

RECEIVED

2013 AUG 14 AM 9:33

WV PURCHASING
DIVISION

***Technical Bid to Provide
Commissioning Services at
William R. Sharpe, Jr. Hospital***

ORIGINAL

2501 Blue Ridge Road, Suite 250
Raleigh, NC 27607
919.608.7547



Engineering Economics, Inc.



Engineering Economics, Inc.

2501 Blue Ridge Road, Suite 250
Raleigh, North Carolina 27607

telephone: 919.608.7547
facsimile: 919.882.8339

August 13, 2013

Department of Administration, Purchasing Division
2019 Washington Street East
Charleston, WV 25305

RE: Bid: WSH14021 – Commissioning Services at William R. Sharpe, Jr. Hospital
EEI No.: 06-13405

Ms. Wagner and Selection Committee:

Engineering Economics, Inc. (EEI) was founded in 1984 as a facility consulting firm. We specialize in building commissioning, facility assessments and energy optimization services. Our work is customized to our clients' specific needs, with a focus on quality assurance and sustainability. Headquartered in Golden, Colorado, EEI has 13 additional branch offices that are strategically located from coast to coast in order to better serve our national and regional clients.

We are well-versed in the operational needs and regulatory requirements of medical facilities, and we use our experience-based knowledge to facilitate smooth transition from construction to operations. We begin our work early in the design process, with the needs of the end-users in mind.

EEI's professionals have extensive experience in healthcare planning and facility design, construction and operations, and we apply this knowledge to improve project delivery and system maintainability. Our staff offers healthcare experience dating back to the early 1980's, with technical expertise and leadership capabilities developed over more than 30 years in the business. Over the years, we have worked on over 500 medical facility and hospital projects, including Energy Star rated buildings.

We understand the design and construction process, as well as the importance of reliability, redundancy and infection control in an operating hospital. We keep abreast of changes to healthcare design and construction standards and are intimately familiar with current Colorado requirements. We understand equipment "right sizing", a key to keeping first costs in line and reducing operational costs during seasonal variations.

EEI's project approach is systematic and organized, based on decades of commissioning and healthcare experience and on evolving commissioning industry, ASHE and environmental standards. We tailor our process to each project's needs to provide structure and guidance for the quality assurance process within the limitations of the owner's budget. We include the Owner's engineering staff in the commissioning process wherever possible, to provide better understanding of the operating intent and greater comfort with new systems when the building is transferred to Owner operation. We also work with the design engineers and construction team to provide supplemental training to the Owner's staff on system concepts and operation.

We look forward to further discussing your needs and our qualifications in detail.

Sincerely,

Engineering Economics Inc.

A handwritten signature in black ink, appearing to read 'Sean Saunders', is written over a horizontal line.

Sean Saunders, PE, LEED® AP, CEM, CxA
Satellite Manager

TABLE OF CONTENTS

Firm Introduction

Qualifications and Experience

Resumes

Firm Location

Project Approach

FIRM INTRODUCTION

Engineering Economics, Inc. (EEI) is an S-Corporation, small business veteran-owned facility consulting firm, specializing in Building Commissioning, Retro Commissioning, Re Commissioning, and LEED® Commissioning. Founded and incorporated in Colorado in 1984 the firm initially focused its services on retrofit designs, energy audits, energy conservation measures, and M/E/P troubleshooting. The firm's experience in each of these areas would set a solid foundation for EEI's future leadership and participation in developing the building commissioning field. Today, EEI has become a national firm with over 70 employees spread over 13 offices. We serve our clients from offices located throughout the United States, including Arizona, California (2 locations), Colorado, Kansas, Missouri, New Mexico, North Carolina, Ohio, Oregon, Texas, and Washington (2 locations).

Unlike many of its competitors, building commissioning is EEI's core business, generating more than 80% of the firm's revenue. For EEI, building commissioning is not an "additional service" – it's our core service. EEI offers its clients:

- Building Commissioning
- Retro-Commissioning
- Re-Commissioning
- Leadership in Energy and Environmental Design (LEED) Commissioning
- Facility Assessment & Planning
- Energy Studies / Energy Conservation Measures
- Expert Witness

EEI considers itself to be an Owner's Representative for the service it provides – responsible for safeguarding the owner's interests and ensuring that the building and owner of each facility receive the maximum value for the construction and maintenance dollars being spent. EEI customizes its services to each client's specific needs, always remaining focused on quality assurance and sustainability. EEI is dedicated to assisting facility builders, owners, and managers in procuring and maintaining fully integrated building systems that function efficiently and properly.

EEI has continued to advance building commissioning by playing a role in developing commissioning standards, participating in commissioning organizations, and speaking extensively on the subject. EEI worked with the Portland Energy Conservation Institute (PECI) in developing national commissioning standards.



EEI was one of the founders of the Building Commissioning Association (BCA), which originated in the Northwest, and we encourage our employees to remain active in this association. EEI also served as a co-host of the National Conference on Building Commissioning and provides speakers to various groups and organizations on the subject of commissioning and sustainable buildings.

Today, building commissioning accounts for 80% of EEI's revenue. These services are supplemented by facility assessment/planning, energy conversation, and expert witness services. For EEI, unlike many of its competitors, building commissioning is our core service and expertise – not an add-on.

QUALIFICATIONS AND EXPERIENCE

Vendors will provide information regarding its employees, such as staff qualifications and experience in completing similar projects; references;

Our staff is committed to improving your bottom line by helping to deliver sustainable and energy-efficient facility systems—ensuring that facility owners maximize the return they receive on each construction dollar spent. Since 1991, EEI has commissioned more than 170 million square feet of space, with total construction value on these projects in excess of \$31 billion.

Nationwide, we have 70+ highly trained and experienced employees who are committed to excellence. Our technical staff includes 22 registered engineers, 30 LEED Accredited Professionals, 4 Certified Energy Managers and 14 certified commissioning professionals, averaging 22 years of experience in building systems. We are also a veteran-owned small business.

copies of any staff certifications or degrees applicable to this project;

The AABC Commissioning Group (ACG) is an independent, non-profit association dedicated to the advancement of professional, independent 3rd party commissioning and energy management services through education, training, and certification of qualified individuals to act as Certified Commissioning Authorities (CxAs), Certified Commissioning Technicians (CxTs), and Energy Management Professionals (EMPs).



hereby certifies that

Sean R. Saunders, P.E.

