drafter
Culvert Replacement Project |
Town of Wheatfield | Wheatfield, NY

Civil Drafter responsible for the drafting of the following engineering plans:

- Base maps
- Traffic Control Plans
- Site Plans
- Waterline Relocation Plans
- Grading Plans
- Details

Civil Drafter
Water Treatment Plant and Lower Pumping Station Improvement Project | City of Auburn | Auburn, NY

Lead Civil Drafter responsible for the drafting of the following engineering plans:

- Project base maps
- Site plans for the Water Filtration Plant and Lower Pumping Station.
- Detail drawings

Civil Drafter
Chemtrade Logistics - Syracuse NOx |
Chemtrade Solutions LLC | Syracuse, NY

Lead Civil Drafter responsible for the drafting of the following engineering plans:

- Site plan
- Plan and interconnection details
- Water details

Civil Drafter
Smart Ditch | Trinity Marine Products, Inc. | Madisonville, LA

Lead Civil Drafter responsible for the drafting of the following engineering plans:

- Site plan
- Plan and profile for the modular wastewater treatment plant installation
- Details

Work history

May 2014 – present	GHD (formerly CRA Infrastructure & Engineering, Inc.), Buffalo, NY
2010 – 2014	Wizard Cooling Performance Radiators, West Falls, NY

RETURN TO TEAM LIST

John B. Davis
Electrical Engineer

Education: B.E.Ep., Electrical Engineering, 2005

Professional Summary: John is an electrical power engineer with 13 years of experience in electrical studies, conceptual design, design-build, upgrade, reliability, construction support, and retrofit electrical projects for the oil and gas industry, municipal, manufacturing sector, and power generation and power utilization facilities; along with field electrical construction management for manufacturing and power generation and power utilization facilities.

Short Circuit/Coordination/Arc Flash Studies/Training

Instructor
NFPA 70E Electrical Safety/Arc Flash Safety Training (8-hour)

John was the Electrical Qualified Worker Instructor for the following clients:

- RM Reinhausen | Humboldt, TN
- Eaton Aerospace | Jackson, MI
- Ecce Panis – Pepperidge Farms | East Brunswick, NJ
- Nobelbiocare | Mahwah, NJ
- Continental Tire | Detroit, MI
- Zotos International | Geneva, NY

Electrical Project Engineer
Arc Flash Study, Upper York Sewage Servicing Water Reclamation Centre | Regional Municipality of York | Ontario

John completed an Arc Flash Study of systems at the Water Reclamation Centre, which included:

- Short Circuit Study/Coordination Study/Arc Flash Analysis

Electrical Project Engineer
SCCR and Arc Flash Mitigation Program | Praxair, USA | Tonawanda, NY

- Front Line Electrical Engineer for Client
- Electrical Package Design
- Electrical Studies

Electrical Project Engineer/Training Instructor
Arc Flash Study | RM Reinhaussen | Humboldt, TN

- Front Line Electrical Engineer for Client
- Electrical Power Systems Distribution Network Data Gathering
- Short Circuit Study/Coordination Study/Arc Flash Study
- Electrical Shock Hazard and Arc Flash Safety Training for company fleet

Electrical Project Engineer
SCCR and Arc Flash Program | Praxair, USA | Tonawanda, NY

- Front Line Electrical Engineer for Client
- Electrical Studies
- Electrical Design

Electrical Project Engineer
Arc Flash Electrical Safety Program | Zotos International | Geneva, NY

- Front Line Electrical Engineer for Client
- Construction Labor Engineering Support
- Electrical Short Circuit, and Arc Flash Studies
- Arc Flash Mitigation

Electrical Technical Lead/Arc Flash Engineer
Arc Flash Study | Confidential Client | Inkster, MI

John completed a Short Circuit Study/Coordination Study/Arc Flash Study at the client's cavern storage facility.

Electrical Technical Lead/Arc Flash Engineer
Arc Flash Study | Pactiv LLC | Plattsburgh, NY

John completed a Short Circuit Study/Coordination Study/Arc Flash Study at the client's packaging manufacturing facility.

Electrical Project Engineer
Brewerton WPCP Asset Renewal Project | Onondaga County Department of Water Environment Protection | Cicero, NY

John is completing a Short Circuit Study/Coordination Study/Arc Flash Study of the WPCP's existing electrical systems.

Electrical Engineering Evaluations and Design

Electrical Project Engineer
2017 Wastewater Management Works | Confidential Client | Kitimat, BC

- Electrical Project Engineer for new power distribution systems
- Electrical Design for new systems; Aeration, Leachate

Electrical Project Engineer
Electrical Upgrades | City of Batavia | Batavia, NY

- Front Line Electrical Engineer for Client
- Electrical Package Lead
- City Electrical contact for Utility Provider

Electrical Project Engineer
Brewerton WPCP Comprehensive Facilities Inspection and Evaluation | Onondaga County Department of Water Environment Protection | Cicero, NY

- Front Line Electrical Engineer for Client
- Electrical Studies
- Electrical Package Lead

Electrical Project Engineer
Electrical and SCADA System Upgrades | Village of Springville | Springville, NY

- Front Line Electrical Engineer for Client
- Electrical Studies
- Electrical Package Lead
- Generator Peak Shaving Control
- Substation Upgrades, including Relaying, 115kV Circuit Switchers, 34.5kV/5kV Vacuum Circuit Breakers/Reclosers, Load Tap Changer Control, Transformer Install, Voltage Regulator Install

Electrical Project Engineer
Evaluation of WPCC Emergency Power | Niagara County Sewer District No. 1 | Wheatfield, NY

- Front Line Electrical Engineer for Client
- Electrical Studies – Generator Peak Shaving

Electrical Technical Lead
Building Expansion Equipment Safety | Moog | East Aurora, NY

John recommended electrical installations for existing systems for hazardous area classification compliance with NFPA 497.

Electrical Technical Lead/Inspector
Building Code Evaluation & Scrubber Design | Moog | Niagara Falls, NY

- Front Line Electrical Engineer for Client
- Recommended electrical installations for existing systems for hazardous area classification compliance with NFPA 497
- Hazardous Area Classification installations
- Site Electrical Installation Inspection
- New scrubber electrical design

Electrical Engineer
Lock Out/Tag Out – Electrical Work Permit | Honeywell | Buffalo, NY

- Front Line Electrical Engineer for Client
- Electrical Power Systems Distribution Network Data Gathering
- Electrical Work Procedures for Equipment

Electrical Project Engineer
G&H Landfill Site | Macomb County, MI

- Front Line Electrical Engineer for Client
- Electrical Studies
- Electrical Design Package Lead

Electrical Project Engineer
Groundwater Treatment Building | Willow Run Powertrain | Ypsilanti, MI

- Front Line Electrical Engineer for Client
- Electrical Studies
- Electrical Design Package Lead

Electrical Project Engineer
New Powerhouse | Confidential Client | McPherson, KS

- Front Line Electrical Engineer for Client
- Electrical Studies
- Electrical Package Lead

Electrical Engineering Design
Marine Well Containment System | Big Oil Consortium | Houston, TX

- Front Line Electrical Engineer for Consultant and Client
- Electrical Package Design
- Electrical Studies

Electrical Engineering Design
Power Utilization Upgrade | Liberty Tire | Lockport, NY

- Front Line Electrical Engineer for Client
- Construction Labor Engineering Support
- Electrical Package Design
- Electrical Studies

Construction/Maintenance Support

Electrical Safety Inspector
Site Area Classification Survey | IUVO BioScience | Erie, PA and Rush, NY

- Front Line Electrical Engineer for Client
- Site Electrical Installation Inspection
- Site Electrical Installation Area Classification Survey Report

Electrical Site Inspector
Novartis Pharmaceuticals | East Hanover, NJ

- Electrical Site Inspection
- Electrical Safety Briefing

Electrical Engineering Construction Lead
New Site Phase Construction |
Hemlock Semiconductor | Hemlock, MI

- Front Line Electrical Engineering Technical Support for Client
- Switchgear, MCC Checkout
- Construction Labor Engineering Support
- Electrical Design Support

Commissioning Engineer
Maritime Sulfur Conveyor | Qatar Gas |
Doha, Qatar

- Switchgear, MCC Checkout
- Cable Database Manager
- Electrical Design Support

Electrical Project Engineer
Scrubber Installation | Constellation Energy |
Baltimore, MD

- Electrical Design Support
- Conduit and Cable Schedule Manager

Contractor Supervisor, Valve Maintenance
200MW Fluidized Bed Boiler Outage |
Bay Shore Power Plant | Oregon, OH

- Valve Inspection
- Contractor Technical Support
- Technical Support, Plant Electrical, Operations and Mechanical Maintenance Crew

Generator Rewind Technical Support
900MW Coal Fired Boiler Turbine, Generator Rewind Outage | Bruce Mansfield Power Plant |
Shippingport, PA

- Turbine Inspection
- Generator Inspection
- Night Shift Technical Support
- Contractor Supervisor, Generator Rewind Night Crew
- Contractor Supervisor, Boiler and Rotating Equipment Maintenance Night Crew
- Technical Support, Plant Electrical, Operations and Mechanical Maintenance Night Crew

Turbine Maintenance Outage Support
220MW Turbine Upgrade Outage |
Eastlake Power Plant | Eastlake, OH

- Turbine Inspection
- Boiler Inspection
- Night Shift Technical Support
- Technical Support, Plant Electrical, Operations and Mechanical Maintenance Night Crew

Technical Experience

- Electrical Safety/Arc Flash Safety Training Instructor
- Substation upgrades – 115kV, 34.5kV, 5kV
- SKM, ETAP, and EasyPower power analysis software: load flow, short circuit, protective device coordination/selectivity, and arc flash studies
- Arc Flash and Electrical Safety training
- Project electrical engineering and construction cost estimating
- Root cause analysis for medium voltage (MV)/low voltage (LV) power system failures and faults
- Root cause analysis for switchgear, LV MCC, motors, gear boxes, and rotation equipment
- Protective relaying and metering
- Primary, emergency and standby electrical power generating systems
- Unit substations
- MV/LV power distribution including switchgear, motor control centers, switchboards and panelboards
- Indoor/outdoor normal/emergency lighting systems
- MV/LV wiring systems
- Heat Trace
- Grounding systems including high resistance type
- Electrical Field Construction Lead Engineer
- Start Up, Shut Down, and Outage Plant On Site Operations, Maintenance, and Technical Support

Other related areas of interest

Recognized (Certifications/Trainings)

- NFPA 70 Training, 2015
- Arc Flash Analysis, 2012
- Relay Coordination, 2012
- Project Management Workshop, Case Western Reserve University, 2007
- Thermography Training – IR Imaging/FLIR Level 1 Certified, 2006
- FirstEnergy Corporate Core Skills Power Plant Training, 2006

Work history

2014 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY
2012 – 2014	Middough Inc., Amherst, NY
2008 – 2011	URS Washington Division, URS Corp., Cleveland, OH
2003 – 2008	FirstEnergy Generation Corporation, Western PA and Northwestern OH

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Tony DeMars

Senior Natural Resources Specialist

Qualified: Bachelor of Science - Natural Resources & Environmental Studies (B.S.) 1994. Natural Resources Technology (A.S.) 1981

Connected: Professional Wetland Scientist (Cert. #2323), Minnesota Certified Wetland Delineator (Cert. #1185), Ecological Restoration Certificate (University of Minnesota), Society of Wetland Scientists, Minnesota Wetland Professionals Association

Professional Summary: Tony has over 30 years of experience in natural resources, water resources, environmental review and permitting. Tony's technical expertise is in wetland science, biological assessments, natural resources management, and ecological restoration. Tony is effective at working on multidisciplinary projects that incorporate planning, engineering and design and is adept at finding solutions to complex environmental issues.

Wetland Science

Tony is a Professional Wetland Scientist and MN Certified Wetland Delineator. Tony's wetland science project work includes: wetland inventory and assessment, comprehensive wetland management plans, replacement/compensatory mitigation design, jurisdictional determination and wetland delineation. Tony has over eighteen years of experience performing wetland delineations and has extensive field experience in wetland plant taxonomy, hydric soil indicators and wetland hydrology. Wetland assessment tools include: MN Wetland Functional Assessment, WDNR Wetland Rapid Assessment, Rapid Floristic Quality Assessment, HEP Habitat Model, and Technical Criteria for Identification of Calcareous Fens in Minnesota.

Representative Wetland Science Projects

- USACE Section 206 Ecosystem Restoration /Technical Review and Plan Revisions for Painter Creek Watershed Restoration. Minnetonka, MN. 2015.
- Lake Superior Wetland Bank/Technical Review and Wetland Conservation Act Administration. St. Louis County, MN. 2015.
- Sandpiper Pipeline Project - Wetland Delineation. Enbridge/Midwest Natural Resources. July, 2013.
- Kleffman Road Gravel Mine – Wetland Delineation. Seppi Bros. Concrete Products Corp. Virginia, MN. 2013.
- Flanagan South Pipeline Project-Bio-Survey (wetlands, waterbodies, Indiana Bat Habitat). Enbridge/URS. Missouri and Indiana. 2012/2013.
- Wetland Replacement and Compensatory Mitigation Identification. USS-Minntac/ArcelorMittal Minorca. Virginia, MN.
- West Tailings Basin Seepage Collection – Wetland Impact Analysis and Review. USS-Minntac. Virginia, MN. 2012.
- North Shore Homes Wetland Delineation. Two Harbors, MN. 2012.
- Drill Site/Access Road Wetland Survey. Twin Metals. Ely, MN. 2012.
- West Tailings Basin Wetland Delineation. USS-Minntac. Virginia, MN. 2011.
- CSAH 102 Realignment Wetland Delineation. USS-Minntac. Virginia, MN, 2011.
- Ashawa Ridge Wetland Replacement and Road Restoration. Norcroft Land. St. Louis County, MN. 2011.
- Costin Area Wetland Delineation. USS-Minntac. Virginia, MN, 2011.
- Ashawa Ridge - Wetland Permitting and Replacement Plan. Norcroft Land. St. Louis County, MN. 2011.
- Hopkins Forcemain Wetland Delineation. Met Council Environmental Services. St. Paul, MN. 2009.
- Pelican Lake Restoration Project. Ducks Unlimited. St. Michael, MN. 2006.
- Trunk Highway 212 Extension - Wetland Permitting and Replacement Plan. MnDOT. Hennepin/Carver County, MN. 2004.

Environmental Review and Permitting

Tony has a strong understanding of the Minnesota Environmental Review Program (Minnesota Environmental Policy Act) and has served as project manager, performed technical analysis, and presented in public hearings for EAW, AUAR and EIS review projects. Tony has completed and coordinated field surveys/evaluations for Biological Assessments, Environmental Assessments and USFS Special Use

Permits. Tony has a working knowledge of local, state and federal wetland and public waters regulatory programs including Minnesota Wetland Conservation Act, Clean Water Act Section 404 and MN-DNR Public Waters Work Permits.

Representative Environmental Review/Permitting Projects

- Sandpiper/Line 3 Replacement Pipeline Projects – MN, ND, WI Reporting and Consolidated Reports for Wetlands and Waterbodies, Sensitive Species and Cultural Resources. Enbridge/Merjent 2014 - 2015.
- Kleffman Road Gravel Mine EAW. Seppi Bros. Concrete Products Corp. Virginia, MN. 2013.
- Center to Grand Forks Power Line - Tree & Shrub Survey. Minnkota Power. North Dakota. 2010.
- Pelican Lake (Shallow Lake Management Plan) EAW. Minnesota Department of Natural Resources. St. Michael, MN. 2006.
- Ramsey Station Alternative Urban Area-Wide Review (AUAR). City of Ramsey, MN. 2003.
- Trout Habitat Preservation Project (Brown's Creek Watershed) EAW. Washington County, MN. 2000.
- Cottage Grove Ravine/West Draw, Alternative Urban Area-wide Review. City of Cottage Grove, MN. 1999.
- Duluth-Hermantown Interceptor EAW. Western Lake Superior Sanitary District. Duluth, MN. 1999.
- Stillwater Annexation Area - Alternative Urban Area-wide Review. City of Stillwater, MN. 1998.
- SE Interceptor EIS. Metropolitan Council Environmental Services, St. Paul, MN. 1998.
- Northern Natural Gas Pipeline - Bio-Survey. (Wetlands, Plant Communities, TE Plants). Minnesota/Wisconsin. 1997.

Natural Resources Management

Tony has 30 years of public/private sector field experience in surveys and assessments of plant communities, rare features, aquatic resources, forest resources, and fish and wildlife habitat. Tony's natural resource surveys and assessments support environmental review, permitting, natural resources-based planning, and ecological restoration projects. Projects range from individual parcels to landscape-scale and include ecological restoration plans for wetland and upland plant communities, brownfield reclamation, and riparian corridors. Tony has extensive experience working with the MN DNR Native Plant Community Classification System, MN DNR Natural Heritage Program-Element Occurrence Ranking Guidelines, MN Land Cover Classification System, and MN DNR Phase II Forest Inventory. Tony has completed training in *Fluvial Geomorphology and Stream Classification* and *Stream Restoration* (MN DNR/American Fisheries Society, 2012-2014).

Representative Natural Resource Inventory Projects

- Minnehaha Creek Watershed-Natural Resources Management Plan Preparation – 12 Parcels. Minnetonka, MN. 2014-2015.
- Mader Family Trust – Conservation Development Plan and Wetland Bank. Medina, MN. 2015.
- Minnesota DNR (multiple sites) Scientific and Natural Areas Program-SNA Adaptive Management Plan Preparation. St. Paul, MN. 2012 and 2015.
- Minnehaha Creek Watershed - Painter Marsh Corridor, Natural Resources Evaluation. Minnetonka, MN. 2012.
- Minnehaha Creek Watershed - Marsh-Wasserman Corridor, Alternatives Analysis. Minnetonka, MN. 2010.
- Six-Mile Creek Corridor Conservation Plan. Minnehaha Creek Watershed District. Deephaven, MN. 2010.
- Crow River Corridor Planning Study. Carver County, MN. 2006.
- Carnelian Marine Watershed District – Natural Resource Inventory. Washington County, MN. 2005.
- Silver Creek Corridor Project. Carnelian Marine Watershed District. Washington County, MN. 2004.
- St. Croix Spring Creek Stewardship Plan. Marine-on-St. Croix Watershed. Washington County, MN. 2004.
- City of Afton Natural Resource Inventory. Afton, MN. 2004.
- Minnehaha Creek Watershed District-Land Cover Classification Mapping. Minnetonka, MN. 2003.
- Bruce Vento Nature Sanctuary (Brownfield Redevelopment), Natural Resource Management Plan. City of St. Paul, MN. 2003.
- Trillium (Brownfield Redevelopment) - Trout Brook Corridor Concept Design. City of St. Paul, MN. 2003.
- Marine on St Croix Watershed, Natural Resources Inventory. Washington County, MN. 2003.
- St. Lawrence Township Natural Resource Inventory. Scott County, MN. 2003.
- Carver County Ravine and Bluff Planning Study. Carver County, MN. 2002.
- City of Red Wing Natural Resources Stewardship Plan. City of Red Wing, MN. 1999.

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Work history

July 2015 - present	GHD, (formerly, Conestoga-Rovers & Associates) St. Paul, MN
2007 - 2015	Cross River Consulting LLC, Minneapolis, MN
1999 - 2007	Emmons and Olivier Resources, Inc., Oakdale, MN
1995 - 1999	Bonestroo Rosene Anderlik & Associates, Inc., St. Paul, MN
1992 - 1995	Department of Natural Resources, Division of Waters, St. Paul, MN
1980 - 1990	MN DNR/US Forest Service, Northern MN (various locations)

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Patrick DiFrancisco

Electrical Designer

Qualified (Education): Drafting Degree, Seneca VOC Technical School, 1973

Professional Summary: Pat possesses design/drafting talents that give clients a broad choice in environmental, industrial, municipal and commercial projects needs. Responsible for developing electrical drawings including plans, sections, details for power, lighting, grounding, instrumentation, heat tracing, fire alarm, security, studio/video, stage/theatrical, motor schematics, block and field diagrams.

Electrical Designer
HVAC Improvements | Tn. Of Amherst | Amherst, NY

Town of Amherst Water Pollution Control Facility HVAC improvements and scrubber System Replacement. Provided 480v feeder, new VFD, instrumentation, tie-ins to existing control panels.

Electrical Designer
Gratwick Marina Improvements | Town of North Tonawanda | North Tonawanda, NY

New Electrical Service, Restrooms, New Marina Power Distribution Centers for boat slips, general site lighting.

Electrical Designer
Mapleton P.S. Emergency Rehabilitation | NCSD | Pendleton, NY

New 480V Panel Board replacement and interfacing of existing circuits to new.

Electrical Designer
WWTP Pump Replacement | Niagara Falls Water Board | Niagara Falls, NY

Replacement of main water pumps, power feeds, instrumentation, general lighting.

Electrical Designer
Sanitary Sewer Lift Pump Replacement | G.M. Tonawanda | Tonawanda, NY

New 480v Power feeds for package lift pump stations and connections.

Electrical Designer
Bell Lumber & Pole Treatment Facility | Bell Pole | Sidney, N.E.

Provided new 480v distribution, lighting, grounding, instrumentation, receptacle to skid mounted pole treatment package.

Electrical Designer
Oak Creek Wastewater Treatment Facility | WWTP | Syracuse, NY

Provided new 480v and 120v power distribution to new classifiers, pumps, sumps, actuators, etc. new lighting, and receptacles.

Electrical Designer
ORF Improvements | City of Auburn | Auburn, NY

Provided new 480v and 120v power distribution to new ORF, pumps, sumps, actuators, etc. new lighting, and receptacles.

Electrical Designer
Onondaga County Pump Station Improvements | Onondaga County | NY

Provided new 480v and 120v power distribution to new ORF and classifiers, pumps, sumps, actuators, etc. new lighting, receptacles.

Electrical Designer
Waste Management Renewable Energy | King George | King George, VA

Landfill gas to energy facility - provided 480V and 120v power feeds to new skid mounted equipment, lighting, receptacle, grounding, instrumentation.

Electrical Designer
Waste Management Renewable Energy, LLC | Riverbend | McMinnville, OR

Landfill gas to energy facility - provided 480V and 120v power feeds to new skid mounted equipment, lighting, receptacle, grounding, instrumentation.

Electrical Designer
Town of Niagara Community Center | Town of Niagara | Niagara County, NY

New build - Provided new 480/277v power distribution, lighting, receptacle, HVAC, stage lighting, gym/auditorium lighting/sound, exterior lighting and power, band shell lighting and sound.

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Patrick DiFrancisco

Electrical Designer

Electrical Designer
Shadagee Road Pumping Station Upgrade | Town Of Eden | Eden, NY

Complete update of all pumps, service, lights, receptacles, instruments, valve chambers, emergency gen-set installation.

Electrical Designer
Vanderbilt Pumping Station Upgrade | ECSD | Depew, NY

Complete update of all pumps, service, lights, receptacles, instruments, valve chambers, emergency gen-set installation.

Electrical Designer
Parker Pump Station Upgrade | City of Tonawanda | Tonawanda, NY

Replacement of main pumps, VFDs, instrumentation.

Work history

2009 - present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY
2007 - 2008	ATSI, Buffalo, NY
2002 - 2007	EI TEAM, Buffalo, NY
1987 - 2002	MESCH Engineering, Lockport, NY

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Morgan Doerflein

Junior Engineer

Qualified: University of Michigan, B.S.E., Chemical Engineering, 2017

Connected: American Institute of Chemical Engineers (AIChE)

Professional Summary: Morgan is a recent graduate from the University of Michigan College of Engineering, magna cum laude. Morgan's experience includes working as a process engineer co-op in a manufacturing facility, where she primarily focused on cost and waste reduction initiatives. Morgan also has experience working as a consultant, where she would analyze the safety of using certain chemicals. She has worked in close contact with clients and customers while working in retail. Morgan's skill set includes attention to detail, superb written and oral communication skills, and excellent people skills. Morgan is always willing to take on a new project, and complete it above expectations in a safe and timely manner. Morgan has written several reports throughout her work experience and academic career. In addition, she has presented her work to large groups of coworkers and supervisors.

Litigation Consulting

Subcontractor Chemical Research Engineer
Miller Engineer Associates | Ann Arbor, MI | 2017

Morgan researched and offered her conclusions on the safety of chemicals in consumer uses. Her work included analyzing Safety Data Sheets (SDSs) and reviewing other scientific information in scholarly journals. Her work would culminate in a report that would support expert witness testimony in civil litigation.

Manufacturing

Process Engineer Co-op
Appvion | Appleton, WI | 2016

Morgan's primary role at Appvion included leading diverse teams in cost and waste reduction projects. Her primary project achieved savings of $100,000 per year for the plant. While at Appvion, she completed Design of Experiments, Process Capability and Gage R&R statistical tests. She was also involved in safety at the plant by completing safety observations and learning risk management tools, such as the fishbone risk analysis tool. She also developed Standard Operating Procedures and trained an incoming co-op.

Legal

Summer Clerk
Commonwealth Land Title Insurance Company | Cincinnati, OH | 2015

Morgan was in charge of organizing, scanning, and destroying aged files in the firm's filing system. Her work helped the firm transition to electronic filing, which helped reduce their environmental footprint and maintain a good organizational system.

Customer Service

Customer Service Representative
Soccer Village | Blue Ash, OH | 2014

Morgan input and processed customer orders into the company's system while checking for possible errors in the ordering process. She contacted customers with any issues regarding their orders. She also packaged completed orders and helped update the inventory website.

Academic Research

UROP Research Assistant
University of Michigan Department of Computational Medicine and Bioinformatics | Ann Arbor, MI | 2013

Morgan worked in a chemical research lab under the guidance of a post-doc researcher. She performed and documented experiments. Morgan presented her experimental findings at the Michigan Research Community Spring Symposium.

Other related areas of interest

Skills

- Programming Languages: C++, MATLAB
- Computer Programs: Aspen PLUSm COMSOL, Microsoft Office (Word, Excel PowerPoint, Visio)

Honors

- Chemical Engineering Departmental Rice Scholar
- University Honors
- College of Engineering Dean's List
- Michigan Research Community Peer Mentor
- Michigan Research Community Recruitment Team

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Work history

2017 – present	GHD (formerly Conestoga-Rovers & Associates), Farmington Hills, MI
2017	Miller Engineering Associates, Ann Arbor, MI
2016	Appvion, Appleton, WI
2015	Commonwealth Land Title Insurance Company, Cincinnati, OH
2014	Soccer Village, Blue Ash, OH
2013 – 2014	University of Michigan Department of Computational Medicine and Bioinformatics, Ann Arbor, MI

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Steven Ehrhard

Environmental Engineer

Qualified: Bachelor of Science, Chemical Engineering

Professional Summary: Steve possesses skills that give clients confidence that their air quality permitting and compliance programs are being effectively managed. His work history spans over a year in the environmental field and experience areas encompass air quality permitting and compliance reporting for numerous areas of the industrial sector.

Environmental Engineer/Air Permitting & Compliance
Construction Machinery and Equipment Manufacturing | Various Locations throughout United States | 2015 - present

Assisted in the preparation of air quality Construction Permit Applications, Operating Permit Applications, Clean Air Act Permit Program (CAAPP) Operating Permit Application, Title V Operating Permit Applications, Prevention of Significant Deterioration (PSD) avoidance permit applications, and compliance documents for facilities located in Arkansas, Florida, Illinois, Iowa, Kentucky, North Carolina, South Carolina, Texas, and Utah.

Environmental Engineer/Air Permitting & Compliance
Lincolnland Agri-Energy | Palestine, IL | 2015 - present

Assisted in the preparation of air quality Construction Permit Applications, Operating Permit Applications, and compliance documents for the Ethanol Production Facility.

Environmental Engineer /Air Permitting & Compliance
Various Grain & Feed Clients | Various Locations throughout United States | 2015 - present

Assisted in the preparation of air quality Construction Permit Applications, Operating Permit Applications, and compliance documents for Clients including Consolidated Grain and Barge, Effingham Equity and Prairie Creek Grain Company. Permitting and compliance work products were prepared in Illinois.

Environmental Engineer /Air Permitting & Compliance
CHS Annawan| Annawan, IL | 2015 - present

Assisted in the preparation of air quality Construction Permit Applications, Operating Permit Applications, and compliance documents for the Ethanol and Biodiesel Production Facilities.

Environmental Engineer /Air Permitting & Compliance
Various Aggregate Industry Clients | Various Locations throughout Illinois | 2015 - present

Assisted in the preparation of air quality Construction Permit Applications, Operating Permit Applications, and compliance documents for Clients including Builders Asphalt and Concrete Specialties.

Environmental Engineer /Air Permitting
Rentech Nitrogen | East Dubuque, IL | 2015 - present

Assisted in the preparation of air quality Construction Permit Applications and a Clean Air Act Permit Program (CAAPP) Operating Permit Renewal Application.

Environmental Engineer /Air Permitting & Compliance
Whirlpool | Amana, IA | 2015 - present

Assisted in the preparation of air quality Construction Permit Applications and compliance documents for the Facility.

Environmental Scientist/Air Permitting & Compliance
BorgWarner | Bellwood, IL | 2015 - present

Assisted in the preparation of air quality Construction Permit Applications, Clean Air Act Permit Program (CAAPP) Operating Permit Renewal Application, and compliance documents for the Facility.

Work history

2015 – present	GHD (formerly Conestoga-Rovers & Associates), Springfield, IL

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Adam Estes

Environmental Scientist/Compliance Specialist

Qualified: Bachelor of Science (BSc)

Professional Summary: Adam work history spans 10 years in the environmental field with a focus on compliance and regulatory interpretation, guidance and support. Adam's area of expertise includes waste management, toxics reporting, air emissions, project management and regulatory education and training. Adam possesses excellent time management skills and response time. Clients routinely ask for his assistance in coordinating a project, reviewing regulations or responding to government agencies on their behalf. Adam has built, developed key performance indicators and subsequently managed programs on behalf of clients.

Clean Air Act (CAA) Compliance

Compliance Specialist

Conducted air regulatory compliance audits and developed air emissions inventories for industrial facilities located throughout the United States. Client industries include but are not limited to printing, surface coating, metal finishing, thermoplastic processing, aggregate handling, fossil fuel combustion and auto parts manufacturing. Prepared applications and permit renewals for numerous emitting activities for the construction/installation or modification of emission units; applications include but are not limited to: Title V, Federally Enforceable State Operating Permits (FESOPs)/Synthetic Minor, State/Minor and Local. Designed tracking programs and completed reporting including but not limited to: annual compliance certifications and notifications, annual emissions reporting, Maximum Achievable Control Technology (MACT) notification/recordkeeping/reporting, preventative maintenance plans, compliance response/assurance plans and stack testing. Coordinated stack and performance testing events located within Indiana and Ohio and for a major oil & gas client within Texas. Served as liaison for clients on response actions, notices of violation, and a Section 114 request to federal, state and local agencies.

Clean Water Act (CWA) Compliance

Compliance Specialist

Designed a table-based platform for a major oil & gas client detailing comparison of thirteen state-specific requirements for Spill Prevention, Control and Countermeasure (SPCC) plans. Detailed information on each state requirement and demonstrated differences between other states and federal requirement.

Emergency Planning and Community Right-To-Know Act (EPCRA) Compliance

Compliance Specialist

Evaluated multiple facilities throughout the United States for compliance with Section 312 (Tier II Hazardous Chemical Inventory Reports) and assisted with the reporting to the State Emergency Response Commission (SERC), Local Emergency Planning Committee (LEPC), and local Fire Departments. Completed reporting for AR, AZ, CA (Hazardous Material Business Plans), CO, IA, ID, IL, IN, LA, NE, NM, NV, OK, OR, TN, TX, UT, WA, and WY states. Conducted review of peer performance for other states. Evaluated, drafted and submitted reporting for Section 313 (Toxic Release Inventory reporting) for multiple industrial facilities in Indiana. Edited regulatory guidebook for EPCRA reporting to major transportation client while serving as technical advisor/regulatory review.

Environmental Compliance Database Management

Project Manager

Editor and designer on a Compliance Calendar database for major oil & gas client for 96 sites covering required recordkeeping, reporting, due dates and regulatory information for CAA, CWA, EPCRA, and RCRA regulations.

National Environmental Protection Act (NEPA) Compliance

Compliance Specialist

Investigated site prior to leasing by federal agency for evaluation of compliance and reviewed historical information regarding activities conducted on premises. Prepared multiple reports for the subsequent leasing to demonstrate consideration to environmental responsibility; reports include: Environmental Condition of Property (ECP), Report of Availability (ROA), Record of Environmental Consideration (REC), Finding of Suitability to Lease (FOSL), and Record of Non-Applicability (RONA).

Resource Conservation and Recovery Act (RCRA) Compliance

Various Roles (Compliance Manager, Project Manager, Program Design Lead and Manager)

Conducted weekly and monthly inspections of Land Use Control Implementation Plan (LUCIP) sites, weekly inspections of 90-day Hazardous Waste storage site and Satellite Accumulation areas for military facility Large Quantity Generator (LQG) to maintain compliance and site integrity. Prepared containers for shipping, assisted in production of tracking manifest vendors, oversaw the

loading of containers, signed manifested and maintained recordkeeping inventory for a military facility LQG. Managed waste streams for major automotive dealer, major railroad and major oil & gas clients including receiving quotes from vendors and managing third party invoicing, characterization of waste streams for profiling and proper method of shipping. Coordinated scheduling of multiple parties for removal of waste within client specified or regulatory enforced deadlines of both clients. Authored management program for all wastes generated by a major oil & gas client including a six-sigma review for improvement methods and cost efficiencies. Completed reporting for annual/biennial waste data to State and Federal agencies in 48 states. Reporting include tax exemptions for waste, in one case resulting in $435,000 return to client from state due to client overpayments discovered due to improper management of waste.

Other related areas of interest

Recognized (Certifications/Trainings)

- DOT 49 CFR 172.70 Hazardous Materials Transportation
- OSHA 29 CFR 1910.120(e)(8) 40-hour HAZWOPER
- RCRA 40 CFR 265.16 Hazardous Waste Management
- McCoy “Understanding RCRA”

Published Reports

- "Discovery of an exotic Asian mosquito, *Ochlerotatus japonicas*, (Diptera: Culicidae) in Southern Indiana,” Proceedings of the Indiana Academy of Sciences 114 (2005).

Work history

December 2011 – present	Environmental Scientist, GHD, Indianapolis, IN
2010 – 2011	Environmental Specialist, Cornerstone Environmental, Health & Safety, Inc.
2009	Environmentalist, Mason & Hanger Corporation
2007 – 2009	Compliance Specialist: Air, City of Indianapolis

Joshua Ezak

Qualified: Bachelors of Science (BS) - Electrical Engineering; Bachelor of Arts (BA) – Mathematics Engineering

Professional Summary: Joshua has over 11 years of experience in the design, construction, installation, start up and support of electrical control systems. Developing complete I&C project design packages, and then implementing these designs in the field. His key area of responsibilities includes instrumentation specification, network architecture communications, control panel designs including system hardware/software selection, with a concentration in PLC and SCADA/HMI programming. Joshua has had the opportunity to support a diverse array of customers in the industrial, municipal and environmental sectors.

Electrical / Control System Engineer
Environmental, Wastewater and Remediation Projects

- American Axle (Buffalo, NY): Electrical/Controls Engineer for Oily water collection and Treatment System. Generated design documentation such as instrumentation lists, piping and instrumentation diagrams, bill of materials, control panel layout, control panel power distribution diagram, PLC control panel wiring diagrams, and network architecture. Specified and procured process instrumentation, PLC hardware and software. Developed and maintained Allen-Bradley PLC ladder logic with RSLogix5000 (ControlLogix hardware) and HMI software (RSView Machine Edition). Developed a HMI Control Narrative and provided training for the site Operator. Engineer in charge of on-site installations, startup, and system debug activities that included; process control panel, process instrumentation, PLC, PanelView Plus, variable frequency drives (AB PowerFlex400), RACO Verbatim Gateway autodialer, and other industrial equipment.
- Phelps Dodge/Laurel Hill Site (Maspeth, NY): Junior Electrical/Controls Engineer for Groundwater Collection and Treatment System. Developed Allen-Bradley PLC ladder logic with RSLogix 5000 (installed in ControlLogix hardware) and SCADA software (RSView32) for this 40 gpm pump and treatment system. Assisted with on-site installation, startup, and system debug activities that included; field instrumentation, power supplies, computers, PLCs, motors, pumps, variable frequency drives (AB PowerFlex70), and other industrial equipment. Assisted with the fabrication, testing, installation, and startup of the process control panel. Generated design documentation such as bill of materials, process and instrumentation diagrams, and an operation maintenance manual.
- Lenz Oil Site (Lemont, IL): Electrical/Controls Engineer for the Phase I Vacuum-Enhanced Remedy (VER). Generated design documentation such as instrumentation lists, piping and instrumentation diagrams, bill of materials, control panel layout, control panel power distribution diagram, PLC control panel wiring diagrams, and network architecture. Provided cost estimations and specifications for process instrumentation, PLC hardware/software, HMI hardware/software, computer system, and various other electrical components. Oversaw contractor submittals. Provided PLC programming with RSLogix5000 and SCADA development on FactoryTalk View Site Edition for a single computer network. Engineer in charge of on-site installations, startup, and system debug activities that included; process control panel, process instrumentation, PLC, SCADA, variable frequency drives (AB PowerFlex70), RACO Verbatim Gateway autodialer, and other industrial equipment.
- Freescale Semi-Conductor (Mesa, AZ): Junior Electrical/Controls Engineer for Wastewater Treatment System. Developed Allen-Bradley PLC ladder logic with RSLogix5000 (installed in CompactLogix hardware) and SCADA software (RSView32) for a 200 gpm groundwater pump and treatment system. Configured and tested Ethernet based spread spectrum radios to remotely control and monitor each groundwater extraction pump. Assisted with the fabrication, testing, and installation of the process control panel. Generated design documentation such as bill of materials, process and instrumentation diagrams.
- Glenn Springs Holdings Inc. F-Area Site (Niagara Falls, NY): Electrical/Controls Engineer for Groundwater Collection and Treatment System. Reverse engineered previous Toshiba control system and replaced with an Allen-Bradley control system, for this 1,600 gpm groundwater pump, air strip and filter treatment system. Developed Allen-Bradley PLC ladder logic with RSLogix5000 (installed in ControlLogix hardware). Assisted with on-site installation, startup, and system debug activities that included; field instrumentation, power supplies, computers, PLCs, Ethernet RIO, and spread spectrum radios. Assisted with the fabrication, testing, installation, and startup of the process control panel. Generated design documentation such as bill of materials, process and instrumentation diagrams. Provides maintenance and technical support for site operators.

Joshua Ezak

- Glenn Springs Holdings Inc. U-Area Site (Niagara Falls, NY): Electrical/Controls Engineer for Groundwater Collection and Treatment System. Reverse engineered previous Micrologix control system and replaced with an Allen-Bradley FlexLogix remote control system, to be integrated with F-Area Site. Updated drawing package to reflect the existing system before the control upgrade was implemented. Upgrade design included PLC hardware, Ethernet radios, power meters and process instrumentation such as pH probes, level indicators and flow meters. Created Scope of Work for Electrical Contractors. Engineer in charge of on-site installations, startup, and system debug activities that included; process control panel, process instrumentation, PLC (RSLogix5000), SCADA (Intellution iFIX), variable frequency drives (AB PowerFlex70), RACO Verbatim Gateway autodialer, and other industrial equipment.
- Glenn Springs Holdings Inc. (Lathrop, CA): Electrical/Controls Engineer for Groundwater Collection and Treatment System Upgrade. Specified, purchased, performed electrical construction management, installed and debugged field instrumentation on site in an existing treatment system. Updated Allen-Bradley ladder logic with RSLogix 5000 (installed in CompactLogix hardware) and SCADA HMI displays (Intellution iFIX). Upgraded Ground Extraction Well controls. Designed, specified, and purchased new remote PLC enclosures, CompactLogix PLC, PowerFlex70 VFD, MOXA Ethernet radio network.
- Glenn Springs Holdings Inc. (Hicksville, NY): Junior Electrical/Controls Engineer for Biosparge Treatment Facility. Assisted with specifying electrical instruments, purchasing, onsite installation, startup and system debug activities that included; field instrumentation, power supplies, computers, RIO, Allen-Bradley ControlLogix, and Flex IO PLCs. Assisted with the fabrication, testing, installation, and startup of the process control panel. Generated design documentation such as bill of materials, process and instrumentation diagrams. Provide Operation and Maintenance services for process instrumentation, PLC hardware/software, HMI hardware/software, computer system, and various other electrical components.
- Glenn Springs Holdings Inc. (Hicksville, NY): Electrical/Controls Engineer for Biosparge Treatment Facility Upgrade. Recommended various changes to process equipment for improved control and diagnostics. During the upgrade, four existing injection wells were changed to reflect improvements and 11 new injection wells were installed. Modified process and instrumentation diagrams, electrical diagrams, instrument list, and operation and maintenance manual. Redeveloped PLC programming (RSLogix5000) and changed/developed existing SCADA system to ICONICS Genesis64, this provided an improvement to flexibility and increased uptime of the system. Provided 2 months of electrical supervision of contractors, and system debug activities that included; field instrumentation installation and programming, electrical panel checkouts, computers, fiber optic network, PLCs (AB ControlLogix and PointIO), compressors, and other industrial equipment. Trained site operators how to use SCADA system and operate the process. Provides maintenance and technical support for site operators.
- Glenn Springs Holdings Inc. (Taft, LA): Electrical/Controls Engineer for Groundwater Collection and Treatment System. Oversaw and approved contractor submittals on instrumentation and electrical equipment. Developed PLC programming (RSLogix5000) on ControlLogix platform and Functional Description documentation. Provided electrical supervision of contractors, and system debug activities that included; field instrumentation installation and programming, electrical panel checkouts, computers, Ethernet communication network, variable frequency drives (AB PowerFlex70), process startup, and other industrial equipment. Trained site operators how to use SCADA system and operate the process. Provides maintenance and technical support for site operators.
- City of Attica (Attica, IN): Electrical/Controls Engineer for City Water Treatment System. Generated design documentation such as instrumentation lists, piping and instrumentation diagrams, bill of materials, control panel layout, control panel power distribution diagram, PLC control panel wiring diagrams, and network architecture. Provided cost estimations and specifications for process instrumentation, PLC hardware/software, HMI hardware/software, computer system, and various other electrical components.
- Caterpillar Wastewater Treatment Plant (Joliet, IL): Electrical/Controls Engineer for on-site wastewater treatment facility to provide primary and secondary treatment of industrial wastewater to remove oil, grit, and soluble organic material prior to discharge to nearby river. Reverse engineered PLC program (1,000 rungs of uncommented code) within RSLogix5000 and SCADA system (RSView Supervisory Edition) to remove unused sections of the facility. Improved PLC programming and commented code. Provided on-site system debug and startup activities. Highlighted areas of the plant that could use an improvement.

Joshua Ezak

- Minnegasco (Minneapolis, MN): Electrical/Controls Engineer for Process and Controls Upgrade. Reviewed existing treatment process and determined controls and instrumentation that were obsolete. Revised current Allen-Bradley PLC ladder logic with RSLogix500 (installed in SLC hardware) and eliminated unused system alarms, improved operation of pump control loops, eliminated old and unused control logic and improved program layout. Revised electrical drawings and process and instrumentation diagrams.
- ARG-Bradford Refinery (Bradford, PA): Junior Electrical/Controls Engineer for Groundwater Collection and Treatment Upgrade. Performed field installation with startup of equipment and control systems. This included field instrumentation, power supplies, computers, PLCs, variable speed drives (AB PowerFlex70), and other industrial equipment.

Industrial Projects

- Occidental Chemical Corporation (Niagara Falls, NY): Electrical/Controls Engineer providing control system design for a 163,000 ton/year hydrochloric acid (HCl) production unit at a chlor-alkali production facility in Niagara Falls, NY. Allen-Bradley ControlLogix platform was used for the control system which included redundant processors, I/O networks (ControlNet) and field devices to achieve a high level of reliability. Responsibilities included PLC (RSLogix5000) & SCADA (FactoryTalk View SE) software development, PLC Enclosure verification/testing, functional description documentation, P&IDs, training of plant personnel/operators and support for field installation and system startup.
- Occidental Chemical Corporation (Niagara Falls, NY): Electrical/Controls Engineer for Caustic Filters Upgrade. Developed and programmed PLC (Allen-Bradley RSLogix5000) and HMI/SCADA application (Allen-Bradley FactoryTalkView Machine Edition) for Caustic Filters system within a Chlor-Alkali Plant, which produced chlorine, sodium hydroxide, hydrogen, gypsum, sulfuric acid, and sodium hypochlorite. Converted and imported FactoryTalkView Machine Edition application into FatoryTalkView Supervisory Edition, to integrate HMI software with the central Control Room SCADA system. Supervised electrical contractors, performed system startup, debugging, testing, and commissioning. Developed electrical drawings, instrument lists, logic diagrams, functional description, and user operations manual for operator usage on HMI system. Trained plant personnel and operators on upgraded Caustic Filters system.
- Occidental Chemical Corporation (Niagara Falls, NY): Junior Electrical/Controls Engineer for North Brine Control Room Consolidation. Developed HMI/SCADA application software program (Allen-Bradley RSView Supervisory Edition) for a Chlor-Alkali Plant, which produced chlorine, sodium hydroxide, hydrogen, gypsum, sulfuric acid, and sodium hypochlorite. Assisted with electrical rewiring, system startup, and system debugging. Developed user operations manual for operator usage on HMI system and trained plant operators.
- Occidental Chemical Corporation (Niagara Falls, NY): Junior Electrical/Controls Engineer for Nash Vacuum Compressor. Developed HMI/SCADA application software program (Allen-Bradley RSView Machine Edition) for a Chlor-Alkali Plant, which produced chlorine, sodium hydroxide, hydrogen, gypsum, sulfuric acid, and sodium hypochlorite. Converted RSView Machine Edition to RSView Supervisory Edition, to interlock software with the North Brine Control Room process. Assisted with system debugging. Developed user operations manual for operator usage on HMI system and trained plant operators.
- Occidental Chemical Corporation (Niagara Falls, NY): Electrical/Controls Engineer for Emergency Vent Scrubber (EVS) upgrade. An Emergency Vent Scrubber is a spray tower which uses caustic to neutralize chlorine. It is a protective unit intended for scrubbing chlorine cell gas at a high rate for short periods to prevent a chlorine release into the atmosphere. Developed HMI/SCADA application software program (Allen-Bradley RSView Supervisory Edition) for a Chlor-Alkali Plant's Emergency Vent Scrubber. Developed user operations manual for operator usage on HMI system and trained plant operators.
- Occidental Chemical Corporation (Niagara Falls, NY): Electrical/Controls Engineer for Bleach Plant upgrade and troubleshooting. Converted existing PanelBuilder32 to RSView Supervisory Edition, to interlock software with the North Brine Control Room process. In the process, identified multiple PLC programming issues within RSLogix500. Corrected programming issues with client, providing accurate controls and diagnostics within the Bleach Plant. Developed user operations manual for operator usage on HMI system and trained plant operators.
- Occidental Chemical Corporation (Niagara Falls, NY): Electrical/Controls Engineer for Chlorine Storage System upgrade, which consisted of multiple Chlorine Storage Tanks, Pump Tanks and Flash Tanks. Developed HMI/SCADA application software program (Allen-Bradley RSView Supervisory Edition) for a Chlor-Alkali Plant's Chlorine Storage System. Assisted with and reviewed Logic Diagrams, Interlock Sequences (to prevent chlorine overfill) and PLC

Joshua Ezak

Programming. Developed user operations manual for operator usage on HMI system and trained plant operators.

- Occidental Chemical Corporation (Niagara Falls, NY): Junior Electrical/Controls Engineer for Chlorine Refrigeration Upgrade. Developed HMI/SCADA application software program (Allen-Bradley RSView Machine Edition) for a Chlor-Alkali Plant, which produced chlorine, sodium hydroxide, hydrogen, gypsum, sulfuric acid, and sodium hypochlorite. Converted RSView Machine Edition to RSView Supervisory Edition, to interlock software with the North Brine Control Room process. Assisted with electrical rewiring, system startup and system debugging. Developed user operations manual for operator usage on HMI system and trained plant operators.
- Niacet Corporation (Niagara Falls, NY): Junior Electrical/Controls Engineer for Mono Chloro Acetic Acid (MCAA) Purification Plant upgrade. Replaced existing Analog Devices uMac-6000 controllers with Rockwell Automation ControlLogix PLC Hardware. Developed HMI/SCADA application software program (Allen-Bradley RSView Supervisory Edition) for the replaced hardware. Assisted with electrical rewiring, system startup and system debugging. Developed user operations manual for operator usage on HMI system and trained plant operators.

Work history

2005 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY

Recognized Trainings

- Rockwell Automation: ControlLogix Fundamentals
- Rockwell Automation: RSTrainer for RSLogix5000
- Rockwell Automation: RSTrainer for RSLogix500
- Rockwell Automation: RSTrainer for FactoryTalk View Machine Edition
- GE Fanuc Automation: Proficy HMI iFIX Fundamentals
- ICONICS: Genesis32 Training Course
- ICONICS: Genesis64 Training Course

Professional Registrations/Affiliations

- Membership Chair (2008 - 2011), International Society of Automation (ISA), Niagara Frontier Section

RETURN TO TEAM LIST

Robert D. Field, Jr.
Technologist

Qualified: Bachelor of Science (B.S.), 1985 – Agricultural Engineering Technology

Connected: Member - National Ground Water Association

Professional Summary: Rob possesses skills that give co-workers and clients' confidence that the day to day operations of their projects are being carefully managed. He effectively organizes and consistently follows through with work tasks. He possesses a strong work ethic and is committed to the projects he works on. He communicates effectively with project team members and creatively develops procedures to streamline efficiency and reduce project costs. His work history spans 30 plus years in environmental remediation and construction related environments.

Superfund Site

Technician
TCAAP | Arden Hills, MN

Rob is the lead operator at TCAAP, a Superfund Site near Minneapolis. He is the lead operator for the operation and maintenance of a 1,800 GPM groundwater treatment system and extraction well field. He ensures the project manager remains updated on the day to day operation of the system. Additional responsibilities include:

- Data management
- Monthly reporting
- Contractor procurement and oversight
- Well drilling and development supervision and groundwater sampling

Petroleum Pipeline Distributions

Technician
NuStar Energy | South Dakota

Rob has experience as the primary site technician at various NuStar Energy petroleum pipeline distribution facilities. He worked closely with facility managers and technicians to His responsibilities included:

- Operation and maintenance of their soil/vapor extraction systems
- Water well sampling
- Soil investigation/excavation oversight
- Cleanup and emergency response services

Landfills

Site Supervisor
WDE Landfill | Andover, MN

Rob has experience as a site construction supervisor for a 74-acre multiphase landfill closure project. Rob's expertise was an asset on the project in exceeding client expectations. He managed and oversaw the construction closure for more than two years. Responsibilities included:

- Construction oversight of the groundwater extraction and discharge system
- Construction oversight of a multilayer soil cap
- Installation of a slurry wall oversight
- Landfill gas vent construction oversight
- Construction oversight of two gas barrier walls

Remedial Investigation

Site Supervisor
Chemical Site | Jeffersonville, IN

Rob has experience as an Engineering Technologist (site supervisor) at a former chemical plant. Responsibilities included:

- Hydrogeologic interpretation
- Subcontractor management
- Supervision of drilling and sampling
- Determining well locations and depths
- Data management and report preparation

Field Geologist
Wauconda | Chicago, IL

Rob's organizational skills were an asset during a landfill remedial investigation project. He demonstrated a strong ability in coordinating an extensive subsurface soil sampling event consisting of sampling teams. Responsibilities included:

- Monitoring well installation
- Extensive subsurface soil sampling
- Methane gas characterization
- Evaluation of landfill cap thickness

Groundwater Investigation

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Project/Field Geologist
Nepera Chemical | Middletown, NY

Rob has a diverse background as a project/field geologist at lagoon and chemical plants. His ability to coordinate and supervise the drilling program at a soil and groundwater investigation allowed the project to proceed without delays. Responsibilities included:

- Coordination and supervision of drilling program
- Single well response tests
- Log and report preparation
- Construction Oversight Activities

Engineering Technician/Drill Rig Foreman
Construction Sites | MN

- Soils and materials testing
- Geotechnical evaluations

Other related areas of interest

Recognized (Certifications/Trainings)

- Midwest Geosciences Group Improving Hydrogeologic Analysis of Fractured Bedrock Systems, 2006
- NGWA Analysis and Design of Aquifer Tests, 1993
- NGWA Principles of Groundwater Hydrology, 1992
- 40-Hour HAZWOPER OSHA Training (per 29 CFR 1910.120), Elvin Safety Supply, 1986 and 1987
- 8-Hour HAZWOPER Refresher OSHA Training (per 29 CFR 1910.120), Annually

Work history

1986 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1985 - 1986	Braun Intertech, St. Paul, MN

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Robert Gabbard
Engineer

Qualified: B.S., Civil Engineering (2012)

Connected: Registered Engineer in Training: Indiana, Graduate Member of Chi Epsilon, Civil Engineering Honor Society

Professional Summary: Rob provides skills and knowledge in all areas of environmental compliance. He a goal oriented and efficient team member with a strong technical understanding of local, state, and federal compliance related regulations. His educational and professional background has provided Rob with a strong foundation in a variety of environmental and engineering fields, ranging from environmental due diligence and hydrology to residential groundwater sampling and sustainable design practices.

Project Assessor
Phase I Environmental Site Assessments | Various Locations

Conducted Phase I ESAs including the site evaluations, record evaluations, and reporting in accordance with ASTM E1527 in a variety of sectors ranging from commercial properties and medical facilities to heavy industrial facilities and food-grade facilities.

Compliance Specialist
EPCRA Section 312 (TIER II) | Throughout the United States

Completed the evaluation and reporting (i.e., Tier Two Hazardous Chemical Inventory Reports) for over 200 industrial facilities Various Locations, including Hazardous Material Business Plans (HMBPs) as required by the state of California.

Compliance Specialist
EPCRA Section 313 (TRI) | Various Locations

Completed the evaluation and reporting (i.e., Toxic Chemical Release Inventory Reporting) for multiple industrial facilities throughout the United States.

Compliance Specialist
Compliance Tracking Tools

Created a variety of tools utilized for tracking facility compliance. These tools include a tool for tracking facility waste streams to determine hazardous waste generator status and a tool for managing training certifications.

Compliance Specialist
Wastewater, Storm Water, and Oil Pollution Prevention Regulatory Compliance | Various Locations

- Assisted with the preparation of National Pollutant Discharge Elimination System (NPDES) permit applications and renewals for facilities with direct discharges, including heavy industrial facilities.
- Prepared or reviewed Spill Prevention, Control and Countermeasure Plans (SPCC Plans) and Storm Water Pollution Prevention Plans (SWPPPs) for industrial facilities located throughout the United.

Engineer
Structural Design | Marion, IN

Assisted with the structural design, assessment, and drafting of ventilation systems and safety equipment for an automotive manufacturing and assembly plant.

Compliance Specialist
Air-Related Compliance | Various Locations

- Prepared applications for various air emitting activities to obtain state and local operating permits for sites located throughout the United States.
- Completed air emission calculations for various industrial facilities relating to state and local air emission permitting requirements.
- Reviewed visible emissions opacity results and leak detection results from pipeline emission testing.

Drafter
Project Layouts and Designs | Marion, IN

Rob drafted a variety of drawing for residential, commercial, and industrial projects, including structural, electrical, and mechanical layouts and designs.

Environmental Field Sampler
Various Environmental Samplings | Various Locations

- Completed the collection and delivery of groundwater samples for industrial facilities and residential areas.
- Completed the collection and delivery of remediation system air samples for industrial facilities.
- Completed the collection and delivery of sediment samples for industrial facilities.

Product Solution Analyst/Architect
Software Design, Database Administration, Data Analytics | Various Locations

- Developed new software designs for existing and future systems for use both internally and for client-specific needs
- Assisted with the maintenance of existing system databases

- Created various compliance tracking and reporting tools for internal use within GHD
- Completed data analytics to improve our current compliance and waste services needs as well as provide analysis for program improvements and tracking for our clients

Other related areas of interest

Recognized (Certifications/Trainings)

- Indiana Environmental Permitting & Hazardous Waste Seminar, Indiana Chamber, 2012
- OSHA 40-hour Hazardous Waste Worker, Refresher, 2012 – 2017
- Green Manufacturing Specialist Training, Purdue University, 2014
- Microsoft Access 2016: Advanced Development, ONLC, 2016
- Business Analyst Boot Camp, ASPE, 2017
- CS50: Introduction to Compute Science, Harvard University, 2017

Work history

July 2012 – present	GHD (formerly Conestoga-Rovers & Associates), Indianapolis, IN
2011	Crandall Engineering & Design

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Mark Galley
Structural Drafter

Qualified (Education): A.A.S. Computer Aided Drafting and Design 2008

Professional Summary: Mark has experience in 3D AutoCAD for project presentations and models. Experience in generating groundwater and chemical concentration contours by using golden surfer software. Handle incoming revisions from multiple offices for all drafting disciplines.

Structural Drafter
Colonel Ward High Service Pump Improvements | Buffalo, NY

Created layouts, sections, and elevations. Prepared the engineering flow diagrams. Assisted in developing single line diagrams, motor schematics, and wiring diagrams. Assisted in the design of lighting, grounding, instrumentation and power plans.

Structural Drafter
City of Buffalo Department of Public Works, Parks and Streets | Erie Basin Marina Boardwalk; Pier Gates; Restroom Improvements; Surface Improvements | Buffalo, NY

Created site plans, elevations, section views, framing plans, and details.

Structural Drafter
WMRE | Pine Tree LFGTE Design - Thiopaq Treatment Building | Lenox Township, MI

Created site plans and framing plans. Created pipe supports, elevations, section views, and detail.

Structural Drafter
Pump Station and Valve Actuator Upgrades | Niagara County Sewer District No. 1 | Niagara Falls, NY

Created site plans, demo plans and sections for pipes in the pump station.

Structural Drafter
Sludge Thickener No. 1 (South) Repairs | Niagara Falls Water Board | Niagara Falls, NY

Created site plans, structural plans and sections for pipes in the sludge thickener.

Structural/Mechanical Drafter
Municipal Facilities Improvements | City of Lockport | Lockport, NY

Created all site plans, elevations, pad details and all other structural details. Created piping plans, HVAC plans, sections, details, and a 3D model for piping in clarifier building.

Structural Drafter
Waste Water Treatment Plant - Upgrade | Caterpillar Joliet | Joliet, IL

Created all site plans, elevations, pad details and all other structural details. Created a 3D model of building, pads and steel.

Structural/Mechanical Drafter
Oak Orchard WWTP Infrastructure Improvements | Onondaga County | Syracuse, NY

Created 3D model of existing concrete for clarifier building. Created piping plans, HVAC plans, sections, details, and a 3D model for piping in clarifier building.

Structural Drafter
HCL Synthesis Project | Niagara Falls, NY

Using Bentley Prosteel created a 3D model of a steel tower, framing plans, grating plans, sections and details.

Structural/Architectural/Mechanical Drafter
Secondary Bypass Disinfections Improvements | Onondaga County | Syracuse, NY

Created 3D model of both chlorine contact tanks and chemical building, elevations, pad details and other structural details. Created architectural plans and elevations, and door and window schedules. Created piping plans, HVAC plans, sections, and details.

General Drafter
Former Buffalo China | Buffalo, NY

Prepared site location map, site plans, chemical concentration contour drawings, groundwater contour drawings, chemical concentration data box drawings, and section drawings for multiple reports.

General Drafter
Ex-Eaton | Batavia, NY

Prepared site plans, site location map, AOC IRM layouts, groundwater contour drawings & chemical concentration data box drawings.

Work history

2008 - present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY

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Douglas M. Gatrell
Engineer

Qualified: M.S., Civil/Environmental Engineering, 1993; B.S., Civil Engineering, 1991

Connected: Registered Professional Engineer: MI, AK, AZ, HI, ID, IN, NV, NM, NY, OH, OR, PA, TN, UT, WA, WI; Registered Technical Service Provider (TSP): MI, AK, AZ, HI, IN, NY, OH, OR, PA, UT, WA; Engineering Society of Detroit (ESD)

Professional Summary: Douglas is a member of the Solid Waste Practice Group, which is responsible for projects in the United States and Canada. Douglas has 23 years of experience related to landfill construction projects, landfill gas collection and control system master planning and beneficial/renewable energy, staged cell development, cell liner and leachate collection systems, final cover systems, and vertical and horizontal expansions at municipal solid waste and ash monofills.

Landfill Subsurface Oxidation Evaluations

Design Engineer
Various Landfill Sites | Confidential Clients | Midwest & Eastern United States

- Evaluation of surface conditions, development of approach to mitigate rapidly developing subsurface oxidation event including implementing immediate response actions to halt further development of oxidation, physical modifications to cover and gas collection system and repair of impaired cover area. Developed long-term corrective action plan. Evaluated and modified procedures for monitoring and balancing of gas collection and control system.
- Evaluation of decreasing landfill gas quality and volume. Project involved investigation of system operation and evaluation of historical data. Collection of carbon monoxide concentrations, gas quality and temperature in select area of landfill, implementation of immediate corrective actions, long-term modifications to operation of wellfield and established procedures to perform detailed evaluation on available data to properly balance gas collection system.
- Review of compiled monthly wellfield data indicated potential for subsurface oxidation based on comparison of ratios of nitrogen and oxygen, temperature, methane concentration and trends in same data. Implemented short-term remedial methods and implemented long-term changes to wellfield balancing operations and criteria to mitigate issue.
- Analysis of elevated wellfield temperatures identified ongoing subsurface oxidation. Created database of historical wellfield data to evaluate trends in data and identify localized "hotspots". Evaluated landfill design and operational systems to identify cause of available oxygen. Implemented short term response actions and developed long-term procedures for evaluating and balancing gas collection system to prevent further events.
- Review and evaluation of procedural data and management approaches as part of an ongoing response action. Project involved development of best management practices to mitigate existing subsurface oxidation condition and future operation of facility.
- Monthly data evaluation of overall wellfield with emphasis on select historical locations with elevated temperatures and associated landfill gas concentrations. Project involved periodic implementation of corrective actions including surface temperature monitoring and wellfield system adjustments.

Landfill Gas Management

Design Engineer
Atomic Energy of Canada | Ontario, Canada

Designed passive landfill gas collection system for hazardous waste application. Design elements included waste modeling, layout of piping works, pressure relief valving (rupture disc configuration).

