gai consultants

Charleston Office
300 Summers Street, Suite 1100
Charleston, West Virginia 25301-1631

T 304.926.8100
F 304.926.8180

March 8, 2018

Project C170430.00

Mr. Guy Nisbet
State of West Virginia
Department of Administration, Purchasing Division
2019 Washington Street East
Charleston, West Virginia 25305-2214

Expression of Interest
Solicitation No. CEOI 1400 AGR1800000002
West Virginia Department of Agriculture
Food Warehouse Electrical Service and
Distribution System Upgrades Project
Ripley, Jackson County, West Virginia

Dear Mr. Nisbet:

GAI Consultants, Inc. (GAI) appreciates the opportunity to provide the West Virginia Department of Agriculture (WVDA) with our Expression of Interest (EOI) for the Food Warehouse Electrical Engineering Service and Distribution System Upgrades Project (Project), located in Ripley, Jackson County, West Virginia (WV) for your review and consideration. We understand the importance of this Project to the WVDA and have assembled a proven Project Team with strong capabilities in successfully completing electrical engineering services for industrial and commercial facilities. We believe our Team is exceptionally qualified to meet the needs of this Project based on the following considerations:

- **Knowledge of the Project Site**: GAI originally performed an initial site investigation at the facility on March 24, 2017, after we were contacted by Mr. Jim Thomas, with the WVDA, to present an estimated opinion of probable cost and scope of services to upgrade the electrical service and distribution system.
- **Our Key Staff and Regional Presence**: GAI's Project Manager, Steven E. Schroth, Is a registered Professional Engineer in WV with over 30 years of experience specializing in project management and electrical engineering for numerous industrial and commercial facilities projects. Additionally, many of our key personnel have over 20 years of electrical engineering experience. GAI's Charleston, WV office is located within five miles of the WVDA office.
- **WV Regulatory Agency Experience**: GAI has an established relationship with the WV Department of Environmental Protection, in addition to working with other WV regulatory agencies for decades.

GAI looks forward to working with the WVDA on this important Project. Should you have any questions or concerns pursuant to our EOI, please contact Mr. Steven E. Schroth at 412.399.5613 or via email at S.Schroth@gaiconsultants.com.

Sincerely,
GAI Consultants, Inc.

Steven E. Schroth

Steven E. Schroth, MBA, PE
Electrical Technical Leader

David J. Bevilacqua

David J. Bevilacqua, MBA
Assistant Vice President

SSE:DJB/gmg/mdw

Attachment: EOI (A-E Services for WVDA Agriculture Food Warehouse Electrical Engineering Service and Distribution Upgrades Project)

EXPRESSION OF INTEREST

WVDA Food Warehouse Electical Service and Distribution System Upgrades Project

Solicitation No: CEOI 1400 AGR1800000002

March 8, 2018

Project: C170430.00

Prepared for:
WV Department of Agriculture
ATTN: Guy Nisbet
State of West Virginia
2019 Washington Street East
Charleston, WV 25305
304.558.2596

Prepared by:
GAI Consultants, Inc.
300 Summers Street, Suite 1100
Charleston, WV 25301
P. 304.926.8100 | www.gaiconsultants.com

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Corporate Experience

GAI Consultants Introduction

GAI Consultants, Inc. (GAI) is pleased to present our Expression of Interest (EOI) to the West Virginia Department of Agriculture (WVDA) to provide Engineering Services for the Food Warehouse Electrical Service and Distribution System Upgrades Project (Project), located in Ripley, Jackson County, West Virginia (WV).

Established in 1958, GAI is an award-winning, 900-person, full-service engineering consulting firm headquartered out of Pittsburgh, Pennsylvania (PA) with 25 office locations, including offices in Charleston and Bridgeport, WV. **GAI's Charleston office opened in 1986, and we have been providing engineering services to the State of WV, and other local and municipal government agencies, and private clients for over 30 years.**

GAI provides engineering services and innovative solutions for electrical systems and components which benefit energy and industrial facilities - from food processing and manufacturing to power generation plants. We are an engineering and environmental hub of professionals who study, analyze, design, build, inspect, and manage for our clients, pooling our skills and resources to deliver superior client service throughout the United States (U.S.) and abroad.

We are safety focused, schedule driven, and prepared with a strategic team approach, with sufficient and flexible resources and staff, to effectively provide electrical engineering, construction administration, and technical support to the WVDA for this important Project. We have established a team that can start upon notice to proceed, as well as have the depth to continue to lead and support this Project from initiation through construction.

GAI is currently ranked 111 out of Engineering News-Record's Top 500 Design Firms. GAI's multi-disciplined staff of engineers, environmental specialists, archaeologists, historians, biologists, soil scientists, geologists, Geographic Information Systems (GIS) specialists, and planners enable us to complete many projects in-house, from initiation through construction, facilitating communication and the timely completion of projects in a cost-efficient manner. GAI is capable of providing the WVDA with all of the electrical engineering services, design, permitting, and construction support services required for this Project.

Local Offices Available for Support

GAI has three local offices with staff available to support this Project, including our Charleston, WV office, located within five miles of WVDA's Headquarters. GAI will also administer this Project based out of our office locations in Pittsburgh and Cranberry Township, PA. GAI's local office locations are provided below.

Charleston Office
300 Summers Street, Suite 1100
Charleston, WV 25301
304.926.8100 (T)
304.926.8180 (F)

Pittsburgh Office
385 East Waterfront Drive
Homestead, PA 15120
412.476.2000 (T)
412.476.2020 (F)

Cranberry Office
600 Cranberry Woods Drive, Suite 400
Cranberry Township, PA 16066
724.772.2011 (T)
724.772.2050 (F)

Proposed Client Contacts

Local WVDA Contact:
Matt T. Tanner, PE
Senior Project Engineer
GAI Charleston Office
Telephone: 681.245.8854 / Fax: 304.926.8180
E-mail: M.Tanner@gaiconsultants.com

Project Management Contact:
Steven E. Schroth, MBA, PE
Electrical Technical Leader
GAI Cranberry Office
Telephone: 412.399.5613 / Fax: 724.772.2050
E-mail: S.Schroth@gaiconsultants.com

GAI's Key Project Success Factors

Our Team is ready to meet the challenges associated with this Project. We have exceptional experience designing electrical systems for numerous facilities. Additionally, we have worked on and designed projects where operations have remained in service during renovation and/or construction. Our quality of work, cost control, and timeliness provides a track record that is evident by our award-winning past performance and repeat contract awards. We believe our Team is exceptionally qualified to meet the needs of this Project based on the following considerations:

- **Our Regional Presence**: GAI's office in Charleston, WV office is located within five miles from the WVDA office. Our Proposed **Local Project Contact, Mr. Matthew T. Tanner, PE**, is located in this office. Mr. Tanner worked with the State of WV on the Anthony Correctional Facility Wastewater Treatment Plant (WWTP) Modifications Project, where he reviewed and developed design drawings, performed site visits, and participated in meetings with the client and contractors.
- **Our Key Staff**: GAI's multi-disciplined professional and support staff collaborate to provide our clients with time-sensitive and cost-effective solutions. Our proposed **Project Manager and Electrical Technical Leader, Mr. Steven E. Schroth, MBA, PE**, is a Professional Engineer licensed in WV, and is an experienced electrical engineer with over 30 years of experience.
- **WV Regulatory Agency Experience**: GAI has an established relationship with the WV Department of Environmental Protection (WVDEP), in addition to working with code officials and other WV regulatory agencies for decades.
- **Construction Engineering and Inspection Services**: GAI is adept at providing construction drawings, specifications, and bidding documents, in addition to Construction Contract Administration Services, with competent professionals to ensure that this Project is constructed and functions as designed.
- **Top Ranked Design Firm**: GAI is ranked 111 on Engineering News Record's list of the 500 top design firms.

Subsequent sections of this Expression of Interest present GAI's Project understanding, and our qualifications to successfully accomplish the objectives for this important Project for the WVDA.

Project Understanding and Proposed Project Management Plan

Project Understanding

GAI understands that the Project will be completed at the WVDA's Food Distribution Program (FDP) Warehouse, located at 4496 Cedar Lakes Drive, Ripley Jackson County, WV.

GAI originally performed an initial site investigation and meeting at the facility on March 24, 2017, after we were contacted by Mr. Jim Thomas with the WVDA to present an estimated opinion of probable cost and scope of services to upgrade the electrical service and distribution system.

Project Background

The WVDA FDP Warehouse is operating on a 1200 Ampere 480Y/277 volt main lugs only panelboard with service from utility pole mounted transformers. The main lugs only panelboard is currently using five of the six circuit breakers. The warehouse is 42,789 square feet (SF) total, including 14,409 SF of freezer space and 5,646 SF of variable cooler-freezer space with 15 total compressors. GAI acknowledges WVDA's needs for an electrical service and system review, assessment, and recommendations for upgrades from present and future warehouse loads.

Project Goals and Objectives

GAI understands that the WVDA is trying to meet the following goals and objectives for Warehouse Electrical Service and Distribution System Upgrades Project:

- **Goal/Objective 1**: GAI shall provide engineering design drawings, bill of materials, and specifications to upgrade the existing electrical service and distribution system for the WVDA FDP Warehouse located at 4496 Cedar Lakes Road, Ripley, Jackson County, WV.
- **Goal/Objective 2**: Review existing plans, conditions, the operations of the facility, and evaluate, while communicating effectively with the WVDA to determine a plan that can be implemented that will minimize disruption to the current operation of the warehouse and meet all Goals/Objectives.
- **Goal/Objective 3**: Based on the needs and alternatives described in all Goals/Objectives listed here, provide all necessary services to design the facilities described in this EOI in a manner that is consistent with the WVDA needs, objectives, current law, and current code; while following the plan to design and execute the Project within the Project budget.
- **Goal/Objective 4**: All new electric service and distribution equipment shall be designed to be installed as near to the existing equipment/intercept point as possible to keep a planned electrical service outage to a minimum, and existing service and distribution system equipment will remain in operation until that time. The new main switchboard will be designed with space capacity for future warehouse loads.

- **Goal/Objective 5**: Existing feeder, branch circuit, and exposed conduit run deficiencies shall be identified and corrected.
- **Goal/Objective 6**: GAI will provide construction drawings, specifications, and bidding documents for owner-agreed items for remediation. GAI will provide Construction Contract Administration Services with competent professionals that ensures the Project is constructed and functions as designed.
- **Goal/Objective 7**: GAI shall analyze existing electric utility metering data provided by the WVDA FDP to determine the maximum demand for a one year period.
- **Goal/Objective 8**: .GAI will provide Project closeout services to assess the Project, review record closeout documents, and perform final punch listing of Project deliverables to ensure completion of the work.
- **Goal/Objective 9**: GAI understands that the WVDA FDP shall provide equipment information, including:
  - New and existing freezer and cooler compressor(s) horsepower, service factor, design type, and locked rotor code letter.
  - Compressor motor(s) starting method or preferred method: across-the-line, solid state reduced voltage, or variable speed drive.
  - All design information regarding the existing emergency generator and corresponding transfer switch.

- **Goal/Objective 10**: GAI understands that site visits shall be included to gather existing electrical, equipment, device, and settings information.

Proposed Project Management Plan

GAI's Proposed Project Management Plan and Project Approach is based upon the WVDA's EOI, dated February 9, 2018, Solicitation No. CEOI 1400 AGR1800000002, which GAI is using as the basis of our Statement of Qualifications. GAI will perform these Projects pursuant to our Project Management System, which is based upon the Project Management Institute's (PMI's) ***Project Management Body of Knowledge***. GAI project managers are trained in PMI principles and use project management tools available to them to initiate, plan, execute, monitor, forecast, control, and close out projects. Below is GAI's approach to these important Projects for the WVDA.

GAI's extensive staff of qualified and specialized in-house engineers and technical personnel, enables a quick response and provides flexibility and expertise for complex multi-disciplinary projects. Our staffing approach to working with the WVDA is to assign a Project Team with total responsibility for completing this Project to the WVDA's satisfaction and budget.

Project Team Coordination and Scheduling

Project Initiation

Upon receipt of the Contract from the WVDA, GAI's Project Manager, Steven Schroth, will visit the site, plan the investigation, respond with a task implementation plan and cost estimate to perform the required work, and assign a Task Manager. GAI's proposed Task Manager for this Project is Mr. Dayne D. Volz, Engineer-in-Training (EIT). When the task contract is awarded, the required personnel will be mobilized.

At that point, GAI's Project Manager and Key Personnel will meet with the WVDA Project Manager to kick off the Project and establish investigation and design criteria. We will then collect background data from published sources, the WVDA, and knowledgeable individuals. A site reconnaissance will be conducted as part of the data collection process.

Project Communication

GAI's points of contact for this Project include our Local Point of Contact, Matthew Tanner, PE, out of our Charleston, WV office; and GAI's Project Manager, Mr. Steven E. Schroth, out of GAI's Cranberry, PA office. GAI's Project Manager will oversee the day-to-day work activities, review technical products and reports, and be responsible for the Project budget and schedule. During Project execution, and particularly as the Project nears completion, meetings with the WVDA will be scheduled to discuss alternatives and discuss past experiences in similar situations.

GAI will participate in routine (typically weekly) conference calls with the WVDA, as required. GAI's Project Manager can lead the calls if requested by WVDA. GAI will provide a conference call phone number to support the conference calls, typically via Skype. During the calls, GAI will update the WVDA regarding the status of the Project details and deliverables, and any proposed engineering changes that could result in changes to the schedule timelines. GAI will discuss implications of design changes with WVDA's team to develop Project adjustments, as necessary.

