

# COMPLIANCE CONNECTION

May / June 2019

Vol 3 Issue 2

A bimonthly newsletter designed to help you navigate the ins and outs of compliance and the safe practice of industrial refrigeration.

## Risk Management Plan Update and Correction Information

By Mark Bennett

Since June 21, 1999, many of our clients are required to submit Risk Management Plans (RMPs) in accordance with 40 CFR Part 68, Subpart G. This is primarily due to the amount of anhydrous ammonia stored in the facility. If your facility has more than the threshold quantity for any chemical designated as regulated, then the RMP program applies to your facility.

The Risk Management Program mandates that accurate and fully updated RMPs must be submitted every five years. This mandatory resubmission has an anniversary date that dictates when your next RMP should be fully completed and submitted. The reporting is completed electronically through Central Data Exchange (CDX) which requires a user ID and password to access.

However, the five-year submission window is not the only time for changing the submitted RMP. Under certain circumstances, the RMP may have to be updated or resubmitted prior to the five-year anniversary. An updated RMP is due within six months if any of the following occur:

There is a change that requires a revised Process Hazard Analysis (PHA) or hazard review.

- There is a change that alters the program level to any covered process.
- A revised off-site consequence analysis (OCA) was performed.

The changes listed above will reset the five-year anniversary date, which means the new date will be five years from when the update was filed.

## REFRIGERATION REVIEW COURSE

August 26-27, 2019  
Kissimmee, FL

*This course is designed as a review course addressing materials that may be included in the RETA certification exam(s). This course is not intended to walk the attendee through the exam(s).*

*All August 26-27 review course attendees will be enrolled in the associated CFC Regional Conference.*

### Instructor

Chris Harmon, RAI



### Who Should Attend

Industrial refrigeration operators • technicians • consultants end-users • plant managers • plant or process engineers

### Registration Investment \$395

Successful completion of the class provides attendees with 16 professional development hours (PDH)

Registration Information: CALL 918-274-8639

**SEE PAGE 4 FOR MORE DETAILS**

Another change that may occur is called a correction. A correction may have to be submitted to the RMP and is due to any of the following:

- An accidental release of a regulated substance that requires an incident investigation occurs. Information about the incident must be added to the accident history and incident investigation sections of the RMP within six months of the occurrence.
- The facility emergency contact information changes; the new information in the RMP must be added within one month of the change.

In closing, the Risk Management Program is important because it brings awareness to facility management and the surrounding community that may be at risk if a regulated substance release occurs. If you have any questions or need assistance with your plan, please contact us and we would be glad to work with you as you endeavor for compliance and community protection.

## Confined Space



By: David Bennett

On one of my many winter survival trips, I deliberately put myself into a confined space situation. I built a shelter that day that was completely enclosed, with the exception of a four-foot by two-foot-wide door. I was able to squeeze my entire body inside (which is no small feat at 6' 7" tall!) but had little room to move around and work once inside. My intention was to keep the heat inside my shelter to protect me from the frigid winter temperatures outside. Around 8 pm, I started the fire outside my shelter. I built it in just a way so it would deflect the heat back into my shelter. It was a great plan, until around two in the morning when suddenly, the front side of my shelter caught fire. I immediately sprung into action and was able to get out of my tiny doorway for a quick escape. Thankfully I was able to wiggle my way out, but not without burning some parts of my clothes, half of my right pant leg was gone and some of the shelter collapsed on my legs. Luckily, I received no physical injuries. The fire started so fast I hardly had time to react to the situation. Because of my confined space training, I was able to escape quickly and without injury. Had I not been trained on confined space and known the hazards surrounding confined spaces, my outcome may have been tragically different.

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and hands-on experience for all parties who will work in or around that area.

A confined space is/has:

- Large enough for an employee to enter fully and to perform assigned work
- Not designed for continuous occupancy by the employee
- Limited or restricted means of entry and exit

A permit-required confined space has one or more of these characteristics:

- Contains or has the potential to contain a hazardous atmosphere
- Contains a material with a potential to engulf someone who enters the space
- Has an internal configuration that might cause an entrant into that area to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section
- Contains any other recognized serious safety or health hazards

In addition to knowing which type of confined space you have on-site, it is essential you are well-informed regarding your Personal Protective Equipment or PPE. At one of my training facilities, I was told about a man who was entering a manhole cover on his job site. Before he opened the manhole, he chose not to wear the correct PPE and did not use the confined space monitor to make certain the atmosphere showed favorable to enter. When he opened the manhole cover, two percent oxygen rushed out and immediately knocked him unconscious. He fell thirty feet down into the manhole. All it takes is that one time that can change your entire life and that of your family.

Make certain you know each item of your PPE's uses and limitations:

The Air Purifying Respirator (APR) is not designed to be used in any IDLH (Immediately Dangerous to Life and Health) situation such as any PPM (Parts per Million) at or above three hundred (two

hundred and fifty in some states) as well as anything under 19.5% oxygen.

The cartridges on your APR are chemical specific as well as the monitor. Make sure you know what the meter is telling you and how to understand it.

The confined space meter will tell you the level of oxygen and will alert you if there are any levels of excess chemicals in the area.

There should always be two people present when working in any confined space area. This is essential in the event of a confined space emergency because the additional person can either leave to get help or start a rescue operation for the person who is in danger. Additionally, this will ensure proper documentation of the emergency following the event.

Confined space accidents can happen in the blink of an eye. One wrong decision or simply being complacent are the conduits for people getting injured on the job site. In my line of work, I frequently hear people say, "I don't wear the PPE because I have done this job for ten years and nothing has happened yet." This is the worst attitude to have on the job site and the very definition of complacency.

Utilize the training materials and PPE at your facility to help you succeed at your job. Know what you are reading and how to apply that knowledge to practical scenarios. The goal for all of us is to get home safely to our loved ones who depend on us and look forward to us coming home each day.

What is the difference between confined space and permit-required confined space? That's the million-dollar question. In our industry, there is often confusion between the two, and not knowing, could prove hazardous. The code and regulations referencing confined space can be found in 29 CFR 1910.146. Reading and understanding these codes could prove crucial in our industry. It's important to have training with confined spaces in your facility as well. Not only is it required by OSHA and strictly enforced, but training could also prevent injury or even death.

Many hazards can occur in a confined space. Sixty-one percent of confined space deaths result from the physical hazards of entering a confined area. Physical hazards include heat, impact, falls and engulfment. Thirty-nine percent lose their lives due to atmospheric hazards such as oxygen deficiency, toxic chemicals and combustible dust.

There are four steps you can take to ensure proper identification of confined space versus permit-required confined space. The first one is a site evaluation cataloging what you have onsite. The second step is identification of proper safety equipment and the required tools to help you succeed in the event of an emergency. The third step is to have a trained rescue team that has developed a pre-plan program before you enter the confined area. The final step is to have certified training that involves practice

**Industrial Consultants**

Your Compliance Connection™

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**Industrial  
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# 2019-2020 TRAINING SCHEDULE

PO Box 833 • Owasso, OK 74055  
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Email: info@ammonia.com

## JULY 2019

### WARRENVILLE, IL

July 23-25 24 Hr Emergency Response  
July 23-26 32 Hr Level I Ammonia  
Refrigeration  
July 25 8 Hr ERT Refresher  
July 26 8 Hr Incident Command  
July 26 8 Hr ERT Refresher

## AUGUST 2019

### KISSIMMEE (ORLANDO), FL

Aug 26-27 16 Hr CARO/CIRO  
Refrigeration Review

## SEPTEMBER 2019

### CLIVE, IA

Sept. 17 8 Hr ERT Refresher  
Sept. 18-20 24 Hr Emergency Response

### PLYMOUTH, MN

Sept. 24-26 24 Hr Emergency Response\*  
Sept. 26 8 Hr ERT Refresher\*  
Sept. 27 8 Hr ERT Refresher\*

