ZDS
Design/Consulting Services
MECHANICAL . ELECTRICAL . INDOOR AIR QUALITY . ENERGY . COMMISSIONING

91 Smiley Drive St. Albans, WV 25177 Phone: 304-755-0075 Fax: 304-755-0076 Email: Todd.Zachwieja@ZDSDesign.com

August 9, 2013

**TO: Roberta Wagner**
**Department of Administration**
WV Purchasing Division
2019 Washington Street East
Charleston, WV 25305-0130

**RFQ NO: WSH14021**
**PROJECT: William R. Sharpe Hospital Commissioning Services**

| Qty: | Doc. No. | Doc. Date | Description | Action Code |
|---|---|---|---|---|
| 4 | | 8-15-13 | Enclosed EOI for your review and consideration | J1-A |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**Action Codes**

| | |
|---|---|
| **A** - Action indicated on item transmitted | **F** - Furnish as corrected--Resubmittal required |
| **B** - For your information or use | **G** - Revise and resubmit |
| **C** - For signature and return to this office | **H** - Rejected |
| **D** - Furnish as submitted | **I** - For your approval |
| **E** - Furnish as corrected--Resubmittal not required | |

**J1. EOI #WSH14021 for William R. Sharpe Hospital Commissioning.**
**EOI Opening Date: 8/15/2013 EOI Opening Time: 1:30 pm**

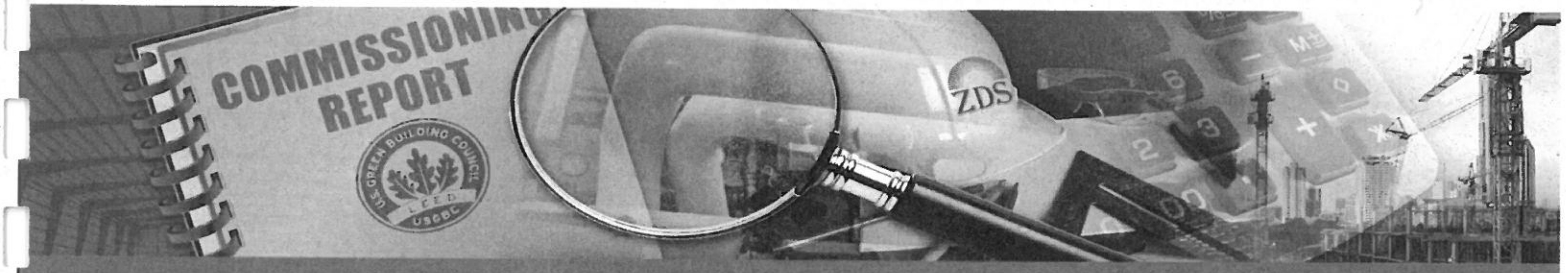
BY: Patricia A. Hart

Mailed by ☒ UPS Next Day Air ☐ UPS Ground ☐ USA Priority Mail ☐ USA Mail
☐ Hand Deliver ☐ Hand Pick Up

COPIES TO: N/A

T:\ZDS\ZDS MARKETING\RFQ\Health Care\WSH14021 Sharpe Hospital Cx EOI Cx Due 08-15-13\WSH14021_T13-08-09RW_ EOI Sharpe Cx.doc.docx

# TRANSMITTAL LETTER




# COMMISSIONING EOI PREPARED FOR WILLIAM R. SHARPE HOSPITAL

**WSH14021**

**August 15, 2013**

Facility Dynamics ENGINEERING

ZDS
Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • Ph: (304) 755-0075 Fax: (304) 755-0076 • www.zdsdesign.com

# TABLE OF CONTENTS

ZDS
Design/Consulting Services
MECHANICAL . ELECTRICAL . INDOOR AIR QUALITY . ENERGY . COMMISSIONING

91 Smiley Drive St. Albans, WV 25177 Phone: 304-755-0075 Fax: 304-755-0076 Email: Todd.Zachwieja@ZDSDesign.com

**WSH14021 Commissioning EOI for William R. Sharpe Hospital, Weston, West Virginia**

We have enclosed one original and three convenience copies of our EOI outlining ZDS**'s Team** proposed to provide Professional Engineering Commissioning (Cx) Services for ***William R. Sharpe Hospital***. ZDS **Design/Consulting Services** and their consultant, ***Facility Dynamics Engineering (FDE)***, have been working together on commissioning projects for over 18 years. Total number of commissioning projects exceeds 2,000 when looking at the work of both companies with the project costs ranging from less than $10 million to over $800 million. We hope to have the opportunity to work on Commissioning Services for the new ***William R. Sharpe Hospital*** located in Weston, West Virginia. We have over five decades of experience in West Virginia, giving us the local understanding of your needs. Our professionals are dedicated to performing quality services taking into account our clients' needs, scheduling and budgets. ZDS and ***FDE*** both carry liability insurance coverage in compliance with local and state laws. Proof of Insurance can be provided as necessary to fulfill the requirements of this Project. A brief description of the organization of ZDS' services and ***FDE*** is described in ***Section II*** of this expression of interest with an organization chart shown immediately following this letter.

**Personnel Having Authority to Execute Binding Contract:** The project is assigned to ZDS' principal-in-charge of commissioning: ***Todd A. Zachwieja, PE, CEM, LEED AP – Principal and CEO*** of ZDS **Design/Consulting Services**, 91 Smiley Drive, Saint Albans, WV 25177 E-mail: Todd.Zachwieja@ZDSDesign.com, Phone 304-755-0075, Ext. 307, Mobile (304) 545-4550.

We do work in 24 states with our corporate offices located in Saint Albans, West Virginia – **located within a 20 minute drive from the Agency and within two hours drive of the project location**. We also have a registered professional engineer located in Morgantown that is **only about an hour's drive from the project** location, so we can readily address this project's needs.

Our team has provided professional mechanical and electrical engineering consulting/commissioning services for many facilities across the country, the State of West Virginia and government agencies. Our companies have partnered on both design and commissioning projects for over 18 years proving we provide a winning Team. We believe that we understand your needs and our knowledge will be an excellent fit for the proposed commissioning services. Our combined commissioning experience includes many healthcare projects and complex systems in other types of projects. Some recent commissioning projects include the $43 million new maintenance hangar/fuel cell facility for the West Virginia Air National Guard at Yeager Airport, a $43 million new LEED Gold Certified Research facility for Harvard University and a 246 bed Western State Replacement Hospital for the Virginia Department of Behavioral Health, Richmond, VA. Refer to ***Section III*** for more project details.

ZDS**'s Team** does not have any litigation or arbitration proceedings or vendor complaints filed with the State's Purchasing Division, nor any disputes with other Agencies or the State of West Virginia that involve legal representation by either party related to the Firm's delivery of professional services.

**PROJECT EXPERIENCE – SECTION III:** The ZDS **Team** has extensive experience in new construction and renovation design, commissioning many projects, including LEED projects, and Performance Contracting projects involving energy and operating savings for health care and others. Our team is recognized for our specialties in mechanical design/commissioning, electrical

design/commissioning, indoor air quality services, and energy conservation/performance contracting services for Commercial, Governmental, Educational and Health Care facilities. ZDS principals, Ted Zachwieja and Todd Zachwieja, specialized in energy conservation design prior to establishing ZDS and were involved in hundreds of millions of dollars in renovations, new construction and Performance Contracting heavily involving HVAC/Electrical systems for health care facilities including commissioning before LEED even existed. Some previous experiences include Commissioning new schools for the Raleigh County Board of Education starting in 1997, Washington & Lee University campus infrastructure in the 1990's, a $400 million retro-commissioning program for General Motors North American Operations, Ohio University facilities at various campuses, Harvard University's new LEED Gold Certified Arboretum, and most recently two (2) phases of new construction for the West Virginia Air National Guard at the Yeager Airport in Charleston. ***FDE*** has over a thousand commissioning projects including health care projects up to $800 million in construction value with over 60 engineers/commissioning specialists to complement ZDS.

The ZDS **Team** has the best expertise to provide economical solutions to your specific project's needs. Our Team's commissioning efforts have been extremely effective in the past by acting in our clients' behalf to help bridge new technologies and management methods into actual operating practices that have saved our clients substantial funds in construction and operating costs. We pride ourselves on being viewed as an extension to the client's staff and successfully incorporating pertinent information about their facility into any proposed solution.

The ZDS **Team** has had many successful years of professional experience with local and state agencies including recent ARRA funded projects. Some recent ARRA funded projects with Government agencies include the VA Huntington Hospital steam distribution upgrades, VA Huntington Hospital water line upgrades and ***successfully working with the West Virginia Department of Health and Human Resources*** involving seven hospitals to reduce energy usage and improve HVAC, lighting and comfort.

**PROFESSIONAL QUALIFICATIONS – SECTION IV:** ZDS Team members have seven (7) registered professionals in all of the required disciplines, including seven (7) graduate Mechanical Engineers with extensive HVAC/controls knowledge to effectively execute the requirements of the project and address the needs for the following:

- **Commissioning/Energy Engineering**
- **HVAC Engineers**
- **Electrical Engineers**
- **Plumbing/Fire Protection Engineers**

We believe that our specialties in Commissioning/design of HVAC systems, Electrical systems, Energy Management, and knowledge of codes make us most qualified to work on this project. We continue to have an excellent working relationship with the West Virginia State Fire Marshal and the West Virginia Office of Health Facility Licensure & Certification. Below is a partial listing of the Project Team. Todd Zachwieja and Jennings Davis will serve as Commissioning Authority (CxA) team leaders during the commissioning process with FDE's engineers providing peer support and review. Detailed resumes are included in *Section IV* of this document.

***Todd A. Zachwieja***, ZDS ***Principal-in-charge of Design/Commissioning and Project Management*** BSME, MSEM, P.E., CEM, LEED AP with over 38 years of experience in M/E design, energy management, IAQ and commissioning. *Nationally recognized for expertise in Energy. Received "Legend in Energy" by AEE in 2007/2008. Selected to teach West Virginia's new Energy Code by WVU and the WV Division of Energy. Current President of WV ASHRAE.*

***Jennings L. Davis II***, ZDS ***Operations/Associate,*** BSME, P.E. with over 23 years of experience specializing in MEP design, construction administration and commissioning.

***Ted T. Zachwieja***, ZDS ***Principal-in-charge of Construction Administration*** with over 55 years of experience in M/E design and Construction Administration. *Ted was one of three engineers selected by the Department of Energy to train those who manage buildings to conserve energy.*

***Jim Watters***, ZDS ***Production Manager/Associate*** with over 40 years of experience in mechanical, electrical and plumbing design/commissioning and Construction Administration.

***James Lowry,*** ZDS ***Senior Engineer***, BSME, P.E. specializing in HVAC design and commissioning with over 14 years of experience.

***Ted A. Zachwieja III,*** ZDS **BIM Manager/Systems Administrator**, BSME, EI, Received the 2012 Legend-in-Energy Award, specializing in 3D MEP design, 3-D imaging technology while working over 10 years with ZDS.

***David Dial,*** ZDS ***Senior Engineer***, BSME, MEE, P.E. specializing in HVAC design and commissioning with over 33 years of field and operations experience.

***Tim Scruby,*** **Facility Dynamics Engineering, Project Executive, Senior Mechanical Engineer**, BSME, P.E., LEED AP with over 32 years experience in the commissioning, controls, design review, functional/performance testing covering all aspects of commissioning HVAC systems. Exceptional ability to analyze complex situations and develop innovative and successful solutions.

***Dave Stabler,*** **Facility Dynamics Engineering, Senior Electrical Engineer**, BSAE, P.E. with over 34 years experience in the electrical construction industry covering all aspects of commissioning electrical systems.

***Scott Stoutenborough,*** **Facility Dynamics Engineering, Senior Mechanical Engineer**, BSAE, P.E. with over 30 years experience in the commissioning, controls, design review, functional/performance testing covering all aspects of commissioning HVAC systems.

***Stan Stough,*** **Facility Dynamics Engineering, Senior Electrical Field Technician** with over 40 years experience in the health care field including the commissioning, site testing, design review, functional/performance and validation of system operation testing covering all aspects of commissioning HVAC systems.

Our team has also worked on many health care projects including CAMC, United Hospital Center, WVDHHR healthcare facilities, Virginia Behavior Health and many others. We encourage you to call our references and ask how well we worked with their staff, about our technical strengths and our ability to work with contractors to provide the Owner with a quality project. Please feel free to contact some of the following references about ZDS' work and refer to ***Section III*** for additional references, letters of recommendation and more project experience details:

1. Mr. Greg Nicholson, Chief Operations Officer, DHHR, Charleston, WV (304) 558-1577.
2. Mr. Ron Adkins, former Project Manager for WV Air National Guard Cx projects (304) 957-0205.
3. Mr. William "Bill" J. Williams, Charleston Area Medical Center, Consultant for Plant Operations, Charleston, WV (304) 388-9740 or home 304-595-3844.
4. Mr. Bill Elswick, formerly CAMC, Washington & Lee University and Ohio University Director and West Virginia Department of Education (304) 542-8877 (see letter of recommendation, section III).

5. Mr. Mike Pickens, Executive Director of the West Virginia Department of Education (304) 558-2711 (see letter of recommendation in section III).
6. Mr. Ron Cantley II, Director of Operations, Fayette County Schools (304) 574-1176, ext 2151 (see letter of recommendation, section III).
7. Mr. Tony Crislip, Manager Mechanical and Electrical Trades, Marshall University (304) 696-6241.
8. Mr. Ray George, Charleston Area Medical Center, Construction Manager, Charleston, WV (304) 388-9740.

Please feel free to contact some of the following references about ***Facility Dynamics Engineering*** work and refer to ***Section III*** for additional project experience details:

1. Mr. Keith Sunderman, Project Manager, Milton S. Hershey Medical Center, PA (814) 321-3200.
2. Mr. Jim Hanson, Senior Project Manager, Children's Hospital of Philadelphia, PA (267) 426-2056.
3. Mr. Brian Heigh, Project Manager, University of Pennsylvania Health System, PA (215) 662-4823.
4. Mr. Chuck Egan, Project Manager, A.I. DuPont Hospital for Children, DE (302) 298-7082.
5. Mr. Scott Campbell, Project Manager, Rockingham Memorial Hospital, VA (540) 432-0826.

Our professionals are dedicated to performing quality commissioning services, taking into account clients' needs, scheduling and budgets.

**APPROACH to Meet Project Goals and Objectives:** We have designed the improvements and commissioned the Mechanical/Electrical systems for many projects. By commissioning the systems, we fine-tune the equipment to actual conditions and assist Owner personnel after occupancy to improve comfort, provide training, and minimize operating costs. We understand the scope of services outlined in the EOI and will meet the requirements. Our Team has extensive experience in the EOI commissioning scope requirements which are common for many of our projects.

***Design Phase:*** We understand the design team needs and will help to identify potential issues for maintenance and operations; assist with the Owner's Project Requirements (OPR) and Basis of Design (BOD), and develop a commissioning plan. Facility Dynamics Engineering will also assist in peer review of the design documents and refinement of the commissioning plan.

***Construction Phase:*** We understand the need and would develop pre-functional checklists and functional performance testing criteria. We would maintain an issues log and work with contractors. ***FDE*** would assist with working with the design team to establish commissioning procedures and testing criteria, review submittals and provide comments. Our Team would coordinate the commissioning process through meetings, witnessing of installations and testing, and submission of reports. Our team has a database of nearly 2,000 commissioning projects with the experience and expertise of issues and solutions that we can access when we need additional resources to assist in overcoming challenges that occur. We believe this database of knowledge accumulated over the last two decades provides you with an excellent resource and the best value for your project.

***Acceptance Phase:*** We would be involved in DDC controls and TAB process for this project. We understand the importance and would witness key systems (including the smoke control system) and equipment testing; witness or verify functional testing of major systems and equipment, especially the HVAC controls. We would maintain issues logs, review training procedures and O&M manuals and provide comments to assist in the training process. We would also prepare a final commissioning report in accordance with the EOI requirements and the standards of care for the industry.

***Warranty Phase:*** We would reviews warranties for equipment to confirm compliance with contract documents, perform follow-up site visits and review operations with Owner personnel. We would also

document issues and report findings that the Contractor or others may need to address while the project is still under warranty. These would be sent through the design team for proper action.

We have worked on many phased renovation projects including health care where stringent requirements are necessary for the protection of the staff and patients. We understand the challenges of phase projects; please ask some of our references on how well we handle phased construction projects. When a construction issue arises, it's important to define and address the project needs as soon as possible to keep the project moving forward. We have an experienced staff with over 300 years of combined experience ready and willing to start on your project. The ZDS **Team** takes pride in meeting our clients' needs and schedule. We believe that our specialties provide ***William R. Sharpe Hospital*** with the best commissioning expertise for your specific project's needs.

We look forward to having an interview with you to further discuss our qualifications and your project. If there are any questions, please do not hesitate to call.

Sincerely,

Todd A. Zachwieja, P.E., CEM, LEED AP
Principal, Chief Executive Officer

T:\ZDS\ZDS MARKETING\RFQ\Health Care\WSH14021 Sharpe Hospital Cx EOI Cx Due 08-15-13\Section I - Executive Summary\Executive Summary Sharpe Hospital 8-14-13.docx

# Project Team

ZDS
DESIGN/CONSULTING SERVICES

## West Virginia Division of Health & Human Resources
## William R. Sharpe, Jr. Hospital

**Todd Zachwieja, *PE, CEM, LEED AP***
***ZDS Principal-in-Charge***

***Prime***
***ZDS Design Consulting Services***
***HVAC, Electrical Commissioning***

- Ted T. Zachwieja, Principal
  Construction , Commissioning
- Jim Watters, Associate
  Electrical/Plumbing Commissioning
- Jennings Davis, P.E., CIE
  Mechanical Commissioning Engineer
- James Lowry, P.E.
  Mechanical Commissioning Engineer
- David Dial, P.E.
  Mechanical Commissioning Engineer
- Ted A. Zachwieja III, E.I .
  Mechanical Commissioning
- John Brigham, P.E.
  Electrical Engineer

***Consultant***
***Facility Dynamics Engineering***
***HVAC, Electrical Commissioning***

- Tim Scruby, P.E, LEED AP
  Project Executive, ME
  Senior Project Manager
  Senior Controls Engineer
- Dave Stabler, P.E.
  Senior Electrical Engineer
- Scott Stoutenborough, PE
  Project Mgr., Senior ME,
  Controls HVAC Engineer
- Stan Stough
  Senior Field Technician

ZDS
DESIGN/CONSULTING SERVICES

Facility Dynamics
ENGINEERING

**ZDS offers an effective organizational structure -- one that takes each project from inception through completion, working as an extension of the client every step of the way.**

**Excellent mechanical and electrical design results from an experienced team, as well as listening to the needs of the client.**

## ABOUT ZDS DESIGN/CONSULTING SERVICES

### ORGANIZATION

In 1983, Todd A. Zachwieja founded ZECO Consultants. In 1994 ZDS Limited Liability Company was incorporated in West Virginia using dba ZDS Design/Consulting Services, and was founded to provide design and consulting services. Today ZDS has four principals with over 100 years of technical expertise:

**Todd A. Zachwieja**, PE, C.E.M., LEED AP, Chief Executive Officer, brings with him over 38 years in the design and consulting business.

**Ted T. Zachwieja**, Principal over Construction Administration services, has over 55 years experience in the design and consulting business. He was owner of Ted T. Zachwieja & Company from 1962 to 1982.

**Daniel H. Kim**, Ph.D., Manager of Strategic Planning, brings with him over 25 years in the design and consulting business and is one of the nation's leading experts in organizational management. He is also owner/founder of Pegasus Communications, Inc. from 1991 to present.

**Lori Zachwieja**, CPA, Chief Financial Officer, MFA, was cofounder of ZECO Consultants and brings over 30 years experience in operating a business.

### SERVICES

| | | |
|---|---|---|
| MECHANICAL | ENERGY | INDOOR AIR QUALITY |
| ELECTRICAL | BIM | 3D LASER SCANNING |
| PLUMBING | COMMISSIONING | EXPERT WITNESS |

Each new project is assigned to a principal in-charge who will follow the project from inception through commissioning.

ZDS assigns the production staff according to the nature of the project and the work force necessary to meet the schedule. The Principal in charge of that project determines if consultants are needed and coordinates all areas. After bidding, a Principal of ZDS coordinates visits to the job site regularly, all the way through the post-warranty inspection.

ZDS believes in the team approach when providing engineering design and consulting services. We start with our client as the number one member on our team. We listen to the needs and concerns of our client and that becomes the basis for our design. Our design expertise includes:

### MECHANICAL DESIGN

Heating & Ventilation
Air Conditioning
Piping
Environmental Controls
Process Controls
Refrigeration
Plumbing
Medical Gases
Sprinkler-Fire Protection
Master Planning

### ELECTRICAL DESIGN

Power Distribution
Interior Lighting
Exterior Lighting
Emergency Power
Communications
Technology
Fire Alarm
Security
Life Safety
Master Planning

ZDS provides comprehensive design services. We have experience and specialties in indoor air quality, energy management and commissioning, along with traditional mechanical and electrical design experience dating back as far as 1958. We offer a complete package.

ZDS works with all levels of the client's staff: the building owner, budget supervisor, operating and maintenance staff and others impacted by the project. We recognize that the maintenance and operating staff live with the design long after the project's completion. We listen to and work with those who will continue to operate and maintain the equipment. We find that proper communication benefits the client throughout the design process and beyond.

The ZDS design team provides a total system evaluation for cost-effective selection, installation, and ease of maintenance for both new systems and retrofit of in-place systems.

Design begins with our client. Our staff meets with our client to review their concerns, budgets and schedules. The ZDS design team reviews the entire picture, and ends with "A Total Design."

### COMPANY LEGAL NAME

**ZDS Limited Liability Company dba ZDS Design/Consulting Services**

### LOCATION OF INCORPORATION

**West Virginia**

### PRINCIPAL OFFICERS

**Todd A. Zachwieja, PE, C.E.O.**

**Ted T. Zachwieja, Principal**

**Daniel H. Kim, PhD**

**Lori Zachwieja, CPA**

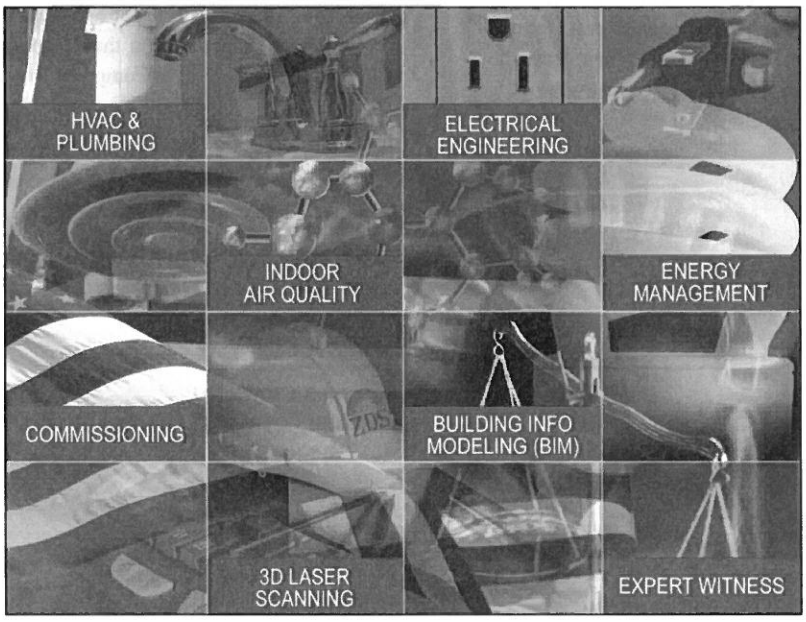
### OFFICES

**St. Albans, WV**

**Morgantown, WV**

### NUMBER OF EMPLOYEES

**ZDS currently employs 15 design professionals.**



## INDOOR AIR QUALITY SERVICES

**ZDS** provides consulting engineering services for the indoor air quality (IAQ) environment. These services include: strategic planning for renovation and new construction projects; technical research and writing; specialized applications software development; corporate and professional training programs; publications support and fulfillment; and site-specific engineering and scientific consultation.

Todd Zachwieja, **ZDS** principal, is contributing editor for the following IAQ publications:

- Technical Review Panel for the publication of the INvironment™ Handbook of Building Management and Indoor Air Quality, by Chelsea Group and published for Powers Educational Services.
- Technical Review Panel for the Quarterly publication of the INvironment™ Newsletter, by Chelsea Group for Powers Educational Services.
- Ventilation for a Quality Dining Experience: a Technical Bulletin for Restaurant Owners and Managers, released in January 1993.
- The New Horizon: Indoor Environmental Quality, published as a supplement to the June 1993 issue of Consulting-Specifying Engineer magazine, a trade magazine distributed to roughly 50,000 engineers.
- Editorial Advisory Board member reviewing the articles of the monthly publication INvironment™ Professional.
- Editorial Advisory Board member of POWER PRESCRIPTIONS™ Indoor Air Quality Publication by Electric Power Research Institute.

**ZDS** provides IAQ services for major corporations, government organizations and property owners to resolve their specific facility problems:

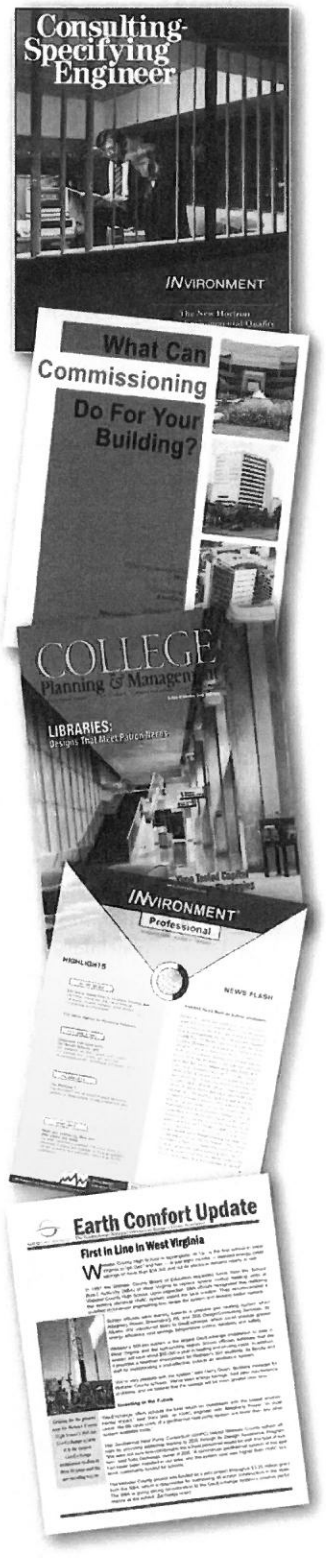
- Resolve the building's "sick building syndrome" complaints.
- Identify solutions to extensive biological contamination building-related illnesses in renovated office buildings.
- Develop solutions for HVAC systems, temperature controls, equipment, operating and maintenance practices causing IAQ problems in schools and commercial buildings.
- Commission new and renovated facilities to minimize or eliminate IAQ issues before they become problems.
- Develop and establish master plans as well as conduct training seminars for IAQ of schools and commercial buildings.

As one of the nation's leaders in Indoor Air Quality, **ZDS** provides sophisticated technical expertise that enables our Client to be proactive in solving and preventing indoor environmental problems.


ASHRAE Insights

**Three Generations of Service to ASHRAE**

**Ted T. Zachwieja, Principal-in-Charge Of Construction Administration**



## SUMMARY

At ZDS, our engineering staff integrates energy efficiency into each project design to provide you, our client, with the added value that you expect and deserve. The ZDS team approach represents a tremendous amount of experience in designing energy efficient facilities. ZDS offers a comprehensive range of energy management services that includes:

- Providing detailed analysis of facilities.
- Recommending sound and proven energy saving solutions.
- Implementing energy management improvements.
- Determining, quantifying and assisting in securing available Utility and Government grants.
- Evaluating and documenting utility savings.

Todd Zachwieja received AEE's LEGENDS IN ENERGY AWARD in 2007 and 2008 for lifetime achievements in energy. The ZDS team members take pride in the quality of their projects and have been responsible for designing and implementing numerous energy management programs. These programs are providing significant energy improvements and include optimizing, central utility plant equipment, control systems, air handling systems, lighting systems, and other energy consuming equipment.


**Recent projects include**:

- Interconnecting boilers and chiller plant systems.
- Designing Geothermal HVAC systems.
- Optimizing HVAC equipment and operating sequences, including upgrades to variable speed operation.
- Installing Direct Digital Control (DDC) Energy Management Systems.
- Replacing inefficient lighting equipment with energy efficient systems.
- Modifying air handling equipment from 100% outside air to return air operation.
- Implementing heat recovery units into HVAC equipment.
- Improving laundry, kitchen and other process application efficiencies.

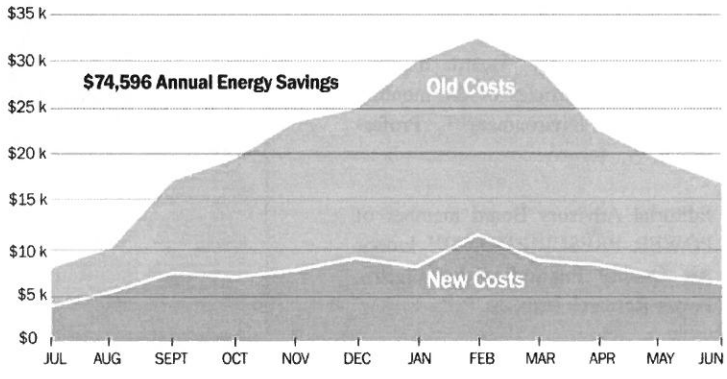
In addition to the energy management projects outlined above, the ZDS team members have extensive experience in identifying and implementing energy efficient operating and maintenance measures. These are typically low cost or no cost measures that include:

- Inspecting, calibrating temperature controls and adjusting outdoor air dampers.
- Commissioning economizer cycle operation.
- Testing steam traps and pressure relief equipment operation.
- Enabling heating and cooling equipment only when required.

ENERGY STAR 2013

Webster County Schools received Energy Star certification in 2013 as one of nation's top 25% of energy efficient schools.

**Chart Below:** ZDS designed and implemented the region's first and largest commercial geothermal system saving Webster County High School over $74,596 in energy savings.



The ZDS team is trained and experienced in advising you of program options to incorporate energy efficiency and operational savings features into the design of your new construction and renovation projects. At ZDS, we view our role as helping you to define your own energy efficiency needs and goals through identifying energy savings options and providing supporting financial information. We then help you fit your energy efficiency needs and goals into a workable budget and schedule, and then design a program to fill those needs.

Sustainable "Green Building" design, including LEED certification, recognizes the importance of commissioning. The design and construction industry have had start-up problems when a facility is occupied and construction deficiencies were not discovered until the contractor's traditional one-year warranty period expired. The mechanical and electrical systems have continued to become more complex with sophisticated control systems and equipment, and a mountainous amount of changing technology. If not properly addressed, building owners could face numerous operational problems from "Sick Building Syndrome," excessive energy costs, and uncomfortable indoor environments. Commissioning is the missing link between design and implementation.

Subsequent to joining ZDS, Todd Zachwieja established commissioning services for one of the nation's largest energy service companies. He is also a LEED Accredited Professional. Many utility companies and building owners now require commissioning for new or renovated facilities in order to maximize the use of their investments in their facilities and to obtain LEED certification. The commissioning process offers the following benefits:

- Improved comfort, serviceability and Owner understanding of systems and design intent.
- Added technical support for the Owner and being proactive in preventing new problems.
- Reduced maintenance and decreased expenses related to operating deficiencies.
- Early identification and resolution of system discrepancies while designers and contractors are still under contract and on the job.
- Verification of system performance while meeting financial restraints.
- Commission new and renovated facilities to minimize or eliminate IAQ issues before they become problems.

