

What If Hazard Review

What If	Event Sequence and Consequences	Potential Mitigating Action	Completion Date
Tank failure	Complete loss of NH3	Comply with ANSI K-61 & OSHA requirements in order to minimize risk	
Hose rupture (partial)	Release rate is below excess flow valve set point. Results in continuous release.	Protection hoses from damage. Clean hoses when necessary. Replace hoses when necessary/required. Install cable release quick shut-off valves.	
Hose rupture (complete)	Release rate exceeds excess flow valve setting. Results in short high quantity release.	Protect hoses from damage. Clean when necessary. Replace hoses when necessary/required. Install shut-off valves.	
Valve failure (partial)	Continuous release of NH3 from failed valve resulting from valve seal or packing gland failure.	Assure only NH3 valves are installed. Perform preventative maintenance. Maintain spare valve and part inventory.	
Valve failure (complete)	Continuous release of NH3 resulting from complete failure of a valve or a pressure relief valve (PRV).	Assure only NH3 valves are installed. Install PRV manifold allowing PRV's to be replaced without emptying NH3 tank.	
Overfill tank (PRV release)	Continuous release of NH3 vapor.	Use 85% spitter gauge when filling tank. Train employees not to overfill tank.	
Overfill tank (tank rupture)	Complete loss of NH3 resulting from overpressurization and damaged tank.	Use 85% spitter gauge when filling tank. Train employees not to overfill tank.	

What If	Event Sequence and Consequences	Potential Mitigating Action	Completion Date
Tanker pulls away before hoses are disconnected	Hoses rupture and/or valves are damaged. Release rate will decrease as tank pressure drops.	A facility employee should monitor the NH ₃ transfer process. Tanker wheels should be chocked before transfer operation begins and removed only after all hoses have been disconnected.	
Physical damage to valves, hoses, and piping.	Continuous release of vapor or liquid from damaged equipment.	Install safety barriers (bumper poles) to protect equipment from damage.	
Valves are not properly closed.	Continuous low quantity release from valve that is not properly closed (i.e., ice on valve seat).	Shut valves with sufficient torque to seat properly.	
Corrosion of piping.	Continuous low quantity release from pin hole.	Include piping system in preventative maintenance program.	
Vandalism and/or theft	Release of NH ₃ from valve opened by vandal.	Install valve locks and security fence.	
Earthquake	Damage to valves, piping or tank.	Make improvement as necessary to reduce risk of damage.	
Flooding	Flood water could damage compressor and hydrostatic pressure relief valves.	Inspect the entire systems after floor water have receded. Assure that entire system is function and free of water.	
Traffic accident	Damage to piping or valves from vehicle impact.	Install safety barriers (bumper poles) to protect equipment from damage.	

Team members:

Date of analysis: