

PBF Energy Delaware City, Delaware

September 10, 2020

Incident Summary

On September 10, 2020, at approximately 8:15 a.m., a large fire erupted at the PBF Holding Company LLC (“PBF Energy”) refinery in Delaware City, Delaware. The Delaware City Refining Company LLC operates the refinery (**Figure 1**). PBF Energy estimated that the fire caused \$1.7 million in property damage.



Figure 1. The PBF Energy refinery in Delaware City, Delaware. (Credit: Google Maps)

On the night of the incident, PBF Energy operators were preparing to start up a unit that had been down for maintenance. During this outage, equipment was opened and needed to be purged with nitrogen to displace the oxygen before restarting. Six valves were opened to allow the nitrogen and displaced oxygen to be discharged into the atmosphere. A board operator was then asked to open a specific control valve to begin the nitrogen flow through the piping, valves, and other equipment. Less than five minutes later, a fire erupted in the unit, fueled by hydrocarbons being released into the atmosphere from the six open valves. The fire lasted approximately five minutes until the open control valve was damaged and its spring-loaded actuator closed the valve (failed closed). PBF Energy estimated that 5,300 pounds of flammable hydrocarbons were released.

PBF Energy’s investigation concluded that the flammable hydrocarbons were ignited by a fired heater located approximately 100 feet downwind from one of the six release points. The opened control valve was not needed to displace oxygen from the system, and its manual isolation valve should have been closed. Instead of supplying nitrogen to the piping, a stream of flammable hydrocarbons, primarily butane, flowed into the system when the control valve was opened. In addition, the company’s investigation also found that the startup procedure did not specify the steps needed for oxygen-freeing this equipment.

Probable Cause

Based on PBF Energy’s investigation, the CSB determined that the probable cause of the incident was an inadvertent valve alignment that directed flammable hydrocarbons into piping and equipment with six valves open to the atmosphere to displace the oxygen from this system. A nearby furnace ignited the flammable hydrocarbons, resulting in the fire. Additionally, the unit startup procedure did not include the proper steps to remove the oxygen from this system, contributing to the incident.