

Incident Summary #II-988065-2020 (#16794) (FINAL)

SUPPORTING INFORMATION	Incident Date	February 18, 2020	
	Location	Peace River Region	
	Regulated industry sector	Boilers, PV & refrigeration - Refrigeration system	
	Impact	Qty injuries	0
		Injury description	0
		Injury rating	None
	Damage	Damage description	Insignificant
		Damage rating	Insignificant
Incident rating	Insignificant		
Incident overview	<p>On February 18, 2020 the Alarm and light outside the Ammonia plant was activated at approximately 6:40pm. The plant operator checked the NH₃ (ammonia) readings and it read 43ppm (parts per million). At 6:45pm the readings increased to 51ppm and staff activated the Emergency Response Plan, contacted 911, the Chief Engineer, and evacuated the building to muster in the lobby of the building. By the time the fire department responded, the readings had dropped to 0ppm.</p> <p>Operators upon inspection of the number 6 compressor discharge valve bonnet “weep hole” using litmus test paper, (ammonia leak detection test method), observed that the test paper indicated a leak in the discharge valve. The operators tightened the discharge valve.</p> <p>There was no physical damage to the valve other than the valve began to leak.</p>		
INVESTIGATION CONCLUSIONS	Site, system and components	<p>Ammonia is used as a refrigerant in the mechanical room to indirectly cool a brine solution piped in a separate system to the floors in ice rinks and subsequently allow applied water to freeze into an ice surface.</p> <p>Compressors are used in the refrigeration process to circulate the ammonia through the refrigerant system with ammonia sensors located in the mechanical room to detect any leaks; which upon detection of a leak will trigger an audio and visual alarm. Compressors as a part of their inherent operation, generate vibration which is transmitted to the discharge and inlet valves and associated piping.</p> <p>Each compressor has a discharge valve that discharges the compressed gas to other components in the system for cooling. The discharge valve has a protective cover called a “bonnet” to protect the valve from external damage while in service. This bonnet has a “weep hole” which allows ammonia to be released as the first indication that the valve inside is beginning to leak.</p>	
	Failure scenario(s)	<ul style="list-style-type: none"> - Vibration from compressor number 6 may have affected the discharge valve stem packing causing the leak. 	

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Facts and evidence	<ul style="list-style-type: none">- Operator reported that during the staff investigation of the ammonia leak, that leak detection litmus test paper indicated an ammonia leak at the No.6 compressor discharge valve bonnet weep hole with an ammonia monitor reading of approximately 3 parts per million.- Operator reported that the No. 6 compressor discharge valve stem was tightened by operator.
Causes and contributing factors	It is possible that vibration from the number six compressor may have caused the discharge valve to leak ammonia.



Above-Compressor Number 6 Overview: Blue arrow is inlet suction valve

The Red arrow is the discharge valve



Compressor Number 6 Discharge Valve with valve stem bonnet (bonnet protects valve from potential external damage such as forklifts or other potential damage)



Pen points to discharge valve bonnet weep hole. Which allows ammonia to leak out and be detected in the event that the valve is leaking.