

# CONDENSER

## 2024 Conference RECAP

NETWORKING AND TECHNOLOGY  
SHOWCASE IN ORLANDO

iiar®  
**2024 NATURAL REFRIGERATION**  
CONFERENCE & HEAVY EQUIPMENT  
EXPO



# MAY 2024 contents

## CONDENSER STAFF

Publisher  
Gary Schrift

Editor-In-Chief  
Andrea Fischer

Staff Writer  
Mindy Long

Creative Director  
Bill Ellis

V.P. and Technical  
Director  
Eric Smith

International  
Institute of Ammonia  
Refrigeration

1001 North  
Fairfax Street,  
Suite 503  
Alexandria, VA 22314  
[www.iiar.org](http://www.iiar.org)

Phone: 703-312-4200  
Fax: 703-312-0065



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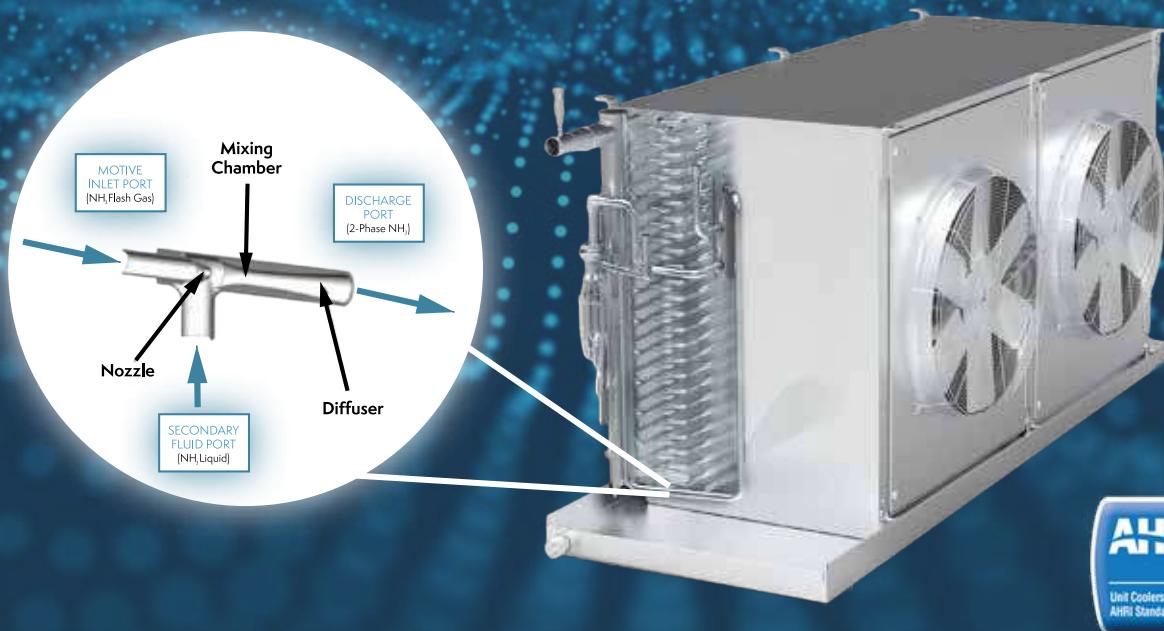
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# president's

BY GARY SCHRIFT

# MESSAGE

We're all back at work after a fun and successful annual conference in Orlando, and now it's time to set some new goals and carry the momentum of our recent meeting into the rest of the year. The post-conference return to projects and deadlines also marks the beginning of the membership renewal process for the 2024-2025 IIAR Membership year, which runs now through June 2025.

I invite you to renew your IIAR membership and continue to receive into the next year all of the many new and expanded benefits provided for you and your co-workers. I am always in awe of the volume of work our organization turns out through the dedicated effort of our many volunteers and the IIAR staff – and we've made significant strides in the last year through the dedication and commitment of members like you.

## IIAR MEMBERSHIP BENEFITS

IIAR has over 3,700 members from more than 50 countries around the world and [members of IIAR](#) include design engineers, end users, manufacturers, contractors, students, scientists, and trainers. [Alliance organizations](#) in Asia Pacific, Europe, Latin America, North America, and Australia continue to make international outreach a hallmark mission of the organization.

The new membership structure, introduced in 2022, continues to provide access to the e-Library, member directory, an eKIT of all IIAR standards (current and past revisions) via an eREADER service, and online webinars. IIAR is encouraging members to take advantage of the free IIAR Academy of Natural Refrigerants certificate course per member per year and the free IIAR Training Video Series per member per year.

Additional benefits, such as eligibility for listing in the [Natural Refrigeration](#)

[Directory](#), are exclusive to Group Membership vs. Individual Membership. Members receive a discount for purchasing published electronic and hard copies through the website, and new for 2024, the Condenser magazine has moved to a new online platform with additional search features on all published articles. For more information, please see the [Member Benefits](#) page.

Attendance at the annual conference

bers, and externally, to any regulators, support personnel, industries that touch industrial refrigeration, and companies and organizations new to the use of natural refrigerants.

I hope you feel free to contribute with the new ideas and level of participation that has become the hallmark of this group. While it's hard to turn our attention away from all the excitement

## I hope you feel free to contribute with the new ideas and level of participation that has become the hallmark of this group.

is also one of the most important – and anticipated membership benefits and activities, and this year was no exception. New in 2024, the first Natural Refrigeration Foundation (NRF) Fun Day was held on Sunday, March 24, benefiting the Foundation's research, education, and scholarship efforts. The pickleball, cornhole, and our annual golf tournament were followed by an awards ceremony, our VIP reception, and the newly announced Diversity in Natural Refrigeration reception. Reformatted programming allowed for a more relaxed committee meeting schedule, and our first-ever IIAR Student Day hosted post-secondary students in every phase of their academic journey to introduce them to a career in natural refrigeration.

My priority this year will be to make sure that these programs continue and to build on everything our industry has to offer, both internally, to our mem-

of our most recent conference, it's time to start thinking about how to use that renewed enthusiasm in the coming year to strengthen IIAR's member presence and plan for our next event.

The 2025 IIAR Industrial Refrigeration Conference & Heavy Equipment Expo will be held March 2–5 in Phoenix, Arizona. If you have a Technical Paper or a workshop that you would like to present in Arizona, please contact Eric Smith at IIAR headquarters to submit your abstract as soon as possible. Technical papers and session topics are the fabric of IIAR meetings and will be selected quickly to allow presenters plenty of time to prepare their presentations. As members, your ongoing work and participation make all of our activities possible. Thank you for continuing to enrich our industry with your support.



# *Remembers*

## Members for Their Service and Contributions

IIAR's success hinges on the involvement of its members, and the association would like to pay tribute to several members who have passed away. These members generously shared their time and expertise with IIAR and the industry, and they will be missed.

