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**BLASLAND, BOUCK & LEE, INC.**  
ENGINEERS & SCIENTISTS

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February 4, 1994

Mr. John G. Kresky  
Code 1821  
Atlantic Division  
Naval Facilities Engineering Command  
LANTNAVFACENGCOM  
1510 Gilbert Street  
Norfolk, VA 23511-2699

Re: Draft Site Characterization Report  
Tow Way Fuel Facility  
Roosevelt Roads Naval Station  
Ceiba, Puerto Rico  
Contract Number N62470-93-4021

File: 399.01

Dear Mr. Kresky:

Blasland, Bouck & Lee (BB&L) is pleased to submit two draft copies of the Site Characterization Report for the above referenced facility. We hope you will find this report to be complete and acceptable for submittal to Puerto Rico Environmental Quality Board.

Based on our review of existing data and current conditions observed at the Tow Way site, BB&L offers the following suggestions for your consideration:

- Prior to initiating a permanent remediation system, the entire fuel storage and distribution system should be tested and repaired, if necessary. Abatement of the contamination source will be required prior to conducting effective site remediation.
- The bunker C fuel sludge that is buried near tanks 83 and 1080, should be excavated for disposal. Removal of the sludge will remove a potential continuous source of soil and ground-water contamination.
- As determined by slug tests, infiltration tests and results of the UGW-22 APT, free product and ground-water contamination at the site lies in very low permeability sediments. Some form of enhanced ground-water recovery will be necessary to effectively remediate free product and ground-water contamination.

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- Enhanced product recovery methods that are recommended include, pneumatic fracturing of vertical recovery wells, and horizontal trenching. Briefly, pneumatic fracturing consists of installing a double packer within the recovery well screen interval and forcing high pressure air (60 to 80 psi) into the formation to create fractures and/or increase the diameter of existing cracks or fractures in the geologic material. The result is to increase the bulk permeability of the material, which will increase ground water as well as free product recovery rates. After the free product has been remediated, contaminated ground water will also be removed more effectively due to the enhancement techniques. Horizontal trenching creates a large surface area and a zone of increased permeability which allows product and ground water to be conveyed at higher flow rates.

BB&L looks forward to hearing your comments and suggestions regarding this draft report. Please contact me at your earliest convenience.

Very truly yours,

BLASLAND, BOUCK & LEE



Kathy Lukasiewicz  
Sr. Project Geologist II

KL/sls  
Enclosure

cc: Mr. Pedro Ruiz