## OCTOBER 2019

### YUMA, AZ

Oct. 1 8 Hr ERT Refresher

### MECHANICSBURG, PA

Sept 30- Oct 2 24 Hr Emergency Response  
Oct. 3 8 Hr ERT Refresher  
Oct. 4 8 Hr ERT Refresher

### WARRENVILLE, IL

Oct. 22-24 24 Hr PSM/RMP Workshop  
Oct. 22-24 24 Hr Emergency Response  
Oct. 22-25 32 Hr Level I  
Refrigeration Operator  
Oct. 24 8 Hr ERT Refresher  
Oct. 25 8 Hr Incident Command  
Oct. 25 8 Hr ERT Refresher

## NOVEMBER 2019

### MIDDLE RIVER, MD

Nov. 5-7 24 Hr Emergency Response  
Nov. 6 8 Hr ERT Refresher  
Nov. 7 8 Hr ERT Refresher

### HILLIARD, OH

Nov. 11-13 24 Hr Emergency Response  
Nov. 14 8 Hr ERT Refresher  
Nov. 15 8 Hr ERT Refresher

## DECEMBER 2019

### SANTA MARIA, CA

Dec. 2-4 24 Hr Emergency Response\*  
Dec. 5 8 Hr ERT Refresher\*  
Dec. 6 8 Hr ERT Refresher\*

### BRIDGEVILLE, DE

## JANUARY 2020

### WARRENVILLE, IL

Jan. 21-23 24 Hr Emergency Response  
Jan. 21-24 32 Hr Level I  
Ammonia Refrigeration  
Jan. 23 8 Hr ERT Refresher  
Jan. 24 8 Hr Incident Command  
Jan. 24 8 Hr ERT Refresher

## FEBRUARY 2020

### FORT WAYNE, IN

Feb. 3-5 24 Hr Emergency Response  
Feb. 6 8 Hr ERT Refresher  
Feb. 7 8 Hr ERT Refresher

### PLYMOUTH, MN

Feb. 11-13 24 Hr Emergency Response\*  
February 13 8 Hr ERT Refresher\*  
February 14 8 Hr ERT Refresher\*

\*Special Pricing Applies to these classes

### **Cancellation Policy**

*Industrial Consultants reserves the right to cancel any course due to insufficient enrollment. Students enrolled in a cancelled course are entitled to a full refund or the payment may be transferred to another course. If you choose to withdraw from a course, you must do so no later than 15 days prior to the course start date. No refunds will be made if the student drops the course after this time. If you fail to cancel and do not attend the class, your payment will be forfeited, and may be subject to a cancellation fee. A person who is registered and is unable to attend, may at no additional cost, send a substitute.*

## About Us ...

**Industrial Consultants, LLC is celebrating its third decade of service providing the training needs for companies like yours.** Companies that must comply with health and safety regulations enacted by the Occupational Safety and Health Administration and the Environmental Protection Agency.

Industrial Consultants, LLC is focused on the food industry, due to the large number of refrigeration systems using anhydrous ammonia, for which safety and health regulations are very strict. These regulations are ever changing, with nearly every aspect of your business being impacted by OSHA and EPA. Expertise is needed at all levels to ensure compliance. We continue to provide this expert assistance and guidance to help meet all your compliance needs.

We are totally dedicated to assisting you in achieving your compliance goals, taking the mystery out of compliance, and helping you gain control of your safety and training needs.

