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May 3, 1995

VIA TELECOPY & FEDERAL EXPRESS

Ms. Caroline Kwan, Project Manager
United States Environmental Protection Agency
New York/Caribbean Superfund Branch II
290 Broadway, 20th Floor
New York, NY 10007-1866

Re: Tutu Wells Site
Draft Feasibility Study
Our File No.: 05120.23876

Dear Ms. Kwan:

We write on behalf of some of those previously associated with the former Laga Industries Ltd., (collectively referred to herein as "Laga") in connection with the Tutu Wells site. This letter is submitted on behalf of Laga to provide general comments on the March 1995 draft document entitled "Feasibility Study, Tutu Wells Site, St. Thomas, U.S. Virgin Islands" ("the FS" or "the Draft FS") prepared by Geraghty & Miller, Inc. for the Tutu Environmental Investigation Committee.¹

¹ Geraghty & Miller, Inc. have been retained by the Tutu Environmental Investigation Committee ("TEIC") which includes representatives of Texaco Caribbean, Inc. and Esso Standard Oil, U.S.A., Inc.

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Beyond setting forth on the record Laga's comments on the Draft FS, this letter is submitted to critique and evaluate conclusions which have been reached and utilized by Geraghty & Miller, Inc. concerning groundwater contamination occurrence and sources in the Tutu area. As drafted, the FS can only be understood when reviewed with the April 1995 report entitled "Phase II Remedial Investigation, Tutu Wells Site, St. Thomas, U.S. Virgin Islands" ("Phase II RI"), which was likewise prepared by Geraghty & Miller. Accordingly, the comments which follow are also directed to information summarized or conclusions reached by Geraghty & Miller in the Phase II RI.

This letter is submitted without prejudice to any defenses Laga may have to allegations concerning their alleged role in the contamination of the Tutu aquifer and without any admission of liability on their part with respect to the Tutu Wells site. Furthermore, considering the limited time permitted for submitting these comments, Laga expressly reserves the right to amend this comment letter to assert or discuss such other information as may be disclosed by further investigation, study or review.

Generally, and by way of introduction, we make the following observations regarding the Geraghty & Miller, Inc. documents:

- The realm of potential sources of chlorinated volatile organic compounds has not been appropriately considered and potential sources upgradient of the Curriculum Center have not been fully considered or investigated.
- To the extent contamination exists in soil or ground water at the Curriculum Center site, the activities of the former Laga facility and the U.S.V.I. Department of Education have not been properly distinguished.
- Contaminant plume(s) have not been adequately delineated.
- The distribution of chlorinated compounds detected in the vicinity of the Curriculum Center is not consistent with the release of perchloroethylene ("PCE") at the Curriculum Center and indicates multiple chlorinated compound sources.
- The consultant/client relationship between Geraghty & Miller, Inc., Texaco and Esso has biased Geraghty & Miller's determinations in this matter.

The foregoing observations will be addressed in detail below.

For your convenience, the following table of contents outlining the discussion in this letter is provided:

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I. Clarification Regarding Contaminant Occurrence and Potential Sources in the Tutu Area	

In the Phase II RI, Geraghty & Miller state that "the overall objectives of the Phase II RI were to identify and characterize potential sources, the horizontal and vertical extent, the rate and direction of transport, and the potential migration pathways for petroleum hydrocarbon constituents and chlorinated volatile organic compounds ("VOCs") in soil and groundwater at the Tutu Wells Site" (see page 1-2). In the Phase II RI, however, Geraghty & Miller have utilized general anecdotal information in combination with some analytical information to reach specific conclusions regarding sources of chlorinated VOCs in groundwater. The Phase II RI ultimately concludes that the Curriculum Center (former Laga facility) and O'Henry Dry Cleaners are the sources of chlorinated VOCs in groundwater. The Geraghty & Miller conclusion, however, overlooks available information and analytical data regarding other potential sources.

As reflected in Section III of this letter, the reliability and credibility of the studies and reports of Geraghty & Miller conducted over a period of years has been questioned in the context of ongoing litigation concerning this matter pending in the United States District Court for the Virgin Islands ("the Virgin Islands federal court litigation"). Therein U.S. District Court Judge Stanley Brotman has addressed the Court's deep concern with the apparent misuse by the Esso

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entities of its relationship with Geraghty & Miller with respect to submissions to the USEPA. **We echo that concern.**

Beyond the foregoing, Geraghty & Miller has treated similar information regarding potential sources inconsistently. For instance, in the Phase II RI, Geraghty and Miller state "The absence of soil constituent concentrations in excess of the NYS TAGM levels does not necessarily imply that a particular site was not a source of impact to soil quality" (see page 5-3). However, as detailed below, Geraghty & Miller has specifically excluded several sites as potential sources because there was no soil data greater than the NYS TAGM levels even though chlorinated VOC-containing materials were present on site.

Enclosed herewith as **Exhibit A** is a May, 1995 report prepared by Arthur D. Little, Inc.² ("ADL") entitled, "Groundwater Contamination Occurrence and Sources in the Tutu Area, St. Thomas, U.S.V.I."³ Based on investigation, information regarding historical, operational characteristics, and environmental modeling, ADL has determined that a number of other sites represent potential sources of chlorinated VOC contamination. Some of the ADL conclusions regarding potential sources are summarized below along with specific comments on the Geraghty & Miller conclusions:

A. Curriculum Center (former Laga facility)

With regard to this site it is important to distinguish between activities and potential releases while the facility was used by Laga for textile manufacturing and the subsequent activities by the U.S.V.I. Department of Education (i.e. use of the site as the Curriculum Center). Environmental investigation results are not consistent with the allegations that PCE from a dry cleaning still and muck cooker sludge were disposed to an alleged pit (north of the building) via a piping system. ADL installed a deep bore hole in the vicinity of the alleged pit and did not find any sludge present. If such disposal did take place, sludges or their residues would be present even long after disposal. The available data have not

² Arthur D. Little, Inc. was retained by counsel for Laga.

³ The ADL report was originally dated November, 1993. Some corrections were made in 1995 but no new data (post 1993) were added. The ADL conclusions, however, remain unchanged.

demonstrated the presence of sludges or soils with elevated concentrations of chlorinated VOCs indicative of sludge disposal.

On page 5-7 of the Phase II RI Geraghty & Miller state "PCE was detected in eight soil samples collected along the north side of the building in the vicinity of the former discharge pipe and the alleged former waste pit." The sample with the highest concentration of PCE (180 ug/kg at SS-9) was collected in the top six inches of soil. Had Laga discharged any VOC, prior to 1978 (when Laga ceased operations), contamination in the top six inches of soil would probably have volatilized.

In addition to the foregoing, the sworn testimony of disinterested and unbiased witnesses in the Virgin Islands federal court litigation demonstrates that Laga operated an environmentally secure and safe knitting facility on the Curriculum Center site for approximately eight (8) years (1970 to 1978).

Riley Kirk, Vice President of Boggs, the company which designed and supplied Laga with the state-of-the-art closed loop dry cleaning system used at the facility, testified that the Laga system contained the most advanced PCE recycling mechanism. The only effluent from the system was a semi-solid distillation residue, which contained no PCE and could not possibly pass through pipes (even though none existed) to the rear of the facility.

After more than 200 depositions, the only testimony which suggests the possible existence of an effluent pipe came from two former employees (Winston Smith and Anthony Richards) of Laga Industries, Inc., who "heard" (from whom, neither could recall) that there was an underground pipe running from the dry cleaning system to the rear of the facility through which PCE may have been discharged. Neither of these individuals had ever seen such a pipe inside the facility nor had either ever seen a discharge pipe exiting the facility.

The current owner, the Virgin Islands government, has disputed the statements of Messrs Smith and Richards through the testimony of its own employees who have testified at length that no such effluent pipe or pipes ever existed.

Clement Hendricks (Director of Property Procurement for the Virgin Islands Department of Education), Adlah A.

Donastorg (Director of Planning and Maintenance for the Virgin Islands Department of Education) and Pedrito Lanclos (Assistant Superintendent of Plant Operations and Maintenance for the Virgin Islands Department of Education), all testified that when the facility was acquired by the Virgin Islands government it was thoroughly inspected and no such underground effluent pipe was found.

Investigations have shown that no such underground pipe has ever been removed from the facility. Moreover, the engineers who designed the building, Lockwood Green (Thomas Rourke and John M. Evans), testified that the building plans contained no underground pipe emanating from the Laga dry cleaning system.

All of this undisputed evidence, none of which has apparently been considered by Geraghty & Miller, establishes that the operations of Laga were not a contributing source of contamination. If the Curriculum Center is a source, it is the result of the operations and maintenance of the facility by the Virgin Islands Government.

The presence of PCE in shallow soil suggests a recent source of contamination. Geraghty & Miller has not addressed the history of the site and chemical uses on-site and has therefore failed to make any distinction between past and present site ownership. Certain contaminants detected on-site may be the result of Curriculum Center activities and unrelated to the former Laga operation.

It is undisputed that at the time the U.S.V.I. Department of Education occupied the former Laga facility (1981), the property was free of drums and waste products. Inspections of the site by ADL and the USEPA have revealed, however, that paint thinners and degreasers containing chlorinated solvents are present at the Curriculum Center and the outside grounds at the site are, and have been, littered with drums, pails, chemical scraps and scrap parts. Furthermore, discarded drums have been observed to be highly rusted, cracked and/or grown over. A sink inside the Curriculum Center facility has been noted to drain to the ground on the northeast side of the building.

On pages 5-6 through 5-7 of the Phase II RI Geraghty & Miller reference a soil gas investigation which was recently conducted at the Curriculum Center. However, no samples were collected by Geraghty & Miller along the northeast side of the

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building where the Curriculum Center was found by ADL to be discharging paint waste. A soil sample collected from this area by ADL contained elevated concentrations of benzene, toluene, ethylbenzene and xylenes. The soil gas data indicated elevated concentrations of VOCs near the loading dock, but Geraghty & Miller did not collect any soil samples from this area. By excluding the collection of any soil or soil gas data from these areas Geraghty & Miller may have excluded present sources of contamination and sources of contamination since 1981.

On page 5-8 of the Phase II RI Geraghty & Miller identify a pipe and an associated sample (TWS-06) which contained 300,000,000 ug/kg PCE and several BNAs. It is my understanding, from our discussion last month at the PRP meeting, that this sampling occurred as a result of your observations at a tour of the facility late last year. It is my further understanding that you decided to sample this location because you and others were able to smell PCE and physically observe open pipes going into the cement floor. As you are aware, we have requested more detailed information concerning sample TWS-06 as well as the results of the surface and subsurface examination by the USEPA of the interior of the Curriculum Center building on April 18 and 19, 1995 and perhaps other dates. The Phase II RI does not provide adequate detail regarding the material sampled (it is simply referred to as an "oil sample from the abandoned pipes", Phase II RI page 5-47), the condition and construction of the pipe, the precise location of the pipe, the precise location of the sample and/or information regarding the apparent purpose of the pipe. If the pipe was abandoned when was it abandoned and by whom? Without a clear understanding of the history and construction of this pipe, and the investigative activities in connection therewith, it is premature to reach any conclusions regarding a connection between the pipe and the contamination in the soil or groundwater at this site.

As of the date of this letter we are not aware of any information (analytical or otherwise) which would suggest that the pipe was a source of chlorinated VOC contamination. Geraghty & Miller, however, equate the presence of PCE in the floor pipe with a release to soil and groundwater. (See Phase II RI page 5-47). The Geraghty & Miller conclusion is an inappropriate leap in logic without the benefit of complete scientific evaluation. With regard to other sites the mere presence of materials containing chlorinated VOCs has not been used by Geraghty & Miller to imply that a release has or may have occurred.

B. The Esso Tutu Service Station

Waste oil, solvent based oil flushes, treatments, degreasers, cleaners and lubricants have been utilized at this site. Sampling and analysis records reveal the detection of TCA and PCE in waste oil/water separator samples, at the location of leaking waste oil tanks and in the waste oil underground storage tank ("UST") and in a holding tank. As a review of the attached ADL report reflects, Esso used or processed chlorinated solvents, and the solvents were likely to have been released to the environment through UST leaks or by discharge from oil/water separators.

On page 5-24 of the Phase II RI Geraghty & Miller report that PCE was detected and sample SS-8 tested at 1,500 ug/kg, approximately one order of magnitude higher than the maximum concentration of PCE detected in soil at the Curriculum Center. The referenced concentration was detected at a depth of 7 feet indicating that surface spills or leaks from the Esso oil/water separator had migrated vertically in the soil. Given the level of PCE in the soil, the Esso site cannot be excluded as a likely source of chlorinated VOCs. In this instance where one of their clients has a soil sample with chlorinated VOCs detected above the NYS TAGM level, Geraghty & Miller have chosen to discount the potential significance.

As discussed in greater detail in Section III below, additional analytical information which was available to Esso as early as 1990 makes it even more likely that the Esso Tutu service station was a source of chlorinated VOC contamination.⁴

C. Tutu Texaco

The Texaco station stored and used waste oils and a large variety of solvent-based auto flushes, treatments and degreasers, cleaners and lubricants, including TCA and PCE. Documentation regarding operational history reveals that USTs have lost integrity, that a drum storage area lacked containment, and that petroleum-saturated soils have been noted on the property. In addition, use of a septic tank for waste disposal enhances the potential for chlorinated solvent degradation to other chlorinated compounds.

⁴ Such information includes PCE concentrations in a holding tank, PCE contamination recorded from soil samples and disposal of holding tank contents through the on-site bathroom toilet.

Chlorinated VOCs were detected in excavated soil and in waste oil at the Tutu Texaco Station. The concentrations of the VOCs in the excavated soil (PCE 160 ug/kg, TCE 39 ug/kg, 1,2-DCE 10 ug/kg) were comparable to those detected for in-situ soils at the Curriculum Center. Nonetheless, in determining which properties were likely sources of chlorinated VOCs Tutu Texaco has been excluded. Once again, Geraghty & Miller have discounted the potential significance of results which concern one of their own clients. As noted above, the chlorinated VOCs which were detected at Tutu Texaco were detected in excavated soils which had been stockpiled some 9 months earlier. Given the tendency of VOCs to volatilize, it is likely that the excavated soil had much higher VOC concentrations prior to excavation. Furthermore, waste oil samples collected at the Tutu Texaco contained 31,000 ug/kg of PCE and 39,000 ug/kg of TCA verifying the presence of chlorinated VOCs.

Given the presence of chlorinated VOCs on site and the concentrations of VOCs in the excavated soil (at concentrations comparable to those found at the Curriculum Center which Geraghty & Miller speculate is a source), Tutu Texaco should also be considered as a potential, if not likely, source of chlorinated VOCs.

D. Ramsay Motor Co. - Cobuild

Similar to Esso and Texaco, waste oil, a large variety of solvent-based auto flushes, treatments, degreasers, cleaners, and lubricants have been used at this facility. TCA and PCE are present in those products. Site information reveals that an underground storage tank was backfilled rather than removed (thus making it difficult to assess integrity) and approximately 40 to 50 drums were present on site with open tops and lack of labeling (allegedly present for approximately 8 years). Additionally, the presence of unsecured gas cylinders, scrap metal and numerous junked cars indicate a disregard for careful handling of materials. A vehicle maintenance bay area has been documented by ADL as not fully cemented with a soil trench in the location where tools and chemicals are stored. Based on this information, there exists a high potential for leakage and spills which cannot be dismissed as a potential source of VOCs in groundwater.

E. Antilles/Gasset Motors/Consolidated Auto Parts Facility

Site information indicates that storage of waste oil, engine fluid and miscellaneous chemicals has taken place. Materials on site containing TCE and TCA have been noted.

A USEPA survey of the facility has indicated poor housekeeping and the release of waste oil into a drainage ditch and other portions of the site which are oil stained. USEPA review was unable to determine the integrity of a UST but did reference lack of adequate secondary containment around drum storage. The U.S.V.I. Department of Planning & Natural Resources has investigated the facility and found extensive staining and improper waste disposal practices. Although the samples collected from a storm ditch and drain at the site did not reveal chlorinated solvents, the ADL report included herewith points out concerns with the method, location and volume of sampling undertaken.

F. O'Henry Cleaners

The ADL report included herewith as **Exhibit A** summarizes what appears to be undisputed about O'Henry. Included in the information provided is the following:

- The facility uses approximately 6 gallons of PCE per day.
- The facility equipment/operations include a leaching pit, a sump holding pit, an underground washwater tank, a PCE drum storage area, above and below ground fuel storage, drains, and effluent discharges for steam condensate from the presses.
- O'Henry records indicate that PCE filters and residues were disposed on site in the past.
- Groundwater monitoring wells in the vicinity of O'Henry show elevated levels of PCE.
- PCE and DCE are also present in elevated concentrations in on-site soils.

G. Jim Tillett, Inc.

Operations at Tillett which have included silk screening, textile painting, piano refinishing, stripping and varnishing along with materials management practices which include raw materials storage, floor drains and an evaporation pit provide the potential for releases of contaminants to the environment. Although ADL has noted that limited data makes it difficult to assess the impact of this site on the environment, the presence of a soil sample containing PCE suggests that further investigation is warranted.

H. Archie's Welding and Auto Body Repair

The presence of paints, primer, thinners and engine degreasers as well as spare auto parts, chemical containers and scrap metals littered throughout the yard area at the site are noted. While it is difficult to assess the impact of this operation on the environment, this type of operation commonly uses degreasing solvents and based on the waste management practices observed, could have released contaminants to the ground. Accordingly, further investigation is warranted.

I. Tracy Dodd Used Car Lot

A tour of this site revealed a number of empty drums, but the lack of sampling makes it difficult to assess environmental impact, if any. Accordingly, further investigation is warranted.

J. The Virgin Islands Housing Authority/Tropical Motors ("VIHA")

On-site operations have included hazardous materials storage, a UST for waste oils, a vehicle maintenance garage, parts degreasing machine, and a drum storage area. Pesticides, caustics and part cleaners which contain TCA, TCE and PCE have been identified on site.

With regard to hazardous material/waste management practices at the VIHA site, ADL notes the following:

- A UST used for waste oil storage was pumped out in 1987, but no excavation of the tank was conducted in order to determine its integrity.

- Parts cleaner was identified outside of a VIHA garage.
- Approximately 20 to 30 unlabeled drums reportedly containing waste oils were stored outdoors on gravel with no secondary containment.
- Degreasing operations may have been performed outdoors and the floors of the facility have been washed with degreasing solvent.
- A waste oil drum sample was found to contain up to 17,450,000 ug/kg of chlorinated VOCs (17.4%) indicating that the compounds of concern are present at the VIHA site.

On-site practices create a likelihood of releases to the environment and merit further investigation to supplement the extremely limited sampling and analysis which have been done at the VIHA site.

On page 5-6 of the Phase II RI Geraghty & Miller note the non-detection of VOCs in soil samples. Geraghty & Miller based their soil sample locations on soil gas data. Although nothing was detected in the soil gas data at the VIHA site, the soil gas sampling locations were not focused around the areas of concern. No soil gas samples were collected in the drum storage area, and only one sample was collected near the drum storage shed. Accordingly, the soil samples were not collected adjacent to the maintenance area or the drum storage area and may not be indicative of overall soil conditions at the VIHA site. Given the site conditions, the presence of chlorinated VOCs at concentrations comparable to those detected in the pipe at the Curriculum Center, and the lack of representative soil samples, we do not believe that the VIHA site can be excluded as a possible source. It is possible that VIHA chlorinated compound sources could have impacted groundwater beneath the Laga facility.

Although not addressed in the ADL report, it is not beyond the realm of possibility that Housing Authority residents conducting auto servicing activities have contributed to TCE and DCE contamination in the ground water. This is yet another example which underscores the need for all possible sources of contamination to be investigated.

K. Four Winds Plaza Partnership

Secondary containment for an on-site bulk storage tank has been noted to lack integrity. A downgradient storm drain has revealed low levels of chlorinated solvent and in October 1990 a roofing compound contaminated cistern potable water with DCE, methylene chloride, TCE and trihalomethanes above potable standards.

L. Western Auto

Western Auto, which is located at Four Winds Plaza, includes maintenance bays, an above-ground diesel storage tank, two underground waste oil tanks, vehicle repair facilities, auto part chemical storage, oil/water separator, floor drains, sumps and underground piping. Some products used/stored by Western Auto contain chlorinated solvents. A sample from a UST has indicated the presence of TCA and tank removal activities have revealed problems with tank leakage. On page 5-21 of the Phase II RI Geraghty & Miller report that PCE was detected in one soil sample at 160 ug/kg. Although this soil was removed and disposed of off-site, it indicates that PCE has been present in soil at this site in the past. Also, PCE has been detected in the waste oil UST at concentrations between 5,900 ug/kg and 10,000 ug/kg. Due to the past presence of PCE-containing soils on-site (at concentrations comparable to those detected at the Curriculum Center) and the presence of possible sources, Western Auto may have contributed to the groundwater contamination in the Four Winds Plaza Area and should not be excluded as a possible source of VOCs.

M. Old Tutu Wastewater Treatment Plant ("WWTP")

The WWTP is reviewed by ADL as a possible contributor to the Tutu aquifer chlorinated compound contamination. ADL notes that the chlorination process at effluent discharge can create chlorinated compounds such as hexachloroethane. Hexachloroethane will degrade readily to PCE and, to a lesser extent, trichloroethane, dichloroethane and vinyl chloride. All that is necessary for this process to occur is free chlorine residual in the presence of humic substances, both of which are expected for the old Tutu WWTP. Given that the WWTP discharges at a large flow rate to the aquifer, about 17% of aquifer safe yield, there is the possibility that the WWTP could have contributed to the observed Tutu aquifer chlorinated compound contamination.

N. Household Septic Systems

In light of the lack of sanitary sewers on the island of St. Thomas, ADL has noted that household septic systems individually may not represent significant sources of chlorinated compounds but collectively they can cause widespread aquifer contamination. With the possibility that septic discharges of chlorinated compounds could cause a widespread distribution of chlorinated compound contamination, this represents yet another issue which has not been adequately investigated for its potential contribution to contamination in the Tutu valley aquifer.

As the foregoing discussion regarding potential contaminant sources in the Tutu area reflects, the list of facilities which may have released chlorinated compounds into the environment based on their past or present activities is lengthy and includes the Esso Tutu, Tillett, Inc., Archie's, Ramsay Motors, Antilles, O'Henry, Old Tutu WWTP, Tutu Texaco, Western Auto and VIHA facilities. Many of the referenced facilities have documented chemical spills, leaking tanks, direct underground disposal and generally poor chemical handling practices. Other facilities in the area (not addressed herein) such as Esso Rodriguez, Overseas Steel Fabrication, Home Petroleum Inc./Caribbean Gas, Classic Printers and the Fellowship Church site are unknowns which may also warrant investigation.

In light of the foregoing highlights and the information provided in Exhibit A, it is Laga's position that the Phase II RI is a flawed and unreliable document with incomplete conclusions regarding the potential sources of VOC contamination at the Tutu Wells site. If the presence of chlorinated solvents on-site is a criteria for determining if a site is a possible source, then additional sites must be included in the Geraghty & Miller list provided in § 5.1.12.2 of the Phase II RI. Although the Phase II RI notes that having soil concentrations below the NYS TAGM levels does not exclude a site as a potential source area, VIHA, Texaco and Western Auto have, in part, been excluded for that very reason. The Phase II RI also utilizes the excavation of contaminated soils as a basis to exclude Texaco and Western Auto. By doing this, Geraghty & Miller has excluded known past sources which may have had an impact on groundwater. Waste oil at VIHA contained VOC concentrations comparable to those detected in the Curriculum Center pipe and Texaco and Western Auto have had soil on site

with PCE concentrations comparable to those at the Curriculum Center.

II. Comments Regarding Draft FS and Phase II RI

A. Contaminant Plume(s) have not been adequately delineated

The Geraghty & Miller documents have interpreted available data and reached conclusions regarding groundwater plume origination based on incomplete information. By way of example, page 2-18 of the Draft FS in connection with the identification of chlorinated VOC plumes states "One plume originated at the Curriculum Center and was referred to as the northern chlorinated VOC plume." This conclusion is repeated throughout the Draft FS and the Phase II RI. While it is reasonable to refer to a northern plume, or set of plumes, there is no evidence that the northern chlorinated plume "originates" at the Curriculum Center. Geraghty & Miller is reaching a conclusion based on the limitations of their own investigation and not on evidence from the investigation. This is bad science unsupported by chemical or physical observations. As such, it is clearly not appropriate.

On page 2-18 of the Draft FS, Geraghty & Miller further state "The data presented in this manner support the identification of two separated total chlorinated VOC Plumes in excess of 100 ppb, although the northern plume appeared to be separated into two discrete bodies in both the shallow and deep zones." As suggested in the discussion above, there are a wide variety of potential sources both upgradient and downgradient of the Curriculum Center. Although Geraghty & Miller have not acknowledged the potential for numerous separate sources, their own language (as quoted above) with regard to separate plumes within the northern plume suggests multiple sources.

With regard to delineation of the chlorinated VOCs, the upgradient edge of the northern chlorinated VOC plume has not been clearly defined. There is only one shallow well upgradient of the well with the highest concentration (MW-16). There are no data points present that will allow for plume definition to the north and the west of MW-16 in the shallow aquifer. Additionally, there is a chemical storage shed at the VIHA site directly upgradient of MW-16 but there are no shallow wells in this area. Laga's consultants were not allowed in this shed during their site visit. Deposition testimony in the pending litigation has revealed that the shed likely contains

hazardous waste drums that have reportedly leaked.⁵ For the deep aquifer there are two points (MW-13D and VIHA-1) used for determining the plume's upgradient edge. VIHA-1 is an open bedrock well from 41 to 175 feet below ground surface. Due to the large sampling interval in VIHA-1, chemical data from that well may not be representative of water quality in the same zone as wells MW-13D (screened from 100 to 120 feet) or MW-1D (screened from 70 to 90 feet). Therefore VIHA 1 should not be considered as an upgradient well for the purpose of preparing chemical concentration contour maps. Additionally, the shape of the 100 ug/kg contour on the deep map (Phase II RI figure 5-23) is only defined along its southwest edge. The shape and extent of the 100 ug/kg contour is poorly defined by the data and therefore, the 100 ug/kg contour, as presented in the Phase II RI, can be misleading.

B. The Distribution of Chlorinated Compounds Detected in the Vicinity of the Curriculum Center is not Consistent with the Release of PCE at the Curriculum Center and Indicates Multiple Chlorinated Compound Sources.

The groundwater sampling data collected in May and June of 1994 confirms that more than one source of chlorinated VOCs are responsible for the observed concentrations in the northern part of the study area. This conclusion is based on two observations: the ratio of concentrations of PCE, DCE, and vinyl chloride to total chlorinated VOCs and the presence of vinyl chloride in the northern plume wells.

If only one source of contamination was responsible for the chlorinated VOCs, a ratio of individual chlorinated VOC concentrations to the total chlorinated VOC concentration (i.e. the mole fraction) would be expected to be similar for each of the sampling wells once equilibrium was reached. The wells in the northern part of the study area, however, show a wide range of mole fractions for the four chlorinated VOCs of concern. Attached hereto as **Exhibit B** is a table which shows the VOC

⁵ See February 8, 1993 deposition of Edward Delargarde, (Director of Maintenance, U.S.V.I. Housing Authority for the districts of St. Thomas and St. John for the past sixteen years), pages 103-114.

concentrations and the mole fractions. The Ramsay well⁶ contained detected levels of only PCE and thus the mole fraction for PCE was 1.0, while the PCE fractions for the Tillett well and MW-3, MW-4, MW-4D and MW-16 were substantially less, ranging from 0.01 to 0.21. The high fraction of DCE in wells MW-3 (DCE mole fraction = 0.79), MW-4 mole fraction (DCE mole fraction = 0.83), MW-4D (DCE mole fraction = 0.83), and the Tillett well (DCE mole fraction = 0.72), both in absolute terms and relative to PCE, suggests the possibility of a direct release of DCE. Although several wells in both of the plume areas have DCE mole fractions between 0.50 and 0.60, the wells in the northern plume have high concentrations of DCE relative to PCE (MW-16, MW-3, MW-15 and TT-5). Wells in the southern plume, however, Eglin III and OHMW-3, have DCE and PCE in approximately the same concentrations. These results suggest that either the environmental conditions in the northern plume area are different than those in the southern plume area, or that the character of the releases in the northern plume are different than those in the southern plume. Available data suggest that the environmental conditions relative to dechlorination potential are similar in both areas.

Additionally, the presence of PCE, without associated TCE, DCE or vinyl chloride, in the Ramsay well suggests that an additional PCE source may be present in this area. The Ramsay well, as noted in footnote 6, is located west of the Curriculum Center and is not downgradient of the source area suggested in the RI.

The presence of vinyl chloride in the northern plume (MW-3, MW-15, MW-16 and TT-5) also suggests that a source other than PCE disposal is present. If the vinyl chloride were the result of PCE degradation, then vinyl chloride would also be expected to be present in the wells near O'Henry where the presence of PCE in the soils is established. However, the wells located near O'Henry (Eglin I, Eglin III, OHMW-3, OHMW-2 and OHMW-4) do not contain detectable vinyl chloride.

If the distribution of compounds at O'Henry is representative of PCE contamination from dry cleaning operations and then subsequent PCE degradation, then the distribution of chlorinated VOCs in the northern part of the study area (in the area of the Curriculum Center) indicates that dry cleaning is

⁶ The Ramsay well is located due west (cross-gradient) of the Curriculum Center.

not the only or principle source of the chlorinated VOCs in the northern plume.

The presence of vinyl chloride alone suggests multiple sources of chlorinated VOC contamination because the environmental conditions measured at the northern sampling locations do not favor the conversion of DCE to vinyl chloride. Relatively strong reducing conditions are required to reduce PCE to vinyl chloride. Measurements of dissolved oxygen taken at the time the wells were sampled last year ranged from 8.0 to 9.1 mg/l, which are quite high, and thus indicate that the reducing conditions necessary for the formation of vinyl chloride were not present at these locations. On pages 5-42 through 5-43 of the Phase II RI Geraghty & Miller state that "vinyl chloride is probably due to more complete dehalogenation of PCE over time". As noted, however, the transformation of DCE to vinyl chloride requires relatively strong reducing conditions. The conditions present in this area do not indicate the existence of such reducing conditions. Thus, Geraghty & Miller is wrong.

C. Comment on the Speculative or biased nature of the Draft FS

There are numerous examples of speculative or biased conclusions or proposals in the Draft FS. By way of example we note the following:

- Draft FS page 2-15. With regard to chlorinated VOCs at the Curriculum Center Geraghty & Miller state, "Higher concentrations may be present in the unsaturated bedrock which was not sampled" and "Concentrations, in conjunction with a very steep concentration gradient, suggest that dense non-aqueous phase liquids (DNAPLs) may be present in the fractures of the unsaturated and/or saturated bedrock." To the extent the investigation was inadequate, as implied, the Draft FS should clearly state the limitation instead of speculating on conditions which may be present.
- Draft FS pages 2-14 through 2-15. Without basis the Tutu Texaco, Ramsay, and Western Auto sites have been excluded as sites with chlorinated solvent contamination in soils.

- Draft FS page 4-3. Again the Draft FS states "However, chlorinated VOCs may be present at higher concentrations in the unsaturated bedrock (which was not sampled), as suggested by the high chlorinated VOC concentrations in the groundwater at the Curriculum Center." As noted above, this is mere speculation and any inadequacy of sampling should be noted as a limitation.
- Draft FS page 4-3. Geraghty & Miller note that chlorinated solvent levels do not exceed remedial action levels. Soil vapor extraction is not proposed for any other site that did not exceed remedial action levels. Accordingly, the need for soil vapor extraction at the Curriculum Center has not been adequately justified. While this point is not intended to comment on the need or use of soil vapor extraction it is intended to point out the biased application of a remedy.
- Draft FS page 4-3. The discussion of DNAPL is premature and based on speculation rather than observation.

The foregoing items are provided to highlight examples of the inappropriate speculation and bias which are evident throughout the Draft FS and Phase II RI.

III. Discussion Regarding Significance of Contempt and Sanctions Motions Concerning Esso Standard Oil, S.A., Ltd. and Their Former Counsel

It is of critical importance that the USEPA record and deliberations reflect the willful misconduct of Esso, and possibly Geraghty & Miller, in failing to provide the USEPA and the other PRPs with vital information that identifies the Esso site as a potential source of the chlorinated solvent contamination. Esso's wrongful conduct has been the subject of various sanction motions in the In re Tutu Wells Contamination litigation pending in the United States District Court for the Virgin Islands. On March 20, 1995 the Honorable Stanley S. Brotman's issued a 99-page Memorandum and Opinion, wherein Esso's failure to disclose this incriminating evidence is discussed at length. (Attached as **Exhibit C** is a copy of Judge Brotman's Memorandum and Opinion). In light of the importance of Judge Brotman's decision and its potential effect on the determination of liability and apportionment among the PRPs, we

would like the USEPA to focus on the most meaningful portions of the decision which we discuss below. However, we urge you to read Judge Brotman's opinion in its entirety so as to appreciate the potential effect of Esso's failure to disclose such indispensable information.

In December 1989, Esso retained Soil Tech to perform soil testing at the Esso Tutu Service Station ("ETSS") site. The President of Soil Tech, Jose Agrelot Pena ("Agrelot"), summarized the sampling results in a memorandum dated 1/23/90:

1. Bore holes at the ETSS site showed BTEX concentrations ranging from 5 to 1300 ppb. Outside of the holding tank, the highest concentrations were at bore holes taken at depths between 8 to 12 feet.
2. Samples taken from the holding tank of ETSS showed "very high" concentrations of BTEX ranging from 45,000 to 250,000 ppb.
3. Samples taken from the holding tank at ETSS showed a "very high" concentration of chlorinated hydrocarbons (PCE) of 477,330 ppb.
4. PCE contamination was recorded in all three soil samples, including the one obtained "very close to the water table".
5. The oil and grease separator at ETSS had no discharge connections.
6. The liquid in the oil and grease trap was pumped to the holding tank in the rear of the office building and periodically emptied by pumping the liquid into the bathroom toilet.

Agrelot directed this memorandum ("the Agrelot Memo") to Esso's then counsel, Goldman & Antonetti ("G&A"). The sampling results and the contents of the Agrelot Memo were discussed with G&A, as well as other Esso representatives. Esso specifically directed Agrelot not to disclose the memo or its

contents to any of the parties to the litigation and/or the PRPs. Agrelot was also instructed not to prepare any "final report" on such sampling. The only information that was disclosed to the other litigants, the PRPs or the USEPA was four volumes of raw test data. As Agrelot has admitted, such data was meaningless without the map he had prepared, but withheld, reflecting the location of the samples. One could not determine the location of the samples without the map. The samples could have come from anywhere.

Thereafter, Soil Tech began working as a sub-contractor for TEIC and Geraghty & Miller in their efforts to identify the source of the contaminants. Soil Tech and Agrelot, however, never advised Geraghty & Miller, USEPA or the U.S.V.I. Department of Planning and Natural Resources of the December 1989 sampling results, which reflected Esso as a potential source of the chlorinated solvent contamination.

An internal memorandum dated May 3, 1990 was prepared by Warren Cole, Esq.⁷ summarizing a discussion at a meeting attended by Agrelot and Esso representatives. The memorandum, which was never sent to the USEPA, provided in pertinent part:

3. The latest soil analysis obtained found Chlorinated Hydrocarbon (CHC) contamination within two areas within the gas station:

(a) In the vicinity of the oil/water separator, it was found that there were 300ppb of chlorinated hydrocarbon (CHC) in the top two foot layer of soil. It was noted that this soil was backfill behind the retaining wall of the western boundary of the property, and that contamination was not below this two foot layer.

(b) On the northwest corner of the property, 10ppb of the CHC was discovered at a level of eight

⁷ Cole is an attorney with the law firm of Hunter, Coliani, Cole & Turner, local counsel to Esso.

feet below grade. Above this level no contamination was found.

* * *

8. Agrelot reviewed the history of soil and water testing relating to the Tutu aquifer showing CHC contamination in the aquifer and soils:

(a) The first indication was the EPA sampling of existing working wells, which showed CHC contamination;

* * *

(e) The fifth indication was the "preliminary soil assessment" conducted by Esso showing the two sites within the station referred to previously.

10. Agrelot pointed out that even small traces of CHC contamination in the soils pose significant problems, insofar as a single cup of pure CHC can contaminate one million gallons of water (4ppb max level for potable water). He also pointed out that over 400ppm (sic) of CHC were found in the soil at the laundry.

