

Rocky Mountain
ASHRAE
Chapter

PRESENTS:

"ASHRAE Leading the Way"

Featuring ASHRAE Standard 90.1 Workshop

Friday, May 21, 2004

AT THE

Sheraton Denver West Hotel
360 Union Boulevard
Lakewood, CO 80228

Thank-you:

Welcome to the Rocky Mountain Chapter of ASHRAE, 12th Annual Technical Conference. Putting together an event of this kind is no small task. It takes a great deal of hard work and commitment through the efforts of a great many people... unpaid people! The net proceeds of this event are donated to the ASHRAE Research and Scholarship funds, but the ultimate beneficiary of this effort is the Rocky Mountain community through increased involvement, technology transfer, and ASHRAE research dollars returned to the community in the form of research grants and scholarships offered to local students.

This event has been ongoing for a great number of years thanks to the efforts of many dedicated individuals and companies that contribute time and money to this project. The Rocky Mountain Chapter Technical Energy and Government Affairs Committee, would therefore like to express it's gratitude to these individuals and companies and to gratefully acknowledge their support.

Technical Conference Committee:

Mike Fulton – York International
David Rodenberg- Long & Associates
Cay Strother – Denver Water
Peter D'Antonio – PCD Engineering Services
Larry Hodgins- Empire Gas & Electric
John Stumpf – Burch Associates
Ira Goldschmidt – Goldschmidt Eng. Solutions

Trevor Bromberg – McGrath Inc.
Kevin Ainsworth – McGrath Inc.
Scott Martin – RMH Group
Jake Mortensen – MKK Consulting Engrs.
Ginger Schulz – Murphy Company
Jim Bradburn – M-E Engineers
Bill Mele – Indoor Environmental Solutions
James Damsgard – JAD Consulting

Technical Conference Seminar Track Sponsors:

CFM Company
Empire Gas & Electric Equipment Company
Long Building Technologies
McNevin Company
York International

A special thanks goes out to all of our speakers also. You may find their names in the pages of this conference abstract.

Brian Lynch – York International
Technical Conference Committee Chair

For Whom:

Presentations for entry level and senior level engineers, students, salespersons, manufacturers, contractors, building officials, building owners, and building managers and operators.

When:

Friday, May 21, 2004

Your Cost:

(Early registration before April 18)

½ day: \$ 60 (no lunch included)

Full day: \$ 110 (lunch included)

Cost for late registration after April 18

½ day: \$ 65 (no lunch included)

Full day: \$ 125 (lunch included)

(10% discount to companies sending 5 or more)

Professional Development Hours (PDH):

A form will be available at the registration desk to document your participation in the Technical Conference, which assigns the appropriate PDHs to each session.

7:30 - 8:00: Registration and Continental Breakfast

Luncheon Keynote Address

11:35 – 1:05: Integrated Design & Business Challenges for the 22nd Century

We are pleased to welcome Michael Haughey P.E. owner of Silvertip Integrated Engineering Consultants. Mr. Haughey has 29 years of experience in HVAC consulting, facilities engineering, energy analysis, and systems commissioning. He will be discussing the rising expectations of buildings and the accompanying decrease in fees. He will look into the future of Colorado construction and discuss our opportunities and responsibilities to create buildings that perform as mechanical systems, rather than buildings with mechanical systems.

Track 1 – HVAC Basics

Sponsored by: CFM Company

8:00 – 8:55: Basic Fan Selection

A basic review of the fundamentals of fan selection including fan types, fan sizing, altitude deration/adjustment, fan curves, fan motors, explosion-proof fans, noise and vibration production by fans, fan testing and balancing, fan troubleshooting, and fan system effect.

Speaker: Jerry Kiel, PE - CFM Company. Jerry is the director of engineering at CFM, with twenty years of engineering experience, a BSME from the University of Missouri at Rolla, and an MSME from CSU. He is an active Rocky Mountain ASHRAE member and a past president.

