

July 16, 1990

FROM: INVESTIGATION TEAM
TO: R. D. SHULTZ - FTM - LUBE MANUFACTURING
SUBJECT: FIRE ON DE-OILING PRODUCT WAX TO STORAGE LINE

Summary

At approximately 1145 on Friday, June 22, 1990, a craftsman discovered a fire in the pipe rack on the southeast side of the MEK unit. The fire was in the area of the valves used to route product wax down the #2 and #3 storage lines. The fire alarm sounded at 1153 but at that time the fire was already extinguished. The all clear sounded at 1156. Molten wax from a valve packing leak had penetrated the insulation covering and saturated the asbestos insulation. The wax saturated insulation smoldered and resulted in the fire.

No injuries or environmental incidences occurred and damage was limited to the insulation surrounding the piping. The PONC for this fire is approximately \$100M (\$90M loss production and \$10M maintenance).

Background

The MEK De-oiling unit routes product wax at approximately 225 degrees F to Lube Logistics down the #1, #2, #3, or #4 storage line. Each of these lines are 3"-150# class lines with 200# steam tracing, asbestos insulation, and metal covered. Isolation valves at the southeast corner of the unit are used to determine the correct routing of product wax to storage. In addition, a 3/4" steamout connection is installed on each product wax to storage line, downstream of the unit isolation valve, to clear the line of wax after use. The piping arrangement at the #2 and #3 lines to storage is shown in attached sketch 1.

Incident

LAM 011055

On the morning of June 22, 1990, the MEK De-oiling unit was on circulation while attempting to clear the #3 line to storage. At approximately 0830, operations found the steam tracing on that line blocked in and the line cold. The steam tracing was lined up and steam was injected into the #3 storage line to clear it of wax. At 1115, the line had cleared and the recovery operator began routing Shell wax 205 to storage through the #3 line.

At approximately 1145, an operator working to unplug the unit solvent sewer was notified by a craftsman of a fire in the piperack on the southeast side of the unit. The operator

DPMC-07435

notified the control board operator using the unit P.A. system and proceeded to extinguish the fire using an 1-1/2" hose reel fire hose located approximately 25 feet from the fire. The control board operator reported the fire to security and sounded the unit evacuation alarm. The fire alarm sounded at 1153 but at that time the fire was already extinguished.

The control board operator attempted to communicate with the field using the P.A. system and the unit radio in order to get information on the fire. With no response from the field, the operator proceeded to shut the De-oiling and De-waxing units down and secure them. The all clear alarm sounded at 1156 but the units were already shutting down. The inadequate communication between the board operator and field operators resulted in severe unit upsets.

The fire occurred in the piperack at the southeast corner of the unit in an area with no obvious ignition sources. However, molten wax from the steam out valve packing was found on the pipe insulation above the fire. The metal covering around the valves on the #2 and #3 lines to storage was not sealed adequately enough to prevent leaking wax from penetrating the insulation.

The temperature of the product wax going to storage (225 degrees F) and the temperature of the 200# steam tracing (390 degrees F) are both below the flash point of the wax that leaked from the valve packing. However, investigation into a similar incidents involving fires in wax soaked insulation revealed that waxes oxidize to form peroxides when exposed to sufficient oxygen. Applying heat to the wax causes formation of more peroxides and a high concentration of peroxides will result in considerably lower auto-ignition temperature.

It is not uncommon to have molten wax on the insulation in this part of the unit. However, in this case all of the conditions existed for the formation of peroxides from the wax. It is concluded that fire was a result of auto-ignition of smoldering wax soaked insulation.

Action Items

LAM 011056

1. Remove all insulation on the steam traced lines in the area of fire and install new cellular glass insulation over a mineral wool wrap. -- S. M. Bear - COMPLETED
2. Tighten or replace all valve packing on the product wax to storage valves and steam out valves. -- S. M. Bear - COMPLETED
3. Investigate other areas of the MEK unit for wax leaks around insulation, correct the leak, and submit a work request for replacing the insulation as necessary. -- J. D. Williamson - COMPLETE BY 8/90

DPMC-07436

4. Establish a guide for engineering and maintenance that designates the appropriate insulating material to be used on each process in Lube Manufacturing. -- D. A. Bulovas - COMPLETE BY 8/90.
5. Address communication problems encountered during the incident and recommend improvements -- W. D. Marriott - COMPLETE BY 9/90.

Investigation Team


S. J. Bannon

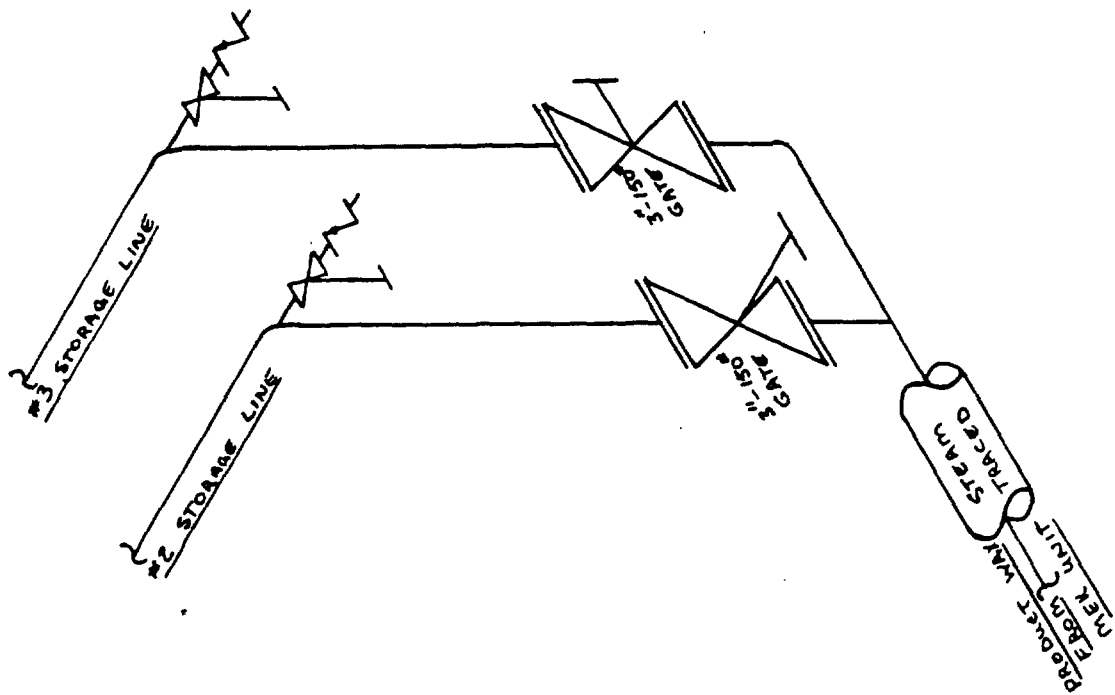

D. A. Bulovas


J. D. Williamson

cc: Investigation Team
Near Miss Distribution
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LAM 011057

DPMC-07437



LAM 011058

DPMC-07438

5-10983-1 (4-76)

ENGINEERING SKETCH PAD

☒ OIL ☐ CHEMICAL
☐ DEVELOPMENT

MEK DE-OILING PRODUCT WAY TO #2 AND #3 STORAGE LINES

SCALE
NONE

DATE DRAWN
7/3/90

DATE REVISED

DRAWING NO.
SKETCH #1

APPROVED BY
O. A. BULLOVAS