Scheduling and Resource Allocation

GAI will work with the WVDA to develop the initial baseline schedule, including setting milestone dates, at the initiation of the Project. Weekly Project updates will be provided to the WVDA throughout the life of the Project.

GAI is well aware of demanding schedules in order to meet permit deadlines and to keep the Project on track for ultimate construction. To coordinate, forecast, and manage the Project schedule, GAI proposes to utilize Microsoft Project or Primavera scheduling and resource allocation software to track Project milestones.

Program Management Tasks:

Coordination and Meetings with Regulatory Agencies

GAI will coordinate the dates of meetings with the attendees, invite the participants, and prepare an agenda for distribution to attendees ahead of the meeting. At the meeting, GAI will facilitate the meeting, note the names and contact information of the attendees, and keep notes. After the meeting, GAI will document the meeting with written minutes to capture important decisions and direction, action items, open and unresolved items, and identify the potential next meeting date. Minutes will be distributed to all attendees, the Project file, and WVDA within five business days of the meeting. If there are any edits to the minutes, they will be incorporated and the revised minutes will be redistributed.

Meetings with Summary Presentations to the WVDA Staff

Similar to above, GAI will schedule, coordinate, and provide an agenda for the meetings. GAI will document the meeting in minutes which will be the official record of the meeting. Minutes will be distributed within five business days of the meeting. Summary presentation slides presented at the meeting will be attached to the meeting minutes for reference.

Coordination, Contracting and Oversight of Subconsultants

GAI is not anticipating the use of a subconsultant for work on this Project. Should GAI need the use of a subconsultant, we will administer that contract, which will be between GAI and the subconsultant. GAI will have on-site oversight of the subconsultant at any time when they have personnel on site. Payment of the subconsultant will be in accordance with GAI's standard contract with subcontractors, or as negotiated with them.

Program Scheduling, Including Development of Required Construction Contract Sequencing

GAI prepares Project schedules using Primavera P6 as its preferred software, but can prepare schedules in Microsoft Project. In addition to the detailed Engineer's Opinion of Probable Construction Schedule, GAI will maintain an overall Project schedule showing design, permitting, construction, and close out activities. GAI will baseline the schedule at the beginning of the Project and, potentially, at various points during the Project when changes in information make it appropriate to do so. Progress will be measured against the current baseline as a means of identifying the need for action to meet projected schedule milestones. The overall schedule will be coordinated with appropriate construction seasons to assure its practicality.

Preliminary and Final Design Approach

GAI will review the existing plans and conditions, as well as the operation of the facility to determine a plan that can be implemented, that will minimize disruption to facility operations, and provide a final design approach for the Project.

Detailed Design and Permitting

An initial set of drawings will be prepared for the repairs and rehabilitation. The drawings will be prepared using AutoCAD software on GAI standard title blocks, unless the WVDA provides its standard title block. The preliminary submittal will include outline level technical specifications for materials and methods of construction. GAI uses the Construction Specification Institute's Master Spec format for its technical specifications, but these can be revised to suit the client's preference. An initial engineer's opinion of probable construction cost and engineer's opinion of probable construction schedule for the construction effort will be prepared for this submittal as well. The preliminary (60 percent level) submittal will be substantially complete and peer reviewed, but may not yet be fully subject to GAI's detailed engineering checking procedure. The primary intent of the preliminary submittal is to provide WVDA with the first review of the complete package for comment and input.

Pre-final design and permitting drawings (90 percent design submittal) will be prepared upon receipt of comments on the 60 percent submittal. The pre-final design package will be a complete, fully checked and peer reviewed set of detailed design drawings and technical specifications for the Project. The engineer's opinion of probable construction cost and engineer's opinion of probable schedule will be updated to reflect the pre-final state of design.

The pre-final design drawings are intended to be reviewed by the WVDA for final acceptance of the design. Once the agency has provided comments and these comments, if any, have been resolved, the bid package will be assembled.

Construction Administration

Upon awarding of the construction contract, GAI will move to the construction administration phase of the Project. GAI anticipates that there will be a pre-construction meeting with the WVDA and GAI representatives. The purpose of the pre-construction meeting is to fully review the scope of work, any hold or inspection points, and any restrictions that must be followed.

GAI will provide Construction Contract Administration Services with competent professionals, which will ensure that the Project is constructed and functions as designed. GAI will coordinate with field personnel to ensure the work has been completed properly in accordance with the construction drawings and specifications. Additionally, GAI will provide construction drawings, specifications, and bidding documents for owner-agreed items for remediation.

Certificate of Final Completion and Final Certificate for Payment

GAI will issue a certificate of final completion and final certification for payment after a detailed review of the site with the Contractor and the WVDA. All contract paperwork must be obtained by GAI prior to issuance of the certificates.

Quality Assurance/Quality Control

Project Controls Group

GAI has established a Project Controls Group to monitor cost and manage reporting in our Energy Business Unit. GAI has several systems used by project managers to monitor and control projects. GAI costs, invoicing, and procurement functions are managed using our Deltek enterprise software system. Scheduling is performed using either Microsoft Project or Primavera P6, depending upon project complexity and/or client preference. GAI utilizes the Newforma Project Information Management software for document management and file transfers. GAI also has developed project management templates for typical project management activities, such as documenting meetings, telephone conversations, and scope changes.

Quality Management System

GAI understands the importance of providing our clients with on-time, cost-effective, high-quality professional services. The continued success of our firm is directly related to our ability to continue to meet the cost, quality, and schedule requirements of our projects. We achieve this goal through our experienced professional staff and by utilizing our Quality Management System (QMS). GAI's QMS is based upon a continuously improving project delivery strategy that reflects our client's needs and utilizes current technology. The Project Delivery System provides the quality assurance (QA) and quality control (QC) functions from project inception through project closeout. The Project Delivery System incorporates processes and procedures that describe how professional services are planned, executed, checked, verified, and delivered to our clients. The system is flexible so that it allows GAI to meet the needs of individual clients. **Mr. David J. Bevilacqua, GAI's Project Advisor, will review all work products for consistency with GAI's QA Manual.**

Invoice Management

To track and manage the Project budgets, GAI proposes to use a Cost Tracking Spreadsheet. GAI will update the Cost Tracking Spreadsheet on a weekly basis, which includes the earned value for each task, approved change order amounts, current invoice amount, amount invoiced to date, remaining amounts approved, and physical percent complete.

To manage and document the Projects' scope, if activities are determined to be required that are not part of this scope (change orders), GAI will provide work plans to the WVDA to be approved. GAI will incorporate these change orders into the Cost Tracking Spreadsheet as they are approved. GAI's proposed weekly conference calls will include a review of the Project budget and change orders, as needed.

GAI will not prepare any change orders unless authorized by the WVDA.

Data Management

GAI will store digital information on corporate servers, including Microsoft Office documents, AutoCAD drawing files, GIS shape files, and PDF documents. GAI will provide a means to share large files with the WVDA through the use of a password protected FX site or by providing direct links to files on the server through the use of GAI's Newforma or SharePoint System. Hard copies may also be stored in GAI's library for future reference.

Project Closure

As standard protocol for this Project, our daily work logs, digital files, and technical information are collected through daily activities. This information is shared with the GAI Team, and at the closure of the Project, and can be provided to the WVDA for facilities records.

Cost Control

Before the start of each new project, the Project Manager must fill out a Project Plan, which includes a Project Description, Scope, Client Team, GAI Team, Contract History, Proposal/Supplement History, a detailed Scope of Work from the GAI Proposal, which details each task, and a Project Schedule with Milestone Dates.

GAI uses Primavera P6 for critical method scheduling and Deltek Vision 7.6 for Cost Reporting. These programs track deliverables and costing and keep the project on time and on budget. Scope and budget must be agreed to prior to the task budget entry in Deltek. The Task Budget creation is the end result of the development and distribution of final scope, fee, budget, and schedule with the Project Team. The Task Budget establishes the base line to monitor and measure project progress and financial performance. Task Budget creation includes: Obtaining external scope, budget, schedule, and fee commitments; and distribution of labor, subconsultant/subcontractor fees, and direct expenses for the purposes of establishing baseline or supplemental task budgets using the Deltek Project Planning Module. The baseline schedule is then updated on a periodic basis, typically weekly or monthly, depending on the pace of the project.

GAI runs a weekly cost report to monitor the actual spend rates compared to the planned spend rates, specifically focusing on man-hours and large purchases. GAI tracks milestones against the project schedule and any variance is noted and discussed with the Client Project Manager. GAI also tracks "Estimate at Completion" and "Estimate to Completion" for projects. GAI implements a change control process that monitors scope and initiates client contact if out-of-scope items are identified or if scope creep begins to occur.

Key Project Personnel

The GAI Team has extensive experience in electrical engineering service upgrade projects. This section presents our key staff biographies and their areas of experience, specialization, and responsibilities for this Project. Our experience encompasses designing electrical systems, power distribution systems, lighting, fire alarm telecommunication, security settings, emergency generators, and emergency power systems. Our staff are also experienced in providing electrical inspection, construction administration, commissioning, power system studies, harmonic analysis, short circuit, voltage drop calculations, arc flash and load flow analysis, relay coordination, power factor correction, and protective device coordination. Our key staff have over 20 years of experience in related projects. Additionally, we have the ability to pull from over 500 engineering and technical personnel from our WV and Western PA offices for this Project. A Project Organizational Chart and Key Personnel Resumes are provided in **Appendix A**.

Steven E. Schroth, MBA, PE - Project Manager

Mr. Schroth is GAI's proposed Project Manager with over 30 years of electrical engineering experience. He is a licensed Professional Engineer (PE) in WV, PA, Ohio, Georgia, Vermont, Wisconsin, Rhode Island, Maine, and Nevada, and has provided project management for numerous projects involving electrical design, including industrial and commercial facilities, WWTPs, hospitals, universities, commercial office buildings, and laboratories. Mr. Schroth's experience includes designing electrical systems, power distribution systems, fire alarm telecommunication, and emergency power systems. He has performed power system studies, harmonic analysis, short circuit, voltage drop calculations, arc flash, and load flow analysis, relay coordination, power factor correction, as well as the protective device coordination, and determined the device settings for the AC and DC power distribution systems. Mr. Schroth received his MBA from Robert Morris University; and his BS in Electrical Engineering from Pennsylvania State University.

Matthew T. Tanner, PE - Local Contact and Support Services

Mr. Tanner is GAI's proposed Local Contact, and will provide Support Services to WVDA pursuant to this Project. Mr. Tanner works out of GAI's Charleston, WV office and is a registered PE in WV, PA, Tennessee, Illinois, and Missouri. He has worked on projects for a wide range of clients from municipal and state government organizations to large and small corporations. His experience includes, but is not limited to: meeting with clients and contractors, scheduling of project personnel, management of project tasks, conducting site investigations, permitting, system design, development of construction drawings and specifications, QA/QC reviews, and construction management. Mr. Tanner received his BS in Engineering Mechanics from Lipscomb University.

Dayne D. Volz, EIT - Task Manager, Electrical Engineering Lead, and Construction Administration

Mr. Volz is GAI's proposed Task Manager, Electrical Engineering Lead, and will be charged with providing Construction Administration Services for this Project. He is registered EIT with 27 years of experience and extensive knowledge in electrical engineering design, communication, and security design, project management, and construction administration services. His experience as an electrical engineer includes: the design of lighting, power, communication, computer, fire alarm, security systems, emergency generators, electrical inspection, and commissioning. Mr. Volz is proficient in Autodesk's AutoCAD and Revit as well as Hubbell Lighting's LitePro 2.0 for lighting design analysis. He also has extensive knowledge of the National Electrical Code. Mr. Volz received his BS in Electrical and Electronics Engineering from Geneva College.

Jeffrey G. Blum - Electrical Engineering Support

Mr. Blum will provide Electrical Engineering Support for this Project. He is an Assistant Electrical Technical Leader with GAI with over 40 years of experience specializing in electrical engineering and electrical instrumentation and control system analysis and design. Mr. Blum is proficient in numerous electronic hardware systems; PLC systems; networks; software languages, and software. His project experience includes working as the electrical engineer for the Anthony Correctional Facility Project located in Greenbrier County, WV. He was also the electrical engineer for the Capitol Complex Electrical Infrastructure Renovation for the State of South Carolina (SC). Mr. Blum received his BS in Electrical Engineering from the University of Pittsburgh.

Alvin E. Radeshak, Jr. - Senior Lead Project Designer

Mr. Radeshak is GAI's proposed Senior Lead Project Designer for this Project. He specializes in electrical design with extensive experience in control system design for the metals, waste water, steel, and chemicals industries on specific client requirements and major turnkey projects. His design work covers customized and very specialized equipment, including control and power schematic design, low and medium voltage systems, motor control for both AC and DC drives, PLC control from various manufacturers, I/O interface analog, and digital. Mr. Radeshak develops MCC layouts with modified and special configurations, PLC panel arrangements, conduit and cable schedules, interconnection and system block diagrams, conduit arrangement both above and embedded, lighting, and HVAC and fire protection systems and grounding. He is proficient with AutoCAD and familiar with NEC, IEC, IEEE, and NEMA standards. Mr. Radeshak received his AA in Electrical Design and Drafting from Triangle Tech.

