



**U.S. Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Region**

Notice No. 008

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OCS Operations Safety Alert

Catalytic Gas Heaters

A review of accident investigation reports submitted by OCS operators has uncovered an accident which occurred sometime ago, but one which has particular importance at this time.

The accident, a flash fire involving a catalytic gas heater, caused personnel injuries. This catalytic heater was being used as a "doghouse" space heater. The investigation which followed the accident brought out the following points.

1. The catalytic reaction had been properly started, in accordance with written operating instructions, approximately five hours before the flash fire occurred.
2. The catalytic heater unit was equipped with the wrong fuel gas regulator.
3. The unit was not equipped with a thermocouple safety shut-off valve.

The operator analysis concluded that the installation of the wrong fuel gas regulator provided excessive heater inlet gas pressure, allowing excess fuel gas to pass through the heater. The unspent fuel gas accumulated within the "doghouse," and a flash fire resulted when the gas was ignited by an unknown source.

The cause of the accident can be attributed to lack of attention to the safety features which must be considered when installing any device which utilizes fuel gas.

Since certain models of these catalytic heaters are approved for Class 1, Group D hazardous locations, it would appear that they are not inherently unsafe. There are, however, certain components which are critical to the proper safe operation of these units; namely, the regulator, the fuel orifice size, and the safety shut-off valve. Some other general safety considerations are:

1. Manual fuel gas shut-off valve.
2. Provision for venting.
3. Clearance from combustible materials.
4. Thermostatically controlled shut-off valve to protect against over temperature conditions.
5. Gas detector.

An analysis of the particular application of the unit will determine which of the above safety considerations must be satisfied, and what additional safety features must be provided.

With regard to the aforementioned accident, a proper venting system might have prevented the accumulation of unburned fuel. While the excessive fuel gas pressure was indicated to be the major contributing factor, there is, under normal operation conditions for these catalytic heaters, a quantity of gas which passes through the unit without being oxidized; and, under certain conditions, a combustible accumulation could occur without high fuel

gas pressure. However, high fuel gas pressure will increase the amount of unspent gas passing through the unit.

There are presently no standards which can be reference for the manufacture or installation of catalytic heater units. It is essential that responsible operator personnel investigate all necessary safety provision for heater unit installation. In the absence of any directly applicable installation standard for catalytic heaters, NFPA Bulletin No. 54, "Installation of Gas Appliances Gas Piping 1969," could be used to point out some of the safety items which must be provided.

Following the issuance of Safety Alert Notice No. 5, entitled "Flash Fires/Explosions," it was brought to our attention by one operator that listing the petroleum vapor ignition temperature as 536 F is misleading. While this value covers the ignition temperature of the main crude constituents, there are some fractions which have identified ignition temperatures below this value. Additionally, there are certain flammable liquids which are used on OCS installations that have ignition temperatures below this value, i.e.,

Fuel Oil No. 1 (Kerosene) 410 F

Fuel Oil No. 2 494 F

Jet Fuel JP-4 464 F

Lubricating Oil 478 F

Ignition temperature considerations are necessary in determining insulation requirements for hot surfaces. The general practice is to insulate those surfaces having an operating temperature above 400 F.

NFPA Bulletin No. 325M, "Fire Hazard Properties of Flammable Liquids, Gases, Volatile Solids, 1969," contains an excellent discussion of this subject and is recommended as a reference document.

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