Safety Alert

BOEM

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Bureau of Ocean Energy Management, Regulation, and Enforcement
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PLUGGED FLAME ARRESTOR RESULTS IN RUPTURE OF OIL STORAGE TANKS

During torch cutting activities on the deck above, but within approximately 12 lateral feet of oil storage tanks, an explosion with no fire ruptured two oil storage tanks. The rupture resulted in approximately $500,000 of damage to the tanks and associated equipment. An estimated 29 barrels of crude oil were spilled overboard.

A BOEM investigation into this incident revealed that the tanks were not protected with flame-proofed covers, rendered inert, or shielded with metal or fire-resistant guards or curtains. The probable cause of the explosion was the ignition of combustible tank vapors escaping from thief hatches on the tanks during the torch cutting operation. Gas escaping from the thief hatch was exacerbated by the flame arrestor being plugged with corrosion deposits. The flame arrestor was equipped with a placard that read, “This device must be periodically serviced for continued safe operation”; however, the Lessee had never serviced the flame arrestor. The flame arrestor was installed on the end of the flare boom section with no easy access for maintenance or inspection.

The volatile vapor/air mixture most likely resulted from the "breathing" of the tanks through the thief hatch. This breathing allowed gas to escape during hot daytime hours and allowed air to enter the tanks during the cooler nighttime hours.

Therefore, BOEM recommends the following:

- Flame arrestors and similar devices should be periodically inspected as per the manufacturer's recommendations, since such devices are prone to fouling due to potential plugging from pipe scale and/or residues associated with the production process.
- Proper placement of the flame arrestor should be considered during the design phase in order to facilitate inspection of the safety device.
- Operators are reminded that 30 CFR 250.113(a) requires equipment containing hydrocarbons or other flammable surfaces be located at minimum 35 feet horizontally from the welding/hotwork area, or from the point of impact where slag, sparks, or other burning materials could fall. If moving equipment (i.e., tanks) is impractical, the equipment must be protected with flame-proofed covers, rendering the flammable substances inert, or shielding equipment with metal or fire resistant guards or curtains.