



# THE COLD FRONT

Summer 2001

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## IRC Leads with Ammonia Refrigeration Web Course

The IRC's *Overview of Ammonia Refrigeration Systems* course via the world-wide web debuted in June 2001. A total of 38 attendees participated in the 2½ week pilot program. Overall, the course was a great success!

### How was the course structured?

The IRC web course format consisted of a preliminary orientation session followed by eight two-hour sessions, presented by IRC Director Doug Reindl and IRC associate Jim Denkmann. Each day's session was designed to maximize knowledge transfer through instructor-led learning periods of approximately 55 minutes, with a 10 minute break between periods.

Prior to the start of the course, each attendee received a detailed set of notes, supplemental refrigerant property tables, and instructions to guide their participation in the program. The instructors used Placeware™ to deliver presentation materials via the web while a standard teleconference bridge carried the audio. The instructional staff enhanced their presentations by interweaving animations of refrigeration systems, interactive polling and graphic annotations.

### Special Features Enabled Participant Interaction

To effectively address attendee's questions during the course, we provided six ways for them to interact with instructional staff. Three of the six methods were available on-line during the instructional sessions and the other three methods were available off-line to answer questions between sessions. The interactive opportunities included:

### On-line Interaction

- speaking directly over the teleconference bridge during live sessions
- sending text messages to the presenter using a "chat" feature in Placeware™
- changing "attendee status" within Placeware™ to alert instructors of a pending question

## Off-line Interaction

- e-mailing questions to the instructional staff: [info@irc.wisc.edu](mailto:info@irc.wisc.edu)
- calling the IRC toll free hotline: (866) 635-IRC1
- posting questions to an on-line threaded discussion bulletin board through the IRC web site

The most frequently used method for asking questions during the pilot was participants sending text messages to presenters with Placeware's chat feature. Many attendees also raised questions when they submitted their homework. Did you say homework? Yes, homework!

## Homework

An integral part of the overall learning experience during the web course was a series of homework "problems". The homework problems were specially designed to:

- reinforce the fundamental principles presented during the live sessions
- link the classroom principles to practices at the attendees' own plant(s)

Homework strengthens the benefit of the overall educational program since it ties the learning experience back to their plant. IRC staff members Jim Elleson and Todd Jekel noted that many of the course participants expended considerable efforts in completing their assignments.

## Web Course Benefits

The format, delivery, and structure of the web course offered several benefits to attendees. The benefits that clearly stood out included: cost, effective knowledge transfer, and linking the classroom to the engine room.

**Cost:** Attendees were able to participate in the course without having to travel. Participating companies forego the expense in airline tickets, hotels, and per diem costs. The stress and strain of cancelled flights, schedule delays, and paltry in-flight meals is also eliminated. Course participants remain accessible and productive at their plants – just taking a few hours out of their day to build their knowledge.

**Knowledge Transfer:** Knowledge transfer during traditional short courses can be challenging since information retention for many adult learners peaks and then diminishes over time (usually during the third day of a short course). The format of the web course facilitates knowledge transfer by presenting information during the on-line sessions and allowing time to digest the information between sessions.

**Plant Linkage:** The homework proved to be a key ingredient that helped participants link what they learned in the "classroom" to their own plant. In many cases, participants from the same plant collaborated to tackle the homework problems.

## Web Course Challenges

Attending a traditional short course provides an opportunity for participants to network and share their experiences with other attendees and the course leaders. Networking in a web environment offers the same possibilities but requires a different mindset.

Although remaining in the plant to participate in the web course has its benefits, it also can present distractions. Distractions can range from technical difficulties (network slowdown or lock-up, computer crashing, etc.) to conditions in the local environment (engine room noise, interruptions from other staff, etc.).



## Noteworthy



- EPA joins the IRC!
- Gene Troy joins IAR as their Technical Director. Congratulations!
- Check out *Automatic Purgers in Refrigeration Systems*, an article by Doug Reindl and Jim Denkmann in the August ASHRAE Journal.
- The IRC has a professional staff position open. Are you interested in teaching, researching and evaluating industrial refrigeration systems? Contact Doug Reindl ([dreindl@facstaff.wisc.edu](mailto:dreindl@facstaff.wisc.edu)) for more information.
- Send items of note for next newsletter to Todd Jekel, [tjkel@facstaff.wisc.edu](mailto:tjkel@facstaff.wisc.edu)

A final challenge relates to the timing of the instructional sessions relative to the participant's individual work schedules. Each on-line session was held from 1:00-3:00 pm central standard time. Those course participants that normally work 2<sup>nd</sup> or 3<sup>rd</sup> shift sometimes found it difficult to balance work, rest, class, and homework.

We recognize these challenges and are already working on approaches to minimize their overall impact on the learning experience.

### Web Course Future

The IRC is in the process of refining the web course. We will use the pilot as an opportunity to build upon the lessons learned and evolve the program to more effectively deliver knowledge to future course participants.

If you would like more information on the web course or other educational opportunities at the University of Wisconsin, please contact Douglas Reindl: (608) 265-3010.