9:00 – 9:55: Design of Underfloor Air Systems

Come learn about the design of under floor air systems. Explore issues such as load calculations, design temperatures, stratification, and how they differ from overhead systems.

Speaker: Michael Fulton – Denver Sales Manager York International has 15 years of experience in the HVAC industry and is an ASHRAE past President.

10:10–10:15: Piping and Hydronic Design

This presentation will discuss basic pipe sizing, expansion tanks, pumps, and other equipment. Hydronic/pumping design options such as constant flow, ride the curve, primary secondary, variable primary, etc... will also be discussed

Speaker: Mark Jelinske, PE – Cator-Ruma & Associates. Mark is a Senior Associate with 19 years of experience. He holds a BSME from University of Missouri-Rolla. He is also a past president of ASHRAE and member of ICBO and NFPA.

1:35 – 2:30: Evaporative Cooling

This presentation will cover the basics of the proper application of evaporative cooling in commercial projects. Myths and misconceptions will also be discussed. The use of direct evaporative cooling with chilled water-cooling to provide significant energy savings over conventional chilled water systems.

Speaker: Rick Philips, P.E. – RMH Group. Rick has 19 years experience in the HVAC industry including 11 years as a facilities engineer for the University of Colorado and eight years as a consultant.

2:35 – 3:30: Building Automation and HVAC Control Basics

This presentation is an introduction to modern Building Automation Systems (BAS) technology and it's use in providing good HVAC control. It will cover the fundamentals of BAS architecture, DDC controller types and capabilities, operator interface, communications issues, developing sequences of operation and point lists, and specifications.

Speaker: William Gibbs, P.E. of Swanson Rink has 9 years of power plant design and construction experience, and 15 years of HVAC system design and construction experience including power plants, industrial, and commercial control systems.

Ira Goldschmidt, P.E. of Goldschmidt Engineering Solutions has over 25 years experience in mechanical design, controls and energy management, and developed some of the earliest DDC installations for HVAC control. He is co-author of the ASHRAE Guideline "Specifying Direct Digital Control" and the BACnet standard.

3:30 – 4:30: HVAC Load Estimating

The presentation will review the current load estimating methods and how the industry got there. We will break down a HVAC load estimate in order to understand what the most important items are and then analyze some past mistakes and horror stories so that you will know how to avoid them in the future.

Speaker: Skip Willenbrock, PE – Jacobs Engineering. Skip has 22 years of experience in the HVAC industry, a BSME from CU Boulder, and has taught engineering courses at Metro State College and CU Denver, He is an active Rocky Mountain ASHRAE member.

Track 2 – HVAC Advanced

Sponsored by: Long Building Technologies

8:00 – 8:55: Ventilation and Acceptable Indoor Air Quality

How much indoor air is required for your project? How do you design a system to insure that you get the proper amount of ventilation? One of our industries most discussed pieces of literature is ASHRAE Standard 62-2001 that specifies minimum ventilation rates. This talk will discuss acceptable air quality for human occupants and how to minimize the potential for adverse health effects.

Speakers: Eli Howard is SMACNA's Group Director of Technical Resources. He has the overall responsibilities of the more than 30 SMACNA Technical and ANSI Standards related to the HVAC and Sheet Metal industry. He is a member of various ASHRAE technical committees and holds a degree in Mechanical Engineering from Allegheny College

9:00 – 9:55: UV Filtration Technology and Applications

Ultraviolet lighting has a long history of use for killing microbes (bacteria, viruses, and spores) in ventilation systems. In the recent efforts to counter bioterrorism the use of UV technology has been increasing. This talk will discuss this technology how it is applied and what equipment is required.

Speaker: Forrest B. Fencil was Director and Executive Committee member of Farr Company when he left to pioneer the modern application of UVC in HVAC&R equipment as president of Steril-Aire. Forrest has more than 35 years experience in the HVAC industry with the majority in air cleaning and treatment technology. He is a member of ASHRAE and IES, has conducted research (R&D) and has been a spokesperson on UVC and Indoor Air Quality for over sixteen years. He is also an ASHRAE Distinguished lecturer.

10:10 – 11:05: Integrated Systems Design

Energy efficiency, indoor environmental quality, and LEED are in high demand these days. But how can mechanical engineers and owners achieve their common goals and build better buildings? This presentation will focus on the how's and why's of integrated design, and its relation to green building design and sustainable design. It will explore how integrated design is fundamentally different than the conventional way we design and build today and provide real-world examples for success.

Speaker: Peter D'Antonio, P.E. is the founding president of PCD Engineering Services, Inc., which is a leading provider of sustainable mechanical and electrical design, energy management and integrated building system solutions. Peter has a B.S. in civil engineering from the University of Maryland and a M.S. in civil engineering from the University of Colorado. He is LEED accredited and a Certified Energy Manager.

1:35 – 2:30: Acoustics and Proper HVAC System Design

One of the most common complaints in HVAC systems is an unacceptable noise level in the building. This can come from many sources and each one requires a unique solution. This presentation gives a brief introduction to acoustics and noise control with an emphasis on how proper system design can reduce noise levels.

Speaker: Bob Gault is vice president of sales for Vibro-Acoustics a leading manufacturer of sound attenuators.

2:35 – 3:30: Dedicated Heat Recovery

As energy costs become higher and more critical, creative methods of energy recovery will become more important. Heat generated by chillers can be recovered and used for heating air or water systems. This system is an efficient answer for times of simultaneous heating and cooling in a building. This talk will discuss design and application features of dedicated heat recovery systems.

Speaker: Dave Willets is a sales engineer for J.L. Hermon & Associates, Inc. He has a B.S. in mechanical engineering from Michigan State and an M.S. in mechanical engineering from Purdue. He has been in the HVAC industry for 44 years and an ASHRAE member since 1966.

3:35 – 4:30: Who's Hot and Who's Not – Designing for Thermal Comfort

The entire basis for our industry is to keep human occupants comfortable in their working and living environments. ASHRAE Standard 55 addresses such fundamental design issues as: What is the legal and practical definition of thermal comfort? What are the design guidelines to use for creating and measuring thermal comfort? How can thermal comfort be improved? This presentation will discuss these issues and how they relate to ASHRAE Standard 55.

Speaker: Chuck Felland is a product manager with TSI – a leading manufacturer of instruments for air quality assessment. He has over twenty years of experience in industrial marketing and product management, primarily in the HVAC industry. He is an active member of AIHA, IAQA and ASHRAE.

Track 3 – Standard 90.1 Energy Efficient Design of New Buildings

Sponsored by: York International

8:00 – 8:55: ASHRAE Standard 90.1 Building Envelope

This presentation will discuss the requirements of the 97 UBC through the 2003 International Energy Codes that reference ASHRAE Standard 90.1. Emphasis will be on understanding the code requirements, the 90.1 path to compliance, methods of showing compliance, and the underlying assumptions of 90.1

Speaker: Dave Kahn is a project manager with The RMH Group, Inc., with over 20 years experience designing HVAC and control systems for a wide variety of facilities. He also has 10 years working for a controls contractor. Dave has served as chair of ASHRAE Technical Committee 1.4, Control Theory and Application, and is a member of SGPC 13 “Specifying Direct Digital Control Systems”, and is an ICC plans examiner for both the Uniform and International Building Codes

9:00 – 9:55: ASHRAE Standard 90.1 Computer Simulation

This presentation includes a demonstration of E-quest a computer simulation program that uses the DOE-2.2 engine and can be used to demonstrate compliance with ASHRAE 90.1. An overview of the software will be presented, along with a discussion of recent improvements, such as energy recovery ventilation, variable speed chillers, and waterside economizers.

Speaker: Sue Reilly is a Senior Engineer with Enermodal Engineering, Inc. and has a B.S. and an M.S. in Mechanical Engineering. Sue has 18 years of experience performing building energy simulations using DOE-2 and other tools.

