

SOL AIR

Newsletter of the Southern California Chapter: American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.
March 2000 website: www.ashrae-socal.org Vol. 45, No. 7

MARCH MEETING INFO

March 7, 2000 Energy Night

Les Freres TAIX
1911 Sunset Blvd., Los Angeles, California

- 5:30 Tech Forum
Cooling Tower Fundamentals
Speaker: Mr. Jerry Conklin
- 6:05 Social Hour (Fun Time!)
- 6:45 Dinner
\$23 with reservation
\$25 without reservation
\$10 student member
- 7:45 Main Program
Energy Efficiency Update
Speaker: Panel Discussion
(SCE and The Gas Co.)
- 9:00 Meeting Ends

Please specify beef or fish when making reservations. For reservations, please fax to Jennifer Farr, Fax (310) 671-1467 by Monday, March 6, 2000.

MARCH MAIN MEETING

Energy Efficiency Update
by: **David Kuo**

The March Main Program will be an exciting panel discussion on the status of energy efficiency programs in California. We are pleased to have two highly-qualified presenters speak at our meeting: Greg Berlin from Southern California Edison and Frank A. Spasaro from Southern California Gas.

The speakers will provide us with an insight of the developments unraveling at the California Public Utilities Com-

mission (CPUC) and the California Board for Energy Efficiency (CBEE). They will share with us the currently available energy efficiency programs and discuss the practical and political aspects of these programs.

Greg Berlin is the manager of regulatory reporting and planning in the Energy Efficiency Division at Southern California Edison's Customer Service Business Unit. Over the last 29 years, Greg has held various positions at SCE in the regulatory, customer service and energy efficiency areas. He has a Bachelor of Arts and a Master of Arts degree in economics from California State University at Los Angeles.

Frank A. Spasaro is the manager of special projects for the Customer Services and Marketing division of Southern California Gas Company. He is currently responsible for managing the transition of SoCalGas' demand side management (DSM) programs under various restructuring initiatives in California. He has worked in many commercial and industrial marketing and sales groups since joining Southern California Gas Company in 1983. He has also worked in the environmental engineering department, helping establish an environmental auditing program for the company. He has been responsible for leading the development of many marketing programs to promote energy efficiency. He has testified in various regulatory proceedings, covering such issues as RD&D, DSM programs, and new gas rates. Frank has a Bachelor of Science degree in Civil Engineering from University of Southern California.

Please join us in March and find out how you can benefit from energy efficiency programs. Alex Llamas will be chairing the panel discussion following the presentation from each speaker. Don't miss this great opportunity to hear the issues directly from the source.

The presentation discusses specific strategies necessary to achieve the effects discussed above.

MARCH TECHNICAL FORUM

Cooling Tower Fundamentals
by: **Ralph Panting**

Come to the Technical Forum to learn about the do's and don't's of cooling tower design. Presented by Jerry Conklin, he brings with him many years of experience.



Will's Testament

by: Will Clark

As our year wraps up, it's time for new leadership to step up and operate the chapter in the coming year. In February, the Nominating Committee has gotten together to develop lists of potential candidates for the various positions of the chapter. The Nominating Committees recommendations will be announced at the March meeting and nominations will be accepted from the floor to be placed on the ballot. If you are interested in becoming a more active player in ASHRAE, please contact Sudhir Agrawal of the L.A. City Metro Transit Authority at (213) 922-7233.

It's a great opportunity to network, learn the industry's latest trends, and give something back to our industry.

FEBRUARY MAIN RECAP

Microbiological Contamination of Mechanical Systems by: Simon Turner

Since the beginning of the 1980's, and arguably earlier, the term "Sick Building Syndrome" was coined to describe a series of sometimes-mysterious ailments claimed by occupants of certain buildings. Let's begin by recognizing that the very term "Sick Building Syndrome" is somewhat of a misnomer in that it implies a defined set of problems with a specific set of symptoms. In our experience, building design, operation and maintenance problems run in a continuum from major life-threatening malfunctions to trivial or non-existent issues. Even minor problems, sometimes perceived as very serious, cause stress to building occupants unless there is a timely, competent response by building managers. If however the causative agent is biological matter growing in some component of the building mechanical system how is a building manager expected to diagnose this? The manager of the Bellevue-Stratford Hotel in Philadelphia surely asked himself this question after the world's first catastrophic outbreak of Legionnaires disease struck his property in late July of 1976, eventually claiming the lives of 34 guests and sickening a further 221.

