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January 25, 2006

Mr. Gary Mauseth
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Ph: (425) 823-4841

Subject: Subsistence Tissue Data - Forensic Review

Dear Mr. Mauseth,

This letter provides our technical review of the chemistry results generated for subsistence tissues that were collected as part of the Selendang AYU Oil Spill Response. The specific data reviewed herin includes polycyclic aromatic hydrocarbons (PAH) results pertaining to subsistence sample CH-SMB7-06-23-05-01.

Sample CH-SMB7-06-23-05-01 was found to contain elevated total PAH (TPAH) concentrations of 1,882 parts per billion (ppb - wet weight), of which 1,389 ppb were USEPA priority pollutant PAHs. These priority pollutant PAHs are combustion derived compounds that occur naturally and are not present in petroleum products (oil) in appreciable concentrations. They are the 'parent' PAH compounds, with no other hydrocarbons attached to them. Petroleum materials contain predominantly PAH compounds that have one or more hydrocarbon groups attached to them (alkyl homologues).

This fundamental difference between combustion derived PAHs (USEPA priority pollutant PAHs - pyrogenic) and petroleum derived PAHs (alkyl homologues - petrogenic) is demonstrated in Figure 1, in which the PAH histograms of sample CH-SMB7-06-23-05-01 and PST-5A/B and PST-11C (the two candidate source oils from the Selendang AYU) are presented. The black bars on the plots are petroleum derived PAHs, while the red bars are those PAHs that make up the USEPA's priority pollutant list (pyrogenic PAHs related to combustion). Figure 1 demonstrates that PAH distributions from combustion related processes are clearly unique from PAH distributions from petroleum. The PAH distribution in sample CH-SMB7-06-23-05-01 is dominated by the priority pollutant PAHs (in red), while the two oils; PST-5A/B - IFO and PST-11C – HFO; are composed predominantly of the PAH alkyl homologues (in black).

Based on the distributions of the PAHs in sample CH-SMB7-06-23-05-01, we conclude that the PAHs in the sample are from combustion derived sources, and are not from residues related to oil. Likely source(s) of these materials include wood ash, diesel and bunker fuel soot, and creosote/coal tar treated timbers.[1]

Please let me know if you have any questions regarding this review.

Sincerely,

Gregory S. Douglas, Ph.D.
Senior Consultant

cc: K. McCarthy, Newfields

[1] Page, D.S., Boehm, P.D., Douglas, G.S., Bence, A.E., Burns, W.A, Makiewicz, P.J. 1999. Pyrogenic polycyclic aromatic hydrocarbons in sediments record past human activity: a case study in Prince William Sound Alaska, Mar. Pollut. Bull. **38**, 247-260.

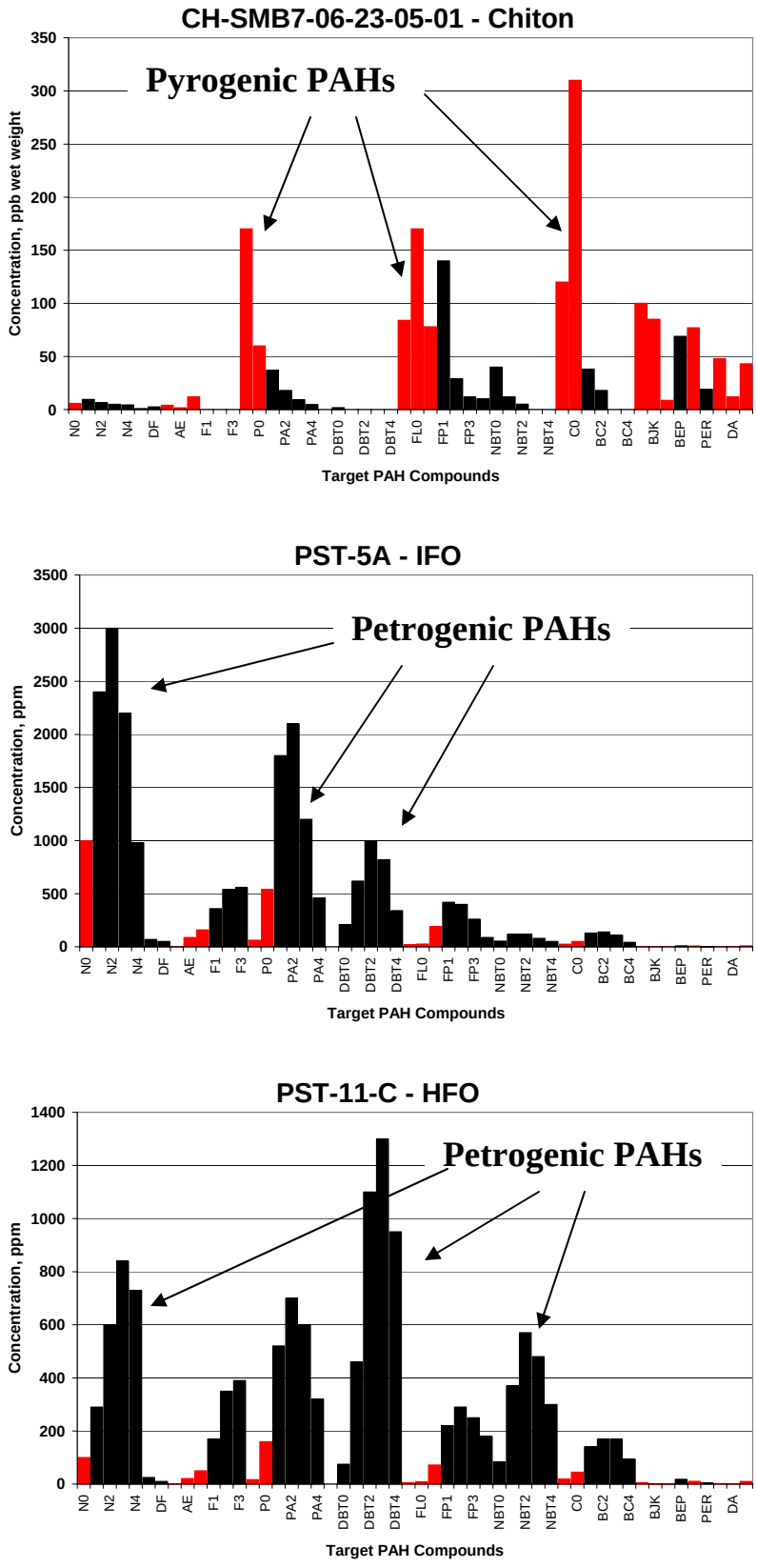

Figure 1. PAH histograms of Chiton sample CH-SMB7-06-23-05-01, PST-5A/B (IFO) and PST-11C (HFO). NOTE: Target analytes in RED are combustion related PAH (Pyrogenic) and those in BLACK are petroleum derived PAH (Petrogenic).