10:10 – 11:05: ASHRAE Standard 90.1 Lighting

This presentation will discuss compliance with the lighting and lighting control requirements of ASHRAE Standard 90.1. Both the prescriptive and building trade-off methods will be explained and the mandatory provisions will be discussed.

Speaker: Mark Rudiger is a Lighting Designer for The RMH Group, Inc. Mark has 14 years of design experience in lighting, lighting control, and daylighting systems. His designs have been recognized with three separate Illuminating Engineering Society awards. Mark is also a LEED Accredited Professional and is Lighting Certified by the National Council on Qualifications for the Lighting Professions.

1:35–2:30: ASHRAE Standard 90.1 Mechanical

This presentation will discuss the HVAC and service water heating requirements of ASHRAE Standard 90.1. The two compliance options, the simplified approach and the prescriptive path will be discussed, as will the limitations of each method and the mandatory requirements. Tools for demonstrating compliance will also be covered.

Speaker: Dave Kahn is a project manager with The RMH Group, Inc., with over 20 years experience designing HVAC and control systems for a wide variety of facilities. He also has 10 years working for a controls contractor. Dave has served as chair of ASHRAE Technical Committee 1.4, Control Theory and Application, and is a member of SGPC 13 “Specifying

Direct Digital Control Systems”, and is an ICC plans examiner for both the Uniform and International Building Codes

2:35 - 3:30: LEED – Optimizing Energy Performance Credit

This presentation will show the process for satisfying the “Optimized Energy Performance” credit of the LEED green building rating system.

Speaker: Renee Azerbegi is a Mechanical Engineer and Sustainable Design Specialist with The RMH Group, Inc. Renee has 5 years of experience in sustainable design consulting, systems design, energy modeling, and LEED certification. She is also LEED accredited and a Certified Energy Manager as well as Vice President and conference chair for the Colorado Renewable Energy Society.

3:35 – 4:30: ASHRAE Green Guide

The ASHRAE Green Guide provides a reference and a guide to designers of HVAC systems. The book covers green design techniques to applicable related disciplines, such as plumbing and lighting and also addresses how mechanical and electrical systems may interact with and be influenced by architectural design. The guide starts with the earliest design stages of a building and carries through to the eventual demolition.

Speaker: Paul Torcellini PhD P.E., works for the National Renewable Energy Laboratory and a contributor to the ASHRAE Green Guide and Research sub-committee chairman of ASHRAE “Building Environmental Impacts and Sustainability”, TC -2.8

Track 4 – Building Automation

**Sponsored by: Empire Gas & Electric
Equipment Company**

8:00 – 8:55: BAS Architecture

This presentation will be an overview of typical BAS capabilities and limitations and issues facing the design engineer. Topics discussed will include the types of controllers, how those controllers can be networked together, as well as various methods available to document the system.

Speaker: Bill Gibbs, PE – Swanson Rink, Senior Mechanical Engineer. Bill has 9 years of power plant design and construction experience and 16 years HVAC system design and construction experience, including design of power plant, industrial and commercial control systems. He holds a BSME from the University of Kansas and is a current ASHRAE member.

9:00 – 9:55: HVAC Control Design

With so much HVAC control attention directed at building automation system features, use of the internet, open protocols, etc., this seminar will focus on a critical step in HVAC design process: good temperature control design practices. This is an introduction to the process and the basic sequences involved in HVAC control system design. The emphasis will be on the HVAC design practices needed to assure good control, writing sequences of operation, developing DDC point lists, and the most common control sequences used for HVAC systems.

Speaker: Ira Goldschmidt, P.E. of Goldschmidt Engineering Solutions has over 25 years experience in mechanical design, controls and energy management, and developed some of the earliest DDC installations for HVAC control. He is co-author of the ASHRAE Guideline “Specifying Direct Digital Control” and the BACnet standard

10:10 – 11:05: Energy Efficiency Control Strategies

This seminar will cover about 25 control strategies that could help any facility save energy, improve comfort and take care of HVAC equipment better. This seminar will explain the reasons behind the strategies and how to really make them work. With the dramatic increase in energy costs recently and emphasis on reducing operating costs, this subject matter is timely.

