WORKSHOP SCHEDULE

DAY 1 – WEDNESDAY 2/8 – 10:20-11:50

BUILDING ENVELOPE

Dry Foundations from Design Through Construction — **EMERALD 1** — Ⓒ Ⓡ

William Rose, University of Illinois at Urbana-Champaign

Learn from an award-winning research architect and author about the physics at work below grade in order to manage water in foundations. How do you build a dry basement, or fix a wet one? Hear about ventilation and insulation approaches for basements and crawlspaces. Participants will understand the energy and moisture issues that need to be considered to keep your basement, crawlspace, or slab dry.

MECHANICAL SYSTEMS

Low-Flow, Low-Temperature, Chilled Water Systems — **EMERALD 2** — Ⓒ

Don Eppelheimer, Trane

Hear about new low-flow, low-temperature, low-energy, design strategies for chilled water systems of all sizes. By lowering chilled water temperature, substantial savings can be found using smaller pumps and fans. These systems are less expensive to install than traditional designs, and they use less energy to operate.

Combustion Testing — **DIAMOND 1** — Ⓒ Ⓡ RC

Eric Rasmussen, Bacharach, Inc.

What can combustion test instruments tell you? How do tight homes affect chimney draft, and occupant health and safety? Hear why and how you should test fossil-fueled heat and hot water equipment for combustion safety and efficiency. Mr. Rasmussen will help participants evaluate systems for combustion safety and venting per code requirements.

LIGHTING

Lighting Concepts and Terminology — **AMPHITHEATRE** — Ⓒ Ⓡ

Peter Romaniello, LC, IESNA, Conceptual Lighting, LLC

This session offers an introduction to high performance residential and light commercial lighting for architects, builders, and developers. Learn the basic terms and concepts of good lighting design and lighting technologies in order to attain well-lit, attractive, and efficient buildings.

Effective Lighting Design for Parking Areas — **DIAMOND 2** — Ⓒ CG

Jim Stockman, ASTC, MIESNA, J&M Lighting Design, Inc.

Mr. Stockman will help participants balance the requirements of local ordinances, LEED criteria, and energy efficiency to achieve effective lighting design with minimum environmental impact. Discussions will center on review of IESNA luminaire classifications for parking lighting, reading of photometric files, ASHRAE requirements and lighting control strategies.

INNOVATIONS & HIGH PERFORMANCE

Zero Energy Homes — **EMERALD 3** — Ⓡ

Marc Rosenbaum, P.E., Energysmiths

Learn about the Zero Energy Home movement, what is meant by a Zero Energy Home, and Zero Energy techniques that you can incorporate into your building projects. As fuel prices continue to rise, Zero Energy Homes can provide your customers increased home value, durability, and lifetime energy savings opportunities!

DAY 1 – WEDNESDAY 2/8 – 1:20-2:50

BUILDING ENVELOPE

Attics for Builders and Designers — **EMERALD 1** — Ⓡ Ⓒ RC

William Rose, University of Illinois at Urbana-Champaign

How do attics work? Learn what energy and moisture issues need to be considered to design and construct a quality attic. Hear whether attics should be ventilated, and how to avoid moisture problems within a cathedral assembly.

Indoor Air Quality and Health in New and Existing Homes — **DIAMOND 1** — Ⓡ RC

Kevin Doering and panel, Vermont Department of Health

Indoor air quality issues have direct impacts on the health of occupants. Learn how to avoid and alleviate problems associated with mold, radon, asbestos, vermiculite insulation, lead, and carbon monoxide. Participants will also gain an understanding of existing regulations and resources that can provide guidance for repair, abatement, and remediation.

MECHANICAL SYSTEMS

Ducts as a System — Ⓡ Ⓒ RC

Rob deKeiffer, Boulder Design Alliance

Hear about techniques used to design and install high quality residential and small commercial HVAC systems. Participants will learn about the importance of proper design, repair, and commissioning of new and existing systems for optimum performance, efficiency, and comfort.

LIGHTING

Daylighting: Unraveling Myths and Practical Solutions — **EMERALD 2** — Ⓒ

Russell Leslie, AIA, FIES, LC, Lighting Research Center

Effective use of daylight can improve our health, mood, productivity, and safety, while reducing the environmental impact of our building stock. Reaping energy-savings from daylighting is dependent upon reducing electric lighting loads. Mr. Leslie will present simple daylighting techniques and control strategies, along with pitfalls to avoid that can reduce the effectiveness and/or energy savings of daylighting use.