Relatively little is known about the part played by microbes in causing ailments associated with buildings, but there are some things we can do to discourage their presence

in building HVAC systems. We must begin by knowing the basic forms these organisms take.

Viruses

Viruses are the smallest organisms of concern, however because they are incapable of producing their own enzymes for nutrition/reproduction they are generally only considered to survive within living cells. For this reason there is little opportunity for air conditioning systems to play a large role in their proliferation. That said, infectious droplet transmission in poorly ventilated spaces might be a common way for viruses to spread, especially when protected inside other particles or cells long enough to survive in the circulating air.

Bacteria

Bacteria are too small to be seen with the naked eye, however when cultured artificially they readily form colonies of millions of single cells that are easily visible. A general way to define organisms as bacterial is the lack of a membrane separating the nuclear material from the rest of the cell components. Most common bacteria found within building HVAC systems are relatively harmless and are equally likely to be found all over your desk – they frequently include members of the genera *Bacillus* and *Micrococcus* as well as diptheroid bacillus. Some potentially harmful bacterial organisms include *Pseudomonas sp.*, *Flavobacterium*, *Staphylococcus Pyrogenes* and of course *Legionella pneumophila*, of which more than 13 serotypes have now been identified. This includes the organism that causes Pontiac Fever, after an early definitive outbreak occurred in Pontiac, Michigan in 1969. The *Legionella* bacteria favors stagnant water in the temperature range of 70 to 115°F and is sometimes found in cooling towers, rarely used showerheads and drinking water stations. Older "tepid" water supply systems are also common breeding grounds for this organism. Sound hygienic water maintenance practices and use of appropriate biocidal treatments especially in cooling towers has proven to be an effective tool in controlling this organism.

Fungi

Fungi, yeasts and molds are generally more complex structures than bacteria and exist as single or multi-cell or filamentous organisms. They reproduce sexually or asexually sometimes producing large numbers of spores that can be carried in air streams. The most common genera, found to be widespread throughout the world both indoors, inside HVAC systems and in the outdoors, are *Cladosporium*, *Alternaria*, *Penicillium* and *Aspergillus*. These four genera are also found to be the most prevalent in causing allergic respiratory disease. In particular the two species *Aspergillus Niger* and *Fumigatus* can cause potentially serious lung infections. Thankfully less common, but equally serious health impacts are created by *Stachybotrys sp.* This organism favors cellu-

lose media such as paper or cardboard, and relatively wet conditions for optimum growth. In indoor air quality studies of nearly 2,500 buildings over the past two decades, we have found fungal growth to be the single most problematic contaminant, more so than bacteria, dust, carbon monoxide or a host of other indoor air constituents.

Protozoans

These organisms are generally more advanced and complex. They are able to colonize swamp cooler reservoirs and improperly draining condensate trays. Aerosolization of their cells occurs directly from the contaminated water, or from the residue as the water evaporated. These organisms can cause ailments such as hypersensitivity, pneumonitis, humidifier fever, asthma and allergic rhinitis. Again, good hygienic practices in condensate trays and other locations where water is stored best prevents proliferation of their numbers. We routinely recommend to our clients that they use biocidal chemical packs in condensate trays to encourage proper drainage and prevent growth of these organisms. Care must be taken with product selection however, in order to ensure the packs do not expire prematurely and their wrappers do not clog the drains.

Sources

Microbes gain entry into building systems in many ways, including via construction dust and debris, dirt drawn in via the outside air intakes, and via the return systems from building occupants and indoor activities. For instance, it has been calculated that we each shed about seven million particles and cells per minute, and each of these carries with it an average of four microbial cells. As a result, there is always some background level of microbiological activity in HVAC systems. If the supply and return system is heavily loaded with dirt, this provides nutrition for microbial growth. Any condensation or other free water may allow for a healthy colony to quickly spread across a surface – and particularly prone to this is internal fibrous glass insulation, especially where it has become wet from carry over from cooling coils or condensate trays.

