



October 28<sup>th</sup>, 2022

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Honolulu, HI 96813

Cc: Eric M. Jensen  
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Honolulu, HI 96813

Dr. Brewer,

This memo provides supplemental analytical data in support of the fuel study conducted by Alpha Analytical and NewFields Environmental Forensics on behalf of the Hawaii Department of Health. The fuel variants considered in this study were obtained from NewFields' forensic reference material library. More information on the reference fuels can be provided upon request. This study included the analysis of the following fuel variants:

Fuel Category	Fuel Variant
Gasolines	E10 87 Octane E10 91 Octane E10 93 Octane
Middle Distillates	Heating Fuel Road Diesel JP-5 JP-8
Residual Fuels	Waste Oil (auto) Bunker C

Alpha Analytical tested the fuel samples for volatile petroleum hydrocarbons (VPH) by Massachusetts Department of Environmental Protection (MADEP) VPH Method 2.1, and volatile paraffins, isoparaffins, aromatics, naphthenes and olefins (PIANO) by a modification of EPA Method 8260D. Using open column chromatography, the fuel samples were separated into aliphatic (F1), and aromatic (F2) fractions. The aliphatic, aromatic, and the whole extracts were then analyzed for total petroleum hydrocarbons (TPH C<sub>9</sub>-C<sub>44</sub>) by EPA Method 8015D. The Alpha data can be found attached to this report. Newfields, using Agilent's EnviroQuant™ data processing software further analyzed the VPH (C<sub>5</sub>-C<sub>8</sub>), and TPH (C<sub>8</sub>-C<sub>32</sub>) raw data to generate concentrations for the following carbon ranges from the aliphatic, aromatic and combined extracts:

Carbon Range		
C5-C6 Aliphatics	>C8-C10 Aromatics	>C8-C10 Combined
>C6-C8 Aliphatics	>C10-C12 Aromatics	>C10-C12 Combined
>C8-C10 Aliphatics	>C12-C16 Aromatics	>C12-C16 Combined
>C10-C12 Aliphatics	>C16-C21 Aromatics	>C16-C21 Combined
>C12-C16 Aliphatics	>C21-C32 Aromatics	>C21-C32 Combined
>C16-C21 Aliphatics		
>C21-C32 Aliphatics		

This report includes carbon range concentrations (mg/kg<sub>oil</sub>), flame ionization detector (FID) chromatograms (aliphatic, aromatic, and combined extracts), and the detailed raw data quantitation reports that record the integration of each carbon range. I am available to discuss this data further at your convenience.

Sincerely,



Eric Litman, M.S.  
Senior Consultant  
NewFields Environmental Forensics

Attached:

- Attachment A: Carbon Range Data Report
- Attachment B: FID Chromatograms - Whole Extract
- Attachment C: FID Chromatograms Aliphatic Fraction
- Attachment D: FID Chromatograms Aromatic Fraction
- Attachment E: FID Chromatograms VPH
- Attachment F: Quantitation Raw Data Reports
- Attachment G: Alpha Analytical Data Package L2240634