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Ms. Caroline Kwan
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
26 Federal Plaza
New York, NY 10278

RE: Comments on Forensic Esso Tutu Station Report
Tutu Wells Site, St. Thomas, U.S. Virgin Islands

Dear Ms. Kwan:

At the request of Western Auto Supply Company's attorneys, ENSR Consulting and Engineering has reviewed the February 1995 Forensic Environmental Services report "Site Remediation and Supplemental Investigation Program: Esso Tutu Service Station". This letter contains comments on that document. Comments on this document are being presented to the US EPA because of their relevance to the Remedial Investigation/Feasibility Study process.

- **The evidence for a perched water table at Esso Tutu appears to be confusing and non-convincing.**

In Section 2.1.2 (pages 2-3 and 2-4) it is stated that there is a region of perched groundwater in the vicinity of well SW-7. Hydraulic conductivity values from slug tests for wells SW-1, SW-3, MW-8, and DW-1 are presented. The lowest conductivity values are located at wells SW-1 and SW-3.

It is not clear from this information what the site specific conditions are that cause the perched water table. The lowest conductivity values are at wells SW-1 and SW-3, but apparently groundwater is not perched in those locations. Also, the hydraulic conductivity value for well SW-7 is given. Finally, the data and analyses by which the hydraulic conductivity values were derived are not presented.

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- **The calculated groundwater velocity is not supported by adequate scientific justification.**

In Section 2.1.2 (page 2-4) a groundwater velocity of 4.7 feet/year is calculated assuming an effective porosity of 0.15. The actual calculation for the velocity is not shown. Assumed values of parameters such as hydraulic conductivity and the hydraulic gradient that are necessary for the calculation of groundwater velocity are not stated. Rational for the assumed porosity value of 0.15 is not provided; however, this value can range from 0 to 0.5 for various types of fractured bedrock. Also, the use of an effective porosity to calculate groundwater velocity in a fractured bedrock system assumes that an equivalent porous medium approximation is appropriate. No information is provided to justify this assumption. Finally, the calculated groundwater velocity does not appear to be correct based on the contaminant plume in the Tutu aquifer.

- **The Esso Tutu chlorinated VOC soil data do not define the limit of contamination and the existing data indicate significant contaminant levels.**

In Section 2.2.2 (page 2-7) it is stated that Esso Tutu soil samples SS-1 and SS-6 define the eastern and western extent of contamination and that Esso soil samples SS-4 and SS-5 define the north and south extent of contamination. It is also stated that Esso sample SS-1, obtained from a depth of nine feet, had non-detectable levels of chlorinated VOCs, implying that this sample defines the vertical extent of contamination.

Esso sample SS-1 does not define either the horizontal or vertical extent of chlorinated VOC contamination. The detection limit for all chlorinated VOCs in this sample was 1600 ppb, too high to be a reliable indicator of the absence of contamination. Also, significant levels of chlorinated VOCs were detected in Esso samples SS-3, SS-7, and SS-8, which are located in the same horizontal location as Esso sample SS-1. This provides further indication that the horizontal extent of contamination is not defined. Finally, it is not clear how Esso samples SS-4 and SS-5 could define the extent of north and south contamination. Both are located too close to each other and are not located to the north and south of the location of the highest detectable chlorinated VOC concentrations (Esso sample SS-3). The attached foldout figure (Figure 1) graphically portrays the PCE and 1,2 DCE soil data at Esso Tutu.

- **The groundwater and soil data indicate that there is a significant potential for a chlorinated VOC contribution to groundwater from Esso Tutu.**

Section 2.3.4 uses data from monitoring wells CHT-4, CHT-7D, MW-8, MW-10, and MW-10D to determine whether the Esso Tutu station has had an impact on groundwater concentrations of chlorinated VOCs. This determination is made using a statistical analysis of groundwater concentrations and relative weight ratios of tetrachlorethene (PCE), trichloroethene (TCE), and

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1,2-dichloroethene (DCE). The analysis indicated that relative weight ratios and concentrations of PCE, TCE, and DCE were statistically similar upgradient and downgradient of the station.

This analysis does not demonstrate that Esso Tutu has had no impact on chlorinated VOCs concentrations in groundwater. This is primarily because the analysis does not consider the overall decrease or downward gradient in chlorinated VOCs in the Tutu aquifer. There is a substantial decrease in groundwater concentrations of chlorinated VOC from north to south down the Tutu valley from the Laga facility. A chlorinated VOC source in this area may add contaminants to the aquifer without causing a noticeable increase in concentrations, but may decrease the contaminant concentration gradient or rate of contaminant concentration decrease. This is, in fact, seen with PCE concentrations at the site. Calculating the concentration gradient using Geraghty & Miller PCE data reported in the RI at wells MW-1 (near Laga), MW-7 (south of Tillet), MW-8 (north of Esso Tutu), and MW-10 (south of Esso Tutu). To the north of Esso Tutu, the concentration gradients of PCE between MW-1 and MW-7, MW-1 and MW-8,and MW-7 and MW-8 were determined to be 0.36 ppb/ft, 0.37 ppb/ft, and 0.38 ppb/ft, respectively. In contrast, the concentration gradient across Esso Tutu, from MW-8 to MW-10, is 0.019 ppb/ft. These gradients provide an indication of the rate of PCE decrease in terms of concentration decrease (in ppb) per foot of distance. The substantially lower concentration gradient from MW-8 to MW-10 indicates that rate of decrease in PCE concentration across Esso Tutu is substantially less than the same rate from Laga down to Esso Tutu. This trend is graphically demonstrated in the attached figure (Figure 2) showing PCE concentration values in groundwater at monitoring wells MW-1, MW-7, MW-8, and MW-10. This information indicates that Esso Tutu could be impacting PCE groundwater concentrations.

The similarity of relative weight ratios seen in the Forensic analysis could be attributable to the relative proximity of the wells used and the pumping influence of the Four Winds wells. The Four Winds wells could have influenced the chlorinated VOC concentrations in the wells that Forensic has used as upgradient wells (monitoring wells CHT-4 and MW-8). In fact, if relative weight ratios are calculated (using data from the RI) for well MW-7, which is the nearest well upgradient of the Four Winds wells, values of 38.6%, 8.0%, and 53.4% are obtained for PCE, TCE, and DCE, respectively. The PCE and DCE relative weight ratios for well MW-7 are significantly different than the corresponding ratios for the wells near Esso Tutu, again indicating that there may be an impact on groundwater concentrations of chlorinated VOCs at that facility.

Finally, the concentrations of chlorinated VOCs in soil at Esso Tutu indicate the potential for groundwater contamination. Table 2-4 of the FS shows soil concentrations above SSLs (soil screening levels). One of the Esso Tutu samples shown in FS Table 2-4 indicates a PCE concentration of 1500 ppb at a depth of 7 feet. The SSL value at Esso Tutu is 32 ppb for PCE in soils that are greater than 4 feet in depth. It should be noted that the USEPA developed the Esso Tutu SSL values specifically to be protective of groundwater at Esso Tutu. An exceedance of the standard by a factor of greater than forty indicates a significant potential for groundwater

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contamination. At a nine foot depth in the same location as the sample discussed above, a sample with a non-detect at 1600 ppb was obtained. Both of these samples were located at depths less than 10 feet to groundwater. There was no deeper sample at this location with a relatively low detection limit. This indicates that there is a significant potential for groundwater contamination through the soil route at this location.

Please feel free to contact us with any questions that you may have on these comments.

Sincerely,

Donald Galya

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Don Galya for

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