**Student 1 post**

**Uses of anhydrous ammonia**

Anhydrous ammonia is a gas composed of a molecule of nitrogen and three molecules of hydrogen. It is a gas or compressed liquid, which is a form of a vapor that contains no water (Ammonia Uses and Benefits | Chemical Safety Facts, 2020). This gas has a sharp odor that is irritating and almost like the overpowering smell of cat urine. It is essential as I can get used in the following ways;

1. It can get used in industries as a cleaning agent which has a strength that can exterminate some harmful bacteria
2. Also used to make the industrial metal shine.
3. In liquid form, it is mixed with plant enhancers to make fertilizer.
4. Anhydrous ammonia can also get used to manufacture medicine although it gets regularly abused in making methamphetamine popularly known as meth.
5. Plays a vital role in the manufacture of other chemicals, making it an essential compound in pharmaceutical labs.

**Emergency Response Plan**

Any plant that deals with ammonia usually has an alarm system that should automatically activate itself upon the occurrence of an event (Ammonia Uses and Benefits | Chemical Safety Facts, 2020). Once the alarm goes off, it automatically alerts the safety and security dispatcher and will also inform the county dispatcher. The safety and security dispatch the maintenance contractor and facility manager. The plant should also have emergency exits, whereby upon the alert of any occurrence, they can quickly evacuate the building. These Emergency exits should be indicated throughout the building to inform all the workers. Only the safety facilities staff should remain behind to assist in salvaging the situation.

There should also be an emergency ammonia release valve, and a refrigerator shut down switch, which is usually a red button mounted on a wall somewhere near the compressor room. There two shut down breakers usually in the compressor room and another near the central heating plant (Ammonia Uses and Benefits | Chemical Safety Facts, 2020). All these are the measures that are put in place to deal with any eventuality or occurrence.

**Role of Site Safety Officer**

The responsibilities of the site safety officers include the following;

1. Directs the company staff and guests out of the building through the evacuation routes
2. They determine whether the immediate area gets completely evacuated
3. Ensures all doors and windows are closed but not locked
4. Helps anyone not in a position to evacuate by themselves
5. After the complete evacuation, the officer should shut completely all critical services to prevent further damages
6. Assembles all the emergency aid kits at the emergency shelter or working station
7. Before leaving the building ensures all the rooms are empty and no one is left behind

These are some of the crucial roles and responsibilities of the site security officer (Guide to ERT Job Descriptions, 2020). The site safety officer conducts all his functions until a senior response officer or relevant authority arrives.

**Preparation Strategies to Prevent an Incident**

Prevention is better than cure. Therefore, before arriving at the occurrence of the incident, safety measures should be put in place when handling the refrigeration plant activities. In every refrigeration plant, there is a person who has the overall responsibility whose duties are clearly outlined under the WHS Act of implementing safe systems of work (2020). This includes comprehensive hazard identification, including risk assessment of the entire workplace, to identify the places that require planning for an emergency.

The most crucial point of an effective emergency response is developing a strategic emergency plan (2020). The goal becomes to prevent the occurrence of an incident. It comes with an emergency manual as well as training of personnel for emergency response. Having laid out the emergency plan, site training of the staff, and laying out their responsibilities should get put into consideration. The roles for those dealing with cases of ammonia incident must get identified with levels of the emergencies at hand and which apply to a particular workplace.

Places with high potential risks and consequences, it is imperative to develop an established emergency response structure used by emergency service organizations. This workplace emergency system must have the following;

1. Be resourced and well maintained
2. Be compatible with the routine organizational structures
3. Must have the locally used emergency systems

Apart from training and putting up the functional and practical emergency system, ensure there is the necessary equipment for the same, which may include electronic resources, technical expertise, and gas detection equipment.

**Prevention of Further Damages after an Incident**

To ensure that no further damage is done either to life or property, safety measures must get taken. When it comes to an injury on an individual the following should be done;

In case of any cloth on, remove it unless it gets directly frozen to the body surface

Run water on the surfaces affected for about 15 minutes to reduce the injury caused on the body surface.

After first aid, seek immediate medical attention to prevent further complications and injury.

Ensure that the site is clear of the incident to prevent harm to the entire facility and also the community living in that environment.

All these are essential measures that ensure no further damage gets done on the affected persons.