---

### Remembering Bob Burdick, IIAR Piping Handbook Author

**B**ob Burdick, the Vice President of Bassett Mechanical from 1967 – 2002, longtime IIAR member, first chairman of the IIAR piping committee, and one of the original authors of the IIAR piping

on the job site, talking and joking with all the people installing his systems. He also loved attending ASHRAE and IIAR conferences, where he could interact with fellow colleagues and come home with up-to-date industry information

experiences. Bob studied Mechanical Engineering at UW Madison, where he met Glenda (Boyer) when she was looking for a bridge partner. They were married in 1963 and enjoyed 61 years of marriage, living primarily in Green Bay, WI.

**Bob was a tireless family man and hockey dad, traveling to and scheduling youth hockey games in three states. He had a passion not only for selling refrigeration and cooling systems but also for teaching customers how to properly operate them.**

Bob was a tireless family man and hockey dad, traveling to and scheduling youth hockey games in three states. A history enthusiast, especially Abraham Lincoln, the Civil War, and World War II, this passion led him to restore a 1947 Willy's jeep to WWII specs, ship it to Normandy, France, and drive it to Belgium on the Liberty Road with three friends and son, Clark.

Later in life, he enjoyed writing, publishing two memoirs, trying his hand at poetry, and building models of military ships. Bob was preceded in death by his parents and his brother Ronald and is survived by his brother Frank. He will be deeply missed by his wife Glenda, sons Clark (Heather) Burdick, Greg (Sarah) Burdick, Raymond (Kate) Burdick, grandchildren Eve (Cael Foster) Burdick, Benjamin Burdick, Olivia Burdick, Caroline Burdick, Faye Burdick, nieces, nephews, and many good friends.

handbook, has passed away.

Most of Bob's working life was spent at Bassett Mechanical, where he became a specialist in ammonia refrigeration. He had a passion not only for selling refrigeration and cooling systems but also for teaching customers how to properly operate them. He loved being

and with new jokes, which he was a master at telling.

Robert (Bob) Sylvester Burdick died on April 25, 2024, at the age of 84. He was born in Beloit, WI, on May 18, 1940, to Sylvester and Ruth (Gotham) Burdick. He loved growing up in Beloit and later wrote a memoir about his



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# 2024 Conference RECAP

## NETWORKING AND TECHNOLOGY SHOWCASE IN ORLANDO

**M**ore than 1,900 attendees participated in the International Institute of All-Natural Refrigeration's Natural Refrigeration Conference & Heavy Equipment Expo in Orlando, Florida, setting a new record for attendance. The event provided the latest information on industry issues, technical knowledge, and networking, as well as an opportunity to see new equipment for those involved in the natural refrigeration industry.

### SHARING KNOWLEDGE

The meeting featured several opportunities to learn about the industry, including technical paper presentations, panel

discussions and product showcases. "Todd Jekel gave a fantastic presentation on his paper that discusses the intricacies of valves that are piped to relieve internally to the system," said Eric Smith, IIAR's vice president and technical director.

Jekel's session, Application and Considerations for Internal Relief in Industry, depicted how various over pressure protection schemes should be considered and addressed.

"There was also an excellent session on energy recovery methods for CO<sub>2</sub> transcritical systems," Smith said. "It clarified the thermophysical and thermodynamic cycle analysis of transcritical sessions." The session featured four

speakers: Brian Fricke and Kashif Nawaz with Oak Ridge National Laboratory, Allesandro Silva of Bitzer U.S., and Azam Thatte with Energy Recovery.

Sessions also covered decarbonization, circulation rates, piping, and more.

### SHOWCASING EQUIPMENT

IIAR's annual conference now includes a heavy equipment expo each year. Previously, equipment was only featured every three years, explained Yesenia Rector, meetings and international program director for IIAR. "Companies who exhibit have the opportunity to showcase their latest equipment," she said, adding that the expo is a draw. "The industry is moving really fast, and



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there is a lot of technological development taking place.”

New innovations in CO<sub>2</sub>, ammonia, and package systems can be brought into the exhibit hall to help educate attendees about the latest technology.

#### CELEBRATING STUDENTS

This year, IIAR created its first “Student Day,” marketing to students, and received approximately 40 student registrations. Students were welcome to attend all days of the conference, but the last day was a dedicated “Student Day,” which featured educational sessions for the novices to natural refrigerant industry as well as exhibitors that were prepared to meet the students.

“The students have always had a free registration to the conference, but it

wasn’t widely advertised or known,” Rector said.

Schrift said the industry recognizes the value of attracting new entrants, which starts with students. “Next year, we will focus more on having novice and student educational sessions throughout the conference and encourage students to attend the entire conference.”

IIAR will emphasize that students are welcome to attend technical programs, networking opportunities, and the expo hours. “Practically speaking, it is best to say it is an opportunity for students to come to the conference overall,” Rector said. “It may not be called ‘Student Day,’ because we want to encourage students to attend the full conference so they benefit from all of the networking and learning.”

#### BUILDING A NETWORK

Attendees were able to take part in several networking opportunities, including the Diversity in Natural Refrigeration Reception, First Timer’s Reception, and Chairman’s Reception. IIAR also created an expanded VIP evening event that brought together volunteers who share their time with the association, including board and committee members, domestic and international VIPs, and staff.

“We held the event at Jaleo in Disney Springs with tapas food stations, a drink station, music and dancing,” Schrift said. “The feedback from all attendees was fabulous, and I believe it was well received not only because of the location but also because we brought together all the very important persons in the IIAR community.”



TODD JEKEL, PHD



CHRISTIAN ALI  
MUNOZ DURAN

## IIAR Recognizes Two Industry Thought Leaders with Presentation Excellence Awards

**T**he IIAR Award for Presentation Excellence was presented to two deserving individuals during IIAR’s annual meeting.

Todd Jekel, University of Wisconsin Madison, received IIAR’s 2024 Award for Presentation Excellence for the English presentation of his paper titled “Application and Considerations for Internal Relief in Industrial Refrigeration Systems.” Jekel is a longtime contributor to NRF research projects.

IIAR also recognizes colleagues who

contribute non-English papers to the program. Christian Ali Muñoz Durán, MR Braz & Associates, PLLC, received IIAR’s 2024 Award for Presentation Excellence for his paper titled “Paquetes de carga crítica de amoníaco DX versus sistema centralizados de amoníaco recirculado, como alternativas de solución para sistemas de refrigeración industrial.”

The IIAR Award for Presentation Excellence, previously IIAR’s “Andy Ammonia Award,” was created to acknowledge the crucial role that education and information-sharing play within the refrigeration

industry and to provide acknowledgment of the expertise that is generously shared by volunteers. Spanish speaking colleagues are specially recognized for their significant efforts to relay important concepts and information to the Spanish-speaking professionals in the industry.

The selection of the award is based on evaluations conference attendees submit on the conference app. This year’s scoring was very close between several excellent presentations.

