

## Cossaboom, Carey C POA

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**From:** Jeff Chiarenzelli [chiarejr@potdam.edu]  
**Sent:** Tuesday, January 10, 2006 7:08 AM  
**To:** Cossaboom, Carey C POA; Jeff\_Brownlee@dec.state.ak.us; Geist, Lisa K POA; Ron Scrudato  
**Subject:** RAB meeting

January 10, 2006

Dear Mr. Carey Cossaboom, Ms. Lisa Geist, and Mr. Jeff Brownlee,

Ron asked me to fill you in on our interest related to the characterization of hydrocarbons at the Northeast Cape. I have attached a letter Ron and I wrote previously outlining our concerns (in case you haven't seen it), but will gladly reiterate them again here for you as well.

Basically, our concerns center on the methodology and interpretation of the samples collected and analyzed for petroleum hydrocarbons. We do not believe that the interpretations made in the Northeast Cape Phase IV Remedial Investigation report can be justified. Specifically, the findings which assign most of the hydrocarbons to a biogenic origin is of concern to us and the people of St. Lawrence Island.

Because of the age of the spilled hydrocarbons, it is likely that they have undergone substantial weathering (change) in the environment as primary constituents are lost (transported) or altered due to a variety of physical, chemical, and biological processes. Everyone has experienced this type of degradation, often in the spring when trying to start a lawn mower in which the gas has "over-wintered". In general, these changes involve loss of the lightest and most volatile components and the relative concentration of less volatile, heavier compounds in the hydrocarbon mixture, resulting in a net shift to the right (longer retention times) on the chromatograms. This shift can be quite dramatic with time, such that the remnant hydrocarbons have little resemblance to the original spilled product. Therefore, comparing the chromatograms from "real" aged samples to pure, fresh product is misleading in the sense that a match is highly unlikely.

As we understand the sampling and analysis procedure, sediment samples in the Suqi Estuary were collected by placing a dredge on the bottom of the river which then filled with the sediment. This near surface, or bed load, sediment was then analyzed and compared to the EZFLASH hydrocarbon library. In some cases, a match, denoted in Appendix D, as weathered middle distillate or diesel fuel was made within the diesel range organic (DRO) compounds. However, in all cases residual range organics (RRO) were interpreted as biogenic. This is problematic, as weathered fuels would ultimately be dominated by the heaviest compounds with retention times falling in the RRO range.

We are concerned that the samples were collected from a limited portion (essentially all in the same small area) of the estuary and based on the sampling procedures, the samples would likely represent more recent deposits. Based on our sampling, the most contaminated sediments are found at depth and extend a minimum of 1000 feet or more into the estuary. Since much of the spillage occurred 30-40 years ago, it would make more sense for samples to include sediment deposited during this interval of time. The literature shows that sediment buried soon after a spill is significantly less weathered than that at or near the surface, which often bears no resemblance to the original hydrocarbon mixture released into the environment.

We have also spent some time reading the available literature on the characterization of petroleum spills and differentiating between aged petroleum hydrocarbons and those of biogenic origin. There are, in fact, a number of standard procedures routinely used by those with expertise in this field to make these determinations. They include the recognition of marker compounds and ratios, distinct biogenic PAH compounds, and other methods that involve more complex analysis. We contacted Dr. Zhendi Wang, Director of the Spill Unit at Environment Canada and an international expert on the characterization of spill hydrocarbons, and asked for her advice on these issues. She has kindly offered to analyze samples at her laboratory's expense because of her

interest in cold climate oil spills. If possible, Dr. Wang will join us by phone, for the next RAB meeting.

What we are asking for is reassessment of the origin of the hydrocarbons in the samples taken using standard modern techniques and protocols. This would include procedures outlined by experts in the field, such as Dr. Wang. Without doing the necessary tests, the origin of the hydrocarbons in the samples cannot be determined. The lab personnel may be right, biogenic hydrocarbons may be an important influence at the site given the organic-rich nature of the sediment samples collected. However, this statement cannot be made with any confidence without further work. Given the spill history of the site, personal observations, and the locations and methods used to collect site samples by the Corps' contractors, it seems probable that petroleum hydrocarbons comprise a significant proportion of the organics sampled from the Suqi drainage system..

We all recognize the importance of this phase of the remedial process. Defining the organics to a biogenic or petrogenic origin determines whether the material will need to be remediated and therefore significantly affects site characterization and factors requiring consideration in the subsequent Feasibility Studies. Without proper characterization of the hydrocarbons, informed decisions cannot be made.

Best wishes,

Jeff Chiarenzelli