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MPH 632: Environmental and Occupational Health Risk Assessment

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Assignment 9- Risk Management Exercise & Practice Lab

1. All employees are properly trained so they may be able to become familiarized with the chemicals they will be around and using.
2. Ensure each facility has a proper Emergency Action Plan (EAP) in place that is reviewed and updated as needed.
3. Employees that are in close contact with the chemicals are wearing proper Personal Protective Equipment (PPE).
4. Each facility must have regularly scheduled and frequent reviews of their facilities and perform proper maintenance and updates on their equipment to ensure safety.
5. Facilities must have systems in place to contain any vapor and emissions using vents, hoods, and closed systems.
6. Still bottoms and sludge are properly stored with clear, obvious labels and are then transported to a proper treatment facility in a timely manner.
7. Ensure that hospitals are well equipped, and medical staff is properly trained in the event that an accident does occur.
8. Employees are placed on rotating schedules, so they are not overexposed to the chemicals they are working with and so that they may not tire while monitoring.
9. Surface areas in each facility are to be regularly cleaned to remove any possible residues that can contribute to additional exposure.

10. Methyl isocyanate (MIC) is substituted for a chemical that is considered to be less harmful.

1. Training would be implemented to every employee by ensuring that they receive training in their primary language. This is important because it does not matter how many risk management policies and strategies are put into place if the staff if not fully and properly trained issues are bound to arise. Employees will receive training in multiple ways so that they may be able to become comfortable with the chemicals they will be around. A specific form of training that will be used is hands on training. Hands on training will allow less experienced employees learn a realistic view of what is expected of them from more experienced employees while also being given the opportunity to practice what they have learned in a controlled situation ("Appendix C to §1910.119 – Compliance Guidelines and Recommendations for Process Safety Management (Nonmandatory).", n.d.). While more concise trainings will be conducted when there are any updates or changes to any policy or equipment that is being used and there will be a training for all employees to be refreshed on the policies on an annual basis.

2. Each facility will create an EAP to keep their employees safe during an emergency. Specifically including the installation of alarms (both sound and flashing lights) throughout the facility that will go off when there is a release of MIC so employees are able to evacuate. A specific group of employees will be assigned in each department to provide help to those that need assistance to evacuate and get them to safety ("Appendix C to §1910.119 – Compliance Guidelines and Recommendations for Process Safety Management (Nonmandatory).", n.d.). A similar strategy could be used for the nearby city by installing sirens, such as the ones used for tornados, radio broadcasting, and emergency text messages to alert everyone to evacuate the area and to get to a safe distance. The EAP will also include a detailed list of what must be done if

accidental direct exposure to MIC occurs such as taking vitals, moving the person(s) to fresh air if exposure was through inhalation, removing contaminated clothing, flushing eyes, and washing exposed skin if exposure was dermal, using activated charcoal is exposure was ingested, and taking the person(s) to a hospital if needed (METHYL ISOCYANATE, n.d.).

3. Employees that are working in direct or close contact with the chemicals would be required to wear proper PPE. This will include clothing that protects against chemicals, properly fitted respiratory protection, the use of gloves when handling the chemicals, and the use of goggles to protect their eyes ("Chemical Hazards and Toxic Substances", n.d.). PPE is important for the employees because MIC can produce explosive and flammable gasses and since they will be working in higher temperatures, it will give the employee some protection.

4. Due to the fact that there are multiple chemical facilities located within 10 miles of the center of the city and that the rail lines are used for both passengers and cargo trains and are within 5 miles of the downtown part of the city, constant maintenance on equipment is necessary. Every facility must take responsibility by having regularly scheduled reviews of not just their facilities, but all the equipment that is also used outside of the facility itself. Maintenance must be done on their equipment frequently, such as every month, to make sure that they are in top condition for everyone's safety.

5. Every facility must have systems in place to contain vapors and emissions that are given off by the chemicals. This could be done by using dilution vents, fume hoods, and enclosed systems. This is important because they will greatly reduce or even eliminate the hazards for the employees ("Chemical Hazards and Toxic Substances", n.d.). Containing these vapors will also protect the city that is 10 or less miles away, ensuring the community is safe as well by not allowing it to spread outside of the designated areas in the facilities.

6. Creating and consistently following through with properly storing still bottoms and sludge must be implemented. This will be done by storing them in proper containers that are clearly labeled as “hazardous waste”. Waste will not be stored for more than a full week before being taken to a waste treatment facility or industrial landfill to be disposed of appropriately (North Dakota Department of Environmental Quality, 2019). This is important as to not keep excess chemicals in the facilities that are unnecessary to minimize any further exposure or damage during an emergency.

7. In the event of an emergency, it is imperative for hospitals to be prepared to handle the aftermath. This will require hospitals to be well equipped by having plenty of beds and for medical staff to be trained on how to handle chemical accidents (Broughton, 2005). Staff will need to have knowledge on what chemicals are being used in these facilities, so they are able to better prepare themselves if a problem does arise. Facilities disclosing the chemicals being used will give medical staff time to create an EAP of their own.

8. Supervisors should schedule their employees so that they are rotating jobs every few weeks (“Chemical Hazards and Toxic Substances”, n.d.). This will help employees not become overexposed to the toxic chemicals that they are working with. Any precaution that can be taken to lower the exposure rate in employees should be taken advantage of so any harm may be reduced. Rotating shifts will also be important for monitoring purposes that way employees do not fall into a routine while overseeing the production process of carbamates and go into autopilot mode and stop paying as close as attention as they should.

9. Common areas in each facility should be regularly wiped down daily to ensure that residue from the chemicals is not being accidently spread around increasing the possibility of exposure. This is vital because in common areas such as a break room or a restroom, people are not likely

to be wearing PPE. Residue spread of this kind could occur if a chemical accidently got on someone's clothing without them realizing and they are not experiencing any exposure symptoms.

10. MIC is an incredibly toxic chemical and substituting it for another chemical would be a way to greatly manage the risks associated with it. There could be many benefits for not only employees, but also employers by making this switch. Changing to a safer chemical could reduce costs, reduce risks in the future, make facilities more efficient, and would allow the company to be competitive since they are choosing a more modern practice ("Transitioning to Safer Chemicals: A Toolkit for Employers and Workers, n.d.). For employees, the use of safer chemicals will reduce risks to their health and safety while also giving them more peace of mind.

References:

Appendix C to §1910.119 – Compliance Guidelines and Recommendations for Process Safety Management (Nonmandatory). Occupational Health and Safety Administration. (n.d.). Retrieved November 30, 2022, from https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.119AppC

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