Engineering Economics, Inc. (Raleigh)

has demonstrated the requisite knowledge and understanding of the building commissioning process as presented in the ACG Commissioning Guideline and passed the necessary examination to be awarded this certificate in recognition of his qualifications as an ACG

Certified Commissioning Authority

This registration number [redacted] and this certificate, valid only for the year 2013, are renewable on an annual basis after examination of the agency's record for the preceding year.



Mark L. Lutz
Mark Lutz, P.E., President
Ryan Best
Ryan Best, Executive Director



hereby certifies that

Matthew J. Chapin

Engineering Economics, Inc. (New Albany)

has demonstrated the requisite knowledge and understanding of the building commissioning process as presented in the ACG Commissioning Guideline and passed the necessary examination to be awarded this certificate in recognition of his qualifications as an ACG

Certified Commissioning Authority

This registration number [redacted] and this certificate, valid only for the year 2013, are renewable on an annual basis after examination of the agency's record for the preceding year.



Mark L. Lutz
Mark Lutz, P.E., President
Ryan Best
Ryan Best, Executive Director

keeping the deficiency log and notifying concerned parties of findings. Mr. Chopin is experienced in virtually all field aspects of building systems operation. Matt's background is in controls, mechanical construction, and systems commissioning and engineering reviews for a broad spectrum of facilities in multiple markets. His prior experience spans industrial, commercial, and government facilities.

descriptions of past projects completed entailing the location of the project, project manager name and contact information, type of project, and what the project goals and objectives were and how they were met.

**UVA HEALTH SYSTEM
HVAC UPGRADE PROJECT
Charlottesville, Virginia
LEED® Project**



The first phase of the HVAC Infrastructure Upgrade replaced six existing air handling units and return fans in the University Hospital. Included in the replacements are units 2M-1 serving surgical pathology, 2M-16 serving radiology, 2M-21 and 22 serving the cath lab and IMRIS, 2M-24 serving the heart center, and OX-2 serving diagnostic radiology. The replacement equipment increases the overall HVAC capacity to each department and changes several of the units from normal power over to emergency power. This required new feeds for the electrical, chilled water, and steam to each unit. Due to the severe space restrictions and limited access, each of the new air

handlers were brought into the building as individual components. This required that the assembly of all fans, coils, humidifiers, control, and wall panels along with pressure testing normally performed at the factory were instead performed within the mechanical spaces of the hospital.

Commissioning activities for the HVAC Upgrade Project have, whenever practicable, followed applicable LEED guidelines for New Construction. Commissioning services revolved around six new variable air volume air-handling units. The testing process also included verification of the air/hydronic testing and balancing activities associated with the six air-handling units.

Commissioning of the air-handling units was complicated to a certain extent by the fact several units served spaces that were being renovated at the same time. This situation had a major impact on balancing and adjusting of airflows as well as "load" testing the equipment to their full design values.

Commissioning of the 2M HVAC Upgrade Project Phase 1 was successful in terms of ensuring that what was working right and not working right on the air-handling units was identified. The process also verified that the components and operation of the units complied with applicable contract documents and specifications.

Owner..... UVA Health System
Completion Date 2011
Project Manager.....Dave Fiero 434-982-2996

**UVA HEALTH SYSTEM
2E HEART CENTER
Charlottesville, Virginia
LEED® Project**

This project completely renovated all 21,600 square feet of the east end of the second floor into the new invasive wing of the Heart Center. It included a new hybrid cath lab, four new electro physiology labs, support offices, supply rooms, and locker rooms.

The five new procedure rooms were added to the existing four rooms to give a total of nine procedure room available to the Heart Center. The corridor system within the center was also renovated to meet semi sterile standards.

One of the most complex components of the project was the construction of a floor in the two-story space above the emergency room public entrance. This was built while the emergency room entrance remained open.

EEl was chosen as the Commissioning Authority and performed the following:

1. Reviewed the construction drawings and specifications.
2. Reviewed the OPR/BOD document provided by the Owner.
3. Developed and utilized a Commissioning Plan (1 for both phases)
4. Provided Commissioning Specifications to the design team (basically the same for both phases with minor changes)
5. Scheduled Coordination for commissioning items.
6. Conducted commissioning kick-off meeting, provide meeting minutes
7. Reviewed Submittals for the equipment to be commissioned.
8. Reviewed contractor provided pre-functional test procedures.
9. Provided Functional Test Procedures for the equipment to be commissioned.
10. Conducted two site visits to observe installation, issue reports. (one ea. for (1A & 1B), B)
11. Maintained an issues log of site observations and functional testing results. (one log for both phases)
12. Observed and directed functional testing conducted by the contractors. Included is 10% retest.
13. Produces a commissioning final report (one report for both phases)

Owner..... UVA Health System
Completion Date 2011
Project Manager.....Kevin Silson 434- 243-8032

**UVA HEALTH SYSTEM
HOSPITAL BED EXPANSION
Charlottesville, Virginia
LEED® Project**



The project is a six story, 61,000 gsf addition to the north façade of the Hospital's Central Bed Tower. The Hospital Bed Expansion (HBE) adds 72 acuity adaptable patient rooms to the University Hospital. The project consists of 12 private room nursing units located on each of floors 3 through 8. The patient rooms are designed to be critical care capable with a full bathroom. This design allows the room to be used for critical care, step-down care, or acute care. This project provides much needed bed capacity to the Hospital while providing maximum flexibility. The HBE began construction in October of 2008 with completion in mid-2012.