Design Engineer
Confidential Client | North America

Designed landfill gas interconnect layout and condensate management systems for landfill gas to energy plants. Design elements included sizing landfill gas header piping, condensate sumps, condensate pumps, and layout of piping works. Plants provide approximately 75 MW of renewable energy from landfill gas fuel application.

Project Manager
LFG Design | Various Clients | North America

Developed landfill gas collection and control system expansion plans for the West Edmonton Landfill, Carleton Farms Landfill, Brent Run Landfill, Sauk Trail Hills Landfill, Citizens Disposal, Inc. Landfill, Arbor Hills Landfill,

Oakland Heights Landfill, Adrian Landfill, Anchorage Regional Landfill, Waimanalo Gulch Landfill.

Project Manager
Anchorage Regional Landfill | Municipality of Anchorage | Anchorage, Alaska

Developed landfill gas collection and control master plan for 160-acre site and construction drawings and technical specifications for Phase I of the collection and control system (~60 acres).

Conducted landfill gas to energy feasibility study which focused on five options for end-use implementation of landfill gas including sale to local power grid, fuel for local school system burners, and fish hatchery development.

Developed field activity plan related to the completion of the Tier II emissions testing and reporting in 2003.

Project Manager
Field Monitoring | Various Clients | North America

Conducted landfill gas monitoring activities for multiple landfill sites across North America involving reporting of gas probe monitoring results, interpretation of thermistor string readings, indoor air quality results and annual emissions reports; coordination and reporting for Tier II emission testing programs; and surface emission monitoring (SEM) programs. Services performed at Merrill Field Landfill, Anchorage Regional Landfill, International Airport Road Landfill, Peters Creek Landfill, City of Billings, Riverbend Landfill, Coffin Butte Landfill, Olympic View Landfill, and Hillsboro Landfill.

Landfill Engineering

Design Engineer
Various Sites | Various Clients | North America

Completed various design efforts for landfill projects including permitting, master planning, horizontal/vertical expansions, design drawing and technical specification development, alternative cover and liner evaluation and implementation, leachate management, gas mitigation systems, Tier 3 analysis for gas flux rates, slope stability evaluation, stormwater analysis, and future end-use development.

Services provided for G&H Landfill, West Edmonton Landfill, Tybouts Landfill, General Motors (Colombia), Anchorage Regional Landfill, 12th Street Landfill, Department of Army, Newberg Landfill, Hidden Valley Landfill, Fons/Old Wayne Landfills, Leichner Landfill, Cactus Landfill, Arecibo Regional Landfill, Pine Tree Acres Landfill, Carleton Farms Landfill.

Landfill Construction Quality Assurance

Design Engineer/Certification Engineer
CQA Services | Various Clients | North America

Designed and supervised construction quality assurance programs for cell and final cover construction efforts involving earthen, single-composite, and double-composite systems for municipal solid waste, hazardous waste, ash monofill, and industrial landfills; oversight services also performed for leachate storage lagoons. Designs included alternative liner systems for increased airspace and reduction of construction effort. Locations include:

- Deer Park MTR104 Landfill, Deer Park, Texas; Himco Dump Site, Elkhart, Indiana; Holcim (US) Inc., Dundee, Michigan; Elk Run Landfill, Onaway, Michigan; Hillsboro Landfill, Hillsboro, Oregon; Merlin Landfill, Josephine County, Oregon; Marion County Ash Monofill Landfill, Marion County, Oregon; Riverbend Landfill, McMinnville, Oregon; Short Mountain Landfill, Lane County, Oregon

Vapor Intrusion Assessment/Mitigation

Design Engineer
Vapor Intrusion Mitigation | Multiple Locations | South Dayton, OH

Design vapor mitigation systems (sub-slab depressurization) for multiple industrial/commercial businesses including blowers, piping networks, and sampling points. Project also included development of contractor bid documents, review of bid submittals, contractor oversight during installation, and modifications as necessary.

Design Engineer
Vapor Intrusion Mitigation | Hyatt | Omaha, NE

Completed design and installation of a vapor barrier and passive ventilation system for a new high rise hotel in eastern Nebraska. Designed and oversaw construction of a Geo-Seal gas vapor barrier and vapor vent system installed in conjunction with construction of the hotel. This passive system was designed to mitigate potential intrusion from VOC vapors. System was successfully installed in 2013.

Design Engineer
Vapor Intrusion Mitigation | Day Care Center | Evansville, IN

Completed design, installation and monitoring of a VOC vapor mitigation system (SSD) for an existing 16,000-square-foot daycare center in Evansville, Indiana to mitigate indoor air quality at the request of the Indiana Department of Environmental Management (IDEM) Voluntary Remediation Program (VRP). TCE and other VOCs were detected above applicable criteria in the soil, groundwater, soil gas, and indoor air during site investigation activities. The findings of these investigations were utilized to focus the design and installation of an SSD to mitigate the suspected vapor intrusion (VI). Communication testing was conducted to facilitate the design of an extraction point layout that would effectively generate a vacuum below the concrete slab. Results of the communication tests indicated that 12 extraction point locations connected to four high-suction/high-flow exhaust blowers would be

appropriate to generate an appropriate vacuum field beneath the slab. The extraction points were framed and enclosed behind drywall for security purposes. The four high-suction/high-flow exhaust blowers were externally mounted on the side of the building approximately 15 feet above adjacent street level. Indoor air clearance sampling and sub-slab pressure readings have documented that the SSD is operating as intended and is providing a reliable vapor barrier to reduce VI. As a result, IDEM approved re-opening of the daycare for business.

Design Engineer
Soil Gas Mitigation | Central City Park | Westland, MI

Designed an interim action for a municipality in southeastern Michigan that included methane mitigation at a public park previously used as a landfill. Mitigation included design and installation of passive ventilation trench placed between the former landfill and the nearby buildings. A portion of the park was redeveloped as soccer fields and methane/soil gas probes were installed around the perimeter and monitored on a routine basis.

Design Engineer
Soil Gas Mitigation | Apartment Complex | Harper Woods, MI

Designed a mitigative measure for an apartment complex in southeastern Michigan that included a passive and active soil gas collection system. Mitigation included design and installation of an active collection system and a passive ventilation trench adjacent to an apartment complex above a natural gas pocket. Subsequent soil gas monitoring determined the pocket to have been mitigated. A methane monitor was installed in the basement of the complex as a precautionary measure.

Civil Engineering

Design Engineer
Various Sites | Various Clients | North America

- Provided civil engineering design services for fire pond remediation, brine pond rehabilitation, soil vapor extraction systems, geotechnical evaluations, lift stations, hydraulic fracking storage ponds
- Services provided for Exxon Mobil, OxyChem, Chevron, Shell, and Agrium

Agricultural Engineering

Certifying Engineer
Multiple Locations | Client | Multiple States | 2007 - present

Waste Management System/Dairy Upgrades

State of Wisconsin

- Various Waste Management System Upgrades for multiple farms in the state. Projects included the design of waste storage ponds, piping, pumping system requirements, surface water drainage features, and associated control features.

State of Michigan

- Multiple dairy upgrades including retrofit existing structures for future operations. Projects included the design of buildings, piping, pumping system requirements, surface water features, and associated control features.

State of Utah

- Certifying engineer for Natural Resource Conservation Service (NRCS) Irrigation and Stockwater Design projects for various farms in the state. Projects included the design of irrigation pipeline layout, pumping system requirements, and associated control features.
- Certifying engineer for Natural Resource Conservation Service (NRCS) Waste Management System Upgrades for various farms in the state. Projects included the design of waste storage ponds, piping, pumping system requirements, and associated control features.

Certification Engineer
Irrigation Diversion | NRCS | Hanksville, UT | 2007 - 2010

Certifying engineer/Engineer of Record for Natural Resource Conservation Service (NRCS) for the design of a diversion structure for irrigation purposes for the town of Hanksville, Utah. Project includes an irrigation control structure with fish passage, water level control structure with sediment management, 9,000 feet of pipeline, a pipeline bridge to direct irrigation waters to the south side of the Fremont River, a sluice structure for sediment removal from the irrigation pipeline, and ancillary features.

Subject Matter Technical Expert
Confidential Client | Washington

Litigation support in the form of expert testimony and technical support regarding geosynthetic material applications for lined impoundments.

Other related areas of interest

Published

Papers Presented and Published in Conference Proceedings

- The 7th International Conference on Remediation of Chlorinated and Recalcitrant Compounds, "Other Considerations At Contaminated Sites: Evaluating and Addressing Landfill Gases", Monterey, California, May 2010 (F. Blickle, B. Holly, D. Gatrell)
- Engineering Society of Detroit 20th Annual Solid Waste Technical Conference "Solutions for the Treatment of Landfill Leachate: A Series of Engineered Wetland Case Studies", E. Lansing, Michigan, March 2010 (L. Pabst, D. Gatrell, N. Shanks)
- The Air & Waste Management Association's 102nd Annual Conference "Soil Vapor Intrusion – Mitigation Case Studies", June 2009 (T. Kinney, D. Gatrell, M. Coram)
- The 6th International Conference on Remediation of Chlorinated and Recalcitrant Compounds, "Installation and Monitoring of a VOC Vapor Mitigation System", Monterey, California, May 2008 (T. Kinney, D. Gatrell, S. Robinson)
- Brownfield News, "Down in the Dumps? Redevelop!", December 2005 (with G. Klepper, P. Masson)
- Solid Waste Association of North America 28th Annual Landfill Gas Symposium, "Cold Climate Engineering – A Heat Transfer Analysis of a Landfill Gas Collection and Control Piping System", San Diego, California, March 2005 (with Dr. L.J. Genik)
- Solid Waste Association of North America 26th Annual Landfill Gas Symposium, "Saving Money Through Application of a Modified Tier III Analysis", Tampa, Florida, March 2003
- Solid Waste Association of North America - Northwest Symposium, Alternative Liner Demonstration for Ash Monofill, Portland, Oregon, April 2002

Work history

January 2005 – present	GHD (formerly Conestoga-Rovers & Associates), Plymouth, MI
1998 – 2004	EMCON, Portland, OR
1993 – 1998	GHD (formerly Conestoga-Rovers & Associates), Romulus, MI

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Charles B. Gjersvik

Senior Environmental Scientist

Qualified: Master of Science (Environmental Studies) 1992, Bachelor of Arts (Biology) 1980

Professional Summary: Mr. Gjersvik's career spans over 30 years addressing complex environmental issues. His career is highlighted with experience in private industry as well as environmental consulting. Mr. Gjersvik manages complex air pollution control/management projects for several national and international manufacturers. His expertise includes permitting, compliance assurance review, program development, BACT review, PSD review, MACT compliance, system evaluation, negotiation and interaction with USEPA and state regulatory agencies. Mr. Gjersvik has provided comprehensive air quality services for numerous sectors including but not limited to heavy equipment manufacturing, pipelines and surface coating operations.

Air Permitting and Air Compliance

Project Manager
Air Permitting and Air Compliance | Various States

Charlie manages complex air pollution control/management projects for national and international manufacturers. His expertise includes permitting, multimedia compliance assurance review, compliance program development, BACT review, PSD review, MACT compliance, system evaluation, negotiation and interaction with USEPA and state regulatory agencies.

Project Manager
Air Permitting and Air Compliance Assistance | Caterpillar Inc. | Various Locations | ongoing

- CAAPP (Title V) Permitting for nine facilities in Illinois
- CAAPP renewal supplements for eleven facilities
- State permitting for facilities located in Arkansas, Florida, Illinois, Kansas, Missouri, North Carolina, Ohio, Tennessee, Texas, South Carolina and Wisconsin
- Developed air compliance databases for various facilities

Project Manager
Title V Air Permitting and Title V Air Compliance Assistance | Various Clients | Various Locations | ongoing

Assisted clients in obtaining Title V Air permits and assisted in the development of Title V Permit recordkeeping and reporting systems. Representative industries include, but are not limited to:

- Large construction equipment manufacturing
- Transportation filter paper manufacturing
- Faux marble manufacturing
- Oil and air filter manufacturing
- Cement plants
- Steel mills
- Fiberglass boat manufacturing
- Soybean processing and extraction
- Small ordinance manufacturing
- Food manufacturing

Project Manager
NESHAP Compliance | Various Clients | Various Locations | ongoing

Assisted clients in demonstrating compliance with National Emission Standards for Hazardous Air Pollutants (NESHAP). In particular, NESHAPs addressing:

- Coating of Miscellaneous Metal Parts
- Paper and Other Web Coating
- Reinforced Plastic Composites Production
- Printing and Publishing
- Solvent Extraction for Vegetable Oil Production
- Reciprocating Internal Combustion Engines
- Iron and Steel Foundries
- Miscellaneous Surface Coating Operations at Area Sources Standards for Nine Metal Fabrication and Finishing Source Categories
- Institutional Boilers and Process Heaters

Project Manager
General Air Permitting Assistance | Various Clients | Various Locations | ongoing

Assisted a wide variety of industries in obtaining air construction and operating permits in Illinois, Indiana, Florida, Georgia, Texas, North Carolina, South Carolina, New Jersey, Missouri, Idaho, Michigan, Washington State, Ohio, and Iowa. These services also include permits with federally enforceable limitations to avoid Title V.

Project Manager
Prevention of Significant Deterioration (PSD) Air Construction Permitting Activities | Various Clients | Various Locations | ongoing

Preparation of PSD applications and PSD avoidance applications for various facilities including, but not limited

to: fertilizer manufacturing, steel mill, coal to gas production and ethanol plants. Assisted numerous facilities in obtaining permits with conditions limiting their emissions below PSD thresholds.

Project Manager
NSPS Compliance | Various Clients | Various Locations | ongoing

Assisted clients in demonstrating compliance with National Emission Standard for New Sources (NSPS).

Project Manager/Environmental Compliance Auditor
Environmental Compliance Audits | Various Clients | Various States | ongoing

Conducted environmental compliance audits at various industries and facilities, include the following:

- Pipelines and tank farms
- Oil and air filter production
- Automotive OEM parts manufacturer
- Coating operations
- Ethanol plants

The audits were conducted to determine compliance with Federal, State, and local air environmental regulations.

Project Manager
Annual Emissions Reports and Emission Inventories | Various Clients | Various Locations | ongoing

Assisted clients with preparation of annual emission reports and emission inventories in various states.

Work history

2006 – present	GHD (formerly Conestoga-Rovers & Associates), Springfield, Illinois
2001 - 2006	SECOR International Incorporated
1995 - 2001	Goodwin Environmental Consultants
1990 - 1994	Environmental Affairs, Continental Baking Company
1985 - 1990	Continental Baking Company

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Dyron Hamlin, MS, PE

Chemical Engineer

Qualified: Master of Science in Engineering (MSE) – Chemical Engineering – The University of Texas at Austin, Bachelor of Science in Chemical Engineering (BSChE) – University of Arkansas, Licensed Professional Engineer (PE, Arkansas #12728)

Connected: Member of the American Institute of Chemical Engineers (AIChE), Invited Instructor, University of Arkansas for Medical Sciences School of Public Health

Professional Summary: Dyron is a registered professional chemical engineer who conducts chemical and environmental engineering, meteorological, and industrial hygiene analyses for the transportation, industrial, academic, and regulatory sectors. Dyron has worked with air dispersion modeling in risk assessment and emergency response scenarios, assessed chemical exposures relating to occupational health and safety issues, aerosol/dust exposure, asbestos exposure, and indoor air quality. Dyron has responded to over 150 major hazardous materials emergencies and has served as an expert in litigation for multiple cases. Dyron has also served as an expert in the chemical manufacturing and transportation sectors in regards to Toxic Inhalation Hazards (TIHs) including chlorine, ammonia, ethylene oxide, hydrogen sulfide, sulfur dioxide, and oleum.

Chemical Release Assessments

Project Manager
Hurricane Katrina Oil Spill | Oil Refinery | Meraux, LA | August 2005 – September 2007

Conducted a comprehensive assessment and remediation project (est. $25MM) in the aftermath of Hurricane Katrina. Managed more than 30 field staff responsible for:

- Louisiana RECAP-compliant remedial efforts
- Documentation and scientific support as expert for major class-action litigation
- Interaction with USEPA, LDEQ, and other regulatory personnel

Assisted client in achieving site closure in two years, demonstrating there was no need to establish the spill area as a Superfund site.

Presidential Inauguration | Washington, DC | January 2008

Was retained on behalf of a Class I Railroad to design and conduct chemical evaluations including terrorism assessments before and during the first Inauguration of President Barack Hussein Obama in secure areas around the event.

PSM Consulting | Multiple States and Facilities | 2011-2013

Was retained to audit and update PSM elements including PHAs, RMPs, Facility Siting, etc. at multiple facilities in multiple states according to relevant API, CCPS, USEPA, OSHA, and other such guidelines in accordance with Process Safety Management (PSM) principles. Provided comprehensive analyses in support of PSM elements.

Prototype Air Monitoring Equipment | US Department of Homeland Security | Washington, DC

Was selected through a sole-source contract (~$250k) to provide field-testing venues for prototype-stage air monitoring equipment for hazardous materials and chemical warfare agents. Deployed 3 prototype models at 4 locations to evaluate performance in detection, durability, and general utility for chemical assessment during emergency response situations.

Train Derailment | Brooks, KY

As a representative example of typical chemical response activities, managed over 30 site personnel in collected exposure data for a multiple-chemical derailment including methyl ethyl ketone, butadiene, phthalic anhydride, chlorine, and cyclohexane. Conducted air dispersion modeling and fate and transport assessments to assist in residential re-occupation of nearby homes and businesses.

Dugway Chlorine and Ammonia Release Tests | Multiple Clients | Dugway, UT | May–June 2010

Provided air monitoring support during the Jack Rabbit chlorine and ammonia field trials. Led the air monitoring efforts and conducted analyses with leading scientists.

Other Chemical Release Events

Project Manager/Expert Witness Support/Site Response and Chemical Assessment

- Plant fire and explosion involving acid gases, multiple organic liquids, Romulus, MI
- Train derailment release of oleum (fuming sulfuric acid), Farragut, TN
- Train derailment release of hydrochloric acid and styrene, Amite, LA

- Plant fire and explosion involving acid gases, multiple organic liquids, Fort Worth, TX
- 4 BLEVE derailment involving propane/LPG, ammonia, Belleville, ON
- In-situ reaction of acids to form TNT, tanker truck incident, Stanton, TN
- Train derailment release of ~280,000 gallons of liquefied anhydrous ammonia, Minot, ND
- Train derailment release of n-butyl acrylate, Longview, TX
- Responded to BLEVE of a railcar containing cyclohexanone oxime which put benzene, oleum tanks at risk. Freeport, TX
- Train derailment release of hydrochloric acid, benzene, LPG, Coahoma, TX
- Train derailment and ethanol fire, Tacoma, WA
- Train derailment release of vinyl chloride, methanol, and formaldehyde, Tamaroa, IL
- Train derailment release of styrene, propyl acetate, vinyl acetate, BNSF, Cameron, TX
- Train derailment and hydrochloric acid release, Columbus, OH
- Pool / chlorine chemical plant fire, Conyers, GA
- Train derailment and chlorine spill, Macdona, TX
- Train derailment and chlorine spill, Graniteville, SC
- Train derailment and sulfur dioxide, chlorine release, Matfield Green, KS
- Assessment of intentionally targeted railcar leaking toluene diamine, Slaton, TX
- Train derailment and kerosene fire, Mirando City, TX
- Reacting tank car of methylene bisphenyl diisocyanate, New Orleans, LA
- Train derailment and hydrofluoric acid spill, Creighton, PA
- In-situ reaction of acids to produce NO2, Roper, UT

Air Dispersion Modeling Evaluations

- Plant fire and explosion acid gases, multiple organic liquids, Valley Center, KS
- Derailment involving phenol, Castleberry, AL
- Derailment involving ethanol and subsequent fire, Painesville, OH
- Odor investigation following reported release, Texas City, TX
- Tank release of Fluorosilicic acid, New Orleans, LA
- Fire started by lightning strike of gasoline tank, Kansas City, MO
- Train derailment and methanol spill, Memphis, TN
- Train derailment and phenol spill, The Dalles, OR
- Train derailment and styrene spill, Atlanta, GA
- Crotonaldehyde leak on ocean-going vessel, Elizabethport, NJ
- Ammonia tank car release, Windsor, ON
- Hydrochloric acid release, Calipatria, CA
- Plant fire and explosion, El Dorado, AR
- 1,3-butadiene release, Texas City, TX
- Styrene tank car polymerization reaction, Cincinnati, OH

GHD FIRST Program Development

From 2011-2017, trained over 300 personnel in 30 locations on the use and implementation of air monitoring evaluation equipment and services as part of the GHD FIRST (Fast Incident Response Services Team) Program. Provided guidance and initial oversight to GHD FIRST personnel during emergency responses to expand GHD's reach into a North-America-wide presence.

Other related areas of interest

Published

Publications

- Hamlin, D. "Modeling Ozone Formation in a Central Texas Power Plant Plume," Master's Thesis, The University of Texas at Austin, May, 2002
- Stout, S., Millner, G., Hamlin, D., Liu, B. "The Role of Chemical Fingerprinting in Assessing the Impact of a Crude Oil Spill Following Hurricane Katrina," Environmental Claims Journal, Vol 18, pp 169-184, Spring 2006
- Stout, S., Liu, B., Millner, G., Hamlin, D., Healey, E. "Use of Chemical Fingerprinting to Establish the Presence of Spilled Crude Oil in a Residential Area Following Hurricane Katrina, St. Bernard Parish, LA," Environ. Sci. Technol., Vol 41, 7242-7251, 2007
- Cawthon, D.; Hamlin, D.; Steward, A.; Davis, C.; Cavender, F., and Goad, P. Field studies on the ammonia odor threshold based on ambient air-sampling following accidental releases. Toxicological & Environmental Chemistry. 2009 Jun; 91(4):597-604
- Hamlin, D.; Khajeh Najafi, S. "Where's the Leak?" Occ. Health & Safety Magazine. September, 2009.

Presentations

- "SAFER STAR: Its Use in Emergency Response and Risk Assessment," 14th Annual Bureau of Explosives Hazardous Materials Seminar, Dallas, TX, May 2002.

- "Responses to Emergencies Involving Propane and LPG." Propane Gas Defense Association Meeting, Chicago, IL, September 2002.
- "Evacuate or Shelter-in-Place?" Presented at the 15th Annual Bureau of Explosives Hazardous Materials Seminar, Dallas, TX, May 2003.
- "Managing an Environmental Crisis" Presented at the Air Regulations Update Seminar of the Arkansas Environmental Federation, April 7, 2004.
- "Managing Emergencies using 21st Century Technology." 16th Annual Bureau of Explosives Hazardous Materials Seminar, Dallas, TX, May 2004.
- "Reconstruction of a Hazardous Material Release using Real-time Air Monitoring Data and Air Dispersion Modeling" Presented at the 57th American Academy of Forensic Sciences Annual Scientific Meeting, New Orleans, LA, February, 2005.
- "Reality Checks on the Use of Hazardous Materials as Weapons of Mass Destruction" Presented at the 9th Force Health Protection Conference, Albuquerque, NM, August, 2006.
- "TIH Releases – an On-site Perspective." Subject Matter Expert, Transportation Security Administration Toxic Inhalation Hazard Preparedness, Response & Recovery Seminar, Los Angeles, CA, June 12, 2007.
- "Using Accidental Observations to Assess Model Performance." 12th Annual George Mason University Conference on Atmospheric Transport and Dispersion Modeling, Fairfax, VA, July 8-10, 2008.
- "Point Location Air Monitoring During Full-Scale Chlorine and Ammonia Release Tests" Presented at the 14th Annual George Mason University Conference on Atmospheric Transport and Dispersion Modeling, Fairfax, VA, July 13-15, 2010.
- "The Feedback Loop: the use of Field Observations to Improve Scientific Understanding." 24th Annual Bureau of Explosives Hazardous Materials Seminar, St. Louis, MO, May 2011 and the Sites & Spills Expo, Toronto, ON, Canada, November 2011.
- "Comprehensive Air Monitoring Strategies During Environmental Spill and Cleanup Projects" Presented at the Sites & Spills Expo, Toronto, ON, Canada, November 2012.
- "Useful Calculations for Hazardous Materials Responders" Presented at the Sites & Spills Expo, Toronto, ON, Canada, November 2012.
- "Integrated Risk Assessment and Management for a Chemical Spill Emergency Response Associated with a Train Derailment" Presented at the 52nd Annual Society of Toxicology Annual Meeting and ToxExpo, San Antonio, TX, March 2013.
- "Air Modeling Crude Oil Spill Exposures." Clean Gulf Conference, Tampa, FL, November 2013.
- "Crude Oil Exposure Assessments." AIHcE Industrial Hygiene Conference, San Antonio, TX, May 2014.
- "Dangerous Goods Response Toolbox." Canadian Emergency Response Contractors Association meeting, Waterloo, ON, Canada. October 2014.
- "Air Monitoring and Public Protective Actions." Chlorine Emergency Response Providers team training, Mississippi State Fire Academy, Jackson, MS. 2014, 2015, 2016.
- "Air Quality Monitoring during Railroad Tunnel Construction Activities in an Urban Environment." Railroad Environmental Conference, University of Illinois, Champaign, IL. October 2015
- "Assessing Inhalation Exposures during an Emergency Response." 8-hour Professional Development Course. AIHcE Spring and Fall 2016.
- "Ice Road Emergency – Responding to Diesel and Crude Oil Spills in Frozen Climates." Clean Pacific Conference, Seattle, WA. June 2016
- "Air Monitoring using Unmanned Aerial Vehicles." Midwest Energy Association Conference, Cincinnati, OH. September 2016.

Work history

January 2011 – present	Chemical Engineer, Shareholder, Associate, Project Manager, GHD (formerly Conestoga-Rovers & Associates), Little Rock, AR
2010	Owner, Hamlin Chemical Consulting
2002-2010	Director, Chemical Fate and Transport, Center for Toxicology and Environmental Health, LLC
1998-2000	Process Engineer, Bioengineering Resources, Inc.

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Shawn Horn

Principal/Vice President

Qualified: Bachelor of Science - Chemical Engineering (B.S.Ch.E.)

Connected: Registered Professional Engineer: Minnesota, Iowa, Nebraska, Wisconsin

Professional Summary: Shawn has worked his entire 30-year professional career with GHD working in the areas of soil and groundwater remediation and multimedia environmental compliance throughout North America. Areas of professional practice include: air permitting, waste water permitting, stormwater permitting, water treatment design, Toxic Release Inventory reporting, spill response preparation, soil and groundwater investigations, feasibility studies, cost estimation and remedy selection.

Multimedia Compliance

Project Principal / Project Manager

Shawn has conducted numerous facility environmental compliance evaluations over the past 20 years, that includes air quality and permit requirements, waste water, stormwater, hazardous waste management, spill response preparation, risk management and SARA reporting requirements. Facilities include: ethanol manufacturing, ammonia storage and distribution, urea manufacturing, composite wood manufacturing, metal pipe manufacturing, motorhome manufacturing and surface coating, metal fastener manufacturing, chlor-alkali operations, outboard motor manufacturing, municipal electric utility, pharmaceutical operations, locomotive refurbishing, cremation operations, egg processing operations, metal and plastic parts coating operations, plating operations, groundwater and soil treatment, and utility pole treatment. States include: Minnesota, Wisconsin, Iowa, North Dakota, South Dakota, Nebraska, Missouri, Illinois, Indiana, Texas, New Jersey, Alabama, Mississippi, Louisiana, Washington and Kansas.

Project Principal / Project Manager
Koch Industries | Multiple States | 2000-Present

Shawn has completed a variety of environmental compliance projects for over 25 ammonia storage terminals, fertilizer manufacturing plants, and liquid fertilizer terminals in the Midwest and South United States (EPA Regions IV, V, VI, VII and VIII). Work includes air permit modifications, air permit construction applications, annual air emissions reporting, Department of Agriculture compliance, Tier II and Toxic Release Inventory reporting, stormwater and waste water permitting and spill response plan preparations.

Project Principal / Project Manager
IBM | Rochester, MN | 1987- Present

Shawn completed a variety of environmental compliance projects for large computer manufacturing plant. Work includes Title V air permit modifications, air permit construction applications, annual air emissions reporting, stormwater impact evaluations and spill response plan preparations.

Project Principal / Project Manager
Electrical Transformer Manufacturing Plant | Shreveport, LA | 2010- Present

Shawn completed a variety of environmental compliance projects for electrical transformer manufacturing plant. Work includes air permit modifications, air permit construction applications, annual air emissions reporting, Tier II and Toxic Release Inventory reporting, stormwater and waste water permitting and spill response plan preparations.

Project Principal / Project Manager
Bell Lumber and Pole Company | Multiple States | 1986- Present

Shawn completed a variety of environmental compliance projects for two utility pole treating plants in Minnesota and Nebraska, and timber peeling and preparation plants in Washington, Michigan, Wisconsin, Oklahoma and Oregon. Work includes air permit modifications, air permit construction applications, annual air emissions reporting, Department of Agriculture compliance, Tier II reporting, stormwater and waste water permitting and spill response plan preparations. Conducted air emissions and odor evaluations. Work was successful to allow State of Minnesota to void the existing air emissions permit. Assisted facility in evaluating and switching wood treating formulation to a more odor friendly product. Designed and completed engineering certification of drip pads consistent with 40 CFR Part 264.573.

Soil and Groundwater Remediation

Project Principal / Project Manager
Bell Lumber and Pole Company | New Brighton, MN | 1986- Present

Shawn managed the environmental activities for an active wood treating site that is on the USEPA National Priorities List. Site contaminants include pentachlorophenol (PCP), polynuclear aromatic hydrocarbons (PAHs), and dioxin/furan congeners. Project involved the remediation of soil (through soil removal and on-site thermal treatment) and groundwater. Responsibilities included:

- Conducting Remedial Investigation/Feasibility Study (RI/FS) and Remedial Action (RA) activities for soil and groundwater impacts. Evaluated off-site impacts to property and downgradient PCP plume.
- Designing, permitting, negotiating with the State agencies, supervising construction, and operating a pilot-scale hot water injection and treatment system to remediate non-aqueous phase liquids (NAPLs) from a surficial aquifer. Variance from state pollution control and department of health regulations, which prohibit groundwater injection was obtained. Prepared evaluation report on the study.

Project Principal/ Project Manager
Twin Cities Army Ammunition Plant | Arden Hills, MN | 2001- Present

Shawn is the Project Manager for this former ammunition manufacturing facility that is on the USEPA National Priorities List. Responsibilities include; operation and maintenance and optimization of 2000 gpm system consisting of 17 extraction wells and treatment for VOC contamination, evaluation of additional corrective actions, PCB investigations, 1,4-dioxane evaluation, cost estimation, preparation of Record of Decision document changes and negotiations with state and federal regulatory agencies.

Project Principal / Project Manager
IBM | Rochester, MN | 1987- Present

Responsible for project coordination and report preparation of RCRA Facility Investigation (RFI), Corrective Measures Study (CMS), PCB remediation, RCRA facility closure, annual reports, voluntary Site Groundwater Monitoring Plan, environmental GIS package. Site groundwater quality involved evaluation of metals (e.g., cadmium, chromium, and nickel), PCBs, and VOCs.

Water Treatment Design

Project Principal / Project Manager

Shawn has been involved in the engineering design of a number of water treatment projects throughout North America over 25 years including:

- Wastewater treatment for ammonia, iron, COD, and solids in central Iowa from boiler blowdown. Included preparation of anti-degradation discharge analysis
- Groundwater extraction and treatment systems for VOCs in Arden Hills, Minnesota, Bruno, Nebraska and Eau Claire, Wisconsin
- Waste water treatment systems for PCP in New Brighton, Minnesota, Sidney, Nebraska and Lumby, British Columbia
- Groundwater treatment using oil/water separation, metals precipitation and UV/H2O2 to treat coal tar contaminants (PAHs) in Minneapolis, Minnesota
- In situ biosparging system to treat PCP in groundwater near Rhinelander, Wisconsin

Other related areas of interest

Recognized (Certifications/Trainings)

- Certified Hazardous Materials Management Training, 2006
- Toxic Release Inventory Reporting Course, 2008
- UST and AST Inspection Course, University of Wisconsin, 1998
- Air Permitting Workshops 1 and 2, MPCA, 1994
- Certified OSHA Hazardous Waste Training and Supervision since 1986

Published Reports

- "Enhanced Recovery of Oily NAPL at a Wood Treating Site Using the CROW Process" (with Fahy, L.J; Johnson, L.A.; Horn, S.G. and Christofferson, J.L.) *Proceedings: HMC/Superfund 1992 Convention.*

Presentations

- “EPA Mandates Leading to Industrial Hygiene Improvements” presentation at American Industrial Hygiene Association, Upper Midwest Section on November 18, 2010. Presented information on EPA Requirements for Area Sources.

Work history

1985 - present	Principal, GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
	Named Principal, 2010 Named Associate, 2003
1984 - 1985	University of North Dakota, Grand Forks, ND
1977 - 1981	United States Air Force

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Amarjog Johal
Electrical Engineer

Qualified: Master of Engineering, Electrical and Computer Engineering, 2010; Bachelor of Technology, Electrical Engineering, 2007; PG Certificate, Wireless Telecommunications, 2009

Connected: Registered Professional Engineer (P.Eng): Professional Engineers Ontario (PEO)

Professional Summary: Amarjog has extensive experience in Electrical LV/MV/HV Design, Protective Relaying and Power System Studies. He possesses distinguished experience in performing Arc Flash studies in compliance with CSA Z462 and NFPA 70E. His work history includes several engineering evaluations, LV/MV/HV system designs, studies and Arc Flash and Electrical Safety instructional trainings for various Industrial and Utility clients throughout Canada and the US.

Arc Flash Study Projects

Electrical Engineer
Arc Flash Study | Brewerton Water Pollution Control Plant (WPCP) | Onondaga County Department of Water Environment Protection | Cicero, NY

The purpose of the project was to perform Short Circuit, Protective Coordination and Arc Flash Study in accordance with NFPA 70E using IEEE 1584 method. The scope of work for this project included the following:

- Developed Single Line Diagram (SLD) for the whole facility using SKM and AutoCAD
- Performed equipment evaluation, short circuit analysis, protective coordination, and arc flash studies for the facility
- Presented detailed study reports and Arc Flash Labels to the customer

Electrical Engineer
Partial Arc Flash Study | Metropolitan Syracuse WWTP and Oak Orchard WWTP | Onondaga County Department of Water Environment Protection | Syracuse and Clay, NY

The purpose of the project was to perform Short Circuit, Protective Coordination and Arc Flash Study for the upgrades done at both the facilities in accordance with NFPA 70E using IEEE 1584 method. The scope of work for this project included the following:

- Developed Partial Single Line Diagram (SLD) for the upgrades in the facilities using SKM and AutoCAD
- Performed equipment evaluation, short circuit analysis, protective coordination, and arc flash studies for the upgrades in the facilities
- Presented detailed study reports and Arc Flash Labels to the customer

Electrical Engineer
Arc Flash Study | Niagara County Sewer District No. 1 WPCC and Remote Pump Stations | Niagara County, NY

The purpose of the project was to perform Short Circuit, Protective Coordination and Arc Flash Study in accordance with NFPA 70E using IEEE 1584 method. The scope of work for this project included the following:

- Developed Single Line Diagram (SLD) for the main facility and all Remote Pump Stations using ETAP and AutoCAD
- Developed Location Plan Drawing for the main facility and all Remote Pump Stations using AutoCAD
- Performed equipment evaluation, short circuit analysis, protective coordination, and arc flash studies for the main facility and all Remote Pump Stations
- Presented detailed study reports to the customer
- Printed and pasted Arc Flash Labels at all the equipment for which study was performed

Electrical Engineer
Operational Arc Flash Studies | Great Lakes Power Transmission | Sault Ste. Marie, ON

The purpose of the project was to provide Arc Flash levels and danger categories for each scenario defined by GLPT in accordance with CSA Z462. The scope of work for this project included the following:

- Perform re-modeling and re-calculation of arc flash hazard levels for a range of switching scenarios defined in coordination with the GLPT study manager using EasyPower software. Respond promptly to GLPT requests for engineering re-modeling and re-calculation of arc flash hazard levels as new data becomes available.
- Maintain continuous liaison with the GLPT study manager and respond to his requests for arc flash analysis and calculations for Clergue T.S. and Watson T.S. promptly.

- Provide a series of PDF files and a table showing the arc flash levels for each scenario at each of the two substations.

Electrical Engineer
Arc Flash Study | Lovell Federal Health Care Center (VA-Hospital) | North Chicago, IL

The purpose of the project was to perform Short Circuit, Protective Coordination and Arc Flash Study in accordance with NFPA 70E using IEEE 1584 method. The scope of work for this project included the following:

- Developed Single Line Diagram (SLD) for the whole facility using SKM and AutoCAD
- Performed equipment evaluation, short circuit analysis, selective coordination, and arc flash studies for the facilities
- Presented detailed study reports to the customer pointing out the possible upgrades
- Delivered Arc Flash Training to the VA employees

Electrical Engineer
Arc Flash Study | Toyota Motor Technical Centers | Various Locations

The purpose of the project was to perform Short Circuit, Protective Coordination and Arc Flash Study in accordance with NFPA 70E using IEEE 1584 method. The scope of work for this project included the following:

- Developed Single Line Diagram (SLD) for the whole facility using EasyPower and AutoCAD
- Performed equipment evaluation, short circuit analysis, protection coordination, and arc flash studies for the facilities
- Presented detailed study reports to the customer pointing out the possible upgrades

Electrical Engineering Design Projects

Protection and Control Engineer
Relay Settings Development | Great Lakes Power Transmission | Sault Ste. Marie, ON

The purpose of the project was to develop relay settings for the 115kV Third Line Substation. The scope of work for this project included the following:

- Produced Logic Diagrams
- Collected complete information by site visits on the Line and Bus Relays installed and the equipment protected by them including the relays at remote stations
- Produced Relay Setting Files and Datasheets

Electrical Design Engineer/Project Manager
44kV Substation Design | Recurrent Energy | Waubaushene, ON

The purpose of the project was to develop relay settings for the 115kV Third Line Substation. The scope of work for this project included the following:

- Engineering calculations for AC station load sizing, battery sizing, power cable sizing, and instrument transformer sizing
- Prepared the Protection Relay Philosophy document
- Prepared the relay coordination study and settings for the substation protection relay systems, including coordination with HONI as required for the line protection
- Arc flash study for the station services AC systems
- Prepared the substation electrical drawings
- Commissioning Support including testing of relays and SCADA points verification for all three sites

Electrical Design Engineer / Project Manager
Generator 3 Upgrade | Ontario Power Generation | Niagara Falls, ON

The purpose of the project was to upgrade the 63 MVA Hydro Generator installed at Sir Adam Beck Generating Station #. The scope of work for this project included the following:

- Developed Single Line Diagrams (SLD), Elementary Wiring Diagrams (EWD), Connection Wiring Diagrams (CWD), Equipment Arrangement Diagrams (EA), and Bill of Materials
- Designed Protection Panels layout drawings and cable layout drawings
- Developed integration and installation specifications for the new Static Exciter
- Developed Scheme for integration of the new protection system with the existing Ontario Power Generation (OPG) and Hydro One (HONI) system
- Prepared technical specifications and mark-up drawings for the removal of old and obsolete equipment
- Designed new AC and DC station service feed from the main load center
- Prepared complete installation and demolition drawings package for OPG
- Executed complete 13.8 kV non-conventional (non-tubular) Bus design in accordance with IEEE605 including short circuit force calculations
- Developed installation specifications and Bill of Materials for the 13.8 kV Bus

Amarjog Johal

Other related areas of interest

Recognized (Certifications/Trainings)

- SEL Product Training
- Rugged Switch Basic Training

Software

- GE Enervista
- SEL Acselerator
- EASYPOWER
- SKM
- ETAP
- MATLAB SIMULINK COMSOL

Work history

July 2017 – present	GHD, Buffalo, NY
2015 – 2016	Schneider Electric, Troy, MI
2014 – 2015	Eat[on Corporation, Glendale Heights, IL
2011 – 2014	One-Line Engineering Inc., St. Catharines, ON

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Jacob Jones

Industrial Hygienist/Project Manager)

Qualified: M.S. Occupational and Environmental Health, 2012, Certified Industrial Hygienist, 2013

Connected: Arkansas Chapter President: American Industrial Hygiene Association, 2017

Professional Summary: Industrial hygiene project manager with more than seven years of experience. Key strengths include attention to detail, focus on safety/accuracy, and ability to work as a team member and independently to successfully complete projects that meet and exceed customer expectations. Mr. Jones is an experienced evaluator of physical, chemical, biological and ergonomic stressors in the workplace.

Emergency Spill Response

Lead Industrial Hygienist
Plaster Rock Derailment | CN Railway | Plaster Rock/NB

Performed real-time air monitoring and industrial hygiene sampling to ensure compliance with provincial standards and regulations. Resulting data helped to evaluate the validity of legal claims.

Lead Industrial Hygienist
Wood River Pipeline Release | Wood River Pipelines LLC | Kankakee, IL

- Performed exposure assessments on workers
- Interfaced with regulatory authorities
- Directed field team air monitoring efforts

Lead Industrial Hygienist
Mooringsport Crude Oil Release | Sunoco | Mooringsport, LA

- Performed worker monitoring and sampling for VOCs associated with crude oil
- Trained field personnel on monitoring and sampling practices
- Reduced client liability by ensuring compliance with occupational regulations and verifying adequacy of respiratory protection.

Lead Industrial Hygienist
Minter City Derailment | CN Railway | Minter City, MS

- Directed real-time monitoring and sampling efforts for chemicals of interest
- Advised client on establishing exclusion zones where respiratory protection was required

Project Manager
Fenceline Air Monitoring | BHP Billiton | Cuero, TX

- Directed real-time monitoring and sampling efforts for chemicals of interest
- Developed a monitoring and sampling plan to comply with regulatory standards
- Notified the client if/when action level exceedances occurred
- Modeled wind conditions to demonstrate the dispersion patterns of chemical concentrations
- Utilized cost effective monitoring methods resulting in reduced analytical cost to client

Industrial Hygienist
Sejita Pipeline Release | Kinder Morgan | Kingsville, TX

- Performed real-time monitoring and industrial hygiene sampling on remediation workers
- Made on-site safety and PPE recommendations to prevent exposures to petroleum VOCs
- Summarized data and generated exposure letters for employees

Project Manager
Maryville Railcar Fire | CSX Transportation | Maryville, TN

- Performed real-time monitoring and industrial hygiene sampling on remediation workers
- Summarized data and generated exposure letters for employees
- Directed field staff to ensure data quality was maintained
- Composed final report summarizing activities

Industrial Hygiene

Industrial Hygienist
Baker Hughes IH Monitoring | Baker Hughes | Hampton, AR

- Performed industrial hygiene exposure assessments for hexavalent chromium
- Identified work activities with the greatest exposure potential
- Made engineering control recommendations which reduced exposures and improved the health and safety of the workplace

Lead Industrial Hygienist
Cable Plant IH Survey | Baker Hughes | Claremore, OK

- Performed industrial hygiene exposure assessments for chemicals of interest
- Identified work activities with the greatest exposure potential
- Recommended chemical substitution and engineering controls to reduce employee exposures

Lead Industrial Hygienist
Refinery Waste Impoundment Remediation | Chevron | Muskogee, OK

- Developed and implemented an extensive air monitoring plan for a remediation involving SO2 emissions
- Performed sampling and real-time monitoring to assess potential exposures
- Provided PPE recommendations to ensure safety of workers and minimize cost to client

Project Manager
Industrial Hygiene Evaluation | Garreco Dental | Heber Springs, AR

- Performed industrial hygiene exposure assessments for silica containing products
- Performed real-time dust monitoring to delineate work areas requiring respiratory protection
- Composed report providing recommendations for engineering controls, administrative controls, and PPE

Air Dispersion Modeling

Dispersion Modeler
Facility Siting Analysis | Shintech | Addis, LA

- Performed atmospheric dispersion modeling to evaluate the potential emissions from hypothetical vinyl chloride release scenarios
- Modeled vapor cloud explosion scenarios within the facility in order to determine the potential overpressure risks to on-site control rooms and equipment
- Composed summary report providing recommendations for blast walls and siting recommendations based on the results of the modeling

Dispersion Modeler
Plaster Rock Derailment | CN Railway | Plaster Rock, NB

- Performed atmospheric dispersion modeling to evaluate the potential emissions from a railcar vent and burn activity
- Modeling data utilized real-time monitoring and weather to show the direction of the fire plume during the fire
- The modeling write-up was utilized in the consideration of potential community damage claims

Dispersion Modeler
Geothermal Switch Modeling | Norfolk Southern | Kansas City, MO

- Performed atmospheric dispersion modeling to evaluate the potential air impacts associated with a catastrophic ammonia release from a geothermal switch heater
- Summarized and reported monitoring results so that the risks could be understood

Work history

June 2013 – Present	Industrial Hygienist, GHD (formerly Conestoga Rovers & Associates), Little Rock, AR
2009 – 2013	Industrial Hygiene Associate, Marshall Environmental Management Inc., Oklahoma City, OK

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Andrew Krajna
Civil Drafter/Designer

Qualified (Education): A.A.S., Computer Aided Drafting and Design, ITT Technical Institute, 2007

Professional Summary: Andy has over 9 years of AutoCAD and Civil 3D experience, mostly focusing on pipeline design and development for municipal and industrial clients. He has design and drafting experience with pressure pipe systems and gravity pipe systems for a variety of products, including potable water, sewage, petroleum products, crude, chlorine, and ethane. Many of these projects have also included experience with the use of trenchless technologies (i.e., HDD, augured, pipe bursting, slip lined, etc.). He also has varied levels of experience with building site plans and grading plans, landfill design/closure, cut/fill calculations, and storage volumes.

Industrial Pipeline

Civil Draftsman
16-Inch Batch Product Project | Confidential Client | Southeastern, MI

Lead Civil draftsman responsible for the development of project base maps, as well as detailed design drawings for the installation of 178,800 linear feet of 16-inch steel piping with 157,150 feet installed via open-cut and 21,650 feet installed via trenchless technology (8 HDDs in total with the longest having a length of 4,000 feet and 81 direct bores), including two interconnections. This project was required to meet DOT requirements.

Civil Draftsman
Little Calumet River Crossing | Confidential Client | Gary, IN

Civil Draftsman responsible for the development of project base maps and detailed drawings of a horizontal directional drill river crossing to replace approximately 1,000 linear feet of a high pressure (~1,440 psi) 16-inch steel loop line.

Civil Draftsman
Ethane Pipeline Connection | Confidential Client | Port Arthur, TX

Civil Draftsman responsible for development of project base maps, as well as detailed drawings for the installation of approximately 22,700 linear feet of 6-inch steel pipeline, including multiple major roadway and waterway crossings, which required horizontal direction drilling of the proposed pipeline.

Civil Draftsman
Ammonia Line Re-Route Project | Confidential Client | Orange, TX

Civil Draftsman responsible for development of route analysis drawings for the installation of a new 4-inch steel pipeline, including multiple major roadway and waterway crossings, which will require horizontal direction drilling of the proposed pipeline. Full design will be done upon completion of the route analysis.

Municipal Water and Wastewater Systems

Civil Draftsman
2009 Infrastructure Improvements | City of Batavia | Batavia, NY

Civil Draftsman responsible for design and drafting of construction package for the installation of new water lines, as well as rehabilitating existing sanitary sewer lines and replacing some that were beyond repair. Andy designed a new roadway to meet NYSDOT requirements and client's request, while matching the existing roadway conditions as close as possible.

Civil Draftsman
Water Pollution Control Center Upgrades | Town of Lewiston | Lewiston, NY

Andy was responsible for design and drafting of the construction package for general plant improvements including new site entrance gate and asphalt. Also responsible for drawings of the sludge processing improvements, which included two new sludge drying buildings along with the necessary piping and grading.

Civil Draftsman
Crescent Avenue Pump Station | Erie County Department of Environment and Planning | Hamburg, NY

Civil Draftsman responsible for design and drafting of construction package for the installation of forcemain sewer piping; duplex submersible pumping station; demolition and abandonment of an existing pump station and creek crossing; and design and installation of a grinder pump and associated forcemain.

Civil Draftsman
Parsons Creek Development, Phase 1 Water | Regional Municipality of Wood Buffalo | Fort McMurray, AB

Civil Draftsman responsible for development of project base maps, as well as construction package for design of 1,000 linear meters (approximately 3,300 linear feet) of 900 mm (36-inch) and 3,100 linear meters (approximately 10,200 linear feet) of 750 mm (30-inch)

Andrew Krajna
Civil Drafter/Designer

transmission main to meet Alberta and Wood Buffalo Standards.

Civil Draftsman
Parson Creek Development, Phase 2 Water | Regional Municipality of Wood Buffalo | Fort McMurray, AB

Civil Draftsman responsible for development of project base maps, as well as construction package for design of 3,100 linear meters (approximately 10,200 linear feet) of 750 mm (30-inch) transmission main to meet Alberta and Wood Buffalo Standards.

Civil Draftsman
Water District No. 5 Water System Improvements | Town of Eden | Eden, NY

Andy was responsible for design and drafting of construction package for the installation of new water lines in the Town of Eden.

Civil Draftsman
Parsons Creek Development, Sanitary Sewer Outfall | Regional Municipality of Wood Buffalo | Fort McMurray, AB

Civil Draftsman responsible for development of project base maps, as well as detailed drawings for design of 2,450 linear meters (8,050 feet ±) three-barrel siphon (sanitary sewer outfall), two 300 mm (8-inch) and one 450 mm (18-inch) within a 1,310 mm (48-inch) casing pipe to meet Alberta and Wood Buffalo Standards. This project also included the crossing of two major roadways, which required the proposed pipeline to be horizontally directional drilled. Also responsible for development of drawings showing bore path for each, which spanned over 250 m (approximately 825 linear feet) with a vertical elevation change over 4 m (approximately 15 feet).

Civil Draftsman
Capital Plan Phase 2 | Niagara County Sewer District No. 1 | Niagara County, NY

Civil Draftsman responsible for development of project base maps, as well as detailed drawings for design of approximately 5,000 linear feet of 18-inch PVC forcemain sewer piping, pump station upgrades including full pump re-build, isolation air/vacuum valve chambers, three creek crossings, two auger road crossing, and interconnections all while maintaining sewage flow. This project was done to replace a deteriorating and remotely located ACP forcemain with a history of breaks.

Civil Draftsmen
Sewer Separation/Overflow Project | Confidential Client | Cincinnati, OH

Civil Draftsmen responsible for completion of construction drawings for the separation of all sanitary, process, and storm sewer systems on site and the addition of a process lift station and equalization tank. Andy worked directly with the engineers to design and draft the separation of all previously combined sewer systems into individual networks. He was responsible for coordinating with other disciplines to put a complete package together and send all drawings to the client. Provided continued support on this project with field revisions as well as working with the site surveyor to give coordinates for specific locations as needed. As-built documents will be received and completed as necessary.

Civil Draftsman
2013 Infrastructure Improvements | City of Batavia | Batavia, NY

Civil Draftsman responsible for the development of project base maps, as well as detailed drawings for the installation of approximately 1,500 linear feet of PVC gravity sewer piping, manholes, and interconnections on various streets throughout the City of Batavia. This project was undertaken to increase capacity and replace damaged pipelines.

Civil Draftsman
Water System Improvements | Village of Alden | Alden, NY

Andy was responsible for the development of project base maps, as well as detailed drawings for the installation of 1,270 linear feet of 8-inch distribution main.

Civil Draftsman
Water System Improvements | Village of North Collins | North Collins, NY

Civil Draftsman responsible for the development of project base maps, as well as detailed drawings for the installation of a water treatment building, new pump station, and 18,700 linear feet of 8-inch and 10-inch transmission and distribution mains.

Civil Draftsman
Water District No. 5 Water System Improvements | Town of Aurora | Aurora, NY

Andy was responsible for the development of project base maps, as well as design and drafting of detailed drawings for the replacement of 3,750 linear feet of 8-inch distribution mains.

Civil Draftsman
Water System Improvements | Town of Eden | Eden, NY

Andy was responsible for design and drafting of the construction package for the replacement of 4,350 linear feet of 8-inch distribution main with flow control vaults.

Andrew Krajna
Civil Drafter/Designer

Civil Draftsman
Storm Sewer Improvements |
Village of Lewiston | Lewiston, NY

Andy was responsible for design and drafting of the construction package for the installation of 1,000 linear feet of 12-inch storm sewer.

Civil Draftsman
2014 Infrastructure Improvements |
City of Batavia | Batavia, NY

Andy was responsible for the development of project base maps, as well as detailed drawings for the installation of approximately 2,000 linear feet of PVC gravity sewer piping, manholes, and lateral connections. Fire hydrants and gate vales were also replaced on the exiting water mains. This project was undertaken to replace aging/damaged pipelines.

Civil Draftsman
Wastewater Treatment Plant Upgrades |
Caterpillar | Joliet, IL

Civil Draftsman responsible for the development of project base maps and detailed drawings for all underground piping included in the installation of a Dissolved Air Flotation (DAF) primary treatment system, stormwater diversions, and other necessary piping.

Environmental Design and Remediation

Draftsman
Site Characterization at USEPA Superfund Site | Confidential Client | Tacoma, WA

Andy was responsible for completion of more than 250 figures for an intensive Site Characterization Report. Andy managed a team of draftsmen in order to complete the task in a timely manner for the client. Andy was also involved in the development of multiple new visual presentations of groundwater and soil data for this report.

Civil Draftsman
Landfill Gas Collection and Control System |
Confidential Client | ON

Civil Draftsmen responsible for design and drafting of construction drawings for the modification and expansion of a landfill gas collection and control system at a landfill in Petrolia, Ontario. The design included preparation of plans and profiles of primary header alignment with condensate sumps spaced to accommodate condensate management. The layout of the piping was prepared to meet minimum slope standards along the alignment, while minimizing the depth of installation at each sump.

Civil Draftsman
SVE System at SMC Superfund Site |
Confidential Client | NE

Andy was responsible for design and drafting of construction drawings for the installation of a Soil Vapor Extraction System and a Groundwater Extraction forcemain from a newly installed well.

Civil Draftsman
Leachate Treatment System |
Confidential Client | Fairborn, OH

Civil Draftsman responsible for the development of project base maps, as well as detailed drawings for the installation of approximately 1,100 linear feet of 3-inch HDPE forcemain to connect leachate system to existing sewer system.

Work history

2007 – present	GHD (formerly CRA Infrastructure & Engineering, Inc.), Buffalo, NY

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Brian Kramer

Environmental Engineer

Qualified: BS Bioengineering, Syracuse University, 1988; MS Environmental Engineering Science, State University of New York at Buffalo, Buffalo, New York, 1991

Professional Summary: Brian has extensive experience in all areas of environmental investigation and remediation. His over-arching knowledge of the natural sciences and engineering has allowed him to develop theoretical and practical expertise in remedial technologies and is invaluable in his role as supervisor of implementation for GHD's Innovative Technology Group. His strong project management and design capabilities are critical in providing clients with novel yet cost-effective approaches to overcome technical challenges and meet the goals of minimizing cleanup time as well as overall project costs. His ability to evaluate and usher a project from the investigation phase, through the conceptual, pilot, and full-scale remedial design and operational phases provides continuity in management throughout the lifespan of the project. Brian's experience with in situ and emerging technologies includes, but is not limited to, air sparging, biosparging, soil vapor extraction (SVE), ozone treatment, chemical oxidation, stabilization, permeable reactive barriers, and biological treatment, as well as numerous unit processes for groundwater pump and treat and effluent water and vapor treatment technologies.

Site Remediation Projects

Design/Build
Confidential Client | Chicago, Illinois

Designed and managed the construction, installation, and start-up of SVE system and air sparge system trailers for treatment of contaminated soil and groundwater at a former manufacturing facility. Also designed the in situ chemical oxidation (ISCO) program consisting of application of 400,000 gallons of sodium persulfate solution activated with sodium hydroxide, and the enhanced anaerobic treatment program involving application of emulsified vegetable oil and nutrients into off-site wells to enhance the biodegradation of the downgradient chlorinated solvent plume. Groundwater objectives substantially achieved in 2014.

Design/Build
Confidential Client | Nebraska

Performed design and work plan preparation for installation of a horizontal well SVE system beneath an operating medical product manufacturing facility building. Built the containerized SVE system, which was shipped to the site, and successfully installed and operated. Over 700 pounds of volatile organic compounds removed during first month of operation.

Design/Build
Former HWD Site | Farmingdale, New York

Designed and directed construction of mobile SVE system, performed on-site construction oversight, trailer installation, and start-up of 13 well SVE systems at a former waste consolidation facility. Also, conducted ISCO applications to 40 groundwater injection wells. Project remedial objectives attained in 2012 after 2 years of treatment system operation.

Sub-Slab Depressurization System Design | West Coast Site

Conceptual design and coordination for sub-slab depressurization systems to mitigate potential soil vapor intrusion in eight industrial buildings located on property adjacent to client's site. Work involved incorporation of owner's design requirements, coordination with facility tenants, and meeting regulatory requirements.

Technical Advisor

Laboratory Bench Testing | Multiple Projects

Work with Innovative Technology Laboratory to prepare work plans and laboratory testing protocols to evaluate a wide range of remedial technologies for potential implementation at respective sites.

Pilot Scale Testing | Multiple Projects

Performed multiple pilot testing programs for various technologies from design through construction, operation, and full-scale application. Specialized areas include SVE, air sparging, ISCO, and bioremediation.

Innovative Technology Implementation

Provided advisement and project supervision for the application and implementation of innovative technologies throughout GHD. Support ranges from work plan preparation to design, construction, field operations, and training of site personnel.

Work history

1992 – present	GHD (formerly Conestoga-Rovers & Associates), Niagara Falls, NY
1991 – 1992	State University of New York at Buffalo, Buffalo, NY

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Bill Kruszona

Lead Mechanical Engineer

Qualified: B.S., Mechanical Engineering, Rochester Institute of Technology, 1977; MBA, State University of New York at Buffalo, 1981

Connected: Registered Professional Engineer: NY, AZ, CA, IL, ME; Member – American Society of Mechanical Engineers (ASME)

Professional Summary: Bill is a Lead Mechanical Engineer and the supervisor of an engineering design group consisting of chemical and mechanical process engineers. He has over 30 years of mechanical design and project management experience, including 18 years of direct employment in the oil, gas, and chemical industries. He has been the lead mechanical engineer for numerous industrial, environmental, and municipal projects. Bill's expertise includes material specifications, mechanical integrity, energy utilization/conservation, and industrial ventilation. He has also provided expert testimony in litigation cases involving mechanical integrity of process equipment, code compliance, and generally accepted good engineering practices.

Industrial

Lead Mechanical Engineer
PVC Resin Plant | Map Ta Phut, Thailand

Lead responsibility for the mechanical design criteria and specifications of a 25,000 metric ton per year PVC Paste Resin manufacturing plant. The scope included high pressure PVC reactor vessels, storage tanks, process piping, plant utilities, selection of materials of construction, and process ventilation systems.

Lead Mechanical Engineer
Chlorine/Caustic Plant Expansion | Bangkok, Thailand

Lead responsibility for the detailed mechanical design of a 70 metric ton per day chlorine/caustic plant expansion using membrane cell technology. Systems included chlorine liquefaction equipment, caustic evaporators, heat exchangers and plant utilities.

Project Manager
WESP Installation | Niagara Falls, New York

Project manager and lead mechanical engineer for the procurement, design, and installation of a Wet Electrostatic Precipitator. The WESP treats discharge gases from a liquid hazardous waste incinerator at a phenolic resins manufacturing plant.

Lead Mechanical Engineer
Propane/Butane Terminal Upgrade | Phoenix, Arizona

The project increased the loading/unloading rates of liquid propane and butane at a rail terminal with cavern storage. The upgrade was achieved with the installation of new transmission pipelines, larger injection pumps, larger off-loading compressors, additional dehydrators and rail racks, and a valve automation system.

Lead Mechanical Engineer
HCL Synthesis Plant | Niagara Falls, New York

This fast-track project involved the design and construction services for a new hydrochloric acid (HCL) synthesis plant. The design included the integration of a proprietary synthesis unit, and ancillary process equipment, into an existing chlor-alkali facility.

Lead Mechanical Engineer
Salt Cavern Leach Plant | Romulus, Michigan

Provided detailed design for the installation of a leach plant and disposal system for the development of salt caverns intended for liquid phase butane storage. Design work included conversion of finished caverns for product loading/unloading.

Lead Mechanical Engineer
Landfill Gas to Energy Plants | Various Locations

Design of electrical generation plants, utilizing landfill gas as fuel, and ranging in size from 5 to 7 megawatts capacity. Systems included landfill gas extraction, conditioning, and compression for use in banks of engine-generator sets.

Mechanical Engineer
Seismic Design Upgrade | Vancouver, British Columbia

Performed technical analyses and managed modifications to piping and process equipment for earthquake resistance of a chlorine/caustic manufacturing plant.

Mechanical Engineer
Cyanuric Acid Calciner | Luling, Louisiana

The project involved the fabrication and installation of a 70 MM lb/year cyanuric acid rotary calciner.

Bill Kruszona

Municipal

Lead Mechanical Engineer
240 MGD Water Treatment Plant | Phoenix, Arizona

Responsibilities included the specification of mechanical process equipment, piping, and chemical storage and handling systems. This facility (Union Hills WTP) was the first treatment plant to utilize water supplied from the Central Arizona Project (CAP) canal.

Mechanical Engineer/Resident Inspector
Wastewater Treatment Plant Expansion | Phoenix, Arizona

Responsibilities included on-site resident inspector services during the construction of a major expansion at the 91st Avenue WWTP. The mechanical systems included aeration blowers, fine bubble diffusers, new anaerobic digesters, sludge pumps, and digester heating equipment.

Environmental

Construction Projects Engineer
Cement Solidification System | West Valley, New York

This 2-year construction project involved the installation of a cement solidification system. The completed system stabilized low level nuclear waste at a Department of Energy facility.

Project Manager
Thermal Oxidizer | Niagara Falls, New York

This project included the design and installation of a 1200 GPM air stripper for vinyl chlorine removal in addition to a 6000 CFM regenerative thermal oxidizer. The installation was integrated into an existing groundwater treatment facility.

Project Manager
Solids Filtration System | Tacoma, Washington

A 4 ton/day solids filtration system was installed at a groundwater treatment site. The primary benefit was cost reduction resulting from less frequent change out of liquid phase activated carbon in existing polishing vessels.