Speaker: Greg Bradshaw has 40 years of experience in the construction industry, and the last 28 focusing on energy management, energy retrofits, automation systems, and smoke control systems. Greg has worked with a mechanical design/build firm, control/integration companies and a BAS manufacturer.

1:35 – 2:30: Commissioning of BAS

An essential first step to whole building commissioning is the commissioning of the building automation system. This presentation will be tailored to the owner/operator of the building to educate them on the issues involved and to explain the process.

Speaker: Pete Sabeff, PE – Engineering Economics, Inc., President. Pete holds a BSME and has 31 years experience in the industry. He has presented at other ASHRAE Technical Seminars, and the National Conference on Building Commissioning. Pete is a member of BOMA, the Association of Physical Plant Administrators, IFMA, and ASHRAE.

2:35-3:30: Using BAS in the Commissioning Process

Now that you've commissioned your BAS and it's working as designed, what's next? It is time to use the commissioning capabilities of a BAS to perform functional performance verification on the remaining HVAC (and possibly other) systems. Not only can you use a BAS to put your systems through their paces, you can document the results as part of this process. Also, should the need arise, you can help the designers and contractors obtain needed information to resolve performance issues.

Speaker: Jack Wolpert Ph.D., C.E.M. and president of E-Cube has been involved in building systems design, installation, and operations since 1975. He has been an ASHRAE member since 1985 and a contributor to Commissioning Guideline 1-1996 and a voting member of Energy & Demand Saving Guidelines-14P

3:35 – 4:30: Round Table Discussion

The general topic of this panel discussion will cover present and future trends in building automation. Panel participants include engineers, manufacturers and building owners/operators. Elements of the discussion may center around protocols, integration, commissioning, web applications, and adaptive/intelligent control sequences. The panel is open to audience suggestions, so bring your input. This is sure to be a dynamic session that is not to be missed.

Speakers: Ira Goldschmidt, P.E. of Goldschmidt Engineering Solutions has over 25 years experience in mechanical design, controls and energy management, and developed some of the earliest DDC installations for HVAC control. He is co-author of the ASHRAE Guideline “Specifying Direct Digital Control” and the BACnet standard.

Dave McLandsborough of Siemens has 26 years of experience in the HVAC industry. Dave has been a small business owner and ran maintenance and construction for a mechanical service company. With Siemens Dave has worked as a design engineer and programmer applying solutions to BAS and Smoke Control System and as an Operations Manager overseeing Temperature Control construction projects.

Pieter van der Mersch has a P.E. license in Colorado as well as Mexico and over 30 years of experience in the HVAC industry. He has been Facilities Mechanical Engineer of the University of Colorado at Boulder since 1984 and worked as a consulting engineer prior to that. At UC-Boulder Pieter has utilized energy-efficient architecture and mechanical systems using a broad range of strategies.

Greg Bradshaw is a Senior Account Manager with Integrated Control Systems has 40 years of experience in the construction industry, and the last 28 focusing on energy management, energy retrofits, automation systems, and smoke control systems. Greg has worked with a mechanical design/build firm, control/integration companies and a BAS manufacturer.

More speakers to be added.

Track 5 –Case Studies

Sponsored by: McNevin Company

8:00 – 8:55: Low Exhaust, Energy-Saving Options in Chemical Fume Hoods

This presentation will discuss how newer fume hoods can do the same job as older fume hoods using a fraction of the air volume.

Speaker: Robert Haugen Ph.D. is the Technological Director of Fume Hood Systems at Kewaunee Scientific Corp. He has published several articles and holds two patents in the exhaust hood and containment device fields.