**Let us be your compliance connection.**

### **Compliance Without Confusion:**

- Emergency Response Training
- Incident Commander Training
- Ammonia Refrigeration Training
- RETA CARO/CIRO/CRES Training
- Process Safety Management(PSM)
- Process Hazard Analysis(PHA)
- Compliance Audits
- EPA Risk Management Programs
- Safety Support Services
- Boiler Operator Training
- Plant Optimization Programs
- Mechanical Integrity Inspections

Each of these widely differing programs must meet specific OSHA and or EPA requirements for training your operating and safety personnel. This is the essence of compliance. However, continuing annual compliance is certainly not simple. Industrial Consultants, LLC can take the mystery out of compliance and help you gain control of your safety and training needs.

We have been training safety and operating personnel for 30 years. Thousands have benefitted from our current, comprehensive, complete and accurate training. You may rely on Industrial Consultants, LLC to keep your organization current on the ever changing OSHA and EPA training requirement for your facility.

# Industrial Consultants

Your Compliance Connection™

## 2019 REFRIGERATION REVIEW COURSE

August 26-27, 2019  
Kissimmee, FL

**Instructor**  
**Chris Harmon, RAI**  
**Industrial Consultants**



This special two-day course is held in conjunction with RETA Chapter Hosted Regional Conferences:

**August 26-27**

**Central FL Ammonia Refrigeration Regional Conference**

Embassy Suites Lake Buena Vista South

4955 Kyngs Heath Rd. • Kissimmee, FL

Room Reservations:

\$122/night (plus applicable tax)

Click here to be connected to the on-line reservation desk and take advantage of the negotiated group rate.

This course is designed as a review course addressing materials that may be included in the RETA certification exam(s). This course is **not** intended to walk the attendee through the exam(s).

**See Next Page For Full Course Outline**

### Who Should Attend

Industrial refrigeration operators • technicians • consultants  
end-users • plant managers • plant or process engineers

### Registration Investment \$395

Successful completion of the class provides attendees with 16 professional development hours (PDH)

Investment includes lecture materials (review textbook) and daily lunch. It is recommended for students to have reviewed and bring the following textbooks: *RETA Industrial Refrigeration One and Two (IR1 and IR2)* and *Basic Electricity 2 (BE2)* - available at <http://www.reta.com>.

**Special for attendees** — All review course attendees will be enrolled in the Regional Conference associated with the class for which they are enrolled. Regional Conference enrollment provides for (but may not be limited to) receipt of Regional Conference attendees materials as well as participation in Exhibit Hall hours.

Enrollment is limited to 30 students.

**REGISTER  
TODAY!  
CALL  
918-274-8639**

**REGISTER  
ON LINE**

### Contact Information

For questions regarding the Refrigeration Review Course, please contact:

**Industrial Consultants**

PO Box 833 • Owasso OK 74055

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Tel: 918-274-8639 • FAX 918-274-8816

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### RETA CIRO or CARO Certification Exam

Course attendees may elect to sit for a RETA certification exam (CIRO or CARO) following the course. **Test candidates must preregister** (submitting all paperwork and payment) for the certification exam at least 2 weeks in advance of testing date. **For details on how to register and arrange for your RETA certification exam, go to the RETA website at <http://www.reta.com>.** If you have questions regarding the Certification Exam, please contact Dan Reisinger at RETA HQ (email [dan@reta.com](mailto:dan@reta.com)) or 541-497-2955.

# Refrigeration Review Course Outline

## Refrigeration Fundamentals Review

### Basic Refrigeration Terms and Principles

- Units of measurement: area, volume, specific volume, rate (CFM, GPM), temperature, pressure (psia, psig) pressure/temperature chart
- Heat: conduction, convection, radiation, BTU, sensible heat, latent heat, specific heat, latent heat of vaporization/conduction, specific heat, subcooling, superheating, saturation, water heat curve
- Ton of refrigeration, heat calculations

### Heat Flow in Refrigeration Systems

- Factors that affect conduction of heat: area, temperature difference, thermal conductivity, distance the heat passes through
- Conditions which increase/decrease effect of evaporator performance
- Pressure-enthalpy or Mollier Diagram