Fixture Selection and Evaluation — **AMPHITHEATRE** Ⓡ RC

Peter Romaniello, LC, IESNA, Conceptual Lighting, LLC

Building upon the lighting concepts and terminology workshop, this session will introduce and evaluate common residential fixture types and products from a variety of manufacturers. The information presented will provide the requisite knowledge needed for the workshop "Application — Lighting Design for High Performance Homes."

INNOVATIONS & HIGH PERFORMANCE

When Does Using a Ground Source Heat Pump Make Sense? — **EMERALD 3** — Ⓒ Ⓡ

Marc Rosenbaum, P.E., Energysmiths

You've heard the hype about ground source heat pumps, and you'd like to know when they make sense for your projects. Learn the benefits, disadvantages, and limitations of this technology. Mr. Rosenbaum will present an overview of the technology, examples of successful installations, and explode a few myths along the way.

DAY 1 – WEDNESDAY 2/8 – 3:15-4:45

Heat Loss, Heat Gain, and Equipment Sizing — **EMERALD 1** — Ⓒ Ⓡ

Rick Karg, R.J. Karg Associates

Understand the basics of heat transfer in buildings, and why it is important to assess this on every project that requires a heating system. Learn the principles, the fundamentals, and the tools required to perform accurate heat load calculations — and the consequences of ignoring this issue of heat transfer.

Advanced Diagnostic Tools and Methods — **DIAMOND 1** — Ⓒ

Buck Taylor, Roltay Energy Services

New tools and services are available that can provide a service technician with real-time feedback and diagnosis of refrigerant circuit charge, economizer operation, and other issues with package roof-top air conditioners. Hear about the field experience of contractors in CT and NY with systems such as Honeywell's HVAC Service Assistant.

Understanding and Preventing Carbon Monoxide — **DIAMOND 2** — Ⓡ Ⓒ RC

James Mullowney, Vermont Gas Systems

How great is the risk from carbon monoxide to your family or business? Learn how carbon monoxide is created and how to prevent it. Mr. Mullowney will review the details of several carbon monoxide cases in Vermont and discuss risk management strategies, code changes, and provide valuable heating system inspection tips.

Lighting Matters: Research Results and Implications for Practice — **EMERALD 2** — Ⓒ Ⓡ

Russell Leslie, AIA, FIES, LC, Lighting Research Center

New technologies such as controls and solid-state lighting are changing the way how we design lighting. Mr. Leslie will present an overview of the latest research on lighting's effect on perception, sales, health, and security and information on technology development and demonstrations.

Lighting Concepts and Terminology (repeat) — **AMPHITHEATRE** — Ⓒ Ⓡ

Peter Romaniello, LC, IESNA, Conceptual Lighting, LLC

This session offers an introduction to high performance residential and light commercial lighting for architects, builders, and developers. Learn the basic terms and concepts of good lighting design and lighting technologies in order to attain well-lit, attractive, and efficient buildings.

Should You Heat Your Commercial Building with Wood Chips? — **EMERALD 3** — Ⓒ

Tim Maker, Biomass Energy Resource Center

Have you wondered whether to use a wood chip heating system? Mr. Maker will explain the details of automated wood-chip heating systems, and the factors to consider when selecting appropriate applications. Participants will hear the lessons learned from several locally installed wood-chip systems.

Ⓡ Residential Ⓒ Commercial RC Includes Residential Code Information CG Includes Commercial Guidelines Information

DAY 2 – THURSDAY 2/9 – 9:00-10:30

Tight Building Envelopes: Sealed and Delivered — **EMERALD 3** — C R

Keith Levenson, Efficiency Vermont & Logan Brown, Efficiency Vermont

With the aid of building mock-ups, trace the pathways of air and moisture leakage into walls and attics, and (weather permitting) see the formation of ice dams and the other damaging effects of air leakage. This hands-on workshop provides live demonstrations of the latest air-sealing techniques in wood-framed buildings.

Commissioning for High Performance — **EMERALD 2** — C CG

Jennifer Chiodo, P.E., LEED AP, Cx Associates, LLC & Tom Anderson, Cx Associates, LLC

Commissioning is a rigorous quality assurance process that mitigates performance issues by stating project goals early and verifying that design, construction and operation meet those objectives. Understand the commissioning process and how the commissioning provider helps the project team achieve its goal of a fully functional, energy-efficient facility.

