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INVESTIGATION INTO THE RAPID DEGRADATION OF US NAVY SHIPBOARD DIESEL FUEL

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Beginning mid-2004, the Naval Fuels team began receiving numerous phone calls and messages regarding excessive filter change-outs onboard Naval vessels. The problem was isolated to ships that had recently received fuel from east coast naval fuel depots or oilers. During the same timeframe, the Coast Guard experienced gas turbine failures onboard two ships. The Navy spent approximately $1.2 M on additional filters during this fuel quality problem and the Coast Guard spent approximately $1.9 M to repair their damaged engines.

Laboratory reports showed that the fuel was on specification at procurement. Fuel samples pulled from the affected depots showed that the fuel remained on specification at the storage depots. However, field samples obtained from various ships showed a very dark, almost black fuel. Particulates exceeded the Navy's limit of 10 mg/L in almost all cases, even those pulled after the filter coalescers. Samples of coalescer elements showed a black, tarry material had penetrated both the inlet and outlet sides of the filters.

The origin of the fuel was traced back to one refiner. A Navy approved fuel stability additive was being added to the fuel. The root cause of the problem was determined to be a combination of poor laboratory procedures at the refinery lab and ineffectiveness of the stability additive being used. The Navy has since removed the allowance for using the stability additive from the military specification for F-76 shipboard diesel fuel.

This paper discusses the investigation into rapid diesel fuel degradation experienced by the US Navy and Coast Guard in the 2004/2005 timeframe.