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EXPRESS MAIL-
RETURN RECEIPT REQUESTED

Mr. McBurney and Mr. Seibel
Project Coordinator for the TEIC
De Maximis, Inc.
186 Center Street
Suite 290
Clinton, NJ 08809

Re: Comments on the Draft Phase II Remedial Investigation (RI) and Development and Screening of Remedial Alternatives Reports for the Tutu Wells Site, St. Thomas, USVI

Dear Mr. McBurney and Mr. Seibel:

The U.S. Environmental Protection Agency (EPA) and the Department of Planning and Natural Resources (DPNR) have completed the review of the above-referenced documents.

Based on the meeting held on December 15, 1995 in the EPA's office, enclosed please find the EPA's comments on the above-mentioned document. Pursuant to the Administrative Consent Order Section VII, paragraph C.2, the Respondents shall submit a revised RI report 20 days after this meeting. Since the final comments were not received until now, the revised RI report should be in the EPA's office on or before January 31, 1995.

A revised Development and Screening of Remedial Alternatives Report is not necessary. EPA's comments should be reflected in the submittal of the draft Feasibility Study (FS) report.

EPA feels it is pertinent that the TEIC group and EPA jointly meet and discuss the various remedial groundwater alternatives with all the VI agencies that might be involved with the logistics of the implementation of the groundwater remedial alternatives before submission of the FS. Based on the discussion held on December 15, the first week of February 1995 would be a logical time to meet with these agencies since the new Governor should have made his appointments to the various agencies.

An RI/FS schedule based on the discussions held during the December 15 meeting is attached to this letter. Pursuant to the Administrative Order Section VII, paragraph F, Respondents shall

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submit a draft FS report within 35 days from the presentation of the Developmental and Screening of Remedial Alternatives report. Of course, the actual submission date of the FS will have to depend on the results of February meetings with the VI agencies and EPA's Final Risk Assessment which is expected on or before January 9, 1995. Therefore, EPA has extended the submission of the draft FS report until March 6, 1995.

If you have any questions, please call Ms. Kwan of my staff.

Sincerely,

Carole Petersen, Chief
New York/Caribbean Superfund Branch II

Enclosure

cc: Andy Praschak- CFO
Sally Odland-CDM-FPC
Leonard Reed-DPNR
Adrian Schotroff- DPNR

Comments on the Draft RI Report

General Comments on the RI

1. The greatest data gap in this investigation is that it failed to adequately identify and delineate the source(s) of the chlorinated volatile organic compound (VOC) plume emanating from the Curriculum Center (formerly LAGA). Yet this plume shows the highest concentrations of VOCs at the Tutu site (e.g., vinyl chloride over 1,000 parts per billion (ppb) and dichloroethene over 2,000 ppb).

   This facility has several potential source areas for groundwater contamination by both chlorinated and petroleum VOCs, including a former discharge pipe from the old dry cleaning area in the north end of the building; a reported waste infiltration pit which may be creating the soil gas anomaly north of the building; an active sink draining directly to site soils northeast of the building which is currently used to clean paints; and floor drains inside the building which currently contain dark viscous liquid with a solvent odor. EPA conducted sampling of some of the suspected sources. When results become available, they should be incorporated in the final RI report.

2. EPA recognizes that G&M had to develop some sort of logical criteria to define contamination in the absence of agency soil cleanup levels or goals. All reviewers have problems with criteria used in this report. At the initial screening, New York State Technical and Administrative Guidance Memorandum (NYSTAGM) (attached) should be used as A TBCs to determine soil impact on individual property. EPA will be conducting more detailed fate and transport modeling to determine clean up goals for the targeted contaminants in the Tutu Wells Site.

3. Criteria established in the Draft RI for determining which facilities have had or are having an "impact" on the Tutu Superfund Site do not parallel nor in any way supersede or replace the basis for liability established by Section 107 of CERCLA or any other provision of that or another applicable statute. EPA will apply all available information and evidence in this case to the standard of liability provided for in the statute when assigning liability for the contamination, remediation, and reimbursement of federal funds spent at this Site.

4. Water elevation data should be plotted on the groundwater flow maps to substantiate the flow interpretation. Also, the RI needs to incorporate information on regional ground water

flow patterns in the discussions on flow interpretation. For example, the 115-ft contour in Figure 4-10 is based on two water level values collected at Kentucky Fried Chicken (KFC), resulting in a southwesterly flow component between O'Henry and KFC. EPA believes this interpretation is erroneous and that the KFC water levels are taken out of context. The US Geological Services (USGS; 1979) and the consultant for Four Winds, Hydrologic Associates USA, Inc. (HAUSA; 1993) measured water levels in a series of wells located to the west of Rt. 38 in the lower section of the Tutu valley. Groundwater contours generated by the USGS and by HAUSA indicate that a major southeasterly flow component exists in the lower section of the Tutu valley, towards the lower section of the Turpentine Run. This flow component partially explains why the southern VOC plume follows a southeasterly path, and why little or no VOC contamination has been detected to the southwest of O'Henry.

In addition, EPA believes the mounding effect indicated in Figure 4-11 in vicinity of O'Henry is more local than currently shown, and that contours to the southwest of O'Henry should curve more to the southwest such that a southeasterly flow component is inferred.

5. Separate maps should be prepared for shallow versus deep/supply well groundwater chemical data. This will provide a better picture of where certain contaminants enter the system. Concentrations from supply wells should be regarded as minimum values due to contaminant dilution across very large open-hole intervals.

6. Separate maps should be prepared for tetrachloroethylene (PCE) and its potential degradation products: total dichloroethene (DCE), trichloroethene (TCE) and vinyl chloride. Mapping the chlorinated VOCs separately (and separated by depth!) will reveal at least two possible source areas at the Curriculum Center: 1) a northern (presumably older) source contributing the elevated vinyl chloride concentrations in well MW-16, and 2) a central (presumably younger or ongoing) source, perhaps beneath the building, contributing the elevated DCE concentrations in wells MW-1 and MW-1D. Note that PCE begins to show up in groundwater immediately south of the Curriculum Center building, but is not detected north of it in well (MW-16).

7. In the discussion of dense non-aqueous phase liquid (DNAPL), the potential presence of DNAPL in fractured bedrock above the water table must be addressed. In the vicinity of the Curriculum Center, the water table is about 30 feet below the top of bedrock. Both groundwater concentrations of chlorinated VOCs and site observations of oil or solvent in floor drains indicate a high probability that DNAPL has

migrated into soils and then into fractured rock on its way to the water table. If this is true, not only will residual product be present above the water table, but there is the potential for DNAPL to pool at permeability boundaries such as the top of weathered bedrock or the weathered/competent bedrock interface.

8. At the November 2 and 3 technical meetings, EPA was made aware of some individual PRP studies whose results were not discussed in the RI. These include a soil gas study (Gore-sorber technique) inside the Four Winds Plaza and an aquifer test performed by Caribbean Hydrotech for Four Winds. The results of these studies should be incorporated in the revised RI. In addition, EPA received evidence of contaminant releases at the Esso gas stations from the other PRPs. These evidence should be included in the RI report.

9. To substantiate the report's premise that all the TCE, DCE and vinyl chloride are breakdown products of PCE, it would be useful to 1) show ratios of these compounds to PCE on the maps or on cross sections along the plume axes, and 2) to provide any field or lab data, such as dissolved oxygen, that might indicate the redox conditions of the aquifer.

10. The two rounds of water elevations shown in the report were both collected in May 1994. The revised RI should incorporate data from previous measuring results to discuss seasonal variation. More data is necessary during the design phase to account for the seasonal variation in the southern portion of the Site.

    Similarly, seasonal water level changes have not been defined. Seasonal fluctuations may become critical to understand during the design stage, particularly when considering treatment of soils through SVE or recovery of floating product at any given site.

11. The Phase II investigation identified VOC contamination above drinking water standards in the Delagarde well. The concentrations detected (in the low tens of ppb range) indicate the well is near the edge of the southern chlorinated plume. This data should be compared to the latest available water quality data from downgradient supply wells to help determine the downgradient extent of this plume.

12. To facilitate any discussion of soil contamination and clean-up, a contour map showing depth to bedrock (overburden thickness) should be provided.

13. The vertical extent of contamination and the salt water interface (base of potable aquifer) will need to be defined

in the RD phase.

14. EPA believes that the characterization of the BTEX and VOC plumes as being stable, or having reached equilibrium, is premature. For example, VOCs were detected in well MW-12D for the first time in the comprehensive groundwater sampling event. Similarly, the non-detection of BTEX in well CHT-7D does not necessarily mean that BTEX has not migrated that far south of Esso. Well CHT-7D is screened over a very large interval, and the non-detect may be a function of water dilution during sampling rather than non-presence of contaminants.

15. The RI should discuss in detail the potential for the existence of LNAPL in addition to the discussion on DNAPL.

16. There seems to be a forested wetland located at south of the site. Documentation of groundwater discharge points in the vicinity of this wetland by comparing groundwater elevation to surface water elevation and site contaminants in the nearest well would give a good indication if groundwater is discharging into this wetland.

17. "The Upper Turpentine Run, which drains the Tutu Wells site from north to south, has been channelized in a storm sewer as part of the development of the valley" (page 3-2). The installation date of this enclosed storm sewer is not provided in this report. It is not clear whether the Run had previously been an open system, allowing site contamination to be transported downstream through the surface water.

Specific Comments on the RI

Page 1-13 - The results of the Gore-sorber soil gas survey performed at Four Winds should be presented in the RI.

page 3-1 - To assist in understanding the relative locations of the various PRPs, a large scale location map should be produced. The map should fit on a 8 1/2" x 11" or slightly larger sized paper.

page 3-16, paragraph 3 - Change "including 21" to "consisting of 21".

Page 3-17 and 3-18 - Well MW-22D, installed near the downgradient end of the southern chlorinated plume, could actually be considered a shallow well. Even though it is screened from 108'-128' below ground surface, the water table at this location is deep - 93' to 106'. Data from this well should therefore be plotted on the shallow well maps.

page 3-25, paragraph 1 and page 3-28, paragraph 1 - The pumping tests should also yield values of hydraulic conductivity (K). Include this in the discussion.

page 4-8, paragraph 3 - Because the geologic transitions are difficult to determine, include what criteria was used for deciding when the geologic material is unconsolidated, weathered bedrock or competent bedrock.

Page 4-11, first paragraph - If the strike of the geologic units is northwest, it is impossible for the dip to be to the southeast as stated. The authors probably meant northeast.

Page 4-12, first paragraph - EPA concurs that a fault, or more likely faults, may exist along the Tutu valley. The 90-foot change in depth of the Cabes Point Conglomerate between wells CHT-6D and CHT-7D and the outcrop 200 to 300 feet away would represent a formation dip of only about 16 to 24 degrees, which is shallower than the expected regional dip of 60 to 80 degrees. We observed small-scale north-trending faults in the outcrop at Tutu Park during our recent site visit.

Page 4-15, Bedrock outcrop fracture analysis - The USGS (1987b) identified a major northeast-southwest lineament transecting St. Thomas from the northern peninsula at Magen's Bay towards Turpentine Run and Mangrove Lagoon. This lineament coincides well with SE-NW fractures identified by G&M and EPA along the Turpentine Run, and the preferential flow path taken by the southern chlorinated plume between O'Henry and the Delagarde well. The report should refer to this as collaborating evidence of major fracture system.

Page 4-20, third paragraph - The two boring logs (CHT-7D and CHT-6D) do not provide enough data to extrapolate the depth of fracture zones for the whole aquifer, especially considering that the intensity of fracturing may be lithologically controlled and that the formations dip steeply. This does not imply the depth of fracture zone are known throughout the Site. The most valuable information on fracture connectivity has come from the responses in observations wells during pumping tests.

page 4-21, paragraph 3 - Figure 4-6 does not show fracture traces. The reference should probably be to Figure 4-1.

page 4-22, paragraph 2 - Figure 4-6 does not depict that the former stream channel of the Turpentine Run has been filled, and the surface drainage is channelized through a storm sewer under the area.

page 4-22, paragraph 3 and page 4-23, top of page- The steep gradient **may** be indicative of the low permeability of the zone penetrated by the shallow well, and conversely, the less steep

gradient **may** be indicative of a high permeability zone. Replace the word "is" with "may" because there could be other factors contributing to these observations, such as topographic controls.

page 4-23, paragraph 2, last sentence - Add that the gentle gradient **may** indicate a more permeable zone.

