FALL SEMINAR 1994 — Facing the Challenge
Submitted by Tom Whittaker, Fall Seminar Chairperson, Baystate Medical Center, Springfield, MA

We have titled this year’s Fall Seminar quite aptly, “Facing the Challenge.” A realization and a commitment to do more—more with less! Government regulation aside, prospective competition is driving all institutions to reduce costs, to become more efficient and therefore more attractive to managed care markets. Engineering departments are being reduced and/or consolidated. Directors are challenged to re-think ways of doing business with less resources while at the same time encountering more regulation! This seminar is designed to allow us to address, discuss and debate how to meet these challenges.

The Setting is Sturbridge
The site for this year’s event is historic Sturbridge, Massachusetts, where you can experience the spirit, charm and hospitality of yesterday in a most unique and beautiful setting.

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COGENERATION — Steam Turbine Driven Cogeneration
Submitted by David D. Asselin, Chief Engineer, Soldiers’ Home, Holyoke, MA
Editor’s Note: David read the article on cogeneration in the last NEHES newsletter, and thought it would be helpful to share information about another form of cogeneration.

In a continuing effort to control operating costs, major consumers of energy are looking for energy cost solutions. The Soldiers’ Home in Holyoke, a 250 bed nursing facility in Holyoke, MA, has decided to join the growing number of users who produce a substantial portion of their own energy utilizing cogeneration. This simultaneous on-site production of electricity and heat (85% efficient) utilizes the thermal energy normally wasted in utility power production process (25% efficient). The Soldiers’ Home decided that cogeneration offered the single greatest opportunity for conservation and reduction of energy costs.

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Both the guest program and our extraordinary social events have been designed to capture the magic of Sturbridge during the peak of fall foliage season. Old Sturbridge Village is an authentic re-creation of a rural 1830’s New England Community. Every detail of early 19th Century life has been painstakingly researched to provide you with an experience you will never forget!

The Salem Crofs Inn is on a quiet New England road, surrounded by rolling fields where grazing cattle hold your eye. The historic Salem Crofs Inn preserves traditional standards of attention to detail and insistence on the highest quality service. The Inn’s Clock Jack or Roasting Jack, a circa 1700 device to permit the even treatment in the fireplace of large pieces of meat, is the only known device in the nation. The cooking technique continues today at the Inn enabling us to experience this unique gastronomical treat!

**Education is the Focus**

Ten different educational sessions have been scheduled for this three-day seminar. On Wednesday, eight 1.5 hour session have been created on topics of technical interest to the engineer.

**Wed. 10/5 — 8:45 - 10:15 a.m.**

**Indoor Air Quality Issues**
**Presenter — Robert Kirchwor, CSP**

This presentation will help increase awareness and knowledge around the growing concern for indoor air quality. The program is designed to provide the information and techniques necessary to perform an “in-house” indoor air quality investigation.

**OR Facilities Survey Results**
**Presenter — Robert Loragner, PE**

This session will focus on the results of an operating expense survey which many new England hospitals participated in this year. Bench marked operations against one’s peer group is a key ingredient in improving quality, service and lowering costs.

**Wed. 10/5 — 10:30 - Noon**

**Air Balancing Methodology**
**Presenter — Richard Wing**

This portion of the program will discuss practical aspects of HVAC testing and balancing. A case study of an actual HVAC system in operation will be presented.

**OR Value Engineering in Construction**

**Presenter — Lawrence Bacher**

This session will focus on the core issue concerning health care facilities today – how to make our departments more efficient and more effective and how to make our operations less costly. Setting accurate construction budgets, managing design against budget and specific examples of materials and systems options which have saved capital or cost will be presented.

**Wed. 10/5 — 1:15 — 2:45 p.m.**

**TQM/COI in Facilities**
**Presenter — Jerry Iliar**

This presentation will address the basic steps for continuously improving the key aspects of a Facilities Services Program. Current management models will be explored which provide some options available to the facilities manager in designing a process improvement system that best fits the organization and the new “performance based” JCAHO standards.