* * *

12. Frances Torres proposed further soil analysis around the station to gather more data in an effort to try to show that Esso did not contribute to the CHC problem with the aquifer. The question then arose as to whether Esso needs or desires such additional information at this stage. When asked, Agrelot said if we excavate around the oil/water separator and storage tank and find clean soils beneath the pits, that this would not be conclusive that

contaminants did not migrate through the soils and into the aquifer. On the other hand, if we find dirty soils beneath the pits, this would be devastating information tending to show that the Esso station did significantly contribute to the pollution of the aquifer. It was determined that the risks of finding such contamination outweighed any possible benefit of finding clean soils, and it was decided that no such testing should take place at this time.

Based upon these and other relevant facts and after conducting hearings on October 28th, October 29th, December 9th and December 10th, 1993, Judge Brotman found that Esso's conduct in failing to disclose this information was sanctionable and that the litigants and PRPs have been severely prejudiced as a result. Most notable is Judge Brotman's concerns as to the integrity and credibility of the Geraghty & Miller reports and their possible misconduct in this matter:

Here, the evidence suggests that the omission of any reference to [the] December 1989 testing event and the documents in the Agrelot files in the April 1991 communications to the EPA was deliberate rather than negligent or inadvertent. A reasonable inference is that the April 1991 letter by the TEIC consultant, Geraghty and Miller, was just another attempt by Esso and its then Counsel to delay and/or hinder discovery in this matter. Indeed, it can be cogently argued that the letter was a calculated attempt not only to mislead the EPA, but also to mislead the other litigants and this tribunal.

* * *

The court is deeply concerned by the apparent misuse by the Esso entities of its relationship with Geraghty and Miller with respect to the submission to the EPA. By using Geraghty and Miller in this manner, Esso may have compromised the reliability

and credibility of the studies and reports
of the TEIC consultant

(See Exhibit D at p. 67.)

Among the various sanctions that the court may impose for Esso's misconduct is a larger allocation of response costs to Esso. No final decision has yet been rendered by Judge Brotman as to what sanctions shall be imposed on Esso. A hearing on the nature of the sanctions issue is scheduled for June 26, 1995 before the U.S. District Court. At that time and subsequently, the federal court will render decisions which will affect the parties' responsibility for the contamination and the allocation of response costs between the PRPs. In addition, the District Court has under consideration other legal issues respecting the responsibility of PRPs. In light of the potential effect of the hearing on June 26 and other rulings to be made by the Court, we believe that the legal meeting scheduled with the USEPA on June 12, 1995, is premature.

IV. Conclusion

Based on the foregoing discussion and the further detail provided in the exhibits attached, the Geraghty & Miller conclusions in the Phase II RI and information presented in the FS should not be utilized as the basis for allocation of responsibility. Both the Phase II RI and the Draft FS have reached conclusions without the benefit of complete evaluation. The conclusions reached, if utilized by the USEPA, may improperly impact the ultimate determinations regarding allocation of responsibility. Any allocation which fails to give adequate consideration to all reasonable scenarios will be seriously flawed and unsupportable.

Laga, through its counsel and consultants, will continue to make a good faith effort to investigate and evaluate potential sources of contamination of the Tutu Wells site. In view of the facts recited here and in the accompanying ADL report, however, we believe the USEPA should postpone all decisions regarding allocation of responsibility. In order to fully address the information provided and the position of Laga, we respectfully request the opportunity to meet with you (with

Ms. Caroline Kwan
May 3, 1995
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PORZIO, BROMBERG & NEWMAN

our consultant) at a mutually convenient time for purposes of discussing this matter in greater detail. In the interim, if you have any questions, please do not hesitate to call us.

Very truly yours,



Edward A. Hogan

cc: All PRP Group Members (with enclosures)

EAH/TS/af
95W1692.295(5P4)
Enclosures

LIST OF EXHIBITS

PORZIO, BROMBERG & NEWMAN

- Exhibit A Arthur D. Little report entitled "Groundwater Contamination Occurrence and Sources in the Tutu Area, St. Thomas, U.S.V.I.", May 1995.
- Exhibit B VOC Concentrations and Calculations of Mole Fractions.
- Exhibit C Stanley S. Brotman, USDJ, Memorandum and Opinion Re: Contempt and Sanctions Motions, March 20, 1995

Arthur D Little

**Ground Water
Contamination
Occurrence and
Sources in the
Tutu Area
St. Thomas, USVI**

**Originally
Prepared for
Rosenman & Collin
November, 1993**

**Revised for
Porzio, Bromberg &
Newman
May, 1995**

Arthur D. Little, Inc.

Reference 44199-15

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Executive Summary

In the context of the In re Tutu Wells Contamination litigation pending in the United States District Court for the Virgin Islands, Arthur D. Little, Inc. (ADL), investigated the sources and occurrence of soil and ground water contamination in the Tutu area, focusing on the potential for the former LAGA Industries, Ltd. operations to have negatively impacted the Tutu Valley aquifer. Based on consideration of site characterizations, ADL's environmental modeling, the Plaintiffs' environmental modeling, and the historical operational characteristics of the former LAGA facility, we have found no conclusive evidence that the former LAGA textile operations contributed to contamination on the U.S. Virgin Islands Department of Education Curriculum Center property¹. Also, there is strong evidence that contamination released during the LAGA operations, if any, has not entered the Plaintiffs' wells. Further, there are numerous other potential sources more likely to have caused contamination in the Plaintiffs' wells.

Allegations of contamination by the former LAGA textile facility have focused on chlorinated solvent contamination related to the drycleaning operation at the former textile facility. We reviewed in detail the former LAGA facility drycleaning operation. These operations used good state-of-the-art chemical handling practices and modern solvent reclamation machinery. The process was fully contained indoors, on a concrete slab. The operation produced one aqueous waste stream which was most likely discharged to the public sewer, and one solid waste stream which was disposed of off-site. These findings show that the former LAGA drycleaning operations are unlikely to have released chlorinated solvents to the soil or ground water.

Our review of the available data and activities both on and in the vicinity of the Curriculum Center suggests that the contamination on the Curriculum Center property is most likely due to either Curriculum Center activities or migration of contamination onto the Curriculum Center from other locations.

Further, the pattern of observed contamination combined with the characteristics of the site hydrology and geology support the following observations:

- The chemical sources responsible for contamination in the Plaintiffs' wells are most likely closely aligned with the Tutu gut, not with sources more removed from the gut, such as the Curriculum Center location. The Plaintiffs' model of the Tutu Valley aquifer hydrogeology (by Mr. Wexler) suggests that travel times for contaminants, if any, released at, for example, the Curriculum Center would require more than 50 years to reach the Plaintiffs' wells, if they would reach them at all.
- The pattern of chlorinated chemicals detected in ground water between the Curriculum Center and the Plaintiffs' wells suggests that much of the chlorinated compound contamination was released into dominantly anaerobic conditions, such as that likely to be found in the filtration basins on the Texaco and possibly Esso properties. The measured conditions in ground water at the Curriculum Center are

¹ This report was originally dated November, 1993. Some corrections were made in 1995, but no new data (post 1993) were added. The ADL conclusions, however, remain unchanged.

Executive Summary

highly aerobic, and, therefore, much less favorable for degradation of perchloroethylene (PCE). PCE released directly to ground water in the Curriculum Center would be unlikely to produce the dichloroethylene (DCE) and vinyl chloride concentrations detected between the Curriculum Center and Tutu Texaco.

- The observed spatial distribution of chlorinated chemicals in soil and ground water in the area between the USVI Housing Authority (VIHA) facility and the Plaintiffs' wells further suggests the likelihood that there are several sources of chlorinated compounds released to the environment in the Tutu Valley area. Facilities which may have released chlorinated compounds into the environment, based on their past or present activities, include Esso Tutu, Esso Rodriguez, Tillett, Inc., Archies, Ramsay Motors, Antilles, O'Henry, Old Tutu WWTP, Tutu Texaco, Western Auto, and VIHA. Many of these facilities which are geologically and hydrologically close to the Plaintiffs' wells, have documented chemical spills, leaking tanks, direct underground disposal, and generally poor chemical handling practices. Additionally, household septic systems and formerly operating (now closed) facilities could be sources.

1.0 Introduction

Arthur D. Little, Inc. (ADL) was first retained in 1993 to investigate allegations that LAGA textile operations contributed to observed ground water contamination in the Tutu Valley area. We initially provided technical support to Rosenman & Colin concerning matters related to U.S. Environmental Protection Agency (USEPA) actions in this area. Subsequently, we were retained to support counsel in the pending litigation. At this time, we are providing technical support to Porzio, Bromberg & Newman, successor counsel to Rosenman & Colin.

Four Winds Plaza Partnership and PID/Harthman, have operated production wells in the Tutu basin (Figures 1-1 and 1-2). In 1987, their production wells were closed down by order of the U.S. Virgin Islands (USVI) Department of Planning and Natural Resources (DPNR) due to the detection of contaminants above maximum contaminant levels (MCLs) for potable water. Four Winds Plaza Partnership reinitiated ground water production in 1988 and currently extracts about 2,000 gallons per day (GPD) for the purposes of non-potable carwash supply²⁸.

To determine whether or not LAGA textile operations contributed to the Tutu aquifer contamination, we reviewed pertinent documents, conducted field investigations, and modeled contaminant transport and fate. These activities were conducted principally during September and October 1993. As noted in the Executive Summary, this report was originally dated November 1993. Some corrections were made in 1995, but no new data (Post 1993) were added. Our conclusions, however, remain unchanged. The field sample collection and chemical analysis conducted by ADL are described in a separate document³⁵.

The rest of this report contains the following sections:

- Section 2.0 summarizes our opinions regarding potential sources of chlorinated compound contamination in the Tutu Valley area
- Section 3.0 summarizes our understanding of the geology (soils and rocks) and hydrology (water occurrence and movement) of the Tutu Valley area
- Section 4.0 summarizes the relationship of prior investigations to the potential sources identified in Section 2.0.
- Section 5.0 summarizes our understanding of chemical contamination movement and degradation in the Tutu Valley environment
- Section 6.0 lists the references cited
- Appendices A through C provide supporting information

* Superscripted numbers located throughout the text identify references found in Section 6.0.

2.0 Potential Contaminant Sources In the Tutu Area

Section 2.0 presents our evaluation of potential sources for chlorinated chemical contamination in the Tutu Valley area. The area of the former LAGA Textile facility is discussed in two sections (2.1 and 2.2) to distinguish between activities and potential releases while the facility was used by LAGA for textile manufacturing and the subsequent activities by the USVI Department of Education.

As a general comment, automotive fuel stations and repair operations historically used chlorinated solvents for degreasing and as a carrier agent for vehicle maintenance products. As environmental laws and sensitivities have changed over time, the use of chlorinated solvents has decreased due to their hazardous nature. Therefore, even though chlorinated solvents may not be present at a site today, they may have been used historically. This would be true for all of the vehicle maintenance facilities present in the area (e.g., Texaco, Rodriguez, Ramsay, Antilles, VIHA, Department of Education). Additionally, there are numerous other historic uses of chlorinated solvents and, consequently, potential sources of chlorinated solvent contamination in the Tutu Valley area. Several of these are described below.

Figure 2-1 shows the location of the facilities discussed below.

2.1 Former LAGA Textile Facility

The LAGA building was designed by Lockwood Green and constructed by the West Indies Company, Inc., in about 1970 on behalf of LAGA Industries, Ltd. The LAGA Industries textile operation began production in 1971, producing wool and polyester knit blend cloth. The primary operations were knitting, pressing patterns, and receiving/shipping. No cloth dyeing or other treatment was conducted. All polyester knit blend cloth was drycleaned at the facility. Wool cloth that became soiled was also drycleaned at the facility. Operations at LAGA ceased about 1978 and was subsequently sold to Panex Co. in 1979. The building was vacated in about 1982, at which time the USVI Department of Education renovated, and later occupied the building.

The focus of Plaintiffs' allegations regarding the LAGA facility concern the drycleaning operation. Two former employees of the LAGA textile operation (Winston Smith and Anthony Richards) have alleged that spent PCE (also known as tetrachloroethylene, tetrachloroethene, perchlorethylene, and perc) and cooker residue were disposed to a pit located outdoors²⁰. Mr. Smith claimed that PCE from the drycleaning still and muck cooker sludge were disposed to the alleged pit via a piping system. As described below, however, this account is not consistent with the environmental investigation results, nor is it the most likely mode of equipment operation. Further, Mr. Smith and Mr. Richards do not seem to have a clear and accurate recollection of the process. For example, Mr. Richards recounts adding water with cleaning solvent in the washer²⁰. This would constitute wet washing rather than drycleaning, which was the LAGA operation.

2.0 Potential Contaminant Sources in the Tutu Area

Geraghty & Miller³⁴ installed three soil borings at what they believed was the alleged disposal pit area. Geraghty & Miller apparently located the alleged disposal pit area based on the location of a concrete filled trench in the floor they believed to be the alleged disposal pipe. In Geraghty & Miller's soil boring records, however, there is no account of a sludge present at this location³⁴, as would be expected if the disposal practice were as described in the testimony of Mr. Smith and Mr. Richards. Subsequent to the Geraghty & Miller investigation, we installed a deep borehole at the Geraghty & Miller boring site and also did not find sludges present³⁵. Our work at other Superfund sites has shown that if a sludge was disposed at a site, then there is a record of it at the site would be present even long after disposal. The lack of any sludge or high soil concentration at the rear of the former LAGA facility, therefore, suggests that sludges were not deposited there.

As part of our activities, we reviewed the LAGA drycleaning operation to assess the likelihood of a release of PCE to the environment. Overall, we believe that the likelihood of a significant release is extremely low. The LAGA drycleaning operations were state-of-the-art with the most advanced solvent recovery system of the day. The system was closed loop with no allowance for liquid solvent release outside the system. As described in detail below, there were two waste streams from the drycleaning operation, an aqueous waste stream from the solvent water separator and a solid (sludge) waste stream from the cooker, which was hauled to an off-site disposal location. Further, feedstock chemicals were handled in a manner that minimized the potential for a release to the environment. There were also undoubtedly fugitive emissions to the air. These would not, however, contribute to soil or water contamination.

The drycleaning operation purchased by LAGA in 1971 used new equipment that included drycleaning washers, dryers, solvent/water separators, sniffers, solvent stills, and a muck cooker. Figure 2-2 shows the general location of this equipment in the building. In this process, fabric is placed in the drycleaning washers where PCE contacts the cloth and dissolves stains or other extraneous materials on the cloth. The process is referred to as "drycleaning" because no water is used on the cloth. After the cleaning cycle, the cloth is removed from the machine and placed in dryers that remove the PCE through the addition of hot air. The dryers are equipped with condensers to collect the trace amounts of drycleaning solvent in the air and return it to the dirty solvent still. Dirty solvent from the washer following each wash cycle is sent to a primary still which boils the solvent away from the entrained greases and dirt. The clean solvent from the still is piped back to the clean solvent tank. The muck (e.g., dirt, oils, and grease) accumulated in the still following the still cycle is then hardpiped to the muck cooker. The cooker further heats the muck and returns the little solvent residue still remaining back to the dirty or clean solvent tank, depending on the quality assurance needs. Eventually, the residual oil from the muck cooker, after a series of cooking cycles, builds up and must be removed. Some solvent would be temporarily released from the drycleaning process through volatilization of solvent on fabric removed from the washers. This vapor would be retrieved from the indoor atmosphere by the sniffers equipment and reintroduced into the clean solvent tank. Figure 2-3 shows the solvent flow and recovery systems for this operation. Figure 2-3 also indicates the two waste streams

2.0 Potential Contaminant Sources In the Tutu Area

which are discussed further below. The entire drycleaning operation was conducted indoors, aboveground, over a 5-inch thick, reinforced concrete floor, in the location shown in Figure 2-2.

For a short period after the facility startup until the equipment described above was installed, the LAGA facility sent cloth to Andrex for drycleaning²¹ and used a smaller Permac drycleaner unit at the facility. The Permac equipment was purchased in April 1970, before the plant began operation, and the system used in the former LAGA facility after the Permac, was purchased in November 1971, during the first year of operation. The Permac unit had essentially the same solvent recovery process built into the unit, except for the muck cooker. The Permac machine, therefore, in addition to the aqueous stream from the solvent/water separator, would have produced a waste stream similar to the muck sent to the muck cooker in the process described above. The Permac unit also had filters which would have contained PCE and would need to have been disposed of. We are not aware of any specific information about disposal of these waste streams.

The aqueous waste stream from the solvent/water separators associated with the PCE recovery systems (Figure 2-2) was most likely channeled to the sanitary sewer where it would have been directed to the local publicly operated treatment works. Normal practice during the 1970s was to discharge the aqueous waste stream to a sewer. If there were a pipe discharging to the ground or a pit by the building, it would most likely have been from the tinter frame, which was in the same room as the drycleaning equipment and produced a clean (distilled) water discharge. Drawings by Lockwood Green indicate that a sanitary sewer was adjacent to the LAGA building, and it would be unlikely that the LAGA facility would not have connected to this sewer. Further, the main sanitary sewer line internal to the building ran beneath the room housing the drycleaning operation. The aqueous discharge from the drycleaning operation would be limited to the water driven from the wool cloth as it was dried and subsequently condensed. The polyester material does not retain water and, therefore, would not contribute water moisture to the separator systems. Since wool cloth was cleaned only when soiled, only a relatively small portion of the total cloth load at the drycleaning operation would have produced an aqueous waste stream. An estimate of the amount of solvent that would have been contained in this aqueous waste stream is provided in Appendix A. Our calculation indicates that about 0.01 pounds of solvent would be discharged each day.

When discharged to the sewer, this solvent would be commingled with other sanitary wastes from the facility. The resulting solvent concentration in the sewer system would be approximately 0.01 mg/L within the main sewer line. The aeration system at the waste water treatment plant and turbulent flow through the sewer piping network would be adequate to reduce this amount of solvent to a negligible concentration, thus removing the LAGA solvent as a source of ground water contamination (calculation method prescribed in Appendix A).

2.0 Potential Contaminant Sources in the Tutu Area

If the aqueous waste stream were discharged to the ground surface, it would be subject to surface runoff, infiltration, and evaporation, similar to rainfall. Using the estimated mass balance for rainfall in this area⁴⁹, about 8% of the discharge water would reach ground water. Over the eight years of plant operation, this would be approximately 2.6 pounds of PCE. Also, because the PCE would evaporate somewhat faster than the water in which it was carried, the actual amount of PCE reaching the ground water would be less than this estimate.

If the aqueous waste stream were released to a pit, it would be subject to evaporation and infiltration. The evaporation rate would be approximately the same as the evaporation rate from a lake surface. We did not have evaporation rate data for St. Thomas, but in a generally similar climate, southern Florida, the lake surface evaporation rate is approximately 60 to 65 inches of water per year, using 60 inches/year as a lower bound estimate or 0.16 inches per day. One source²⁰ alleged the existence of a 9-foot diameter disposal pit. The area of such a pit would be approximately 64 square feet. As long as the surface of the pit were moist, the average daily evaporation would be 0.85 ft³ (about 6.4 gallons), or about 70% of the average daily aqueous discharge. In the absence of any further information about the alleged pit, the rate of infiltration into the ground is difficult to estimate. It would likely, however, be relatively slow because the soils in the area have low hydraulic conductivity and the bedrock is relatively competent (low fracture density).

Further, any PCE reaching the bedrock surface would have to travel approximately 30 feet further down through bedrock to reach the first waterbearing fracture. Then, using the hydraulic conductivity and gradient information presented by Wexler²¹, any PCE reaching ground water would travel at a rate of approximately 2 feet per year under pumping conditions and one foot per year under non-pumping conditions. The actual travel velocity would be retarded by the effect of adsorption. As a cross check on these estimates using the Wexler hydrogeologic model, we estimated the travel velocity of MTBE from the available monitoring data. If the release date is assumed to be 1990 from either the Tutu Texaco or Tutu Esso stations, the travel velocity in the gut area would be approximately 41 m/year. This would be a maximum travel velocity because the MTBE was likely released before 1990. The model presented by Wexler showed a hydraulic conductivity of 0.25m/day (.82ft/day) in this area. Using a gradient and hydraulic conductivity of .113 and 6.67×10^{-3} m/day, respectively in the LAGA facility area, again from the Wexler model, the ground water velocity in the LAGA area, calculated by scaling the MTBE velocity down in proportion to the hydraulic conductivity in this area, would be less than 4.0 feet per year. Figure 2-4 illustrates the flow paths and distances for contaminants released at the alleged pit area. At this rate, if contaminants were released at the LAGA facility in 1971, they would not have reached the Plaintiffs' wells to date, having traveled only about 72 feet during this period.

The other solvent containing waste product from the LAGA drycleaning operation is the spent waxy sludge from the muck cooker. This sludge is a liquid when removed from the cooker but quickly sets up and forms a waxy solid with about 2% solvent remaining. Based on our best estimates of the drycleaning system operation, about 110 tons of this waxy

2.0 Potential Contaminant Sources In the Tutu Area

sludge would have been produced over the operational period of the LAGA facility. These estimates of sludge production rate and PCE content are based on a comparable operation for which records are available. We understand that this sludge was removed from the LAGA facility and disposed elsewhere. Again using the alleged 9-foot diameter disposal pit site, this material would be about 60 feet deep in the alleged disposal pit if disposed of on-site (calculation provided in Appendix A).

This waxy sludge, if exposed to the environment, would be expected to leach the PCE extremely slowly and would undoubtedly still be obviously present if disposed in a pit. The lack of any on-site evidence of sludge from the environmental investigations, therefore, supports the testimony that this material was not disposed of on-site.

Considering chemical handling, operational incidents can occur during loading and unloading of solvents, and potentially, leaks or spills could occur. Solvents generally were delivered to LAGA in 55-gallon drums that were stored indoors over reinforced concrete²¹. The drums would not have been opened until they were indoors, and the PCE was introduced into the drycleaning machines indoors. Therefore, any spills would have occurred indoors. Assuming that a gallon of solvent is spilled on the floor, then it would likely wet the floor and begin to absorb into the concrete; however, prior to passing through the 6-inch thick reinforced concrete floor, the solvent would volatilize and be intercepted by the sniffers and recovered. One LAGA worker has attested that small spills were rapidly volatilized in this manner²⁰.

In summary, although the LAGA operation did use solvents of a type found in the aquifer, it is most likely that they were disposed of off-site and did not contribute to ground water contamination in the Tutu Valley aquifer. Further, if there were any on-site disposal, the contaminants would not have reached the Plaintiffs' wells.

2.2 US Virgin Island Department of Education Curriculum Center

The Department of Education occupied the former LAGA textile building in 1981. At the time of their occupation, the property was free of drums and waste products^{21/22}. During our tour of the Department of Education building in October 1993, we identified the following shop areas: painting, masonry, plumbing, woodworking, kitchens, and welding/metal working. We noted a storage room containing paints, thinners, and degreasers, and other rooms for miscellaneous chemical storage. The outside grounds were littered with drums, pails, chemical sacks, and scrap parts. Most of the chemical drums were highly rusted, cracked, or grown over. The USEPA inspection team noted similar conditions in February 1989 and June 1989²³.

During ADL's tour of the facility, we observed a shallow waste disposal pit where liquid had been channeled to the pit. The pit was also fed by a PVC pipe line that appeared to be connected to the sink of the paint room at the Department of Education. There was obvious red and white colored soil staining in the pit and in the paint room sink. The pit sediments

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possessed a strong organic chemical odor. We sampled the shallow soil at this location and detected benzene, toluene, ethylbenzene, and xylenes (BTEX). We also observed two other sinks with drains to the ground around the building; one in the kitchen shop, and one outside the welding shop.

Sampling and chemical analysis has shown petroleum hydrocarbon and chlorinated hydrocarbon contamination of the Curriculum Center property.

A soil gas sample collected by Geoscience Consultants, Ltd.³⁷ in 1987 at one location on-site showed detectable levels of PCE in soil gas. Shallow soil sampling and drum sampling by the USEPA detected various hydrocarbons. A boring and monitoring well program conducted by TEIC indicated low levels of PCE (non-detect to 170 ug/L) were present in shallow soils, and low to moderate levels of PCE (1 ug/L to 590 ug/L) were found in ground water³⁴. ADL tested additional shallow soils and ground water at the site in October 1993³⁵. The results indicate that much of the shallow soil is free of chlorinated compounds; however, one shallow sample near a former Department of Education drum storage area contained elevated levels of PCE (SS-9 = 180 mg/kg) and TCE (SS-9=7 UJ mg/kg). Also, as mentioned above, a soil sample from the paint shop sink discharge pit contained BTEX.

The origin of this contamination can not be clearly established with the available data. The poor chemical management practices at the Curriculum Center, combined with the types of chemicals used at the Curriculum Center, as noted above, suggest that the source could be releases from the Curriculum Center operations. Some of the contamination could also be due to migration from nearby properties, such as VIHA or Texaco.

2.3 Tutu Esso

The Tutu Esso station is close to the Four Winds Plaza well field and is along Tutu Gut. This facility began operations in 1969. A CERCLA 104(e) notification by Esso indicated that Esso used/stored waste oil, a variety of solvent based auto flushes, treatments, degreasers, cleaners and lubricants. The Esso station has vehicle maintenance bays, two underground oil/water separators, and an underground waste oil tank. At least five underground fuel storage tanks have been used on-site, and at least two have been excavated. The report by Garrett⁴⁸ provides more detail on the underground chemical handling systems and practices.

Leaks from underground storage tanks and discharges from the Esso oil/water separators to an alleged infiltration septic system have been well documented (e.g., HRS documentation record and Four Winds inspection document). Esso employees have reported that solvents were commonly disposed to waste oil pits which were pumped out and disposed to the toilet. Esso workers have also testified to pipeline leaks⁵. The sampling and analysis record indicates that in August 1987, TCA (58,000 ug/kg) and PCE (110,000 ug/kg) were detected in Esso waste oil/water separator samples, and in September 1988, TCA (100 mg/kg) and PCE (65 mg/kg) were again detected. Soil samples collected at the base of a leaking waste

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oil tank excavation at Esso were analyzed and PCE (91,000 ug/kg) and TCA (42,000 ug/kg) were again detected. In 1990, an EPA contractor collected oil samples from the waste oil UST that indicated PCE (30,000 ug/kg) and (25,000 ug/kg) were present⁵. Samples collected at the holding tank have indicated that presence of TCE (63,000 ug/kg) and TCA (43,000 ug/kg)⁵. A soil gas survey was conducted by Belgodere & Associates on the Esso property in April 1988 and DCE, TCE and PCE were detected. Testimony by Four Winds Plaza representatives indicate that during excavation of a water cistern, free product oil seeped into the excavation, and 10 drums of oil were removed.

The discharge points for the oil/water separators and sanitary facilities have not been established. The Report by Mr. Carlos Garrett⁴⁸ suggests the possible use of a septic tank and leaching pit, similar to the system used by the Tutu Texaco service station. A pit of this type is designed to effectively transfer liquid into the ground and would allow a minimum of solvent volatilization. The anaerobic conditions common within these leach pits would have contributed to solvent biodegradation. For example, the anaerobic environment of the septic tank would have enhanced the biodegradation of any PCE or TCA into DCE, TCE, and vinyl chloride. Further, the presence of toluene tends to further accelerate the degradation (Appendix C). In contrast, our measurements of water in the Tutu aquifer near the Curriculum Center show adequate dissolved oxygen (7.9-8.6 mg/l oxygen) and nitrate content to be considered aerobic. Thus, biodegradation of PCE and TCA is not expected to readily occur in the Tutu aquifer.

In summary, the available data and records indicate that Esso used or processed chlorinated solvents, and that these solvents were likely to have been released to the environment through underground storage tank leaks or by discharge from oil/water separators.

2.4 Tutu Texaco

The Tutu Texaco station began operation in 1966. This facility is located directly across the street from Four Winds Plaza and near Tutu Gut. During its history of operation, at least six underground storage tanks were installed, four maintenance bays were used, two fueling islands were operated, and an oil/water separator connected to a leaching tank was operated. Currently, there are also a total of about 75 drums stored on-site split between two separate locations, and two aboveground bulk storage tanks.

The Texaco CERCLA 104(e) notification indicates that the Texaco station stored waste oils, a large variety of solvent based auto flushes, treatments and degreasers, cleaners, and lubricants. Among the hazardous constituents found in these specific products were TCA and PCE. During ADL's October 1993 tour of the Texaco station, we noted the presence of a tire puncture seal chemical that contains PCE and a parts cleaner chemical that contains chlorinated aromatic solvents.

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The documentation record of Texaco's operational history indicates that large releases of gasoline have occurred in the past, including losses of 100 to 150 gallons in 6/81²⁴ and 4,072 gallons in 1987³⁶. Tank tightness testing in 1980 and tank inspections in 1988 confirmed that three underground storage tanks had lost integrity. When these tanks were finally removed, it was noted that strong odors of petroleum hydrocarbons and elevated HNu readings were recorded in the excavation²⁶. EPA contractors in 1989 noted a lack of containment for the drum storage area, and stains and petroleum saturated soils have been noted on the property²⁶. A DPNR inspection of the facility in 1987 revealed seven violations of Virgin Islands regulation related to improper hazardous waste storage, soil contamination, illicit septic system hookup, and contamination of a storm sewer. During ADL's tour of the property in October 1993 we also noted a lack of secondary containment for drum storage areas and petroleum-like staining on the ground. An inspection of the Texaco station by Mr. Carlos Garrett of GVA Consultants in 1991 indicated that an oil/water separator was connected to an infiltration pit. The infiltration pit reportedly contained about 1 1/2 feet of free product on the surface⁴⁸. This infiltration pit would have a tendency to enhance degradation of chlorinated solvents in the same manner as the Esso infiltration described in Section 2.3.

The chemical sampling record for the Texaco station indicates that TCA (2400 ug/kg) was present in Texaco's waste oil in August 1987 and, in September 1988 DCE (10 ug/kg) was found in soil samples. In June 1988 soil samples were found to contain TCE (39 ug/kg) and PCE (160 ug/kg)¹⁵. In July 1989, waste oil samples were collected that contained TCA (3900 ug/kg). In 1987, a soil gas survey of the Texaco station area conducted by GeoScience Consultants Ltd. showed PCE in air collected from the unsaturated zone³⁷.

In summary, the Texaco station used and continues to use chlorinated solvents such as PCE, and their waste management practices are such that ground water at the site could readily become contaminated. In addition, their use of a septic tank for waste disposal further enhances the potential for chlorinated solvent degradation to other chlorinated compounds (i.e., TCE, DCE, and vinyl chloride).

2.5 Ramsay Motor Company/Cobuild

Ramsay Motor Company initiated operations in the Tutu area about 1978⁴. Ramsay is located northeast of Four Winds Plaza along Tutu Gut. Ramsay Motor operations include at least three vehicle maintenance bays, an underground waste oil storage tank, a large scrap parts building, a vehicle painting operation, and a large drum storage area. Prior to Ramsay's operation, Cobuild operated a car repair facility from about 1974 to 1978⁴.

A CERCLA 104(e) notification for the facility indicates that waste oil, a large variety of solvent based auto flushes, treatments, degreasers, cleaners, and lubricants were used at the facility. The hazardous chemicals present in these products includes TCA and PCE²⁷. During ADL's tour of the Ramsay facility in October 1993, we observed a brake parts cleaner that contains PCE and TCA, and a degreaser parts washer on-site.

2.0 Potential Contaminant Sources In the Tutu Area

The two soil samples installed on-site both contained PCE (2 and 6 ug/kg)⁶. Samples from a ground water well along the northern portion of the property also contained chlorinated solvents. The underground storage tank was backfilled rather than removed, so it is difficult to assess its integrity. During ADL's field tour of the Ramsay facility, we noted that about 40 to 50 drums are present on-site, many with open tops, and obvious staining on the drums and at the drum base. The drums did not appear to be labeled, and have reportedly been stored on-site since Water and Power Authority (WAPA) stopped receiving waste about eight years ago³. The contents of these drums are not known by facility personnel. We also noted that there were two storm drains on-site, one of which was dry (appeared uphill), and the other (appeared downhill) had a rapid flow despite the dry weather conditions. This indicates that there may be a discharge from the facility to the storm drain other than rainwater. We also noted unsecured gas cylinders and a building completely filled with scrap metal and a yard containing numerous junked cars. These housekeeping issues point to a disregard for careful handling of materials. The vehicle maintenance bay area was not fully cemented and there was a soil trench along the back wall where most of the tools and chemicals were stored. Prior to 1992, the drum storage area had no secondary containment³. We also observed several locations where the concrete floor was patched in geometric patterns, possibly an indication of backfilled sumps or underground piping connections.

The general housekeeping and chemical management practices create a high potential for leakage and spills. Since this facility is along the gut, chemicals released to the ground surface have a good chance of reaching ground water.

2.6 Antilles/Gasset Motors/Consolidated Auto Parts Facility

The Antilles facility is located northeast of Four Winds Plaza along Tutu Gut. The facility began operations about 1968. Their operations include several vehicle maintenance bays and an underground and aboveground storage tank.

A CERCLA 104(e) notification for the facility indicates that waste oil, engine fluids and miscellaneous chemicals were stored on-site. During ADL's October 1992 tour of the Antilles facility, we located a brake parts cleaner that contains TCE and TCA.

The USEPA contractors survey of this facility indicated that messy housekeeping was present in the service yard and bays, and that waste oil was observed in a drainage ditch and had traveled off-site, and other portions of the Antilles facility were also oil stained. The USEPA contractors were not able to determine the integrity of the underground storage tank but did note that drums lacked adequate secondary containment²⁸. The DPNR investigated the Consolidated Auto Parts Facility in 1987 and found extensive staining and improper waste disposal practices.

In August 1987, waste oil samples collected from a storm ditch and drain, and in September 1988, soil samples and surface water were analyzed. The results indicate that hydrocarbons were present but chlorinated solvents were not detected. The underground storage tank has

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not been excavated, so it is difficult to assess its integrity. The lack of chlorinated compound detection may be due to increased detection limits caused by the high concentrations of hydrocarbons, or may be due to collection of shallow samples from which chlorinated hydrocarbons have fully volatilized, or insufficient numbers of sampling locations.

Reportedly, the numerous waste drums that were collected since WAPA stopped taking waste oils have been emptied into a 10,000 gallon aboveground storage tank. We have proposed in a workplan, issued to Antilles, that a sample be collected from this tank for chlorinated solvent analysis. This sample analysis would theoretically be representative of the average waste content generated by Antilles, et al. over a long time period.

2.7 Rodriguez Auto Parts (Esso)/Shell Oil

The Rodriguez Auto Parts facility is located adjacent to the Harthman property. The facility began operations about 1981. Their operations include bulk underground fuel storage, underground oil collection pit, floor drains, and a cement cistern used for car wash water collection. The facility was operated by Shell Oil from 1971 to 1981.

A CERCLA 104(e) notification indicated that waste oil and miscellaneous solvents were used.

No sampling data are available for this site's oils, soils, or wastewaters, so it is difficult to evaluate its impact on the environment. The available information is not adequate to support an opinion on their facility's likely contribution to ground water contamination. The character of the activities, however, suggests that further investigation is warranted.

2.8 O'Henry Cleaners

The O'Henry facility is located across from the Harthman property, near potable water supply wells, and along Tutu Gut. The facility began a drycleaning operation in 1981. The facility uses about 6 gallons per day of PCE in the process of drycleaning fabrics, based on their PCE purchasing records²⁹.

Current and former facility equipment/operations include a leaching pit, a sump holding tank, an underground wash water tank to the north of the property, a PCE drum storage area, aboveground and underground fuel storage, drains, and effluent discharges for steam condensate from the presses, and a clothes dryer.

The documentation record for O'Henry indicates that spent PCE filters and residues were disposed of on-site in the past¹⁴. During ADL's tour of the facility in October 1993, we were told by O'Henry representatives that no PCE wastes are currently generated by the facility, and that everything is recycled. ADL proposed collecting waste samples from the

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O'Henry process, and we were again told that no wastes are generated. Our field tour of the facility, manufacturer's diagrams, and estimated drycleaning throughput for the O'Henry equipment would suggest, however, that wastes are generated by the facility. The wastes would include the Dri Vac machine PCE residues, PCE/water separator wastewaters, spent PCE filters, and spent solvent still bottoms. In 1987, the filters were disposed to sanitary trash, and spent PCE was reported as being recycled until evaporated⁹. Since no records of waste disposal are available for the facility, it is possible that all these wastes are being disposed on-site. The liquid wastes may be disposed of in a leaching basin or, for the liquid from the Dri Vac machine, directly to the ground. The spent PCE filters may be disposed to the sanitary trash for on island municipal landfill disposal, since we didn't see any landfill on-site.

On October 26, 1993, ADL conducted field sampling at the O'Henry facility accompanied by Nancy D'Anna and Ken Loy (International Technology). We found that contrary to what we had been told earlier, O'Henry did have filters on their solvent drycleaner and had amassed eight drums of spent PCE on-site (RCRA Waste Classification #F001). This contradicts their 1987 notification to the USEPA which states that only dry residues are generated and all the solvent is evaporated. We also located a hose connected to the drycleaning machine that led to a bucket.