Page 4-23, Section 4.6.2.2, penultimate sentence - Reference to southwesterly ground water flow should be removed. See General Comment 3.

Page 4-23, Section 4.6.2.3 - An explanation for the occasional upward gradients near monitoring wells MW-13/13D should be provided. These wells are located in a recharge area and vertical upward gradients are not expected. Similarly, the wording "at times" should be explained.

Sections 4.6.2.4 and 4.6.2.5 - Include what the assumed aquifer thickness is for each analysis.

Sections 4.6.2.4 and 4.6.2.5 - For every transmissivity value calculated, determine what the hydraulic conductivity (K) is. This information may be needed in the future, in particular, for the capture zone analysis which will be performed as part of the Feasibility Study.

Page 4-24, first paragraph - The head difference between wells MW-20 and MW-20D should be explained. This well pair is characterized as having "the steepest downward gradient" on site, based on a single measurement. This pair should have been measured in subsequent rounds. Pair MW-1/MW-1D also had a very steep downward vertical gradient in one round, but lesser gradients in other rounds. Yet it is classified as a well with a "predominantly downward gradient".

Section 4.6.2.6 Pumpage Impact - Although we have some comments concerning interpretation of the test results, we feel that overall, this test provided good information on aquifer response and conclusively demonstrated the existence of a more conductive zone along the presumed northwest-southeast fracture set between O'Henry and Eglin. Practical emphasis should be placed on the aquifer's measured response to pumping, and these results should be included in any future ground water extraction planning scheme.

The RI should provide rainfall data for May, 1994, prior to, and during, the aquifer test. G&M postulates that the rise in water levels immediately prior to aquifer pumping in some wells is the result of potential external pumping influences. To better resolve this issue, a graphical comparison should be provided between barometric pressure, rainfall and antecedent water levels. G&M should also discuss whether the water level rises

show any spatial trends or patterns which can specifically pinpoint a pumping supply well which may have interfered with the testing of the Eglin III well.

The cause for the negative drawdown (i.e., a water level rise) observed in the Steele well during the aquifer test should be discussed.

In most cases, the methods of analyses employed in the RI to calculate aquifer transmissivity are based on limiting assumptions which are not valid for the Tutu aquifer. Generally, the methods of analyses employed were developed for homogenous, porous media aquifers. While the numerical analyses of non-porous, fractured aquifers are often also based on sets of limiting assumptions, EPA believes that, for comparative purposes, an attempt should be made to apply recent methods specifically developed for fractured rock. Examples are Moench (1984), Boonstra-Boehmer (1986), Warren-Root (1963), Bourdet-Gringarten (1980), etc. It is interesting to note that Geraghty & Miller's commercially available software package for aquifer test analyses (AQTESOLV) includes Moench's solution, yet this method of analysis was not described in the RI, and it is unclear whether or not this method was attempted.

Finally, because assumptions for each method applied have not been satisfied, the calculated transmissivity values should be regarded as estimates only. For example, a transmissivity value of 18,000 gpd/ft should be regarded as being virtually equivalent to a value of 22,500 gpd/ft.

page 4-28, paragraph 3, last sentence - In reference to Figure 4-18, confirm that this sentence is correct as written.

page 4-29, paragraph 3 - Provide more information on how the contour spacing was calculated using the Cooper-Jacob equation to approximate the logarithmic decrease in drawdown with increasing distance from the pumping well.