Expert Testimony

Expert Witness
Defense Against Claims | Savannah, Georgia

This litigation involved claims of defective assets against the seller of a chemical manufacturing facility. The role as expert witness was to defend the seller against 33 individual claims involving the mechanical integrity of plant equipment and other assets. The testimony focused on compliance with industrial codes, process safety management, and generally accepted good engineering practices. The vast majority of claims were rejected by the London Court of International Arbitration (LCIA).

Expert Witness
Claims Against General Contractor | Naperville, Illinois

This litigation involved faulty engineering and construction work performed at a college dormitory complex. Testimony was provided in support of the claims by the college and focused on proper design practices, project management, and construction quality control. The claims were settled for recovered losses to the satisfaction of the college.

Other related areas of interest

Recognized (Certifications/Trainings)

- Advanced Course in Industrial Ventilation – North Carolina State University

Industry Associations

- Participating member of the Chemical Manufacturer's Association (CMA) Committee for Pressure Equipment from 1991 through 1995

Work history

1998 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY
1996 – 1998	Glenn Springs Holdings, Inc. (Subsidiary of Occidental Petroleum Corp.), Niagara Falls, NY
1990 – 1996	Occidental Chemical Corp, Niagara Falls, NY.
1989- 1990	Carborundum Corp. (Subsidiary of BP America), Niagara Falls, NY
1986- 1989	Wendel Engineers, P.C., Amherst, NY
1984- 1986	Westinghouse Electric Corp., West Valley, NY
1982- 1984	Carollo Engineers, Phoenix, AZ
1976- 1982	Occidental Chemical Corp., Niagara Falls, NY

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Kim Kwok
Environmental Scientist

Qualified: B.S., Biology, 2006

Professional Summary: Kim has 10 years of experience in Hazardous Waste Disposal, State and Federal Regulation, and Material Packaging/Handling. Other experience includes customer service, waste classification, and document preparation. Kim has experience in DEA controlled substance regulations, and is certified to sign off on DEA paperwork. Kim spends the majority of her time coordinating waste disposal services for a major railroad client with locations throughout the Midwest and West coast.

Waste Coordinator
Major Oil and Gas Company |
Various Locations, United States

Currently coordinates waste pickups for bulk and drum material; reviews lab data; and verifies hazard class, disposal, and labeling. Helps maintain compliance; ensures regulatory requirements are maintained; creates waste profiles with vendors; sets up purchase orders with vendors; and reviews vendor invoices. During 2014, the team managed over 1400 disposal events at 330 client site locations.

Waste Coordinator
Disposal and Recycling Data Management |
Plastic Packaging Manufacturing |
Various Locations, United States

Assists with product management support services for a plastics container manufacturer with multiple production and warehouse locations in the U.S. The program includes review and approval of disposal invoicing, tracking of landfill and recycling volumes, calculation of landfill diversion rates, and development of zero landfill initiatives. The client has achieved zero landfill status at four production facilities and corporate office location since program inception.

Corporate Account Coordinator
Large Freight Company, Metals Manufacturer, Food Processing Plant, Testing Laboratories, and Bathroom Outfitters/Paint Manufacturer |
Various Locations, United States

Coordinated waste disposal for large corporate accounts. Tasks included:

- Waste classification/characterization
- Waste profiling
- Completion of hazardous waste manifests
- Coordination of pickups
- Reporting
- Ordering of drum/clean up supplies
- Provided compliance information and customer service
- Verified correct packing of all waste, lab pack via paper pack, as needed for proper handling
- Trained corporate clients on waste programs
- Coordinated waste minimization efforts

Waste Coordinator
Railroad Company |
Various Locations, United States

Currently coordinates waste pickups for bulk and drum material; creates sampling plans and reviews lab data; verifies hazard class, disposal, manifesting and labeling. Helps maintain compliance; ensures regulatory requirements are maintained; creates waste profiles with vendors; sets up purchase orders with vendors; reviews vendor and client invoices. Updates and tracks all progress through WasteManager.

Other related areas of interest

Recognized (Certifications/Trainings)

- DOT Hazardous Materials Transportation Course, 2015
- California State Regulations (Lion Course), 2015
- DEA Certified, 2014
- Heritage Lab Pack Certified, 2014
- McCoy RCRA 5-Day Seminar, 2016
- eRail Safety Certification, 2016

Specialized Regulations

- UST Exemptions (LUST Sites)
- RCRA Regulations
- Generator Status Exemptions
- Limited Quantity Rule
- Universal Waste Rule: as it applies to each state

Work history

October 2014 – present	GHD (formerly Conestoga-Rovers & Associates), Indianapolis, IN
2007 – 2014	Heritage Environmental Services, Indianapolis, IN

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Matt Lang
Mechanical Engineer

Qualified: B.S., Mechanical & Aerospace Engineering, 2012

Connected: Intern Engineer: NY; Member – American Society of Mechanical Engineers (ASME)

Professional Summary: Matt has been working 5 years as a design engineer with a focus on industrial process and HVAC design. Matt utilizes programs such as Caesar II (pipe stress and code compliance calculations) and Hourly Analysis Program (building heat loss and dehumidification analysis) to provide industries with engineering solutions to existing issues and new projects.

Mechanical Design Engineer
Dehumidification Study | Westinghouse | Madison, PA

HVAC study of an industrial warehouse to determine the cause and solution to high relative humidity within the facility. Study included a computer simulation using the Hourly Analysis Program (HAP) to calculate humidity, power consumption and annual utility costs.

Mechanical Design Engineer
Buffer Dust Collection | Dunlop | Kingman, AZ

Evaluation of the dust collection system for a tire buffer not collecting an adequate amount of tire particles. The study included performing pressure drop and conveying velocity calculations for the current system. Performance curves were created to compare the current collection efficiency with that of improved simulations. Pressure drop and sizing calculations were made for the installation of a cyclone separator.

Mechanical Design Engineer
Label Room Ventilation | Ashton Potter | Williamsville, NY

Design of a supplemental ventilation system to reduce the concentration of flammable vapors near electrical hazards. This included performing pressure drop calculations, sizing industrial blowers, and designing a bench style collection hood.

Mechanical Design Engineer
HCL Burner | Occidental Chemical | Niagara Falls, NY

Design of a safety shower system for a ten-story process tower. The design included making head loss calculations and specifying components such as piping, storage tank, immersion heater, and shower units.

Mechanical Design Engineer
Hazard Application | Thatcher Company | Henderson, NV

Developed detailed piping drawings and specifications for a chlorine environmental hazard application. Performed relief valve and expansion chamber sizing calculations for emergency release scenarios.

Mechanical Design Engineer
Hot Oil Pipe Stress Analysis | ONEOK | Medford, OK

Performed a stress analysis using the Caesar II modelling program on a 3-mile hot oil pipe network. The calculated stresses were compared with allowable limits set by the ASME B31.3 Process Piping Code. Recommendations were offered to the client regarding pipe routing and support locations to minimize stress in the pipe.

Work history

2012 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY
2011 – 2012	Avox Systems Inc., Lancaster, NY

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Michael Laschinger

Project Manager/Engineer

Qualified: MBA, 1990; BSc Chemical Engineering, 1985

Connected: Registered Professional Engineer: New York, Kentucky, Massachusetts, Ohio, Montana; Member, American Institution of Chemical Engineers

Professional Summary: Mike has 31 years' experience in engineering design, construction, and project management. During the past 7 years, Mike has been involved in the Oil and Gas sector and completed several pipeline and fuel terminal maintenance and upgrade projects. The projects involve pipeline system design, pipeline station power and controls upgrades, station metering and piping improvements, fuel terminal tank realignment, tank farm piping modifications, loading rack improvements, biodiesel systems and stormwater treatment. Previous experience includes industrial and groundwater treatment systems for the removal of metals and organic compounds. These projects Involved developing process drawings (PIDs), sizing and specifying tanks, pumps, piping systems, mixing, chemical addition and pH adjustment equipment, instrumentation (flow, pressure, level) selection, control system PLC, and operator interface programming, system startup, equipment troubleshooting, and operator training.

Project Manager/Design Engineer
Pipeline Station Metering Upgrade | Carbon County, MT | 2015 - 2017

The detailed design and equipment selection for a metering system and prover to improve metering accuracy at a crude oil pipeline station. The detailed design includes layouts, piping design instrumentation selection electrical power and instrumentation wiring design and improvements to the station control system. Mike had overall responsibility for the detailed design and ensured the project proceeded within the schedule and budget commitment.

Project Engineer
Pipeline System Design | Detroit, MI | 2015 - 2017

Engineering support for the design and construction of a new 32-mile section of 16” of refined product pipeline. Mike’s tasks included design development and support for new automated block valve stations, preview densitometer, surge assessment and mitigation, CP, hydrotesting, coatings, products pipeline controls and automation and other design tasks.

Project Manager/Design Engineer
Pipeline System Station Refurbishment | Woodhaven, MI | 2015 - 2017

Detailed design for station power and controls upgrade in addition to mechanical assessment and improvements to a pipeline station in support of reactivating a section of idled refined product pipeline. Mechanical tasks included existing equipment assessment, stations. Detailed station transmix piping improvements, surge evaluation and mitigation. Electrical design main tasks included installing a new electrical building, replacement of site power distribution and motor control equipment, updating site controls with a new Programmable Logic Controller (PLC) system and replacement of power distribution and control wiring. Mike had overall responsibility for the station upgrade detailed design and provided engineering design support for the pipeline and block valve stations. The overall project was highly successful and met the client’s schedule and budget expectations.

Project Manager/Design Engineer
New Pipeline Metering Station Preliminary Design | Billings, MT | 2014 - 2015

Design tasks included determining equipment requirements and arrangement and completing cost estimates for a new crude oil pipeline metering station. The space requirements and total installed cost for various options were used for client project planning. Mike was the project manager and lead engineer for determining the required piping and metering equipment and electrical and controls equipment for the new station.

Project Manager/Design
Pharmaceutical Packaging Upgrade | Grand Island, NY | 2016 - 2017

The controls upgrade to provide automated operation for a lyophilizer (freeze dryer) door operation used in conjunction with other automated pharmaceutical packaging equipment. The automation included motion control, light curtain and other safety systems to integrate the freeze dryer into the overall packaging line. Mike had overall responsibility for the project and ensured the project proceeded within the schedule and budget commitment.

Project Manager
Fuel Terminal Pipe Relocation | Spokane, WA | 2016 - 2017

Detailed design for the relocation of underground delivery piping to above ground. The project required design of over 3,000 feet of 8-inch piping and the associated pipe supports to meet DOT requirements. The pipe routing was complex and needed to minimize interference with existing underground utilities and have minimal impact on station operation and access to equipment. Mike was

responsible for the detailed design, overall project schedule and budget and was the main client contact.

Project Engineer
Pipeline Connection Evaluation | Billings MT | 2015

Preliminary design and total installed cost estimate for the connection of two crude oil pipelines for risk reduction during a storm event. Mike completed the process development and estimate of piping and electrical materials to allow completion of an estimate of project cost. The project deliverables allowed the client to compare the pipeline connection with alternate options.

Mike was responsible for the preliminary design development, overall project schedule and budget and was the main client contact.

Project Manager
Pipeline Station Automation Upgrade | Lockport, IL | 2013 - 2015

The detailed design project scope main tasks included installing a new electrical building, replacement of site medium voltage power distribution and motor control equipment, updating site controls with a new Programmable Logic Controller (PLC) system and replacement of power distribution and control wiring. Mike had overall responsibility for the detailed design and ensured the project proceeded within the schedule and budget commitment.

Project Manager/Design Engineer
Fuel Terminal Delivery Valve Automation | Helena, MT | 2014

Detailed electrical design to add valve actuators and associated controls on to existing pipeline manifold valves to improve safety and automation of product deliveries to a fuel terminal.

- Coordinated the design team efforts for an efficient field level multidiscipline project
- Design to meet the requirements of both the fuel terminal and pipeline station

Project Manager
Biodiesel Storage and Blending | Aston, PA | 2014

Mike coordinated the efforts of the electrical, instrumentation, mechanical and civil/structural groups for the detailed design. Mike was in regular contact with the client to report on design progress. With experience in the areas of process/mechanical design and electrical/instrumentation areas Mike was able to discuss and address issues and questions covering a range of disciplines.

Project Manager
Fuel Terminal Tank Gauging | Spokane, WA | 2013

Detailed design of a Radar Gauging System for nine fuel storage tanks for overfill protection. The design required close attention to existing conditions and reused existing and routed new conduit and layouts to minimize installation costs. The system included assessing existing systems and design of central PLC panel as a point of communication between the existing control system and new tank gauging system. Mike was in regular contact with the client and reported on project status and progress.

Project Manager
Pipeline Station Connection | Hammond, IN | 2013

Electrical design and PLC programming updates required for a new fuel terminal connection to pipeline station. The project created a new delivery point for a pipeline station.

- PLC program development required meeting the safety and control requirements of the delivering and receiving station and terminal
- Project required the successful work between the client, their mechanical design firm and the shipper terminals
- Project included startup to ensure proper flow rate control and metering

Project Manager
Pipeline Station Automation Upgrade | Niles, MI | 2012

Design-build of a $1.3 MM pipeline station controls and automation upgrade in Michigan. The project scope included creating accurate site electrical and process drawings describing of existing site conditions, an evaluation of existing site equipment, updating site PLC programming to a more modern standard format and implementing batch delivery automation.

- On-site electrical investigation to create accurate electrical drawings to use as a starting point for the controls upgrade
- The project required the design, construction and implementation of wireless communication and remote operator interfaces to send, receive and display product delivery information to five pipeline station local area shippers
- Extensive PLC and SCADA programming to automate fuel deliveries to local terminals
- The automation allowed the client to eliminate the full time station operator, reducing the operating labor
- Effective investigation of wiring alternatives allowed meeting area classification requirements without major equipment replacement

Project Manager/Engineer
Fuel Terminal Improvements | Bozeman, MT | 2012

Detailed design to add a diesel loading arm and loading rack pumping system to increase tank truck fill rate at a fuel terminal in Montana. The design required equipment selection and sizing, mechanical piping design, piping supports and foundations and pump power and controls. The result was an efficient field level design package. The design included construction options to allow for efficient construction and avoid excessive site investigation during the design phase. Mike was responsible for the mechanical and process design, overall project schedule and budget and was the main client contact.

Project Manager/Engineer
Pipeline Station Piping Improvements | Carbon County, MT | 2011

Detailed design of a 16-inch pipeline manifold upgrade at a crude oil collector station with five 20,000 to 30,000 bbl crude oil storage tanks. The new manifold was required to meet current client design standards and specifications. The design included equipment and instrumentation selection and sizing, mechanical piping design, piping stress analysis, piping supports and foundations and pump power and controls. Mike was responsible for the mechanical and process design, overall project schedule and budget and was the main client contact.

- An innovative layout and construction plan was necessary to allow for the construction of a new manifold in the same area as the existing while the existing manifold is in operation
- Laser scanning of the site was performed to produce layouts of existing piping systems and accurately locate tie points
- 3D pictorial rendering of the existing and new piping allowed for efficient client meeting to review piping design

Project Manager
Fuel Terminal Ethanol Pumping Upgrade | Providence, RI | 2010

Detailed design of a 100 hp ethanol transfer pump system for a fuel terminal. Mike was responsible for the overall project schedule and budget and was the main client contact.

- Pump and equipment selection
- Pump foundation and pipe support design
- Piping connections to existing systems
- Electrical power and controls design
- A piping stress analysis was performed in the final design to confirm appropriate piping supports and layout

Design Coordinator/Process Engineer
Storm and Groundwater Treatment - Design Build | Fuel Terminal | Everett, MA | 2009 - 2010

Design-build upgrade of a combined 13,600 gpm storm and groundwater treatment system for an operating fuel terminal. The system has capacity to collect and treat the site stormwater for up to a 10-year, 24-hour storm event by the combination of a 300 gpm continuous treatment system using media filtration and carbon adsorption, a 4,000 gpm storm event oil-water separator and up to 9,600 gpm flow to storage for post-storm event treatment. Mike's tasks included:

- Process development, Identify the process requirements to meet agency required capacity, flow and treatment levels
- Develop the process diagrams (P&IDs) identify equipment and instrumentation requirements
- Design of a pumping system that reused an existing pumping basin structure and avoided a costly new structure
- Develop the functional description and controls programming requirements for automation to minimize operator attention
- Equipment purchasing, construction and startup support

Project Engineer
Activated Carbon Treatment | Pottstown, PA | 2007

Detailed design and construction to add two 20,000# carbon adsorption treatment vessels to an existing 300 gpm groundwater treatment system in Pennsylvania. Project required equipment selection, piping system modifications, vessel foundations, new piping heat trace, heat and insulation of an existing building.

- Avoided constructing a new building by identifying and using space in an existing near-by building
- The added treatment allowed discharge to surface water eliminating considerable sewer charges

Project Manager
Stormwater Collection Detailed Design | Chemical Manufacturing Plant | Friendly, WV | 2006

Detailed design of a combined 35,000 gpm storm/process water collection/pumping/equalization system for a chemical manufacturing plant. The design allowed for collection and storage of peak flows for treatment following a storm event. Design required careful placement of large underground piping and sumps within a congested area of the plant. Mike coordinated the efforts of the electrical, instrumentation, mechanical and civil/structural design groups and reported design progress to the client. Mike was responsible for the

mechanical and process design, overall project schedule and budget.

- The design effort included evaluation of alternatives to large above ground tanks. The result was confirmation that the tanks were the best option
- To meet the clients budget constraints the project was separated into four construction phases

Project Manager/Design Engineer
Electroplating Process Water Treatment | Buffalo, NY | 2005

Design-build 10,000 gpd ultrafiltration system for removal of nickel from electroplating operations. Mike was responsible for the mechanical and process design, the project schedule and budget and was the main client contact.

- Evaluation and selection of ultrafiltration equipment
- Integrating the ultrafiltration unit onto the overall treatment system with water collection, chemical addition, solids separation, filter press, and effluent monitoring
- System performance to meet discharge to city sewer
- Installation to meet available space and startup

Design and Construction Coordinator
Groundwater Collection and Treatment System | Bradford, PA | 2004 - 2005

Design-build treatment system and building for the removal of oils and iron from groundwater prior to discharge to surface water. Project required the design and construction of a 38- by 68-foot treatment building with aeration, pH adjustment, coagulant and flocculent addition, DAF clarification, with control system with PLC and SCADA system. Mike was responsible for the mechanical and process design.

- The system allowed for the surface water discharge of treated groundwater
- System automation allowed for unattended operation and remote access

Lead Design Engineer
Groundwater Collection and Treatment | Delaware City, DE | 2003 - 2004

Design-build groundwater collection and treatment system for the removal of chlorinated organic compounds and mercury at a chlor-alkali chemical plant in Delaware. Project required the design and construction of a 22- by 40-foot treatment building with DNAPL separation, pH adjustment, and carbon adsorption with control system with PLC controls and connection to plant DCS system. Mike was responsible for the mechanical and process design and coordinated the efforts of the electrical, instrumentation, mechanical and civil/structural groups for the detailed design.

- Treatment system allowed for surface water discharge
- Detailed design required a compact design to allow equipment to fit into a congested area of the plant

Work history

2000 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY
1998 – 2000	CRA Services, Niagara Falls, NY
1986 - 1998	Andco Environmental Processes, Inc., Amherst, NY

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Timothy P. Leo
Civil Engineer

Qualified: Bachelor of Science - Civil Engineering (BSCE), 1992

Connected: International Erosion Control Association

Professional Summary: Tim has over 20 years' experience managing construction activities relating to RCRA remedial action projects. Landfill cap and liner systems construction, water treatment plant construction, as well as the long term operation and maintenance of remedial systems has kept him occupied for many years. Tim has developed an extensive working familiarity with OSHA and RCRA regulations as they apply to construction projects.

Ground Water Treatment

Construction Management Engineer
Caterpillar Wastewater Treatment Plant | Caterpillar | Joliet, IL | 2014 - 2015

Tim communicates with Caterpillar Engineering team members regarding weekly contractor progress updates. Technical reviews of contractor submittals, response to contractor Requests for Information, and oversight of daily construction activities. Coordination of multiple contracts and construction activities to keep the project on schedule and within budget allowed a successful project completion.

Construction Management Engineer
Lenz Oil Superfund Site Removal Action | DuPage County, IL | 2010

Tim represented the Lenz Oil RD/RA Group on a daily basis. Daily interaction with the USEPA and their oversight contractor provided confidence that the works were being completed in a responsible manner and consistent with the approved work plans.

Responsibilities included communications with regulatory agencies, coordination of remedial contractors, construction quality assurance/quality control contractors, design team, and owner personnel; review and processing of contract submittals and invoices; tracking schedule, manpower, equipment, and materials; resolve design discrepancies; conducting weekly Site progress meetings and providing assistance with system startup, commissioning, and operations and maintenance of new $5 million treatment system.

System components include 850 feet of slurry wall, 350 feet of grout curtain wall near a high-pressure gas pipeline that supplies fuel to O'Hare airport, 1,000 feet of french drain with 12 extraction well points, several thousand feet of buried force main, a new 3,000 square foot water treatment building, and a fully automated SCADA/PLC controlled multi-phase 70-gpm groundwater removal system.

Construction Management Engineer
Former Gas and Coke Facility Superfund Site | Waukegan Coke Site | Waukegan, IL | 2006 - 2007

Responsibilities included communications with regulatory agencies, coordination of remedial contractors, construction quality assurance/quality control contractors, design team, and owner personnel; review and processing of contract submittals and invoices; tracking schedule, manpower, equipment, and materials; resolve design discrepancies; conducting monthly Site progress meetings and providing assistance with system startup, commissioning, and operations and maintenance of new $12 million treatment system.

System components include several thousand feet of buried force main with several hundred extraction and injection points and five remote metering stations, a remodeled 22,500 square foot water treatment building, large tanks up to 150,000-gallon capacity, pumps, piping, sand filtration, sludge handling equipment, chemical storage and metering systems, blowers, air compressors, along with a wireless SCADA/PLC control system of a biological batch reaction groundwater treatment system.

Landfill Cap and Closure

Resident Engineer
Holtz Krause Landfill | Wausau, WI | 2013

Responsible for day-to-day contract administration, coordination of a dozen contractors, daily QC and construction oversight of a 40-acre landfill closure and modification. Gas collection system modifications, and new flare system to burn collected methane gas, and a new soil barrier above a 40-mil liner completed the closure of the existing landfill. A new state-of-the-art athletic field construction above the landfill returned the site to useful recreational greenspace.

The 57-acre property has been developed into a soccer field and curling complex, complete with lighting for night games, bleachers, concession stand, and on-site parking.

This is the first time in Wisconsin that Department of Natural Resources has issued a Certificate of Completion on the clean-up of a licensed, municipal landfill.

Resident Engineer
Koochiching County Closed Sanitary Landfill | Minnesota Pollution Control Agency | International Falls, International Falls, MN | 2012

Responsible for day-to-day QC and construction oversight of 27-acre landfill cap utilizing LLDPE liner with GCL drainage layer, improved drainage layer, and 2-foot thick soil barrier landfill cap.

Oversight of construction of a pumping control station with perimeter leachate collection and landfill interior leachate collection and pumping system. Control Station pumped leachate to a settling pond system 2,000 feet from the landfill.

Improvements made allow for less leachate accumulation and reduced management costs for the State of Minnesota.

Soil Removal Action

Construction Management Engineer
OU-1 Pilsen Site and OU-2 Pilsen Site | Chicago, IL | 2014 - 2017

Multiple sites consisting of lead contaminated soils in a school zone, residential areas, and industrial areas. Site activities include removal of lead contamination, remediation of lead contaminated areas, and protection of workers and public from lead exposure.

Responsibilities include initial definition of work activities, cost estimating, site inspections, contractor procurement and coordination, treatment and disposal coordination, review of site work plans, site control plans, responsible party interaction, daily reporting of site activities, interaction with USEPA personnel and USEPA START contractor personnel.

Resident Engineer
Former Manufactured Gas and Coke Facility Superfund Site | Public Utility Company | Waukegan, IL | 2004

Responsibilities included communications with regulatory agencies, coordination of remedial contractors, construction quality assurance/quality control contractors, design team, and owner personnel; review and processing of contract submittals and invoices; tracking schedule, manpower, equipment, and materials; resolve design discrepancies; conducting monthly site progress meetings.

Conduct investigation of buried tar and coke residues and oversee removal action of several hundred thousand tons of contaminated soils.

Logistics Control Engineer
Former MGP Facility | Commonwealth Edison | Oak Park, IL | 2002

Responsible for coordination of rail and truck shipping operations of up to 1,500 tons of waste shipments per day. Responsible for tracking of waste shipments and coordinating waste disposal details.

Resident Engineer
Drum Removal Action | MDI Superfund Site | Houston, TX | 1998

Contract administration and oversight of waste removal and consolidation of a dozen waste streams. More than 5,600 drums of catalytic wastes and numerous soil and debris piles were removed. This cleanup activity opened the door for redevelopment of the site and returning the property to useful land with residential or commercial application.

Work history

1993 – present	GHD (formerly Conestoga-Rovers & Associates), Chicago, IL
1992 – 1993	Abbott Construction, Northbrook, IL

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Andy Lovell, GISP

Spatial Sciences Manager

Qualified: Masters of Environmental Management and Restoration, Charles Sturt University, Wagga Wagga, New South Wales, Australia, 2004. Bachelor of Applied Science (Parks, Recreation and Heritage), Charles Sturt University, Albury, New South Wales, Australia, 1999. Geographic Information Systems Professional (GISP)

Connected: Member Survey & Spatial Sciences Institute (SSSI); Past Chair of the SSSI Spatial Information and Cartography Commission (Victoria).

Professional Summary: Andy is the Service Line Leader for Spatial Sciences in North America. A specialist Geographical Information Systems and Database Analyst, with a background in Environmental and Earth Sciences, Andy has applied his knowledge to a range of data analysis and information management applications. As a senior consultant, Andy's focus is on the coordination of location-based data during large, multidisciplinary infrastructure development projects. From strategic assessments and options studies to design, construct and decommissioning, Andy is well connected across all areas of GHD's business, including Mining & Geotechnical, Environment, Infrastructure, Water, Transportation and Urban Planning. He has also worked across the globe on GHD projects such as London Rail planning, Malaysian environmental flooding, and New Zealand data standards. With all this experience under his belt, Andy has a proven ability to bring together a team and build positive and productive working relationships with GHD's clients and stakeholders.

Project Manager
GIS Data Automation | City of Sacramento, CA

Working closely with the City of Sacramento GIS department, GHDs global team of spatial sciences and data management professionals, is currently building new data workflow processes to assist the City in achieving greater efficiency in handling land parcel, address and assessor details for City processes. The integration process is focused on using FME as the core processing tool, and will create an environment for additional value to be gained through process improvement and data coordination.

GIS Lead
Asset Management and System Condition Planning | MRWPCA, Monterrey, CA

GHD is working with the MRWPCA to inspect and plan for upgrades to a number of forces mains, pumps stations and associated utilities. As GIS Lead; Andy is also responsible for the management of all digital information, development and implementation of the online communication tools, and coordination and integration to the agencies new Citiworks Asset Management platform.

GIS Lead
Healdsburg Avenue Project | Healdsburg, CA

GHD is working with the City of Healdsburg to upgrade the Healdsburg Avenue intersection and associated utilities. As GIS Lead, Andy is also responsible for the development and implementation of the digital communication tools, to broadcast project information and coordinate community engagement data.

GIS Advisor
Information Management Master Plan | Water Replenishment District, California

Working closely with Water Replenishment District (WRD), GHD is undertaking a number of improvement projects relating to Asset Management and Information Master Planning. As GIS Lead, Andy is guiding WRD through the process of requirements identification, vendor selection, and implementation.

Project Manager
Asset Management Planning | City of Eureka, California

GHD is providing guidance and advice to the City of Eureka's GIS Department in the development of an integrated GIS and Asset Management strategy. Andy is responsible for the overall project management and client coordination, as well as technical specifications relating to GIS integration.

Spatial Sciences Manager
Port of Hastings – Options Assessment | Victoria, Australia

GHD is working with Port of Hastings Development Authority (PoHDA) to assess options for port facilities as well as potential environmental risks for the future development of the Port of Hastings site. As Spatial Sciences Manager, Andy is responsible for the overall coordination of geographic data across all project teams. This has included collation and centralisation of information systems; analysis and interpretation of multi-discipline information; and presentation of project data to a range of stakeholders.

Project Director
Metropolitan Waste Management Group, Landfill Multi-Criteria Analysis | Victoria, Australia

GHD in collaboration with Metropolitan Waste Management Group (MWMG) undertook a spatial multi-criteria assessment to determine the most suitable sites for potential future landfill. The project looked at integrating the Environmental Protection Agencies' Best Practice Environmental Management (BPEM) – Siting, Design, Operation and Rehabilitation of Landfills requirements into a desktop study to assess areas of landfill siting suitability. As Project Director, Andy led the client relationship management, and overall technical review of the methodology.

Spatial Sciences Manager
Macquarie Point Development Authority, Spatial Data Management | Hobart, Tasmania, Australia

Andy led a team of specialists in the development and implementation of spatial data management solution combining MS SharePoint and ESRI ArcGIS for Server. The system forms the basis for ongoing work in developing the Macquarie Point site in Hobart, Tasmania.

Project Director
Victorian Grants Commission, GIS Mapping of Local Roads and Cost Modifiers | Victoria, Australia

GHD were engaged by Victoria Grants Commission (VGC) to develop a standardised methodology to allow the efficiently quantify the factors guiding the distribution of grants to Local Government Authorities (LGAs). An FME workbench methodology was used to calculate road lengths for all responsible authorities in conjunction with the associated cost modifiers that influence the distribution of grants for the LGA. Results were tailored to meet client requirements, using a customised report template in Microsoft Access and as a summary table through Microsoft Excel.

As Project Director, Andy provided overall guidance for the project, including client liaison and contract negotiation.

Spatial Sciences Manager
Linking Melbourne Authority, East-West Link Spatial Support | Melbourne, Victoria, Australia

Working closely with the Authority's management for several years, Andy has been responsible for the ongoing coordination of location based data for several major transport projects, including the East West Link investigations. System design and implementation, staff training and advice are some of the support provided.

Spatial Lead
Growth Areas Authority, Aboriginal Cultural Heritage Modelling | Melbourne, Victoria, Australia

GHD and sub consultant Andrew Long and Associates assessed the aboriginal cultural heritage values in the growth areas surrounding Melbourne.

The project involved collation of information about heritage values and engaging with Registered Aboriginal Parties and applicants to develop a multi-criteria geographic model. The model provided a basis for the generation of maps of cultural heritage sensitivity for the growth areas.

Spatial Sciences Manager
Western Highway EES, VicROADS | Victoria, Australia

GHDs team of spatial analysts were central to the coordination of all location based information for the project and specialist assessments. Andy provided the overall structure for the team as they managed all aspects of the data: Capture, Analysis, Storage and Presentation..

Project Director
Victorian Department of Planning and Community Development, Bushfire Prone Area Amendment Mapping | Victoria, Australia

GHD assisted the Victorian Department of Planning and Community Development in remapping the Bushfire Prone Areas spatial dataset. The project involved detailed, cadastral-level amendments through the assessment of the presence and absence of hazard areas. This also required open engagement with stakeholders such as developers and local government bodies in an attempt to future-proof the dataset. The output from the amended spatial dataset is that of an accurate representation of areas classified as bushfire prone, which as a result aims to protect communities while also reducing adverse impacts to areas initially incorrectly classified as bushfire prone.

As Project Director, Andy led the client relationship management, and overall technical review of the methodology.

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Ruth L. Mickle
Project Chemist

Qualified: Bachelor of Arts in Chemistry (BA Chemistry), May 1987 College of St. Benedict/St. John's University, MN

Connected: Member, American Chemical Society

Professional Summary: Ruth manages all tasks related to analytical requirements for a wide variety of remediation and compliance projects. These tasks include: analytical lab service procurement/coordination, data validation, quality assurance plan preparation and progress report preparation.

Analytical Chemist
Laboratory- Organics Department

Analytical chemist managing all tasks related to analytical requirements for a wide variety of projects including:

- Performed laboratory analysis utilizing a number of instrumental techniques including gas chromatography (GC), gas chromatography-mass spectrometry (GC-MS), high performance liquid chromatography (HPLC).
- Performance of internal laboratory audits and assessments.
- Assessment and validation of data in accordance with various state and regional EPA agencies .including United States Environmental Protection Agency (USEPA) and Minnesota Pollution Control Agency.
- Participated in development of laboratory QA/QC program. Liaison with USEPA/State Agencies regarding QA/QC issues for various analytical programs.

Project Chemist
Data Validation and Quality Control | Many Remediation and Compliance Projects

Project chemist managing all tasks related to analytical requirements for a wide variety of projects including:

- Assessment and validation of data in accordance with various state and regional EPA agencies .including USEPA National Functional Guidelines, Region III, TRRP, etc.
- Preparation of analytical Quality Assurance Project Plans (QAPPs) and Site Sampling and Analysis Plans.
- Liaison with USEPA/State Agencies regarding QA/QC issues for various analytical programs.
- QA/QC Officer for numerous Superfund and RCRA investigation and remediation programs.
- Oversight and review of analytical testing in support of compliance programs under the Clean Water Act.
- Assisted in treatability study for groundwater containing PCP and PAHs.
- Assisted in evaluation of in situ bioremediation system for treatment of PCP in groundwater.
- Proficient use of computer applications including Microsoft Excel, Word and Power Point.

Other related areas of interest

Certificates/Training

- USEPA Region II Training Course for CLP Organic Data Validation, Westchester Community College, Dr. John Samulian, June 1993
- Environmental Chemistry Course, University of Minnesota, Winter Quarter 1994-95
- "Treatment Technology for Contaminated Soils and Groundwater", National Groundwater Association, June 1997
- 40-Hour Training Program for Hazardous Waste Work as Specified by OSHA 29CFR 1910.120(e)(2) and yearly refresher courses

Work history

1991 – present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1989 – 1991	Aspen Research Corp, St Paul, MN

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Daniel (OJ) Ojinaga

Project Engineer

Qualified: Civil Engineering-Engineering Management (B.A.Sc.), 2006

Connected (professional affiliations): Member, American Society of Civil Engineers, Member, Society of Hispanic Professional Engineers, Member, Arizona Floodplain Management Association, Member, Southern Arizona Environmental Management Society, Member, Arizona Mining Industry Gets Our Support

Professional Summary: OJ is a detail-oriented engineer with a varied background and has over nine years of experience in the environmental and civil engineering fields. His experience has included civil design specializing in hydrologic and hydraulic analysis for surface flow, environmental site investigations, environmental remediation, and multiple types of environmental sampling. OJ also possesses excellent people skills have contributed to the success of many projects.

Environmental Investigation and Remediation

Field Project Management/Field Team Lead
Confidential Mining Client |
Bisbee & Douglas, AZ

Field Project Management/Field Sample Team Lead: Leader of a field sampling crews on a major commercial consulting project within a townsite setting. Skills demonstrated and developed include:

- Site assessment and soil sampling techniques
- Technical expertise in field data management
- Field personnel management
- Decision analysis and execution
- Public interaction with the interest of the client

Project Manager
Oil and Gas Terminal | Holly Energy |
Tucson, AZ

Services provided include a wide range of activities, from pipeline installation to general construction, with services provided to meet compliance needs or improve operational efficiency.

Project Engineer
Tucson International Airport Superfund Site |
Tucson, AZ

Project Engineer responsible for portions of the site investigation and PCB remediation services at the Tucson International Airport Superfund Site, Tucson, Arizona. Site specific activities included:

- Project planning
- Evaluation of analytical process data for groundwater and SVE treatment systems
- Conducted Radius of Influence (ROI) calculations
- Preparation of memoranda and reports for clients and regulatory agencies
- Construction administrative services, submittals, change orders, quality assurance, including verification of compliance with contract documents
- Project recording and documentation, and final reporting

Project Coordinator/Field Engineer
Tucson International Airport Superfund Site |
Tucson, AZ

Project Coordinator/Field Engineer responsible for portions of the sites remediation services, at the Tucson International Airport Superfund Site, Tucson, Arizona. Site specific activities included:

- Collecting soil samples
- Construction oversight for PCB remediation activities in the Three Hangars Building
- Collected groundwater samples using dedicated bladder pumps
- Monitored aquifer water levels, assisted in daily operation of the groundwater extraction system while on site
- Downloaded/reviewed transducer data
- Soil gas and process air sampling
- Monitoring of wells following Potassium Permanganate injection
- Drilling oversight and soil logging

Project Engineer
TIA Landfill Cap | Tucson, AZ

Project Engineer responsible for portions of the design and coordination efforts to provide a RCRA cap for landfill closure. Site activities included:

- Initial site investigation and documentation
- Collected soil samples
- Construction oversight during all phases of the Landfill Remedy (Landfill Cap)

- Construction administrative services (submittals and change orders)
- Field design changes, quality assurance, and quality control including verification of compliance with contract documents
- Project recording and documentation, and assisted in preparing the Construction Completion Report

Project Engineer/Operator
COT Police/Fire Station HQ | Tucson, AZ

Field Engineer/Operator responsible for maintaining a groundwater and soil vapor remediation system, which treated LNAPL. This site located in Tucson, Arizona. Site activities included groundwater sampling, LNAPL monitoring, cleaning and maintaining groundwater pumps, assisted in coordination and injection of the In Situ Chemical Oxidation (ISCO) pilot test and confirmatory soil sampling for the site.

Field Engineer
Operable Unit 2 (OU2) | Phoenix, AZ

Field Engineer for semi-annual groundwater monitoring at the 52nd Street Superfund Site Operable Unit 2 (OU2) in Phoenix, Arizona (NPL site). Collected groundwater samples using Grundfos pump, monitored aquifer water levels, performed well maintenance, and assisted in the daily operation of the groundwater extraction system.

Civil Engineering Design (Hydrologic and Hydraulic Design)

Design Engineer
Marana Market Place | Tucson, AZ

Responsible for the hydrologic and hydraulic design performing hydrologic and hydraulic analysis and design per the Pima County Hydrology Manual and the Pima County Drainage and Channel Design Standards for Local Drainage.

- Analysis of an existing conditions and proposed conditions using HEC-RAS, as well as the design of bank protection along the channels
- HEC-HMS, CulvertMaster, FlowMaster were used to help design sizes for culverts, scuppers, and curb openings
- Drainage reports were produced in support of the grading and drainage plans

Design Engineer/Principal Investigator
CLOMR - Senita Valley Elementary School | Vail, AZ

Author of a Conditional Letter of Map Revision for an elementary school. Tasks included the analysis of proposed drainage structures designed to remove the schools multiuse field from a FEMA Floodplain. Specific tasks included revising an existing two-dimensional floodplain model, using HEC-RAS analysis of the channel improvement to the site. A CLOMR report along with all supporting models and documentation was compiled for submittal to FEMA.

Design Engineer
Residential Subdivisions | Pima County, AZ

Part of design team responsible for performing hydrologic and hydraulic analysis and design per the Pima County Hydrology Manual and the Pima County Drainage and Channel Design Standards for Local Drainage.

- Analysis of an existing conditions and proposed conditions using HEC-RAS, as well as the design of bank protection along the channels
- HEC-HMS, CulvertMaster, FlowMaster were used to help design sizes for culverts, scuppers, and curb openings
- Drainage reports were produced in support of the grading and drainage plans

Design Engineer/Field Engineer
Railroad Site | Tucson, AZ

Responsible for the preparation of a drainage study, in support of the grading and drainage plan.

- Construction Stormwater Pollution Prevention Plan
- HEC-HMS model of existing and proposed conditions
- Conducted weekly SWPPP inspection during the construction
- Coordinated project with client and the City of Tucson Development Services Department

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Other related areas of interest

Recognized (Certifications/Trainings)

- 8-Hour Arizona Mine Safety and Health Administration Refresher, 2015
- BSNF/UPRR e-Railsafe Training, 2015
- 24-Hour Arizona Mine Safety and Health Administration, Part 48, 2010
- 40-Hour HAZWOPER OSHA Training, 2010
- 8-Hour HAZWOPER Refresher OSHA Training, Annually
- HEC-RAS River Analysis System - Training in Advance Steady Flow Analysis, 2009
- Erosion Control & Gabion Systems - Erosion Control using Gabion systems, 2007
- AZPDES SWPPP Basic Training - Course on Preparing Stormwater Pollution Prevention Plans, 2007
- Pima County Hydrology Procedures - Training in Methods and Procedures including PC-HYDRO, 2007

Work history

2010 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
2006 - 2010	Rick Engineering Company, Tucson, AZ
2005	Kiewit Construction Company, Omaha, NB

Jeremy Pautler

Electrical/Instrumentation Designer

Qualified (Education): A.A.S. ITT Technical Institute, 2004 - 2006

Connected (professional affiliations): AUGI (AutoCAD Users Group International), National Technical Honor Society, National Deans List, ITT Technical Institute Program Advisory Committee

Professional Summary: Jeremy has over 10 years of experience in the area of electrical/instrumentation design and drafting, experienced in commercial, municipal, industrial and government applications. His expertise extends to control panel layouts and wiring diagrams, equipment layouts and wiring interconnection diagrams.

Electrical/Instrumentation Designer
Phase 1 Final Remediation Design | Lemont, IL

Lead instrumentation and control designer responsible for PLC control panel design and associated wiring, assisted with creation of single line diagrams and motor schematics.

Electrical/Instrumentation Designer
Storage Terminal Facility | Bumstead, AZ

Lead instrumentation and control designer responsible for designing four complex PLC panels (each consisting of hundreds of I/O points) and all associated analog/digital wiring diagrams. Created full 3D models of all electrical/instrumentation equipment to ensure proper location of the vast cable tray system.

Electrical/Instrumentation Designer
Groundwater Treatment Plant | Taft, LA

Lead instrumentation and control designer responsible for new PLC panel and all associated analog/digital wiring diagrams. Designed new layout of existing electrical building.

Electrical/Instrumentation Designer
Continuous Parameter Monitoring System | Bellwood, IL

Lead instrumentation and control designer responsible for new PLC panel and all associated analog/digital wiring diagrams. Designed new intrinsically safe enclosure for the system

Electrical/Instrumentation Designer
Wastewater Treatment Plant | Auburn, NY

Lead instrumentation and control designer responsible for design of PLC with multiple remote I/O enclosures, and all associated analog/digital wiring diagrams.

Electrical/Instrumentation Designer
Refinery | Bradford, PA

Lead instrumentation and control designer responsible for PLC control panel design and associated wiring, assisted with creation of single line diagrams and motor schematics.

Work history

2004 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY

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Thomas F. Pestka

Qualified (Education): Bachelor of Science (BSc)

Connected (professional affiliations): Member Instrument Society of America

Professional Summary: Tom possesses skills in all areas of Instrumentation & Controls engineering and exhibits effective procedure development and reporting, targeted communication, good organization and excellent people skills. His work history spans 40 years of Control System design, development, and servicing and related experience areas. He is highly experienced in instrumentation and automatic control equipment specification and selection as well as startup, troubleshooting and repair. He has designed and directed the fabrication, programming, testing, installation and startup of numerous process control panels. Tom has developed complete project I&C design packages along with implementing these designs in the field. He has designed control systems for industrial, municipal and environmental projects and has specified, written, and implemented PLC and HMI control software programming for various projects.

Instrumentation & Controls Design Engineer New HCl Manufacturing Facility | Occidental Chemical | Niagara Falls, New York

Tom developed I&C drawing packages consisting of P&ID, PLC control panel fabrication details, loop drawings and instrument plan drawings. He prepared instrument specifications and obtained quotations for the client to procure the instruments. He worked with other design disciplines regarding the installation of the project instruments.

Instrumentation & Controls Design Engineer Landfill Gas Recovery Facility Automation | Seneca Meadows Inc. | Waterloo, New York

Tom developed project P&ID, PLC control panel fabrication drawings and instrument plan drawings. He performed the factory test and field commissioning of the control panel and designed, programmed and commissioned the PLC control programming. He worked closely with the SCADA engineer who developed the HMI control screens for the project.

Instrumentation & Controls Design Engineer Continuous Emissions Monitor Upgrade to Incinerator | Durez Corp. | Niagara Falls, New York

Tom developed a specification for a Continuous Emissions Monitor for the client, then obtained competitive quotes and assisted in the selection process. He determined the requirements to interface the new CEMS system to the clients existing PLC based incinerator control system and developed the required documentation to perform the integration. Tom made programming changes to the clients PLC and worked closely with the CEMS contractor to integrate the two systems together.

Instrumentation & Controls Design Engineer Liquid Waste Feed Monitor System | Durez Corp. | Niagara Falls, New York

Tom designed and programmed a PC based virtual PLC for the client to use in reporting data to the EPA regarding the plant's liquid waste stream. The PC was connected to a flow transmitter signal that measured the amount of liquid waste the plant produced. The operator would input laboratory analysis information of the liquid waste stream and the virtual PLC programming would calculate and display the individual data to be monitored by the operator and reported to the EPA

Instrumentation & Controls Design Engineer Wireless Leak Detection Network | Glenn Springs Holdings | Niagara Falls, New York

This project replaced some hardwired leak detection equipment with wireless leak detectors in landfill monitor well system. Tom developed drawings and specifications to obtain wireless system quotations. He developed a drawing package and obtained bids for contractors to install the new instrumentation. He directed the contractor installation activities of the hardware and modified the client's existing PLC programming to except the new wireless instruments.

Instrumentation & Controls Design Engineer Biosparge Treatment Facility | JIS Landfill | S. Brunswick, New Jersey

Tom designed a PLC based biosparge treatment facility to inject oxygen into the ground to effect biologic cleanup of contaminated ground water. He developed project P&ID and PLC control panel fabrication drawings. He designed the control panel containing instrumentation to sparge a number of wells simultaneously or sequentially. The sparging sequence was controlled by a PLC and operated through SCADA displays on a PC. Tom designed and programmed both the PLC and SCADA screens. He performed the panel factory test and field commissioning and startup.

Thomas F. Pestka

Instrumentation & Controls Design Engineer
Biosparge Treatment Facility | Glenn Springs Holding | Hicksville, New York

Tom designed a PLC based biosparge treatment system to inject air and water into the ground to effect biologic cleanup of contaminated ground water. He developed project P&ID and PLC control panel fabrication drawings. He designed the PLC control panel that controlled the injection of air or water into the ground several injection wells simultaneously or sequentially. He specified, bid and ordered the instrumentation, including automatic control valves, required on the project. The sparging sequence was controlled by a PLC and operated through SCADA displays on a PC. Tom designed and programmed the PLC. He performed the panel factory test and field commissioning and startup.

Instrumentation & Controls Design Engineer
WWTP Filter Gallery Rehabilitation | City of Buffalo DPW | Buffalo, New York

This project replaced an outdated control system on the city's filtration plant with a new PLC based system. Tom was responsible for developing all I&C drawings and specifications for a large construction package for competitive bidding of the project. This included design and specification of the main operator station along with numerous local control stations located at each filter. In addition Tom developed a specification outlining the PLC and HMI programming requirements for the control system which included color depictions of the exact HMI screens that would be required on the project along with detailed descriptions as to how the process was operated from those screens.

Instrumentation & Controls Design Engineer
Joliet Station Upgrade | Joliet, Illinois

Tom performed the I&C detailed design for a power and controls upgrade project at a pipeline pump station. He developed design P&IDs and instrument and control drawings including control panel fabrication drawings and instrument plan drawings. Tom was responsible to determine interface requirements between all control equipment and worked with other engineering disciplines to produce a complete construction package of drawings and specifications for use in bidding and construction the project.

Instrumentation & Controls Design Engineer
Lockport Station Upgrade | Lockport, Illinois

Tom performed an I&C FEED design and detailed design for a power and controls upgrade project at a Wolverine PL transfer station. He developed design P&IDs and instrument and control drawings including control panel fabrication drawings and instrument plan drawings. Initially a FEED design package was produced for the client who used it to obtain funding for the construction project. Tom then assisted in developing the FEED package design into a detailed construction package for bidding and constructing the upgrade. Tom was responsible in determining interface requirements between all control equipment and worked with other engineering disciplines to produce a complete construction package of drawings and specifications for use in bidding and construction the project.

Work history

1994 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY
1987 – 1994	Carborundum Co., Niagara Falls, NY
1982 – 1987	Scipar, Inc., Buffalo, NY
1975 – 1982	Union Carbide, Buffalo, NY

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Sean Pike

Civil Drafter / Designer

Qualified (Education): A.A.S., Computer Aided Drafting and Design, 2001

Connected

Professional Summary: Sean has 16 years of AutoCAD experience, and 10 years of Civil 3d experience. He has a wide variety of civil design experience including, active landfill design, landfill closure, , landfill gas header design, storm water, building site plans, grading plans, sanitary sewer, groundwater & chemical concentration maps, dike grading, cut/fill calculations and storage volumes.

Landfill Design

Civil Drafter / Designer
Permit Drawings for Major Modifications | SKB Environmental | Austin, MN

Lead Civil Drafter responsible for the drafting and design of the following engineering plans:

- Volume calculations,
- Phasing plans and sections
- Stormwater management plans and sections
- Leachate collection plans and profiles
- Gas collection plans and profiles
- Details

Civil Drafter / Designer
East Development Permit Drawings | SKB Environmental | Austin, MN

Lead Civil Drafter responsible for the drafting and design of the following engineering plans:

- Volume calculations,
- Phasing plans and sections
- Stormwater management plans and sections
- Leachate collection plans and profiles
- Gas collection plans and profiles
- Details

Civil Drafter / Designer
Permit Drawings for Major Modifications | SKB Environmental | Rosemount, MN

Civil Drafter responsible for the drafting and design of the following engineering plans:

- Leachate collection plans and profiles
- Gas collection plans and profiles
- Details

Civil Drafter / Designer
Permit Drawings for Landfill Expansion | Viking Pump | Cedar Falls, IA

Lead Civil Drafter responsible for the drafting and design of the following engineering plans:

- Volume calculations,
- Phasing plans and sections
- Stormwater management plans and sections
- Leachate collection plans and profiles
- Gas collection plans and profiles
- Details

Civil Drafter
Landfill Gas to Energy Facility – Columbia Ridge | Waste Management Renewable Energy, LLC | Arlington, OR

Lead Civil Drafter responsible for the drafting and design of the following engineering plans:

- Grading Plan
- Paving Plan
- Utility plans and sections
- Gas collection system plans and profiles
- Gas system and site details

Civil Drafter
Landfill Gas to Energy Facility – Middle Peninsula| Waste Management Renewable Energy, LLC | Gloucester County, VA

Lead Civil Drafter responsible for the drafting and design of the following engineering plans:

- Grading Plan
- Paving Plan
- Utility plans and sections

Sean Pike
Civil Drafter / Designer

- Gas collection system plans and profiles
- Gas system and site details

Civil Drafter
Landfill Gas to Energy Facility – King George | Waste Management Renewable Energy, LLC | Fredericksbrug, VA

Lead Civil Drafter responsible for the drafting and design of the following engineering plans:

- Grading Plan
- Paving Plan
- Utility plans and sections
- Gas collection system plans and profiles
- Gas system and site details

Civil Drafter
Landfill Gas to Energy Facility – Eco Vista | Waste Management Renewable Energy, LLC | Tontitown, AR

Lead Civil Drafter responsible for the drafting and design of the following engineering plans:

- Grading Plan
- Paving Plan
- Utility plans and sections
- Gas collection system plans and profiles
- Gas system and site details

Civil Drafter
Landfill Gas to Energy Facility – Riverbend | Waste Management Renewable Energy, LLC | McMinnville, OR

Lead Civil Drafter responsible for the drafting and design of the following engineering plans:

- Grading Plan
- Paving Plan
- Utility plans and sections
- Gas collection system plans and profiles
- Gas system and site details

Civil Drafter / Designer
Permit Drawings for Landfill Expansion | Rosby Resource Recycling, Inc. | Brooklyn Heights, OH

Civil Drafter responsible for the drafting and design of the following engineering plans:

- Volume calculations,
- Phasing plans and sections
- Details
- Assessing Agency review comments

Civil Drafter
Landfill Gas to Energy Facility – DFW | Waste Management Renewable Energy, LLC | Lewisville, TX

Lead Civil Drafter responsible for the drafting and design of the following engineering plans:

- Gas collection system plans and profiles
- Gas system and site details

Civil Drafter
Landfill Gas Collection and Control System Expansion| Republic Services Inc. | Grand Blanc, MI

Lead Civil Drafter responsible for the drafting and design of the following engineering plans:

- Gas collection system plans and profiles
- Gas system and site details

Civil Drafter
Landfill Gas Collection and Control System | Stony Hollow Landfill, Inc. | Dayton, OH

Lead Civil Drafter responsible for the drafting and design of the following engineering plans:

- Gas collection system plans
- Gas system and site details

Civil Drafter
Dike Grading| Confidential Client | Lockport, IL

Lead Civil Drafter responsible for the drafting and design of the following:

- Re-grade of 6 containment areas totaling 45 million gallons for spill control.
- Containment calculations
- Cut/Fill calculations
- Grading Plans
- Dike Cross-sections
- Civil details

Civil Drafter
Containment Dike | Confidential Client | Memphis, TN

Lead Civil Drafter responsible for the drafting and design of the following:

- Design of containment area totaling 25 million gallons for spill control.
- Containment calculations

Sean Pike
Civil Drafter / Designer

- Cut/Fill calculations
- Grading Plans
- Dike Cross-sections
- Civil details

Civil Drafter
Erosion Control | Magellan Midstream Partners | Scott County, IA

Lead Civil Drafter responsible for the drafting and design of the following:

- Cut/Fill calculations
- Grading Plans
- Pipe cross-sections
- Civil details

Civil designer for Erosion control around an 8" gas pipeline, including sheet pile wall and culverts.

Civil Drafter
16-Inch Batch Product Project | Confidential Client | Southeastern, MI | 2015

Sean coordinated the use of the photogrammetry survey and Civil 3D surface for the development of project base maps, and cut profile views for the installation of 178,800 linear feet of 16-inch OD, X52 steel piping with 157,150 feet installed via open-cut and 21,650 feet installed via trenchless technology (8 HDDs in total with the longest having a length of 4,000 feet and 81 direct bores) and two interconnections. This project was required to meet DOT requirements.

Water Resources

Civil Designer
FEMA Floodplain Flood Insurance Rate Map | Town of Pendleton | Pendleton, NY

Civil Designer utilized GIS information to generate FEMA Flood Insurance Rate Map (FIRM) to update the 0.2 percent and 1 percent floodplain boundaries. Used Map 3D to create maps from various different sources.

Water Treatment, Transmission and Distribution

Civil Designer
Parsons Creek Development, Phase 1 Water| Regional Municipality of Wood Buffalo \ Fort McMurray, AB

Civil Designer utilized Civil 3D for the design and drafting of 4,300 linear meters (14,000 feet ±) of 750 mm (30-inch) transmission main. Coordinated with the Survey department for the development of the project base maps. Created details and sections as required.

Civil Designer
Southwest Erie County Regional Water, Shadagee Road Pump Station | Town of Eden | Eden, NY

Responsible for civil drawings of a water booster pump station capable of pumping up to 1,800 gallons per minute (gpm). Drafted site layout and grading design, as well as details for interconnections to the existing system and other necessary appurtenances.

Wastewater Treatment and Collection Systems

Civil Designer
I/I Demonstration Project | Town of Tonawanda | Tonawanda, NY

Civil Designer responsible for using Civil 3D for the detailed design and drafting plan and profile drawings, as well as verifying survey information. Coordinated with the utility companies for pipe and utility crossings. Project includes installation and lining of approximately 30,000 linear feet of sewer to replace undersized and deteriorated sewers. Pipe sizes on this project range from 8 inch diameter up to 15 inch diameter.

Civil Designer
Parker-Fries Interceptor Project | Town of Tonawanda | Tonawanda, NY

Civil Designer responsible for using Civil 3D for the detailed design, and drafting plan and profile drawings, as well as verifying survey information. Also coordinated with utility companies for pipe and utility crossing information. Project included installation of approximately 48,000 linear feet of sewer to replace undersized and deteriorated sewers. Pipe sizes on this project range from 12 inches in diameter up to 84 inches in diameter, with approximately 18,000 feet of pipe larger than 36 inch diameter. The installed depths of the piping will range up to 30 feet. The project included new sanitary sewer overflow (SSO) chambers, manholes, overflow structures, and a new flow monitoring system.

Civil Designer
Parsons Creek Development, Phase 1 Sewer| Regional Municipality of Wood Buffalo \ Fort McMurray, AB

Civil Designer utilized Civil 3D for the design and drafting of 3,100 linear meters (10,000 feet ±) of a three barrel siphon (sanitary sewer outfall), two 300 mm (12-inch) and one 450 mm (18-inch). Coordinated with the Survey department for the development of the

Sean Pike
Civil Drafter / Designer

project base maps. Created details and sections as required.

Civil Designer

Sewer Separation/Overflow Project | Confidential Client | Cincinnati, OH

Civil Designer responsible for drafting of an underground sewer overflow containment tank. The 20,000-gallon tank involved the interconnection of piping from existing pump stations and overflow pipes, and routing them through industrial areas allowing for gravity flow to the proposed tank location.

Environmental Investigations and Remediation

Civil Designer

600-acre Facility | Confidential Client | Southeast Michigan

Utilized AutoCAD in the creation of storm and sanitary sewer base maps; posting results of water, sediment, and oil samples from manholes and catch basins, concrete pads, and building rooftops for polychlorinated biphenyls (PCBs), metals, semi-volatile organic compounds (SVOCs), and volatile organic compounds (VOCs).

Civil Designer

Industrial Facility | Confidential Client | Western New York

Used AutoCAD to develop a comprehensive set of drawings outlining the facility's storm, sanitary, and industrial waste sewer systems. Used soil and sediment results in mapping the PCB content.

Civil Designer

Superfund Site | Confidential Client | Tacoma, WA

Prepared chemical concentration contour drawings, groundwater contour drawings, chemical concentration data box drawings, and USGS mapping

Work history

2001 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY
2001	Draftsman, ATSI, Inc.

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Lisa L. Poole

Project Engineer/Manager

Qualified: Bachelor of Science - Environmental Engineering, 1996

Professional Summary: Lisa has worked her 20-year professional career with GHD working extensively in the areas of soil and groundwater remediation, regulatory permitting and environmental compliance, and project management and coordination - including former State and Federal Superfund landfill sites, and environmental site assessments. Lisa's organization and excellent people skills have contributed to the success of many projects at GHD.

Environmental Compliance

Project Engineer

Lisa has provided environmental compliance support for numerous projects throughout the United States. Specific project experience and locations are listed below:

- Preparation of facility air evaluations, air permit modifications, annual emissions reporting, underground injection control permitting, EPCRA Section 313 Toxic Release Inventory (TRI) reporting, storm water permit reissuance applications, Storm Water Pollution Prevention Plan (SWPPP) and Spill Prevention Control and Countermeasures Plan (SPCC) preparations for 22 anhydrous ammonia storage terminals and 2 urea processing/handling facilities (Alabama, Illinois, Indiana, Iowa Kansas, Louisiana, Minnesota, Missouri, Nebraska, South Dakota, Texas, and Wisconsin)
- Preparation of design report and related permitting applications for wastewater treatment system at an animal feed manufacturing facility (Iowa)
- Facility air emission calculations for motorhome manufacturing and surface coating operations (Alabama and Mississippi)
- Storm water permit amendment, annual emissions reporting, Toxic Release Inventory reporting for a steel casting foundry with production and coating operations (Iowa)
- Air permit application preparation for light fixture manufacturing and surface coating operations (Minnesota)
- Regulatory research within 6 states for purposes of selecting a location for a new utility pole treatment facility (Idaho, Montana, Nebraska, Oklahoma, Oregon, and Washington)
- Prepared SPCC plans for 5 dairies (Idaho)
- SPCC plan preparation and SPCC 5-year reviews for 12 drug distribution centers (California, Missouri, North Carolina, New York, Ohio, Pennsylvania, Texas, Virginia)
- Assisted with SWPPP preparations and updates for utility pole treatment facilities (Minnesota, Nebraska, and Wisconsin)
- Assisted with noise mitigation studies for utility pole treatment facilities (Minnesota and Washington)
- Prepared SWPPP for a mortar and grout manufacturing facility (Georgia)
- Updated SWPPP for manufacturer of commercial transformers and regulators (Louisiana)
- Updated SWPPPs for rail yards with vehicle maintenance operations (Arkansas, Kansas, Louisiana, Oklahoma, and Texas)
- Prepared TRI Report and assisted with the preparation of Pollution Prevention Progress Report for a Public Utility client (Minnesota)
- Assisted with multi-media compliance evaluation at a manufacturing/storage/distribution facility for concrete mixing chemical admixtures (Minnesota)

Landfill

Project Manager

Lisa has contributed to multiple landfill projects for several clients. Specific project experience and locations are listed below:

- Project management, coordination, system operation, maintenance, and monitoring, reporting, and agency negotiations associated with remediation of landfill gas and groundwater contamination on a Former Landfill Site (Federal Superfund Site) in Tomah, Wisconsin
- Project management, coordination, system operation, maintenance and monitoring, permitting, reporting,

agency negotiations, and public relations associated with remediation of groundwater contamination at a Former Landfill Site (State Superfund Site) in White Bear Township, Minnesota

Remediation

Project Manager

Lisa was the project manager for a long-term groundwater containment system monitoring program, in White Bear Township, Minnesota, involving:

- Coordination of groundwater sampling events, long-term inspections, and monitoring
- Coordination with subcontractors to bid and schedule repair and maintenance activities
- Oversight during repair and maintenance activities
- Preparation of quarterly discharge reports, quarterly summary reports, sampling summaries, annual monitoring reports, sampling specifications, sampling analysis and monitoring plan

Lisa was the analytical data manager for a site remediation in Auburn Hills, Michigan, involving:

- Solidification and disposal of 30,000 cy of contaminated non-hazardous sediment
- Excavation, characterization and disposal of 1,200 tons RCRA hazardous waste, 1,000 tons TSCA waste and 1,000 tons RCRA/TSCA waste
- Implementation of waste minimization procedures and segregation protocols
- Operation and compliance monitoring for 70 gpm temporary groundwater treatment plant
- Wetland restoration

Construction Oversight

Project Engineer

Lisa provided construction oversight on a number of projects, including:

The installation of double barrier geosynthetic liner at an 18-acre landfill in Tomah, Wisconsin, involving:

- On-site management/supervision of field testing of the liner installation, welder qualification testing, destructive and non-destructive seam testing
- Assistance with the preparation of final completion of construction report and O&M plan
- Completed long-term weekly inspections and monitoring of active gas extraction system and associated residential gas probes
- Collected groundwater, residential well, and blower discharge gas samples. Prepared quarterly monitoring reports

The excavation of nitrate impacted soil from a 4-acre site in Maysville, Kentucky, involving:

- The collection of confirmatory and/or characterization profile samples for concrete, soil, and water prior to their disposal off site
- On-site management/supervision of excavation, backfilling, surveying, final grading, and restoration activities
- Provided weekly summary reports, prepared Soil Excavation Report and various associated permit applications

The regrading and capping of a 21-acre landfill in Byesville, Ohio, involving:

- Capping system consisted of a leachate collection system, groundwater collection system, double barrier geosynthetic liner, vegetated frost protection layer, and surface water drainage system
- Performed and coordinated quarterly groundwater sampling and landfill gas monitoring
- Prepared quarterly monitoring reports and associated permit applications

Lisa provided on-site management/supervision of a variety of field construction projects including:

- Landfarm closure
- Air stripping tower packing replacement and flowmeter maintenance
- Monitoring well installation/maintenance/abandonment
- Gas probe installation

Environmental Site Assessment

Lisa completed numerous Phase I and Phase II Environmental Site Assessments for various properties in Minnesota, Illinois, Colorado, Utah, Indiana, and Ohio.

