

IIAR Natural Refrigeration Conference & Heavy Equipment Expo (IIAR 2025)

Phoenix, Arizona, USA
2-5 March 2025

ISBN: 979-8-3313-2976-1

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2025) by International Institute of Ammonia Refrigeration
All rights reserved.

Printed by Curran Associates, Inc. (2026)

For permission requests, please contact International Institute of Ammonia Refrigeration
at the address below.

International Institute of Ammonia Refrigeration
1001 N. Fairfax Street,
Suite 503
Alexandra, VA 22314
USA

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

www.iiar.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

| | |
|---|-----|
| Encontrando el Balance Entre Consumo Energético y de Agua en Condensadores y Torres de Enfriamiento..... | 1 |
| <i>Karel Ortiz</i> | |
| Getting Knocked Out by the Pendulum: The 2024 EPA RMP Rule Changes and Strategies for Compliance..... | 19 |
| <i>William Lape</i> | |
| Connecting Cooling and Process Heating in Industrial Applications with Natural Refrigerants | 59 |
| <i>Felix St-Germain, Ivan Rangelov</i> | |
| Livin' La Vida LOPA: A Case Study in the Application of HAZOP and LOPA for Ammonia Refrigeration Systems | 95 |
| <i>Michael Lacher, James Topp</i> | |
| CO ₂ Heat Pumps: System Solutions and Applications Mapping..... | 153 |
| <i>Ivan Rangelov, Mazyar Karampour, Thomas Lund</i> | |
| Refrigeration System Design using Float Expansion Valves..... | 185 |
| <i>Todd B. Jekel</i> | |
| Applications of Ammonia and Carbon Dioxide for Decarbonization and Markets Other than the Food and Beverage Refrigeration Industry..... | 223 |
| <i>Paul Danilewicz</i> | |
| Lessons Learned from a Collection of Ammonia Incident Investigations..... | 259 |
| <i>C'Anna Wiens</i> | |
| Understanding Water Treatment Performance..... | 331 |
| <i>James Booth</i> | |
| CO ₂ Systems: Lubricants and Oil Management Strategies..... | 345 |
| <i>Giacomo Pisano</i> | |
| Interior Ammonia Release: Dispersion, Ventilation, and Hazardous Zone of the Negligible Extent Volume..... | 369 |
| <i>William J. Greulich</i> | |
| Using Scorecards to Manage and Improve Your RMP/PSM Program | 395 |
| <i>Nikolaus Despain</i> | |
| Sustainable Solutions for Agricultural Cold Storage: A Case Study | 417 |
| <i>Tania Herrera, Dan O'Brien</i> | |
| Measurement Device Platform Designed for the Performance Assessment of Low-Temperature Blast Freezing Systems..... | 437 |
| <i>Eric Alar</i> | |
| Decarbonizing with District Energy Systems: When an R744 (CO ₂) Heat Pump is the Obvious Choice..... | 465 |
| <i>Parham Eslami-Nejad</i> | |

Author Index