Page 5-3, Criteria for impact to soil

The recommended (as per RAGS) method for comparing background sampling data to site-related data is through a statistical (e.g., student t test) test. Often, the number of background samples is limited and precludes conventional statistical analysis. In such cases, a surrogate technique for determining whether site data is significantly different than background is the "two times rule:" (i.e., if the mean of the site data exceeds two times the mean of the background data, then the element should be included as a Chemicals Of Concern).

Page 5-7, 2nd paragraph- Last sentence should be deleted since the criteria for identifying soil impact will be removed from the

revised RI report.

Page 5-8- 1st paragraph- first sentence in the first paragraph should be deleted.

Page 5-8, Section 5.1.2, Curriculum Center - The soil sources at this property have not been adequately delineated. See general comments.

page 5-9, last paragraph, sentences 1 and 2 - Remove these two sentences because they do not agree with the available data. The highest soil gas survey levels are not in the same location as the soil boring locations. These sentences are misleading.

Page 5-9, 2nd paragraph- "However, these compounds were detected in only one of four samples", should be deleted.

Page 5-9, 3rd paragraph-last sentence, "Based on the stated assumptions...." should be deleted.

Page 5-10, last paragraph - Acetone was detected at 480,000 (BD) ug/l in an oil/water sample at Ramsay. It was also detected at high concentrations (1000 BJ ug/kg, 800 BJ ug/kg) in soils near the underground storage tank. These concentrations may represent acetone levels in soil; they cannot be written off as laboratory contamination without comparison to the concentrations detected in the laboratory blanks.

Page 5-11, 2nd paragraph- The word "only" in the 1st sentence should be deleted.

Page 5-11- last paragraph- last sentence of the paragraph- "The presences of BNA compounds..." should be deleted.

Page 5-12, last paragraph - The concentrations of methylene chloride, acetone and 2-butanone referred to here have not been qualified with a "B" (also found in QC blank sample) and cannot be dismissed as laboratory artifacts without further discussion of the results.

Page 5-12, second paragraph - Antilles may be a potential source of <u>some of</u> the impacts to soils observed at Ramsay. It is not the source of <u>all</u> the Ramsay contamination.

Page 5-21, 2nd paragraph, the word "only" in the 1st sentence should be deleted.

Page 5-21, second and third paragraphs - The PCE detected in soil SS-1 (160 ug/kg) at Western Auto was from stained soils in the vicinity of a ruptured pipe where PCE was detected at 5,900 to 10,000 ug/kg. G&M have ruled out this property as having chlorinated impacted soils because the soils were later

excavated. While it may not represent a current potential impact, that soil certainly represents a past release and potential impact. Based on the Decemeber 15 meeting, DPNR has requested Western Auto further investigatory work be done on the property.

Page 5-23, 2nd paragraph, 2nd sentence, "Review of these data...." should be deleted.

Page 5-24, first paragraph - G&M state that "...impact [of PCE] from the south oil/water separator [at Esso] is limited in vertical extent...." Yet PCE was found at 1500 ug/kg in SS-8 from a depth of 7 feet.

Page 5-26, third paragraph - Note that PCE was also detected entering the sanitary sewer line in the vicinity of the O'Henry property.

Page 5-30 - Western Auto should be identified as a property with possible PCE impact to soils from the waste oil pipe rupture.

Page 5-31, Criteria for impact to groundwater - The principal chlorinated constituents of groundwater contamination should be mapped separately before evaluating whether groundwater concentrations of individual constituents increase at or downgradient from a site.

page 5-31, bullet 1 - EPA generally agrees with this statement except at the Laga property where the soils were not adequately investigated, both at the soil-gas hot spot and under the building. This criteria should be modified to reflect conditions at Laga.

Page 5-35, second paragraph - The distribution of the gasoline additive MTBE should be mapped and discussed further. Due to its high solubility, it travels at the plume front. It is detected in the vicinity of both gas stations and extending all the way to the southern end of the O'Henry chlorinated plume (Delagarde well).

Page 5-36, Section 5.2.1.3, Chlorinated VOCs - Separate maps of the four main chlorinated compounds (PCE, TCE, DCE and vinyl chloride) should be prepared for both shallow and deep/supply well depths to substantiate the discussions in this section.