9:00 – 9:55: ASHRAE 62-2001 Demand Controlled Ventilation System Design Considerations

This presentation will discuss ASHRAE Standard 62–2001 and providing the correct amount of ventilation air in the right space at the right time while saving energy cost and optimizing the indoor air quality.

Speaker: Rudy Romijn is the Regional Manager of Commercial Systems Marketing for Carrier Corp. He has over 30 years experience in HVAC Design. He has presented on various topics affecting the HVAC Industry throughout the U.S. and in Asia. He is also a past Programs Chairman

10:10 – 11:05: Denver Water’s Cooling Tower Audit Program

Denver Water has initiated a cooling tower audit program to identify if and to what extent water conservation is possible through optimizing cooling tower system operation. The results of the program to date will be discussed identifying the water savings possibilities.

Speaker: Ken Lykens B.S. Chemical Engineering has 3 years consulting experience, 9 years as an environmental compliance officer, and 1 year as a Denver Water Industrial Water Conservation Engineer.

Jim Reed B.S. Business Administration has 30 years plus experience with Water Utilities and is currently a Conservation Specialist with Denver Water

1:35–2:30: Energy Retrofits for Facilities

This presentation will cover mechanical and lighting retrofits, facility envelope issues, including heating, cooling, VFD's, and controls. Financing and estimated savings will also be discussed.

Speaker: Greg Bradshaw has 40 years of experience in the construction industry, and the last 28 focusing on energy management, energy retrofits, automation systems, and smoke control systems. Greg has worked with a mechanical design/build firm, control/integration companies and a BAS manufacturer.

2:35 - 3:30: Integrated Design for Successful Sustainable GSHP Project

An integrated design process enabled the building envelope loads to be minimized and assurance that the mechanical system could be right-sized for the actual load. The selected mechanical system design is a ground-coupled (ground-source) heat pump (GSHP) system with 300 ft. deep “wells” for heat exchange with the earth. The project was designed with the directive from the Owner to “display” the building systems in a manner that would be educational to visiting students and the public.

Speaker: Michael Haughey, PE – Silvertip Integrated Engineering Consultants. Michael has twenty-five years of experience as a consulting engineer and three years as a facility engineer. Has taught numerous senior level HVAC courses at CU Denver. He is an active Rocky Mountain ASHRAE member and past president.

3:35–4:30: Gas v. Electric Heat Conversion Projects

Comparing gas v. electric heat requires an understanding of a number of factors including type of facility and system, utility rate structures, and operation of the facility. This seminar will present information on determining if and when these issues are of importance and how to calculate their impacts. A number of Denver-Area projects will be described along with operating cost data.

Speaker: Jack Wolpert Ph.D., C.E.M. and current president of E-Cube has been involved in building systems design, installation, and operations since 1975. He has been an ASHRAE member since 1985 and a contributor to Commissioning Guideline 1-1996 and a voting member of Energy & Demand Saving Guidelines-14P

“ASHRAE Leading the Way ”

