

Incident Summary (Reference # II 607002-2017)

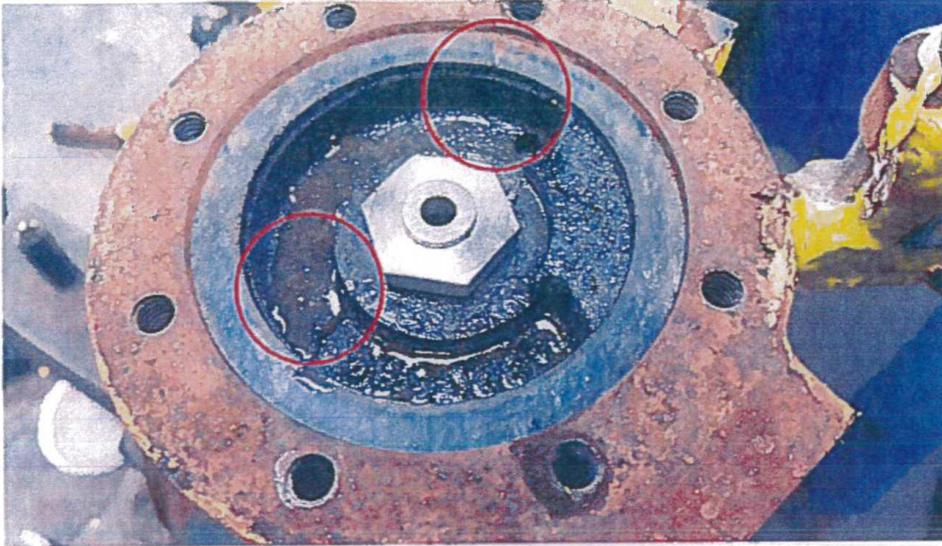
SUPPORTING INFORMATION	Incident Date	October 24, 2017	
	Location	Port Coquitlam	
	Regulated industry sector	Refrigeration system	
	Impact	Qty injuries	None
		Injury description	None
		Injury rating	None
	Damage	Damage description	A suction regulator O-ring was blown out and this allowed approximately 2 pounds of ammonia to leak in to the boning department..
		Damage rating	Insignificant
Incident rating	Minor		
Incident overview	The suction regulator O-ring on an ammonia refrigerant system failed and allowed ammonia gas to leak into the boning room where production workers were present. The supervisor of the boning room noticed a faint smell of ammonia and evacuated the production workers as a precaution.		
INVESTIGATION CONCLUSIONS	Site, system and components	<i>The equipment that failed is located in the boning room that is part of a poultry processing plant. The boning room process is mainly taking the poultry by-product and cooling this product to near 2 Celsius by passing it through a heat exchanger that is fitted with a surge drum. The heat exchanger and a portion of the surge drum are filled with liquid ammonia and as the by-product flows through the heat exchanger the liquid ammonia refrigerant will extract the heat from the by-product and in doing so the liquid refrigerant will change to a vapor. The suction regulator is connected to the heat exchanger surge drum outlet pipe and this pipe leads back to the refrigerant compressor. The purpose of the suction regulator is to maintain a constant pressure in this part of the system and that in turn maintains a constant temperature. The by-product that leaves the heat exchanger has been adequately cooled before it is placed in a blast freezer.</i>	
	Failure scenario(s)	One of the O-rings in the suction regulator failed and allowed ammonia gas to leak into the boning room. <ol style="list-style-type: none"> 1. O-ring failure due to the age and lack of maintenance 2. The O-rings are subjected to varying pressure and temperature changes throughout the day depending on the operating mode such as cooling or defrost cycle. 	
	Facts and evidence	<ul style="list-style-type: none"> • The boning room supervisor detected a faint smell of ammonia in the boning department but there was no audible ammonia leak detection alarm at this point. • The leak detection system will activate an alarm when the level of ammonia reaches 25 ppm. • The boning department supervisor called the maintenance department to investigate and evacuated all the employees from the boning department area. Eventually the ammonia concentration level in the boning department 	

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	<p>reached 25 ppm and the alarm was triggered by the leak detection system. Full plant evacuation was initiated as a precaution.</p> <ul style="list-style-type: none"> • The ventilation fans were switched on for the boning department area. • The ammonia levels as indicated on a panel outside the maintenance department indicated 29 ppm for the boning department and 0 ppm for the rest of the plant. The refrigeration mechanic who was called in by the maintenance department arrived on scene and isolated the suction regulator by way of isolation valves that are located outside the boning department. • The highest level the leak detection system reached was 41 ppm of ammonia in the boning department and it took approximately 2 hours before the leak detection system indicated 0 ppm. • The suction regulator is subjected to the daily sanitizing wash and was found to be corroded and had internal moisture and rust.
<p>Causes and contributing factors</p>	<p>The suction regulator bottom O-ring was found to be blown out and this allowed the ammonia gas to leak in to the room. It is likely the O-ring was subjected to varying temperatures and pressures throughout the day and over time the mechanical properties of the material declines.</p>

Photos or diagrams (if necessary)

Photos on page 3



Corroded suction regulator and moisture present



Suction regulator – bottom "O" ring is blown out and the seat face has a dimple in it