Sampling

Sampling for microbes must be done with care if the results are not to be misleading. For instance, there is little or no point in sampling for *Legionella* bacteria in indoor air as this could result in a false negative – the place to sample for this organism is in the water supply at source. Similarly, the absence of a positive result in an air sample for *Stachybotrys* sp. should not be taken to mean no problem exists if the black, slightly slimy colonies are visible on building substrates. Even if these colonies are currently absent but wet, humid growth conditions exist on say, paper-coated gypsum wallboard corrective action should be taken immediately.

That is not to say that air sampling is of no use. Careful air sampling, with controls taken in outdoor air, can be very helpful in determining if the interior of the building is unusually heavily infested with both bacterial and fungal organisms. If the numbers and types of species present are very different than found in outdoor air, this should be cause for concern. If there are very high numbers of common bacteria present in indoors, especially compared with outdoors, but few fungal numbers, this is often a sign that the building is simply poorly ventilated.

There are currently no "official" standards for levels of bacteria and fungi either on surfaces in HVAC systems or building surfaces in general and our results are interpreted based on field experience. Likewise, no formal standards for indoor air microbial levels exists but, based on hospital operating room and other building experience and we feel that no more than 750 colony forming units per cubic meter of air should be present in office buildings. However, such a standard is essentially an arbitrary one and results are interpreted based on field experience and comparison with outdoor air levels of bacteria and fungi on the day of testing.

Conclusions

There is much still to learn about the means by which microorganisms flourish in buildings, and their relationships to the humans that occupy them. Research is ongoing on dose-response relationships, and the role of microbial by-products such as bacterial endotoxins and fungal glucans on symptomatology. We are currently evaluating the use of volatile organic compound (VOC) sampling for specific VOCs produced by fungal growth. This technique may prove useful in tracking down mold hidden in walls, thereby eliminating the need for wholesale destructive testing. It may also be that "new" microbes emerge that prove to play a part in building related illnesses in the same way that *L. pneumophila* emerged. It is inevitable, however, that we will continue to compete with microbes for our living and working space – as building technologies change we can be sure that they will find ways to adapt and thrive in new kinds of environments.

About the Author

Simon Turner is Director, Western Region for Healthy Buildings International. With a British Higher National Diploma in Applied Biology from Nottingham City University, Turner has managed hundreds of indoor air quality inspections throughout the Americas. He has also been the IAQ manager of numerous design projects for new buildings, including the Southern California Gas Co. Energy Resource Center in Downey, CA; the new Staples Arena in Downtown Los Angeles, and the new six-building Global Administration Facility for Fluor Daniel, Inc. in Aliso Viejo, CA.



Paul Dedona presents a Certificate of Appreciation to Simon Turner who spoke on Microbiology Contamination at our Main Meeting.



Technical Session speaker, Dr. Robert Scheir, pictured between Doug Haines on the left and Paul Dedona on the right. Dr. Scheir gave a presentation about Ultra-Violet light.

SOL*AIR EDITOR 2000-2001

I am privileged to accept the position as the new *Sol*Air* editor for the next ASHRAE year. I will assist Ralph Panting the remainder of this year and attend the CRC to make my year as editor a successful one for the Chapter.

- Joe C. Ablay, P.E., CEM
SIEMENS Building Technologies, Inc.
Landis Branch Network
(714) 816-1434 direct / (714) 216-6917 pager/
(714) 761-2134 fax/ (714) 227-1553 mobile
joe.ablay@sbt.siemens.com

CHAPTER REGIONAL CONFERENCE (CRC)

Dates: May 11, 12 and 13, 2000

Location: Vancouver, Canada

by: Sudhir Agrawal

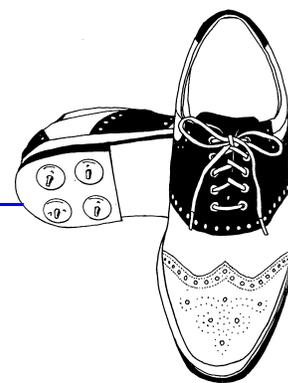
This year the Region X CRC will be held at Vancouver, Canada on May 11, 12 and 13th, 2000. I will be your Chapter representative as Delegate and Bob Brennan will be the Alternate. You, as member may have several ideas to make the ASHRAE better. You may see the Society's role differently. You may want Society to function differently. You, as members have voice in the Society. We will be your spokes person, your formal means of communication to the Society. Bob and I are requesting you to come forward with more motions, which we can carry for you to the CRC. After the motion is passed through the Region X CRC, it will be formally submitted to the Society at the Counsel meeting for adoption. There is no limit to the number of motions from any Chapter. There are 10 Chapters represented at Region X. Our Chapter (Southern California Chapter) is the largest and strongest. Our Past President, Mary Johnson, will summarize various activities of our Chapter throughout the year 1999-2000. I will represent this summary at CRC as your delegate. We also get PAOE points for our attendance at CRC. I encourage you all to attend the Chapter's Board of Directors monthly meetings and bring your motions for CRC. At CRC, we also bring forward the name of the Regional Vice Chairperson for Research promotion, Refrigeration, Membership, TEGA, Historian, etc. for any openings at the Region. Our Chapter has held all these positions at various times. Currently, Cindy Callaway is Region X RVC for Refrigeration.