## Web Course Attendee Quotes

### Content

- "I think you guys did an excellent job--I learned a lot and you did a great job answering all my questions."
- "I have a better understanding of ammonia systems and a resource to rely on."
- "The course offered some valuable information on systems and components we work with everyday."
- "Came for a refresher course and that's what I got...made me think about our system and how it works."

### Web Interface

- "If the training wasn't convenient to our plant site we probably would not have a chance to attend it for many years."
- "Looking at the presentation from an instructional system point of view, I thought the format for the training was great...It definitely gave me a few ideas on another medium to use for presenting our programs through distance learning."

## IRC Hotline



Is there a question about your refrigeration system that has been puzzling you? Have you passed that question around the lunch table only to see shrugging shoulders from your co-workers? Have you considered calling us toll free at 866-635-4721 with your questions?

As part of your company's membership in the IRC, employees obtain access to the IRC hotline. Typical question topics include:

- Refrigeration system operational strategies
- Process Safety Management
- Refrigeration system trouble shooting
- National, state or local codes
- State of the art refrigeration components commercially available
- Latest information on refrigeration industry research
- Refrigeration design issues
- Fundamental refrigeration questions

When you call, e-mail or write, an IRC staff member will promptly research your question and return an answer to you. Most calls are answered immediately on the phone with the inquirer. If the call warrants a significant amount of time, or raises more questions of importance to your facility, the IRC will put together a proposal to perform the work necessary to answer your question.

Do not be bashful with your questions. When you contact the IRC hotline, we all benefit. Not only do you have your question answered but also the IRC staff gains further insight into the challenges facing the refrigeration industry. By tracking questions received, IRC staff can report to the IRC Advisory Council on topics that need further attention. This results in research, publications and information better suited towards your needs.

You can contact the IRC by phone, fax, e-mail or mail.

Phone: 866-635-4721 (toll free)  
608-262-8220  
Fax: 608-262-6209  
e-mail: [info@irc.wisc.edu](mailto:info@irc.wisc.edu)

We are found on the web at [www.irc.wisc.edu](http://www.irc.wisc.edu) and you can always drop us a note to 949 E. Washington Ave., #2, Madison, WI 53703.

We always enjoy hearing from our members.

## Benchmarking of Refrigeration Systems

"Benchmarking" is a management tool that compares your own organization's performance with that of others. The basic steps of benchmarking are to:

1. define appropriate measures or metrics that adequately characterize performance in the area of interest
2. measure your own performance, and that of "best practice" companies
3. identify and implement measures to close performance gaps

IRC members have expressed strong interest in benchmarking energy costs, staffing, safety practices, and engineering standards. We believe that the collaboration fostered by the IRC will provide a productive environment for exchanging information in these areas. As the first step, we are beginning an effort to gather benchmark data on refrigeration system operating costs.

Refrigeration is the single largest electrical load and is responsible for the majority of energy costs in most food processing and distribution facilities. However, energy use can vary dramatically from one plant to another, and there are little or no published data nor rules-of-thumb to evaluate whether a given facility uses more or less energy than "average". Refrigeration practitioners need reference data and methods that do not require detailed engineering studies to help them identify systems with above- or below-average energy use.

Benchmark data that provide normalized measures of operating costs for many plants can help refrigeration managers and operators assess where they stand, in terms of energy efficiency. Follow-up information on how the best plants achieve and sustain high efficiency levels can help managers and operators improve their own performance.

A critical issue for benchmarking is defining a metric that allows an "apples-to-apples" comparison of operating costs. Industrial refrigeration systems serve a many types of loads, at temperatures from – 45°F or lower to +50°F or higher. The energy use of a given system depends on the type of product load, production rates, weather, system design, and operating strategies and procedures.

For comparison purposes, energy cost is commonly expressed in terms of dollars per unit of product, and is often normalized to account for weather effects. For refrigerated warehouses, the energy cost might be compared in terms of dollars per square foot or per cubic foot of storage space.

The IRC benchmarking effort will initially have two objectives:

1. Create guidelines and a standardized format for collecting and presenting benchmark information on the operating costs of industrial refrigeration systems.
2. Begin the process of assembling a database of operating cost data.

The IRC has already begun collecting data on operating costs for industrial refrigeration systems. Creation of a standardized format will allow data collected by others to be added to the database, and will provide guidance for those collecting data.

We anticipate that the operating cost database (without site identities) will be made available to IRC member-organizations. In the future, we hope to identify the "best practices" that characterize the most efficient systems.

If your company would be interested in participating in the benchmarking project, or if you would like more information, contact Jim Elleson, (608) 262-6940 or [jselleson@facstaff.wisc.edu](mailto:jselleson@facstaff.wisc.edu).

### [2001 Ammonia Refrigeration Courses](#)

[Design of Ammonia Refrigeration Systems for Peak Performance and Efficiency](#)  
September 17-21, 2001                      Madison, WI

[Introduction to Ammonia Refrigeration Systems](#)  
October 10-12, 2001                      Madison, WI

[Ammonia Refrigeration Piping](#)  
October 31-November 2, 2001              Madison, WI

[Intermediate Ammonia Refrigeration Systems](#)  
December 5-7, 2001                      Madison, WI

Visit [www.engr.wisc.edu/epd/](http://www.engr.wisc.edu/epd/) for more information.