ZDS and its consultants offer commissioning services for their commercial and institutional clients, including meeting LEED enhanced commissioning requirements. These services include strategic planning and operations assistance for renovation and new construction projects. Commissioning services consist of construction document review, equipment performance testing, documentation of design criteria, value engineering, operational fine tuning, coordination of professional operations training programs and site-specific engineering consultation. Our project team has the unique experience of in-depth design knowledge and hands-on operations knowledge that fills in the gap between traditional design services and the building Owner's operational needs.

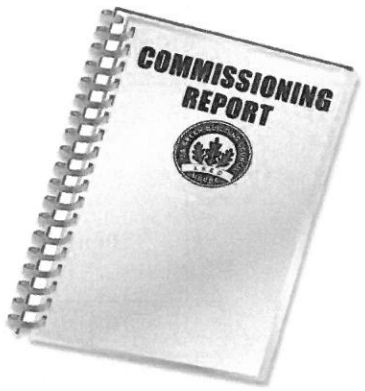
## NATIONAL RECOGNITION

The National Conference on Building Commissioning invited Todd Zachwieja, ZDS' owner, to speak. He jointly presented a paper with the Director of Maintenance of Charleston Area Medical Center's Memorial Division. The Tampa, Florida Conference involved experts nationwide.

The principal owners of ZDS and their consultants have extensive experience in building commissioning and have saved their customers hundreds of thousands of dollars in construction costs and operating costs through their efforts.

The design team at ZDS is the best to provide engineering services for your project. Satisfying our client's individual needs and distinct requirements is the foremost concern of ZDS.

The most important member of the design team is the client. We make every effort to involve our clients throughout the entire process, from the planning through the construction and beyond.



The ZDS design staff continuously provides engineering design services value well into the millions of dollars on a variety of project types. Designing expertise goes as far back as 1958.

ZDS clients can rest assured that the design team will be available, not just for the year or two that we are involved in the initial design and construction, but also for years that follow as questions arise about your facility. A good engineered system and its equipment should last 15 to 40 years. Why not select a design firm with experienced staff committed to their projects with a comparable track record.

**Through the efforts of our staff, working locations include:**

| | |
|---|---|
| West Virginia | Massachusetts |
| Arkansas | Michigan |
| California | New York |
| Colorado | North Carolina |
| Connecticut | Ohio |
| Florida | Pennsylvania |
| Georgia | South Carolina |
| Hawaii | Tennessee |
| Illinois | Texas |
| Indiana | Virginia |
| Kentucky | Washington, DC |
| Maryland | Wisconsin |


The ZDS design team will provide comprehensive services utilizing experienced staff through planning, cost estimating, engineering, coordination of bidding, regular site visitation during construction and specifications for equipment. You, our client, will greatly benefit from a single point of responsibility for every need your project may have.

The ZDS staff has the expertise with codes and standards. We have extensive experience in conducting engineering code surveys of existing facilities. Our staff has excellent working relationships with the West Virginia Fire Marshal's Office, West Virginia Department of Education and the West Virginia School Building Authority.

In addition to comprehensive Engineering services from an experienced design team, another major consideration in the selection of your engineer and design staff should be their track record. ZDS' organization has an unbeatable, long running, and well-known track record for meeting our clients' needs, on time and within budget, with outstanding quality.

ZDS views these characteristics as the foundation of Quality. We look forward to the opportunity to discuss our ideas with you and assist you by providing solutions for your needs with a full range of services from Planning to Commissioning.

**CLIENTS**

Charleston Area Medical Center, Charleston, WV

Cabell Huntington Hospital, Huntington, WV

Hopemont State Hospital, Terra Alta, WV

Jackie Withrow Hospital, Beckley, WV

John Manchin Sr. Healthcare Facility, Fairmont, WV

Lakin State Hospital, West Columbia, WV

Lewistown Outpatient Surgical Facility, Lewistown, PA

Mildred Mitchell-Bateman Hospital, Huntington, WV

Montgomery General Hospital, Montgomery, WV

Thomas Memorial Hospital, South Charleston, WV

United Hospital Center, Clarksburg, WV

VA Medical Center, Huntington, WV

VA Medical Center, Clarksburg, WV

Webster Memorial Hospital, Webster Springs, WV

William R. Sharpe Jr. Hospital, Weston, WV

WV Division of Health & Human Resources, state-wide

Facility Dynamics
ENGINEERING

## Facility Dynamics Engineering Overview

With its founding goal of improving the operation of facilities, Facility Dynamics Engineering (FDE) has been active in facility commissioning since its inception in 1989. Facility Dynamics' engineers and technicians possess a unique combination of capabilities to support HVAC, controls and electrical system commissioning. Our company was founded on an emphasis in addressing the challenges of facility operation, with a background consisting of a strong HVAC controls expertise, systems knowledge, training experience and maintenance perspective. In recent years, we have expanded our emphasis to include development of software tools. These software tools include *PACRAT*, a 'continuous commissioning' tool which provides the only fully automated HVAC diagnostics analysis using facility automation system data.

**At-A-Glance**: FDE has commissioned over 2000 projects over the past 24 years. Approximately 95% of our work is devoted to commissioning, and we currently average over 250 commissioning jobs per year. We garner new clients almost exclusively by word-of-mouth from our existing clients and from our training activities and most of our clients continue to return on a repeated basis. Facility Dynamics Engineering is comprised of over 70 employees with about 60 practicing commissioning engineers. Most of these engineers are senior engineers who serve as project managers and commissioning engineers. Our two principals continue to actively practice in commissioning projects.

## Additional Services Available from FDE

In addition to our core work in facility commissioning and retro-commissioning, Facility Dynamics Engineering also provides an array of specialized services that complement our commissioning process. Many of these are related to our experience and commitment to understanding the complex yet critical area of DDC controls and Building Automation Systems. Additional services include, but are not limited to:

- Troubleshooting and Remediation of Mechanical/Electrical/Controls
- Vendor-Independent Control Design and Consulting
- Facility and Campus Controls Master Planning and Specifications
- Automated, Continuous-Commissioning & Trend Analysis Tools (PACRAT)
- Energy Analysis
- Owner/Operator Education and Training

## Name and Location of Firm – Facility Dynamics Engineering

**Corporate Office:** 6760 Alexander Bell Drive, Suite 200

Columbia, MD 21046

Phone: 410-290-0900, Fax: 410-290-0901, Website: www.facilitydynamics.com

## Firm Ownership and Length of Time in Business

Facility Dynamics Engineering Corp. is co-owned by J. Jay Santos, PE, and E. Lon Brightbill, PE. The firm was started in 1989 and has been in business continuously for over 24 years. FDE is a Corporation that is incorporated in the State of Maryland.

## FDE Branch Offices

FDE's technical staff is comprised of Professional Engineers, degreed engineers, former mechanical contractors, and BAS technicians/installers. We value the unique talents and expertise of our engineers and it is their "hands-on" experience with commissioning, controls design and installation, mission-critical and high security facility operation, facility and central plant operation, and research/academia that creates unmatched effectiveness in the field. In addition to our corporate office in Columbia MD, FDE employees are located in the following geographic areas and cities:

- Washington, DC
- Virginia: Vienna, Richmond, Charlottesville
- Pennsylvania: Harrisburg, York
- North Carolina: Greensboro
- Illinois: Champaign/Urbana
- Minnesota: Minneapolis/St. Paul
- Northern California: Sacramento
- Southern California: Los Angeles
- Colorado: Boulder
- Oregon: Portland
- Texas: Houston
- Michigan: Leonard
- Washington: Vancouver

**Types of Facilities Commissioned:** FDE has commissioned a wide variety of facilities, from campus housing to mission-critical data centers to some of the largest laboratory and medical facilities in the United States. FDE has developed specific commissioning expertise in the special needs of medical and laboratory facilities, many of which have critical control requirements. FDE staff members have commissioned the following types of facilities:

- Offices and Administrative Facilities
- Hospitals and Medical Campuses
- Laboratories/Research Facilities (BSL2, 3, and 4)
- Industrial/Assembly Plants
- Pharmaceutical Manufacturing
- School Districts (K-12)
- College/University Campus Facilities
- High Rise Construction
- Large Central Plants
- LEED-certified facilities
- Federal Courthouses
- Museums
- Prisons
- Libraries/Archive Facilities
- Aviation Facilities
- High Security/High Reliability Facilities
- Data/Communications Centers
- Business Office Complexes

## Medical Centers, Laboratory and University Commissioning Clients

A partial list of our Medical, Laboratory and College/University clients include:

- National Institute of Health (MD)
- MD Anderson Cancer Center (TX)
- University of Maryland Medical
- Children's Hospital of Philadelphia
- Cedars-Sinai Medical Center (CA)
- St John's Hospital (CA)
- Johns Hopkins Medical Institute
- Howard Hughes Medical Institute (VA)
- Johns Hopkins University
- Milton S. Hershey Medical Center (PA)
- Johns Hopkins – Applied Physics Lab
- University of Pennsylvania Health System
- Rush University Medical Center (IL)
- Rockingham Memorial Hospital (VA)
- University of California – Berkeley
- Washington University Medical Center
- Chambersburg Hospital (PA)
- Virginia Dept. of Behavioral Health
- North Carolina Health and Human Services
- University of Iowa Hospitals & Clinics
- A.I. DuPont Hospital for Children
- University of Texas – SW Medical Center
- Virginia Commonwealth University
- University of Wisconsin
- University of Delaware
- University of Pittsburgh
- George Washington University
- Virginia Tech
- Georgetown University
- University of North Carolina - Chapel Hill
- East Carolina University
- Princeton University
- University of Virginia
- University of Maryland
- University of Maryland Medical System
- University of California – Berkeley, Davis, San Diego
- Cornell University
- Harvard University
- West Virginia University
- University of California - Berkeley
- Penn State University
- University of Pennsylvania Health System
- Virginia Military Institute

**Additional Clients:** In addition to the above, we have performed commissioning work for a number of Commercial Industrial and Government Agencies, including:

- National Security Agency (NSA)
- General Services Administration (GSA)
- Federal Aviation Administration (FAA)
- Environmental Protection Agency (EPA)
- Marine Corps Base Hawaii
- Montgomery County, MD Government
- District of Columbia Government
- Exxon Mobil
- Bank of America
- Marriott Corporation
- N.C. Dept of Health and Human Services
- State of Delaware
- General Motors
- Lockheed Martin

## LEED Project Experience

FDE has been involved in LEED commissioning for over ten years and has conducted over 220 projects where LEED certification was part of the commissioning objective. We have multiple LEED AP engineers on staff and many other engineers have attended LEED Training.

We recently completed the new Rush University Medical Center Modernization Project in Chicago, IL. This 1,000,000+ sf project includes a 14-story East Tower, Kellogg Pavilion, Central Energy Plant and the Orthopedic Ambulatory Building. The project received a LEED Gold certification by the USGBC and will be the largest teaching hospital in the country to receive this rating. Additionally, it will be only one of four LEED Gold hospitals in the country.

FDE is also providing LEED commissioning services to the new 191,000 sf annex addition and renovation of the existing 327,000 sf Judicial Center for Montgomery County Government in Rockville, Maryland. The $140 million expansion will include ten new courtrooms and administrative spaces, and it will house the juvenile and family divisions as well as have room for further expansion space. The building includes a green roof with plants and trees to absorb rainfall, solar panels, a storm water management system and energy efficient mechanical systems. The project is expected to achieve a Gold certification.

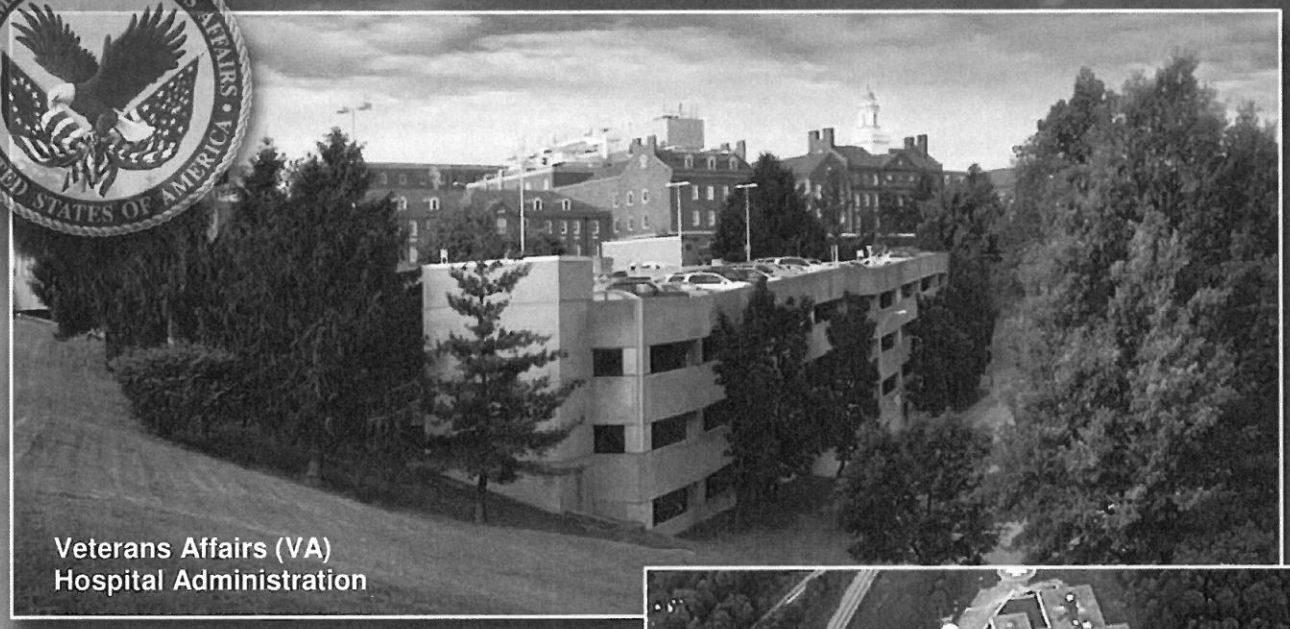
## Current or Recent FDE LEED Clients

The following clients are working toward or have applied for LEED certification.

- U.S. Naval Academy
- District of Columbia Government
- National Institute of Health
- General Services Administration
- University of Pittsburgh
- Hershey Medical Center (PA)
- State of Delaware
- Children's Hospital of Philadelphia
- U.S. Army Corps of Engineers
- Georgetown University
- Montgomery County (MD) Government
- Howard County (MD) Government
- Cornell University
- University of California – Campus Districts
- Harvard University
- Penn State University
- St Mary's College of Maryland
- Johns Hopkins University
- University of Virginia
- Rockingham Memorial Hospital
- University of Wisconsin
- University of Georgia
- Rush University Medical Center (IL)
- Virginia Commonwealth University
- University of Hawaii
- University of Texas – SW Medical Center
- West Virginia University
- University of Iowa

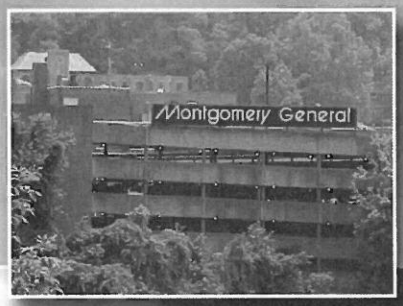
# Engineering for Health Care Facilities

**Our project experience includes engineering for over 75 health care facilities — those publicly and privately owned.**



Veterans Affairs (VA)
Hospital Administration

Summersville
Memorial
Hospital




Montgomery
General
Hospital

Webster
County
Memorial
Hospital


Bluefield Regional Medical Center

ZDS
Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

# Engineering for Health Care Facilities

**Our experience includes 75 health care facilities including the hospitals within the West Virginia Division of Health and Human Resources.**

William R. Sharpe, Jr. Hospital

Mildred Mitchell-Bateman Hospital

Hopemont Hospital

Lakin Hospital

Welch Community Hospital

Jackie Withrow Hospital

John Manchin, Sr. Health Care Facility

ZDS

Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

# Engineering for Health Care Facilities

**Our project experience includes engineering for three divisions of CAMC. CAMC is the largest health care provider in West Virginia.**

CAMC General Division

CAMC Memorial Division

CAMC Women and Children's Hospital


**CAMC General Division**

Prior to forming ZDS, their principals and personnel managed an energy program that saved CAMC approximately $800,000 annually—plus it paid for the improvements made to the mechanical, electrical and controls systems.

CAMC Wound Healing Center


CAMC Emergency and Trauma Center

ZDS

Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

# Engineering for Health Care Facilities

**Our project experience includes engineering for three divisions of CAMC, the largest health care provider in West Virginia.**

**CAMC Memorial Division Hospital Renovations:**

Prior to forming ZDS, their principals and personnel assisted in Engineering for Special Care Facility, Physical Therapy, Emergency Room Retrofit, South Patient Retrofit, Medical Records and District Chiller Plant Replacement and Interconnect

**CAMC Women & Children's Hospital Renovations:**

Prior to forming ZDS, their principals and personnel assisted in Engineering for LDRP Additions, NICU and PICU, Emergency Room, Patient Rooms, as well as the District Chiller Plant Replacement & Interconnect

Since 1982, prior to forming ZDS, their principals and staff have provided engineering services while meeting stringent health care requirements and safety of the patients for CAMC.

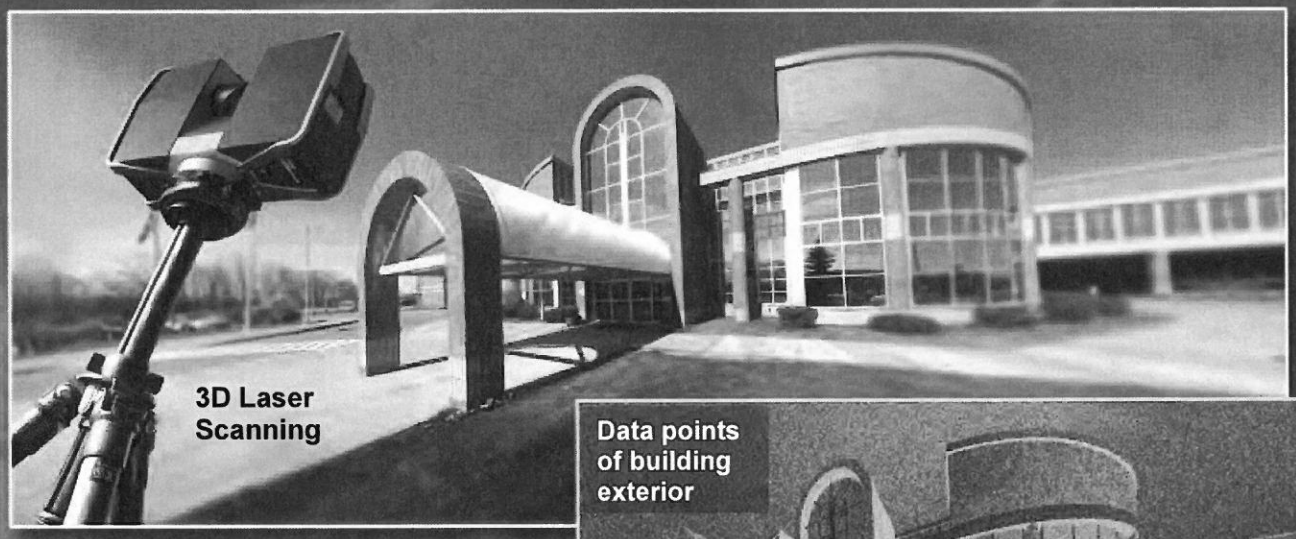
ZDS

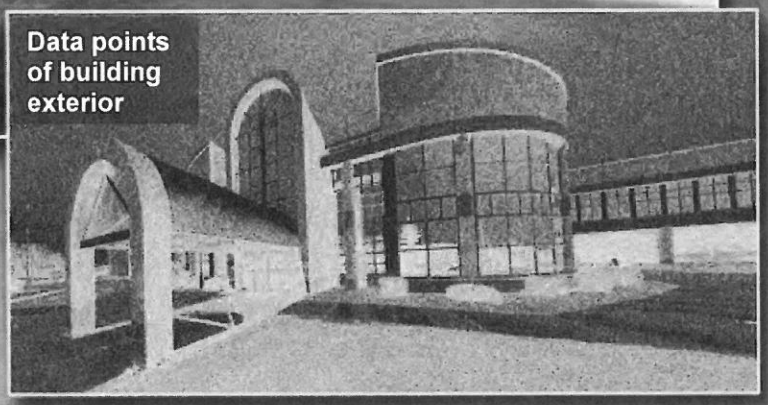
Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

# 3D Digital Imaging for Health Care Facilities

**Our 3D Laser Scanning Services helped William R. Sharpe, Jr. Hospital document existing conditions and integrate their 50-bed renovation.**




**Why 3D Laser Scanning is better:**

3D laser scans reveal significant differences between existing conditions and the original drawings.

3D laser scans also provide superior details by capturing data that is more comprehensive and precise than conventional methods.

**"With the 3D laser scanning service, ZDS saved us countless hours communicating to all project team members, even to those who work or live far away.**

**Also, we now have an accurate record of the existing conditions that DHHR can easily access now and into the future."**

*Greg Nicholson, DHHR Chief Operations Officer*

**Web Share:**

3D laser Scanning allows facility owners to view and measure areas with others on their planning and construction team.

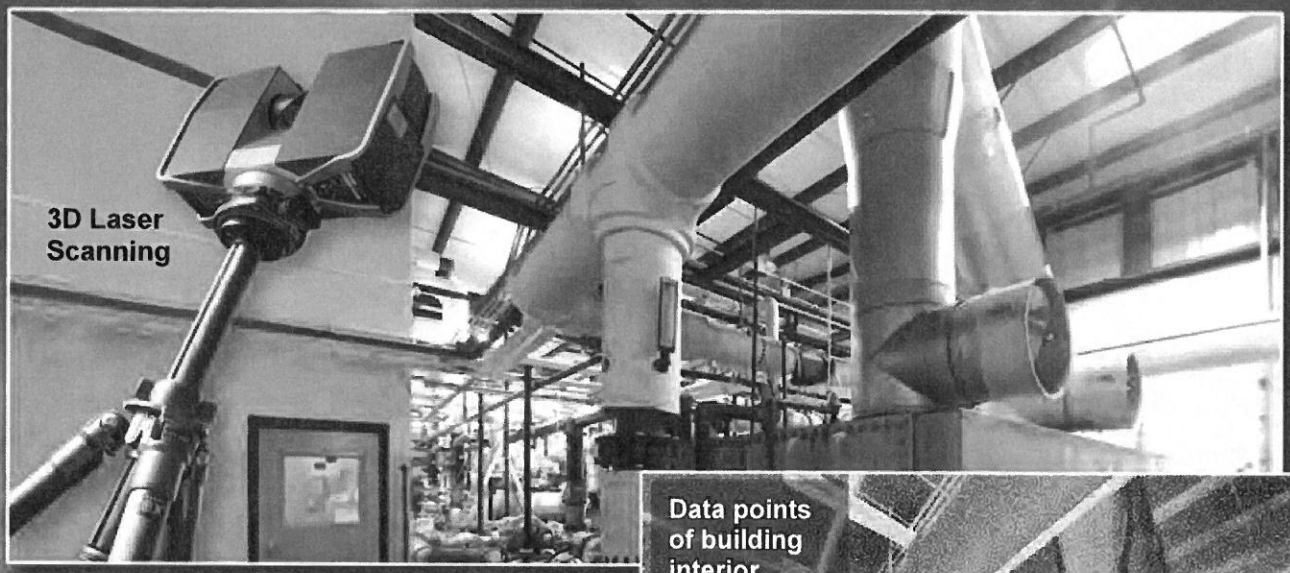
ZDS

Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

**"The 3D laser imaging improves quality, saves time and money while providing a valuable resource now and into the future."**

*DHHR*

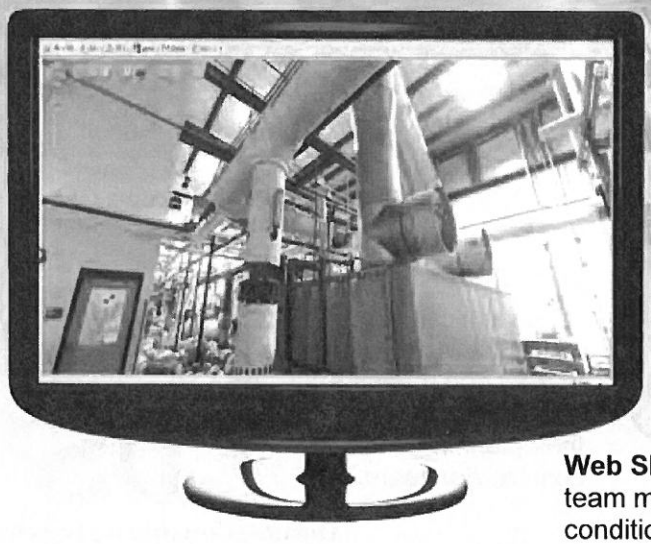


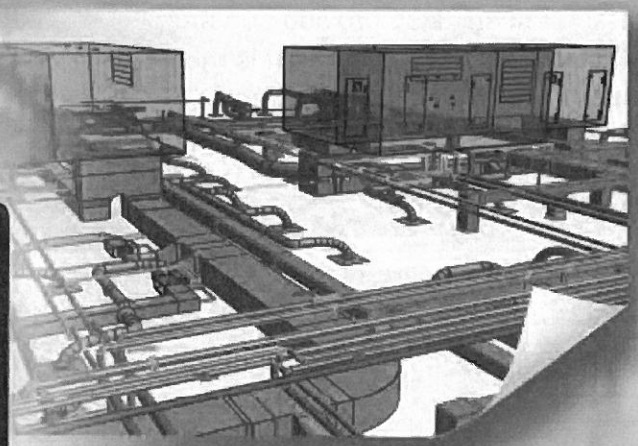


**"The 3D laser scans safely document hard-to-reach interior areas — this greatly reduces our risk for liability.**

**Also, the excellent details of the laser scans convert to accurate construction drawings, both architectural and engineering."**

*Ron Adkins, DHHR Director of Construction & Project Management*





**3D Engineering Drawing:** Sample of 3D mechanical drawing converted from 3D laser scan data points.

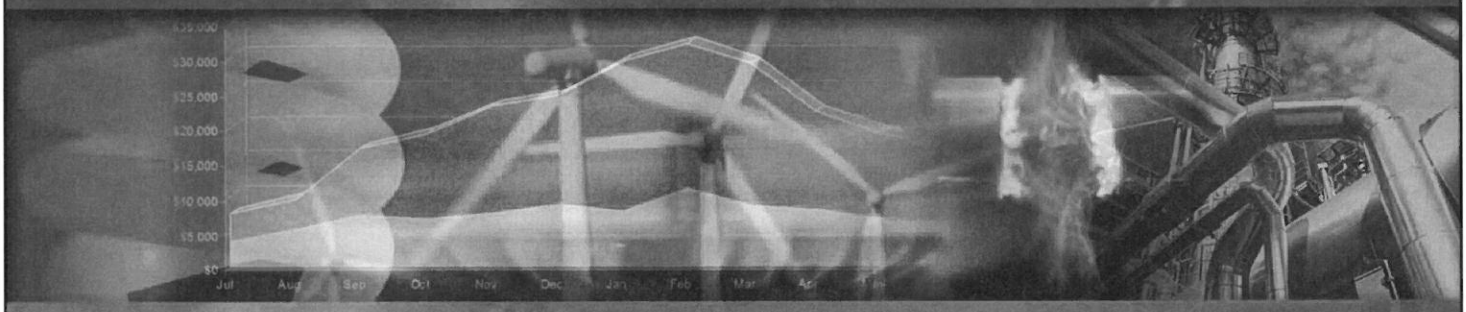
**Web Share:** Helps construction team members integrate existing conditions into BIM models.

ZDS

Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

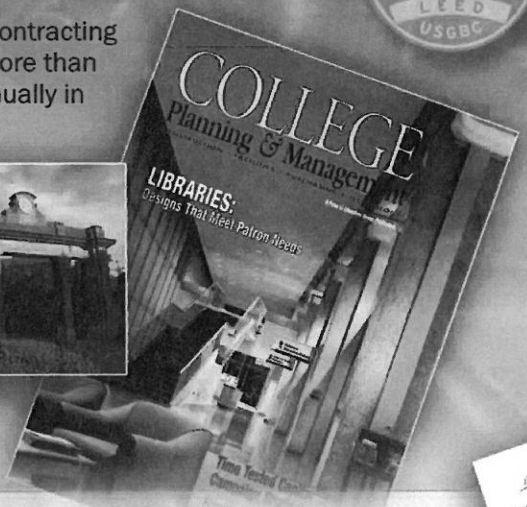
NATIONALLY RECOGNIZED FOR ENGINEERING EXCELLENCE




# Energy Management Engineering

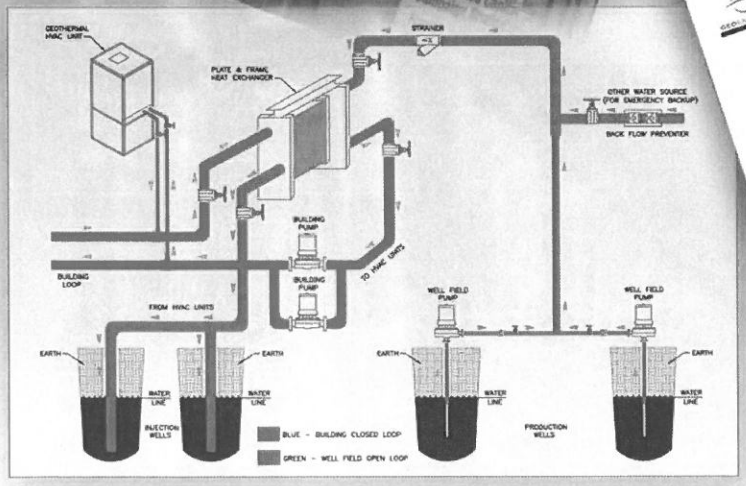
**Ohio University—Athens**

A performance contracting project saving more than $2,500,000 annually in energy costs.