The LAGA drycleaning facility waste management practices were more advanced than those practiced at O'Henry. LAGA had post-still-processing of solvent sludges, whereas O'Henry has none; hence, O'Henry's wastes are far more concentrated with PCE. LAGA used sniffers to clean the indoor air of PCE and all PCE collection systems were return piped to the solvent recovery system, whereas O'Henry has no indoor air cleaning devices and solvent collected in the Dri Vac system is piped outdoors to the ground.

Ground water monitoring wells in the vicinity of O'Henry show elevated levels of PCE, including 300 ug/L at MW-02 and 250 ug/L at MW-04, and at the closest former potable water well the concentrations have been as high as 7,600 ug/L. TCE and DCE are also at elevated concentrations on-site. ADL representatives collected sanitary sewer sample presumably originating at the O'Henry site (on October 27, 1993) but have not had enough time yet to analyze the sample. The available environmental monitoring data in combination with the observations on waste generation and handling described above strongly suggest that the O'Henry drycleaning operation is a source of ground water contamination by chlorinated compounds. Soil sampling at the O'Henry site has found soil PCE concentrations as high as 440,000 ug/kg. Other sampling events have shown PCE soil contamination at concentrations of 180,000, 200,000, 15, and 29 (ug/kg); TCE at 75 ug/kg; and DCE (20 ug/kg)²³.

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2.9 Jim Tillett, Inc.

Tillett, Inc. is located directly across the street from Four Winds Plaza, near Tutu Gut. Tillett, Inc. began operations about 1959. The operations at Tillett, Inc. included silkscreening, textile painting, piano refinishing, stripping and varnishing, and a restaurant. Materials management practices include a raw material storage area, floor drains, and an evaporation pit. Reportedly, dry residues were disposed at a local dump³⁰.

In November 1987 a soil gas survey detected hydrocarbons, PCE, TCA and TCE at Tillett, Inc. A soil sample collected near the tillett well was found to contain PCE at low concentrations³⁴. Due to the limited available contaminant data for this facility, it is difficult to assess their impact on the environment. The soil sample containing PCE, however, suggests that further investigation may be warranted.

2.10 Archies Welding and Auto Body Repair

Archies is located between Four Winds Plaza and Harthman, near Tutu Gut. We do not know when Archies began operations at the site. ADL personnel toured the Archies facility in October 1993. Archies business consists of two maintenance garages where welding, auto body repair, and painting are conducted. During the tour we noted paints, primers, thinners, and one empty 30-gallon drum of engine degreaser. We also observed that spare auto parts, chemical containers, and scrap metals were littered throughout the yard area. We were not able to determine during our tour the underground piping and waste management systems in place. This business has not previously been investigated by the USEPA, so it is difficult to assess its impact on the environment. This type of operation, however, commonly uses degreasing solvents and, based on the waste management practices we observed, could have released contaminants to the ground.

2.11 Tracy Dodd Used Car Lot

The used car lot was home of Tracy's Radiators from 1989 until May 1993. Prior land uses include another used car lot and Top Banana, a fruit sales business. In October 1993, ADL representatives toured the used car lot and identified about eight empty drums. One of the drums was labeled as containing a flammable polyester liquid and another was labeled as a fruit preservative. The rest were unlabeled. No sampling has been conducted on-site so it is difficult to assess their environmental impact.

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2.12 Overseas Steel Fabrication

This facility is located near Four Winds Plaza and consists of one field office and one trailer, both of which were empty during ADL's tour of the facility. We were not able to determine the activities of Overseas Fabrication, and no sampling has been conducted on-site to assess their environmental impact.

2.13 Virgin Islands Housing Authority/Tropical Motors

VIHA is located immediately up valley of LAGA on the adjoining property. Tropical Motors operated at the VIHA site prior to 1978, and VIHA afterwards. Operations that have been conducted on-site include hazardous material storage, an underground storage tank for waste oils, a vehicle maintenance garage, parts degreasing machine, and a drum storage area with about 20 to 30 drums.

During ADL's tour of this building in October 1993 we located the presence of pesticides, caustics, and parts cleaners. The parts cleaners contained TCA, TCE, and PCE.

The hazardous material/waste management practices at VIHA include the use of an underground storage tank for waste oils storage. The UST was pumped out in 1987 but no excavation of the tank was conducted in order to determine its integrity. We were not able to determine if the UST was registered with the DPNR. We identified a parts cleaner outside one of the garages; runoff from this area is down the concrete drainage ditch to the gravel yard. Approximately 20 to 30 drums are outdoors, most of which are unlabeled but reportedly contain waste oils. The drums are stored on gravel with no secondary containment. There are several small buildings near the VIHA potable water wells No. 1 and No. 2. These buildings contain likely hazardous waste drums, which we were not allowed by VIHA to inspect, that have reportedly leaked to the ground³⁸. Reportedly, VIHA authorities are awaiting DPNR's testing of the drums to determine disposal methodology. A joint DPNR and USEPA inspection of the facility in April 1993 revealed the presence of numerous insecticide, caustic, cleaners, and conditioner drums present as well as unlabeled drums. The inspectors recommended that the waste oil drums should be bermed (they have not been as of 10/93). The deposition of Mr. Edward D. Lagarde³⁸ indicated that degreasing operations were performed outdoors and that the floors were washed with degreasing solvents. These practices create a likelihood of releases to the environment and merit further investigation.

The only sampling records available for this facility indicate that the waste oil from the underground storage tank contained petroleum products. Samples were not analyzed for specific chlorinated compounds. Ground water sampling of the potable water wells has shown elevated levels of nitrates and chlorinated substances. The presence of both of these

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compounds together may indicate that the common source is a septic pit nearby. Since VIHA is upgradient of the LAGA building under ambient ground water conditions, it is possible that VIHA chlorinated compound sources could have impacted ground water beneath the LAGA facility.

2.14 Four Winds Plaza Partnership

Four Winds Plaza began to construct the current shopping plaza about 1977. Operations at the shopping plaza include a movie theater, car wash, assorted restaurants, an auto repair facility, an electronics store, a food store, and a general merchandise store. Equipment at The Plaza includes several backup diesel electric generators, several aboveground storage tanks and formerly an underground storage tank.

In 1980, Four Winds Plaza applied for a test well permit and was granted a license to pump for domestic use, up to 500 gallons per day (GPD). In 1981, they applied for a permit to pump 43,000 GPD, but were denied by the permitting authority because the aquifer had already been over appropriated beyond the safe yield. During this time period, the permitting authority was also lowering pumping rates for commercial appropriations because they were not able to show need and prior use to authorized permit rates. In August 1981, a DPNR official observed Four Winds Plaza dispensing water to commercial entities without a permit, and also questioned whether they were exceeding their appropriation limit. Four Winds tried several other times thereafter to increase their well appropriation limit, but were denied for the reasons previously given.

In 1987, the Four Winds wells were closed by DPNR. Then in 1989 their wells were reopened for the use of ground water supply for a car wash and a proposed laundromat business at the Plaza. The permitted pumping rate was increased to 50,000 GPD for each of the three wells in 1993.

ADL personnel inspected Four Winds Plaza in October 1993 and found that there are a number of bulk storage tanks on-site, one of which was inspected in detail and found to have holes in its secondary containment. Also paper, wood, and food wastes were piled on-site, not in trash receptacles, and were causing an odor and visual nuisance. Storm water passing over the back store area had an oily sheen appearance and was discharging to a storm drain. During our visit, we noted a strong chemical odor emanating from this storm drain which is fed by Four Winds Plaza storm drains. Later, we sampled the drain directly down slope of the Four Winds discharge and found low levels of chlorinated solvents. The storm drain had a high flow rate despite no rainfall for that day. The water flow could have been contributed by the Four Winds Plaza Carwash, but we were not able to definitively determine the source. During the tour we also observed a black substance coating the sides of the rainfall collection pipes which appears to have run down the sides of the pipe. Reportedly, this substance may be the tary material used to coat the roof. In September 1990, DPNR issued a notice of violation to Four Winds for exceeding potable water standards¹¹. In October 1990, Four Winds received sampling results indicating that their

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roofing compound applied to the roof following Hurricane Hugo had contaminated the cistern potable water with DCE, methylene chloride, TCE and trihalomethanes above potable standards¹².

A review of aerial photographs for the pre-development period of Four Winds Plaza indicates that numerous tanks were previously located on-site. The contents and integrity of these tanks could not be determined from the photo. It is possible that chemical storage occurred on-site prior to Four Winds Plaza development that may have contributed to observed chemical concentrations in ground water.

2.15 Western Auto

Western Auto is located within Four Winds Plaza, along Tutu Gut. Western Auto began repair and parts distribution operations in 1978. Operations/equipment at Western Auto include maintenance bays, an aboveground diesel storage tank, two underground waste oil tanks, vehicle repair facilities, auto parts chemical storage, oil/water separator², floor drains, sumps, and underground piping.

ADL personnel conducted a limited tour of this facility but were not permitted to inspect maintenance bay chemical storage areas. Documentation¹ indicates that at least three products are used/stored by Western Auto that contain chlorinated solvents.

The documentation record for Western Auto indicates that the ownership of the two underground storage tanks on-site is questionable². Apparently both Western Auto and Four Winds Plaza Partnership deny owning the tanks². Western Auto registered the tanks in 1993, more than nine years after they were required to have been registered by the DPNR. These tanks received waste oils and any other substance that would have poured into the collection sump on the maintenance bay floor. A sample from one of these tanks in December 1992, indicated the presence of TCA (700 ug/L) in the underground tank¹⁰. Excavation of these tanks was undertaken in October 1993, and at the excavation base free product oils were found as well as oil saturated solid. Further excavation activities caused the rupturing of a nearby pipe which discharged a black colored liquid. The results of analytic testing of the tank excavation sediments and oils should help determine whether chlorinated solvent contamination is also associated with these tank leaks. A soil gas survey conducted by Target Environmental in 1992 showed that soil gas with detectable levels of hydrocarbon contamination were present extending about 100 feet from the Western Auto storage tanks²⁷. These observations suggest that Western Auto may have contributed to the ground water contamination in the Four Winds Plaza area.

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2.16 Home Petroleum, Inc./Caribbean Gas Corporation

The Home Petroleum, Inc. gas station was located southeast of Harthman Plaza. The facility began operations in 1963 under the name of Caribbean Gas Corporation and later became Home Petroleum, Inc. until closing in 1986¹⁹.

This facility reportedly contained two to three underground storage tanks, some of which leaked. Reportedly, upon excavation of the tanks, free product hydrocarbons were observed in the excavation.

Since this facility no longer exists and we were not able to obtain analytical records for any sampling at the site, it is difficult to assess its environmental impact. Our data so far indicates that local service stations have used chlorinated solvents so it is reasonable to assume that this station also used chlorinated solvents. Water pumping in the Harthman, Elgin, and Harvey well fields may have caused chlorinated solvents released at this site to migrate upvalley towards the Plaintiffs' well fields.

2.17 Old Tutu Wastewater Treatment Plant

The Old Tutu Wastewater Treatment Plant (WWTP) was built about 1967⁴. It services the upper Tutu Basin and Harthman's Tutu Plaza facility. Its design capacity is about 220,000 gpd and currently processes about 50,000 gpd. The treatment equipment consists of grit separation, two aeration and activated sludge settling basins, and two air diffuser systems leading to a chlorination system with eventual discharge to an infiltration pond. The infiltration pond is reportedly between 5 to 15 feet deep, with a surface area of about 9,000 square feet. Due to the shallow soil thickness in the area, the infiltration pond may be excavated into bedrock. Evapotranspiration from the surface is likely to be approximately 555 gpd, based on lake evapotranspiration rates in southern Florida (conservatively used 65 inches/year for this calculation). The remaining 49,445 gpd is expected to seep into the ground, recharging the ground water. Our sampling and chemical analysis of the influent wastewater received at the wastewater treatment plant did not detect any chlorinated solvents. The chlorination process at effluent discharge, however, can create chlorinated compounds such as hexachloroethane. Hexachloroethane will degrade readily to PCE and to a lesser extent, trichloroethene, dichloroethene, and vinyl chloride. All that is necessary for this process to occur is free chlorine residual in the presence of humic substances, both of which are expected for the Old Tutu WWTP. Given that the WWTP discharges at a large flow rate to the aquifer, about 17% of aquifer safe yield, it is conceivable that the WWTP could have contributed to the observed Tutu aquifer chlorinated compound contamination. The WWTP is hydrologically upgradient of both the Four Winds and Harthman well fields and, therefore, any release from the WWTP is expected to impact the Plaintiffs' well fields. None of the investigations to date have evaluated this possibility.

2.0 Potential Contaminant Sources In the Tutu Area

ADL conducted sediment and aqueous sampling at the base of the Old Tutu WWTP infiltration pond in October 1993, but the samples have not yet been fully analyzed. A better understanding of the current potential for chlorinated compound formation at this site will be available once the samples have been analyzed.

2.18 Classic Printers, Inc.

Classic Printers is located midway between the Harthman estate and Four Winds Plaza, across Route 38. We were unable to determine when this facility began operations and did not inspect the site. However, given the name of the business, it is likely that some inks and ink cleaning agents may have been used at the site that could contain chlorinated solvents. This site has not been investigated by the USEPA or others, so it is difficult to assess its impact on the Tutu aquifer.

2.19 Fellowship Church/Storage Facilities, Inc./West Indies Enterprises, Inc.

This facility is located in Hidden Valley, upgradient of the Plaintiffs' well fields. The facility was developed prior to 1971 based on aerial photographs. Property owners have included the Fellowship Church (current owner), Storage Facilities, Inc., and West Indies Enterprises, Inc. The facility is rather large and old, but we were unable to determine what historic operations were conducted at the site. We have seen reference to a West Indies chemical and paint company located in Tutu in the 1970 and thought that this may have been their building, but were unable to confirm this. The facility includes at least one aboveground chemical storage tank of unknown current or past contents. Since this area has not been sampled, we were unable to determine its impact on the Tutu aquifer. Based on the potential for chemical handling at this site, however, it warrants further evaluation as a potential contaminant source in the Tutu Valley aquifer area.

2.20 Household Septic Systems

Much of the Virgin Islands is serviced by household septic systems rather than by sanitary sewers⁴⁰. Household septic tanks individually may not represent significant sources of chlorinated compounds, but collectively they can cause widespread aquifer contamination. Septic systems receive chlorinated compounds through household disposal of chemicals to sinks and drains. Many household products contain chlorinated compounds. These products, when disposed to a sanitary drain, discharge to the septic tank where they can then be transported to ground water. Additionally, many septic tank cleaning companies use chlorinated compounds to unclog or clean septic tanks, thus increasing the load of chlorinated compounds to the aquifer. These septic discharges of chlorinated compounds could cause widespread distribution of chlorinated compound contamination in the aquifer. This is an issue which has not yet been adequately investigated for its potential contribution to contamination in the Tutu Valley aquifer.

3.0 Site Physical Characterization

Detailed evaluations of the geology and hydrology, both on St. Thomas in general and at the Tutu site, have been provided in numerous reports^{32/40/41/42}; therefore, only a brief summary has been provided here. For a detailed description of the site geology and hydrology, the reader is referred to those pertinent reports.

3.1 Geology

The geology of the site consists of a thin soil layer overlying volcanic and volcanoclastic rocks. The soil thicknesses range from less than 2 feet to approximately 10 feet across the site. Two major rock units underlie the upper valley of Turpentine Run: the Water Island Formation, consisting primarily of lava flows and flow breccias and some intrusive dikes and plugs, and the Louisenhoj Formation, which are pyroclastic deposits consisting primarily of andesite.

Turpentine run consists of gently rolling hills in a basin surrounded by steep slopes. The valley shape resulted from weathering and differential erosion of the bedrock along fault lines which dissect the valley. The LAGA Facility lies off the main fault line in a zone of relatively competent bedrock.

We conducted surface reconnaissance of the geology in this Tutu Valley area, the results of which are presented in a separate report³⁵. Our evaluation of the geology is generally consistent with that reported by Dr. Grenville Draper⁴⁰.

3.2 Hydrology

We reviewed several hydrologic studies for St. Thomas^{32/34/40/41/42}. These studies are generally consistent with the water balance presented in Table 2 of the deposition by Mr. Wexler³¹. As shown in that table, the average annual rainfall is approximately 42 inches. Of the 42 inch average annual rainfall, 38.4 inches (91.4%) is transported back to the atmosphere via evapotranspiration. Strong solar radiation wind, and high vegetative cover provide for the high rate. Of the total rainfall, 0.4 inches (1%) are lost to stormwater runoff; however, in the vicinity of the site, a significant portion of the land is covered by roads, buildings, or parking lots. Therefore, the amount of rain lost to stormwater runoff is likely to be higher in these developed areas than reported here. Only 3.2 inches (8% of the total rainfall) of rainfall infiltrates to the ground water. This is primarily a result of the soil type. The surface soils at the site act as a sponge, absorbing and retaining water at shallow depths and making it available to the surface vegetation. The soil is a clayey-silt mixture which tends to granulate or clump together when dry. The soil layer has high to moderate permeability when dry, but when wet, becomes increasingly impermeable and holds water in its pores, rejecting any excess. As the soil at the surface dries, it forms clumps and provides pathways for air infiltration into the soil causing further rapid evaporation³¹. Of the 3.2

3.0 Site Physical Characterization

inches per year that reaches the ground water, 2.3 inches are lost to evapotranspiration, 0.3 inches supports base flow in Turpentine Run, and 0.6 inches discharges to the ocean. The water balance presented here does not account for water exports or consumptive losses.

The primary aquifer in the study area lies within the Louisenhoj formation. The alluvium, (soil) forms a water-bearing unit of lesser significance. A number of extraction and monitoring wells have been installed in the vicinity of the site and data collected from these wells allows for aquifer analysis.

Hydraulic conductivities at the site are reported to range from 3.5×10^{-3} m/day to 2.5 m/day³¹. The higher hydraulic conductivities are located within the Turpentine Run gut and decrease significantly with distance from the gut. The hydraulic conductivity beneath the former LAGA facility was reported as 6.67×10^{-3} m/day³². This low value is generally consistent with information collected at this location during drilling which indicated bedrock was very competent.

The deposition of Mr. Leo Swayze⁴⁷ provides the most complete description of well pumping in the Tutu Valley we have seen. Even the pumping rates described in this reference, however, are subject to considerable uncertainty. Our best estimate of the cumulative time history of pumping from the aquifer at the site is displayed in Figure 3-1.

The high rate of ground water extraction at the site, at or above the hydrogeologic safe yield, could result in the following negative impacts to the aquifer:

- Compression of the openings within the aquifer where water is stored, resulting in less storage during times of recharge, thus, the loss of a valuable renewal resource
- Increasing the potential for upwelling of saline water from beneath the island
- Loss of recharge to streams and wetlands resulting in brackish water conditions and loss of ecological habitats

4.0 Tutu Site Environmental Investigations

Environmental investigations to date have focussed on the previously suspected source areas, but have not fully investigated all of the potential sources discussed in Section 2, nor have they presented convincing evidence that the LAGA facility operations contributed to either contamination at the Curriculum Center property or in the Plaintiffs' wells. Section 4.0 briefly reviews the relationship of the investigated areas to the potential contaminant sources. Section 4.0 is not an exhaustive review of all the available data.

Figure 4-1 shows the soil gas survey areas. Notably absent is any exploration in the vicinity of VIHA, Ramsay Auto Parts, most of the Antilles property, Archies Auto Repair, Tracy's Radiator, and O'Henry's Drycleaners. Also, there is only one point on the Curriculum Center property.

Figure 4-2 shows the location of soil samples taken by Geraghty & Miller. The Soiltech samples around Tutu Esso and ADL sampling around the Curriculum Center are not shown. The samples from Tutu Esso showed relatively high chlorinated compound concentrations. The additional soil sampling around the Curriculum Center showed relatively low or non-detectable concentrations. Notably absent is any soil sampling around VIHA, Ramsay Auto Parts, Tutu Texaco, Antilles Auto Repair, Archies Auto Repair, and Tracy's Radiator.

Figure 4-3 shows the extent of ground water monitoring in the area. Notably absent are:

- Chlorinated solvent plume edge definition in any direction, including upgradient
- Monitoring west of the Four Winds Shopping Center
- Monitoring downgradient from Ramsay Auto Parts or Antilles Auto Repair

In general, environmental investigations are driven, and biased, by conceptual theories of contamination sources and movement. The collected data, in combination with other information, are then used to examine, and perhaps modify, the conceptual theories. For this area, our evaluation of the available data, potential sources, and principles of contaminant behavior in the environment suggest that further evaluation is needed before all the contributing sources will be known.

5.0 Chemical Behavior in the Environment

This section discusses two principle issues regarding chemical behavior in the environment and provides some interpretation of the observed conditions in the Tutu Valley aquifer in the context of those issues. Subsection 5.1 discusses chemical movement in the environment, and Subsection 5.2 discusses chlorinated hydrocarbon degradation in the environment.

5.1 Chemical Movement in the Environment

After chemicals are introduced into the environment, they exist in either free phase or in association with environmental media (water, air, solids). Free phase chemicals move in accordance with forces applied directly to the free phase chemicals. Movement of chemicals associated with environmental media is governed by a combination of the environmental media movement and the dynamic transfer of chemicals among the media. The rest of this discussion will focus on the movement of chemicals dissolved in water.

Except in extremely low conductivity environments such as very tight clays, underground movement of chemicals dissolved in water is dominated by movement of the water. This is commonly referred to as advective transport. The chemical movement is also influenced by other processes. The two most important of these other processes are retardation by adsorption and dispersion. Adsorption of dissolved chemicals onto the media through which the water is flowing, has the effect of retarding the transport velocity of the chemical mass centroid in comparison to the average velocity of the water. Dispersion has the effect of spreading the chemical distribution, making the leading edge advance more rapidly, and the trailing edge more slowly, than the centroid of the chemical mass as well as producing contaminant motion transverse to the ground water flow direction.

Evaluating advective transport of chemicals in ground water depends on an understanding of the ground water flow.

Figure 5-1 shows the ground water potentiometric surface under non-pumping conditions as simulated by Wexler³¹. In the area shown on Figure 5-1, the Wexler simulation is very consistent with the piezometric surface interpretation presented by Jordan & Cosner⁴¹. The flow direction implied by this piezometric surface in the vicinity of the Curriculum Center is also shown on Figure 5-1.

The representation in Figure 5-1 is based on a porous media flow model. This conceptualization is applicable to flow near the gut and may be applicable at a large distance scale for the entire aquifer. With increasing distance from the gut, however, the fracture density decreases and the local applicability of a porous media conceptualization decreases. The currently available data are not adequate to determine how well a porous media model represents flow conditions in the vicinity of the Curriculum Center. As a cross check on the likely flow directions, therefore, we also evaluated the fracture patterns in this area.

5.0 Chemical Behavior in the Environment

Figures 5-2 and 5-3 shows the average fracture trace directions for this area in plan view. The fracture trace directions are generally consistent with the flow direction inferred from the piezometric head interpretation shown in Figure 5-1.

The flow directions shown in Figure 5-1 are based on non-pumping conditions. Ground water flow directions are influenced by pumping of ground water. Ground water pumpage in this area was discussed in Section 3.0. We are not aware of a fully adequate evaluation of the influence of pumping on piezometric head or flow directions in this aquifer. The model developed by Wexler may provide an appropriate tool for evaluating the influence of pumping, but the accuracy of the pumping rates used in the simulations presented in his deposition had not been demonstrated. The report of Mr. Leo Swayze⁴⁷ incorporated pumping rates which seemed to be based on more information than was available to Mr. Wexler, but we are not in full agreement with the methodology Mr. Swayze used to estimate well capture zones.

Of particular interest in the vicinity of the Curriculum Center are the influence of the Tillett well and the VIHA wells. The analysis of both Mr. Wexler and Mr. Swayze indicate that in the absence of other pumping, chemicals in the ground water around the Curriculum Center will eventually be captured by the Tillett well under the Tillett well pumping rates during the 1970s and through 1987. The analysis of Mr. Swayze, however, suggests that when the VIHA wells are pumping, ground water under the Curriculum Center will be drawn upvalley, towards the VIHA wells. Mr. Wexler's simulation did not show this effect, but was based on a lower VIHA well pumping rate.

Geraghty & Miller³⁴ determined that the aquifer in this area may be viewed as having two zones, upper and lower. In the lower zone, recent data show a gradient going towards VIHA from the Tutu Texaco service station. Dissolved chemicals would also, therefore, move in the same direction.

While none of these evaluations are definitive, they do suggest the likelihood that ground water flow directions, and consequently dissolved chemical flow directions, in the vicinity of the Curriculum Center can be either toward the gut or away from the gut, toward VIHA, depending on pumping patterns in the aquifer. This suggests that contamination observed on the Curriculum Center property could be due to migration from off-site sources from either VIHA or Texaco. This possibility, in combination with the chemical handling practices of the Curriculum Center, support the position that the LAGA facility operation has not been shown to be responsible for contamination detected on the Curriculum Center property. This situation, in combination with the long travel time for ground water contaminant movement from the alleged LAGA disposal area and eventual capture by the Tillett Well clearly demonstrates that the LAGA facility operations were not responsible for contamination in the Plaintiffs' wells.

5.0 Chemical Behavior in the Environment

5.2 Chlorinated Solvent Degradation

The available data on concentrations of PCE, TCE, DCE, and vinyl chloride indicate that there are multiple sources of contamination in the Tutu area. As noted by Dr. Eugene Meyer⁵¹, if only a single source of PCE were responsible for the contamination observed in the aquifer, ratios of the concentrations of PCE to TCE and TCE to DCE would be consistent across the affected wells once equilibrium was reached⁵¹. Differences in the ratios from well to well indicates multiple PCE sources, long duration continuous releases, or sources of TCE or DCE to the ground water independent of that formed through PCE degradation. A general discussion of chlorinated degradation is presented in Appendix C.

Meyer has calculated his ratios in terms of concentrations in ug/l; we have worked in terms of μ moles per liter, and calculated the ratios of individual chlorinated ethenes to total chlorinated ethenes. Because the number of moles of PCE initially present is conserved through the PCE-TCE-DCE-VC degradation chain, expressing the ratios in this manner provides a more meaningful measure of the degree of PCE transformation. The concentration ratios calculated in this manner, however, would still be expected to be equal from well to well, under equilibrium conditions, in the same way they would be when calculated in terms of mass concentrations.

The data in the Tutu area show a wide range of concentration ratios. There are, nevertheless, some patterns which may be noted.

In the southern part of the area, the Eglin I, II, and III wells show a consistent pattern of degradation products. These ratios are also consistent with the IT O'Henry monitoring well MW-03 (designated here as ITMW-03 to distinguish it from Geraghty & Miller well MW-03), which is the O'Henry well closest to the Eglin wells. Data for these wells are listed below:

Compound	Molar Ratio of Listed Compound to Total Chlorinated Ethenes			
	Eglin I	Eglin II	Eglin III	ITMW-03
PCE	0.31	0.30	0.32	0.28
TCE	0.17	0.16	0.15	0.17
DCE	0.52	0.54	0.53	0.55
VC	0.00	0.00	0.00	0.00

These ratios are much different from those for wells ITMW-02 and ITMW-04, as well as the Harvey well, which are either closer or to the south of the O'Henry facility. In those samples, PCE ranges up to 74% of the total chlorinated ethenes, and DCE percentages are much lower than that indicated in the table above. This pattern could be due to either multiple sources in the area or continuing releases by O'Henry.

5.0 Chemical Behavior In the Environment

Meyer has argued in his expert report that the contamination of the Tillett and Four Winds Plaza Wells indicate contamination from at least two independent sources of PCE and/or TCE⁵¹. The ratios of PCE degradation products to total chlorinated ethenes also support this view. Below, the Tillett well ratios are compared with those of MW-3, MW-4, and MW-4D, the closest wells to the north of the Tillett well:

Compound	Molar Ratio of Listed Compound to Total Chlorinated Ethenes			
	Tillett	MW-3	MW-4	MW-4D
PCE	0.20	0.04	0.14	0.14
TCE	0.10	0.02	0.06	0.04
DCE	0.70	0.67	0.80	0.82
VC	0.00	0.27	0.00	0.00

The ratios for the Tillett well are inconsistent with any of the other wells, indicating at least two sources of contamination. Because of a clean area showing virtually no contamination exists to the north of the Eglin Wells, the O'Henry Dry Cleaners is not likely to contribute contaminants to the Tillett well. The Tutu Esso service station identified by Meyer, the Tutu Texaco service station, and other facilities in this area (see Section 2.0) seem to be a much more likely sources.

The northern Tutu area also indicates that multiple sources of contamination are present. The Ramsay well (north of Ramsay Auto) contains a much higher proportion of PCE than any of the wells nearby. PCE generally accounts for less than 15% of the total chlorinated ethenes in wells of this area. At the Ramsay well, the proportion is 82%. This suggests at least a different source of contamination in the area or a later release (or releases) affecting the well.

The patterns of vinyl chloride (VC) occurrence may also be indicative of contamination sources. Reduction of DCE to vinyl chloride requires relatively strong reducing conditions. Vogel et al.⁵² report that this transformation would occur under conditions that are strong enough to reduce nitrate to nitrite. The ambient conditions in the aquifer in the Tutu area do not indicate that these conditions are present. Ground water samples taken by ADL show high concentrations of dissolved oxygen, meaning that anaerobic conditions did not exist and a reducing environment was not present. Also, data on nitrite and nitrate concentrations^{49/50} in the area show nitrite concentrations to be much lower than nitrate concentrations, suggesting that even if anaerobic environments did exist, conditions were not sufficiently reducing to form either nitrite or vinyl chloride.

Reducing conditions strong enough to support the transformation of DCE to vinyl chloride would, however, be expected to exist in a septic tank and may exist in any leaching pit. Septic systems operate anaerobically. The strong odors they are responsible for are a result of the reduction of sulfur to sulfide. This reaction requires more strongly reducing

5.0 Chemical Behavior In the Environment

conditions than the reduction of nitrate to nitrite, and thus the reduction of DCE to vinyl chloride would be expected to occur under these conditions. The Tutu Texaco service station is known to have used a leaching pit in which highly reducing conditions were likely. Esso Texaco may also have used such a pit.

The analytical data collected in the Tutu area are consistent with the Texaco service station, which discharged chlorinated organic compounds through its leaching pit, being the principal (if not the sole) source of vinyl chloride in the area. As discussed earlier, migration from the Texaco facility to the north and northwest would be possible under some pumping conditions.

Vinyl chloride was also detected to the north of the curriculum center building in samples taken by ADL. Concentrations were 1,600 and 140 (estimated) ug/L in the shallow and deep samples, respectively. The location from which these samples were taken is in the same direction relative to the Texaco station as MW-1D and MW-14, but farther away. These samples may represent a continuation of the plume from the Texaco station. This evaluation supports the concept that flow gradients have in the past and may currently be directed from the Tutu Texaco service station towards the Curriculum Center property.

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Figures

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TUTU WELLS SUPERFUND SITE
FIGURE 1-1
TURPENTINE RUN BASIN AQUIFER IN THE
TUTU AREA EASTERN ST. THOMAS, U.S.
VIRGIN ISLANDS, (1987): (TUT 006-1981)

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FIGURE 1-2

TUTU AREA BASE MAP: (TUT 006-1982)

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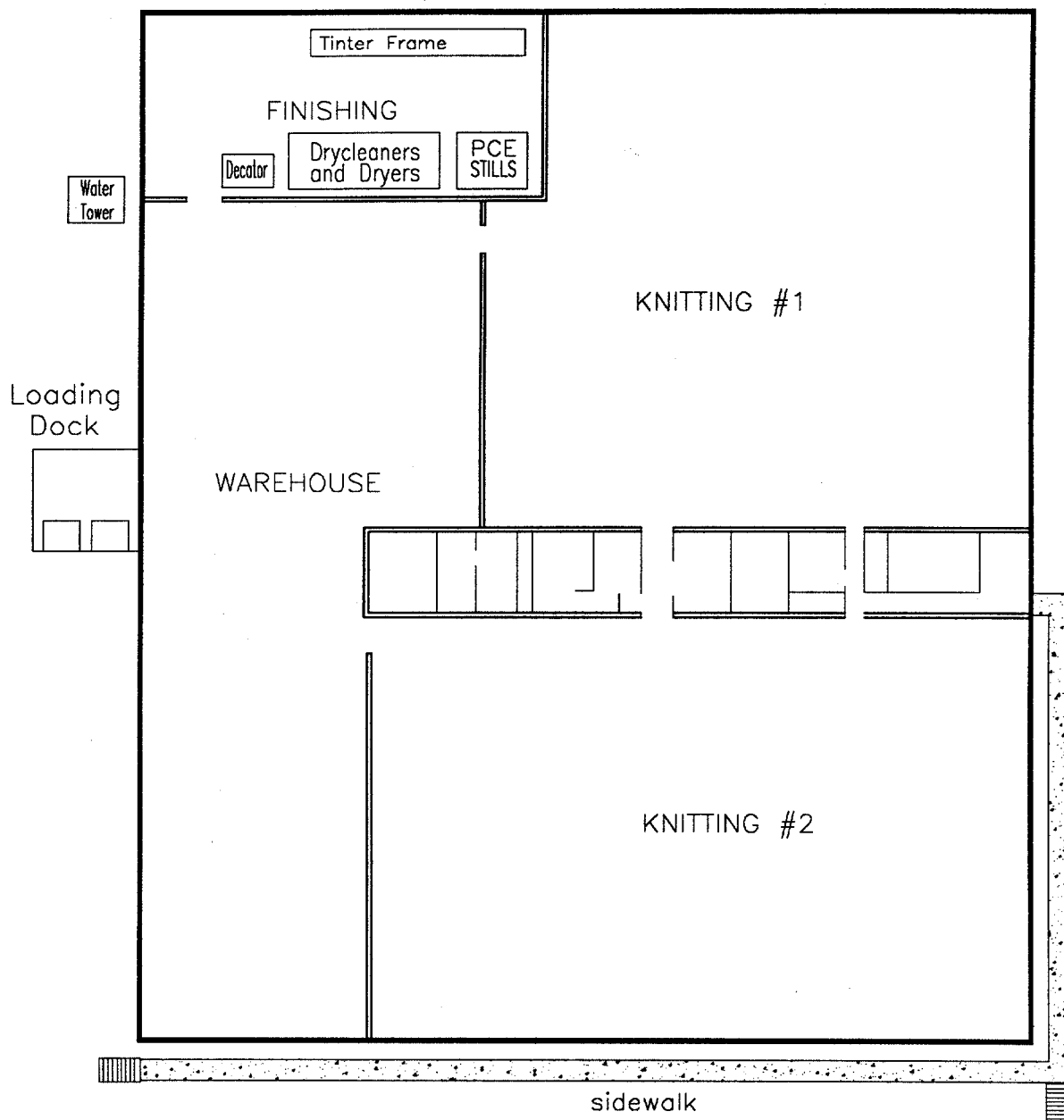
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FIGURE 2-1
POTENTIAL CONTAMINANT SOURCES IN
TUTU AREA: (TUT 006-1983)