# IIAR Signs MOUs with IIR and NASRC

IIAR has signed memorandums of understanding with the International Institute of Refrigeration (IIR) and the North American Sustainable Refrigeration Council (NASRC). Schrift said MOUs are important in documenting a board-approved framework that allows IIAR and other organizations to work together on mutually beneficial projects.

“In general, IIAR signs MOUs with organizations that share a vision that matches or overlaps with IIAR’s goal to promote the use of natural refrigerants,” Schrift said.

IIR focuses on the global need for cooling and providing it in an efficient and sustainable manner. While they are not specifically devoted to only natural refrigerants, they have and do recognize that the world is moving towards naturals and that governments are regulating the use of many synthetic refrigerants.

“IIR has historically provided education and conferences devoted entirely to the use of ammonia and CO<sub>2</sub> as a refrigerant,” Schrift said. “IIR’s worldwide presence at the governmental level can provide IIAR access to more groups in our promotion of all-naturals.”

In addition, Schrift said IIAR’s expertise in education, standards and expositions can support IIR as they continue to advocate for efficient, safe, and sustainable cooling in the world, including very preliminary discussions for a joint IIR-IIAR conference and exposition in Europe beginning in 2027.

NASRC shares IIAR’s mission to promote natural refrigerants. “IIAR has been a longtime partner in our common mission to support the successful adoption of natural refrigerants. This MOU formalizes our collaboration and reflects the growing need in the refrigeration industry for future-proof solutions,” said Danielle Wright, executive director of NASRC.

Schrift said their strength in and focus on the use of CO<sub>2</sub> in commercial applications compliments IIAR’s overall mission to promote ammonia, CO<sub>2</sub>, propane, and all-natural refrigerants. Additionally, NASRC has joined some of IIAR’s task forces and committees and can support the committees’ efforts



through their expertise in the practical use of CO<sub>2</sub> and through the knowledge from the NASRC members.

“NASRC’s focus on education for technicians on servicing and operating CO<sub>2</sub> refrigeration systems helps prepare the world for a change to naturals,” Schrift said. “So, IIAR’s work in developing CO<sub>2</sub> standards recognized by building codes and NASRC’s work in expanding the workforce to be able to support more CO<sub>2</sub> systems are quite complimentary.”

NASRC was recently selected as the third-party administrator for the \$65 Million California Air Resources Board’s (CARB) Fluorinated Gas Reduction Incentive Program.

“The goal of FRIP is to reduce greenhouse gas emissions in the commercial and industrial refrigeration sector by replacing existing high global warming potential refrigerants with ultra-low-GWP refrigerants,” Wright said.

She added that FRIP is funded partially through the State’s General Fund and partially through California



Climate Investments, a statewide initiative that puts billions of cap-and-trade dollars to work reducing greenhouse gas emissions, strengthening the economy, and improving public health and the environment, particularly in disadvantaged communities.





## NRF Fun Day Raises Nearly \$80,000 for Scholarships and Research

**T**he Natural Refrigeration Foundation's Fun Day during the annual conference featured golf, cornhole, and pickleball, raising \$77,000 to support the foundation's scholarships and research projects. All of the events reached their maximum capacity.

"We had 100 golfers, and we had more that were interested that were not able to participate because we were capped by the golf course," said Yesenia Rector, meetings and international program director for IAR. "We had 16 teams of two people each for pickleball and 16 teams of two people each for cornhole."

Trevor Hegg, chairman of the Natural Refrigerant Foundation, said in the past the foundation planned for 80 golfers. He believes the new format of the meeting, which had attendees arriving on Saturday for the committee meetings, enabled more people to participate in Fun Day on Sunday.

"With the success we had, we're going to plan to reserve the whole course going forward. That will be 128 golfers that you can put on in a shotgun start," Hegg said, adding that he hopes to see 32 teams each for pickleball and cornhole next year.

The number of people taking part in pickleball and cornhole has already increased, tripling over last year. The foundation added the events last year to appeal to non-golfers. "Pickleball and cornhole seemed like a good idea to encourage the friendly competitiveness and let people just have fun," Rector said, adding that she hopes to add another activity next year that could appeal to even more attendees. "We could add bingo or something fun that is not physical."

All three events took place at the same venue, which allowed attendees to connect with those taking part in the different activities. "After the event, it was nice to have the gathering where we could celebrate the champions of the

event but, more importantly, celebrate what the NRF does," Hegg said.

The research the NRF produces is often incorporated into standards, requirements, and guidelines used within the refrigeration industry. "It is key to continue with these research projects because it gives us a way to move forward," Rector said. "It is important to have these kinds of events. They not only nourish our relationships as an organization but also help develop the future of the industry."

This year, the foundation awarded 20 scholarships. "The quality and caliber of these students speaks volumes to how the scholarship program has grown and continues to grow," Hegg said.

NRF is also looking at developing an internship program through IAR that would engage top students and connect them with member companies. "I think it will grow where we can offer students internships that they might value more than a scholarship," Hegg said.



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# RSES and RETA Merger Moves Forward

**T**he Refrigeration Service Engineers Society (RSES) will be merging with Refrigerating Engineers & Technicians Association (RETA) to help build awareness of industrial refrigeration careers and increase the number of technicians entering the industrial space. “We believe we will be better together moving forward,” said Jim Barron, executive director of RETA.

who are and will be retiring in the next few years, and we have a ratio of about seven leaving and three entering our industry. We will have a major shortfall of qualified operators and technicians in all our trades,” Barron said.

There is an overwhelming amount of knowledge that will leave the industry as older employees retire. “We need to embrace those folks and encourage them to share their experiences with the new folks we do have in the industry,”

As part of the merger, RSES plans to improve its education and certification,” Schiavo said. “RETA has the blueprint for creating the gold standard for that. We’re looking to do the same thing on the HVACR side because right now, it is the Wild West out there.”

## BUILDING A TALENT PIPELINE

To help attract new entrants to the industry, RETA regularly attends job fairs at the high school level to share information about the refrigeration industry with students. “We need more companies nationwide to do this,” Barron said.

The earlier the better when it comes to exposing students to the opportunities in the refrigeration industry and other trades, Hawkins said. “If companies can participate in school career fairs, etc., that would be wonderful, and it is something we need to embrace across the country,” he explained.

RETA also visits junior colleges and technical schools. “RETA and RSES both are currently working with some technical colleges and vocational tech schools to build awareness and hope to expand on these relationships,” Hawkins said. “Through the RETA Training Institute, we have programs focused on folks transitioning out of the military, women, and youth and young adults.”

Schiavo said that compensation that meets the basic needs of individuals, as well as a path to proceed upward into the company, is crucial to attracting workers. “An investment in employees’ education and providing a living wage will certainly incentivize new talent,” she said, adding that employees also value the opportunity to obtain continuing education.

## SUPPORTING THE INDUSTRY

Hawkins added that there is an ongoing need for financial donations to support RETA so it can continue recruiting and training individuals.