Page 5-37, Sect 5.2.1.3.1, second paragraph, first sentence - the words " and deep" should be inserted after "shallow".

Page 5-40, Section 5.2.2, Evaluation of Potential Presence of DNAPL - This section should also evaluate the potential for DNAPL to be present in the unsaturated zone, both soils and fractured bedrock.

Page 5-41, Section 5.2.3, Vertical Distribution of Organic Compounds in Groundwater - VOCs in Shallow and Deep/Supply wells should be plotted separately to substantiate this discussion.

Page 5-42, second paragraph, second sentence - Dissolved BTEX compounds flow along prevailing hydraulic gradients and may reach greater depths. This should be stated.

Page 5-47- 4th sentence- The area immediately north of the Curriculum Center building appears to be "one of" the "main" sources areas for the northern plume of chlorinated VOCs. The words "one of" and "main" should be inserted.

page 5-47, paragraph 2 , sentence 4 - Remove this sentence because the source(s) of VOCs from the Curriculum Center building have not been located.

Page 5-47, last paragraph - The sources of contamination at the Curriculum Center are likely above the water table, based on the soil gas anomalies, the decrease in VOC concentrations with depth, and the evidence of current releases and potential releases of product to the environment through sink and floor drains within the building. DNAPL may not have migrated deep into the water table. Or, if present, it may be within the seasonal high water table.

page 5-50, paragraph 1, Curriculum Center - Remove the last phrase of the last sentence because the source(s) of the VOCs from the curriculum Center building have not been located.

Table 3-4 - Key the sources of the data to the actual data.

Table 4-1 and 4-2 - Provide a complete reference for the source of data.

Table 4-4 - State what type of geophysical techniques were used to assemble this information.

Table 4-8 - Provide hydraulic conductivity values (K) and aquifer thicknesses (b).

Tables 5-1, 5-2, 5-3, 5-4, 5-5, 5-7, 5-8, 5-9, 5-10, 5-11 and 5-12 - List the ARARs on the Tables and flag the excedances. PCBs action level is 1 ppm for residential and 10 to 25 ppm for commerical/industrial. In the case of Tillet, it would be 1 ppm. Attached are tables generated from the EPA's Risk Assessment on groundwater preliminary remediation goals (PRGS) for contaminants that have no MCLs promulgated standards. These PRGs should be included in the Final RI report.

Table 6-1 - Key the sources of the properties to the listed

properties.

Table 6-1 - Provide information on the subscripts in the vapor pressure column.

Figure 4-9, 4-10 and 4-12 - Plot the actual groundwater elevations on the Figures. The Figures are not useful in their present form.

Page 5-48, 1st paragraph , 1st sentence, "... which appears to be "one of" the "main" sources area"s"... " The words "one of", "main" and "s" should be inserted.

Page 5-48, first paragraph, and page 5-50 - The Esso station cannot be ruled out as a potential source of chlorinated VOCs to groundwater. Based on back calculations, soil concentrations of VOCs near the oil/water separator are high enough to potentially cause groundwater contamination. Because the area is paved, it may not be currently impacting groundwater, but maps of individual chlorinated VOC constituents should be prepared to substantiate the claim that groundwater concentrations do not increase at or downgradient from the property. Therefore, the last sentence should be deleted.

Page 5-48, third paragraph - several wells very close to the Esso station had lead concentrations above the federal action level of 15 ppb. However, they are within the area of BTEX contamination and can be addressed with that plume.

Page 6-15, last paragraph, and page 8-1, third paragraph - Groundwater at the site is found at depths ranging from 7 to 106 feet, not 65 feet.

Page 8-3, "Criteria established in the Draft RI for determining which facilities have had or are having an "impact" on the Tutu Superfund Site do not parallel nor in any way supersede or replace the basis for liability established by Section 107 of CERCLA or any other provision of that or another applicable statute. EPA will apply all available information and evidence in this case to the standard of liability provided for in the statute when assigning liability for the contamination, remediation, and reimbursement of federal funds spent at this Site." must be inserted before Section 8.3 and 8.4.

