

IRGF Final Report

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Project Title: Hydraulic oil infiltration into the drinking water of commercial aircraft: An assessment of chemical contamination

1.1 Project Summary

Certain organophosphate esters (OPEs), present in aircraft hydraulic and engine oil, have the potential to contaminate the drinking water onboard aircraft. Tricresyl phosphate (TCP) for example, is an engine oil anti-wear additive, that is suspected of contributing to increased neurological illness experienced by flight crew. Work completed at MRU, with the assistance of MRU undergraduate students, used world class analytical equipment (Multidimensional Gas Chromatography- Time of Flight Mass Spectrometry – (GCxGC-ToFMS)) to examine these oils/ fluids in detail, and to develop sample collection and analytical strategies.

1.2 Student involvement

Two Students (partial support)

1.3 Dissemination and Knowledge Mobilization

One oral presentation (International conference) - Multidimensional Chromatography Workshop 2026 - Williamsburg Virginia, USA Journal article - Prepared for submission - Expected submission June 2026.

1.4 Project Outcomes and Impacts

This project explored how chemicals used in aircraft systems could potentially end up in onboard drinking water. Rather than testing the water directly, we focused on analyzing aviation oils to understand what compounds they contain and which of those might realistically transfer into water during normal aircraft operation. Working with two undergraduate students, we identified several additives, including organophosphate compounds, that are commonly used in these oils and could serve as important markers in future water testing. This lays the groundwork for future studies by clarifying what we should be looking for when we test aircraft potable water more directly. By narrowing down likely compounds of interest, we can design efficient and reliable methods for measuring them and better understand how exposure might occur. It also strengthens my broader research program by linking potential sources of contamination to real-world exposure pathways. The project provided hands-on training for undergraduate students, who were involved in preparing samples, running analyses, and interpreting results. This experience helped build practical skills in analytical chemistry while contributing to meaningful research.