David J. Bevilacqua - Project Advisor

Mr. Bevilacqua is an Assistant Vice President with GAI and leads the Nuclear and Industry Market Sector. In this role he leads engineering and design efforts for small and large scale maintenance, operation and capital projects for our clients. Mr. Bevilacqua specializes in engineering and construction management as well as program and project management, primarily for government, industrial, and power generation facilities. He has 35 years of broad experience managing engineering and construction projects for nuclear, fossil, and renewable power plants. He has also provided engineering and program management for industrial facilities. Mr. Bevilacqua received his MBA from Point Park University; and his BS in Mechanical Engineering from the University of Pittsburgh.

Relevant Project Experience

GAI works on various projects for numerous clients and many of our projects are confidential in nature; therefore, we have reflected this confidentiality in our confidential projects by not giving out project names, locations, and confidential client information. If deemed essential, GAI may be able to discuss with our respective clients with whom there are confidentiality obligations and request written permission to make further disclosure.

Anthony Correctional Facility - WV Division of Corrections

Greenbrier County, WV

The Anthony Correctional Center Sewage Treatment Plant is an extended aeration/activated sludge treatment system permitted to discharge 20,000 gallons per day. The plant was issued a notice of non-compliance with WVDEP guidelines and regulations for wastewater treatment facilities. GAI was asked to assist the WV Division of Corrections (DOC) in achieving compliance at the sewage treatment plant. GAI developed a compliance strategy and schedule to bring the facility back into compliance with WVDEP guidelines and regulations. On behalf of the DOC, GAI submitted a compliance plan and schedule to the WVDEP. GAI prepared an Engineering Report that included recommendations to install new equipment, including: installation of a back-up power supply; electrical, instrumentation, and control improvements; lift station pumps, primary screening equipment, flow and analytical monitoring devices, and surge tank pump repair/replacement.

GAI prepared complete "bid" ready construction plans, specifications, and pertinent documents at suitable scale for all items described above, including demolition of existing features to be removed, civil plans, and permit drawings at 60 percent, 90 percent, and 100 percent. The final design documents (100 percent) consisted of Contract Specifications and Contract Drawings ready to be publicly advertised for bidding by qualified construction contractors.

GAI also provided scheduled administrative and field construction services, as well as Requests for Information and Requests for Deviations from the specifications. GAI conducted a final punch list review of the completed project and prepared a letter, along with corresponding construction documents to the WVDEP upon substantial completion of construction. GAI also prepared recordkeeping forms, and maintenance and operating procedures to be used at the facility.

Capitol Complex Electrical Infrastructure Renovation - State of SC

Columbia, SC

GAI provided a conceptual design and Opinion of Probable Cost for the State of SC's Capitol Complex Electrical Infrastructure Renovation Project, located in Columbia, SC. This project included eight buildings with electric service which configured in loop which feeds existing pad mounted or secondary unit substation transformers with associated switchgear. The voltage was an antiquated standard that was no longer widely supported by manufacturers of electric equipment, making the availability of parts and components scarce or relegated to the custom or refurbished market. This lack of support and readily available equipment created difficulties in maintenance and could render a building or buildings entirely without power if one of the transformers were to fail. Therefore, updating the service and equipment to a modern standard primary voltage service, which is available locally, was necessary to provide ongoing reliable electric service to the Capitol Complex.

GAI conducted a study that included a site investigation; equipment investigation through the local utility, and equipment manufacturers; consideration of installation and demolition issues, including evaluation of the structures that are to support the equipment; equipment sizing commensurate with measured load conditions at the buildings; environmental and equipment disposal considerations; logistics of installation and removal of equipment; location of new service equipment; future maintenance costs and options; and an overall Opinion of Probable Costs to replace the existing equipment.

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Full-Service U.S. Government Facilities Engineering Program

Multiple Locations, U.S.

GAI has completed the two base years and is currently in year two of our additional three year option of an ongoing facilities engineering program for a Confidential U.S. Government Facility. The facility includes over 50 buildings. GAI provides facilities planning and design engineering services for building and campus expansion, demolition, and modification projects. GAI is performing all aspects of the work, including: permitting, environmental, planning, design, drafting, surveying, cost estimating, safety analysis, energy-related studies, building and site investigations, life-cycle cost analysis, engineering reports, construction management, and preparing construction specifications for design-build. Building sizes range from 5,000 SF to 50,000 SF. Type of buildings include office/computer space, security, library, cafeteria, laboratory, and other commercial, and industrial space.

Electrical Engineering Project Examples:

Design Support for Retrofit of Existing Facilities

GAI provided conceptual and final design support for the retrofit of several existing facilities. Systems involved in these retrofits included office and task-specific lighting systems, low-voltage branch circuit distribution, classified and unclassified telecommunications systems, grounding systems, lightning protection systems, security, fire alarm, and mass notification systems.

Design Support for Lab Spaces and Facilities

GAI provided conceptual and final design support for the installation/modification/retrofit of lab spaces and facilities. General lab services provided include specialized process specific instrumentation and controls; medium and low voltage AC power distribution systems; DC power distribution systems less than 1,000 volts; specification and design of custom electrical distribution equipment transformers, load interrupter switches, starters, and load banks; preparation of system continuity plans; decommissioning and removal of legacy equipment systems and infrastructure; general space and specialized task lighting systems; classified and unclassified telecommunications systems; grounding systems; lightning protection systems; and the implementation and integration of several "black box" type government furnished specialized equipment systems with typical campus-type building infrastructure systems using military specifications and other specialty (excessive sustained temperature, etc.) type cables.

Decommissioning

GAI provided support of several facility and system decommissioning activities, including retrofit of existing facility lighting with new energy efficient LED type luminaires.

Allegheny County Sanitary Authority Demineralization Project

Pittsburgh, PA

GAI provided engineering services for the Allegheny County Sanitary Authority (ALCOSAN) WWTP, which runs at 225 million gallons per day at full capacity. GAI provided electrical and instrumentation, mechanical, structural, and chemical engineering design and consulting services for an upgrade of the existing Demineralization System at the ALCOSAN WWTP. The project required an evaluation of the existing ion exchange system providing make-up to its boiler system. Evaluation consisted of existing and future needs analysis, alternative technologies, and demolition and installation coordination. Tasks consisted of the following:

- Investigation and Evaluation - Investigation of existing system and understanding of what are ALCOSAN's current requirements for the system;
- Basis of Design Report - Evaluate using WWTP effluent as a feed source for the demineralizer, compare this against the option of using city water as a feed for the demineralizer; Size the system for ALCOSAN's needs as a design basis;
- Refurbishment vs Replacement Evaluation - After the mechanical investigation, an evaluation of using existing structures and equipment vs. fabricating new equipment will be carried out;
- Final Bid Specifications and Bid Assistance - A fully designed bid specification along with an Engineers Opinion of Probable Cost will be issued; and
- Construction Oversight.

Uptown District Energy Center Engineering Services - NRG Energy, Inc.

Pittsburgh, PA

GAI is providing Engineering, Permitting, Construction Monitoring, and Scheduling Support for the NRG Energy, Inc. Uptown District Energy Center, which is located in the City of Pittsburgh, Allegheny County, PA. The new Uptown District Energy Center is a district heating and cooling facility that will deliver steam, chilled water, and backup power to the University of Pittsburgh Medical Center, Mercy Hospital, and future customers, in an inner-city environment with higher efficiency, lower carbon emissions, and lower capital and operating costs compared to multiple stand-alone systems.

The new Uptown District Energy Center will provide reliable, resilient, and efficient energy services, producing district energy which will allow the University of Pittsburgh Medical Center's Mercy Hospital to focus resources on its primary mission of health care. GAI's Tasks included: Electrical Engineering, Mechanical Engineering, Structural Analysis, Pipe Stress Analysis, Property Investigation and Existing Conditions Survey, Building Location Stakeout, Landscape and Bicycle/Automobile Parking Plan, Permitting Support, and Project Management and Schedule Support.

Water Intake Structure Project

U.S.

Due to declining water levels, GAI is assisting in the relocation of an existing water intake structure to allow the intake piping to reach a deeper part of the lake. This includes extending the existing truss which supports the pumping equipment above the surface of the lake, as well as replacing or relocating the electrical and mechanical components of the intake. Many unique design considerations have arisen during the course of this project, including analysis of and design for a nearby active fault line. GAI is also coordinating with the original constructor of the truss regarding methods of construction, schedule, and cost. GAI personnel are reviewing the Power System and Load Flow Studies for this project.

Electrical design to support the new and relocated pumping equipment and associated connections to the power supply and controls includes the following:

- two 800 horsepower (HP) pump motors;
- addition of two 1,500 HP or two 1,700 HP motors;
- electrical control equipment enclosures within the pump house for valve operation to be relocated to truss extension;
- replace control terminal cabinet and extend control wiring to end of new truss extension;
- new pump house lighting;
- power feed for pump house crane;
- new lighting for pump house lower deck (valve location);
- new/modified switchgear within the intake control house;
- vibration detection;
- supervisory control and data acquisition control updates (identify but not program).
- ancillary items, including the pump house lighting, instrumentation and control updates and features will be included in the final design; and
- drawing package to include but not limited to Single Line, Conduit and Cable Schedule, Lightning and Grounding Protection Plan, Lighting Plan, Underground duct bank design, Conduit Plan, PLC Cabinet Layout, and I/O Wiring Schematics.

After the main equipment and layout is set multiple analyses to evaluate the existing system's ability to power the proposed equipment. GAI performed the following studies:

- Load Flow Study and Motor Starting Analysis;
- Coordination and Protection Study; and
- Existing Switchgear Battery Calculation.

Wastewater Treatment Facilities Engineering Project

Maryland

GAI provided Electrical Engineering, Water/Wastewater Process, Geotechnical Engineering, Structural Engineering, Mechanical Engineering, and Civil Engineering Services at a Confidential Generating Station for the installation and incorporation of Membrane Bioreactor (MBR) of modular wastewater treatment systems for two separate Power Stations. The project required a Contractor's Performance Specification and Construction Documents for the supply and installation of the treatment systems and a pre-engineered metal building to house all associated new equipment.

One MBR system and building was installed at each Station. The Contractor's Performance Specification and Construction Documents included specifications for the building; finalization of the general arrangement of the process equipment within the building; and the required specifications for mechanical and electrical equipment.

Highlights of the work performed by GAI included:

1. design, construction drawings, and specifications for the foundation and building;
2. building interior heating for freeze protection, ventilation, fire protection and detection and space conditioning of the electrical equipment room;
3. grounding for systems and equipment, Motor Control Center;
4. process flow diagrams, piping and instrumentation diagrams, and process narratives;
5. site investigative soil borings;
6. site and grading plan, access roads, erosion and sedimentation control plan, and topographical survey;
7. bidding services: evaluating bids, estimating cost range; and
8. construction phase services.

Health and Safety

GAI believes all employees should go home in the evening just as healthy and safe as they were when they arrived in the morning. GAI is committed to a culture of safety. At GAI, project tasks are completed in accordance with all applicable state and federal regulatory requirements including Occupational Health and Safety Administration (OSHA) standards, client-specific health and safety requirements, and GAI policies and procedures. GAI employees are provided health and safety training as needed, particularly OSHA 10-hour and 30-hour construction awareness and/or SafeLand Training. New employees are introduced to GAI Health and Safety policies during the new employee orientation. GAI also provides OSHA 40-hour HAZWOPER training and the eight-hour HAZWOPER refresher classes as needed.

Completing project tasks safely and without injury is an achievable goal for all involved. As such, GAI field staff begins and ends each day with a safety discussion. Field staff wear proper personal protective equipment, including reflective vests, hard hats, safety glasses, and safety footwear. Field teams are provided a site-specific Health and Safety Plan before performing field activities.

Ms. Pamela J. Walaski, CSP, CHMM, is GAI's Director of Health and Safety with over 20 years of experience providing health and safety support. Ms. Walaski specializes in conducting safety and health management system assessments that assist organizations in improving bottom line performance, and assists with policy and procedure development and implementation. Ms. Walaski is skilled in risk management identification, evaluation, and treatment, OSHMS design, implementation and auditing; and training for curriculum development, implementation, and auditing.

Product Quality Assurance

GAI understands the importance of providing our clients with on-time, cost-effective, high-quality professional services. The continued success of our firm is directly related to our ability to continue to meet the cost, quality, and schedule requirements of our projects. We achieve this goal through our experienced professional staff and by utilizing our QMS. GAI's QMS is based upon a continuously improving project delivery strategy that reflects our client's needs and utilizes current technology. The Project Delivery System provides the QA and QC functions from project inception through project closeout. The Project Delivery System incorporates processes and procedures that describe how professional services are planned, executed, checked, verified, and delivered to our clients. The system is flexible so that it allows GAI to meet the needs of individual clients.

GAI is structured so that personnel whose function includes activities affecting quality have the necessary authority and organization freedom to control quality and especially to do the following: 1) initiate action to prevent occurrence of any nonconformance relating to service, process, and/or QMS; 2) Identify and record any service, process, and/or QMS problems; 3) Initiate, recommend, or provide solutions to those problems; 4) Verify the implementation of those solutions; and 5) Limit or control further processing or delivery of nonconforming services or deliverables until nonconforming conditions have been resolved; and implement corrective action to eliminate the causes of quality problems.

GAI's QMS verifies that activities which affect the quality of services are performed in a controlled manner and are documented to provide evidence of conformance to specified requirements. The Scope of the QMS includes project management, engineering, consulting, analysis, design, testing, construction monitoring, inspection, and purchasing.

