ROBERT T SAWYER, PE, CEM
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COVENANT ENGINEERING

Design and Engineering Capability

HVAC air distribution system design including selection of appropriate system type(s), load calculations, selection of air handling units, makeup air units and exhaust fans, layout and sizing of duct work, heating and cooling coils, variable refrigerant flow indoor and outdoor units, variable air volume boxes, fan coil units, unit ventilators and heat pumps.

Heating and cooling system design including sizing and selection of steam boilers, hot water boilers, chillers, cooling towers and heat exchangers.

Hydronic system design including selection of appropriate piping arrangements, flow rate and pressure drop calculations, equipment sizing and selection of piping, pumps, valves and flow metering devices.

EXPERTISE SUMMARY

- Air Handling Units
- Variable Air Volume Boxes
- Exhaust Systems
- Variable Refrigerant Flow Systems
- Computer Room Air Conditioners
- Heat Pumps
- Hot Water and Steam Boilers
- Chillers
- Cooling Towers
- Pumps and Hydronic Distribution
- Air Side and Water Side Economizers
- Swimming Pool Heaters
- Direct Digital Control Systems
- Domestic Water Distribution, Heaters and Storage
- Waste and Vent piping
- Roof Drainage

Control system design including creation of process and instrumentation diagrams, operational sequences, control valve and actuator sizing and selection, control damper and actuator sizing and selection.

Plumbing system design including domestic hot and cold water, layout and sizing of waste and vent piping and roof drainage piping.

Building condition assessments, feasibility studies and energy audits, related data analysis and subsequent reports.

System troubleshooting, investigations, inspections and subsequent reports.

Construction related services including but not limited to submittal review and determination of valid ‘or equals’, site inspections, responses to requests for information, issuance of supplemental instructions and creation of as-built drawings.

Owner representative services including design review and issuance of design comments and opinions.

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Work Experience

Covenant Engineering (Lewiston, ID) - founded and originated a Professional Engineering firm, acted as the mechanical engineer of record for HVAC and plumbing system designs. (June 2014 – Present)

McKinstry (Pullman, WA) – engineered and developed energy projects, performed financial projections and project cost estimates, wrote contract language, managed creation of contracts and change orders, directed other engineering personnel; Proficient in the use of software tools such as: Excel, Word, Access, Project, Siemens APOGEE, SQL, AutoCAD, Adobe Acrobat, NIST BLCC, Trane TOPPS, Carrier HAP. (January 2008 – July 2017)

QUALIFICATION ABSTRACT

- Eighteen (18) years energy industry experience
- Registered Professional Engineer for thirteen (13) years
- Active registration in five (5) states
- In depth knowledge of chilled water, hot water, steam and air handling systems
- Broad familiarity with a variety of control systems
- Proven ability to sustain client relationships
- Proficiency managing engineering and construction personnel through various contract arrangements

Constellation Energy (Baltimore, MD) – performed engineering to support the sale of Constellation's energy related projects, monitored performance of energy plants and recommended operational improvements, troubleshot control system and instrumentation problems, maintained interpersonal relationships with plant personnel and external customers, created contractual work scopes and project cost estimates, reviewed and approved mechanical design documents and submittals, managed sub-contracted engineering firms, developed life cycle cost analyses, examined and evaluated utility billing data, performed energy audits, calculated energy cost savings. (September 2000 – January 2008)

Thermal Science Technologies (Baltimore, MD) – executed field inspections of steam and HTHW systems, prepared written reports for clients regarding energy loss and condition assessment of the same, forecasted economic benefits for investments in re-insulation, performed cost and material estimates for construction projects, re-insulated underground steam and HTHW distribution piping with polyurethane modified polyisocyanurate foam [Condufill process], operated and maintained mobile reaction injection molding (RIM) equipment. (April 1998 – July 2000)

NBI Construction (Moscow, ID) – residential construction (1994 – 1998)

Covenant Engineering Projects

Gritman Medical Office Building III (Tenant Improvements) – performed HVAC and plumbing design for four (4) tenant improvements in a medical office building. Tenant improvements included dental, medical exam, cardiac rehab facility, oncology treatment area and pharmacy - including a positive pressure clean room and bio safety cabinet. (June - September 2016)