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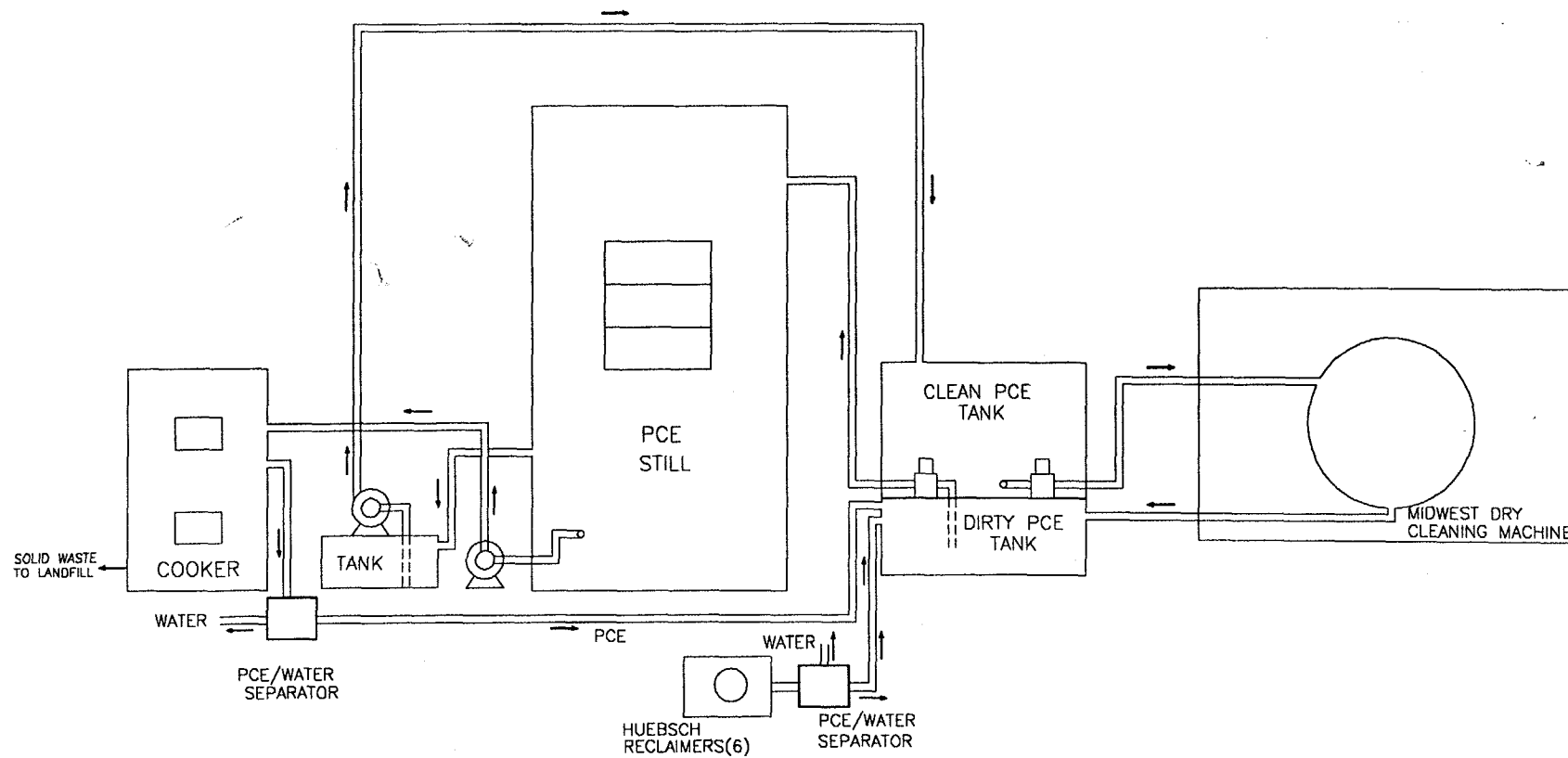
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Spartanburg, S.C. (Job # 69049)

Arthur D Little

TITLE:

Figure 2-2.
Laga Building
Floor Partition Plan

REV. #	REVISION DATE
0	10/23/93



SOURCE: BOGGS COMPANY (ADAPTED BY ADL)

PREPARED FOR: ROSENMAN & COLIN		DRAWN BY: (INITIALS)			Figure 2-3 PCE FLOW, SHOWING WASTE STREAMS LAGA DRY CLEANING OPERATIONS
DATE: 10/93	SCALE: NONE	DWG. NO. 44199-021	APPROVED BY: (INITIALS)		

Arthur D Little

Figure 2-3
PCE FLOW, SHOWING WASTE STREAMS
LAGA DRY CLEANING OPERATIONS

TUT 006 1984A

EPA REGION II
SCANNING TRACKING SHEET

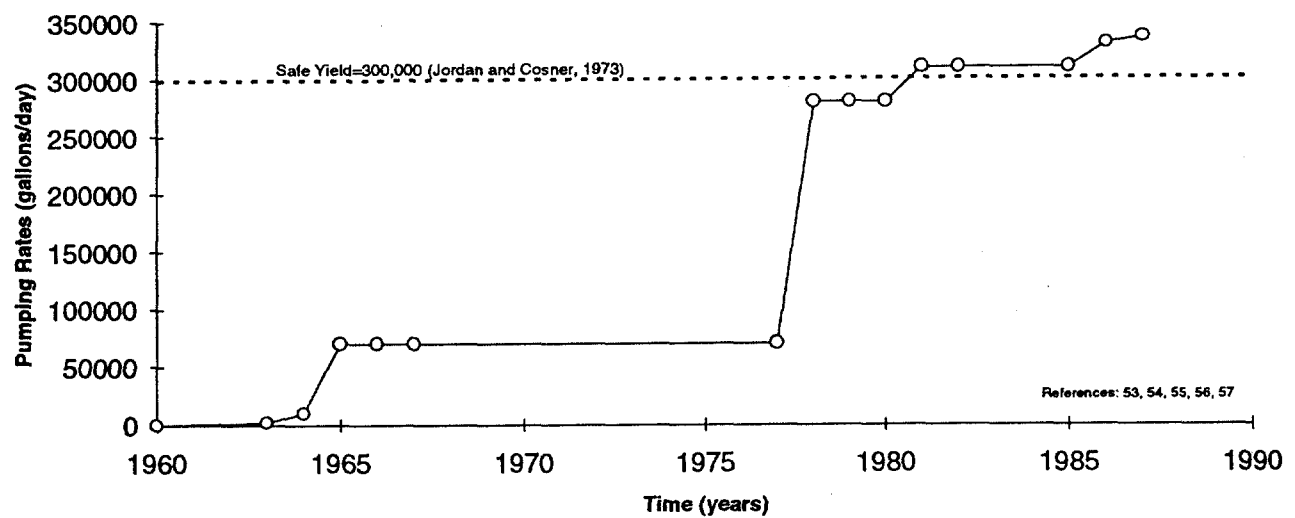
DOC ID # 64924

DOC TITLE/SUBJECT:
TUTU WELLS SUPERFUND SITE
FIGURE 2-4
TRAVEL DISTANCES FOR CONTAMINANTS
ORIGINATING AT THE ALLEGED DISPOSAL
PIT AFTER 20 YEARS OF TRAVEL TIME
(TUT 006-1985)

THIS DOCUMENT IS OVERSIZED AND CAN BE
LOCATED IN THE ADMINISTRATIVE RECORD FILE
AT THE

SUPERFUND RECORDS CENTER
290 BROADWAY, 18TH FLOOR
NEW YORK, NY 10007

Figure 3-1
Cumulative Pumping Rates in Tutu Valley



EPA REGION II
SCANNING TRACKING SHEET

DOC ID # 64924

DOC TITLE/SUBJECT:
TUTU WELLS SUPERFUND SITE
FIGURE 4-1
SOIL GAS SURVEY AREAS
(TUT 006-1987)

THIS DOCUMENT IS OVERSIZED AND CAN BE
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NEW YORK, NY 10007

EPA REGION II
SCANNING TRACKING SHEET

DOC ID # 64924

DOC TITLE/SUBJECT:
TUTU WELLS SUPERFUND SITE
FIGURE 4-2
CHLORINATED COMPOUNDS IN SOIL (ug/kg)
(TUT 006-1988)

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NEW YORK, NY 10007

EPA REGION II
SCANNING TRACKING SHEET

DOC ID # 64924

DOC TITLE/SUBJECT:
TUTU WELLS SUPERFUND SITE
FIGURE 4-3
CHLORINATED COMPOUNDS IN
GROUNDWATER (ug/l)
(TUT 006-1989)

THIS DOCUMENT IS OVERSIZED AND CAN BE
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NEW YORK, NY 10007

EPA REGION II
SCANNING TRACKING SHEET

DOC ID # 64924

DOC TITLE/SUBJECT:
TUTU WELLS SUPERFUND SITE
FIGURE 5-1
SIMULATED GROUND WATER ELEVATIONS
(FT.) UNDER NON-PUMPING CONDITIONS)
(TUT 006-1990)

THIS DOCUMENT IS OVERSIZED AND CAN BE
LOCATED IN THE ADMINISTRATIVE RECORD FILE
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NEW YORK, NY 10007

TUT 006 1991

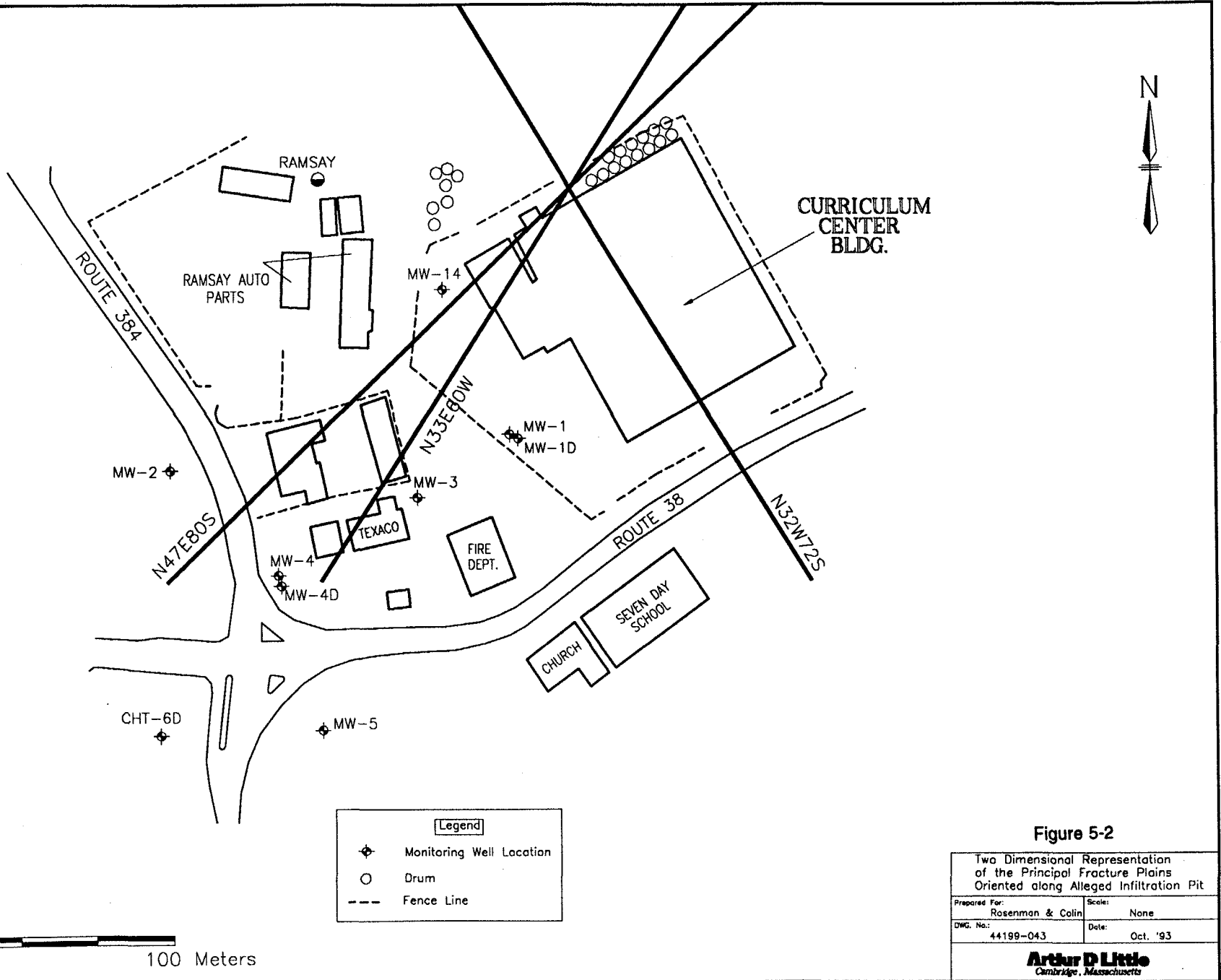
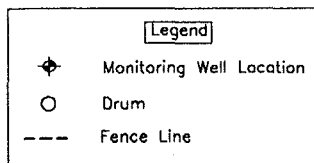
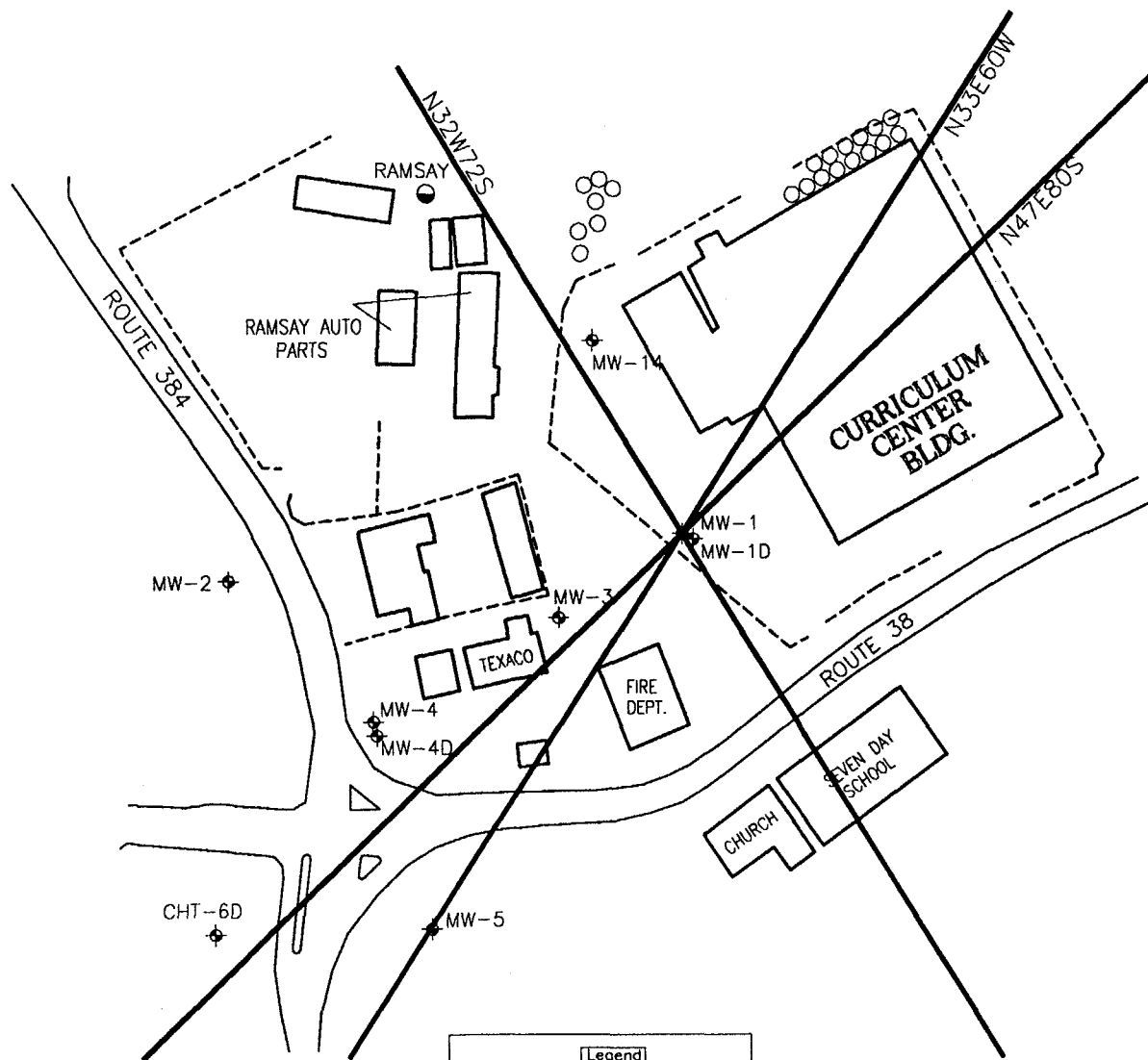


Figure 5-2

Two Dimensional Representation of the Principal Fracture Plains Oriented along Alleged Infiltration Pit	
Prepared For: Rosenman & Collin	Scale: None
DWG. No.: 44199-043	Date: Oct. '93
Arthur D Little Cambridge, Massachusetts	

TUT 006 1992



0 100 Meters

Figure 5-3

Two Dimensional Representation of the Principal Fracture Plains Oriented along Monitoring Well #1	
Prepared For: Rosenman & Colin	Scale: None
DWG. No.: 44199-042	Date: Oct. '93
Arthur D Little Cambridge, Massachusetts	

Appendix A LAGA Drycleaning Unit Waste Streams

A.1 Aqueous Waste Stream (Solvent/Water Separators)

Once wool has been oven dried, it is able to pick up moisture from the humidity in the air with a property called "hygroscopicity". The moisture regain for wool stored at 75°F and 50% relative humidity is about 13 to 18% water by weight. At 90% relative humidity and above (typical in the Caribbean areas) the moisture regain for wool can reach 30% water by weight.¹

The other fiber used in knitting, polyester (Dacron®), picks up almost no moisture sitting in humid air. In other words, it is very "hydrophobic".² From testimony given, all of the polyester fabric was subjected to drycleaning while only an occasional wool fabric that was accidentally soiled was subjected to drycleaning. Based on that information, a reasonable estimate of the blend of wool and polyester in the drycleaning of LAGA would be 10% wool and 90% polyester. For this mix of fabrics, the maximum moisture content of fabrics would be 3% water by weight. If half of this moisture is transferred to the drycleaning fluid, then about 1.5 lbs. of moisture will be collected from each 100 lbs. of fabric that was laundered. Full time operation (48 100-pound loads per day) could have produced 72 lbs. of water per day from the drycleaning operation.

With a solubility of PCE in water at equilibrium of 150 ppm, the PCE that could have left the plant with aqueous waste stream was:

$$\frac{\text{PCE}}{\text{day}} = 72 \text{ lb. } \frac{\text{water}}{\text{day}} \left(\frac{150 \text{ lb PCE}}{10^6 \text{ lb water}} \right) = 0.0108 \text{ lb PCE/day}$$

$$\frac{\text{PCE}}{\text{year}} = (0.0108 \text{ lb PCE/day}) 365 \frac{\text{day}}{\text{year}} = 3.94 \text{ lb PCE/year}$$

¹ Evelyn E. Stoud, Introduction to Textiles, John Wiley & Sons, Inc., New York, NY, 1960, page 90.

² Advances in Textile Processing, Volume 1, Editors J. Edward Lynn and J.J. Press, Interscience Publishers, Inc., New York, NY, 1961, page 107.

A.2 Sludge Waste Stream (muck cooker)

Sludge production by weight and volume

Weight = 110 tons x 2000 lb/ton = 220,000 lbs in ten years

$$\text{Volume} = 220,000 \text{ lbs} \times \left(\frac{1 \text{ cubic foot}}{56 \text{ lbs}} \right) = 3,929 \text{ ft}^3$$

Disposal depth in alleged pit

For a pit 9 feet in diameter

$$\text{Area} = \frac{\pi(4.5 \text{ feet})(4.5 \text{ feet})}{4} = 63.6 \text{ ft}^2$$

For disposing of 3929 ft³ of sludge

$$\text{Depth of material in pit} = \frac{3929 \text{ ft}^3}{63.6 \text{ ft}^2} = 62 \text{ feet deep}$$

Appendix A.3

Calculating Maximum Expected PCE Concentrations From Former LAGA Facility After Passing Through New Tutu WWTP			
parameter	units	value	notes
Input			
Density of Water	lbs/gal	8.35	
Average Water Through WWTP	mgd	0.1	30% of WWTP 300,000 gpd capacity
Alleged Water From LAGA	lbs/day	70	
PCE Concentration in LAGA Water	mg/l	150	PCE solubility
PCE mass lost during trip to WWTP	percent	2%	estimated, likely higher
PCE mass lost at WWTP	percent	92%	from EPA, 1980 data, pg 41 values pertinent to expected influent
Calculations			
Alleged water from LAGA	gal/day	8.4	
	l/day	32	
Average Water Through WWTP	gal/day	100000	
	l/day	378541	
PCE mass allegedly from LAGA	mg/day	4760	
PCE mass lost during trip to WWTP	mg/day	95	
PCE mass in influent to WWTP	mg/day	4665	
PCE mass lost at WWTP	mg/day	4284	
PCE mass in effluent of WWTP	mg/day	381	
PCE concentration in WWTP effluent	mg/l	0.001	

EPA, 1980, An Exposure and Risk Assessment for Tetrachloroethylene, Office of Water Regulations and Standards (WH-553)
(used values from those cities believed to have influents to those expected from LAGA between 10 and 50 ppb, cities include:
Salford UK, Minworth UK, Indianapolis IN, Lewiston PA, Grand Rapids MI, Flint MI. see below)

City	Influent Concentration ug/l	Percent Removal
Salford, UK	30	93%
Minworth, UK	46	99%
Indianapolis, IN	51	90%
Lewiston, PA	45	93%
Grand Rapids, MI	15	80%
Flint, MI	26	96%
Average	36	92%

Appendix B Deed Search

Curriculum Center

From Aux 26, page 44

Warranty Deed dated 11/30/1970

From Cobuild Companies, NC. (Formerly known as West Indies Enterprises, Inc.) to LAGA Industries, Ltd. Recorded December 3, 1970. Book 12-I, page 325. No. 6822.

Deed Dated 12/12/1979 from LAGA Industries, LTD to The Duplan Corporation of 1430 Broadway, NY, NY to PANEX CO., c/o Bisen & Fishman, 645 5th Ave., NY, NY. Recorded 12/20/79, Book 20T, page 409. No. 5245.

Warranty Deed Dated 12/23/81 from PANEX CO., a partnership consisting of Paul Lazare and Andreas Gal of 1450 Broadway, NY, NY 10018, to The Government of The Virgin Islands of the U.S.. Recorded 2/9/82, Book 23H, pg. 175. No. 539.

Texaco

From Aux 17, pg. 115

Warranty Deed dated November 7, 1966 from Sidney S. Kessler, agent for the stockholders of St. Thomas Real Estate Corporation, to Texaco Antilles, LTD., a province of Ontario Canada Company. Recorded 1/10/1967, Book 8-P, page 222. No. 57.

Warranty Deed dated May 16, 1974 from Texaco Antilles, LTD of Ontario, Canada to Texaco Caribbean, LTD. Recorded June 28, 1974. Book 15-S, page 330, no. 2615 (T. Box 12 atty. Barley).

Aux 17, pg. 8

Warranty Deed dated October 28, 1966. From St. Thomas Real Estate Corporation to Sinna S. Kessler, agent for the stockholders of St. Thomas Real Estate Corporation. Recorded November 4, 1996. Book 8N pg. 137, no. 4617.

O'Henry

From Aux 14, pg. 11

Warranty Deed dated February 9, 1965 from West Indies Marine Sales, Inc. to Francois Realty Corporation. Recorded March 2, 1965. Book 7Q page 279. No. 1183.

Bargain and Sale Deed dated June 1, 1984 from Francois Realty Corp. to the Cyril V. Francois Associates of P.O. Box 276, St. Thomas, VI. Recorded June 27, 1984 Book 25-W, page 40. No. 2460.

Lease dated May 29, 1981 from Francois Realty Corp. of 41 Norre Gade, St. Thomas, VI to L'Henri, Inc. of P.O. Box 232, St. Thomas, VI for a period of 20 years commencing April 1, 1981 and terminating on the 20th of March, 2001. Recorded September 28, 1981, Book 22-X, page 197. No. 3415.

Consent of the Owner to mortgage by L'Henri, Inc. to First Pennsylvania Bank, NH, between Francois Realty Corp. and L'Henri, Inc. to First Pennsylvania Bank. Recorded December 11, 1981, Book 23-D, page 187. No. 4374.

Landlord's Consent to conditional assignment of Lease (Leasehold Mortgage) between L'Henri, Inc. and Buy The Case, Inc. Dated. June 29, 1982. Recorded July 7, Bk. 23-J pg 369. No. 2276.

Ramsays

From Aux. 32, page 25.

Deed dated July 25, 1974 from Cobuild Companies, Inc. to Rudy D'Angelico and Yvonne Louise D'Angelico of Box 7101 C'sted St. Croix, USVI, recorded September 6, 1974. Book 15X, page 309. No. 3649.

Warranty Deed dated May 19, 1978 from Rudy D'Angelico and Yvonne Louise D'Angelico to R & R Properties, Inc. Recorded June 9, 1979, Recorded June 9, 1978. Book 18-X, page 329, No. 1842.

Quitclaim Deed dated December 17, 1986 from R & R Properties, Inc. to Rita Ramsay of 19M Estate Solberg, St. Thomas, VI. Recorded December 30, 1986. Book 29P, page 439. No. 6665.

From County Reg. Pg. 450

Antilles Lot 214

From Aux 23. Pg. 325

Warranty Deed dated December 14, 1968 from West Indies Enterprises, Inc. to Siegfried Torinus and Waltraud Torinus as tenants by the entirety. Recorded September 29, 1969. Book 11B, page 46. No. 1213.

Memorandum of Right of First Refusal dated March 30, 1971, referring to a lease between Siegfried Torinus and Fred Eaglin and Seth Larrabee dated February 26, 1971 to a portion of PCC 214 Annas Retreat for a term of 5 years beginning 4/1/1971. This refusal is in regard to event of sale of property. Recorded August 25, 1971. Book 13A, pg. 97. No. 2758.

VIHA

from Aux. 29, pg. 211

Warranty Deed dated February 15, 1972 from Co-Build Companies, Inc. to Stephen H. Kornfeld, General Partner and Husnu M. Ozyegian, General Partner d/b/a Annas Retreat Realty Company. Recorded July 19, 1973, Book 14S, page 354. No. 3283.

Warranty Deed dated November 7, 1973 from Stephen H. Kornfeld and Husnu M. Ozyegian, d/b/a Annas Retreat Realty Company to Warren S. Newman of 7 King St. C'sted St. Croix, VI. Recorded November 16, 1973, book 15A, page 263. No. 5073.

Quitclaim Deed dated February 7, 1978 from Warren S. Newman of 300 East 56th St., NY, NY 10022 to Joseph F. Sanson of #14 Tracy Way, Cowpet Bar Village, St. Thomas, VI. Recorded March 28, 1978, book 18S pg., 48, no 78.

Certificate of sale dated June 12, 1978 from Alfred E. Francis, U.S. Marshall for the Virgin Islands to the VIHA, recorded August 9, 1978, book 19C, page 461, No. 2696.

Quitclaim Deed dated July 7, 1978 from Joseph F. Samson of 14 Tracy Way, Cowpet Bay East St. Thomas, VI to VIHA of Box T668, Oswald Harris Court, St. Thomas, VI. Recorded November 21, 1978, book 192, page 45, No. 3953.

Deed of Marshal dated November 28, 1978 from Alfred E. Francis, US Marshal for the Virgin Islands to VIHA, PO Box 7668, Recorded December 21, 1978, Book 19N, page 309., No. 4312.

VITEL CO.

From Aux 20, page 230

Warranty Deed dated October 16, 1968 from Jim Tillet Caribbean, Inc. to VITEL Co. of Box 1141, St. Thomas, VI. Recorded October 21, 1968, book 94, page 259, No. 3684.

TILLET

From Aux 7, page 60

Deed dated November 12, 1958 from the St. Thomas Real Estate Corporation to Everett B. Birch and Patti Birch. Recorded November 19, 1958 in book 4T, page 264. No. 1406.

Warranty Deed dated May 19, 1959 from Everett B. Birch and Patti Birch to JIM TILLET CARIBBEAN, Inc. Recorded May 21, 1959, book 42, page 48.

Tracys Radiator

From Aux 42, page 100

TITLE TO MBT MOTORS, INC.

Warranty Deed dated August 29, 1986 from MBT Motors, Inc. to Excalibur, Inc. of PO Box 7614, St. Thomas, VI. Recorded November 20, 1986, Book 29J page 381, No. 5832.

From Aux 9, page 37

Warranty Deed dated March 15, 1961 from St. Thomas Real Estate Corp. to Eric Winter and Nancy Winter as tenants by the entirety. Recorded April 11, 1961. Book 5T, page 96. No. 640.

Warranty Deed dated June 22, 1979 from Gloria Belvedere of St. Thomas, VI to Branko, Inc. of 128 Annas Retreat, St. Thomas, VI. Recorded July 24, 1979. Book 20F, page 185. No. 2842.

Warranty Deed dated June 25, 1979 from John E. Branham of NY to Branko, Inc. of 128 Annas Retreat, St. Thomas, VI. Recorded July 24, 1979. Book 20F, page 188. No. 2843.

Marshals Deed, dated November 9, 1984. From John Washington, U.S. Marshal to MBT Motors, Inc. Recorded December 4, 1984, book 26J, page 62. No. 4698.

Deed of Gift dated January 3, 1966 from Eric Winter and Nancy Winter to Nancy Winter. Recorded January 14, 1966, book 8c, page 28, no. 71.

Warranty Deed dated May 1, 1978 from Nancy Winter of 116 Archwood Avenue, Annapolis, MD 21401 to Branko Inc. of 128 Annas Retreat. Recorded May 25, 1978, Book 18W, page 88, No. 1562.

Deed dated August 14, 1978 from Branko, Inc. to Gloria M. Belvedere of No. 128 Annas Retreat and John C. Branham of 43 Spray Court, Bayport, NY as Tenants in Common. Recorded September 7, 1978. Book 19F, page 29, no. 3045.

Fellowship Church

Indenture dated May 16, 1975 from Richard Reubin, receiver of Cobuild Co., Inc. (aka West Indies Enterprises, Inc.), to IBC Properties, Inc. c/o International City Bank, STTVI to parcel 394148-99, 100, 101 and 102 and Parcel No. 215 Annas Retreat Recorded May 23, 1975 Book 16-P page 1 No. 1676.

Indenture dated 2/23/77 from Richard Reuben, trustee in bankruptcy of Cobuild Co., Inc. (aka West Indies Enterprises, Inc.) c/o Adelman and Lovine, Esqs., Suite 1900, Two Penn Center Plaza, Philadelphia, PA 19120 to IBG Properties, Inc. to First National City Bank, St. Thomas, VI to Parcel 394-A Recorded April 12, 1977 Book 17-V page 125 No. 979.

Quitclaim deed dated July 1, 1977 from **IBG Properties, Inc.**, of P.O. Box 7954, St. Thomas VI, to Joseph F. Sanson of 14 Tracy Way, Cowpet Bay Village, St. Thomas, VI. Recorded July 8, 1977, Book 18-A page 475 No. 2304.

Quitclaim deed dated December 29, 1978 from Joseph Sanson of Box 19, Red Hook Shopping Center, St. Thomas VI to a **Sue Mortimer and her successors** as trustee of the Sue Mortimer Trust U/A/O 7/11/1977 of Vitrac Park, St. Thomas VI recorded 1/5/1979 Book 19-0 page 159 No. 33.

Warranty Deed dated Feb. 11, 1988 from Sue Mortimer, trustee to **Storage Facilities, Inc.**, c/o Island Block Corporation, No. 1 Hasnerks Grade St., St. Thomas VI. Recorded March 2, 1988, Book 31-S page 376 no. 890.

Warranty Deed dated Sept. 14, 1992 from Storage Facilities, Inc. to F.C. Fellowship Church of St. Thomas Inc. of P.O. Box 7158, St. Thomas VI 00801-7158. Recorded Sept. 29, 1992 Book 394 page 405 no. 5116.

4 Winds Plaza

Quitclaim Deed Sept. 12, 1985 from Aux 41 page 164 from Three Two Two Developers, Ltd. to 4 Winds Plaza Partnership of P.O. Box 3692 St. Thomas VI recorded Oct. 8, 1985 Book 27-N page 369 No. 4371.

Quitclaim Deed dated August 15, 1977 from Aux 35 page 83 from Plaza Associates to Three Two Two Developers, Ltd. Recorded August 24, 1977 Book 18E page 95 No. 2884.

Warranty Deed dated 7/17/70 from West Indies Enterprises, Inc. to Kenneth G. Klein recorded 7/21/1970 Book 12-A page 49 No. 5227.

Quitclaim Deed dated April 9, 1974 from Kenneth G. Klein to Antilles International Trust Company, Ltd. of P.O. Box 86 Roadtown Tortola BVI recorded April 30, 1974 Book 15-0 Page 305 No. 1699.

Order confirming sale dated March 13, 1976 Civil No. 488-1973 action to foreclose mortgage action on Notes Court ordered the sale conducted by U.S. Marshal on 2/27/1976 be sold to Richard I. Rubin receiver for Cobuild Companies, Inc. (aka West Indies Enterprises, Inc.) Marshall should make a Marshal's Deed to this property. Recorded June 15, 1976 Book 17-6 Page 44 No. 1535.

Certificate of Sale dated March 13, 1976 from Alfred E. Francis, U.S. Marshal certifying that Richard I. Rubin, receiver for Cobuild Companies, Inc., aka West Indies Enterprises, Inc., has purchases at a sale held on 2/27/76 PcL 392. Recorded 7/13/76, Book 17H Page 165 No. 1723.

Marshal's Deed dated 7/30/76 from Alfred E. Francis as United States marshal for the District Court of the VI to Richard I. Rubin of Cobuild Companies, Inc., aka West Indies Enterprises, Inc. c/o Stuart H. Savett, Esq., 1214 IVB Building, 1700 Market Street, Philadelphia PA. Recorded August 11, 1976. Book 17-I Page 408 No. 2004.

Receiver's Deed dated Nov. 22, 1976 from Richard I. Rubin, as Receiver of Cobuild Companies, Inc., aka West Indies Enterprises, Inc., c/o Stuart H. Savett, 1214 IVB Building, 1700 Market St., Philadelphia PA 19103 to Three Two Two Developers, Ltd. of Suite 875, Frenchmans Reef Hotel, St. Thomas VI. Recorded Nov. 22, 1976 Book 17-N Page 398 No. 3081.

Quitclaim Deed dated 7/5/77 from Three Two Two Developers, Ltd. to Plaza Associates. Recorded July 22, 1977 Book 18-B Page 480 No. 2487.

Quitclaim Deed dated Aug. 5, 1977 from Plaza Associates to Three Two Two Developers, Ltd. Recorded August 24, 1977 Book 18-F Page 95 No. 2884.

Leases:

- | | | |
|-----|----------|--|
| 1. | 5/22/78 | Hamilton Caribbean Assoc., Inc. |
| 2. | 5/22/78 | Army/Navy Surplus |
| 3. | 5/22/78 | Records, Needles & Things |
| 4. | 11/14/78 | VI Furniture Center |
| 5. | 3/6/79 | Bassim Jamal Isis (mini-mall) |
| 6. | 5/10/79 | ITT Financial Corp. |
| 7. | 8/17/79 | Gardner McLaughlin, Inc. |
| 8. | 5/22/78 | Gourmet Gallery, Inc. |
| 9. | 5/22/78 | Pueblo Supermarkets |
| 10. | 10/3/78 | First Penn Bank |
| 11. | 11/30/78 | RC Cobb of The Virgin Islands, Inc. |
| 12. | 5/22/78 | Florida West Amusement (Theater) |
| 13. | 5/22/78 | Pizza Hut |
| 14. | 5/22/78 | Veronica Simmonds (kiosk) |
| 15. | 5/22/78 | West Indies Corporation |
| 16. | 5/22/78 | West Auto Supply Company |
| 17. | 5/22/78 | Kinney Shoe Corp. |
| 18. | 5/18/79 | Leonig David-Island Boutique |
| 19. | 9/18/79 | Cupios Shoe Store |
| 20. | 7/16/79 | Rosevan Fabrics |
| 21. | 8/17/79 | LB Development Company |
| 22. | 3/20/80 | Bachman's Bakery |
| 23. | 3/5/81 | Suboh Saleh and/or Najah Saleh Abjada |
| 24. | 11/1/79 | Dale Bachman |
| 25. | 2/1/82 | Timeout Family Amusement Center of Puerto Rico |
| 26. | 5/3/82 | DNL Boutique |
| 27. | 5/3/82 | West Indian Food Corporation |
| 28. | 7/1/82 | Arthur S. Newton, Third World Electronics |
| 29. | 6/18/82 | People's Fashion |
| 30. | 9/8/82 | Just a Thought Amusements d/b/a Jimbo's |
| 31. | 7/26/83 | Glentronics of St. Thomas, Inc. |
| 32. | 3/1/84 | HB Inc. d/b/a Bachman's Bakery |

Esso, 4 Winds Plaza and Car Wash

Warranty Deed dated Dec. 16, 1968 from West Indies Enterprises, Inc. to Esso Standard Oil Co. (P.R.). Recorded December 23, 1968 Book 10-E Page 265, No. 4497.

Warranty Deed dated 12/18/69 from Esso Standard Oil Company (Puerto Rico) to Esso Standard Oil SA Limited, a Bahama Corp. GPO Box 1930 Santunce PR 00936. Recorded 2/27/1970 Book 11-P Page 195 No. 3200.

Quitclaim Deed dated 1/3/89 from Esso Standard Oil SA Limited to Esso Virgin Islands, Inc., of PO Box 8619 St. Thomas VI. Recorded April 11, 1989 Book 33-W Page 410 No. 1857.

Certificate of Attachment dated 6/16/82 from Dept. of Finance against Esso Standard Oil SA Ltd. for 1980. Taxes \$800.89 recorded Feb. 4, 1985. Lien Book XII Page 475 No. 471.

Lot 7 Rodriguez Auto Parts and Esso

From Aux 4 p.307:

Deed of Gift dated Oct. 31, 1955 from Ludwig Christensen and Eona Christensen, his wife, to William C. Christensen, their son. Recorded Oct. 31, 1955 Book 4I Page 546 No. 868.