“With financial donations to the RETA Training Institute, we can continue to train and recruit folks into our industry,” Hawkins said. “Once folks are hired, we need the industry to continue to support these individuals with additional training and certification.”

“There is an overwhelming amount of knowledge that will leave the industry as older employees retire. We need to embrace those folks and encourage them to share their experiences with the new folks we do have in the industry.”

—Michael Hawkins, manufacturers’ representative for Midatlantic Refrigeration and the current RETA president

Michael Hawkins, manufacturers’ representative for Midatlantic Refrigeration and the current RETA president, said that up until 1933, RETA and RSES were one organization, and RSES split off to form their own organization when residential air conditioning systems got smaller, and that market took off. “It only makes sense that with the focus on natural refrigerants, we come together again as one organization,” he said.

This merge should be complete by the end of 2024. Barron said there is an overall shortage of skilled technicians as a whole, including in industrial refrigeration, HVAC/R, plumbing, electrical and welding.

“We have millions of Baby Boomers

Hawkins said.

Lori Schiavo, senior director of operations for RSES, said, as is the case with RETA, RSES would like to see HVACR company owners, manufacturers and distributors embrace training by providing it to their techs of all levels.

“At the rate our industry is changing today, combined with the lack of techs entering the field, it is absolutely dire that these groups offer continuing education to their employees,” Schiavo said. “It should range from basics/fundamentals through to advanced courses. This will guarantee that all levels of professionals can continue on their respective paths of learning while serving customers in need of HVACR service.”



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# The Role of Emergency Preparedness for Facilities with Natural Refrigerants

Natural refrigerants, including ammonia and CO<sub>2</sub>, require robust emergency response and management protocols to address potential risks and ensure safety. As the refrigeration industry continues its transition towards natural refrigerants, prioritizing emergency response and management is paramount, and the industry, state and federal governments and local jurisdictions are all working to ensure they're prepared.

"There are multiple regulatory avenues the government is trying to address in emergency response," said Lowell Randel, vice president of government and legal affairs for the Global Cold Chain Alliance. "Regulatory bodies are evaluating emergency response policies and looking to ensure that the regulatory landscape has sufficient rules around it to support effective emergency response at the facility level and from local response teams."

There have been federal rulemakings that are either just completed or underway. The Environmental Protection Agency's recent changes to the Risk Management Program has an emergency response element, and there is also a proposed OSHA emergency response regulation. "I expect that OSHA will be doing something with PSM similar to the recent RMP changes," Randel said.

The Risk Management Program is a key regulation for facilities with over 10,000 pounds of ammonia and requires them to engage in emergency response planning and engagement with their local responders. "The recently finalized rule strengthens some of the requirements for emergency response. It sets forth a specific timeline for field exercises and emphasizes the importance of coordination and communication with local responders as well as the local community," Randel said.

It also emphasizes the importance of employee communication and participation in the emergency response planning process. "There are a lot of core principles you'll see from facility to facility, but every facility will be different, so you'll take into account the unique factors for your facility and your team what the details of your emergency plans will be," Randel said.

OSHA's proposed Emergency Response rule would extend and "beef up" provi-

sions around how a facility's responders would respond to fire or other type of incidents, i.e. how they plan for an emergency event, how they train employees, and equipment maintenance, usage and upkeep to ensure they are responding in a safe manner.

"It is important to note that if the facility qualifies as a non-responding facility, they would not be subject to the proposed rule change, but if they have responders who enter an Immediately Dangerous to Life and Health (IDLH – 300 ppm) atmosphere, the HAZWOPER -and process safety management requirements do become subject to this proposed rule," Randel said."

## CREATING A PLAN

The Ammonia Safety Training Institute offers a range of emergency preparedness insights and has been asked by the Region 9 Environmental Protection Agency to conduct four tabletop exercises (TTX) per year within Region 9 for the last five years.

A TTX is an emergency preparedness activity that uses a fictitious ammonia loss of containment 'event' to engage participants from industry, public safety and government (the Tripod) to respond to pre-developed inject questions that are created by ASTI. The TTX process invokes the need for the Tripod responders to communicate their plan of action for the inject response challenge TTX 'Event' that they face.

ASTI facilitators encourage a cooperative and constructive command and operations connection between the local industrial and public safety first responders, government personnel, and other Tripod attendees to evaluate the key messages that would improve the future engagement of their own emergency response practices.

"We create tabletop experiences with high-profile ammonia-related scenarios that begin as an accidental release Event that escapes containment and control and progresses through the four stages of response: discovery, initial response, sustained response, and termination/recovery stages. During the recovery stage, we conduct a debriefing that points out the key points needed by responders that address their locally adopted concept of operations (Ammonia Response CONOPS)," said Gary Smith, CEO and co-founder of the Ammonia Safety Training Institute.

This is a federal framework that outlines the core components of an emergency response plan. "The overarching emergency response framework then officially links to the states, especially the states enforcing the federal regulations. Even if they aren't, states have certain rights to come up with requirements they think are necessary, and the authorities have the jurisdiction to dictate how to address ammonia emergency events," Smith said.

IIAR standards offer valuable emergency system components such as operational SOPs and best practices guideline documents such as the 'Critical Task Guidance for Ammonia Refrigeration System Emergency Planning. The guidance should be considered by the AJJ for inclusion within the Ammonia Response CONOPS.

"The emergency preparedness and system control recommendations for industrial responders and operators that extend from training and certification provided by RETA and IIAR adds a great deal of validity and strength to the locally adopted ammonia response CONOPS," Smith said. "The Tripod agreement to utilize a local ammonia response CONOPS is the best opportunity to stop an emergency when it is small."

Smith said ASTI's framework for training and emergency response includes four key areas. These include:

**Ammonia Emergency Response Concept of Operations (CONOPS):** The CONOPS is to be utilized based upon emergency response logic adopted by the local Authorities Having Jurisdiction (AHJ) that must also comply with the State and Federal emergency response framework. The adopted response CONOPS is nurtured during pre-event training sessions and tabletop exercises. The goal is to attain Tripod cooperation and compliance with the contents of an AHJ-adopted ammonia response CONOPS.

**Cooperative Research and Development Agreement (CRADA):** ASTI was invited by IIAR leadership to work with the Department of Homeland Security - Chemical Security Analysis Center (CSAC) to share insights about the emergency management readiness to contain and control ammonia and aqueous ammonia hazards, risks and threats of high-impact emergency events that could become catastrophic disaster events. The ASTI report is a compendium

of lagging and leading indicators that play a part in the Bowtie hazard analysis. Lagging indicators inspire preventative barriers (risk mitigations) that contain and control the threats associated with a loss of hazard containment event. If preventative barriers fail, a top event—an emergency—emerges. System operator specialists and emergency responders must collaborate and use Leading indicators to assess the risks and threats and devise an incident action plan to safely contain and control the top event before it becomes catastrophic.