Data Management and Reporting

- Managed various databases using Microsoft Excel
- Prepared summary analytical reports for clients and applicable agencies, and assisted with the preparation of sampling and analysis plans, remedial action plans, remedial action construction specifications and drawings, a soil erosion control plan, and various permit application forms
- Assisted with preparation of bids for general construction and remediation projects
- Prepared certification reports for aboveground storage tanks in accordance with API 653. Included evaluating both quantitative and qualitative data

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Sampling and Other Field Activities

- Groundwater sampling using a Geoprobe and submersible bladder and peristaltic pumps
- Air quality monitoring using PID, FID, LandTec GEM 500, MSA Gascope, Digital Manometer, Draeger Tubes, and sampling using Summa Canisters
- Soil sampling using Geoprobe, Encore, and other ASTM and USEPA approved methods
- Groundwater and surface water levels and flowrate measurements
- Surface water sampling
- Electromagnetic Induction survey and data interpretation
- Treatment system influent and effluent sampling (groundwater and gas)
- Septic system sampling
- Surveying

Other related areas of interest

Recognized (Certifications/Trainings)

- 40-Hour HAZWOPER OSHA Training (per 29 CFR 1910.120)
- 8-Hour HAZWOPER Refresher OSHA Training (per 29 CFR 1910.120), Annually
- Underground and Aboveground Storage Tank Inspection, University of Wisconsin, 1998

Work history

1997 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1997	STS Consultants, Plymouth, MN

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Gary Pritchard, P.E.

Engineering Services / Process Engineer

Qualified: Bachelor of Science (BS), Chemical Engineering, State University of New York at Buffalo; Master of Business Administration (MBA), State University of New York at Buffalo

Connected: Registered Professional Engineer: NY; Member, American Institute of Chemical Engineers; LEED Accredited Professional

Professional Summary: Process engineer experienced with the design and operation of groundwater treatment systems, industrial wastewater treatment systems, and chemical plant process systems.

Process Engineer
Manufacturing Facility | IN | 2018

Startup and commissioning coordinator for membrane bioreactor activated sludge wastewater treatment system.

Process Engineer
Chemical Manufacturing | NY | 2017

Developed mass and energy balance and specified equipment for front end engineering design of $40MM chemical plant expansion.

Process Engineer, Project Manager
Precious Metals Refinery | NY | 2013

Designed emergency closure system for sulfur dioxide ton cylinder system. Designed vaporizer system for sulfur dioxide distribution.

Process Engineer
Precious Metals Refinery | NY | 2013

Designed pH instrumentation upgrades to wastewater treatment system at precious metals refinery.

Process Engineer
Precious Metals Refineries | NY, NM | 2014

Conducted audits and risk assessments of industrial wastewater systems at precious metals manufacturing locations in New York and New Mexico.

Process Engineer
Chlor-Alkali Plant | Niagara Falls, NY | 2014

Specified pressure relief valves and rupture discs for chemical plant expansion in New York.

Process Engineer
Chemical Manufacturer | KS | 2014 - 2015

Evaluated pressure relief valves and rupture discs in chemical plant service for compliance with API-520 and API-521 standards for capacity and inlet and outlet pressure loss. Designed process modifications as needed for valves to meet API-520 and API-521 requirements. Used Aspen Properties, Aspen Hysys, Aspen Flare System Analyzer, and Pipe-Flo modeling software for evaluations.

Process Engineer
Groundwater Treatment Systems | LA, WA | 2013

Designed air stripping processes to retrofit into existing groundwater treatment systems. Developed P&IDs for new process.

Process Engineer
Groundwater Treatment Systems | NY, WA | 2017

Specified Regenerative Thermal Oxidizers and offgas scrubbers to treat VOCs from air stripping processes at groundwater treatment systems. Developed P&IDs for new process.

Process Engineer
Groundwater Remediation System | CT | 2014

Designed and specified sand filter skid system to remove suspended solids from groundwater in remediation facility in Connecticut. Specified new pumps to match existing process conditions.

Process Engineer
Groundwater Remediation System | DE | 2017

Developed process flow diagrams, piping and instrumentation diagrams, and selected major process equipment for in-situ biosparge groundwater remediation system.

Process Engineer
Chemical Manufacturing Facility | NY | 2015

Developed piping and instrumentation diagrams for chemical manufacturing pilot plant.

Process Engineer
Animal Feed Manufacturing Facility | IA | 2014

Specified pumps, tank, mixer, and instrumentation for system to treat boiler blowdown at manufacturing facility in Iowa. Processes included aeration, pH adjustment, chemical oxidant addition, and filtration.

Process Engineer
Groundwater Remediation System | NM | 2014

Designed groundwater storage system for collection and disposal of chloride impacted groundwater at gas processing facility in New Mexico.

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Process Engineer
Manufacturing Facility | NY | 2013

Designed process for destruction of hydrazine in wastewater treatment system using chlorination.

Process Engineer
Manufacturing Facility | NY | 2013

Designed process to recover acetone vapors from chemical reactor vent using two-stage refrigeration system.

Process Engineer
Chemical Manufacturing Facility | LA | 2012

Developed project design basis report for change of service of atmospheric storage tank from methanol to cumene storage.

Process Engineer
Groundwater Remediation Site | NY | 2012

Performed field startup and commissioning activities on in situ biosparge remediation system in New York. Specified new air compressor for site.

Process Engineer
Chemical Manufacturing Facility | LA | 2012

Designed replacement chlorine liquefier/heat exchanger for chlor-alkali plant. Modeled liquefier performance using HYSYS.

Process Engineer
Chemical Manufacturing Facility | LA | 2012

Modeled hydrocarbon storage tank emissions using ProMax software package.

Process Engineer
Chemical Manufacturing Facility | ON | 2011

Developed mass and energy balance for tank vapor recovery system to recover and condense hydrocarbon and chlorinated hydrocarbon products. Performed process modeling using HYSYS, including vapor liquid equilibrium (VLE) calculations. Selected vacuum pumps and compressors for project.

Process Engineer
Chemical Manufacturing Facility | NY | 2011

Developed process flow diagrams (PFD) for plant to process tungsten ore into Ammonium Paratungstate (APT). Evaluated equipment options for scrubbers to control H_2S, SO_2, and NH_3 emissions.

Process Engineer
Groundwater Remediation System | NY | 2010

Developed mass balance for 125 gpm groundwater treatment system in New York.

Process Engineer
Stormwater Remediation System | MA | 2009

Developed water balance for 9,600 gpm stormwater and 300 gpm groundwater treatment systems in Massachusetts.

Process Engineer
Groundwater Remediation System | WA | 2009

Developed cost estimates for major capital upgrades to an existing 125 gpm groundwater treatment facility in Washington.

Process Engineer
Oil and Gas Producer | MT | 2009

Calculated headloss and specified pumps for crude oil lift station.

Process Engineer
Chemical Manufacturer | NY | 2011

Developed and implemented disinfection and reseeding plan for activated sludge sequencing batch reactors treating chemical plant process wastewater.

Process Engineer
Groundwater Remediation System | WA | 2011

Designed process upgrades for groundwater remediation plant in North Carolina. Specified pumps and instrumentation.

Process Engineer
Groundwater Remediation System | WA | 2010

Startup and commissioning of Vacuum-enhanced Remedy (VER) and Groundwater Treatment System in Illinois, including 330 SCFM air sparge system, 1,800 SCFM soil vapor extraction (SVE) system, and 70 gpm ground water extraction. Specified filter press for sludge dewatering.

Process Engineer
Groundwater Remediation System | LA | 2011

Developed process design and specified equipment for major capital upgrades to groundwater treatment system in Louisiana.

Process Engineer
Stormwater Remediation System | NY | 2010

Designed process for 25,000 gpd treatment system to remove coal fines from groundwater and stormwater runoff at coke manufacturing facility.

Process Engineer
Municipal Wastewater Treatment System | NY | 2013 - 2014

Developed sampling plans for testing of municipal wastewater processes.

Process Engineer
Soil Remediation System | NY | 2009

Developed design drawings and design reports for SVE system in New York.

Process Engineer
Groundwater Remediation System | NY, OH | 2009

Provided major updates to operation and maintenance manuals for groundwater treatment systems in New York and Ohio.

Work history

2008 – present	GHD (formerly Conestoga Rovers & Associates), Buffalo, NY
2006 – 2008	Gerster Trane, Buffalo, NY

Other related areas of interest

Recognized (Certifications/Trainings)

- PEC Safeland Training
- H_2S Awareness Training

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R. T. (Bob) Pyle
Principal/Project Manager

Qualified: Bachelor of Applied Science, Civil Engineering, 1979

Connected: Professional Engineers Ontario

Professional Summary: Bob has over 35 years of experience in project and environmental management. He began his career rehabilitating bulk fuel storage plants and pipelines in the Canadian arctic and has managed progressively more complex environmental projects throughout the United States and Canada. He has conducted and/or managed over 2,000 due diligence and compliance audits for a broad range of industrial and commercial clients in the United States, Canada, Mexico, South America, West Africa and Europe. In addition, he has managed the characterization and remediation of numerous Superfund and State regulated sites on behalf of his private sector clients. Bob strives to identify practical and economic solutions for his clients' environmental and risk management issues. He has successfully negotiated cost effective risk management solutions using various tools such as exposure area averaging, soil stabilization, exposure barriers, various in situ treatments, and institutional controls.

Environmental Site Assessment and Remediation

Supervising Contractor
Horton Iron & Metal Co. Superfund Site | Wilmington, NC

Bob managed the Remedial Investigation (RI) and Feasibility Study (FS) for this former fertilizer production and ship breaking facility. Primary contaminants include metals, PCBs, asbestos and semi-volatile organics. He is currently negotiating the final remedy with USEPA; developed justification for on-Site encapsulation of impacted sediments in on-Site boat slips to preclude removal of sediments and embedded sunken barge remnants. Final proposed remedy includes:

- On-Site consolidation
- Stabilization
- In situ groundwater treatment
- Encapsulation
- Institutional controls

Supervising Contractor
Aqua-Tech Environmental, Inc. Superfund Site | Greer, SC

Bob managed the RI/FS and remedial design/remedial action for this former solvent reclamation site on behalf of a diverse group of Potentially Responsible Parties (PRPs). He successfully negotiated installation of a soil cover over the majority of the former landfill in lieu of a RCRA cap; the revision resulted in a significant cost reduction while maintaining protection of the public and the environment. A RCRA cap and SVE system was installed in a portion of the former process area.

Supervising Contractor
Alternate Energy Resources (AER) Superfund Site | Augusta, GA

Bob developed the remedial action design and associated work plans after providing justification for soil stabilization in lieu of in situ chemical oxidation (ISCO) after identifying excessive chemical demands and associated costs for ISCO. He managed the implementation of soil stabilization using a Portland cement and carbon mix.

Project Principal/Project Manager
Zep Inc. | Atlanta, GA

Bob developed and implemented a 3-stage remedial action plan for an active chemical formulator including: free product removal; in situ chemical oxidation of hot spots; and use of in situ oxygen curtain (ISOC) to protect an adjacent creek from chemical impact.

Project Principal/Project Manager
Various

Bob is project manager for characterization and/or corrective action on numerous active and abandoned industrial facilities throughout North America including:

- Abandoned PCB capacitor manufacturing plant
- Various pharmaceutical manufacturing plants
- Transformer servicing facilities
- Former cotton/fabric mills
- Black liquor ponds associated with pulp mill
- Former pesticide manufacturing facilities
- Locomotive maintenance facilities
- Former Chlor-alkali (mercury cell) production facility
- Former municipal and industrial landfills
- Heavy equipment and automotive manufacturing and assembly plants
- Foundries and steel mills

Environmental Due Diligence/ Phase I ESAs

Project Principal/Project Manager
Various Clients | Various Sites

Bob serves as one of the corporate leaders of the due diligence/Phase I Environmental Site Assessment group managing and conducting a variety of projects in diverse industry sectors and diverse geographic regions. A selection of facility types and locations where he has conducted or managed environmental due diligence include:

- Pharmaceutical and personal care product production plants - United States, Mexico, Puerto Rico, and Israel
- Oil Refineries – Israel, and Indiana
- Bottling plants, food production / packaging plants and warehouse/distribution and fleet maintenance facilities - United States, Canada, Mexico, Central America, Barbados, and West Africa
- Pulp mills, converting plants, and paper mills - United States
- PVC resin manufacturing plants – United States and Mexico
- Hydrofluoric acid production plant - Juarez, Mexico and St. Louis, Missouri
- Cement plants and terminals, cement pipe plants and pre-cast cement plants – United States and Canada
- Electronics component manufacturing plants – United States and Mexico
- Yacht manufacturing / ship maintenance plant - Savannah, Georgia
- Foundries and associated landfills – United States
- Retail/wholesale gasoline distributor including over 200 outlets and bulk stations, North and South Carolina
- Medium and heavy manufacturing plants – United States, Canada, Mexico, Brazil, Europe, and India
- Commercial cleaner/specialty product formulation facilities - United States, Mexico, and Puerto Rico
- Locomotive and rail car maintenance facilities; abandoned rail yards/terminals – United States, Canada and Mexico
- Pesticide Formulation and Packaging – United States, and Mexico
- Pharmaceutical Manufacturing Facilities – United States, Mexico, and Puerto Rico
- Carton and paperboard plants – United States, Canada, and Mexico
- Fleet maintenance facilities – various locations
- Active and Abandoned Textile plants – various locations
- Automotive component plants – United States, and Mexico
- Medical Care Facilities – United States, and Canada
- Food and Beverage Processing Facilities – United States, Canada, Mexico, Barbados and West Africa
- Asphalt plants – various locations
- Metal finishing/plating operations – United States, Canada, and Mexico
- Forge, foundries – United States, Canada, and Mexico
- Abandoned manufacturing facilities - United States, Canada, Mexico, and Brazil
- Heavy equipment manufacturers - United States
- Commercial/industrial malls; equipment, auto and truck dealerships; dry cleaners – various locations
- Residential and agricultural properties – various locations

Expert Witness

Bob has served as an expert witness providing testimony regarding the historic source and migration of PCBs at a former WWII manufacturing facility and chrome/solvent contamination at a former aircraft manufacturing facility. He has also provided litigation support related to a rail yard tank car failure.

General and Municipal Engineering

Bob has developed servicing feasibility studies, conceptual design and/or detailed design for a variety of residential, community and commercial servicing projects including:

- Air cargo terminal and commercial development - Domodedovo Airport - Russia
- Kota Legenda Town Site – Indonesia
- Fire main Utilidor, Ft. McMurray – Alberta, Canada
- Water supply servicing (lake and groundwater) First Nation Reservations – Northern Alberta and Saskatchewan, Canada
- Residential and institutional developments – Alberta, Saskatchewan and Ontario, Canada

Cold Regions Engineering

Bob designed and managed clean-up and reconstruction of various bulk fuel plants, pipelines and airport refueling stations on remote settlements throughout the Canadian Arctic.

Work history

1996 – present	Principal, GHD (formerly Conestoga-Rovers & Associates), Duluth, GA
	Named Principal, 1998
1993 - 1996	I.D. Engineering Canada, Inc./IDG Stanley, Inc. Winnipeg, MB
1986 - 1993	Conestoga-Rovers & Associates, Waterloo, ON and Niagara Falls, NY
1982 – 1986	I.D. Engineering Company, Ltd., Lloydminster, AB
1979 - 1982	Government of the Northwest Territories, Yellowknife, NWT

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Brian Regan

Civil/Structural Engineer

Qualified: Master of Science (MS) Civil Engineering, State University of New York at Buffalo, Bachelor of Science (BS) Civil Engineering, State University of New York at Buffalo

Connected: Intern Engineer, New York

Professional Summary: Mr. Regan is a Civil/Structural engineer and has been with CRA for over 5 years. During this time, he has gained experience in municipal, chemical, oil and gas, environmental, and engineering consulting industries. His experience includes analysis and/or design of foundations, retaining walls, truss/joist systems, wall and roof framing systems, and equipment supports. Other responsibilities have included preliminary and detailed design, and bid and construction document preparation.

Water Treatment

Design Engineer
BCWA Residual Handling Facility | Bradford City Water Authority | Bradford, Pennsylvania

- Designed two cast in place concrete sludge tanks and associated interconnected pump station.
- Designed cast in place equipment supports, elevated, composite concrete / grating floor, structural steel floor framing, cast in place concrete shear/retaining walls, and cast in place floor/ foundation slab for a centrifuge building.
- Specified a pre-engineered metal building.

Design Engineer
Alden Water System Assistance | Alden | Alden, New York

- Designed a reinforced concrete masonry unit (CMU) shear wall building with steel framed roof and cast in place concrete foundation.
- Designed a cast in place concrete clear well.
- Designed cast in place concrete equipment supports.
- Specified a precast concrete overflow chamber.

Design Engineer
Colonel Ward Pumping | City of Buffalo | Buffalo, New York

- Designed modifications to an existing cast in place concrete pump foundation to support new pumps and associated valves and piping.
- Designed modifications in an existing cast in place concrete wall to allow the installation of a new steel pipe.
- Evaluated existing precast concrete planking and specified new planking for elevated floor modifications above a clear well.

Wastewater Treatment/Distribution

Design Engineer
Phase 3 Rehabilitation | Niagara Falls Water Board | Niagara Falls, New York

- Designed cast in place concrete modifications and supports to existing concrete structures.
- Designed an aluminum elevated walkway.
- Designed new penetrations in existing masonry walls for mechanical equipment.

Design Engineer
NCSD Phase 1A Capital Plan | Niagara County Sewer District No. 1 | Wheatfield, New York

- Evaluated existing elevated cast in place concrete two-way slab for new loading conditions.
- Designed equipment supports and containment area for a polymer feed system.
- Designed an elevated cast in place concrete platform and supporting steel columns and bracing.
- Designed cast in place concrete and steel equipment supports for a centrifuge and screw conveyor.

Design Engineer
Hamburg Drain Screening Facility | Buffalo Sewer Authority | Buffalo, New York

- Designed a temporary steel bulkhead for an existing stone box culvert wall.
- Designed new cast in place concrete interconnections to an existing stone box culvert and a new screening facility.
- Specified precast concrete box conduit sections.
- Designed cast in place concrete below grade walls and beams for a screening facility.
- Designed cast in place concrete supports for screening facility equipment.

Design Engineer
Tonawanda | Town of Tonawanda | Tonawanda, New York

- Designed several cast in place concrete underground chambers to regulate sewer flows.
- Designed a cast in place concrete foundation for a pump station backup generator.

Design Engineer
ECSD No. 4 Vanderbilt PS Rehab | Erie County Department of Environmental Protection | Depew, New York

- Designed modifications to an existing masonry wall and cast in place concrete floor to allow the installation of a new generator, wall fan, and louver in an existing pump station.
- Designed a new steel baffle and modified an existing cast in place concrete wall in an overflow retention facility.
- Modified an existing cast in place concrete headwall to accommodate a new outfall pipe.
- Designed a cast in place concrete foundation for electrical equipment.

Industrial

Design Engineer
Niagara HCl Burner | Confidential Client | Niagara Falls, New York

- Evaluated existing steel framing for loading/unloading facilities and piping/equipment supports.
- Designed cast in place concrete equipment foundations and steel supports for new and existing equipment and piping.

Design Engineer
Petrolia Bldg Hardening | Confidential Client | Petrolia, Pennsylvania

- Evaluated existing unreinforced masonry control rooms using new loads developed by an outside company and designed new support steel to retrofit the control rooms.

Design Engineer
Everett, MA Terminal | Confidential Client | Everett, Massachusetts

- Specified a pre-engineered metal building.
- Designed cast in place concrete footings and piers for a pre-engineered steel stormwater treatment building.
- Designed a reinforced concrete masonry unit (CMU) shear wall control room with composite steel and concrete ceiling and cast in place concrete floor.
- Designed cast in place concrete equipment supports and steel equipment access platforms.
- Assisted with design of underground vapor intrusion mitigation system.

Design Engineer
Renewable Energy – Landfill Gas to Energy Power Plant | Confidential Client | Lockwood, Nevada

- Designed a special reinforced concrete masonry unit (CMU) shear wall building with steel beam framed roof and cast in place concrete foundation.
- Designed cast in place concrete foundations for mechanical and electrical equipment.
- Designed a cast in place concrete containment area for a vertical tank.

Design Engineer
Limonene Chiller Project | Confidential Client | Trenton, Michigan

- Specified a pre-engineered metal building for a building addition.
- Designed a cast in place concrete foundation for a building addition and mechanical equipment.
- Designed steel pipe supports with cast in place concrete foundations for elevated piping.

Work history

2007 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, New York

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Christopher Rohrich
Civil Drafter/Designer

Qualified: A.A.S., Computer Aided Drafting and Design, 2008

Professional Summary: Chris has more than 10 years of experience using AutoCAD and 5 years of experience utilizing AutoCAD Civil 3D. Chris utilizes Civil 3D for various municipal and industrial projects. In addition to Civil 3D, Chris has 3 years of entry level ArcGIS experience.

Landfill Design

Civil Drafter/Designer
Permit Drawings for Major Modifications |
SKB Environmental | Austin, MN

Chris provided drafting and design of the following engineering plans:

- Volume calculations
- Phasing plans and sections
- Stormwater management plans and sections
- Leachate collection plans and profiles
- Gas collection plans and profiles
- Details

Civil Drafter/Designer
West Development Permit Drawings |
SKB Environmental | Austin, MN

Chris was the lead civil drafter responsible for the drafting and design of the following engineering plans:

- Volume calculations
- Phasing plans and sections
- Stormwater management plans and sections
- Leachate collection plans and profiles
- Gas collection plans and profiles
- Details

Civil Drafter/Designer
Permit Drawings for Major Modifications |
SKB Environmental | Rosemount, MN

Chris was the lead civil drafter responsible for the drafting and design of the following engineering plans:

- Volume calculations
- Phasing plans and sections
- Stormwater management plans and sections
- Leachate collection plans and profiles
- Gas collection plans and profiles
- Details

Civil Drafter/Designer
Site 104 MTR Landfill Closure |
Confidential Client | Deer Park, TX

Chris completed the drafting for two 8-acre cells that consisted of the following engineering plans:

- Volume calculations
- Phasing plans and sections
- Stormwater management plans and sections
- Passive gas venting plans
- Details

Civil Drafter
Final Cover Design | Himco | Elkhart, IN

Chris prepared the record drawings of the final cover design for a 60-acre closed landfill.

- Volume calculations
- Slope Verifications
- Details

Civil Drafter
Landfill Gas to Energy Facility – Eco Vista |
Waste Management Renewable Energy, LLC |
Tontitown, AR

Chris was the lead civil drafter responsible for the drafting and design of the following engineering plans:

- Grading Plan
- Paving Plan
- Utility plans and sections
- Gas collection system plans and profiles
- Gas system and site details

Civil Drafter
Landfill Gas to Energy Facility – Naples |
Waste Management Renewable Energy, LLC |
Naples, FL

Chris provided drafting and design of the following engineering plans:

- Gas collection system plans and profiles
- Gas system and site details

Civil Drafter
Landfill Gas to Energy Facility – Eagle Valley | Waste Management of Michigan Inc. | Orion, MI

Chris was the lead civil drafter responsible for the drafting and design of the following engineering plans:

- Gas collection system plans and profiles
- Gas system and site details

Civil Drafter
Landfill Gas to Energy Facility – Riverbend | Waste Management Renewable Energy, LLC | McMinnville, OR

Chris provided drafting and design of the following engineering plans:

- Grading Plan
- Paving Plan
- Utility plans and sections
- Gas collection system plans and profiles
- Gas system and site details

Civil Drafter
Landfill Gas to Energy Facility – Pine Tree Acres | Pine Tree Acres, Inc. | Lenox, MI

Chris provided drafting and design of the following engineering plans:

- Gas collection system plans and profiles
- Gas system and site details

Civil Drafter
Landfill Gas to Energy Facility – Lockwood | Waste Management of Nevada Inc. | Lockwood, NV

Chris was the lead civil drafter responsible for the drafting and design of the following engineering plans:

- Grading Plan
- Utility plans and sections
- Gas collection system plans and profiles
- Gas system and site details

Industrial Design

Civil Drafter
Invista Ammonia M-Line Re-Route Evaluation | Confidential Client | Orange, TX

Chris was the lead civil drafter responsible for the drafting of the preliminary route analysis for more than 10 miles of steel ammonia pipeline. Drawings included plans and profiles.

Civil Drafter
Stormwater Treatment System | Confidential Client | Everett, MA

Chris completed detailed drawings for the installation of a new 4-inch and 16-inch storm line. Used 3D survey information to locate and establish elevations from objects such as tanks and pipe supports, and incorporated information into design where necessary.

Civil Drafter
Underground Chlorine Line | Titanium Metals Corporation | Henderson, NV

Chris drafted the detailed drawings for the installation of an 8-inch steel chlorine pipeline.

Civil Drafter
Liquefied Gas Conveyance Pipeline Design | Confidential Client | Maricopa County, AZ

Chris utilized AutoCAD Civil 3D for the drafting of two 6-inch, 20,000 linear feet (LF) liquefied gas conveyance pipelines. Design included site plans, plans and profiles, and details.

Civil Drafter
Stormwater Management Improvements | Confidential Client | Tonawanda, NY

Chris provided the drafting of the upgraded stormwater management improvements for a coal sorting and storage area within a coke manufacturing facility. The design included regarding swales, berms, detention pond, and sedimentation pools.

Water and Wastewater Systems

Civil Drafter
Smith Street Drain CSO No. 026 Sewer Separation | Buffalo Sewer Authority | Buffalo, NY

Chris completed detailed drawings to facilitate the installation of over 15,000 LF of dedicated storm sewer piping.

Civil Drafter
Central Avenue Pump Station Relocation | Rhode Island Resource Recovery Corp. | Johnston, RI

Chris completed detailed drawings to facilitate the installation of a 12-inch watermain and booster pump station. The design consisted of plan and profiles, grading plan, demolition plan, interconnections and details.

Civil Drafter
Water System Improvements | Village of Alden | Alden, NY

Chris completed detailed drawings consisting of site plans, profiles, and details. The project included the routing of multiple waterlines and sanitary sewer lines for a new water treatment system at well site 3 and 4.

Civil Drafter
Groundwater Remediation System | Hooker/Ruco Site | Hicksville, NY

Chris completed detailed drawings for a groundwater remediation system. Design included extraction well site plans and details.

Volume Calculations and Estimates

Civil Drafter
Confidential Client | Plaquemines Parish, LA

Chris estimated the amount of material to be excavated and treated at an off-site location. He utilized AutoCAD Civil 3D and boring log data to create 3D surfaces to create multiple plans, sections and estimate the volume of material.

Civil Drafter
Smith Street Drain CSO No. 026 RTC Structure | Buffalo Sewer Authority | Buffalo, NY

Chris modeled the existing Smith Street Drain in order to estimate the amount of stormwater that could be stored within the existing outfall. Based on the results, he determined the best location to place a control structure in order to maximize containment.

Civil Drafter
Hamburg Drain CSO Storage | Buffalo Sewer Authority | Buffalo, NY

Chris modeled the existing Hamburg Drain in order to estimate the amount of stormwater that could be stored within the existing outfall.

Civil Drafter
ARC Terminals Drainage Project | ARC Terminals | Mobile, AL

Chris created drainage runoff drawings within a tank containment area, and provided cut and fill calculations based on the drainage design to determine material removal. Water was directed towards six separate sumps and discharged to two oil/water separators.

Civil Drafter
Gratwick Riverside Park Marina | City of North Tonawanda | North Tonawanda, NY

Chris determined the depth and volume of dredge material. The project consisted of site plans, profiles, sections and details.

Civil Drafter
Parking Garage Demolition | City of Lockport | Lockport, NY

Chris completed civil design plans for a multi-level surface parking lot. The project included the demolition of a five-story, pre-cast concrete municipal parking garage that was used as fill for the multi-level surface parking lot.

Work history

2008 – present	GHD (formerly CRA Infrastructure & Engineering, Inc.), Buffalo, NY

Peter Romzick
Associate

Qualified (Education): B.S., Chemical Engineering, 1981

Connected (professional affiliations): Michigan Manufacturer's Association (MMA), Engineering Society of Detroit (ESD)

Professional Summary: Mr. Romzick is an Associate of GHD and a senior environmental engineer. Mr. Romzick is a registered professional engineer in the State of Michigan. Mr. Romzick provides environmental consulting services to oil and gas, secondary aluminium, automotive, metal parts coating, coking and chemical processing industries that are focused on Clean Air Act and RCRA Compliance. Mr. Romzick has conducted multi-media environmental compliance audits for numerous facilities across the country. Mr. Romzick's air permitting experience includes New Source Review Permits (NSR), Prevention of Significant Deterioration (PSD), synthetic minor and Title V air permits. Mr. Romzick has experience in preparation of Pollution Incidence Prevention Plans (PIPP), Stormwater Pollution Prevention Plans (SWPP), Annual Air Emissions Reporting in multiple states, Spill Prevention Control and Countermeasures Plan (SPCC), and Risk Management Plans (RMP).

Air Permitting/Compliance

Project Manager
Major PSD Air Permit | Secondary Aluminum Processor | Coldwater, MI | June 2015

Prepared a PSD air permit application for the relocation and modification of two secondary aluminium melting furnaces at a major PSD source. The scope of work included meeting with the State regulators for an air permitting pre-meeting, selecting the contemporaneous period, emission calculations for adding oxy fuel to the rotary furnaces, calculating the project emissions based on the contemporaneous period, managing the air dispersion modelling, and preparing the final air permit application for submittal to the Michigan Department of Environmental Quality (MDEQ). By determining the stack heights required to avoid conducting full PSD modelling we saved the client significant dollars by avoiding full PSD modelling.

Project Manager/Senior Engineer
Oil and Gas E&P Air Permits | Texas| 2012 - Present

Successfully prepared over 1,200 oil and gas permit by rule (PBR) and/or standard permits in the state of Texas. Architected the emission calculation templates used for the FASTRAC® automated air permitting program, a novel air permit application automation system for high-volume air permitting applications. Responsible for ongoing evaluations of emissions and evaluating alternatives to reduce emissions such as removing excess oil production storage tanks and/or adding vapor recovery units to maintain VOC emissions below the PBR limit of 25 tons per year.

Project Manager
NESHAP Subparts JJJJ and MMMM Compliance Monitoring | Confidential Client | Chicago, IL

Managed the design and installation of three Continuous Parameter Monitoring Systems (CPMS) for web coating and metal coating operations. The CPMS systems allow the client to monitoring and record the required regulatory parameters to demonstrate compliance with the applicable regulations for the closed vent system capture efficiency and thermal destruction efficiency. The CPMS systems include programmable alarm limits which provide flexibility in allowing advance warning if parameters are trending in an unfavorable direction thus allowing the client to minimize any non-compliant operations. With VPN access we can troubleshoot and update the software from any remote location thus minimizing travel to the site. The recorded data can then be reviewed to determine if there are any reportable deviations.

Greenhouse Gas Lead Verifier/Independent Reviewer | Multiple Projects | California | 2010 - 2014

Lead Verifier or Independent Reviewer for over 25 GHG verification projects with the California Air Resources Board (ARB) Regulation for Mandatory Reporting of Greenhouse Gas Emissions (RMRGGE) hydrogen production, cogeneration, and general stationary combustion sources.

Senior Project Engineer
Packaged Boiler System Evaluation, PSD and Title V and Alternate Fuel Analysis | Confidential Client | Detroit, MI

Performed a technical feasibility analysis to install three 150 mmBtu/hour packaged boilers and evaluate alternate fuels to improve the energy efficiency. The evaluation included energy needs, steam loads, permitting requirements, air permitting alternatives, dispersion modeling, NOx reduction strategies, stack requirements,

Peter Romzick
Associate

permits, access, and enclosures. The completed package was used to procure Design-Build-Own-Operate-Maintain Performance Contracting for a 10-year term at the facility in an effort to reduce energy costs. Prepared and successfully negotiated Opt-out permit with the State of Michigan and EPA. The new steam system was subsequently constructed and is currently in successful operation at the facility.

Project Manager

New Source Review Permitting | Chemical Processing Plant | Confidential Client | Trenton, MI

This projects involved preparation of several New Source Review (NSR) air permits for a Title V major source from using alternative raw chemicals to reconstruction of existing process equipment. Each project included preparing emissions calculations and preparing air permit applications in a timely manner to allow the projects to proceed on schedule.

Project Manager

Fugitive Emissions Monitoring Program| Chemical Processing Facility | Confidential Client | Trenton, MI

This project consisted of identifying and monitoring fugitive emissions under Federal and State regulations. A monitoring program was developed which included photographs of the components to be monitored. The photographs significantly aided differentiation between components that needed monitoring from adjacent components that did were not part of the monitoring program. Monitoring was conducted on a quarterly, semi-annual, and annual basis depending on the component, and the applicable regulations.

Senior Project Engineer

Turnkey Design and Installation of RTO and Concentrators | Military Rubber Parts Manufacturing Facility| St. Marys, Ohio

This "turnkey" project involves bringing the facility into compliance with the Miscellaneous Metal Parts and Products Surface Coating MACT Standard at 40 CFR 63 Subpart MMMM (MMP MACT) from the evaluation stage through the equipment design, air permitting, construction, and startup phase of the project. Through detailed site-specific compliance and engineering evaluations, design options were identified that have reduced the number of process points needing controls as well as the airflow from those sources needing control. This has significantly reduced the client's anticipated capital and operating costs for the project. The project is energy efficient and self-sustaining with the help of a concentrator that reduced the size of the stream requiring treatment from 50,000 cfm to 5,000 cfm.

Work history

1999 - present	Associate, GHD (formerly Conestoga-Rovers & Associates)
	Named Associate, 2015
1995 - 1999	Senior Environmental Engineer, Waste Management, Inc.
1990 - 1995	Project Manager/Environmental Engineer, Chemical Waste Management, Inc.
1987 - 1990	Supervisor/Project Engineer, Canonie Environmental Services, Corp
1985 - 1987	Process Engineer, American Cyanamid Company
1981 - 1985	Process Engineer, Atlantic Richfield Co.

Other related areas of interest

Recognized (Certifications/Trainings)

- Licensed Professional Engineer - Michigan
- Accredited Lead Verifier for California Air Resources Board (ARB) Greenhouse Gas Reporting Program

Awards

- TAU BET PI, Honorary Engineering Society

Papers Presented and Published in Conference Proceedings

- "Applying the Clean Air Act to Municipal Solid Waste Landfills," presented at AWMA annual meeting, June 1998, 98-TP55.01
- "Review the Draft Title V With Care," presented at AWMA annual meeting, June 1998, 98-RAB.04P
- "Clarifying Issues of the NSPS for MSW Landfills," presented at AWMA annual meeting, June 1997, 97-P566

Published Refereed Papers

- "X*TRAX ™ Laboratory Treatability Study of Jet Fuel Contaminated Soil from Chanute Air Force Base Near Rantoul, Illinois," Hazardous Waste Research & Information Center, Champaign, IL HWRIC TR-003, 1991

Patents

- Two United States patents (No. 5,253,597 and No. 5,453,562) for thermal desorption techniques

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Steven J. Roste
Engineer

Qualified: Bachelor of Science - Civil Engineering (B.Sc.), Associate of Science - Engineering (A.Sc.), Diploma - Automotive & Diesel Technology

Connected: Registered Engineer in Training in Minnesota, Member of Minnesota Society of Professional Engineers and Volunteer on K-College Outreach Committee, Member of Order of the Engineer

Professional Summary: Steven possesses a wide range of skills that provide versatility across many different types of projects. With a strong desire to learn and an ability to adapt to changing situations, Steven is always ready to tackle new challenges. His technical experience as a mechanic coupled with his engineering focus has made him successful at troubleshooting and solving all types of problems.

Compliance & Regulations

EMERGENCY RESPONSE
Engineer | Multiple Railroad Companies (USA)

Engineer responsible for writing Emergency Response Manuals for multiple railroad companies to assist them in being compliant with MN Statute 115E.

MCES SPECIAL DISCHARGE PERMITS
Engineer | Multiple Companies (MN)

Engineer responsible for compiling discharge flow and sampling data for MCES Special Discharge Reports.

MDNR AIR PERMITS
Engineer | St. Louis, MO

Engineer responsible for determining fugitive emissions created by vehicle traffic on haul roads as it pertains to MDNR Air Permits.

MINERAL EXPLORATION
Engineer | Ely, MN

Engineer responsible for co-writing ISO 140001 Environmental Management Manual for an international mineral exploration and mining company. Worked with ISO 140001 Consultant to write manual, best management practices, standard operating procedures, and documentation forms with regard to numerous governmental agencies and regulatory bodies for mineral exploration activities in the Superior National Forest and the Boundary Water Canoe Area Wilderness.

MNDNR WATER APPROPRIATION PERMITS
Engineer | Multiple Companies (MN)

Engineer responsible for compiling discharge flow for MNDNR Water Appropriation Permit Reports.

PUBLIC WATER SYSTEMS
Engineer | Multiple Clients (USA)

Engineer responsible for compiling personnel data to evaluate facilities' compliance with Public Water System regulations.

TIER II: CHEMICAL INVENTORY
Engineer | Shreveport, LA

Engineer responsible for reviewing and compiling chemical inventory data for Tier II Reporting.

TITLE 200 APPLICATION
Engineer | North Platte, NE

Engineer responsible for compiling project information for client reimbursement under Nebraska's Title 200 Program.

Computer Modeling & Design

AIR POLLUTION
Junior Scientist | University of Minnesota, Dept. of Civil Engineering | Minneapolis, MN

Junior Scientist responsible for designing and programming computer code for the purposes of modeling EPA air emissions inventory data, atmospheric chemical reactions, and pollution dispersion based upon the EPA's Cobra II modeling software. Project purpose was to statistically link health risks and costs to pollution exposure from original emitters with primary focus on PM2.5 and Ozone. An air quality simulation and performance evaluation was published in *Geoscientific Model Development* in April 2015.

LANDFILL DRAINAGE
Engineer | Multiple Landfills (IA, MN)

Engineer responsible for modeling landfill slopes, leachate pipe dimensions, and liner thicknesses using the U.S. Army HELP Model and Giroud equations to ensure proper drainage of landfill will be achieved in engineered designs.

Construction Oversight

GROUNDWATER TREATMENT FACILITY
Engineer | Golden Valley, MN

Engineer responsible for conducting oversight on the repair and modification of an extraction well as part of a groundwater treatment facility.

LANDFILLS
Engineer | Cedar Falls, IA

Engineer responsible for inspection of landfill liner construction and testing, slope grading, and cover thickness testing to ensure proper construction to engineered specifications.

Construction Specifications

LANDFILL CONSTRUCTION
Engineer | Multiple Landfills (IA)

Engineer responsible for assisting in development of the Construction Specifications Manual for landfill construction.

Emergency Response

AIR MONITORING
Engineer | Multiple Train Derailments (IA, MN, PA)

Engineer responsible for responding to train derailment emergencies and working as a team to provide air monitoring coverage for responders and residents.

Engineer | Multiple Pipeline Releases (MN)

Engineer responsible for responding to pipeline release emergencies and working as a team to provide air monitoring coverage for responders and residents.

Environmental Investigation

GROUNDWATER
Engineer | Multiple Sites (AR, IA, MN, WI)

Engineer responsible for coordinating and conducting groundwater contamination sampling and monitoring.

SOIL
Engineer | Multiple Sites (AR, MN)

Engineer responsible for coordinating and conducting soil contamination sampling and monitoring.

SURFACE WATER
Engineer | Multiple Sites (MN, WI)

Engineer responsible for coordinating and conducting surface water contamination sampling and monitoring.

Field and Lab Technician | University of Minnesota, Dept. of Ecology (St. Paul, MN)

Lab and Field Technician responsible for collecting water, sediment, data, and larvae specimens from rivers and streams throughout Minnesota, then performing physical analyses of samples and data entry in laboratory. Project purpose was to determine the role of dissolved organic carbon (DOC) on aqueous methylmercury ($MeHg^+$) cycling in streams and its impact on $MeHg^+$ bioaccumulation in stream ecosystems. Final Report published in the American Chemical Society's *Journal of Environmental Science & Technology* in June 2011.

Environmental Remediation

DEMOLITION
Engineer | Minneapolis, MN

Engineer responsible for the environmental sampling and segregation of ground water, soil, and building materials, and the operation and maintenance of the temporary ground water containment system during the demolition of a former metal plating facility, and preparation of the site for redevelopment.

GROUNDWATER
Engineer | Multiple Sites (IA, IL, MN, NE, NJ, WI)

Engineer responsible for assisting in the analysis and planning of sites' groundwater remediation.

SOIL
Engineer | Multiple Sites (IL, MN, NJ)

Engineer responsible for assisting in the analysis and planning of sites' soil remediation.

SURFACE WATER
Laborer | Petrolia, PA

Laborer responsible for assisting in the removal and replacement of a damaged bentonite liner in the bottom of a creek that runs through a chemical manufacturing plant.

Health & Safety

HEALTH & SAFETY PLANS
Engineer | Multiple Sites (AR, IA, IL, MN, NE, NJ, WI)

Engineer responsible for creating and updating Health & Safety Plans for use at clients' sites.

Operation & Maintenance

CLOSED LANDFILLS
Engineer | Multiple Landfills (IA, IL, MN, NJ, WI)

Engineer responsible for assisting in project management of closed landfill sites.

GROUNDWATER EXTRACTION, CONTAINMENT, & TREATMENT SYSTEMS
Engineer | Multiple Facilities (IL, MN, NE, WI)

Engineer responsible for inspecting and performing maintenance on and/or assisting in project management of groundwater treatment systems at contaminated sites to ensure containment of plume and proper treatment of extracted groundwater.

QA/QC

LANDFILL CONSTRUCTION
Engineer | Multiple Landfills
(IA, Guam)

Engineer responsible for assisting in development of the Quality Assurance and Quality Control Manual for landfill construction.

Other related areas of interest

Recognized (Certifications/Trainings)

- 40-Hour HAZWOPER Training
- e-Rail Safe Training
- Roadway Worker Protection Training
- EPA Section 609 of Clean Air Act - EPA Refrigerant Recovery and Recycling Certification, 2006

Work history

2012 - present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
2012	University of Minnesota – Dept. of Civil Engineering, Minneapolis, MN
2008	University of Minnesota – Dept. of Ecology, St. Paul, MN

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Nicholas Schilling

Qualified (Education): Bachelor of Science (BSc) Mechanical and Aerospace Engineering

Connected (professional affiliations): Member of American Society of Mechanical Engineers (ASME), Registered Professional Engineer of New York

Professional Summary: Nicholas possesses the necessary skills to design and specify mechanical equipment and piping for complex industrial facilities. He has successfully installed: fans, blowers, storage tanks and pressure vessels, piping and ductwork and all associated insulation, pipe supports and expansion joints. He has a working knowledge of ASME codes and API publications to be used for the design and evaluation of new and existing systems.

Industrial

Mechanical Engineer

Main Steam Header Relocation | Niagara Falls, NY

Designed, specified, procured and installed all material to relocate a major portion of an industrial facility's steam delivery system. Pipe stress calculations in accordance with ASME B31.3 were completed to determine the thermal growth of the system and to calculate the loads exerted by the new system layout for the structural design of a new pipe bridge. Acted as the field engineer in charge of installation for the foundations and steel of the new bridge, and the piping and supports for a 24" steam line and 8" condensate return line.

Mechanical Engineer

Waste Water Treatment System | Caterpillar | Joliet, IL

Mechanical engineer responsible for the design, specification and layout of all process equipment and piping required for a new waste water treatment facility. Treatment system was used to remove oil from the facilities waste water stream prior to sending the water to the outfall.

Mechanical Engineer

Landfill Gas to Energy | Waste Management | Various Locations

Designed and specified equipment, piping and pipe supports for new landfill gas to energy plants throughout the country. The projects included landfill gas distribution headers, combustion engines, and plumbing system designs.

Mechanical Engineer

Piping Design |

Engineer responsible for the design of numerous industrial piping systems. Piping systems included: a liquid chlorine system, high pressure liquid propane and liquid butane loading and unloading delivery system, hydrochloric acid loading and delivery system, and high temperature gas piping. Piping was designed in accordance with ASME B31.3 Process Piping Code.

Mechanical Engineer

Air Emissions Study | Goodyear Tire & Rubber | Kingman, AZ

Performed an air transfer study to determine the cause of escaped tire particles from a tire refurbishing facility's air handling system. As a result of this study new equipment was specified and installed to capture debris created during the refurbishment process.

Mechanical Engineer

Chlorine Pipeline | Timet | Henderson, NV

Designed a new 3,000 foot underground chlorine pipeline. The pipeline delivered dry chlorine gas thru an 8" diameter buried pipe. The pipeline was designed in accordance with applicable DOT and ASME requirements.

Project Engineer

Crude Oil Transmission Line Repairs | Detroit, MI

Coordinated construction efforts with local authorities and jurisdictions for the excavations to and repairs of a buried oil transmission line. Planned the work schedule of construction crew, ensured company specific specifications were followed and repairs were done correctly, and enforced safe work practices. Applied for permits and oversaw the creation of design documents.

Project Engineer

Industrial Facility Upgrades | Niagara Falls, NY

Developed the scope of work for multiple capital improvement projects at an industrial facility. Directly oversaw construction, enforced safety procedures and ensured technical compliance with the specifications and design documents.

Work history

2008 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY
2007 – 2008	Quality Inspection Services, Buffalo, NY

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Brendan A. Shaw
Process Engineer

Qualified: B.S. Chemical & Biomolecular Engineering, New York University

Professional Summary: Brendan is a junior process engineer with 2 years in industry across various engineering sectors including government, consulting, and manufacturing. He has been exposed to several areas of engineering that accompany process design, including civil/structural, mechanical, and electrical and controls. His experience includes designing models and P&IDs, waste minimization, treatment and regulation, environmental testing, and various laboratory techniques.

Environmental and Wastewater Projects

Jr. Process Engineer
Petroleum Refinery| Confidential | Lake Charles, LA

Project includes designing a process to manage impact to soil and groundwater adjacent to product storage tanks and organic vapor recovery and monitoring within active units.

Process Engineer
Oil/Water Separator Design | Tonawanda Coke Corporation | Tonawanda, NY | 2017

Created bench-scale models for experimentation and designing full scale process equipment. Created P&ID and SOP documents.

Process Engineer
SPC Analysis - Cyanide Reduction | Tonawanda Coke Corporation | Tonawanda, NY | 2016 – 2017

Drafted and implemented SPC procedure to reduce cyanide and naphthalene concentrations in wastewater discharge.

Project Engineer
Activated Coke Conversion | Tonawanda Coke Corporation | Tonawanda, NY | 2017

Lead experiments to convert by-product “breeze” to highly porous activated carbon via a steam activation process. Activated coke would then be used in the wastewater treatment process.

Environmental Technician
Leak Detection and Repair Program | Tonawanda Coke Corporation | Tonawanda, NY | 2016 – 2017

Sampled all coke oven gas pipes in the Leak Detection and Repair program with the ThermoEnvironmental TVA-1000B. Retrieved and organized data; wrote reports for regulator submittals.

Environmental Engineering Intern
Hudson Yards Site | Related Co. / Oxford Properties | New York, NY | 2013

Supervised soil excavation process and performed air quality measurements via PID analyzers.

Other related areas of interest

Recognized (Certifications/Trainings)

- OSHA 40-hour HAZWOPER, 2017
- EPA Method 9 Test, Visible Opacity Reading by AeroMet Engineering, Inc., 2017

Work history

Nov 2017 – present	GHD, Buffalo, NY
2016 – 2017	Tonawanda Coke Corporation, Buffalo, NY
2014 – 2015	Fire Department of New York, New York, NY
2013	Langan Engineering, New York, NY

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Peter John Storlie
Geologist

Qualified: Bachelor of Science - Geology (B.S.)

Connected: Professional Geologist: Wisconsin, Licensed Wisconsin Waste Water Treatment Plant Operator (Special K), Asbestos Building Inspector: Minnesota, Iowa, North Dakota, and South Dakota, Wisconsin Department of Commerce, PECFA Registered, Member, Minnesota Groundwater Association, Member, National Ground Water Association, Mine Safety and Health Administration certificate for mine work.

Professional Summary: 30 years of environmental investigation and remediation on sites throughout the United States dealing with contaminated soil, groundwater, and/or surface water. Managing sub-contractors such as drillers, construction crews, and heavy equipment operators. Handling waste streams in the form of soil, water, debris, landfill waste and oil. Effective procedure development and reporting, targeted communication, good organization, excellent people skills. In addition, manage health and safety of self and subcontractors.

Waste Water Treatment

Licensed Waste Water Treatment Plant Operator
Penta Wood Superfund Site | Siren, WI

- Licensed Waste Water Treatment Plant operator for the superfund groundwater treatment plant in Siren Wisconsin. Managed the rotary drum vacuum filter system using diatomaceous earth. Separating emulsified oil in groundwater using the dissolved air floatation and flocculent separation process. Operated the granular activated carbon system to treat groundwater in the final stage of the treatment process. In addition, managed the waste manifests, LNAPL removal, and operated the program logic control system.

Project Geologist/Hydrogeologist

Project Geologist/Hydrogeologist
Bell Lumber & Pole | New Brighton, MN

- Project Geologist/Hydrogeologist: Installed groundwater injection wells and associated monitoring wells at a pentachlorophenol wood treatment facility in New Brighton, Minnesota. Designed, implemented, and analyzed groundwater pumping tests. Operated the groundwater treatment plant. Managed the LNAPL, DNAPL and contaminated groundwater. Conducted low-flow sampling to determine natural attenuation. Developed and conducted various independent studies for the treatment of pentachlorophenol in groundwater using polymers, carbon (GAC), Zeolite, Fenton's reagent, peroxide, and ozone. Developed the treatment of groundwater from using a costly dissolved air floatation and microsept process to treatment with ozone.
- **Project Geologist**: Trained groundwater sampling procedures to non-GHD field personnel at Minntac iron mine in Virginia, Minnesota. Training also included recommendations for monitoring and sampling equipment for sulfate contaminated groundwater.

Phase II Environmental Site Assessments

Asbestos Inspector
Project Geologist | Field Coordinator

- Coordinated, supervised, and conducted numerous Phase II ESAs across the United States, including several sites for Class I railroads. Many of the Phase II ESAs involved managing and coordinating several contractors, property owners, and regulatory agencies

Asbestos

Asbestos Inspector
MN/IA/ND/SD

- Asbestos Inspector completing various asbestos containing material survey reports in Minnesota, Iowa, North and South Dakota. Including coordinating asbestos abatement projects that involve the following tasks: preparing bid specifications, contractor selection, preparation of contract documents, oversight of contractor operations, and confirmation of abatement completion.
- Agricultural Services Group - completed several Comprehensive Nutrient Management Plans for Wisconsin farmers. Worked with Wisconsin NRCS and FSA staff to design conservation practices for individual and corporate farm operations.
- **Project Geologist/Hydrogeologist**: Voluntary Site Groundwater Monitoring Plan (for cadmium, chromium, and nickel) for a multi-layer aquifer in Rochester, Minnesota. Coordinate groundwater sampling, organize well drilling, well abandonment, and characterize groundwater flow.
- Proj**ect Geologist/Hydrologist**: Installed groundwater monitoring wells, evaluated surface water and surface soil impacted with DDT, lead, and

chromium at a former chemical plant in Selma, North Carolina.

- **Geologist/Hydrogeologist**: Remedial investigation and feasibility study for soil and groundwater for a scrap yard (NPL site) at Agate Lake, Minnesota. Installed groundwater monitoring wells, sampled surface soil and removed lead and PCB contaminated soil. Designed, implemented, and analyzed groundwater pumping tests.
- **Geologist/Hydrogeologist**: Installed several high volume ground water extraction wells, test, and evaluate multi-level aquifer characteristics for remediation of VOCs in groundwater at an ammunition plant in Arden Hills, Minnesota.
- **Geologist/Hydrogeologist:** Remedial investigation and feasibility study for soil and groundwater for a former solvent recycling and disposal facility (NPL site), in Belmont, North Carolina.
- **Geologist:** Phase II assessments for soil and groundwater impacted by underground storage tanks for several cola beverage distribution sites in North and South Carolina.
- **Geologist:** Remedial investigation for groundwater, separation lagoon and landfill area of a chemical manufacturing company, Cincinnati, Ohio.
- **Geologist:** Remedial investigation for groundwater and soil for a chemical processing facility in Kingsbury, Indiana.
- **Geologist:** Remedial investigation for groundwater for a former wood treating facility, Fort Lauderdale, Florida.
- **Geologist:** Remedial Design for groundwater extraction and treatment system for an Electric Company, Wausau, Wisconsin.
- **Geologist:** Plant Closure for a parts manufacturing facility, Plymouth, Indiana.
- **Geologist:** Oversight of the EPA for a chemical manufacturer remedial investigation and closure for groundwater holding pond and soil (NPL site), Marshall, Indiana.
- **Geologist**: Remedial investigation for groundwater and soil for a chemical distribution facility in Hartford, Connecticut.

Other related areas of interest

Recognized (Certifications/Trainings)

- Richard Chinn Environmental Training, Inc., "Wetland Delineation and Management" Eagan, Minnesota, May 2002
- Lakes States Environmental, Ltd., "Asbestos Building Inspector Training" White Bear Lake, Minnesota, April 2002
- University of St. Thomas, "Mini MBA® for Environmental Professionals", Minneapolis, Minnesota, November 1999 - February 2000
- Waterloo Center for Groundwater Research, "Migration and Remediation of Dissolved Organic Contaminants in Groundwater", Chicago, Illinois, February 1993
- Minnesota Pollution Control Agency, "Soil Vapor Boot Camp" Quantitative field analysis of VOCs in soil and water via PID and Draeger tube, January 1991
- The National Water Well Association, "Principles of Groundwater", Phoenix, Arizona, October 1988
- MSHA – 24-Hour New Miner Training

Work history

1985 – present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
Summer 1985	Sherburne National Wildlife Refuge, Santiago, MN

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Brandon Suchan

Mechanical Designer

Qualified: A.A.S. ITT Technical Institute, 2004 - 2006

Connected: Member, National Technical Honor Society

Professional Summary: Brandon has 10 years of experience in the area of mechanical piping design and drafting, experienced in commercial, municipal, industrial and government application. His expertise extends to Process Flow Diagrams, Process and Instrumentation Diagrams, Piping Specification Development, Piping & Equipment Modeling, Orthographic/ Isometric/ B.O.M design drawings.

Mechanical Designer
City Water & Tempered Water Supply | Tonawanda, NY

Lead Mechanical designer responsible for mechanical design of city water and tempered water supply an existing manufacturing facility. Maintaining existing water infrastructure as process water only. Extensive on-site fieldwork laying out 3,000+/- linear ft. of piping (sizes 16"ø to 1/2"ø). Piping material ranged from ductile iron, carbon steel, galvanized steel, HDPE, copper and PEX. Develop 3D model of header piping and valve stations, vendor skids, safety shower recirculation loops and facility tie-points. Mechanical construction package included plans, section, details, Isometric, B.O.M., valve list, line-list, and Tie-Point List. Project hurdles included site restrictions (photos, accessibility and limited existing infrastructure drawing

Mechanical Designer
FEED PN to PA Chemical Plant | Niagara Falls, NY

Lead Mechanical designer developing a TIC estimate of a new PN to PA chemical Plant. Equipment included (4) 15,000 gallon reactors, (3) Distillation Columns, Tank Farm, Loading & Unloading Railcar Stations, Transfer Pumps, Metering and Automation Controls. Worked with junior mechanical designer developing (20) "smart" P&IDs. Used report creator to develop line list and valve list from the "smart P&IDs". Developed material take offs from site plans. Piping material included lined pipe, stainless steel, FRP, PVC, Copper and Carbon Steel. Deliverable package included PFD's, P&IDs, mechanical site layout and mechanical equipment layout. Worked with estimating group to develop material cost, equipment cost and man hours for +/- 30% TIC package.

Mechanical Designer
Hydrochloric Acid Production Facility | Niagara Falls, NY

Lead Mechanical Designer responsible for PFD/P&IDs, Specification Development, Plant Piping and Equipment Modeling. Developing mechanical package that includes equipment drawings, orthographic drawings, Line/Valve list, and piping/component B.O.M.

Mechanical Designer/ Project Coordinator
Piping Manifold Design & Grading Plan | Lockport, IL

Mechanical Designer responsible for the development of existing conditions model from field measurements during site visit. Coordinate with structural discipline leads to develop scope of work. Produce deliverables to client that includes multiple discipline detailed design drawings and Scope of Work.

Mechanical Designer
Cavern Development Leach Plant and Brine Disposal System | Inkster, MI

Lead Mechanical Designer responsible for PFD/P&IDs, Specification Development, Plant Piping and Equipment Modeling. Developing mechanical package that includes equipment drawings, orthographic drawings, Line/Valve list, and piping/component B.O.M.

Mechanical Drafter
Air Sparge and SVE Remediation System | Lemont, IL

Mechanical Draftsmen responsible for preparation of mechanical building layout, equipment placement, building sections, piping details, and HVAC layout.

Mechanical Designer
Landfill Gas to Energy | Gloucester County, VA

Lead Mechanical Designer responsible for PFD/P&IDs, Specification Development, Plant Piping and Equipment Modeling. Developing mechanical package that includes equipment and orthographic drawings.

Work history

2005 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY

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David Szalach

Electrical/Instrumentation Designer

Qualified (Education): B.S., Business Administration – Management, 1993; A.A.S, Drafting, 1997

Connected: AUGI (AutoCAD Users Group International)

Professional Summary: David has over 35 years of experience in the area of electrical/instrumentation design and drafting, experienced in commercial, municipal, industrial and government applications. His expertise extends to lighting and power control schemes, control panel layouts and wiring diagrams, equipment layouts and wiring interconnection diagrams, heat tracing design and applications. His duties also include being the Supervisor for the design/Drafting Group in Buffalo, where his responsibilities include managing staff and equipment, coordinating work assignments, estimating budgets, maintaining and coordinating client specific design and drafting requirements, standards.

Electrical/Instrumentation Designer
Hydrochloric Acid Production Facility | Niagara Falls, New York

Lead Electrical Designer responsible for grounding, lighting, instrumentation, PLC control panel design, 120 VAC and 480 VAC power systems and interconnection, coordination with other disciplines and plant personnel.

Electrical/Instrumentation Designer
Chlorine Monitoring and Detection System | Henderson, Nevada

Lead Electrical Designer responsible for designing field located control panels and implementation wiring, loop diagrams.

Electrical/Instrumentation Designer
Emergency Vent System Upgrade | Niagara Falls, New York

Lead Electrical Designer responsible for grounding, lighting, instrumentation, PLC control panel design, 120 VAC and 480 VAC power systems and interconnection, coordination with other disciplines and plant personnel.

Electrical/Instrumentation Designer
PLC Replacement - Chemical Facility | Niagara Falls, New York

Lead Electrical Designer responsible for PLC control panel design and interconnecting wiring.

Electrical/Instrumentation Designer
PLC Replacement - Chemical Facility | Niagara Falls, New York

Groundwater Collection System Design - Chemical Facility - Niagara Falls, New York. Lead Electrical Designer responsible for PLC control panel design, 120 VAC and 480 VAC power systems and interconnection, coordination with other disciplines.

Electrical/Instrumentation Designer
Landfill Gas Sulfur Removal System | Michigan

Project Coordinator responsible for coordinating in-house design with design system vendors, building vendor and client to develop complete construction package.

Electrical/Instrumentation Designer
Landfill Gas-to-Energy Conversion | Michigan

Project Coordinator and Lead Electrical Designer at a number of different site projects, responsible for grounding, lightning protection, lighting, 120 VAC and 480 VAC power systems and interconnection, 4,160 VAC interconnection, coordination with other disciplines and vendor information.

Electrical/Instrumentation Designer
Solid Waste Incinerator Expansion | British Virgin Islands

Lead Electrical Designer responsible for grounding, lighting, instrumentation, 120 VAC and 480 VAC power systems and interconnection, coordination with other disciplines and vendor information.

Electrical/Instrumentation Designer
Groundwater Treatment System PLC Upgrade | Niagara Falls, New York

Lead Electrical Designer responsible for multiple PLC control panels, panel design arrangement and wiring.

Electrical/Instrumentation Designer
Wastewater Treatment System Project | Sistersville, West Virginia

Lead Electrical Designer responsible for grounding, lighting, cable tray, instrumentation, 120 VAC and 480 VAC power systems and interconnection, coordination with other disciplines and vendor information.

David Szalach

Electrical/Instrumentation Designer

Electrical/Instrumentation Designer
Standby Generator Installation | Mokena, Illinois

Lead Electrical Designer responsible for grounding, 120 VAC and 480 VAC power systems and interconnection, coordination with other disciplines and vendor information.

Electrical/Instrumentation Designer
Electrical As-Built Drawing Documentation | Niles, Michigan

Lead Electrical Designer responsible for investigating and documenting existing 4160 VAC, 480 VAC, 240 VAC distribution and control and PLC control systems.

Electrical/Instrumentation Designer
SVE/Extraction Water Treatment System | Lemont, Illinois

Lead Electrical Designer responsible for grounding, lighting, cable tray, instrumentation, 120 VAC and 480 VAC power systems and interconnection, coordination with other disciplines and vendor information.

Electrical/Instrumentation Designer
Groundwater Treatment System Project | Tucson, Arizona

Lead Electrical Designer responsible for grounding, lighting, instrumentation, PLC control panel design, 120 VAC and 480 VAC power systems and interconnection, coordination with other disciplines.

