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October 27, 2005

Mr. Jerald Reichlin
Fortier & Mikko, P. C.
S - 101 W Benson Blvd # 1500
Anchorage, Alaska 99503

Re: Response to your letter of 9/27/05

Dear Mr. Reichlin:

In response to your letter related to the origin of the compounds in the NEC water and sediments/soils and because of the timing and importance of this topic, we have decided to provide copies of our response to the entire RAB, the Corps of Engineers, and to ADEC.

In our opinion, the topics you mentioned have not received the attention they deserve. Although briefly mentioned in previous RI reports, the determination that appears in the Phase IV RI indicating that nearly all the hydrocarbons contained in the soils and sediments within the impacted areas of the NEC are biogenic in origin. We believe this conclusion is unsupported by existing data and explanation available in the RI IV and earlier reports...

Hydrocarbons found in environmental samples can be derived from several sources. They can be produced naturally and deposited in sediment near the surface (biogenic) or by maturation deep within the Earth over many millions of years (petrogenic). Others are formed during the burning of fossil fuels (pyrogenic).

Vast volumes of naturally occurring hydrocarbon compounds are refined and sold as various commercial products. Distinguishing between biogenic, petrogenic, and pyrogenic hydrocarbons, and their refined commercial by-products, is the subject of considerable research, particularly where legal liability is at issue. The sourcing of

hydrocarbons in a mixture can be a particularly vexing problem that ultimately relies on differentiation by modern fingerprinting analysis for resolution.

The consultants (Shannon and Wilson) for the Army Corps of Engineers have suggested that the majority of the hydrocarbon compounds found in the samples analyzed in the recent Phase IV remedial investigation at Northeast Cape (NEC) are of biogenic origin. Since local organic-rich soil, sediment, and peat (often nearly completely organic in nature) would be expected to contain considerable amounts of organic matter, this suggestion is plausible and in some cases may hide previously spilled petroleum compounds. Analytical difficulties such as coelution (analytical masking) or distinguishing between petroleum hydrocarbons within an abundant (often % level) organic matrix are expected. Sediments, including material being transported by the Suqi River will also contain large quantities of petroleum hydrocarbons. Based on the spillage history of the NEC site, and based on personal observations of the Suqi sediments, petroleum hydrocarbons dominate the sediment hydrocarbon patterns from the Suqi River drainage from the Main Complex into the Suqi Estuary. For obvious reasons, the origin of the hydrocarbons is of critical importance in determining the extent of governmental liability and subsequent remedial efforts that will be earmarked for the various sites at the NEC.

Regardless of the origin of the hydrocarbons, our objections to this characterization lie in the methodology used to make the determination between introduced (petroleum contaminants) and biogenic (natural plant/animal) hydrocarbons. This judgment is then given considerable weight in drawing conclusions in the Phase IV Remedial Investigation (see Appendix D).

As stated on page 19 of the RI:

“The influence of biogenic compounds on the diesel and residual range organic (DRO, and RRO) results from specific site identified in the Work Plan were assessed by the project laboratory. Background soil and sediments were assessed for biogenic compounds by running a library search on DRO/RRO extracts by Method SW8270. The laboratory project manager reviewed the tentatively identified compounds (TICs) from the library search and the DRO/RRO chromatograms to comment on whether petroleum hydrocarbons were the likely source of the reported DRO and RRO concentrations. This methodology is not nationally published, relies largely on the skills of the project laboratory, and will not be subject to the same level of QC as the primary project samples. The assessments are summarized in the site-specific summary of analytical results tables. The laboratory project manager’s comments are included in Table D-1 of Appendix D.”

Unfortunately Appendix D gives no additional details on the methodology. Given the lack of details and qualifying statements above, there is essentially no way to evaluate the validity of conclusions drawn in the report, except to say the method outlined falls far short of modern practices and applications. And as the statement freely admits, the

methodology relies largely on the skills of the project laboratory, and by inference analyst(s). No reassurance as to the skills or experience of either has been provided.

While reviewing the RI, we took the initiative to canvas the modern literature and contact experts on the topic of the identification and differentiation of spilled oils from biogenic hydrocarbons. Numerous powerful analytical and statistical tools are now available to help distinguish between biogenic and petroleum hydrocarbons, none of which were employed by the Corps' consultant. The use of chromatograms and an unspecified library search are simply inadequate for fingerprinting, particularly in complex systems where numerous sources and extensive degradation is expected. For example, numerous compositional marker compounds and ratios have been used in the literature to support biogenic interpretations and none of these are even mentioned, let alone referenced. Nor is there any reassurance or reason to believe that the rigorous quality assurance and control procedures required to carry out chemical fingerprinting have been met or even attempted.

In summary, given the limitations of the methodology employed and referenced in the Phase IV RI, the lack of technical details and supporting information provided regarding the methodology, acknowledged lack of QC procedures, the lack of references, physical reports of oil in Suqi drainage sediments, the specific locations and character of the analyzed sediments and soils, and the enormous volume of petroleum spilled in the basin (~200,000 gallons), assigning a biogenic origin to most of the hydrocarbons detected during in the RI study cannot be done with any credibility and begs the question of where did the spilled oil go? Given the magnitude of past spillage, questions of contaminant mass balance, fate, and transport become paramount to remedial efforts. We suggest that unless additional evidence can be supplied, and is reviewed by recognized experts in the field (we have several suggestions of who could do this), all such determinations should be removed from the Phase IV RI report because they are unsupported.

It should also be noted that the biogenic classification of the petroleum contents of the soils and sediments at the NEC has not received adequate discussion by the RAB. Because of the importance of this unsupported supposition, the Feasibility Study cannot effectively be assessed until the origin of the hydrocarbons identified in the soils and sediments at the NEC is determined. It is suggested that this topic be included in the next RAB meeting. We cannot overemphasize the importance of this determination since the remediation of the NEC will likely be influenced by the relative concentrations of the biogenic and petroleum hydrocarbons.

A second point addressed in your letter is the issue of detection limits used for many of the analytical compounds (e.g. SVOCs, GRO, DRO, BTEX, Benzene, PCBs). In many cases, practical quantitation limits (PQLs) exceed ADEC clean up criteria. Regardless of the reasons, valid or not, it is impossible to know whether or not the contaminant is actually present, if it is above cleanup criteria, and, if so, how far above. The selection and use of proper detection limits is critical to making informed decisions related to site cleanup. For example, how will samples with contaminant levels below PQLs, but above

cleanup criteria be treated? If ignored, then considerable amounts of contaminants could remain in place.

This issue has been noted in earlier correspondence without adequate explanations or modification of reporting detection limits. In particular, we have noted this problem in relation to the detection limits used for PCBs and other compounds which are commonly above concentrations found in highly contaminated regions including the Hudson River in upstate New York and one of the PCB manufacturing sites, Anniston Alabama.

Because of the importance of these issues, we recommend they be included in the next RAB meeting at which time we will have prepared a more basic and comprehensive explanation of the issues relative to petroleum origins and contaminant detection limits and their relative importance in attaining remedial objectives at the NEC.

Very truly yours,

Ronald J. Scudato and

Jeffrey R. Chiarenzelli