INSTITUTE OF PETROLEUM
RESEARCH REPORT

INVESTIGATION INTO THE EFFECTS OF LUBRICITY ADDITIVES ON THE PERFORMANCE OF FILTER/WATER SEPARATORS

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March 2003

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The Institute of Petroleum gratefully acknowledges the financial contributions towards the scientific and technical programme from the following companies:

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ISBN 0 85293 395 9

Published by The Institute of Petroleum

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FOREWORD

This publication provides the report of an investigation that the IP Aviation Committee commissioned into the effects of diesel fuel lubricity additives on the performance of aviation fuel filter/water separators. The work was undertaken by Fuel Products Division of ExxonMobil Research & Engineering[1] under contract to the IP during the period February 2002 to September 2002. A draft version of this report was technically reviewed and accepted by Aviation Committee members.

The investigation was commissioned to enhance the knowledge of the aviation fuelling industry of the performance of filter/water separators in aviation fuel that has become contaminated by a diesel fuel lubricity additive. Large quantities of aviation fuel are distributed in multi-product pipelines, along with other petroleum products which may contain a lubricity additive. Such additives are used to increase the capacity of pipeline systems. As a result there is an increasing possibility that aviation fuel could be contaminated by such additives, the identification of which in routine operations is not straightforward.

The focus of this study was to determine the effect of certain diesel fuel lubricity additives on aviation fuel water separation at concentrations consistent with cross-contamination (10 ppm) and complete mis-additisation (200 ppm).

The investigation utilized aviation fuel that was free of any additional additives that can be used commercially (e.g. Stadis 450) to isolate the effects of the particular lubricity additives in question. Following the results of this first phase of work it is anticipated that further tests using fuel/additive blends may be undertaken in the near future.

The results of this investigation will be of significant interest to those involved in the handling of aviation fuel from multi-product pipelines.

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ABSTRACT

This report provides the results and interpretation of a study into the water separation characteristics of aviation turbine fuels contaminated with diesel fuel lubricity additives. The study was undertaken to gain an understanding of the impact that these additives might have on the coalescence of water from jet fuel. Results indicate that low levels (10 ppm) of these additives (monoacid or ester-based) do not disarm one model of aviation fuel coalescers; however, higher concentrations (200 ppm) of additive may indeed disarm coalescers, especially in the case of the ester additive. Tests including the Single Element Test (SET), ExxonMobil Coalescence Test (EMCT), Microseparometer (MSEP), Water Shedding Property (WASP), Interfacial Tension (IFT) and ASTM D1094 Water Reaction were investigated to determine their ability to predict which fuel/additive combinations would disarm coalescers.