Electrical/Instrumentation Designer
State Hazardous Waste Treatment Center | State of Qatar

Lead Electrical Designer responsible for grounding, lighting, instrumentation, PLC control panel design, 120 VAC and 480 VAC power systems and interconnection, coordination with other disciplines.

Electrical/Instrumentation Designer
Injection Treatment System | Hicksville, New York

Lead Electrical Designer responsible for grounding, lighting, instrumentation, PLC control panel design, 120 VAC and 480 VAC power systems and interconnection, coordination with other disciplines.

Electrical/Instrumentation Designer
Wastewater Treatment Plant – Chemical Facility | Pottstown, Pennsylvania

Lead Electrical Designer responsible for grounding, lighting, cable tray design, instrumentation, PLC control panel design, 120 VAC and 480 VAC power systems and interconnection, coordination with other disciplines.

Work history

1995 – present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY
1995	Praxair, Tonawanda, NY
1990 – 1995	Occidental Chemical Corp, Niagara Falls, NY
1988 – 1990	E.I. DuPont de Nemours, Niagara Falls, NY
1985 - 1988	Occidental Chemical Corp, Niagara Falls, NY
1977 – 1985	Hibbard Engineers, Niagara Falls, NY

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S. Brett Tarkington, M.S., CIH, CHMM

Senior Industrial Hygienist

Qualified: Master of Science (M.S.), Occupational & Environmental Health, Bachelor of Science (B.S.-Environmental Health Sciences, Certified Industrial Hygienist (CIH), Certified Hazardous Materials Manager (CHMM)

Connected: Member of the American Industrial Hygiene Association (AIHA)

Professional Summary: Brett possesses skills that clients rely on to assist them manage their industrial hygiene and safety programs and protect their team members from workplace hazards. Effective and innovative project management from initiation, planning, coordination, execution, and communication of results are consistently exhibited by Brett. His work history spans 20 plus years in industrial, transportation, mining, medical, energy, oil and gas, emergency response, and remediation related work environments. Brett's experience areas encompass Health, Safety, and Environment (HSE) plan development, reporting on HSE key performance areas, undertaking HSE inspections, and training staff.

Consulting CIH/Project Manager
3M-IH Support | 3M | Little Rock, AR | ongoing

- Serve as Facility Certified Industrial Hygienist and report to 3M Division CIH
- Perform personal and area IH sampling/monitoring and evaluate potential airborne contaminant hazards (primarily crystalline silica/dust) and noise exposures in the quarry and processing plant
- Provide feedback to Facility staff and assist with communicating sampling/monitoring results to plant employees

Project CIH
Chevron Environmental Management Company | CEMC | Sweetwater, TX | ongoing

- Serve as Project Certified Industrial Hygienist and report to GHD Project Manager
- Oversee the implementation of perimeter and personal air monitoring plan (AMP) for the excavation and stabilization of lead contaminated soils. The AMP specifies the use of perimeter real-time aerosol monitoring instruments that upload directly to a secure website for immediate viewing by authorized personnel. The AMP also specifies the use of air sample pumps to collect personal and perimeter air samples for lead and total dust analysis.
- Provide feedback to Project Manager and field staff and assist with communicating sampling/monitoring results to workers

Embedded Consulting CIH
Sherwin Alumina IH Support| Sherwin Alumina | Gregory, TX

- Served as Facility CIH in support of Facility HSE Director
- Performed qualitative exposure assessment of plant departments to focus IH/Safety efforts on tasks/operations more likely to result in worker exposures
- Performed baseline air, noise, and heat stress monitoring to comply with MSHA requirements
- Developed MS-Access database to archive and manage IH sampling/monitoring data collected
- Reviewed and revised existing IH programs

Consulting CIH/Project Manager
GEO Specialty Chemicals IH Support | GEO Specialty Chemicals | Multiple Facilities in the U.S. | Ongoing

- Serve as consulting CIH to the Director of HSE
- Provide guidance to GEO employees tasked with performing IH sampling/monitoring for protection of workers and compliance with OSHA regulations
- Make recommendations regarding protective measures to the HSE Director based on sampling/monitoring data

Consulting CIH/Project Manager
IH-Support | Pioneer Chemical | Henderson, NV

- Performed annual industrial hygiene sampling/monitoring to ensure compliance with OSHA standards
- Provided recommendations on additional control measures and appropriateness of personal protective equipment

Project CIH
New Augusta Derailment| Illinois Central Railroad | New Augusta, MS | 2014

- Provided direction and oversight of air monitoring efforts in support of emergency response activities related to the release of multiple tank cars of crude oil
- Ensured that the air sampling scope was sufficient to ensure that workers and members of the surrounding community were adequately protected from airborne compounds released during the incident

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Project CIH
Sweetwater Soil Remediation Chevron | Sweetwater, TX | 2012 - Present

Developed and implemented air personal and perimeter air monitoring plan to comply with OSHA and EPA regulations related to lead (Pb) contaminated dust generated during soil remediation. Trained and mentored environmental technician to competently manage air monitoring activities on site. Analyzed air sampling data and communicated results to the client and workers.

Other related areas of interest

Recognized (Certifications/Trainings)

- OSHA 40-Hour HAZWOPER, 1996
- OSHA 40-Hour HAZWOPER, Refresher, 2015
- OSHA 30-Hour Safety Training for General Industry, 2010

Published Refereed Papers

- "Effectiveness of Common Shelter-in-Place Techniques in Reducing Ammonia Exposure Following Accidental Release". Journal of Occupational and Environmental Hygiene, 2009 April; 6(4): 248-55 Tarkington, B., Harris, AJ, Barton, P., Chandler, B., Goad, PT., 2009

Papers Presented and Published in Conference Proceedings

- "A Comparison of Two Direct Reading Aerosol Instruments to Each Other and Various Gravimetric Samplers in Several Different Aerosol Environments", American Industrial Hygiene Conference & Exposition, 1997
- "Effectiveness of Common Shelter-in-Place Techniques in Reducing Ammonia Exposure Following Accidental Release". Journal of Occupational and Environmental Hygiene, 2009 April; 6(4): 248-55 Tarkington, B., Harris, AJ, Barton, P., Chandler, B., Goad, PT., 2009

Presentations

- Safety, Health, and Environment Roundtable, Arkansas Environmental Federation Workshop, 1999
- Air Monitoring and Selection of Personal Protective Equipment (PPE) During Emergency Response to Chemical Spills Transportation Training Center, Pueblo, CO., 2000
- S. Tarkington, A. Harris, P. Barton, B. Chandler, P. Goad, Center for Toxicology and Environmental Health, L.L.C., Little Rock, AR. Reduction of Ammonia Gas Exposures During a Catastrophic Release Using Shelter in Place. AIHA, June 2007
- Making the Most Out of Workplace Air Monitoring Data and Other Helpful IH Calculations, Health & Safety Seminar, Arkansas Environmental Federation Workshop, 2016

Work history

2011 – present	GHD (formerly Conestoga-Rovers & Associates), Little Rock, AR
2000 – 2011	Senior IH, CTEH, LLC
1992 - 2000	Industrial Hygiene Officer, University of Arkansas for Medical Sciences

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James Thornton

Senior Civil/Structural Engineer

Qualified: BS Civil Engineering 1977; Master of Business Administration (MBA) 1994

Connected: Professional Engineer – New York State; Member - American Institute of Steel Construction (AISC)

Professional Summary: Jim has 38 years of experience in designing structures and buildings. Work has included the design of superstructures and foundations composed of reinforced concrete, structural steel, timber, and masonry among other building materials. Work has been completed in the water, wastewater, energy, and industrial sectors along with some commercial and institutional work.

Civil/Structural Group Leader
Various Projects | Confidential Client | Various Cities, Various States

Lead group of three engineers designing structures for new Energy from Landfill Gas Facilities in Oregon, Virginia, Arkansas, Nevada, Florida, and Michigan.

Work included the design and drafting of reinforced concrete masonry unit (CMU) buildings with reinforced concrete foundations to house the compressors and generators. Roofs were generally steel framed with metal deck and single ply roofing. Work included miscellaneous pipe supports and foundations for ancillary equipment.

Civil/Structural Engineer
Joliet Wastewater Treatment Upgrade | Caterpillar | Joliet, Illinois

Provided civil/structural design for reinforced concrete sumps, pits, tank foundations, tank dikes, and buildings for an $8 million wastewater treatment plant upgrade. Work included structural steel design of new pipe supports and the design of a new control room structure within an existing building.

Civil/Structural Group Leader
Structural Steel Evaluation | Confidential Client – Chemical Manufacturing| Niagara Falls, New York

Led a team of three engineers inspecting and evaluating all exterior steel structures in a 110 acre chemical manufacturing plant. Work included rating the condition of each structure and making recommendations on repairs and replacements.

Civil/Structural Engineer
Pelletizer System Design | Lafarge North America Cement| Ravena, New York

Designed reinforced concrete foundations for a new 120' tall Cement Kiln Dust (CKD) silo pelletizer, and loadout area. Work included designing structural steel supports with reinforced concrete foundations for approximately 500 l.f. of 10" steel CKD slurry pipeline.

Project Manager
102nd Street Landfill | Confidential Client | Niagara Falls, New York

Project Manager coordinating the field efforts to remediate a 3-acre CERCLA landfill. Field work included the construction of a barrier wall around the landfill perimeter along with a groundwater collection and pumping system. Work also included construction of a 1900 l.f. earthen cofferdam in the Niagara River and the excavation of contaminated sediment which was then dewatered and placed on the landfill. Site was capped with an HDPE geomembrane and bentonite mat with topsoil and turf.

Project Manager
Remedial Waste Storage Facility | Confidential Client | Niagara Falls, New York

Coordinated the design and construction effort to install a 15,000 s.f. drum storage building (pre-engineered steel) and a 54,000 s.f. solid waste storage building with secondary containment and leak detection.

Civil/Structural Group Leader
Hamburg Drain Screening Facility | Buffalo Sewer Authority| Buffalo, New York

Work included the design and construction of a 4500 s.f. building which was steel framed with masonry exterior walls to house the new screens. Scope also included the realignment of an existing 16' wide by 13' deep underground canal to and from the new facility.

Civil/Structural Engineer
Chlorine Pipeline Replacement | Timet | Henderson, Nevada

Provided civil/structural design for reinforced concrete foundations and structural steel pipe supports for a new 8" chlorine pipeline between two chemical plants. Work included the installation of snubber supports required to dampen the seismic loads in the area.

Civil/Structural Group Leader
Plains Bumstead Facilities Upgrade | Plains Midstream Canada| Glendale, Arizona

Work included the design of a new structural steel rack for loading railcars with butane and propane. Project also required the design of new foundations for pumps and tanks and the design of numerous pipe bridges and pole lines to support product piping.

Project Manager
Remedial Waste Disposal | Confidential Client | Niagara Falls, New York

Coordinated the classification, loading, shipping, and disposal of over 60,000 tons of hazardous waste from western New York remediation activities. Work included the design and installation of 1000 l.f. of railroad siding to increase loading productivity and reduce shipping costs.

Civil/Structural Engineer
Donner Road Bridge Replacement | Town of Pendleton| Pendleton, New York

Provided civil/structural design for a bridge deck replacement. Work included evaluating various deck alternates to determine the most effective and best cost solution. Scope also entailed checking the capacity of the existing bridge abutments and working with the bridge deck precaster to ensure that all state and local requirements were met.

Work history

1998 – present	GHD (formerly Conestoga-Rovers & Associates) Buffalo, New York
1996 – 1997	Glenn Springs Holdings, Inc., Grand Island, New York
1984 – 1996	Occidental Chemical Company, Niagara Falls, New York
1982 – 1984	Norman Bahler Associates, Tonawanda, New York
1980 – 1982	Occidental Chemical Company, Grand Island, New York
1977 – 1980	Charles H Sells, Inc., Dansville, New York

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Gary Ushiro
Draftsman

Qualified: Certificate of Completion in the Design program, Schoolcraft College, Computer-Aided Design, 1999

Professional Summary: Gary possesses skills in design using Autocad abilities to create drawings for requests given by engineers and project manager in an organized and timely manner. Developing figures necessary for groundwater contouring, adding data to figures showing results from monitoring wells, soil boring, etc. Also have the capabilities to scan and copy plans in color or B/W using high quality equipment, formatting in various file types (PDF, TIFF, and JPEG).

General Drafting

Draftsman
Trident Parcel Summary Report |
Former Wixom Assembly Plant | Wixom, MI

Generate plans and figures for various ongoing phases of the project including:

- Soil and Groundwater Analytical Results
- Investigation and Remedial Activities
- Geological Cross-Sections

Draftsman
Remedial Investigation and Activities |
Former Plainwell, Inc. Mill Property
Superfund Site | Plainwell, MI

Generate plans and figures for various ongoing phases of the project including:

- Remedial Investigation
- Remedial Activities

Draftsman
Ford R/E Center | Various Buildings |
Ford Motor Company | Dearborn, MI

Generate plans and figures for various ongoing phases of the project including:

- Site Use Histories

Draftsman
Various ESAs | Various Clients | Various States
Various Automotive Dealerships, Commercial Properties, and Undeveloped Land across the United States

- Phase I ESA through Phase IV ESA Activities

Work history

2006 - Present	GHD (formerly Conestoga Rovers & Associates), Plymouth, MI
2000 - 2006	Tempro Industries Inc., Plymouth, MI
1987 - 2000	Jacobson's Department Store/Restaurant, Livonia, MI

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Sube Vel

Principal/Vice President

Qualified: Master of Science in Environmental Engineering, Bachelor of Science in Civil Engineering

Connected: Professional Engineer in Michigan, Air and Waste Management Association (AWMA)

Professional Summary: Mr. Vel is a Principal-in-charge of U.S. National Air Practice. Mr. Vel is a registered professional engineer in the State of Michigan. Mr. Vel provides air and environmental compliance consulting services to general manufacturing, oil and gas, energy, automotive, plastic products manufacturing, foundries, food processing, metal parts manufacturing, coating, and electroplating industries in the areas of air quality, Clean Air Act, SARA, NPDES and RCRA Compliance. Mr. Vel has conducted multi-media environmental compliance audits for over 200 facilities across the country. Mr. Vel's air permitting experience includes New Source Review Permits (NSR), Prevention of Significant Deterioration (PSD), synthetic minor and Title V air permits. Mr. Vel has experience in preparation of Pollution Incidence Prevention Plans (PIPP), Stormwater Pollution Prevention Plans (SWPP), Annual Air Emissions Reporting in multiple states, and Spill Prevention Control and Countermeasures Plan (SPCC). Mr. Vel has designed and developed Emission Tracking System Software (ETS) widely used in process industries and other automotive manufacturing industries. Mr. Vel has conducted Phase I, Phase II, and Baseline Environmental Site Assessments for many industrial facilities.

Air Permitting and Environmental Compliance Experience

Project Manager/Technical Lead
Packaged Boiler System Evaluation, PSD, and Title V and Alternate Fuel Analysis | Confidential Client | Detroit, MI

Performed a technical feasibility analysis to install three 150 MMBtu/hour packaged boilers and evaluate alternate fuels to improve the energy efficiency. The evaluation included energy needs, steam loads, permitting requirements, air permitting alternatives, dispersion modeling, NOx reduction strategies, stack requirements, permits, access, and enclosures. The completed package was used to procure Design-Build-Own-Operate-Maintain Performance Contracting for a 10-year term at the facility in an effort to reduce energy costs. Prepared and successfully negotiated Opt-out permit with the State and EPA. The new steam system was subsequently constructed and is currently in successful operation at the facility.

Senior Air Permitting Engineer
PSD Permitting for Ethanol Facility | Confidential Client | Jennings, LA

This project involves preparation of a PSD construction and Title V operation permit for a proposed new 70-million-gallon per year fuel grade ethanol facility in Jennings, Louisiana. The proposed plant included a 480 MMBtu per hour biomass-fired primary boiler and multiple natural gas fired packaged boilers, two different fermentation process lines, feedstock storage, handling and processing operations, wastewater treatment, product storage and truck and barge loadout facilities. The project involved process evaluation, preparation of detailed emission inventories, preparation of top-down detailed BACT analyses for NOx, SO_2, PM, CO, and VOC originating from numerous combustion, process and materials handling sources, and preparation of an air quality analysis including significance, NAAQS and increment analyses for multiple sources and multiple pollutants. GHD worked with facility design engineers and consultants to set performance specifications and resolve air pollution control and ambient air impact issues that arose during the BACT and air quality analyses. The preliminary permit application was submitted to the Louisiana Department of Environmental Quality in February 2006.

Project Technical Lead
Air Permitting for Oil and Gas Facilities | United States

Successfully prepared and obtained over 2,000 oil and gas minor source permits/permit by rule/standard permits in the states of Texas, Ohio, West Virginia, Colorado, North Dakota, Utah, Wyoming, Kansas and Oklahoma, New Mexico for oil and gas exploration facilities. Architected the development of FASTRAC® automated air permitting program, a novel air permit application automation system for high-volume expedited oil and gas upstream air permitting projects

Senior Project Engineer
Minor NSR and Synthetic Minor Permits | Confidential E&P Client | Fort Berthold, ND

Completed over 250 preconstruction oil and gas permits for new and modified minor sources, and minor modifications at major sources, located in Indian country pursuant to 40 CFR 49.151 – 161.

Senior Project Engineer
GHG Emissions Inventory | Confidential Client | Texas, Utah, and Kansas

Developed and reported GHG emissions inventory for 2,000 oil and gas exploration sites and compressor stations to meet 40 CFR 98 Subpart W requirements.

Worked with the client to develop a comprehensive data collection template. CRA also field trained on-site personnel in gathering equipment details and operating parameters for estimating GHG emissions. CRA estimated, validated, and reported facility-wide GHG emissions on EPA's electronic Greenhouse Gas Reporting Tool (e-GGRT).

Senior Project Engineer
NSR Permits for Terminal Facilities | Confidential Client | Texas

Prepared and negotiated major NSR permits for multiple terminal facilities that handle a variety of organic liquids generally categorized as gasoline, asphalt, ethanol, kerosene, jet fuel, diesel fuels and other petroleum products. The primary air emissions from the facilities include VOCs and HAPs including working and breathing emissions from storage tanks, storage tank roof landings and degassing activities associated with tank cleanings, barge loading, tank truck loading operations, and distillate truck loading.

Senior Project Engineer
Air Permitting for Gas Processing Facilities | Texas and Oklahoma

Successfully prepared and negotiated air permits for multiple gas processing facilities. These facilities were designed to treat gas and liquids to a quality suitable for sale to midstream companies by removing hydrogen sulfide (H2S) and carbon dioxide (CO_2) from the gas stream, removing water, and stabilizing the condensate. The Facilities comprised of multiple processing trains each consisting of gas sweetening and dehydration units (amine and glycol), BTEX units, condensate stabilizers, and thermal incinerator. Additionally, the Facilities have stable condensate storage tanks, produced water storage tanks, liquids loading truck racks, control equipment (vapor recovery, and back-up high pressure flare), and an emergency generators. Utilized ProMax simulation software for emission estimation and AERMOD for dispersion modeling.

Senior Air Permitting Engineer
Title V Operating Permits for Oil and Gas Compression and Storage Facilities | Kansas and Colorado

Prepared and submitted Title V permits for multiple compression and storage facilities in Kansas and Colorado. The project emissions inventory development, evaluating compliance with NSPS and NESHAP Regulations for reciprocating internal combustion engine (ZZZZ and JJJJ) and NSPS 40 CFR 60 OOOO. Developed GHG Monitoring Plans to comply with EPA Mandatory GHG Reporting Requirements (40 CFR 98)

Project Manager
Global Environmental Compliance Management | Confidential Client | Ecorse, MI

Developed detailed environmental compliance management systems for twelve major industrial facilities for a confidential Tier I automotive supplier. The scope of work included with annual air emissions reporting, SARA/EPCRA reporting, NPDES permits sampling and reporting, air permit modification, coordinate source stack testing activities, develop stack testing protocols, regulatory agency notification, stack testing, submit stack testing reports, odor assessment studies, industrial hygiene studies, Spill, Prevention, Control and Countermeasures (SPCC) Plans, Pollution Incident Prevention Plan (PIPP), Stormwater Pollution Prevention Plans (SWPPP), Industrial Wastewater Permitting, Annual wastewater reporting, Compliance Assurance Monitoring (CAM) plan compliance evaluation and MACT compliance review.

Project Manager
Waste-to-Energy Regulatory Analysis | Confidential Client | Midlothian, TX

Completed a detailed regulatory analysis to review the existing regulatory framework to identify impediments to a waste-to-energy gasification project and offer alternative solutions to address them. In the proposed gasification system, waste is treated at controlled temperatures in the process chamber under a non-oxidative atmosphere which enables its organic content to be degraded and transformed into synthetic gas (syngas). The syngas is subsequently cleaned prior to use. The power generation configuration of the proposed system consists of a gas-fired combustion turbine. The power block may also include a heat recovery steam generator with a steam turbine. The regulatory analysis included environmental impacts and review of all applicable state and federal regulations.

Senior Project Engineer
Municipal Solid Waste Pelletization Process Evaluation | Confidential Client | Michigan

Conducted a detailed technical and regulatory analysis for converting MSW to pellets for a waste to energy project. The review focused on technology, air emissions, hazardous waste management, wastewater and permitting. The review also included control technology review for criteria pollutants and toxic air contaminants, fugitive emission control technology analysis and wastewater treatment evaluation.

Greenhouse Gas Lead Verifier
GHG Verification | Various Clients | California

Lead Verifier for over 50 GHG verification projects with the California Air Resources Board (ARB) Regulation for

Mandatory Reporting of Greenhouse Gas Emissions (RMRGGE). Completed over 65 verification projects for electrical and cogeneration facilities, refineries, general stationary combustion sources and hydrogen plants.

Project Engineer

Energy Efficiency Study | Confidential Client | California

The energy efficiency study focused on detailed analysis of the existing boilers, energy consuming sources including blow down heat recovery, utilizing back pressure steam turbine, improving combustion control, and flue gas heat recovery of a co-generation fruit processing plant. An engineering cost estimate and return-on investment analysis was completed for recommended solutions.

Project Manager

Solvent and Energy Reduction Strategies | Confidential Client | Sterling Heights, MI

The project involved pollution prevention practices that eliminate, substitute or reduce, to the extent possible, regulated substances from products, as well as its own manufacturing processes for a Tier I automotive manufacturer. The painting process has five major steps: phosphate cleaning, E-coat application, sealer application, primer application, and color application. The project approach integrated process engineering, environmental, occupational health and safety requirements as well as recycling concerns. The process change recommendation resulted in successfully eliminating various solvents in the paint shop and not compromising on the quality. The energy analysis was performed by collecting data on process, equipment, operations and energy usage. The statistical model was utilized to breakdown the energy usage into comfort and production dependent ratios. The peak energy reduction opportunities were identified. The energy saving strategies and recommendations were successfully implemented.

Project Manager

Turnkey Design and Installation of RTO and Concentrators | Confidential Client | St. Mary's, OH

This turnkey project involves bringing a military rubber parts manufacturing facility into compliance with the Miscellaneous Metal Parts and Products Surface Coating MACT Standard at 40 CFR 63 Subpart MMMM (MMP MACT) from the evaluation stage through the equipment design, air permitting, construction, and startup phase of the project. Through detailed site-specific compliance and engineering evaluations, design options were identified that have reduced the number of process points needing controls as well as the airflow from those sources needing control. This has significantly reduced the client's anticipated capital and operating costs for the project. The project is energy efficient and self-sustaining.

Lead GHG Verifier

GHG Verification for Multiple Refineries | Various Clients | California

Retained by various petroleum refineries throughout California (namely within the San Francisco Bay and Los Angeles regions) to verify the reported GHG emissions under the California Air Resources Board's Mandatory GHG Program. These clients operate major refineries and are engaged in refining crude oil sourced from multiple locations. Some major process units at the facilities include an atmospheric distillation unit, a vacuum distillation unit, a fluidized catalytic cracking unit (FCCU), a coking unit, a sulfur recovery unit/plant (SRU), an isomerization unit, hydrogen plants, a wastewater treatment plant, flares, a cogeneration plant, marine terminal, and multiple storage tanks.

Systems Architect

Environmental Data Management Systems | Various Clients | Michigan

Designed and developed Emission Tracking System (ETS) to comply with the regulatory recordkeeping requirements. ETS was successfully implemented in various coating, electroplating, manufacturing, engine testing and chemical processing facilities.

Other related areas of interest

Recognized (Certifications/Trainings)

- Licensed Professional Engineer - Michigan
- Accredited Lead Verifier for California Air Resources Board (ARB) Greenhouse Gas Reporting Program

Presentations

- Vel, Sube and VanAssche, James, "NSPS OOOO – Compliance Challenges", Gas Processors Association, Dallas, Texas, November 2012
- Vel, Sube and Hamlin, Dyron, "Compliance Challenges in meeting 1 hour NO_2 and SO_2 NAAQS Standards", 84th PERF Meeting, Emerging Environmental Challenges and Risks, November 2011
- Vel, Sube and Blickle, Frederick W., "Energy Efficiency Strategies in a competing global economy", 20th Annual Technical Conference, AWMA Technical Conference, 2011
- Vel, Sube and Quigley, Jennifer, "Reinventing Food Processing Industry under Cap and Trade Regulation", Spring Conference WMAWMA 2011

- Vel, Sube, " GHG Management: Drivers, Approaches and Financial Mechanisms", National Air & Waste Management Conference, Detroit, June 2009
- Vel, Sube, "GHG Accounting Practices and Pitfalls", Michigan Chamber of Commerce, Lansing, Michigan May 2009
- Vel, Sube, Adamowski, Scott, and Bennett, Mark, "Data Center: From Brown to Green – GHG Drivers, Approaches and Financial Mechanisms", IBM Pulse Conference, Las Vegas, NV, February 2009
- Vel, Sube, Montgomery, Jane, and Kolaz, David "Greenhouse Gas Emission Inventory – Approaches and Methodologies", Schiff-Hardin Key Elements and Climate Change Seminar, Chicago, Illinois, December 2008
- Vel Sube and Klepper, Gary, "Introduction to Carbon and Greenhouse Gas Accounting", Michigan Chemistry Council, Lansing, Michigan November 2008
- Vel Sube and Montgomery, Jane, "Rules of the Game – Steps for conducting GHG Inventory", Chemical Industries Council of Illinois, September 2008
- Vel, Sube, "Boiler MACT Compliance and EPA MACT compliance tools", Presentation, American Facilities Engineers, May 2005
- Vel Sube, "Cost-effective air quality compliance strategies", Presentation, CRA Compliance Conference, Warren, Michigan, July 2004
- Vel, Sube, A., "Emerging Environmental Regulations", Technical Paper Presentation, Global Environmental Conference, New Delhi, September 2000
- Vel, Sube and Mott, Henry, "Ash and Sulfur Removal Techniques from Coal using froth flotation process", Presentation, Environmental Management conference, Rapid City, SD April 1992

Work history

2003 - present	Principal/Vice President, GHD (formerly Conestoga-Rovers & Associates), Plymouth, MI
	Named Principal, 2013
1996 - 2003	Advanced Engineering Solutions, Canton, Michigan
1992 -1996	Beckler Consultants, Livonia, Michigan
1985 - 1990	Rail India Technical and Economic Services

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Steven R. Voss

Senior Project Manager

Qualified: M.S. - Civil and Environmental Engineering (Clarkson University, 1993), B.S. - Biology (University of Minnesota, 1988), MOTT Foundation Research Fellow (1989)

Professional Summary: Steve has over 25 years of professional consulting experience with a diversified portfolio of projects over his career, including Phase I/II ESAs, environmental site investigations and remediations, brownfields redevelopment, remediation system operation and maintenance, and manufacturing facility decommissioning.

Steve's professional practice includes special emphasis on due diligence in property transactions, brownfields remediation, and hazardous waste site investigation and compliance. Steve's experience and familiarity with a broad range of industrial and commercial facilities geographically across the country provides invaluable expertise to our clients.

Steve has also been involved with local government for over 20 years, first serving as chair of the East Bethel Planning & Zoning Commission for 11 years, two terms on the East Bethel City Council, and is currently the Mayor of East Bethel. This municipal government experience brings a unique perspective to many projects and provides years of negotiating and collaborative experiences working with all levels of government and with various regulatory agencies.

Brownfields

Project Manager

Steve has managed numerous brownfield and greenfield projects, assisting clients in redeveloping their blighted properties into productive, useable land. Examples of specific Brownfields project experience and outcomes are described below:

- Decommissioning, remedial design, and management of the former Superior Plating Superfund Site, a former 100,000 square-foot plating facility in downtown Minneapolis, Minnesota. Provided assistance with successfully obtaining $1,900,000 in environmental grant funding. Property is planned for a $120 million residential and retail development.
- Assisted StorageMart in the design and construction oversight of the redevelopment of an 8-acre former landfill into a self-storage facility in Hopkins, Minnesota.
- Assisted the City of Brooklyn Park in successfully obtaining funding for the Brooklyn Park Dump Superfund site through the Hennepin County Environmental Response Fund (ERF) to complete a remedial investigation and a Response Action Plan (RAP), and additional funding through the Federal Stimulus Funding program to fund the remediation. Also assisted in the design and construction of year-round hockey rinks over the former dump
- Assisted the City of Saint Paul in support of legislation that led to a $2,000,000 grant to the city to fund the remedial design and implementation of the Phase I Response Action Plan for the Pigs Eye Dump Superfund Site in St. Paul, Minnesota.
- Assisted the City of Saint Paul in support of additional legislation to fund the remaining $5,100,000 cost of remediating the Pigs Eye Dump Superfund Site in St. Paul, Minnesota. Provided testimony before the Minnesota Senate and House Environment and Natural Resources Committees.

Environmental Site Assessments

Project Manager/Assessor

Steve has conducted over 200 Phase I Environmental Site Assessments of industrial, commercial, residential, and vacant properties in 28 states and 2 provinces. Properties assessed include aerospace contractors, high tech industries, heavy and light industrial facilities, oilfield contractors, refineries, port and trucking terminals, automotive and heavy equipment dealership and service facilities, agricultural processing and supply facilities, food processing facilities, commercial office space, senior housing, and medical office facilities.

Facility Decommissioning

Project Manager

Steve has provided clients with the technical and regulatory guidance for closure and decommissioning of former manufacturing facilities, including:

- Decommissioning of a former WM Lamptracker fluorescent lamp recycling facility in Roseville, Minnesota.
- Decommissioning of a former WM Lamptracker RCRA-permitted fluorescent lamp recycling facility in Kaiser, Missouri.
- Facility decommissioning of a former SPX 300,000 square foot manufacturing plant in Owatonna, Minnesota, including tank closures and remediation of a former electroplating line.

Steven R. Voss

Soil and Groundwater Remediation

Project Manager/Engineer

Steve has provided engineering support and project management for many large and small remediation projects. Examples of specific projects and locations include:

- Design and remedial implementation of a groundwater collection/treatment and soil vapor extraction system at an active metal foundry site in Skokie, Illinois.
- Design and remedial implementation of a soil vapor extraction system at a light industrial park in Hopkins, Minnesota with soils contaminated with VOCs.
- Design and remedial implementation at an operating metal salvaging facility in Elgin, Illinois with soil contaminated with PCBs, lead, and dioxins.
- Investigation and remediation of a 20-acre Superfund dump in Brooklyn Park, Minnesota.
- Design and construction of a groundwater pump and treatment system and a soil vapor extraction system at a former manufacturing facility in Denville, New Jersey.
- Implementation of a soil removal and capping of a former oil distribution facility in Duluth, Minnesota with contaminated soil and groundwater.
- Feasibility Study for remediation of an operating metal salvaging facility in Peoria, Illinois with soil contaminated with PCBs, lead, and dioxins.

Remedial Investigations/Feasibility Studies

Project Manager/Engineer

Steve has provided engineering support and project management for many remedial investigations. Examples of specific projects and locations include:

- Remedial investigation of a former railroad maintenance yard in St. Paul, Minnesota.
- Soil and groundwater investigation of a manufacturing facility contaminated with heavy metals and BTEX in Salem, South Dakota.
- Investigation of a former SafetyKleen solvent recovery facility in Schaumburg, Illinois with soil and groundwater contaminated with VOCs.
- Investigation of a former oil distribution facility in Duluth, Minnesota with soil and groundwater contaminated with fuel oil.
- Investigation of a former electronics manufacturing facility in Elk Grove, Illinois with soil and groundwater contaminated with VOCs.
- Investigation of an operating gray iron foundry in Skokie, Illinois with soil and groundwater contaminated with VOCs and PCBs.
- Remedial Investigation of an active fire training center in Syracuse, New York with soil contaminated with PCBs, PAHs, lead, and mercury.

Landfills

Project Manager/Engineer

Steve has provided engineering support and project management for many landfill closures. Examples of specific projects and locations include:

- Project Engineer/Manager of an operation and maintenance program for a 63-acre Superfund landfill in Wauconda, Illinois, including groundwater monitoring, leachate collection system monitoring and sampling, and landfill cap maintenance.
- Project Engineer/Manager of the design and construction of a landfill cap of a 43-acre Superfund landfill in Woodstock, Illinois.
- Project Engineer/Manager for the design and construction of a landfill cap over a 25-acre RCRA/Superfund industrial landfill in Joliet, Illinois.
- Design and construction oversight of a landfill cap regrading project of a 17-acre landfill in Ottawa, Illinois.
- Project Manager for the construction of a landfill cap, landfill gas extraction system, and soil vapor extraction system of a 7-acre landfill in New Richmond, Wisconsin.
- Project Manager for the construction of a permeable cap for the 230-acre Pigs Eye Dump in St. Paul, Minnesota.

Work history

1992 – present	GHD (formerly Conestoga-Rovers & Associates), St. Paul, MN
1990 – 1992	C&S Engineers, Inc., Syracuse, NY

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Steven D. Wilsey
Principal

Qualified: BS Biology Alfred University (1988), Certified Hazardous Materials Manager

Connected: Air and Waste Management Association, Solid Waste Association of North America, New York State Solid Waste Management Association

Professional Summary: Steve is a Principal with GHD and has over 28 years of professional experience in the solid waste industry across North America. He is involved in all aspects of projects, including feasibility studies, development, siting, permitting, environmental impact, design, construction oversight, and operations. He has been involved with all types of solid waste facilities, including landfills, transfer stations, hazardous waste treatment, storage and disposal facilities, recycling centers, landfill gas-to-energy (LFGTE) plants, waste-to-energy plants, and alternative waste processing facilities. Steve has completed feasibility studies for transfer stations, anaerobic digesters, and alternative waste management facilities that included collection, hauling, and processing of waste streams.

Renewable Energy

Project Manager
LFGTE Plant Permitting | Waste Management Renewable Energy (WMRE) | New York

Title V permitting and building design for five LFGTE plants, ranging from 3.2 to over 18 MW of electricity. Air permitting included New Source Review and Prevention of Significant Deterioration dispersion modeling and permitting. Modifications were made to existing and new Title V air permits for each facility.

Project Manager
LFGTE Facility Design and Construction | WMRE | North America

Design and construction of multiple LFGTE projects across the United States and Canada. Projects included permitting; construction administration; and design of electrical, process, mechanical-structural, civil, and LFG interconnect elements. Total electrical generation of approximately 90 MW using both turbines and reciprocating engines. Facilities ranged in size from single engine containers to eight engines, and a three-turbine facility.

Project Manager
Confidential Client | Michigan

Project Manager for the design of a biological hydrogen sulfide treatment facility for the treatment of up to 10,000 CFM of landfill gas prior to use of the gas as a fuel for renewable energy production. Design included detailed structural, mechanical, and electrical engineering.

Project Manager
Confidential Client | Multiple Locations

Project Manager and senior reviewer for multiple feasibility projects to determine the potential for the utilization of landfill gas for on-site utilization, off-site medium Btu fuel, and flaring for the generation of greenhouse gas (GHG) credits.

Solid Waste

Project Manager
Confidential Client | New York

Project Manager for the design of a landfill gas collection system that utilizes a series of four centrifugal blowers driven by variable frequency drives controlled by a process logic control (PLC) system. The system, which can be operated remotely, is designed to maintain a set vacuum on the landfill and direct collected gas to a series of up to three control devices based on the amount of gas available. The system is designed to handle over 10,000 CFM of landfill gas.

Project Manager
Feasibility Study for Centralized Waste Management Facility | Confidential Client | Midland, TX

GHD was retained to evaluate waste treatment and disposal options for a variety of waste streams and prepare a feasibility study including preliminary site plan and process flow diagram for a centralized waste disposal facility prepared a database and evaluated waste disposal records for an oil drilling company for a 3-year period, determined waste disposal quantities and costs per well for Drilling and Completions, Production, and Closure. He projected 10-year waste quantities per waste stream, evaluated treatment and disposal options, prepared a preliminary site plan and process flow diagram for a centralized waste disposal facility for oil and gas production wastes. He provided waste treatment/disposal options for various waste streams.

Technical Support
Municipal Solid Waste (MSW) to Energy | Sanciflex | Scottsdale, AZ

Assisted a private Swedish developer with the preliminary design layout and design cost estimating for a MSW to energy facility, including tipping floor, Swedish pre-processing technology for MSW, material recovery facility (MRF), Anaerobic Digestion (AD), and biogas to biomethane upgrade.

Project Manager
Confidential Client | New York

Project Manager for the air permitting of a hazardous waste treatment, storage, and disposal facility (RCRA Subtitle C) and landfill expansion. The project included detailed air emission inventories of all points, areas, and process sources; air dispersion modeling for comparison of NYSDEC health risk guidance values, source testing, and public hearings.

Project Manager
Valliant, OK

Project Manager for the conceptual design of a 4 million cubic yard industrial landfill, including a needs analysis, evaluation of design alternatives to optimize cost, construction costs estimates and schedules. Detailed design and permitting is scheduled to begin in 2017.

Peer Reviewer
Winnipeg, AB

Peer reviewer for the site master plan and phased cell development for a large municipal solid waste disposal facility. GHD prepared a phased development plan including the detailed design of multiple individual cells with the goal of maximizing operational efficiency and minimizing construction and operational costs.

Project Manager
Confidential Client | Ontario

Project Manager for the monitoring and balancing of a landfill gas collection and control system consisting of 55 landfill gas wells and two 2,000-cubic foot per minute enclosed flares and leachate collection systems. Project includes monthly monitoring and maintenance of gas and leachate collection systems; balancing of the system in preparation for a high Btu utilization facility; functional analysis of gas and leachate collection systems; and development of a software program to manage monthly data using a geographically based data management package to allow for the trending, contouring, and tracking of data to optimize performance of the system.

Project Manager
Confidential Client | Pennsylvania

Project Manager for the temporary operation of a 7,000-cubic foot per minute landfill gas collection and control system consisting of multiple enclosed and open flares and an off-site medium Btu power project. The project consisted of initial operation of the gas collection and control system, assistance in hiring and training the client's staff, and properly balancing the system to allow for maximum gas collection and odor controls. Once GHD trained new staff, operation of the system was transferred over to the client.

Project Manager
Confidential Client | Ohio

Project Manager for the design of a gas collection and control system and air permit modification for a 10-million cubic yard landfill expansion. The system was designed to control odors, maximize landfill gas collection, and deliver landfill gas to a third party high Btu plant. GCCS was designed to accommodate pneumatic pumps at all well locations to manage liquids.

Project Manager
Confidential Client | New York

Project Manager for the air, landfill gas, and leachate recirculation aspects of 31 million ton landfill expansion that included the addition of a landfill gas–to-energy project. Project involved an air emission inventory for the life of the landfill and dispersion modeling for air toxics and criteria pollutants. Air quality portions of DEIS, Title V application, GCCS and leachate recirculation systems design. Included evaluation of leachate collection system for compatibility with recirculation including HELP model analysis.

Project Manager
Confidential Client | New York

Project Manager for air, landfill gas, and leachate recirculation aspects of 14 million cubic yard landfill expansion that included the addition of a landfill gas-to-energy project. Project involved an air emission inventory for the life of the landfill and dispersion modeling for air toxics and criteria pollutants. Completed GCCS and leachate recirculation systems design. Included detailed analysis of landfill moisture field capacity and functionality of leachate collection system and gas collection system with recirculation.

Included environmental impact statement, air permitting, system design, monitoring, recordkeeping, reporting and contingency plans, and associated portions of the environmental impact statement.

Ongoing support for leachate treatment system, landfill construction quality assurance (CQA), Title V permitting, and NSPS compliance on an as-needed basis.

Project Manager
Kenai Borough | Alaska

Project manager for the evaluation of alternative leachate treatment methods and feasibility study for multiple on-site versus off-site leachate treatment and disposal options.

Project Manager
Confidential Client | New York

Provided technical support for several landfills regarding the design, construction, and proper operation of gas collection systems utilizing up to 24,000 CFM of landfill gas. Provide routine review of monthly data, recommendations for adjustments, evaluation of alternative operating scenarios, and agency correspondence.

Project Manager
Confidential Client | New York

Designed and implemented a study at a large municipal solid waste landfill which encompassed determination of

the impact of fugitive emissions via emission isolation flux chamber sampling, dispersion modeling, and ambient sampling. Project included community awareness meetings with the local public and training of local health department personnel for sample collection during odor events. Actual data was compared to modeled data (ISCLT) from flux chamber samples to evaluate trends, causes, and risk evaluation to determine compliance with health-based guidance values.

Project Manager
Confidential Client | Pennsylvania

Project Manager for the conceptual GCCS layout for a 140-acre landfill in Pennsylvania. The landfill has a third party energy project and wants to maintain operation of the GCCS and deliver gas to third party at point of sale. Project includes dewatering of leachate mound within the landfill and control/blower system upgrades.

Project Manager
Confidential Client | New York

Developed an environmental management system for a landfill client to comply with state and federal air quality regulations. Project included tying various permits into a compliance manual followed by establishing recordkeeping and reporting systems for gathering data. Program was implemented by establishing an overall recordkeeping and filing system for the facility, in addition to instituting personnel accountability for various records

Project Manager
Confidential Client | New York

Prepared an annual reporting program for several municipal solid waste landfills that includes NSPS, MACT, and Title V reports.

Project Manager
Confidential Client | Various States

Assisted numerous MSW landfills with air quality issues surrounding facility expansions including: Title V, PSD, NSR, landfill gas generation modeling, regulatory applicability, and mobile sources.

Project Manager
Confidential Client | Various States

Performed several landfill gas testing events to determine NMOC and individual contaminant concentrations for comparison to predicted values.

Project Manager
Confidential Client | New York

Prepared emission inventory, Title V application/permit to construct, and air quality sections of environmental impact statement for a large municipal solid waste landfill expansion in New York State.

Lead Auditor
Confidential Client | Various States

Performed merger and acquisition multi-media compliance audits for municipal solid waste landfills in New York, Virginia, and Florida.

Project Manager
Confidential Client | Vermont

Project Manager for the building design and geotechnical investigation for a landfill gas-to-energy facility in Coventry, Vermont.

Project Manager
Human Health Risk Assessment | Confidential Client | Pennsylvania

Project Manager for emissions inventory, field study, and dispersion modeling as part of a human health risk assessment at a municipal solid waste landfill. The project included landfill gas modeling, surface scan, and flux chamber sampling with field GC analysis and laboratory analysis to estimate emission rates for speciated landfill gas compounds. Additionally, the project also included a six week ambient air monitoring program and developed sampling and analysis plan approved by PADEP, PADOH, and ATSDR. Operated network of five monitoring stations for H_2S, SO_2, PM10, PM2.5, and TSP. Coordinated with off-site sampling conducted by state environmental agency and ATSDR. Ongoing support includes Title V permitting and reporting, NSPS and SSM reporting, and operational support.

Project Manager
Confidential Client | New York

Project Manager and technical lead for the air permitting of a major landfill expansion and landfill gas-to-energy plant. Project included Title V permit modification, dispersion modeling for criteria pollutants and air toxics, PSD/NSR permitting, as well as BACT and LAER analysis.

Project Manager
Confidential Client | New York

Project Manager and technical lead for the addition of a high Btu landfill gas management project to an existing power plant. Project included air dispersion modeling for criteria pollutants, Title V permit modification, PSD/NSR permitting, BACT and LAER analysis, SEQR permitting, and agency negotiations.

Project Manager
Confidential Client | New York

Project Manager for the air permitting of a mine for a solid waste facility. Project required air dispersion modeling, draft environmental impact statement, and adjudicatory hearings focusing on air quality impacts. Prepared expert witness for testimony on the emissions generated from mining activities.

Project Manager
Confidential Client | New York

Technical lead on several common control determinations between landfill gas-to-energy developers and landfills. Assisted in the preparation of Petition for Ruling to NYSDEC and USEPA Region 2 to separate landfill from gas developer resulting in the issuance of separate Title V Permits.

Project Manager
Confidential Client | New York

Testified as a fact witness in Federal court in relation to the use of USEPA's LANDGEM model in an attempt to assign cost to Potentially Responsible Parties as part of a state Superfund case.

Project Manager
Confidential Client | Calgary, AB

Project Manager for the design of a cover system that utilized methane oxidation (meth-ox) beds for the control of fugitive landfill gas emissions from a closed landfill. Beds consisted of stone trenches leading to compost filled meth-ox beds. Project included design and monitoring of a test meth-ox bed at an operating landfill and design of a closure plan implementing the test bed full-scale into the long-term closure of a meth-ox bed system at a landfill in Western Canada, demonstrating an 89-percent reduction in fugitive emissions. Prepared cost estimates for construction, monitoring, and oversight of full-scale closure using meth-ox beds.

Project Manager
Confidential Client | Various States

Managed and conducted an environmental compliance training program for a solid waste client that covered over 300 personnel in 15 states from Maine to Virginia. The project consisted of developing multi-media, industry-specific material in the following subject areas: air quality, stormwater, wastewater, drinking water, special waste, facility operating requirements, EPGHD, storage tanks, and hazardous waste.

Project Manager
Confidential Client | Various States

Completed several projects for a municipal waste combustor client with multiple facilities in the Northeast United States. Services provided included air quality compliance, compliance audits, and due diligence assessments (including Phase I and II ESAs) for existing sites and potential acquisitions. Performed Phase I ESAs and compliance audits of facilities receiving combustion ash.

Project Manager
Confidential Client | New York

Project Manager for the development of a geographically based data collection and management system to handle data for a municipal solid waste landfill encompassing: 196 groundwater quality wells, 132 gas wells, 522 quarterly surface scan points, and 25 gas migration probes. The system allows a field technician to gather data using handheld personal computers that automatically download the data on a daily basis, enabling the future utilization of all site data and historic data.

Project Manager
Confidential Client | New York

Project manager for the permitting of an aerobic composting facility at an existing solid waste landfill. Operation uses green and organics wastes received by the landfill to create a salable mulch product.

Project Manager
Quasar Energy | New York

Project manager for the air and solid waste permitting for two anaerobic digesters in upstate, New York. The facilities utilize biosolids and organics waste streams to generate methane which is used to fuel internal combustion gensets that generate electricity for sale on the open market. These are the first two private digester projects known to have been permitted in New York.

Lead Auditor
Confidential Client | Pennsylvania

Lead auditor for a multi-media compliance audit of a kryogenic landfill gas separation project. Reviewed air, solid waste and stormwater compliance with particular focus on NSPS requirements.

Project Manager
Confidential Client | New York

Project manager and lead auditor for multi-media compliance audits for multiple transfer stations, hauling companies and recycling facilities across New York State.

Project Manager
Confidential Client | New York

Managed design of a $1.4 million air pollution control system to be used for the stabilization of hazardous waste lagoons. Project included design of baghouses, blowers, and carbon adsorption systems able to treat 55,000 CFM of off-gas. Project also consisted of negotiations with regulatory agencies, ambient air quality impact evaluation, and the design of a continuous emissions monitoring system used to demonstrate compliance. Provided CQA services during lagoon stabilization followed by cap design and CQA services for capping and final closure.

Project Manager
Confidential Client | Ohio

Project Manager for the design of an approximately 2.1 million cubic yard expansion of a construction and demolition debris landfill in Northeastern Ohio. Project included civil design, leachate collection system design, cap design, groundwater dewatering and agency negotiations.

Project Manager
Confidential Client | Texas

Project Manager for the completion of a feasibility study evaluating the potential of constructing and operating a private waste management facility for the oil field wastes generated from natural gas hydrofracking operation in the Permean Basin.

Project Manager
Confidential Client | New York

Project Manager for the completion a State Facility Permit Application for hazardous waste treatment and disposal facility. Following issuance of initial permit, prepared Application for Major Permit Modification to add additional landfill space to the facility. Project included detailed air emissions inventory for waste and leachate treatment processes, leachate collection and land disposal activities. Prepared rebuttal to expert report opposing the facility.

Peer Reviewer
Richfield Landfill | Michigan

Senior peer review for CQA activities associated with the sideslope overliner for Cell 3D, Cell 3E, and Cell 3F (approximately 82,185 square feet). Construction activities included preparation of the subgrade layer, installation of the geosynthetic clay liner, installation of the geosynthetic membrane, placement of the geocomposite, and thickness verification of the protective sand layer.

Other related areas of interest

Publications and Presentations

- Optimizing or Ending Post-Closure Care for Municipal Solid Waste Landfills Using Performance-Based Methodologies, Canadian Waste to Resource Conference, Toronto, Ontario, November 8-10, 2016. Michael Caldwell, PG, Steven Wilsey.
- Biological Nutrient Removal Process for Landfill Leachate Treatment, Global Waste Management Symposium, Orlando, Florida, June 22-25, 2014, Sara Arabi, Ph.D., P.Eng., Steven Wilsey.
- Dark Matter – The Hidden Tale of Variations in the Physical and Chemical Characteristics in the Universe of Landfills Federation of New York Solid Waste Associations – Solid Waste & Recycling Conference, May 2013. Andrew Lugowski, P.Eng., Duncan Miller, P.Eng., Sara Arabi, Ph.D., P.Eng., Steven Wilsey.
- Overview of Requirements Pertaining to Reciprocating Internal Combustion Engines, AWMA Niagara Frontier Section Annual Spring Environmental Seminar, April 2011
- The Tailoring Rule and Its Impact on MSW Landfills and Landfill Gas To Energy, Federation of New York Solid Waste Associations – Solid Waste & Recycling Conference, May 2011
- Advanced Monitoring and Balancing of Gas Collection Systems Utilizing Data Management and GIS Software SWANA 31st Annual Landfill Gas Symposium, Houston, Texas, March 2008
- Calculating Landfill Gas Emission Rates for Solid Waste Landfill Risk Assessments, WasteTech Conference, Miami, Ohio 2007. Sarah A. Foster, Paul C. Christowski, Ph.D., Steven D. Wilsey, Ben Hoffman, MD.
- New Technologies for Electronic Data Collection and Management at a Regional Municipal Solid Waste Landfill, Engineering Society of Detroit, March 2005
- Title V – Technology – Compliance and Solid Waste Landfills, AWMA Frontier Chapter Spring Conference, April 2005
- Technical Approach for the Assessment of Air Emissions from Municipal Landfills Using the USEPA Flux Chamber and Dispersion Modeling to Predict Off-Site Impact Potential, AWMA National Meeting, San Diego, California 1998
- Clean Air Act/Title V Permitting Update, Coltec Industries, Inc., National Environmental, Health & Safety Conference, Nashville, Tennessee, June 1996
- Title V Permitting Issues, AWMA Niagara Frontier Section Annual Spring Environmental Seminar Planning for the Unexpected, April 1995
- Implementation of the Clean Air Act in the Business Sector, Roundtable Discussion, Rochester, New York 1994

Work history

2002-Present	Principal/Vice President, GHD (formerly Conestoga-Rovers & Associates), Niagara Falls, NY
	Named Principal/Vice President, 2009
	Named GHD Associate, 2005
1994-2002	IT Corporation (formerly EMCON), Tonawanda, NY
1991-1994	LaBella Associates, P.C., Rochester, NY
1988-1991	Independent Labs, East Syracuse, NY

Julian G.R. Worrall

Sr. Process Engineer

Qualified (Education): Bachelor of Science, Chemical Engineering, State University of New York at Buffalo, 1989

Connected (professional affiliations): Registered Professional Engineer: New York

Professional Summary: Julian is a process engineer with over 25 years of process design experience in groundwater and industrial wastewater treatment systems, including 7 years with metals, solids and organic removal equipment manufacturers. Unit processes include, but are not limited to, pH adjustment, clarification, filtration, air stripping, carbon adsorption, oxidation, and dewatering. His duties include project management, P&ID and mass balance preparation, equipment specification, cost estimating, proposal preparation, and engineering design calculations. He is also responsible for design standards, design report and engineering specification preparation, bid documents preparation, and construction package preparation. He has extensive experience in instrumentation design, specification, system start-up, and operations troubleshooting, as well as PLC and HMI software programming.

Environmental, Wastewater, and Remediation Projects

Project/Design Manager
Various Locations, United States

Julian has been responsible for the design and construction of environmental remediation systems as a Project/Design Manager. His responsibilities have included design, project management, construction management, and startup of projects on various sites, including:

- Vacuum-Enhanced Remedy (VER) and Groundwater Treatment System (Illinois)
  - 330 SCFM air sparge system
  - 1,800 SCFM soil vapor extraction (SVE) system
  - 70 GPM ground water extraction
- 500 SCFM SVE system for treatment of organics in ground/groundwater (Pennsylvania)
- 130 SCFM SVE system for treatment of gasoline in ground/groundwater (Texas)
- 1200 SCFM SVE system for treatment of organics in ground/groundwater (Arizona)
- 1200 SCFM SVE and 2 GPM groundwater treatment system for treatment of gasoline in ground/groundwater (Michigan)
- 10 GPM system for removal of oil and PCBs from groundwater in New York
- 65 GPM system for removal of heavy metals and organics from groundwater in Arizona
- 300 SCFM Biosparge system for treatment of vinyl chloride in New York
- Groundwater removal and containment system for tritium in Illinois
- Groundwater bioremediation system for treatment of gasoline (iSOC – 12 wells) at a terminal in Illinois
- Groundwater bioremediation system for treatment of gasoline (iSOC – 29 wells) from a pipeline break in Texas
- Groundwater bioremediation system (iSOC - 22 wells) in Michigan
- 100 SCFM Groundwater bioremediation system in New Jersey
- 75 GPM system for removal of heavy metals and organics from groundwater in Illinois
- 300 SCFM bioremediation system for treatment of vinyl chloride in groundwater (New York)
- 50 GPM groundwater treatment system for the removal of hexavalent chrome in Massachusetts
- 300 GPM system for removal of heavy metals from groundwater in New York
- 150 GPM system for removal of heavy metals and organics from wastewater in Connecticut
- 50 GPM groundwater treatment system for removal of heavy metals and organics
- 50 GPM landfill leachate water treatment system for removal of heavy metals and organics in Ohio
- 30 GPM wastewater treatment system for removal of solids and dioxin in Missouri
- 50 GPM multi-media filter installation. Management and integration of a multi-media filter into an existing 50 GPM treatment system
- 32 well (1000 to 1600 SCFM) sub-slab depressurization system (New York)
- 39 well (100 SCFM) enhanced air sparge system (EAS) (Georgia)
- Air sparge/soil vapor extraction system design at an active oil refinery in Pennsylvania
  - 500 SCFM SVE system for treatment of gasoline in ground/groundwater
  - 50 SCFM air injection

Julian G.R. Worrall
Sr. Process Engineer

  - ISCO/soil vapor extraction system (New York)
  - 300 SCFM SVE system
  - 50 GPM liquid injection
- Groundwater NAPL removal system for a gasoline terminal (Denver)
- 10 GPM mobile groundwater treatment system for removal of PCBs and oil (New York)
- ISCO/Air sparge/soil vapor extraction system design for treatment of organics (Illinois)
  - 1,500 SCFM SVE system
  - 50 SCFM air injection into groundwater
  - Liquid injection into soils
- 125 GPM groundwater treatment system for the treatment of metals (Arsenic, Iron and Manganese), VOCs, SVOCs, and NAPL
- 125 SCFM groundwater bioremediation system in New Jersey. Retrofitted the system with air injection to replace the original oxygen system
- 14 GPM groundwater treatment system in an active chloro alkali plant for the treatment of metals (Iron), VOCs, and SVOCs (Louisiana)
- 100 GPM groundwater extraction system at an active chemical plant (Kansas)
- 300 SCFM soil vapor extraction system design modifications for treatment of organics (gasoline) (Illinois)
- 10 GPM groundwater extraction/treatment system design modifications for treatment of organics (Minnesota)
- Landfill leachate system modification (Illinois)
- SVE system process and instrumentation design modifications (Illinois)
- Landfill leachate system design (Minnesota)
- 100 GPM groundwater treatment system for the treatment of metals, VOCs, SVOCs, and NAPL (Pennsylvania)
- 600 GPM groundwater extraction/treatment system for the treatment of VOCs and pesticides at an active chemical plant (Kansas)
- Air sparge/soil vapor extraction/MPE system design for treatment of organics (Georgia)
  - 80 SCFM SVE system
  - 40 SCFM air injection into groundwater
  - 240 SCFM/12 GPM multi-phase extraction system
- Vapor intrusion system design at several buildings at an industrial site (Washington)
- Wetlands design for iron, manganese, and aluminum treatment (Pennsylvania)
- 15 GPM boiler blowdown treatment system for iron removal, pH and temperature adjustment and oxygenation (Iowa)
- SVE and groundwater treatment system modifications for treatment of VOCs in ground/groundwater (Nebraska)
- 500 GPM industrial wastewater treatment system for the removal of free and emulsified oil and grease, TSS, and dissolved metals (Illinois)
- 140 GPM air stripper upgrade/replacement for the removal of VOCs in an existing groundwater treatment system (Washington)
- 7,500 SCFM Regenerative Thermal Oxidizer (RTO) and scrubber upgrade/replacement for the destruction of chlorinated VOCs and the scrubbing of hydrochloric acid (HCl) from the exhaust of an existing air stripper in a groundwater treatment system (New York)
- 1 GPD DNAPL standalone (solar) well recovery system at a landfill (Indiana)

Process Design/Start-up of Treatment Systems
Various Locations, United States

Julian has also been responsible for Process Design and Start-up of Treatment Systems. His responsibilities in this capacity include process and instrument development, preparation of O&M manuals, computerized Process Control (PLC and SCADA functions), site startup, and operator training.