Rocky Mountain Chapter ASHRAE Technical Conference May 21, 2004

7:30 to 8:00	Registration and Continental Breakfast				
	HVAC&R Basics	HVAC&R Advanced	ASHRAE Standard 90.1	Building Automation	Case Studies
	<i>Sponsored by:</i>	<i>Sponsored by:</i>	<i>Sponsored by</i>	<i>Sponsored by:</i>	<i>Sponsored by:</i>
	CFM Company	Long Building Technologies	Empire Gas & Electric Equipment Co	YORK International	McNevin Company
8:00 to 8:55	<i>Fan Selection</i> Jerry Kiel, PE CFM Company	<i>Ventilation and Acceptable Indoor Air Quality</i> Eli Howard SMACNA	<i>ASHRAE Standard 90.1 Building Envelope</i> Dave Kahn The RMH Group	<i>BAS Architecture</i> William Gibbs, P.E. Swanson Rink	<i>Low Exhaust, Energy Saving Options in Chemical Fume Hoods</i> Robert Haugen PhD Kewaunee Scientific
9:00 to 9:55	<i>Design of Underfloor Air Systems</i> Michael Fulton York International	<i>UV Filtration Technology and Applications</i> Dean Saputa UVDI	<i>ASHRAE Standard 90.1 Computer Energy Modeling</i> Sue Reilly Enermodal	<i>HVAC Control Design</i> Ira Goldschmidt P.E. Goldschmidt Engineering Solutions	<i>Demand Controlled Ventilation System Design Considerations</i> Robert Romijn Carrier Corp.
9:55 to 10:10	Morning Break				
10:10 to 11:05	<i>Piping and Hydronic Design</i> Mark Jelinske, P.E. Cator Ruma & Associates	<i>Integrated Systems Design</i> Peter D'Antonio PCD Engineering Services	<i>ASHRAE Standard 90.1 Lighting</i> Mark Rudiger The RMH Group	<i>Energy Efficiency Control Strategies</i> Greg Bradshaw	<i>Denver Water's Cooling Tower Audit Program</i> Ken Lykens & Jim Reed Denver Water
11:05 to 11:35	Vendor Exhibits				
11:35 to 1:05	Lunch Break & Keynote Address <i>Michael D. Haughey P.E.</i> <i>“Integrated Design & Business Challenges for the 22nd Century”</i>				
1:05 to 1:35	Vendor Exhibits				
1:35 to 2:30	<i>Evaporative Cooling</i> Rick Phillips, P.E. RMH Group	<i>Acoustics and Proper HVAC System Design</i> Bob Gault Vibro-Acoustics	<i>ASHRAE Standard 90.1 Mechanical</i> David Kahn The RMH Group	<i>Commissioning of BAS</i> Pete Sabeff P.E. Engineering Economics	<i>Energy Retrofits for Facilities</i> Greg Bradshaw
2:35 to 3:30	<i>Building Automation and HVAC Control Basics</i> William Gibbs, P.E. Swanson Rink Ira Goldschmidt, P.E. Goldschmidt Engineering Solutions	<i>Dedicated Heat Recovery</i> Dave Willets J.L. Hermon & Associates	<i>LEED – Optimizing Energy Performance Credit</i> Renee Azerbegi The RMH Group	<i>Using BAS in the Commissioning Process</i> Jack Wolpert E-Cube, Inc.	<i>Integrated Design for Successful Sustainable GSHP Project</i> Michael D. Haughey P.E. Silvertip Engineering
3:35 to 4:30	<i>HVAC Load Estimating</i> Skip Willenbrock, P.E. Jacobs Engineering	<i>Who's Hot and Who's Not – Designing for Thermal Comfort</i> Chuck Felland TSI	<i>ASHRAE Green Guide</i> Paul Torcellini PhD P.E. National Renewable Energy Laboratory	<i>Round Table Discussion: Present and Future Trends in Building Automation</i>	<i>Gas v. Electric Heat Conversion Projects</i> Jack Wolpert E-Cube, Inc.
4:30 to 5:00	Conference Conclusion-Cash Bar- Vendors				

Some Speakers and Presentations may be subject to change

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REGISTRATION FORM

12th Annual Technical Conference
Friday, May 2, 2004
Sheraton Hotel Denver West – 360 Union Boulevard, Lakewood CO 80228

“ASHRAE Leading the Way”

Presented by:

The ASHRAE Rocky Mountain Chapter

Register by May 14, 2004 to ensure space availability.

Checks received after May 14th (or walk-ins the day of the seminar) will be accommodated pending space availability.

Please photocopy this form for additional attendees and for your records.

Individual Registration:

Your Name _____ Title _____

Company _____

Mailing Address _____

Phone _____ Fax _____

Company Registration:

Company _____

Mailing Address _____

Phone _____ Fax _____

Seminar Preference: (This is for space allocation only. You may attend any seminar during the conference.)

Check Your First and Second Preference

HVACR Fundamentals, Basics

HVACR Fundamentals, Advanced Topics

ASHRAE Standard 90.1

Building Automation

Innovative Design Case Studies

Please register me for... Please register my company for... _____ passes.