Mr. Bradley F. Cellier, PE, is GAI's Director of Quality. He specializes in QMS maintenance and development, and has over 25 years of experience in engineering and QA. He is responsible for overseeing the corporate-wide QMS and QA Programs, including the ongoing implementation, success, development, and verification of compliance with the QMS initiative and GAI's QA Program.

Supplemental Information

WVDA Signed Forms

Pursuant to the EOI, GAI has provided the following signed forms, attached and incorporated as part of this submission, as **Appendix B**:

- EOI Cover Page;
- Designated Contact;
- Addendum Acknowledgement Form; and
- State of West Virginia Purchasing Affidavit.

Certificate of Authorization

GAI's Certificate of Authorization to perform Professional Engineering services in the State of WV, is provided in **Appendix C**.

GAI's license number is C00208-00.

Supplemental Services

GAI is a full-service consulting engineering company. In addition to the services we are proposing to provide for the base scope of work, GAI has extensive mechanical, geotechnical, structural, civil, and environmental capabilities and experience. Please see **Appendix D** for select GAI Service Briefs for supplemental services that we have to offer for this important Project.

Closing

We look forward to working with the WVDA on this important Project. Should you have any questions or require additional information regarding our EOI, please feel free to contact Mr. Steven E. Schroth at 412.399.5613 or via email at S.Schroth@gaiconsultants.com.

Sincerely,
GAI Consultants, Inc.

Steven E. Schroth
Steven E. Schroth, MBA, PE
Electrical Technical Leader

David J. Bevilacqua, MBA
Assistant Vice President

SES:DJB/gmg/mdw

Attachments: Appendix A (Project Organizational Chart and Key Personnel Resumes), Appendix B (WVDA Signed Forms), Appendix C (Certificate of Authorization), and Appendix D (GAI Service Briefs)

APPENDIX A
Project Organizational Chart and Key Personnel Resumes

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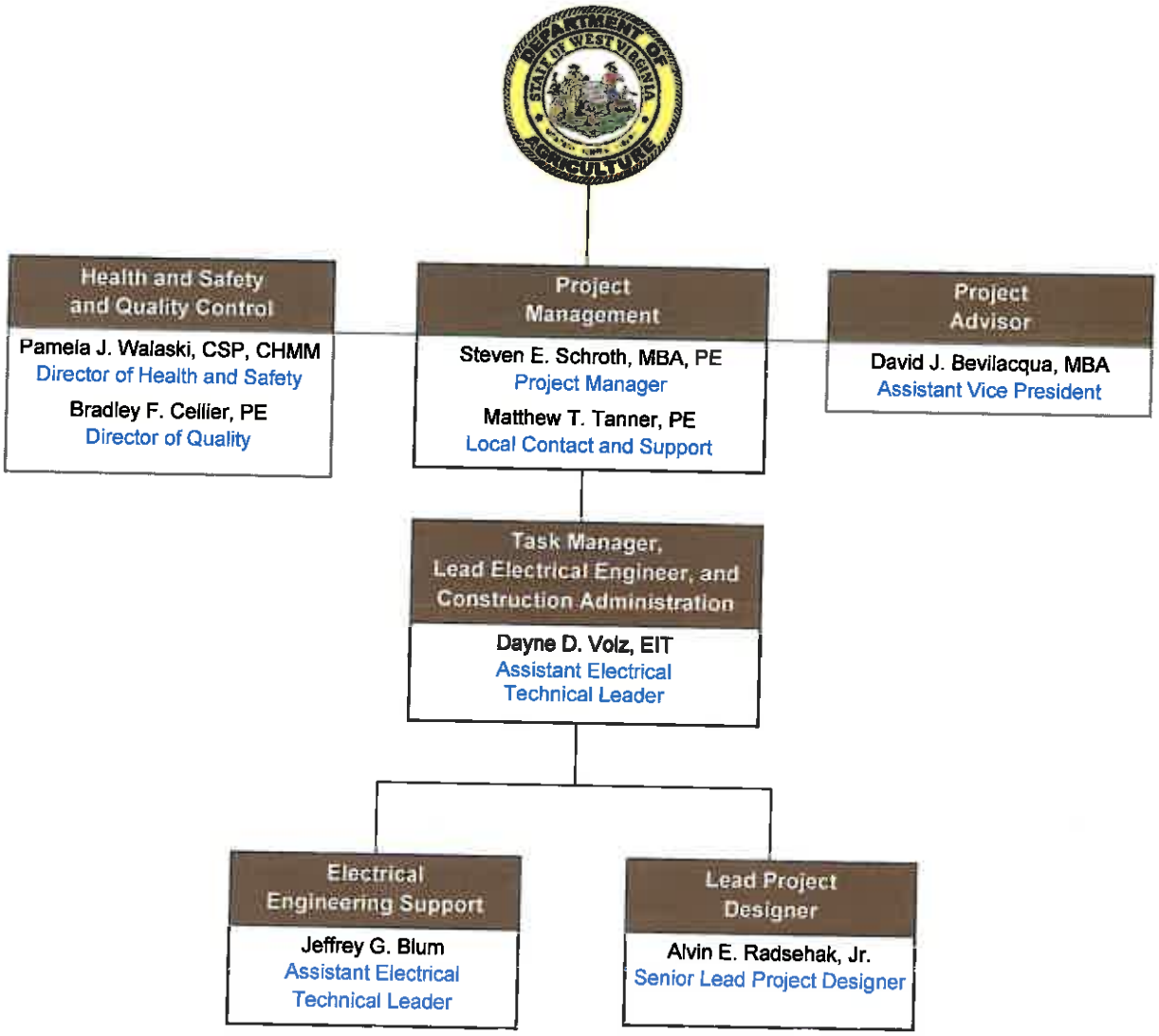
PROJECT ORGANIZATIONAL CHART



Steven E. Schroth, MBA, PE

Project Manager / Electrical Technical Leader

Education

MBA, Management, Robert Morris University

BS, Electrical Engineering – Power Emphasis, Penn State University

Registrations

Professional Engineer (PE): WV, PA, OH, GA, VT, RI, ME, WI, NV

Skills

Electrical Engineering

Project Management

Industry Experience

GAI Consultants, Inc., 2017-Present

Eaton Corporation, 2015-2017

Schneider Electrics/Square D, 2008-2015

Bombardier Transportation, 2005-2008

H.F. Lenz Company, 2002-2005

Burt Hill Kosar Rittelmann Associates, 2000-2002

Duquesne Light Co., 1997-2000

Strategic Energy Ltd., 1994-1996

Galletta Engineering Corp, 1992-1993

Centerline Engineering Corp., 1989-1992

Westinghouse Electric Corp., 1987-1989

Professional Summary

Mr. Schroth is an Electrical Technical Leader with GAI with over 28 years of experience specializing in project management and electrical engineering. He is a licensed Professional Engineer (PE) in WV, PA, OH, GA, VT, RI, ME, WI, and NV, and has performed studies and design for numerous industrial and commercial facilities, including wastewater treatment plants, hospitals, school, commercial office buildings, and laboratories. Mr. Schroth's experience includes designing electrical systems, power distribution systems, fire alarm and telecommunication systems, and emergency power systems. He has performed power system studies, harmonic analysis, short circuit, voltage drop calculations, arc flash, and load flow analysis, relay coordination, power factor correction, as well as the protective device coordination, and determined device settings for the AC and DC power distribution systems. Additionally, he is proficient in SKM, ETAP, EasyPower, Micro Station, and AutoCAD.

Select Professional Experience

- Full Service Facilities Engineering Program, located in United States. Electrical Technical Leader. GAI is providing facilities planning and design engineering services for building and campus expansion, demolition, and modification projects. Mr. Schroth's responsibilities include: facilities electrical upgrades, laboratory instrumentation and control systems, networking cabling, fire protection systems, and computer electrical systems. Building sizes range from 5,000 SF to 50,000 SF. Type of buildings include office/computer space, security, library, cafeteria, laboratories, and firing range.
- Intake Structure Modifications for a Confidential Client located in Nevada. Lead Electrical Engineer. GAI assisted our client in the evaluation of options to extend intake piping approximately 80 feet further into a lake. GAI conducted a site visit to make observations and take photographs of the existing intake facility and developed cost estimates based on preliminary structural and geotechnical calculations. The services were provided to support development of a preliminary professional opinion and recommendation(s) relative to a preferred option, based on available reference information. Mr. Schroth's responsibilities included reviewing drawings and the Power System and Load Flow Studies.

- K&L Gates Building Arc Flash Study, located in Pittsburgh, Pennsylvania. Senior Power Systems Engineer. Performed short circuit, device coordination and arc flash study for a large commercial office building. Performed detailed data collection on site and provided arc flash training to the customer. Provided arc flash labels and installed them at each piece of electrical equipment on site.
- Veterans Administration Hospital Arc Flash Study, located in Long Island, New York. Senior Power System Engineer. Performed short circuit device coordination and arc flash study for a large Veterans Administration Hospital. Performed detailed data collection on site and provided arc flash training to the customer. Provided arc flash labels and installed them at each piece of electrical equipment on site.
- UPMC Animal Research Laboratory, located in Pittsburgh, Pennsylvania. Electrical Design Engineer. Responsible for designing power distribution, fire alarm, telecommunication, and emergency power systems. Provided drawings and specifications to the contractor. Performed field data collection and construction engineering support. Met with the client to review project requirements and kept the client informed of any design changes.
- Wheeling Hospital, located in Wheeling, West Virginia. Electrical Design Engineer. Performed power distribution system design for an emergency power system upgrade. Provided pre-bidding and post-bidding engineering support. Provided construction management in dealing with contractor Requests for Information. Performed a post-installation checklist to determine any electrical construction issues.
- Pennsylvania State University, University Park, Pennsylvania, Power System Studies. Lead Electrical Engineer performing power system studies for PSU's Main Campus. He performed short circuit, device coordination, and arc flash studies.
- David L. Lawrence Convention Center, Pittsburgh, Pennsylvania. Lead Electrical Engineer responsible for guiding an Electrical Contractor to perform data collection for the purposes of performing a Power System Study that included a short circuit device coordination and arc flash study.
- Responsible for performing power systems studies on various industrial, commercial, healthcare, data centers, wastewater treatment facilities, colleges and universities, K-12 schools and numerous governmental facilities. His studies included short circuit, protective device coordination including ground fault, arc flash, and reliability analysis. He supervised and performed data collection for the purposes of arc flash analysis as well as risk assessments. He also created one line diagrams and performed electrical power system risk assessments to determine the probability of crucial electrical system failures.
- Responsible for the power distribution system design for various electric transportation systems. He also performed harmonics, short circuit, voltage drop, arc flash and load flow analysis as well as the protective device coordination and determined the device settings for the AC and DC power distribution systems.
- Responsible for the design of electrical systems including lighting, fire detection, telecommunications, and emergency power for commercial, institutional and health care facilities. He performed power systems studies including short circuit, load flow, voltage drop, power factor correction and harmonic analysis for various types of facilities.
- Developed an internet-based system where commercial and industrial customers could monitor their electricity consumption and track electricity costs at their location. He also developed a real time system where customers could control their electricity demand through an internet based communications link. Additionally, he developed new products and services that helped to position Duquesne Light as a progressive growth utility.
- Performed a power systems study for a major northeast Ohio steel manufacturer that included a short circuit, power flow, relay coordination, power factor correction and harmonics analysis.
- Designed power distribution systems for various large metals producing companies and designed lighting systems. He also prepared specifications for Motor Control Centers. He also prepared single-line diagrams and ladder logic diagrams.

Matthew T. Tanner, PE

WVDA Local Contact and Support Services / Senior Project Engineer

Education

BS, Engineering Mechanics, 2005, Lipscomb University

Skills

Water and Wastewater System Design

Water, Wastewater, Stormwater Permitting

Registrations

Professional Engineer (PE): WV #019324, TN #114516, IL #062069174, MO #2017001512

Industry Experience

Littlejohn Engineering Associates, 2010-2011

E. Roberts Alley & Associates, 2007-2010

James + Associates, Inc., 2006-2007

Professional Summary

Mr. Tanner specializes in the design various structures for municipal and industrial applications. He has worked on projects for a wide range of clients from municipal and state government organizations to large and small corporations. His experience includes, but is not limited to: meeting with clients and contractors, scheduling of project personnel, management of project tasks, conducting site investigations, water and wastewater treatability studies, permitting, system design, development of construction drawings and specifications, Quality Assurance/Quality Control (QA/QC) reviews, and construction management.

Select Professional Experience

- Anthony Correctional Facility Wastewater Treatment Plant Modifications, for Silling Associates in Neola, West Virginia (WV). Review and development of design drawings. Performed site visit to collect information. Participated in meetings with client and contractors.
- Edgewood Elementary Site Package for ZMM in Charleston, WV. Developed responses to comments from regulatory agencies and utilities regarding proposed water and wastewater lines.
- Natural Gas Compressor Station site design for Confidential Client in Wetzel County, West Virginia. Project responsibilities included: scheduling and coordination of design staff; conducting site visits; conference calls with client personnel; review and development of design drawings, hydraulic and hydrologic calculations and stormwater pollution prevention plan; and WVDEP construction stormwater permit application preparation and submittal.
- Natural Gas Compressor Station site design of two facilities for Confidential Client in Wetzel County, West Virginia and Monroe County, Ohio. Project responsibilities included: scheduling and coordination of design staff; conducting site visits; conference calls with client personnel; review and development of design drawings, hydraulic and hydrologic calculations and stormwater pollution prevention plan; and WVDEP construction stormwater permit application preparation and submittal.