- 300 GPM Cr, Cu, As removal from groundwater in California
- 50 GPM metals removal in Texas
- 50 GPM groundwater treatment system for heavy metals in California
- 50 GPM Cr removal system in Massachusetts
- 300 GPM groundwater treatment system for heavy metals and organics removal in New Jersey
- 450 GPM groundwater treatment system for heavy metals and organics removal in Ohio
- 100 GPM groundwater treatment system for the treatment of heavy metals, VOCs, SVOCs, and NAPL (Pennsylvania)
- 125 GPM groundwater treatment system for the treatment of heavy metals, VOCs, SVOCs, and NAPL (Ohio)
- 50 GPM carbon system upgrade for a groundwater treatment system (New York)

Julian G.R. Worrall

Sr. Process Engineer

- 500 SCFM oxidizer addition to an existing treatment system (Texas)
- Evaluation and upgrade of a 50 GPM treatment system for the destruction of hydrazine (New York)
- Design support for removal of radioactive iron oxide fines from a 500 GPM wastewater stream from a nuclear power plant (North Carolina)
- Design of a 3 GPM extraction/injection bio-barrier at an active chemical plant (Louisiana)
- Design of a 34 GPM extraction/injection bio-barrier at an active chemical plant (Louisiana)
- System upgrade (two extraction wells) of a 20 GPM groundwater extraction system at a landfill (Ohio)
- 14 GPM groundwater collection trench design at an active power plant (Illinois)

Troubleshooting/Site Review/Operator Training
Various Locations, United States

- 60 GPM metal processing Al and CR+6 in Illinois
- 400 GPM Cr+6, CR+3, removal from groundwater in New Jersey
- SVE and air injection system evaluation (Kansas)
- Groundwater treatment system evaluation (Texas)
- Evaluation of unintentional discharge of groundwater containing VOCs, PCBs, metals, and TSS (New York)
- Comprehensive peer review of a system design to address chlorides in the groundwater (New Mexico)
- Evaluation of a phosphorous removal treatment system at an operational industrial facility (Georgia)

Pilot Tests
Various Locations, United States

- Pennsylvania - Color removal, breakdown, and precipitation of dyes using ferrous iron based process (industrial)
- Indiana - Chromium removal
- Ohio - Heavy metals removal

Industrial Water/Wastewater Projects

Project/Design Management
Various Locations, United States

Project/Design Management for the design and construction of industrial remediation and plant process systems. Responsibilities included design, project management, construction management, and startup of projects in various manufacturing facilities:

- 500 GPD ultra filtration system for removal of oil and grease in Monterrey, Mexico
- 10 GPM reverse osmosis system for generation of ultra-pure water in New York

Process Design/Startup of Treatment Systems
Various Locations, United States

Responsibilities include process and instrument development, preparation of O&M manuals, computerized Process Control (PLC and SCADA functions), site startup, and operator training:

- Ohio - Acid transfer/addition system to a chemical process

Troubleshooting/Site Review/Operator Training
Various Locations, United States

- 20 GPM plating waste Cu, Cr, Ni, Zn in New York
- 200 GPM plating waste Zn in Indiana
- 50 GPM plating waste Cu, Ni, Pb in Pennsylvania
- 100 GPM automotive Cu, Ni, Zn, Cr in Alabama
- 100 GPM paint wastes, phosphorus Pb, Zn, Ni, Cr, Cu (automotive) in Brampton, Ontario, Canada
- 50 GPM metals removal automotive Pb, Zn, Ni, Cu in Kentucky
- 800 GPM color BOD and COD removal from textile washing facility for water reuse in Kentucky
- 300 GPM solids removal wastewater treatment system at a ceramics plant in Mexico
- Solids removal wastewater treatment system at a ceramics plant in Ohio. Water was recycled to feed various process systems throughout the plant
- 500 GPD ultrafiltration process at a jewelry company in New York
- Process engineering evaluation of an existing heavy metals treatment system from an industrial anodizing line

Work history

2000 - present	GHD (formerly Conestoga-Rovers & Associates), Buffalo, NY
1997 - 2000	CRA Services, Buffalo, NY
1993 - 1997	CSK Technical, Inc., Tonawanda, NY
1990 - 1993	Andco Environmental Processes, Inc., Amherst, NY

APPENDIX 2

GHD Training / Certifications

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Ryan Aamot

6/26/2000	FT180A	CLASS - Construction Administration and Inspection
6/26/2000	FT050A	CLASS - Fluid Level Monitoring
6/26/2000	FT060A	CLASS - Groundwater Sampling
6/26/2000	FT130A	CLASS - Test Pits
6/26/2000	FT180B	FIELD - Construction Administration and Inspection - Practical
6/26/2000	FT050B	FIELD - Fluid Level Monitoring - Practical
6/26/2000	FT060B	FIELD - Groundwater Sampling - Practical
6/26/2000	FT130B	FIELD - Test Pits - Practical
7/7/2000	EHS006	Initial 40-hour HAZWOPER
7/7/2000	H003	Initial 40-hour HAZWOPER
6/15/2001	FT100A	CLASS - Surficial Soil Sampling
6/15/2001	FT100B	FIELD - Surficial Soil Sampling - Practical
8/10/2001	FT220A	CLASS - Air Monitoring
8/10/2001	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
8/10/2001	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
8/10/2001	FT210A	CLASS - Site Surveying
8/10/2001	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
8/10/2001	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
8/10/2001	FT220B	FIELD - Air Monitoring - Practical
8/10/2001	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
8/10/2001	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
8/10/2001	FT210B	FIELD - Site Surveying - Practical
8/10/2001	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
8/10/2001	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
8/20/2001	FT120A	CLASS - Surface Water Flow Measurements
8/20/2001	FT120B	FIELD - Surface Water Flow Measurements - Practical
11/9/2001	FT070A	CLASS - Residential Well Sampling
11/9/2001	FT070B	FIELD - Residential Well Sampling - Practical
11/11/2002	FT020A	CLASS - Drilling Progam-Preparation and Closure
11/11/2002	FT020B	FIELD - Drilling Program-Preparation and Closeure Practical
11/25/2002	FT030A	CLASS - Borehole Installation and Sampling
11/25/2002	FT040A	CLASS - Monitoring Well Design & Construction
11/25/2002	FT030B	FIELD - Borehole Installation and Sampling - Practical
11/25/2002	FT040B	FIELD - Monitoring Well Design and Construction - Practical
10/10/2003	H009	Asbestos Awareness
4/22/2005	H011	Excavation for Competent Persons
11/15/2005	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
4/4/2006	F108	COURSE - Aquifer Hydraulic Testing: Pumping Tests, Packer Tests, and Single-well Response Tests

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4/13/2006	EX111	Understanding LNAPL Basics
4/18/2007	H011	Excavation for Competent Persons
2/12/2008	PDH021	Geosynthetic Materials, Applications and Design
3/2/2008	Q010	Inspection, Measurement, and Test Equipment Work Instructions
7/2/2008	H108	Hydrogen Sulfide Awareness
7/9/2010	F119T	COURSE - Sample Handling and Management Protocols
2/27/2012	F115	COURSE - Topographic Surveys
2/27/2012	F113	COURSE - Soil Gas Sampling
3/13/2012	H200	Confined Space Entry
4/18/2013	PDH082	An Introduction to Coal Mining
4/18/2013	PDH095	Vapor Intrusion Overview and Assessment Approaches (Part A)
3/28/2014	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
3/28/2014	PDH060	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues
3/28/2014	PDH061	Wind Energy Part 3 - Wind Resource Evaluation, Siting and Regulatory Issues
3/28/2014	PDH062	Wind Energy Part 4 - Wind Project Design, Engineering, Construction and Connecting to the Grid
1/30/2015	H304	Worker Electrical Safety Program (WESP) (Online)
3/2/2015	H100	8 HR HAZWOPER Refresher Training - Online
1/20/2016	H100	8 HR HAZWOPER Refresher Training - Online
1/24/2016	H100	8 HR HAZWOPER Refresher Training - Online
3/29/2016	EX144	LNAPL Training Part 1: An Improved Understanding of LNAPL Behavior in the Subsurface - State of Science vs. State of Practice)
3/29/2016	EX145	LNAPL Training Part 2: LNAPL Characterization and Recoverability – Improved Analysis - Do you know where the LNAPL is and can you recover it?
3/29/2016	EX146	LNAPL Training Part 3: Evaluating LNAPL Remedial Technologies for Achieving Project Goals
1/30/2017	H100	8 HR HAZWOPER Refresher Training - Online
1/31/2017	H100	8 HR HAZWOPER Refresher Training - Online
1/20/2018	H100	8 HR HAZWOPER Refresher Training - Online

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Matthew Abdallah

3/31/1994	EHS006	Initial 40-hour HAZWOPER
3/31/1994	H003	Initial 40-hour HAZWOPER
1/9/1996	H200	Confined Space Entry
1/24/2003	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
1/24/2003	FT130A	CLASS - Test Pits
1/24/2003	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
1/24/2003	FT130B	FIELD - Test Pits - Practical
2/26/2003	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
2/25/2005	FT180A	CLASS - Construction Administration and Inspection
4/6/2005	FT220A	CLASS - Air Monitoring
4/6/2005	FT210A	CLASS - Site Surveying
11/8/2005	EX105	Vapor Intrusion - From Assessment of Health Risks to Soil Gas Sampling
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group
2/7/2006	F104	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
2/21/2006	F106	COURSE - Decontamination of Heavy Equipment
2/24/2006	QS0200	Design Services Work Instructions
2/24/2006	H111	Heavy Equipment Operation Safety
3/1/2006	EX110	Chlorobenzenes: Sources, Fate, and Treatment
4/4/2006	F108	COURSE - Aquifer Hydraulic Testing: Pumping Tests, Packer Tests, and Single-well Response Tests
12/7/2006	H009	Asbestos Awareness
2/23/2007	EHS016	Rigging and Crane Use Safety
4/25/2007	EX118	Constructed Wetlands and Phytoremediation for the Treatment of Leachate and Groundwater
2/6/2009	H011	Excavation for Competent Persons
2/17/2009	EHS028	HAZWOPER - Manager & Supervisor
2/18/2009	H020	Commercial Motor Vehicle Program
7/28/2009	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
12/17/2009	PDH060	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues
1/19/2010	PDH062	Wind Energy Part 4 - Wind Project Design, Engineering, Construction and Connecting to the Grid
2/9/2010	PDH057	CRA Brownfield Services Overview
2/26/2010	H108	Hydrogen Sulfide Awareness
2/26/2010	EHS016	Rigging and Crane Use Safety
12/15/2010	EHS19R	Resource Conservation and Recovery Act (RCRA) Refresher
3/7/2012	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
3/7/2012	EHS018	Department of Transportation (DOT) Hazardous Materials Transportation Course
8/13/2013	H018	Professional Chainsaw Operator
8/23/2013	EHS19R	Resource Conservation and Recovery Act (RCRA) Refresher
2/21/2014	H109	Benzene Training
2/21/2014	H108	Hydrogen Sulfide Awareness
8/18/2014	EHS056	2008 Emergency Action Plan Training
8/18/2014	H113	Emergency Action Plan Training - Required Annually
1/13/2015	H310	Powered Industrial Trucks
1/15/2015	EHS201	8 HR HAZWOPER Refresher Training - Classroom

1/28/2015	EHS018	Department of Transportation (DOT) Hazardous Materials Transportation Course
1/28/2015	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
2/6/2015	H304	Worker Electrical Safety Program (WESP) (Online)
5/6/2016	H100	8 HR HAZWOPER Refresher Training - Online
5/9/2016	H100	8 HR HAZWOPER Refresher Training - Online
1/12/2017	H100	8 HR HAZWOPER Refresher Training - Online
1/12/2017	H111	Heavy Equipment Operation Safety
12/14/2017	H302	Department of Transportation (DOT) Hazardous Materials Shipping Course
1/11/2018	H100	8 HR HAZWOPER Refresher Training - Online

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Charles Ahrens

11/20/1987	EHS006	Initial 40-hour HAZWOPER
11/20/1987	H003	Initial 40-hour HAZWOPER
5/2/1998	QS0200	Design Services Work Instructions
6/1/1998	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT030A	CLASS - Borehole Installation and Sampling
6/1/1998	FT180A	CLASS - Construction Administration and Inspection
6/1/1998	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
6/1/1998	FT050A	CLASS - Fluid Level Monitoring
6/1/1998	FT040A	CLASS - Monitoring Well Design & Construction
6/1/1998	FT070A	CLASS - Residential Well Sampling
6/1/1998	FT120A	CLASS - Surface Water Flow Measurements
6/1/1998	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
6/1/1998	FT100A	CLASS - Surficial Soil Sampling
6/1/1998	FT170A	CLASS - Tank Closures
6/1/1998	FT130A	CLASS - Test Pits
6/1/1998	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT030B	FIELD - Borehole Installation and Sampling - Practical
6/1/1998	FT180B	FIELD - Construction Administration and Inspection - Practical
6/1/1998	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
6/1/1998	FT050B	FIELD - Fluid Level Monitoring - Practical
6/1/1998	FT060B	FIELD - Groundwater Sampling - Practical
6/1/1998	FT040B	FIELD - Monitoring Well Design and Construction - Practical
6/1/1998	FT070B	FIELD - Residential Well Sampling - Practical
6/1/1998	FT120B	FIELD - Surface Water Flow Measurements - Practical
6/1/1998	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
6/1/1998	FT100B	FIELD - Surficial Soil Sampling - Practical
6/1/1998	FT170B	FIELD - Tank Closures - Practical
6/1/1998	FT130B	FIELD - Test Pits - Practical
3/13/1999	H200	Confined Space Entry
10/20/1999	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/20/1999	FT020A	CLASS - Drilling Progam-Preparation and Closure
10/20/1999	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
10/20/1999	FT210A	CLASS - Site Surveying
10/20/1999	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
10/20/1999	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/20/1999	FT020B	FIELD - Drilling Program-Preparation and Closeure Practical
10/20/1999	FT210B	FIELD - Site Surveying - Practical
10/20/1999	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
2/20/2002	FT200A	CLASS - Geophysical Surveys
2/20/2002	FT200B	FIELD - Geophysical Surveys - Practical
5/26/2004	FT060A	CLASS - Groundwater Sampling

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3/2/2005	EX103	In-Situ Chemical Injection: Practical Design & Field Application
4/7/2005	EX104	In-Situ Bioremediation
4/22/2005	H011	Excavation for Competent Persons
1/10/2006	F102TB	COURSE - Soil Sampling SOP Part II: CRA Approach for Soil Materials Description and Classification
3/1/2006	EX110	Chlorobenzenes: Sources, Fate, and Treatment
4/18/2007	H011	Excavation for Competent Persons
3/12/2008	EX119	LNAPL Advanced Concepts
3/12/2008	EX111	Understanding LNAPL Basics
4/8/2008	PDH024	The Use of Organic Carbon Substrates for Enhanced Biodegradation of Chlorinated Solvents
6/17/2008	PDH027	Vapor Intrusion: Evaluation and Mitigation Case Studies
7/2/2008	H108	Hydrogen Sulfide Awareness
1/15/2009	EX134	CRA Risk Assessment Services: How Can We Help You?
3/5/2010	EX143	Maximizing the Use of 3-D Site Visualizations
5/18/2010	PDH024	The Use of Organic Carbon Substrates for Enhanced Biodegradation of Chlorinated Solvents
5/18/2010	PDH027	Vapor Intrusion: Evaluation and Mitigation Case Studies
7/13/2010	PDH068	Assessing Ecological Risk with Sediment Quality Guidelines (e.g., ER-L/ER-M, LEL/SEL, TEL/PEL): Kids, don't Try This at Home! Or at the Office!
3/30/2011	F119T	COURSE - Sample Handling and Management Protocols
3/30/2011	PDH090	Resolving GSI Criteria Exceedances in Groundwater Under the new Part 201 Regulations
5/2/2012	PDH081	Incremental Sampling Methodology
2/5/2015	H304	Worker Electrical Safety Program (WESP) (Online)
2/19/2015	H100	8 HR HAZWOPER Refresher Training - Online
12/23/2015	H100	8 HR HAZWOPER Refresher Training - Online
12/28/2015	H100	8 HR HAZWOPER Refresher Training - Online
12/29/2015	H100	8 HR HAZWOPER Refresher Training - Online
12/30/2015	H100	8 HR HAZWOPER Refresher Training - Online
2/25/2017	H100	8 HR HAZWOPER Refresher Training - Online
2/14/2018	H100	8 HR HAZWOPER Refresher Training - Online

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Grant Anderson

6/16/1993	EHS006	Initial 40-hour HAZWOPER
6/16/1993	H003	Initial 40-hour HAZWOPER
5/2/1998	QS0200	Design Services Work Instructions
5/2/1998	QS0400	Inspection, Measurement and Test Equipment Work Instructions
5/26/1998	FT060A	CLASS - Groundwater Sampling
6/1/1998	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT180A	CLASS - Construction Administration and Inspection
6/1/1998	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
6/1/1998	FT050A	CLASS - Fluid Level Monitoring
6/1/1998	FT200A	CLASS - Geophysical Surveys
6/1/1998	FT070A	CLASS - Residential Well Sampling
6/1/1998	FT120A	CLASS - Surface Water Flow Measurements
6/1/1998	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
6/1/1998	FT100A	CLASS - Surficial Soil Sampling
6/1/1998	FT170A	CLASS - Tank Closures
6/1/1998	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT180B	FIELD - Construction Administration and Inspection - Practical
6/1/1998	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
6/1/1998	FT050B	FIELD - Fluid Level Monitoring - Practical
6/1/1998	FT060B	FIELD - Groundwater Sampling - Practical
6/1/1998	FT070B	FIELD - Residential Well Sampling - Practical
6/1/1998	FT120B	FIELD - Surface Water Flow Measurements - Practical
6/1/1998	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
6/1/1998	FT100B	FIELD - Surficial Soil Sampling - Practical
6/1/1998	FT170B	FIELD - Tank Closures - Practical
10/11/1999	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/11/1999	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
10/11/1999	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
10/11/1999	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/11/1999	FT160B	FIELD - Sewer System and Flow Measurement: Sewer Flow Sampling, Sewer and Open-Channel Flow Measurement, Sewer Inspection
10/11/1999	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
4/6/2005	FT220A	CLASS - Air Monitoring
4/6/2005	FT210A	CLASS - Site Surveying
4/22/2005	H011	Excavation for Competent Persons
11/16/2005	FT020A	CLASS - Drilling Progam-Preparation and Closure
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group
3/1/2006	EX110	Chlorobenzenes: Sources, Fate, and Treatment
4/18/2007	H011	Excavation for Competent Persons
4/18/2007	H111	Heavy Equipment Operation Safety
8/10/2010	PDH074	Threatened & Endangered Species – How will they impact my project?
1/26/2015	H304	Worker Electrical Safety Program (WESP) (Online)

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Lisa Armbruster

6/12/2007	Q009	Design Services Work Instructions
6/12/2007	Q009	Design Services Work Instructions
10/23/2007	PDH016	Wind Power - the Challenges and Opportunities of a Fast Growing Industry
10/23/2007	PDH016	Wind Power - the Challenges and Opportunities of a Fast Growing Industry
11/19/2007	DS002	Development of a Project Work Plan
11/19/2007	DS002	Development of a Project Work Plan
12/3/2007	EX105	Vapor Intrusion - From Assessment of Health Risks to Soil Gas Sampling
12/3/2007	EX105	Vapor Intrusion - From Assessment of Health Risks to Soil Gas Sampling
1/21/2008	DS003	Developing the Design Fee
1/21/2008	DS003	Developing the Design Fee
2/12/2008	PDH021	Geosynthetic Materials, Applications and Design
2/12/2008	PDH021	Geosynthetic Materials, Applications and Design
6/24/2008	PDH028	Landfill Gas Collection and Combustion: Engineered Systems and Global Opportunities
6/24/2008	PDH028	Landfill Gas Collection and Combustion: Engineered Systems and Global Opportunities
12/9/2008	PDH039	Steel Tank Coatings
12/9/2008	PDH039	Steel Tank Coatings
3/20/2009	DS002	Development of a Project Work Plan
3/20/2009	DS002	Development of a Project Work Plan
9/5/2013	H200	Confined Space Entry
9/5/2013	H200	Confined Space Entry
2/5/2015	H304	Worker Electrical Safety Program (WESP) (Online)
2/5/2015	H304	Worker Electrical Safety Program (WESP) (Online)

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Samuel Atazadeh

9/26/2008	EHS006	Initial 40-hour HAZWOPER
9/26/2008	H003	Initial 40-hour HAZWOPER
12/9/2013	F101	Overview of Drilling Program
12/10/2013	F102TA	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
12/10/2013	F102TB	COURSE - Soil Sampling SOP Part II: CRA Approach for Soil Materials Description and Classification
12/10/2013	F103T	COURSE - Monitoring Well Design and Construction
12/10/2013	F104	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
12/10/2013	F106	COURSE - Decontamination of Heavy Equipment
12/10/2013	F107	COURSE - Soil Excavation and Confirmatory Sampling
12/11/2013	F108	COURSE - Aquifer Hydraulic Testing: Pumping Tests, Packer Tests, and Single-well Response Tests
12/11/2013	F109	COURSE - Lagoon and Sediment Sampling
12/11/2013	F110	COURSE - Surface Water Flow Measurements
12/11/2013	F113	COURSE - Soil Gas Sampling
12/11/2013	F114	COURSE - Sewer Flow Sampling, Sewer and Open-Channel Flow Measurement, and Sewer Inspection
12/11/2013	F115	COURSE - Topographic Surveys
12/11/2013	F116	COURSE - Bedrock Drilling Methods and Rock Description
12/17/2013	F118	COURSE - Landfill Gas Sampling: Gas Probe Installation and Landfill Gas Monitoring
12/17/2013	F119T	COURSE - Sample Handling and Management Protocols
12/17/2013	F119	COURSE - Sample Handling and Management Protocols
12/18/2013	Q009	Design Services Work Instructions
12/31/2013	UFT116	Soil and Rock Logging to BS5930:1999
1/8/2014	PDH120	Life Cycle Assessment – The Key to Sustainability
2/1/2014	T107C	FIELD - Soil Excavation and Confirmatory Sampling
2/1/2014	T102CB	FIELD - Soil Sampling SOP, Part 1: Borehole Installation and Sample Collection
2/20/2014	EHS045	Newly Employed Inexperienced Miner
2/24/2014	Q010	Inspection, Measurement, and Test Equipment Work Instructions
10/17/2014	T104CA	FIELD - Water Sampling: Groundwater
1/13/2015	H100	8 HR HAZWOPER Refresher Training - Online
1/15/2015	EHS19R	Resource Conservation and Recovery Act (RCRA) Refresher
3/24/2015	H108	Hydrogen Sulfide Awareness
1/25/2016	H100	8 HR HAZWOPER Refresher Training - Online
1/26/2016	H009	Asbestos Awareness
2/24/2016	T101	Overview of Drilling Methods (Online)
2/24/2016	T102A	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
2/24/2016	T102B	COURSE - Soil Sampling SOP Part II: CRA Approach for Soil Materials Description and Classification
2/25/2016	T103	COURSE - Monitoring Well Design and Construction
2/25/2016	T104	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
2/25/2016	T106	COURSE - Decontamination of Heavy Equipment

2/25/2016	**T107**	COURSE - Soil Excavation and Confirmatory Sampling
2/25/2016	**T108**	COURSE - Aquifer Hydraulic Testing: Pumping Tests, Packer Tests, and Single-well Response Tests
2/25/2016	**T110**	COURSE - Surface Water Flow Measurements
2/26/2016	**T113**	COURSE - Soil Gas Sampling
2/26/2016	**H009**	Asbestos Awareness
6/30/2016	**H312**	Hydrogen Sulfide (H2S) Alive Training
6/30/2016	**H312**	Hydrogen Sulfide (H2S) Alive Training
11/23/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
11/24/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
11/26/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
6/29/2017	**H302**	Department of Transportation (DOT) Hazardous Materials Shipping Course
6/29/2017	**H103**	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
10/13/2017	**H100**	8 HR HAZWOPER Refresher Training - Online

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Matthew Barnes

2/17/2011	**F119T**	COURSE - Sample Handling and Management Protocols
2/17/2011	**F102TA**	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
2/18/2011	**F118**	COURSE - Landfill Gas Sampling: Gas Probe Installation and Landfill Gas Monitoring
2/18/2011	**F113**	COURSE - Soil Gas Sampling
2/18/2011	**F104**	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
3/11/2011	**EHS006**	Initial 40-hour HAZWOPER
3/11/2011	**H003**	Initial 40-hour HAZWOPER
4/4/2011	**T104CD**	FIELD - Fluid Level Monitoring
4/4/2011	**T118C**	FIELD - Landfill Gas Sampling: Gas Probe Installation and Landfill Gas Monitoring
3/13/2012	**H200**	Confined Space Entry
11/26/2012	**T104CA**	FIELD - Water Sampling: Groundwater
10/28/2013	**H018**	Professional Chainsaw Operator
2/13/2014	**PDH059**	Wind Energy Part 1 - Orientation to Wind Energy
2/13/2014	**PDH060**	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues
2/13/2014	**F103T**	COURSE - Monitoring Well Design and Construction
3/28/2014	**UFT116**	Soil and Rock Logging to BS5930:1999
1/23/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)
2/18/2015	**H100**	8 HR HAZWOPER Refresher Training - Online
1/12/2016	**H311**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
1/18/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
1/25/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
2/17/2016	**T102CB**	FIELD - Soil Sampling SOP, Part 1: Borehole Installation and Sample Collection
2/7/2017	**H100**	8 HR HAZWOPER Refresher Training - Online
12/14/2017	**H100**	8 HR HAZWOPER Refresher Training - Online

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Rebecca Bentley

12/9/2010	**EHS018**	Department of Transportation (DOT) Hazardous Materials Transportation Course
3/2/2013	**EHS045**	Newly Employed Inexperienced Miner
8/12/2015	**Q009**	Design Services Work Instructions
8/12/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)
4/6/2017	**T016**	Some Failures of the Geotechnical Variety
5/18/2017	**T017**	MASW for Site Characterization and Infrastructure Condition Assessment
7/26/2017	**H109**	Benzene Training
7/26/2017	**H108**	Hydrogen Sulfide Awareness
8/18/2017	**H200**	Confined Space Entry
8/18/2017	**H011**	Excavation for Competent Persons
8/18/2017	**H111**	Heavy Equipment Operation Safety
8/18/2017	**H003**	Initial 40-hour HAZWOPER

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James Blumke

4/21/1995	EHS006	Initial 40-hour HAZWOPER
4/21/1995	H003	Initial 40-hour HAZWOPER
6/4/2001	QS0200	Design Services Work Instructions
11/5/2001	FT030A	CLASS - Borehole Installation and Sampling
11/5/2001	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
11/5/2001	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
11/5/2001	FT050A	CLASS - Fluid Level Monitoring
11/5/2001	FT040A	CLASS - Monitoring Well Design & Construction
11/5/2001	FT210A	CLASS - Site Surveying
11/5/2001	FT030B	FIELD - Borehole Installation and Sampling - Practical
11/5/2001	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
11/5/2001	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
11/5/2001	FT050B	FIELD - Fluid Level Monitoring - Practical
11/5/2001	FT060B	FIELD - Groundwater Sampling - Practical
11/5/2001	FT040B	FIELD - Monitoring Well Design and Construction - Practical
11/5/2001	FT210B	FIELD - Site Surveying - Practical
2/20/2002	FT200A	CLASS - Geophysical Surveys
2/20/2002	FT200B	FIELD - Geophysical Surveys - Practical
3/31/2002	FT170A	CLASS - Tank Closures
3/31/2002	FT170B	FIELD - Tank Closures - Practical
4/3/2002	H200	Confined Space Entry
10/15/2002	FT020A	CLASS - Drilling Progam-Preparation and Closure
10/15/2002	FT070A	CLASS - Residential Well Sampling
10/15/2002	FT100A	CLASS - Surficial Soil Sampling
10/15/2002	FT130A	CLASS - Test Pits
10/15/2002	FT020B	FIELD - Drilling Program-Preparation and Closeure Practical
10/15/2002	FT070B	FIELD - Residential Well Sampling - Practical
10/15/2002	FT100B	FIELD - Surficial Soil Sampling - Practical
10/15/2002	FT130B	FIELD - Test Pits - Practical
5/19/2003	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
10/10/2003	H009	Asbestos Awareness
12/1/2003	FT180B	FIELD - Construction Administration and Inspection - Practical
5/26/2004	FT060A	CLASS - Groundwater Sampling
11/30/2004	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
2/25/2005	FT180A	CLASS - Construction Administration and Inspection
4/7/2005	EX104	In-Situ Bioremediation
4/22/2005	H011	Excavation for Competent Persons
11/8/2005	EX105	Vapor Intrusion - From Assessment of Health Risks to Soil Gas Sampling
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group
3/1/2006	EX110	Chlorobenzenes: Sources, Fate, and Treatment
3/28/2006	SW103	3 Dimensional Visualization
4/13/2006	EX111	Understanding LNAPL Basics

6/27/2006	F115	COURSE - Topographic Surveys
8/2/2006	F113	COURSE - Soil Gas Sampling
8/31/2006	EX116	New "Uniform" Hazardous Waste Manifest Seminar
12/4/2006	F118	COURSE - Landfill Gas Sampling: Gas Probe Installation and Landfill Gas Monitoring
4/18/2007	H011	Excavation for Competent Persons
4/18/2007	H111	Heavy Equipment Operation Safety
6/22/2007	F107	COURSE - Soil Excavation and Confirmatory Sampling
11/20/2007	PDH019	Statistics for Engineering
7/2/2008	H108	Hydrogen Sulfide Awareness
9/29/2009	PDH050	Sustainable Remediation – Making Cleanups Greener
10/15/2009	ESA002	Beyond All Appropriate Inquiry – ASTM Update and Status of the ASTM E1903 Phase II Standard
4/5/2012	Q009	Design Services Work Instructions
2/20/2014	PDH123	Changes and Advances in the ASTM Phase I Site Assessment Procedures
2/20/2014	ESA002	Beyond All Appropriate Inquiry – ASTM Update and Status of the ASTM E1903 Phase II Standard
3/20/2014	PDH085	Environmental Assessment for Engineers
3/22/2014	PDH058	Slope Stabilization: Best Practices and Challenges
2/19/2015	H304	Worker Electrical Safety Program (WESP) (Online)
2/26/2015	H100	8 HR HAZWOPER Refresher Training - Online
12/28/2015	H100	8 HR HAZWOPER Refresher Training - Online
12/29/2015	H100	8 HR HAZWOPER Refresher Training - Online
2/21/2017	H100	8 HR HAZWOPER Refresher Training - Online
4/11/2017	T015	T015: Vapor Intrusion
2/1/2018	H100	8 HR HAZWOPER Refresher Training - Online

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Brian Boevers

3/16/1987	EHS006	40 Hr HAZWOPER
3/16/1987	H003	H003: OSHA 40-Hour HAZWOPER
5/2/1998	QS0200	Design Services Work Instructions
7/30/1998	FT190A	Asbestos Sampling
7/30/1998	FT190B	Asbestos Sampling Practical
7/30/1998	FT030B	Borehole Installation and Sampling Practical
7/30/1998	FT030A	Borehole Installation and Sampling
7/30/1998	FT180B	Construct Administration and Inspection Practical
7/30/1998	FT180A	Construction Administration and Inspection
7/30/1998	FT140B	Drum Soil Ex Stock Practical
7/30/1998	FT140A	Drum Soil Excav and Stock
7/30/1998	FT050B	Fluid Level Monitoring Practical
7/30/1998	FT050A	Fluid Level Monitoring
7/30/1998	FT060A	Groundwater Sampling
7/30/1998	FT060B	Groundwater Sampling Practical
7/30/1998	FT040A	Monitoring Well Design and Construction
7/30/1998	FT040B	Monitoring Well Practical
7/30/1998	FT070B	Residential Well Sampling Practical
7/30/1998	FT070A	Residential Well Sampling
7/30/1998	FT100B	Surf Soil Sampling Practical
7/30/1998	FT120B	Surf Wat Flow Meas Practical
7/30/1998	FT110B	Surf Wat Lag Sed S Practical
7/30/1998	FT110A	Surf Water Lagoon Sediment S
7/30/1998	FT120A	Surface Water Flow Measurement
7/30/1998	FT100A	Surficial Soil Sampling
7/30/1998	FT170A	Tank Closures
7/30/1998	FT170B	Tank Closures Practical
7/30/1998	FT130A	Test Pits
7/30/1998	FT130B	Test Pits Practical
3/13/1999	H200	Confined Space Entry
10/29/1999	FT090B	Decon Procedures Practical
10/29/1999	FT090A	Decontamination Procedures
10/29/1999	FT160B	Sew SysFlow Meas St Practical
10/29/1999	FT160A	Sewer System Flow Meas Stud
10/15/2009	ESA002	Beyond All Appropriate Inquiry – ASTM Update and Status of the ASTM E1903 Phase II Standard
2/12/2018	T240	T240: ASTM E1527 Phase I ESA Level 1 Assessor Training Course
2/12/2018	T241	T240: ASTM E1527 Phase I ESA Level 1 Assessor Training Course
2/13/2018	T242	T240: ASTM E1527 Phase I ESA Level 1 Assessor Training Course
3/27/2018	T243	T240: ASTM E1527 Phase I ESA Level 1 Assessor Training Course
3/27/2018	T244	T244: Limited Environmental Compliance Reviewer Training Record (Level 2)

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Timothy Braun

2/10/2006	F112T	Landfill Gas Sampling
2/10/2006	F103T	Monitoring Well Design and Construction
2/10/2006	F101T	Overview of Drilling Programs
2/14/2006	T102CA	Field - Soil Sampling SOP, Part 1: Surficial Soil Sampling
2/14/2006	QS0400	Inspection, Measurement and Test Equipment Work Instructions
2/14/2006	F102TA	Soil Sampling Part I
2/16/2006	FT220A	Air Monitoring
2/16/2006	FT030A	Borehole Installation and Sampling
2/16/2006	FT020A	Drilling Progam Prep Closure
2/16/2006	FT050A	Fluid Level Monitoring
2/16/2006	FT190A	General Asbestos Awareness
2/16/2006	FT060A	Groundwater Sampling
2/16/2006	FT040A	Monitoring Well Design and Construction
2/16/2006	FT070A	Residential Well Sampling
2/16/2006	FT210A	Site Surveying
2/24/2006	EHS006	40 Hr HAZWOPER
2/24/2006	H003	H003: OSHA 40-Hour HAZWOPER
3/1/2006	EX110	Chlorobenzenes: Sources, Fate, and Treatment
3/16/2006	F106	CLASS Decontamination of Heavy Equipment
3/17/2006	FT170A	Tank Closures
11/14/2006	QS0200	Design Services Work Instructions
11/30/2006	F118	CLASS Landfill Gas Monitoring
12/6/2006	T104CD	FIELD - Fluid Level Monitoring
12/6/2006	T118C	FIELD - Landfill Gas Sampling: Gas Probe Installation and Landfill Gas Monitoring
12/6/2006	T104CA	FIELD - Water Sampling: Groundwater
12/15/2006	FT220B	Air Monitoring Practical
2/26/2007	EHS07B	Air Monitoring
4/18/2007	H011	Excavation for Competent Persons
4/18/2007	H111	Heavy Equipment Operation Safety
2/21/2008	PDH022	Wetlands and Related Issues Affecting Land Development
5/22/2008	EHS08B	Air Monitoring
5/22/2008	PDH016	Wind Power - the Challenges and Opportunities of a Fast Growing Industry
7/2/2008	H108	Hydrogen Sulfide Awareness
9/24/2008	H200	Confined Space Entry
11/11/2008	EX118	Constructed Wetlands and Phytoremediation for the Treatment of Leachate and Groundwater
11/11/2008	PDH029	Ultraviolet Disinfection for Municipal Water and Wastewater Applications
11/24/2009	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
2/16/2010	EHS10A	Air Monitoring
3/9/2012		Construction Administration for Engineers
4/17/2012		Erosion & Stormwater Mgmt
4/24/2012		Erosion & Stormwater Mgmt
1/22/2015	EHS19R	RCRA Refresher
3/9/2015	H100	8 HR HAZWOPER Refresher

3/9/2015	**EHS202**	EHS202: 8-Hour HAZWOPER Refres
4/27/2016	**H100**	H100: OSHA 8-Hour HAZWOPER Re
4/28/2016	**H100**	H100: OSHA 8-Hour HAZWOPER Ref
5/26/2017		SMS Training
7/10/2017	**H100**	H100: OSHA 8-Hour HAZWOPER Re
7/11/2017	**H100**	H100: OSHA 8-Hour HAZWOPER Ref

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Jon Christofferson

3/16/1987	EHS006	Initial 40-hour HAZWOPER
3/16/1987	H003	Initial 40-hour HAZWOPER
2/25/1989	EHS028	HAZWOPER - Manager & Supervisor
5/2/1998	QS0200	Design Services Work Instructions
6/1/1998	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT180A	CLASS - Construction Administration and Inspection
6/1/1998	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
6/1/1998	FT050A	CLASS - Fluid Level Monitoring
6/1/1998	FT060A	CLASS - Groundwater Sampling
6/1/1998	FT070A	CLASS - Residential Well Sampling
6/1/1998	FT100A	CLASS - Surficial Soil Sampling
6/1/1998	FT130A	CLASS - Test Pits
6/1/1998	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT180B	FIELD - Construction Administration and Inspection - Practical
6/1/1998	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
6/1/1998	FT050B	FIELD - Fluid Level Monitoring - Practical
6/1/1998	FT060B	FIELD - Groundwater Sampling - Practical
6/1/1998	FT070B	FIELD - Residential Well Sampling - Practical
6/1/1998	FT130B	FIELD - Test Pits - Practical
3/13/1999	H200	Confined Space Entry
10/14/1999	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/14/1999	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
10/14/1999	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
4/18/2002	FT040A	CLASS - Monitoring Well Design & Construction
4/18/2002	FT040B	FIELD - Monitoring Well Design and Construction - Practical
3/1/2006	EX110	Chlorobenzenes: Sources, Fate, and Treatment
8/31/2006	EX116	New "Uniform" Hazardous Waste Manifest Seminar
6/13/2007	ESA001	Update to Environmental Site Assessments for Commercial Real Estate: ASTM E 1527-05 and 40 CFR Part 312 All Appropriate Inquiry
7/31/2007	EX126	Carbon Footprint / Greenhouse Gas Emissions Inventory
2/21/2008	PDH022	Wetlands and Related Issues Affecting Land Development
9/29/2009	PDH050	Sustainable Remediation – Making Cleanups Greener
10/1/2009	PDH054	Sustainable Remediation – Making Cleanups Greener Part 2
10/15/2009	ESA002	Beyond All Appropriate Inquiry – ASTM Update and Status of the ASTM E1903 Phase II Standard
10/28/2009	F119T	COURSE - Sample Handling and Management Protocols
2/9/2010	PDH057	CRA Brownfield Services Overview
8/17/2010	PDH075	Wetlands – Recent Issues - How will they affect your project?
11/11/2010	PDH081	Incremental Sampling Methodology
11/16/2010	PDH082	An Introduction to Coal Mining
2/22/2011	PDH089	Cape Breton Coalfield Mine Water Project:: A Case Study
3/30/2011	PDH090	Resolving GSI Criteria Exceedances in Groundwater Under the new Part 201 Regulations

4/26/2011	PDH091	Remediation of Metals in Groundwater and Soil
2/7/2012	H009	Asbestos Awareness
3/27/2014	PDH131	CRA Uses Forensics to Solve $168M Lawsuit
2/6/2015	H304	Worker Electrical Safety Program (WESP) (Online)
5/7/2015	H100	8 HR HAZWOPER Refresher Training - Online
5/21/2015	T101	Overview of Drilling Methods (Online)
2/11/2016	H304	Worker Electrical Safety Program (WESP) (Online)
1/11/2018	H100	8 HR HAZWOPER Refresher Training - Online
2/12/2018	T240	ASTM E1527 Phase I ESA Level 1 Assessor Training Course
2/12/2018	T241	ASTM E1527 Phase I ESA Level 1 Assessor Training Record
2/13/2018	T242	ASTM E1527 Phase I ESA Level 2 Assessor Training Record
3/27/2018	T243	ASTM E1527 Phase I ESA Level 3 Assessor Training Record
3/27/2018	T244	Limited Environmental Compliance Reviewer Training Record (Level 2)

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Julia Clark

10/5/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)
10/25/2017	**T022**	Permafrost: Mapping, monitoring and methods of restoration

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D'Arcy Cook

6/27/2017	**H009**	Asbestos Awareness
6/27/2017	**H304**	Worker Electrical Safety Program (WESP) (Online)
6/28/2017	**T113**	COURSE - Soil Gas Sampling
6/29/2017	**H109**	Benzene Training
6/30/2017	**T118**	COURSE - Landfill Gas Sampling: Gas Probe Installation and Landfill Gas Monitoring
6/30/2017	**H108**	Hydrogen Sulfide Awareness
7/5/2017	**T210**	Air Emissions Source Permitting 101
7/5/2017	**T211**	Basic Dimensional Analysis
7/5/2017	**T119**	Sample Handling and Management Protocols (Online)
7/7/2017	**T221**	Air Compliance Testing – USEPA Reference Method 18 - Measurement of Gaseous Organic Compound Emissions by Gas Chromatography
7/10/2017	**Q009**	Design Services Work Instructions
7/10/2017	**Q010**	Inspection, Measurement, and Test Equipment Work Instructions
7/21/2017	**T225**	Air Compliance Testing - ASTM D6348-12 Determination of Gaseous Compounds by Extractive Direct FTIR
7/21/2017	**T224**	Air Compliance Testing – Method 6
7/21/2017	**T222**	Air Compliance Testing – USEPA Reference Method 21 - Determination of Volatile Organic Compound Leaks

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Casey Cowan

5/16/1997	EHS006	Initial 40-hour HAZWOPER
5/16/1997	H003	Initial 40-hour HAZWOPER
12/21/2004	QS0200	Design Services Work Instructions
5/31/2005	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group
7/5/2006	H200	Confined Space Entry
9/20/2006	PDH002	Drifting Toward the Brink: Challenges in the Niagara Falls Water and Wastewater Utilities
12/19/2006	PDH005	Spatial Analysis of Household Water Supply & Demand
1/30/2007	PDH006	Utility Financial Consulting: Evaluating and Improving the Financial Condition of Water/Wastewater Systems
3/6/2007	PDH007	Demonstration of Real Time Flow Monitoring & Online Hydraulic Model to Facilitate Sewer System Operations and Management
9/11/2007	PDH014	Design and Trenchless Installation of Ductile Iron Pipe
11/19/2007	DS002	Development of a Project Work Plan
2/12/2008	PDH021	Geosynthetic Materials, Applications and Design
12/9/2008	PDH039	Steel Tank Coatings
1/6/2009	PDH041	Steel Water Pipe in the Water Industry
11/3/2009	PDH056	Iron and Manganese Treatment in Drinking Water
1/12/2010	PDH063	The Impacts of Water Treatment Process and Chemicals on Wastewater Treatment Plant Operations and Permits
12/7/2010	PDH084	Nutrient Removal Process Modeling and Optimization Strategies: A WEFTEC 2010 Update
5/8/2012	PDH119	NFWB -The Gorge Pumping Station's Continuing Rehabilitation
12/11/2014	PDH137	WWTP Aerobic Digestion Retrofit and Production

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Ryan Coy

7/30/2001	FT070A	CLASS - Residential Well Sampling
8/17/2001	EHS006	Initial 40-hour HAZWOPER
8/17/2001	H003	Initial 40-hour HAZWOPER
9/28/2001	QS0200	Design Services Work Instructions
3/9/2002	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
10/6/2002	FT050A	CLASS - Fluid Level Monitoring
10/6/2002	FT060A	CLASS - Groundwater Sampling
10/6/2002	FT050B	FIELD - Fluid Level Monitoring - Practical
10/6/2002	FT060B	FIELD - Groundwater Sampling - Practical
4/7/2005	EX104	In-Situ Bioremediation
11/8/2005	EX105	Vapor Intrusion - From Assessment of Health Risks to Soil Gas Sampling
11/11/2005	FT070B	FIELD - Residential Well Sampling - Practical
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group
3/28/2006	SW103	3-Dimensional (3D) Visualization Training Seminar - Learn How to Use EVS
4/13/2006	EX111	Understanding LNAPL Basics
5/4/2006	EX113	Scale Formation and Prevention
6/27/2006	F115	COURSE - Topographic Surveys
8/2/2006	F113	COURSE - Soil Gas Sampling
12/19/2006	PDH005	Spatial Analysis of Household Water Supply & Demand
5/9/2007	EX119	LNAPL Advanced Concepts
2/21/2008	PDH022	Wetlands and Related Issues Affecting Land Development
9/17/2008	F109	COURSE - Lagoon and Sediment Sampling
9/17/2008	F102TA	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
9/17/2008	F102TB	COURSE - Soil Sampling SOP Part II: CRA Approach for Soil Materials Description and Classification
10/6/2010	H009	Asbestos Awareness
2/27/2015	H304	Worker Electrical Safety Program (WESP) (Online)
2/27/2015	H100	8 HR HAZWOPER Refresher Training - Online
3/18/2016	H100	8 HR HAZWOPER Refresher Training - Online
7/6/2017	H100	8 HR HAZWOPER Refresher Training - Online
2/12/2018	T240	ASTM E1527 Phase I ESA Level 1 Assessor Training Course
2/12/2018	T241	ASTM E1527 Phase I ESA Level 1 Assessor Training Record
2/13/2018	T242	ASTM E1527 Phase I ESA Level 2 Assessor Training Record

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Gordon Crone

11/24/2009	**PDH059**	Wind Energy Part 1 - Orientation to Wind Energy
12/17/2009	**PDH060**	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues
1/7/2010	**PDH061**	Wind Energy Part 3 - Wind Resource Evaluation, Siting and Regulatory Issues
7/6/2010	**PDH073**	Incorporating Habitat Enhancement and Compensatory Mitigation into Remediation Design and Restoration
6/24/2014	**EHS301**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
2/4/2015	**PDH059**	Wind Energy Part 1 - Orientation to Wind Energy
2/6/2015	**PDH059**	Wind Energy Part 1 - Orientation to Wind Energy
2/6/2015	**PDH060**	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues

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Thomas Dahmer

5/28/2014	**Q009**	Design Services Work Instructions
1/23/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)
6/21/2016	**H111**	Heavy Equipment Operation Safety

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John Davis

1/28/2014	**H113**	Emergency Action Plan Training - Required Annually
6/24/2014	**EHS301**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
1/5/2015	**Q009**	Design Services Work Instructions

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Anthony DeMars

2/12/2016	**EHS006**	Initial 40-hour HAZWOPER
2/12/2016	**H003**	Initial 40-hour HAZWOPER
12/21/2017	**H304**	Worker Electrical Safety Program (WESP) (Online)

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Patrick DiFrancisco

3/26/2010	**Q009**	Design Services Work Instructions
6/19/2015	**EHS301**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
4/12/2016	**H009**	Asbestos Awareness

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Morgan Doerflein

10/23/2017	**H304**	Worker Electrical Safety Program (WESP) (Online)
10/24/2017	**H009**	Asbestos Awareness
10/24/2017	**H109**	Benzene Training
10/24/2017	**H108**	Hydrogen Sulfide Awareness
10/24/2017	**T119**	Sample Handling and Management Protocols (Online)
10/25/2017	**Q009**	Design Services Work Instructions

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Adam Estes

8/3/2009	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
12/22/2011	F119T	COURSE - Sample Handling and Management Protocols
12/22/2011	F102TA	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
12/22/2011	F119	COURSE - Sample Handling and Management Protocols
12/23/2011	F103T	COURSE - Monitoring Well Design and Construction
12/23/2011	F104	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
12/23/2011	F106	COURSE - Decontamination of Heavy Equipment
12/23/2011	F107	COURSE - Soil Excavation and Confirmatory Sampling
12/23/2011	EHS19R	Resource Conservation and Recovery Act (RCRA) Refresher
2/29/2012	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
2/29/2012	EHS018	Department of Transportation (DOT) Hazardous Materials Transportation Course
12/18/2012	EHS19R	Resource Conservation and Recovery Act (RCRA) Refresher
2/24/2013	EHS19R	Resource Conservation and Recovery Act (RCRA) Refresher
2/24/2014	EHS19R	Resource Conservation and Recovery Act (RCRA) Refresher
1/26/2015	H304	Worker Electrical Safety Program (WESP) (Online)
2/25/2015	EHS018	Department of Transportation (DOT) Hazardous Materials Transportation Course
3/5/2015	EHS19R	Resource Conservation and Recovery Act (RCRA) Refresher
6/23/2015	H100	8 HR HAZWOPER Refresher Training - Online
3/8/2016	H100	8 HR HAZWOPER Refresher Training - Online
3/9/2016	H100	8 HR HAZWOPER Refresher Training - Online
3/14/2016	H100	8 HR HAZWOPER Refresher Training - Online
3/22/2016	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
5/8/2017	H100	8 HR HAZWOPER Refresher Training - Online
12/31/2017	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
3/2/2018	H302	Department of Transportation (DOT) Hazardous Materials Shipping Course
3/2/2018	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management

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Joshua Ezak

7/5/2006	H200	Confined Space Entry
7/5/2007	Q009	Design Services Work Instructions
3/20/2009	DS002	Development of a Project Work Plan
11/24/2009	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
2/25/2014	H009	Asbestos Awareness
1/27/2015	H304	Worker Electrical Safety Program (WESP) (Online)
3/17/2015	H100	8 HR HAZWOPER Refresher Training - Online
3/26/2015	EHS301	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
3/7/2016	H100	8 HR HAZWOPER Refresher Training - Online
3/8/2016	H100	8 HR HAZWOPER Refresher Training - Online
4/5/2016	T010	Engineering Ethics
3/8/2017	H100	8 HR HAZWOPER Refresher Training - Online
1/31/2018	H100	8 HR HAZWOPER Refresher Training - Online

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Robert Field

11/20/1987	EHS006	Initial 40-hour HAZWOPER
11/20/1987	H003	Initial 40-hour HAZWOPER
5/2/1998	QS0200	Design Services Work Instructions
6/1/1998	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT030A	CLASS - Borehole Installation and Sampling
6/1/1998	FT180A	CLASS - Construction Administration and Inspection
6/1/1998	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
6/1/1998	FT050A	CLASS - Fluid Level Monitoring
6/1/1998	FT060A	CLASS - Groundwater Sampling
6/1/1998	FT040A	CLASS - Monitoring Well Design & Construction
6/1/1998	FT070A	CLASS - Residential Well Sampling
6/1/1998	FT120A	CLASS - Surface Water Flow Measurements
6/1/1998	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
6/1/1998	FT170A	CLASS - Tank Closures
6/1/1998	FT130A	CLASS - Test Pits
6/1/1998	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT030B	FIELD - Borehole Installation and Sampling - Practical
6/1/1998	FT180B	FIELD - Construction Administration and Inspection - Practical
6/1/1998	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
6/1/1998	FT050B	FIELD - Fluid Level Monitoring - Practical
6/1/1998	FT060B	FIELD - Groundwater Sampling - Practical
6/1/1998	FT040B	FIELD - Monitoring Well Design and Construction - Practical
6/1/1998	FT070B	FIELD - Residential Well Sampling - Practical
6/1/1998	FT120B	FIELD - Surface Water Flow Measurements - Practical
6/1/1998	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
6/1/1998	FT170B	FIELD - Tank Closures - Practical
6/1/1998	FT130B	FIELD - Test Pits - Practical
3/13/1999	H200	Confined Space Entry
11/8/1999	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
11/8/1999	FT100A	CLASS - Surficial Soil Sampling
11/8/1999	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
11/8/1999	FT100B	FIELD - Surficial Soil Sampling - Practical
11/2/2000	FT220A	CLASS - Air Monitoring
11/2/2000	FT200A	CLASS - Geophysical Surveys
11/2/2000	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
11/2/2000	FT210A	CLASS - Site Surveying
11/2/2000	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
11/2/2000	FT220B	FIELD - Air Monitoring - Practical
11/2/2000	FT020B	FIELD - Drilling Program-Preparation and Closeure Practical
11/2/2000	FT160B	FIELD - Sewer System and Flow Measurement: Sewer Flow Sampling, Sewer and Open-Channel Flow Measurement, Sewer Inspection
11/2/2000	FT210B	FIELD - Site Surveying - Practical

11/2/2000	**FT150B**	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
10/4/2001	**QS0400**	Inspection, Measurement and Test Equipment Work Instructions
4/22/2005	**H011**	Excavation for Competent Persons
11/16/2005	**FT020A**	CLASS - Drilling Progam-Preparation and Closure
1/10/2006	**F102TB**	COURSE - Soil Sampling SOP Part II: CRA Approach for Soil Materials Description and Classification
3/1/2006	**EX110**	Chlorobenzenes: Sources, Fate, and Treatment
6/27/2006	**F115**	COURSE - Topographic Surveys
7/2/2008	**H108**	Hydrogen Sulfide Awareness
10/6/2010	**H009**	Asbestos Awareness
2/24/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)
3/20/2015	**H100**	8 HR HAZWOPER Refresher Training - Online
12/4/2015	**Q010**	Inspection, Measurement, and Test Equipment Work Instructions
12/29/2015	**H100**	8 HR HAZWOPER Refresher Training - Online
1/5/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
1/6/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
1/12/2016	**H311**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
3/17/2017	**H100**	8 HR HAZWOPER Refresher Training - Online
2/1/2018	**H100**	8 HR HAZWOPER Refresher Training - Online

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Ronald Frehner

11/16/1990	EHS006	Initial 40-hour HAZWOPER
11/16/1990	H003	Initial 40-hour HAZWOPER
5/2/1998	QS0200	Design Services Work Instructions
3/19/2002	FT030A	CLASS - Borehole Installation and Sampling
3/19/2002	FT040A	CLASS - Monitoring Well Design & Construction
3/19/2002	FT030B	FIELD - Borehole Installation and Sampling - Practical
3/19/2002	FT040B	FIELD - Monitoring Well Design and Construction - Practical
3/2/2005	EX103	In-Situ Chemical Injection: Practical Design & Field Application
8/31/2006	EX116	New "Uniform" Hazardous Waste Manifest Seminar
10/23/2007	PDH016	Wind Power - the Challenges and Opportunities of a Fast Growing Industry
11/4/2008	PDH037	Dioxins and Furans
12/29/2008	PDH032	In Situ Chemical Oxidation of TCE in Low Permeability Soils
1/15/2009	EX134	CRA Risk Assessment Services: How Can We Help You?
1/27/2009	PDH038	Engineering Principles Applicable to Sediment Management Projects
10/9/2009	PDH004	Groundwater Investigation and Remediation
11/19/2009	PDH005	Spatial Analysis of Household Water Supply & Demand
12/8/2009	PDH022	Wetlands and Related Issues Affecting Land Development
12/17/2009	PDH060	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues
12/8/2010	PDH120	Life Cycle Assessment – The Key to Sustainability
12/8/2010	EX149	New EPA Coal Ash Regulation: Change is Coming!
12/13/2010	PDH072	Enhanced Attenuation – A Solution to a Common Groundwater Remediation Problem
12/20/2010	PDH068	Assessing Ecological Risk with Sediment Quality Guidelines (e.g., ER-L/ER-M, LEL/SEL, TEL/PEL): Kids, don't Try This at Home! Or at the Office!
12/20/2010	PDH057	CRA Brownfield Services Overview
12/20/2010	PDH024	The Use of Organic Carbon Substrates for Enhanced Biodegradation of Chlorinated Solvents
12/26/2010	PDH057	CRA Brownfield Services Overview
11/20/2011	PDH080	Treatability Studies: A Cost Effective Approach to Remedy Selection
11/20/2011	PDH058	Slope Stabilization: Best Practices and Challenges
11/21/2011	PDH082	An Introduction to Coal Mining
11/22/2011	PDH082	An Introduction to Coal Mining
11/25/2011	PDH050	Sustainable Remediation – Making Cleanups Greener
12/30/2011	PDH100	Biodegradation for Site Remediation
12/31/2011	PDH085	Environmental Assessment for Engineers
1/1/2012	PDH085	Environmental Assessment for Engineers
8/13/2012	Q009	Design Services Work Instructions
12/10/2012	PDH044	New Approaches to In Situ Chemical Oxidation: (Not your mother's chem ox!)
12/20/2012	PDH090	Resolving GSI Criteria Exceedances in Groundwater Under the new Part 201 Regulations
12/21/2012	PDH091	Remediation of Metals in Groundwater and Soil
12/26/2012	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
4/4/2013	EX149	New EPA Coal Ash Regulation: Change is Coming!
7/24/2013	ESA002	Beyond All Appropriate Inquiry – ASTM Update and Status of the ASTM E1903 Phase II Standard
3/5/2015	H304	Worker Electrical Safety Program (WESP) (Online)
8/11/2015	H100	8 HR HAZWOPER Refresher Training - Online
6/29/2016	H100	8 HR HAZWOPER Refresher Training - Online

12/5/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
12/6/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
12/7/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
12/8/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
12/9/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
9/13/2017	**T019**	Emerging Contaminates
10/24/2017	**PDH131**	CRA Uses Forensics to Solve $168M Lawsuit
11/13/2017	**T005**	Green Remediation and Sustainable Remediation – Innovative Solutions & Practical Applications
11/16/2017	**T010**	Engineering Ethics
11/22/2017	**PDH133**	Natural Resource Damage Assessment
11/22/2017	**PDH143**	New Technology Applications
11/22/2017	**T015**	Vapor Intrusion
11/26/2017	**T014**	LNAPL Natural Attenuation and its Quantification
3/2/2018	**T016**	Some Failures of the Geotechnical Variety

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Shannon Froiland

4/18/2007	H011	Excavation for Competent Persons
4/18/2007	H111	Heavy Equipment Operation Safety
4/23/2007	QS0200	Design Services Work Instructions
4/27/2007	EHS006	Initial 40-hour HAZWOPER
4/27/2007	H003	Initial 40-hour HAZWOPER
4/30/2007	F106	COURSE - Decontamination of Heavy Equipment
4/30/2007	F102TA	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
4/30/2007	F102TB	COURSE - Soil Sampling SOP Part II: CRA Approach for Soil Materials Description and Classification
4/30/2007	Z00011	USDA Security Awareness and Privacy Basics FY07
5/7/2007	Z00001	Agricultural Waste Management Systems - A Primer
5/7/2007	F103T	COURSE - Monitoring Well Design and Construction
5/7/2007	F104	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
5/8/2007	Z00022	Nutrient Management Track 1 - Part 1
5/10/2007	F108	COURSE - Aquifer Hydraulic Testing: Pumping Tests, Packer Tests, and Single-well Response Tests
5/16/2007	Z00002	Agricultural Waste Management Systems - Level 2
2/13/2008	F107	COURSE - Soil Excavation and Confirmatory Sampling
7/2/2008	H108	Hydrogen Sulfide Awareness
10/6/2010	H009	Asbestos Awareness
1/11/2011	T104CB	FIELD - Water Sampling: Residential
2/23/2011	T104CD	FIELD - Fluid Level Monitoring
2/23/2011	T104CA	FIELD - Water Sampling: Groundwater
3/29/2011	F119T	COURSE - Sample Handling and Management Protocols
3/13/2012	H200	Confined Space Entry
3/22/2015	H100	8 HR HAZWOPER Refresher Training - Online
4/2/2015	H304	Worker Electrical Safety Program (WESP) (Online)
1/17/2016	H100	8 HR HAZWOPER Refresher Training - Online
1/24/2016	H100	8 HR HAZWOPER Refresher Training - Online
1/25/2016	H100	8 HR HAZWOPER Refresher Training - Online
4/4/2016	T211	Basic Dimensional Analysis
4/5/2016	T211	Basic Dimensional Analysis
2/26/2017	H100	8 HR HAZWOPER Refresher Training - Online
2/27/2017	H100	8 HR HAZWOPER Refresher Training - Online
1/26/2018	H100	8 HR HAZWOPER Refresher Training - Online
1/27/2018	H100	8 HR HAZWOPER Refresher Training - Online

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Robert Gabbard

8/3/2012	F101	Overview of Drilling Program
8/7/2012	F102TA	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
8/8/2012	F102TB	COURSE - Soil Sampling SOP Part II: CRA Approach for Soil Materials Description and Classification
8/8/2012	F103T	COURSE - Monitoring Well Design and Construction
8/8/2012	Q009	Design Services Work Instructions
8/8/2012	F119T	COURSE - Sample Handling and Management Protocols
8/8/2012	F119	COURSE - Sample Handling and Management Protocols
8/9/2012	F104	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
8/9/2012	F106	COURSE - Decontamination of Heavy Equipment
8/9/2012	F107	COURSE - Soil Excavation and Confirmatory Sampling
8/9/2012	F108	COURSE - Aquifer Hydraulic Testing: Pumping Tests, Packer Tests, and Single-well Response Tests
8/9/2012	F109	COURSE - Lagoon and Sediment Sampling
8/10/2012	F110	COURSE - Surface Water Flow Measurements
8/10/2012	F113	COURSE - Soil Gas Sampling
8/10/2012	F118	COURSE - Landfill Gas Sampling: Gas Probe Installation and Landfill Gas Monitoring
8/10/2012	F114	COURSE - Sewer Flow Sampling, Sewer and Open-Channel Flow Measurement, and Sewer Inspection
8/10/2012	F115	COURSE - Topographic Surveys
8/10/2012	F116	COURSE - Bedrock Drilling Methods and Rock Description
9/14/2012	EHS006	Initial 40-hour HAZWOPER
9/14/2012	H003	Initial 40-hour HAZWOPER
9/28/2012	F104	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
11/1/2012	T104CA	FIELD - Water Sampling: Groundwater
11/14/2012	ESA002	Beyond All Appropriate Inquiry – ASTM Update and Status of the ASTM E1903 Phase II Standard
11/19/2012	EX144	LNAPL Training Part 1: An Improved Understanding of LNAPL Behavior in the Subsurface - State of Science vs. State of Practice)
11/20/2012	EX144	LNAPL Training Part 1: An Improved Understanding of LNAPL Behavior in the Subsurface - State of Science vs. State of Practice)
11/21/2012	EX145	LNAPL Training Part 2: LNAPL Characterization and Recoverability – Improved Analysis - Do you know where the LNAPL is and can you recover it?
11/21/2012	EX146	LNAPL Training Part 3: Evaluating LNAPL Remedial Technologies for Achieving Project Goals
12/31/2012	PDH085	Environmental Assessment for Engineers
12/31/2012	PDH042	Estimation of Greenhouse-Gas Emissions from Municipal Wastewater Treatment Plants – Part 1
12/31/2012	PDH043	Estimation of Greenhouse-Gas Emissions from Municipal Wastewater Treatment Plants – Part 2
1/16/2013	PDH091	Remediation of Metals in Groundwater and Soil
1/16/2013	PDH111	In-Situ Remediation
1/16/2013	PDH045	Application of Engineering to the Oil and Gas Industry: A Case History, Lake Charles, Louisiana
1/16/2013	PDH080	Treatability Studies: A Cost Effective Approach to Remedy Selection
1/17/2013	PDH114	Sustainable Remediation: Innovative Solutions & Practical Applications
1/17/2013	PDH050	Sustainable Remediation – Making Cleanups Greener
1/17/2013	PDH120	Life Cycle Assessment – The Key to Sustainability

3/6/2013	PDH123	Changes and Advances in the ASTM Phase I Site Assessment Procedures
3/28/2013	PDH054	Sustainable Remediation – Making Cleanups Greener Part 2
4/25/2013	PDH124	The New HAZCOM and Impacts of Adopting GHS
5/29/2013	PDH093	Implications of Industrial Boiler MACT: Sorting out the Facts
5/29/2013	PDH122	NSPS and NESHAP Regulations for Oil and Gas Sector – An Overview
5/29/2013	PDH103	Biological, Chemical, and Physical Techniques for Evaluating and Optimizing Nutrient Removal in Wastewater Treatment Plants –WEFTEC 2011 Trends
7/2/2013	PDH106	Eutrophication, Nutrient Water Quality Criteria, and TMDLs for Nutrients
7/2/2013	EX134	CRA Risk Assessment Services: How Can We Help You?
7/8/2013	PDH024	The Use of Organic Carbon Substrates for Enhanced Biodegradation of Chlorinated Solvents
11/22/2013	Q010	Inspection, Measurement, and Test Equipment Work Instructions
12/9/2013	PDH105	Treatment Wetlands: Applications and Design Considerations
12/9/2013	PDH121	Permeable Reactive Barrier Treatment Systems and Nanoscale Iron
8/26/2014	PDH129	Environmental Forensics
1/26/2015	H304	Worker Electrical Safety Program (WESP) (Online)
3/24/2015	H100	8 HR HAZWOPER Refresher Training - Online
3/15/2016	H100	8 HR HAZWOPER Refresher Training - Online
3/22/2016	H100	8 HR HAZWOPER Refresher Training - Online
5/25/2016	H302	Department of Transportation (DOT) Hazardous Materials Shipping Course
5/25/2016	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
5/25/2017	H100	8 HR HAZWOPER Refresher Training - Online

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Mark Galley

3/22/2010	**Q009**	Design Services Work Instructions
2/5/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)

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Doug Gatrell

12/2/1993	EHS006	Initial 40-hour HAZWOPER
12/2/1993	H003	Initial 40-hour HAZWOPER
1/31/2005	QS0200	Design Services Work Instructions
2/25/2005	FT180A	CLASS - Construction Administration and Inspection
4/6/2005	FT220A	CLASS - Air Monitoring
4/6/2005	FT210A	CLASS - Site Surveying
4/7/2005	EX104	In-Situ Bioremediation
9/30/2005	H200	Confined Space Entry
11/8/2005	EX105	Vapor Intrusion - From Assessment of Health Risks to Soil Gas Sampling
11/16/2005	FT020A	CLASS - Drilling Progam-Preparation and Closure
11/30/2005	F102TA	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
12/8/2005	EX108	Visualizing the Effectiveness of MNA and Enhanced Attenuation Remedies Using SEQUENCE
1/24/2006	F103T	COURSE - Monitoring Well Design and Construction
2/7/2006	F104	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
2/21/2006	F106	COURSE - Decontamination of Heavy Equipment
3/1/2006	EX110	Chlorobenzenes: Sources, Fate, and Treatment
5/4/2006	EX113	Scale Formation and Prevention
6/14/2006	F116	COURSE - Bedrock Drilling Methods and Rock Description
8/8/2006	PDH001	Coarse Monomedia Conversion and Primary Effluent Treatment Demonstration Project
5/1/2007	EX119	LNAPL Advanced Concepts
6/27/2007	EX124	Geochemical Data Evaluation with the Remediation Toolkit
7/9/2007	H011	Excavation for Competent Persons
7/9/2007	H111	Heavy Equipment Operation Safety
8/21/2007	PDH013	Two For One Deal: Lewiston I/I Removal and Drainage Improvements
11/20/2007	PDH019	Statistics for Engineering
1/31/2008	EX130	Chemistry Solutions
3/11/2008	PDH023	Management of Aging Utilities
4/8/2008	PDH024	Enhanced Biodegradation
6/3/2008	PDH029	UV Disinfection for DW
6/24/2008	PDH028	Landfill & Sustainable Solutns
8/12/2008	PDH032	In Situ Chemical Oxidatn Pt 2
1/6/2009	PDH041	Pipes and Engineering Concerns
3/3/2009	PDH044	New Approaches to In Situ Chemical Oxidation: (Not your mother's chem ox!)
3/17/2009	PDH043	Estimation of Greenhouse-Gas Emissions from Municipal Wastewater Treatment Plants – Part 2
3/24/2009	PDH045	Application of Engineering to the Oil and Gas Industry: A Case History, Lake Charles, Louisiana
5/12/2009	PDH047	Radon Measurement and Mitigation
5/19/2009	PDH048	Application of Aerobic and Anaerobic Respirometry for Optimization of Wastewater Treatment
6/1/2009	H108	Hydrogen Sulfide Awareness
12/17/2009	PDH060	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues
2/24/2010	PDH064	Greenhouse Gases Validations & Verifications 99
8/30/2011	PDH096	Vapor Intrusion Overview and Assessment Approaches (Part B)
8/12/2014	H113	Emergency Action Plan Training - Required Annually