Heating System Choices and Installation: Maximizing Comfort and Efficiency — **EMERALD 1** — C R

Skip Hayden, Advanced Combustion Technologies

What are your heating equipment choices for both new and retrofit applications? How can you set up the system for maximum performance and occupant comfort? Learn about the latest in heating technologies, including condensing equipment, efficient furnace fan motors, and controls.

Lamp and Ballast Update — **AMPHITHEATRE** — C

Ben Koyle, Osram Sylvania, Inc.

Come see what is new in the world of lamps and ballasts. Topics of discussion will include high efficiency electronic ballasts; benefits from using programmed rapid start ballasts with controls; and updates on trends in Super T8s, T5s, T5HOs, Compact Fluorescents, ceramic metal halides, and LEDs.

ENERGY STAR® Homes 2006: Striving for High Performance — **DIAMOND 1** — R RC

Jeff Gephart, Efficiency Vermont

Participants will learn about these changes and their affect on Vermont ENERGY STAR Homes, including upgraded EPA thermal requirements, Builder Option Packages, and other changes in Efficiency Vermont incentives.

Making It Work: Managing an Integrated Design Project — **DIAMOND 2** — C R

Cathy Reynolds, Efficiency Vermont and Panel

What does it take to create a building that takes advantage of advanced envelope performance to reduce mechanical system complexity and cost, while improving occupant comfort and minimizing operating costs? Hear about a multi-phase, multi-family residential project. Learn what worked and what didn't.

DAY 2 – THURSDAY 2/9 – 11:00-12:30

Boundaries and Barriers — **EMERALD 3** — C R

John Straube, Ph.D., University of Waterloo

We have heard the terms and are still confused: pressure boundaries, thermal and air barrier alignment, vapor retarders, drainage planes. What are they? Where do we put them? What works and what doesn't? Dr. Straube will demystify the physics and clarify the jargon.

Achieving Zero-Year Paybacks with Low-Cost Facility Energy Improvements — **DIAMOND 1** — C

Paul Grover, Kilawatt Partners

Combining energy conservation with continuous facility operational improvement can dramatically improve the energy performance of buildings and increase occupant comfort and productivity. Hear about local Vermont commercial and institutional buildings that have achieved electrical and carbon dioxide savings of 10–45% with little or no capital investment.

Practicality and Heating System Choices — **EMERALD 2** — C R

Henry Gifford, Gifford Fuel Saving, Inc.

Eliminate confusion about heating system and heat distribution options. Topics will include: the real value of condensing heating plants, the impacts of improper plant and distribution sizing, and controls that work. Learn how to choose and install the best (most practical) system and controls for specific heating applications.

The True Value of Office Lighting — **DIAMOND 2** — C

Carol Jones, LC, Battelle Pacific Northwest National Laboratory

How much does lighting cost? Traditionally, we have thought of lighting costs as installation, maintenance, and energy. But what about the lighting cost for people? Ms. Jones will present the latest research on the effects of lighting quality on worker productivity, and the true value of high-quality light.

Fixture Selection and Evaluation (repeat) — **AMPHITHEATRE** — R RC

Peter Romaniello, LC, IESNA, Conceptual Lighting, LLC

Building upon the lighting concepts and terminology workshop, this session will introduce and evaluate common residential fixture types and products from a variety of manufacturers. The information presented will provide the requisite knowledge needed for the workshop Application — Lighting Design for High Performance Homes.

Selling and Marketing Home Performance Services — **EMERALD 1** — R

Mike Rogers, GreenHomes America & Richard Kornbluth, BPI, EnTherm, Inc.

Learn how successful home performance contractors help homeowners understand, embrace, and pay for comprehensive, whole-house work scopes. Mr. Rogers and Mr. Kornbluth will present business overviews and share some of the "secrets" of successful contractors.

DAY 2 – THURSDAY 2/9 – 1:45-3:15

BUILDING ENVELOPE

Making the most of NFRC Window Ratings **EMERALD 2** Ⓒ Ⓡ

Ray McGowan, National Fenestration Rating Council

Everybody wants good windows, but how do you choose the right windows for your project? Mr. McGowan will explain what National Fenestration Rating Council ratings mean and how to use them to make more comfortable, affordable, efficient buildings. Topics will include: low-e coatings, gas options, multi layer glazing, solar heat gain, and air conditioning load reduction.

Notes From the Field **EMERALD 3** Ⓒ

John Straube, Ph.D., University of Waterloo

Come see the details Dr. Straube is including in his projects and find out why. Hear about recent success stories working with insulated concrete forms (ICFs), brick veneer, glazing, and double facades in commercial and mixed-use buildings. Topics will include air barriers, thermal bridging, and a host of other building science concerns.