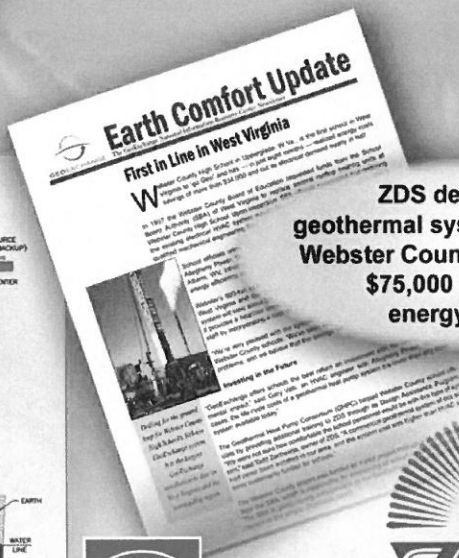



**ZDS offers these and other energy management services:**

- Compliance with LEED
- Utility Monitoring & Forecasting
- Energy Audits
- Performance Contracting Management
- Utility Savings Verification
- Utility & Government Funding
- Staff Training




Webster Springs Geothermal System Designed by ZDS

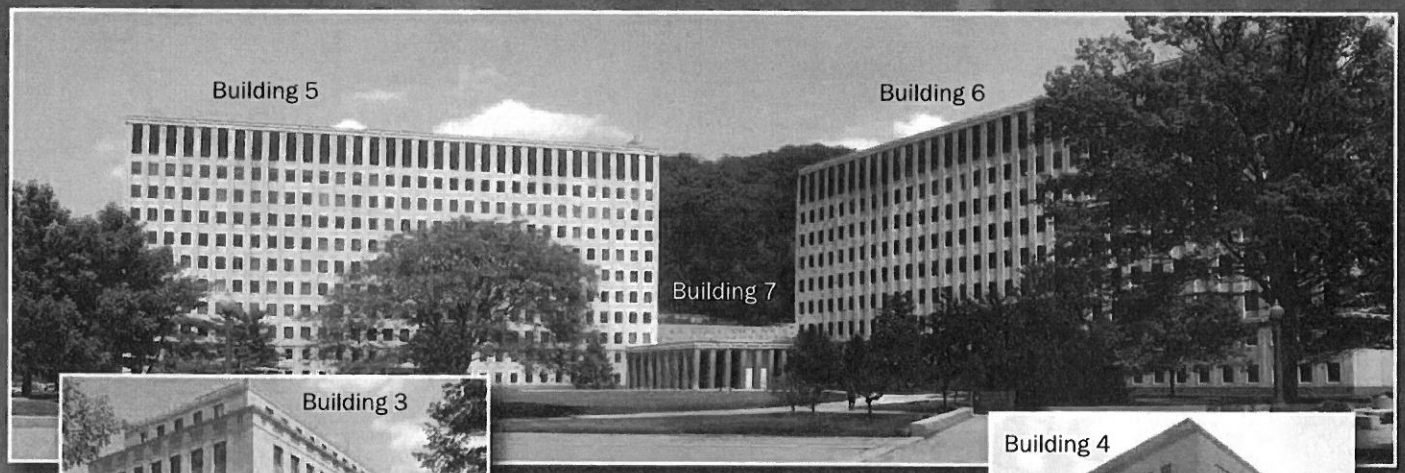



**ZDS designed a geothermal system that saves Webster County High School $75,000 in annual energy costs.**

ENERGY STAR 2013

ZDS
Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com






Below: East Wing

West Wing

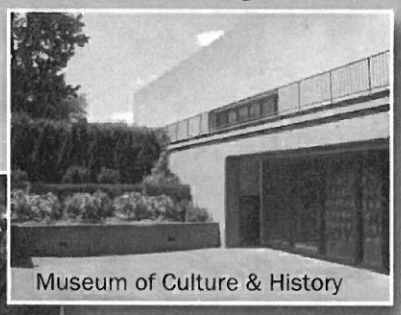
**West Virginia Capitol Complex**

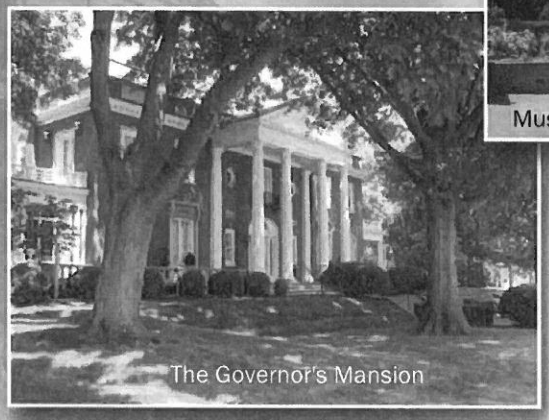
LEED Certified Candidate

An integration of nine buildings involving over 1.9 million square feet of building space.

The initial year savings of $1,079,296 paid for the $10,108,102 investment cost over time.

Project savings include a new central heating plant serving nine buildings while eliminating old inefficient boilers and heating sytems.

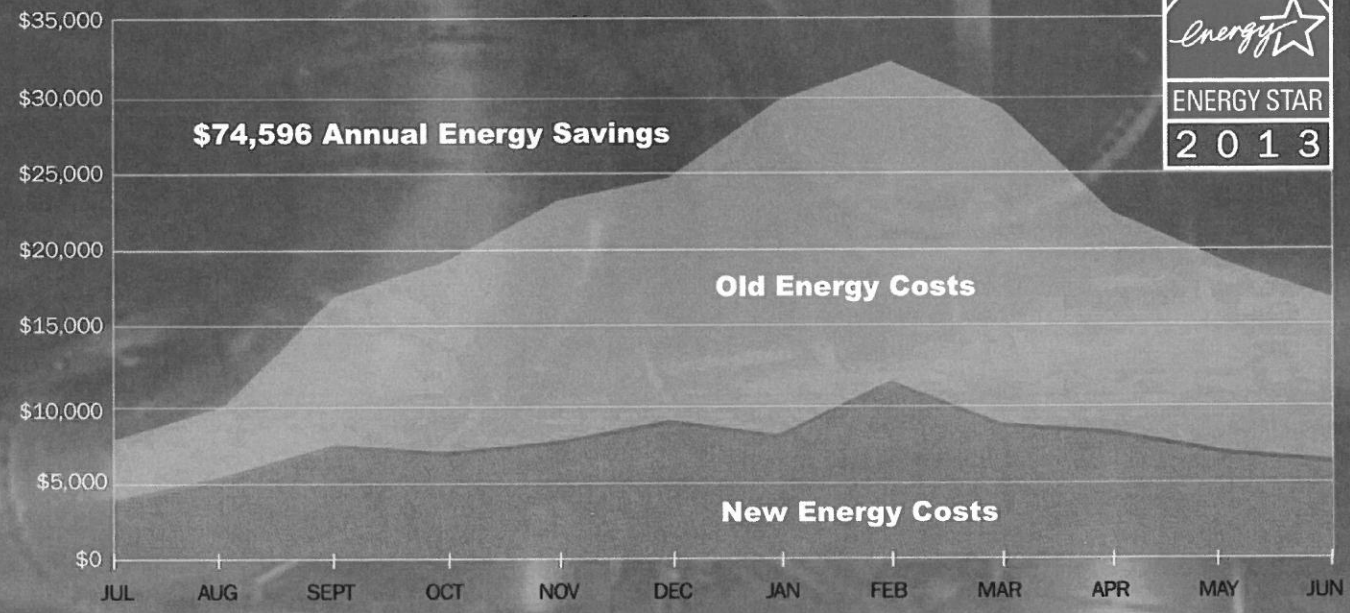

Museum of Culture & History


The Governor's Mansion

ZDS
Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

## ZDS Geothermal Energy Engineering Savings

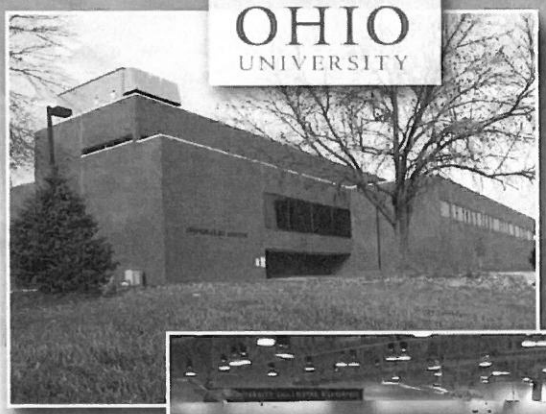



ENERGY STAR 2013

**"We're very pleased with the system.
We've seen energy savings and have had zero maintenance problems."**
*Webster County Schools*

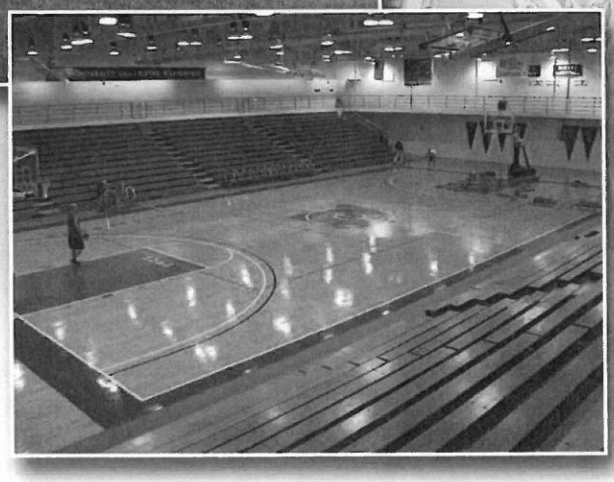
OHIO UNIVERSITY 1804

Ohio University Chillicothe Campus realizes an annual **energy savings from $200,000 to $300,000** through ZDS master planning, HVAC/Electrical/Plumbing design, and the established comprehensive Performance Contracting program.



Stevenson Center Library

Bennett Hall



Shoemaker Center and Gymnasium

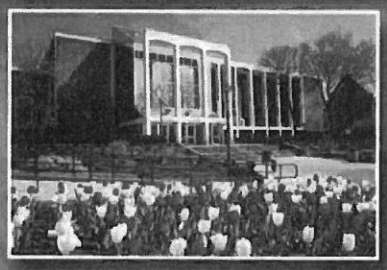
ZDS
Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

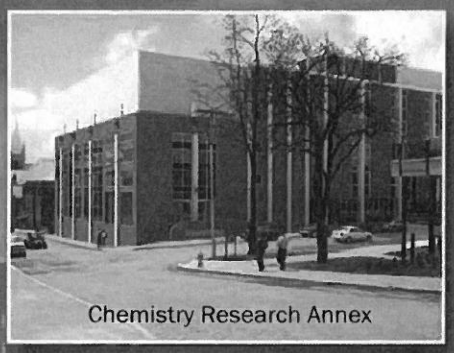
## West Virginia University

ZDS established the central plan and renovations for the downtown campus chilled water loop system.

Renovations result in a **$300,000 to $400,000 in annual savings** in energy and related costs.

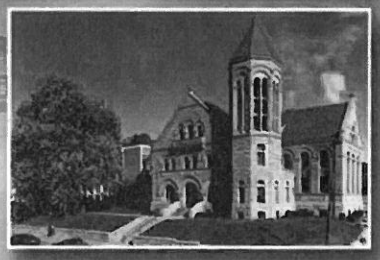


WVU Mountainlair



Chemistry Research Annex

White Hall

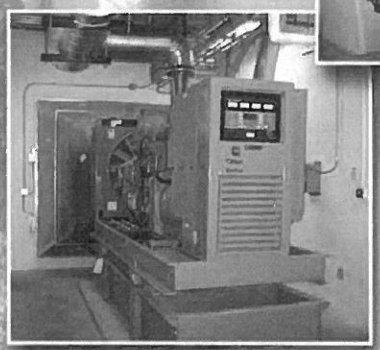


Stewart Hall

## West Virginia Center for Culture and History

ZDS initiated the HVAC renovations and reduced HVAC operating costs up to 50%.

HVAC Boiler System



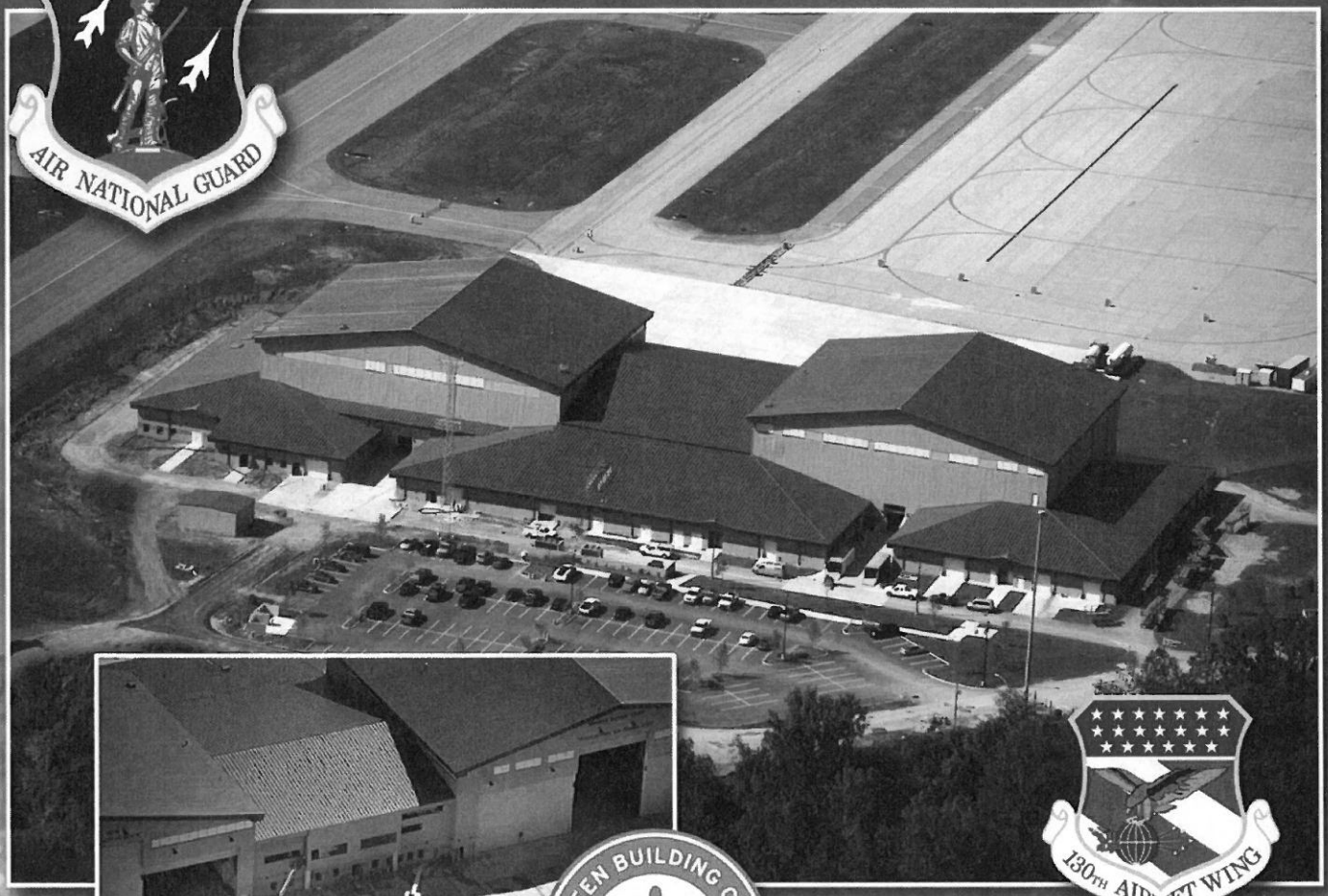
Emergency Generator

ZDS

Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

# ZDS LEED Project Experience




**Air National Guard**

130th Airlift Wing at Yeager Airport, Phase I and Phase II
Aircraft Maintenance Fuel Systems Hangars and Shops

**Awarded Two LEED Silver Certifications**

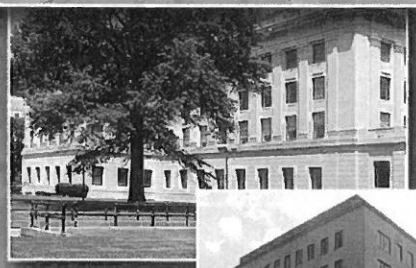
ZDS
Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

# ZDS LEED Project Experience

Buildings 5, 6 and 7

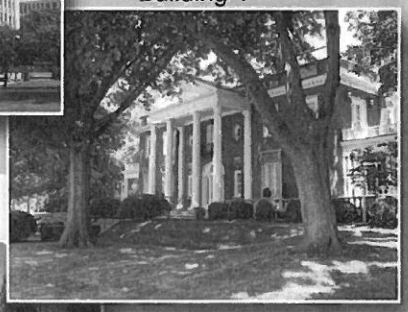
East Wing



West Wing

Building 4

Building 3



Governor's Mansion

Center for Culture and History

**West Virginia Capitol Complex**

An integration of nine buildings involving over 1.9 million square-feet including the Capitol, Governor's Mansion, Center for Culture and History, plus six other administration facilities.

The initial years **savings of $1,079,296** paid for the $10,108,102 investment costs over time

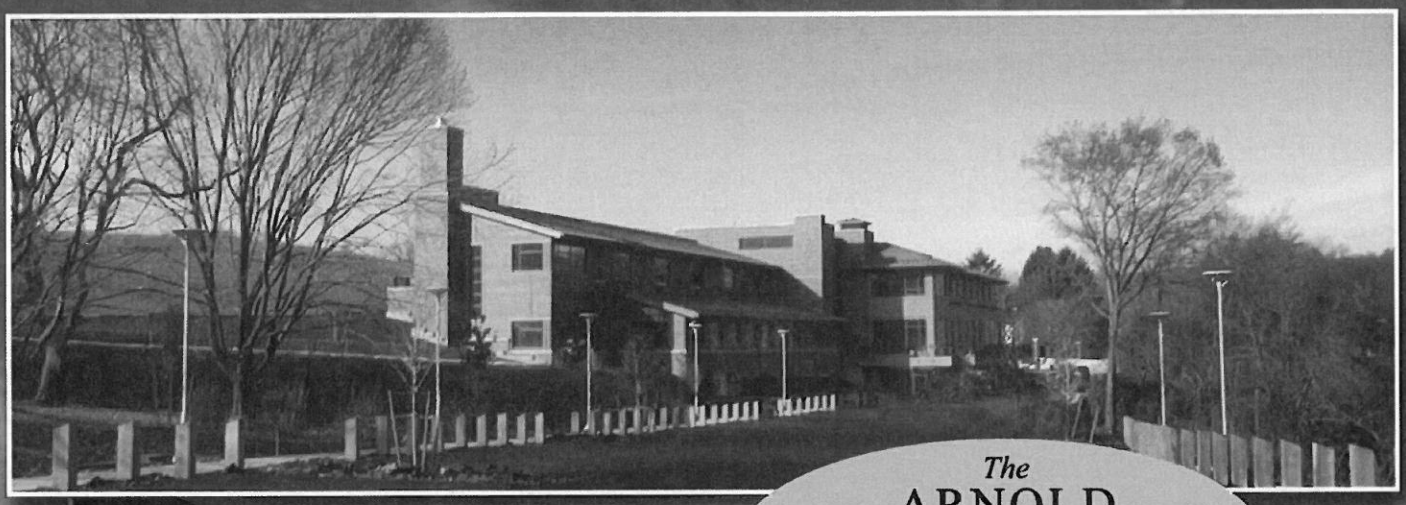
LEED Certified Candidate

ZDS

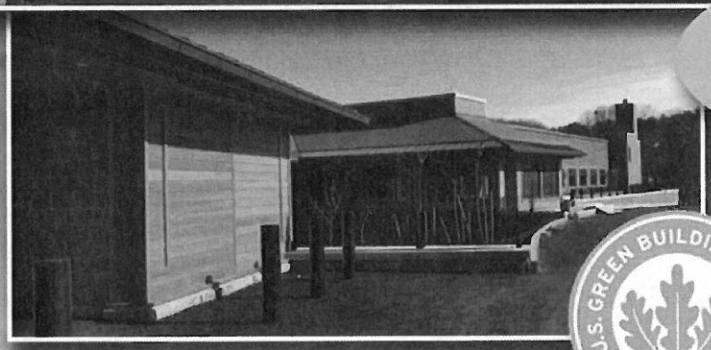
Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

# ZDS LEED Project Experience

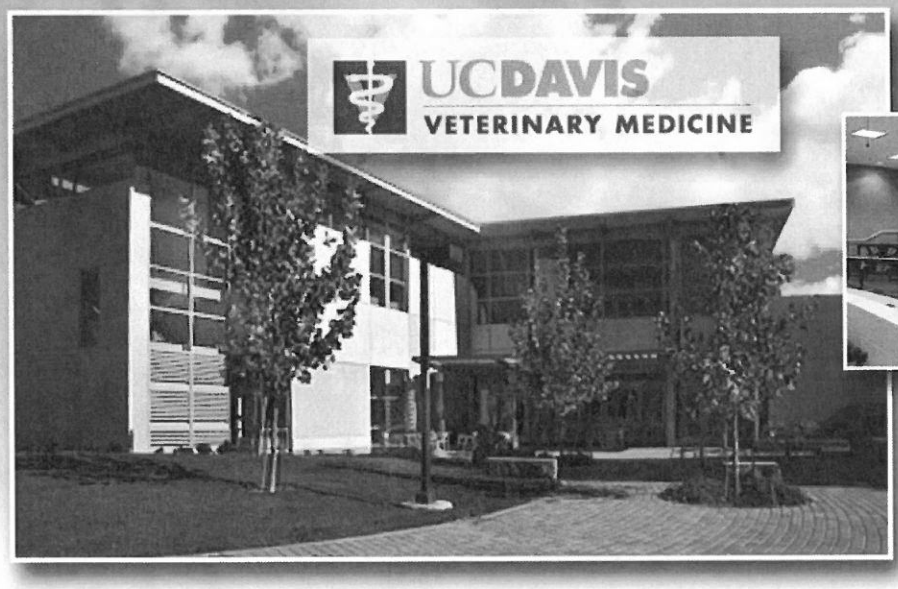


*The*
ARNOLD
ARBORETUM
*of* HARVARD UNIVERSITY



**Harvard University**
**Arnold Arboretum Weld Hill Research and Administration Building**

**LEED Gold Certified**



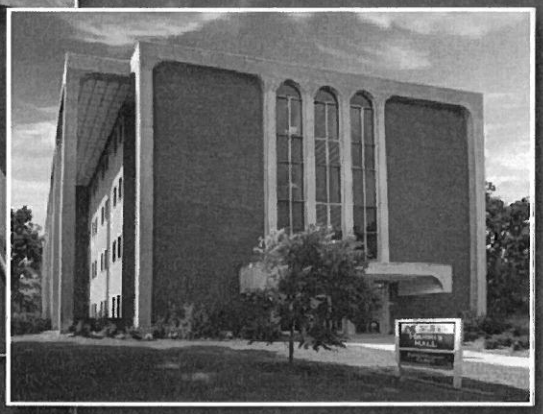

**Gladys Valley Hall—Awarded Best Overall Sustainable Design**

**University of California Davis Campus School of Veterinary Medicine**
Adapted LEED Principles Including Commissioning

ZDS
Design/Consulting Services

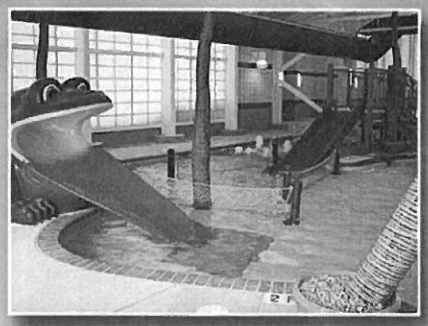
91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

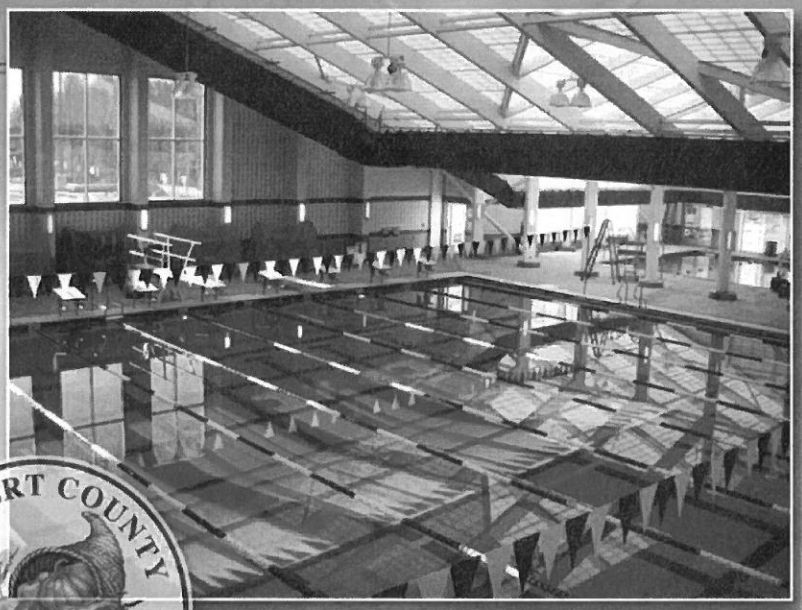
# ZDS LEED Project Experience



**Marshall University Harris Hall**

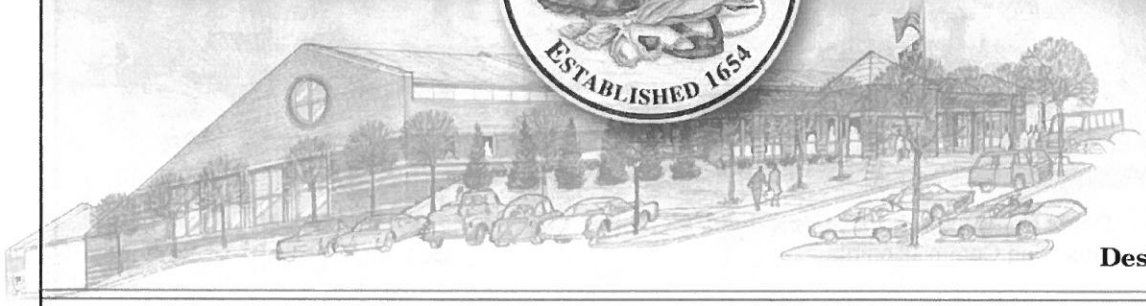
Applied LEED Principles





**Maryland - Calvert County**
**Indoor Aquatic Center**

Adapted LEED Principles
Including Commissioning



ZDS

Design/Consulting Services

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

## *ZDS Design/Consulting Services*

***Project Name:*** ***New Fuel Cell & Maintenance Hangars Commissioning***
***Client:*** ***West Virginia Air National Guard***

***Contact:*** Captain Harry Netzer, Project Mgr.
WV Air National Guard
130th Civil Engineering Squadron
Charleston, WV 26311
Harry.Netzer@ang.af.mil
(304) 341-6649

***Services:*** HVAC/Lighting Controls/DWH commissioning services involving direct digital controls (DDC); operating and maintenance; energy recovery; VFD's; variable water volume pumping; boiler optimization; and chiller optimization.


***Project Description***

***ZDS Design/Consulting Services*** worked with the West Virginia Air National Guard on the Commissioning for their new Replacement Aircraft Maintenance Hangar and Shops plus a new Fuel Cell Hangar. The first phase of the program initiated in early 2008 and continued until 2011. This facility included a larger maintenance hangar, miscellaneous maintenance shops, central boiler plant and chiller plant. The goal of the project was to achieve LEED and Air Force Silver Certification with commissioning being an integral part of that certification.

> ***"ZDS's commissioning services were invaluable in helping us understand our facility and ensure the systems were installed as intended and optimized for long-term operating benefits. We would recommend them again!"***
>
> *Captain Harry Netzer, WVANG Project Manager*

The commissioning scope met the LEED Energy and Atmosphere requirements for obtaining LEED certification. The HVAC system was comprised of a mixture of ten constant air volume and variable air volume (VAV) HVAC air handling systems plus four make-up air handling units with comprehensive DDC controls. The VAV units served about 77 VAV terminal boxes with a mixture of both heating hot water and electric reheat coils. The complex has 38 exhaust fans and 11 ceiling fans to serve the variety of spaces. Some of the specialty areas included the fuel cell hangar with a corrosion control room, welding shop, computer center, and telecom room. The commissioning process refined the proper control strategies to meet actual conditions.

The chilled water system consists of three variable speed pumps and two air-cooled chillers piped in parallel. The central heating hot water system consisted of five variable speed pumps and six condensing boilers. Commissioning of the HVAC equipment documented actual operating conditions, which allowed for the system to be fine-tuned to operate effectively and efficiently for the long term. The domestic hot water system and lighting controls were also commissioned.

***"ZDS performed a stellar job, going above and beyond what was expected. We would recommend them again!" says Mr. Tom Warner, RA, LEED AP who was the LEED Coordinator for SAIC for both phases of the project. Mr. Warner adds with reassurance, "Please ask anyone to give me a call at (651) 209-2802."***

The projects involved working cooperatively with the Owner, Contractors and the Design Professional (SAIC) personnel and meeting difficult construction phasing requirements. The commissioning program's work expanded for Phase II as WVANG continued to realize the value from the commissioning program that helps them ensure the facilities operate more efficiently and effectively.

Commissioning allowed for construction issues to be identified early in the process while the contractors were still heavily involved with the project saving both the contractor and Owner from future issues. Commissioning also allowed for the Owner to gain a better understanding of how the systems are operated through extensive review of the DDC controls and communication between the contractor, Owner and design professional in a way that all could understand the issues and focus on resolving any challenges in an effective manner.

| | |
|---|---|
| **Project size** | **128,715 ft$^2$** |
| **Project Costs for both Phase I & II** | **$43,000,000** |
| **General Contractor** | **BBL Carlton, Charleston, WV** |
| **Design Professional** | **SAIC, with LEED Coordinator from St. Paul MN** |

## *ZDS Design/Consulting Services*

***Project Name:*** ***General Motors' Worldwide Facilities Group Commissioning***

***Client:*** ***General Motors Corporation***

***Contact:*** Jay Santos, Principal
Facility Dynamics Engineering
6760 Alexander Bell Dr., #200
Columbia, MD 21046
JayS@FacilityDynamics.com
(410) 290-0900

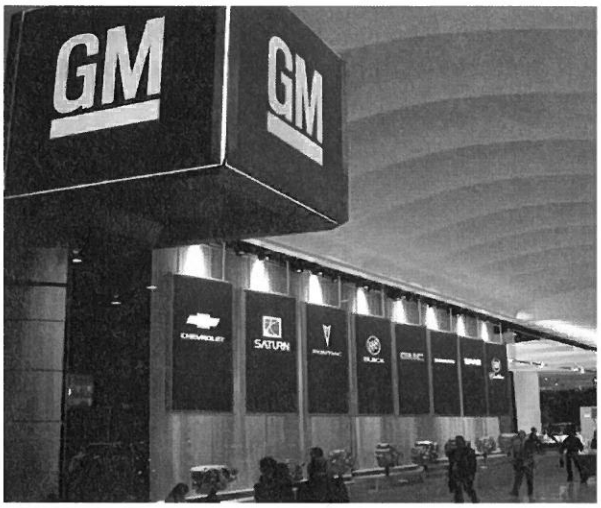
***Services:*** HVAC planning and full upgrades; DDC/PLC controls; operating and maintenance; heat recovery; fuel conversion; training; VFD's; variable water volume pumping; steam optimization; and chiller optimization.


***Project Description***

***ZDS Design/Consulting Services and Facility Dynamics Engineering*** worked with General Motors Corporation's Worldwide Facilities Group on the Re-Commissioning Program for GM's North American Facilities. GM is comprised of over 350 million square feet of plant facilities spread out over 160 plants. The first phase of the program initiated in early 1996 involved the challenge of analyzing the HVAC systems within nine existing plants to determine deficiencies and opportunities to improve comfort, IAQ, extend the life of existing equipment, and reduce operating costs.

The nine plants are located in Ohio, Wisconsin, Maryland, Georgia, Michigan, Indiana and Toronto, Canada. The 1996 retro-commissioning pilot projects showed that an *annual* savings in millions of dollars could be saved in energy and operating costs by implementing a *one-time*, multi-million dollar program in HVAC upgrades, repairs and new components. Even more millions are saved through the deferred capital costs realized for up to 10-15 years. Implementation of the 1996 studies started in mid-1997 and continued through 2001.

Some typical improvements include reactivating proper control strategies, reducing outdoor air when allowable, installing building automation systems, HVAC equipment repair/replacement, documenting existing conditions, and establishing a consistent overall operating strategy. The HVAC plans of each plant are also brought up to meet overall GM standards by identifying the capital projects and assisting GM in prioritizing potential improvements. The projects involved working cooperatively with union personnel and meeting difficult construction phasing requirements that, if performed incorrectly, could shut down production and cost GM millions in lost revenues. The re-commissioning program's work expanded as GM continues to realize the value from the program that helps them operate their facilities more efficiently and effectively.