**OR Elevator Maintenance & Modernization**

**Presenter — John Albrecht**

This portion of the program will focus on improving elevator reliability and customer satisfaction. Sound maintenance practices will be covered as well as the federal initiatives pertaining to ADA accessibility and state initiatives for upgrading fire service features and other code requirements.
Wed. 10/5 — 3:00 — 4:30 p.m.
How to Reduce Energy Consumption
Presenter — Britta Fominaya
This session will present and discuss energy savings investments with a payback of less than 4 years which are available to most hospitals. Projects such as: electronic ballasts/f-8 fixture retrofits, variable speed drives and HVAC balancing are among the topics to be discussed.

OR Facilities Management Systems
Presenter — David Kittrell
This session will explore today’s sophisticated facility management systems and identify ways they can help management make vital decisions affecting the hospital. In order to gain support, as well as funding, for an FMS, the value must be understood by upper management. Mr. Kittrell will discuss the importance of upper management “buy in” and point out some of the many advantages of networked DDC in terms of operational and business issues.

Thurs. 10/6 — 10:00 — Noon
Presenter — Ronald Cote
Ronald Cote will present and describe the latest changes to NFPA Chapter 101 – Life Safety Code. Mr. Cote will provide many examples of how to access and apply code requirements to the New England hospital environment.

Fri. 10/7 — 10:00 — Noon
Presenter — Ode Keil
Ode Keil, Director of the Dept. of Plant and Technology Management for the JCAHO will address a variety of matters relating to the new PTSM standards. He will discuss the future direction these standards will take and will highlight topics which are frequently of concern to hospitals undergoing an inspection.

All this, plus a vendor show on Thursday, with over 80 exhibits of products and services of interest to every hospital engineer!

Register NOW!
Conference dates are: Wednesday, October 5 through Friday, October 7, 1994. Consult your information packet which you recently received, or call Mr. Fran Murphy, Noble Hospital, for details. Fran’s number is (413) 568-2811 x 5768.

HOW DO YOU MAKE DECISIONS?

Do you have a problem with decisions? See if you fit one of these decision-making styles:

- **Wafflers.** These are folks who stall and stall while they seesaw between options. They ask lots of people for advice—and never take any of it. **Their problem:** They never learned how to make informed decisions. **What to do:** Jot down the pros, cons & consequences on paper. You’ll sharpen your focus.

- **Second Guessers.** These are people who worry about how their decisions will affect those around them. If their decisions fail, they blame themselves. **What to do:** Make sure the decision meets your needs and those of the job you have to do. And never blame yourself if a decision goes sour.

Source: Communication Briefings, 8/94.

TREASURER’S REPORT

Submitted by Don Garrison, Treasurer

The financial condition for our organization is very sound. We currently have $40,073.72 in the bank with no outstanding bills. We are currently receiving 3.30% interest on our money market balance which is paid every Friday. We have received $74.86 since we established the account. This translates to roughly $13.10 per week income. We just recently deposited another $15,000 into the account which will result in a weekly interest income of approximately $25.00.

We have closed out all income and expenses for the spring 1994 seminar and it appears that we broke even. Money for the fall seminar has started to come in. To date we have received $8,450 for 13 vendor booths.
Following the enactment of Massachusetts’ pilot legislation enabling the Commonwealth’s facilities to incorporate modular cogeneration and private investment in their cost cutting efforts, the Soldiers’ Home issued an RFP to qualified bidders for competitive proposals. After a comparison of cogeneration shared savings proposals, the Soldiers’ Home selected the Aegis Energy Services’ proposal because of their comprehensive approach. Aegis Energy Services, Inc., of Westfield, MA is an experience developer specializing in modular cogeneration who engineers, owns, operates and maintains these systems with no requirement of the on-site staff.

It’s important to add that there are many companies willing to install generators, but few are willing to bear the entire capital investment and share the profits with the user. A shared savings program truly brings about the most efficiently designed system for your facility. It’s most reassuring to have unquestionable confidence with the system (contractor) and know that when it’s finished, it will be operating at maximum revenue producing efficiency.