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10/27/2014	**EHS056**	2008 Emergency Action Plan Training
10/27/2014	**H113**	Emergency Action Plan Training - Required Annually
2/12/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)
1/27/2016	**H311**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash

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Charles Gjersvik

8/7/2007	**EHS07B**	Air Monitoring
2/15/2011	**H108**	Hydrogen Sulfide Awareness
9/20/2013	**EHS102**	EHS102: Motor Vehicle Safety Training

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Dyron Hamlin

3/25/2002	EHS006	Initial 40h HAZWOPER
3/25/2002	H003	H003: OSHA 40-Hour HAZWOPER
3/16/2011	H108	Hydrogen Sulfide Awareness
5/10/2011	PDH093	Implications of Industrial Boiler MACT: Sorting out the Facts
1/31/2013	EX154	Mobile Field Data Collection a
1/23/2014	H020	Commercial Motor Vehicle Program
2/4/2015		Bridge Worker
2/4/2015		Continuous Welded Rail
2/4/2015		Freight Car Air Brake
2/4/2015		NS Roadway Worker
3/12/2015	H100	8 HR HAZWOPER Refresher
3/12/2015	EHS202	EHS202: 8-Hour HAZWOPER Refres
3/31/2015	EHS102	EHS102: Motor Vehicle Safety Training
12/28/2015	H100	8 HR HAZWOPER Refresher
12/29/2015	H100	8 HR HAZWOPER Refresher
2/1/2016		Roadway Worker Protection
8/3/2016	H110	H110: Control of Hazardous Energy
1/2/2017	H100	H100: OSHA 8-Hour HAZWOPER Re
2/9/2018	T131	T131: Leading Technical Communities

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Johan Hedblom

6/8/2015	**EHS008**	EHS008: Respiratory Protection
6/9/2015	**H108**	Hydrogen Sulfide Awareness
6/10/2015	**H108**	Hydrogen Sulfide Awareness
6/10/2015	**EHS029**	EHS029: Hydrogen Sulfide Aware
6/10/2015	**EHS102**	EHS102: Motor Vehicle Safety Training
6/10/2015	**EHS023**	EHS023: Lead Awareness (Online
6/11/2015	**F101**	Overview of Drilling Program
6/11/2015	**T104**	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
6/11/2015	**T113**	COURSE - Soil Gas Sampling
6/11/2015	**T118**	COURSE - Landfill Gas Sampling: Gas Probe Installation and Landfill Gas Monitoring
6/11/2015	**F104**	F104: Water Sampling (GW/RW/SW
6/11/2015	**F113**	F113: Soil Gas Sampling (online)
6/11/2015	**F118**	F118: Landfill Gas Sampling
6/12/2015	**F119**	COURSE - Sample Handling and Management Protocols
6/12/2015	**T102A**	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
6/12/2015	**T102B**	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
6/12/2015	**F103T**	COURSE - Monitoring Well Design and Construction
6/12/2015	**F102A**	F102A: Soil Sampling SOP Part
6/12/2015	**F102B**	F102B: Soil Sampling SOP Part
6/12/2015	**F103**	F103: Monitoring Well Design a
6/12/2015	**T110**	COURSE - Surface Water Flow Measurements
6/12/2015	**F110**	F110: Surface Water Flow Measurement
6/15/2015	**T109**	COURSE - Lagoon and Sediment Sampling
6/15/2015	**F109**	F109: Lagoon and Sediment Sampling
6/18/2015	**T107**	COURSE - Soil Excavation and Confirmatory Sampling
6/18/2015	**F107**	F107: Soil Excavation and Confirmatory Sampling
6/26/2015	**H005**	30 Hr. OSHA Training
6/26/2015	**H109**	Benzene Training
6/26/2015	**H200**	Confined Space Entry
6/26/2015	**H011**	Excavation for Competent Persons
6/26/2015	**EHS005**	EHS005: Fall Protection
6/26/2015	**EHS008**	EHS008: Respiratory Protection
6/26/2015	**EHS010**	EHS010: Confined Space Entry
6/26/2015	**EHS012**	EHS012: Excavation for Compete
6/26/2015	**EHS031**	EHS031: Benzene Training
6/26/2015	**EHS033**	EHS033: 30-Hour OSHA Construct
6/26/2015	**EHS006**	40 Hr HAZWOPER
7/2/2015	**T114**	COURSE - Sewer Flow Sampling, Sewer and Open-Channel Flow Measurement, and Sewer Inspection
7/2/2015	**F114**	F114: Sewer Sampling, Flow Measurement
8/25/2015	**T104CD**	FIELD - Fluid Level Monitoring
8/28/2015	**T118C**	FIELD-Landfill Gas Monitoring

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11/12/2015	**T104CA**	Water Sampling - Groundwater
1/12/2016	**H311**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
1/14/2016	**H100**	8 HR HAZWOPER Refresher
1/15/2016	**H100**	8 HR HAZWOPER Refresher
1/28/2016	**T108**	COURSE - Aquifer Hydraulic Testing: Pumping Tests, Packer Tests, and Single-well Response Tests
4/22/2016	**T106**	COURSE - Decontamination of Heavy Equipment
4/28/2016	**F113C**	F113C: Soil Gas Sampling Fiel
4/28/2016	**T113C**	Soil Gas Sampling
9/21/2016	**H110**	H110: Control of Hazardous Energy
9/21/2016	**H009**	H009: Asbestos Awareness (Onl
1/12/2017	**H100**	8 HR HAZWOPER Refresher
1/13/2017	**H100**	H100: OSHA 8-Hour HAZWOPER Re
3/31/2017	**F102CB**	F102ACb: Soil Sampling SOP Pa
5/25/2017	**T102CB**	T102ACb: Soil Sampling SOP Pa
1/11/2018	**H100**	H100: OSHA 8-Hour HAZWOPER Re
2/26/2018	**T231**	T231: GHG Testing - CDM Sampli

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Thomas Hobday

5/5/2003	FT150A	Soil Gas Study
5/5/2003	FT150B	Soil Gas Study Practical
6/2/2003	FT050A	Fluid Level Monitoring
6/2/2003	FT060A	Groundwater Sampling
6/2/2003	FT070A	Residential Well Sampling
6/2/2003	FT150A	Soil Gas Study
6/3/2003	FT090A	Decontamination Procedures
6/3/2003	FT140A	Drum Soil Excav and Stock
6/3/2003	FT100A	Surficial Soil Sampling
6/12/2003	EHS006	40 Hr HAZWOPER
6/12/2003	H003	H003: OSHA 40-Hour HAZWOPER
7/5/2003	FT050B	Fluid Level Monitoring Practical
8/12/2003	H009	Asbestos Awareness
12/16/2003	QS0200	Design Services Work Instructions
5/21/2004	FT030A	Borehole Installation and Sampling
5/21/2004	FT020A	Drilling Progam Prep Closure
5/21/2004	FT110A	Surf Water Lagoon Sediment S
5/21/2004	FT120A	Surface Water Flow Measurement
6/3/2004	FT130A	Test Pits
12/8/2004	FT090B	Decon Procedures Practical
3/2/2005	EX103	In Situ Chemical Injection
11/16/2005	H200	Confined Space Entry
3/1/2006	EX110	Chlorobenzenes: Sources, Fate, and Treatment
12/1/2006	F118	CLASS Landfill Gas Monitoring
3/22/2007	EHS07B	Air Monitoring
4/18/2007	H011	Excavation for Competent Persons
6/10/2008	EHS08B	Air Monitoring
7/2/2008	H108	Hydrogen Sulfide Awareness
11/2/2009	F119T	Sample Handling & Mgmt
11/24/2009	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
3/26/2010	EHS10A	Air Monitoring
1/13/2014	EHS035	EHS035: Towing and Trailering
1/12/2016	H311	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
2/26/2016	H100	8 HR HAZWOPER Refresher
3/17/2016	H100	8 HR HAZWOPER Refresher
3/18/2016	H100	H100: OSHA 8-Hour HAZWOPER Re
3/16/2018	H100	H100: OSHA 8-Hour HAZWOPER Ref

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Eric Hoglund

10/9/1992	EHS006	40 Hr HAZWOPER
10/9/1992	H003	Initial 40-hour HAZWOPER
5/2/1998	QS0200	Design Services Work Instructions
6/1/1998	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT030A	CLASS - Borehole Installation and Sampling
6/1/1998	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
6/1/1998	FT050A	CLASS - Fluid Level Monitoring
6/1/1998	FT040A	CLASS - Monitoring Well Design & Construction
6/1/1998	FT070A	CLASS - Residential Well Sampling
6/1/1998	FT120A	CLASS - Surface Water Flow Measurements
6/1/1998	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
6/1/1998	FT170A	CLASS - Tank Closures
6/1/1998	FT130A	CLASS - Test Pits
6/1/1998	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT030B	FIELD - Borehole Installation and Sampling - Practical
6/1/1998	FT180B	FIELD - Construction Administration and Inspection - Practical
6/1/1998	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
6/1/1998	FT050B	FIELD - Fluid Level Monitoring - Practical
6/1/1998	FT060B	FIELD - Groundwater Sampling - Practical
6/1/1998	FT040B	FIELD - Monitoring Well Design and Construction - Practical
6/1/1998	FT070B	FIELD - Residential Well Sampling - Practical
6/1/1998	FT120B	FIELD - Surface Water Flow Measurements - Practical
6/1/1998	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
6/1/1998	FT170B	FIELD - Tank Closures - Practical
6/1/1998	FT130B	FIELD - Test Pits - Practical
11/25/1998	FT100A	CLASS - Surficial Soil Sampling
11/25/1998	FT100B	FIELD - Surficial Soil Sampling - Practical
3/13/1999	H200	Confined Space Entry
10/12/1999	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/12/1999	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
10/12/1999	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
10/12/1999	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
5/26/2004	FT060A	CLASS - Groundwater Sampling
1/12/2005	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
2/22/2005	EX102	Assessment of Sources and Microbial Transformation of Organic Compounds in Groundwater Using Compound-Specific Isotope Analysis
2/25/2005	FT180A	CLASS - Construction Administration and Inspection
3/2/2005	EX103	In-Situ Chemical Injection: Practical Design & Field Application
4/7/2005	EX104	In-Situ Bioremediation
4/22/2005	H011	Excavation for Competent Persons
9/14/2005	FT220A	CLASS - Air Monitoring

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9/14/2005	FT200A	CLASS - Geophysical Surveys
9/14/2005	FT210A	CLASS - Site Surveying
9/19/2005	FT020A	CLASS - Drilling Progam-Preparation and Closure
9/29/2005	FT220B	FIELD - Air Monitoring - Practical
9/29/2005	FT210B	FIELD - Site Surveying - Practical
11/8/2005	EX105	Vapor Intrusion - From Assessment of Health Risks to Soil Gas Sampling
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group
3/28/2006	SW103	3 Dimensional Visualization
4/13/2006	EX111	Understanding LNAPL Basics
6/27/2006	F115	COURSE - Topographic Surveys
8/2/2006	F113	COURSE - Soil Gas Sampling
4/25/2007	EX118	Constructed Wetlands and Phytoremediation for the Treatment of Leachate and Groundwater
5/9/2007	EX119	LNAPL Advanced Concepts
7/31/2007	EX126	Carbon Footprint / Greenhouse Gas Emissions Inventory
2/21/2008	PDH022	Wetlands and Related Issues Affecting Land Development
3/11/2008	PDH023	Utility Merger Challenges
5/6/2008	PDH026	Landscape Architecture in the Design Process
5/13/2008	PDH016	Wind Power - the Challenges and Opportunities of a Fast Growing Industry
5/21/2008	EX113	Scale Formation and Prevention
6/17/2008	PDH027	Vapor Intrusion
11/13/2008	PDH038	Engineering Principles Applicable to Sediment Management Projects
1/27/2009	PDH038	Engineering Principles Applicable to Sediment Management Projects
3/3/2009	PDH044	New Approaches to In Situ Chemical Oxidation: (Not your mother's chem ox!)
9/29/2009	PDH050	Sustainable Remediation – Making Cleanups Greener
11/24/2009	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
1/7/2010	PDH061	Wind Energy Part 3 - Wind Resource Evaluation, Siting and Regulatory Issues
1/19/2010	PDH062	Wind Energy Part 4 - Wind Project Design, Engineering, Construction and Connecting to the Grid
2/24/2010	F108	COURSE - Aquifer Hydraulic Testing: Pumping Tests, Packer Tests, and Single-well Response Tests
3/5/2010	EX143	Maximizing the Use of 3-D Site Visualizations
6/4/2010	EX149	New EPA Coal Ash Regulation: Change is Coming!
6/8/2010	PDH071	Modified Active Gas Sampling (MAGS)
7/13/2010	PDH068	Assessing Ecological Risk with Sediment Quality Guidelines (e.g., ER-L/ER-M, LEL/SEL, TEL/PEL): Kids, don't Try This at Home! Or at the Office!
8/10/2010	PDH074	Threatened & Endangered Species – How will they impact my project?
8/17/2010	PDH075	Wetlands – Recent Issues - How will they affect your project?
1/28/2015	H304	Worker Electrical Safety Program (WESP) (Online)
5/1/2015	H100	8 HR HAZWOPER Refresher Training - Online
4/25/2016	H100	8 HR HAZWOPER Refresher Training - Online
4/26/2016	H100	8 HR HAZWOPER Refresher Training - Online
7/15/2016		SMS Training
1/11/2018	H100	8 HR HAZWOPER Refresher Training - Online
1/12/2018		SMS Training

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Shawn Horn

11/20/1987	EHS006	40 Hr HAZWOPER
11/20/1987	H003	H003: OSHA 40-Hour HAZWOPER
5/2/1998	QS0200	Design Services Work Instructions
6/1/1998	FT180B	Construct Administration and Inspection Practical
6/1/1998	FT180A	Construction Administration and Inspection
6/1/1998	FT050B	Fluid Level Monitoring Practical
6/1/1998	FT050A	Fluid Level Monitoring
6/1/1998	FT060A	Groundwater Sampling
6/1/1998	FT060B	Groundwater Sampling Practical
6/1/1998	FT070B	Residential Well Sampling Practical
6/1/1998	FT070A	Residential Well Sampling
6/1/1998	FT100B	Surf Soil Sampling Practical
6/1/1998	FT110B	Surf Wat Lag Sed S Practical
6/1/1998	FT110A	Surf Water Lagoon Sediment S
6/1/1998	FT100A	Surficial Soil Sampling
6/1/1998	FT130A	Test Pits
6/1/1998	FT130B	Test Pits Practical
3/13/1999	H200	Confined Space Entry
7/4/2000	FT090B	Decon Procedures Practical
7/4/2000	FT090A	Decontamination Procedures
7/4/2000	FT160B	Sew SysFlow Meas St Practical
7/4/2000	FT160A	Sewer System Flow Meas Stud
4/18/2001	FT220A	Air Monitoring
4/18/2001	FT220B	Air Monitoring Practical
8/1/2007	EHS07B	Air Monitoring
11/6/2007	CRA001	Phase I ESA Workshop
6/23/2010	EHS10A	Air Monitoring
10/6/2010	H009	Asbestos Awareness
12/3/2011	PDH082	An Introduction to Coal Mining
12/5/2011	ESA002	Beyond All Appropriate Inquiry – ASTM Update and Status of the ASTM E1903 Phase II Standard
12/7/2011	PDH082	An Introduction to Coal Mining
12/7/2011	ESA002	Beyond All Appropriate Inquiry – ASTM Update and Status of the ASTM E1903 Phase II Standard
12/7/2011	PDH084	Nutrient Removal Process Modeling and Optimization Strategies: A WEFTEC 2010 Update
12/10/2011	PDH093	Implications of Industrial Boiler MACT: Sorting out the Facts
12/11/2011	EX149	New EPA Coal Ash Regulation: Change is Coming!
12/11/2011	PDH075	Wetlands – Recent Issues - How will they affect your project?
12/12/2011	PDH075	PDH075: Wetlands – Recent Issues - How will they affect your project?
12/22/2011	PDH087	Kam Kotia Mine site – Case Study
9/12/2012	PDH084	PDH084: Nutrient Removal Process Modeling and Optimization Strategies: A WEFTEC 2010 Update
7/8/2013	EHS102	EHS102: Motor Vehicle Safety Training
11/17/2013	PDH091	Remediation of Metals in Groundwater and Soil
11/18/2013		2013-2014 Erosion & Stormwater
12/1/2013	PDH081	Incremental Sampling Methodology

12/2/2013	PDH081	PDH081: Incremental Sampling Methodology
12/15/2013	PDH105	PDH105: Treatment Wetlands: Applications and Design Considerations
12/15/2013	PDH121	PDH121: Permeable Reactive Barrier Treatment Systems and Nanoscale Iron
12/22/2013	PDH095	Vapor Intrusion Overview and Assessment Approaches (Part A)
12/26/2013	PDH103	Biological, Chemical, and Physical Techniques for Evaluating and Optimizing Nutrient Removal in Wastewater Treatment Plants –WEFTEC 2011 Trends
12/26/2013	PDH111	In-Situ Remediation
12/26/2013	PDH120	Life Cycle Assessment – The Key to Sustainability
12/26/2013	PDH121	Permeable Reactive Barrier Treatment Systems and Nanoscale Iron
5/25/2015	H100	8 HR HAZWOPER Refresher
5/25/2015	EHS202	EHS202: 8-Hour HAZWOPER Refres
3/3/2016	H100	8 HR HAZWOPER Refresher
5/5/2016	H100	8 HR HAZWOPER Refresher
5/7/2016	H100	8 HR HAZWOPER Refresher
5/11/2016	H100	8 HR HAZWOPER Refresher
5/15/2016	H100	8 HR HAZWOPER Refresher
5/16/2016	H100	H100: OSHA 8-Hour HAZWOPER Re
12/23/2017	PDH136	PDH136: Step-by-Step Approach to Prevention of Significant Deterioration (PSD) Permitting Process and Challenges
1/25/2018	T215	T215: Air Dispersion Modeling
3/12/2018	H100	H100: OSHA 8-Hour HAZWOPER Ref

RETURN TO TEAM LIST

Kiel Jenkin

5/10/2012	H108	Hydrogen Sulfide Awareness
3/1/2013	H108	Hydrogen Sulfide Awareness
3/14/2013	EHS008	EHS008: Respiratory Protection
3/15/2013	F101T	Overview of Drilling Program
3/15/2013	F102TA	Soil Sampling Part I
3/15/2013	F101	F101: Overview of Drilling Program
3/15/2013	F102A	F102A: Soil Sampling SOP Part
3/18/2013	F102TB	Soil Sampling Part II
3/18/2013	F102B	F102B: Soil Sampling SOP Part
3/18/2013	F103T	Monitoring Well Design and Construction
3/18/2013	F103	F103: Monitoring Well Design a
3/19/2013	F104	Water Sampling
3/19/2013	F106	Decon Heavy Equipment
3/19/2013	F108	Hydraulic Testing
3/20/2013	F110	Surface Wtr Flow Measure
3/20/2013	F109	Lagoon & Sediment Sampling
3/20/2013	F116	Bedrock Drilling Methods
3/21/2013	EHS102	EHS102: Motor Vehicle Safety Training
3/21/2013	F119T	Sample Handling and Management
3/21/2013	F113	Soil Gas Sampling
3/21/2013	F119	F119: Sample Handling and Management
4/1/2013	EHS006	Initial 40h HAZWOPER
4/15/2013	EHS006	Initial 40h HAZWOPER
4/15/2013	H003	H003: OSHA 40-Hour HAZWOPER
4/25/2013	PDH124	The New HAZCOM and Impacts of Adopting GHS
10/16/2013	T116C	Bedrock Drilling Methods
10/16/2013	T103C	Monitoring Well Design and Construction
12/2/2013	T104CD	Fluid Level Monitoring
12/2/2013	T102CA	Soil Sampling SOP Part 1
12/2/2013	T102CB	Soil Sampling SOP Part 1
12/2/2013	T104CA	Water Sampling Groundwater
2/1/2014		Basic Orientation Plus
2/1/2014	H108	Hydrogen Sulfide Awareness
4/3/2014	H103	DOT Training - US
4/3/2014	EHS018	TDG Training
4/3/2014	EHS019	EHS019: DOT Training with RCRA
10/1/2014		Occidental Site Orientation
10/1/2014		OXYCHEM Site Orientation
2/1/2015		Basic Orientation Plus
2/1/2015	H108	Hydrogen Sulfide Awareness
4/10/2015	EHS19R	RCRA Refresher
4/22/2015	H100	8 HR HAZWOPER Refresher
4/22/2015	EHS202	EHS202: 8-Hour HAZWOPER Refres
1/25/2016	H108	Hydrogen Sulfide Awareness

1/26/2016	**H103**	DOT Training - US
3/31/2016		SMS Training
4/20/2016	**H100**	8 HR HAZWOPER Refresher
4/22/2016	**H100**	H100: OSHA 8-Hour HAZWOPER Re
1/23/2017	**H108**	Hydrogen Sulfide Awareness
4/28/2017	**H100**	H100: OSHA 8-Hour HAZWOPER Re

RETURN TO TEAM LIST

Amarjog Johal

7/13/2017	**H304**	H304: Worker Electrical Safety
1/18/2018	**H110**	H110: Control of Hazardous Energy

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Jacob Jones

10/25/2013	**EHS006**	Initial 40h HAZWOPER
10/25/2013	**H003**	H003: OSHA 40-Hour HAZWOPER
12/3/2013	**H108**	Hydrogen Sulfide Awareness
12/6/2013	**EHS102**	EHS102: Motor Vehicle Safety Training
12/8/2013	**EHS008**	EHS008: Respiratory Protection
1/2/2014	**Q009**	Design Services Work Instructions
1/23/2014	**H020**	Commercial Motor Vehicle Program
5/28/2014		Asbestos Inspector Refresher
7/3/2014		2014 DTL Fueling & Bulk Fuel
7/3/2014		Emerg Response to RR HAZMAT
7/3/2014		Emerg Response to RR Incidents
5/14/2015	**H108**	Hydrogen Sulfide Awareness
5/14/2015	**EHS029**	EHS029: Hydrogen Sulfide Aware
5/14/2015	**EHS011**	EHS011: Excavation Safety
10/23/2015	**H100**	8 HR HAZWOPER Refresher
12/1/2015	**H100**	8 HR HAZWOPER Refresher
12/2/2015	**H100**	8 HR HAZWOPER Refresher
12/3/2015	**H100**	8 HR HAZWOPER Refresher
2/12/2016	**T215**	Dispersion Modeling
4/5/2016	**H100**	8 HR HAZWOPER Refresher
11/2/2016	**H108**	Hydrogen Sulfide Awareness
11/3/2016	**H108**	H108: Hydrogen Sulfide Awareness
8/28/2017	**H100**	H100: OSHA 8-Hour HAZWOPER Re

RETURN TO TEAM LIST

Kai Kasprick

2/7/2018	**H304**	H304: Worker Electrical Safety
2/9/2018	**H108**	H108: Hydrogen Sulfide Awareness
2/12/2018	**H109**	H109: Benzene Awareness (Online)
2/13/2018	**T101**	T101: Overview of Drilling Met
2/13/2018	**T102A**	T102A: Soil Sampling SOP Part
2/13/2018	**T102B**	COURSE - Soil Sampling SOP Part II: CRA Approach for Soil Materials Description and Classification
2/15/2018	**T104**	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
2/19/2018	**T119**	Sample Handling and Management Protocols (Online)
2/20/2018	**T110**	COURSE - Surface Water Flow Measurements
2/23/2018	**T113**	COURSE - Soil Gas Sampling
2/27/2018	**H009**	H009: Asbestos Awareness (Onli
3/1/2018	**T115**	COURSE - Topographic Surveys
3/6/2018	**T107**	COURSE - Soil Excavation and Confirmatory Sampling
3/7/2018	**H110**	H110: Control of Hazardous Energy

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Andrew Krajna

2/19/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)
6/21/2016	**H111**	Heavy Equipment Operation Safety

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Brian Kramer

3/27/1992	EHS006	Initial 40-hour HAZWOPER
3/27/1992	H003	Initial 40-hour HAZWOPER
4/17/1999	H200	Confined Space Entry
5/22/2000	QS0200	Design Services Work Instructions
9/12/2000	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
9/12/2000	FT030A	CLASS - Borehole Installation and Sampling
9/12/2000	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
9/12/2000	FT020A	CLASS - Drilling Progam-Preparation and Closure
9/12/2000	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
9/12/2000	FT050A	CLASS - Fluid Level Monitoring
9/12/2000	FT060A	CLASS - Groundwater Sampling
9/12/2000	FT040A	CLASS - Monitoring Well Design & Construction
9/12/2000	FT070A	CLASS - Residential Well Sampling
9/12/2000	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
9/12/2000	FT120A	CLASS - Surface Water Flow Measurements
9/12/2000	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
9/12/2000	FT100A	CLASS - Surficial Soil Sampling
9/12/2000	FT170A	CLASS - Tank Closures
9/12/2000	FT130A	CLASS - Test Pits
9/12/2000	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
9/12/2000	FT030B	FIELD - Borehole Installation and Sampling - Practical
9/12/2000	FT180B	FIELD - Construction Administration and Inspection - Practical
9/12/2000	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
9/12/2000	FT020B	FIELD - Drilling Program-Preparation and Closeure Practical
9/12/2000	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
9/12/2000	FT050B	FIELD - Fluid Level Monitoring - Practical
9/12/2000	FT060B	FIELD - Groundwater Sampling - Practical
9/12/2000	FT040B	FIELD - Monitoring Well Design and Construction - Practical
9/12/2000	FT070B	FIELD - Residential Well Sampling - Practical
9/12/2000	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
9/12/2000	FT120B	FIELD - Surface Water Flow Measurements - Practical
9/12/2000	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
9/12/2000	FT100B	FIELD - Surficial Soil Sampling - Practical
9/12/2000	FT170B	FIELD - Tank Closures - Practical
9/12/2000	FT130B	FIELD - Test Pits - Practical
4/7/2001	H009	Asbestos Awareness
2/25/2005	FT180A	CLASS - Construction Administration and Inspection
4/7/2005	EX104	In-Situ Bioremediation
10/30/2007	PDH017	Capture Zone Analysis for Pump and Treat Systems
3/19/2008	F113	COURSE - Soil Gas Sampling
6/17/2008	PDH027	Vapor Intrusion: Evaluation and Mitigation Case Studies

6/24/2008	PDH028	Landfill Gas Collection and Combustion: Engineered Systems and Global Opportunities
7/10/2008	PDH030	Installation and Monitoring of a VOC Vapor Mitigation System - Part 1
11/4/2008	PDH037	Dioxins and Furans
3/3/2009	PDH044	New Approaches to In Situ Chemical Oxidation: (Not your mother's chem ox!)
5/19/2009	PDH048	Application of Aerobic and Anaerobic Respirometry for Optimization of Wastewater Treatment
7/14/2009	PDH052	Advanced Oxidation Processes: Part 1
10/30/2009	ESA003	Excelling as an Expert Witness – Tips and Strategies from a Technical Perspective
1/12/2010	PDH063	The Impacts of Water Treatment Process and Chemicals on Wastewater Treatment Plant Operations and Permits
4/26/2010	H113	Emergency Action Plan Training - Required Annually
6/22/2010	PDH072	Enhanced Attenuation – A Solution to a Common Groundwater Remediation Problem
9/7/2010	PDH077	Remedial Technology Update and Summary of the Battelle 7th International Conference on the Remediation of Chlorinated and Recalcitrant Compounds
1/25/2011	PDH088	Molecular Tools in Environmental Monitoring
2/1/2011	H111	Heavy Equipment Operation Safety
4/26/2011	PDH091	Remediation of Metals in Groundwater and Soil
5/20/2011	PDH094	CRA's Expert Services: Risk Assessment, Ecological Assessments (Spill Response & NRDA) & Groundwater Modeling
8/30/2011	PDH096	Vapor Intrusion Overview and Assessment Approaches (Part B)
4/24/2012	PDH117	Pharmaceuticals and Emerging Organic Contaminants in the Environment
7/5/2012	PDH119	NFWB -The Gorge Pumping Station's Continuing Rehabilitation
7/27/2012	PDH119	NFWB -The Gorge Pumping Station's Continuing Rehabilitation
5/24/2013	EHS004	Laboratory Safety
11/14/2013	PDH127	Metals Treatment
2/25/2014	PDH129	Environmental Forensics
3/27/2014	PDH131	CRA Uses Forensics to Solve $168M Lawsuit
6/26/2014	EHS301	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
2/20/2015	H304	Worker Electrical Safety Program (WESP) (Online)
4/23/2015	PDH143	New Technology Applications
4/7/2017	H100	8 HR HAZWOPER Refresher Training - Online
4/8/2017	H100	8 HR HAZWOPER Refresher Training - Online
10/26/2017	DS003	Developing the Design Fee

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William Kruszona

5/29/1997	EHS006	Initial 40-hour HAZWOPER
5/29/1997	H003	Initial 40-hour HAZWOPER
4/17/1999	H200	Confined Space Entry
9/8/2003	QS0200	Design Services Work Instructions
8/8/2006	PDH001	Coarse Monomedia Conversion and Primary Effluent Treatment Demonstration Project
9/19/2006	PDH002	Drifting Toward the Brink: Challenges in the Niagara Falls Water and Wastewater Utilities
10/17/2006	PDH003	The Do's and Don'ts of Long Term Control Plans
11/28/2006	PDH004	Groundwater Investigation and Remediation
12/19/2006	PDH005	Spatial Analysis of Household Water Supply & Demand
1/30/2007	PDH006	Utility Financial Consulting: Evaluating and Improving the Financial Condition of Water/Wastewater Systems
3/6/2007	PDH007	Demonstration of Real Time Flow Monitoring & Online Hydraulic Model to Facilitate Sewer System Operations and Management
5/11/2007	PDH008	Evaluating Dewatering and Disposal Options: A Tale from Both Ends of the Stick
8/8/2007	PDH012	Improving SLUG Tests Part 2
9/11/2007	PDH014	Design and Trenchless Installation of Ductile Iron Pipe
10/23/2007	PDH016	Wind Power - the Challenges and Opportunities of a Fast Growing Industry
10/30/2007	PDH017	Capture Zone Analysis for Pump and Treat Systems
11/20/2007	PDH019	Statistics for Engineering
1/21/2008	DS003	Developing the Design Fee
2/12/2008	PDH021	Geosynthetic Materials, Applications and Design
2/21/2008	PDH022	Wetlands and Related Issues Affecting Land Development
3/11/2008	PDH023	Management of Aging Utilities
4/8/2008	PDH024	Enhanced Biodegradation
5/6/2008	PDH026	Landscape Architecture in the Design Process
6/3/2008	PDH029	UV Disinfection for DW
8/12/2008	PDH032	In Situ Chemical Oxidatn Pt 2
11/4/2008	PDH037	Dioxins and Furans
11/13/2008	PDH038	Engineering Principles Applicable to Sediment Management Projects
12/9/2008	PDH039	Steel Tank Coatings
1/6/2009	PDH041	Pipes and Engineering Concerns
1/27/2009	PDH038	Engineering Principles Applicable to Sediment Management Projects
2/17/2009	PDH042	Estimation of Greenhouse-Gas Emissions from Municipal Wastewater Treatment Plants – Part 1
3/3/2009	PDH044	New Approaches to In Situ Chemical Oxidation: (Not your mother's chem ox!)
3/24/2009	PDH045	Application of Engineering to the Oil and Gas Industry: A Case History, Lake Charles, Louisiana
5/12/2009	PDH047	Radon Measurement and Mitigation
5/19/2009	PDH048	Application of Aerobic and Anaerobic Respirometry for Optimization of Wastewater Treatment
7/14/2009	PDH052	Advanced Oxidation Processes: Part 1
9/29/2009	PDH050	Sustainable Remediation – Making Cleanups Greener
10/1/2009	PDH054	Sustainable Remediation – Making Cleanups Greener Part 2
11/3/2009	PDH056	Iron and Manganese Removal
11/24/2009	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
12/17/2009	PDH060	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues
1/7/2010	PDH061	Wind Energy Part 3 - Wind Resource Evaluation, Siting and Regulatory Issues

1/12/2010	PDH063	The Impacts of Water Treatment Process and Chemicals on Wastewater Treatment Plant Operations and Permits
1/19/2010	PDH062	Wind Energy Part 4 - Wind Project Design, Engineering, Construction and Connecting to the Grid
2/9/2010	PDH057	Brownfields
2/26/2010	PDH065	Understanding the Clean Development Mechanism Project Development Process
6/1/2010	PDH070	Online Monitoring in Water and Wastewater Treatment
6/8/2010	PDH071	Modified Active Gas Sampling (MAGS)
6/22/2010	PDH072	Enhanced Attenuation – A Solution to a Common Groundwater Remediation Problem
7/13/2010	PDH068	Assessing Ecological Risk with Sediment Quality Guidelines (e.g., ER-L/ER-M, LEL/SEL, TEL/PEL): Kids, don't Try This at Home! Or at the Office!
8/10/2010	PDH074	Threatened & Endangered Species – How will they impact my project?
9/7/2010	PDH077	Remedial Technology Update and Summary of the Battelle 7th International Conference on the Remediation of Chlorinated and Recalcitrant Compounds
10/14/2010	PDH078	Using 3D Laser Scanning Survey Technology for Facilitating Engineering Design Projects
11/11/2010	PDH081	Incremental Sampling Methodology
11/16/2010	PDH082	An Introduction to Coal Mining
11/23/2010	PDH083	Shortening Permit Approvals for Mining Operations using Animation
12/7/2010	PDH084	Nutrient Removal Process Modeling and Optimization Strategies: A WEFTEC 2010 Update
12/14/2010	PDH085	Environmental Assessment for Engineers
1/18/2011	PDH087	Kam Kotia Mine site – Case Study
1/25/2011	PDH088	Molecular Tools in Environment
2/22/2011	PDH089	Cape Breton Coalfield Mine Water Project:: A Case Study
3/8/2011	PDH086	Incorporating Habitat Enhancement and Compensatory Mitigation into Sediment Remediation Design
4/26/2011	PDH091	Remediation of Metals in Groundwater and Soil
5/3/2011	PDH086	Incorporating Habitat Enhancement and Compensatory Mitigation into Sediment Remediation Design
5/10/2011	PDH093	Implications of Industrial Boiler MACT: Sorting out the Facts
5/20/2011	PDH094	CRA's Expert Services: Risk Assessment, Ecological Assessments (Spill Response & NRDA) & Groundwater Modeling
6/21/2011	PDH095	Vapor Intrusion Overview and Assessment Approaches (Part A)
8/30/2011	PDH096	Vapor Intrusion Overview and Assessment Approaches (Part B)
10/6/2011	PDH097	Implementation of In Situ Treatment Technologies
10/25/2011	PDH098	Distribution of Caronaceous materials in a small urban watershed, implication for PAH Contamination
12/1/2011	PDH100	Biodegradation for Site Remediation
12/15/2011	PDH102	Nutrient Problems and Solution
1/12/2012	PDH103	Biological, Chemical, and Physical Techniques for Evaluating and Optimizing Nutrient Removal in Wastewater Treatment Plants –WEFTEC 2011 Trends
1/19/2012	PDH104	Numeric Nutrient Criteria – Result of Florida's Interaction with EPA
1/26/2012	PDH105	Treatment Wetlands: Applications and Design Considerations
2/9/2012	PDH106	Eutrophication, Nutrient Water Quality Criteria, and TMDLs for Nutrients
2/16/2012	PDH107	Incorporating Sustainability into the City of Tomorrow – A Case Study of the Babcock Ranch Community's Sustainable Land Development Code
3/6/2012	PDH111	In-Situ Remediation

3/22/2012	PDH112	Lee County Nutrient Study - Desktop method for Optimizing Source Locations
3/22/2012	PDH111	In-Situ Remediation
5/8/2012	PDH119	NFWB -The Gorge Pumping Station's Continuing Rehabilitation
5/8/2012	PDH117	Pharmaceuticals and Emerging Organic Contaminants in the Environment
6/20/2012	PDH094	CRA's Expert Services: Risk Assessment, Ecological Assessments (Spill Response & NRDA) & Groundwater Modeling
1/24/2013	PDH121	Permeable Reactive Barrier Treatment Systems and Nanoscale Iron
2/7/2013	PDH122	NSPS and NESHAP Regulations for Oil and Gas Sector – An Overview
4/25/2013	PDH124	The New HAZCOM and Impacts of Adopting GHS
4/15/2014	PDH130	Wetlands & Phytoremediation
2/20/2015	H304	Worker Electrical Safety Program (WESP) (Online)
11/17/2015	T002	Successfully Applying In Situ Remediation: Site Considerations & Technology Selection
1/28/2016	T006	Nanoparticle Emissions: Real Risk or a Sheep in Wolf's Clothing
2/26/2016	T217	Mid-Stream Facilities
4/5/2016	T010	Engineering Ethics

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Kimberly Kwok

10/27/2014	**T106**	COURSE - Decontamination of Heavy Equipment
10/27/2014	**F106**	F106: Decontamination of Heavy Equipment
10/29/2014	**F101**	Overview of Drilling Program
10/29/2014	**T102A**	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
10/29/2014	**T104**	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
10/29/2014	**F102A**	F102A: Soil Sampling SOP Part
10/29/2014	**F104**	F104: Water Sampling (GW/RW/SW
10/30/2014	**F119**	COURSE - Sample Handling and Management Protocols
10/30/2014	**EHS008**	EHS008: Respiratory Protection
11/3/2014	**EHS102**	EHS102: Motor Vehicle Safety Training
11/3/2014	**T107**	COURSE - Soil Excavation and Confirmatory Sampling
11/3/2014	**F107**	F107: Soil Excavation and Confirmatory Sampling
11/4/2014	**T109**	COURSE - Lagoon and Sediment Sampling
11/4/2014	**F109**	F109: Lagoon and Sediment Sampling
11/21/2014	**H108**	Hydrogen Sulfide Awareness
11/21/2014	**EHS19R**	RCRA Refresher
11/21/2014	**EHS023**	EHS023: Lead Awareness (Online
11/21/2014	**EHS029**	EHS029: Hydrogen Sulfide Aware
2/25/2015	**EHS018**	TDG Training
1/20/2016	**H103**	DOT Training - US
10/24/2016	**EHS19R**	RCRA Refresher
3/13/2018	**T240**	T240: ASTM E1527 Phase I ESA Level 1 Assessor Training Course

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Matthew Lang

6/22/2012	**Q009**	Design Services Work Instructions
6/27/2012	**EHS102**	EHS102: Motor Vehicle Safety Training
9/5/2013	**H200**	Confined Space Entry
9/5/2013	**EHS010**	EHS010: Confined Space Entry
2/26/2016	**T217**	Mid-Stream Facilities
10/3/2016		Pressure Vessel Design & Analy

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Larry Lardy

7/25/1997	EHS006	40 Hr HAZWOPER
7/25/1997	H003	H003: OSHA 40-Hour HAZWOPER
5/2/1998	QS0200	Design Services Work Instructions
2/9/1999	H009	Asbestos Awareness
11/25/2002	FT190A	Asbestos Sampling
11/25/2002	FT190B	Asbestos Sampling Practical
11/25/2002	FT060A	Groundwater Sampling
11/25/2002	FT060B	Groundwater Sampling Practical
11/25/2002	FT150A	Soil Gas Study
4/22/2005	H011	Excavation for Competent Persons
10/14/2005	FT050B	Fluid Level Monitoring Practical
11/16/2005	H200	Confined Space Entry
11/16/2005	FT020A	Drilling Progam Prep Closure
2/3/2006	FT140A	Drum Soil Excav and Stock
2/3/2006	FT130A	Test Pits
4/13/2006	EX111	LNAPL Basics
3/8/2007	EHS07B	Air Monitoring
9/24/2008	T118C	Landfill Gas Monitoring
9/29/2008	H101	Hazardous Materials
2/9/2010	EHS10A	Air Monitoring
10/6/2010	H009	Asbestos Awareness
3/15/2013		Construction Administration for Engineers
5/28/2013	EHS102	EHS102: Motor Vehicle Safety Training
1/13/2014	EHS035	EHS035: Towing and Trailering
7/6/2015	H100	8 HR HAZWOPER Refresher
1/12/2016	H311	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
2/9/2016	H100	8 HR HAZWOPER Refresher
2/10/2016	H100	8 HR HAZWOPER Refresher
5/3/2017	H100	H100: OSHA 8-Hour HAZWOPER Re
1/16/2018		SMS Training
		Roadway Worker Protection

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Michael Laschinger

1/25/1991	EHS006	40 Hr HAZWOPER
1/25/1991	H003	Initial 40-hour HAZWOPER
4/17/1999	H200	Confined Space Entry
9/21/2000	FT180A	CLASS - Construction Administration and Inspection
9/21/2000	FT180B	FIELD - Construction Administration and Inspection - Practical
9/8/2003	QS0200	Design Services Work Instructions
2/25/2005	FT180A	CLASS - Construction Administration and Inspection
3/2/2005	EX103	In-Situ Chemical Injection: Practical Design & Field Application
11/16/2005	FT020A	CLASS - Drilling Progam-Preparation and Closure
12/8/2005	EX108	Visualizing the Effectiveness of MNA and Enhanced Attenuation Remedies Using SEQUENCE
1/10/2006	F102TB	COURSE - Soil Sampling SOP Part II: CRA Approach for Soil Materials Description and Classification
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group
9/19/2006	PDH002	Drifting Toward the Brink: Challenges in the Niagara Falls Water and Wastewater Utilities
10/17/2006	PDH003	The Do's and Don'ts of Long Term Control Plans
11/28/2006	PDH004	Groundwater Investigation and Remediation
12/19/2006	PDH005	Spatial Analysis of Household Water Supply & Demand
1/30/2007	PDH006	Utility Financial Consulting: Evaluating and Improving the Financial Condition of Water/Wastewater Systems
3/6/2007	PDH007	Demonstration of Real Time Flow Monitoring & Online Hydraulic Model to Facilitate Sewer System Operations and Management
4/10/2007	PDH008	Evaluating Dewatering and Disposal Options: A Tale from Both Ends of the Stick
4/25/2007	EHS07B	Air Monitoring
4/25/2007	EX118	Constructed Wetlands and Phytoremediation for the Treatment of Leachate and Groundwater
8/21/2007	PDH013	Two For One Deal: Lewiston I/I Removal and Drainage Improvements
9/11/2007	PDH014	Design and Trenchless Installation of Ductile Iron Pipe
9/20/2007	PDH015	Permeable Reactive Barrier Treatment Systems and Nanoscale Iron
10/23/2007	PDH016	Wind Power - the Challenges and Opportunities of a Fast Growing Industry
10/30/2007	PDH017	Capture Zone Analysis for Pump and Treat Systems
1/31/2008	EX130	Chemistry Solutions
2/12/2008	PDH021	Geosynthetic Materials, Applications and Design
2/21/2008	PDH022	Wetlands and Related Issues Affecting Land Development
4/8/2008	PDH024	The Use of Organic Carbon Substrates for Enhanced Biodegradation of Chlorinated Solvents
4/15/2008	PDH025	Managing Special Waste – Bio-Medical
6/3/2008	PDH029	Ultraviolet Disinfection for Municipal Water and Wastewater Applications
6/9/2008	EHS08B	Air Monitoring
12/9/2008	PDH039	Steel Tank Coatings
1/6/2009	PDH041	Steel Water Pipe in the Water Industry
2/17/2009	PDH042	Estimation of Greenhouse-Gas Emissions from Municipal Wastewater Treatment Plants – Part 1
3/3/2009	PDH044	New Approaches to In Situ Chemical Oxidation: (Not your mother's chem ox!)
3/17/2009	PDH043	Estimation of Greenhouse-Gas Emissions from Municipal Wastewater Treatment Plants – Part 2
3/24/2009	PDH045	Application of Engineering to the Oil and Gas Industry: A Case History, Lake Charles, Louisiana
5/12/2009	PDH047	Radon Measurement and Mitigation
5/19/2009	PDH048	Application of Aerobic and Anaerobic Respirometry for Optimization of Wastewater Treatment

7/14/2009	PDH052	Advanced Oxidation Processes: Part 1
9/29/2009	PDH050	Sustainable Remediation – Making Cleanups Greener
10/1/2009	PDH054	Sustainable Remediation – Making Cleanups Greener Part 2
10/30/2009	ESA003	Excelling as an Expert Witness – Tips and Strategies from a Technical Perspective
11/24/2009	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
12/17/2009	PDH060	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues
1/7/2010	PDH061	Wind Energy Part 3 - Wind Resource Evaluation, Siting and Regulatory Issues
1/12/2010	PDH063	The Impacts of Water Treatment Process and Chemicals on Wastewater Treatment Plant Operations and Permits
1/19/2010	PDH062	Wind Energy Part 4 - Wind Project Design, Engineering, Construction and Connecting to the Grid
2/9/2010	PDH057	CRA Brownfield Services Overview
2/26/2010	PDH065	Understanding the Clean Development Mechanism Project Development Process
3/5/2010	EX143	Maximizing the Use of 3-D Site Visualizations
4/20/2010	PDH058	Slope Stabilization: Best Practices and Challenges
5/13/2010	EX148	In-vessel Technology for On-site Halogenated Soil Remediation
6/1/2010	PDH070	Online Monitoring in Water and Wastewater Treatment
6/8/2010	PDH071	Modified Active Gas Sampling (MAGS)
6/22/2010	PDH072	Enhanced Attenuation – A Solution to a Common Groundwater Remediation Problem
7/13/2010	PDH068	Assessing Ecological Risk with Sediment Quality Guidelines (e.g., ER-L/ER-M, LEL/SEL, TEL/PEL): Kids, don't Try This at Home! Or at the Office!
10/14/2010	PDH078	Using 3D Laser Scanning Survey Technology for Facilitating Engineering Design Projects
11/9/2010	PDH080	Treatability Studies: A Cost Effective Approach to Remedy Selection
11/16/2010	PDH082	An Introduction to Coal Mining
11/23/2010	PDH083	Shortening Permit Approvals for Mining Operations using Animation
12/7/2010	PDH084	Nutrient Removal Process Modeling and Optimization Strategies: A WEFTEC 2010 Update
12/14/2010	PDH085	Environmental Assessment for Engineers
1/25/2011	PDH088	Molecular Tools in Environmental Monitoring
2/22/2011	PDH089	Cape Breton Coalfield Mine Water Project:: A Case Study
3/30/2011	PDH090	Resolving GSI Criteria Exceedances in Groundwater Under the new Part 201 Regulations
4/26/2011	PDH091	Remediation of Metals in Groundwater and Soil
4/29/2011	PDH092	Recognizing the Emerging Issues Involving Defective Imported Drywall
5/3/2011	PDH086	Incorporating Habitat Enhancement and Compensatory Mitigation into Sediment Remediation Design
6/21/2011	PDH095	Vapor Intrusion Overview and Assessment Approaches (Part A)
8/30/2011	PDH096	Vapor Intrusion Overview and Assessment Approaches (Part B)
10/25/2011	PDH098	Distribution of Caronaceous materials in a small urban watershed, implication for PAH Contamination
12/1/2011	PDH100	Biodegradation for Site Remediation
12/15/2011	PDH102	Nutrient Problems and Solutions in Water Treatment
1/19/2012	PDH104	Numeric Nutrient Criteria – Result of Florida's Interaction with EPA
1/26/2012	PDH105	Treatment Wetlands: Applications and Design Considerations
2/9/2012	PDH106	Eutrophication, Nutrient Water Quality Criteria, and TMDLs for Nutrients
2/16/2012	PDH107	Incorporating Sustainability into the City of Tomorrow – A Case Study of the Babcock Ranch Community's Sustainable Land Development Code
2/23/2012	PDH114	Sustainable Remediation: Innovative Solutions & Practical Applications

2/28/2012	PDH108	Optimization for Phosphorus Removal at Metro Syracuse WWTP (84 mgd)
5/24/2012	PDH118	Pilot Experience Treating South Florida Urban and Agricultural Stormwaters to less than 10 ppb TP Using Chemical,Membrane and Wetland Technologies
6/12/2012	EHS061	EHS061: Emergency Action Plan
1/24/2013	PDH121	Permeable Reactive Barrier Treatment Systems and Nanoscale Iron
2/7/2013	PDH122	NSPS and NESHAP Regulations for Oil and Gas Sector – An Overview
11/14/2013	PDH127	Metals Treatment
12/13/2013	PDH119	NFWB -The Gorge Pumping Station's Continuing Rehabilitation
12/16/2013	PDH120	Life Cycle Assessment – The Key to Sustainability
12/17/2013	PDH117	Pharmaceuticals and Emerging Organic Contaminants in the Environment
12/19/2013	PDH112	Lee County Nutrient Study - Desktop method for Optimizing Source Locations
12/19/2013	PDH117	Pharmaceuticals and Emerging Organic Contaminants in the Environment
12/19/2013	PDH119	NFWB -The Gorge Pumping Station's Continuing Rehabilitation
12/19/2013	PDH120	Life Cycle Assessment – The Key to Sustainability
1/6/2014	PDH111	In-Situ Remediation
1/10/2014	PDH097	Implementation of In Situ Treatment Technologies
1/15/2014	PDH111	In-Situ Remediation
1/15/2014	PDH097	Implementation of In Situ Treatment Technologies
2/25/2014	PDH129	Environmental Forensics
3/27/2014	PDH131	CRA Uses Forensics to Solve $168M Lawsuit
4/15/2014	PDH130	Wetlands & Phytoremediation
5/8/2014	PDH133	Natural Resource Damage Assessment
6/26/2014	PDH135	Mobile, Real-time Atmospheric Methane Analysis
11/20/2014	PDH139	Combining Treatment Technologies at Complex Sites
12/11/2014	PDH137	WWTP Aerobic Digestion Retrofit and Production
1/8/2015	PDH140	Using Integrated Water Resources Planning to Achieve TMDL Compliance in Onondaga Lake – A Success Story
1/27/2015	H304	Worker Electrical Safety Program (WESP) (Online)
3/26/2015	EHS301	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
11/5/2015	T003	Why Class A Does Not Always Make Cents: Cost Model to Drive Biosolids Planning Decisions
11/17/2015	T002	Successfully Applying In Situ Remediation: Site Considerations & Technology Selection
12/10/2015	T004	The Challenge with Gravity: How to Build a Better Trunk Sewer
1/14/2016	T005	Green Remediation and Sustainable Remediation – Innovative Solutions & Practical Applications
1/28/2016	T006	Nanoparticle Emissions: Real Risk or a Sheep in Wolf's Clothing
2/23/2016	T007	Protecting Watersheds: An Integrated Approach to Lessen Phosphorus Loads
3/15/2016	T008	Combined Sewer Overflow Reduction and Capture: Successfully Implementing a Major CSO Project in an Urban Environment
4/5/2016	T010	Engineering Ethics
4/19/2016	T009	Protecting Water Quality: An Integrated Coastal Watershed Planning Approach
5/31/2016	T011	Preparing for Future Precipitation: The Benefits and Challenges to Updating IDF Curves
10/13/2016	T014	LNAPL Natural Attenuation and its Quantification
4/6/2017	T016	Some Failures of the Geotechnical Variety
4/11/2017	T015	Vapor Intrusion
5/18/2017	T019	Emerging Contaminates

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5/18/2017	**T017**	MASW for Site Characterization and Infrastructure Condition Assessment
9/27/2017	**T021**	Geotechnical - Ottawa Light Rail Project, Petrucco Box Application
10/25/2017	**T022**	Permafrost: Mapping, monitoring and methods of restoration

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Timothy Leo

2/25/1993	EHS006	Initial 40-hour HAZWOPER
2/25/1993	H003	Initial 40-hour HAZWOPER
5/5/1998	QS0200	Design Services Work Instructions
6/1/1998	FT030A	CLASS - Borehole Installation and Sampling
6/1/1998	FT180A	CLASS - Construction Administration and Inspection
6/1/1998	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
6/1/1998	FT050A	CLASS - Fluid Level Monitoring
6/1/1998	FT060A	CLASS - Groundwater Sampling
6/1/1998	FT040A	CLASS - Monitoring Well Design & Construction
6/1/1998	FT070A	CLASS - Residential Well Sampling
6/1/1998	FT120A	CLASS - Surface Water Flow Measurements
6/1/1998	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
6/1/1998	FT100A	CLASS - Surficial Soil Sampling
6/1/1998	FT170A	CLASS - Tank Closures
6/1/1998	FT130A	CLASS - Test Pits
6/1/1998	FT030B	FIELD - Borehole Installation and Sampling - Practical
6/1/1998	FT180B	FIELD - Construction Administration and Inspection - Practical
6/1/1998	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
6/1/1998	FT050B	FIELD - Fluid Level Monitoring - Practical
6/1/1998	FT060B	FIELD - Groundwater Sampling - Practical
6/1/1998	FT040B	FIELD - Monitoring Well Design and Construction - Practical
6/1/1998	FT070B	FIELD - Residential Well Sampling - Practical
6/1/1998	FT120B	FIELD - Surface Water Flow Measurements - Practical
6/1/1998	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
6/1/1998	FT100B	FIELD - Surficial Soil Sampling - Practical
6/1/1998	FT170B	FIELD - Tank Closures - Practical
6/1/1998	FT130B	FIELD - Test Pits - Practical
3/27/1999	H200	Confined Space Entry
10/18/1999	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/18/1999	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
10/18/1999	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
10/18/1999	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/18/1999	FT160B	FIELD - Sewer System and Flow Measurement: Sewer Flow Sampling, Sewer and Open-Channel Flow Measurement, Sewer Inspection
10/18/1999	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
9/22/2004	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
5/31/2005	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
11/16/2005	FT020A	CLASS - Drilling Progam-Preparation and Closure
2/7/2006	F104	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring

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2/21/2006	**F106**	COURSE - Decontamination of Heavy Equipment
3/1/2006	**EX110**	Chlorobenzenes: Sources, Fate, and Treatment
4/4/2006	**F108**	COURSE - Aquifer Hydraulic Testing: Pumping Tests, Packer Tests, and Single-well Response Tests
4/13/2006	**EX111**	Understanding LNAPL Basics
1/24/2007	**H011**	Excavation for Competent Persons
4/25/2007	**EX118**	Constructed Wetlands and Phytoremediation for the Treatment of Leachate and Groundwater
6/24/2008	**H103**	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
12/16/2008	**PDH040**	Quantifying Environmental Performance using an Environmental Footprint Calculator
2/18/2009	**H009**	Asbestos Awareness
3/3/2009	**PDH044**	New Approaches to In Situ Chemical Oxidation: (Not your mother's chem ox!)
1/26/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)
3/19/2015	**H100**	8 HR HAZWOPER Refresher Training - Online
3/7/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
3/8/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
3/9/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
3/24/2016	**H200**	Confined Space Entry
2/21/2017	**H100**	8 HR HAZWOPER Refresher Training - Online

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Andrew Lovell

12/15/2017	**T133**	Using Technology to Build Knowledge Communities (Online)

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Robert Martin

10/9/1992	EHS006	Initial 40-hour HAZWOPER
10/9/1992	H003	Initial 40-hour HAZWOPER
6/1/1998	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT030A	CLASS - Borehole Installation and Sampling
6/1/1998	FT180A	CLASS - Construction Administration and Inspection
6/1/1998	FT050A	CLASS - Fluid Level Monitoring
6/1/1998	FT060A	CLASS - Groundwater Sampling
6/1/1998	FT040A	CLASS - Monitoring Well Design & Construction
6/1/1998	FT070A	CLASS - Residential Well Sampling
6/1/1998	FT120A	CLASS - Surface Water Flow Measurements
6/1/1998	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
6/1/1998	FT100A	CLASS - Surficial Soil Sampling
6/1/1998	FT170A	CLASS - Tank Closures
6/1/1998	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT030B	FIELD - Borehole Installation and Sampling - Practical
6/1/1998	FT180B	FIELD - Construction Administration and Inspection - Practical
6/1/1998	FT050B	FIELD - Fluid Level Monitoring - Practical
6/1/1998	FT060B	FIELD - Groundwater Sampling - Practical
6/1/1998	FT040B	FIELD - Monitoring Well Design and Construction - Practical
6/1/1998	FT070B	FIELD - Residential Well Sampling - Practical
6/1/1998	FT120B	FIELD - Surface Water Flow Measurements - Practical
6/1/1998	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
6/1/1998	FT170B	FIELD - Tank Closures - Practical
6/5/1998	QS0200	Design Services Work Instructions
3/13/1999	H200	Confined Space Entry
10/14/1999	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/14/1999	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
10/14/1999	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
10/14/1999	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/14/1999	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
4/22/2005	H011	Excavation for Competent Persons
4/27/2005	H009	Asbestos Awareness
7/2/2008	H108	Hydrogen Sulfide Awareness
1/15/2009	EX134	CRA Risk Assessment Services: How Can We Help You?
3/5/2010	EX143	Maximizing the Use of 3-D Site Visualizations
4/20/2010	PDH058	Slope Stabilization: Best Practices and Challenges
8/10/2010	PDH074	Threatened & Endangered Species – How will they impact my project?
3/28/2011	F119T	COURSE - Sample Handling and Management Protocols
4/26/2011	PDH091	Remediation of Metals in Groundwater and Soil
1/22/2015	H304	Worker Electrical Safety Program (WESP) (Online)
7/16/2015	H100	8 HR HAZWOPER Refresher Training - Online

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1/12/2016	**H311**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
5/19/2016	**H100**	8 HR HAZWOPER Refresher Training - Online

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Daniel Ojinaga

7/15/2010	**F102TA**	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
7/23/2010	**EHS006**	Initial 40-hour HAZWOPER
7/23/2010	**H003**	Initial 40-hour HAZWOPER
8/31/2010	**Q010**	Inspection, Measurement, and Test Equipment Work Instructions
2/1/2011	**H111**	Heavy Equipment Operation Safety
12/1/2011	**PDH100**	Biodegradation for Site Remediation
2/29/2012	**EHS045**	Newly Employed Inexperienced Miner
3/26/2012	**H011**	Excavation for Competent Persons
3/27/2012	**H111**	Heavy Equipment Operation Safety
3/27/2012	**H108**	Hydrogen Sulfide Awareness
4/26/2012	**F104**	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
5/8/2012	**PDH117**	Pharmaceuticals and Emerging Organic Contaminants in the Environment
11/14/2012	**EHS018**	Department of Transportation (DOT) Hazardous Materials Transportation Course
11/15/2012	**H103**	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
6/21/2013	**H020**	Commercial Motor Vehicle Program
7/18/2013	**F104**	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
11/12/2013	**EHS19R**	Resource Conservation and Recovery Act (RCRA) Refresher
12/16/2015	**H100**	8 HR HAZWOPER Refresher Training - Online
12/17/2015	**H100**	8 HR HAZWOPER Refresher Training - Online
1/4/2016	**T104CD**	FIELD - Fluid Level Monitoring
1/4/2016	**T104CA**	FIELD - Water Sampling: Groundwater
1/12/2016	**H311**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
2/11/2016	**F113**	COURSE - Soil Gas Sampling
2/17/2017	**H100**	8 HR HAZWOPER Refresher Training - Online
2/7/2018	**H100**	8 HR HAZWOPER Refresher Training - Online
2/12/2018	**T240**	ASTM E1527 Phase I ESA Level 1 Assessor Training Course
2/12/2018	**T241**	ASTM E1527 Phase I ESA Level 1 Assessor Training Record

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Jeremy Pautler

11/30/2006	**QS0200**	Design Services Work Instructions
11/19/2007	**DS002**	Development of a Project Work Plan
6/26/2014	**EHS301**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
2/5/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)

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Thomas Pestka

3/25/1994	**EHS006**	Initial 40-hour HAZWOPER
3/25/1994	**H003**	Initial 40-hour HAZWOPER
4/17/1999	**H200**	Confined Space Entry
9/8/2003	**QS0200**	Design Services Work Instructions
3/20/2009	**DS002**	Development of a Project Work Plan
6/24/2014	**EHS301**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash

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Sean Pike

9/8/2003	**QS0200**	Design Services Work Instructions
6/27/2006	**F115**	COURSE - Topographic Surveys
8/2/2006	**F113**	COURSE - Soil Gas Sampling
5/6/2008	**PDH026**	Landscape Architecture in the Design Process
1/16/2009	**3D0001**	AutoCAD Civil 3D 2009 Training
2/27/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)

