

Industrial Hygiene Case Study: Demolition of the Tetra Ethyl Lead Additive Building at Sunoco Marcus Hook Refinery

Objective:

To manage health and safety for both the contractor and Sunoco Refinery personnel during the dismantling of the Tetra Ethyl Lead (TEL) additive building, associated tanks, and piping at the Sunoco Marcus Hook Refinery. The project involved cold cutting of piping containing gasoline and TEL, conducted under stringent safety protocols to protect workers from hazardous exposures.

Scope of Service:

KES was hired to oversee and manage the health and safety of all personnel involved in the demolition of the TEL additive building, including Sunoco Refinery employees and contractors. This high-risk project required precise industrial hygiene measures to address potential exposures to gasoline, TEL, and other hazardous chemicals. The operation was carried out during the summer months, and the personnel were required to wear EPA level B personal protective equipment (PPE) due to the nature of the hazardous materials being handled.

Key Services Provided:

1. Health and Safety Program Development:

- KES designed and implemented a comprehensive health and safety program tailored to the specific risks of the project. This included developing protocols for hazard identification, exposure control, and emergency response.
- KES ensured compliance with OSHA and EPA regulations regarding the handling and removal of hazardous materials, such as TEL and gasoline.

2. Risk Assessment and Hazard Identification:

- Conducted a detailed risk assessment to identify the hazards associated with the demolition activities, particularly the potential for exposure to gasoline, TEL, and lead.
- Identified potential risks related to the cold cutting of pipes, including the release of toxic fumes, dust, and chemical spills.
- Assessed environmental conditions, including high summer temperatures, which could impact the effectiveness of PPE and overall worker safety.

3. Personal Protective Equipment (PPE) Requirements:

- Due to the highly toxic nature of TEL and gasoline, workers were required to wear EPA level B protection, which includes chemical-resistant suits, gloves, boots, and self-contained breathing apparatus (SCBA).
- KES ensured that all personnel were properly trained on the use and maintenance of their PPE to ensure maximum protection during the demolition.

4. Exposure Monitoring and Air Sampling:

- Conducted continuous air monitoring for potential exposure to TEL, gasoline vapors, and other hazardous chemicals throughout the project.
- Air sampling was performed in real-time during the cold cutting and dismantling process to assess airborne concentrations of lead and volatile organic compounds (VOCs).
- Results from air sampling were analyzed and reviewed to ensure compliance with OSHA's permissible exposure limits (PELs) and to determine if additional safety measures were needed.

5. Cold Cutting and Chemical Hazard Management:

- Monitored the cold cutting operations of pipes that contained gasoline and TEL, ensuring that the proper procedures were followed to minimize the release of flammable and toxic substances.
- KES provided guidance on the safe isolation of the pipes and tanks before cutting to prevent accidental releases or leaks of gasoline or TEL into the work environment.

6. Emergency Response and Spill Control:

- Developed emergency response procedures in the event of a chemical spill, fire, or exposure incident. These procedures included protocols for evacuating personnel, containing spills, and decontaminating workers and equipment.
- Ensured that all workers were trained in emergency response actions, and spill containment kits were made available at strategic locations on-site.

7. Worksite Monitoring and Safety Inspections:

- KES conducted regular safety inspections and site walkthroughs to identify potential hazards and ensure compliance with safety protocols.
- Monitored worksite conditions, including ventilation and temperature, to ensure that environmental factors did not compromise worker health or safety.
- Provided on-site supervision and consultation to the contractor and Sunoco personnel to address safety concerns in real-time.

Project Activities and Response Efforts:

1. Pre-Demolition Assessment and Planning:

- Prior to beginning the demolition, KES conducted a thorough pre-demolition assessment to identify areas of high risk, including the presence of TEL and gasoline in pipes and tanks.
- A detailed plan was developed to isolate and purge all hazardous materials from the pipes and tanks before cutting began, minimizing the potential for exposure or accidental release.

2. Cold Cutting Operations:

- The cold cutting process involved using specialized equipment to cut through pipes and other infrastructure. KES ensured that all personnel involved in these operations were trained in the specific safety protocols necessary for working with hazardous materials.
- During the cold cutting process, KES monitored air quality and exposure levels to ensure that any airborne contaminants were within safe limits, with immediate corrective actions taken when necessary.

3. Monitoring PPE and Worksite Conditions:

- Given the high summer temperatures, KES implemented additional measures to ensure that workers remained protected and hydrated while wearing full EPA level B suits.
- On-site cooling stations were set up, and regular breaks were mandated to prevent heat stress among workers while maintaining their PPE.

4. Exposure Monitoring and Continuous Air Sampling:

- Continuous air monitoring devices were used to track lead levels, TEL, and gasoline vapors. KES ensured that all workers were within safe exposure levels and that air quality remained within compliance with industry standards.
- When necessary, additional ventilation or containment measures were implemented to prevent the spread of hazardous vapors.

5. Waste Management and Environmental Protection:

- KES oversaw the safe removal and disposal of hazardous waste generated by the demolition process, including contaminated PPE, debris, and chemical residues.
- Proper disposal methods were followed, including the segregation of hazardous materials, and waste disposal was done according to EPA regulations to ensure environmental safety.

6. Post-Demolition Health and Safety Review:

- After the demolition, KES conducted a final health and safety audit to ensure that all risks had been properly managed, and that no hazardous residues remained in the area.

- Clearance air sampling was conducted to confirm that the work area was safe for re-entry and that all hazardous materials had been properly removed.
-

Program Results and Impact:

1. Successful Management of Worker Health and Safety:

- Through the use of EPA level B protection, rigorous safety protocols, and continuous monitoring, KES successfully minimized the risk of hazardous exposures to workers during the demolition of the TEL additive building and associated tanks.
- PPE and safety measures were adjusted to account for summer heat, ensuring worker safety and comfort during the project.

2. Regulatory Compliance:

- The project remained in full compliance with OSHA, EPA, and other applicable safety and environmental regulations, ensuring that worker exposure to TEL, gasoline, and other chemicals was kept within permissible limits.
- KES's proactive monitoring and management of air quality and exposure levels ensured that all workers were protected from harmful exposures throughout the duration of the project.

3. Prevented Environmental Contamination:

- By implementing strict waste management and spill control procedures, KES helped prevent any accidental release of gasoline or TEL into the environment, ensuring minimal impact on the surrounding area.

4. Successful Project Completion:

- The project was completed on time, within budget, and without any significant health or safety incidents. KES's effective management of health and safety ensured that both Sunoco personnel and contractors were able to complete the demolition safely.
-

Conclusion:

KES's management of health and safety during the demolition of the Tetra Ethyl Lead (TEL) additive building at Sunoco's Marcus Hook Refinery demonstrated the company's expertise in handling hazardous materials, managing exposure risks, and ensuring worker safety. The project required careful planning, continuous monitoring, and the use of EPA level B PPE to mitigate the risks associated with gasoline, TEL, and high summer temperatures. Through strict adherence to safety protocols and comprehensive environmental monitoring, KES successfully

protected workers and the environment, ensuring that the demolition was completed without incident and in full compliance with all regulatory requirements.