Page 8-3 - Western Auto should be identified as a property with soils impacted by chlorinated VOCs.

Page 8-4 - Esso should be identified as a potential source of chlorinated VOCs to groundwater.

Page 8-4, third paragraph - The sentence should be modified to read "There is a moderate to high probability that DNAPL in the

pure phase historically migrated through the unsaturated zone and is present as droplets or globules in fractures both in the unsaturated and saturated zone.

Page 8-5 - The action levels for soils at the site will be selected by EPA to be protective of groundwater quality.

Figure 4-20 - Ground water contours to the southeast of the pumping center (Eglin III) should be redrawn and should be closed.

Comments on the Draft Development and Screening of Remedial Alternatives Report

General Comments

1. The draft FS must use soil cleanup numbers provided by EPA and not the criteria used in the draft RI report.

2. The FS should contain a brief summary/synthesis of the major findings and issues of concern identified in the RI that will affect the selection of remedial alternatives. Results from studies that were not discussed in detail in the RI (e.g., the detection of diesel constituents and naphthalene in the Gore Sorber soil gas study beneath Four Winds Plaza) should be included in this summary.

3. All data which passed data validation should be considered as significant information. Unvalidated data should be considered, too, after careful review. Data should not be summarily dismissed (e.g., detected phthalates are common laboratory artifacts) without adequate comparison to sampling and laboratory QC samples.

4. All applicable ARARs should be surveyed and included in the FS. Without this information, the alternatives discussion/analysis is incomplete and subject to revisions.

5. The FS should discuss the technologies/alternatives in depth by contaminant. For example, the report states that some alternatives which include soil vapor extraction (SVE) will achieve cleanup goals. Yet SVOCs and metals are also present in the soils. Also, most of the soils reportedly have a high clay content. These factors should be considered in the evaluation of SVE.

6. This document completely ignores remediation of unsaturated bedrock, yet this medium is highly likely to be contaminated at the Curriculum Center based on the thin soil thickness (2 to 4 feet), depth to water (about 30 feet), and evidence of potential shallow sources that may be continuing to release to the ground (reported waste infiltration pit, paint sink drain, and floor drains with apparent solvent).

   The potential for DNAPL or dissolved contamination in the fractured bedrock above the water table cannot be

ignored as this may constitute a major source of groundwater contamination. Potential remedies for this media, such as SVE, must be evaluated.

References that address this problem include, for example, "Dense Non-aqueous Phase Liquids--A Work Shop Summary", Dallas, Texas, April. 16-18, 1991. (EPA/600/R-92/030).

7. The no action alternative cannot be evaluated alone; it must be combined with institutional controls.

8. In the FS report, technologies/alternatives apply to which property or area of concern (AOC) . Some sort of matrix should be developed presenting nature and extent of contamination by property or AOC and presenting relevant and appropriate technologies for each that requires soil remediation.

9. This document states (page 3-3) that no ecosystems are potential receptors of chemicals of concern (COCs) from the site. Please note that EPA's endangerment assessment did identify potential receptors of COCs in site surface soils through the food web. Thus preventing exposure to ecological receptors should also be a remedial objective.

Remedial Objectives

10. One of the remedial action objectives should be to remove and/or control the source of groundwater contaminants.

11. Another remedial objective should be to remove contamination in groundwater to the extent practically possible.

Groundwater Remedial Alternatives

12. The report claims that DNAPLs are present in groundwater, but no supporting evidence (observations or calculations) is provided. This conclusion has been used throughout the report to assert that aquifer restoration is "impossible" and that only containment will be appropriate as a groundwater remedy. However, no delineation of DNAPL areas has been performed, nor have magnitudes and depths of DNAPL been estimated. In light of the lack of even minimal information, the statements regarding recovery/control of DNAPL are too strong and unsupported. This lack of information also

makes the list of technologies/alternatives very preliminary; it may require extensive revision.

If DNAPL is present, it must be delineated to be controlled.

13. A groundwater alternative combining GRA 3 and GRA 4 is needed. This alternative would combine point of extraction treatment with institutional controls, plume containment and source control.