#### **Playbooks Based on Federal Emergency**

**Response Framework:** The One Plan Playbook emergency response system that plays on a web-app platform. The Playbook platform allows a facility to upload emergency response details that apply to each hazard zone in their plant. The One Plan (Integrated Contingency Plan) was built by the National Response Team (NRT) and adopted by EPA in 1991. The web-app system provides the facility owner with the opportunity to upload emergency plans, master maps, diagrams, pictures, and video clips that depict critical information needed during the four stages of response. The goal is to provide the facility owner with a self-sufficient custom-built response system that complies with all governmental regulations and public safety responder needs. The Playbooks are used for emergency planning, compliance training, and to provide guidance and documentation of situation status during an emergency event that the facility team leader can link to off-site response contractors and corporate tech support.

**Significantly Improve Operational Critical Tasks First Responder Capability:** ASTI recommends that a facility owner/employer consider selecting two or more facility operators and/or ammonia system maintenance personnel to engage in defensive actions to address Discovery and Initial Response actions under the auspices of an Emergency Action Plan First Responder Operations-level Emergency Action Plan rather than to select the non-responder option. The OSHA standard for “Operational” eight-hour responder training is found in 1910.120(q)(6)(ii) HAZWOPER training. This would allow the employer to use the IIAR Critical Tasks Guidance information as a recommended standard of operation to support life safety during reconnaissance, rescue support, and emergency system control while working outside of the IDLH (300 ppm) threat.



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# EPA Issues Final Rule with Risk Management Program Changes

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## RELATIONS

BY LOWELL RANDEL, IIAR GOVERNMENT RELATIONS DIRECTOR

**O**n March 11th, the Environmental Protection Agency (EPA) published the [Safer Communities by Chemical Accident Prevention Final Rule](#) that makes changes to the agency's Risk Management Program (RMP). The move is the latest in a series of rulemakings related to RMP over the last 10

Below is a summary of major provisions included in the Final Rule:

**Natural hazards and power loss:** Related to climate change, the Final Rule adds amplifying regulatory text to emphasize that natural hazards (including those that result from climate change) and loss of power are among the hazards that must be addressed in Program

RMP reportable accident, their next scheduled compliance audit must be a third-party audit. Third-party audits must meet independence and competence requirements. A third-party audit can also be triggered when an implementing agency (EPA or a state equivalent) requires a third-party audit due to conditions at the stationary source that could lead to an accidental release of a regulated substance, or when a previous third-party audit failed to meet the competency or independence criteria. If an implementing agency makes a preliminary determination that a third-party audit is necessary, written notice will be provided to the facility and there is an appeals process to challenge the determination.

**Root cause analysis:** Requires a formal root cause analysis incident investigation when facilities have had an RMP-reportable accident. Report shall be completed within 12 months of the incident and include factors that contributed to the incident including the initiating event, direct and indirect contributing factors, and root causes.

**Employee participation:** Requires employee participation in resolving process hazard analyses, compliance audit and incident investigation recommendations and findings. Outlines stop work procedures in Program 3 employee participation plans. Requires Program 2 and Program 3 employee participation plans to include opportunities for employees to anonymously report RMP-reportable accidents or other related RMP non-compliance issues. Requires training on employee participation plans.

**Community notification of RMP accidents:** Requires non-responding RMP facilities to develop procedures for informing the public about accidental releases. Requires release notification data be provided to local responders. Requires partnering with local responders to ensure a community notification

## The Biden Administration believes that the final rule will help further protect human health and the environment from chemical hazards through advancement of process safety based on lessons learned.

years and reinstates several requirements similar to those mandated by the Obama Administration and later rescinded by the Trump Administration.

The Biden Administration believes that the final rule will help further protect human health and the environment from chemical hazards through advancement of process safety based on lessons learned. The RMP program changes seek to improve chemical process safety; assist in planning, preparedness, and response to Risk Management Program-reportable accidents; and improve public awareness of chemical hazards at regulated sources. Many of the changes move back to policies enacted during the Obama Administration, but there are also new provisions that address Biden priorities related to climate change and environmental justice.

2 hazard reviews and Program 3 process hazard analyses. The rule also requires back-up power for release monitoring equipment.

**Facility siting:** In the rule, EPA expresses concern that disadvantaged populations are disproportionately exposed to RMP regulated facilities. To address this concern, the rule emphasizes that facility siting should be addressed in hazard reviews and explicitly defining the facility siting requirement for Program 2 hazard reviews and Program 3 process hazard analyses. Facilities must provide a justification in the Risk Management Plan when facility siting hazard recommendations are not adopted.

**Third-party compliance audits:** Third-party audits have been a major topic in recent RMP rulemakings. Under this rule, when a facility experiences an



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system is in place for notification of RMP-reportable accidents.

**Emergency response exercises:** Requires a 10-year frequency for field exercises unless local responders indicate that frequency is infeasible. Requires mandatory scope and reporting requirements for emergency response exercises.

**Enhanced Information Availability:** New requirements for the facility to

petroleum manufacturers (NAICS 324 and 325). Requires an STAA evaluation for all Program 3 processes. Facility must conduct a practicability assessment of inherently safer technologies and designs (IST/ISD) considered for processes (a) in Program 3 NAICS code 324 and 325 within one mile of another Program 3 NAICS code 324 or 325 process, (b) with hydrofluoric acid alkyl-

### OTHER PROVISIONS/ CLARIFICATIONS:

- Program 3 process safety information should be kept up to date
- Program 2 and Program 3 requirements consistent for recognized and generally accepted good engineering practices (RAGAGEP)
- Hot work permits should be retained for three years,
- RAGAGEP should be reviewed in process hazard analyses to determine gaps in safety.

### COMPLIANCE DATES

The compliance date for most provisions, including: STAA, incident investigation root cause analysis, third-party compliance audit, employee participation, emergency response public notification, exercise evaluation reports, and information availability provisions, is three years after the effective date - May 10, 2024. The revised emergency response field exercise frequency provision by March 15, 2027, or within 10 years of the date of an emergency response field exercise conducted between March 15, 2017, and August 31, 2022. Updates and resubmission of risk management plans with new and revised data elements, four years after the effective date of the final rule.

IIAR encourages members with RMP regulated facilities to familiarize themselves with the Final Rule and make preparations for compliance with the new provisions.

## The revised emergency response field exercise frequency provision by March 15, 2027, or within 10 years of the date of an emergency response field exercise conducted between March 15, 2017, and August 31, 2022.

provide chemical hazard information upon request to the public living, working or spending significant time within six miles of the facility, in at least two most common languages in the community. Under the previous regulation, facilities were not required to provide this information.

**Safer technologies and alternatives analysis:** Safer technologies requirements apply only to chemical and

tion processes classified under NAICS 324, (c) having one RMP accident since the facility's most recent process hazard analysis. Requires the implementation of at least one passive measure at the facility, or IST/ISD, or a combination of active and procedural measures equivalent to or greater than the risk reduction of a passive measure for the same facilities required to conduct the practicability assessment.

