Programs for the Seattle Meeting (June, 2014):

Forum (Intermediate)
Sunday, June 29, 2014, 2:15 - 3:00 PM

Statistical Sampling in Commissioning
Sponsor: *7.9 Building Commissioning, 7.7 Testing and Balancing*
Track: *Installation, Commissioning, Operation, Maintenance of Existing Buildings*
Room: *Metropolitan Ballroom B - Sheraton*
Chair:*Lee Riback, Member, P2S Engineering, Long Beach, CA*

OPEN SESSION: no badge required; no PDHs awarded; presented during the TC's meeting. One driving force in the scope of commissioning effort is the quantity of equipment being field tested. Commissioning strategies vary in methods; some use statistical sampling, others test all equipment, while some others use software to analyze trend data. When sampling is used and results are poor, the percentage is typically increased, adding costs that may not be supported by the project team. This leads us to the question of "how much is enough?" We intend to promote a lively discussion with active audience participation in order to provide guidance to industry stakeholders.

Seminar 19 (Intermediate)
Monday, June 30, 2014, 11:00 AM-12:00 PM

Optimizing Operating Staff Capabilities and Energy Efficiency with Commissioning
Sponsor: *7.9 Building Commissioning*
Track: *Installation, Commissioning, Operation, Maintenance of Existing Buildings*
Room: *606 - Convention Center*
Chair: *Mike Eardley, P.E., Member, Cannon Design, Boston, MA*

A comprehensive commissioning process provides a facility's staff with information necessary to efficiently operate building systems. A formal monitoring based commissioning (MBCx) effort is also useful in investigating operational issues, troubleshooting, determining actions required to permanently correct the problem, reducing the frequency of issue reoccurrence and improving equipment maintenance due to wear and tear on equipment. This session provides a case study where the commissioning process optimized the efficient facility that was delivered, and reviews the benefits of MBCx in achieving peak building system performance throughout a facility's lifetime.

Learning Objectives:

1. Describe the equipment selection process and how to compare energy use and life cycle costs to determine least cost of ownership and highest return on investment.
2. Demonstrate the lessons learned from commissioning a multiple chiller plant replacement project.
3. Discuss how monitoring is used in the commissioning process.

4. Argue the benefits of long term monitoring for building systems.

1. Using Monitoring Based Commissioning to Improve the Capabilities of O&M Staff
H. Jay Enck, Member, Commissioning & Green Build Solutions Inc., Buford, GA

2. Chiller Plant Optimization through Proper Commissioning
Norman Nelson, P.E., Member, CH2M Hill, Portland, OR

Conference Paper Session 9 (Intermediate)
Tuesday, July 1, 2014, 11:00 AM-12:30 PM

Evaluating Building Performance for Real Cost Saving Options
Sponsor: *7.6 Building Energy Performance, 7.9 Building Commissioning*
Track: *Installation, Commissioning, Operation, Maintenance of Existing Buildings*
Room: *606 - Convention Center*
Chair: *Michelle Contri, P.E., Member, DLB Associates, Eatontown, NJ*

This session provides building energy modeling ideas to reduce the difference between modeled energy consumption with meter energy consumption and how these models can be used to evaluate energy conservation methods during the measurement and verification process. This session will also addresses quantitative airtightness testing that is required in some energy codes and ways to maximize boiler efficiency at part load conditions.

Learning Objectives:

1. Understand the large building air leakage testing requirements in Seattle & WA State
2. Understand how tight large buildings currently being constructed are and what air barrier systems are most effective.
3. Explain what is a targeted simulation.
4. Use the energy signature as a guide for calibration process.
5. know the basic Measurement and Verification methodologies, pros and cons of each methodology used in building retrofit projects
6. know the lessons learnt from the case study buildings
7. Introduce the opportunities for improving boil energy operational efficiency.
8. Describe the impact of different use pattern of burners to boiler efficiency

1. Building Enclosure Airtightness Testing in Washington State: Lessons Learned about Air Barrier Systems and Large Building Testing Procedures (SE-14-C037)
Graham Finch, P.Eng., Associate Member, RDH Building Engineering Ltd., Vancouver, BC, Canada

2. Targeted Calibration of Energy Models for Existing Building (SE-14-C038)
Ery Djunaedy, Ph.D., Member and Kevin Van Den Wymelenberg, University of Idaho, Boise, ID

3. Use Calibrated Whole Building Energy Model to Disaggregate Retrofit Savings and Evaluate Demand- Response Strategies (SE-14-C039)
Ke Xu, Ph.D., Associate Member1, James Freihaut, Ph.D.2, Payam Delgoshaei, Ph.D.2, Scott Wagner1 and Mark Stutman, Member1, (1)The Pennsylvania State University, Philadelphia, PA, (2)The Pennsylvania State University, University Park, PA

4. Case Study: Optimization of an Industrial Steam Boiler System Operation (SE-14-C040)
Bei Zhang, Ph.D., Student Member, Yunhua Li, Ph.D., Student Member and Mingsheng Liu, Ph.D., P.E., Member, Bes-Tech Inc., Omaha, NE