The Chapter encourages attendance of our chapter Chairperson for Membership, Research Promotion, TEGA, Refrigeration, and Historian at CRC. The Chapter funds a part of the expenses. There are training sessions conducted at CRC in all of these areas. Various Chapter representatives share their experiences. This information is very useful, in conducting and improving our Chapter operation.

So I encourage all of you to be a part of ASHRAE and make a difference at Society. You as a member can steer the Society in the direction you desire. Please bring your request to me or Bob and we will translate into the official motion form and present at the CRC. You can fax me at (213) 922-7536 or e-mail me at agrawals@mta.net or call me at (213) 922-7233.

Southern California Chapter ASHRAE

2000 SPRING GOLF TOURNAMENT



Wednesday, April 12, 2000

Brookside Golf Club, Course #2, Pasadena

Time: Sign in at 11:30 a.m.
Shotgun start at 12:30 p.m.
Banquet and dinner to follow.

Limited: to 144 golfers

Fee: \$110 per player
\$40 dinner only

Format Individual SCGA Handicap and Handicap Scoring

Awards: Golf Awards, Door Prizes and Raffle Prizes

Donations: Company Golf Gifts are encouraged.

Name	Company	Phone	S.C.G.A. Handicap
------	---------	-------	-------------------

1. _____

2. _____

3. _____

4. _____

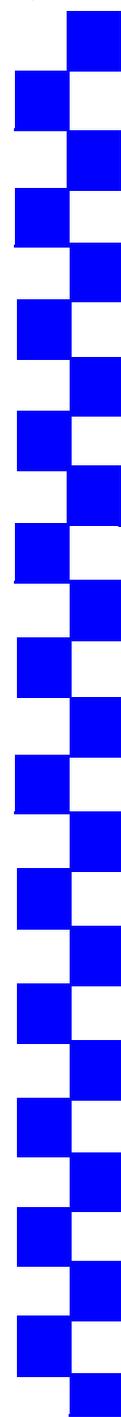
Group Contact Name _____ Phone No. _____

Corporate Hole Sponsor @ \$125\$ _____

Total\$ _____

Golf Chairperson:
Robert Donat (562) 941-2233 / Fax (562) 944-2664

Checks payable to Southern California ASHRAE
Key Air Conditioning Contractors, Inc.
c/o Robert Donat
10905 Laurel Avenue, Santa Fe Springs, CA 90670



SOUTHERN CALIFORNIA CHAPTER OF THE
 AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR CONDITIONING ENGINEERS
 PRESENTS

ANNUAL SPRING SEMINAR
CURRENT ISSUES IN LAB DESIGN

THURSDAY, APRIL 13, 2000
8:00 A.M. TO 1:15 P.M.
CALIFORNIA INSTITUTE OF
TECHNOLOGY, BAXTER HALL,
PASADENA

Southern California Chapter of ASHRAE will present, with the support of Cal-Tech, what promises to be an interesting, exciting and timely topic: Current Issues in Lab Design.

The speakers will be the very best in their fields, known and respected in their respective disciplines for their experience, insight and knowledge.

The seminar will consist of four modern, highly relevant topics for the industrial hygiene community, mechanical engineers, owners, contractors and anyone interested in the intricacies of lab design.

Each presentation will be approximately 50 minutes with a 10 minutes break. A catered lunch will be served after the seminar and you should be on your way by approximately 1:15 p.m.

This half-day seminar located at the prestigious Cal-Tech campus includes lunch and is \$100/person.

Additional persons from the same company can attend for \$85/person. Students get 50% off (must submit current student I.D.).