ZDS **Design/Consulting Services** and Facility Dynamics Engineering worked with General Motors Corporation's Worldwide Facilities Group on the Re-Commissioning Program for GM's North American Facilities.

GMC
PONTIAC
Oldsmobile
CHEVROLET
CHEVY TRUCKS
Cadillac
SATURN
EV1
BUICK
SAAB
GM Service Parts Operations

| | |
|---|---|
| **Retro-Commissioning Program Size** | **$400,000,000** |
| **North America Operations** | **Encompassing 160 Facilities** |
| **Facility Size** | **Over 350,000,000 ft$^2$** |
| **Energy and Operating Saving** | **Millions per major facility** |

# ZDS Health Care Project Experience

**Hopemont Hospital**
**Terra Alta, WV**

**William R. Sharpe, Jr. Hospital**
**Weston, WV**

**Charleston Area Medical Center (CAMC)**
**Charleston, WV**

ZDS

DESIGN/CONSULTING ENGINEERING SERVICES

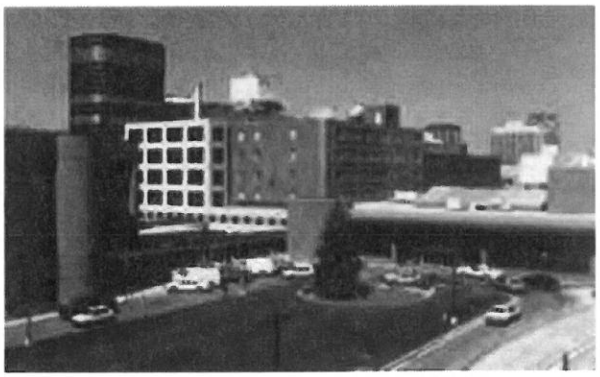
MECHANICAL • ELECTRICAL • IAQ • ENERGY • COMMISSIONING

91 Smiley Drive, St. Albans, WV 25177 • (304) 755-0075 • www.zdsdesign.com

***Project Name:*** ***CAMC General Division***

***Location:*** ***Charleston Area Medical Center (CAMC), Charleston, WV***

***Description:***



CAMC is the largest health care provider in West Virginia and consists of several separate hospital campuses and facilities encompassing nearly 10 million square feet. Prior to forming ZDS, their principals and personnel's work at the General Division included the following: Special Care Facility, Physical Therapy, Emergency Room Retrofit, 3-4-5-6 South Patient Retrofit, District Chiller Plan Replacement and Interconnect, and Medical Records.

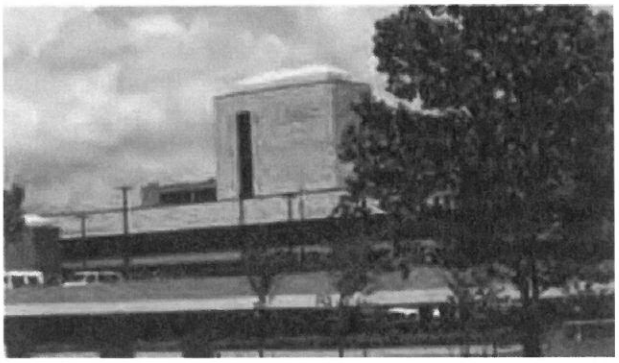
***Contact:*** Bill Williams, Consultant for Plant Operations (304) 388-5544
Ray George, Corporate Director of Construction (304) 388-9740

---

***Project Name:*** ***CAMC Memorial Division***

***Location:*** ***Charleston Area Medical Center (CAMC), Charleston, WV***

***Description:*** Prior to forming ZDS, Todd Zachwieja, Ted Zachwieja, and Jim Watters were involved at CAMC with review of the design and commissioning of a $40 million surgery addition to the Memorial Division campuses. This work paid for itself in less than two years from the savings generated and addressed maintenance reliability and future expandability issues. Their involvement at this location included Emergency Room Renovations, Patient Room Renovations, Chiller Replacement/Interconnect, Radiology/Nuclear Medicine Renovations, Cath Lab, SICU, MICU Renovations and CT Scan, Emergency Generator/Fuel Oil Storage, Surgery Addition Commissioning, and Laundry Facility Renovations.

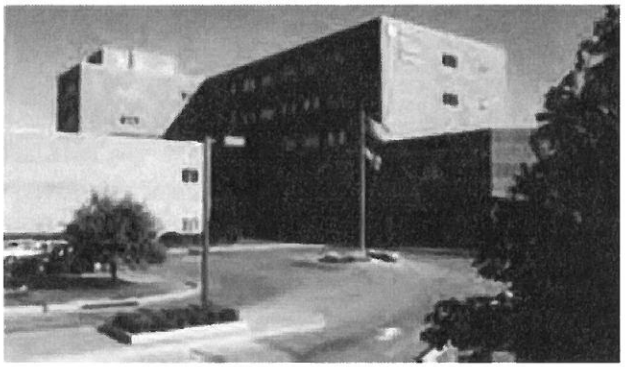


***Contact:*** Bill Williams, Consultant for Plant Operations (304) 388-5544
Ray George, Corporate Director of Construction (304) 388-9740

***Project Name:*** ***CAMC Women & Children's Hospital***

***Location:*** ***Charleston Area Medical Center (CAMC), Charleston, WV***

***Description:*** ZDS' principals and personnel have worked with CAMC since 1982 while at ZDS and through previous employers on many design, energy conservation and commissioning projects involving sophisticated mechanical and electrical systems while meeting stringent health care requirements and safety of the patients for CAMC. Some of their involvement at CAMC's Women & Children's Hospital included LDRP Additions/Renovations, NICU & PICU Renovations, Emergency Room Renovations, Patient Room Renovations, and the District Chiller Plant Replacement and Interconnect.



***Contact:*** Bill Williams, Consultant for Plant Operations (304) 388-5544
Ray George, Corporate Director of Construction (304) 388-9740

---

***Project Name:*** ***Hopemont Hospital, Terra Alta, WV – Heating Plant Renovations***

***Location:*** ***West Virginia Department of Health and Human Resources (WVDHHR), Charleston, WV***

***Description:*** ZDS' initial work addressed their fire alarm needs in 2003. ZDS was contacted again in 2010 to provide master planning, heating system upgrades and ARRA funded lighting upgrades. The heating plant optimization initial phase involved replacing underground piping between the central plant and hospital, along with comprehensive steam trap upgrades. This required engineering planning, design, supervision, preparation of construction documents, specifications, and construction administration of the heating systems including lighting upgrades with replacement of T-12 lighting fixtures and incandescent lights with energy efficient T-8/T-5 and LED lighting, reducing lighting energy usage by over 30%.

***Project Cost:***

| | | |
|---|---|---|
| ARRA Renovation | $760,000 | Completed in 2011 |
| Fire Alarm | $175,000 | Completed in 2003 |

***Hospital Size:*** 124,800 $ft^2$

***Contact:*** Greg Nicholson, Chief Operations Officer, WVDHHR, One Davis Square, Charleston, WV 25301. (304) 558-1577 greg.c.nicholson@wv.gov

***Project Name:*** ***Jackie Withrow Hospital, Beckley, WV – Heating Plant Renovations***

***Location:*** ***West Virginia Department of Health and Human Resources (WVDHHR), Charleston, WV***

***Description:*** ZDS was the Prime for this project. Renovations included creating a central plant at one end of the large facility which included three 3,000 MBH, 125 psi steam boilers with upgrades to the condensate return system and comprehensive steam trap upgrades, providing a new gas service to the new boiler plant. The existing boiler plant in the opposite end of the large facility was upgraded to lengthen the life of it including a 2,500 MBH steam boiler. Several old or poor condition boilers were removed or isolated from providing heat to the system. The natural gas service upgrades were coordinated through the State Fire Marshal for approval to meet emergency backup fuel needs required by current code for both heating and emergency power.

***Heating Project Cost:*** $1,907,000 408,820 $ft^2$ Completed in 2011

***Contact:*** Greg Nicholson, Chief Operations Officer, WVDHHR, One Davis Square, Charleston, WV 25301. (304) 558-1577 greg.c.nicholson@wv.gov

---

***Project Name:*** ***WV Department of Health and Human Resources***

***Location:*** ***William R. Sharpe, Jr. Hospital – Renovations & Addition, Weston, WV***

***Description:*** Prime consultant for renovation work including Engineering Master Planning, energy analysis, Mechanical, Electrical, and Fire Protection design, bidding and construction administration services for retrofitting the 212,000 $ft^2$ Hospital. Consultant for all MEP engineering for the 32,000 $ft^2$ addition.

| ***Construction Costs:*** | | | |
|---|---|---|---|
| | Phase I HVAC Cost | $ 1,403,000 | Completed in 2011 |
| | ARRA Funded Lighting Upgrade Costs | $ 618,700 | Completed in 2011 |
| | Comprehensive Renovation Cost | $30,000,000 | Completed in 2016 |
| | Addition Project Cost | $13,500,000 | Completed in 2014 |

***Contact:*** Greg Nicholson, Chief Operations Officer, WVDHHR, One Davis Square, Charleston, WV 25301. (304) 558-1577 greg.c.nicholson@wv.gov

Michael Pickens

172 Oak Street

Dunbar, WV 25064

(304) 400-9993

July 26, 2013

**RE: ZDS Design/Consulting Services**

I have had the privilege to work with ZDS Design/Consulting Services' principals and many of their staff since working at the School Building Authority in the 1990's in my roles at the School Building Authority to my current role as Executive Director of the Office of School Facilities at the West Virginia Department of Education.

When an emergency issue arose, they would immediately make themselves available to help. ZDS's principal, Todd Zachwieja, did not hesitate to board a helicopter during a weekend to help assess the damage to the State's school facilities when damaging floods occurred. Helicopters were the only way to reach many of the facilities because the roads had been washed away or were impassible. Anytime a challenging issue has arisen that no one knew how to resolve, ZDS has stepped up to solve the challenges. Their extensive engineering knowledge of energy efficient systems, HVAC, controls, lighting, power and plumbing systems has always been at the leading edge in the industry, providing innovative solutions that also minimize energy and operating costs. I have always considered their approach in engineering design and commissioning for buildings to be the best and would highly recommend them to anyone.

Their ability to work with the State Fire Marshal and other agencies – while guiding everyone to a practical design approach – always provided each project with the best value. They are much more than excellent design engineers; they also understand the importance of operating and maintaining equipment and have hands-on knowledge to troubleshoot and also commission to ensure our projects were a great success. Their combined engineering design and commission skills prove to be invaluable.

ZDS Design/Consulting Services was also selected to help the WV Department of Education and the School Building Authority in writing new codes and standards to raise the bar for the entire State. They were chosen because their projects were a success while we were having challenges with others. Todd Zachwieja was also asked to teach school facility staff members, and his reference books continue to be used today. I would always think of ZDS first whenever a challenge would occur, knowing I would get the best results possible.

I trust ZDS's staff in their technical expertise and their approach in solving challenging engineering issues and believe that anyone who uses them will be as satisfied as I have been. They are worth it!

Sincerely,

Michael E. Pickens

**ELSWICK & ASSOCIATES, LLC**

August 5, 2013

To Whom It May Concern:

I am distinctly honored to provide this letter of recommendation for ZDS Design/Consulting Services to your organization. I have known ZDS's principals and many of their staff since working with Ted and Todd Zachwieja at West Virginia Institute of Technology located in Montgomery, WV, from the 1970's, while I was the Physical Plant Director there. That relationship continues through today. Their knowledge of energy efficient systems related to Heating, Ventilating, and Air-Conditioning (HVAC), Building Automation Systems (BAS), lighting, power distribution, and plumbing systems has always been at the cutting edge of the industry. They have routinely provided innovative solutions to complex design challenges while minimizing energy and operating costs and enhancing maintenance efficiency. I have always considered their approach to engineering design and commissioning systems first for higher education, hospitals and schools to be superior and I would recommend them to anyone.

Throughout my career I have continued my working relationship with Ted and Todd Zachwieja and Jim Watters while I was Director of Facilities Management at Charleston Area Medical Center (CAMC), General Division, located in Charleston, WV. During that time, they provided mechanical, electrical, and plumbing (MEP), engineering, and construction administration services for all areas of CAMC's facilities. Their knowledge of health care code and practical design approach always provided the uniqueness required for the scope of the work. They understood the importance of operating and maintaining equipment and used their hands-on knowledge to ensure all our projects were on schedule and within budget. As a matter of fact, Todd led the first energy services performance contract in West Virginia. Through Todd's leadership, CAMC saved in excess of $800,000.00 annually in energy costs and those savings were used for mechanical, electrical, and infrastructure upgrades at all three CAMC divisions. Ted, Todd, and Jim also assisted in many other projects at all CAMC divisions, including commissioning the work implemented as part of the energy savings program. Their combined engineering design and commissioning skills proved to be invaluable.

I also worked with ZDS Design/Consulting Services while I was Director of Facilities, Planning and Management at Washington & Lee University in the 1990's. They designed, acted as the construction project manager and commissioned the campus chilled water plant and distribution system to address the needs of the growing campus while fast tracking the project from start to finish in just nine months. I would always think of ZDS first whenever I was faced with a challenge, knowing that I would get the best technical expertise available.

513 Havana Dr.
Charleston, WV 25311
304.542.8877

Likewise, ZDS helped establish one of the first performance contracting programs in the State of Ohio's higher education system for Ohio University, saving the Athens campus millions annually while the savings were used for the mechanical, electrical and building automation improvements to generate the savings.

I have the utmost confidence in the technical expertise, the collaborative approach and ethical standards of ZDS Design/Consulting Services. Furthermore, these individuals are truly honorable professionals. In this regard, if you have questions or need additional information, please don't hesitate to contact me.

Sincerely,

Bill Elswick, MBA, CEO

# Fayette County Board of Education

111 Fayette Avenue
Fayetteville, WV 25840
(304) 574-1176

July 29, 2013

To Whom It May Concern:

Ron Cantley II
Director of Operations

I have had the privilege of working with ZDS Design/Consulting Services from when I was a principal at a Beckley Stratton Middle School in Raleigh County in 1997 to my current position as Director of Operations for Fayette County Schools. ZDS is a firm we have come to rely on. When I worked for Raleigh County Schools, ZDS commissioned a new large school that helped resolve many complex control and HVAC issues after others tried but failed to correct. The ZDS staff is effective in communicating technical issues in ways administrative staff can understand. They have an excellent attention to important details that improve any project. Their expertise and services have added significant value on every project they have been involved with.

ZDS works well with administrators, maintenance, contractors, code officials, and others that benefit any project. They have technical acumen that is well respected among their peers. I value and strongly consider their opinions when we make capital improvement decisions, independently audit the work of other companies, correct stubborn problems, or reassure our constituents in regards to our educational facility activities. This assessment comes from multiple interactions over the years. I recommend ZDS for engineering and commissioning services for which they are asked to engage.

Respectfully,

Ronald Cantley II
Director of Operations
Fayette County Board of Education

# Ritchie County Schools

134 South Penn Avenue, Harrisville, WV 26362
Edward T. Toman, Superintendent

Telephone 304-643-2991
Fax 304-643-2994


August 6, 2013

To: Whom It May Concern

From: David B. Weekley, Director of Student Support Services

RE: ZDS Design/ Consulting Services

We have had the privilege of working with ZDS Design/ Consulting Services on construction projects for Ritchie County Schools. The first project was at Ritchie County Middle/High School. This was on an emergency basis with school closed due to indoor Air Quality issues with which all parties were struggling to determine the cause. ZDS promptly came to our need, assessed the issues, and identified solutions that helped immediately re-open the school. They developed a long-term plan while providing the design and construction administration services which solved the complex issues within the school. This job was ultimately completed to the satisfaction of all parties involved.

Ritchie County Schools had yet another opportunity to work with ZDS on the Smithville Elementary Addition and Renovation project. The professionalism exhibited by ZDS allowed their part of this project to progress smoothly and efficiently. Our community is still very proud of the facility they received.

ZDS Design/ Consulting Services works well with the West Virginia Department of Education, the School Building Authority, State Fire Marshal, and other agencies as needed. This has proven invaluable to Ritchie County Schools. They were very responsive to any issues raised and often offered ideas or suggestions that greatly benefit Ritchie County Schools. They are also very responsive long after these projects have been completed, helping our staff when requested in a prompt, professional manner.

I trust the staff of ZDS and their practical approach to solving challenging facility issues in both new construction and renovations. I would highly recommend ZDS Design/ Consulting Services as they are an exceptional company that is willing to do what it takes to provide a quality job.

SAIC®

July 19, 2013

To whom it may concern:

ZDS Design/Consulting Services was sub-contracted by SAIC to perform the fundamental commissioning activities on a two-phase maintenance and fuel cell hangar project for the 130th Airlift Wing on the West Virginia Air National Guard Base at Yeager Airport outside Charleston, West Virginia.

Without hesitation, I recommend Todd Zachwieja and his team for their efforts on this complex project. The first phase, the Replace Aircraft Maintenance Hangar and Shops phase, was initially scoped to meet a certifiable level for LEED® certification. ZDS Design/Consulting Services worked with my team and the West Virginia Air National Guard (WVANG) representatives through the design phase to provide the necessary activities required to meet the LEED® Energy and Atmosphere Prerequisite 1, Fundamental Commissioning of the Building Energy Systems. However, when the second phase, the Fuel System/Corrosion Control Hangar and Shops phase, came to life about the time that phase 1 construction began, the entire project was required by the National Guard Bureau to be certified by the Green Building Certification Institute (GBCI) at a LEED® Silver level. ZDS Design/Consulting Services diligently worked with the general contractor, the WVANG and SAIC to develop an approach to the phasing of the commissioning activities for both buildings that still met the fundamental commissioning prerequisite requirements as one of the hangars was to lay dormant after completion for an extended period of time until near the completion of the second phase. This required that ZDS Design/Consulting Services perform some of the commissioning activities for the first phase during the first phase construction and the remainder during commissioning of the second phase.

Through the construction process, Todd Zachwieja's group kept me well informed on their schedule and their deliverables. Todd was frequently on my LEED status calls with the contractor to stay abreast of any upcoming issues that would affect the commissioning activities and to assist in how to resolve issues that would come up. In addition, ZDS Design/Consulting Services assisted us with services beyond the commissioning activities as well. These included providing and reviewing building flush-out calculations to determine if LEED® Indoor Environmental Quality Credit 3.2, Construction IAQ Management Plan, Before Occupancy, was achievable and providing light level readings for a light pole that needed to meet certain light levels. The project achieved LEED® Silver certification and the fundamental commissioning prerequisite was approved by the GBCI after the first construction review without qualification.

ZDS Design/Consulting Services proved to be a well-qualified firm that provides timely and efficient services. SAIC was extremely pleased with their services on this challenging project.

Sincerely,

SAIC Energy, Environment & Infrastructure, LLC

Thomas Warner, LEED® AP, BD&C
LEED Administrator/Senior Architect

**SAIC Energy, Environment & Infrastructure, LLC**

*60 East Plato Boulevard, Suite 300 | St. Paul, MN 55107 | tel: 651.771.2222 | fax: 651.778.3911 | saic.com/EEandI*

**TIM HOLBROOK**

[redacted]

July 8, 2013

Re: ZDS Design/Consulting Services.

To Whom It May Concern:

I have had the recent privilege to work with ZDS Design/Consulting Services on several construction projects for the Greenbrier County Board of Education. In my role as the Clerk of the Works (owner's representative) for these projects, I was fortunate to be able to work with a company possessing their level of knowledge and expertise as an important part of our design team.

ZDS was on board from the conceptual design/development phase through the completion of construction and close out of the project. They constantly pushed to see that work progressed as it should and was done right.

Their personnel was extremely qualified and easy to work with. They were immediately responsive to any questions, problems, or issues that came up, and often called offering ideas and suggestions that could benefit the owner.

They were also instrumental in helping the board secure some rebates and credits that helped with the project costs.

I would be very happy to do another project with ZDS as they were a first class company, willing to do what it took give the owner a quality job. I highly recommend them for any mechanical and electrical construction project you may have.

Very truly yours,

Tim Holbrook

Facility Dynamics
ENGINEERING

## Western State Replacement Hospital

**Virginia Department of Behavioral Health, Richmond, VA**

FDE is providing commissioning services to the 246 bed Western State Replacement Hospital. FDE's commissioning scope included commissioning of all HVAC systems which include: variable refrigerant flow (VRF) HVAC systems with direct expansion heat pump fan coil units, water cooled VRF system, differential pressure monitoring, terminal units, 100% outside air units, lighting controls, domestic hot water, security systems and electrical systems.

In addition, FDE has provided commissioning and control services for over 18 years with over 90 projects completed to the Virginia Department of Mental Health – Mental Retardation and Substance Abuse Service (DMHMRSAS). Projects include: Carter Hall, Bldg. 806, Admin Building 113, SVTC Hiram Davis AHU-2 Investigation, SVTC Bldg 93, Richmond Dormitory Facility Renovation and Bldg 11 HVAC Replacement.

**Point of Contact:** Jim Taylor – Capital Project Manager
804-840-7155, jim.taylor@co.dmhmrsas.virginia.gov
Virginia Department of Behavioral Health
1220 Bank Street
Richmond, VA 23219

## Weinburg Building Expansion

**University of Maryland Medical Center, Baltimore, MD**

Facility Dynamics commissioned the new $200 million, 400,000 sf Weinberg Building at the University Of Maryland Medical System Medical Center in downtown Baltimore. This building houses a new Adult and Pediatric Emergency Room as well as Clinical Space, Radiology, Central Sterilization, Pediatric Operating Rooms and a total of 3 Operating Room Pods containing 18 Ors. It encompasses 400,000 sf and cost $250 million. Due to the specialized needs of the Ors (burn and heart use), special cooling and heating requirements were needed. This critical facility required a high level of reliability and redundancy on both the mechanical and electrical systems.

Facility Dynamics commissioned 100% of the mechanical and electrical systems along with specialty medical gas systems in the building. We also provided MEP coordination services. We took a lead role in coordinating utility system shutdowns for chilled water, hot water, steam, electricity, medical gases and vacuum systems.

Facility Dynamics
ENGINEERING

## Eastern Regional Psychiatric Hospital

**NC Department of Health and Human Services Goldsboro, NC**

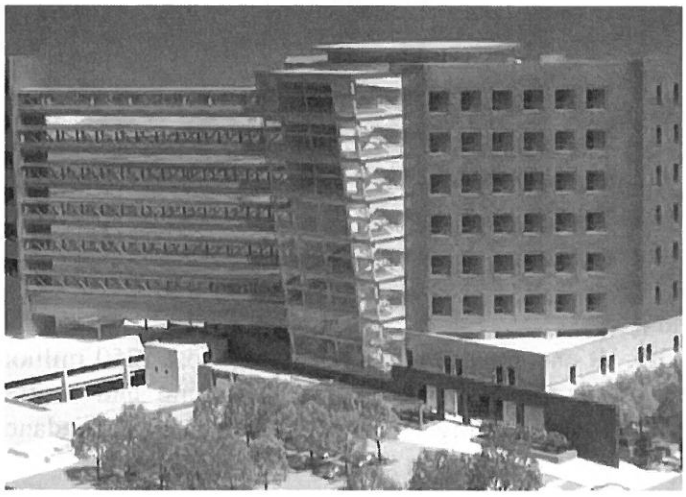
Facility Dynamics is providing commissioning services to the 375,000 square foot, 304 bed replacement psychiatric hospital. The new facility will house non-medical patient rooms, medical isolation rooms, laboratories, a pharmacy, office and administration areas and a boiler/chiller plant.

FDE's commissioning services include all HVAC systems including air handling units, chillers, cooling towers, boilers, variable air volume boxes, pumps and exhaust systems. We are also providing commissioning services to the new 216,000 sf Public Health Lab/Medical Examiner's Office.

**Point of Contact:** **Peter Veit – Project Manager**
919-733-6829
Department of Health and Human Services
Division of Property and Construction
101 Blair Drive, Raleigh, NC 27603

## Saperstein Critical Care Tower

**Cedars-Sinai Medical Center, Los Angeles, CA**



Facility Dynamics is providing design and construction phase commissioning for the new 250,000 sf, $150 million addition to the Cedars-Sinai Medical Center in Los Angeles, CA. This eight-story state-of-the-art building addition contains 120 intensive care unit beds, 48 monitored medical/surgical patient rooms and 30 acute care beds. The facility also provides expansion areas for the existing trauma and emergency departments and the Cancer Treatment Center.

Facility Dynamics scope includes commissioning of all HVAC systems including: air handling units, chillers, boilers, cooling towers, pumps, fan coil units, cabinet unit heaters, exhaust and outside air, negative and neutral pressure rooms, stairwell pressurization and smoke controls.

Facility Dynamics
ENGINEERING

## Hershey Medical Center – Cancer Institute

**Milton S. Hershey Medical Center, Hershey, PA**

Facility Dynamics provided commissioning services to the new four-story, 180,000 sf, $92 million Penn State Hershey Cancer Institute. The new facility houses outpatient rooms, exam rooms, infusion stations, radiation oncology suite, private treatment rooms, state-of-the-art radiation treatment spaces, office and administration space, research labs and a healing garden. This facility achieved a LEED certified rating from the USGBC.

FDE's scope of commissioning services includes all HVAC systems; air handling units, fan coil units, variable air volume terminal units, package chillers, chilled water systems, medical and lab gas systems, central building automation system, life safety systems and general plumbing and electrical.

**Point of Contact:** Keith Sunderman – Project Manager, Phone: 814-321-3200
Milton S. Hershey Medical Center
500 University Drive, M/C HS50, Hershey, PA 17033

## South Campus Research Facility

**Children's Hospital of Philadelphia, Philadelphia, PA**

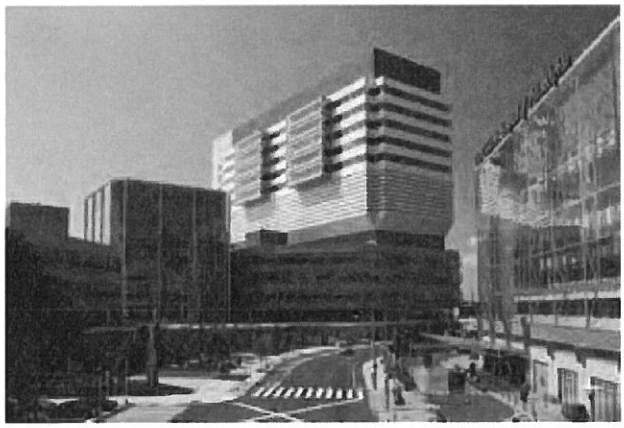

FDE was the Commissioning Authority for the new 11-story, 423,000 sf, $260 million South Campus Research Facility at the Children's Hospital of Philadelphia. The facility includes basic science and clinical research with 200,000 sf to supporting science and other research related areas. The facility houses a state-of-the-art research laboratory and support areas, offices, café, conference rooms and lounges. This project received a LEED Silver certification from the USGBC. FDE is also providing design and construction phase services on the new Ambulatory Care Center project which includes outpatient care, surgery and imaging.

FDE performed construction phase commissioning services on all HVAC systems including: air handling units, hydronic systems, fan coil units, misc. exhaust systems, steam systems, variable volume terminal units and lab control systems. Electrical systems included lighting controls and emergency power generators.

Facility Dynamics
ENGINEERING

## Translational Research Center

**University of Pennsylvania Health System, Philadelphia, PA**



Facility Dynamics is providing commissioning services to the new 517,000 sf, $220 million, 12-story hospital and research facility. It houses clinical and patient-oriented research areas, imaging, support research spaces, a conference and seminar center, administrative/office areas and several floors of biomedical laboratories.

FDE's commissioning services include all HVAC systems and controls including chillers, heat exchangers, cooling towers, air handling units, pumps, lab/specialty exhaust systems, fan coil units, cabinet units heaters, chilled water systems, emergency power and transfer systems, lighting control systems, laboratory/vivarium gas systems and electrical and plumbing systems.

**Point of Contact:** Brian Heigh - Project Manager, Phone: 215-662-4823
University of Penn Health System - Real Estate Design/Construction
3400 Spruce Street, Philadelphia, PA, 19104

## A.I Dupont Hospital for Children Upgrade

**A.I. Dupont Hospital, Wilmington, DE**

FDE recently completed commissioning services to the Operating Room Expansion project (12 operating rooms) renovation to the Nemours/Alfred I. DuPont Hospital for Children. The project involved construction phase commissioning services for the operating room expansion, neurology renovation and boiler expansion.

The project consists of a roof mechanical penthouse containing three air handling units with common manifold supply and return duct, air cooled process chiller, steam–to- glycol hot water pre-heat and reheat systems, Neurology care renovation with VAV terminal units, twelve operating rooms and support areas with Tek-Air boxes, dual fuel steam boiler. Commissioning (Cx) primarily included new HVAC equipment, Building Automation Control system and its interface to the fire alarm system.

**Point of Contact:** Chuck Egan – Project Manager, Phone: 302-298-7082
Nemours, Corporate Facilities for A.I. DuPont Hospital for Children
1600 Rockland Road, Wilmington, DE 19803

Facility Dynamics
ENGINEERING

# Rush University Medical Center – East Tower

**Rush University Medical Center, Chicago, IL**

In Dec 2011, FDE completed commissioning of the East Hospital Tower at Rush University Medical Center. The new 14-level, 806,000 sf, $575 million facility houses acute and critical care patients and includes surgical, diagnostic and therapeutic facilities. It also features an expanded emergency services facility including the Center for Advanced Emergency Response and over 376 private patient beds. FDE also provided commissioning services to the Rush University Medical Center's new Central Energy Plant. The new 20,000 ton cooling plant includes additional boilers, chillers and cooling towers, and generators to accommodate the new and existing facilities. Primary heating, cooling and power distribution from the new Central Energy Plant will be through the Materials Management Tunnel. The project also includes emergency power (10 megawatts). FDE also commissioned the new Atrium Building, Kellogg Pavilion and the Orthopedic Ambulatory Building.

FDE provided commissioning services on all HVAC systems including air handling units, domestic water systems, pumps, smoke pressurization systems, lab systems and terminal units. Electrical commissioning includes lighting and emergency power systems. This project received a LEED Gold certification from the USGBC.

**Point of Contact:** Valerie Larkin – Program Manager,
Phone: 312-942-4886
RUMC Transformation Program
Rush University Medical Center
600 South Pauline Street,
Chicago, IL 60612

Facility Dynamics
ENGINEERING

# Rockingham Memorial Hospital

**Rockingham Memorial Hospital, Harrisonburg, VA**

FDE recently provided commissioning services to the new 280 million dollar, 630,000 square foot Rockingham Memorial hospital facility. The 6-story, 238-bed state-of-the-art full service hospital facility houses cardiology, general surgery, heart surgery, women's health and cancer care. This project received a Gold certification with the U.S. Green Building Council's LEED Rating System.

FDE provided commissioning services on all HVAC systems including air handling units, fan coil units, VAV terminal units, CHW and HW hydronic pumping stations, heat recovery systems, chillers, boilers, pumps, supply/return/relief exhaust air systems, building automation systems and electrical systems.

