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MPH 632 Risk Assessment

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Assignment 9

- Emphasis on workplace safety management regarding identifying hazards, appropriate PPE, policies and procedures, and continuing education.
- Ensure those residing within 10 miles of each facility are aware of risks, preparedness, and response initiatives.
- Proper training to work with chemicals and understanding of necessary response if not working properly.
- Ensure rail car is equipped to move waste and keep passenger safety as the priority.
- Proper storage of chemicals and waste.
- Resources to expel fire in case of emergency.
- Manage risk associated with this scenario with an emphasis on public health, occupational health, and ecological health hazards.

The employees of this organization are at risk by working with many chemicals but especially methyl isocyanate. In order to ensure their safety in the workplace, safety standards must be met and hazards continually evaluated. The working environment should be measured for the amount of harmful chemical the employee is exposed to and compared to guidelines set by agencies such as NIOSH or OSHA. For example, OSHA states that the recommended PEL is $0.05\text{mg}/\text{m}^3$, each facility should be below the recommended limit in order to keep their

employees safe (Methyl Isocyanate, 2015). There must be closed systems and well-equipped ventilation to prevent exposure to the chemical (CDC, 2014). PPE usage is vital and consists of respirators, suits, gloves, and goggles. There should be safety checks that employees perform daily to ensure proper function of the facility. Additionally, there should be a quarterly overview of all equipment and functionality to ensure everything is working as it should as well as the safety measures designed to aid in avoiding an emergency. All expectations of operational and safety standards as well as SDS should be clearly outlined in a policy that is readily available to all employees at any given time. Procedure manuals of equipment with instructions on how to fix errors should also be available. Continuing education is important in a high-stake environment and competency should be re-evaluated yearly.

Ten miles away from each facility should preliminarily cover all of those who would be affected by an accident occurring at any of these facilities. I would recommend a risk analysis be performed to understand the exact radius of hazard associated with chemical production facilities. This initiative would more accurately predict who could be affected if an accident would occur. Once established, local governments should arrange for residents to receive educational brochures semi-annually to ensure they are aware of the risks associated with the chemical plants as well as what to do in an emergency. It should include that there will be communication by phone, radio, and television if there is a leak and instructions on what the community should do in any given situation, including evacuation or shelter in place. The company of the chemical plants needs to be working closely with local, state, and federal governments to ensure notification systems are in place, coordination of emergency response, and yearly drill simulation, yearly policy review and update.

Each individual employed by the chemical production facility should have chemical or engineering educational and/or experienced background. If the individual is not working directly with the chemical, they are able to receive on the job training to be made aware of the risks and responsibilities that come with working in the facility. What to do in case of an emergency will be included in the employee's yearly competency. There will also be biannual simulations on things that could go wrong and employees will need to act accordingly. Emergency simulations will include scenarios such as storage leaks, equipment malfunction, fires, emergency valve failure, etc.

The rail car must be able to keep the tanks cool and grounded while in transport (Hazardous Substance Fact Sheet, 1996). Temperature monitoring systems should be in place to ensure the tanks stay at the correct temperature. The presence of heat will adversely affect the chemical and produces risk of fire. The same principles should be applied as listed below in the storage section. Additionally, there must be no sparks from the rail car. There should be resources to extinguish the fire onboard. The employees that run the rail car must also be trained on adverse effects occurring with the chemicals. I would also like to get the tanks on a separate transport system to be away from passengers. Other routes should also be considered as it is unsafe to transport such highly volatile chemicals with passengers onboard and going as close as 5 miles to the city.

Methyl isocyanate and its waste products should be kept in cool, dry, well-ventilated areas (Hazardous Substance Fact Sheet, 1996). It should be kept out of direct sunlight and the container kept tightly closed. Use of non-sparking tools and grounded equipment should be utilized while working with this chemical (Hazardous Substance Fact Sheet, 1996).

In the event of a fire all ignition sources should be shut off or taken away if possible. For small fires various materials may be used to distinguish the flame. Alcohol resistant foam, water fog, dry sand, carbon dioxide, dry chemical powder, or sand is recommended for small fires (Methyl Isocyanate, 2015). The local fire department should be notified immediately as they will be able to handle the fire more efficiently. It is important for staff to know that using water will only spread the fire (Methyl Isocyanate, 2015).

This overview of the presented risk will ideally be minimized with the efforts put forth during this risk management exercise. Many of these initiatives keep public health, occupational health, and ecological health at the forefront. The suggestions made are a good start to managing the risks presented by this chemical production facility but should be continually monitored and evaluated to further protect the city, residents, employees, and the environment. Many of the suggestions made are fit to protect from Methyl Isocyanate which is arguably the most dangerous chemical used in production. Due to these precautions, safety from all other chemicals involved is obtained.

References

Center for Disease Control and Prevention. (2014). *The National Institute for Occupational Safety and Health (NIOSH) – Isocyanates*.

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