Conference Paper Session 15 (Intermediate)
Wednesday, July 2, 2014, 8:00 AM-9:30 AM

Retro-Commissioning Effectiveness
Sponsor: *07.09 Building Commissioning, TRG7 Tools for Sustainable Building Operations, Maintenance and Cost Analysis*
Track: *Installation, Commissioning, Operation, Maintenance of Existing Buildings*
Room: *606 - Convention Center*
Chair: *Alonzo Blalock, P.E., Member, Jacobs, Fort Worth, TX*

Retro-commissioning, as a systematic process for identifying and improving less-than-optimal energy performance in an existing building's equipment and control systems, is arguably one the most cost effective strategies for reducing energy consumption in buildings. Possible detectable HVAC deficiencies in energy consumption data are explored. Development of a building cluster emulator for building/building and building/grid operation optimization will be introduced. If not operated according to the design, passive design strategies could reverse energy savings to energy consumptions. Most of the times commissioning identifies the almost inevitable "drift" in HVAC system operation from its design specifications and the measures and then put in place to ensure that HVAC system is performing as close as possible to its optimum.

Learning Objectives:

1. Explain how faults in residential HVAC systems can cause excess energy consumption in homes.
2. Describe how energy consumption data can be used to detect faults in residential HVAC systems.
3. Understand typical ventilation practices for high-rise multi-unit residential buildings including corridor pressurization systems.
4. Understand performance issues with corridor pressurization based ventilation systems.

5. Explain the complex interaction between active and passive HVAC systems for a net zero energy home.
6. Define the need for occupancy education related to hybrid home operation and need for commissioning and advanced control strategies.
7. describe the importance of carbon emission reduction in built environment and Singapore's Green Mark approach in assessing energy efficiency of air-conditioning systems.
8. familiarise themselves with the approach surrounding successful implementation of low-cost measure as part of retro-commissioning process.

1. Residential HVAC Commissioning through Energy Consumption Data Analysis (SE-14-C061)
Kristen S. Cetin, Student Member and Atila Novoselac, Ph.D., Member, University of Texas at Austin, Austin, TX

2. Corridor Pressurization System Performance in Multi-Unit Residential Buildings (SE-14-C062)
Lorne Ricketts, Student Member and Graham Finch, P.Eng., Associate Member, RDH Building Engineering Ltd., Vancouver, BC, Canada

3. The Potential Energy Efficiency of a Hybrid Designed House: A Post-Occupancy Case Study on the Heating and Cooling System (SE-14-C063)
Shan He and Ulrike Passe, Iowa State University, Ames, IA

4. The Investigation into Retro-Commissioning Effectiveness in Tropical Climate (SE-14-C064)
Ljiljana Marjanovic-Halburd, Ph.D.1 and Challa Venu Kumar, Member2, (1)UCL (University College London), London, United Kingdom, (2)Energy Conservation.Sg (Comfort Management Pte. Ltd.), Singapore, Singapore

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Seminar 40 (Intermediate)
Wednesday, July 2, 2014, 8:00 AM-9:30 AM

Ground Source Systems Commissioning and Closeout: Unique Issues, Avoiding Fatal Flaws and Ensuring Client Satisfaction
Sponsor: *06.08 Geothermal Heat Pumps and Energy Recovery Applications, 07.09 Building Commissioning*
Track: *Ground Source Heat Pumps: State of the Art Design, Performance and Research*
Room: *Ballroom 6B - Convention Center*
Chair: *Cary Smith, Member, Sound Geothermal Corp., Sandy, UT*

High performance ground source systems require a little tender, loving care (TLC) to properly bring them online and ensure that the system meets the design intent and owner’s needs. This process begins during the design phase and continues through construction and start-up. The design team, commissioning agent and general contractor need to be invested and engaged with the project. Attention to detail and communication between the

owner, design team, commissioning agent and contractor permits continuous improvement and prevents poor performance and an unhappy client. Properly executed, this will result in a well-tuned building system and a happy client. This seminar addresses some of the to-dos and not-to-dos during the process.

Learning Objectives:

1. Provide an overview the various key commissioning activities for a ground source HVAC system and show understanding of the importance of design and construction team communication during the various construction and commissioning phases.
2. Express a general understanding of the need for commissioning, issues that could arise, and how the commissioning process can find and help resolve issues.
3. Explain issues associated with water treatment of circulating water in a closed loop geothermal heat pump system.
4. List some of the pitfalls that must be avoided to ensure that the building owner receives a high performance ground source system.

1. Commissioning and Close-out Tips for Geothermal Heat Pump Systems: Addressing GHP Nuances to Meet the Design Intent and Owners Project Requirement
Michael Kuk, Member, CERx Solutions, Oswego, IL

2. Best Practices for a Well-Integrated Geothermal Heat Pump System
Lisa Meline, P.E., Member, Meline Engineering Corporation, Sacramento, CA

3. Did the Client Get What they Were Promised?
Kent T. Bell, P.E., Member, Harris Consulting Engineers, Las Vegas, NV