GERAGHTY & MILLER, INC.
Environmental Services

Ground Water *Engineering* *Hydrocarbon* *Remediation* *Education*

May 19, 1992

Caroline Kwan
USEPA Region II
26 Federal Plaza
New York, New York 10278

Re: Addendum to Technical Memorandum I
Tutu Service Station Investigation
St. Thomas, U.S. Virgin Islands.

Dear Ms. Kwan:

Geraghty & Miller has prepared this addendum to address the USEPA and Camp, Dresser, and McKee - Federal Programs Corporation (CDM-FPC) Comments on Technical Memorandum I, dated April 10, 1992. On May 5, 1992 a meeting was held at the USEPA Region II Office, in New York City, to discuss Technical Memorandum I. This meeting was attended by representatives of the USEPA, CDM-FPC, Soil Tech Corporation, Inc., Geraghty & Miller, Inc., and the Tutu Environmental Investigation Committee (TEIC). As a result of the May 5, 1992 meeting the attendees reached agreement on final monitoring well locations. Additionally, the analytical parameters for sludge sampling and surficial soil (i.e., upper two feet below land surface) sampling, as well as, split sampling procedures for soil samples were agreed upon. These agreements and the additonal information regarding the magnetometer survey are discussed in detail below.

FINAL MONITORING WELL LOCATIONS

Based upon the fracture trace analysis performed by CDM-FPC, the proposed locations of Monitoring Wells MW-1 and MW-1D have been relocated (see Figure 1) approximately 250 feet south of the originally proposed locations. The purpose of the relocation of MW-1 and MW-1D is to situate this well pair downgradient of the Curriculum

Center (former LAGA) property closer to the fracture lineament identified by CDM-FPC that appears to run parallel to Route 38. The newly proposed locations for Monitoring Wells MW-1 and MW-1D are more likely to intersect potential ground-water contamination that may flow preferentially along the fracture trace.

In addition, a shallow monitoring well, designated MW-14, has been added to replace the originally proposed MW-1 (see Figure 1). The purpose of this well is to monitor soil and ground-water quality downgradient of the drum disposal area at the Curriculum Center property.

ADDITIONAL SURFICIAL SOIL AND SLUDGE SAMPLING

In Technical Memorandum I, Geraghty & Miller proposed collection of two sludge samples from the residue visible in corroded steel drums and two surficial soil samples at areas of stained soils located north of the Curriculum Center for volatile organic compound (VOC) analysis. The USEPA and CDM-FPC agreed that these samples should be collected, however the analytical parameters were a subject of discussion at the May 5th meeting. Since the collection and analysis of the sludge samples was proposed to determine if the former contents of the drums may have contributed to the VOCs contained in ground-water, it was agreed at the meeting that the sludge samples would require only VOC analyses.

However, because surficial soil sample data will be used for a risk assessment analysis, the USEPA has requested that the analytical parameters include base neutral and acid extracatable (BNA) compounds (also known as semivolatile compounds) and metals. Geraghty & Miller voiced concerns regarding the usefulness and interpretation of metal results due to the presence of significant metal concentrations in naturally occurring soils derived from the weathering of volcanic bedrock. To address these concerns, Geraghty & Miller proposes to collect two surficial soil samples in the vicinity of the northwest corner of the Curriculum Center property which is presumed to be indicative of background conditions. These two background surficial soil samples will be analyzed for Target Analyte

List (TAL) inorganic parameters (which include metals). Determination of natural background conditions is not necessary for organic parmeters (i.e., VOCs and BNAs) because typical organic contaminants do not occur naturally.

To provide further surficial (i.e., upper two feet) soil sample data for a risk assessment, Geraghty & Miller proposes to collect and analyze the soil from the upper two feet of Boring B-13, located south of O'Henri. Analytical parameters will include VOCs, BNAs and TAL parameters using the anaytical methods specified in the Quality Assurrnce Project Plan. The majority of the Tutu Site is paved and therefore exposure to surficial soil is precluded. The area north of the Curriculum Center and the area south of the O'Henri Laundry facility are two areas of potential contamination that are unpaved. Geraghty & Miller believes the additional surficial soil sampling described above, in conjunction with the other work plan activities, should satisfy the analytical requirements for a risk assessment. To avoid additional costs for re-mobilization and additional quality control/quality assurance samples, Geraghty & Miller would like to request the the USEPA evaluate and comment as to whether the proposed surficial soil sampling provides sufficient data for a risk assessment.