MECHANICAL SYSTEMS

The Value of Commissioning for One School Project **DIAMOND 1** Ⓒ

Mark Biedron, LEED AP, Sustainable Growth Technologies

Mr. Biedron is co-founder of The Willow School in NJ. He was also the general contractor on the construction project for the school's first academic building, which received LEED Gold Certification. While originally skeptical about the benefits of commissioning, Mr. Biedron's experience has made him a true believer in its value. Come and learn from his experience.

LIGHTING

Redefining the Lumen **AMPHITHEATRE** Ⓒ

Gabe Arnold, LC, Efficiency Vermont

Lumens and foot-candle measurements do not fully represent humans' ability to see, particularly in indoor environments. New research leads us to reexamine the metrics we use to measure and design with light. Mr. Arnold will present a hands-on workshop describing future changes in lighting metrics, and illustrating how to integrate them with your current work.

Application — Lighting Design for High Performance Homes Part 1 **VALCOUR** Ⓡ

Peter Romaniello, LC, IESNA, Conceptual Lighting, LLC

Participants will learn to understand plans and specify lighting to achieve high performance and aesthetic goals in a variety of residential environments. (Participants should have a strong understanding of basic lighting terminology and fixture characteristics.) This advanced session consists of two parts, for a total of 3 hours.

INNOVATIONS & HIGH PERFORMANCE

Increasing Profits with Whole-House Services **EMERALD 1** Ⓡ

Richard Kornbluth, BPI, EnTherm Inc. & Paul Zabriskie, Home Performance Partners

Hear the real-world experiences of two whole-house contractors with different approaches in the private sector. Learn how Home Performance with ENERGY STAR® has expanded business opportunities and increased profits for these contractors by providing comprehensive energy services.

Non-Energy Benefits in the Commercial & Industrial Sector: What Matters to Your Customers **DIAMOND 2** Ⓒ

Lisa Skumatz, Ph.D., Skumatz Economic Research Associates, Inc. & Jonathan Kleinman, Optimal Energy, Inc.

This workshop focuses on describing and quantifying key non-energy efficiency project benefits, many of which prove more valuable to customers than energy savings. Two Vermont buildings that used energy savings to finance non-energy improvements will be discussed.

DAY 2 – THURSDAY 2/9 – 3:30-5:00

BUILDING ENVELOPE

Use of Infrared in Building Inspections **EMERALD 1** Ⓒ Ⓡ

John Snell, Snell Infrared

Infrared scans are becoming more common for new and existing building inspections. Mr. Snell will provide some perspective on what IR can (and can't) show. What do typical envelope failures and fixes look like, thermally? Should you purchase your own equipment? Learn to think thermally about your new construction or renovation project.

MECHANICAL SYSTEMS

Panel Discussion on Mechanical Systems **EMERALD 3** Ⓒ Ⓡ

Henry Gifford, Gifford Fuel Saving, Inc., Skip Hayden, Advanced Combustion Technologies & John Madden, JR Madden Co, LTD

Bring your questions about heat, hot water, sizing, efficiency, distribution, best practices, problems, and concerns. This panel will offer its perspectives on how to achieve system reliability, performance, and efficiency.

LIGHTING

Application — Lighting Design for High Performance Homes Part 2 **VALCOUR** Ⓡ

Peter Romaniello, LC, IESNA, Conceptual Lighting, LLC

This is the second part of the workshop initiated in the prior time period.

INNOVATIONS & HIGH PERFORMANCE

Vermont Examples of High Performance Ⓒ CG

Alison Hollingsworth, Efficiency Vermont and Panel

Come hear about Enosburg Falls Middle and High School and Vermont Mutual Insurance high performance building projects. Design teams will discuss challenges of renovating existing structures to integrate cutting edge technologies including radiant cooling panels and daylight dimming. An update of Vermont's New Commercial Energy Guidelines will also be presented.

Using Financing and Tax Credits to Help Sell the Job **DIAMOND 1** Ⓒ Ⓡ

Richard Faesy, Vermont Energy Investment Corporation, Jan Harris, Vermont Energy Investment Corporation & Eric Belliveau, Optimal Energy, Inc.

This workshop will explore the opportunities available through the Federal Energy Policy Act of 2005, the State of Vermont, and Efficiency Vermont for tax credits, incentives, and grants for energy efficiency and renewable energy systems. Learn how to access these opportunities, so you can use them in your next project.

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