Incident Summary #II-962261-2020 (#16279) (FINAL)

SUPPORTING INFORMATION	Incident Date		January 4, 2020
	Location		Sunshine Coast
	Regulated industry sector		Boilers, PV & refrigeration - Refrigeration system
	Impact – Injury	Qty injuries	0
		Injury description	None
		Injury rating	None
	Impact – Damage	Damage description	Ammonia was released from a refrigeration system at a recreational arena, into the machinery room.
		Damage rating	Minor
	Incident rating		Minor
	Incident overview		A small amount of ammonia was released from a refrigeration system, into the machinery room, of a recreational arena located in a small community. The leak occurred at a threaded pipe fitting at a recently installed reciprocating compressor.
INVESTIGATION CONCLUSIONS	Site, system and components		This public skating arena utilizes 240 lbs. of ammonia, under pressure, to make skating ice. The refrigeration system is comprised of compressors, heat exchangers, pressure vessels, pressure piping and controls. Threaded pipe fittings are occasionally used to connect refrigeration system components.
	Failure scenario(s)		A new ammonia compressor was installed in September 2019. A Nominal Pipe Size (NPS) ¾ close threaded nipple was used to attach a new relief valve to the compressor. After 3 months of operational vibrations, a thread leak developed on the nipple threads adjacent to the compressor discharge header.
	Facts and evidence		• A major plant up-grade to the ammonia refrigeration machinery room was completed in September 2019. • This included new compressors, heat exchangers, pressure vessels, pressure piping and controls. • The refrigeration system was in operation for 3 months. • On January 4, 2020 @ 0800 the shift engineer observed a reading of 12 ppm on the ammonia leak detector monitor. • The first stage ammonia alarm and high speed fan were not activated. • The shift engineer notified the on-site chief engineer who donned PPE and located the leak. • The compressor was isolated, pumped down and locked-out. • The chief engineer notified the refrigeration contractor, who made repairs by replacing the NPS ¾ close threaded nipple. • The refrigeration technician observed a loose cut thread on the NPS ¾ close nipple pipe fitting that was installed adjacent to the compressor discharge header to connect the relief valve.
	Causes and contributing factors		It is very likely that the leak, at the NPS ¾ close threaded nipple, resulted when the nipple did not engage properly and vibrations from the operating compressor caused further disengagement.

Normal Pipe Size ¾ close nipple upstream of elbow.

Side View of Normal Pipe Size ¾ close nipple upstream of elbow.