**Point of Contact:** Scott Campbell – Project Manager
Phone: 540-432-0826
Rockingham Memorial Hospital
235 Cantrell Avenue,
Harrisonburg, VA 22801

Facility Dynamics
ENGINEERING

## Jacobs Medical Center

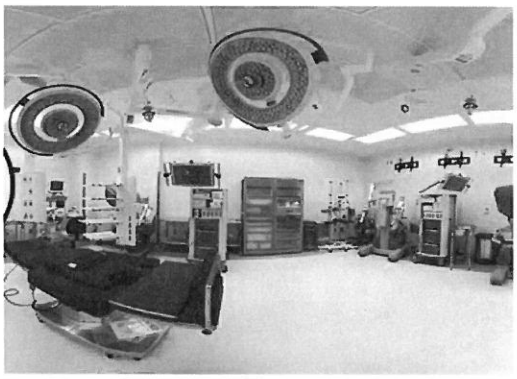
**University of California, San Diego, CA**

FDE was awarded the new UC San Diego – Jacobs Medical Center and are providing full commissioning services to the 510,000 sf 10-story project. It features four hospitals in one location which includes: the existing Thornton Hospital, Hospital for Advanced Surgery, Cancer Care Center and a Women and Infant's hospital. The facility includes: 250 inpatient beds, intensive care units, labor/delivery rooms, intermediate care unit, operating rooms, labs, family lounges, offices and administration areas.

Commissioning services include all HVAC, plumbing and lighting control systems. The HVAC system was comprised of a central plant with water chillers and boilers, air handling units, and variable-air-volume terminal units. The project is expected to achieve a LEED Gold certification by the USGBC.

## NMMC – Main Operating Room Modernization/Central Plant Upgrade

**Walter Reed National Military Medical Center, Bethesda, MD**



Facility Dynamics performed design and construction phase commissioning services for the 20,000 sf operating room modernization project at the Walter Reed National Military Medical Center. Critical environmental control was delivered to ensure positive pressure in operating rooms was consistently maintained at desired space comfort conditions. Unique HVAC systems delivered within this scope included a dewpoint controlled, dessicant air handling system and smoke purge ventilation system.

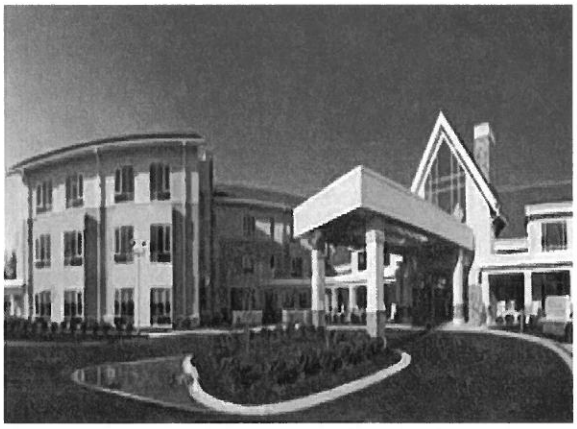
In addition to the operating room modernization scope, Facility Dynamics performed design and construction phase commissioning services at WRNMMC's existing 13,000 ton chiller plant. The design proposed retrofitting DDC controllers on existing equipment to replace antiquated pneumatic controls. Our scope included optimizing the plant's performance and verifying new DDC controls were implemented per design intent.

**Points of Contact:** Mark Corwin (Operating Room) – Project Manager
301-787-5596
John Schauder – (Central Plant) Project Manager
703-875-9458
Clark Construction
7500 Old Georgetown Road
Bethesda, MD 20814

Facility Dynamics
ENGINEERING

## Levindale Hebrew Geriatric Center

**Life Bridge Health, Baltimore, MD**



FDE performed full commissioning services for the $31 million expansion project at the Levindale Hebrew Geriatric Center and Hospital. The facility includes 84 private suites with a kitchen, lounge and office spaces.

FDE's scope of services included commissioning of all HVAC systems which include: chillers, boilers, heat exchangers, pumps, air handling units, fan coil units, VAV terminal units, exhaust systems, building automation system and all related control systems.

**Points of Contact:** Dan Minkiewicz – Project Manager
410-601-9000
Life Bridge Health
2401 W. Belvedere Ave.
Baltimore, MD 21215

## Cancer Research Building

**Johns Hopkins Medical Institute, Baltimore, MD**

Facility Dynamics commissioned this 272,000 square foot $80,000,000 new laboratory building. The facility includes various labs, BL-3 laboratory space, a barrier vivarium and office space. Two floors of office space line up with every one level of mechanical and laboratory space, resulting in 10 levels of office space at each end of the building. The mechanical systems generally include 9 custom air handling units, 12 heat recovery wheels, RODI water system, medical gas distribution, specialized laboratory exhaust serving a vivarium, lab fume hoods, sterilizers, animal cage wash equipment, and environmental cold rooms.

**Point of Contact:** Mike Dausch - Director
215-898-2414
Facilities Design & Construction
1501 East Jefferson Street
Baltimore, MD 21231

Facility Dynamics
ENGINEERING

## Cancer Research Center

**University of Hawaii, Oahu, HI**

FDE provided commissioning services to the new 150,000 sf, $120 million Cancer Research Center at the University of Hawaii campus. The six-floor facilities features wet and dry research facilities, biosafety level 3 (BSL-3) lab areas, conference rooms, offices and administration areas. The project is expected to achieve a LEED certification from the USGBC.

The Cancer Research Center consists of both lab and office spaces, including a BSL-3 lab. The office spaces are served by a standard VAV air handling unit, with terminal units and chilled beam as the primary cooling source. The lab spaces are served by 100% outdoor air handling units in conjunction with central exhaust fans. Direct evaporative cooling of the exhaust air stream is used to pre-cool the 100% outdoor air flowing through the air handling units. The BSL-3 lab has dedicated air handlers and exhaust systems. Cooling requirements are met by a central chilled water plant with cooling towers, and terminal unit reheat is generated by condenser water/plate-and-frame heat exchangers. All of these systems were commissioned.

**Point of Contact:** Maynard Young – Manager – Facilities Planning and Design
808-956-4071
University of Hawaii
1960 East-West Road

## Sulpizio Cardiovascular Center

**University of California, San Diego, CA**

FDE provided full commissioning services to the new 128,000 sf, $269 million cardiovascular patient care and clinical research facility located in La Jolla, CA. The facility houses ambulatory, clinical and inpatient heart and stroke care into one location. The academic medical center also provides research in cardiovascular medicine, vascular surgery, heart imaging and pulmonary vascular medicine.

Commissioning services include all HVAC systems including air handling units, constant air volume tracking terminal for critical care areas, operating room HVAC systems, negative and positive pressure isolation rooms, exhaust systems, plumbing energy systems and electrical emergency power and lighting control systems. The project received a LEED Gold certification by the USGBC and is the first hospital in San Diego County to achieve the certification.

**Point of Contact:** Randy Leopold – Project Manager
Phone 858-583-3904
University of California – San Diego
9500 Gilman Drive, La Jolla, CA 92093

Facility Dynamics
ENGINEERING

## Keck Diagnostic Treatment Center

**St Johns Health Center, Santa Monica, CA**

Facility Dynamics is the Commissioning Authority for the new 4-story 275,000 sf, $140,000,000 Keck Diagnostic Treatment Center. Once complete the facility will house the Weingart Foundation Emergency Department, the Thomas and Dorothy Leavey Foundation Radiation Oncology Center, the Vasek Polak Cancer Center, Joyce Eisenberg Keefer Breast Center and the Henry E. Singleton Express Diagnostic Center. Additional facilities will also include a new surgery center, imaging department and cardiac catheterization laboratories.

FDE's scope includes commissioning of HVAC systems including air handling units, VAV terminals, exhaust fans, fan coil units, humidifiers, chilled water systems, central building automation systems, laboratory and clean rooms hoods, life safety systems, emergency power and supply systems.

**Point of Contact:** Shane Miller – Owner's Representative
310-829-8816
Construction Department
1328 22nd Street
Santa Monica, CA 90404

## Southwestern Medical Center

**University of Texas, Dallas, TX**

Facility Dynamics is providing commissioning services to the new $800 million, 1,300,000 square foot medical center. The new 12-story, 424-bed facility is one of country's leading state-of-the-art academic medical centers and research institutions. It will feature various hospital facilities including: classrooms, administrative space, conference rooms and a dedicated thermal energy plant.

FDE's commissioning services include all HVAC systems including air handling units, chillers, cooling towers, boilers, variable air volume boxes, pumps and exhaust systems. It also includes all electrical systems, plumbing systems and a new chiller plant.

# ZDS Design/Consulting Services

**Ted (Todd) A. Zachwieja, P.E., C.E.M., LEED AP**
**Chief Executive Officer**
**Principal-in-Charge M/E/P Design and Commissioning**

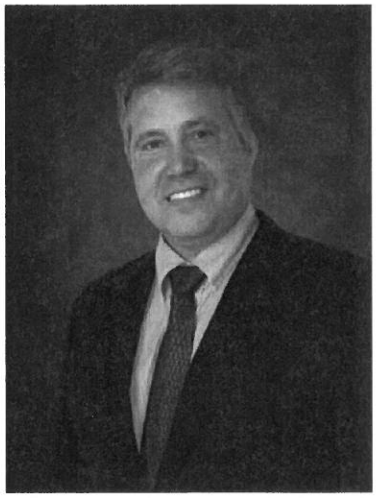
Todd has more than 38 years of experience in the design, construction management, and specifications for mechanical engineering, heating, ventilating, air conditioning, plumbing, electrical, and lighting, as well as indoor air quality analysis and building system commissioning for educational, commercial, industrial and health care facilities. His specialties include mechanical engineering, HVAC systems master planning, conceptual design, energy conservation program development, commissioning and IAQ analysis relating to HVAC systems. He has extensive experience in industrial, commercial, hospitals and educational design.

Prior to joining ZDS, Todd Zachwieja coordinated millions in comprehensive energy conservation programs resulting in annual energy savings of millions per year and managed a profitable regional office for one of the country's largest energy service companies covering southeastern United States. He also developed computer programs for building energy analysis and monitoring and presented technical papers at regional and national conferences. Some of Todd's project experience includes:

### GOVERNMENT AND COMMERCIAL

- Bank One – WV
- Bayer Material Science, South Charleston, WV
- Calvert County Aquatic Center, MD
- Culture Center HVAC, Fire Alarm, and Fire protection renovations,
- General Motors Corporation of North America Re-commissioning Program
- Kanawha County Commission – 120,000 sf additions/renovations for the Judicial Annex/Kanawha County Courthouse – Charleston
- Kohl's
- Laidley Towers – Charleston
- Mercer County Courthouse Annex – Princeton
- Olin Corporation
- Phillip Morris USA
- Rhone-Poulenc
- Santa Anna Federal Building, CA
- State of WV Capitol Complex Central Heating Plant and Renovations
- Sears
- Toyota Motor Manufacturer, WV Inc.
- Union Carbide/DOW
- United Center – Charleston
- Walker Machinery
- West Virginia Air National Guard including Cx recent $45M Fuel Cell/Maintenance Hangers at Yeager Airport for LEED Silver
- West Virginia Army National Guard
- West Virginia Department of Transportation/DOH
- West Virginia Division of Protective Services
- West Virginia Higher Education Authority
- West Virginia General Services Division
- West Virginia Parkways Authority
- West Virginia Public Service Commission Headquarters
- West Virginia State Capitol Complex renovations
- Yeager Airport

Todd also designed one of the largest geothermal heat pump applications in the mid-Atlantic region, and retro-commissioned HVAC systems and mechanical engineering at many General Motors' facilities in North America.



### EDUCATION

Bachelor of Science in Mechanical Engineering from West Virginia Institute of Technology in 1982

Masters of Science in Engineering Management from the University of West Virginia College of Graduate Studies in 1989

### REGISTRATIONS

Professional Engineer:

- West Virginia No. 10127
- Ohio No. E-53587
- Georgia No. 18253
- Kentucky No. PE-17961
- North Carolina No. PE-017445
- Pennsylvania No. PE-040929-R
- South Carolina No. 25985
- Virginia No. 0402 025427

Certified Energy Manager (C.E.M.), National Certification, No. 2205

CEM®

LEED AP

LEED® Accredited Professional, National Certification through USGBC No. #10083891

### OTHER RECOGNITIONS

Energy Star Certified for facilities in the nation's top 25% of energy efficiency

ENERGY STAR 2013

**Ted (Todd) A. Zachwieja, P.E., C.E.M., LEED AP**
**Chief Executive Officer**
**Principal-in-Charge M/E/P Design and Commissioning**

# ZDS Design/Consulting Services

## HEALTH CARE

- Bluefield Regional Medical Center
- Boone Memorial Hospital
- Cabell Huntington Hospital
- Charleston Area Medical Center Memorial Division - millions in renovation and new construction design, including commissioning of Charleston Area Medical Center Surgery Replacement Center
- Charleston Area Medical Center General Division - millions in renovations
- Charleston Area Medical Center Women & Children's Hospital - millions in renovations
- Charleston Surgical Center
- Family Practice Center
- Jackie Withrow Hospital
- John Manchin Sr. Health Care
- Hometown Healthcare Center
- Hopemont Hospital
- Lakin Hospital
- Lewistown Outpatient Surgical Facility, PA
- Mercy Medical Center
- Mildred Mitchell-Bateman Hospital
- Monongalia General Hospital
- Montgomery General Hospital
- St. Joseph's Hospital
- St. Mary's Hospital
- Summersville Regional Medical Center
- Surgicare Center
- Thomas Memorial Hospital
- United Hospital Center
- VA Hospital - Clarksburg
- VA Hospital - Huntington
- Wayne Memorial Hospital
- Webster Memorial Hospital
- Welch Community Hospital
- William R. Sharpe, Jr. Hospital Additions and Renovations

## EDUCATIONAL

### Colleges and Universities

- Alderson Broadus College
- Bluefield State College
- Concord University
- Fairmont State College
- Harvard University – *LEED Gold Certified*
- Marshall University
- Ohio University's Athens Campus
- Ohio University's Chillicothe campuses
- Southern West Virginia Community & Technical College
- University of California-Davis
- University of Charleston
- Washington & Lee University
- WVU Institute of Technology
- West Virginia State University
- West Virginia University
- West Virginia Wesleyan College

Todd was recognized nationally for his work with Ohio University in development of multiple performance contracting programs that are anticipated to save $2.5 million annually in energy and operating costs. He has been involved in 100's of higher education facilities.

### Schools

M/E/P design for schools in West Virginia include counties of Calhoun, Clay, Fayette, Grant, Greenbrier, Hardy, Harrison, Jackson, Kanawha, Lewis, Logan, Marion, McDowell, Mercer, Mingo, Monroe, Ohio, Pocahontas, Putnam, Raleigh, Randolph, Ritchie, Summers, Taylor, Tucker, Upshur, Webster, and Wyoming. ***In 2013 Elkins Middle School, Webster Springs Elementary and Glade Elementary/Middle School were given Energy Star Certification, placing them in the nation's top 25% of energy efficiency schools.***

Some of Todd's project experience includes development and design of a pilot geothermal heat pump HVAC with variable speed pumping system at Webster County High School, which reduced electric bills by more than 40% while meeting IAQ requirements.

## PROFESSIONAL AND COMMUNITY AFFILIATIONS

Charter member Mountaineer Chapter of American Society of Heating, Refrigeration and Air Conditioning Engineers

ASHRAE West Virginia Chapter

Served as ASHRAE's Energy and Technical Affairs Chairman for six years, currently **President**-WV ASHRAE

Recognized by the International Who's Who of Professionals

Recognized nationally as West Virginia's Business Man of the Year

Recognized nationally in 2007 as a "Legend in Energy"

Recognized nationally in 2008 as a "Charter Legend in Energy"

Charter Life Member of the Association of Energy Engineers

AIA Professional Affiliate Member of the American Institute of Architecture

Associate Member West Virginia Society for Healthcare Engineering

Member of the National Society of Professional Engineers

Member of the International Code Council

Contributing editor and served on the Editorial Review Panel for "The Handbook of Building Management and Indoor Air Quality," "Ventilation for a Quality Dining Experience," INvironment Professional, Power Prescriptions and other publications and articles dealing with Indoor Air Quality (IAQ) and MEP engineering systems.

Presented at regional and national conferences including the annual National System Commissioning Conference

Selected to train code officials and the design community the new ASHRAE 90.1 State Energy Code by WVU and the Division of Energy in 2013.

# ZDS Design/Consulting Services

**Ted T. Zachwieja**
**Principal-in-Charge**
**Construction Administration**

Ted has over 55 years of experience in mechanical, electrical systems design and construction administration including commissioning. His specialties include the design and development of mechanical and electrical systems, master planning and budgeting for mechanical and electrical systems, and management of complex design and construction projects. He is also a Codes and Standards Specialist. Ted has been involved in all aspects of mechanical and electrical design and construction since 1958, including machine design, structural design and design of heating, ventilating, air conditioning, plumbing, fire protection, energy conservation and electrical systems. Ted's experience includes work for the following as well as many additional clients in the private sector:

| | |
|---|---|
| Bank One | U.S. Steel |
| Bluefield Regional Medical Center | Union Carbide/Dow |
| Charleston Area Medical Center | United Hospital Center |
| Kanawha County Schools | West Virginia Capitol Complex |
| Marshall University | West Virginia Institute of Technology |
| Rhone-Poulenc | West Virginia University |

Ted's design regarding Chase Towers – Charleston included conducting a comprehensive energy audit, design of a Building Automation Energy Management System, HVAC renovations, design of flat plate heat exchanger system for the perimeter fan coil units and design of the boiler replacement.

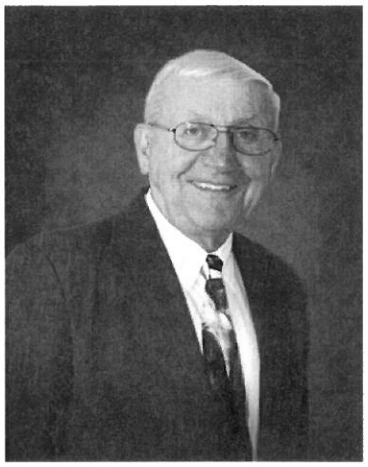
Ted was involved with the mechanical, electrical and fire protection renovations for the State of West Virginia Division of Culture and History as part of a total $6 million upgrade program. The indoor air quality, temperature and humidity each were not in accordance with good design practices for this type of structure. ZDS was commissioned to correct these deficiencies while conserving energy.

Ted was selected as one of three engineers to train and teach a course designed by the Department of Energy and American Society of Heating, Refrigeration and Air Conditioning Engineers for emergency building temperature restrictions.

Prior to forming ZDS, Ted was regional manager for a hospital design firm and responsible for designing, construction management and project management for over $200 million in hospital and health care facilities. The facilities were located over the eastern United States. Ted's most recent health care experience includes lighting projects and various studies for seven hospitals for the West Virginia Department of Health and Human Resources:

Hopemont State Hospital, Terra Alta
Jackie Withrow Hospital, Beckley
John Manchin, Sr. Health Care Center, Fairmont
Lakin State Hospital, West Columbia
Mildred Mitchell-Bateman Hospital, Huntington
Welch Community Hospital, Welch
William R. Sharpe, Jr. Hospital, Weston

The renovations and additions to William R. Sharpe, Jr. Hospital involves $35 million and involves careful phasing of the work to allow the hospital to remain in operation during construction while meeting Infection Control Risk Assessment requirements and Office of Health Facility Licensure & Certification requirements. ARRA funds were use to increase energy efficiency at all seven hospitals. Our Master Planning provided the Agency with a roadmap on how to move forward with major needs and limited resources.



**EDUCATION**

Bachelor of Science in Mechanical Engineering, West Virginia Institute of Technology, 1958

**PROFESSIONAL AND COMMUNITY AFFILIATIONS**

Construction Specifications Institute (Charter Member)

Life Time Member
American Society of Mechanical Engineers

American Society of Heating, Refrigeration & Air Conditioning Engineers (ASHRAE)

West Virginia Chapter ASHRAE
Past President and Charter Member

Association of Energy Engineers

Associate Member
West Virginia Society for Healthcare Engineering

Professional Affiliate Member of AIA

WV Association of Physical Plant Administrators

Other health care experience includes millions in renovation and new construction design for the following:

Bluefield Regional Medical Center
Cabell Huntington Hospital
Charleston Area Medical Center's
(CAMC) Special Care Facility
Lewistown Outpatient Surgery Center
Mercy Medical Center
Monongalia General Hospital
Montgomery General Hospital
St. Joseph's Hospital
St. Mary's Hospital
Summersville Memorial Hospital
Thomas Memorial Hospital
United Hospital Center
VA Hospital – Clarksburg
VA Hospital – Huntington
Wayne Memorial Hospital
Webster Memorial Hospital
Welch Emergency Hospital Surgicare Center
Wyoming County Hospital

Prior to forming ZDS, Ted was involved with the design and construction administration for many projects at **all Charleston Area Medical Center (CAMC) division**s including involvement with the following:

Memorial Division Chiller Replacement
750 kW Emergency Generator & Underground Fuel System
Main Electrical Service Upgrade
600 Ton Central Chiller Plant and Variable Water Pumping
Surgical Intensive Care Retrofit
Four-North HVAC Renovations
Laboratory Fume Ventilation
Allied Health, Physical Therapy & Hydrotherapy
Emergency Generator Retrofit Design
General Division Chiller Replacement
Newborn Intensive Care Unit
CT Scan Addition
Surgery Addition
Cath Lab III Renovations
Two-Four West Nursing Wing
Emergency Room Renovations
700 Ton Chiller Replacement and Variable Water Pumping
Two/Three East Patient Room Renovations
Nuclear Medicine Renovations
Special Care Facility Contract Administration
Three-Six Floor Patient Room South
Wound Center
Pediatric Intensive Care Unit
Central Electric Metering Design
LDRP/Gynecology
Operating and Recovery Room HVAC System

Ted has been involved in the planning, design and construction administration of many facilities including the following:

Concord University New Technology Center and Concord's campus medium voltage upgrades
Marshall University's Harris Hall and Smith renovations
Southern West Virginia Community & Technical College's renovations at Logan and Williamson campuses
Washington & Lee University Campus Master Planning, Central Cooling Plant/Campus distribution Renovations
West Virginia University (WVU) - Open-end Contract since 1998 for projects campus wide
Armstrong Hall, Clark Hall, Mountainerlair, Steward Hall, White Hall, Wise Library and may others
Downtown Campus Chilled Water Loop Interconnect, Stadium and Forestry Building

Throughout the years, Ted has worked on new and renovation projects such as:

Addition and renovation of the air conditioning system for the West Virginia State Capitol Building – Charleston
West Virginia Institute of Technology – Montgomery Conley Hall and Science Building HVAC renovations and additions
Indoor air quality (IAQ) and HVAC renovations of Andrew Jackson Junior High School for Kanawha County School Systems
Fume Hood Design and HVAC additions and renovations for Union Carbide - Charleston and Rhone Poulenc – Institute
Greenbrier East Middle School addition/renovations and Greenbrier West High Schools additions and renovations
McDowell County Schools including county wide evaluation, new Southside K-8 schools, new Iaeger/Panther Elementary School, Kimball Elementary School Renovations.
Mingo County Schools
Raleigh County Schools County-wide including a new Shady Springs Middle School, New Trap Hill Middle High School, Academy of Career and Technology Center HVAC renovations, Marsh Fork Elementary renovations, Park Middle School renovations, Woodrow Wilson High School renovations
Randolph County's Elkins Middle School renovations a **2013 ENERGY STAR** Certified Schools
Ritchie County Middle/High Schools Renovations and Smithville Elementary Additions/Renovations.
Pocahontas County High School (Geothermal) renovations and Science Lab additions
Wyoming County Schools
Tucker County Schools
Webster County High School – the largest geothermal project in the region and first, Webster Springs Elementary School (a **2013 ENERGY STAR** Certified School), and Glade Elementary/Middle School a **2013 ENERGY STAR** Certified School

**James E. Watters**
**Associate - Production Manager**

Jim has over 40 years experience in design and implementation of HVAC, plumbing and electrical systems including nine years in the construction industry. He has a comprehensive knowledge of construction documents, contracts, and development of cost estimates, budgets and schedules.

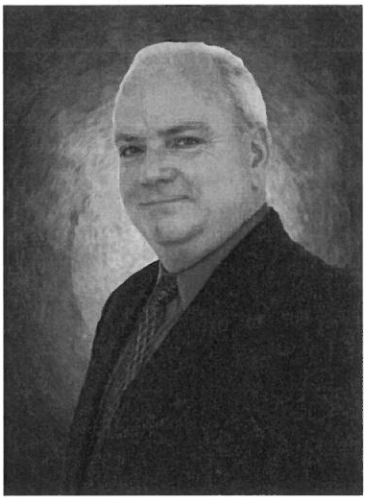
Jim's strengths reside in his ability to manage projects and people in an organized and cost-effective manner. Jim has been involved with the design and production of mechanical and electrical drawings including HVAC, plumbing, fire protection, lighting, electrical power and specialized systems. He has worked with and managed engineers in projects for health care, educational and commercial buildings in the states of West Virginia, Ohio, Kentucky, Virginia, Georgia, New York, Arizona, Illinois and Massachusetts.

Jim has extensive experience in energy savings' programs for HVAC, plumbing and electrical systems in hospitals, state and government office buildings, school systems, and manufacturing facilities, as well as managing performance contracts for the state of Georgia totaling $10,000,000 in construction costs on various projects, including the conception, design and construction administration for the installation of a 1.5 Megawatt emergency generator at the Central State Hospital facility in Milledgeville, Georgia. The propane-fired generator and associated switchgear in conjunction with 60,000 gallons of propane fuel storage served to provide peak shaving/load shedding to save on the facility utility costs as well as emergency power functions.

Through the years, Jim has researched and implemented into practice International Building Codes, NFPA Codes, National Electrical Codes, Life Safety Codes, IES standards, AIA Guidelines for Design and Construction, and the evolving ADA standards. Some of Jim's HVAC, plumbing, fire protection and electrical project experience includes the following:

## EDUCATIONAL

- Davis Thomas Elementary/Middle School Renovations
- Elkins Middle School HVAC and Electrical Renovations- ***2013 Energy Star Certified***
- Eastern Greenbrier Middle School Addition
- Kanawha County Schools
- Greenbrier West High School Additions/Renovations
- Marshall University Smith Hall Renovations
- Marshall University Student Housing in Huntington
- Mercer County Schools, Princeton High Schools Renovations, Vo-Tech Renovations, Lashmeet/Matoaka School Renovations, Montcalm High School, and Spanishburg Elementary Renovations.
- New Iaeger/Panther Elementary School
- Paul Blazer High School in Ashland
- Pleasant Hill Elementary School Renovations in Calhoun County
- Pocahontas County Community Center
- Raleigh County School County-Wide Domestic Water Service Upgrades
- Ritchie County Middle/High School Renovations
- Smithville Elementary School Additions/Renovations
- Woodrow Wilson High School HVAC/Electrical Renovations
- WVU Wise Library Fire Protection Renovations



## PROFESSIONAL AND COMMUNITY AFFILIATIONS

Member of the National Fire Protection Association (NFPA)

Member of the Health Care Section of the NFPA

Member of the Illuminating Engineering Society (IES)

Past member of the American Society of Plumbing Engineers (ASPE)

Past member of the Institute of Electrical Engineers (IEE)

## OTHER RECOGNITIONS

Energy Star Certified for facilities in the nation's top 25% of energy efficiency

ENERGY STAR 2013

## GOVERNMENT AND COMMERCIAL

- Bluefield Area Transit Authority Administration and Maintenance Facility design.
- Boyd County, Kentucky Judicial Center
- Chase Towers (formally Charleston National Bank)
- Department of Transportation Rest Area prototype
- Department of Transportation Welcome Center prototype
- Fenway Park in Boston - Lightning Protection and Grounding Study
- Glenville State College
- I-70 Welcome Center
- Jackson County Libraries Renovations
- Kanawha County Commission Judicial Annex Renovations
- Meadowbrook Rest Areas North and South Bound
- Morgantown Welcome Center
- Redmond House Renovations design
- Rhone-Poulenc new administrative offices
- Sacred Heart Pavilion and Daycare Center
- Saint Patrick Church Renovations
- Shawnee Park Clubhouse
- Stonewall Jackson Marina Renovations
- Tucker County Board Office Boiler Retrofit
- Tucker County Courthouse Renovations
- West Virginia Air National Guard – Commissioning for $43 million maintenance and fuel cell hangars – ***LEED Silver Candidate***
- West Virginia Department of Military Affairs and Public Safety Maintenance Facility in Eleanor
- West Virginia Department of Transportation Burnsville Rest Area (*AIA Merit Award Recipient*) and Domestic Water Pumping Station
- West Virginia Division of Culture and History Fire Alarm/Sprinkler upgrades
- West Virginia Parkways Authority, Toll Booth HVAC Renovations and Tamarack Study
- White Sulphur Springs Welcome Center

## HEALTH CARE

- Cabell Huntington Hospital
- **All Charleston Area Medical Center (CAMC) divisions**, prior to joining ZDS, projects included:
  - ✓ Cath Lab III Renovations
  - ✓ 750 kW Emergency Generator/Underground Fuel System
  - ✓ Two-Four West Nursing Wing
  - ✓ Main Electrical Service Upgrade
  - ✓ Emergency Room Renovations
  - ✓ Surgical Intensive Care Retrofit
  - ✓ Two/Three East Patient Room Renovations
  - ✓ Four-North HVAC Renovations
  - ✓ Nuclear Medicine Renovations
  - ✓ Special Care Facility Contract Administration
  - ✓ Allied Health, Physical Therapy & Hydrotherapy
  - ✓ Three-Six Floor Patient Room South
  - ✓ Emergency Generator Retrofit Design
  - ✓ Heliport and pilots quarters
  - ✓ Wound Center
  - ✓ Pediatric Intensive Care & Newborn Intensive Care Unit
  - ✓ Central Electric Metering Design
  - ✓ CT Scan Addition
  - ✓ LDRP/Gynecology
  - ✓ Surgery Addition
  - ✓ Operating and Recovery Room HVAC System
  - ✓ Medical Office Building – General Division
- Kings Daughters Medical Center, Ashland prior to join ZDS projects include: Cardiac Care center, medical office building
- Thomas Memorial Hospital
- St. Mary's Medical Center, Huntington
- United Hospital Center
- VA Hospital, Huntington –steam distribution system to serve six additional facilities on campus, main hospital domestic water line replacement and CT Scan renovations
- West Virginia Department of Health and Human Resources Master Planning and renovations:
  - o Jackie Withrow Hospital, Beckley: new central steam plant and renovations to heating system and lighting renovations.
  - o Hopemont State Hospital, Terra Alta: renovations to heating system and lighting systems.
  - o John Manchin, Sr. Health Care Center, Fairmont: renovations to lighting systems.
  - o Lakin State Hospital, West Columbia: lighting renovations.
  - o Mildred Mitchell-Bateman Hospital, Huntington: lighting renovations.
  - o Welch Community Hospital, Welch: lighting renovations.
  - o William R. Sharpe, Jr. Hospital, Weston: fifty bed forensic addition and renovations to entire existing hospital, 1,800 KW emergency power station.

**Jennings L. Davis II, P.E.**
**Mechanical Engineer**

Jennings has more than 23 years of experience in the design, project management and construction of heating, ventilating and air conditioning (HVAC), plumbing, electrical and specialized systems for healthcare, institutional and commercial facilities. His professional experience includes 11 years as an Owner's Representative at West Virginia University (WVU) in the positions of Staff Engineer and Construction Project Manager, 5 years as Mechanical Engineer for the West Virginia Department of Education (WVDE), and 6.5 years as a Project Engineer with a design and consulting engineering firm.

