



Ray M. 311 SP-20

National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Date: MAR 28 1986
In reply refer to: M-86-26

Mr. C. J. Silas
Chief Executive Officer
Phillips Petroleum Company
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Bartlesville, Oklahoma 74004

On January 15, 1985, the U.S. semi-submersible mobile offshore drilling unit (MODU) GLOMAR ARCTIC II was conducting well testing operations 130 nautical miles east-southeast of Aberdeen, Scotland, in the North Sea. About 2030, an explosion occurred in the port pontoon pumphouse. The chief engineer and the third assistant engineer were killed in the blast. Damage to the drilling vessel was estimated to be \$2.3 million. ^{1/}

At 1950 on January 15, 1985, a member of the Otis Pressure Control Company (Otis) well testing crew opened the adjustable choke valve and allowed crude oil from the well to flow through well testing and sampling equipment to the Otis crude oil burner on the port burner boom. Hydrocarbons from the well contaminated the rig compressed air system through a fracture in the No. 3 burner tip on the port side crude oil burner. The rig compressed air system then furnished contaminated compressed air to the purge air system. The automatic methane gas alarm, which was installed in the exhaust vent duct in the overhead of the drillers house, sensed methane gas in a mixture of explosive hydrocarbon gas that was expelled from equipment enclosures pressurized by the contaminated purge air. At 2010, the automatic methane gas alarm sounded at the drillers house. The Safety Board believes that sometime between 1950, when the adjustable choke valve was opened, and 2010, when the automatic methane gas alarm sounded, the No. 3 burner tip fractured.

After the low-level gas alarm sounded at 2010, the Phillips drilling supervisor began searching for the source of the gas. The toolpusher and the master, who equipped himself with a portable gas detector, proceeded to the drill floor where they met the drilling supervisor. The master began measuring the gas levels in and around the vicinity of the active alarm in the drillers house. After ascertaining that there were high levels of methane gas present, at 2026 the drilling supervisor ordered the well test crew to shut off the well flow. According to the American Petroleum Institute's recommended practice, when the low-level alarm sounded, the well flow should have been shut off

^{1/} For more detailed information, read Marine Accident Report--"Explosion and Fire Onboard the U.S. Mobile Offshore Drilling Unit GLOMAR ARCTIC II in the North Sea, 130 Nautical Miles East-Southeast of Aberdeen, Scotland, January 15, 1985" (NTSB/MAR-86/03).

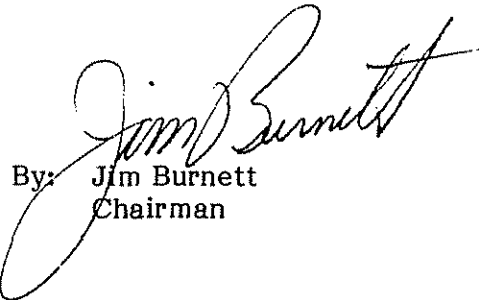
immediately to eliminate the major fuel source. However, the Safety Board is not aware of any Phillips Petroleum Company (Phillips) procedures directing its personnel to shut off well flow when the automatic low-level methane gas alarm sounded, and there were no instructions in Global Marine's GLOMAR ARCTIC II Critical Procedures Manual or Operations Manual directing its personnel to shut off the well flow when the low-level automatic methane gas alarm sounded. The Safety Board believes that the Phillips drilling supervisor should have shut off the well flow when the low-level automatic methane gas alarm sounded about 2010. Failing that, the master or the toolpusher should have ordered the well flow to be shut off upon their arrival at the drill floor area and then attempted to locate the source of the gas with the portable gas detector. However, even if the well flow had been shut off at 2010, the explosion probably still would have occurred because crude oil/gas had already entered the pumproom before the low-level alarm sounded.

Therefore, as a result of its investigation, the National Transportation Safety Board recommends that the Phillips Petroleum Company:

Develop mobile offshore drilling unit operating procedures to include instructions directing personnel to shut off the well flow when the low-level methane gas alarm is sounded. (Class II, Priority Action)
(M-86-26)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation M-86-26 in your reply.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and LAUBER, Member, concurred in this recommendation.


By: Jim Burnett
Chairman