SPLIT SAMPLING OF SOIL SAMPLES

CDM-FPC will be collecting split samples for USEPA oversight. The potential for limited soil volume due to poor drive-spoon recovery was discussed at the May 5th meeting. When split sampling is required, a discrete sample (i.e., non-composite) will be collected for VOC analyses and the remainder of the available sample will be composited and mixed in a decontaminated container. The composite sample may be collected over a four foot interval, if necessary. After thorough mixing, the split samples will be collected. The priority of collection will be as follows:

1) VOCs (non-composite),
2) BNAs (composite),

3) TAL parameters (composite), and

4) Total Petroleum Hydrocarbons (TPHs;composite).

MAGNETOMETER SURVEY

CDM-FPC provided comments regarding the magnetometer surveys at the Esso property, Texaco property, and the Curriculum Center property in the letter addressed to Caroline Kwan, "Review of Technical Memorandum I", dated April 24, 1992. The CDM-FPC comments are presented below, followed by Geraghty & Miller's response to the comment. The page, paragraph, and sentence citations refer to the text of Technical Memorandum I.

Page 9, 4th Paragraph - The calibration process should be described in more detail (i.e., How accurate was the calibration?).

- The use of the word "calibration" may not have been entirely appropiate. During the initial setup procedure the magnetometer was tuned to the magnetic field strength in the Virgin Islands, which is about 40,000 gammas.

Page 10, 2nd Paragraph, 2nd Sentence - The term "a few gammas" should be quantified.

- In order to locate a suitable site for a base station, magnetometer readings were obtained over a 400 foot square area (i.e., 20 feet by 20 feet) to determine if the area contained any anomalous magnetic fields. If the readings varied by more than 20 gammas the area was rejected for use as a potential base station.

Page 10, 2nd Paragraph, 4th Sentence - Was the base station the same for all three surveys?

- The same base station was used for all of the areas surveyed.

Page 10, 3rd Paragraph, 2nd Sentence - How was a regional component of 40500 gammas determined.

- The regional component of the magnetic field was calculated as the mean of all of the total magnetic field readings whose corresponding vertical gradient was less then 10 gammas. This procedure minimizes the influence of anomalous magnetic field values on the regional component and allows a better representation of the positive and negative anomalies on the contour map.

Page 11, 1st Paragraph - The discussion on negative anomalies is not self-evident and requires clarification.

- Magnetic anomalies can be divided into two groups, those caused by magnetization induced by the earth's magnetic field and those whose magnetization is remanent. Remanent magnetization results when a metal solidifies in an ambient magnetic field; the solidified the metal becomes magnetized with a strength and orientation characteristic of the field at that time.

  A metal body with only induced magnetization will produce an anomaly with a magnetic high and a magnetic low to the north of the body. The exact shape of this anomaly is determined by a number of factors including the latitude at which the anomaly is recorded. Metal bodies with remanent magnetization have anomalies caused by both the remanent magnetization and the induced magnetization. The anomaly resulting from the remanent component of the magnetization can be entirely positive, entirely negative or any combination of positive and negative. Thus, a body with significant remanent magnetization can cause strong negative anomalies. The approximate depth of these bodies can be estimated since the frequency

components of the anomalies remain essentially the same as anomalies from bodies with only induced magnetization bodies at similar depths.

In addition to the negative anomalies created by the above phenomenon, such anomalies also occur when the sensor head is at a lower elevation than the metal causing the anomaly. This is because the earth's magnetic field induces north poles on the upper surface of the metal and south poles on its lower surface. The north poles create positive anomalies and the south poles create negative anomalies. A magnetometer responds to all of the poles in the vicinity of the sensor head with those which are nearer to the sensor having a much larger influence. Thus, when the sensor is underneath metal it is nearer to the south poles and therefore records a negative anomaly.