EEl was contracted to provide:

**UVA HEALTH SYSTEM
9 BED ACUITY ADAPTABLE PROJECT
Charlottesville, Virginia**

The 9 Bed Acuity Adaptable project encompasses approximately 4,533 SF on the 8th floor West of University Hospital Building 1150, located at 1212 Lee Street in Charlottesville, VA. The project includes:

- Patient rooms with bathrooms (9)
- Nurse station with code cart alcove (1)
- Shared work space (1)
- Equipment storage room (1)
- Staff lounge (1)
- Electrical closet (1)
- Staff toilet (1)
- Corridor (1)

The scope of commissioning included installation verification site visits, providing functional test procedures, reviewing the controls submittal, conducting functional testing with the assistance of the control contractor, and providing the final report. The systems that were functionally tested in the facility are:

HVAC

EF-PX-7
VAV Supply Boxes w/reheat
CV Supply Boxes w/reheat
VAV Supply Boxes (no heat)
Room Pressurization
Smoke Dampers
DDC Graphics & Trends
Verify calibration of DDC sensors

ELECTRICAL

Nurse Call System
Occupancy Sensor Switches
New Power Panels

Owner..... *University of Virginia - Health Sciences*
Completion Date *2008*
Project Manager..... *Mashal Afredi 434-982-5821*

**MOSES CONE HEALTH SYSTEM
MOSES CONE MEDCENTER HIGH POINT
High Point, North Carolina**



The Moses Cone MedCenter in High Point is phase one of a three phase development which initially provides Emergency Services 24/7, diagnostic Imaging and Lab services, pre-admission testing, rehabilitation services, medical oncology, primary care, orthopedics and related physician office space. Future phases extend the ambulatory diagnostic and treatment services as well as provide additional medical office space. Phase one is a three story 76,000 SF structural steel facility that includes entrance canopies for the main entrance, emergency entrance and ambulance entrance.

EEL was commissioned to perform the following tasks for Phase I:

- Provide reviews of the design intent and the Construction Documents.
- Review the specifications for feasibility (and code compliance) of performance and installation requirements for the sensors, actuators, final control elements, controllers, workstation and any other components that comprise the control system
- Evaluate the base mechanical systems as well as the control systems related to building management, life safety systems and technology interface needs.
- Develop a Commissioning Plan
- Functional test procedures and evaluation metrics shall be developed for both normal system operation and failure mode function.
- Observe the start-up of two major mechanical systems and one major electrical system to ensure that proper procedures are followed and documented.
- Provide functional testing services. This includes the testing of all equipment, systems and control sequences for all aspects of system operation.
- The final report of the commissioning process will be prepared.

Systems commissioned include:

- Rooftop AC Units (2 w/ separate condensing units)
- Computer Room AC
- Exhaust Fans
- Humidifiers
- VAV Boxes w/reheat - Shell
- Building Management System
- Main Switchboards
- Emergency Generators
- Automatic Transfer Switches
- Fire Alarm

Owner..... *Moses Cone Health System*
 Completion Date 2009
 Project Manager..... *Ron Galloway 336-832-7851*

Provide the name, address, phone number, e-mail address and signature of the Firm's contact person responsible for the project and having full authority to execute a binding contract on behalf of the Firm submitting the proposal.

Sean Saunders, PE, LEED AP, CxA, CEM
 2501 Blue Ridge Road, Ste. 250
 Raleigh, NC 27607
 919-861-9052
Sean.Saunders@eeengineers.com



It is preferred that the Prime firm has provided commissioning services for 10 years or more.

EEL has been providing commissioning services since 1991.

Demonstrate the size of the project is within the Vendor's capabilities by showing at least three projects of equal or larger in size.

1. **UVA Health System – Hospital Bed Expansion:** The project is a six story, 61,000 gsf addition to the north façade of the Hospital's Central Bed Tower.
2. **UVA Health System – The Emily Couric Clinical Cancer Center:** The Cancer Center project is a five-story 153,104 square foot building.
3. **Moses Cone MedCenter Highpoint:** A three story 76,000 SF structural steel facility that includes entrance canopies for the main entrance, emergency entrance and ambulance entrance.

Demonstrate the Vendors expertise in the health care field including psychiatric care facilities.

The following is a sample list of health care facilities to whom we have provided commissioning services:

- Ohio State-MCFP Expansion-Cx & Program Mgmt, Columbus, OH
- OSU South Campus Central Chiller Plant-Cx, Columbus, OH
- Ohio State University MCFP-Fuel Oil System-Commissioning, Columbus, OH
- Lunenburg County Community Health Center - Cx - Addl. Services, Victoria, VA
- St Francis Medical Center-Richmond-Cx, Midlothian, VA
- Carilion Riverside Clinic-LEED Cx, Roanoke, VA
- UVA-The Emily Couric Clinical Cancer Center-LEED Cx, Charlottesville, VA
- UVA -Labor & Delivery Operating Rooms-Cx, Charlottesville, VA
- UVA Central Tower Bed Expansion-LEED Cx, Charlottesville, VA
- University of VA-UH-2E Heart Center Reno Phase I-Cx, , VA
- University of VA-UH2E Intraoperative MRI-Cx, , VA
- UVA-Univ Hosp-Radiology Renovation-LEED Commissioning, Charlottesville, VA
- UVA-UH HVAC Upgrade Phase I-LEED Cx, Charlottesville, VA
- UVA-Univ Hosp-Surgical Pathology Lab-Commissioning, Charlottesville, VA
- University of Virginia-Hospital Fire Alarm Replacement-Commissioning, Charlottesville, VA
- University of Virginia-East Chiller Plant-Commissioning, Charlottesville, VA
- UVA UH 8th Floor Reno-Bone Marrow Transplant-Cx, Charlottesville, VA
- UVA UH Heart Center A Lab Renovation-Cx, , VA
- San Mateo County Health Center - Cx, Redwood City, CA
- San Mateo County Health Center - 1954 Building - Commissioning, San Mateo, CA
- Mecklenburg County Behavioral Health Center-Cx, Charlotte, NC

Provide a description of any litigation or arbitration proceedings, including vendor complaints filed with the State's Purchasing Division, disputes with other Agencies of the State of West Virginia that involved legal representation by either party related to the Finn's delivery of professional services, if applicable. Also any disputes with other Agencies of the State of West Virginia that involve legal representation by either party.

EEI has not had any litigation, arbitration, complaints or otherwise within the State of West Virginia.

WV Terms and Conditions

EEI takes no exception to the completed sections of requirements.

Provide the names, function and resume of individuals within the lead Firm's organization who will be assigned to this project. This was provided above under the Org chart.

Registered West Virginia Professional Engineers that are graduate mechanical engineers are required with experience in Commissioning with strengths in HV AC and direct digital controls (DDC) systems.