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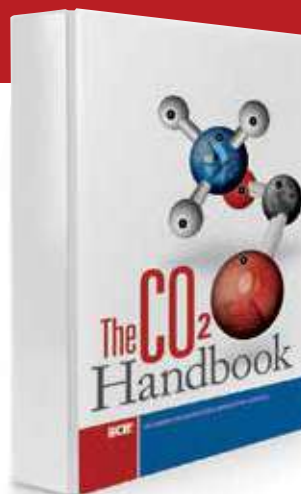
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# RMP Rule Changes Resulting from the SCCAP Rule

The Environmental Protection Agency has issued proposed rule changes to the Risk Management Program Rule as part of the Safer Communities by Chemical Accident Prevention Rule. The final rule provisions took effect on May 10, but there are future phase-in dates for some provisions.

Douglas Reindl, a professor of mechanical engineering at the University of Wisconsin-Madison and the founding director of the Industrial Refrigeration Consortium, provided an overview of the rule during IAR's annual meeting. He said the rule will impact Program 3 facilities using anhydrous ammonia, and many of the changes will also apply to Program 2 facilities. He also expects the new rule will create a lot more engagement with standards among those in the industry.

"Part of the SCCAP changes to the RMP rule requires future Process Haz-

ard Analysis (PHAs) to evaluate changes to standards, and the facility will have to consider whether or not to incorporate new requirements in RAGAGEP (Recognized and Generally Accepted Good Engineering Practice) standards to lower hazards," Reindl said.

If owners or operators specify IAR for their RAGAGEP, the SCCAP rule changes for sure will involve IAR 2, IAR 4, 5, and 6 will also be relevant.

"As part of PHAs, owners/operators will need to consider changes to RAGAGEP standards. In addition, they

The Environmental Protection Agency has issued proposed rule changes to the Risk Management Program Rule as part of the Safer Communities by Chemical Accident Prevention Rule. The final rule provisions took effect on May 10, but there are future phase-in dates for some provisions.

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## RMP Rule Changes Resulting from the SCCAP Rule

will have to consider hazards posed by natural events that include high winds, flooding, hurricanes where relevant, earthquakes, etc.,” Reindl said. “Also, facilities need to be more cognizant on facility siting, including where portions of their refrigeration systems may be close to the border of the property and present greater risks to those off-site.”

### RMP CHANGES BASED ON THE SCCAP RULE

There are several sections of the rule that outline new requirements. Beginning on May 10, 2024, end users must ensure and document these new requirements. The process is designed and maintained in compliance with RAGAGEP. PSI must be kept up to date. The owner or operator shall certify that they have evaluated compliance with the provisions of this subpart at least every three years to verify that the procedures and practices developed under this subpart are adequate and are being followed.

PHAs must consider natural hazards, including those resulting from climate change, and a PHA must include a gap analysis between the existing system and the current RAGAGEP.

Additionally, PHAs must consider natural hazards, including those resulting from climate change, and a PHA must include a gap analysis between the existing system and the current RAGAGEP. The new rules also require justification for PHA recommendations not adopted.

Regarding Hot Work Permits, after the Hot Work itself and the associated fire watch is completed, the permits must be kept for three years.

By May 10, 2027, facilities need to have standby or backup power for

continuous operation of monitoring equipment associated with prevention and detection of accidental releases. The rule will also require incident investigation and root cause analysis by a third party if an ammonia refrigeration system has a release and/or an accident that caused damage to people, property, or the environment. It also requires a third-party compliance audit to take place whenever a facility has an RMP-reportable accident and requires justification when TPCA recommendations are not adopted.

Facilities also have until May 10, 2027, to engage employees and have them participate in resolving findings and recommendations from PHAs, compliance audits and incident investigations. It establishes requirements to enable employees to “stop work” and to anonymously report RMP non-compliance or RMP-reportable accidents.

Reindl said staying up to date with the latest changes can always be challenging for end users. He recommends they sign up for PSM or RMP rule change alerts via Google.



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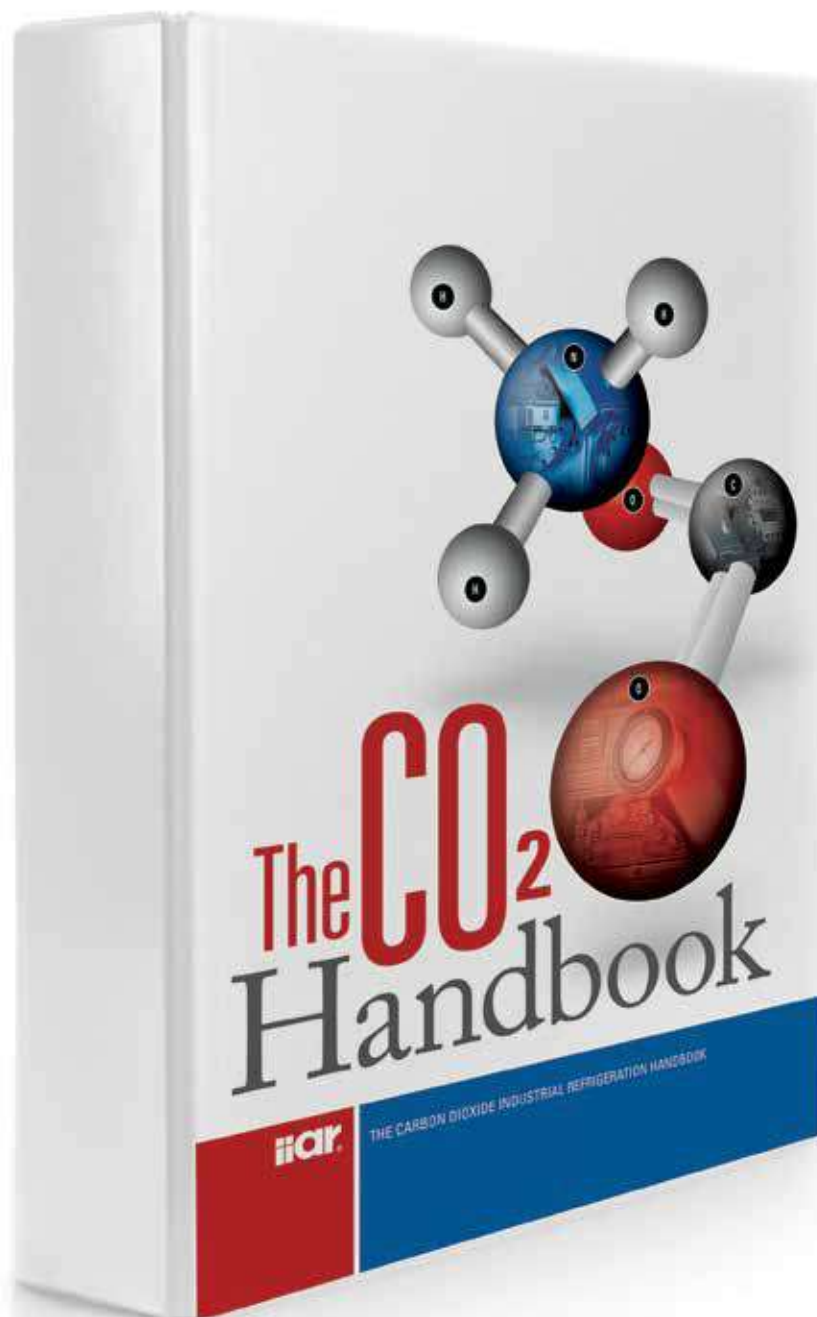
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# Global Perspectives on Integrating Natural Refrigerants

**T**he use of natural refrigerants is increasing as governments, investors, and end users work to reduce the use of high-global-warming potential refrigerants. Europe has been at the forefront, promoting the use of natural refrigerants through regulations and incentives, but challenges remain in other areas. Those involved in refrigerants globally said it would take increased awareness and, possibly, regulatory changes to facilitate the adoption of lower GWP solutions.