Warranty Deed dated July 12, 1963, from William Christensen to Courtland Adkins recorded 7/19/63 Book 6T Page 39 No. 2773.

Warranty Deed dated Nov. 14, 1978 from Courtland Adkins and Martha Adkins, of PO Box 23087 Oakland Park, FL 33307 to Ephraim Adkins and Courtland Adkins. Recorded 1/10/79 Book 19-O Page 311 No. 85.

Warranty Deed dated Nov. 12, 1986 from Ephraim Adkins individually and Ephraim Adkins and Jeffrey A. Adkins trustees to E's and A's Corporation of PO Box 2576, St. Thomas VI. Recorded Dec. 1, 1986 Book 29-L Page 144 No. 6029.

Final Adjudication dated May 3, 1980 Probate No. 8/1980. In the matter of the estate of Courtland Adkins, deceased, as title to Jeffrey A. Adkins and Ephraim Adkins as trustees to one half (1/2) interest. Recorded April 7, 1993 Book 40-Z Page 41 No. 1714.

Certificate of Correct Spelling of Corporate Name dated June 2, 1993 from Rodriguez Auto Parts Inc. to Carl H. and Constance J. Pattison. Recorded June 2, 1993 Book 41-G Page 413 No. 2718.

Consent of Lessons to Assignment of Lease dated Dec. 6, 1982. Recorded Jan. 18, 1983 Book 24-F Page 108 No. 136.

Personal Guaranty of Lease dated 12/22/82. Recorded 1/18/1983 Book 24-F Page 110 No. 136C.

Sublease Agreement dated April 6, 1971 from Carl H. Pattison and Constance H. Pattison to the Shell Company (Puerto Rico) limited to sublease a portion of Pcl. 7 Suite Charlotte Amalie containing 24,148 sq. ft. for **Auto Car Wash** for a term of 5 years commencing 60 days of prior notice to landlord. Subleased to Shell for car wash, subleased from Shell for gas station. Recorded May 28, 1971 Book 12-V Page 205 No. 1593.

Sublease Agreement dated April 6, 1971 from the Shell Company (Puerto Rico) Limited to Carl H. Pattison and Constance J. Pattison of St. Thomas to sublease portion of Pcl. 7 Charlotte Amalie for period of 5 years. Recorded May 28, 1971 Book 12-V page 210 No. 1594.

OLD TUTU WWTP

From Aux. 18 Page 238.

8/23/1967 Warranty Deed from Sidney Kesler Agent for the Stockholders of St. Thomas Real Estate Corporation to the Government of the Virgin Islands. Recorded October 9, 1967 Book 9-B Page 315, No. 4251.

Parcel 2 KRONP IV page 52

Subdivided:

Parcel No. 2-4 to Versailles Associates 0.844 acres.

From page 53, same book:

Warranty Deed dated 12/22/83 from Amalia Mylner, D8 PO Box 941, St. Thomas VI to Versailles Associates of PO Box 3678, St. Thomas VI. Recorded 1/10/84. Book 25-I page 369 No. 92.

Warranty Deed dated 4/26/93 from Versailles Associates to Winsor E. Daniel and Juell D. Daniel of PO Box 9496, St. Thomas VI 00801. Recorded May 24, 1993, Book 41-F page 100 No. 2486.

Contract of Sale dated 4/1/87 from Versailles Associates to Winsor Daniel, recorded 5/5/87, Book 30-H page 236 No. 2225.

Parcel No. 2-1, 2-2, 2-3, 2-5, and 2-6 to B. Read Miller and Nancy N. Miller to page 205.

From KRONP IV:205:

Warranty deed dated 4/19/88 from Amalia Mylner to B. Read Miller and Nancy Miller of Buccaneer Mall No. 33, St. Thomas VI 00802. Recorded 8/19/92, Book 39-R page 379 No. 4363.

Insert diagram of "Frank's best guess at sanitary sewer flow around the curriculum center"

Lessors Estoppel Certificate dated 3/2/81 between Arthur L. Witty and Donald McCarthy d/b/a "Mainland Appliances" on portions located at Pcls 2-1,2-2, and 2-3 Est. Charlotte Amalie. Recorded April 1, 1981. Book 22-h page 160 No. 1175.

Consent to Assignment of Lease dated 3/2/81 between Arthur L. Witty and Donald McCarthy d/b/a "Mainland Appliances" and the Chase Manhattan Bank. Recorded 4/1/81 Book 22-H page 162 No. 1176.

Assignment of Lease dated April 1, 1981 by Donald McCarthy to the Chase Manhattan Bank on Pcls 2-1, 2-2, and 2-3 Est. Charlotte Amalie. Recorded April 1, 1981 Book 22-H page 164 No. 1179.

Supplemental Assignment of Lease dated 7/6/82 between Donald McCarthy, d/b/a "Mainland Appliances" and the Chase Manhattan Bank for an additional \$90,000 recorded 7/6/82 Book 23-S page 325 No. 2217.

Acknowledgement of First Priority Leasehold Mortgage dated Aug. 4, 1982 between Versailles Associates and Arthur Witty on behalf of Arthur Witty Fort Mylner Shopping Center. Recorded Aug. 6, 1982 Book 23-U page 368 No. 2827.

IV Page 205

Quitclaim Deed dated 7/20/92 from B. Read Miller and Nancy N. Miller to Miller Properties, Inc. of Buccaneer Mall No. 33 St. Thomas VI 00802 Recorded 8/19/92 Book 39R page 479 No. 4363.

Assignment of Rents and Leases dated 4/1/93 from Miller Properties, Inc. to the Bank of Nova Scotia. Recorded 4/1/93 Book 40-Y page 206 No. 1629.

*Parcel No. 2-7 to Miller Properties, Inc. to Aux 48 page 103.

Warranty Deed dated 7/10/92 from Amalia Mylner to Miller Properties, Inc. of Buccaneer Mall No. 33, St. Thomas USVI 00802. Recorded Aug. 3, 1992 Book 39-P page 87 No. 4081.

KFC from: KRONP III - page 771

Deed dated 4/4/38 from V.A. Christensen and Ludvig Christensen and V.A. Miller to Svend Aage Mylner. Recorded 4/6/38 Book 3V No. 292 page 319.

Deed dated May 29, 1971 from Svend Aage Mylner to Amalia Mylner, an individual, 1/2 interest in said property. Recorded 12/13/71 Book 13-F page 169 No. 4146.

Lease dated 9/27/62 between Svend and Amalia Mylner and Arthur L. Witty leasing 1.69 acres of a portion of Pcl. 2-1 est. Charlotte Amalia for 10 yrs. Recorded Oct. 12, 1962, Book 6-K page 344 No. 2157.

Lease dated 1/26/63 from Arthur L. Witty to Island Drug and Gift Shop, Inc. leasing Parcel 2-1-B, an area of 6,220 sq. ft. for a term of 9 yrs 7 months commencing 3/1/63 recorded 2/13/63 Book 6N page 267 No. 573.

Lease dated 4/23/63 from Arthur L. Witty to Carib. Gas Corporation on Pcl. 2-1-C for a term of 10 years \$200/mo. Recorded 4/30/63 Book 6Q page 123 No. 3020.

Lease dated 4/17/64 from Arthur L. Witty to Robert Heggie and Jack Lachelle on Parcel 2-1-B comprising 6,200 sq. ft. for a term beginning May 1, 1964 to Oct. 31, 1972. Recorded April 29, 1964 Book 7C Page 386 No. 1617.

Lease dated 9/1/66 between Arthur L. Witty Fort Mylner Shopping Center and the Virgin Islands National Bank to lease portion of Bay No. 1 at the Northerly End of Fort Mylner located on Pcl. 2-1-C Est. Charlotte Amalie for a period of 10 years. Recorded 9/16/66 Book 8L page 346 No. 3988.

Amended lease dated 9/1/65 between Svend and Amalia Mylner and Arthur L. Witty to lease Pcl. 2-1 and 2-2 est. Charlotte Amalie, comprising 2,113 acres for a term expiring 12/31/90. Recorded 9/16/66. Book 8L page 354 No. 3989.

Release dated (no date) from Arthur L. Witty giving government permission to construct culvert and public road. Recorded November 12, 1970. Easement Book II page 159 No. 6597 on Parcel 2-1-B.

Sublease dated April 17, 1973 from Christina Fuentes to Jose Santos Acosta to a room in Bay No. 9-C within the Fort Mylner Shopping Center located at Parcel 2-1-C for a term of 12 months. Recorded June 4, 1973 Book 14-P page 277 No. 2549.

Certificate of limited partnership dated April 23, 1971 Arthur Witty Fort Mylner Shopping Center. Recorded June 18, 1971 Book 12-V page 54 No. 1736.

Amendment to amended lease (Item G) dated Nov. 20, 1980 between Amalia Mylner of Box 941, St. Thomas VI and Arthur L. Witty of Box 358, St. Thomas, VI to Extend Lease for an additional 5 years through 12/31/95. Recorded November 20, 1980 Book 21-X page 48 No. 4334.

Contract of sale dated 11/20/80 from Amalia Mylner of Box 941, St. Thomas, USVI to Arthur L. Witty of Box 358, St. Thomas, USVI to sell a strip of Parcel 2 Charlotte Amalie. Recorded November 20, 1980. Book 21-X page 45 No. 4333.

Lease dated May 19, 1975 between Arthur L. Witty and Donald McCarthy d/b/a Mainland Appliances on premises located at Parcels 2-1, 2-2, and 2-3 Estate Charlotte Amalie #3 New Qtr. Recorded April 1, 1981 Book 22-14 page 146 No. 1174.

Parcel 2 KRONP IV - page 52

Subdivided:

Parcel No. 2-4 to Versailles Associates 0.844 acres.

From page 53 same book:

Warranty deed dated 12/22/83 from Amalia Mylner D8, P.O. Box 941, St. Thomas, VI to Versailles Associates of P.O. Box 3678, St. Thomas, VI. Recorded 1/10/84. Book 25-I page 369 No. 92.

Warranty deed dated 4/26/93 from Versailles Associates to Winsor E. Daniel and Juell D. Daniel of P.O. Box 9496, St. Thomas, VI 00802. Recorded May 24, 1993 Book 41-F page 100 No. 2486.

Contract of sale dated 4/1/87 from Versailles Associates to Winsor Daniel recorded 5/5/87 Book 30-H page 236 No. 2225.

Parcel no. 2-1, 2-2, 2-3, 2-5, and 2-6 to B. Read Miller and Nancy N. Miller to page 205.

From Kronp IV - 205:

Warranty deed dated 4/19/88 from Amalia Mylner to B. Read Miller and Nancy Miller of Buccaneer Mall No. 33, St. Thomas, VI 00802. Recorded 8/19/92 Book 39-R page 479 No. 4363.

Lessors Estoppel Certificate dated 3/2/81 between Arthur L. Witty and Donald McCarthy d/b/a "Mainland Appliances" on portions located at Parcels 2-1, 2-2, and 2-3 Est. Charlotte Amalie. Recorded April 1, 1981. Book 22-H page 160 No. 1175.

Consent to Assignment of Lease dated 3/2/81 between Arthur L. Witty and Donald McCarthy d/b/a "Mainland Appliances" and the Chase Manhattan Bank. Recorded 4/1/81 Book 22-H page 162 No. 1176.

Assignment of Lease dated April 1, 1981 by Donald McCarthy to the Chase Manhattan Bank on Parcels 2-1, 2-2, and 2-3 Est. Charlotte Amalie. Recorded April 1, 1981 Book 22-H page 164 No. 1179.

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Acknowledgement of First Priority Leasehold Mortgage dated August 4, 1982 between Versailles Associates and Arthur Witty on behalf of Arthur Witty Fort Mylner Shopping Center. Recorded Aug. 6, 1982 Book 23-U page 368 No. 2827.

Quitclaim deed dated 7/20/92 from B. Read Miller and Nancy N. Miller to Miller Properties Inc. of Buccaneer Mall No. 33, St. Thomas, VI 00802. Recorded 8/19/92 Book 39 R page 479 No. 4363.

Assignment of Rents and Leases dated 4/1/93 from Miller Properties Inc. to the Bank of Nova Scotia. Recorded 4/1/93 Book 40-Y page 206 No. 1629.

*Parcel No. 2-7 to Miller Properties, Inc. to Aux. 48 page 103.

Warranty deed dated 7/10/92 from Amalia Mylner to Miller Properties, Inc. of Buccaneer Mall No. 33, St. Thomas, VI 00802. Recorded August 3, 1992 Book B9-P page 87 No. 4081.

Harthman Estate

Deed dated 2/15/43 from Viggo Christiansen to Sammy Harthman and Louis Lindquist. Recorded 4/1/43 Book 3W page 912 No. 55.

Deed dated 3/18/46 from Louis Lindquist to Sammy Harthman on Grantors Interest in Est. Charlotte Amalie. Recorded May 14, 1946 Book 3X page 912 No. 206.

Final Adjudication dated 11/12/85 Probate No. 13/1983 in the matter of the Estate of Sammy Emanuel Harthman as title to Rhoda J. Harthman, 1/3 interest in a 1/9 interest to each of the following: Edgar A. Harthman, Arthur E. Harthman, Albert E. Harthman, Sammy E. Harthman, Jr., Austin E. Harthman and Charlotte A. LaBarre nee Harthman. Recorded Nov. 20, 1985 Book 27-R page 69 No. 5082.

Indenture dated May 16, 1975 from Richard Reubin, Receiver of Cobuild Co. Inc. a/k/a West Indies Enterprises, Inc., to IBG Properties Inc., c/o First National City Bank, St. Thomas, VI to parcel 394, 148-99, 100, 101, 102, and parcel no. 215 Annas Retreat. Recorded May 23, 1975 Book 16-P page 1 No. 1676.

Indenture dated 2/23/77 from Richard Reuben, Trustee in Bankruptcy of Cobuild Co., Inc. a/k/a West Indies Enterprises Inc. c/o Adelman & Lovine, Esquires, Suite 1900, Two Penn Center Plaza, Philadelphia, PA 19120 to IBG Properties, Inc. to First National City Bank, St. Thomas, VI to parcel 394-A. Recorded April 12, 1977 Book 17-V page 125 No. 979.

New Tutu WWTP

Aux. 18, Page 238

Warrenty deed dated August 23, 1967 from Sidney Kessler, Agent for the Stockholders of St. Thomas Real Estate Corporation to the Government of the Virgin Islands. Recorded October 9, 1967. Book 8-B, pg. 315. No4251

Appendix C Degradation of Chlorinated Compounds

C.1 Degradation Pathway for Tetrachloroethene (PCE)

Tetrachloroethene (PCE) can undergo reductive dehalogenation mediated by microorganisms in strongly reducing ground water (4). The breakdown products are trichloroethane (TCE), dichloroethene (DCE), and vinyl chloride, as shown in Figure C-1. The presence of toluene in anaerobic environments (e.g., such as in the Esso and Texaco septic pits) has been found to stimulate the reductive dechlorination of PCE (6). This suggests that at sites contaminated by gasoline, the transformation of PCE would be enhanced.

Under aerobic conditions and less reducing (denitrifying) conditions, PCE tends to persist (4). The abiotic degradation of PCE also occurs very slowly. The compound is not easily hydrolyzed; volatilization is a more important loss process for shallow surface waters (1,2,3).

Trichloroethene can be reduced to dichloroethene, which itself may be subsequently reduced to vinyl chloride or transformed to chloroethane (4,5). Because the ease (and speed) with which these reductions occur is proportional to the number of chlorine atoms in the molecule, stronger reducing conditions are required to reduce TCE than to reduce PCE, and even more strongly reducing conditions are required to reduce DCE than TCE (5).

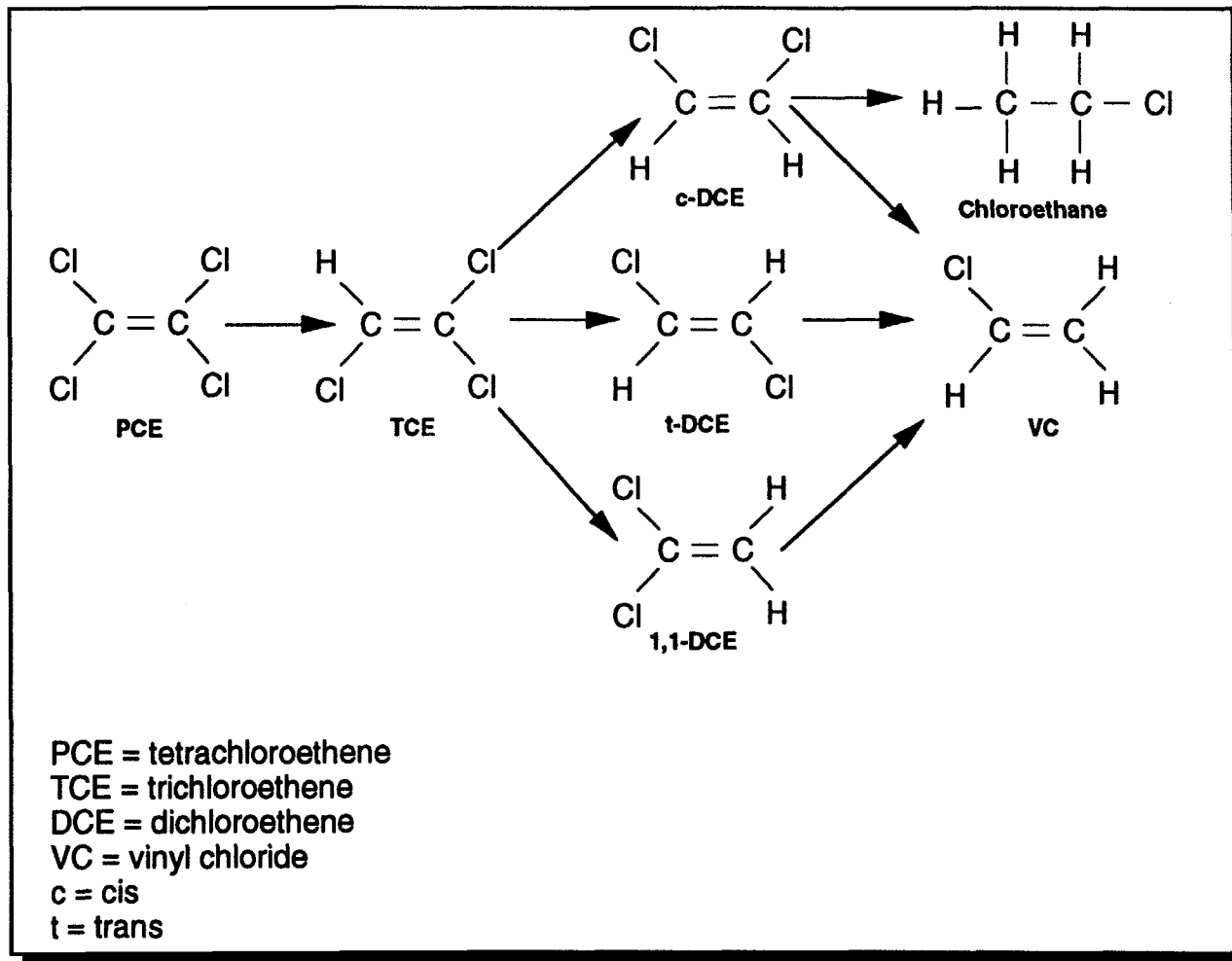
Under highly reducing (methanogenic) conditions in laboratory scale experiments, vinyl chloride has been observed to degrade relatively rapidly--100% removal within 11 weeks in the presence of sand (4). It has been suggested that vinyl chloride may be mineralized to carbon dioxide under anaerobic conditions (13). Because water would serve as the source of oxygen for carbon dioxide, molecular oxygen would not be necessary for the reaction to occur.

Another study (15) found that the addition of nutrients, such as methane, methanol, ammonium phosphate and phenol, was necessary for vinyl chloride to be degraded under anaerobic conditions. After five months 89% of the vinyl chloride had been degraded in samples to which nutrients had been added, while in samples without the addition of nutrients, vinyl chloride was found to be resistant to transformation. Methane and ethylene were the main products of vinyl chloride degradation. Carbon dioxide was observed only when oxygen-containing nutrients were added.

Studies examining the biodegradation of radio-labelled vinyl chloride under aerobic conditions in a shallow aquifer indicated rapid degradation (14). After 108 days, more than 99% was degraded, and approximately 65% of the labelled carbon was mineralized to carbon dioxide (14).

The presence of compounds that are formed from the breakdown of PCE under certain conditions *does not mean* that PCE is the source. The same compounds may

Figure 1. Tetrachloroethene (PCE) Degradation Pathway



Sources: Vogel *et al.*, 1987(5); Barrio-Lage *et al.*, 1986(10).

have been introduced into the environment directly, or they may have been formed through the degradation of other chlorinated organic compounds (e.g., TCA), as shown by the alternate routes to PCE degradation products in Figure C-2 or introduced into the ground directly. Hexachloroethane is readily reduced to PCE (5), and because hexachloroethane is a stronger electron acceptor than oxygen, its reduction is favored even under aerobic conditions. Thus PCE could be the second rather than the first step in the reaction sequence described above.

There seems to be no evidence that trichloroethane (TCA) is a degradation product of PCE, although it may be formed through the stepwise hydrogenolysis of hexachloroethane to pentachloroethane, tetrachloroethane, and then trichloroethane (5). A number of the compounds identified as products in the breakdown chain of PCE, such as 1,1-DCE, vinyl chloride, and chloroethane can also result from TCA degradation (5). TCA is *not* a chemical suspected of being used at the LAGA textile operation but was present in Texaco and Esso waste oils.

The conditions present in the aquifer do not favor the transformation of the PCE to the observed degradation products (see section below). The aquifer conditions indicate that the vehicle maintenance stations are a more likely source of the DCE, VCE and TCE observed in the aquifer due to the stations' use of septic systems produce anaerobic conditions more favorable to the reduction of chlorinated organic compounds to the observed compounds. The stations are sources of toluene contamination in the aquifer-through codisposal with solvents and leaking gasoline tanks. As noted above, PCE degradation is enhanced in the presence of toluene (6).

It is also apparent that the TCE, VCE and DCE found in ground water are not necessarily formed by PCE degradation as mistakenly indicated in Technical Memorandum II by Geraghty & Miller, Inc. In fact, TCE is a common solvent reported as present in many of the facility CERCLA 104(e) notifications.

C.2 Chlorinated Organic Compounds in Wastewater Treatment Plant Effluents

Chlorinated organic compounds are found in the effluents of wastewater treatment plants for two reasons. These compounds are often present in the influent of the plants and are not completely removed by the treatment process. They are also formed through the disinfection of the plant's effluent with chlorine.

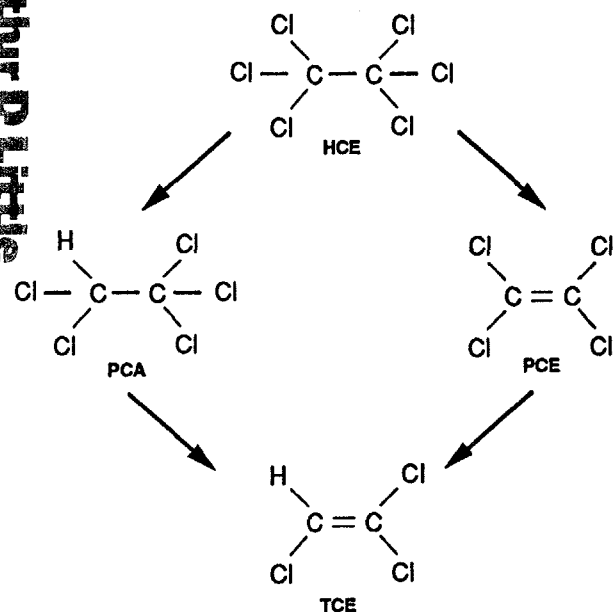
The table below summarizes the results of a survey of the concentrations of chlorinated organic compounds in the effluents of 40 U.S. municipal waste water treatment plants. The data are for pollutants that were detected in at least 10 percent of the 302 samples analyzed.

TUT 006 2012

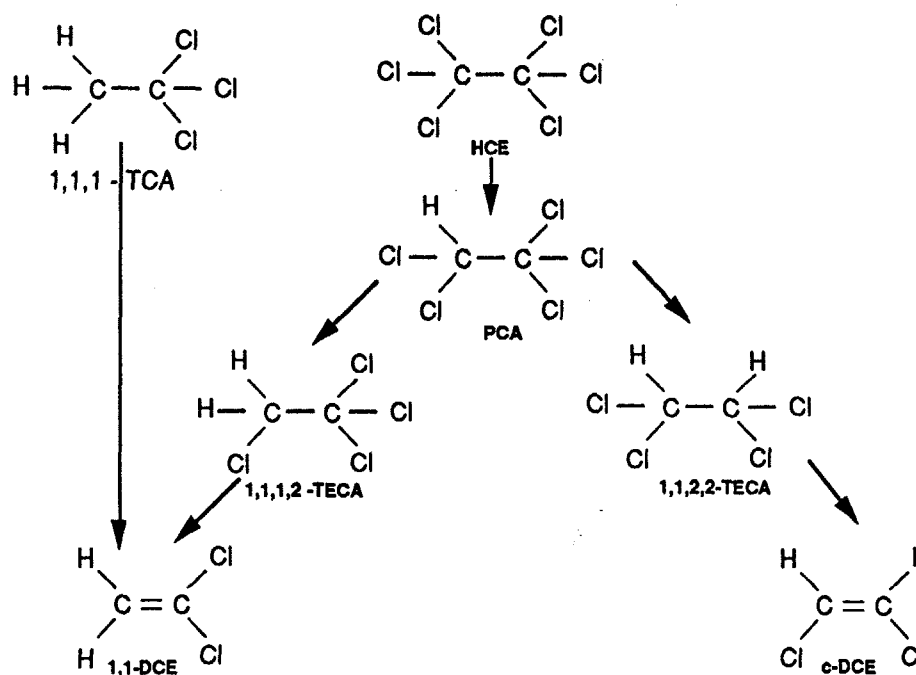
Figure 2: Alternate Routes to PCE Degradation Products

Arthur D Little

a. TCE from HCE



b. DCE from HCE or TCA



Sources: Vogel et al, 1987 (5) and Barrio Lage et al, 1986 (10)

Note: Final degradation products may be formed from any compound along the degradation pathway.

HCE = hexachloroethane
PCA = pentachloroethane
TECA = tetrachloroethane
TCA = trichloroethane
DCA = dichloroethane

CA = chloroethane
PCE = tetrachloroethene (perchloroethylene)
TCE = trichloroethene
DC = dichloroethene
VC = vinyl chloride
C = CIS

Arthur D. Little



Compound	Percent of Samples with Detectable Concentrations	Maximum Concentration ug/l
Methylene Chloride	86	62,000
Chloroform	87	87
Tetrachloroethene (PCE)	79	1,200
1,1,1-Trichloroethane (TCA)	52	3,500
Trichloroethene (TCE)	45	230
trans-1,2-Dichloroethene (DCE)	39	17
1,1-Dichloroethene (DCE)	29	11

Source: Mills et al., 1985 (7).

The reaction of free chlorine with humic substances in drinking water and wastewater leads to the formation of trihalomethanes (THM), such as chloroform, and small quantities of hexachloroethane (HCE)(3,8). The rate (and generally the extent) of THM formation increases with temperature, Ph, and the concentration of organic precursors (8). Free chlorine is necessary for the formation of THMs, but free chlorine residuals in excess of the chlorine demand have little effect in increasing the rate of THM formation (8). Because the precursors of THM formation (humic materials) are naturally occurring and not industrial pollutants, the presence or absence of industrial dischargers to the sewage treatment plant does not affect THM formation (8).

As noted above, hexachlorethane (HCE) is readily reduced to PCE. This transformation can occur under any environmental conditions including aerobic conditions (5,9). The reduction of HCE to PCE has been observed in the field--in aerobic ground water (9).

References

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3. Howard, P.H. 1989. Handbook of Environmental Fate and Exposure Data. Lewis Publishers, Chelsea Michigan.
4. Barber, L.E. et al., 1988. Long term fate of organic micropollutants in sewage-contaminated ground water. Environmental Science and Technology 22:205-211.

5. Vogel, T.M., C.S. Criddle, and P.M. McCarty, 1987. Transformation of halogenated aliphatic compounds. *Environmental Science and Technology* 21:722-736.
6. Sewell, G.W. and S.A. Gibson, 1991. Stimulation of the reductive dechlorination of tetrachloroethylene in anaerobic aquifer microcosms by the addition of toluene. *Environmental Science and Technology* 25:982-984.
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10. Barrio-Lage G. et al., 1986. Sequential Dehalogenation of Chlorinated Ethenes. *Environmental Science and Technology* 20:96-99.
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16. Meyer, E., 1993. Expert Report.

Tutu May/June/July 1994 Sampling Results												
Compound	Concentrations in ppb		OHMW-3	OHMW-2	OHMW-4	Harvey*	Tillett	Ramsay	MW-3	MW-4	MW-4D	MW-16
	Eglin I	Eglin III										
	5/19/94	5/18/94	5/24/94	5/24/94	5/24/94	7/27/94	5/25/94	5/26/94	6/14/94	6/13/94	6/13/94	6/10/94
PCE	10	31	6 J	26	140	100	180	11	56	20 J	17 J	71 J
TCE	3 J	12	3 J	5 J	16	13	45	0 U	17 J	6 J	4 J	72 J
DCE	2 J	31	8 J	9 J	23	21	360 D	0 U	440 D	76 J	64 J	2100
VC	0 U	0 U	0 U	0 U	0 U	0 U	0	0 U	48	0 UJ	0 UJ	1300
J = estimated value												
U = not detected at 10 ppb, non-detects are taken as zero												
D = concentration determined at a secondary dilution factor												
* results not validated												
Compound	concentration in umol/l											
PCE	0.0602954	0.186916	0.0361773	0.1567682	0.8441363	0.6029545	1.085318	0.066325	0.337655	0.120591	0.102502	0.428098
TCE	0.0228328	0.091331	0.0228328	0.0380546	0.1217749	0.0989421	0.342492	0	0.129386	0.045666	0.030444	0.547987
DCE	0.0206292	0.319752	0.0825168	0.0928314	0.2372357	0.2166065	3.713254	0	4.538422	0.783909	0.860134	21.66065
VC	0	0	0	0	0	0	0	0	0.768	0	0	20.8
total	0.1037574	0.597999	0.1415268	0.2876542	1.2031468	0.9185031	5.141064	0.066325	5.773462	0.950166	0.79308	43.43673
Compound	mole fraction of total chlorinated ethenes											
PCE	0.58	0.31	0.26	0.54	0.70	0.66	0.21	1.00	0.06	0.13	0.13	0.01
TCE	0.22	0.15	0.16	0.13	0.10	0.11	0.07	0.00	0.02	0.05	0.04	0.01
DCE	0.20	0.53	0.58	0.32	0.20	0.24	0.72	0.00	0.79	0.83	0.83	0.50
VC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.48

IN THE DISTRICT COURT OF THE VIRGIN ISLANDS
DIVISION OF ST. THOMAS AND ST. JOHN

IN RE:
TUTU WELLS CONTAMINATION LITIGATION

: MASTER DOCKET FILE
: NO. 1989-107

RHODA J. HARTHMAN, ET AL.,

Plaintiffs,

v.

TEXACO, INC., ET AL.,

: CIVIL NO. 89-220

Defendants.

ESSO STANDARD OIL, S.A., LTD., ET AL.

Third-Party Plaintiffs,

v.

LAGA INDUSTRIES, LTD., ET AL.,

Third-Party Defendants.

FOUR WINDS PARTNERSHIP,

Plaintiff,

: CIVIL NO. 89-224

v.

TEXACO CARIBBEAN, INC., ET AL.,

Defendants.

ESSO STANDARD OIL, S.A., LTD.,

Counter-claimant and
Third-Party Plaintiff,

v.

LAGA INDUSTRIES, LTD., ET AL.,

Third-Party Defendants.

ORDER
RE: CONTEMPT AND SANCTIONS MOTIONS

Brotman, J.

March 20, 1995

AND NOW in accordance with the reasons set forth in the court's Memorandum Opinion dated this date and filed herewith,

IT IS HEREBY ORDERED, ADJUDGED AND DECREED THAT pursuant to Rules 11, 16 and 37 of the FED. R. Civ. P. and the court's inherent power, sanctions are warranted against the Esso Defendants, ESSOSA, ESSORICO and ESSOVI, and the law firm of Goldman Antonetti Cordova & Axtmayer, and Francis Torres, Esq., Eugenio Romero, Esq., and Jose A. Cepeda, Esq., for the discovery violations found in this proceeding; and

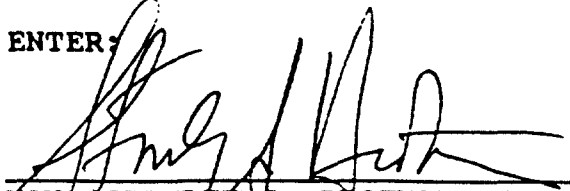
IT IS FURTHER ORDERED that a hearing be scheduled on June 26, 1995 at 10:00 a.m. at the District Court of the Virgin Islands, St. Thomas, for a determination as to the nature and extent of sanctions warranted by Respondents' misconduct; and

IT IS FURTHER ORDERED that the Esso Defendants and their former counsel are hereby given the opportunity to negotiate with the Movants, prior to the hearing date, a mutual resolution of the monetary claims only; and

IT IS FURTHER ORDERED that the court will also make a final determination on Movants' equitable claims for sanctions, i.e., dismissal of claims, and disciplinary action against the attorneys, after the June 26, 1995 hearing.

IT IS SO ORDERED.

ENTER:



HON. STANLEY S. BROTMAN, USDJ
(Sitting by Designation)

Dated: March 20, 1995

A T T E S T:
ORINN F. ARNOLD
Clerk of the Court

BY: Frank Blackman
Deputy Clerk

cc: All counsel

. FOR PUBLICATION:

IN THE DISTRICT COURT OF THE VIRGIN ISLANDS
DIVISION OF ST. THOMAS AND ST. JOHN

IN RE:
TUTU WELLS CONTAMINATION LITIGATION

: MASTER DOCKET FILE
: NO. 1989-107

RHODA J. HARTHMAN, ET AL.,

Plaintiffs,

: MEMORANDUM AND OPINION
: RE: CONTEMPT AND
: SANCTIONS MOTIONS

v.

TEXACO, INC., ET AL.,

: CIVIL NO. 89-220

Defendants.

ESSO STANDARD OIL, S.A., LTD., ET AL.

Third-Party Plaintiffs,

v.

LAGA INDUSTRIES, LTD., ET AL.,

Third-Party Defendants.

FOUR WINDS PARTNERSHIP,

Plaintiff,

: CIVIL NO. 89-224

v.

TEXACO CARIBBEAN, INC., ET AL.,

Defendants.

ESSO STANDARD OIL, S.A., LTD.,

Counter-claimant and
Third-Party Plaintiff,

v.

LAGA INDUSTRIES, LTD., ET AL.,

Third-Party Defendants.

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Texaco Caribbean, Inc.

**In Re Tutu Water Wells Contamination Litigation
Master Docket No. 1989-107; Civil Nos. 1989-220 & 1989-224
Memorandum Opinion and Findings on Contempt and Sanctions Motion
Brotman, J.**

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Brotman, J.

March 20, 1995

MEMORANDUM OPINION AND ORDER

Pending before this court are several motions requesting sanctions, including monetary awards, dismissal of counter-claims and cross-claims, and other relief because of various acts of alleged discovery misconduct among the Esso Defendants and their counsel.

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I. THE JANUARY 15, 1993 ORDER

The first series of motions for sanctions, relating to failure of the Esso Defendants to obey a discovery Order of the Magistrate, were submitted to the Honorable Geoffrey Barnard, United States Magistrate Judge (hereinafter "Magistrate"), for Report and Recommendation pursuant to 28 U.S.C. § 636 (b) (1). The Magistrate found sanctions to be warranted, and acknowledged his dismay that the discovery did not proceed according to his Order of January 15, 1993. The Magistrate concluded that "while testimony was presented by the plaintiff which could be construed to suggest that counsel [for the Esso interests] obstructed the investigation, . . . their efforts, if anything, were out of zealous defense of their clients and not willful, malicious, or contumacious disregard of the court." (Emphasis added.) Though no objections to the Magistrate's factual findings were filed, several parties filed objections to the Magistrate's conclusion that the actions taken by Counsel for Esso were not willful, and in bad faith, but merely out of "zealous defense." For the following reasons, this court disagrees with the Magistrate's characterization of the conduct of former counsel for the Esso Defendants, and finds that the failure to obey the mandate of the Order and permit discovery was willful and in bad faith.