**How the system works**

The cogeneration system at Soldiers’ Home consists of two reciprocating internal combustion engines, (Big Block Chevy 454) fired by natural gas, which drives electric generators. Because of their high performance, ease of maintenance and longevity, Aegis selected 75 KW Tecogen units. Thermal energy is recovered from the engine’s cooling, exhaust and lubrication systems through heat exchangers providing high temperature water for a variety of heating purposes. The electricity produced is virtually a free by-product when the recovered heat is utilized.

**The savings add up**

The system will run approximately 8500 hours each year and produces 1.25 million KWH of electricity. This translates into approximately 75% ($90,000) of the facility’s electricity. In addition, it will meet 30% of the required space heating and provide 100% of the domestic hot water heating requirements. During the summer months when space heating requirements cease, the system will supply energy to a 50 ton absorption chiller. Just think, 20,000 sq. ft. of cooling without the cost of an electrically driven compressor!

Under the terms of a 12-year energy shared savings contract, (80% – 20% split), electricity is provided to the Soldiers’ Home at a 20% discount from the local electric utility rate. Furthermore, the Soldiers’ Home benefits financially from the developer’s amortization of initial costs. The heat recovered from the system is provided at a price comparable to current heating costs and offsets boiler fuel. All cogeneration related fuel expenses and maintenance costs are borne by Aegis.

Additionally, what was very important to our facility was the fact that this capital energy improvement was made without any cost incurred by our facility. This is certainly a win/win situation (with no risk and all benefit) that was an easy sell to our administrator. The system has generated both immediate results (savings) and thankful recognition.

Although the Soldiers’ Home will own the cogeneration system at contract term, it retains the option to purchase the system any time at annually decreasing cost. This early purchase option enables the facility to achieve full operating savings (both thermal and electrical).

**An opportunity to talk with experts**

In closing, I would like to point out that Aegis is planning to attend the vendor exhibition at our fall seminar in Sturbridge, MA on October 5, 1994. I hope that our fellow engineers get the chance to meet with representatives of Aegis and learn more about modular cogeneration. It’s application, while not conducive to every facility, is truly remarkable.
NEW ENGLAND MEMORIAL — Reduces Water Consumption with Once through Cooling

Submitted by Steve Boyd, New England Memorial Hospital, Stoneham, MA

In the recent past, water was both inexpensive and plentiful. As a result, many of us did not hesitate to use it without any thought of conservation. In today’s world, that viewpoint is starting to fade as a result of rising water and sewer costs and increased awareness of the limited resources of our planet.

Taking responsibility
At New England Memorial we realized we needed to face the problem of rising water costs due to the Boston Harbor Cleanup Project, and also fulfill our responsibility as stewards of the resources allotted to us. With this in mind, Facilities Management staff did a water audit of the complex to find out how much and where our water was being used. One area that stood out was domestic water that was used to cool the hospital’s compressors and air dryers.

In a typical “once through cooling” application, domestic water is used to cool air or gas that has gained heat while being compressed—the gas passing through one side of a heat exchanger with domestic water passing through the other side and then exiting to the drain. It is an effective way to remove heat, but has also become very expensive as a result of rising water costs.

According to 360 CMR 10.023 (2), it is now also against the law in Massachusetts to discharge non-contact cooling water into the Massachusetts Water Resources Authority’s sewage system.

**Significant water savings**
With these issues in mind, Facilities Management staff started considering ways to eliminate this discharge. The resulting “Once Through Cooling Modification” (OTCM) was a system that reduced our facility-wide water use by approximately 15% and has saved us an average of $28,000 a year in water costs over the last three years.

The modifications included the following:
- Making sure that the water supply line to each heat exchanger (HX’s) was common to all HX’s.
- Tying the drains from each compressor’s heat exchanger into a common line.
- Finding a suitable heat sink—in our case, the cooling coil from one of our continuously run Air Handling Units and tying it in series with the HX’s.
- Controls and Pump to monitor and switch cooling source between outside air, chilled water, or domestic water.
- Providing a reduced pressure zone backflow preventor for protection of domestic water.