Your Spring Seminar Technical Committee has gone to a great deal of work to ensure your chapter the very best speakers to cover a timely topic. Ignorance of lab design techniques can cost you time, money and exposure to legal liability.

The areas of presentation are in architectural and mechanical aspects of lab design. These include:

- Architectural Aspects of Modern Lab Design presented by Glen Barry, Vice-President and Director of Science and Technology at HOK, Newport Beach, California. He will review the parameters of lab design with an eye to designing labs for future expansion and change, as well as present use. ASHRAE members need to be aware of these issues in working with architects and owners.
- Lab Hood Exhaust Systems, Design, Location and Placement of Rooftop Exhaust Fans and Other Equipment, The Code Related to Stack Height, Recirculation, and Fan Controls presented by Victor Neuman of GPR Planners in Irvine, CA. Victor is on the ANSI committee regarding lab design and was formerly with Earl Walls Associates. Victor is a recognized expert in these topics and has lectured extensively. GPR Planners is a large lab

planning consulting firm located in Irvine.

- Design, Performance and Testing of Laboratory Hoods presented by Tom Smith. Mr. Smith is an Industrial Hygiene Engineer who specializes in laboratory ventilation systems with an emphasis on hoods, hood testing, hood standards and commissioning. Mr. Smith has evaluated many laboratory hood systems and served on committees for development of the ANSI Z9.5 and ASHRAE 110 "Method of Testing Performance of Laboratory Fume Hoods" standard.
- Commissioning will be presented by Peter Ebbink, a commissioning specialist with the firm of AEI located in Walnut Creek, California. AEI does lab and research facilities for pharmaceutical companies, bio-tech companies, and major universities throughout the country. Mr. Ebbink has been involved in many practical commissioning issues and advise on commissioning specifications and procedures.

SPRING SEMINAR RESERVATION FORM

Company Name: _____

Company Phone: () _____ Company Fax: () _____

Attending: _____ \$100

_____ \$85

_____ \$85

_____ Total

Please make checks payable to:

Southern California ASHRAE

Reservations: Kathy LaRue
 2602 Pacific Park Drive, Whittier, CA 90601
 Fax: (562) 695-8282 / E-Mail: kathy@dmg-la.com / Phone: (562) 692-1277

go for it!

Tri-County ASHRAE Golf Tournament

At the beautiful, private,
Spring Valley Lake Country Club
 Victorville, California

Directions: Only 20 minutes north of San Bernardino. Take I-15 north to Bear Valley Blvd. exit, turn right, go 5 miles to Spring Valley Lake Parkway on the left.

Monday, May 22, 2000
 Putting Contest 9:00 a.m. - 10:00 a.m.
 Check In: 9:00 a.m. / Start: 10:30 Shotgun
 Format: Four person SCRAMBLE, GROSS & Net

Includes: Continental Breakfast, Putting Contest, Range Balls, Cart, Green Fees, Raffle Prizes and Awards Banquet

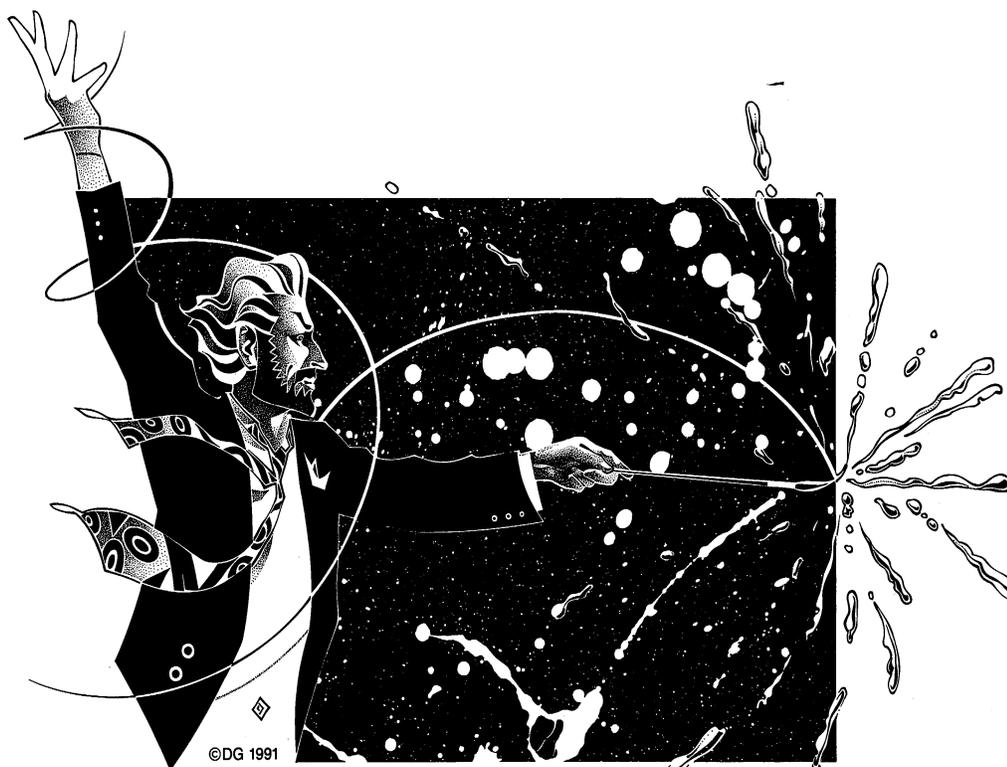
Proper golf attire, please... collared shirts (no jeans or short shorts).