Sean R. Saunders, PE, LEED® AP, CEM, CxA, Principal-in-Charge

EDUCATION M.S., Mechanical Engineering, Purdue University, 1995
B.S., Mechanical Engineering, State University of New York at Stony Brook, 1992
B.S., Applied Mathematics, State University of New York at Stony Brook, 1992

PROFESSIONAL REGISTRATION Registered Professional Engineer in North Carolina, South Carolina, and Virginia

EXPERIENCE Mr. Saunders is a highly experienced Professional Engineer and LEED® Accredited Professional with specialized expertise in Building Commissioning, LEED Commissioning, and Retro-Commissioning services. Having served as the Commissioning Authority and team leader on many technically-challenging and complex projects, he brings to his projects the leadership and experience needed to maximize the performance of building systems.

Mr. Saunders has substantial experience in project management, design, peer review, process optimization, operations and maintenance, energy management and the commissioning of various facility systems. These systems have included standard mechanical (HVAC, plumbing and fire protection) and electrical (power distribution, emergency backup, lighting, security and communications), as well as specialized systems for high purity gas, compressed air, process cooling, acid scrubbers, and industrial waste water treatment. As specific examples, Mr. Saunders has established guidelines for the installation of steam piping and implemented modifications to reduce the potential of catastrophic failure due to design issues, and also analyzed manufacturing gas systems, eliminating unscheduled downtime with minimal cost upgrades.

REPRESENTATIVE PROJECTS

- **UVA Health System – Emily Couric Clinical Cancer Center**, Charlottesville, VA: Principal-in-Charge of new 150,000 SF cancer center. EEI was contracted to provide LEED EA Prerequisite 1 – Fundamental Building Systems Commissioning and LEED EA Credit 3 – Enhanced Commissioning.
- **UVA Health System – Central Tower Bed Expansion**, Charlottesville, VA: Project Manager. A six-story addition and renovation to the existing hospital equaling 85,800 SF. The project is seeking US Green Building Council LEED™ certification under version 2.2
- **UVA Health System – HVAC Infrastructure Upgrade**, Charlottesville, VA: Project Manager. The first phase of the HVAC Infrastructure Upgrade will replace six existing air handling units and return fans in the University Hospital. EEI is providing commissioning services.
- **UVA Health System - UH 8W Bone Marrow Unit Renovation Project**, Charlottesville, VA: Principal. Commissioned a new 6,000 SF bone marrow transplant unit.
- **Moses Cone – MedCenter Highpoint**, Highpoint, NC: Principal. Commissioned new 76,000 SF medical center.
- **US Department of Veterans Affairs – VISN 6 Mid-Atlantic Health Care Network**, 8 locations spread throughout North Carolina, Virginia and West Virginia. Program Manager responsible for the retro-commissioning of eight Veterans Affairs (VA) hospitals. The Government requested that EEI make VA design parameters a priority while also improving energy efficiency and optimizing equipment/system performance levels. EEI will provide services for the planning phase and investigation phase. The planning phase includes review of existing documentation and requirements, preparation of a retro-commissioning plan. The investigation phase includes field inspections, data gathering, testing, and analysis to accurately assess system performance and identify improvement opportunities.
- **Virginia Tech Carilion School of Medicine & Research Institute**, Roanoke, VA: Principal-in-Charge of new 150,000 SF combination medical school and research institute. EEI was contracted to provide services required to meet LEED Energy and Atmosphere (EA) Prerequisite 1 – Fundamental Commissioning of the Building Energy Systems.
- **Central Carolina Community College, Chatham Community Library / Sustainable Technologies Building**, Pittsboro, NC : Commissioning Authority (CxA) to perform Fundamental Commissioning of the Building Energy Systems and Enhanced Commissioning services. Seeking LEED-Gold certification.

PROFESSIONAL AFFILIATIONS

- Building Commissioning Association (BCA)
- LEED Accredited Professional with the US Green Building Council (USGBC)
- AABC - ACG Certified Commissioning Authority
- AEE - Certified Energy Manager

Joe Davis, PhD, PE, CEM, CEA, CSP, Project Manager

EDUCATION

PhD and MS Industrial Engineering, North Carolina State University (NCSU), Raleigh, NC
BS in Mechanical Engineering, NCSU

PROFESSIONAL REGISTRATIONS

Engineering: Registered Professional Engineer (PE), North Carolina
Energy: Certified Energy Manager (CEM), Certified Energy Auditor (CEA)
Safety: Certified Safety Professional (CSP)

EXPERIENCE

Dr. Davis has been working in the engineering field for over 25 years, and as an energy engineer for more than 12 years. Before joining EEI he served as Energy Engineer & Program Manager for Energy Technical Assistance within the State Energy Office (SEO) in North Carolina. There he performed energy engineering work including energy assessments, leadership, project management, audits, training, measurement & verification (M&V) of energy costs and savings for facilities, energy commissioning and retro-commissioning, performance contracting, energy field engineering, water savings, etc. He also served as senior-level technical and advisory energy field engineer (1 of 4 in NC) for a utility savings initiative (USI) program that saved \$55.3 million in one fiscal year for State of NC buildings. He is experienced with achieving energy savings in all systems such as HVAC, lighting, boilers, chillers, cooling towers, CHP, machines, motors, compressed air, renewables, etc. Joe has practical hands-on experience working within facilities at the managerial level (decision makers) and at the tactical level (site supervisors, operators, maintenance technicians, etc.) in all types of facilities including medical (hospitals, etc.), commercial, consumer, manufacturing plants, service industries, pharmaceutical, chemical plants, office buildings, K-12 schools, colleges, etc. This work included using Energy Star Portfolio Manager to benchmark facilities and using the results for encouraging state facilities to improve energy efficiency via energy savings performance contracts. Also, his work included reviewing and evaluating M&V reconciliations.