On January 15, 1993, the Magistrate entered an Order in

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these consolidated cases regarding the site assessment and inspection of a certain Esso Virgin Islands, Inc., property on St. Thomas, the Esso Tutu Service Station ("ETSS"), one alleged source of the contaminants found on the Plaintiffs' properties. As the Magistrate noted in his Report and Recommendation, "[t]he Order entered by the court was the culmination of months of discussion, planning, and hearings on this topic the site assessment and inspection."¹ R&R at p.3.

The parties' awareness and knowledge of the importance of the inspection that was the subject matter of the January 15, 1993 Order is well-documented and is noted by the Magistrate in his Report and Recommendation. Indeed, Plaintiff Four Winds avers in its February 5, 1993 "Motion for An Order of Contempt, Dismissal of the ESSOVI Counterclaim and Affirmative Defenses and Other Sanctions," that "the proposed Order had been published to all counsel on December 1, 1992, and that ESSOVI had raised no

¹ Specifically, as noted in the R&R, "[t]he inspection particularly related to what has been characterized as an anomaly revealed by ground penetrating radar and magnetometer surveys previously conducted, as well as pipe tracing to determine the routing and discharge points of various underground piping systems relating to storage tanks, drains and the oil/water separators at the defendant's service station." R&R at p. 3.

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objection."² Four Winds Motion For An Order of Contempt, Dismissal of the ESSOVI Counterclaim and Affirmative Defenses and Other Sanctions, at p. 5. Moreover, the scope of the investigation was one of three topics discussed during a hearing before the Magistrate on January 13, 1993.

It is apparent from a review of the transcript of the January 13, 1993 hearing that the Magistrate intended that the inspection was to be conducted in good faith (1) to determine to a degree of certainty the presence or absence of an anomaly; and (2) to perform pipe tracing to locate and investigate the ingress and egress pipes from the oil/water separator at ETSS. The Order entered by the Magistrate two days later on January 15, 1993 made clear that the investigation was not to be concluded until evidence was obtained to make it known to a scientific certainty what was underground at the Esso Tutu site. Nonetheless, despite the existence of the site assessment agreement to which counsel for the Esso entities were signatories;³ and despite the

² Though no objection was filed to the proposed order submitted on December 1, 1992, Warren B. Cole, on behalf of ESSOVI, circulated his own draft order on December 30, 1992.

³ The Stipulated Order Regarding Inspection of Real Property [the "Site Assessment Agreement"] was entered into by the parties on June 28, 1992. On July 2, 1992, Esso made a request for inspection of the Four Winds Property, which tracked the language

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of the Site Assessment Agreement paragraph for paragraph. On August 6, 1992, the inspection of the Four Winds Property proceeded.

In contrast, Plaintiff Four Winds' July 2, 1992 request for inspection of the Esso property, which also tracked the language of the agreement, was stalled by motions for extension of time, objections, and nonfeasance. Plaintiff Four Winds states that Esso responded to its request by first demanding an extension of time to respond beyond the five days set by the Site assessment agreement. Esso's response, in a letter dated August 7, 1992, included a censorious but meritorious objection to the site inspection dates; an insupportable objection to any "excavation" as overly intrusive; and a statement of intent to conduct its own testing sufficient to satisfy Plaintiff Four Winds' request. Two months later, in response to a letter from counsel for the Harthman plaintiffs regarding the inspection, Esso reiterated its intent to do its own testing and/or excavation necessary to "cover the scope of all aspects described in Four Winds' Request For Inspection." In a letter dated October 15, 1992, Four Winds objected to this statement of intent and asserted its right to conduct an inspection as provided for under the Federal Rules.

On November 4, 1992, four months and two days after propounding its Request for Inspection, and almost three months after it had permitted inspection of its property, Four Winds filed a motion to compel inspection. A hearing on this matter was held on November 19, 1992. Subsequent to that hearing, the Magistrate granted Esso its request to dictate the method and equipment to be used in the site assessment and the qualifications of the personnel who were to conduct the testing. However, the Magistrate's Order contained the proviso that testing was to be conducted in such a manner as to elicit the information requested by Plaintiff Four Winds.

On November 30, 1992, counsel for Esso served notice of its intent to conduct site inspection. This time the dates chosen for the site assessment conflicted with Plaintiffs' deposition schedule set by the Case Management Order. The PID/Harthman Plaintiffs reminded Esso of the conflict. Counsel for Esso allegedly refused to reschedule the site inspection. Counsel for the Harthman Plaintiffs was forced to file a motion for a protective order in which Plaintiff Four Winds joined. An emergency conference with the Magistrate was sought and granted. However, one hour before the scheduled emergency conference, counsel for Esso agreed "to set aside the inspection."

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circulation of the proposed Order on the investigation of the Esso service station site, and despite the January 13, 1993 hearing, counsel for Esso, further delayed the proposed site inspection by requesting a hearing before the Magistrate to clarify the scope of the investigation to be conducted.

The Magistrate held a telephone conference on January 19, 1993, the eve of the scheduled inspection. Despite another round of exhortations of Counsel for Esso, the Magistrate was not moved to stay the scheduled investigation of the ETSS Site. Indeed, the Magistrate reiterated several times during the January 19, 1993 teleconference, that the anomaly investigation and site assessment, including excavation and trenching if necessary, were to be conducted according to the unequivocal terms of the January 15, 1993 Order.

Notwithstanding this clear mandate as to the scope of the investigation to be conducted, counsel for Esso aborted the investigation after a show at compliance, and before any meaningful evidence could be obtained. First, Esso began the

A proposed Order, incorporating Esso's objections, was submitted on December 1, 1992 by Plaintiff Four Winds, and circulated among the parties. No objection was made to that proposed Order. Esso, however, filed a proposed Order of its own on December 30, 1992. Subsequent to yet another hearing on the matter, the Magistrate entered the Order, as submitted by Plaintiff Four Winds, on January 15, 1993.

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inspection hours after it was scheduled to commence. Experts brought to the site inspection by the parties at great expense were kept idle waiting for the Esso contingency to conduct the inspection. Second, Esso failed to have available the basic tools and equipment necessary to complete the exploratory phase of the inspection. Third, Esso failed to have a backhoe or other appropriate equipment on standby to commence trenching once the exploratory or non-invasive phase of the inspection had been attempted and had proved inadequate. This disregard of the Magistrate's clear mandate occurred despite the representation at the hearing on January 13, 1993, of Attorney Romero, counsel for Esso, that the equipment to carry out the investigation was on its way and would be on hand on January 20, 1993. Finally, Counsel for Esso failed to share with other parties' representatives and their experts the results of field-test it conducted.

On January 21, 1993, the pipe tracing segment of the investigation was commenced. Though what has been described as a "dark viscous material" was obtained from piping connected to the oil/water separator, samples were not taken and preserved. R&R at p. 4. The Magistrate determined in the Report and Recommendation that "[o]n balance the pipe tracing phase of the investigation was so wholly inadequate as to be completely

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worthless in accurately determining the architecture of the underground piping." R&R at p. 5.

Esso's unilateral decision to abort the investigation of its Tutu site generated several motions for contempt, including Plaintiff Four Winds' Motion for an Order of Contempt, Dismissal of ESSOVI's Counterclaim and Affirmative Defenses and Other Sanctions filed on February 5, 1993 ("Four Winds February 5, 1993 Motion for Sanctions"). Discovery again became mired in delays. Beginning on April 23, 1993, and continuing on April 26, April 28, and June 3, 1993, the Magistrate conducted fact-finding hearings on the motions for contempt and/or sanctions with respect to the January 20 & 21, 1993 investigation of the ETSS Site.

On July 16, 1993, a status conference was held before Magistrate Judge Barnard and me. It was not until November 9, 1993 that inspection of the Esso site commenced, after this Court issued a strong reprimand to current counsel to Esso that the discovery must proceed forthwith. No additional clarification from the court as to the scope of its Order was necessary.

It is obvious that former counsel for the Esso Defendants never needed additional clarification of the Magistrate's initial Order, but engaged in dilatory tactics calculated to burden and frustrate the opposition in this

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litigation. To excuse the flagrant abuse of the Rules of Federal Procedure to secure delay after delay in an attempt to exhaust the opponent as "zealous advocacy" is to encourage the parties in this case and parties in other cases in this jurisdiction to flout the discovery orders of the court. Failure to comply with the rules governing discovery and Orders of the court with respect to discovery often results in interminable delays, multiplying greatly the costs of litigation. This is such a case.

Zealous advocacy requires counsel both to act in a manner consistent with the best interests of the client, and to adhere strictly to the responsibilities and duties owed to the court and opponents. See *National Hockey League v. Metropolitan Hockey Club, Inc.*, 427 U.S. 639, 640 96 S. Ct. 2778, 49 L. Ed. 2d 747 (1976); see also EC 7-9, 7-10. Canon 7, of the Model Code of Professional Responsibility which governs the conduct of lawyers in this jurisdiction states that "A lawyer should represent a client zealously within the bounds of the law." The phrase "within the bounds of the law" places certain limitations on this representation. This phrase entails concurrent responsibilities and duties not only to the client but also to the court and our adversary system of justice, all of which are equally important.

Upon de novo review of the evidence adduced at the

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hearings on this matter before the Magistrate on April 23, April 26, April 28, and June 3, 1993, a review of the record, and consideration of the objections and responses thereto, and for reasons noted in the Report and Recommendation, this court finds that counsels' disregard of the Order of January 15, 1993 was willful and in bad faith and cannot be excused as "zealous" advocacy.

A wide spectrum of sanctions are available to the court under Rule 37, including preclusion of evidence or dismissal of claims and counterclaims, as well as sanctions awarded against counsel, personally. However, before deciding on the appropriate sanctions for this discovery abuse, the court will now consider the later pleas for sanctions for other alleged acts of misconduct by these same parties in this litigation, past counsel for Esso and the Esso Defendants.

II. THE SOIL TECH INCIDENT

On or about Friday, October 22, 1993, current counsel for the Esso Defendants in these consolidated actions, (i.e. Esso Standard Oil, S.A., Ltd., ["ESSOSA"], Esso Standard Oil, Co., (Puerto Rico) ["ESSORICO"], and Esso Virgin Islands, Inc., ["ESSOVI"]), informed the court that it had come to counsel's attention that "certain empirical data collected at the Esso Tutu

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Service Station site in December 1989, apparently had not been produced by prior counsel of the Esso Defendants." 10/28/93 Tr. at p. 14. Esso's present counsel further stated "that the existence of these materials appears to have been denied in the presence of this court and in direct response to inquiries . . ." and other discovery requests from opposing counsel. *Id.* A more detailed chronology of the events leading up to the setting of a hearing on this matter for October 28 and 29, 1993 was made part of the record at that time and will not be repeated.

On October 28 and 29, 1993, this court held a preliminary fact-finding proceeding regarding this appearance of attorney misconduct, discovery misconduct, breaches of the canons of ethics, and misrepresentation to and/or misleading the tribunal. The purpose of the hearings was to establish the factual predicate on the question of sanctions and whether a show cause Order should issue. The preliminary fact-finding hearing was continued on December 9 and 10, 1993 (hereinafter the "October Hearing" and "December Hearing" respectively). As ordered by the court, the parties submitted their position briefs on or before February 3, 1994.

The term "movants" as used herein, includes the following parties: PID-Harthmans, Four Winds Plaza Partnership, Vernon Morgan, Texaco, Inc., Texaco Caribbean, Inc., Ramsay

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Motors, Inc., L'Henri, Inc., Paul Lazare, Andreas Gal, The Duplan Corporation, Laga Industries, Ltd., Panex Industries, Inc., Panex Company, Western Auto, Virgin Islands Housing Authority and Virgin Island Department of Education.

A. . The Evidence Presented:

**1. Testimony of Jose Agrelot -- President,
Soil Tech**

On October 28 and 29, 1993, the court received testimony from a Mr. Jose Agrelot Pena [hereinafter "Agrelot"]. Agrelot is the President of Soil Tech, and was retained in December 1989 to perform soil testing at the site of Esso Tutu Service Station. The testimony pertained to objective scientific evidence obtained by Agrelot as a result of testing at the ETSS site. Agrelot testified that he received the preliminary chemical results of the testing at ETSS on December 20 & 21, 1989. See 10/29/93 Tr. at p. 47. According to Agrelot, he prepared a memorandum summarizing the preliminary results of the ETC findings and showing the location of the samples in order to discuss the results at a meeting sometime after January 23, 1990. See 10/28/93 Tr. at 43, 45-48. The handwritten copy of Agrelot's memorandum dated January 23, 1990 shows it was directed initially to Esso Standard Oil Company, then redirected to Goldman &

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Antonetti, Lic. Jose L. Cepeda. See 10/28/93 Tr. at 62, 63.⁴

Agrelot explained that he crossed out Esso Standard Oil Company and redirected the memorandum to Goldman Antonetti, because in later reviewing his documents he realized that the work had been requested by Goldman Antonetti and not Esso. See 10/28/93 Tr. at 62.⁵ The memorandum identifies the project as "Esso Tutu Car Care Center, Soil Sampling, (Job No. 89579)."

Agrelot testified that he recalled discussing the results of the sampling and the contents of the memorandum with all of the attendees of the meeting, among whom were an Esso representative, Mr. Blanco, Vice President and Operations and Administrations Manager for ESSORICO (see 12/9/93 Tr. at 85, 86), and Messrs. Jose Cepeda and Francis Torres, Counsel for Esso at the time, from the firm of Goldman & Antonetti. See 10/28/93 Tr. at 42-46, 94-96, 105; 10/29/93 Tr. at 27-29. Agrelot recalled being instructed "that the work should be kept privileged and confidential . . ." (see 10/29/93 Tr. at 36), to keep "all

⁴ A copy of the handwritten memo was presented at the October 28, 1993 hearing by Four Winds as Plaintiff's Exhibit 23 and identified by Mr. Agrelot at p. 62.

⁵ Esso and former counsel for Esso, the firm of Goldman Antonetti Cordova & Axtmayer ["GAC&A"], now dispute the fact of who retained Mr. Agrelot to conduct the December 1989 testing at ETSS.

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information in his files and not to complete the final report." 10/28/93 Tr. at 49. The January 23, 1990 Memorandum which is captioned "PRIVILEGED AND CONFIDENTIAL" supports Agrelot's contention that he was so instructed. See EXHIBIT No. 12. Agrelot could not recall specifically who gave him the instruction, but he testified that he was told to do so "[b]y the attorneys," and that Mr. Jose Blanco, Vice President of ESSORICO and member of the board of directors of ESSOVI "was present at that moment" when the lawyers told him to keep his report privileged and confidential. See 10/29/93 Tr. at 35, 36.

Agrelot further testified that he kept the memorandum indexed under the project number in his files for Goldman Antonetti. See 10/28/93 Tr. at 50. Although Esso was invoiced for and paid an additional five thousand dollars for preparation of a report, a final report was never requested. See 10/28/93 Tr. at 49, EXHIBIT No. 26. He also testified that from January 1990 to the present, neither Esso nor its counsel, Goldman Antonetti, made a specific request for these particular testing results and report. See 10/28/93 Tr. at 50-52; 10/29/93 Tr. at 24. He claimed that it was located seven or eight weeks prior to the October 1993 hearings because he had finally been asked for "all the reports we have done for Tutu." Id.

The critical facts of the January 23, 1990 memorandum

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are summarized below:

1. The samples summarized by Mr. Agrelot from boreholes at the ETSS site showed concentrations of benzene, toluene, ethylbenzene and xylene ("BTEX") ranging from 5 to 1,300 PPB. Outside of the holding tank, the highest concentrations were at bore holes taken at depths between 8 to 12 feet.
2. Samples taken from the holding tank at ETSS showed "very high" concentrations of BTEX ranging from 45,000 to 250,000 PPB.
3. Samples taken from the holding tank at ETSS showed a "very high" concentration of chlorinated hydrocarbons (PCE) of 477,330 PPB.
4. PCE contamination was recorded in all three soil samples, including the one obtained "very close to the water table."
5. That it was reported that the oil and grease separator at ETSS had no discharge connections.
6. That the liquid in the oil and grease trap was pumped to the holding tank in the rear of the office building and periodically emptied by pumping the liquid into the bathroom toilet.

Exhibit No. 12; 10/28/93 Tr. at 46-48.

Testimony was elicited from him that on or before January 31, 1990 he received a final report from ETC on the December 1989 sampling event. Though he had no independent recollection of a conference with Jose Cepeda of Goldman Antonetti, Agrelot admitted that there might have been a

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conference, as reflected by Goldman Antonetti's time and billing records on January 31, 1990. Agrelot conceded that in all probability the discussion would have been about the final report he had received from ETC within that week. See 10/28/93 Tr. at 74-76, 78, 79. He further admitted that it was not possible to determine the location of the samples listed in the large volumes of ETC data without the map that he had prepared and kept confidential. See 10/29/93 Tr. at 33, 34.

Before summarizing the remainder of Agrelot's testimony it is necessary to place it in context. Sometime after the December 1989 sampling event, Agrelot began working as a consultant for the Tutu Environmental Investigation Committee ("TEIC"). 10/28/93 Tr. at 52, 81-92. TEIC is comprised of representatives from Esso and Texaco, potential responsible parties (PRPs) for the contamination of the aquifer. By administrative order of EPA dated March 22, 1990, TEIC was charged with identifying the source or sources of the contamination to the aquifer for the EPA and DPNR. TEIC hired the firm of Geraghty & Miller to conduct the remedial investigation of the contamination to the Tutu aquifer. Agrelot's firm, Soil Tech, was brought into TEIC as a sub-contractor to Geraghty & Miller by Ms. Ana Gloria Ramos, the designated coordinator of TEIC for "everything related to

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environmental matters." See 12/9/93 Tr. at 39-41. Ms. Ramos was also the designated environmental coordinator for ESSORICO.
12/9/93 Tr. at 39-41.

Agrelot testified that though he became part of the team charged with identifying the source or sources of contamination to the aquifer for EPA, he never mentioned the December 1989 sampling results of ETSS to Geraghty & Miller, or the EPA or DPNR.⁶ 10/28/93 Tr. 54, 61-62. He explained that he

⁶ This claim is refuted by documents Bates stamped A08884 and A08885, dated 12/20/89 and 12/21/89 respectively, produced among approximately 10,000 documents by Geraghty & Miller, in connection with the 30(b)(6) deposition of Thomas V. Danahy. Mr. Danahy is an employee of Geraghty and Miller, and holds the position of a Senior Scientist and Project Manager. The documents, which bear the letterhead of Geraghty & Miller, reflect notations presumably made by Mr. Danahy. To the extent the court can decipher these notations, the 12/20/89 document reads in part:

Talked to EPA Monday -- explained to them how we're proceeding. . . .

--Call Agrelot

--if he tells us to talk to Esso, call McCay, (noon on 4th), what lab to use? Set up for 4/5th January.

coordinate with Agrelot

--Francis or Cepeda - how we're going to exchange information.

The document dated 12/21/89, is captioned "Telephone Conversation Record," and states it was from "Dan" to "Agrelot." The notations in this document read as follows:

--We will coordinate to meet in STT 1/4, will talk next week

Re: exchange of info -- he put me on w/ Ana Gloria Ramos - Esso

she wants me to talk to Francis Torres
wants to make sure we work as a team

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failed to mention the December 1989 sampling results in part because "it was not on his mind" and also because "the information was supposed to be privileged and confidential." See 10/28/93 Tr. at 54, 55; 10/29/93 Tr. at 8.⁷ Later Agrelot testified that when discovery was conducted at his office, these files on the December 1989 testing at ETSS may not have been discovered because they were filed "under the Goldman, Antonetti not under Tutu." See 10/28/93 Tr. at 108-110.

Agrelot also gave testimony about an internal memorandum, dated May 3, 1990, drafted by Warren Cole, Esq., of the law firm of Hunter, Coliani, Cole & Turner, local counsel to Esso.⁸ The May 3rd memorandum memorialized the discussion that

concerned about lack of coordination w/Texaco

⁷ During the second day of the October 1993 hearings, Agrelot stated that he never mentioned the December 1989 testing, in part because he "didn't think the results imply anything else that was not known until that particular time . . . [since] the concentrations found were very close to the ones that EPA had sampled before." 10/29 Tr. at 8.

⁸ The memorandum was produced in response to this court's October 25, 1993 order. As a result of an assertion of privilege by Esso, the memo was redacted. See Order of October 27, 1993. During the October hearings, the Court indicated its intention to rely on the memo and read parts of it into the record. See 10/29/92 Tr. at 74-77. The contents of the memo were corroborated by various witnesses. See, for instance, 10/28/93 Tr. at 65-67. It was not marked as an exhibit during the hearings and is admitted as the Court's Exhibit A. Attorney Cole declined to proffer testimony or witnesses. See 12/10/93 Tr. at 90.

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had taken place during a meeting with Messrs. Torres, Romero, Cepeda, Cole and Agrelot. In relevant parts, the May 3rd

Memorandum to File states at the following numbered paragraphs:

3. The latest soil analysis obtained found Chlorinated Hydrocarbon (CHC) contamination in two areas within the gas station:

(a) In the vicinity of the oil/water separator, it was found that there were 300pbb(sic) of chlorinated hydrocarbon (CHC) in the top two foot layer of soil. It was noted that this soil was backfill behind the retaining wall of the western boundary of the property, and that contamination was not below this two foot layer.

(b) On the northwest corner of the property, 10pbb(sic) of the CHC was discovered at a level of eight feet below grade. Above this level no contamination was found.

8. Agrelot reviewed the history of soil and water testing relating to the Tutu aquifer showing CHC contamination in the aquifer and soils:

(a) The first indication was the EPA sampling of existing working wells, which showed CHC contamination;

* * *

(e) The fifth indication was the "preliminary soil assessment" conducted by Esso showing the two sites within in (sic) the station referred to previously

10. Agrelot pointed out that even small traces of CHC contamination in the soils pose significant problems, insofar as a single cup

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of pure CHC can contaminate one million gallons of water (4pbb max level for potable water). He also pointed out that over 400 pbm(sic) of CHC were found in the soil at the laundry.

12. Frances Torres proposed further soil analysis around the station to gather more data in an effort to try to show that Esso did not contribute to the CHC problem with the aquifer. The question then arose as to whether Esso needs or desires such additional information at this stage. When asked, Agrelot said if we excavate around the oil/water separator and storage tank and find clean soils beneath the pits, that this would not be conclusive that contaminants did not migrate through the soils and into the aquifer. On the other hand, if we find dirty soils beneath the pits, this would be devastating information tending to show that the Esso station did significantly contribute to the pollution of the aquifer. It was determined that the risks of finding such contamination outweighed any possible benefit of finding clean soils, and it was decided that no such testing should take place at this time.

See Court Exhibit, Annex A.

Agrelot testified that he had no recollection of this meeting. However, he admitted that he must have been present because of the phrase in the May 3rd memorandum "a single cup of PCH (sic) can contaminate four million gallons of water." See 10/28/93 Tr. at 66 (Witness: I do remember this particular phrase because I have used it before so I know that probably . . . I was there.") Agrelot testified that though he may have

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discussed his report summarizing the ETC results, which were contained in four large volumes of data, he does not recall giving a hard copy of his summary or the ETC reports to anyone at G&A or Esso until he was reminded recently of the December 1989 work by Ana Gloria Ramos of Esso. See 10/28/93 Tr. at 52, 79-81.

On October 29, 1993, Agrelot reiterated his earlier testimony that he believed his memorandum report on the December 1989 testing was to be kept "privileged and confidential" and that was the primary reason he did not disclose the memorandum. See 10/29/93 Tr. at 34-37. Agrelot stated that though he may not have distributed the handwritten memorandum to the attendees of the January 23, 1990 meeting he:

should have shown and maybe distributed the map to all of them in order for them to locate where the sampling points were. . . . because they had to look at the map in order to know where the samples were taken. But I know if anything was distributed at that moment [it] was probably the map.

10/29/93 Tr. at 28. Agrelot later admitted that without the map showing the location of the soil borings in the Tutu area, a person could not pick up the ETC reports alone and know the soil borings were on the ETSS property. 10/29/93 Tr. at 33, 34. Agrelot added that Mr. Jose Blanco, the Vice President of ESSORICO, was at the January 23rd meeting when he presented his report. 10/29/93 Tr. at 35, 36. Agrelot explained that he was

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told to keep the files on this testing in his hands. See 10/29/93 Tr. at 36. Agrelot first testified that he was instructed by counsel from Goldman Antonetti that the report was "privileged and confidential." He added the qualification that because, generally, his work for Esso was to be kept privileged and confidential, he characterized the report in preparation for the meeting as privileged and confidential. See 10/29/93 Tr. at 36-37.

2. Testimony of Ana Gloria Ramos -- Environmental Coordinator, ESSORICO

On December 9, 1993, at the continuation of this fact-finding hearing, the court heard testimony from Ms. Ana Gloria Ramos, Chemical Engineer in Health, Safety and Welfare for the Esso Standard Caribbean Division ["Ms. Ramos"]. See 12/9/93 Tr. at 14. Ms. Ramos testified that she retained Soil Tech, Agrelot's firm, to conduct testings for ESSOVI, at the ETSS site, among others. See 12/9/93 Tr. at 14, 15. Ms. Ramos admitted that it was her signature on the document (marked as Exhibit 6, Annex A) dated December 13, 1989, authorizing the testing to be conducted at the ETSS site. See 12/9/93 Tr. at 15, 16. The document, signed by Ms. Ramos and described by her as a justification to the accountants for deviating from the usual

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bidding procedure, was translated by a certified court translator and reads as follows:

The study has a purpose to define if in the area of the station of Danny Bayard, Tutu, St. Thomas, U.S.V.I., there is a presence of chlorinates with objective to submit our objection to the EPA, to include us under CERCLA in the administrative order of this case.

The agency [EPA] accepts our objection if we have data to substantiate it, which results are needed with urgency before December 22nd, 1989, as agreed in meeting of November 21, 1989.

EXHIBIT 6, ANNEX A; 12/9/93 Tr. at 71, 72. Ms. Ramos, however, did not have independent recollection of giving the authorization for the soil sampling as reflected in the document. Although, Ms. Ramos admitted that a copy of the December 21, 1989 facsimile of the results of this "urgent" sampling was retrieved from her files, she did not recall receiving this facsimile on the results of the testing. See 12/9/93 Tr. at 42,43; EXH. 14. Neither did Ms. Ramos recall meeting or speaking with the lawyers at G & A to discuss the results of the soil sampling, though confronted with billing statements recording meetings on December 20 and 21, 1993 with Francis Torres. See 12/9/93 Tr. at 47, EXH. 15 (G & A January 21, 1990 billing statement showing one December 21, 1989 conference with Mr. Blanco and two December 21, 1989 conferences with Ms. Ramos, one including Agrelot) and EXH. 16 (G & A) January

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21, 1990 billing statement stating that there was one December 21, 1989 conference with Mr. Jose Blanco, two conferences on that date with Agrelot, and three with Ms. Ana Gloria Ramos, one including Agrelot, as well as receipt and explanation of the soil sampling results and a conference with Mr. Nachman of Geraghty & Miller). Indeed, exhibit 16 references several conferences with Ms. Ramos, including one to discuss arrangements with Geraghty and Miller, none of which Ms. Ramos could recall. See 12/9/93 Tr. at 47-49.

Ms. Ramos was examined at great length with respect to her role in the certification of discovery responses in this case and her certification of responses to requests for information of the EPA. According to Ms. Ramos, though her signature evidences that she was charged with the responsibility of certifying the responses on behalf of ESSO, the responses were actually prepared by outside counsel, Goldman Antonetti. See 12/9/93 Tr. at 23, 24, 31. Ms. Ramos admitted to participating in the preparation of the December 15, 1987 response to EPA and to reviewing and certifying the April 29, 1991 response. 12/9/93 Tr. at pp. 25, 30, 31. She also testified that, although she appended her signature, under oath, to various responses to discovery in this case, as well as to the EPA responses, she did not recall making any inquiry as to the truth of the answers, or the information

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contained therein. See 12/9/93 Tr. at 22-24, 30-35, 38.

One of Ms. Ramos' unequivocal statements was her admission that "I saw the employees of Mr. Bayard were discharging from (sic) the oil and water separator into the toilet." See 12/9/93 Tr. at 69. She admitted that she saw this done on another occasion when she visited the site. See 12/9/93 Tr. at 70. Ms. Ramos testified that on both occasions she told Daniel Bayard that the practice "was not supposed to be done." 12/9/93 Tr. at pp. 69, 70. Later Ms. Ramos testified that Bayard⁹ told her he had problems with disposal of the contents of the oil/water separator and needed the assistance of Esso. See 12/9/93 Tr. at 79, 80. Aside from mentioning the problem to her supervisors, Ms. Ramos testified that she did nothing to assist Bayard with the problem of disposal. See 12/9/93 Tr. at 80.

An August 3, 1990 memorandum from Mr. Bustelo, corporate counsel for ESSORICO, ESSOVI, and Esso CCD division, to Ms. Ramos' supervisor, Mr. Jose Blanco, references a meeting where "the subject came up of the analysis of sensitive documents which was requested of Agrelot of Soil Tech, which has been pending for quite some time." See EXH. 13. Ms. Ramos, a recipient of that memorandum, could not identify which documents

⁹ Daniel Bayard is the operator of the Esso Tutu Service Station.

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were referred to as "sensitive documents." 12/9/93 Tr. at 74-75. Even though there is no mention of the holding tank at ETSS in the memo, Ms. Ramos testified that the subject of the memo was "Tutu holding tank." 12/9/93 Tr. at 37, 38; Exhibit 13.

3. Testimony of Jose Blanco -- Vice President of Operations and Administration for ESSORICO; member of the Board of ESSORICO and ESSOVI:

Jose Blanco (hereinafter "Blanco") testified that he had been working for Esso until April of 1987 and resumed working for Esso on January 1, 1989. Blanco stated that he was rehired as an "outside title oil specialist" for ESSORICO, and that as Vice President of Operations and Administration, he was "entrusted with the function of environmental matters." 12/9/93 Tr. at 85-87. Blanco was also named to the Board of Directors of ESSORICO and ESSOVI. See 12/9/93 Tr. at 86. He denied seeing the Agrelot January 23, 1990 memorandum before October 1993. *Id.* Blanco was not positive he was even at the January 23, 1990 meeting. See 12/9/93 Tr. at 111. However, he admitted to having been briefed, at least verbally, about the information in the report, sometime around late December 1989. 12/9/93 Tr. at 86.

Blanco stated he discussed the results of the December testing at ETSS with his immediate supervisor, Mr. C. Stuart

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Griffith, President of ESSORICO and of ESSOVI and member of the board of directors of both corporations. See 12/9/93 Tr. at 88. The information was also conveyed to Mr. J. S. Simon, Mr. Griffith's immediate supervisor, who came to Puerto Rico early in 1990. 12/9/93 Tr. at 89, 90. Blanco testified that for the meeting with Mr. Simon, a presentation, including charts, was prepared in order to bring Mr. Simon abreast. *Id.* Mr. Simon, apparently, did not have time to receive Blanco's presentation, but was given the report. See 12/9/93 Tr. at 89, 92. Blanco testified that he gave the information to Mr. Otto Bustelo, with instructions that it "contained confidential data, please handle as attorney/client privilege." 12/9/93 Tr. at 90. The "report" prepared by Blanco was not extant at the time of this hearing. *Id.* Though he had believed these events occurred in January, Blanco stated he must date these events as occurring around February 22, 1990, from documents placing Mr. Simon in Puerto Rico at that time. *Id.* Blanco remembered discussing the results of the December testing with "Lodo. Francis Torres, Mr. Cepeda." *Id.* With respect to the August 3, 1990 memorandum directed to him from Mr. Bustelo, Blanco could not recall what documents were referred to as "sensitive documents." 12/9/93 Tr. at 99, 100.

According to Blanco, he was not responsible for and had no role in preparing responses for the EPA. 12/9/93 Tr. at. 93,

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94. As a result, he had no knowledge of whether the results of the December testing were revealed to the EPA. *Id.* Blanco admitted that during his deposition testimony in April 1991, he denied knowledge of the presence of chlorinated solvents at ETSS or of any "problem related to chlorinated solvents" there. 12/9/93 Tr. at 95. Blanco stated he reviewed the April 29th, 1991 letter from Geraghty & Miller to the EPA alleging that "there is no evidence that Esso Tutu Service Station has released or contributed chlorinated compounds to the Environment and thus the citations are unwarranted." 12/9/93 Tr. at pp. 96, 102. Blanco testified that he relied "totally on the advise of counsel [on how to] respond and prepare [responses to the EPA]." 12/9/93 Tr. at pp. 102, 103. Blanco testified that he did not believe it necessary to present Agrelot's December 1989 findings to the EPA because the EPA already knew (from its own testing) that PCE had been found at the site. 12/9/93 Tr. at 103. He emphatically denied any attempt to hide information, claiming that his technical people had convinced him that "this study was very positive." 12/9/93 Tr. at 105. According to Blanco, ESSO interpreted the results as not showing "definite information . . . that can condemn ESSO as the source and the contaminator of the aquifer." 12/9/93 Tr. at 103-105, 119.

Blanco admitted that he knew the Agrelot December 1989

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testing cost his company in excess of \$60,000, but denied knowing that Agrelot was told not to prepare a final report, and that a final report was, indeed, never prepared. 12/9/93 Tr. at 97, 98, 106. According to Blanco, a final report was not "critical" because all he needed to know were the "main concepts of . . . these results". 12/9/93 Tr. at 106, 107. Blanco stated that though he was "delighted" with the results of the December 1989 testing, he did not disclose the findings to the EPA because "this information was not new to the EPA." 12/9/93 Tr. at 107.

Moreover, Blanco testified that he learned later that the raw data of the December testing, the ETC reports, was disclosed to the parties in 1990. See 12/9/93 Tr. at 94. After testifying that the ETC volumes provided sufficient data to locate the samples listed therein, Blanco participated in an in-court demonstration, wherein he was provided with all four volumes of the ETC raw data, and given ten minutes to determine the location of a sample. See 12/9/93 Tr. at 138-141. In response to the question: "Sir, having looked through those, and you pointed out the sample number, were you able to find anything within those documents which disclosed where that sample came from?" Blanco admitted that without

[t]he location you can't. There is a code in there that definitely you would have to have the code in order to determine the location.

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If you can determine the code, concentration, depth at which the concentration was found, the process involved in the analysis, You can basically get all the information you want except you would have to have the code.

The Court: You can't use it without a map.

Mr. Blanco: You have to have a code, yes.

12/9/93 Tr. at 140, 141.

Like Agrelot, Blanco testified that because no formal report was issued, the results were never disclosed to the EPA. See 12/9/93 Tr. at 127. Blanco admitted that during this period he was Chairman of TEIC (Tutu Environmental Investigation Committee). See 12/9/93 Tr. at 124. He, however, saw the position as imbuing him with no "additional powers, no additional responsibility." *Id.* It was "simply a matter of building up a structure so we can answer the EPA requirements as a group." *Id.* Moreover, Blanco explained, in the first instance the December testing was not "foremost" in his mind, and in the second, it was subject to the attorney/client privilege. See 12/9/93 Tr. at pp. 128, 129.

Finally, with regard to the liquid from the ETSS oil/water separator that was pumped into the toilet, Blanco admitted that the water is always contaminated with some amount of oil. See 12/9/93 Tr. at 135. He further admitted that in a situation where the separator was devoid of water, only oil would

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be present. See 12/9/93 Tr. at 136, 138.

**4. Testimony of Eugenio Romero, Esq. --
Former Counsel for the Esso Defendants**

Eugenio Romero (hereinafter "Romero"), the attorney with the law firm of Goldman Antonetti in charge of the litigation aspect of the Tutu case for ESSO, appeared in the Virgin Islands litigation in late 1989. See 12/9/93 Tr. at 145. Romero denied having seen the Agrelot handwritten memo prior to October 1993. See 12/9/93 Tr. at 147. The gist of his direct testimony was that if the other parties had thoroughly examined the volumes of the ETC reports produced by his firm on behalf of the Esso defendants, their experts would have been able to determine that PCE's and other chlorinated compounds were indicated in the samplings. See 12/9/93 Tr. 148-52. Romero admitted that the parties would need a map to locate the boring sites, and that it should have been produced. 12/9/93 Tr. at 152, 153. He also admitted that the ETC reports were produced in response to a request for information relating to the entire Tutu Area and that no mention of the ETSS was made in the response. See 12/9/93 Tr. at 176. He alleged that he would have had no problem producing the map, if anyone had asked. See 12/9/93 Tr. at 154.

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Romero also admitted that the December Soil Tech reports produced in Esso's responses were misnumbered January 11, 1989, instead of 1990, and that several reports similar to the January 23, 1990 Soil Tech report were produced. See 12/9/93 Tr. at 153. According to Romero, the Soil Tech map and report was not produced initially because it was improperly identified in the data base and overlooked. See 12/9/93 Tr. at pp. 155, 156. He testified that there was never a "conscious decision" not to produce the testing results. 12/9/93 Tr. at 155. With respect to later requests for the reports, the misidentification was alleged to have caused the continuing failure to produce. See 12/9/93 Tr. at 155, 156. In sum, Romero explained the non-production of the documents as sheer inadvertence.