This is how the system works: If the outside air is below approximately 55 degrees F., heat from the compressors are used to preheat incoming outside air (and remove the heat from the cooling water). If outside air is above 55 degrees F., chilled water is normally available and is used as the heat sink. If either of the first two options fail, domestic water is still maintained as a safety.

This system paid for itself in five months.

If you have any questions about this system, give Steve Boyd or Barney Bolton a call at New England Memorial Hospital, (617) 979-7000. ■

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**Diagram:**

- CHWR - Chilled Water Return
- CHWS - Chilled Water Supply
- D.W. - Domestic Water
- BFP - Back Flow Preventor
- COOLING COIL
- PUMP
- HEAT EXCHANGERS
- REF. COMP. (6)
- MED. AIR COMP.
- MED. VAC. PUMP
- AIR DRYER (2)
- AIR COMPS (2)
- NO D.W.
- TO DRAIN
Electromagnetic Interference Proves Fatal in Some Cases


Submitted by Vincent (Jerry) Gardner, Honorary Member and NEHES past president.

As life-saving electronic medical equipment becomes more sophisticated and sensitive, evidence has begun to pile up that these instruments are vulnerable to increasing levels of electromagnetic interference – the waves given off by radios, cellular phones and television sets. The consequences can be frightening: A ventilator malfunction while the child using it is riding in a car, and the problem is traced to the car’s cellular phone. A doctor installs a pacemaker after electrocardiogram equipment shows a patient’s heart isn’t working right; nurses later trace similar – inaccurate – readings on the machine to TV signals. A woman dies inside an ambulance as paramedics try to revive her heart with a defibrillator – which doesn’t work because of interference from the vehicle’s two-way radio.

Although electromagnetic interference, or EMI, has been known to be a source of problems for some time, the widespread use of cellular phones, metal detectors, computers and other sources of radio energy is creating pressure for stricter controls.

Zapped Wheelchairs

Government safeguards are spotty, but concern is growing at the Food and Drug Administration. Last month, the agency ordered makers of motorized wheelchairs to shield them from EMI and educate users about the hazard. The FDA said it acted after getting “many reports of erratic, unintentional powered-wheelchair movement.” In one such incident, according to a recent article by an FDA researcher, radio waves zapped a power wheelchair, sending its passenger over a cliff in Colorado, “causing a broken hip and several other injuries.” The victim wasn’t identified.

But only a few devices are subject to FDA review for electromagnetic vulnerability before they go on sale. “The problem is going to increase before it decreases...because of the proliferation of medical devices,” predicts Joe Dyro, director of biomedical engineering at the State University of New York at Stony Brook. “There is still a lack of awareness of how to properly shield these devices.”

EMI is a broad term for invisible waves and pulses, natural and man-made, that move through space and matter. Although the waves are usually harmless, certain devices will sometimes react to them, the way TV sets can pick up “snow” from a nearby hair dryer.

The Phone Ban

A few hospitals are starting to act. Earlier this year, St. Margaret Mercy Healthcare Centers in Hammond and Dyer, two Indiana towns, banned cellular phones after linking them to medical-device failures. So did Children’s Memorial Hospital in Chicago last November.

“We’ve verified potentially dangerous interference with ventilators, electrocardiogram monitors, apnea monitors, infusion pumps, blood warmers, infant incubators, with the list continually growing,” says Terry Clemans, St. Margaret Mercy’s director of technology management. Mr. Clemans says cellular phones were interfering with signals sent by portable heart monitors carried by patients. Most large hospitals use such telemetry monitors to free patients from bedside machines.

Jeffrey Sillerberg, an FDA electronics engineer, says the FDA has received reports of EMI being involved in more than 100 frightening and occasionally fatal failures of medical equipment going back to 1980. In the fall 1993 issue of the journal Compliance Engineering, he cited these cases and called for tighter regulation.