Enterprise Christian Church – reviewed an existing mechanical system and made recommendations for improvement. (July 2016)

Gritman Medical Office Building III – performed complete HVAC and plumbing design for a 54,000 sf medical office building located in Moscow, ID; design included a variable refrigerant flow (VRF) system with outside air heat recovery and demand control ventilation, a recirculating domestic water system, full sanitary and storm drainage and general building exhaust. (November 2015)

McKinstry Projects

Samaritan Hospital Air Handling Unit Remodel – re-programmed the operation of three (3) large central station air handling units that serve patient rooms, lab spaces and operating rooms in conjunction with an upgrade to variable frequency drives and occupancy driven room pressurization control within individual zones (January 2014)

Waterville School District – performed an energy audit on this K-12 school and developed a project to replace over 40 aging fan coil units, determined the level of maximum price and annual energy savings guarantees (February 2013)

Washington State University Smart Grid – created contractual work scope and financial guarantees for an electrical load shedding and smart metering project that covered over 30 buildings, managed the collection and subsequent analysis of end-of-the-line voltage data trends for over 300 service locations, became familiar with the proper installation, set up and operation of Schweitzer Engineering Laboratories SEL 735 Power Quality and Revenue Meter (August 2011)

Clearwater Paper Extruder Building Air Flow Study – studied the building wide and equipment specific air flow patterns and volumes in order to make recommendations for consistent pressurization and better contaminant control at this large industrial site (August 2011)

University of Idaho Thermal Storage Tank and Chilled Water Plant – managed the technical energy audit, conceptual design, guaranteed maximum price development and contract creation for a 1,000 ton chilled water plant (500 ton build out and 500 ton future capacity) and 2,000,000 gallon stratified thermal storage tank (May 2009)

University of Idaho Remote Wood Storage Facility – wrote a proposal and contract amendment to create a covered wood chip storage facility designed to

increase the capacity of an existing wood fired boiler by preventing fuel from gaining moisture during storage. The facility included a truck scale, unloading tipper, distribution conveyor and covered building (October 2008)

Washington State University Lab Building HVAC Upgrade – developed a project to replace several vane axial fans with variable speed fan walls and improve the air flow distribution and zone control at Fulmer Hall (July 2008)

Constellation Energy Projects

Chilled Water & Steam Plant Design – on behalf of a Northeast hospital client, created a conceptual design for a 7,500 ton chilled water plant and a 120,000 pph steam plant by sizing and selecting major equipment (i.e. chillers, cooling towers, boilers, de-aerator and pumps), preparing schematic diagrams, determining equipment / header piping layouts and establishing the required building footprint. (May 2007 – January 2008)

Control System Replacement – worked directly with a federal government client to replace an aging direct digital control system that contained approximately 20,000 controlled points through an indefinite delivery, indefinite quantity (IDIQ) contract arrangement, reviewed mechanical and electrical design documents, prepared written proposals, work scopes and cost estimates, conducted a competitive bidding process and selected capable sub-contractor(s), negotiated unit prices and maintained a pricing database (January 2003 – January 2008)

Plant Performance Monitoring – monitored and evaluated the performance of several energy production facilities representing 30,000 tons of chilled water production and 250 MMBtu/hr of heating production; monthly reports included analysis of key metrics designed to accurately assess the efficiency of each plant's pumps, chillers, cooling towers and boilers, reports also contained financial impacts and propositions for operational improvement (July 2003 – January 2008)

District Energy Plant Construction – performed project engineering and project management functions for the installation of a sizable district energy plant that is capable of producing over 23,000 tons of chilled water and 260,000 pph of steam, specific duties included reviewing submittal data for plant equipment such as pumps, chillers, boilers, de-aerators, tanks, heat exchangers and distribution piping (March 2003-December 2003)

Shopping Mall Mechanical Design Review – reviewed over 200 mechanical designs for tenant spaces at a prominent Las Vegas shopping mall, evaluated cooling load calculations, confirmed AHU and control valve selection, verified AHU coil performance and appraised design conformance to published standards (March 2002 – March 2006)

Federal Government Agency Energy Audit – operated in conjunction with a subcontracted engineering firm to complete an energy audit for an 829,000 square foot federal building, identified energy and water conservation measures, calculated annual energy cost savings and performed life cycle cost analysis for each identified measure (March 2002)