Finally, Romero testified that he personally, or someone from his office, reviewed with Ms. Ramos the discovery responses of the Esso Defendants in this litigation, prior to her signing them. See 12/9/93 Tr. at 178, 179, 183. "I make sure that if Ana Gloria Ramos is signing whatever responses are being advanced, that she is totally satisfied with the contents of those responses." *Id.*

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5. Testimony of Francis Torres, Esq. -- Former
Counsel for the Esso Defendants

Francis Torres (hereinafter "Torres") is a partner in Goldman Antonetti, who testified that he has practiced environmental law in Puerto Rico since 1977. See 12/10/93 Tr. at 5, 6. Torres testified that he was introduced to Agrelot as an Esso consultant and that he had no knowledge of the terms of Agrelot's employment until he was shown an invoice at the December hearing. See 12/10/93 Tr. at 10, 47.

Torres admitted receiving on December 21, 1989 a facsimile copy of a table showing some results of Agrelot's sampling at ETSS. See 12/10/93 Tr. at 11; EXHIBIT 14. He also admitted simultaneously receiving a copy of the map showing the location of the sampling points. *Id.* He testified that he discussed the documents with Mr. Jose Cepeda, Ana Gloria Ramos, Agrelot, Blanco and Romero prior to the January 23, 1990 meeting. See 12/10/93 Tr. at 11, 12. He identified the "Privileged and Confidential" agenda for the January 23 meeting as being prepared by him and confirmed that the meeting was attended by Blanco, Ana Gloria Ramos, Agrelot, himself, and Mr. Bustelo, Esso corporate counsel. See 12/10/93 Tr. at 13, 14; Exhibit 27. He alleged that the results of Agrelot's December '89 testing at ETSS were discussed only briefly because "[i]t was a side issue. We didn't

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spend too much time. We already knew the results." 12/10/93 Tr. at 15. According to Torres, he did not see Agrelot's memo dated January 23, 1990 until it was sent to him in Barcelona by facsimile on October 26, 1993. See 12/10/93 Tr. at 16. He corroborated Romero's testimony that the sampling results and map had not been produced in litigation because they were misfiled. See 12/10/93 Tr. at 20-23.

Significantly, Torres testified that another Esso consultant, Carlos Belgodere, allegedly required his assistance to prepare proper reports for submission to EPA. See 12/10/93 Tr. at 29-32. As a result of Mr. Belgodere's alleged lack of qualifications, his services were terminated and he was replaced by Agrelot. *Id.* Torres admitted that he was the "principal drafter" of the April 29, 1991 letter to the EPA and that despite his knowledge of the Agrelot test results, those results were not reflected in the letter. 12/10/93 Tr. at 42-44; Exhibit 10. He acknowledged that at the time he received the data showing CHC's in the ETSS holding tank and soil, he was working toward dissuading EPA from looking at ETSS as a source of the CHC's. See 12/10/93 Tr. at 52-54.

**6. Testimony of Jose A Cepeda, Esq. -- Head of the
Environmental Department of Goldman Antonetti**

Jose A. Cepeda (hereinafter "Cepeda") testified on

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December 10, 1993 that he was a partner in Goldman Antonetti from the time he joined the firm in 1986. See 12/10/93 Tr. at 56, 57. He admitted that G&A had received by facsimile the December 21, 1989 sampling results and map and that he had discussed the results with Torres. See 12/10/93 Tr. at 57, 58; Exhibit 14. He confirmed that Mr. Jose Blanco, Ms. Ana Gloria Ramos, Agrelot, Mr. Otto Bustelo and Mr. Francis Torres had attended the January 23, 1990 meeting. See 12/10/93 Tr. at 59. Like Torres, Cepeda testified that he had not seen the January 23, 1990 report of Agrelot until it was sent by facsimile to him overseas on October 26, 1993. Id. He argued that because his name was misspelled, and he had not corrected it, he was certain he never saw the report. See 12/10/93 Tr. at 60, 62, 63. He suggested that his name was on the report because he was the head of the environmental department of G&A. See 12/10/93 Tr. at 71.

Cepeda testified that he had prior knowledge that there were PCE's in the holding tank at ETSS but that the specific amount found in the Agrelot sample was never discussed with him. See 12/10/93 Tr. at 65, 66. He further testified that he had no knowledge of instructions to Agrelot to retain documents in his files or refrain from producing a final report. See 12/10/93 Tr. at 66. Finally, he testified that he had been introduced to Agrelot in the Esso offices and that it was his "impression" that

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Esso had hired Agrelot to conduct the December sampling.

12/10/93 Tr. at 70.

**7. Testimony of Otto M. Bustelo, Esq. -- In-house
Counsel for ESSORICO, ESSOVI, and the Esso CCD
Division**

On December 10, 1993, Mr. Otto Miguel Bustelo-Darriga testified that he was legal counsel, in house, for ESSORICO, ESSOVI, and CCD. 12/10/93 Tr. at 81, 82. He admitted being present at the January 23, 1990 meeting and that he "could have heard something . . ." about Agrelot's sampling at that meeting. 12/10/93 Tr. at 83. He had no recollection of Agrelot being instructed to treat his work as privileged. 12/10/93 Tr. at 86.

III. THE LAW

A. Standards for Imposition of Sanctions

1. Sources of Authority

This court bears the responsibility and has authority to monitor the conduct of attorneys and litigants appearing before it. With this court's authority comes the inherent power to impose sanctions against members of its Bar and to levy monetary sanctions against party litigants, both to "vindicat[e] its judicial authority and to mak[e] the prevailing party whole for expenses caused by an opponent's obstinacy" or misconduct.

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See *Chambers v. Nasco*, ___ U.S. ___, 111 S. Ct. 2123, 2133 (1991); See also *Roadway Express, Inc. v. Piper*, 447 U.S. 752, 765, 100 S.Ct. 2455, 2463, 65 L.Ed. 488 (1980). This authority is reinforced, but not limited, by statutes and rules. In the instant matter, the court's power to impose sanctions is also invoked pursuant to Rules 11, 26(g) and 37 of the Federal Rules of Civil Procedure, and 28 U.S.C. § 1927. In *Chambers v. Nasco*, the Supreme Court noted that a court's inherent power is "both broader and narrower than other means of imposing sanctions, . . . and extends to a full range of litigation abuses." *Chambers v. Nasco*, 111 S. Ct. at 2134. However, the Supreme Court sounded the following note of caution that "because of their very potency inherent powers must be exercised with restraint and discretion." *Chambers v. Nasco*, 111 S. Ct. at 2132. As such, courts are directed to examine whether the conduct at issue "could be adequately sanctioned under the rules" and statutes before "resorting to the inherent power." *Chambers v. Nasco*, 111 S.Ct. at 2136. Imposition of sanctions under the court's inherent powers requires a finding of "bad-faith conduct during the course of litigation." *Id.*

Movants also argue that the court is authorized under both Rule 11 and Rule 26(g) of the Federal Rules of Civil Procedure to impose "an appropriate sanction upon an attorney, a

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party, or both" for "presenting to the court (whether by signing, filing, submitting, or later advocating," a false or misleading statement. Because, as amended in 1983, Rule 11 tests the certification of "knowledge and reasonable inquiry" of pleadings filed with the court, no finding of subjective bad-faith is required before sanctions may be imposed for violations of its provisions. Rather, a Rule 11 violation is judged by an objective standard of reasonable inquiry. *Chambers v. Nasco*, 111 S. Ct. at 2134, citing *Business Guides, Inc. v. Chromatic Communications Enterprises, Inc.*, 498 U.S. ___, ___, 111 S.Ct. 922, 932, 112 L. Ed. 2d 1140 (1991). Likewise, under Rule 26(g) the standard for determining the appropriateness of sanctions is "reasonable inquiry."

Federal Rule of Civil Procedure 37 gives the court broad authority to impose any of a wide range of sanctions for discovery abuses against both counsel and party. Rule 37(a)(4) authorizes only the mildest or monetary sanctions for the failure to provide or permit discovery or for obstructing the discovery process. However, where the discovery violation involves a failure to obey a court order compelling discovery, under Rule 37(b) the court, "may, within reason, use as many and as varied sanctions as are necessary to hold the scales of justice," including the most severe sanction of dismissal. Failure to

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disclose, or the making of false or misleading disclosure during discovery amounts to the type of "culpable failure" that is appropriately disciplined pursuant to Rule 37(b).¹⁰ The fashioning of the appropriate sanction is committed to the sound discretion of the district court judge. Under Rule 37, a negligent "refusal" or "failure to comply" with discovery is a sufficient basis for sanctions. Thus, unlike sanctions imposed pursuant to the court's inherent powers, "willfulness is relevant only to the selection of sanctions, if any, to be imposed," *Societe Internationale v. Rogers*, 357 U.S. 197, 212, 78 S. Ct. 1087, 1095, 2 L.Ed. 2d 1255 (1958); see also *Argo Marine Systems, Inc. v. Camar Corp.*, 102 F.R.D. 280, 285 (S.D.N.Y. 1984) (citing *Id.*) (observing that "gross or even simple negligence on the part of a noncomplying party or its attorney can be sufficient basis for imposition of the less severe sanctions provided under Rule 37."). However, once culpable conduct is found, the court is required to impose such sanctions that are just, both "to penalize" the wrongful conduct and "to deter those who might be

¹⁰ Movants argue that, in addition to the Magistrate's January 15, 1993 Order, compelling discovery at the ETSS, "the valid orders violated by [Respondents] include the September 26, 1990, Case Management Order, the February 5, 1992 Second Amended Case Management Order, [and] the November 9, 1992 Third Amended Case Management Order. Movants argue that the failure to correct the misleading discovery responses is sanctionable pursuant to Rule 37(b), as authorized by Rule Fed. R. Civ. P. 16(f).

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tempted to such conduct in the absence of a deterrent." *National Hockey League v. Metropolitan Hockey Club, Inc.*, 427 U.S. 639, 643, 96 S.Ct. 2778, 2781, 49 L. Ed. 2d 747 (1976).

In addition, Movants invoke the court's power to sanction pursuant to 28 U.S.C. § 1927 which authorizes the assessment of fees against attorneys who so multiply the proceedings in any case unreasonably and vexatiously. Under Section 1927, the assessment of fees is to be satisfied personally by the attorney.

B. Criminal or Civil Contempt

The court turns now to the issue of whether the sanctions to be imposed are for criminal or civil contempt. Respondents, the Law Firm, and the individual attorneys subject to this court's jurisdiction, posture the proceeding as one for criminal contempt. Citing the Third Circuit Court of Appeals in *Taberer v. Armstrong World Industries, Inc.*, 954 F.2d 888, 909 (3d Cir. 1982), these Respondents contend that before criminal sanctions may be imposed, this court must find that they acted with "knowledge that [their actions were] wrongful and [with] a purpose nevertheless to do the act[s]." In addition, Respondents posit that evidence of "[g]ood faith pursuit of a plausible though mistaken alternative is antithetical to contumacious

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intent, however unimportant it may be in the context of civil contempt." *Taberer* 954 F.2d at 909, citing *In Re Brown*, 454 F.2d 999 (D.C. 1971). See MEMORANDUM OF EUGENIO ROMERO at p. 16, and GOLDMAN ANTONETTI CORDOVA & AXTMAYER POST HEARING MEMORANDUM at p. 33 (arguing that criminal contempt is extremely harmful to the professional reputations of the Law Firm and attorneys, and suggesting civil sanctions as more appropriate).

Respondents reliance on *Taberer* is selective. The court in *Taberer*, after a thorough analysis of the nature of civil and criminal contempt proceedings concluded, that:

the key distinction between civil and criminal contempt lies in the court's purpose. Civil contempt sanctions are intended to coerce or compensate; criminal contempt sanctions to punish. (citation omitted). 'Criminal contempt, more specifically, is reserved for those instances where the court must vindicate its authority.'

954 F.2d at 896. The issue was addressed definitively by the Supreme Court in *Hicks On Behalf of Feiock v. Feiock*, 485 U.S. 624, 628-39, 108 S. Ct. 1423, 1428-33, 99 L. Ed. 721 (1988).

There the Supreme Court noted that:

The question of how a court determines whether to classify the relief imposed in a given proceeding as civil or criminal in nature, for purposes of applying the Due Process Clause and other provisions of the Constitution, is one of long standing, and

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its principles have been settled in their
broad outlines for many decades.

* * *

[T]he critical features are the substance of the proceeding and the character of the relief that the proceeding will afford. 'If it is for civil contempt, the punishment is remedial, and for the benefit of the complainant. But, if it is for criminal contempt, the sentence is punitive, to vindicate the authority of the court.' *Gompers v. Bucks Stove & Range*, 221 U.S. 418, 441, 31 S.Ct. 492, 498, 55 L.Ed. 797 (1911).

Thus, whether the proceeding is one for civil or criminal contempt depends on the form of relief to be granted. Further, as the Court in *Hicks* noted "[i]n contempt cases, both civil and criminal relief have aspects that can be seen as either remedial or punitive or both." *Hicks*, 485 U.S. at ___, 108 S. Ct. at 1431. As that Court explained, where the penalty is conditional, and even if it calls imprisonment, the proceeding is civil "if 'the defendant stands committed unless and until he performs the affirmative act required by the court's order.'" *Hicks*, 485 U.S. at 632, 108 S. Ct. at 1429 (quoting *Gompers*, 221 U.S. at 442, 31 S.Ct. at 498. For this reason, it is said that the imprisoned civil contemnor "'carries the keys of his prison in his own pocket.'" Indeed, *Taberer*, to which Respondents cite, notes that "'[i]n responding to a single contemptuous act, a court may well impose both civil and criminal sanctions--wishing

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to vindicate its authority and to compel compliance.'" 954 F.2d at 896, (quoting *In Re Irving*, 600 F.2d 1027, 1031 (2d Cir. 1979)). Accordingly, if the evidence before the court is sufficient to support the conclusion that the prerequisites to the imposition of criminal sanctions are met in this matter, then this court may consider the imposition of criminal sanctions to punish the disobedient conduct. However, as urged by our court of appeals, this court will "consider [first] the imposition of civil contempt sanctions before resorting to criminal contempt." *Taberer*, 954 F.2d at 896, quoting *Waste Conversion*, 893 F.2d 605, 612 (3d Cir. 1990) (*en banc*).

IV. FINDINGS OF FACT

The parties have taken antipodal positions on the issue of sanctions. Movants seek the imposition of a variety of sanctions ranging from the least severe in the spectrum or the "mildest,"¹¹ monetary sanctions, to the most extreme, dismissal of claims and counterclaims. Respondents argue that there is no or slight prejudice and therefore sanctions are not warranted. Moreover, Respondents argue that, technically, they have violated

¹¹ See *Cine Forty-Second St. Theater v. Allied Artists*, 603 F.2d 1062, 1066 (2d Cir. 1979) (remarking that the "mildest [of sanctions] is an order to reimburse the opposing party for expenses caused by failure to cooperate)."

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no order of this court compelling discovery. Before the court can resolve this dispute it must first make findings on the issues of willfulness and bad-faith.

Upon review of all the testimony and the evidence before it, the court makes the following findings as to the disputed facts:

1. Whether ESSO or Goldman Antonetti Retained Agrelot to Conduct the December 1989 testing?

The court finds by clear and convincing evidence that * Agrelot was retained by Esso. Agrelot testified at one point that he was retained by the Goldman Antonetti Cordova and Axtmayer law firm to conduct this lone testing event, having discussed the project with Mr. Francis Torres and Mr. Jose Cepeda. See 10/28/93 Tr. at 32. However, Agrelot's later testimony [10/28/93 Tr. at 37] and records produced for the hearing indicate that he was retained and paid directly by Esso. The record shows that on December 5, 1989, Agrelot sent Mr. Carlos Fuentes of Esso a four-page proposal for a soil investigation and waste oil sampling to be conducted near the oil/water separator and the holding tank at the ETSS site. The total cost for the work to be performed was \$60,285.00, and the cost breakdown included a separate \$5,000 estimate for "report

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preparation." Moreover, Agrelot's cover letter to the proposal stated that "[t]he scope of the work have (sic) been discussed with Esso Environmental Engineer, Ms. Ana Gloria Ramos and legal counselors." See EXH. 7, 12/9/93 Tr. at 17.

Mr. Fuentes requested approval of Agrelot's proposal on an emergency basis to meet a deadline for submitting objections to the EPA. The proposal was approved by two of Esso's employees, A. Munoz and Ana Gloria Ramos. Agrelot performed the field-testing over several days, ending on December 8, 1989. The soil samples taken from eight bore holes on the ETSS site were sent to Environmental Testing and Certification Corp. ("ETC"). ETC was paid to expedite its results and returned its first preliminary analysis report on or about December 21, 1989. Moreover, on February 4, 1990, Agrelot's firm, Soil Tech, issued invoice No. E-90021, to Esso for remittance of the entire project cost of \$60,285.00. This amount was approved for payment by Esso employee, Carlos Fuentes. Whatever occurred later, there can be no dispute that the client, ESSO, retained Agrelot to perform the testing.

2. Whether the Non-Production of Agrelot's File was Inadvertent?

Counsel from Goldman Antonetti argue that the non-production of Agrelot's file was due to "inadvertence" on

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Agrelot's part, because as Agrelot explained, he filed the information under "Goldman Antonetti" and not under "Esso". The client, ESSO, argues that there is no evidence that any of its "personnel willfully withheld anything." Esso's Memorandum at p. 14. Both of the alleged malfeasants argue that because there was no willful withholding of the discovery materials, there can be no finding of bad-faith and intentional misconduct so as to warrant the imposition of sanctions.

The court disagrees with both parties' positions. First, with respect to counsel from Goldman Antonetti, the court finds the claim of "inadvertence" totally contradicted by the evidence. The parties' conduct following the preliminary results of the December 1989 testing show that they viewed the results as an "evidentiary hot-potato." The court agrees, that arguably, the results were "inconclusive" as to whether the ESSO site was a source of the contamination to the aquifer. However, an inescapable conclusion is that the results were sufficiently damning to ESSO, in that they would have provided the Plaintiffs, the EPA and cross-claimants with sufficient ammunition to make the ESSO site a focal point in the investigation for source or sources of the contamination. See EXH. 12, Agrelot's January 23, 1990 Memorandum, and Cole Memorandum, Court Exh. A.

The parties engaged in several conferences and

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discussions, as evidenced by the records produced by G & A and the aforementioned file memoranda as to the best strategy to take with respect to these results.¹² Clearly, the report would not have served the purpose for which it was commissioned, that is, to support "[ESSO's] objection to the EPA (Environmental Protection Agency) to include us under CERCLA in the

¹² On December 20, 1989 the first reports regarding the testing/sampling were sent by facsimile from the lab in New Jersey to Mr. Agrelot.

On December 21, 1989, Attorney Frances Torres logged three (3) conversations with Mr. Agrelot, and three conferences/conversations with Ana Gloria Ramos of Essosa. The third conference with Ms. Ramos included Mr. Agrelot.

On January 2, 1990, attorney Torres recorded a telephone conference with Ana Gloria Ramos, followed by "intra-office meetings regarding St. Thomas inspection and sampling strategy ..."; a conference with the consultant for the Exxon Corporation Mr. Frank Delucca, regarding selection of monitoring well locations, as well as four (4) more conferences with Mr. Agrelot. See FOUR WINDS RESPONSE at p. 7.

On January 3, 1990, the Goldman Antonetti records reflect several conferences/meetings took place with Attorney Cepeda, Ana Gloria Ramos and Agrelot, and with Attorney Torres, Ana Gloria Ramos and Mr. Agrelot regarding "litigation considerations in investigatorial program with EPA, occupying seven and a half (7 1/2) hours of Attorney Torres day.

On January 23, 1990, the same day that Mr. Agrelot testified he met with Francis Torres, Jose Cepeda and Jose Blanco of Essosa and discussed the "draft memorandum," Attorney Torres recorded on his time sheet that he met at the Esso offices with Mr. Blanco, Mr. Bustelo (corporate counsel of ESSOSA) and A.G. Ramos. Attorney Torres recorded conferring with Mr. Agrelot and the "receipt and examination of ETC summary package. Supporting documents and technical reports."

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administrative order of this case." Exh. 6, Annex A. Attorney Cole's memorandum of May 3, 1990, at numbered ¶ 12, eloquently states this conclusion:

Francis Torres proposed further soil analysis around the station to gather more data in an effort to try to show that Esso did not contribute to the CC problem with the aquifer. The question then arose as to whether Esso needs or desires such additional information at this stage. When asked, Mr. Agrelot said if we excavate around the oil/water separator and storage tank and find clean soils beneath the pits, that this would not be conclusive that contaminants did not migrate through the soils and into the aquifer. On the other hand if we find dirty soils beneath the pits, this would be devastating information tending to show that the Esso station did significantly contribute to the pollution of the aquifer. It was determined that the risks of finding such contamination outweighed any possible benefit of finding clean soils, and it was decided that no such testings should take place at this time.

Subsequently, the parties continued their "wait and see" strategy that they had adopted initially, when Agrelot was told not to be concerned about producing a final report on this \$60,000 plus project. It is clear that these parties wanted the Agrelot file "buried" or on the "back-burner," while they explored ways of minimizing its import. Indeed, the claim that the "file" became "lost" in their minds, strains credulity and cannot be excused as mere "inadvertence." For instance:

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a. It was not "inadvertence" when on April 20, 1990, Esso filed its responses and objections to Plaintiff's Four Winds First Request for Production of Documents in the *Total Vision v. Texaco, Inc. Litigation*, wherein it omitted any mention of the December 1989 testing event and the January 23, 1990 preliminary report summarizing this sampling event and the results. Though the four volumes of the ETC report on the December 1989 testing event were produced, they were (a) not identified by date or subject matter, and (b) identified as responsive to studies in the "Tutu Area" and not at the ESSO Tutu Service Station. Moreover, without Agrelot's report and the Map, both ESSO's personnel and former counsel admit, there was no way of identifying the location of the testing results as the ETSS.

b. Even if the court were to credit this claim of "inadvertence", less than two weeks later, on May 3, 1990, the subject of the December 1989 testing was discussed among Esso representatives and its counsel, and this "oversight" was not corrected. Indeed, the conclusion to be drawn from ¶12 of the May 3, 1990 memorandum is that this testing event was to be "ignored" or forgotten.

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3. Whether The Parties Were Prejudiced by the
Non-Disclosure?

Counsel for the firm of Goldman Antonetti argue that:

1. There is no evidence that anyone from the firm of GAC&A had requested that Agrelot "destroy, conceal, refrain from producing" or otherwise give special treatment to the information or related materials.

2. That the information had been provided in response to other discovery demands, in the form of raw data, or by reference to materials produced.

3. That Agrelot's handwritten report merely summarized the raw data, and such materials prepared by an attorney, a party or agent in anticipation of litigation is protected under Fed. R. Civ. P. 26(b)(3), or not subject to discovery under Rule 26 (b)(4).

4. That plaintiffs were not adversely affected by the failure to produce the memorandum of January 23, 1990 or the accompanying map.

The Client argues:

1. That Esso relied completely on outside counsel in developing and providing discovery responses.

2. That the scientific evidence withheld is currently insignificant, given later developed data.

3. That the parties have suffered no real prejudice.

Arguably, the evidence is inconclusive to support a finding that counsel or the client expressly directed Agrelot to

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destroy or conceal the file. However, it can certainly be argued that the Respondents "fathered" this consequence and thus must have intended it. Several factual findings that support this conclusion may be made: (1) Agrelot was told at some point that the file was "privileged and confidential";¹³ (2) during or shortly after the January 23, 1990 meeting Agrelot was instructed not to prepare a final report; (3) around, the same time Agrelot was instructed to keep the file under his control; (4) Both Esso and then counsel for Esso knew of the testing event and the arguably "inconclusive" though potentially damaging results of that testing event; (5) by directing Agrelot not to produce a report or a summary, and to keep his preliminary report in his files, respondents contrived a situation where they could not produce a summary or report with the raw data because none existed; and (6) sometime after August 1990, all of the respondents suffered a "collective loss of memory" with respect to this testing event and the documents in the Agrelot files.

Concededly, it may have been usual to characterize the report as "privileged and confidential." However, though not

¹³ It is immaterial to this determination, who, client or then counsel, directed Agrelot to hold the files as "privilege and confidential." The fact is that both, client and then counsel had knowledge, constructive and actual, of the testing event and of summaries and/or reports, that would follow in the normal course of events.

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especially extraordinary, it was not established that it was a common practice to treat a project commissioned and paid for by the client, as one commissioned by the law firm and to file it under the firm's name. Neither was it established, by a preponderance of the evidence that it was a usual business practice to pay in excess of \$60,000 for an "emergency" project, an amount which includes a separate and distinct charge of \$5,000 for the preparation of a report, and then completely and conveniently forget about the project. The court does not agree with the contention that the "file" was not handled in an "unusual" or "special" manner. It is evident that all parties involved contrived to buy time to deal with this evidence, hence the instruction to Agrelot, after the numerous discussions on the results, to in effect "sit" on the file and not prepare a final report. After a while, neither the representatives from Esso or its then Counsel gave Agrelot any new instructions as to this file. Conveniently, it allegedly escaped their collective memories. It is clear from subsequent responses by respondents in this case, the cumulative effect of the instructions to Agrelot and their non-action was the "in fact" concealment of the file. This result could have been avoided had respondents acted differently. The court concludes that the evidence supports the inference of a tacit agreement on the part of all parties

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involved to "conceal" or "lose" or "obscure" the December 1989 testing event and the documents in the Agrelot file.

Having disposed of the question of intent, the court now addresses the question of prejudice, if any, suffered by the plaintiffs. Respondents from the law firm contend that the movants suffered no prejudice because (1) the information was disclosed as raw data; and (2) even if the parties can identify prejudice, it was due entirely to the movants own lack of diligence. The client contends that its personnel relied wholly on counsel and that movants suffered no prejudice because the information is currently insignificant in light of later developments.

As to the first contention, the evidence supports a finding that the submission of the four volumes of raw data, without identification as to date of the sampling event and as to the location of testing, was "a failure to answer" within the meaning of Fed. R. Civ. P. 37 (a)(3). Under the applicable legal standards, the submission of this raw data was evasive, and thus non-responsive. When Esso and then Counsel for Esso responded to the Total Vision First Request for Production of Documents on April 20, 1990, the December 1989 testing, the January 23, 1990 conference to discuss this testing and the February 1990 conference with Mr. Simon, were not too remote in time for a

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total failure of recall of these events on the part of these parties. Moreover, Cole's memorandum of May 3, 1990 totally refutes the claim that these "events" were not "foremost" in the minds of respondents. Nonetheless, though the parties discussed the matter in depth at that time, no one acted to correct or supplement Esso's discovery response to the Total Vision Interrogatory.¹⁴

¹⁴ Esso's and then counsel failed to correct this "mistake" in their future responses to interrogatories:

Four Winds Request For Production:

Requests Nos. 1, 3, 9 and 11, would encompass the draft report, the lab data, or some indication that samples were taken at the Esso Tutu Service Station.

Esso Response Dated March 17, 1992, and signed by Attorneys Romero and Cole did not raise an objection based upon privilege work product, and simply stated:

"All documents which could be responsive to this request, related to Esso Facilities in the Tutu area, have been provided as part of Esso's previous response."

Ramsey's First Set of Interrogatories and Requests to Produce:

Interrogatories. Nos. 1, 2 and 4 asked for a description of all activities, investigations and samplings by Esso from 1987 and clearly encompassed the non-disclosed scientific material.

Esso's Response dated 9-25-92, signed by Romero, Cole and Ana Gloria Ramos, failed to

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Rule 33(c) places an affirmative duty on the party responding to an interrogatory to "specify the records from which the answer may be derived and ascertained" Indeed, Rule 33(c) goes on to provide that "the specification shall be in sufficient detail to permit the interrogating party to locate and to identify, as readily as can the party served, the records from which the answer may be ascertained." As was demonstrated at the hearing on this matter, neither Agrelot, Ms. Ramos nor Blanco could identify the location of the December testing event without the map [and summary] that were concealed in Agrelot's files. As the Advisory Committee Note to the 1980 Amendment to this section makes clear, a responding party's responsibility to provide answers to interrogatories is not satisfied under Rule 33(c) by dumping several volumes of unspecified raw data on opposing counsel.¹⁵

reveal the December 1989, Site Assessment by
Soil Tech.

L'Henri's First Set of Interrogatories:
Sought similar information under a more general request.

Esso Response was again misleading.

¹⁵ The Advisory Committee note to the 1980 Amendment of Rule 33(c), states clearly, that

If the information sought exists in the form
of compilations, abstracts or summaries then
available to the responding party, those

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Respondents further contention that any prejudice to the parties was due entirely to their own lack of diligence adds insult to injury. Moreover, the concealment of this December 1989 testing event casts an even darker light on Esso's and then counsel's conduct with respect to the Site Assessment Agreement of June 28, 1992. As discussed in Part I of this Opinion, the opposing parties in this case attempted for more than a year to gain the type of information contained in the Agrelot files through a site assessment of the Esso Tutu Service Station. Despite the June 1992 Order of Stipulation, ESSO and then Counsel engaged in a strategy of delay and evasiveness to hinder the agreed to site assessment of the property. The assessment at the Esso's property did not commence, until November 9, 1993, and only after I ordered the parties to comply. This compliance came more than one year after the Order of Agreement; and only after numerous conferences, court hearings, Orders and Extensions concerning this subject with the Magistrate; an aborted show of compliance which, in turn, generated several motions to compel. Absent the concealment of the documents in the Agrelot files and the Esso Defendants and then counsel success in burying the

should be made available to the interrogating party.

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December 1989 testing event in excess of 10,000 documents,¹⁶ the waste of resources by the parties and this court with respect to discovery at the ETSS site would not have occurred. It is beyond dispute that both Esso, through its personnel, and the Law Firm had knowledge of the course of conduct at the ETSS site of emptying the contents of the oil/water separator into the toilet, and of the testing event indicating contaminants in high and/or substantial concentrations around the area of the holding tank. Nonetheless, both Esso and then counsel, not only continued to deny the presence of CHCs contaminants, but acted with deliberation to hinder the plaintiffs and the other litigants from conducting their own discovery for CHCs at the ETSS site.

Further, the April 1991 submissions to the EPA support the reasonable inference that the concealment of the Agrelot files and the December 1989 testing event were but one link in the strategy to prevent or delay investigation of the ETSS site. Through Geraghty & Miller, Respondents claimed to the EPA that "the CERCLA citation is unwarranted" because "there is no evidence to suggest that the Esso Tutu service station has released or contributed chlorinated organic compounds to the

¹⁶ In his responsive brief, Eugenio Romero, states that "the bulk of the documents produced in response to the first document production request [] exceeded 10,000 documents." MEMORANDUM OF EUGENIO ROMERO at p. 20.

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environment." Exh. 18. Conspicuously absent from the numerated testing and reports considered for this claim was the December 1989 sampling event and the documents in the Agrelot files. Attorney Francis Torres, on April 29, 1991, submitted a response to the EPA, certified by Ms. Ana Gloria Ramos of Esso, basically affirming the claim contained in the Geraghty & Miller April 5, 1991 letter. Responses Numbers 6 and 8, based on the testimony and admissions at this proceeding, are factually false and misleading.¹⁷ Responses 9, 13, and 14 compounded the denials

¹⁷ The Esso entities, in their "Response for Information Under 42 U.S.C. § 9604, certified to the EPA through Ana Gloria Ramos, in a letter by counsel, Francis Torres, the following:

REQUEST NO. 6

If oil changes were conducted at the facility, please give an annual summary explaining how the used oil was disposed of, the quantity disposed of per month and any and all analysis of this used oil. Please provide all appropriate documentation. If any such document is not available, please describe the document and explain why it cannot be provided.

RESPONSE NO. 6

Used oil handling, management and storage practices were conducted at the ETSS by Mr. Daniel Bayard who is the person with specific knowledge of those practices. Esso has knowledge of the common practice of service station operation in the U.S. Virgin Islands to provide the used oil generated at the stations' mechanics shops for energy recovery

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to the Water and Power Authority of the Virgin Islands until such time that the regulations applicable to such operations become effective. ESSO is also aware of off-site disposal by Safety Kleen Environmental Company, Inc. of the used oil generated at the service station in the U.S. Virgin Islands, which may include the ETSS.

According to Mr. Bayard, approximately 75 gallons of used oil were generated at the service station as a result of oil changes. The used oil was removed by gravity into a 5 gallon storage cart with a capture funnel on top. The used oil was then stored at a 2,000 gallon storage tank located at the ETSS. Subsequently, the used oil was removed by the local government (V.I. Department of Energy) for usage at the WAPA power plant. The used oil was also removed and transported off-site for disposal by Safety Kleen EnviroSystems, Inc.

Mr. Bayard maintains that he has no records of the instances in which the used oil was removed and transported off-site. Nor are there records of analysis, if any, of the used oils.

REQUEST NO. 8

Is there, or has there ever been, any means by which fluids or sludge can escape or be discharged from any oil and water separator (i.e., an open overflow valve or pipe) that presently exists or existed at the facility?

RESPONSE NO. 8

In 1986 a pipe was constructed by EDACO to connect the water phase of the separator into a sewer line located in the parking lot of the Four Winds Shopping Center behind the

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made in Responses 6 and 8, of any knowledge of discharge or discharges of oil from the oil/water into the environment. These denials were made under oath, despite all the parties' knowledge of Mr. Bayard's practice of pouring the "fluids" from the separator into the toilet. It is no wonder that Mr. Bayard had no documentation of how he disposed of "fluids and sludge" from the oil/water separator. These submissions to the EPA were drafted or certified by, and copied to, among others, Ms. Ana Gloria Ramos, Jose Cepeda, Esq., Francis Torres, Esq., and Jose Agrelot. Esso production of these April 1991 communications to the EPA in discovery, supports the reasonable inference that one of the aims of its campaign with the EPA was first, to induce reliance by the parties and this tribunal on the accuracy and

ETSS. Pursuant to the information provided by Mr. Eugenio de Arce of EDACO and Mr. Daniel Bayard, liquids from the oil/water separator were not discharged through this connection as the pipe was immediately eliminated and capped by EDACO.

The oil and water separator is designed, constructed and operated to prevent the escape or release of the substances which are stored therein. According to information provided by Mr. Bayard, there has never been an overflow of liquids at the oil/water separator. The oil from the separator was transferred manually into a used oil storage tank located at the premises and the water was also transferred manually and discharged into the sanitary line.

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truthfulness of the statements to the EPA, and as a consequence of such reliance, to prevent or delay discovery as to the Esso Tutu site. The parties relied on the truthfulness of this claim to the EPA and, clearly were prejudiced significantly by this strategy.

Under the applicable legal rules the parties' reliance was not unreasonable. As the Third Circuit Court of Appeals has noted:

The Federal Rules themselves recognize the reliance aspect of discovery, permitting parties to request information inadmissible at trial where such request is "reasonably calculated to lead to the discovery of admissible evidence. See Fed. R. Civ. P. 26(b)(1). Discovery could not serve the function of triggering subsequent inquiry if parties were not entitled to rely on the results obtained at each step. See *Rozier v. Ford Motor Co.*, 573 F.2d 1332, 1345 (5th Cir. 1978) ('Our system of civil litigation cannot function if parties . . . suppress information called for upon discovery.')

Averbach v. Rival Mfg. Co., 879 F.2d 1196, 1201 (3d Cir. 1989). After noting the reliance aspects of the "deposition-discovery process established by Rules 26-37" the Third Circuit court explained, that "[b]ecause the Federal Rules of Civil Procedure are structured to elicit truthful answers given under oath, an opposing party, in [certain] circumstances . . . , may reasonably rely on interrogatory answers." *Averbach*, 879 F.2d at 1201. As

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such, an adverse party "cannot be faulted for failing to pry by further discovery into the very same inquiry aborted by [a party's] misleading answer." *Id.*

Here, the evidence suggests that the omission of any reference to December 1989 testing event and the documents in the Agrelot files in the April 1991 communications to the EPA was deliberate rather than negligent or inadvertent. A reasonable inference is that the April 1991 letter by the TEIC consultant, Geraghty and Miller,¹⁸ was just another attempt by Esso and its then Counsel to delay and/or hinder discovery in this matter. Indeed, it can be cogently argued that the letter was a calculated attempt not only to mislead the EPA, but also to mislead the other litigants and this tribunal. See *infra*, V. Though the court recognizes that it was the client, through current counsel, that unearthed the files, and as such took a substantial step in correcting the wrong, this act did not erase the previous wrong, and the prejudice flowing therefrom.

