

## Incident Summary #II-700086-2018 (#BPVII-1141825) (FINAL)

SUPPORTING INFORMATION	Incident Date	6/11/2018	
	Location	Vancouver	
	Regulated industry sector	Boilers, PV & refrigeration - Refrigeration system	
	Impact	Qty injuries	1
		Injury description	Person appeared disoriented, had watery eyes and flushed face.
		Injury rating	Moderate
	Damage	Damage description	Ammonia wafted when handhole cover was opened slightly.
		Damage rating	None
	Incident rating	Moderate	
Incident overview	During planned maintenance technician slightly opened handhole cover for the ammonia compressor crankcase and inhaled waft of ammonia.		
INVESTIGATION CONCLUSIONS	Site, system and components	The Ammonia compressor is part of a refrigeration plant in a public assembly site-ice rink. The compressor compresses low pressure ammonia vapour to high pressure vapour. Compressor crankcase houses the crankshaft of the compressor and act as lubricating oil sump. Handhole cover is a bolted cover for compressor crankcase access opening and opened to gain access to compressor crankcase for maintenance and inspection.	
	Failure scenario(s)	During planned maintenance, the mechanic removed all but one loose guide bolt and opened cover slightly once he felt oil was below the cover level. Evaporating ammonia from remaining oil wafted from crankcase and inhaled by the mechanic.	
	Facts and evidence	<p>There were two witness accounts.</p> <ul style="list-style-type: none"> <li>• First was certified refrigeration mechanic from licensed refrigeration company. Upon arrival on site at about 12:30pm, he went to machine room with his portable detector, bite block and tools. He purged compressor to Opsig after isolating compressor. Upon completion of purging, he connected hose to compressor oil drain line and started draining oil. Once he felt oil level was below cover level, he removed all but one loose guide bolt and opened cover slightly. He inhaled strong waft of ammonia and left machine room immediately to get attention and met one of the plant operators.</li> <li>• Second account was certified operator. He was approached by the mechanic outside the machine room at about 2:25 and observed that the mechanic was disoriented and had watery eyes, flushed face. He sent him to first aid with another employee. He went to vestibule of machine room</li> </ul>	

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	<p>and found machine room detector reading 0ppm. He went inside machine room and his personal detector read 17ppm near the compressor where the mechanic was working.</p> <p>Communication with licensed contractor responsible for maintenance at this plant confirmed that wearing ammonia mask was not part of the standard working procedure for compressor oil change up to the time of incident.</p>
<p>Causes and contributing factors</p>	<p>It is highly probable that ammonia concentration in waft inhaled by mechanic was strong enough for him to call for attention (Oil remaining in the crankcase exudes ammonia until all ammonia in oil is evaporated and evaporated ammonia accumulates above oil in crankcase and escapes outside when cover is opened) .</p>

Photos or diagrams (if necessary)