Page 12, 3rd Paragraph, 2nd Sentence - What magnitude of anomalies are associated with steel pipes? How can a distinction be made?

- Anomalies from pipes depend on the depth to the pipe, its diameter and wall thickness and the susceptibility of the pipe. For a 12-inch diameter steel pipe buried at a depth of five feet (thus sensor to pipe distance is about 10 feet) the anomaly can have an amplitude from less than 100 gammas to over 1000 gammas.

Page 12, 3rd Paragraph - Reference is made to computer modeling. The modeling software, assumptions used, and results should be described in more detail and be appended.

- Computer modelling was performed using the program MAGIXXL written by Interpex Ltd. of Golden, Colorado. The models were produced assuming a susceptibility of 0.1 cgs units, which represents approximately 6 pounds of iron per cubic foot. All of the bodies have three dimensions for modelling and

assume the magnetic field strength is 40,000 gammas and the inclination of the earth's magnetic field is 50 degrees.

Page 12, 3rd Paragraph, Final Sentence - The coordinates given for boring B-1 is 25E, 24N, and Figure 10 is referenced. However, according to Figure 10 the coordinates of boring B-1 should be approximately 20E, 15N.

- The correct location of proposed boring B-1 is at grid coordinates 18E, 15N as shown in Figure 10.

Page 13, 3rd Paragraph, Final Sentence - A description of the contour diagram should be provided with the "erroneous" data point removed.

- Any anomaly supported by only one data point should be ignored. However, the anomaly in question is supported by a second data point at 65E, 35N. Thus, it is reasonable to assume that the anomaly is real and it probably should not be removed. However, the limited number of data points does not allow its true extent or shape to be seen.

Figure 12 - The apparent discontinuities in magnetic contours should be explained. Also, the proposed borings and/or monitoring wells should be shown on the magnetic field maps.

- The discontinuities in the contours are caused entirely by the software package used. They occur because the program does not allow contour density to go beyond a predetermined limit. When this limit is reached, selected contours are dropped.

Figure 13 - The locations for proposed monitoring wells MW-4 and MW-4D are were transposed according to all other figures.

- Proposed Monitoring Well MW-4D will be installed south of proposed Monitoring Well MW-4. Actual well locations will be subject to final drill rig accessibility. Field sketches of drilling locations will be prepared to document field revisions, if any. All monitoring wells will be surveyed and plotted on an appropiate base map.

We hope this Addendum to Technical Memorandum I has addressed all of the USEPA comments. Please comment on whether the proposed additional soil sampling is considered satisfactory for a risk assessment, so that the proper arrangements can be coordinated with our laboratory subcontract. If you have any further questions or comments, please call one of the individuals listed below.

Sincerely,
GERAGHTY & MILLER, INC.

Thomas V. Danahy
Senior Scientist/Project Manager

Daniel A. Nachman
Vice President/Project Director

c: Sally Odlund, CDM-FPC
Ana Gloria Ramos, TEIC
Jose Agrelot, Soil Tech

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GERAGHTY
& MILLER, INC.
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May 18, 1992

Caroline Kwan
USEPA Region II
26 Federal Plaza
New York, New York 10278

Re: Fifth Sampling Report, February 1992, Tutu Wells Site, St. Thomas, U.S. Virgin Islands.

Dear Ms. Kwan:

Enclosed are five copies of the above referenced report. Please note that chlorinated volatile organic compounds were detected at concentrations above the USEPA maximum contaminants levels (MCLs) in ground-water samples collected from the following supply wells: Eglin I, Eglin II, Eglin III, Four Winds I, Four Winds II, Hartman II, Harvey, LaPlace, Matthias, Ramsay, Smith, Steele, and Tillett. The Matthias well sample had a reported chromium concentration which barely exceeded the MCL.

Sincerely,

GERAGHTY & MILLER, INC.

Thomas V. Danahy
Senior Scientist/Project Manager

Daniel A. Nachman
Vice President/Project Director

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201 West Passaic Street, 3rd Floor • Rochelle Park, New Jersey 07662 • (201) 909-0700 • FAX (201) 909-0567/0568