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Lisa Poole

7/25/1997	EHS006	Initial 40-hour HAZWOPER
7/25/1997	H003	Initial 40-hour HAZWOPER
5/2/1998	QS0200	Design Services Work Instructions
6/1/1998	FT050A	CLASS - Fluid Level Monitoring
6/1/1998	FT120A	CLASS - Surface Water Flow Measurements
6/1/1998	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
6/1/1998	FT050B	FIELD - Fluid Level Monitoring - Practical
6/1/1998	FT120B	FIELD - Surface Water Flow Measurements - Practical
6/1/1998	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
11/23/1998	FT060A	CLASS - Groundwater Sampling
11/23/1998	FT070A	CLASS - Residential Well Sampling
11/23/1998	FT060B	FIELD - Groundwater Sampling - Practical
11/23/1998	FT070B	FIELD - Residential Well Sampling - Practical
3/13/1999	H200	Confined Space Entry
10/8/1999	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/8/1999	FT020A	CLASS - Drilling Progam-Preparation and Closure
10/8/1999	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
10/8/1999	FT100A	CLASS - Surficial Soil Sampling
10/8/1999	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/8/1999	FT100B	FIELD - Surficial Soil Sampling - Practical
3/19/2002	FT030A	CLASS - Borehole Installation and Sampling
3/19/2002	FT030B	FIELD - Borehole Installation and Sampling - Practical
11/15/2003	FT220A	CLASS - Air Monitoring
11/15/2003	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
11/15/2003	FT130A	CLASS - Test Pits
11/15/2003	FT220B	FIELD - Air Monitoring - Practical
11/15/2003	FT180B	FIELD - Construction Administration and Inspection - Practical
11/15/2003	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
11/15/2003	FT130B	FIELD - Test Pits - Practical
2/25/2005	FT180A	CLASS - Construction Administration and Inspection
4/22/2005	H011	Excavation for Competent Persons
2/3/2015	H304	Worker Electrical Safety Program (WESP) (Online)
3/9/2015	H100	8 HR HAZWOPER Refresher Training - Online
4/6/2016	H100	8 HR HAZWOPER Refresher Training - Online
4/28/2016	H100	8 HR HAZWOPER Refresher Training - Online
5/4/2016	H100	8 HR HAZWOPER Refresher Training - Online
5/9/2016	H100	8 HR HAZWOPER Refresher Training - Online

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Gary Pritchard

12/9/2008	PDH039	Steel Tank Coatings
12/19/2008	EX110	Chlorobenzenes: Sources, Fate, and Treatment
12/19/2008	Q009	Design Services Work Instructions
12/22/2008	F108	COURSE - Aquifer Hydraulic Testing: Pumping Tests, Packer Tests, and Single-well Response Tests
12/22/2008	F103T	COURSE - Monitoring Well Design and Construction
1/6/2009	PDH041	Steel Water Pipe in the Water Industry
3/20/2009	DS002	Development of a Project Work Plan
7/14/2009	PDH052	Advanced Oxidation Processes: Part 1
9/29/2009	PDH050	Sustainable Remediation – Making Cleanups Greener
10/1/2009	PDH054	Sustainable Remediation – Making Cleanups Greener Part 2
10/30/2009	ESA003	Excelling as an Expert Witness – Tips and Strategies from a Technical Perspective
6/8/2010	PDH071	Modified Active Gas Sampling (MAGS)
6/22/2010	PDH072	Enhanced Attenuation – A Solution to a Common Groundwater Remediation Problem
10/22/2013	H108	Hydrogen Sulfide Awareness
11/14/2013	PDH127	Metals Treatment
4/23/2014	H108	Hydrogen Sulfide Awareness
3/25/2015	H304	Worker Electrical Safety Program (WESP) (Online)
3/26/2015	EHS301	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash

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Robert Pyle

11/24/1987	EHS006	Initial 40-hour HAZWOPER
11/24/1987	H003	Initial 40-hour HAZWOPER
5/5/1998	QS0200	Design Services Work Instructions
6/1/1998	FT030A	CLASS - Borehole Installation and Sampling
6/1/1998	FT180A	CLASS - Construction Administration and Inspection
6/1/1998	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
6/1/1998	FT050A	CLASS - Fluid Level Monitoring
6/1/1998	FT060A	CLASS - Groundwater Sampling
6/1/1998	FT040A	CLASS - Monitoring Well Design & Construction
6/1/1998	FT070A	CLASS - Residential Well Sampling
6/1/1998	FT120A	CLASS - Surface Water Flow Measurements
6/1/1998	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
6/1/1998	FT100A	CLASS - Surficial Soil Sampling
6/1/1998	FT170A	CLASS - Tank Closures
6/1/1998	FT130A	CLASS - Test Pits
6/1/1998	FT030B	FIELD - Borehole Installation and Sampling - Practical
6/1/1998	FT180B	FIELD - Construction Administration and Inspection - Practical
6/1/1998	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
6/1/1998	FT050B	FIELD - Fluid Level Monitoring - Practical
6/1/1998	FT060B	FIELD - Groundwater Sampling - Practical
6/1/1998	FT040B	FIELD - Monitoring Well Design and Construction - Practical
6/1/1998	FT070B	FIELD - Residential Well Sampling - Practical
6/1/1998	FT120B	FIELD - Surface Water Flow Measurements - Practical
6/1/1998	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
6/1/1998	FT100B	FIELD - Surficial Soil Sampling - Practical
6/1/1998	FT170B	FIELD - Tank Closures - Practical
6/1/1998	FT130B	FIELD - Test Pits - Practical
3/20/1999	H200	Confined Space Entry
7/4/2000	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
7/4/2000	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
7/4/2000	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
7/4/2000	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
7/4/2000	FT160B	FIELD - Sewer System and Flow Measurement: Sewer Flow Sampling, Sewer and Open-Channel Flow Measurement, Sewer Inspection
7/4/2000	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
10/31/2000	FT020A	CLASS - Drilling Progam-Preparation and Closure
10/31/2000	FT210A	CLASS - Site Surveying
10/31/2000	FT020B	FIELD - Drilling Program-Preparation and Closeure Practical
10/31/2000	FT210B	FIELD - Site Surveying - Practical
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group

4/25/2007	EX118	Constructed Wetlands and Phytoremediation for the Treatment of Leachate and Groundwater
4/8/2008	PDH024	The Use of Organic Carbon Substrates for Enhanced Biodegradation of Chlorinated Solvents
11/9/2010	PDH080	Treatability Studies: A Cost Effective Approach to Remedy Selection
1/24/2013	PDH121	Permeable Reactive Barrier Treatment Systems and Nanoscale Iron
11/14/2013	PDH127	Metals Treatment
2/27/2015	H304	Worker Electrical Safety Program (WESP) (Online)
2/12/2018	T240	ASTM E1527 Phase I ESA Level 1 Assessor Training Course
2/12/2018	T241	ASTM E1527 Phase I ESA Level 1 Assessor Training Record
2/13/2018	T242	ASTM E1527 Phase I ESA Level 2 Assessor Training Record
3/27/2018	T243	ASTM E1527 Phase I ESA Level 3 Assessor Training Record
3/27/2018	T244	Limited Environmental Compliance Reviewer Training Record (Level 2)

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Timothy Ree

6/16/1995	EHS006	Initial 40-hour HAZWOPER
6/16/1995	H003	Initial 40-hour HAZWOPER
10/29/2003	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
10/29/2003	FT030A	CLASS - Borehole Installation and Sampling
10/29/2003	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/29/2003	FT020A	CLASS - Drilling Progam-Preparation and Closure
10/29/2003	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
10/29/2003	FT050A	CLASS - Fluid Level Monitoring
10/29/2003	FT060A	CLASS - Groundwater Sampling
10/29/2003	FT040A	CLASS - Monitoring Well Design & Construction
10/29/2003	FT070A	CLASS - Residential Well Sampling
10/29/2003	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
10/29/2003	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
10/29/2003	FT120A	CLASS - Surface Water Flow Measurements
10/29/2003	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
10/29/2003	FT100A	CLASS - Surficial Soil Sampling
10/29/2003	FT170A	CLASS - Tank Closures
10/29/2003	FT130A	CLASS - Test Pits
10/29/2003	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
10/29/2003	FT030B	FIELD - Borehole Installation and Sampling - Practical
10/29/2003	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/29/2003	FT020B	FIELD - Drilling Program-Preparation and Closeure Practical
10/29/2003	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
10/29/2003	FT050B	FIELD - Fluid Level Monitoring - Practical
10/29/2003	FT060B	FIELD - Groundwater Sampling - Practical
10/29/2003	FT040B	FIELD - Monitoring Well Design and Construction - Practical
10/29/2003	FT070B	FIELD - Residential Well Sampling - Practical
10/29/2003	FT160B	FIELD - Sewer System and Flow Measurement: Sewer Flow Sampling, Sewer and Open-Channel Flow Measurement, Sewer Inspection
10/29/2003	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
10/29/2003	FT120B	FIELD - Surface Water Flow Measurements - Practical
10/29/2003	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
10/29/2003	FT100B	FIELD - Surficial Soil Sampling - Practical
10/29/2003	FT170B	FIELD - Tank Closures - Practical
10/29/2003	FT130B	FIELD - Test Pits - Practical
12/16/2003	QS0200	Design Services Work Instructions
2/25/2005	FT180A	CLASS - Construction Administration and Inspection
3/4/2005	FT180B	FIELD - Construction Administration and Inspection - Practical
4/7/2005	EX104	In-Situ Bioremediation
4/22/2005	H011	Excavation for Competent Persons
4/27/2005	H009	Asbestos Awareness
11/8/2005	EX105	Vapor Intrusion - From Assessment of Health Risks to Soil Gas Sampling

11/16/2005	H200	Confined Space Entry
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group
3/1/2006	EX110	Chlorobenzenes: Sources, Fate, and Treatment
4/4/2006	F108	COURSE - Aquifer Hydraulic Testing: Pumping Tests, Packer Tests, and Single-well Response Tests
4/13/2006	EX111	Understanding LNAPL Basics
5/4/2006	EX113	Scale Formation and Prevention
8/2/2006	F113	COURSE - Soil Gas Sampling
8/31/2006	EX116	New "Uniform" Hazardous Waste Manifest Seminar
5/9/2007	EX119	LNAPL Advanced Concepts
10/23/2007	PDH016	Wind Power - the Challenges and Opportunities of a Fast Growing Industry
2/12/2008	PDH021	Geosynthetic Materials, Applications and Design
2/21/2008	PDH022	Wetlands and Related Issues Affecting Land Development
7/2/2008	H108	Hydrogen Sulfide Awareness
9/25/2008	PDH033	Hydraulic Control Valve Overview
11/13/2008	PDH038	Engineering Principles Applicable to Sediment Management Projects
12/9/2008	F115	COURSE - Topographic Surveys
2/17/2009	PDH042	Estimation of Greenhouse-Gas Emissions from Municipal Wastewater Treatment Plants – Part 1
3/25/2009	DS033B	Inspection of Buried Utilities – Pressure Systems – Watermains
9/29/2009	PDH050	Sustainable Remediation – Making Cleanups Greener
10/1/2009	PDH054	Sustainable Remediation – Making Cleanups Greener Part 2
12/17/2009	PDH060	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues
12/30/2009	F119T	COURSE - Sample Handling and Management Protocols
2/24/2010	PDH064	Greenhouse Gases Validations & Verifications 101
4/20/2010	PDH058	Slope Stabilization: Best Practices and Challenges
4/22/2010	PDH050	Sustainable Remediation – Making Cleanups Greener
4/22/2010	PDH054	Sustainable Remediation – Making Cleanups Greener Part 2
3/30/2011	PDH090	Resolving GSI Criteria Exceedances in Groundwater Under the new Part 201 Regulations
6/18/2014	PDH040	Quantifying Environmental Performance using an Environmental Footprint Calculator
6/23/2014	PDH130	Wetlands & Phytoremediation
6/23/2014	PDH129	Environmental Forensics
6/23/2014	PDH040	Quantifying Environmental Performance using an Environmental Footprint Calculator
6/24/2014	PDH129	Environmental Forensics
6/26/2014	PDH127	Metals Treatment
6/26/2014	PDH126	Environmental Litigation, Cleanup Cost and Allocation
6/26/2014	PDH120	Life Cycle Assessment – The Key to Sustainability
6/27/2014	PDH120	Life Cycle Assessment – The Key to Sustainability
6/27/2014	PDH126	Environmental Litigation, Cleanup Cost and Allocation
11/18/2014	EHS19R	Resource Conservation and Recovery Act (RCRA) Refresher
1/26/2015	H304	Worker Electrical Safety Program (WESP) (Online)
9/14/2015	H100	8 HR HAZWOPER Refresher Training - Online
9/15/2015	H100	8 HR HAZWOPER Refresher Training - Online
2/26/2016	PDH138	Laboratory Treatability Studies
6/28/2016	PDH139	Combining Treatment Technologies at Complex Sites

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6/28/2016	**PDH141**	Permeable Reactive Barrier Treatment Systems and Nanoscale Iron
6/29/2016	**PDH143**	New Technology Applications
10/13/2016	**T014**	LNAPL Natural Attenuation and its Quantification
10/14/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
10/17/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
6/22/2017	**T020**	Tunnelling and Trenchless Technology 101
1/11/2018	**H100**	8 HR HAZWOPER Refresher Training - Online
1/12/2018	**H100**	8 HR HAZWOPER Refresher Training - Online

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Brian Regan

6/11/2004	QS0200	Design Services Work Instructions
10/12/2007	Q009	Design Services Work Instructions
11/19/2007	DS002	Development of a Project Work Plan
1/21/2008	DS003	Developing the Design Fee
5/6/2008	PDH026	Landscape Architecture in the Design Process
6/3/2008	PDH029	Ultraviolet Disinfection for Municipal Water and Wastewater Applications
6/17/2008	PDH027	Vapor Intrusion: Evaluation and Mitigation Case Studies
6/24/2008	PDH028	Landfill Gas Collection and Combustion: Engineered Systems and Global Opportunities
12/9/2008	PDH039	Steel Tank Coatings
1/6/2009	PDH041	Steel Water Pipe in the Water Industry
3/20/2009	DS002	Development of a Project Work Plan
3/25/2009	DS033B	Inspection of Buried Utilities – Pressure Systems – Watermains
4/17/2009	DS003	Developing the Design Fee
1/13/2010	Q010	Inspection, Measurement, and Test Equipment Work Instructions
1/19/2010	PDH062	Wind Energy Part 4 - Wind Project Design, Engineering, Construction and Connecting to the Grid
4/20/2010	PDH058	Slope Stabilization: Best Practices and Challenges
10/26/2010	PDH079	Mining 101 – An Overview of the Industry and Terms
11/16/2010	PDH082	An Introduction to Coal Mining
4/29/2011	PDH092	Recognizing the Emerging Issues Involving Defective Imported Drywall
9/5/2013	H200	Confined Space Entry
1/26/2015	H304	Worker Electrical Safety Program (WESP) (Online)

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Christopher Rohrich

2/5/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)
6/21/2016	**H111**	Heavy Equipment Operation Safety

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Peter Romzick

9/28/1990	EHS006	Initial 40-hour HAZWOPER
9/28/1990	H003	Initial 40-hour HAZWOPER
10/8/1999	QS0200	Design Services Work Instructions
11/26/1999	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
6/16/2000	FT220A	CLASS - Air Monitoring
10/27/2000	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
10/27/2000	FT030A	CLASS - Borehole Installation and Sampling
10/27/2000	FT180A	CLASS - Construction Administration and Inspection
10/27/2000	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/27/2000	FT050A	CLASS - Fluid Level Monitoring
10/27/2000	FT190A	CLASS - General Asbestos Awareness
10/27/2000	FT060A	CLASS - Groundwater Sampling
10/27/2000	FT040A	CLASS - Monitoring Well Design & Construction
10/27/2000	FT070A	CLASS - Residential Well Sampling
10/27/2000	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
10/27/2000	FT120A	CLASS - Surface Water Flow Measurements
10/27/2000	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
10/27/2000	FT100A	CLASS - Surficial Soil Sampling
10/27/2000	FT130A	CLASS - Test Pits
10/27/2000	FT220B	FIELD - Air Monitoring - Practical
10/27/2000	FT030B	FIELD - Borehole Installation and Sampling - Practical
10/27/2000	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/27/2000	FT050B	FIELD - Fluid Level Monitoring - Practical
10/27/2000	FT060B	FIELD - Groundwater Sampling - Practical
10/27/2000	FT040B	FIELD - Monitoring Well Design and Construction - Practical
10/27/2000	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
10/27/2000	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
10/27/2000	FT100B	FIELD - Surficial Soil Sampling - Practical
10/27/2000	FT130B	FIELD - Test Pits - Practical
2/26/2003	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
6/16/2004	FT190A	CLASS - General Asbestos Awareness
7/28/2004	FT200A	CLASS - Geophysical Surveys
1/12/2005	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
11/8/2005	EX105	Vapor Intrusion - From Assessment of Health Risks to Soil Gas Sampling
11/16/2005	FT020A	CLASS - Drilling Progam-Preparation and Closure
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group
2/21/2006	F106	COURSE - Decontamination of Heavy Equipment
4/13/2006	EX111	Understanding LNAPL Basics
12/7/2006	H009	Asbestos Awareness
11/14/2007	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
1/31/2008	EX130	Chemistry Solutions
1/6/2009	PDH041	Steel Water Pipe in the Water Industry

5/12/2009	PDH047	Radon Measurement and Mitigation
11/24/2009	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
1/7/2010	PDH061	Wind Energy Part 3 - Wind Resource Evaluation, Siting and Regulatory Issues
2/24/2010	PDH064	Greenhouse Gases Validations & Verifications 101
9/5/2014	PDH136	Step-by-Step Approach to Prevention of Significant Deterioration (PSD) Permitting Process and Challenges
2/6/2015	H304	Worker Electrical Safety Program (WESP) (Online)

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Steven Roste

12/19/2012	**F101**	Overview of Drilling Program
12/20/2012	**Q009**	Design Services Work Instructions
12/20/2012	**Q010**	Inspection, Measurement, and Test Equipment Work Instructions
12/21/2012	**F102TA**	COURSE - Soil Sampling SOP Part I: Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling
12/21/2012	**F102TB**	COURSE - Soil Sampling SOP Part II: CRA Approach for Soil Materials Description and Classification
12/26/2012	**F103T**	COURSE - Monitoring Well Design and Construction
12/26/2012	**F104**	COURSE - Water Sampling (Groundwater, Residential, and Surface Water) and Fluid Level Monitoring
12/27/2012	**F106**	COURSE - Decontamination of Heavy Equipment
12/28/2012	**F107**	COURSE - Soil Excavation and Confirmatory Sampling
12/28/2012	**F108**	COURSE - Aquifer Hydraulic Testing: Pumping Tests, Packer Tests, and Single-well Response Tests
12/28/2012	**F109**	COURSE - Lagoon and Sediment Sampling
12/28/2012	**F110**	COURSE - Surface Water Flow Measurements
12/31/2012	**F113**	COURSE - Soil Gas Sampling
12/31/2012	**F116**	COURSE - Bedrock Drilling Methods and Rock Description
1/16/2013	**F118**	COURSE - Landfill Gas Sampling: Gas Probe Installation and Landfill Gas Monitoring
1/16/2013	**F119T**	COURSE - Sample Handling and Management Protocols
1/16/2013	**F119**	COURSE - Sample Handling and Management Protocols
1/21/2013	**H109**	Benzene Training
1/21/2013	**H200**	Confined Space Entry
1/21/2013	**H111**	Heavy Equipment Operation Safety
1/21/2013	**H108**	Hydrogen Sulfide Awareness
1/25/2013	**EHS006**	Initial 40-hour HAZWOPER
6/5/2013	**T104CD**	FIELD - Fluid Level Monitoring
6/5/2013	**T104CA**	FIELD - Water Sampling: Groundwater
6/5/2013	**T104CB**	FIELD - Water Sampling: Residential
6/5/2013	**F115**	COURSE - Topographic Surveys
6/7/2013	**T118C**	FIELD - Landfill Gas Sampling: Gas Probe Installation and Landfill Gas Monitoring
8/26/2013	**T101C**	FIELD - Overview of Drilling Programs
8/26/2013	**T102CB**	FIELD - Soil Sampling SOP, Part 1: Borehole Installation and Sample Collection
8/3/2014	**EHS006**	Initial 40-hour HAZWOPER
1/23/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)
2/17/2015	**H100**	8 HR HAZWOPER Refresher Training - Online
2/18/2015	**H108**	Hydrogen Sulfide Awareness
11/10/2015	**H100**	8 HR HAZWOPER Refresher Training - Online
11/11/2015	**H100**	8 HR HAZWOPER Refresher Training - Online
12/28/2015	**H009**	Asbestos Awareness
12/30/2015	**H108**	Hydrogen Sulfide Awareness
12/30/2015	**H109**	Benzene Training
1/12/2016	**H311**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
11/1/2016	**H100**	8 HR HAZWOPER Refresher Training - Online
11/3/2016	**H100**	8 HR HAZWOPER Refresher Training - Online

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12/23/2016	**H109**	Benzene Training
1/2/2017	**H108**	Hydrogen Sulfide Awareness
2/21/2017	**H009**	Asbestos Awareness
10/26/2017	**H100**	8 HR HAZWOPER Refresher Training - Online
10/27/2017	**H100**	8 HR HAZWOPER Refresher Training - Online
12/18/2017	**H109**	Benzene Training
12/18/2017	**H108**	Hydrogen Sulfide Awareness
1/24/2018	**H304**	Worker Electrical Safety Program (WESP) (Online)
2/27/2018	**H009**	Asbestos Awareness

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Brian Sandberg

11/24/1987	EHS006	Initial 40-hour HAZWOPER
11/24/1987	H003	Initial 40-hour HAZWOPER
5/2/1998	QS0200	Design Services Work Instructions
6/1/1998	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT030A	CLASS - Borehole Installation and Sampling
6/1/1998	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
6/1/1998	FT060A	CLASS - Groundwater Sampling
6/1/1998	FT040A	CLASS - Monitoring Well Design & Construction
6/1/1998	FT070A	CLASS - Residential Well Sampling
6/1/1998	FT100A	CLASS - Surficial Soil Sampling
6/1/1998	FT130A	CLASS - Test Pits
6/1/1998	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT030B	FIELD - Borehole Installation and Sampling - Practical
6/1/1998	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
6/1/1998	FT060B	FIELD - Groundwater Sampling - Practical
6/1/1998	FT040B	FIELD - Monitoring Well Design and Construction - Practical
6/1/1998	FT070B	FIELD - Residential Well Sampling - Practical
6/1/1998	FT100B	FIELD - Surficial Soil Sampling - Practical
6/1/1998	FT130B	FIELD - Test Pits - Practical
3/13/1999	H200	Confined Space Entry
11/11/1999	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
11/11/1999	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
11/11/1999	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
11/11/1999	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
11/11/1999	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
11/19/1999	FT210A	CLASS - Site Surveying
11/19/1999	FT210B	FIELD - Site Surveying - Practical
2/22/2005	EX102	Assessment of Sources and Microbial Transformation of Organic Compounds in Groundwater Using Compound-Specific Isotope Analysis
4/22/2005	H011	Excavation for Competent Persons
11/8/2005	EX105	Vapor Intrusion - From Assessment of Health Risks to Soil Gas Sampling
3/28/2006	SW103	3-Dimensional (3D) Visualization Training Seminar - Learn How to Use EVS
4/8/2008	PDH024	The Use of Organic Carbon Substrates for Enhanced Biodegradation of Chlorinated Solvents
1/15/2009	EX134	CRA Risk Assessment Services: How Can We Help You?
3/5/2010	EX143	Maximizing the Use of 3-D Site Visualizations
6/8/2010	PDH071	Modified Active Gas Sampling (MAGS)
10/25/2013	PDH126	Environmental Litigation, Cleanup Cost and Allocation
2/23/2015	H304	Worker Electrical Safety Program (WESP) (Online)
4/2/2015	H100	8 HR HAZWOPER Refresher Training - Online
4/28/2016	H100	8 HR HAZWOPER Refresher Training - Online
4/29/2016	H100	8 HR HAZWOPER Refresher Training - Online
4/30/2016	H100	8 HR HAZWOPER Refresher Training - Online
5/11/2017	H100	8 HR HAZWOPER Refresher Training - Online

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Nicholas Schilling

7/8/2008	Q009	Design Services Work Instructions
3/20/2009	DS002	Development of a Project Work Plan
4/17/2009	DS003	Developing the Design Fee
11/24/2009	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
12/17/2009	PDH060	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues
1/19/2010	PDH062	Wind Energy Part 4 - Wind Project Design, Engineering, Construction and Connecting to the Grid
9/14/2010	H200	Confined Space Entry
2/23/2012	H011	Excavation for Competent Persons
4/6/2012	EHS038	10 Hr. OSHA Construction
3/15/2016	T008	Combined Sewer Overflow Reduction and Capture: Successfully Implementing a Major CSO Project in an Urban Environment
4/19/2016	T009	Protecting Water Quality: An Integrated Coastal Watershed Planning Approach
5/31/2016	T011	Preparing for Future Precipitation: The Benefits and Challenges to Updating IDF Curves
4/11/2017	T015	Vapor Intrusion

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Brendan Shaw

11/29/2017	**H304**	Worker Electrical Safety Program (WESP) (Online)
12/1/2017	**H108**	Hydrogen Sulfide Awareness
12/5/2017	**H109**	Benzene Training
12/7/2017	**Q009**	Design Services Work Instructions
12/7/2017	**Q010**	Inspection, Measurement, and Test Equipment Work Instructions
2/12/2018	**T211**	Basic Dimensional Analysis

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Mark Siekmeier

2/25/2005	**FT180A**	CLASS - Construction Administration and Inspection
10/23/2007	**PDH016**	Wind Power - the Challenges and Opportunities of a Fast Growing Industry
3/5/2010	**EX143**	Maximizing the Use of 3-D Site Visualizations
1/26/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)

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Peter Storlie

2/12/1988	EHS006	Initial 40-hour HAZWOPER
2/12/1988	H003	Initial 40-hour HAZWOPER
6/1/1998	FT170A	CLASS - Tank Closures
6/1/1998	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
6/1/1998	FT030B	FIELD - Borehole Installation and Sampling - Practical
6/1/1998	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
6/1/1998	FT050B	FIELD - Fluid Level Monitoring - Practical
6/1/1998	FT060B	FIELD - Groundwater Sampling - Practical
6/1/1998	FT040B	FIELD - Monitoring Well Design and Construction - Practical
6/1/1998	FT070B	FIELD - Residential Well Sampling - Practical
6/1/1998	FT120B	FIELD - Surface Water Flow Measurements - Practical
6/1/1998	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
6/1/1998	FT170B	FIELD - Tank Closures - Practical
6/1/1998	FT130B	FIELD - Test Pits - Practical
6/5/1998	QS0200	Design Services Work Instructions
3/13/1999	H200	Confined Space Entry
10/29/1999	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
10/29/1999	FT160B	FIELD - Sewer System and Flow Measurement: Sewer Flow Sampling, Sewer and Open-Channel Flow Measurement, Sewer Inspection
10/29/1999	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
3/11/2000	H009	Asbestos Awareness
2/20/2002	FT200A	CLASS - Geophysical Surveys
2/20/2002	FT200B	FIELD - Geophysical Surveys - Practical
3/19/2002	FT210B	FIELD - Site Surveying - Practical
11/27/2002	FT220B	FIELD - Air Monitoring - Practical
11/27/2002	FT020B	FIELD - Drilling Program-Preparation and Closeure Practical
11/27/2002	FT190B	FIELD - General Asbestos Awareness - Practical
5/19/2003	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
1/6/2004	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
1/6/2004	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
1/6/2004	FT040A	CLASS - Monitoring Well Design & Construction
1/6/2004	FT070A	CLASS - Residential Well Sampling
1/6/2004	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
1/6/2004	FT100A	CLASS - Surficial Soil Sampling
1/6/2004	FT130A	CLASS - Test Pits
1/6/2004	FT100B	FIELD - Surficial Soil Sampling - Practical
1/7/2004	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
4/12/2004	FT220A	CLASS - Air Monitoring
4/12/2004	FT180A	CLASS - Construction Administration and Inspection
4/12/2004	FT210A	CLASS - Site Surveying
5/21/2004	FT120A	CLASS - Surface Water Flow Measurements
5/21/2004	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling

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5/24/2004	FT030A	CLASS - Borehole Installation and Sampling
5/24/2004	FT050A	CLASS - Fluid Level Monitoring
5/24/2004	FT060A	CLASS - Groundwater Sampling
4/22/2005	H011	Excavation for Competent Persons
4/27/2005	H009	Asbestos Awareness
11/16/2005	FT020A	CLASS - Drilling Progam-Preparation and Closure
11/16/2005	H200	Confined Space Entry
6/27/2006	F115	COURSE - Topographic Surveys
4/18/2007	H011	Excavation for Competent Persons
4/18/2007	H111	Heavy Equipment Operation Safety
5/9/2007	EX119	LNAPL Advanced Concepts
2/21/2008	PDH022	Wetlands and Related Issues Affecting Land Development
2/27/2008	Q010	Inspection, Measurement, and Test Equipment Work Instructions
2/11/2009	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
2/18/2010	EHS045	Newly Employed Inexperienced Miner
10/6/2010	H009	Asbestos Awareness
2/13/2012	EHS045	Newly Employed Inexperienced Miner
3/13/2012	H200	Confined Space Entry
6/6/2013	F115	COURSE - Topographic Surveys
8/15/2014	EHS19R	Resource Conservation and Recovery Act (RCRA) Refresher
2/5/2015	H304	Worker Electrical Safety Program (WESP) (Online)
4/2/2015	H100	8 HR HAZWOPER Refresher Training - Online
12/21/2015	H100	8 HR HAZWOPER Refresher Training - Online
12/22/2015	H100	8 HR HAZWOPER Refresher Training - Online
1/12/2016	H311	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
1/15/2016	H100	8 HR HAZWOPER Refresher Training - Online
1/18/2016	H100	8 HR HAZWOPER Refresher Training - Online
12/23/2016	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
1/2/2017	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
2/9/2017	H100	8 HR HAZWOPER Refresher Training - Online
2/21/2017	F116	COURSE - Bedrock Drilling Methods and Rock Description
2/23/2017	H100	8 HR HAZWOPER Refresher Training - Online

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Brandon Suchan

5/25/2006	**QS0200**	Design Services Work Instructions
2/24/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)

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David Szalach

9/8/2003	QS0200	Design Services Work Instructions
11/19/2007	DS002	Development of a Project Work Plan
1/21/2008	DS003	Developing the Design Fee
11/24/2009	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
10/14/2010	PDH078	Using 3D Laser Scanning Survey Technology for Facilitating Engineering Design Projects
5/21/2014	PDH078	Using 3D Laser Scanning Survey Technology for Facilitating Engineering Design Projects
5/22/2014	Q009	Design Services Work Instructions
6/3/2014	PDH078	Using 3D Laser Scanning Survey Technology for Facilitating Engineering Design Projects
6/3/2014	EX143	Maximizing the Use of 3-D Site Visualizations
1/22/2015	H304	Worker Electrical Safety Program (WESP) (Online)
3/26/2015	EHS301	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash

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Brett Tarkington

1/23/1997	EHS006	Initial 40-hour HAZWOPER
1/23/1997	H003	Initial 40-hour HAZWOPER
3/16/2011	H108	Hydrogen Sulfide Awareness
5/27/2011	Q010	Inspection, Measurement, and Test Equipment Work Instructions
1/14/2014	EHS420	ExxonMobil Env. Mgmt. PTW Issuer and Receiver Training
1/23/2014	H020	Commercial Motor Vehicle Program
2/24/2015	H304	Worker Electrical Safety Program (WESP) (Online)
4/3/2015	H100	8 HR HAZWOPER Refresher Training - Online
1/5/2016	H100	8 HR HAZWOPER Refresher Training - Online
1/6/2016	H100	8 HR HAZWOPER Refresher Training - Online
1/12/2017	H100	8 HR HAZWOPER Refresher Training - Online
1/13/2017	H100	8 HR HAZWOPER Refresher Training - Online
12/20/2017	H100	8 HR HAZWOPER Refresher Training - Online

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James Thornton

5/22/2000	QS0200	Design Services Work Instructions
3/16/2001	H200	Confined Space Entry
3/16/2001	H011	Excavation for Competent Persons
3/16/2001	EHS006	Initial 40-hour HAZWOPER
3/16/2001	H003	Initial 40-hour HAZWOPER
12/5/2001	FT210A	CLASS - Site Surveying
12/5/2001	FT210B	FIELD - Site Surveying - Practical
11/6/2003	FT040A	CLASS - Monitoring Well Design & Construction
12/6/2004	H009	Asbestos Awareness
2/25/2005	FT180A	CLASS - Construction Administration and Inspection
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group
1/24/2006	F103T	COURSE - Monitoring Well Design and Construction
7/5/2006	H200	Confined Space Entry
8/8/2006	PDH001	Coarse Monomedia Conversion and Primary Effluent Treatment Demonstration Project
9/19/2006	PDH002	Drifting Toward the Brink: Challenges in the Niagara Falls Water and Wastewater Utilities
11/28/2006	PDH004	Groundwater Investigation and Remediation
12/19/2006	PDH005	Spatial Analysis of Household Water Supply & Demand
1/30/2007	PDH006	Utility Financial Consulting: Evaluating and Improving the Financial Condition of Water/Wastewater Systems
3/6/2007	PDH007	Demonstration of Real Time Flow Monitoring & Online Hydraulic Model to Facilitate Sewer System Operations and Management
4/10/2007	PDH008	Evaluating Dewatering and Disposal Options: A Tale from Both Ends of the Stick
4/25/2007	EX118	Constructed Wetlands and Phytoremediation for the Treatment of Leachate and Groundwater
8/8/2007	PDH012	Improving SLUG Tests Part 2
8/21/2007	PDH013	Two For One Deal: Lewiston I/I Removal and Drainage Improvements
9/11/2007	PDH014	Design and Trenchless Installation of Ductile Iron Pipe
9/20/2007	PDH015	Permeable Reactive Barrier Treatment Systems and Nanoscale Iron
10/23/2007	PDH016	Wind Power - the Challenges and Opportunities of a Fast Growing Industry
10/30/2007	PDH017	Capture Zone Analysis for Pump and Treat Systems
11/20/2007	PDH019	Statistics for Engineering
2/12/2008	PDH021	Geosynthetic Materials, Applications and Design
4/8/2008	PDH024	Enhanced Biodegradation
4/15/2008	PDH025	Special Waste
5/6/2008	PDH026	Landscape Architecture in the Design Process
6/3/2008	PDH029	UV Disinfection for DW
6/17/2008	PDH027	Vapor Intrusion
6/24/2008	PDH028	Landfill & Sustainable Solutns
7/10/2008	PDH030	VOC Vapor Mitigation Systems
8/12/2008	PDH032	In Situ Chemical Oxidatn Pt 2
11/4/2008	PDH037	Dioxins and Furans
12/9/2008	PDH039	Steel Tank Coatings
1/6/2009	PDH041	Pipes and Engineering Concerns
2/17/2009	PDH042	Estimation of Greenhouse-Gas Emissions from Municipal Wastewater Treatment Plants – Part 1
3/3/2009	PDH044	New Approaches to In Situ Chemical Oxidation: (Not your mother's chem ox!)

3/17/2009	PDH043	Estimation of Greenhouse-Gas Emissions from Municipal Wastewater Treatment Plants – Part 2
3/24/2009	PDH045	Application of Engineering to the Oil and Gas Industry: A Case History, Lake Charles, Louisiana
4/17/2009	DS003	Developing the Design Fee
5/12/2009	PDH047	Radon Measurement and Mitigation
5/19/2009	PDH048	Application of Aerobic and Anaerobic Respirometry for Optimization of Wastewater Treatment
9/29/2009	PDH050	Sustainable Remediation – Making Cleanups Greener
10/1/2009	PDH054	Sustainable Remediation – Making Cleanups Greener Part 2
10/30/2009	ESA003	Excelling as an Expert Witness – Tips and Strategies from a Technical Perspective
11/3/2009	PDH056	Iron and Manganese Removal
11/24/2009	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
12/17/2009	PDH060	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues
1/7/2010	PDH061	Wind Energy Part 3 - Wind Resource Evaluation, Siting and Regulatory Issues
1/12/2010	PDH063	The Impacts of Water Treatment Process and Chemicals on Wastewater Treatment Plant Operations and Permits
1/19/2010	PDH062	Wind Energy Part 4 - Wind Project Design, Engineering, Construction and Connecting to the Grid
2/9/2010	PDH057	Brownfields
2/26/2010	PDH065	Understanding the Clean Development Mechanism Project Development Process
4/20/2010	PDH058	Slope Stabilization: Best Practices and Challenges
6/1/2010	PDH070	Online Monitoring in Water and Wastewater Treatment
6/8/2010	PDH071	Modified Active Gas Sampling (MAGS)
6/22/2010	PDH072	Enhanced Attenuation – A Solution to a Common Groundwater Remediation Problem
7/6/2010	PDH073	Incorporating Habitat Enhancement and Compensatory Mitigation into Remediation Design and Restoration
7/13/2010	PDH068	Assessing Ecological Risk with Sediment Quality Guidelines (e.g., ER-L/ER-M, LEL/SEL, TEL/PEL): Kids, don't Try This at Home! Or at the Office!
8/10/2010	PDH074	Threatened & Endangered Species – How will they impact my project?
8/17/2010	PDH075	Wetlands – Recent Issues - How will they affect your project?
10/14/2010	PDH078	Using 3D Laser Scanning Survey Technology for Facilitating Engineering Design Projects
10/26/2010	PDH079	Mining 101 – An Overview of the Industry and Terms
11/16/2010	PDH082	An Introduction to Coal Mining
11/23/2010	PDH083	Shortening Permit Approvals for Mining Operations using Animation
12/14/2010	PDH085	Environmental Assessment for Engineers
1/18/2011	PDH087	Kam Kotia Mine site – Case Study
2/22/2011	PDH089	Cape Breton Coalfield Mine Water Project:: A Case Study
4/29/2011	PDH092	Recognizing the Emerging Issues Involving Defective Imported Drywall
5/3/2011	PDH086	Incorporating Habitat Enhancement and Compensatory Mitigation into Sediment Remediation Design
5/10/2011	PDH093	Implications of Industrial Boiler MACT: Sorting out the Facts
8/30/2011	PDH096	Vapor Intrusion Overview and Assessment Approaches (Part B)
12/15/2011	PDH102	Nutrient Problems and Solution
1/12/2012	PDH103	Biological, Chemical, and Physical Techniques for Evaluating and Optimizing Nutrient Removal in Wastewater Treatment Plants –WEFTEC 2011 Trends
1/19/2012	PDH104	Numeric Nutrient Criteria – Result of Florida's Interaction with EPA
1/26/2012	PDH105	Treatment Wetlands: Applications and Design Considerations

2/9/2012	PDH106	Eutrophication, Nutrient Water Quality Criteria, and TMDLs for Nutrients
2/16/2012	PDH107	Incorporating Sustainability into the City of Tomorrow – A Case Study of the Babcock Ranch Community's Sustainable Land Development Code
3/22/2012	PDH112	Lee County Nutrient Study - Desktop method for Optimizing Source Locations
5/8/2012	PDH119	NFWB -The Gorge Pumping Station's Continuing Rehabilitation
5/24/2012	PDH118	Pilot Experience Treating South Florida Urban and Agricultural Stormwaters to less than 10 ppb TP Using Chemical,Membrane and Wetland Technologies
6/20/2012	PDH094	CRA's Expert Services: Risk Assessment, Ecological Assessments (Spill Response & NRDA) & Groundwater Modeling
2/7/2013	PDH122	NSPS and NESHAP Regulations for Oil and Gas Sector – An Overview
2/28/2013	PDH123	Changes and Advances in the ASTM Phase I Site Assessment Procedures
4/25/2013	PDH124	The New HAZCOM and Impacts of Adopting GHS
10/25/2013	PDH126	Environmental Litigation, Cleanup Cost and Allocation
11/14/2013	PDH127	Metals Treatment
4/14/2014	PDH134	Mechanical Seals 101
4/15/2014	PDH130	Wetlands & Phytoremediation
5/8/2014	PDH133	Natural Resource Damage Assessment
6/26/2014	PDH135	Mobile, Real-time Atmospheric
9/5/2014	PDH136	Step-by-Step Approach to Prevention of Significant Deterioration (PSD) Permitting Process and Challenges
12/11/2014	PDH137	WWTP Aerobic Digestion Retrofit and Production
2/16/2015	H304	Worker Electrical Safety Program (WESP) (Online)
4/23/2015	PDH143	New Technology Applications
11/5/2015	T003	Why Class A Does Not Always Make Cents: Cost Model to Drive Biosolids Planning Decisions
11/17/2015	T002	Successfully Applying In Situ Remediation: Site Considerations & Technology Selection
12/10/2015	T004	The Challenge with Gravity: How to Build a Better Trunk Sewer
1/14/2016	T005	Green Remediation and Sustainable Remediation – Innovative Solutions & Practical Applications
1/28/2016	T006	Nanoparticle Emissions: Real Risk or a Sheep in Wolf's Clothing
2/23/2016	T007	Protecting Watersheds: An Integrated Approach to Lessen Phosphorus Loads
2/26/2016	T217	Mid-Stream Facilities
3/15/2016	T008	Combined Sewer Overflow Reduction and Capture: Successfully Implementing a Major CSO Project in an Urban Environment
5/31/2016	T011	Preparing for Future Precipitation: The Benefits and Challenges to Updating IDF Curves
4/6/2017	T016	T016: Some Failures of the Ge

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Gary Ushiro

3/5/2010	**EX143**	Maximizing the Use of 3-D Site Visualizations
8/18/2014	**EHS056**	Emergency Action Plan
8/18/2014	**EHS061**	EHS061: Emergency Action Plan

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6/7/1996	EHS006	Initial 40-hour HAZWOPER
6/30/2003	FT080A	Aquifer Testing
6/30/2003	FT030A	Borehole Installation and Sampling
6/30/2003	FT020A	Drilling Progam Prep Closure
6/30/2003	FT050A	Fluid Level Monitoring
6/30/2003	FT060A	Groundwater Sampling
6/30/2003	FT040A	Monitoring Well Design and Construction
6/30/2003	FT070A	Residential Well Sampling
6/30/2003	FT110A	Surf Water Lagoon Sediment S
6/30/2003	FT120A	Surface Water Flow Measurement
6/30/2003	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
6/30/2003	FT030A	CLASS - Borehole Installation and Sampling
6/30/2003	FT020A	CLASS - Drilling Progam-Preparation and Closure
6/30/2003	FT050A	CLASS - Fluid Level Monitoring
6/30/2003	FT060A	CLASS - Groundwater Sampling
6/30/2003	FT040A	CLASS - Monitoring Well Design & Construction
6/30/2003	FT070A	CLASS - Residential Well Sampling
6/30/2003	FT120A	CLASS - Surface Water Flow Measurements
6/30/2003	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
7/15/2003	QS0200	Design Services Work Instructions
5/26/2004	FT180A	Construction Administration and Inspection
5/26/2004	FT180A	CLASS - Construction Administration and Inspection
7/28/2004	FT200A	Geophysical Surveys
7/28/2004	FT200A	CLASS - Geophysical Surveys
1/12/2005	FT150A	Soil Gas Study
1/12/2005	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
12/8/2005	EX108	MNA AND SEQUENCE
12/8/2005	EX108	Visualizing the Effectiveness of MNA and Enhanced Attenuation Remedies Using SEQUENCE
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group
10/23/2007	PDH016	Wind Power - the Challenges and Opportunities of a Fast Growing Industry
11/14/2007	H103	TDG/DOT Training
11/14/2007	H103	Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management
1/31/2008	EX130	Chemistry Solutions
3/17/2009	PDH043	Estimation of Greenhouse-Gas Emissions from Municipal Wastewater Treatment Plants – Part 2
5/17/2010	EHS10A	Air Monitoring
6/4/2010	EX149	New EPA Coal Ash Regulation: Change is Coming!
9/26/2011	PDH064	Greenhouse Gases Validations & Verifications 100
9/5/2014	PDH136	Step-by-Step Approach to Prevention of Significant Deterioration (PSD) Permitting Process and Challenges
2/5/2015	H304	Worker Electrical Safety Program (WESP) (Online)
3/19/2015	EX157	SPCC FASTRAC
12/28/2015	T210	T210: Air Emissions Source Per
12/28/2015	T210	Air Emissions Source Permitting 101
1/15/2016	T212	Engines

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1/22/2016	**T213**	Stationary Engines – Operation
2/5/2016	**T214**	Process Simulators in Oil and
3/11/2016	**T219**	Pollution Control Devices
5/30/2017	**T219**	T219: Pollution Control Devic
11/14/2017	**T213**	T213: Stationary Engines - Op

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Steven Voss

12/8/1990	EHS006	40 Hr HAZWOPER
12/8/1990	H003	H003: OSHA 40-Hour HAZWOPER
5/2/1998	QS0200	Design Services Work Instructions
6/1/1998	FT030B	Borehole Installation and Sampling Practical
6/1/1998	FT030A	Borehole Installation and Sampling
6/1/1998	FT180B	Construct Administration and Inspection Practical
6/1/1998	FT180A	Construction Administration and Inspection
6/1/1998	FT140B	Drum Soil Ex Stock Practical
6/1/1998	FT140A	Drum Soil Excav and Stock
6/1/1998	FT050B	Fluid Level Monitoring Practical
6/1/1998	FT050A	Fluid Level Monitoring
6/1/1998	FT060A	Groundwater Sampling
6/1/1998	FT060B	Groundwater Sampling Practical
6/1/1998	FT040A	Monitoring Well Design and Construction
6/1/1998	FT040B	Monitoring Well Practical
6/1/1998	FT070B	Residential Well Sampling Practical
6/1/1998	FT070A	Residential Well Sampling
6/1/1998	FT100B	Surf Soil Sampling Practical
6/1/1998	FT120B	Surf Wat Flow Meas Practical
6/1/1998	FT110B	Surf Wat Lag Sed S Practical
6/1/1998	FT110A	Surf Water Lagoon Sediment S
6/1/1998	FT120A	Surface Water Flow Measurement
6/1/1998	FT100A	Surficial Soil Sampling
6/1/1998	FT130A	Test Pits
6/1/1998	FT130B	Test Pits Practical
3/13/1999	H200	Confined Space Entry
11/11/1999	FT090B	Decon Procedures Practical
11/11/1999	FT090A	Decontamination Procedures
11/11/1999	FT160A	Sewer System Flow Meas Stud
11/11/1999	FT150A	Soil Gas Study
11/11/1999	FT150B	Soil Gas Study Practical
11/8/2005	EX105	Vapor Intrusion
4/18/2007	H011	Excavation for Competent Persons
6/28/2007	EHS07B	Air Monitoring
7/31/2007	EX126	Carbon Footprint / Greenhouse Gas Emissions Inventory
11/6/2007	CRA001	Phase I ESA Workshop
1/15/2009	EX134	CRA Risk Assessment Services: How Can We Help You?
1/27/2009	PDH038	Engineering Principles Applicable to Sediment Management Projects
10/15/2009	ESA002	Beyond All Appropriate Inquiry – ASTM Update and Status of the ASTM E1903 Phase II Standard
3/23/2010	EHS10A	Air Monitoring
2/14/2013	ESA002	Beyond All Appropriate Inquiry – ASTM Update and Status of the ASTM E1903 Phase II Standard
5/5/2015	H304	Worker Electrical Safety Program (WESP) (Online)
5/21/2015	T101	Overview of Drilling Methods (Online)
4/4/2016	H100	8 HR HAZWOPER Refresher

4/5/2016	**H100**	H100: OSHA 8-Hour HAZWOPER Re
10/5/2016	**T210**	Air Emissions Source Permitting 101
6/30/2017	**H100**	H100: OSHA 8-Hour HAZWOPER Re
2/12/2018	**T240**	ASTM E1527 Phase I ESA Level 1 Assessor Training Course
2/12/2018	**T241**	ASTM E1527 Phase I ESA Level 1 Assessor Training Record
2/13/2018	**T242**	ASTM E1527 Phase I ESA Level 2 Assessor Training Record
3/27/2018	**T243**	ASTM E1527 Phase I ESA Level 3 Assessor Training Record
3/27/2018	**T244**	Limited Environmental Compliance Reviewer Training Record (Level 2)

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Steven Wilsey

4/1/1994	EHS006	Initial 40-hour HAZWOPER
4/1/1994	H003	Initial 40-hour HAZWOPER
4/8/2002	FT220A	CLASS - Air Monitoring
4/8/2002	FT080A	CLASS - Aquifer Testing: Pumping Tests, Packer Tests and Single-Well Response Tests
4/8/2002	FT030A	CLASS - Borehole Installation and Sampling
4/8/2002	FT180A	CLASS - Construction Administration and Inspection
4/8/2002	FT090A	CLASS - Decontamination Procedures: Decontamination of Field Equipment, Personnel and Heavy Equipment
4/8/2002	FT020A	CLASS - Drilling Progam-Preparation and Closure
4/8/2002	FT140A	CLASS - Drum/Soil Excavation and Stockpiling
4/8/2002	FT050A	CLASS - Fluid Level Monitoring
4/8/2002	FT190A	CLASS - General Asbestos Awareness
4/8/2002	FT200A	CLASS - Geophysical Surveys
4/8/2002	FT060A	CLASS - Groundwater Sampling
4/8/2002	FT040A	CLASS - Monitoring Well Design & Construction
4/8/2002	FT070A	CLASS - Residential Well Sampling
4/8/2002	FT160A	CLASS - Sewer System & Flow Measurement: Sewer Flow Sampling, Sewer & Open-Channel Flow Measurement, Sewer Inspection
4/8/2002	FT150A	CLASS - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring
4/8/2002	FT120A	CLASS - Surface Water Flow Measurements
4/8/2002	FT110A	CLASS - Surface Water/Lagoon/Sediment Sampling
4/8/2002	FT100A	CLASS - Surficial Soil Sampling
4/8/2002	FT170A	CLASS - Tank Closures
4/8/2002	FT130A	CLASS - Test Pits
4/8/2002	FT220B	FIELD - Air Monitoring - Practical
4/8/2002	FT080B	FIELD - Aquifer Testing - Practical: Pumping Tests, Packer Tests and Single-Well Response Tests
4/8/2002	FT030B	FIELD - Borehole Installation and Sampling - Practical
4/8/2002	FT180B	FIELD - Construction Administration and Inspection - Practical
4/8/2002	FT090B	FIELD - Decontamination Procedures - Practical: Decontamination of Field Equipment, Personnel and Heavy Equipment
4/8/2002	FT020B	FIELD - Drilling Program-Preparation and Closeure Practical
4/8/2002	FT140B	FIELD - Drum/Soil Excavation and Stockpiling - Practical
4/8/2002	FT050B	FIELD - Fluid Level Monitoring - Practical
4/8/2002	FT190B	FIELD - General Asbestos Awareness - Practical
4/8/2002	FT200B	FIELD - Geophysical Surveys - Practical
4/8/2002	FT060B	FIELD - Groundwater Sampling - Practical
4/8/2002	FT040B	FIELD - Monitoring Well Design and Construction - Practical
4/8/2002	FT070B	FIELD - Residential Well Sampling - Practical
4/8/2002	FT160B	FIELD - Sewer System and Flow Measurement: Sewer Flow Sampling, Sewer and Open-Channel Flow Measurement, Sewer Inspection
4/8/2002	FT150B	FIELD - Soil Gas Study - Soil Gas Study: Soil Gas Sampling, Gas Probe Installation, and Landfill Gas Monitoring - Practical
4/8/2002	FT120B	FIELD - Surface Water Flow Measurements - Practical
4/8/2002	FT110B	FIELD - Surface Water/Lagoon/Sediment Sampling - Practical
4/8/2002	FT100B	FIELD - Surficial Soil Sampling - Practical

4/8/2002	FT170B	FIELD - Tank Closures - Practical
4/8/2002	FT130B	FIELD - Test Pits - Practical
4/17/2002	QS0200	Design Services Work Instructions
9/22/2008	EHS056	2008 Emergency Action Plan Training
4/26/2010	H113	Emergency Action Plan Training - Required Annually
5/21/2015	T101	Overview of Drilling Methods (Online)
6/10/2015	EHS018	Department of Transportation (DOT) Hazardous Materials Transportation Course
2/12/2018	T240	ASTM E1527 Phase I ESA Level 1 Assessor Training Course
2/12/2018	T241	ASTM E1527 Phase I ESA Level 1 Assessor Training Record
2/13/2018	T242	ASTM E1527 Phase I ESA Level 2 Assessor Training Record

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Julian Worrall

7/19/1991	EHS006	Initial 40-hour HAZWOPER
7/19/1991	H003	Initial 40-hour HAZWOPER
4/17/1999	H200	Confined Space Entry
9/21/2000	FT180A	CLASS - Construction Administration and Inspection
9/21/2000	FT180B	FIELD - Construction Administration and Inspection - Practical
9/8/2003	QS0200	Design Services Work Instructions
3/2/2005	EX103	In-Situ Chemical Injection: Practical Design & Field Application
4/6/2005	FT220A	CLASS - Air Monitoring
4/6/2005	FT210A	CLASS - Site Surveying
4/7/2005	EX104	In-Situ Bioremediation
1/19/2006	EX107	An Introduction to Sustainability and CRA's Sustainable Solutions Group
1/24/2006	F103T	COURSE - Monitoring Well Design and Construction
3/1/2006	EX110	Chlorobenzenes: Sources, Fate, and Treatment
9/19/2006	PDH002	Drifting Toward the Brink: Challenges in the Niagara Falls Water and Wastewater Utilities
12/19/2006	PDH005	Spatial Analysis of Household Water Supply & Demand
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9/11/2007	PDH014	Design and Trenchless Installation of Ductile Iron Pipe
10/30/2007	PDH017	Capture Zone Analysis for Pump and Treat Systems
11/20/2007	PDH019	Statistics for Engineering
1/21/2008	DS003	Developing the Design Fee
2/12/2008	PDH021	Geosynthetic Materials, Applications and Design
2/21/2008	PDH022	Wetlands and Related Issues Affecting Land Development
3/11/2008	PDH023	Utility Merger Challenges
4/8/2008	PDH024	Enhanced Biodegradation
4/15/2008	PDH025	Special Waste
5/6/2008	PDH026	Landscape Architecture in the Design Process
6/17/2008	PDH027	Vapor Intrusion
6/24/2008	PDH028	Landfill & Sustainable Solutns
7/10/2008	PDH030	VOC Vapor Mitigation Systems
9/25/2008	PDH033	Hydraulic Control Valve Overview
12/9/2008	PDH039	Steel Tank Coatings
1/6/2009	PDH041	Pipes and Engineering Concerns
3/3/2009	PDH044	New Approaches to In Situ Chemical Oxidation: (Not your mother's chem ox!)
3/17/2009	PDH043	Estimation of Greenhouse-Gas Emissions from Municipal Wastewater Treatment Plants – Part 2
3/24/2009	PDH045	Application of Engineering to the Oil and Gas Industry: A Case History, Lake Charles, Louisiana
3/25/2009	DS033B	Inspection of Buried Utilities – Pressure Systems – Watermains
5/12/2009	PDH047	Radon Measurement and Mitigation
5/19/2009	PDH048	Application of Aerobic and Anaerobic Respirometry for Optimization of Wastewater Treatment

7/14/2009	PDH052	Advanced Oxidation Processes: Part 1
9/29/2009	PDH050	Sustainable Remediation – Making Cleanups Greener
10/1/2009	PDH054	Sustainable Remediation – Making Cleanups Greener Part 2
10/30/2009	ESA003	Excelling as an Expert Witness – Tips and Strategies from a Technical Perspective
11/3/2009	PDH056	Iron and Manganese Removal
11/24/2009	PDH059	Wind Energy Part 1 - Orientation to Wind Energy
12/17/2009	PDH060	Wind Energy Part 2 - The Current State of the Wind Industry and Associated Economic Issues
1/19/2010	PDH062	Wind Energy Part 4 - Wind Project Design, Engineering, Construction and Connecting to the Grid
2/9/2010	PDH057	Brownfields
2/26/2010	PDH065	Understanding the Clean Development Mechanism Project Development Process
5/13/2010	EX148	In-vessel Technology for On-site Halogenated Soil Remediation
6/1/2010	PDH070	Online Monitoring in Water and Wastewater Treatment
6/8/2010	PDH071	Modified Active Gas Sampling (MAGS)
6/22/2010	PDH072	Enhanced Attenuation – A Solution to a Common Groundwater Remediation Problem
7/6/2010	PDH073	Incorporating Habitat Enhancement and Compensatory Mitigation into Remediation Design and Restoration
9/7/2010	PDH077	Remedial Technology Update and Summary of the Battelle 7th International Conference on the Remediation of Chlorinated and Recalcitrant Compounds
10/14/2010	PDH078	Using 3D Laser Scanning Survey Technology for Facilitating Engineering Design Projects
10/26/2010	PDH079	Mining 101 – An Overview of the Industry and Terms
11/9/2010	PDH080	Treatability Studies: A Cost Effective Approach to Remedy Selection
11/11/2010	PDH081	Incremental Sampling Methodology
11/16/2010	PDH082	An Introduction to Coal Mining
12/7/2010	PDH084	Nutrient Removal Process Modeling and Optimization Strategies: A WEFTEC 2010 Update
12/14/2010	PDH085	Environmental Assessment for Engineers
1/25/2011	PDH088	Molecular Tools in Environment
2/22/2011	PDH089	Cape Breton Coalfield Mine Water Project:: A Case Study
4/26/2011	PDH091	Remediation of Metals in Groundwater and Soil
5/3/2011	PDH086	Incorporating Habitat Enhancement and Compensatory Mitigation into Sediment Remediation Design
5/10/2011	PDH093	Implications of Industrial Boiler MACT: Sorting out the Facts
5/20/2011	PDH094	CRA's Expert Services: Risk Assessment, Ecological Assessments (Spill Response & NRDA) & Groundwater Modeling
6/21/2011	PDH095	Vapor Intrusion Overview and Assessment Approaches (Part A)
8/30/2011	PDH096	Vapor Intrusion Overview and Assessment Approaches (Part B)
10/6/2011	PDH097	Implementation of In Situ Treatment Technologies
10/25/2011	PDH098	Distribution of Caronaceous materials in a small urban watershed, implication for PAH Contamination
12/1/2011	PDH100	Biodegradation for Site Remediation
12/15/2011	PDH102	Nutrient Problems and Solution
1/12/2012	PDH103	Biological, Chemical, and Physical Techniques for Evaluating and Optimizing Nutrient Removal in Wastewater Treatment Plants –WEFTEC 2011 Trends
1/26/2012	PDH105	Treatment Wetlands: Applications and Design Considerations
2/9/2012	PDH106	Eutrophication, Nutrient Water Quality Criteria, and TMDLs for Nutrients

2/16/2012	**PDH107**	Incorporating Sustainability into the City of Tomorrow – A Case Study of the Babcock Ranch Community's Sustainable Land Development Code
3/6/2012	**PDH111**	In-Situ Remediation
3/22/2012	**PDH112**	Lee County Nutrient Study - Desktop method for Optimizing Source Locations
3/22/2012	**PDH111**	In-Situ Remediation
5/8/2012	**PDH119**	NFWB -The Gorge Pumping Station's Continuing Rehabilitation
5/24/2012	**PDH118**	Pilot Experience Treating South Florida Urban and Agricultural Stormwaters to less than 10 ppb TP Using Chemical,Membrane and Wetland Technologies
6/20/2012	**PDH094**	CRA's Expert Services: Risk Assessment, Ecological Assessments (Spill Response & NRDA) & Groundwater Modeling
1/24/2013	**PDH121**	Permeable Reactive Barrier Treatment Systems and Nanoscale Iron
2/7/2013	**PDH122**	NSPS and NESHAP Regulations for Oil and Gas Sector – An Overview
2/28/2013	**PDH123**	Changes and Advances in the ASTM Phase I Site Assessment Procedures
4/25/2013	**PDH124**	The New HAZCOM and Impacts of Adopting GHS
10/25/2013	**PDH126**	Environmental Litigation, Cleanup Cost and Allocation
11/14/2013	**PDH127**	Metals Treatment
2/25/2014	**PDH129**	Environmental Forensics
4/14/2014	**PDH134**	Mechanical Seals 101
4/15/2014	**PDH130**	Wetlands & Phytoremediation
5/8/2014	**PDH133**	Natural Resource Damage Assessment
9/5/2014	**PDH136**	Step-by-Step Approach to Prevention of Significant Deterioration (PSD) Permitting Process and Challenges
10/16/2014	**PDH138**	Laboratory Treatability Studies
12/11/2014	**PDH137**	WWTP Aerobic Digestion Retrofit and Production
1/8/2015	**PDH140**	Integrated Water Resources Pla
2/5/2015	**H304**	Worker Electrical Safety Program (WESP) (Online)
3/26/2015	**EHS301**	The Electrical Safety and National Fire Protection Association (NFPA) 70E Arc Flash
11/5/2015	**T003**	Why Class A Does Not Always Make Cents: Cost Model to Drive Biosolids Planning Decisions
2/26/2016	**T217**	Mid-Stream Facilities

RETURN TO TEAM LIST

Margaret Zuckweiler

6/22/2001	EHS006	Initial 40h HAZWOPER
6/22/2001	H003	H003: OSHA 40-Hour HAZWOPER
4/26/2012	Q009	Design Services Work Instructions
5/2/2012	F101T	Overview of Drilling Program
5/2/2012	F101	F101: Overview of Drilling Program
5/14/2012	F118	Landfill Gas Monitoring
5/14/2012	F119T	Sample Handling and Management
5/14/2012	F119	F119: Sample Handling and Management
8/21/2012	EHS028	HAZWOPER - Manager & Supervisor
10/20/2013		2013 RAM/SWANA Conference
6/23/2014	PDH058	Slope Stabilization: Best Practices and Challenges
6/23/2014	PDH040	Quantifying Environmental Performance using an Environmental Footprint Calculator
6/29/2014	PDH091	Remediation of Metals in Groundwater and Soil
6/29/2014	PDH130	Wetlands & Phytoremediation
6/29/2014	PDH129	Environmental Forensics
6/29/2014	PDH097	Implementation of In Situ Treatment Technologies
6/29/2014	PDH070	Online Monitoring in Water and Wastewater Treatment
6/30/2014	PDH131	CRA Uses Forensics to Solve $168M Lawsuit
8/8/2014	PDH040	PDH040: Quantifying Environmental Performance using an Environmental Footprint Calculator
8/8/2014	PDH058	PDH058: Slope Stabilization: Best Practices and Challenges
8/8/2014	PDH070	PDH070: Online Monitoring in Water and Wastewater Treatment
8/8/2014	PDH091	PDH091: Remediation of Metals in Groundwater and Soil
8/8/2014	PDH097	PDH097: Implementation of In-Situ Treatment Technologies
8/8/2014	PDH129	PDH129: Environmental Forensics
4/29/2015	H100	8 HR HAZWOPER Refresher
4/29/2015	EHS202	EHS202: 8-Hour HAZWOPER Refres
10/8/2015		2015 RAM/SWANA
4/28/2016	H100	8 HR HAZWOPER Refresher
5/3/2016	DS005	DS005: Managing Scope Change
1/30/2018	T131	T131: Leading Technical Communities
1/30/2018	T133	T133: Using Technology to Build Knowledge Communities

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