- Natural Gas Well Pad Design for Confidential Client at more than 20 proposed locations throughout Eastern Ohio (OH). Project responsibilities involved day to day management related to natural gas well pad designs including: scheduling and coordination of designers and surveyors, meeting with client personnel, QA/QC review and development of design drawings, and contacting clients for submittals and information requests.
- Natural Gas Freshwater Impoundment Design for Confidential Client at two proposed locations in Eastern Ohio. Project responsibilities involved day to day management related to natural gas well pad designs including: scheduling and coordination of designers and surveyors, meeting with client personnel, QA/QC review and development of design drawings, and contacting clients for submittals and information requests.
- Natural Gas Pipeline Design for Confidential Client at two locations in Southeastern Ohio. Project responsibilities involved day to day management related to natural gas pipeline design including: scheduling and coordination of surveyors, QA/QC review and development of Construction Alignment Sheets, and contacting clients for submittals and information requests.
- Nestle Waters North America, Red Boiling Springs, Tennessee (TN). Project involved evaluation of the wastewater system at the facility's Continuous Microfiltration building. Project also included evaluation of existing system and preparation of engineering report recommending modification to allow for reduced operator involvement.
- American Cast Iron Pipe Company, Birmingham, Alabama (AL). Project included performing a scaling index assessment and treatability study to explore treatment options for reducing scaling in the facility's cement water reuse system. As a part of the treatability study, the project included performing onsite settling tests, polymer dosing optimization, and evaluating the resulting sludge.
- JM Huber Corporation/CP Kelco, Okmulgee, Oklahoma (OK). Prepared a process feasibility evaluation for treatment alternatives, operational requirements, and capital and operational costs for the removal of potassium from facility process wastewater stream. Evaluations included, precipitation, ion exchange, and reverse osmosis evaluation.
- Whitlock Packaging Corporation, Fort Gibson, OK. Prepared a process modification evaluation for treatment requirements, operational requirements, and opinion of capital and operational costs to increase the production capacity of the facility's water treatment system. Evaluations included membrane filtration, ultraviolet disinfection, reverse osmosis treatment, and tank storage.
- Nuclear Fuel Services, Erwin, TN. Assisted in the design of a 140 GPM groundwater treatment system in a nuclear facility. Project involved process design, instrumentation, equipment selection, specifications, controls and piping. Reviewed and compared equipment specifications for quality control. Ordered equipment for construction and monitored shipment and delivery.
- Tennessee Mountain Springs, Hookers Bend, TN. Conducted a treatability study for bottling water at the Tennessee Mountain Springs Hookers Bend water source. Analysis of the effects of light and heat over time on odor and color. Preparation of a treatability report to outline the proposed treatment process. Design of a treatment system that would meet the required bottled water standards as well as the wishes of the client.
- Palmyra Health Care Center, Palmyra, TN. Preparation of engineering report for TN Department of Environment and Conservation (TDEC), outlining several options for the replacement of the facility's onsite wastewater treatment facility. Report included status of the current system and system descriptions, cost estimations, and site layouts for the proposed replacement options. Also assisted in the design and construction management of the replacement treatment system.
- TWRA Stones River Hunter Education Facility, Nashville, TN. Assisted in supervising construction of a building to house a classroom, material storage, and the facility office. Project included site inspection, review of contractor submittals, project progress meetings, completion of required state forms and documentation for validation required for contractor payment.

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Dayne D. Volz, EIT

Assistant Electrical Technical Leader

Education

BS, Electrical and Electronics Engineering, Geneva College, 1989

Registrations

Engineer-in-Training

Skills

Electrical Engineering Design

Construction Administration

Project Management

Power Distribution

Power Systems

Lighting Design

Commissioning

Alarm/Security Systems

Access Control

National Electrical Code

Industry Experience

GAI Consultants, 2017-Present

Mott MacDonald, Electrical Engineer, 2016

Hatch Mott MacDonald, Electrical Engineer, 2013-2016

Foreman Group, Electrical Engineer, 1989-2013

Professional Summary

Mr. Volz is an innovative electrical engineer with 28 years of experience and extensive knowledge in electrical, communication, and security design, project management, and construction administration. His experience as an electrical engineer includes: the design of lighting, power, communication, computer, fire alarm, security systems, emergency generators, electrical inspection, and commissioning. Mr. Volz is proficient in Autodesk's AutoCAD and Revit as well as Hubbell Lighting's LitePro 2.0 for lighting design analysis.

Select Professional Experience

- Ramp Services Improvements, Yeager Airport, Kanawha County, Charleston, West Virginia (WV). Mr. Volz was the electrical engineer responsible for providing electrical design for the upgrade/replacement of the main electrical service of the Terminal (existing landside electrical distribution system) and a new second electrical service for airside equipment electrical distribution system to be installed at the main facility as part of Ramp Services Improvement Project. Ramp Services Equipment included passenger boarding bridges (PBB), fixed ground power unites (FGP), and preconditioned air units (PCA) at 7 gates. Equipment electrical service was sized and designed for future apron equipment upgrades at seven additional gates and a circuit breaker for direct feed of Solar PV Site E (Parking Garage) inverter and net metering provided in the following Project.
- Solar Energy Facility Installation Project, Yeager Airport, Kanawha county, Charleston, WV. Mr. Volz was the electrical engineer responsible for providing design and support of the interconnection of Site E parking garage: one of three solar array sites at Yeager Airport. Providing electrical design for new garage lighting and electrical distribution system modifications required to facilitate installation of the new solar PV arrays at Site E parking garage. Included field observation services to review, assess, and document the existing garage lighting levels with a light meter. Existing structural and roofing conditions were also assessed and documented to provide detailed information for conduit roofing supports and attachments to walk-bridge to garage from terminal.

- Engineering Services for a Confidential Federal Client located in Allegheny County, PA. Mr. Volz is the Electrical Project Engineer for multidiscipline architectural/engineering and construction services in a campus-like setting. Project experience includes:
  - Conceptual and final design support for the retrofit of several existing facilities. Systems involved in these retrofits include office and task specific lighting systems, low-voltage branch circuit distribution, classified and unclassified telecommunications systems, grounding systems, lightning protection systems, security, fire alarm, and mass notification systems.
  - Conceptual and final design support for the installation/modification/retrofit of lab spaces and facilities. General lab services provided include specialized process specific instrumentation and controls; medium and low voltage AC power distribution systems; DC power distribution systems less than 1000V; specification and design of custom electrical distribution equipment transformers, load interrupter switches, starters, and load banks; preparation of system continuity plans; decommissioning and removal of legacy equipment systems and infrastructure; general space and specialized task lighting systems; classified and unclassified telecommunications systems; grounding systems; lightning protection systems; and the implementation and integration of several "black box" type government furnished specialized equipment systems with typical campus-type building infrastructure systems using military specification and other specialty (excessive sustained temperature, etc.) type cables.
  - Support of several facility and system decommissioning activities, including retrofit of existing facility lighting with new energy efficient LED type luminaires.
- CSO Rack 15 Storage Basin, City of Akron Department of Public Service, Akron, OH. Mr. Volz was the electrical engineer responsible for providing construction period services which included submittal review and preparation of responses to RFIs for Electrical, Process Integration, and Water & Wastewater Equipment for the project to provide combined sewage overflow (CSO) control by construction a storage basin between Rack 15 the Little Cuyahoga River. The proposed facilities include a storage basin, screening structure, flow meter and valve vaults, an operational building, electrical, instrumentation, mechanical equipment and supporting utilities.
- Tuscarora Tunnel Portal Buildings Inspection, Pennsylvania Turnpike Commission, PA. Mr. Volz was the electrical engineer responsible for providing field observation services to review, assess, and document the existing electrical systems conditions of the east and west portal buildings at the Tuscarora Tunnel to support the preparation of a long-term maintenance plan.
- Shumaker Public Safety Center – Commissioning, Harrisburg Area Community College, Harrisburg, PA. Mr. Volz was responsible for the commissioning services for the electrical systems, lighting, lighting controls, and fire alarm systems for HACC. The building consists of classrooms, a police and emergency responder command training center with control rooms, and a firing range.
- Wendover Middle School, Hempfield Area School District, PA. Mr. Volz was responsible for electrical, communications, security design, and construction administration services for a 120,000 SF existing middle school. The design included a complete renovation of the existing portion of the building and additions, consisting of a band room and a boiler room. The building construction was completed with extensive phasing using the auditorium as temporary classrooms during construction.
- North Dickinson Elementary School, Carlisle Area School District, Carlisle, PA. Mr. Volz was responsible for electrical, communications, security design and construction administration services for complete renovations and additions to a 43,000 SF elementary school. The design included lighting, lighting controls, VAV heating system, boilers, and chiller. Data network, television, telephone systems, security, CCTV Surveillance, and Card Access systems were also included. The building was designed with six (6) 120/240V/1PH/3W separate electrical services due to its rural location. Communications were a separate prime bid.

Jeffrey G. Blum
Assistant Electrical Technical Leader

Education

BS, Electrical Engineering
1993, University of Pittsburgh

AD, Electronics, 1974, Penn Technical Institute

Skills

Electrical Engineering

Electrical Instrumentation and Control System Analysis and Design

Electrical / Mechanical System Troubleshooting

Industry Experience

GAI Consultants, Inc., 2009-Present

HydoGenLLC, a Fuel Cell Company, 2006-2009

United States Steel, Mon Valley Works, 2002-2006

Bricmont, Inc. (Inductotherm Company), 1997-2002

ITT Technical Institute, 1994-1996

Westinghouse Electric Company, NATD/Advanced Energy Systems Division, Fuel Cell Test Facility, 1984-1992

Westinghouse Instrument Service Company, Nuclear Services Division, 1982-1984

General Electric Company, 1974-1981

Professional Summary

Mr. Blum specializes in electrical, electronic, and control systems engineering. He has extensive experience providing research, testing and development, and design for major manufacturing firms.

Mr. Blum is proficient of the following systems:

Hardware: IBMPC (MSDOS6.2, Microsoft Windows 3.11/95/98/NT/2000/XP/Vista), DEC VAXstation 3100 (VMS 5.1), and DEC DECstation (Ultrix 4.2)

PLC Systems: Allen Bradley PLC-5, SLC100,150,500, Control Logix Series Controllers, Siemens, Mitsubishi, TI, and Siemens S7,S5

Allen Bradley, Mitsubishi and Siemens Drives. Alstom DC Drives, and Fip Level 1 systems

Networks: DH+, Siemens, H1, TCP/IP, RSLinx, and Melsecnet

Software Languages: C, Assembly, FORTRAN, and BASIC

Software: P-Spice, Tutsum, Siglab, Monarch, MatLab Wonderware MMI, Intilution iFix, RSView32, RSView Supervisory Enterprise, Studio, Factory Link, and Altom Pilot

Select Professional Experience

- Anthony Correction Facility Sewage Treatment Plant Electrical Engineering Upgrade and Compliance, located in Greenbrier County, West Virginia (WV) for the West Virginia Division of Corrections. Lead Electrical Engineer. Responsible for an Engineering Report that included recommendations to install new equipment, including installation of a back-up power supply; electrical, instrumentation, and control pumps; flow and analytical monitoring devices; and primary screening equipment.
- Confidential Power Station, located in Winfield WV. Electrical Engineering Design of a Pump Station Control Building. Included the electrical and communications, electrical layout, replacement of all Schweitzer control hardware, all electrical drawings necessary, bill of materials, and vendor quotes.
- State Capital Complex in Columbia, South Carolina. Perform a feasibility study to replace the outdated 8320V power system that encompasses the State Office Complex of nine buildings with a new 23 kV loop system. Reviewed existing system and complexities of the switchover to a new power loop to be installed. Made recommendations on how to proceed with a probable cost estimate of removal of the old system and installation of the new system.