REPRESENTATIVE PROJECTS

- **SSM Healthcare – St. Mary’s Health Center**, St. Louis, MO: Project Engineer. Mechanical, electrical, and plumbing (MEP) systems assessment.
- **McKee Medical Center**, Loveland, CO: Project Engineer. Evaluation and energy analysis of the current hospital engineered systems to include HVAC, power, emergency power, medical gases, medical vacuum and life safety systems. The life safety systems will include fire alarm, fire protection and smoke control systems.
- **Veterans Affairs Medical Center, VISN 6 Mid-Atlantic Healthcare Network in VA, WV and NC**: Project Engineer. Retro-commissioning of eight Veterans Affairs (VA) hospitals across Virginia, West Virginia and North Carolina. EEI made on-site corrective actions to generate immediate operational energy savings, as well as recommending long-term operational energy savings. Performed energy calculations and analysis to quantify savings.
- **State Energy Office (SEO) in North Carolina**: Energy Engineer & Program Manager for Energy Technical Assistance. In that role for over two years, performed energy technical services himself and also supervised (visited sites, reviewed technical reports, approved invoices, etc.) 34 technical assistance contractors who were paid \$3.7 million to provide energy technical assistance services (energy assessments, measurement/verification, etc.) at 260 facilities in NC (office buildings, K-12 schools, colleges, etc.) that received grants totaling \$106 million for energy efficiency projects. For that work, Joe looked for every opportunity to do hands-on work himself such as he personally installed data loggers in electrical panels at some sites. Additionally, he analyzed lifecycle costs and energy savings and then summarized, reported energy savings and associated greenhouse gas (GHG) reductions.
 - **Energy Performance Contracting**: Also, as part of his work in SEO, reviewed and constructively critiqued performance contracting proposals, investment grade audits (IGA), and M&V reconciliations from multiple Energy Service Companies (ESCOs) for state, county, and municipal (Multi-Million \$ projects) facilities throughout NC for energy-saving projects.
- **U.S. Department of Energy (DOE)**: Reviewer/evaluator for 111 energy funding (>\$100 million) applications for U.S. companies. Obtained over \$2 million energy grants for facilities throughout NC including writing energy grant applications, creating strategic energy + water plans, energy audits, performing M&V, prioritizing energy projects, and recommending performance contracting.

PROFESSIONAL AFFILIATIONS

- American Association of Energy Engineers (AEE) – Senior member, NC chapter President, NC chapter advisory board member
- Institute of Industrial Engineers (IIE) – NC chapter President, senior member, past southeast USA regional VP.

James B. Gibson, CLEP, LEED AP, Electrical Commissioning Specialist

EDUCATION Candidate for Bachelors Degree in Electrical Engineering, University of Colorado, Denver Campus
Master Certification, Colorado State Electrical Board, June 1990
Product and Technology Training (Lighting, Power Conditioning, Fire Alarm, Security, Generators and Inverter Systems, Lighting Controls, and UPS Systems)

EXPERIENCE Mr. Gibson has extensive experience in designing, installing and testing electrical power, lighting, security and fire alarm systems for commercial, institutional, medical, hotel and historical facilities. He is certified as a master electrician and is a candidate for a Bachelors Degree in Electrical Engineering. He also has extensive AutoCAD and electrical product training.

- REPRESENTATIVE PROJECTS**
- **University Health Downtown Clinic**, San Antonio, TX: Senior Project Engineer for LEED Enhanced commissioning of this 269,500 SF ambulatory care facility and outpatient clinic. This project is part of a \$900 million Capital Improvement Project for University Health System. The project involves extensive electronic documentation during design, construction and commissioning that will continue to be used by the operations staff after the building is occupied.
 - **St Bernard Parish Hospital, Chalmette, LA**: Electrical Commissioning Specialist for commissioning of a 107,360 SF hospital and attached 62,290 SF medical office building, owned by St Bernard Parish and funded in part by Katrina reconstruction dollars. The hospital will replace Chalmette Hospital, destroyed in hurricane Katrina.
 - **North Colorado Medical Center**, Greeley, CO: Electrical commissioning of all standard hospital electrical systems as well as emergency power systems and electrical aspects of life-safety systems for new wing addition. Electrical system evaluation and master planning / deficiency resolution for 142,000 square foot wing constructed in the 1980s.
 - **Virtua Health West Jersey Hospital**, Voorhees, NJ: Electrical Commissioning services for this 360 bed, 681,395 square foot replacement hospital facility
 - **Allen Hospital ED & Cardio-Vascular Center**, Waterloo, IA: Electrical Commissioning Engineer of a 3-story, 76,000 SF addition to a 600,000+ SF regional hospital
 - **Mills Peninsula Replacement Hospital**, Burlingame, CA: Electrical Commissioning Engineer for this \$520+ Million replacement hospital facility
 - **Great Plains Regional Medical Center**, Elk City, OK: Electrical Commissioning Engineer for this 62-bed, 151,000 square foot replacement hospital
 - **Grand River Medical Center**, Rifle, CO: Electrical commissioning services for this 63,400 square foot critical access hospital facility
 - **National Jewish Medical and Research Center**, Denver, CO: Retro-commissioning Electrical Commissioning Engineer for this 480,000 SF hospital facility responsible for recommendations which led to approximately \$35,000 in annual operating savings
 - **Good Samaritan Hospital**, Cincinnati, OH: Electrical Commissioning Engineer responsible for electrical portion of a 10-year infrastructure improvement program
 - **St. Joseph Medical Center**, Reading, PA: Electrical Commissioning Engineer responsible for reducing the size of the electrical power systems based on diversity of use and using lower cost and higher reliability materials
 - **St. Joseph Medical Center**, Towson, MD: Electrical commissioning for this 800,000 SF hospital campus project
 - **Catholic Health Initiatives**: Investigation and analysis of existing power systems for various aging hospitals in several states

SPECIAL QUALIFICATIONS

- LEED Accredited Professional

PROFESSIONAL AFFILIATIONS

- Association of Energy Engineers, Certified Lighting Efficiency Professional (CLEP)
- National Fire Protection Association (NFPA)
- National Electrical Testing Association (NETA)
- Institute of Electrical & Electronics Engineers, Inc. (IEEE)

Mark Allen Laity-Snyder, LEED® AP, CPMP, Mechanical Commissioning Specialist

EDUCATION B.S., Mechanical Engineering, University of Akron, 1994

EXPERIENCE Mr. Laity-Snyder has 15 years experience as a testing and balancing engineer. He has extensive knowledge of AABC and NEBB test and balance procedures. He also has experience with specialized HVAC systems for clean rooms, laboratories, humidity-controlled rooms, and low-pressure plenum air delivery systems. His project management skills include: confirmation that all aspects of each system are operating properly, coordination with the various trades, report-writing to produce an accurate picture of the project site, and communication with all members of the construction team to get the work done in an efficient manner. He was also responsible on a daily basis for the evaluation of the commissioning and test and balance reports generated by 35 employees and problem resolution.