During his employment with WVU, Jennings was responsible for management of major repair and capital construction projects designed by outside Architectural and Engineering firms with budgets ranging from $50,000 to $37,000,000, as well as the design of smaller in-house projects ranging from $10,000 to $500,000. While working for the WVDE, he was responsible for quality control of design documents for various construction projects; troubleshooting maintenance for HVAC controls and for Indoor Air Quality (IAQ); recommissioning of HVAC systems to original design parameters; recommendations for HVAC operational and energy savings procedures; and training of maintenance personnel. He investigated facilities concentrating primarily on HVAC operation and occupant safety. Tasks included IAQ measurements such as temperature, humidity and carbon dioxide; HVAC equipment visual inspection; life safety assessment; and building component checks.

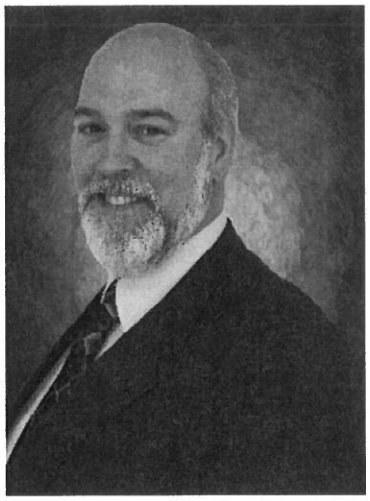
As a Project Engineer, Jennings specializes in developing scope, budget and design parameters; establishing program requirements through interaction with Owners and other Team members; design reviews; budget analysis and control; schedule control; complete design oversight and task assignment; and project closeout. Some of the projects he has been involved with include numerous renovation projects at several VA Medical Centers including multiple radiology room/suite installations and renovations, MRI's, X-ray and CT Scanners, Emergency Department renovations, numerous hospital out-patient treatment areas and specialty clinic renovations, a new $4.4 million Hospice facility at the VA Medical Center in Coatesville, Pennsylvania, and a new $5 million Medical Office Building for Somerset Hospital in Somerset, Pennsylvania.

Other projects include a $37 million addition and renovation to WVU's Wise Library, a $2.1 million chiller replacement for WVU's Engineering Sciences Building, a new primary 23kV power feed to the existing sub-station for the WVU Coliseum, engineering design for a hydrogenation reactor laboratory for WVU's Engineering Research Building, an $8 million HVAC and sprinkler renovation for WVU's Armstrong Hall and HVAC design for transmitter station for the West Virginia Public Broadcasting Station.

A more complete list of Jennings' clients and projects includes the following:

### SCHOOLS AND UNIVERSITIES

- West Virginia University (WVU)
  - Wise Library addition and renovation
  - Engineering Sciences Building chiller replacement
  - Coliseum's new primary 23kV power feed to existing sub-station
  - Engineering Research Building hydrogenation reactor laboratory
  - Armstrong Hall HVAC and sprinkler renovation
- Shepherd University Ikenberry Hall HVAC Renovation



### EDUCATION

BS in Mechanical Engineering from West Virginia University

### REGISTRATIONS

Professional Engineer West Virginia No. 15060

Professional Engineer Pennsylvania No. PE062186

Professional Engineer Virginia No. 040028

### PROFESSIONAL AFFILIATIONS

Vice President - American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) West Virginia Chapter

ASHRAE West Virginia Chapter

Associate Member West Virginia Society for Healthcare Engineering

## HEALTH CARE

- Children's National Medical Center (CNMC) 7-story East Wing Addition and Fit Out, multiple office suite renovations, Pediatric Intensive Care Unit (PICU) renovations, Hearing & Speech Outpatient Suite renovations, Quarantine Infection Control System Modifications, Pulmonary Outpatient Renovations, and Pharmacy Renovations
- Friendship Ridge Bulk Oxygen System and Facility Distribution Upgrade
- Heritage Valley Health Systems (HVHS)/Sewickley Valley Hospital (SVH) Radiology Reading and Processing Suite Renovations, Outpatient Clinic and Emergency Department Renovations, 5th Floor Central/West Inpatient Wing Renovations
- HVHS/Moon Imaging X-Ray Relocation
- HVHS/The Medical Center of Beaver (TMC) Helipad Study, Bulk Oxygen Supply and Storage Replacement, Radiology Reading and Processing Suite Renovations, RIS-PACS Data Storage Facility
- Indiana (Pennsylvania) Regional Medical Center (IRMC) Blairsville Medical Office Building, IT Data Storage Room HVAC Upgrade, Dialysis Treatment Suite HVAC Upgrade
- Mount Nittany Medical Center (MNMC) commissioning for East Wing addition, ED renovations, Central Utility Plant upgrades, Special Services/Computer Services Building
- Somerset Hospital ADL Suite Fit-out, Medical Office Building, Cath Lab Renovation, CT Replacement, X-Ray Replacement, Pharmacy Relocation/Renovations
- VAMC Clarksburg 4th Floor Renovations (Psychiatric Suite)
- VAMC Coatesville New Hospice Facility
- VAMC Huntington Mental Health-Psychiatric Residential Rehabilitation Treatment Program (MH PRRTP) Addition and Renovations
- VAMC Philadelphia Canteen Renovations, Dental Lab Renovations, Emergency Department and Patient Processing Renovations, Home Health Renovations, Medical Records Renovations, MRI Renovations, CT Scan Renovations, Angio Suite Renovations, Specialty Clinic Renovations, OR Suite HVAC System Upgrades, Chiller and Cooling Tower Replacements, New Patient Transport Elevator, Clean Steam System for Facility Wide Humidification
- West Virginia Department of Health and Human Resources Hospitals:
  - Jackie Withrow Hospital, Beckley
  - Hopemont State Hospital, Terra Alta
  - John Manchin, Sr. Health Care Center, Fairmont
  - Lakin State Hospital, West Columbia
  - Mildred Mitchell-Bateman Hospital, Huntington
  - Welch Community Hospital, Welch
  - William R. Sharpe, Jr. Hospital, Weston fifty bed forensic addition and renovations to entire existing hospital while building remains in use including new central heating/cooling plant, 1,800 KW emergency power station and comprehensive HVAC and electrical renovations throughout the facility.

## OTHER EXPERIENCE

- West Virginia Parkways Authority Toll Booth HVAC Renovations and Tamarack Study.
- West Virginia Air National Guard (WVANG) Commissioning for $43 million maintenance and fuel cell hangars – **LEED Silver Candidate**
- West Virginia Public Broadcasting Station HVAC design for transmitter station
- Federal Government Facility Cafeteria and Food Court Renovations, Electrical Vault Renovations

**James W. Lowry, P.E.**
**HVAC, Fire Protection, Plumbing and Commissioning Engineer**

James has over 14 years of experience and has focused on HVAC, Fire Protection, Plumbing and Commissioning engineering.

James' experience includes the Project Management, engineering design and commissioning for heating, ventilating, air conditioning, plumbing, electrical and lighting for educational, health care, industrial, educational and commercial facilities. He researches and applies International Building Codes, NFPA, ASHRAE standards, FGI Guidelines, NEC and the AIA Guidelines for Design and Construction of Health Care Facilities.

Some of James' project experience includes the following:

### EDUCATIONAL

- Davis Thomas Elementary/Middle School Renovations
- Eastern Greenbrier Middle School addition
- Elkins Middle School HVAC/electrical renovations - ***2013 Energy Star Certified***
- Glade Elementary/Middle School renovations – ***2013 Energy Star Certified***
- Greenbrier West High School additions/renovations
- Harvard University Weld Hill Research and Administration Arnold Arboretum – ***LEED Gold Certified***
- Iaeger/Panther Elementary School
- Independence Middle School
- James Monroe High School HVAC renovations
- Man/Central Elementary addition
- Marshall University
- Mercer County Schools, Princeton High Schools Renovations, Bluefield Middle School, Vo-Tech Renovations, Lashmeet/Matoaka School Renovations, Montcalm High School, and Spanishburg Elementary Renovations.
- New McDowell County Southside K-8 School
- Park Middle School HVAC renovations
- Pleasant Hill Elementary renovations
- Ritchie County Middle/High School HVAC/plumbing renovations
- Shady Spring Elementary School
- Smithville Elementary School additions/renovations
- South Charleston High School Evaluation
- Tucker County High/Career Center HVAC renovations
- West Virginia University Institute of Technology – Engineering Building Evaluation
- Woodrow Wilson High School HVAC/electrical renovations

### INDUSTRIAL

- Bayer Material Science
- West Virginia Higher Education Policy Commission (WVHEPC) South Charleston Tech Center – Campus Comprehensive Infrastructure Evaluation

### EDUCATION

BS in Mechanical Engineering from West Virginia University Institute of Technology, Montgomery, WV in 2004

### REGISTRATIONS

Professional Engineer

- West Virginia No. 18948
- Ohio No. E-77003

### PROFESSIONAL AFFILIATIONS

American Society of Mechanical Engineers

American Society of Heating, Refrigeration and Air Conditioning Engineers, Young Engineer's Association Chair for ASHRAE's West Virginia Chapter

Association of Energy Engineers (AEE)

### OTHER RECOGNITIONS

Energy Star Certified for facilities in the nation's top 25% of energy efficiency

ENERGY STAR 2013

## COMMERCIAL

- Bluefield Area Transit Authority Administration and Maintenance Facility design.
- Building 11, Capitol Complex HVAC Renovations.
- Burnsville Rest Areas North and South Bound – ***AIA Merit Award Recipient***
- Cultural Center Fire Alarm and Fire Protection Renovations
- Department of Transportation Rest Area prototype
- Department of Transportation Welcome Center prototype
- Hardy County Daycare Center
- I-70 Welcome Center
- Jackson County Libraries Renovations
- Jackson County Courthouse Annex
- Kanawha County Judicial Annex Renovations
- Mason County Courthouse/Annex
- Meadowbrook Rest Areas North and South Bound
- Morgantown Welcome Center
- Multiple branch banking facilities
- Pendleton County Courthouse additions/renovations
- Pocahontas County Community Center
- Point Pleasant River Museum addition
- Redmond House Renovations design.
- Sacred Heart Pavilion and Daycare Center
- Saint Patrick Church Renovations
- Tucker County Courthouse renovations
- Webster County Multi-tenant build-out
- West Union Bank **AIA Award Winning** new facility
- West Virginia Army National Guard Indoor fire Range HVAC renovations at four locations.
- West Virginia Air National Guard – Commissioning for $43 million maintenance and fuel cell hangars – ***LEED Silver Candidate***
- West Virginia Capitol Complex Performance Contracting HVAC Retrofits and Master Planning for Security/Fire Alarm/Life Safety systems
- West Virginia Parkways Authority, Toll Booth HVAC Renovations and Tamarack Study.
- White Sulphur Springs Welcome Center

## HEALTH CARE

- Charleston Area Medical Center (Wound Center)
- Charleston Surgical Center
- United Hospital Center
- VA Hospital, Huntington – Evaluation of existing campus steam distribution system and extension/upgrades to the steam distribution system to serve six additional facilities on campus, main hospital domestic water line replacement and CT Scan renovations
- Woodcrest Medical Center
- West Virginia Department of Health and Human Resources:
    - Jackie Withrow Hospital, Beckley: Master Planning Study, new central steam plant and renovations to heating system and lighting renovations.
    - Hopemont State Hospital, Terra Alta: Master Planning Study, renovations to heating system and lighting systems.
    - John Manchin, Sr. Health Care Center, Fairmont: Master Planning Study, renovations to lighting systems.
    - Lakin State Hospital, West Columbia: Master Planning Study and exterior envelop renovations and lighting renovations.
    - Mildred Mitchell-Bateman Hospital, Huntington: Master Planning Study and lighting renovations.
    - Welch Community Hospital, Welch: Master Planning Study and lighting renovations.
    - William R. Sharpe, Jr. Hospital, Weston: fifty bed forensic addition and renovations to entire existing hospital while building remains in use including new central heating/cooling plant, 2,100 KW emergency power station and comprehensive HVAC and electrical renovations throughout the facility.

David G. Dial, P.E.
Senior M/E/P Engineer

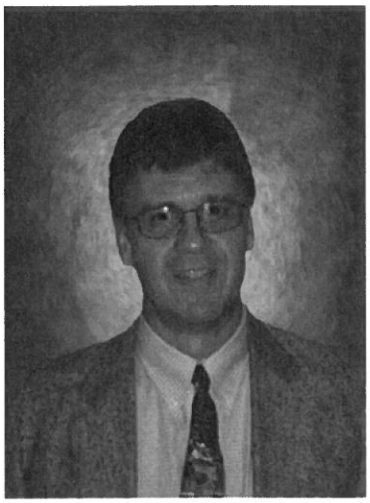
David has over thirty-three years of experience in the design and commissioning of mechanical and electrical systems. He provides HVAC, electrical and plumbing design services for a variety of clients in West Virginia. His background includes managing operating and maintenance repair and construction services for HVAC, plumbing, electrical and maintenance. He has managed grounds maintenance, security staff, information technology, IT NASA network, video surveillance and telephone systems.

David has experience in Maintenance Engineering in plumbing, HVAC, clean room design, dust collector selections, steam and condensate flow measurement, transfer of steam production from in-house to private contractor, athletic field lighting design, and farm pump water design. He has even completed a successful energy grant application from the U.S. Department of Energy. His Environmental Design experience includes PCB remediation, Air Pollution Control Commission annual reporting, removal of underground fuel storage tanks/pumps, installation and testing for radioactive material, conversion of a fleet of vehicles to operated duel fuel (gasoline and natural gas) including training, designing a filling station, custom built compressor station, cylinder operations area, filling post and monitoring of natural gas usage.

David has been involved in the design, document development, contract administration and recommissioning of the structural, mechanical and electrical disciplines of several WVU projects including Downtown Steam Tunnel Assessment, Coliseum Tunnel Redesign, Towers Exercise Room, Brooks Clean Room, lighting retrofits at Brooks Hall, exterior lighting for Mountainlair Parking Garage, cooling towers replacement at the Chemistry Annex, replacement of electric hot water boilers with natural gas pulse steam boilers, HVAC controls for Allen Hall, measure flow for sub metering/billing for campus steam/condensate systems, PCB removal from electrical equipment on campus, and power/cooling for a data Center at the WVU/NASA facility.

Other project experience includes design for Trinity High School's HVAC, plumbing and electrical system, industrial dust collector system for the Percival Dust Collector and replacement of rigging of a 2500 seat auditorium. As a production engineer, David optimized design of medical quality cryogenic freezers, incubator and shaker including scheduling the freight trucks, quality assurance of sheet metal shipments, writing repair manuals and setting up insulation.

David is also instrumental in construction administration and field investigation including working on projects with the West Virginia Division of Health and Human Resources. Some of his work included Hopemont Hospital Renovations, John Manchin Sr. Health Care Center and William R. Sharpe Hospital additions and renovations.



## EDUCATION

Bachelor of Science Mechanical Engineering, West Virginia University, 1978

Masters of Science Environmental Engineering, West Virginia University, 1980

## REGISTRATION

Professional Engineer, West Virginia, No. 11692

## PROFESSIONAL AND COMMUNITY AFFILIATIONS

Charter member Mountaineer Chapter of American Society of Heating, Refrigeration and Air Conditioning Engineers

ASHRAE®
West Virginia
Chapter

# ZDS Design/Consulting Services

**Ted A. Zachwieja III, EI, BSME**
**Building Information Modeling (BIM) Manager**
**M/E/P Designer**

Ted has over ten years of experience in building construction design industry. Ted has specialized in Building Information Modeling and manages the processes, technology, and communication methods at ZDS. Ted is an innovative problem solver when it comes to communication methods and management of BIM models between stakeholders during a design project. He has been responsible for development and deployment of ZDS BIM standards at the office, as well as in house training and overseeing day to day operations on the software/processes.

Ted develops and manages the IT systems. The experience encompasses development and deployment of central server systems to networked client computer systems, strategic development for ZDS' Integrated Design Processes, and research and development into new technologies to continue staying on the cutting edge at ZDS.

Ted's project experience includes the commissioning and design for heating, ventilating, air conditioning, plumbing, electrical and lighting systems for educational, health care, industrial and commercial facilities. His experience encompasses working both on new construction as well as renovation projects.

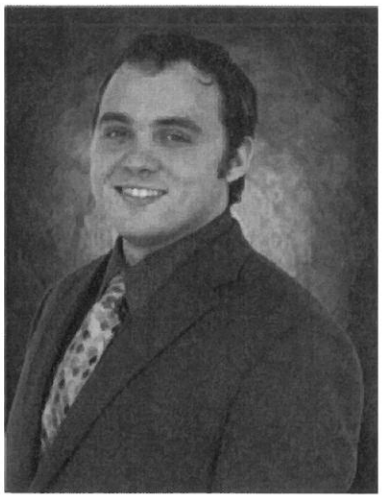
Ted maintains an active membership to the ASHRAE professional society and also has a lifetime membership to the Association of Energy Engineers. He maintains an active continuing education towards today's standards and codes. Some of Ted's project experiences include the following:

### COMMERCIAL AND INDUSTRIAL

- West Virginia Air National Guard Maintenance Hangar and Fuel Cell Hangar, Charleston, WV – ***LEED Silver Candidate***
- Bayer Material Science
- Meadowbrook Rest Areas, WV
- I-70 Welcome Center, WV
- Morgantown Welcome Center, WV
- West Virginia State Capital Complex Central Heating Plant
- West Virginia I64 Turnpike Tollbooths Renovation Project
- White Sulfur Springs Rest Area

### HEALTH CARE

- West Virginia Department of Health and Human Resources Hospitals:
    - Jackie Withrow Hospital, Beckley: Master Planning Study, new central steam plant and renovations to heating system and lighting renovations.
    - Hopemont State Hospital, Terra Alta: Master Planning Study, renovations to heating system and lighting systems.
    - John Manchin, Sr. Health Care Center, Fairmont: Master Planning Study, renovations to lighting systems.
    - Lakin State Hospital, West Columbia: Master Planning Study and exterior envelop renovations and lighting renovations.
    - Mildred Mitchell-Bateman Hospital, Huntington: Master Planning Study and lighting renovations.
    - Welch Community Hospital, Welch: Master Planning Study and lighting renovations.
    - William R. Sharpe, Jr. Hospital, Weston: fifty bed forensic addition and renovations to entire existing hospital while building remains in use including new central heating/cooling plant, 1,800 KW emergency power station and comprehensive HVAC and electrical renovations throughout the facility.



### EDUCATION

Bachelors of Science in Mechanical Engineering from Rochester Institute of Technology, Rochester, NY

### REGISTRATIONS

West Virginia State Board of Registration for Professional Engineers

West Virginia No. 9569

### PROFESSIONAL AFFILIATIONS

American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

Membership Promotion Chair and Board Member of ASHRAE's West Virginia Chapter

ASHRAE West Virginia Chapter

Lifetime Member of the Association of Energy Engineers (AEE)

Associate Member West Virginia Society for Healthcare Engineering

### OTHER RECOGNITIONS

Energy Star Certified for facilities in the nation's top 25% of energy efficiency

ENERGY STAR 2013

## EDUCATIONAL

**Schools**

M/E/P design for schools in the following West Virginia counties includes:

- Davis-Thomas Elementary/Middle School Renovations, WV
- South Charleston High School Evaluations, WV
- Elkins Middle School Renovations, WV – ***2013 Energy Star Certified***
- Greenbrier West High School Additions/Renovations, WV
- Iaeger/Panther Elementary School, WV
- Lashmeet/Matoaka Elementary School Renovations, WV
- Marshall University, Huntington, WV
- Mercer County Technical Education Center Renovations, WV
- 
- Montcalm High School Renovations, WV
- Princeton High School Renovations, WV
- Raleigh County Schools, WV – County-Wide Domestic Water Service Upgrades
- Smithville Elementary Schools additions and renovations.
- Spanishburg Elementary School Renovations, WV
- Webster County - Glade Elementary/Middle School Renovations, WV – ***2013 Energy Star Certified***
- Woodrow Wilson High School HVAC/electrical renovations
- West Virginia Higher Education Policy Commission (WVHEPC) South Charleston Tech Center – Campus Comprehensive Infrastructure Evaluation

## AWARDS AND RECOGNITIONS

Special recognitions and awards indicating levels of achievement and leadership include:

- Awarded **2012 Legend in Energy** by the Association of Energy Engineers
- Vice President and Social Chair for Phi Kappa Psi, a predominant scholastic fraternity celebrating over 20 years at Rochester Institute of Technology (RIT)
- Distinguished by the RIT Dean's List for outstanding scholastic achievement
- Numerous scholarships to Rochester Institute of Technology (RIT) including Recipient of RIT Presidential Scholarship

**John T. Brigham, PE**
**Electrical Engineer**

John has more than 22 years of engineering experience, 5 of those years in the design, construction management, and specifications for electrical engineering experience for educational, commercial, industrial and health care facilities. His specialties include electrical engineering, systems master planning, conceptual design. He has experience in commercial, hospitals and educational design.

Prior to joining ZDS, John Brigham completed numerous residential electrical projects that included apartments, condos and multi-family housing. Other project experience included street lighting and interstate highway lighting design. Some of John's project experience includes:

### GOVERNMENT AND COMMERCIAL

Aldi Market, OH
Alpha Investments, OH
Avril and Bleh Market, OH
Butler County Regional Airport, OH
Central Parkway Car Wash, OH
Colorado Metals, OH
Evans Landscaping Facility, OH
Fairfield Church, OH
Fairfield Salon, OH
Foundation Advisors, OH
Gateway Distribution Center, OH
Grant County Extension Office, KY
Hamilton City Schools Modular Classroom, OH
Heinz Offices, OH
Kenwood Nails, OH
Murphy Hair Salon
Necco Offices, OH
Ocean Spray Offices, OH
Pure Concepts Salon, OH
Senate Restaurant, OH
Ted's Pawn Shop, OH
Tot Dogs, OH
Urban Active, OH
Village of Glendale Fire Station, OH
Wachovia, OH
Wake Nation Water Skiing Facility, OH

### HEALTH CARE

Arthritis Foundation, OH
Gateway Chiropractic Center, OH
Springfield Cardiac Care, OH

### EDUCATIONAL

Great Oaks Institute of Technology, OH
Hondros College, OH
Mt. Vernon Nazarene University, OH
Southwestern College, OH

### SITE LIGHTING

1202 Main Street Parking Lot Lighting, OH
4411 Courtland Avenue Site Lighting, OH
5202 Delhi Avenue Site Lighting, OH
Hughes Street Sit Lighting, OH

### EDUCATION

Associate of Applied Science in Electronics from Kentucky State University, Frankfort, KY in 1986

Bachelor of Science in Electrical Engineering Technology from Thomas Edison State College, Trenton, NJ in 1988

Masters of Business Administration from Brenau University, Gainesville, GA in 1994

### REGISTRATIONS

Professional Engineer Ohio No. E-66883

Professional Engineer Oregon No. 67074 PE

Professional Engineer Pennsylvania No. PE-063137-R

### PROFESSIONAL AND COMMUNITY AFFILIATIONS

Member of the Institute of Electrical and Electronic Engineers

Institute of Transportation Engineers

## FACILITY DYNAMICS ENGINEERING

### TIMOTHY SCRUBY, P.E., LEED A-P
### PROJECT EXECUTIVE, SENIOR PROJECT MANAGER, SENIOR CONTROLS ENGINEER

Tim Scruby is a Project Executive, Senior Project Manager and Senior Controls Engineer with over 32 years of experience. Tim has an exceptional ability to analyze complex situations and develop innovative and successful solutions. As a Senior Engineer, Tim is responsible for planning, conducting, and overseeing numerous commissioning and re-commissioning projects including LEED-certified buildings, hospitals, museums, laboratory buildings, data and research centers. Tim has extensive knowledge in museum commissioning and archival storage requiring reduced humidity. Additionally, Tim evaluates chilled water systems and assesses load analysis, then develops and implements cost-effective chilled water system designs; originates and implements remedial HVAC designs; executes controls commissioning; conceives, develops, and implements mechanical system master planning; conducts energy analysis and economic feasibility studies and offers recommendations; performs HVAC replacement studies; authors DDC articles for the Iowa Energy Center website; instructor of Advanced HVAC Commissioning courses; provides technical assistance and expertise. Tim Scruby has been with FDE since 1996; projects include:

**COMMISSIONING AND RETRO-COMMISSIONING**

**Albemarle County Public Schools, Charlottesville, VA**

- Western Albemarle High School - Sr. Project Manager and Lead Engineer for retro-commissioning for the main high school in Albemarle Virginia.

**University of Virginia, Charlottesville, VA**

- Sr. Project Manager for over 40 commissioning and retro-commissioning projects at the University of Virginia Academics, Health Systems, and Health System Foundation including: Carter Harrison Medical Research Facility, South Chiller Plant 5000 and 2500 ton expansions, 5 MW standby power system, heating plant medium temperature water system replacement, Aquatic Fitness Center chiller plant, Jordan Hall renovation, Alderman Residence Halls, Carter Harrison Medical Research Building, Observatory Hill Residence Hall, Special Collections Library, ITC Data Center, Garrett Hall, Rouss Hall, OMS Neurology Lab and Life Science Annex.

**Virginia Polytechnic Institute and State University, Blacksburg, VA**

- ICTAS Facility - Sr. Project Manager and Lead Engineer for commissioning of the new lab research facility.

**Rockingham Memorial Hospital, Harrisonburg, VA**

- Sr. Project Manager for LEED commissioning of a 600,000 sf, $280 million, 238 bed replacement hospital.

**Virginia Department of Behavioral Health, various locations**

- Sr. Project Manager and Lead Engineer for commissioning for multiple projects for the Virginia Department of Mental Health, including steam plant replacements at multiple sites. Currently working as technical representative and commissioning engineer on biomass boiler project at Piedmont Geriatric Hospital campus heating plant, Project Manager for replacement hospital.

**The Monticello Visitor Center/Smith History Center, Charlottesville, VA**

- Sr. Project Engineer for the new visitor center and exhibition facility. It includes education classrooms, museum areas, café and a multi-purpose theater.

**Colonial Williamsburg Foundation, Williamsburg, VA**

- Sr. Project Manager and Lead Commissioning Engineer for the commissioning of the $40 million Bruton Heights School Educational Center.
- Sr. Project Manager for commissioning including a heating and cooling central plant, VAV air handlers and terminal equipment at the John D. Rockefeller Library, and DeWitt Wallace Collections and Conservation Building.

**Harvard University, Cambridge, MA**

- Sr. Project Manager for re-commissioning and commissioning renovation of office buildings at Harvard University: 14 Story Street, Holyoke Center, 90 Mt. Auburn Street.
- Lead engineer for commissioning of renovation of book depository including low temperature chilled water system, 40 and 50 degreeF low relative humidity rack storage warehouses, desiccant dehumidifiers.

**Yale University, New Haven, CT**

- Kahn Art Building – Sr. Project Manager for commissioning of the newly renovated Art Gallery facility.

**Wake Forest University, Winston-Salem, NC**

- Project Manager and Lead Engineer for chilled water loop hydronic model and load analysis followed by emergency remedial engineering for pumping and cooling capacity increase at South Chiller Plant.

**FACILITY DYNAMICS ENGINEERING**

**TIMOTHY SCRUBY, P.E., LEED A-P**
**PROJECT EXECUTIVE, SENIOR PROJECT MANAGER, SENIOR CONTROLS ENGINEER**

- Project Manager and Lead Design and Commissioning Engineer for replacement of central heating plant boiler combustion controls and balance of plant controls, also later project to replace boiler multi-burner burner management systems.

**Marine Corps Base Hawaii, Honolulu, HI**

- Sr. Engineer for troubleshooting HVAC systems at Aircraft Flight Simulator facility.

**General Motors Corporation, various locations**

- Lead engineer for Baltimore, Doraville and Ipsalanti plants during retro-commissioning; survey plants between 3 and 5 million square feet for improvement to their HVAC systems.

**St. Mary's College of Maryland, St. Mary's City, MD**

- Sr. Project Manager and Lead Engineer for commissioning and remedial design projects, including academic buildings, housing and utility plants.

**The Nelson-Atkins Museum of Art, Kansas City, MO**

- Sr. Project Manager and Lead Engineer for commissioning the Nelson Atkins Museum of Art renovation, including utility plant, and Bloch Building.

**Birmingham Museum of Art**

- Lead Engineer for emergency assistance to overcome humidity control and humidification capacity problems on an emergency basis when they were unable to meet environmental specifications for a traveling exhibit.

**Additional Commissioning Clients include**:

- Cedars-Sinai Medical Center – Saperstein Critical Care Tower, City of Charlottesville – Fontaine Fire Station, College of William and Mary – North Campus Plant Boiler, Environmental Protection Agency, Virginia Museum of Fine Arts, General Services Administration, George Mason University, Rush University Medical Center – East Tower, Federal Reserve – Bank of Atlanta and

**TEACHING, AUTHORSHIP**

- Co-author and instructor for Advanced HVAC System Commissioning Courses for University of Wisconsin, Iowa Energy Center, PECI/NYSERTA and National Security Agency.
- Author of I/O Device Fundamentals Section of DDC web site for Iowa Energy Center.
- Author and Instructor for HVAC 101 course for Belimo Company sales representatives.

Prior to working with Facility Dynamics Engineering, Tim Scruby worked for:

6/85-8/96 **WILEY & WILSON,** Lynchburg, VA
Sr. Mechanical and Controls Engineer

- Commissioning of HVAC systems for The Barnes Foundation, Canon Virginia, Inc. and E.I. DuPont de Nemours; responsible for trouble-shooting study and remedial design of air conditioning systems at Mount Vernon Archival Storage; performed HVAC replacement studies; oversaw RR Donnelley & Sons printing plant expansion including chilled-water plant addition, boiler modifications, and HVAC, plumbing, and fire protection; oversaw the renovation of Canon Virginia, Inc. manufacturing plant including HVAC for Class 1,000 clean room and utilities building addition with 7,000-SCFM compressed air plant; designed new 500,000 sf rotogravure printing plant for Quad Graphics, Martinsburg, WV; designed a 3,000-ton expansion to the North Campus chilled water plant for Virginia Tech University; performed energy analysis and economic feasibility studies.

**EDUCATION** Virginia Polytechnic Institute & State University, Blacksburg, VA
Bachelor of Science, Mechanical Engineering

**REGISTRATIONS**

Professional Engineer: Virginia - 015029, North Carolina - 026159, Wisconsin – 25401-6, Ohio - 53143, California - 28154, West Virginia - 012727, Georgia - 027762, Arizona - 38204, Missouri - 2004008990, Maryland - 21344, Massachusetts - 43260, Hawaii – 12695, NCEES – 21133, LEED-AP

DAVID STABLER, P.E.
SENIOR ELECTRICAL ENGINEER

David Stabler is a Senior Electrical Engineer with 34 years of experience. David's commissioning responsibilities include preparation of specifications, coordinating and participating in site testing, reviewing completed test forms and results, and verification of systems operation. Dave has performed electrical commissioning services for a variety of facilities including: data centers, research labs, (BSL2, 3 and 4) office buildings, university/college campuses, assisted living and hospitals. David has been with FDE since 2006; projects include:

**Rush University Medical Center, Chicago, IL**

- East Tower Hospital – Sr. Electrical Engineer for the LEED commissioning of a 900,000 sf, $617 million, 360-bed patient care and surgical tower.
- Central Energy Plant – Sr. Electrical Engineer for commissioning a new Central Energy Plant producing 10,000 tons of chilled water, 250,000 lb/hr of steam and 10 MW of emergency power to serve entire campus.

**Children's Hospital of Philadelphia, Philadelphia, PA (multiple Projects)**

- Sr. Electrical Engineer for LEED commissioning of the 1,000,000 science and clinical research facilities which include South Campus Research Facility and Ambulatory Care Building.