It is clear that in this matter, prejudice to all

¹⁸ The court is deeply concerned by the apparent misuse by the Esso entities of its relationship with Geraghty and Miller with respect to the submission to the EPA. See, *supra*, n. 6, and *infra* n. 26. By using Geraghty and Miller in this manner, Esso may have compromised the reliability and credibility of the studies and reports of the TEIC consultant--studies and reports conducted over a period of years and for which, as of October 1993, over \$1.65 million dollars were expended by Texaco, alone.

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parties derives, in the first instance, from the expense incurred as a result of the concealment of the documents in the Agrelot files. In light of the late disclosure of these documents, it becomes apparent that Respondents objections to the site investigation were interposed improperly. The numerous delays, extensions of time, and objections raised as to witnesses¹⁹ and the scope of the investigation, resulted in a waste not only of the parties' limited resources and time, but in a considerable waste of judicial resources. The Magistrate devoted several days to a separate contempt hearing with respect to the Respondent's non-compliance with the January 15, 1993 Order. The time spent carefully reviewing this record by this court and its staff is also considerable. The importance of these documents cannot be argued. It was vital if not critical evidence that was withheld from both the parties and the local and federal agencies for more than two years, while the investigation for source or sources of the contamination to the aquifer was ongoing. That Esso and then counsel abused the discovery process is beyond question.

The evidence also establishes that the tactics engaged

¹⁹ The Magistrate has issued numerous admonitions both oral and written against the ESSO defendants, and their then Counsel. Indeed in the Orders dated October 23, 1991, and November 18, 1992 (appealed and affirmed by this judge), fees and costs were assessed against the Esso Defendants for discovery abuses.

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in by Respondents, both counsel and client, for several years in the litigation of this case, were calculated to frustrate and exhaust the opposition. The testimony received by this court and the Movants in their memoranda of law, chronicle this history of dilatoriness. Whether masterminded or led by then Counsel, with the acquiescence of the client, Respondents' campaign in this litigation was one of misdirection, delay, oppressive pleadings, expense and harassment.

Such an abuse of the discovery process is antithetical to the proper functioning of our system of justice. This court notes that one of the cornerstones of our adversarial system of justice "is access of all parties to all evidence bearing on the controversy between them, including that in control of adverse parties." *Litton Systems, Inc., v. American Tel & Tel. Co.*, 91 F.R.D. 574, 576 (S.D.N.Y. 1981). Imperative to the proper functioning of our system of justice is "complete and accurate responses to discovery" requests. *Averbach v. Rival Mfg. Co.*, 879 F.2d 1196, 1201 (3d Cir. 1989) (citing *Rozier v. Ford Motor Co.*, 573 F.2d 1332, 1346 (5th Cir. 1978) (stating that "It is axiomatic that [d]iscovery by interrogatory requires candor in responding," (alterations in original)). As such "[d]estruction or concealment by a party of relevant documents in its files threatens the viability and public acceptance of the system."

Litton Systems, 91 F.R.D. at 576. Prejudice to the parties and this tribunal is not a question, but an issue of degree. The only question remaining concerns what sanctions are appropriate to compensate the aggrieved parties and to vindicate the court's authority for the discovery abuses found in this proceeding.

V. MOVANTS' SPECIFIC SANCTION REQUESTS

A. Four Winds Plaza Partnership:

Movant Four Winds requested, as just and appropriate, the imposition of the following sanctions:

1. An award of costs and attorney's fees against ESSORICO, ESSOVI, ESSOSA [the "Esso Defendants"], and the law firm of Goldman Antonetti, Attorneys Jose A. Cepeda and Francis Torres, pursuant to Rules 11, 26(g) and 37(b) and (d).
2. An award of excess costs, expenses and Attorney's fees against Goldman Antonetti, Attorneys Jose A. Cepeda and Francis Torres, pursuant 28 U.S.C. § 1927.
3. An award of all fees incurred in this litigation, as well as the funding of a medical evaluation and monitoring program, pursuant to the court's inherent power against [the Esso Defendants], and Goldman Antonetti, Francis Torres and Jose A. Cepeda.

B. Ramsay Motors:

Specifically, Movant Ramsay Motors seeks:

1. Dismissal of Esso's Third-Party Complaint for contribution and response cost pursuant

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to 42 U.S.C. § 1907, the CERCLA Act. Pursuant to this claim, Ramsay seeks an award of its reasonable expenses, including expert consultant fees and attorney fees incurred in the defense of Esso's claims, as authorized by Rule 37(b) and the court's inherent powers.

2. An award of reasonable expenses incurred, (a) in its efforts to identify possible sources of PCE contamination in the area around ESSO TuTu, (b) to counter ESSO's campaign to have the EPA reverse its March 1990 CERCLA citation, and (c) in connection with these fact-finding hearing proceedings, including, but not limited to costs, expert consultant fees, and attorney's fees, pursuant to Fed. R. Civ. P. 26(g) and 11.

3. An order, pursuant to 28 U. S. C. § 1927, assessing excess costs, expenses, and attorney's fees against G & A attorneys personally, for those expenses incurred by Ramsay as a result of their conduct; and

4. Such other relief that the court deems just and proper under the circumstances.

C. L'Henri, Inc.:

Movant L'Henri, Inc. seeks the following sanctions:

1. Dismissal of the Esso Defendants' cost recovery claim for contribution against L'Henri.

2. An award of costs and expenses and reasonable attorney fees, incurred as a result of the misconduct.

D. Western Auto Supply Company:

Movant Western Auto Supply Company ("WASCO") joins and adopts the arguments of Texaco, Inc., and L'Henri, Inc. for a finding of contempt and sanctions. WASCO makes

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the following specific arguments:

1. That it was served with the Esso Defendants' Third-party Complaint after February 1993;
2. That the Third Case Management Order in effect at the time required the Esso Third Party Plaintiffs to provide WASCO, as a new party, with "[c]opies of all responses provided by original parties to requests for production of documents";
3. That in response to a written request for document production dated April 6, 1993, legal counsel for the Esso Defendants at the time, again omitted the documents in the Agrelot files;
4. That Esso's Attorney Romero, however, produced for WASCO a statement which purportedly was provided to the U.S. EPA which stated, in response to a November 6, 1987 inquiry from EPA, at page 7, Bates No. 901032 that: "No hazardous or regulated substances are disposed of."
5. That Esso's Attorney Romero, also, produced the following response made to the EPA, which stated:

There were or are no hazardous or regulated substances regulated under CERCLA, or hazardous wastes regulated under RCRA ever used, stored, generated, disposed or otherwise handled at the service station.
(Pages 9-10, Bated Nos. 901034-35)

DEFENDANT WESTERN AUTO SUPPLY COMPANY'S MOTION FOR SANCTIONS AGAINST THE ESSO DEFENDANTS, pp. 2-3.

6. That the documents not produced in response to WASCO's request, when contrasted with those which were, demonstrate that the Esso Defendant's response to the request for documents was not only misleading, but willfully false.
7. Finally, WASCO argues that "the conduct of the Esso Defendants so transcends the duty of candor," that the

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only appropriate sanction is an order permanently barring the Esso Defendants from raising a claim for recovery of any costs under CERCLA.

E. All other Parties:

All other parties to this litigation have, through oral advocacy at the hearings on these proceedings, argued for the imposition of sanctions for the discovery misconduct of the Esso Defendants and then legal counsel.

VI. SPECIFIC SANCTIONS

Because the court has found that the conduct here was not the result of inadvertence or mere oversight, but was intentional and in bad-faith, it need not "eschew the harshest of sanctions" available to it under Rule 37 or its inherent power. *Cine v. Allied Artists*, 602 F.2d at 1068. Indeed, "the full range of sanctions may be marshalled" including dismissal of claims and departure from the American Rule, which prohibits fee-shifting in most cases. *Id.*, See also, *Nasco v. Chambers*, 111 S.Ct. at 2133-34.

A. Monetary Awards

All the movants attorneys' fees and costs incurred in connection with all depositions, discovery motions, hearings and conferences related to the parties attempt to obtain evidence as

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to releases from and/or presence of chlorinated hydrocarbons on the Esso Tutu Service Station site, investigation costs incurred as a result of the concealment of the documents in the Agrelot files, and attorneys fees and costs incurred in the Fact Finding Hearing in this matter may be capable of recovery by movants.

B. Dismissal of Claims

All the Movants sought dismissal of the Esso counter- and/or cross-claims for contribution. Four Winds settlement of its suit against the Esso Defendants moots its requests for attorney's fees and costs. However, its request for dismissal of the Esso Defendant's counter-claim for contribution remains viable. Movants Ramsay and L'Henri, Third-Party Defendants, were joined to this action by the Esso Defendants. The Esso Defendants assert a CERCLA cost recovery claim against Ramsay and L'Henri. Specifically, Movant L'Henri argues, that since "a CERCLA cost recovery action between private parties is an equitable action for contribution," citing *Smith Land and Improvement Corp., v. Celotex Corp.*, 851 F.2d 86, 90 (3d Cir. 1988), cert. denied, 488 U.S. 1029 (1989), the concealment and pattern of discovery abuses in this case warrant dismissal of the Esso Defendants' equitable claim.

Dismissal as a sanction is within the discretion of the

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court. And as noted earlier, dismissal is a drastic measure--the most severe of civil sanctions that may be imposed for dilatory conduct and other discovery violations. Moreover, because "dismissal constitutes a denial of access to justice, . . . it should . . . be resorted to only to the minimum extent necessary to induce future compliance and preserve the integrity of the system." See *Litton*, 91 F.R.D. at 576. However, where as here, past counsel with the knowledge and apparent acquiescence of the client have flouted their obligations under the rules and their responsibility to this court, sanctions are clearly warranted. The aggrieved parties argue for dismissal. Since the court has found serious misconduct in this matter, it will consider whether dismissal of the equitable cross-claims and counterclaims for contribution is a reasonable and appropriate sanction.

When considering dismissal as a sanction for counsel's misconduct, the court is required to give notice to the party against whom dismissal is being sought. See *Dunbar v. Triangle Lumber & Supply Co.*, 816 F.2d 126, 129 (3d Cir. 1987). This is to ensure that the client is given the opportunity to defend against the consequences of the attorney's misconduct, since a litigant chooses counsel at his peril, and the misconduct of counsel may lead to the dismissal of the litigant's claim. See *Link v. Wabash Railroad Co.*, 370 U.S. 626, 82 S. Ct. 1386, 8 L.

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Ed. 2d 734 (1962). However, because of the possibility of a client's unawareness of its counsel misconduct, courts, generally, are reluctant to visit the sins of the attorneys upon the heads of their clients by dismissing valid and meritorious claims. But where, as here, the client's complicity in the "acts and omissions" of its chosen counsel has been established clearly, sanctions for the discovery abuses may be assessed against the client, independently, and not merely through attribution of counsel's misconduct. Indeed, in this case, it was current legal counsel for the clients who brought the concealed Agrelot files to light, and who was given the opportunity to, and did defend fully the clients' position in this matter.

Before deploying the severe sanction of dismissal pursuant to Rule 37 or its inherent power, this Circuit's precedent requires a district court to weigh and consider certain factors. Those factors were identified by the Third Circuit Court of Appeals in *Poullis v. State Farm Fire and Cas. Co.*, 747 F.2d 863, 868 (3d Cir. 1984), and are as follows:

- (1) the extent of the party's personal responsibility;
- (2) the prejudice to the adversary caused by the failure to meet scheduling orders and respond to discovery;
- (3) history of dilatoriness;
- (4) whether the conduct of the party or the attorney was willful or in bad faith;
- (5) the

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effectiveness of other sanctions other than dismissal, which entails an analysis of alternative sanctions; and (6) the meritoriousness of the claim or defense.

Poulis, 747 F.2d at 868. All six factors need not weigh against the intransigent party for the court to find that dismissal is warranted. In light of the extensive factual findings, *supra* at Part V, the court will only discuss these factors to the extent not touched upon before.

1. Application of the Poulis Factors

a. Responsibility of the Party

The record clearly establishes the client's personal responsibility for the failure to comply with the discovery requests and this court's Order. Though it has been argued that the clients acted upon advice of counsel, the record is replete with evidence of the client's knowing participation in the strategy to delay and hinder discovery in this case.²⁰

²⁰ Ana Gloria Ramos: It was Ms. Ramos who retained Agreiot to conduct the December testing on an expedited basis. Ms. Ramos submitted and gained approval for the testing which deviated from the usual bidding procedures. Ms. Ramos' justification was that the testing was needed before December 22, 1989 to substantiate ESSO's objections to the EPA. The record reflects several discussions on the preliminary results on the sampling sent by ETC involving Ana Gloria Ramos. Less than three (3) months after the January 23, 1990 strategy session on this matter, Ana Gloria Ramos certified for Esso the response to the Total Vision Interrogatory Requests, yet she "omitted" mention of this "urgent" study. Ms.

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b. Prejudice to the Adversary

Any further discussion of prejudice serves only to amplify the court's earlier findings. The court has found that the adversaries in this case were hampered significantly in pursuing their claims and defenses against the Esso Defendants. Purposeful and deliberate concealment of evidence raise a rebuttable presumption that "the innocent party's interest in pursuing the full and fair litigation of its claims" has been prejudiced. See *Anderson v. Cryovac*, 869 F.2d at 925, quoting *National Association of Radiation Survivors v. Turnage*, 115

Ramos also certified responses for Esso to the EPA which, albeit a year later, repeated this non-disclosure. Ms. Ramos' actual knowledge of the study and the documents retained by Agrelot, and thus fault for the repeated non-disclosure of these documents, is imputed to her employer, the Esso Defendants.

Jose Blanco: Knowledge of and fault for the non-production of the documents are also imputed to the client by virtue of the conduct of Mr. Blanco, Vice President of Operations and Administration for ESSORICO, member of the Board of ESSORICO and ESSOVI, and Chairman of TEIC. Blanco was present at the first strategy session of January 23, 1990 when Agrelot discussed his report. Jose Blanco testified he discussed the information received from Agrelot with respect to the December 1989 test sampling with his immediate supervisor Mr. C. Stuart Griffith, President of ESSORICO and ESSOVI. Blanco acknowledged that he must have reviewed the April 5, 1991 letter from Geraghty and Miller to the EPA on behalf of ESSO, but claimed he did not recall the December 1989 testing event or the documents retained by Agrelot to correct any misleading allegations. In any event, Blanco claimed he relied on the advice of counsel as to the position taken with the EPA.

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F.R.D. 543, 557 (N.D. Cal. 1987). The presumption may be refuted by clear and convincing evidence that withheld material was immaterial. Here, this burden has not been met. Moreover, under the *Poulis* analysis, prejudice need not be "irremediable," and may consist of excess costs incurred as a result of the dilatory conduct or discovery violations. See *Curtiss T. Bedwell & Sons v. International Fidelity Ins. Co.*, 843 F.2d 683, 693 (3d Cir. 1988).

c. History of Dilatoriness

The parties' scheme to harass and oppress the opposition, and hinder discovery in this case was not limited to the concealment of Agrelot files, but extended to the conduct surrounding the pipe tracing and anomaly investigation at the Esso Tutu Service Station.²¹ As documented in the proceedings from that motion to compel, even where the parties acknowledged their discovery obligations, as with the August 7, 1992 consent agreement to discovery at its site, these parties acted to hinder such discovery for more than six months. Even then, on January 19, 1993, the scheduled day of the site inspection, when all

²¹ The court does not overlook in its findings that the Esso Defendants, through the efforts of current counsel have compensated Plaintiffs Four Winds and L'Henri for the cost suffered in bringing the motions to compel the "anomaly" investigation.

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parties and their experts were standing by, Respondents resisted discovery. It required a telephone conference that day with the Magistrate, culminating with a verbal order compelling the Esso Defendants to go forward with the inspection as per the court's order of January 15, 1993, before there was a show of compliance. As noted in Part I of this Memorandum Opinion, despite the court's express order, the inspection was nonetheless aborted. The record supports the inference that this particular non-compliance was but one of the more egregious examples of Respondents' campaign to hinder and delay discovery in this action.

The record shows that the court was required to referee every aspect of discovery involving these particular litigants.²² The pattern of delay also includes the misleading and evasive responses to opposing party's interrogatories and the EPA, in light of information actually and constructively known to, and in the possession of, then counsel and the client. Delay was incurred when Respondents produced witnesses, pursuant to Rule 30

²² In particular, Movant L'Henri points to, and argues that the ESSO Defendants' untimely "Urgent Motion for a Protective Order" with respect to deposition of Mr. Guswa, was made only to harass and inconvenience plaintiffs. The motion was denied, ultimately, by the Magistrate, but not before great expense and delay had been incurred in litigating its merits. This, movants argue, is but one of many examples of the strategy of delay undertaken by Esso and its then counsel.

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(b)(6), so ill-prepared and lacking in knowledge that the Magistrate ordered the retaking of the depositions at these parties' expense. Then counsel's response was typical of the bad-faith and intransigency manifested throughout this action. Attorney Cole responding to a letter from counsel for Four Winds regarding the terms of the Order to retake the deposition, stated--"Ms. Moody: Re: Your letter of today. You suffer from delusions of integrity."²³ That this action has been characterized by consistent delays by the Esso Defendants' past counsel is beyond peradventure.

d. Willfulness or Bad Faith

The court has found that Respondents, both the clients and the individual attorneys, acted willfully or purposefully and, at times, in bad faith. The court will briefly clarify the willfulness issue as it relates to the client. First, the Esso Defendants' first-hand knowledge of the December 1989 testing event and custody of the documents in the Agrelot files have been clearly established. Yet, as was shown, less than four months after the testing event, after several discussions in the interim on the very subject matter, Ms. Ana Gloria Ramos certified

²³ Attorney Cole's display of improper Conduct during this litigation was dealt with in a separate Memorandum and Order.

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responses in this case, omitting references to the testing. Ms. Ramos' explanation for the repeated non-disclosure of this evidence is two-fold. In the first instance she claims to have acted on advise of counsel, and in the second, she suffered a memory loss as to these events. The same argument is made by Ms. Ramos' immediate supervisor, Mr. Blanco, who is also charged with first-hand knowledge of the information. Blanco claims to have prepared a presentation, including charts on the December 1989 testing event for the hierarchy in his organization, namely Mr. J. S. Simon and Mr. C. Stuart Griffith. Blanco stated he was unable to make the presentation, but that he gave the prepared materials to Mr. Simon. In this case Ms. Ramos principally, and Blanco as her supervisor, were charged with reviewing the truthfulness and accuracy of responses in this action. They both testified that they relied on counsel in the preparation of the responses that they certified to this court. Without questioning the veracity of this averment, it is clear that this failure to review the responses was in dereliction of duties and obligations to this court and the parties, of which they were clearly aware. As one court remarked, courts "will not allow a party sentiently to avoid its obligations by filing misleading or evasive responses, or by failing to examine records within its control." Cryovac, 862 F.2d at 929. Moreover, what later transpired with

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Geraghty & Miller with respect to the EPA evidences deliberate decision making by Ms. Ramos and Blanco for their employer. Indeed, the apparent manipulation of the TEIC environmental consultants to stymie discovery in this action, supports an independent finding of "willfulness" and or bad faith on the part of the client.

e. Alternative Sanctions

Under *Poulis* the court is required to consider the effectiveness of a lesser penalty short of dismissal. In addition to monetary sanctions, as in an award of fees and costs, alternative sanctions as set forth under Rule 37(b)(2)(A), include, the designating of facts to be established, refusing to allow the disobedient party to support or oppose designated claims or defenses, prohibiting the party from introducing designated matters in evidence, the striking of pleadings, or staying further proceedings. As noted previously, monetary sanctions have been imposed for several prior acts of misconduct with no apparent deterrent effect. Respondents simply paid the sum and continued to disregard their obligations under the rules and as ordered by this court. Nor does it appear that any of the lesser penalties enumerated above would be effective or practicable under the circumstances of this case. For instance,

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as to Movant Four Winds, the common law claims are settled, and only the equitable claim for contribution by the Esso Defendants remain. The Esso Defendants remaining cross-claims against Movants L'Henri and Ramsay Motors are also equitable claims for contribution under CERCLA. With the exception of the PID/HARTMAN plaintiffs, the claims that may be asserted by and against the other party litigants aggrieved by the delays and other misconduct would be for contribution under CERCLA and RCRA. For the court to impose any of these lesser penalties, as in deeming certain facts as established, in this instance to hold as established Esso's responsibility for any or all presence of CHCs' in the Tutu aquifer, would be to place a disproportionate burden on the Esso Defendants for the clean-up costs of this superfund site far beyond their misconduct in this case. Moreover, such a broad presumption would not direct the sanction to the particular abuse that has occurred in this action, since it fails to consider the clinical data concerning the migratory paths of particular contaminants. The alternative, a more limited order with respect to certain evidence, would require time-intensive parsing of the empirical or clinical data developed over the last seven years. In order to make the determination as to what facts to be deemed established or which defenses or claims to prohibit, the court would have to engage

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its own expert to conduct its own testing or to analyze the mountainous data extant in this complex environmental case. It is obvious that such an order would not only further tax the court's scarce resources and perpetuate the harm, inherent in any delay, to the aggrieved parties, but would in effect be a dismissal of the asserted claims for contribution. An award of the full cost of litigation incurred by the aggrieved parties to date would be inappropriate and unworkable for similar reasons. It appears then, that the imposition of any of the enumerated lesser sanctions would engender further delay, and would in effect be no less harsh than dismissal.

f. Meritoriousness of the Claims

For purposes of determining whether dismissal is the most appropriate sanctions, "[a] claim . . . will be deemed meritorious when the allegations of the pleadings, if established at trial, would support recovery . . . or would constitute a complete defense. *Poulis*, 747 F.2d at 869-70. As to Movant Four Winds, the Esso Defendants' counterclaim is based on two allegations: first, there allegedly was a discharge of contaminated water from the Four Winds Cistern sometime after September 1990; and secondly, Four Winds allegedly had installed or operated underground storage tanks ("USTs") for the storage of

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certain hazardous materials. The allegations involving a release of water from the cistern after September 1990, by definition could not cause or contribute to the contamination discovered to exist in 1986. The allegations which referenced the USTs simply do not state any failure of the tanks' integrity, nor do they identify any mechanism of release. Therefore, even if the allegations, as asserted, were established at trial, they would neither constitute a complete defense, nor support recovery against Four Winds.

The Esso Defendants in their cross-claim against Ramsay Motors make similar assertions to those raised in the counter-claim against Four Winds Plaza in relation to USTs, and as such the complaint suffers from the same deficiencies. As with the allegations against Four Winds, the complaint fails to allege any failure of the integrity of the Ramsay tanks or any mechanism of release. Thus, on the face of the amended third-party complaint it may be determined, that even if all the allegations are established at trial, they would not support recovery or establish a complete defense against Ramsay Motors.

In contrast to the allegations against Four Winds and Ramsay Motors, the assertions in the amended third-party complaint against Movant L'Henri, Inc. rest on stronger factual grounds, in that the complaint identifies a mechanism for release

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of contaminants by L'Henri. Specifically, the complaint states at paragraph 16:

Upon information and belief on, at least one occasion during 1986, as a result of the willful and/or negligent act of third-party defendant, an employee at O'Henry, disposed of and released hazardous substances on the site, upon which the dry-cleaning business is located.

AMENDED THIRD-PARTY COMPLAINT AGAINST L'HENRI, INC., at p.3.

Accordingly, under a liberal application of the above standard, which is essentially "that of a dismissal for failure to state a claim on which relief can be granted." *Andrews v. Government of the Virgin Islands*, 132 F.R.D. 405, 413 (D.V.I. 1990), only the Esso Defendants' cross-claims against L'Henri are clearly "meritorious."

The court notes at this point, the additional argument of Movants Ramsay Motors and L'Henri, and as specifically adopted by WASCO, that a private litigant's recovery of CERCLA response costs is conditioned, in large measure, on equitable considerations. See *Smith Land & Imp. Corp. v. Celotex Corp.*, 851 F.2d 86, 90 (3d Cir. 1988) (remarking that "CERCLA expressly conditions the amount of contribution on the application of equitable considerations"). Thus, the allocation of response costs under CERCLA may be increased or decreased, in the discretion of the court, after relevant equitable considerations

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are taken into account. Among the factors of equity taken into consideration when determining the allocation of response costs is "the degree of cooperation of the parties with government officials to prevent any harm to the public health or the environment." See *Amoco Oil Co. v. Borden, Inc.*, 889 F.2d 664, 672-73 (5th Cir. 1989). Movants L'Henri and Ramsay Motors argue that the deliberate and willful concealment of evidence of environmental contamination from the EPA is not only "uncooperative conduct," but may be properly characterized as actively impeding government efforts to protect the public health and the environment.

Movants cite *Folino v. Hamden Color & Chemical Co.*, 832 F. Supp. 757 (D. Vt. 1993)²⁴, where a similar failure to disclose information regarding environmental contamination was found to be sufficiently egregious to bar completely a private party's CERCLA claim for contribution. Movants argue that Respondents'

²⁴ In *Folino* a lessee hired an environmental consultant and discovered that the property it had leased was contaminated. The lessee did not disclose the existence of the contamination, either to the lessor or the appropriate government agency. It was not until six years later when the lessee corporation was sold, that the consultant's report was disclosed to the lessor, who then advised the appropriate state environmental agency. Both lessee and lessor incurred CERCLA costs. However, the lessee's claim for contribution against the lessor was denied, based on its decision to conceal the existence of the contamination. *Folino*, 832 F. Supp. at 764.

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deliberate concealment of the scientific evidence of PCE contamination at the ETSS site, may have resulted in the continued migration of the contamination off-site via groundwater, to other areas. Such migration may have led to an increase in the extent of the contamination, resulting in a corresponding increase in response and clean-up costs. Movants point out the fact that the non-disclosure or concealment is even more egregious because it was repeated several times in almost four years, while hundreds of thousands of dollars were paid to consultants to identify and clean-up the source or sources of PCE contamination in the Tutu aquifer. Movants conclude that because it is highly probable that the Esso Defendants would be barred from obtaining contribution under CERCLA once allocation costs are assessed, any sanction which does not include dismissal of these equitable claims would not compensate them for the harm incurred and would simply delay this result.

g. Summary of the Factors

The court recognizes and commends current lead counsel for the Esso Defendants, Robert T. Lehman, Esq., of the Archer & Greiner law firm, for taking this action out of its frozen state and for bringing about compliance with the discovery Rules and court orders. However, this fact does not absolve the client of

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its substantial responsibility for the earlier discovery abuses, nor does it erase the harm caused to the aggrieved parties.

In this matter the first five factors support dismissal of the claims for contribution against all movants. As to Movants Four Winds and Ramsay Motors, all six factors weigh in favor of dismissal. On balance, the weighing of the Poulis factors, appears to compel dismissal of the equitable claims of Respondents. The court is nevertheless mindful of the fact that dismissal is disfavored and that in cases involving a pattern of attorney delay, an award of monetary damages is "the most direct and therefore preferable sanction." *Poulis*, 747 F.2d at 863. However, the justification is not compelling where prior monetary damages have been imposed against Respondents with little or no deterrent effect, where the acts of misconduct include the concealment of evidence, and where, as here, the client bears responsibility for the acts of misconduct. See *National Hockey League*, 427 U.S. 643, 96 S. Ct. at 2781. See also, *C. T. Bedwell & Sons v. Intern. Fidelity Inc. Co.*, 843 F.2d 683, 695-696 (3d Cir. 1988). Moreover, the court cannot overlook the Supreme Court's admonition that sanctions must be weighed in light of the full record in the case. *National Hockey League*, 427 U.S. at 646.

Our judicial system cannot bear the burden of its

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courts having to referee every document request, as this court has in this matter. With respect to discovery at the Esso Tutu Service Station site, countless conferences with the Magistrate did not bring about compliance; it took the intervention of this Magistrate to bring about the inspection of this site, almost two years later. The pattern of misconduct here spawned several motions for contempt and the imposition of sanctions. Disposing of these motions necessitated the court carving out several days for the receipt of testimony in a jurisdiction where judicial time and resources are scarce and over-burdened. In addition, the court has expended countless hours sifting through the resulting record, motions and relevant case law. Such a misuse of valuable court time also deprives litigants, outside of this case, of an opportunity to be heard. Here, the history of delay and oppressive pleadings is well documented. Indeed, as the evidence unfolded during the hearings on this matter, this court was moved to comment that "[t]here is a real, real history here, and the history is not good." 10/29/93 Tr. at 69. Respondents' strategy of litigation not only unduly burdened the opposition and increased exponentially the litigation costs and time in this case, but resulted in a gross waste of judicial resources. Monetary sanctions alone will not suffice to vindicate the court's authority and compensate the aggrieved parties for the

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prejudiced suffered.

VII. ATTORNEYS' SANCTIONS

The court concludes that the attorneys in control of the litigation at the time, as officers of the court, whether actually or specially admitted to this bar, breached their duty of honesty and candor to the tribunal. Even where the litigation stakes are high and personalities conflict, as in the instant matter, attorneys must be vigilant not to cross the fine line between zealous advocacy and mendacious conduct. The court expects, and the rules of professional responsibility require, attorneys to fulfill their duty of candor to the court and to be truthful in disclosures to their adversary. An attorney's signature on a document that is misleading is a serious breach of this affirmative duty. An attorney certifies by his signature on pleadings and other documents filed with the court that:

to the best of the person's knowledge,
information and belief, formed after an
inquiry reasonable under the circumstances
[that the filing] is not being presented for
any improper purpose, such as to harass or
cause unnecessary delay or needless increase
in the cost of litigation; that the denials
of factual contentions are warranted on the
evidence or, if specifically so identified
are reasonably based on lack of information
or belief.

See FED. R. CIV. 11 (B). Aside, from the suppression of evidence,

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it appears that the tactic, here, was to burden the opposition, to exhaust their resources and thus impair their ability to fully present their case. This was big league litigation in the small community of the Virgin Islands. However, the campaign, calculated to strain to exhaustion opposing parties' litigation time and resources, also burdened the resources of the court which are at a premium. Respondents' repeated non-disclosure, under the circumstances presented here, constitutes an abuse of the process, clearly violative of the mandate of the Rules, in effect at the time.

Moreover, the evidence suggests that the non-disclosure became the root of a strategy to impede discovery as to the ETSS site. As the trial judge stated in *Nasco, Inc. v. Calcasieu Television and Radio*, 124 F.R.D. 120, 143 (W.D.La 1989), there is no place in modern litigation practice for "trial by ordeal." More significantly, these Respondents, the Attorneys, admitted to practice before this court, owed a separate and independent duty of good faith and candor to the court and the public. In failing to make truthful and responsive disclosures in documents filed in this matter, they violated this continuing duty. "[T]he power of the court to punish attorneys as officers of the same, for misbehavior in the practice of the profession" is unassailable. See *Nasco v. Calcasieu*, 124 F.R.D.

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at 140, citing *Ex Parte Bradley*, 74 U.S. (7 Wall) 364, 19 L. Ed. 214 (1869). In upholding the sanction of "fee shifting" imposed by the trial court in *Nasco v. Calcasieu*, the Supreme Court recognized that such an award is clearly within the court's power, if it is to punish the parties conduct during the litigation and/or to vindicate the court's authority over a recalcitrant litigant. *Chambers v. Nasco*, ___ U.S. ___, 111 S.Ct. at 2137.

Movants are clearly entitled to an award of fees and costs reasonably incurred in proving the misconduct alleged in this matter and in applying for relief from the court for Respondents' failure to cooperate in discovery. The record evidences the numerous discovery abuses by Respondents, and Movants have shown that as a result of Respondents' dilatory tactics and misleading responses, the cost of litigation in this case was increased substantially.

Under its inherent power and pursuant to 28 U.S.C. § 1927, this court, in its discretion may award costs and fees to the aggrieved parties and assess against the attorneys the excess costs incurred as a result of the misconduct in this case. The court recognizes that since it did not receive evidence on the amount of damages suffered as a result of the misconduct in this case, it is constrained to a discussion of the sanctions that are

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legally appropriate and not the exact amount of the awards.

Sanctions will be imposed against those attorneys, who the record discloses had knowledge, actual or constructive, of the December 1989 testing and of the documents held by Agrelot in his files, and who actively participated in the litigation of this matter. Specifically, as to the individual attorneys, the record reveals, as follows:

Francis Torres: Partner in law firm of Goldman Antonetti. He submitted the April 29, 1991 responses to the EPA that were false and misleading. From the testimony and evidence introduced at the hearing, Torres appears to have controlled the litigation strategy in this case. He knew the testing was being conducted; he received the preliminary results from ETC on December 21, 1989, and the record indicates he discussed these testing results that day with Agrelot, Jose Cepeda of his firm, and Ana Gloria Ramos of Esso. Torres prepared the "Privileged and Confidential" agenda for the January 23, 1990 meeting and was present at the May 3, 1990 strategy conference where the documents and results were the topic of discussion. He is charged with knowledge of the April 1990 interrogatory response to the Total Vision Request for Production. Torres never moved to correct or supplement this response even though he must have known it contained critical omissions. Torres allowed this

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'concealment' or 'non-disclosure' of documents to be repeated, thereby thwarting subsequent attempts to obtain the information. Torres was copied with and worked with Geraghty & Miller on the misleading submission certified by Ana Gloria Ramos to the EPA.

Jose Cepeda: Head of the environmental department of Goldman Antonetti. Although Cepeda's involvement was less extensive than that of Torres, his responsibility to the court and opponents was no less clear. He was charged with knowledge of the testing event, because of his receipt on December 21, 1989 of the ETC preliminary results. Cepeda was named as attending the first strategy session on January 23, 1990 with respect to this testing event, and where Agrelot was directed to keep the documents in his files. Though Cepeda claims to have no memory of this meeting, the record produced for this hearing belies this claim.

Eugenio Romero: Partner with law firm of Goldman Antonetti. He was placed in charge of the litigation aspect of the Tutu case. Romero, who formally appeared in the Virgin Islands case in late 1989, was in charge of directing or responding to the discovery requests. It was Romero who produced the ETC reports which were misdated as January 11, 1989 and not 1990, and which were designated as responsive to testing in the Tutu area. It was through Romero's claimed "inadvertence" that

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this map and summary, which he admits was necessary and relevant, were not disclosed; yet, other similar type summaries were included with the over 10,000 documents produced. Romero also claimed to have confirmed and reviewed with Ana Gloria Ramos personally the discovery responses of the client, meaning that the misleading disclosures were actually prepared by Romero. Gross professional negligence in the discovery process is equally inexcusable as willful misconduct. See *Cine Forty-Second Street*, 602 F.2d at 1068. Indeed, Romero and local counsel Warren Cole were the principal actors in carrying out the strategy of delay, and it was for their acts of misconduct that prior monetary sanctions were assessed against the client.

Warren B. Cole: Local Virgin Islands counsel for the Esso entities. Cole participated in the May 3, 1990 strategy session with Torres, Cepeda, Romero and Agrelot which he memorialized. Although he cannot be charged with the initial non-disclosure of the documents in the Agrelot files, Cole acceded to the "wait and see" strategy adopted at the May 3, 1990 meeting. Moreover, Cole together with Mr. Romero, carried out the strategy of delays and harassment of the opposition. (See *supra*, footnotes 22, 23 and discussion on the 30(b)(6) discovery abuses and other motions for sanctions specifically against Attorney Cole).

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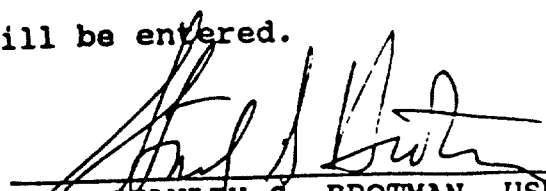
Otto Bustelo: In-house counsel for ESSORICO, ESSOVI, and the Esso CCD division. Undeniably, Bustelo, and thus the client, had knowledge of the December testing and the documents retained by Agrelot. However, the hearing revealed that Bustelo's role in this campaign appears to have been minimal. To the extent that Bustelo knew of the concealed documents, he had a duty, as an officer of the court, to counsel his employer and client to obey the discovery demands.

VIII. DETERMINATION OF SANCTIONS

The court concludes that the imposition of sanctions is warranted against the Esso Defendants and their former counsel, the law firm of Goldman Antonetti Cordova Axtmayer, Francis Torres, Esq., Eugenio Romero, Esq. and Jose A. Cepeda, Esq. To make a determination as to the nature and extent of sanctions warranted by Respondents' misconduct, the court is scheduling a hearing on this matter for June 26, 1995. However, the court will afford the Esso Defendants and their former counsel the opportunity to negotiate with the Movants, prior to the hearing date, a mutual resolution of the monetary claims only. The court will consider Movants' equitable claims for sanctions, i.e. dismissal of claims, and will also make a final determination on such claims after the June 26, 1995 hearing.

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An appropriate order will be entered.


HON. STANLEY S. BROTMAN, USDJ
(Sitting by Designation)

Dated: March 20, 1995