Mr. Laity-Snyder is knowledgeable in wiring involving relays, optical and temperature sensors, and complex system analysis. He also has significant experience with Rover, WCIS, Hoffman & Hoffman, Siemens, and Hyperterminal software which interfaces with building automation systems. Mr. Laity-Snyder has extensive knowledge of the Intellihood control system by Melink Corporation which was required to coordinate with the EMS, Ansul, and cooking systems.

REPRESENTATIVE PROJECTS

- **UVA Health System – Emily Couric Clinical Cancer Center**, Charlottesville, VA: Commissioning Technician for new 150,000 SF cancer center. EEI was contracted to provide LEED EA Prerequisite 1 – Fundamental Building Systems Commissioning and LEED EA Credit 3 – Enhanced Commissioning.
- **UVA Health System – 2E Heart Center Renovation**, Charlottesville, VA: Commissioning technician for renovation of 21,600 SF Heart Center.
- **UVA Health System - Central Tower Bed Expansion**, Charlottesville, VA: Commissioning Technician for new addition to the hospital. Duties include testing of mechanical systems and data compilation for this LEED project.
- **Department of Veterans Affairs (VISN 6) Salem VAMC – Retrocommissioning**, Salem, VA. Commissioning Technician. Conducted energy audit activities and suggested improvement measures. Made on-site corrective actions to generate immediate, as well as long-term operational savings.
- **Virginia Tech Carilion School of Medicine & Research Institute**, Roanoke, VA: Commissioning Technician for new 150,000 SF combination medical school and research institute. EEI was contracted to provide services required to meet LEED Energy and Atmosphere (EA) Prerequisite 1 – Fundamental Commissioning of the Building Energy Systems.
- **Roanoke County – South County Library**, Roanoke, VA: Commissioning Technician for this new library. Duties include testing of mechanical systems and data compilation for this new LEED facility.
- **University of North Carolina – Center City Classroom Building**, Charlotte, NC: Commissioning Technician for new classroom. Duties include testing of mechanical systems and data compilation for this new LEED facility.
- **Washington and Lee – Sorority House #6**, Lexington, VA: Commissioning Technician for new sorority house. Duties include testing of mechanical systems for this LEED facility and data compilation.
- **Seymour Johnson Air Force Base – Consolidated Support Center**, Goldsboro, NC: Commissioning Technician for the new courthouse/office building. Duties include testing of mechanical systems for this LEED facility and data compilation.
- **Washington and Lee – Colonnade - Payne Hall**, Lexington, VA: Commissioning Technician for the remodeled English department. Duties include testing of mechanical systems for this LEED facility and compilation of data.
- **Merck Pharmaceuticals, Building 130**, Durham, NC: TAB Engineer for this large 2 story, clean room/laboratory facility. Tested HVAC air, water and glycol systems, building pressurization, HVAC troubleshooting, ensured controls were calibrated.

PROFESSIONAL AFFILIATIONS

- LEED Accredited Professional with the US Green Building Council (USGBC)
- ASHRAE – Commissioning Process Management Professional (CPMP)

Matthew J. Chopin, CxA, Controls Specialist

EDUCATION B.S., Mechanical Engineering, The Ohio State University, 1996

EXPERIENCE Mr. Chopin joined EEI in 2012 as the Satellite Manager of our Columbus, Ohio branch office. His background is in controls, mechanical construction, and systems commissioning and engineering reviews for a broad spectrum of facilities in multiple markets. His prior experience spans industrial, commercial, and government facilities. His primary focus has been to insure engineered documents meet the owners' project requirements, project installations meet design requirements, and building systems interface properly and efficiently.

Much of Mr. Chopin's career has been focused on energy conservation measures to drive improvements in building systems' performance and enhance facility operations. His engineering and analysis expertise, in addition to his comprehensive knowledge of installation/operation of mechanical and electrical systems from conceptual design through project close-out, make him a great asset to our commissioning team.

REPRESENTATIVE PROJECTS

- **UVA Health System – 2E Heart Center Renovation**, Charlottesville, VA: Project Engineer for renovation of 21,600 SF Heart Center.
- **UVA Health System – Radiology Renovation** Charlottesville, VA. Project Manager. This project is seeking LEED certification under CI Version 2.0. Commissioning activities for all applicable LEED Energy & Atmosphere Prerequisite 1 (EA PR 1) requirements were conducted. Prominent among the commissioning services provided was the witnessing of functional testing for all variable volume terminal units and interior lighting control.
- **OSU Wexner Medical Center Cancer & Critical Care Tower**, Columbus, OH: Project Engineer for design through warranty phases of the 1,122,228SF, 20-story, \$500MM+, Cancer and Critical Care Tower. Commissioned systems include mechanical, emergency power, plumbing, life safety, vertical transportation, and smoke control systems. EEI is contracted to provide LEED Enhanced Commissioning for this project. This project is seeking LEED Silver Certification.
- **OSU Wexner Medical Center RDJ MEP Upgrades**, Columbus, OH. Project Engineer for commissioning services from design through warranty phases for this \$46MM+ mechanical and electrical upgrade project. Project includes replacement of major mechanical equipment and connection to a remote chilled water plant within the operating hospital. EEI provided just-in-time commissioning for the entire project. All mechanical equipment was installed in a fully functional facility with the new systems enabled for the first time while serving patient areas. EEI was instrumental in the planning, testing and turnover of this newly installed equipment while minimizing patient impact.
- **OSU Wexner Medical Center RDJ Chilled Water RCx**, Columbus, OH. Field Engineer for 1,640,000 SF campus chilled water evaluation. EEI's provided as-built documentation of the entire chilled water system for all three buildings. This process focused on chilled water flow and velocities, coil connection details and equipment operating points. EEI's on-site investigation revealed several issues which dramatically improved patient comfort when implemented.
- **Ohio State University - South Campus Central Chiller Plant (SCCCP)** Columbus, OH. Project Engineer. Developed a plan to identify and repair pre-existing issues associated with the existing chilled water system and developing a plan to convert from the existing local central plant to the remote central plant. Procured and managed professional services for Medium Voltage commissioning, Test, Adjust & Balance (TAB), and Sound & Vibration.
- **US Department of Veterans Affairs Medical Centers – Retrocommissioning**, Salem, VA and Beckley, WV. Project Manager for 2 sites. Conducted energy audit and suggested improvement measures. Made on-site corrective actions to generate immediate, as well as long-term operational savings.