Monthly Utility Use Analysis and Review – reviewed monthly utility bills at over 150 nationwide sites for the purpose of spotting anomalies and trends, applied statistical techniques to collect and correlate data, prepared a written report that summarized findings and recommended methods to reduce energy expenditures (September 2000 – January 2003)

Thermal Science Technologies Projects

Insulation Performance Verification – researched the TX method for condition assessment of underground piping by infrared ground surface temperature measurements, used this method to develop and carry out a plan to verify the performance of TST's foam insulation, also used the TX method during field inspections of underground piping (October 1999)

RIM Equipment Presentation – prepared an oral presentation summarizing the mobile reaction injection molding (RIM) equipment, delivered the address to various groups including a group of > 30 people at the International District Energy Association annual meeting in Boston, MA (June 1999)

Total Quality Control Report – conducted an informal study of total quality principles and drafted a report suggesting ways to implement quality control for continuous improvement, included concepts like teams, the PDCA cycle, statistical methods and Dr. Deming's 14 points (May 1999)

Certifications

Idaho Professional Engineer Licensure (ID# 13224, Currently Active) – License by reciprocity (March 2008)

Washington Professional Engineer Licensure (WA# 44552, Currently Active) – License by reciprocity (March 2008)

Montana Professional Engineer Licensure (MT# 18597, Currently Active) – License by reciprocity (March 2008)

Oregon Professional Engineer Licensure (OR# 91605, Currently Active) – License by reciprocity (September 2016)

Maryland Professional Engineer Licensure (MD# 28418, Currently Active) – earned a score of 91 on the Principles and Practices of Engineering exam for mechanical engineers (October 2002)

Certified Energy Manager Certification (# 9524, Currently Active) – met the Association of Energy Engineers' standards for certification and passed a required exam with a score of 928/1040 (April 2002)

LEED Accredited Professional – met the US Green Building Council's standards for certification and passed the required exam (December 2005)

Electrical Arc Flash Certification – received training and passed the exam required to receive the Maintenance Training Association of the America's Electrical Arc Flash NFPA 70E certification (June 2011)

EPA Refrigerant Certification – certified as a "Universal Technician" (July 2003)

US Government Security Clearance (Inactive) – underwent the Department of Defense's necessary background investigations and received TOP SECRET clearance (Spring 2002)

Continuing Education

Power System Fundamentals – learned the fundamentals of the electrical distribution system and its major components in this electrical engineering course sponsored by Schweitzer Engineering Laboratories (August 2013)

Spin Selling – received salesmanship and relationship building skills according to the Huthwaite's SPIN strategy (September 2009)

Compressed Air Challenge – studied the efficient operation of air compressors and compressed air systems in a seminar sponsored by Atlas Copco (May 2009)

Siemens Master Programmer – developed a detailed knowledge of control system composition and operation in these four courses: 5-620, 5-625, 5-630 & 5-635; currently possess a proven ability to read, interpret, create and modify DDC programming line code (June 2004 – June 2007)

Constellation SIRIUS Training – studied Constellation's six-step continuous process improvement program (scope, investigate, reason, innovate, undertake, sustain), learned the practical application of various statistical and data analysis tools, SIRIUS training is roughly equivalent to the Six Sigma green belt program (July 2005)

Chilled Water System Seminar – attended a professional development course focused on operation and maintenance concerns of chilled water and condenser water systems (July 2003)

Trane AC Clinic – attended a 12 week course on air conditioning equipment sponsored by Trane, learned operating principles of chillers, compressors, fans, variable frequency drives, DX cooling systems and thermal energy storage units (February 2001)

Water Hammer Seminar – learned the mechanism of condensation induced water hammer in steam systems and the dangers of the same in a one day seminar sponsored by Trigen Philadelphia Energy Corporation (February 1999)

RIM Training – attended manufacturer's seminar covering operation and maintenance of various types of reaction injection molding equipment (December 1998)

Education

University of Idaho, BS ChE – completed the chemical engineering curriculum in four years, graduated in 1997 with a cumulative GPA of 3.38/4.0, course highlights include: Hazardous Waste Management, Reactor Design, Process Control, Stagewise Operations and Integrated Circuit Fabrication