Check Your Preference

Full day @ \$110.00, (Lunch included), (Total Number) _____

1/2 day at \$60.00, (Lunch is not included), (Total Number) _____

Morning Session

Afternoon Session

Late Registration, received after After May 14, 2004, will be:

\$125.00, (includes lunch), \$65.00 1/2 day, (no lunch)

10% Discount for 5 or more Company Passes

Enclosed please find a check for: \$ _____ Mastercard/Visa total: \$ _____

Please Make Checks payable to Rocky Mountain Chapter ASHRAE

MC# _____ Cardholder Name _____ Exp Date: _____

VISA# _____ Cardholder Name _____ Exp Date: _____

Please mail check and registration form to:

James Damsgard

PO Box 738

Littleton, CO

Phone: 303-475-5544

e-mail: j.damsdgar@att.net

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For questions please call: Brian Lynch, York International, (720) 889-1500 ext 110

ASHRAE Standard 90.1 Publication Special Offers

In conjunction with Standard 90.1 workshop offered at this year's conference, The Rocky Mountain Chapter is able to offer Standard 90.1 publications at a reduced price to those attending the Track seminars.

ASHRAE 90.1 Standard Normal Price _____	\$88.00
Special offer _____	\$44.00
ASHRAE 90.1 Users Manual Normal Price _____	\$74.00
Special offer _____	\$38.00
Both Publications _____	\$82.00

Please include the correct amount with your registration fee and indicate below which publications you would like.

Standard 90.1 Quantity _____
Users Manual Quantity _____

Total amount to be added to Registration _____

Your Name _____

Company _____

***To have requested publications available
for use at the conference, your Request for
Publications must be received with your
RSVP by May 12, 2004***

Vendor Exhibit Booth Registration Form

Rocky Mountain Chapter ASHRAE
12th Annual Technical Conference & Expo

Friday, May 21, 2004
Sheraton Denver West Hotel (360 Union Blvd. in Lakewood)

We are asking for you and your company's support again this year with the Rocky Mountain Chapter ASHRAE's 12th Annual Technical Conference. This year's conference will focus on ASHRAE Standards in the HVAC&R industry. Seminars will be presented on HVAC&R Fundamentals, Advanced HVAC&R Topics, Building Automation, LEED Prerequisites, ASHRAE 90.1, ASHRAE Standards and Case Studies.

Once again we will feature a scaled down product exposition with table top exhibit space provided for vendors at this year's conference. You can help support ASHRAE Research and promote your company's product line(s) by displaying a tabletop exhibit or booth. Six foot long table tops or space for a booth will be offered on a first come first serve basis at a cost of \$350.00. One lunch is included with the cost of your registration for the table tops/booths and additional lunches are available for \$25.00 each.

In addition, we will be requesting sponsors for our morning and afternoon refreshments with sponsors names listed on poster boards in the break area. Break sponsorships will cost \$100.00, or you may get both a tabletop and break sponsorship for \$425.00. Don't miss out on this opportunity to promote your company's products and services and support ASHRAE Research at the same time. Please fill out this sponsorship submission form and return it as soon as possible to:

Kevin Ainsworth
McGrath Inc.
Kainsworth@mcgrath-inc.com
Telephone: (303) 969-0220
Fax: (303) 985-5565
5353 W. Dartmouth Avenue, Suite 506
Denver, CO 80227

Company Name			
Address			
Phone:			
Fax:			
Sponsorship (circle one)	6' L Table Top / Booth	Break Sponsor	Both
	\$350.00	\$100.00	\$425.00
Total including sponsorship and _____ additional lunches @ \$25.00 each	Total \$ _____ .00		

Please enclose your check made payable to ASHRAE with your form and thank you for your support.

Rocky Mountain Chapter

ASHRAE

“ASHRAE Leading the Way”
Friday, May 21, 2004

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