PROFESSIONAL AFFILIATIONS

- ASHRAE
- AABC Commissioning Group (ACG) - CxA

FIRM LOCATION

The Firm's staff should be capable of being at the Agency located in Charleston, WV and to the project located in Weston WV within two (2) hours after notification.

EEl employees are located in Raleigh, North Carolina, Columbus, Ohio and Roanoke, Virginia. The closest office is Matt Chopin. He is a 3.5 hours drive. Raleigh is a 3 hour 15 minute flight from Charleston.

PROJECT APPROACH

Commissioning Strategy

The commissioning strategy is based on the understanding that it is the contractors' desire, as well as their obligation, to provide systems that function in accordance with the OPR and BoD. The role of the Commissioning Authority (CxA) is to develop and manage the commissioning process, within the limits of the contract, as a means of verifying that this goal is accomplished for the appropriate systems. The CxA serves on behalf of the Owner to verify that the BoD is achieved for the systems to be commissioned. Commissioning is predominantly a quality assurance function—a verification of system performance, relying on enhanced field testing upon completion of construction. As with all quality assurance activities, simply testing the end product does not guarantee performance and may only serve to highlight performance deficiencies to be corrected. In order to gain the greatest possible benefit from the commissioning process, it should contain all of the following elements:

Continual Quality Assurance

The Owner, designers, General Contractor (GC), contractors, and CxA become the commissioning team and must all make concerted efforts to continually build quality into all phases of the project, not just at the final performance testing. The commissioning team must carefully monitor construction progress and verify compliance with contract documents and overall standards of quality.

Owner's Project Requirements (OPR)

The OPR must be completed by the Owner, CxA and project team prior to the approval of contractor submittals of any commissioned equipment or systems. Updates during the design and construction process are the primary responsibility of the Owner.

The OPR should address the following issues, as applicable to the project:

- Owner and user requirements
- Environmental and sustainability goals
- Energy efficiency goals
- Indoor environmental quality requirements
- Equipment and system expectations
- Building occupant and O&M requirements

Basis of Design (BoD)

The design team must document the BoD for the systems to be commissioned prior to approval of contractor submittals of any commissioned equipment or systems. Updates during the design and construction process are the primary responsibility of the Owner.

The BoD should include the following, as applicable:

- Primary Design assumptions
- Standards
- Narrative descriptions

The Commissioning Plan

This document is developed to define the scope and format of the commissioning process and the responsibilities of all involved parties. The Commissioning Plan is provided to all commissioning team members to inform them that the intent and scope of the commissioning work are part of the project, and to expedite the commissioning process. The commissioning plan is developed at the start of the commissioning process and is updated during the course of a project to reflect any changes in planning schedule or other aspects.

Commissioning Program Overview

- **Goals and objectives**
- **General project information**
- **Systems to be commissioned**

Commissioning Team

- **Team members, roles and responsibilities**
- **Communication protocol, coordination, meetings and management**

Commissioning Process Activities

- **Documenting the OPR**
- **Preparing the BoD**
- **Developing systems and functional test procedures**
- **Verifying system performance**
- **Reporting deficiencies and the resolution process**
- **Accepting the building systems**
- **Reviewing contractor submittals**
- **Developing the system manual**
- **Verifying the training of operations personnel**
- **Reviewing building operation after final acceptance**

The Commissioning Specifications

The specifications will be provided [or have been provided] to outline the contractor expectations and requirements for participation in the commissioning process.

The Commissioning Schedule

The commissioning schedule will be developed in conjunction with the construction schedule. It defines the milestones and conditions that must be achieved before system testing and other commissioning activities can commence. The schedule should also include the expected duration of the various tasks, so that the commissioning process can be incorporated into the overall project schedule. Engineering Economics, Inc. (EEI) requests that a copy be made available in Microsoft Project such that the CxA provides comments and input on the commissioning schedule. At all times, however, the contractor shall bear responsibility for maintaining the schedule with input of day-to-day operations from their subcontractors.

Preparation for Testing

To prepare for the system performance testing, the CxA and the contractors must carefully examine the construction documents, submittals and contract revision documents to develop Pre-functional Test Checklists. The contractors must provide completed Pre-functional Test Checklists to the CxA for review and approval prior to functional testing. Using the Pre-functional Test Checklists, each contractor must verify that the systems are installed in compliance with the construction documents, are clean and properly prepared for operation, are fully functional for test and balance, and are ready for functional testing. Contractors may choose to submit their own start-up checklists for approval by the CxA. If the CxA approves, the start-up checklists will be used in place of the Pre-functional Test Checklists. The CxA will write all Functional Test Procedures, which will identify the specific functional tests to be performed. Functional testing can begin only when the Checklists are completed by the appropriate contractors, initialed, signed and returned to the CxA. Commissioning is not intended to be a testing or inspection function that replaces any of the contractors' obligations for testing and proof of performance. Should there be a call to the CxA for functional testing and the CxA has determined that the pre-functional checklists have not been completed satisfactorily, EEI will backcharge the contractor for time and expense to site.

Functional Testing

Functional testing is performed by experienced and qualified technicians of the contractor(s) responsible for installation as facilitated by the CxA, and may be observed by other members of the commissioning team. Functional testing will verify proper sequencing, operation and performance of installed equipment and systems under realistic operating conditions. The functional testing will follow the written Functional Test Procedures with test results documented for permanent record. Unresolved testing issues are noted in the final report. The CxA is not accountable for issues left unresolved.