A Wall Street Journal request under the Freedom of Information Act resulted in the release of reports of the incidents, without the names of patients or sites. FDA regulations require companies to file the reports, although most manufacturers don’t acknowledge product malfunctions in these cases.

A Fatal Case

Physio-Control Corp., an Eli Lilly Corp. unit in Redmond, Wash., reported that medical technicians taking a 93-year-old heart-attack victim to a hospital in 1991 attached her to one of the company’s LifePak monitor/defibrillators to track and try to revive her failing heart. But they said the heart
machine shut down every time the technicians turned on their radio transmitter. The woman died.

Michael Willingham, director of regulatory affairs for Physio-Control, says the radio waves were the source of the problem. He says company engineers discovered that the ambulance maker had replaced the metal roof of the vehicle with a fiberglass dome that didn't block radio waves well — then placed a powerful, long-range radio-transmission antenna atop it.

In 1992, a doctor installed an apparently unnecessary pacemaker in a patient's chest after an electrocardiogram telemetry system made by SpaceLabs Inc., also of Redmond, displayed "long periods of flat line." That evening, the same phenomenon recurred. Nurses discovered that the patient was next to a TV set when the flat line occurred.

"Current labeling has warning about TV interference with telemetry signals," SpaceLabs reported to the FDA.

"We've had only two or three instances of problems" with EMI, says John Hall, vice president of quality assurance at SpaceLabs.

"Another kind of diagnostic would normally be done" before implanting a pacemaker, he adds, but the company "can't tell people how to practice medicine." ■

Editor's Note: We will reprint the second part of this alarming and important article in the next issue of the NEHES newsletter. Part two will attempt to shed some light on the numerous causes of EMI, and some possible ways of dealing with this potentially fatal problem.

STATE REPORTS — Abbreviated for the summer recess

**Connecticut**

Jack Gosselin reported that he and NEHES Secretary Mark Cappello met with the Executive Board of the Connecticut Hospital Engineers' Society (CHES) on August 4th. The purpose of the meeting was to discuss the potential for a closer working relationship between CHES and NEHES.

Mutual support and participation at each group's activities was cited for areas of focus. Also reviewed were ways to improve the coordination of each group's seminars so that topics and timing do not conflict. CHES President Chris Burney stated that the Connecticut Engineers are looking forward to hosting the NEHES Fall Seminar in 1996. CHES Executive Board members agreed to meet jointly with the NEHES Board to continue the dialog on the topics noted above. A tentative meeting date was established for Wednesday, October 5th.

**Maine**

Don Garrison reports that the Maine hospital engineers had a very successful meeting on May 19th. 18 engineers received an excellent presentation on current and potential requirements for TB and isolation room ventilation.

Following a June 25th meeting, the Maine Engineers won't hold another official meeting until September.

**Massachusetts**

Ernest Margeon reported that a mailing of the Facilities Survey Questionnaire to 85 Massachusetts members was made. Ernie is also working to obtain dues from members whose dues are in arrears.

**New Hampshire**

Kurt Peterson reports that the NHSHE meeting was held at the Hospital Assn. Building in Concord on June 19th. The majority of this meeting was dedicated to finalizing the Staff Empowerment Seminar.

Daniel Ebbeghauser was accepted as a new NHSHE member.

**Rhode Island**

Ovid Bordeianu (in Wally Brown's absence) reported that the current pressures being placed on hospital engineers by "downsizing" was making it difficult for most Rhode Island hospital engineers to participate in activities outside of their own facilities for the time being.

**Vermont**

Dan Ayres reports that a May meeting of VHES was held at North Country Hospital in Newport. Susan Davis of Erik Davis Architecture, a consultant to the State Health Care Authority for plans review, was the speaker.

Susan stated that she sees her role as an interpreter, communicator and facilitator between the hospitals and state during the CON process. She recommended the following when submitting plans:

- Send a site plan in addition to the project plans.
- Send an existing floor plan.
- Send a proposed floor plan.
- Be sure the plans are the same scale.
- If space is left over or not designated, clearly identify and specify future use.
- If a strategic master plan exists, it may be helpful to submit for review.