### The Basic Refrigeration Cycle – Heat Flow

- The flow of heat through the four main components
- Basic P&ID for a system
- Heat of compression, compression ratio, pressure drop, noncondensable gases

### Properties of Refrigerants

- Refrigerant selection factors
- Refrigerant operating characteristics: evaporator pressure, condensing pressure, theoretical discharge temperature, refrigerating effect (BTU/lb), Mass flow (lb/min/ton)
- Advantages/disadvantages of refrigerants
- Saturated refrigerant table: explanation of each column

### Compressors

- Types of compressors:
  - Positive displacement, dynamic displacement
  - Open drive, hermetic
  - Reciprocating, rotary
- Reciprocating compressor: horizontal, VSA, V-W
- Rotary vane compressor
- Rotary screw compressor: compression cycle, oil
- Loading of a compressor
- Two stage compression and booster compressors
- Operation and maintenance: oil, oil heaters, slugging, log sheets

### Lubrication

- Function in a refrigeration system, quality
- Types: splash, force-feed
- Oil and an ammonia system: draining oil and its dangers
- Oil pots, oil stills, oil scrubber
- Oil cooling

### Evaporators/Cooling Units

- Function
- Fluid cooling, air cooling, forced convection, blast freezing, plate freezing
- Secondary coolant

### Condensers

- Function and general types
- Shell and tube condenser
  - Causes of elevated head pressure
  - Cleaning, leaking, re-tubing
- Evaporative condenser
  - Basic design components and flow of refrigerant
  - Effect of humidity
  - Scale, corrosion
  - Head pressure control, fans, motors, dampers

### Receivers

- Function
- Typical receiver connections and their functions
- King valve
- Overpressure protection

### Purging

- Function
- Sources of noncondensables
- Types: manual, on-line, automatic
- Hansen purger

## Refrigeration System Operations

### Low Side Feed Valves and Controls (Evaporator Feed)

- Hand expansion valve (HEV)
- Thermostatic valve (TXV):
  - forces that drive the valve
  - nine basic points of operation
  - equalization
- Solenoid valve
- Float switch/level sensor
- Float valve

### Direct Expansion System (DX)

- Basic design
- Slop-over/slugs
- Top feed/bottom feed
- Suction line accumulator

### Flooded Systems

- Basic design
- Oil accumulation
- Resistance to heat transfer: product side/refrigerant side
- Causes of over-fill
- Consequences of slop-over (slugs)

### Pumped Liquid Recirculation Systems (Liquid Overfeed)

- Basic design and recirculation ratio
- Pumps: mechanical and gas operated
- Basic rules for operation of centrifugal pumps

- Gas pumper systems: single, double, constant pressure
- Pump sizing, line sizing
- Refrigerant charge
- Start-up and basic operation, oil removal
- Advantages/disadvantages

### Secondary Coolant Circulation System

- Direct vs. indirect
- Common secondary coolants
- 2 pipe/3 pipe system
- Defrost of secondary coils
- Pump types for secondary refrigerant
- Heat exchangers:
  - Open tank
  - Shell and tube
  - Plate and frame and its advantages

### Two Stage System

- Basic design of operation
- Horsepower savings
- Compression cycle: booster compressor/high stage compressor
- Intercooler function: shell & coil, flash type
- Noncondensables
- Cascade System

### Coil Defrost

- Moisture content, pump down, fan delay, pressure equalization
- Air defrost
- Electric defrost
- Water defrost
- Continuous defrost
- Hot gas defrost operation and guidelines
- Causes for excess of ice buildup

### Measuring System Performance

- Measurements: horsepower, BTU, HP/ton, Kilowatt, Kw/ton, Kw demand
- Calculation: compression ratio, cost and efficiency

### Electricity

- Fundamentals: Ladder Diagram
  - Rungs of the ladder
  - Symbols
  - Switches
  - Circuits



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