- Water Intake Structure Project, Nevada. Responsibilities included, Electrical systems for municipal water supply. Control systems for the operation of water distribution to pumping station.
- Exclusive five-year Government contract (Non-disclosure). Responsibilities include a wide range of projects, from facilities electrical upgrades, laboratory instrumentation and control systems, networking cabling, fire protection systems, and computer electrical systems.
- Confidential Power Plant, located in Pennsylvania (PA. Responsibilities included the review of electrical drawings, contract submittals for the acid mine drainage wastewater treatment plant project.
- Confidential Power Plant, located in PA. Industrial Wastewater Treatment dewatering project, and filtration system. Responsibilities included the electrical supply, instrumentation and Programmable Logic Controller (PLC) electrical layout for the operation of these systems.
- Confidential Power Station Haul Road Storm Water Equalization Pond. Electrical Design for 12 KV power systems from the scrubber area to equalization pond area, approximately 2,100 feet including the overhead and underground systems for this install. Layout, grounding, Bill of materials etc.
- Electrical and Control System Design for the Process Waste Stream Filtration System. This design included Motor Controls, Variable Frequency Drive (VFD) drives for pump and material handling, AC and DC wiring for instrumentation, power schematic diagrams and emergency power backup systems. Also Allen Bradley Control Logix PLC configuration including I/O for discrete and analog devices. Conduit and cable schedules. Interconnections and control panel arrangements. Bill of materials. I/O list development. Plant lighting local and area, grounding and protection of power distribution systems. Integration with local control system.
- Electrical/Control Systems Engineer for a coal ash leachate pumping system. Primary responsibilities were design and layout of two electrical controls buildings including Motor Control Center, VFD's, and Emerson Ovation Control System. Contractor submittal reviews along with vendor quotations for designed systems. This pipeline carried gathered liquid seepage from the landfill in two stations and pumped two+ miles for treatment.
- Electrical/Controls Engineering responsible for the controls design of the pH Control and Color Mitigation pumping system. This consisted of Panel layouts, instrumentation, conduit, and cable schedules, Bill of materials. Control Hardware and interfacing with the stations Distributed Control System (DCS) system. Also system startup and commissioning.
- Project engineer responsible for control system programming of the release valving, "pig catcher" system of 15-mile pipeline. Assisted in start-up and commissioning of the pipeline project, which included pumps, transmitters, VFD drives, control valves.
- Designed and programmed control systems software for industrial applications in the metals and emissions areas, using PLC's, VFD drives, and MMI application software and hardware. Responsible for installation and site commissioning after development of software at customer sites worldwide.
- Instructor in a post-High School Teaching Institute. Responsibilities: Presented analog and digital circuit theory and construction of these circuits in a laboratory setting to present their operating properties to the students as practice for true industry applications.
- Developed, tested, and serviced specialized robotic tooling equipment for sleeving and tube end repair on commercial nuclear power generators.
- General Electric Company. Responsibilities: Advised purchasing for the Advanced Lightweight Torpedo project. Performed automatic fault insertion testing for the Trident Submarine Fire Control System. System and software design for an IC analyzer based on a Tektronix component tester. Software design for the General Electric Training System.
- Research and development of Magneto-hydrodynamic Power. Repair, modifications and calibrations of combustors, coal handling systems, air compressors, water cooling systems, and control instrumentation.

gai consultants

Alvin E. Radeshak, Jr.

Senior Lead Project Designer

Education

AA, Electrical Design and Drafting, 1974
Triangle Tech

Skills

Electrical Instrumentation and Control System Analysis and Design

Certifications / Training

PID Analog and Instrumentation Control, 1999

PLC Control, Modicon and Allen-Bradley, 1978

Electrical Design, Westmoreland Vo-Tech, 1977

Continuing Education, Penn State New Kensington Campus, 1976

Industry Experience

GAI Consultants, Inc., 2012-Present

Vulcan International, Inc., 2004-2012

SD Engineers, 2004-2005

Vulcan Engineering Company, 1974-2003

Bechtel Power Corporation, 1974

Professional Summary

Mr. Radeshak specializes in electrical design with extensive experience in control system design for the metals, waste water, steel, and chemicals industries on specific client requirements and major turnkey projects. His design work covers customized and very specialized equipment, including control and power schematic design, low and medium voltage systems, motor control for both AC and DC drives, PLC control from various manufacturers, I/O interface analog, and digital.

Mr. Radeshak develops MCC layouts with modified and special configurations, PLC panel arrangements, conduit and cable schedules, interconnection and system block diagrams, conduit arrangement both above and embedded, lighting, and HVAC and fire protection systems and grounding. He is proficient with AutoCAD and familiar with NEC, IEC, IEEE, and NEMA standards.

Professional Experience

- Compressor Installation in Cheswick, Pennsylvania (PA). Designed feeder and instrumentation power and control for relocation of a new screw compressor system which entailed interfacing with the existing DCS system and alarm monitoring and new conduit arrangements and installation of high capacity switches and supports for field installation.
- Process Waste Stream Filtration Controls Project located in PA. Installation and design of VFD drives for pump and material handling, AC and DC control for instrumentation, power schematic diagrams and emergency backup systems. PLC configuration along with I/O diagrams for discrete and analog devices. Conduit and cable schedules custom designed with detail on cable sizes and all required information for material takeoff for the electrical contractor, interconnections and control panel arrangements and equipment layouts with bill of materials. I/O list development, conduits arrangements and detail along with data sheets. Plant lighting local and area, grounding and protection of power distribution systems.
- Allegheny County Sanitary Authority (ALCOSAN) Electrical Design for Demineralization Package. Designed electrical system, included new single line diagrams for motor controls, conduit and cable schedules and plant conduit arrangement drawings.

- Designed electrical system and pump controls for new pumping stations. Pump house control and equipment rooms which included control, PLC, HVAC, Lighting, Power distribution and communications. Embedded conduit installation, transformers and external instrumentation for pumping operation. AutoCAD design included single lines, circuit design, panel arrangements, building plan details, conduit and cable schedules, grounding and plan arrangements.
- Acid Mine Drainage (AMD) Treatment Plant. Responsible for designing single line diagrams, Motor control center arrangements, VFD drive power and control, Load flow studies, Motor schematic diagrams, interconnections, panel layout and details, conduit and cable schedules, conduit plan arrangements, lighting and grounding details, embedded conduits and equipment specifications and bill of materials.
- Installation of four new BOF oxygen lance cranes, custom wired, and field installed new 250vdc contractor panels, pushbutton stations and touch screen color monitors. Worked with plant programmers to develop software and screen designs.
- New Shroud mechanism with drive and controls for Burns Harbor in Chicago, Illinois (IL). AC variable speed drive panel along with remote PLC rack. Shop wired all solenoids and limit switches, pushbutton stations via power track to control panels.
- Multiple Rolling Mill and Vacuum Degassing System Projects for Nucor Steel. Lead CAD Designer. Design included all motor controls with complete PLC and hardwired system interface; all single lines, schematic diagrams, I/O discrete and instrumentation drawings, lighting, grounding, panel arrangements; conduit schedules, cable tray installation, and drawings; piping and instrumentation integrated with existing system for custom equipment in various applications of the steel and metals industry.
- Waste water treatment facility for Youngstown Sheet and Steel facility, designed all control panels and interfacing with pumps and necessary drives, instrumentation and control systems for a complete installation. Also generated budget and scope of work for the electrical contractors.
- Rolling mill equipment for Nucor Steel, this work consisted of power and control room arrangements for large multi section motor control centers, power transformers, and incoming main switchgear units. All I/O interfacing to remote located transmitters, and limit switches. 480vac motor control, cable and conduit arrangements, pull box and terminal box design, motor control with starter and variable speed drive operation with local and automated operator control, communication system, and fiber optic to various instruments. Incorporation of fire protection systems and alarm monitoring.
- Complete design and internal wiring of custom built control rooms with power and control sections. High temperature reflective glass along with under the floor wiring to control panels, lighting systems and closed circuit television.
- Automatic de slagging for furnace tap hole includes valve stands, hydraulic power units, PLC control for tracking furnace motion and schematic diagrams. System included encoders and resolvers for machine and furnace tracking.
- Dual desulfurization and temperature lance mechanisms, full voltage motor control with custom designed and built control panels, encoder and resolver feedback, local and automatic control.
- Slag retention system for Wuhan China hot metal steel facility, works and responsibilities included the project specifications, and design engineering for automated slag retention mechanism along with PLC control with entailed interfacing with new valve stands and the existing furnace controls.
- Automated bricking furnace reline tower, Power and control automation for transporting various size bricks along tracking conveyors which traveled and rotated at variable speeds to a matching dropping conveyor belt to deliver the bricks to operating personal. The drive system included PLC control along with various servo and motorized drives. Custom designed control panels and lift tables for providing the bricks to the reline tower.

David J. Bevilacqua, MBA

Project Advisor / Assistant Vice President

Education

MBA, Point Park University, 2017

BS, Mechanical Engineering, 1982, University of Pittsburgh

Skills

Mechanical Engineering

Electric Utility Management, Operations and Maintenance

Construction Management

Project / Program Management

Power Plant Infrastructure Operations, Studies, Design

Certifications / Training

Harvard Leadership Development Training, GAI Consultants 2014

Advanced Project Management Training, GAI Consultants 2014

Toshiba Generator School, Tokyo Japan

Effective Contract and Claims Administration for the Construction Owner, Watt, Teider, Hoffer & Fitzgerald

Antitrust Seminar and the Art of Negotiations, Condor Group

Mergers and Acquisitions – Darden School of Business, University of Virginia

Organic Growth for Development - Darden School of Business, University of Virginia

Industry Experience

GAI Consultants, Inc., 2013-Present

Westinghouse Electric Co., 2007-2013

Allegheny Energy (FirstEnergy), 1982-2006

Professional Summary

Mr. Bevilacqua leads the Nuclear and Industry Market Sector for GAI Consultants. In this role he leads engineering and design efforts for small and large scale maintenance, operation and capital projects for our clients. Mr. Bevilacqua specializes in engineering and construction management as well as program and project management, primarily for industrial and power generation facilities. He has more than 33 years of broad experience managing engineering and construction projects for nuclear, fossil and hydro generation power plants. He has also provided engineering and program management for industrial facilities.

Select Professional Experience

- Program Manager for a Confidential US Government Laboratory, Architect-Engineering Services Contract. GAI is providing engineering services in support of the Laboratory operations and facilities, including: mechanical, electrical, structural, piping, civil, permitting, and geotechnical engineering services for design and maintenance of facilities on the Laboratory Campus. Buildings range in size from 5,000 square feet to 50,000 square feet. Responsible for the overall contract administration and execution of over 60 projects performed under this contract. He interfaces with the client senior management to implement contract additions, deletions, and resolve any issues.
- Supervisor, NRG Uptown District Energy Center, located in Pittsburgh, Pennsylvania (PA), for NRG Energy. Project Manager responsible for client interface to define scope, schedule, and budget to assure design, permitting, and construction management assignments are completed in accordance with the project. He is the primary contact with client senior management, and he oversees design modifications, as requested by the client. The new Uptown District Energy Center will provide reliable, resilient, and efficient energy services, producing district energy which will allow UPMC Mercy Hospital to focus resources on its primary mission of health care. GAI's Tasks included: Electrical Engineering, Mechanical Engineering, Structural Analysis, Pipe Stress Analysis, Property Investigation and Existing Conditions Survey, Building Location Stakeout, Landscape and Bicycle/Automobile Parking Plan, and Project Management and Schedule Support.

- Supervisor, ALCOSAN Water Treatment Demineralizer Upgrade Project, located in Pittsburgh, PA, for the Allegheny County Sanitary Authority. GAI provided electrical, mechanical, design, and detailing support of the replacement of an existing demineralization system for the boiler feed-water treatment. Evaluation consisted of existing and future needs analysis, alternative technologies, and demolition and installation coordination.
- Director, Plant Engineering U.S., Westinghouse Electric Company. Directed engineering and construction services for design and installation of modifications to Nuclear Power Plants worldwide. Managed large capital projects from supporting sales and budgetary estimates through engineering construction and start-up. Developed, monitored and controlled annual expense budgets, and established contracting strategies, directed contract negotiations and managed contracts to minimize disputes and change orders. Provided dispute resolution to resolve all issues at both the project and executive level. Supported the Global Plant Engineering portfolio offices in Germany, Spain and South Africa as necessary. Selected as a member of the Guiding Coalition to establish the growth strategy for Westinghouse Electric Company. Support the implementation of the strategic initiatives established by the Guiding Coalition and the Global Growth & Innovation organization.
- Vice President Supply Services, Allegheny Energy Supply, LLC. Directed engineering, construction, technical services, and operations support groups for Allegheny Energy. Led 92 professionals in providing engineering services, construction management, project management, and technical specialist services for over 11,000 MWs of electrical generation capacity located in 29 power generation facilities. Officer of 15 Allegheny Energy subsidiaries. Interfaced with Senior Management regarding day-to-day operations of Allegheny Energy and the power generating facilities. Managed large capital projects including the siting, design, and construction of new generation facilities, FGD system retrofits, and maintenance projects from inception through engineering construction and start-up.
- Director, Engineering and Construction, Allegheny Energy Supply, LLC. Directed 90 professionals in the engineering, construction, and technical services departments. Established scope, budgets, and schedules for both capital and expense projects for all generating stations. Developed, monitored and controlled $6M expense budget. Contracted for external engineering and construction services and maintenance services for unit outages, supplying support services and technical expertise. Provided management oversight for installation of five (5) Selective Catalytic Reduction systems projects totaling over $370M which were completed on schedule and within budget. Directed engineering oversight for design, installation, and start-up of $318M natural gas-fired combined cycle power plant. The plant was completed ahead of schedule and within budget.
- Power Engineer, Allegheny Energy, Inc. Provide engineering support and project management leadership across Allegheny Energy's generating system. Managed the technical review of the design, construction and interconnection of seven independent power producer and cogeneration projects which were interconnected to the Allegheny System under federal PURPA legislation
- Plant Engineer, Operations, Allegheny Energy, Hatfield's Ferry Power Station, three 570 MW Units, Coal-fired Station. Designed and implemented capital and expense projects to resolve issues for operation and maintenance of a 1,710 MW supercritical, coal-fired power plant. Performed outage planning and coordination of projects. Supervised union labor and operations crews.

