

Appendix F – Industry Practice and Awareness Study

The below information is based on outreach to refrigeration contractors and refrigeration facility managers. Representatives from three separate licensed refrigeration contractors and 8 refrigeration facility leaders were asked a series of questions around decommissioning of ammonia systems.

The goal of the outreach was to understand if the practices at the Arctic Glacier facility leading up to the incident were representative of typical industry practice. The current practices of industry were estimated from the outreach responses and then compared to those practices that unfolded at various points of disassembly of the ammonia systems at the Arctic Glacier facility.

In conclusion, the assessment practices at the arctic glacier facility did not follow general industry practice.

Refrigeration Contractors

Industry Practice: Steps to Evacuate Ammonia

At several points during the disassembly of the ammonia systems at the Arctic Glacier, the systems were assessed for the presence of ammonia. The Refrigeration Contractors were asked what steps they typically followed to verify for the presence of ammonia prior to completing work on the system. To verify that ammonia has been removed, contractors included the following steps:

1. Verify valve positions to ensure ammonia is not “trapped.”
2. Use the system gauges on site
3. Use the contractors’ own gauges to verify for the presence of ammonia at various points in the system
4. Diffuse any remnants through water and/or use a vacuum pump on the system.
5. Once remaining ammonia is evacuated, purge with nitrogen and/or air.

All of the contractors also stated that the system had to be “opened to atmosphere.” The methods of doing that varied from opening all valves and “tagging them open” to “making a cut every 20 feet.”

Analysis:

The investigation found that there was no evidence that the majority of the steps that would be followed by typical refrigeration contractors were followed when assessing the systems on May 25, 2022 after the first ammonia release.

Industry Practice: Is disassembly regulated work?

Disassembly of the refrigeration systems proceeded in 2022 without the inclusion of a currently licenced refrigeration mechanic. It was relevant to determine whether industry had a common understanding of whether this work would typically require a licensed contractor.

All contractors asked agreed that, while the system was full of ammonia, any work on the ammonia system was regulated and required the involvement of a licensed refrigeration mechanic. However, once the system was evacuated of ammonia, work was no longer regulated.

Analysis:

Between late 2016 and May 2022, the disassembly of the plant was being completed under the assumption that all ammonia had been evacuated. The use of rigging contractors for this work was in-line with typical industry practice. However, when ammonia was encountered on May 25, 2022, that assumption was invalidated and industry practice would typically have involved a licensed contractor to remove the remaining ammonia before work could continue.

Industry Practice: How do you communicate the removal of ammonia to an owner?

Arctic Glacier incorrectly believed that ammonia had been removed from the system during work done by a refrigeration contractor at equipment shutdown. Refrigeration contractors were asked how they would communicate to an owner that refrigerant had been removed from the system. The responses varied between contractors. Some completed a full report, while others would document the work through an invoice. A third contractor indicated they had no defined process for doing that.

Analysis:

The Refrigeration Contractor shutting the system down in 2016 documented that ammonia was not removed from the system in the invoice generated for the work performed. This is consistent with how other contractors might document this work. However, there is significant variation in how contractors communicate this vital step to owner's and this could lead to confusion. A review of the current CSA B52 code does not provide guidance related to disassembly or decommissioning.