**Penn State University, University Park, PA (multiple projects)**

- Millennium Science Complex – Sr. Electrical Engineer for LEED commissioning of the 275,000 sf, science research complex. Facility includes: 10,000 sf nano clean room, classrooms, lecture halls, lab space, office and administrative areas.
- Dickinson School of Law – Sr. Electrical Engineer for LEED commissioning of the 120,000 sf facility.
- Harrisburg Student Housing Complex – Sr. Electrical Engineer for LEED commissioning of the new 4-story, 100 bed dormitory.

**University of Pittsburgh, Pittsburgh, PA**

- New Freshman Housing – Sr. Electrical Engineer for LEED Commissioning of the new 11-story, 212,000 sf student dormitory
- Chevron Hall - Sr. Electrical Engineer for LEED commissioning of the 31,000 sf academic building.
- Mid Campus Renovations - Sr. Electrical Engineer for LEED commissioning of the Mid Campus Complex which includes five science buildings.

**Cornell University, Ithaca, NY (multiple projects)**

- Physical Sciences Building - Sr. Electrical Engineer for commissioning of the 139,000 sf research and academic facility.
- East Campus Research Facility – Sr. Electrical Engineer for commissioning of the 79,000 sf research facility.

**George Mason University, Fairfax, VA**

- Biomedical Research Facility - Sr. Electrical Engineer for commissioning the 52,000 sf research facility.

**University of Pennsylvania Health System, Philadelphia, PA**

- Translational Research Center - Sr. Electrical Engineer for commissioning of the new 12-story, 517,000 sf hospital/research facility. It houses clinical and patient research areas, offices and biomedical laboratories.

**Milton S. Hershey Medical Center – Cancer Institute, Hershey, PA**

- Sr. Electrical Engineer for LEED commissioning of the 180,000 sf medical center. Facility includes: outpatient rooms, exam rooms, infusion stations, radiation oncology suites, labs and office areas.

**National Bio-Defense Analysis & Countermeasures Center (NBACC), Ft Detrick, MD**

- Sr. Electrical Engineer for commissioning of the new 160,000 sf, $128 million bio-defense (BSL3&4) research laboratory.

**Integrated Research Facility (IRF) Ft Detrick, MD**

- Sr. Electrical Engineer for commissioning of the new 100,000 sf, $105 million bio-safety labs 3&4 (BSL3&4) research facility.

**Corning Inc., Corning, NY (multiple Projects)**

- Sullivan Park DV and DX Buildings – Sr. Electrical Engineer for commissioning of multiple research facilities at the Corning, Inc. New York campus.

**University of North Carolina – Chapel Hill, Chapel Hill, NC**

- Genetic Medicine Building - Sr. Electrical Engineer for commissioning of the 331,000 sf, $122 million research facility.

**General Motors, Detroit, MI**

- GMIT Corporate Data Center – Sr. Electrical Engineer for commissioning of the new 114,000 sf data center facility.

DAVID STABLER, P.E.
SENIOR ELECTRICAL ENGINEER

**Constitution Center, Washington, DC**

- Sr. Electrical Engineer for commissioning of the new 1.4 million sf business office complex. The ten-story building includes office space, conference rooms, a café and a three-story parking garage.

**Barnes Foundation – Art Education Center, Philadelphia, PA**

- Sr. Electrical Engineer for commissioning of the new 93,000 sf art gallery and education center. The facility includes: art galleries, an auditorium, classrooms and seminar rooms.

**Additional Cx Clients include**:

- West Virginia University – White Hall and Advanced Engineering Research Building, Johns Hopkins University – Data Center, Central Plant and Quadrangle Projects, University of Virginia – ITC Data Center, State of Delaware – Stockley Medical Center, Chambersburg Hospital Expansion (PA), Rockingham Memorial Hospital, JHU Applied Physics Lab, WellSpan Health – Aspers Health Center/Rehabilitation Center, M.D. Anderson Cancer Center, Capital Source Data Center, Dartmouth College – Etna Road Data Center and multiple projects for the National Institute of Health.

5/03-5/06 **JDB ENGINEERING**
Electrical Engineer

- Performed total project electrical design for construction projects such as schools, commercial buildings, labs, data centers, clean rooms, etc. Provided project management on selected projects with oversight of entire project architectural and MEP design team.
- Developed standard design specifications for telecommunications and CATV systems for the firm.

8/98-5/03 **BARTON ASSOCIATES, INC.**
Senior Electrical Engineer

- Performed total project electrical design and project management for construction projects such as schools, commercial buildings, etc. Project types included primarily school facilities at all levels.
- Developed standard design specifications for telecommunications and CATV systems for the firm.

8/88-7/98 **S3E, INC.**
Principal and Lead Electrical Engineer

- Managed electrical department, both personnel and design, for a 20-30 person engineering consulting firm in the building design field. Participated in the company management as one of three principals.
- Project types included schools, hospitals, assisted-living facilities, libraries, commercial office buildings, various government facilities such as penal facilities, federal and state government buildings.

9/87-7/88 **MAGUIRE GROUP**
Electrical Department Head

- Managed electrical department for a 30 person branch office architectural-engineering design firm.
- Project types included schools, hospitals, various government facilities such as penal facilities, federal and state government buildings.

8/86-8/87 **GIRARD ENGINEERING, INC.**
Senior Electrical Engineer

- Performed total electrical design for primarily commercial office renovation projects as well as the broadcast center for PBS in Alexandria, VA.

6/78-7/86 **BARTON ASSOCIATES, INC**
Electrical Engineer

- Performed electrical design and project management for a variety of building projects including schools, hospitals, prisons, industrial facilities, etc. Responsible for coordination of design teams with other building team members, including architects and owners.

**EDUCATION** **Penn State University** - Associate Degree in Information Systems and Technology
**Penn State University** - Bachelor of Architectural Engineering

**REGISTRATION** Professional Electrical Engineer – Delaware - 13874 and Pennsylvania – 032889E

## FACILITY DYNAMICS ENGINEERING

### SCOTT STOUTENBOROUGH, P.E.
### PROJECT MANAGER/SENIOR MECHANICAL ENGINEER

Scott Stoutenborough is a Project Manager/Senior Mechanical Engineer with over 30 years of experience. He is responsible for engineering and the management of projects including: commissioning, retro-commissioning, controls design, system diagnostics and design review. Scott has extensive experience with reviewing construction documents, developing and writing commissioning plans and specifications, performing submittal reviews, performing of functional testing and the preparation of final reports. He also has experience with numerous LEED Projects. Scott has been with FDE for over 24 years; projects include:

#### COMMISSIONING AND RETRO-COMMISSIONING

**Georgetown University, Washington, DC**

- New Science Center – Project Manager/Sr. Mechanical Engineer for LEED commissioning of the 155,000 sf, $100 million research and teaching facility.
- Chiller Plant Expansion – Project Manager/Sr. Mechanical Engineer for commissioning of the new chiller expansion to the central chilled water plant.

**Walter Reed National Military Medical Center, Bethesda, MD**

- Project Manager/Sr. Mechanical Engineer for commissioning of the new 50,000 sf operating room modernization project.
- Central Plant DDC Upgrade Project – Project Manager provided functional testing, retrofit DDC control project to 13,000 ton central chiller plant

**University of Maryland College Park, College Park, MD**

- Physical Sciences Complex – Project Manager/Sr. Mechanical Engineer for LEED commissioning of the 158,000 sf, $128 million academic and research science facility. Facility includes classrooms, 18 prep labs, 8 biophysics labs and 27 laser and condensed mater labs.

**National Institute of Health, Bethesda, MD**

- Project Manager/Sr. Mechanical Engineer for multiple projects at the National Institutes of Health (NIH). Work involved consulting with many project officers, design agencies, building occupants, and operations personnel at various phases of projects. Involved with overall project design review, detailed controls design, construction phase services, systems commissioning and troubleshooting. Design Services for a dozen Patient Care Unit Upgrades Projects in the Clinical Center at NIH.
- Projects include: Building 4 NIAID, 6B, 7 10, 14D, 30, 41 and Visitor Center Gateway

**Johns Hopkins University, Baltimore, MD**

- Undergraduate Teaching Laboratory - Project Manager/ Sr. Mechanical Engineer for commissioning of the 105,000 sf research and teaching lab facility. It includes lab areas, seminar rooms, lounges, computer lab, offices and café/coffee shop.

**George Washington University, Washington, DC**

- Ames Hall - Project Manager/ Sr. Mechanical Engineer for LEED commissioning of the 50,000 sf academic renovation project. The facility includes state-of-the-art classrooms, lounge and study areas and office space.

**Alexandria City Public Schools, Alexandria, VA**

- T.C. Williams High School – Project Manager/Sr. Mechanical Engineer for LEED commissioning of the new 461,000 sf high school. The project received a LEED Gold certification.

**Washington Navy Yard, Washington, DC**

- Project Manager/Sr. Mechanical Engineer for Washington Navy Yard Quadrangle recommissioning / energy savings project including measurement & verification, control system optimization, systems analysis, design review and contractor implemented energy conservation measures.

**Howard County Government, Columbia, MD**

- Robinson Nature Center and Museum - Project Manager/Sr. Mechanical Engineer for LEED commissioning of the 25,000 sf museum/visitor center facility. The project received one of the first LEED Platinum certifications in the state of Maryland.

**DC Government, Washington DC**

- Unified Communications Center – Project Manager/Sr. Mechanical Engineer for commissioning of the new 140,000 sf, emergency operations center. The facility houses the District of Columbia - Emergency Operations Center, Regional Incident Command and Control Center and the Mayor's Command Center.

**John F. Kennedy Center for the Performing Arts, Washington, DC**

- Project Manager/Sr. Mechanical Engineer for retro-commissioning of the 2,400 seat Symphony Hall

**FACILITY DYNAMICS ENGINEERING**

**SCOTT STOUTENBOROUGH, P.E.**
**PROJECT MANAGER/SENIOR MECHANICAL ENGINEER**

**Montgomery County Government, Rockville, MD**

- Judicial Center Annex - Project Manager/Sr. Mechanical Engineer for LEED commissioning of the 191,000 sf annex addition and 327,000 sf renovation project.
- Strathmore Concert Hall – Project Manager/Sr. Mechanical Engineer for commissioning of the 2,000 seat concert hall and Music Education Center.
- AFI Silver Spring Theater – Project Manager/Sr. Mechanical Engineer for commissioning of the Silver Theater renovation project.

**Lifebridge Health – Levindale Neighborhood Geriatric Living Center, Baltimore, MD**

- Project Manager for commissioning of the new 87,000 sf addition project. The facility includes 84 private rooms, common areas, administrative areas and offices.

**Bank of New York**

- Tennessee Processing (Data) Center – Project Manager/ Sr. Mechanical Engineer for commissioning of the new 160,000 sf data center facility.

**Federal Aviation Administration, Washington, DC**

- Andrews Air Force Base Control Tower - Project Manager/Sr. Mechanical Engineer for commissioning of the 15,000 sf air traffic control tower and support areas.
- Leesburg (VA) Air Traffic Control Center – Project Manager/Sr. Mechanical Engineer providing testing and analysis services for the radar support center facility.

**Maryland Stadium Authority, Baltimore, MD**

- Camden Station – Project Manager/ Sr. Mechanical Engineer for commissioning of the 45,000 sf renovation of this historic building at the gateway to Camden Yards Sports Complex.

**General Motors, Detroit, MI**

- Sr. Mechanical Engineer for HVAC systems and troubleshooting in support of the General Motors recommissioning project at various plants in the Midwest.

**Additional Cx and RCx Clients include**:

- State of Delaware - Stockley Medical Center, Federal Bureau of Prisons, University of Maryland Medical Center - Shock Trauma Expansion, Johns Hopkins Applied Physics Lab – Buildings 12, 15 and 21, West Virginia University – multiple projects, Salisbury University – Perdue School of Business and Seagull Square Housing and Symantec – Tucson Data Center

1/88-3/89 **HEC ENERGY CORPORATION**
Project Engineer

- Conception, analysis and design for energy conservation projects.
- Responsibilities included economic justification, client coordination and construction management. Emphasis of projects was in air systems, distribution systems and control modifications including pneumatic and DDC designs. Performed facility walkthroughs to determine project potential. Construction management included coordination of subcontract design firms, and commissioning.

3/83-1/88 **UNITED STATES AIR FORCE**
Mechanical Engineer

- Design of mechanical systems including HVAC, fire protection, plumbing and heat distribution.
- Provided contract drawings and specifications, design review and construction management services
- Other duties included troubleshooting of HVAC system and controls, direction of operations personnel for building systems improvements and development of standard control system improvements for implementation by operations personnel.

**EDUCATION** University of Cincinnati, Cincinnati, OH
Bachelor of Science – Mechanical Engineering

**REGISTRATION** Professional Mechanical Engineer – Maryland

## FACILITY DYNAMICS ENGINEERING

### STAN STOUGH
### SENIOR ELECTRICAL FIELD TECHNICIAN

Stan Stough is a Senior Electrical Field Technician and has over 40 years of experience. Stan's background includes 20+ years with a consulting engineering firm which provided design and engineering services to commercial, industrial and institutional facilities. Stan provides project management, design and field services for various projects within the company His commissioning responsibilities include preparation of specifications, coordinating and participating in site testing, reviewing completed test forms and results and verification of systems operation. He has spent over 60% of his career working on healthcare and research lab facilities. Stan has been with FDE since 1991; projects include:

#### COMMISSIONING AND RETRO-COMMISSIONING

**Hershey Medical Center, Hershey, PA**
- Cancer Institute - Sr. Electrical Engineer for LEED commissioning of the 180,000 sf medical center. Facility includes outpatient & exam rooms, infusion stations, oncology suites, labs and office areas.

**Rockingham Memorial Hospital, Harrisonburg, VA**
- Sr. Electrical Engineer for LEED commissioning of the 600,000 sf new hospital. The 6-story, 238-bed state-of-the-art full service hospital facility houses cardiology, general surgery, heart surgery, women's health and cancer care

**Children's Hospital of Philadelphia, Philadelphia, PA**
- South Campus Research Facility – Sr. Electrical Engineer for LEED commissioning of the 1,000,000 science and clinical research facility.

**University of Pennsylvania Health System, Philadelphia, PA**
- Translational Research Center – Sr. Electrical Engineer for commissioning of the 517,000 sf hospital/research facility.

**Johns Hopkins University, Baltimore, MD**
- Cancer Research Building – Sr. Electrical Engineer for the new 272,000 sf lab facility.
- Broadway Research Building -. Sr. Electrical Engineer for commissioning of the new 250,000 sf, $90 million biomedical lab facility.

**Penn State University, University Park, PA**
- Eastview Terrace Housing Complex – Sr. Electrical Engineer for the multiple housing facility project.
- Dickenson School of Law (LEED Silver) - Sr. Electrical Engineer for LEED commissioning of the 120,000 sf academic facility which includes a library, student lounge, classrooms, a 250-seat auditorium and mock courtrooms.

**University of Virginia, Charlottesville, VA (multiple projects)**
- Alderman Road Residence Halls (LEED Silver) – Sr. Electrical Engineer for LEED commissioning for the four-phase multiple residence hall campus projects.
- Carter-Harrison Medical Research Building – Sr. Electrical Engineer for commissioning of the 189,000 sf BSL-2/3 research lab facility.

**Cornell University, Ithaca, NY (multiple projects)**
- Life Science Technology Building (LEED Silver) – Sr. Electrical Engineer for LEED commissioning of the new 260,000 sf science research/academic facility.
- East Campus Research Facility – Sr. Electrical Engineer for commissioning of the 79,000 sf research and academic facility.
- Physical Sciences Building - Sr. Electrical Engineer for commissioning of the 139,000 sf research and academic facility.
- Uris Hall – Sr. Electrical Engineer for commissioning of the 187,000 sf academic facility.

**Georgetown University, Washington, DC**
- New Science Center -Sr. Electrical Engineer for LEED commissioning of the 155,000 sf, $100 million research and teaching facility. It houses multiple departments including chemistry, biology and physics.

**East Carolina University, Greenville, NC**
- Family Medicine Center – Sr. Electrical Engineer for commissioning of the new state-of-the-art medical/teaching center. Facility features over 60 exam rooms, labs, teaching areas and a geriatric center.
- Cotanche Data Center – Sr. Electrical Engineer for commissioning of the 30,000 sf data center facility.

STAN STOUGH
SENIOR ELECTRICAL FIELD TECHNICIAN

**Harrisburg University, Harrisburg, PA**
- Science and Technology Building – Sr. Electrical Engineer for commissioning of the 371,000 sf research/academic facility. Building includes: 24 classrooms, teaching labs and a 125-seat auditorium.

**University of Maryland, Baltimore, MD**
- New Dental School - Sr. Electrical Engineer for the commissioning of the 360,000 sf teaching and research facility. Project includes: offices, classrooms, dental labs, and a vivarium.

**Federal Aviation Administration, Wilkes-Barre, PA**
- Warrenton Air Traffic Control Command Center – Sr. Electrical Engineer for commissioning of the new 63,000 sf critical operations facility.

**Additional Cx Clients include**:
- University of Maryland Medical Systems – Trauma Expansion, National Institute of Health - Building 50 and Biomedical Research Facility, East Carolina University – Cotanche Data Center and Family Medicine Center, JHU Applied Physics Lab – Building 24 Data Center, DC Government – Unified Communications Center, Howard Hughes Medical Institute – Janelia Farms Research Campus, Alexandria City Public Schools – T.C. Williams High School, College of William and Mary – Integrated Science Complex, The Monticello – Visitor and Smith History Center, Corning Inc. - Sullivan Park and the University of North Carolina- Chapel Hill – Genome Science Building

10/71-6/91 **BARTON ASSOCIATES, INC.**
Control Systems Department Head/Electrical Engineer/Project Manager
- Responsible for total quality management and design within Control Department for projects that involved direct digital, pneumatic and electric (programmable control and relay) control system.
- Provided electrical design for lighting, emergency power, fire protection, communications, power distribution, and power generation systems.
- Industrial projects include food-processing plants, brick making plants, wastewater treatment plants, major wastewater pump station and multiple renovations to other industrial plants.
- Commercial projects included 4.5 MW standby generator facility for a computer/office building, banking facilities, office buildings and various renovations/additions to other buildings.
- Institutional projects include renovations/additions to hospitals, health care facilities and nursing homes.
- Government projects included renovations, additions and energy audits at various military facilities.

7/69-10/71 **FABRICATING ENGINEERING CORPORATION**
- Designed, built and assisted in field installation of control systems for manufactured equipment (combustors, hot blast heaters and heat exchangers)

7/67-7/69 **BUCHART/HORN (CIVIL STRUCTURAL ENGINEERS)**
- Right-of-way designer in civil engineering department.

7/64-7/67 **U.S. NAVY**
- Built, maintained and instructed on anti-submarine warfare equipment, flight trainers, submarine simulators and various other electrical/electronic equipment.

**EDUCATION**
U.S. Navy
Electronics Fundamentals School
Electronic Training Deviceman School
Leadership Training School
Advance Schools, Inc. – Certificate of completion for Electrical Theory and Application

**SEMINARS**
Telecontrolling Energy (Government Institutes)
HVAC Control Systems Technology (Tempcon, Inc.)
Solid State Switching Logic, Programmable Controllers – 14 CEU's (Penn State University)

**AFFILIATIONS**
Instrument Society of America
Affiliate member of NETA

ASHRAE Insights

The Newspaper of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

# Three Generations of Service to ASHRAE

By Pat Cross

As the First World War raged in Europe, Polish immigrant Walenty Zachwieja drove his pick into a coal vein in southern West Virginia. Back bent and lungs tarnished with the hardships of coal mining, he could not have conceived that three generations of engineers would rise from those black, dusty depths to navigate peak achievements in their industry.

Ted T. Zachwieja, Sr. founded the Mountaineer Chapter of ASHRAE, while his son, Ted (Todd) A. Zachwieja II, designed the first and largest commercial geothermal system in the West Virginia region.

Reaching from the shoulders of his father, Ted A. Zachwieja III graduated from the Rochester Institute of Technology and joined his father and grandfather in the family engineering business.

Their story catches the ears and hearts of anyone who acknowledges the challenges and unique achievements of a family business arising from the ashes of poverty and hazardous hardship of coal mining labor.

All three "Teds" are currently part of ZDS Design/Consulting Services, in its 17th year of operation. The company is located in Saint Albans, West Virginia. ZDS provides a variety of engineering services including HVAC, plumbing, fire protection, electrical power, lighting, fire alarm and technology system design.

ASHRAE has played a key part in the three men's success, especially when they work on projects requiring the integration of several engineering specialties, such as energy-efficient design, IAQ, HVAC systems and commissioning.

***The Zachwieja family (from left to right), Ted (Todd) A., Ted A. III, and Ted T. — all are engineers and members of ASHRAE.***

## Ted T. Zachwieja, Sr., Principal-in-Charge Of Construction Administration

Ted T. Zachwieja, Sr. made his mark on the engineering industry in West Virginia not only by founding the ASHRAE Mountaineer Chapter, but in an extensive project involving the design and construction of the West Virginia Capitol Complex. He also engineered many of the buildings at the West Virginia Capitol Complex, which involved more than 640,000 square feet of new facilities; those systems continue working today.

"An ASHRAE Life Member [who joined in 1964], I founded the Mountaineer Chapter of ASHRAE and served as president for many of its early years.

"I was born in the southern coal fields of West Virginia and am the only living son out of a family of seven (two brothers who died before the age of 10 and four sisters). My father was a first generation

immigrant from Poland who went to the coal fields in West Virginia during World War I as a coal miner. The hardships of mining took his life with black lung, but not before he made sacrifices to be sure I had the opportunity to go to college and become an engineer.

"I have four children, one son and three daughters. I started working in the early 1960s and had to fast-track learn how to design HVAC, plumbing and electrical systems. I was responsible for all MEP design and didn't have the luxury of specializing in only one area like engineers do today—we had to learn it all."

### Ted (Todd) A. Zachwieja, P.E., Principal, CEO

Ted Zachwieja II (also known as Todd) acquired national acclaim with the design and installation of the largest commercial geothermal system in West Virginia and the surrounding region and pioneering indoor air quality practices in design prior to them ever being adopted into codes or standards.

"I started working for my father when I was 14 years old and found a passion in engineering design. I knew in sixth grade I wanted to be an engineer. I followed my father's advice in pursuing a mechanical engineering degree and then a M.A. in Engineering Management, with ASHRAE being an important part of my development.

"I have been involved with ASHRAE for over 30 years. I also founded the Mountaineer Chapter with my father and served as Technical Chairman for many years. My father encouraged me to continue developing my engineering skills, which allowed us to start our business in 1994 as partners."

**ASHRAE has played a key part in the three men's success, especially when they work on projects requiring the integration of several engineering specialties, such as energy-efficient design, IAQ, HVAC systems, and commissioning.**

### Ted A. Zachwieja III, Systems Manager, Designer

"I started working for both my father and grandfather at the age of 14 through ZDS Design/Consulting Services. I was told I had the 'knack' at a very early age and was very interested in the engineering field.

"I received a scholarship to attend Rochester Institute of Technology in mechanical engineering and in my senior year, I continued to co-op with ZDS and assisted remotely while completing my undergraduate engineering degree.

"I joined ASHRAE as a student member and attended my first Winter Conference with my father to gain the exposure and experience that ASHRAE has to offer. I am very fortunate to be able to work with both my father and grandfather and gain their wisdom with many opportunities to share in their ASHRAE experience and create lifetime memories."

The strong bonds between these three generations of engineers all named Ted give testimony to the tradition of the family business. The devotion and determination to make sacrifices for the benefit of the next generation show most clearly in the story of these three Teds whose beginnings heard the ring of an iron pick on the black walls of the West Virginia coal mines nearly a century ago. ■

*Pat Cross is the daughter of Ted T. Zachwieja.*

---

For more information on how ZDS Design/Consulting Services can help your organization improve its work environment, productivity and energy management, contact:

Todd A. Zachwieja, CEO
Ted T. Zachwieja, Sr.
Ted A. Zachwieja III

ZDS Design/Consulting Services
91 Smiley Dr.
St. Albans, WV 25177
Phone: (304) 755-0075
contact@zdsdesign.com
www.zdsdesign.com

ZDS
Design/Consulting Services

# What Can Commissioning Do For Your Building?


*Written and researched by*
**PECI**



*Sponsored by*
**PacifiCorp**

*Cosponsored by*
**Bonneville Power Administration**
**DPIC Companies**
**Northwest Power Planning Council**
**U.S. Dept. of Energy Federal Energy Management Program**
**U.S. Environmental Protection Agency**

# Acknowledgment to Case Study Contributors

PECI and the sponsors of this project would like to express our sincere appreciation to the firms and organizations that contributed commissioning case study data.

Ashforth Pacific, Inc.
BES Company, Inc.
Camidor Property Services
Camino Healthcare
Capital Projects Division, Montgomery County, Maryland
Craig Hawkins Design Services
E-Cube
Energy Investment, Inc.
Engineered Automation Systems, Inc.
Eugene Water & Electric Board
Facilities Resource Management Company
Gillies Stransky Brems Smith Architects
Herzog/Wheeler
Isotherm Engineering, Ltd.
K.D. Fuller, Co.
Lawrence Berkeley National Laboratory
MicroGrid, Inc.
New England Electric
New York State Research & Development Authority
National Institute of Science and Technology
Northeast Utilities
Pacific Gas & Electric
PacifiCorp
PECI (Portland Energy Conservation, Inc.)
Robert Bein, William Frost & Associates
Sacramento Municipal Utility District
Seattle City Light
Sebesta Blomberg & Associates
SERA Architects, PC
Sieben Energy Associates
Simon Martin-Vegue Winkelstein Moris
Southern California Edison
Systems Commissioning Consultants
The Boeing Company
Theodor D. Sterling & Associates
U.S. Army Corps of Engineers
University of Washington
Westin Hotels and Resorts
Wisconsin Power & Light
Wren Janus Engineering, Inc.
ZDS Design/Consulting Services

# The Buzz on Commissioning

As the owner or manager of a commercial building, you may have begun to hear the term building commissioning. Perhaps your utility representative mentioned it to you, or you heard about it from a firm that provides commissioning services. Or perhaps you heard the term from another building owner or manager. In any case, commissioning is beginning to get a "buzz".

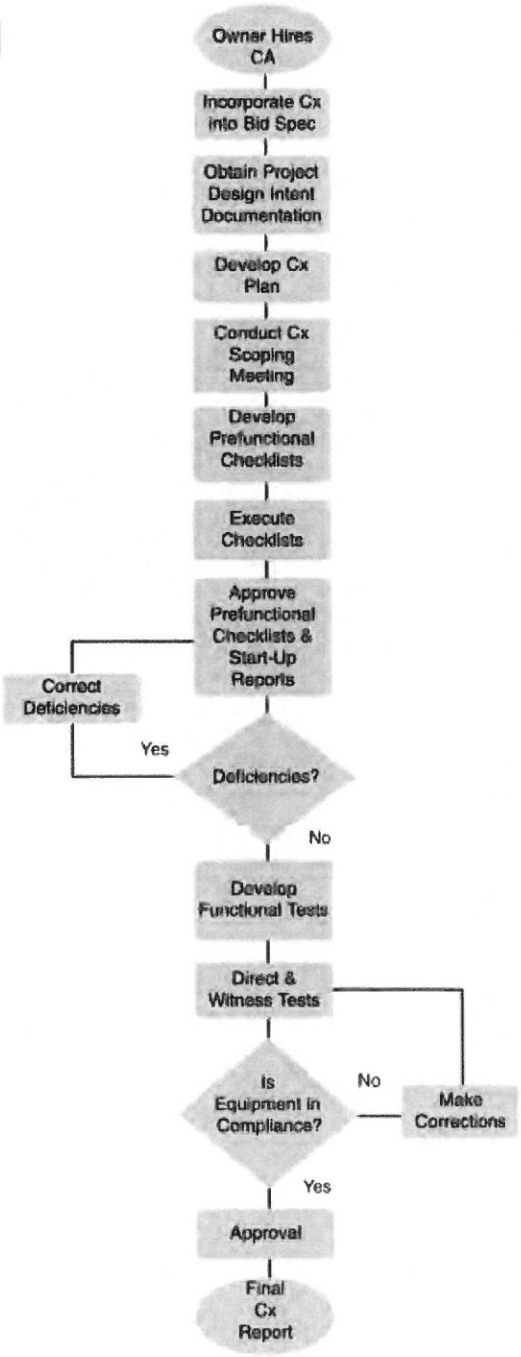
But what is building commissioning? Is it just the latest fad in the building construction and operation & maintenance industries? Advocates of commissioning note that it can result in:

- Improved system performance
- Improved operation and maintenance
- Improved indoor air quality and thermal comfort
- Improved energy efficiency (reduced energy bills)

and other benefits for both new and existing facilities. Advocates say that the cost of commissioning is exceeded by the long-term benefits and improved asset value of commissioned buildings.

Commissioning goes beyond testing, adjusting and balancing (TAB) and traditional inspections. Commissioning involves functional testing to determine how well mechanical and electrical systems work together. Commissioning seeks to determine whether equipment meets a facility's operational goals or whether it needs to be adjusted to improve efficiency and overall performance.

These activities are not, as many owners and managers believe, part of the typical design and construction process or part of standard operation and maintenance service contracts. Owners who have commissioned their buildings are spreading the word about its benefits to other building owners and managers. Owners who are just learning about commissioning are often excited about its potential, but somewhat daunted by the extra cost involved. What benefits can they really expect to see? And what costs should they expect to pay? This brochure answers these questions about building commissioning and more.



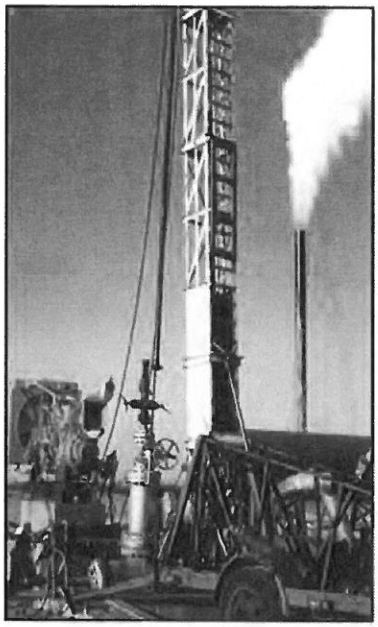
GEOEXCHANGE The GeoExchange National Information Resource Center Newsletter

# Earth Comfort Update

# First in Line in West Virginia

Webster County High School in Upperglade, W. Va., is the first school in West Virginia to "go Geo" and has - in just eight months - realized energy costs savings of more than $34,000 and cut its electrical demand nearly in half. ***Update – annual energy savings exceed $74,500.***

In 1997 the Webster County Board of Education requested funds from the School Board Authority (SBA) of West Virginia to replace several rooftop heating units at Webster County High School. Upon inspection, SBA officials recognized that restoring the existing electrical HVAC system wasn't the best solution. They recommended a qualified mechanical engineering firm review the system and develop better options.



*Drilling for the ground loop for Webster County High School's 500-ton GeoExchange system. It is the largest GeoExchange installation to date in West Virginia and the surrounding region.*

School officials were leaning towards a propane gas heating system when Allegheny Power, Greensburg, PA, and ZDS Design/Consulting Services, St. Albans, WV, introduced them to GeoExchange, which could provide greater energy efficiency, cost savings, temperature control, reliability and safety.

Webster's 500-ton system is the largest GeoExchange installation to date in West Virginia and the surrounding region. School officials estimate that the system will save about $50,000 a year in heating and cooling costs. ***Update – Energy savings increasing every year and now exceed $74,500 annually.*** In addition, it provides a healthier environment for Webster's 600 students, its faculty and staff by incorporating a cost-effective, outside air ventilation system.