Early "Birdie" Discounts received before May 1st: \$50/4-some of \$10/pp

Team Name: _____	Contact: _____	Phone: _____	
Players	Index	No. Handicap	Amount
1. _____	_____	_____	@ \$125.00 \$ _____
2. _____	_____	_____	@ \$125.00 \$ _____
3. _____	_____	_____	@ \$125.00 \$ _____
4. _____	_____	_____	@ \$125.00 \$ _____
Dinner Only: _____	_____	() _____	@ \$30.00 \$ _____
_____	_____	() Hole Sponsors @ \$150.00	\$ _____
_____	_____	Early Birdie Discounts: _____	< _____ >
_____	_____	Total Amount Enclosed: _____	\$ _____

Make check payable to: Tri-County ASHRAE
Chairman: Vicki Rolofson @ Air Treatment (909) 869-7975. fax (909) 595-6874
807 South Lemon Avenue. Walnut. CA 91789

A portion of the proceeds will be used to support the ASHRAE Scholarship fund



©DG 1991

Installation Dinner and Annual Award Ceremony

at the Magic Castle

June 10, 2000

6:00 p.m.

Address: 7001 Franklin Avenue, Hollywood, California 90028
(213) 851-3313

Cost: \$70 per person
(Dinner and magic show included)

Directions: From 101 northbound:
Exit Highland Ave., turn right under freeway, left on Highland Ave. and right on Franklin Ave.

From 101 south bound:
Exit Highland Ave./Hollywood Bowl, Highland Ave. and right on Franklin Ave.

Reservations: Sudhir Agrawal, (213) 922-7233
e-mail: agrawals@mta.net

INSTALLATION DINNER AND ANNUAL AWARD RESERVATION FORM

Name: _____

Address: _____

City: _____ **State** _____ **Zip** _____

Checks Payable to: ASHRAE, Southern California Chapter

Mail to: ASHRAE, Southern California Chapter
c/o Sudhir Agrawal
11208 Freer St., Arcadia, CA 91006

1999-2000 ASHRAE SOUTHERN CALIFORNIA CHAPTER AND WESTERN SECTION PROGRAMS

SOUTHERN CALIFORNIA CHAPTER

MARCH 7, 2000

Location: Les Freres TAIX
 Tech Forum: Cooling Tower Fundamentals
 Speaker: Mr. Jerry Conklin
 Main Program: Energy Efficiency Update
 Speakers: Panel Discussion (SCE and The Gas Co.)
 Co-chairs: Alex Llamas

APRIL 4, 2000: RESEARCH NIGHT

Location: Les Freres TAIX
 Tech Forum: SCAQMD Regulations for Boilers
 Speaker: Mr. Bob Jones
 Main Program: Meeting Code for Minimum OSA per person with VAV Systems
 Speaker: Representative from Air Monitor
 Chairperson: Ron Sweet

MAY 5, 2000: STUDENT NIGHT

Location: Les Freres TAIX
 Tech Forum: Chiller Fundamentals
 Speaker: Mr. John Clark
 Main Program: TBA
 Co-Chairs: Paul Dedona

JUNE 10, 2000: INSTALLATION DINNER/DANCE

Location: Magic Castle
 7001 Franklin Avenue, Hollywood, CA
 (213) 851-3313
 Time: 6:00 p.m.