Affiliations

Member, American Society of Mechanical Engineers

Industry Advisory Board Member, USDOE Advanced Combustion Turbine Program

Member Owner Advisory Committee – National Maintenance Agreements Policy Committee

Board of Directors – Landmarks Financial Corporation (a subsidiary of Pittsburgh History and Landmarks Foundation)

APPENDIX B
WVDA Signed Forms

gai consultants

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

State of West Virginia
Centralized Expression of Interest
02 — Architect/Engr

Proc Folder: 419818

Doc Description: Agriculture Food Warehouse Electrical Engineering Service

Proc Type: Central Contract - Fixed Amt

Date Issued	Solicitation Closes	Solicitation No	Version
2018-02-09	2018-03-08 13:30:00	CEOI 1400 AGR1800000002	1

BID RECEIVING LOCATION

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

VENDOR

Vendor Name, Address and Telephone Number:

GAI Consultants, Inc.
300 Summers Street, Suite 1100
Charleston, WV 25301
Phone: 304.926.8100

FOR INFORMATION CONTACT THE BUYER

Guy Nisbet
(304) 558-2596
guy.l.nisbet@wv.gov

EJH-Ok

Signature X David J Bumgarner **FEIN #** 25-1260999 **DATE** 3/08/2018

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

ADDITIONAL INFORMATION:

Expression of Interest
(Agriculture Food Warehouse Electrical Service Project)

The West Virginia Purchasing Division is soliciting Expression of Interest for the Agency, The West Virginia Department of Agriculture from qualified firms to provide professional architectural/engineering services for electrical upgrades to the Agency's Food Warehouse per the attached bid requirements, the Expression of Interest, and the Terms and Conditions as attached hereto.

INVOICE TO	SHIP TO
PROCUREMENT OFFICER 304-558-2221 AGRICULTURE DEPARTMENT OF ADMINISTRATIVE SERVICES 1900 KANAWHA BLVD E CHARLESTON WV25305-0173 US	AUTHORIZED RECEIVER 304-558-3200 AGRICULTURE DEPARTMENT OF EXECUTIVE DIVISION 217 GUS R DOUGLAS LN, BLDG 1 RM 100 CHARLESTON WV 25312 US

Line	Comm Ln Desc	Qty	Unit Issue
1	Engineering Services		

Comm Code	Manufacturer	Specification	Model #
81000000			

Extended Description :

Engineering Services

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

Steven E. Schroth, Electrical Technical Leader
(Name, Title)

Steven E. Schroth, MBA, PE - Electrical Technical Leader
(Printed Name and Title)

600 Cranberry Woods Drive, Suite 400, Cranberry Township, PA 16066
(Address)

Phone: 412.399.5613 / Fax: 724.772.2050
(Phone Number) / (Fax Number)

S.Schroth@gaiconsultants.com
(email address)

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

GAI Consultants, Inc.
(Company)

David J Bevilacqua, Assistant Vice President
(Authorized Signature) (Representative Name, Title)

David J. Bevilacqua, MBA - Assistant Vice President
(Printed Name and Title of Authorized Representative)

March 8, 2018
(Date)

Phone: 412.399.5442 / Fax: 724.387.2265
(Phone Number) (Fax Number)

EJH – Ok

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.:

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

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

Addendum Numbers Received:
(Check the box next to each addendum received)

- ☐ Addendum No. 1
- ☐ Addendum No. 2
- ☐ Addendum No. 3
- ☐ Addendum No. 4
- ☐ Addendum No. 5
- ☐ Addendum No. 6
- ☐ Addendum No. 7
- ☐ Addendum No. 8
- ☐ Addendum No. 9
- ☐ Addendum No. 10

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

GAI Consultants, Inc.
Company

Steven E. Schroth
Authorized Signature

March 8, 2018
Date

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

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

CONSTRUCTION CONTRACTS: Under W. Va. Code § 5-22-1(i), the contracting public entity shall not award a construction contract to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees.

ALL CONTRACTS: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (*W. Va. Code* §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: GAI Consultants, INC

Authorized Signature: [signature] Date: 2/28/18

State of Pennsylvania

County of Allegheny, to-wit:

Taken, subscribed, and sworn to before me this 28 day of February, 2018.

My Commission expires April 17, 2018, 20___.

AFFIX SEAL HERE

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Donna J. Zeno, Notary Public
Homestead Boro, Allegheny County
My Commission Expires April 17, 2018
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

NOTARY PUBLIC [signature]

APPENDIX C
Certificate of Authorization

gai consultants

CERTIFICATE OF *Authorization*

STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

The West Virginia State Board of Registration for Professional Engineers having verified the person in responsible charge is registered in West Virginia as a professional engineer for the noted firm, hereby certifies

GAI CONSULTANTS, INC.
C00208-00

Engineer in Responsible Charge: ANTHONY F MORROCCO - WV PE 012843

has complied with section §30-13-17 of the West Virginia Code governing the issuance of a Certificate of Authorization. The Board hereby notifies you of its certification with issuance of this Certification of Authorization for the period of:

January 1, 2018 - December 31, 2019

providing for the practice of engineering services in the State of West Virginia.

IF YOU ARE REQUIRED TO REGISTER WITH THE SECRETARY OF STATE'S OFFICE, PLEASE SUBMIT THIS CERTIFICATE WITH YOUR APPLICATION.

IN TESTIMONY WHEREOF, THE WEST VIRGINIA STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS HAS ISSUED THIS COA UNDER ITS SEAL, AND SIGNED BY THE PRESIDENT OF SAID BOARD.

BOARD PRESIDENT

APPENDIX D
GAI Service Briefs

gai consultants

Service Profile

Electrical Engineering

Industry relies on electric power and control systems to operate and monitor processes that function within defined environmental and economic considerations. The electrical engineers at GAI Consultants help clients meet this critical need with safe and reliable electric power and control systems. Our innovative solutions for electrical systems and components benefit energy and industrial facilities—from food processing and manufacturing to power generation plants.

The combined approach of engineers, environmental specialists, and health & safety professionals means customized solutions that fit each unique challenge.

Developing control systems starts with system mapping and a detailed summary of operations. Turnkey power systems require precise substation sizing, detailed designs, and specialized equipment and structural components. GAI's services include equipment testing and validation, system testing and start-up, contractor selection, and O&M training for employees. Our job is not complete until start-up is successful and controls are fine-tuned.

GAI's substation and power plant services cover 5kV-138kV primary and 120V-15kV secondary voltage, and facility sizes ranging from 500kVA-50MVA. Our skilled electrical engineers address harmonic and power quality problems and conduct studies to evaluate equipment ratings, protective device coordination, system loading, and arc flash incident energy and flash protection boundaries.

GAI uses sophisticated software to conduct arc flash hazard studies. We quantify arc flash hazard information for plant workers to use when evaluating how to approach work tasks involving energized electrical equipment. These arc flash studies often reveal preventive maintenance or equipment upgrades needed to help avoid catastrophic damage to electrical equipment caused by arcing between energized conductors. GAI also provides safety training and helps clients determine the level of Personal Protection

gaiconsultants.com

Transforming ideas into reality® since 1958, GAI is an employee-owned, engineering, planning, and environmental consulting firm providing local expertise to worldwide clients in the energy, transportation, development, government, and industrial markets.

Service Profile

Equipment (PPE) required for their maintenance staff. We address NFPA 70E and OSHA compliance and allowable approach distances for non-qualified personnel.

GAI's lighting system designs cover interior building systems, entire facilities, and highways. We follow standard illumination guidelines and use innovative concepts based on legacy/cutting edge technology. GAI also specializes in audio and visual system design, and provides design and analysis for security systems.

Focusing on reliability and sustainability, GAI conducts QA/QC, insulation coordination, harmonic analysis, and energy conservation studies. Our professionals evaluate power quality, and analyze power distribution system reliability and availability.

GAI combines the years of experience, project knowledge, and sector-specific familiarity of our electrical engineers with mechanical, structural, geotechnical, and environmental engineering to bring clients comprehensive cost-effective solutions.

Electrical Engineering Services

- AC/DC substation design, layout, specifications
- AC/DC power distribution system (PDS) design
- Motor control system design and specifications
- Traction power substation (TPSS) design
- AC/DC substation, PDS, and TPSS construction
- Lightning system and surge protection design
- Emergency backup power and protection systems
- Building and facilities security and access systems
- Program and construction management
- Control system design and construction
- Energy storage systems engineering and design
- Electrical testing/preventative maintenance
- System integration and procurement services
- Ground grid design/smart and micro-grid solutions
- Building information system coordination
- Copper, fiber, wireless voice data and networking
- Short circuit analysis/equipment rating evaluation
- Arc flash hazard analysis, labeling, training
- Electric load flow analysis/motor starting studies
- Power factor analysis/corrective mitigation design
- Switching transient analysis

GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

Service Profile

Construction Engineering and Inspection

GAI Consultants monitors the daily activities and building materials that are critical to Construction Engineering and Inspection (CEI) projects with the following in mind—client service, construction integrity, and a successfully completed project. Whether GAI provides transportation construction monitoring, construction engineering and inspection for development, or construction management services for massive energy facility projects, our pool of resident engineers and construction specialists skillfully address the distinct construction challenges of clients in all industries.

Fully understanding the importance of project team communication and public information processes means project impacts are avoided and goals are met.

GAI's engineering and inspection services cover all elements of the building process. We start by evaluating each construction project before it begins, tailoring staff and resources to fit the need, and setting a tone of cooperation and close communication. GAI uses pre-construction meetings with client, owner, contractors, and subcontractors to outline communication methods, detail change order and pay request processes, and emphasize milestone completion dates. We believe successful pre-construction conferences are the basis for superior project performance.

GAI's construction professionals test construction material quality, inspect workmanship, and monitor on-site construction safety. Our services often include progress and materials reporting, shop drawing review, plan interpretation, pay request administration, claims and disputes resolution, and more. We follow each stage of construction to verify that the work is executed in accordance with the contract documents, and administer concrete, bituminous material, steel, and soil sample testing.

GAI understands the importance of implementing public information processes that keep all project

gaiconsultants.com

Transforming ideas into reality® since 1958, GAI is an employee-owned, engineering, planning, and environmental consulting firm providing local expertise to worldwide clients in the energy, transportation, development, government, and industrial markets.

Service Profile

stakeholders well informed. We work with each client to prepare public outreach programs as needed, and when construction is complete, we submit a detailed report to the client. Our final reporting summarizes overall performance and includes a full evaluation of the established goals and objectives.

GAI's project portfolio includes construction services for major highways and bridges, large-scale site developments, wastewater treatment plants, industrial facilities, and power plants. We specialize in complex, multiphase construction projects for state agencies, municipalities, institutions, private developers, and power providers. Our repeat success is based on building trusted relationships with clients and contractors, and helping them meet their project goals.

As a client's eyes and ears, GAI provides quality control and cost protection throughout the building process so the work meets or exceeds quality standards. Clients' projects are professionally delivered with minimal or no construction delays, cost overruns, or safety violations.

Construction Engineering and Inspection Services

- Pre-construction project evaluation and conference
- Post-construction inspection and evaluation
- Value engineering
- Biddability and constructability reviews
- Cost estimating
- Scheduling
- Permit approval
- Construction inspection and monitoring
- Project management
- Contract administration
- Progress reporting
- Change order review and processing
- Supplier/construction deliveries
- Shop drawing review and plan interpretation
- Contractor quality control program monitoring
- Project closeout
- Public outreach

GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

Service Profile

Environmental Studies and Permitting

GAI Consultants guides clients through the complexity of federal, state, and local agency environmental and permitting regulations. Our established agency relationships and precise study processes advance small projects as well as large regional efforts. Whether new gas and electric corridors, infrastructure rehab, or brownfield redevelopment, GAI conducts detailed environmental studies in the initial project planning stages to keep permitting, planning, and construction on schedule.

Advanced GIS capabilities and in-house cultural resources services means GAI has the skills and range of disciplines to deliver complete project solutions.

We anticipate environmental and developmental issues that can put a project on hold and conduct comprehensive assessments that address impacts to wetlands and floodplains, terrestrial and aquatic natural systems, vegetation and wildlife, cultural resources and socioeconomics, air and water quality, noise levels, aesthetics, and geologic and hazardous conditions. Our professionals identify issues to avoid and minimize impacts where possible, prepare permit applications, and develop mitigation plans for unavoidable impacts. We develop cost-effective solutions to meet regulatory requirements while keeping projects on schedule.

GAI's environmental services encompass siting and master planning, as well as permitting. Our environmental specialists evaluate alternative sites, handle site inspections and features inventories, and rank sites by their potential for successful development—for energy facilities, industrial plants, commercial and retail centers, trails, transmission line corridors, and more. GAI's master plans identify infrastructure, layout, and access needs. Clients benefit from extensive scheduling, cost estimating, and regulatory agency approval experience.

With sophisticated Geographical Information System (GIS) capabilities, the database systems GAI creates streamline the National Environmental

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Service Profile

Policy Act (NEPA) process through large-volume data sharing that optimizes the regulatory review process. We work extensively with regulatory agencies to obtain permits and clearances for all types of facilities.

GAI's in-house cultural resource services complete the full-service package we bring to environmental assessment, study, planning, or engineering efforts.

From a few hours of consultation to total design and environmental impact assessment responsibility, our dedicated specialists are skilled in a broad range of disciplines. Whatever the required level of involvement, GAI delivers full-service project services with continued success.

Environmental Studies and Permitting Services

- Gas and electric transmission siting and permitting
- NEPA compliance and FERC certification
- Environmental Impact Statements and Assessments
- Permitting and environmental reporting
- NPDES and 404/401 permitting
- Groundwater and surface water modeling
- Navigability and floodplain studies
- Water quality permitting and air quality monitoring
- Noise studies and mitigation
- GIS database management
- State power siting board certification
- Threatened and endangered species surveys
- Invasive species surveys and management
- Route evaluation studies
- Siting and alignment evaluation and selection
- Land use assessments for site development
- Subdivision and zoning site approvals
- Model ordinances for land-use control
- Market analyses for highway/roadside plazas
- Recreational site demographic and use analyses
- Community and land-use planning
- Fiscal impact analysis
- Public outreach coordination
- Cultural resources investigations

GAI Services Summary

- Airport Planning and Design
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- Construction Inspection and Management
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- Electric Transmission Design and Siting
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- Geotechnical Engineering and Geology
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- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
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- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
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Service Profile

Foundation Studies

In 1958 GAI Consultants established itself as a premier engineering and consulting firm specializing in foundation and soil mechanics engineering. Over the following years, GAI has amassed formidable experience in full-scale load testing of foundations, calibrating analytical models, and developing computer programs for designing foundations. We continue to provide specialized services in foundation engineering for clients in energy, industry, transportation, government, and land development.