14. Some sort of capture zone analysis needs to be performed, either based on groundwater modeling or on extrapolation from the responses of the aquifer to the various pumping tests that have been performed during the design stage. While this information will need to be refined by individual well pumping tests at the design stage, enough hydrogeologic information is available now to make some reasonable assumptions for aquifer parameters.

15. With respect to extraction of the petroleum plumes, contingencies are needed to remove pure product if it attains a certain thickness.

Soils Remedial Alternatives

16. Areas and volumes of contaminated soil must be determined in the FS based on the soil cleanup TBCs given by EPA. For example, a soils alternative which includes excavation and on-site or off-site treatment was not included, presumably because the soil volumes will be "low". This conclusion has not been supported. Calculation of volumes may result in revision of the list of alternatives.

17. For soils, this document assumes that SVE will be the presumptive remedy, based on EPA's presumptive remedy guidance. However, if cleanup of metals or SVOCs is also required, then pre- or post-treatment options will need to be added to SVE.

Tutu Wells Site RI/FS Project Schedule
Revised December 15, 1994

TEIC Submits Draft Final RI Report	January 31, 1995
TEIC Submits Draft FS Report to EPA	March 6, 1995
EPA Hold Public Availability Meeting (St. Thomas)	April 4, 1995
PRP Meeting to Discuss FS Report (St. Thomas)	April 5, 1996
PRPs Submit Comments on FS to EPA	April 19, 1995
EPA Provides Final Comments on FS to TEIC	May 12, 1995
Meeting Between EPA and TEIC To Review FS Comments	May 26, 1995
TEIC Submits Draft Final FS Report to EPA	June 23, 1995
EPA Issues Proposed Remedial Action Plan (PRAP)	July 14, 1995
Public Comment Period (Assume 30 day duration)	Aug. 14, 1995
EPA Public Meeting on PRAP	Aug. 2. 1995
EPA Signs ROD	Aug. 30, 1995
Special Notice Letters to PRPs	Sept., 1995
Complete CD Negotiations With PRPs (Assume 120 days)	Dec., 1995
Remedial Design	Jan. 1996 - Aug. 1996
Initiate Remedial Action (Construction)	Sept. 1996

Summary of Soil Cleanup Goals/Screening Levels for Tutu-Ramsay Site (ug/kg)

Chemical	NYS TAGM (foc+1%) (DAF=100) (Note 1)
BTEX Compounds	
Benzene	60
Toluene	1,500
Ethylbenzene	5,500
Xylenes	1,200
Chlorinated VOCs	
Tetrachloroethane	1,400
cis-1,2 Dichloroethene	---
trans-1,2 Dichloroethene	300
Trichloroethene	700
Semi-VOCs	
Naphthalene	13,000
Inorganics	
Arsenic	7,500 or Site Bkgd.*

Notes

1. New York State (NYS) Technical and Administrative Guidance Memorandum, NYS Dept. of Environmental Conservation, Division of Hazardous waste Remediation, HWR-94-4046, Jan. 24, 1994 (Revised). The given Recommended Soil Cleanup Objectives assume foc=1% and Dilution Attenuation Factor (DAF) [or simply Dilution Factor]=100. (The assumptions for foc and DAF are not applicable to Arsenic.) Given levels are same as for groundwater protection.

   * Use Site Background if available.

TUTU WELLS SITE

GROUNDWATER RISK-BASED PRELIMINARY REMEDIATION GOALS (PRGs)

FOR NONCARCINOGENS (mg/l)

RESIDENTIAL INGESTION:

Chemicals	Risk-Based PRGs
1,2-Dichloroethene (Total)	0.33
Manganese	0.18

TUTU WELLS SITE

SOIL RISK-BASED PRELIMINARY REMEDIATION GOALS (PRGs)

FOR NONCARCINOGENS (mg/kg)

RESIDENTIAL INGESTION AND INHALATION:

Chemical	Risk-Based PRGs
Manganese	1,360

COMMERCIAL/INDUSTRIAL INGESTION AND INHALATION:

Chemical	Risk-Based PRGs
Manganese	9,500