**References**

ChemicalSafetyFacts.org. 2020. Ammonia Uses And Benefits | Chemical Safety Facts. [online] Available at: <https://www.chemicalsafetyfacts.org/ammonia/> [Accessed 25 March 2020].

The American National Red Cross. 2020. Guide To ERT Job Descriptions. [online] Available at: <https://www.readyrating.org/Resource-Center/All-Resources/guide-to-ert-job-descriptions> [Accessed 24 March 2020].

Worksafe.qld.gov.au. 2020. [online] Available at: <https://www.worksafe.qld.gov.au/\_\_data/assets/pdf\_file/0009/82908/ammonia-based-refrigeration-systems.pdf> [Accessed 24 March 2020].

**Student 2 post**

Anhydrous Ammonia ID # 1005 chemical identification Corrosive Gases. Used for aeration of crops in planting on large farmland areas. The 2016 Emergency Response Guidebook outlines the basic Public safety, Evacuation, Protection, Fire , Spill, and First Aid.

**HEALTH: toxic may be fatal if inhaled, ingested or absorbed through skin.**

**\*Vapors are extremely irritating and corrosive \*Contact with gas or liquidfied gas may cause burns, severe injury and/or frostbite**

**\*Fire will produce irritating, corrosive and/or toxic gases \* Runoff from fire control may cause pollution**

**PROTECTIVE CLOTHING: \*Wear positive pressure  self-contained breathing apparatus (SCBA) \*Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection \*Structural firefighter turnout gear provides limited protectionin fire situations ONLY, not recommended in spill situations where contact is evident**

FIRST AID:\* Ensure that all medical personnel are aware of the materials involved and take precautions to protect themselves. \*Move victim to freash air \*Call 911 or EMS \*Give artificial respiration if not breathing \*DO NOT use mouth to mouth method if victim ingested or inhaled the substancel give artificial respiration with a mask device (one-way-valve) \*Administer oxygen if breathing is difficult \*Remove and isolate contaminated clothing and shoes \*In case of contact with liquefied gas, thaw frosted parts with lukewarm water \*In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes. \*Keep victim calm and warm \* Keep victim under observation because the effects of contact may be delayed

EVACUATION:

**Isolate in all directions 30 m (100ft) Protect downwind DAY 0.1km (0.1ml) NOGHT 0.2km (0.1ml) LARGE SPILLS Isolate in all directions 400 m (1250 ft)  DAY 2,2 km (1.4ml)  NIGHT 4,8 lm (3.0 ml) (ERG Guide 2016)**

LESSONS for Preventing Hydraulic Shock in Industrial Refrigeration Systems (CSB 2010) Anhydrous Ammonia Release at Millard Refrigerated Services, Inc. What would a safety Officer do for prevention?

\*For the design of ammonia refrigeration systems, avoid grouping multiple large capacity evaporators to a single set of control valves. \*Program the defrost control sequence to automatically depressurize or bleed the coil upon restart after an outage or interruption, prior to opening the suction stop valve to set the evaporator into cooling mode.\*Avoid the manual interruption of evaporators while in defrost and equip control systems with password protected controls to ensure only trained and authorized personnel have the authority to manually override system processes. \*For time-initiated hot gas defrost systems, ensure pump-out times are long enough to remove all liquid refrigerant from the evaporator coils prior to introducing hot gas, especially after low-load periods or power outages. \*In the event of an ammonia release, activate the emergency shut-down switch to de-energize pumps, compressors and valves instead of attempting to isolate leaking equipment while the refrigeration system is running. Training from there on out would be the new normal status.Both supervisors and forman on ALL shifts would recieve and sign-off on mandatory training on safe usage and what to do in case of a power outage and reserve power is not adequate.

Emergency Response- 15 minutes after being notified of the release the Millard Plant Manager call 911, this automatically triggered a response from the Mobile Fire Department at the facility as well as the Theodore Volunteer Fire Department. The Emergency Management agency was notified who contacted the U.S.Coast guard to halt water traffic in that area. Employees at the nearby Deep-Water Horizon which was 025 miles away began feeling the effects of the release. Air monitoring processes begun as well as several other Chemical Clean-up/response organizations responded.  Overall there were 32 hospital admissions of which 4 were placed in Intensive care.

References: US Guidebook 2016

US Chemical Safety and Hazard Investigation Board Augist 23 2019 No.2010-13-A-AL.