Dr. Michael Riese, manager for defense business and R&D at industrial refrigeration contractor Cold Logic, said he sees a lack of awareness in Australia. One of the challenges in the country is that it has its own legislation that isn't modeled after any other regulatory requirements.

"It is a very inward-looking country. There is very little view in terms of what happens outside of Australia," Riese explained. "We know HFCs and HFOs are going to be reduced further and further in Europe, and they are well and

works to ensure people have access to the right information and know the questions they need to ask so they make informed decisions. "In a lot of countries cold chain is so new that there isn't a local refrigeration association," Brondy explained. "There is a need for more people to understand what those investments look like."

As part of her work, Brondy is currently involved in a project in Ghana, Senegal, and the Ivory Coast, and she is sharing information about the processes and procedures that need to be in place to transition to natural refrigerants. She noted that many companies and organizations funding cold chain projects are doing so to help reduce food waste.

"They see the cold chain as a solution for reducing food waste, but concurrently, they don't want to invest in refrigerants that would negate the sustainability gains made by reducing food waste," Brondy said. "That is a positive for the natural refrigerant market, and they do have a vested interest in natural refrigerants and making sure the investments and grants they're making will have a net zero impact on the environment."

"As recently as 2020, there was an investment in Egypt using R22, which was effectively phased out that same year. Even if governments have signed on to policies, the information hasn't always reached current or potential cold chain operators."

—Amanda Brondy, vice president of international projects for the Global Cold Chain Alliance

## BUILDING AWARENESS

Amanda Brondy, vice president of international projects for the Global Cold Chain Alliance, works on cold chain development in emerging markets, such as Angola, Bangladesh, Indonesia, Vietnam, and Thailand.

"In speaking with cold chain investors in new markets, a lot of companies are completely unaware of the phase down of HFCs," Brondy said. "As recently as 2020, there was an investment in Egypt using R22, which was effectively phased out that same year. Even if governments have signed on to policies, the information hasn't always reached current or potential cold chain operators."

In some markets, synthetic refrigerants are much more prominent and easier to access. "Because of that, the companies that have invested in cold chain are using those," Brondy said. "Unless someone is working to understand natural refrigerants, they will do what other people are doing."

truly on their way to getting low GWP refrigerants and using natural refrigerants to a larger and larger extent in their countries."

Eventually, manufacturers will stop making equipment that uses HFCs and HFOs. "It might be cheaper right now, but in three to four years, you won't be able to get the parts," Riese said. "We like to think we're independent and do everything ourselves, but the reality is most companies are all Australian subsidiaries of big multinationals. If the companies decide to stop manufacturing certain articles overseas, they aren't going to make equipment just for Australia."

Brondy said she is seeing some increased desire among end users to know and understand natural refrigerants, which makes it important to ensure the right information is easily accessible. "There is a great desire to learn," she said.

The Global Cold Chain Foundation

## OVERCOMING BARRIERS

The initial investment in natural refrigerants can be higher than synthetics, which can create a barrier. "I have members serving as project advisors, and they'll point out the lower operating costs of natural refrigerant systems, but that case may not resonate as strongly with someone because first they have to get through the capital expenditure," Brondy said.

The narrative that while equipment is slightly more expensive now but will be cheaper in the next five to ten years doesn't resonate with end users in Australia. "Smaller end customers are purely interested in the capital expense in the first instance, not so much the ongoing maintenance costs," Riese said.

Although natural refrigerants have been used for more than 100 years, Brondy said there can still be concerns about safety among some users. "In India, many of our members will have facilities right outside of large cities and may feel the risk is too great given the proximity to large populations," she explained.

Riese said he also hears safety concerns being used as a potential deterrent for natural refrigerant adoption. “Because there is a great misunderstanding around the dangers around ammonia, that is being exploited and worked against by the HFC lobby,” he said, adding that manufacturers selling synthetic refrigerants say they are safer. “There is a bit of friction on the industrial side with providers for transcritical CO<sub>2</sub> systems pointing to the corrosive nature of NH<sub>3</sub> but neglecting to mention the energy penalty for CO<sub>2</sub> when compared to ammonia.”

There are supermarkets in Australia turning to transcritical CO<sub>2</sub>, but most small commercial and residential applications use HFC- and HFO-based refrigerants. He expects to see more interest in hydrocarbon water chillers, which is a new trend.

Australia has signed up to Kigali and Montreal and has import quotas of CO<sub>2</sub> equivalent, but it doesn't apply to pre-charged equipment. “Due to the impact and influence of the manufacturing lobby, any pre-charged equipment with HFOs and HFCs are excluded from the quota,” Riese said. “Theoretically, Australia should be well ahead of reduction of high GWP refrigerants.”

Yet between 2016 and 2021, the actually installed average GWP has only reduced minimally due to the pre-charged equipment exemption. “We're now very, very slowly seeing a reduction in 404A, but even at this point, it is still so cheap that there is no requirement for people to reduce it,” Riese said.

There is currently work in Australia to re-write the licensing as well as the issue around installed base and import quotas, but Riese said the HVAC equipment manufacturing lobby is very powerful.

Another challenge in Australia is around its four-year apprenticeship training-based program. “To work as a refrigeration technician in Australia, you have to have a license for some parts,” Dr Riese explained. “To work with HFC and HCFCs you have to have a license, which is only available after an internship. For hydrocarbons, you don't have to have license.”

As a result, CO<sub>2</sub> and hydrocarbons are treated as electives during trade

school-based residency, and they are few and far between. “That is because the trainers and educators don't have the knowledge. Ammonia is completely foreign to them. They haven't worked with it, and it is going to be hard to find the training,” Riese said. “What that means for us as a contractor is we have to train our own people.”

### ENGAGING USERS

IIAR is also continuing its work with globally. During IIAR's annual conference, IIAR representatives met with Latin American members, discussing their needs and how to best promote IIAR programs in the region. IIAR staff

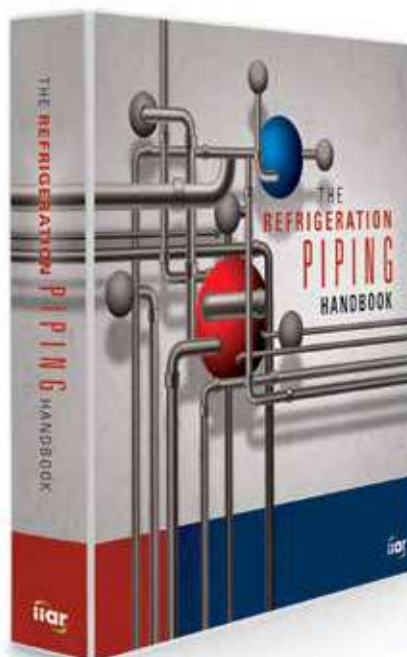
and volunteers also met with representatives from the Chinese Association of Refrigeration to discuss how the groups might work together on common goals.

IIAR recently signed a memorandum of understanding with International Institute of Refrigeration (IIR), which focuses on the global need for cooling and providing it in an efficient and sustainable manner.

“The goals are to work together to promote natural refrigerants and their implementation through education, seminars, and programming,” said Eric Smith, IIAR's vice president and technical director.

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# Refrigeration Industry Works to Increase Diversity and Inclusion

**T**he industrial refrigeration industry is working to build a diverse workforce and foster an inclusive environment, and this year's annual conference created opportunities for those in the industry to learn more about promoting diversity and inclusion.

"Diversifying our workforce not only broadens the talent pool but also provides our industry the opportunity to flourish with varying perspectives and backgrounds," said Melissa Cassell, finance director for General Refrigeration Company. "Embracing diversity in the workforce is not only essential for creating a more inclusive environment but also brings different viewpoints and ideas to the table, ultimately leading to innovation and growth."

Cassell, Nova-Aer Tealel, director of engineering for Lineage Logistics, and Dave Malinauskas, president at CIMCO Refrigeration, took part in the panel discussion Diversity and Inclusion in Natural Refrigeration that took place during the conference. Nova Teal moderated the panel.

"Melissa and Nova-Aer are incredibly strong and are now both diversity champions who share their powerful messages," Malinauskas said.

Diversity ensures that a wide range of perspectives, experiences, and backgrounds are represented within the industry. "When people from different walks of life participate in the industry, it leads to more innovative solutions and better decision-making," Malinauskas said. "For example, having women, people of color, and individuals from various cultural backgrounds involved in refrigeration research and development can bring fresh insights and ideas."

Cassell received positive feedback on the panel from attendees, who said it showcased the importance of diversity and inclusion from multiple angles. "By presenting a variety of perspectives, and especially the experiences of someone well known in our industry, it helped drive home the impact of

embracing diversity in the workplace," she said.

Danielle Wright, executive director of the North American Sustainable Refrigeration Council, applauded IIAR's efforts to bring diversity and inclusion to the forefront. "Focusing on diversity is a great opportunity to attract the best and brightest into the refrigeration sector," she said. "This is a dynamic and evolving industry with a need for all skill sets and perspectives, we only stand to benefit."

IIAR's direction is to focus on five pillars, which include diversity, Malinauskas said. They are:

- **Leadership Diversity** – actively seek candidates from diverse backgrounds.
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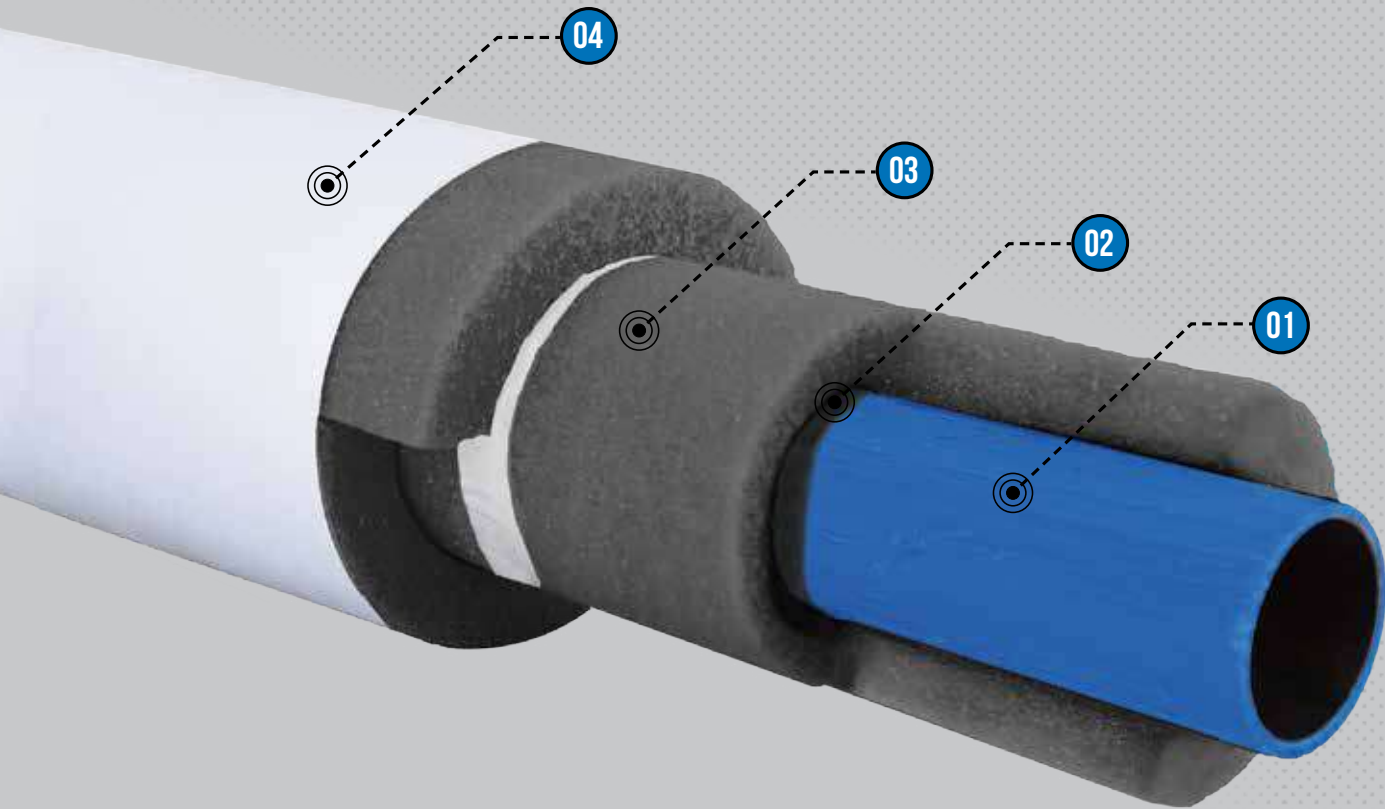
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