More than 50 years of foundation experience means we deliver practical and proven solutions.

GAI's engineers and geologists are highly experienced in the basic principles of engineering geology, soil and rock mechanics, foundation engineering, subsidence, and mine studies. These professionals analyze earth slope stability and retaining wall systems, and design solutions for buildings, highways, and deep excavation projects.

When structures are built in areas where the uneven rise of expanding subgrades can occur, structural damage that was not anticipated can be a major concern. GAI investigates subgrade movements, determines their causes, and designs repairs that stabilize structures or eliminates the problem.

GAI's foundation services for electric transmission structures are based on our more than 50 years of geotechnical engineering experience. Geotechnical engineers and geologists conduct subsurface investigations, geologic assessments, subsidence evaluations and remediation, and detailed foundation testing, analysis, and design for energy clients' facilities.

With proven foundation analysis and design capabilities, GAI also focuses on construction—using detailed quality control procedures to

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monitor the construction of all types of structures and foundations. As a matter of routine, we perform pile, pier, or plate load-testing, and vibration monitoring. We also conduct pre-blast or pre-driving surveys of facilities near a construction or demolition project to determine the presence of pre-construction damage.

Utilizing skills in applied foundation research and analytical model calibrations, GAI's foundation services are supported by the work of proven professionals who understand the fundamentals of foundation analysis and design, and are dedicated to assisting clients in achieving their project goals.

Foundation Studies Services

- Structure capacity investigations
- Stress analyses for new loading conditions
- Catastrophic damage inspections and analyses
- Shop drawing review
- Subsurface investigations and stabilization
- Geologic, subsidence, and landslide assessments
- Foundation testing, analysis and detailed design
- Applied foundation research and analytical modeling
- Drilled shaft and grillage design
- Pipe pile foundation and foundation retrofit design
- Construction monitoring

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Service Profile

Geotechnical Engineering

Since 1958, GAI Consultants has been a leader in addressing the broad spectrum of engineering issues associated with the behavior of earth materials—soil, rock, mining refuse, coal combustion residuals (CCR), slag from steel-making processes, slurry, and others—that impact projects within the civil, mining, transportation, petroleum, natural gas, transmission, and power-generation economy sectors.

GAI's services encompass the entire breadth of geology and geotechnical engineering.

Our geotechnical engineers and geologists are highly proficient in the fundamentals of engineering, soil and rock mechanics, foundation and slope engineering, seismic analyses, underground and surface mining, mine fires, and mine subsidence.

Operating out of office locations throughout the U.S., these specialists bring with them a wealth of knowledge from years of academic training, research, and practical field experience—knowledge that is bolstered by expertise from GAI staff members in other disciplines such as structural engineering, groundwater engineering, and hydrologic/hydraulic engineering.

GAI's services encompass the entire breadth of geology and geotechnical engineering. Studies typically begin with subsurface characterization of the site and culminate in a report, often accompanied by the preparation of technical drawings and specifications, and monitoring during construction to verify project compliance with design specifications.

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Service Profile

Geotechnical Engineering Services

- Geologic studies using aerial photographs, topographic maps, and mine maps
- Subsurface and ground-surface investigations
- Instrumentation programs to monitor ground movements
- Mine fire mitigation studies
- Mine subsidence studies
- Blasting plans and vibration monitoring reviews
- Mine waste and CCR management and land reclamation
- Design studies for earth- and rock-fill dams and appurtenances
- Seismic evaluation of earth works
- Earth and rock slope stability evaluation, recommendations, and design
- Forensic studies for attorneys including reports, depositions, and testimony
- Design of shallow and deep foundations
- Design of specialty foundations such as micropiles and metal-finned pipe piles
- Retaining wall support analysis and design
- QA/QC construction observation and testing
- Soil improvement design to reduce settlement and increase bearing capacity
- Ground support development of mine grouting plans and specifications
- Karst investigations and sinkhole remediation

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Service Profile

Mechanical Engineering

Industrial facilities and power plants benefit from seasoned mechanical engineers who are skilled in a broad range of disciplines. The design services and operations and maintenance support that GAI Consultants has for building, in-plant, and power generation challenges keeps boiler systems, gas compressors, and entire manufacturing facilities and power plants operating efficiently. GAI's solutions improve efficiencies and reduce costs with a focus on preventative maintenance and safety.

Years of experience, knowledgeable teams of innovators, sector-specific familiarity, and multidiscipline in-house resources means practical and cost-effective solutions delivered seamlessly.

Professionals that have career-long familiarity with industrial processes are the earmark of GAI's ability to provide mechanical engineering solutions that are both cost-effective and innovative. The applications we address for industrial processes include pump, motor, mechanical seal, air compressor, rotary lube blower, gearbox, instrumentation, and stream turbine design.

GAI designs practical piping solutions for compressed air and steam lines, industrial processes, manufacturing and food processing plants, power generation facilities, and water and wastewater treatment systems. Our design packages include specifications for instrument and control equipment, pumps, vessels, tanks, process equipment, and conveyor systems. We design vessels in accordance with ASME codes and standards and tanks in accordance with American Petroleum Institute (API) standards.

Engineers specializing in boiler systems test boiler efficiency, troubleshoot poor performance, make recommendations for operational efficiency, and conduct combustion safety reviews. GAI educates clients' employees on the systems we develop and provides training for maintenance and safety.

GAI designs waste-to-energy facilities that reduce carbon footprint and landfill overflow. We specialize in air pollution control and keep facilities, including bag houses, spray absorbers, fume incinerators, and flare stacks, compliant with federal and state regulations.

From equipment selection and sizing to utility pipe system mapping, stress analyses, and distribution

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verification, GAI's electrical, structural, civil, and geotechnical engineers support our mechanical engineering staff. We deliver comprehensive solutions, from analysis and planning to startup and commissioning, that keep facilities running efficiently.

Pairing the skills of mechanical, structural, and electrical engineering professionals, GAI delivers a full array of disciplines to meet our clients' industrial and energy plant design and maintenance needs.

Mechanical Engineering Services

- HVAC heating and cooling load estimating; system comparison, cost estimating, and design; and equipment sizing and selection for industrial and commercial facilities
- ICC building code compliance studies
- 2D/3D AutoCAD and Microstation drawing creation and 3D Revit modeling capability
- Construction administration
- Plumbing system sizing and construction drawings for sanitary, storm, domestic hot/cold water, natural gas, and compressed air piping systems
- Fire protection, fire hazard analysis, and fire service system sizing
- Finite element analyses
- 3D machine design and modeling
- Facility piping and valve mapping
- Energy conservation studies and planning
- Combustion system design and safety review
- Steam and air load analysis and system sizing
- Equipment and facility layout

Industrial, Electric Energy, and Power Generation Systems Services

- P&ID and PFD development and drawings
- ASME safety device sizing
- PHA, HAZOP and regulatory compliance support
- ASME B31.1, B31.3 and PBE piping design
- Pipe stress and flow analysis and support design
- API tank and system design and analysis
- Combustion fuel systems and equipment
- FGD ductwork and wastewater treatment systems
- Air, dust and ash, and slurry handling systems
- Solid/liquid bulk conveyance and storage systems
- Baghouse ductwork systems and scrubbers
- Procurement services
- Shop fabrication review, inspection, approvals
- Construction monitoring, inspection, management

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Service Profile

Structural Engineering

Since 1958, GAI Consultants has been utilizing advanced technology in applied structural engineering and mechanics to solve complex structural engineering problems and address analysis and design projects.

GAI has built a solid reputation for providing outstanding engineering and project management services to our clients; always available, responsive and innovative.

GAI's structural engineering staff utilizes their knowledge, experience, understanding of structural engineering and the latest codes and standards in their structural engineering practice. We are committed to providing proactive project management on every project.
GAI specializes in structural design for commercial, industrial, and municipal buildings and process structures, as well as existing structure evaluations and rehabilitation assessments. We are versed in various project delivery approaches, including Design-Bid-Build, Construction Management at Risk, Design – Build and Open Book (time and material).

GAI's structural engineering expertise encompasses design and analysis of a variety of unique specialty structures which include heavy industry support structures and foundations, steel and concrete storage tanks and process structures, spillway and dam structural support, metal structural design and fabrication support for steel stacks, rigging and safety equipment, walkways and service platforms. GAI's professionals identify and evaluate structural deterioration causes and develop remediation measures that solve space, capacity, and performance issues. We tailor structural assessments to each client's specific needs and provide alternative solutions with safety, economic, operational, and environmental considerations. Our structural engineering services are enhanced by our access to GAI's in structural, civil, geotechnical, mechanical, electrical, and transportation expertise.

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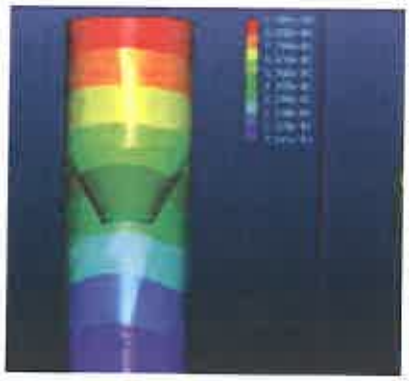

Structural Engineering Services

- Building structure and foundation analysis and design
- Existing structure investigations for current condition, rehabilitation, and capacity
- Construction phase structural engineering services, including construction monitoring.
- Soil-structure interaction studies
- Structural reliability studies
- Vibration and seismic analyses
- Heavy lift rigging consultation
- Fatigue analysis
- Noise and vibration problem design mitigation
- Theoretical and experimental stress analyses
- Analysis and simulation software development
- Load and stress determinations
- Instrument and on-site testing
- Failure investigations
- Catastrophic damage inspections and design
- Visual inspections
- Detailed deficiencies documentation
- Rehabilitation design
- Remedial measures analysis and design
- Engineer's construction estimates
- Life-cycle costing
- Underwater and tall structure inspection
- Hazardous waste site structural inspections
- Construction monitoring
- Materials and non-destructive testing
- Peer review of design by others
- Expert witness

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Service Profile

Surveying

The survey teams at GAI Consultants—a dedicated and experienced group of skilled professionals that provide services ranging from boundary and topographic surveys to specialized surveys for archaeology projects. Our surveys cover any discipline in any market including transportation, development, energy, and industry.

Providing valuable survey information accurately and early means clients and contractors avoid spending thousands of dollars in potentially damaging lost time and litigation liability.

GAI field survey crews, working closely with in-house mapping specialists, have access to an extensive library of computerized mapping software including Terramodel, Arc-Info, GRASS, Microstation and AutoCAD.

Design Surveys—Design surveys are the foundation upon which designs are based. GAI records boundary line locations, topography, physical features, on-site buildings and utilities, encroachments, and easements. Quality foundation design plans are produced from these details.

Topographic Surveys—GAI uses the latest technology in field equipment, recorders, and computer mapping for accurate topographic surveys that incorporate ground run, aerial, tree, utility location, wetland, floodplain and hydrographic surveying and mapping for CADD.

Construction Surveys—Conducted on site during the initial preparation stage of construction, these surveys provide information critical to establishing location and elevation. GAI saves clients and contractors thousands of dollars in potentially damaging lost time and litigation liability by providing this key information accurately and early.

Boundary Surveys—GAI's boundary surveys identify land titles and ownership, and document real estate financing, appraisals and sales, insurance, as-built delineations, encroachment delineation, boundary

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line disputes, subdivisions, rezoning and variances.

Control Surveys—GAI's control surveys establish a series of grid lines and points that pinpoint physical features. The data is used to establish horizontal and vertical control points and independent triangulation measurements to develop reliable control grids.

Hydrographic Surveys—Supporting storm water management and wetland mitigation, these surveys require trained staff, special equipment, and extensive experience. GAI conducts hydrographic surveys for bridges and on wetlands, lakes, rivers, and shorelines.

GAI uses Global Positioning System (GPS) for horizontal and vertical control surveys. With GPS technology our surveyors can reference global datum, re-create control points. We conduct utility location surveys, document archaeological/historical data, and support eminent domain work. Combining GPS technology with conventional survey saves time and money.

Organized for quick response, GAI's comprehensive surveying services cost-effectively meet the needs of public and private landowners, developers, and government agencies.

Surveying Services

- ALTA/ACSM Land Title surveys
- Topographic, boundary, and hydrographic surveys
- Aerial mapping and geodetic control surveys
- Floodway and dam surveys
- Subdivision and land development plans
- Volume calculations (cut/fill)
- FEMA flood elevation certificates
- Boundary and right-of-way legal descriptions
- Right of way plats
- Wetland boundary delineating surveys
- Embankment failure surveys
- Construction layout
- Existing conditions surveys (as-built)
- Erosion and Sedimentation Control Drawings
- Post Construction Stormwater Management Plans
- Borings and Piling Layout
- Structural Monitoring Surveys
- Forensic surveys
- Transportation surveys
- Industrial plant surveys

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