"***We're very pleased with the system***," said Harry Given, facilities manager for Webster County schools. "***We've seen energy savings, had zero maintenance problems, and we believe that the savings will be even greater over time.***"

## Investing in the Future

"GeoExchange offers schools the best return on investment with the lowest environmental impact," said Gary Valli, an HVAC engineer with Allegheny Power. "In most cases, the life-cycle costs of a geothermal heat pump system are lower than any other system available today."

The Geothermal Heat Pump Consortium (GHPC) helped Webster County school officials by providing additional training to ZDS through its Design Assistance Program. "We were not sure how comfortable the school personnel would be with this type of system," said Todd Zachwieja, owner of ZDS. "A commercial geothermal system of this size had never been installed in our area, and the system cost was higher than HVAC systems customarily funded for schools."

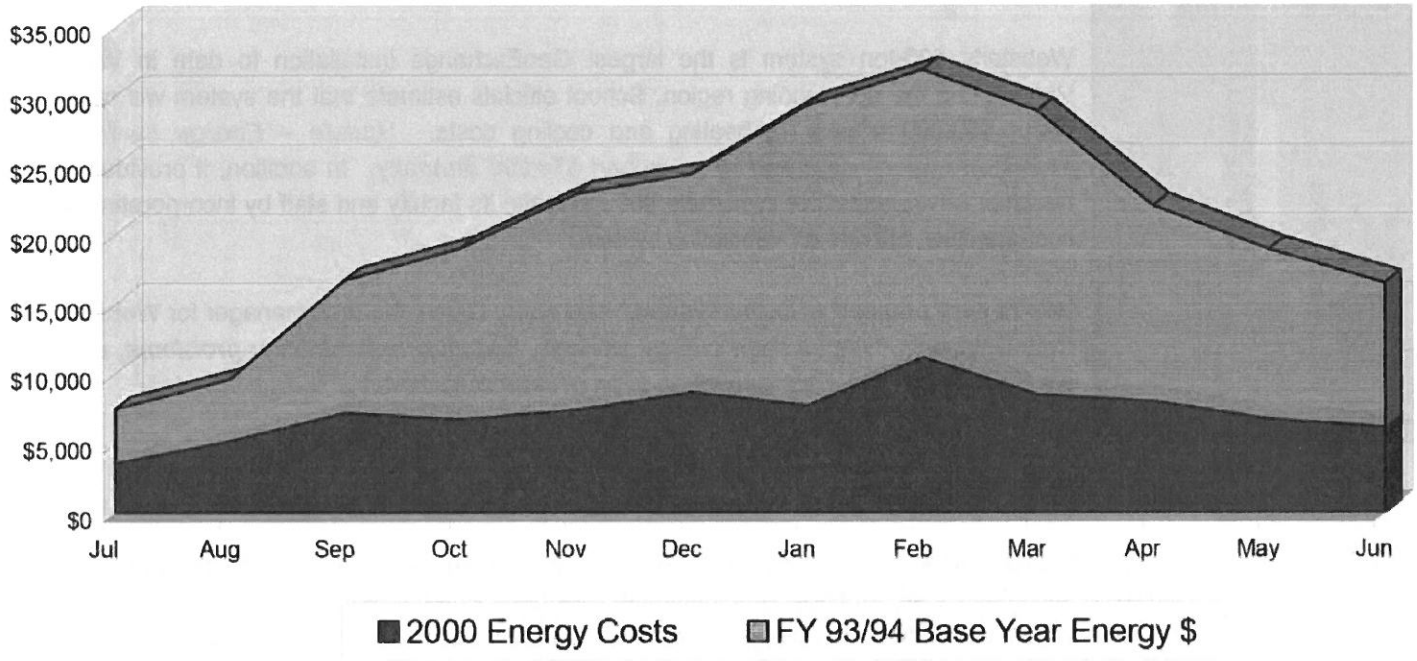
The Webster County project was funded as a pilot project through a $3.25 million grant from the SBA, which is responsible for overseeing all school construction in the state. The SBA is giving strong consideration to the GeoExchange system's positive performance at the school, Zachwieja noted. Significant lifecycle cost savings could allow more schools to benefit from funding for GeoExchange projects in the future.

## Improved Comfort and Efficiency

The Webster County High School system includes 240 vertical loop heat exchangers inserted 304 feet into the ground. The new units that replaced the old multizone units incorporate exhaust air heat recovery for the incoming outdoor air. "That's another benefit of the system -bringing the outdoor air indoors," Given said. "***We've improved our indoor air quality; everyone appreciates that***."

"Schools are definitely realizing the benefits of GeoExchange for comfort and energy-efficiency," Valli said. To help, Allegheny Power is producing a technically detailed video on the step-by-step GeoExchange installation at the Webster County High School.
"Many schools have HVAC systems that are reaching the end of their useful life," Valli said. "These schools will look at a lot of options. Our job is to educate the decision-makers that GeoExchange is a viable and cost effective solution."

**Webster County High School**
**Geothermal Heat Pump Energy Savings**




**For More Information contact: Todd A. Zachwieja, PE, CEM, Principal**
**ZDS Design/Consulting Services**
**91 Smiley Drive, St. Albans, WV 25177**
**Phone (304) 755-0075, Fax (304) 755-0076**

# Paying for Performance

## A growing number of colleges sign contracts with guarantees of savings of energy and money

BY MARTIN VAN DER WERF

TECHNICIANS are crawling over the campus of Ohio University, charting the use of electrical current in every office and dormitory room, measuring the brightness of lighting, the consumption of water, the air temperature in every room and alcove. They are trying to document every way that the university can cut its energy costs.

The answers are in little places. Ohio will replace 9,000 exit signs with exit lights that use 80 percent less energy and last 25 times longer. It will replace windows. It will put smaller, more efficient fluorescent tubes in the light fixtures. It will probably be watering its lawns and fields with well water rather than water from the tap. And, as a symbol of its turn away from a longtime reliance on coal, the university is considering buying its own natural-gas field, in the nearby hollows of the Appalachians.

It will be a 20-year project that will save millions of dollars per year in energy costs. Yet, to do it, the university won't have to come up with any new money up front.

In April, it signed a $25-million "performance contract" with Vestar, a subsidiary of Cinergy Corporation, a Cincinnati-based energy company.

### HOW IT WORKS

Performance contracts are an innovative financing method that is increasing in popularity on campuses. The process works like this: A contractor or energy company explores a campus and recommends ways to save money on energy bills. Then the contractor makes the changes or hires others to make them, and guarantees, in writing, that the savings the college will realize will cover the costs of the changes, usually within 10 years. The company can also arrange financing, so the college does not have any upfront costs. The college pays the company for construction and equipment in installments that roughly equal the amounts by which the college is cutting its energy bills.

The companies benefit by selling more of their products. For many colleges, the greatest appeal of the contracts is that they can use the savings to help eliminate backlogs in deferred maintenance. Many of them use the savings to buy more-efficient chillers, ventilation systems, and other utility-related equipment.

*"This is* a way for many institutions to get capital quickly," says Mohammad H. Qayoumi, vice chancellor for administrative services at the University of Missouri at Rolla, who leads sessions on utilities policy at institutes sponsored by the Association of Higher Education Facilities Officers.

"Are we going to see more? Definitely. We are going to see things going in that direction, especially with the deregulation of energy companies. They are increasingly going to want to sell electricity not only as a commodity, but all kinds of services along with it," he says.

University officials who have entered into the contracts point out, however, that the deals are immensely complicated. Any institution that is considering such a contract should consult with outside

*Todd A. Zachwieja, a Consultant with ZDS Design/Consulting Services: "Some schools have moved forward with contracts without fully understanding what they were doing."*

*Sherwood G. Wilson of Ohio U. says its new energy contract will help it cover the costs of deferred maintenance.*

experts, says Joe Kelley, executive director of facilities at Louisiana State University at Baton Rouge, which signed one of the first performance contracts by any college, an $18.8-million deal in 1990.

"We sort of had to find a pathway through the jungle on this one," says Mr. Kelley. His advice: "Get every word of it in writing."

Todd A. Zachwieja, principal of ZDS Design/Consulting Services an Ohio and West Virginia-based consultant on performance contracting, says there are now more than 100 companies in the business. The traditional market leaders are Fortune 500 companies like Honeywell, Johnson Controls, and Sempra Energy. Many of the newest ones are utilities trying to broaden their services.

### AN UNTAPPED MARKET

The size of the market is difficult to quantify. Johnson Controls alone has about $1.6-billion in contracts, about 100 million worth with colleges, says Tom Proffitt, marketing manager for performance contracting at the Milwaukee-based company.

The college market, however, remains relatively untapped. Mr. Proffitt estimates that fewer than 20 percent of institutions have signed such contracts. But higher education has been a steadily growing segment of his company's business, he says.

Performance contracts were born in the 1970's, during the Arab

*Continued on Following Page*

*Continued From Preceding Page*

oil embargo, when energy savings were at a premium. But they were not widely used until the mid to late 1980's, when they became particularly popular at hospitals, which could get some Medicaid and Medicare reimbursement for facilities improvements, says Mr. Zachwieja, chief executive officer of ZDS Design/Consulting Services, in St. Albans, W.Va.

Slowly, as states have passed laws allowing multiyear financing, elementary and secondary schools and local governments are beginning to sign the contracts. About 35 states have now enacted the laws, says Mr. Proffitt.

In 1994, President Clinton signed an executive order allowing federal agencies to make the agreements, and the contracts have begun to proliferate, mostly at military bases and at office buildings owned by the General Services Administration.

#### STAYING ON THE SIDELINES

Other than pioneers like Louisiana State; however, most higher-education institutions have stood on the sidelines.

Many were scared away by earlier performance contracts, in which hospitals and some government agencies didn't save as much as they expected. In the 1980's and early 1990's, the contracts were usually structured to give the company a share of the savings. Those incentives encouraged companies to maximize profits by doing the least amount of work to save the amount of money specified in the contract. But the long-term benefits for the institution were dubious.

Mr. Zachwieja, the West Virginia consultant, says that if colleges are careful about what they specify in their contracts, the real savings will come after the contract expires, as newly installed equipment continues to cut energy costs for years.

"Some companies are structuring contracts that only give benefits during the life of the contract," he explains. "You really aren't saving any money unless you get benefits that are lasting."

Louisiana State, for example, decided that it wanted all of the energy savings rather than sharing them, and, in 1992, bought out its contract with CES/Way International, an energy-contracting company, which has since been acquired by Houston-based Sempra Energy.

"We didn't really need the savings guarantee, because the savings were there, the technology was proven, and it was, in our minds, a low-risk project, so we took it over ourselves," says Mr. Kelley, the facilities director.

Colleges also feared losing control of the operation of their buildings, something that indeed came about in early contracts.

"Some schools have moved forward with contracts without fully understanding what they were doing," says Mr. Zachwieja. "Let's say they agree to a shutdown schedule — the lights shut down at a certain time, as opposed to before, when a custodian just shut down the lights on a room-by-room basis. Then the college decides to go to a nighttime-use schedule. Then it won't be able to produce the savings that were projected in its contract. How do you deal with that? All those possibilities must be considered."

Some college officials say they think such kinks have been worked out.

Sherwood G. Wilson, associate vice president for facilities and auxiliaries at Ohio University, believes that more institutions will sign the contracts as an answer to deferred-maintenance problems.

"We are faced with a backlog of deferred maintenance," says Mr. Wilson, who estimates Ohio's total at $55-million. "We have resources that fall a long way short of covering all of our needs." The contract will allow Ohio to take care of more than $10-million of the backlog.

Nationally, deferred-maintenance costs for colleges reached an estimated $26-billion, according to a 1996 report by the facilities-officers association. Chipping away at that total will become a big selling point as more companies approach colleges about the contracts, says Mr. Proffitt, of Johnson Controls.

"Everyone has looked at the K-12 market, and this has worked at K-12," he says. "You look at universities. There are greater bureaucracies, they may have credit issues, they have more-complex systems. Quite frankly, you go where the low-hanging fruit is, and that has been the school systems. The more-complex clients usually come later."

At Ohio, it took three years to get the administration, the Board of Trustees, and the state Board of Regents to approve the contract, mostly because of bureaucratic problems, says Mr. Wilson. When key financial people left, he had to explain and justify the contract to their replacements. It is one of the largest performance contracts ever signed by a university.

Then there is the cultural shift for a region where the economy is centered on energy consumption.

Ohio University has always been run by burning the very ground beneath it. Like clearing a forest to build a log cabin, the university has counted on nearby coal mines to stoke the boilers in the bowels of its sprawling campus.

But then came the Clean Air Act, and black-lung disease, and acid rain, and unemployment for many of the miners who dug up the ore that, in this part of the world, is particularly high in pollution-causing sulfur.

"We have tried to support the local industry, but this is even better," says Gene Mapes, an associate professor of environmental and plant biology and director of environmental studies. "I think this is a real leadership role, because we are modeling behavior." The university is trying to get area residents to acknowledge that the local economy must shift its emphasis from coal to tourism and small industry.

#### CREATING A LONG-TERM RELATIONSHIP

Construction is set to begin in June on the first phase of the contract with Vestar, in which the company will make changes in nine of the 200 or so buildings on campus.

"Our math building is a huge building, with lots and lots of lights that are inefficient," says Mr. Wilson. "Our library is the same way." In addition, showerheads and perhaps toilets will be changed in two residence halls to models that use less water. The power plant will get new controls, which will more closely match energy production to demand.

This is the beginning of a relationship that is expected to last for 20 years, says Mr. Wilson. The project will comprise five phases, with one starting every two years. Each phase will have a guarantee that the costs will be repaid by energy savings over the ensuing 10 years. Ohio can terminate the contract after any of the phases.

#### SAVING $25-MILLION

If the university goes through with all of the phases, the contract guarantees that Ohio will save $25-million, although Mr. Wilson and Vestar officials have analyzed only about half of the seven million square feet of building space on the campus.

Construction costs in the first phase are estimated at $4.2-million. Ohio University is financing the project itself, probably with bond issues. Financing costs for the first phase are estimated at $23 1,000. If the changes in the first phase save $700,000 a year, as projected, the savings will have paid for the costs, including financing, in a little more than six years. Each succeeding phase will involve more-complex projects, with longer payback schedules. Plans are still being drawn up for those phases.

*Continued on Following Page*

*Continued From Preceding Page*

Mr. Wilson says he has not calculated how much all of the work will eventually save the university. In the first phase alone, he says, the equipment being installed will continue to save Ohio $700,000 annually for 20 years. The total savings after subtracting the cost of the equipment and financing would exceed $9-million.

At Louisiana State, the annual energy bill before the performance contract was $12.5-million. Now it is about $8.5-million, even with 10 percent more students on the Baton Rouge campus, says Peter N. Davidson, director of energy services.

The contracts are structured to guarantee that the savings will cover not only the costs of construction, new equipment, and financing, but also, in some cases, a fee, generally ranging from 1 to 4 percent of the size of the contract, for a guarantee that the contractor will make up the difference if the college's projected savings fall short of expectations.

Usually, the savings guaranteed in the contract are about 80 percent of the company's estimated energy-cost reductions, says Michael Besspiata III, director of facilities management at Georgetown College, in Kentucky.

Johnson Controls last year paid out about 1 percent of the total savings it guaranteed but could not meet in its $1.6-billion worth of contracts, says Mr. Proffitt.

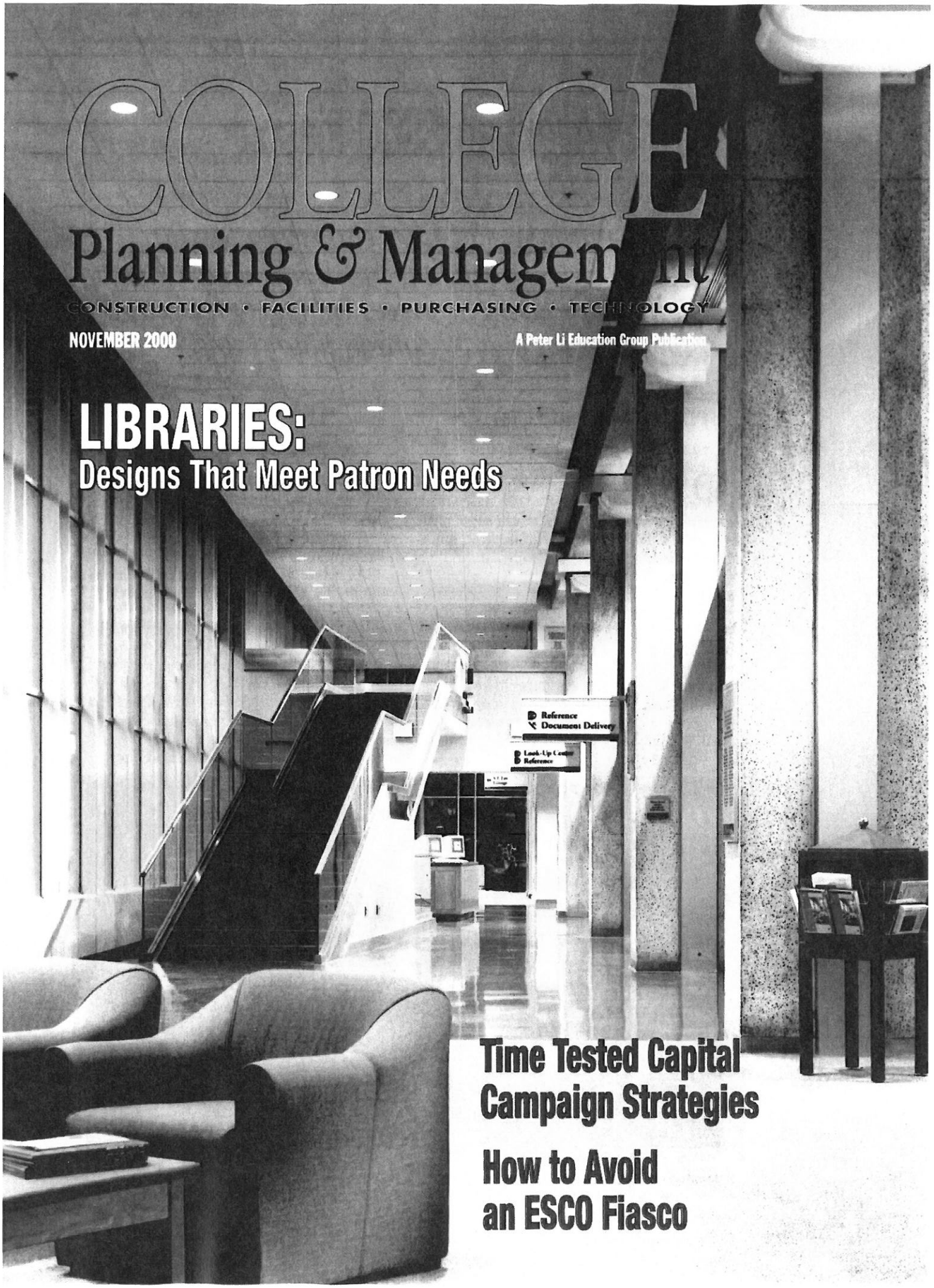
As performance contracts become more common, Mr. Besspiata says, any size institution can benefit. Georgetown College, for example, signed a $750,000 performance contract last year with Enertech, a subsidiary of LG&E Energy Corporation.

Mr. Besspiata moved to Georgetown in May 1998, from the Southern Baptist Theological Seminary. Both institutions have fewer than 2,000 students. And each one now has modern energy-management systems, which tightly control energy use across the campus, paid for by the savings produced in performance contracts.

"I think a lot of colleges think they are too small to really get much benefit," says Mr. Besspiata. He projects savings in the current fiscal year of $85,000 on a typical annual utility bill of $1-million. "That's real money," he says. ■

For More Information contact:

**Todd A. Zachwieja, PE, CEM**
**Principal**
**ZDS Design/Consulting Services**
**91 Smiley Drive**
**St. Albans, WV 25177**
**Phone (304) 755-0075**
**Fax (304) 755-0076**




# COLLEGE Planning & Management

CONSTRUCTION • FACILITIES • PURCHASING • TECHNOLOGY

NOVEMBER 2000

A Peter Li Education Group Publication

## LIBRARIES:
### Designs That Meet Patron Needs

## Time Tested Capital Campaign Strategies

## How to Avoid an ESCO Fiasco

# How to Avoid an ESCO Fiasco

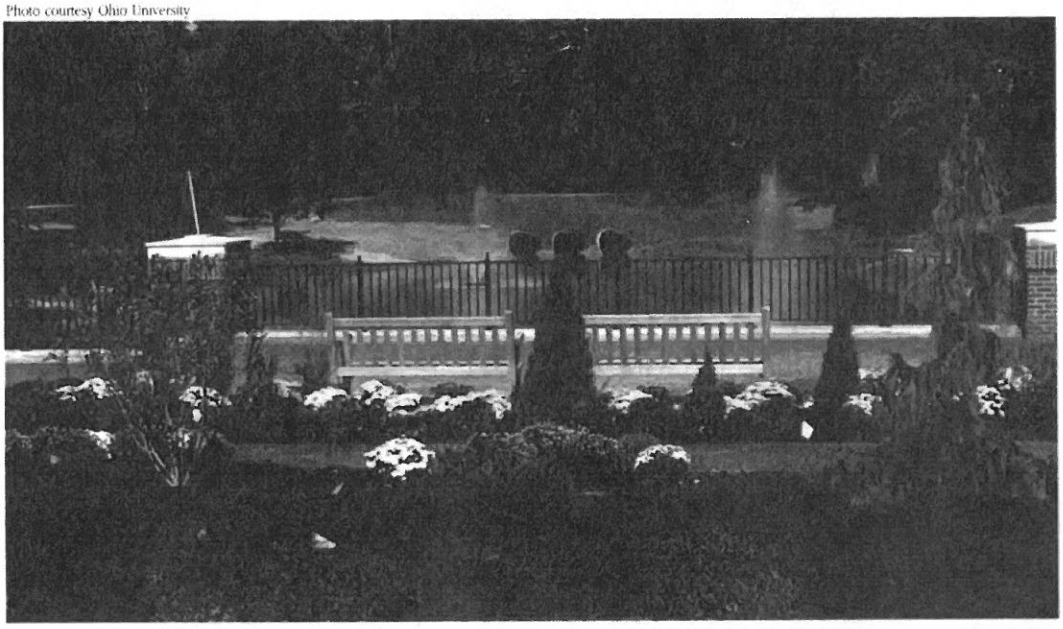
*Facility managers at Ohio University used a performance contracting consultant to assist them in hiring an energy services company that could implement an energy conservation project.*

*by Dorothy Wright, staff writer*

Performance contracting seems like a win-win proposition: Work with an energy services company (ESCO) to implement an energy conservation project that will improve facilities and lower energy and operating costs. Pay the ESCO using the energy savings — not capital funds. After the payback period, keep the savings. Yet many college and university facilities planners are reluctant to do so. Some lack experience with this approach to funding and implementing a facilities project. Others have heard of cases in which a project simply did not deliver results or, worse yet, an educational institution became embroiled in litigation with the ESCO.

Facility managers at Ohio University in Athens, Ohio, found an effective solution: They relied on an independent consultant experienced in performance contracting to guide them through the process of selecting an ESCO. Now the university and its ESCO are in the first phase of implementing an energy efficiency project comprising new and upgraded lighting, heating and ventilation systems; enhanced building controls; and water conservation measures, including low-flow plumbing fixtures. When the project is completed, the university will save $2 million to $2.5 million a year in energy and operating costs, which will pay for the project within 10 years. After the payback period, the

Photo courtesy Ohio University



*Ohio University's independent consultant helped administrators select an ESCO to implement an energy efficiency project that will save $2 million to $2.5 million a year in energy and operating costs.*

university will retain the annual savings.

Founded in 1804, today Ohio University is an educational community of 20,000 students and 3,500 faculty and staff. The 1,700-acre campus has some 190 buildings comprising a total 6.7 million square feet. In the 1970s the university created an energy management fund to carry out energy conservation projects, implementing a number of effective initiatives through the years. In the mid-1990s, with utility costs projected to rise to $19.1 million by 2020, the university knew it was time to make a major investment in upgrading its infrastructure and increasing energy efficiency.

The university's facility managers first identified performance contracting as a means to implement a new central chilled water plant. "Initially, the university saw no way to do this with existing resources, so we started looking for alternatives," says Terry Conry, director of Facilities Management. "While we have an outstanding staff, we didn't have anyone who personally had gone through a performance contract selection or implementation process. We were concerned about it, and we looked for help."

## Selecting a Consultant

The consultant's key service would be to assist the university in selecting an ESCO. Through open advertisements and direct invitations, consultants were invited to submit their qualifications for consideration. After an evaluation of the RFQs, the university's facilities management team developed a short list of consultants, who were asked to provide the university with a proposal detailing their experience in the field of performance contracting. References were carefully checked, and interviews were conducted with finalists. All members of the consultant's staff who would be assigned to work with the university were required to be present for the interview.

The consultant's past experience with similar projects in colleges and universities was essential to Ohio University. "The consultants were asked to provide a list of at least five performance-based energy projects completed in the higher education environment," explains Ted Fares, director, Engineering and Technical Services, Ohio University.

Candidates were required to prove their expertise in design, planning, specifications, implementation and monitoring of energy conservation projects. "They had to be capable of analyzing energy use at our facilities and making recommendations for energy conservation projects which, if implemented, would provide guaranteed energy savings to Ohio University," Fares says.

Most important, they needed past experience in awarding similar contracts to ESCOs. "Knowledge of the legal and financial issues surrounding performance contracting was essential," Fares says.

In addition, the consultant needed to be able to train the university's staff in operation, final inspection and commissioning.

As a result, the university selected ZDS DESIGN/CONSULTING SERVICE. Based in St. Albans, W.Va., and Cincinnati, Ohio, ZDS is a consulting engineering firm specializing in mechanical and electrical engineering, indoor air quality, commissioning and energy conservation projects.

ZDS had previously worked with the university in a traditional design and mechanical/electrical engineering role. "Our role in this project was to assist the university in defining its needs, ensure that the structure of the program met these needs and guide the university in its selection of a performance contractor," says Todd Zachwieja, principal, ZDS.

## Selecting the ESCO

The ESCO was selected through a two-step, RFQ/RFP process. The university advertised internationally, nationally and locally in trade magazines and newspapers. The advertisement required all candidates to attend a meeting at Ohio University to obtain the RFQ document, walk through the campus and participate in a question-and-answer session.

RFQ submittals from 14 ESCO candidates were evaluated and candidates short-listed by a committee of 12, comprising the university's architect, facility engineers, energy managers, administrators and service personnel, and ZDS. The two ESCOs who made it past the first cut were required to submit a detailed RFP.

The two-step process lengthened the selection process by about eight months, Conry says, while at the same time streamlining it. "ZDS provided a template that the companies had to respond to, to keep them from burying us in paper," he explains. "We asked everyone clear, concise questions, then limited the amount of additional information they could add. Nevertheless we got two- to three-inch-thick binders back from each firm. We took a lot of time going through those and checked references carefully."

Conry says one of the advantages of the two-step process is that it effectively narrows

the field for the RFP. "If we had had the complete RFP done by 14 companies we would have had a mountain of paper," he says. "This streamlined the process even though the initial step took extra time."

Conry says there were a lot of similarities among candidates, but some distinct differences revealed by the RFQ. "One is the level of experience in performance contracting in higher education," he says. "Second, some had more solid in-house engineering teams and wouldn't need to go to subcontractors as much — we liked that accountability. Third, they differed in their philosophies of project staging and customer service."

The RFP got to the nitty gritty. "We said, 'Here are sample buildings: We want you to bring in your engineering team and give us specific proposals for improvements, tell us what the cost savings are, and explicitly show us how you calculated these cost savings,'" Conry says. "That allowed us to see how creative their engineering teams were, how sensitive they are to occupants during the implementation/construction, and how conservative or liberal they were in calculating the energy savings on a given measure. It was good to have that type of in-depth analysis of fewer firms."

As a result, the university selected as its energy services partner Vestar, an energy efficiency design, engineering, construction and facility operation firm with headquarters in Cincinnati, Ohio, and Toronto, Ontario.

Ironically, design and construction of the chilled water plant, which initially drove the university to explore performance contracting, is not part of the performance contract with Vestar. Conry says it did not have a quick enough payback — 10 years, as required by Ohio state law. That project is proceeding in phases under a separate contract, funded with Ohio University operating money, revenues accrued in its energy management fund and bonds, he says, "but coordinated with the energy performance contract to make sure that the system we are building is efficient and that we have controls in place that allow it to be operated efficiently in the future."

## Consultant Proves Beneficial

Considering that the energy efficiency program implemented under the performance contract will save the university more than $2 million a year, Ohio University's facility planners and managers are convinced that their consultant, **ZDS**, is worth the monies the university paid for their services. "It was important to have somebody guide us through the process," says Sherwood Wilson, associate vice president for Facilities and Auxiliaries. "It is also important when you are doing something new to have an independent consultant to help convince trustees and administrators of the validity of the approach. Performance contracting was a new concept here."

Indeed, it's still a new concept. "Many universities really don't understand performance contracting, and they are scared to death of it," he says. "Performance contracting can be as little or as much as you want it to be — it is a concept, not a template. It can be styled and adjusted to meet the needs of your own campus."

But many administrators and planners shy away from hiring consultants. "They see consultants wanting to charge fees to guide them through a process they think they can already do themselves," Wilson says. "Our energy management program was very successful through the years, but it only picked the 'low fruit.' We still identified a need for a $25- to $30-million performance contract."

That's why hiring a consultant is smart business, Wilson says. "Having a professional to get you started is worth every penny."

RFQ No. WSH14021

STATE OF WEST VIRGINIA
Purchasing Division

# PURCHASING AFFIDAVIT

**MANDATE:** 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 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: ZDS Design/Consulting Services

Authorized Signature: Todd C. Zastrow Date: August 2, 2013

State of West Virginia

County of Putnam, to-wit:

Taken, subscribed, and sworn to before me this 2 day of August, 2013.

My Commission expires November 1, 2014.

**AFFIX SEAL HERE**

OFFICIAL SEAL
Notary Public, State Of West Virginia
PATRICIA HART
105 Mesa Drive
St. Albans, WV 25177
My Commission Expires Nov. 1, 2014

**NOTARY PUBLIC** Patricia Hart

# CERTIFICATION AND SIGNATURE PAGE

By signing below, I certify that I have reviewed this Solicitation in its entirety; understand the requirements, terms and conditions, and other information contained herein; that I am submitting this bid or proposal for review and consideration; that I am authorized by the bidder to execute this bid or any documents related thereto on bidder's behalf; that I am authorized to bind the bidder in a contractual relationship; and that to the best of my knowledge, the bidder has properly registered with any State agency that may require registration.

ZDS Design/Consulting Services

(Company)

Todd A. Zachwieja

(Authorized Signature)

Todd A. Zachwieja, Principal, CEO

(Representative Name, Title)

(304) 755-0075 (304) 755-0076

(Phone Number) (Fax Number)

August 12, 2013

(Date)

## 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)

| | | | |
|---|---|---|---|
| [ X ] | Addendum No. 1 | [ ] | Addendum No. 6 |
| [ ] | Addendum No. 2 | [ ] | Addendum No. 7 |
| [ ] | Addendum No. 3 | [ ] | Addendum No. 8 |
| [ ] | Addendum No. 4 | [ ] | Addendum No. 9 |
| [ ] | Addendum No. 5 | [ ] | 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.

ZDS Design/Consulting Services
Company

Todd A. Zaborieja
Authorized Signature

August 12, 2013
Date

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