WESTERN SECTION PROGRAMS

MARCH 14, 2000

Location: Ventura
 Topic: Liability Issues
 Speaker: Joan Calnon, Dealey, Renton & Assoc.

APRIL 11, 2000

Location: Santa Barbara
 Topic: Fan Principals Demonstration
 Speaker: Ed Langlo, Independent Contractor

MAY 9, 2000

Location: Santa Maria
 Topic: Pump and Chiller Applications
 Speaker: Jack Dawson, Dawson Company

JUNE 13, 2000

Location: Ventura
 Topic: To be announced.
 Speaker: To be announced.

HELP WANTED COLUMN

Anybody wishing to place an ad in this column for an engineering or other position please submit your request to:

RALPH PANTING, Air Conditioning Specialties Co.
 850 E. La Habra Blvd.
 La Habra, CA 90631
 (562) 694-8543
 Fax: (562) 697-6296
 e-mail: ralph_judy@msn.com

Please make a donation of \$50 per ad made payable to:
 ASHRAE Southern California Chapter

People looking for a job may place an ad without donating.

HVAC ENGINEER

Large A/E firm has an opening for an HVAC engineer with 10 years experience in commercial design and central chilled water plants. Candidate will be responsible for design of critical data center HVAC systems throughout the United States. Strong written and verbal communication skills, and working knowledge of AutoCad 14 required.

Our firm offers a rewarding work environment and competitive benefits.

Send resumes to:

Jay Madden
 Einhorn, Yaffee, Prescott
 11845 W. Olympic Blvd., Suite 850W
 Los Angeles, CA 90064
 Fax – (310) 914-3397
 e-mail: jmadden@eypae.com



Marley Cooling Tower
A United Dominion Company

John Rees
HVAC Products Manager

The Marley Cooling Tower Company
500 Kraemer Blvd., Suite 311
Brea, CA 92821
Tel 714-572-9100 Fax 714-572-9925
Pager 213-267-7918
email: reesjp@marleyct.com



Antti Korhonen
Branch Manager
HUMIDITY/DEWPOINT/CO₂/PRESSURE

Vaisala Inc.
5 Buttonwood Street
Irvine, CA 92614-7546
http://www.vaisala.com

Tel. (949) 651-0407
Toll Free (888) VAISALA
Fax (949) 651-9743
antti.korhonen@vaisala.com




PAUL M. GOUDSMIT
SALES REPRESENTATIVE
PUMPS, PARTS & SERVICE

3215 Producer Way
Pomona, CA 91768

Phone: (909) 594-9959, Ext. 338
Fax: (909) 594-1335
e-mail: pacola@flow-products.com



Valley Mechanical Services
AIR CONDITIONING • ENERGY MANAGEMENT

Carlos Villarreal
General Manager

21600 Oxnard Street
Suite 2100
Woodland Hills, CA 91367
TEL: (818) 716-2654
FAX: (818) 716-2605
State Contractors License No. 74605

Phoenix Controls Corporation

Providing precision airflow controls for critical room environments, including:

- laboratories
- hospital isolation rooms
- vivariums
- clean rooms
- pharmaceutical process areas

www.phoenixcontrols.com
Represented locally by:
George Yardley Company, Inc.
(714) 241-7700

K.H. WATTS COMPANY
INCORPORATED
REPRESENTING

BALTIMORE AIRCOOL COMPANY, INC. • CERAMIC COOLING TOWER COMPANY
ALFORD PUMPS • GRISWOLD • HCl TERMINATOR VALVES
HITACHI VFD'S • PUMPHUX CORPORATION. • UNIDSOURCE CONTROLS

JERRY J. CONKLIN
SALES ENGINEER

1815 WEST 205TH STREET • SUITE 106 • TORRANCE, CA 90501
TELEPHONE: (310) 783-4710 • FAX: (310) 783-4718
VOICE MAIL EXTENSION # 118
E-MAIL: jconklin@worldnet.att.net
FIELD OFFICE PH: (805) 493-5820 • FIELD OFFICE FAX (805) 241-7838