Documentation

Customized Pre-functional Test Checklists and Functional Test Procedures are developed to guide the commissioning process. Specific written documentation is maintained for all other commissioning activities. Commissioning reports are issued as often as daily to the GC and key members of the commissioning team to document project issues, deficiencies and status of construction and/or testing. Reports and resolution are tracked for the duration of the project. At the end of the commissioning process, all documentation is assembled and summarized in the final commissioning report.

Problem Resolution

When a report is issued to address an identified deficiency, the GC [Owner] has the responsibility to forward it to the appropriate parties to initiate corrective action in an expeditious manner. The designer is relied on for design modification and issuance of final design details, and the contractors are relied on for implementation of that design.

COMMISSIONING PROCESS

Coordination

Meetings

Commissioning issues pertaining to the overall construction process will be raised at the regular construction meetings. A commissioning kickoff meeting will be held to review the commissioning process, responsibilities and schedule with all affected parties. Additional meetings will be held between the CxA and the GC to refine the schedule and coordinate commissioning activities. As the project advances into the system start-up and testing phases, commissioning team meetings will be scheduled on an as-needed basis to plan and coordinate commissioning activities and to resolve issues and deficiencies. Minutes of the commissioning meetings will be recorded by the GC and distributed to the commissioning team.

Scheduling

The start-up schedule and plan developed by the GC and contractors will be reviewed by the CxA in conjunction with the Owner.

Since successful commissioning is a criteria for acceptance of this project, adequate time must be reserved in the overall project schedule for commissioning activities, including resolution of problems and retesting. This schedule is based on the overall project schedule provided by the GC, but is modified to refine testing durations. This schedule should be integrated into the overall project schedule by the GC.

distributed to the commissioning team and specifically to installing contractors for completion.

Functional Test Procedures and Data Forms

Functional Test Procedures with integral data forms are developed by the CxA. Draft procedures will be submitted to the commissioning team for review and comment, and will be revised as appropriate by the CxA. Final Functional Test Procedures will be executed and endorsed by the CxA. Test results will be documented in the data forms that are integral to the procedures.

Project Communication Reports

Significant project issues and communication generated by the commissioning process are documented using PCRs, which are issued by the CxA to the GC and members of the commissioning team. PCRs are sequentially numbered and are logged along with responses and/or resolution, and are used to document the following issues:

- Daily commissioning activities and progress on site
- Commissioning meeting minutes
- Issues identified in design and construction documents
- Issues identified in installation
- Observations of contractor start-up and testing activities
- Successful or unsuccessful results of functional performance testing

Where appropriate, recommendations for corrective action will be made in the PCR for the consideration of the commissioning team. Specific contractor direction for corrective action or changes will be through the established contractual channels for the project.

Final Commissioning Report

The CxA will assemble the commissioning documentation into the final commissioning report, to be submitted to the Owner's representative and the GC. This report will include:

Project Summary

- Executive summary
- History of any system deficiencies identified and how they were resolved
- Outstanding issues
- Seasonal testing schedule
- Confirmation form CxA indicating whether individual systems meet the OPR and BoD
- Summary of submittal Review Process
- Summary of the O&M Documentation and training process

Commissioning Plan

- Completed Pre-functional Test Checklists
- Functional Test Procedures and test records
- PCRs and PCR log
- Other relevant supporting information

Training

The Owner's operation and maintenance personnel can be formally trained in classroom sessions at the completion of the project. The CxA will facilitate this O&M training, including approval of the training schedule. The contractors and vendors providing training will complete training plans and submit to the CxA for review and approval in conjunction with the Owner's representative.

APPROPRIATE LEVEL OF COMMISSIONING

The most appropriate level of effort is enough time spent on the job to complete our quality assurance efforts, but not so much time as to become a hindrance to the project. In our experience, our time is dependent on the true quality of the design and the quality of the subcontractors. We will not be able to evaluate the contractors until construction is underway and problems start to appear or we find there are very few problems. Our method is to start with a more rigorous approach and then back off if we find that things are going well. If there are problems, we assemble the involved parties, as early after the problem has been discovered as feasible, to explore resolution options.

We do not attempt to play or circumvent the roles of the design team or construction manager. When we discover problems, we report them via a Project Communication Report describing the problems along with our recommendations. We then continue follow up until it is either resolved or accepted by the Owner. We do not attempt to direct or manage either the engineering or construction activities required for the solution but rather stay in the loop on a consultative basis.

The appropriate level of commissioning for any system depends upon how critical it is that the system functions without problems. The question is asked, "What will happen if this system fails?" If the failure of that system causes serious repercussions then it is obviously important to devote more time to commissioning that particular system.

EEl uses the lessons learned from other projects we have commissioned to benefit our clients by pointing out potential problems as early in the process as possible. The earlier a problem can be identified the more likely – and less costly – it is to correct.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: WSH14021

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

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


Addendum Numbers Received:

(Check the box next to each addendum received)

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

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

Engineering Economics, Inc.

 Company


 Authorized Signature
 8-13-13

 Date

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



Arizona

2320 E. Baseline Road, Suite 148-291
Phoenix, AZ 85042
602.329.3485

New Mexico

11930 Menaul Blvd NE, #224C
Albuquerque, NM 87112
505.830.6069

Arizona

120 S. Houghton Road, Suite 138-255
Tucson, AZ 85748
520.780.6263

North Carolina

2501 Blue Ridge Road, Suite 250
Raleigh, NC 27607
919.608.7547

Northern California

152 Oakmont Way
Los Gatos, CA 95032
408.438.0355

Ohio

5195 Hampsted Village Center Way, PMB 220
New Albany, OH 43054
740.501.7651

Southern California

5721 W. Slauson Avenue, Suite 160
Culver City, CA 90230
310.568.0807

Oregon

12042 SE Sunnyside Road, Suite 365
Clackamas, OR 97015
503.545.8096

Colorado

780 Simms Street, Suite 210
Golden, CO 80401
303.239.8700

Texas

85 NE Loop 410, Suite 300
San Antonio, TX 78216
210.496.3100

Kansas/Missouri

8700 Monrovia Street, Suite 310
Lenexa, KS 66215
913.707.4422

Washington

1201 Western Avenue, Suite 325
Seattle, WA 98101
206.622.1001

Washington

1324 N. Liberty Lake Road, Suite 263
Liberty Lake, WA 99019
800.606.8008