QUALITY COMPRESSOR
Air Conditioning & Refrigeration Compressors



REMANUFACTURERS, SALES & PARTS

- Trane
- Carrier
- Copeland
- Worthington
- Dunham-Bush
- York, etc.

available from stock:
www.QualityCompressor.com
7500 S. GARFIELD AVENUE
BELL GARDENS, CA 90201
(562) 806-5185 FAX: (562) 806-5191



well aquatronics
Engineered Pumps and Hydronic Equipment

Bob Brennan

Toll Free 1-800-74-PUMPS
Tel: (818) 244-5582 Fax: (818) 247-0083
e-mail: weilacqua@aol.com
115 E. Palmer Ave. • Glendale, CA 91205-3122

John A Clark
District Manager
Worldwide Applied Systems Group



Los Angeles Sales District
The Trane Company
17760 Rowland Street
City of Industry CA 91748
TEL/FAX 626 435 1188
johnaclark@trane.com

An American Standard Company



WONG & GOTAMA, INC.
Building Systems Consultants

Simon S. Wong, P.E.

13160 Mindanao Way, Marina del Rey, CA 90292
tel: 310.827.3332 fax: 310.822.5511
e-mail: SSWong@earthlink.net

The Northwest Chapter of the Institute of Environmental Sciences and Technology Presents

Applications of Computational Fluid Dynamics (CFD) to Cleanroom Design

Dr. George Ting-Kwo Lei
March 24, 2000, Portland, Oregon
9:00 AM to 12 Noon and
1:00 PM to 4:30 PM
Morning session outlines
(9:00 a.m. to 12:00 a.m.)

- Introduction to Computational Fluid Dynamics (CFD) and CFD applications
CFD required computer inputs and outputs.
- A case study: Computer aided design of a ceiling plenum system.
- A case study: Computer aided design of a cleanroom
- Afternoon session outlines (prerequisite morning session) (1:00 p.m. to 4:30 p.m.)
- Illustrate how to use a CFD program
- The limit of CFD. What problems can CFD be used to solve with satisfactory accuracy? What problems would CFD give you a poor analysis?
- What personnel training, equipment and software are necessary to establish a CFD program?
- Examples of CFD practical applications.

Questions about this seminar?
George Lei, Ph.D.,
Fluid Dynamics Solutions
(503) 698 5355 / 9:00 a.m. to 6:00 p.m.

Please register with payment to:
Hal Smith,
14520 NW Oak Hills Dr.
Beaverton, OR 97116
(503) 629-4965, fax: 503 693 8701,
e-mail: mrclean@transport.com

FEE SCHEDULE:
IEST Members: AM Session: Free;
PM Session: Free
Others: AM Session - \$25;
Both Sessions - \$45

CALENDAR OF EVENTS

APRIL 12, 2000

Southern CA Chapter ASHRAE Spring Golf Tournament
Brookside Golf Club, Pasadena, California

APRIL 13, 2000

Southern CA Chapter ASHRAE Annual Spring Seminar
Cal Tech, Baxter Hall, Pasadena, California

MAY 11-13, 2000

Region X Chapter Regional Conference
Vancouver, Canada

MAY 22, 2000

Tri-County ASHRAE Golf Tournament
Spring Valley Lake County Club, Victorville, California

JUNE 10, 2000

Southern CA Chapter ASHRAE Installation/Dinner
Magic Castle, Hollywood, California

Published by the Southern California Chapter of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Los Angeles. Statements made herein are not expressions of the Society or of the Chapter. Republication of material printed herein is expressly forbidden without Chapter authorization.

Southern California Chapter 1999-2000 Board of Directors

President William W. Clark, Jr.
President-Elect. Sudhir Agrawal
Secretary Bob Brennan
Treasurer John Clark
Director Mike Burke

Bob Jones
Bob Woods
David Kuo

Editor: Ralph Panting

Editorial Office:

850 E. La Habra Blvd., La Habra, CA 90631
(562) 694-8543 / Fax: (562) 697-6296

<http://www.ashrae-socal.org>

Newsletter of the Southern California Chapter American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

Mail Change of Address to:

Southern California Chapter of the American Society of Heating,
Refrigerating and Air Conditioning Engineers, Inc.

JODY RUSLING, Executive Secretary
1942 Endicott Road, San Marino, California 91108
Fax: (626) 285-9568
